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December 27, 2022
Review

EXHIBIT A

SCOPE OF SERVICES

FOR

Financial Project ID: 428947-1-32-01

FDOT District 5

VOLUSIA

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SCOPE OF SERVICES FOR CONSULTING ENGINEERING SERVICES

HIGHWAY AND BRIDGE/STRUCTURAL DESIGN

This Exhibit forms an integral part of the agreement between the State of Florida Department of Transportation (hereinafter referred to as the DEPARTMENT or FDOT) and ***[Consultant Name or leave blank until CONSULTANT is selected]*** (hereinafter referred to as the CONSULTANT) relative to the transportation facility described as follows:

Financial Project ID: 428947-1-32-01

Related Financial Project ID(s):

Federal Aid Project No.:

Roadway:

Roadway Id	Begin milepost	End milepost
79100000	24.25	26.71

Project Description: SR 40 FROM BREAKAWAY TRAIL TO WILLIAMSON BLVD

Bridge No(s).:

- ***790027***
- ***790163***
- ***790193***

Railroad Crossing No.: ***N/A***

Context Classification:

- ***C3R-Suburban Residential Mostly residential uses within large blocks and a disconnected or sparse roadway network.***
- ***C3C-Suburban Commercial Mostly non-residential uses with large building footprints and large parking lots within large blocks and a disconnected or sparse roadway network.***
- ***C4-Urban General Mix of uses set within small blocks with a well-connected roadway network. May extend long distances. The roadway network usually connects to residential neighborhoods immediately along the corridor or behind the uses fronting the roadway.***

The future land use patterns expected for the areas around SR 40 between Breakaway Trail and Williamson Road suggest that a suburban/low density urban context will develop over time, with lesser development intensities in the area between Breakaway Trail and Tymber Creek Road, and higher development intensities in the segment closer to the SR 40 interchange with I-95.

1 PURPOSE

The purpose of this Exhibit is to describe the scope of work and the responsibilities of the CONSULTANT and the DEPARTMENT in connection with the design and preparation of a complete set of construction contract documents and incidental engineering services, as necessary, for improvements to the transportation facility described herein.

- Major work mix includes:
  - ***0213 - ADD LANES & RECONSTRUCT***
- Major work groups include:
  - ***3.3 - Major Highway Design***
- Minor work groups include:
  - ***2.0 - PD&E Studies***
  - ***4.1.1 - Miscellaneous Structures***
  - ***4.2.1 - Major Bridge Design - Concrete***
  - ***5.4 - Bridge Load Rating***
  - ***6.1 - Traffic Engineering Studies***
  - ***6.2 - Traffic Signal Timing***
  - ***6.3.1 - Intelligent Transportation Systems Analysis and Design***
  - ***6.3.2 - Intelligent Transportation Systems Implementation***
  - ***7.1 - Signing, Pavement Marking and Channelization***
  - ***7.2 - Lighting***
  - ***7.3 - Signalization***
  - ***8.1 - Control Surveying***
  - ***8.2 - Design, Right of Way & Construction Surveying***
  - ***8.3 - Photogrammetric Mapping***
  - ***8.4 - Right of Way Mapping***
  - ***9.1 - Soil Exploration***
  - ***9.2 - Geotechnical Classification Laboratory Testing***
  - ***9.3 - Highway Materials Testing***
  - ***9.4.1 - Standard Foundation Studies***
  - ***15.0 - Landscape Architect***

Known alternative contracting methods include: ***N/A***

The general objective is for the CONSULTANT to prepare a set of contract documents including plans, specifications, supporting engineering analysis, calculations and other technical documents in accordance with FDOT policy, procedures and requirements. These Contract documents will be used by the contractor to build the project and test the project components. These Contract documents will be used by the DEPARTMENT or its Construction Engineering Inspection (CEI) representatives for inspection and final acceptance of the project. The CONSULTANT shall follow a systems engineering process to ensure that all required project components are included in the development of the Contract documents and the project can be built as designed and to specifications.

The Scope of Services establishes which items of work in the FDOT Design Manual and other pertinent manuals are specifically prescribed to accomplish the work included in this contract,

and also indicate which items of work will be the responsibility of the CONSULTANT and/or the DEPARTMENT.

The CONSULTANT shall be aware that as a project is developed, certain modifications and/or improvements to the original concepts may be required. The CONSULTANT shall incorporate these refinements into the design and consider such refinements to be an anticipated and integral part of the work. This shall not be a basis for any supplemental fee request(s).

The CONSULTANT shall demonstrate good project management practices while working on this project. These include communication with the DEPARTMENT and others as necessary, management of time and resources, and documentation. The CONSULTANT shall set up and maintain throughout the design of the project a contract file in accordance with DEPARTMENT procedures. CONSULTANTs are expected to know the laws and rules governing their professions and are expected to provide services in accordance with current regulations, codes and ordinances and recognized standards applicable to such professional services. The CONSULTANT shall provide qualified technical and professional personnel to perform to Department standards and procedures, the duties and responsibilities assigned under the terms of this agreement. The CONSULTANT shall minimize to the maximum extent possible the DEPARTMENT's need to apply its own resources to assignments authorized by the Department.

The DEPARTMENT will provide contract administration, management services, and technical reviews of all work associated with the development and preparation of contract documents, including Construction documents. The DEPARTMENT's technical reviews are for high-level conformance and are not meant to be comprehensive reviews. The CONSULTANT shall be fully responsible for all work performed and work products developed under this Scope of Services. The DEPARTMENT may provide job-specific information and/or functions as outlined in this contract, if favorable.

2 PROJECT DESCRIPTION

The CONSULTANT shall investigate the status of the project and become familiar with concepts and commitments (typical sections, alignments, etc.) developed from prior studies and/or activities. If a Preliminary Engineering Report is available from a prior or current Project Development and Environment (PD&E) study, the CONSULTANT shall use the approved concepts as a basis for the design unless otherwise directed by the DEPARTMENT.

SR 40 FROM BREAKAWAY TRAIL TO WILLIAMSON BLVD

The purpose of this project is to widen SR 40 from four lanes (2-lanes in each direction) to six lanes (three lanes in each direction), stormwater retention and treatment for the roadway widening, and the widening of the existing S.R. 40 bridges over the Tomoka River. Rural typical section between Breakaway Trail and Tymber Creek Road. Urban typical section between Tymber Creek Road and I-95. Propose to reduce posted speed from 50 mph to 45 mph from Tymber Creek Road to I-95. Turn lane and signalization improvements at major intersections and in the I-95 interchange area. The project also includes enhancement of pedestrian and bicycle facilities to include a shared use path along the north side.

2.1 Project General and Roadway (Activities 3, 4, and 5)

Public Involvement:
CAP Level: ***4***
During the PD&E Phase, the following meetings have already taken place:

- ***8 Agency Meetings***
- ***Public Kick-Off Meeting (July 21,2011)***
- ***Alternatives Public Meeting (June 7, 2012)***
- ***Public Hearing (June 25, 2013)***

A Public Involvement Program (PIP) was developed and carried out as part of the S.R. 40 PD&E Study. The PIP is in compliance with Part 1, Chapter 11 of the "Project Development and Environment Manual," Section 339.155, Florida Statutes, Executive Orders 11990 and 11988 Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act, and 23 Code of Federal Regulations (CFR) 771. The purpose of the PIP was to document the tools and techniques used to establish and maintain communication with the public at-large, local, state, and federal agencies and other project stakeholders. As a result of extensive public involvement, the project team was able to effectively build consensus among the public and affected stakeholders.
In an effort to identify and address project-related issues that were raised by the public and agency stakeholders, the Department conducted an extensive interagency coordination and consultation effort in conjunction with an inclusive public participation process. This section of the document outlines the Department's efforts to engage the public and agency partners during the PD&E process, and provide continuous opportunities for discussion of project-related issues throughout the study.

It is anticipated that at least 1 public meeting will need to occur during the design phase of this project to obtain the support of the locals. The Public Involvement Program that was performed during the PD&E study shall be reverified, and prior commitments honored with local stakeholders.

Other Agency Presentations/Meetings:

Agency	Number of Meetings
Volusia Transportation Planning Organization Citizens Advisory Committee	1
Volusia Transportation Planning Organization Technical Coordinating Committee	1
Volusia Transportation Planning Organization Board	1
Volusia County Traffic Engineering	1

City of Ormond Beach Staff	1
City of Daytona Beach	1
Black Bear Scenic Byways Committee	1
Volusia Transportation Planning Organization Bicycle/Pedestrian Advisory Committee	1

Joint Project Agreements:
Will establish the need through the coordination process with local government

Specifications Package Preparation: ***N/A***

Specification Package will be prepared with the Plans Update phase

Estimated Quantities Report Preparation:
Quantities reports required for plans production

Value Engineering:
Update to the previously completed Value Engineering under the PD&E Phase

Risk Assessment Workshop:
Number of Risk Assessment Workshop: ***1***
Reduced effort to only Risk based Graded Approach using FDOT Risk Based Graded Approach worksheet.

Plan Type:
Plan/Profile

Typical Section:
Number of Typical Sections: ***5***

Typical section #1 utilizes the existing 40-foot wide swale median and maintains the rural character of the roadway, with uncurbed, depressed median and flush outside shoulder. The widening for this typical section would all occur outside of the existing roadway. The existing center crown of the westbound direction will remain and will be at the outside edge of the inside westbound travel lane. By widening to the outside only, maintenance of traffic during construction can be easily achieved, and construction impacts to the existing travel lanes will be limited. A 5-foot-wide pedestrian sidewalk is provided on the south side and a 12-foot wide shared use path is provided on the north side of S.R. 40. Both pedestrian facilities are located outside the clear zone. The 5-foot paved shoulders in both directions also serve as bicycle lanes. The 40-foot border width specified for arterials with flush shoulder in the FDOT Plans Preparation Manual (PPM) cannot be achieved for typical section #1. The border width from Breakaway Trail to Tymber Creek Road will generally be 34-feet wide on each side of S.R. 40, which requires a design variance to be approved by FDOT.

The widening for typical section #1 matches the geometrics (horizontal and vertical alignment) of the existing roadway, which was constructed with a 65-mph design speed for the segment between Breakaway Trail and Tymber Creek Road. The segment is currently posted at 50 mph and the turn lane and other geometric features will accommodate a 50 mph design speed.

The widening for typical section #2 occurs both on the inside and outside of the existing travel lanes, reducing the median to the 30-foot minimum specified in the FDOT PPM for suburban highways. Median curb and gutter are used, and the outside shoulders remain uncurbed. Because of the existing center crown of the westbound direction from Breakaway Trail to Tymber Creek Road, a portion of the roadway will need to be milled and overbuilt to achieve a new crown for that direction of travel, which would be at the outside edge of the inside travel lane. From Tymber Creek Road to Interchange Boulevard the existing westbound roadway is sloped from the inside shoulder, so overbuilding would not be necessary. A 5-foot-wide pedestrian sidewalk is provided on the south side and a 12-foot wide shared use path is provided on the north side of S.R. 40. Both pedestrian facilities are located outside the clear zone. The 5-foot paved outside shoulder in both directions also serves as a bicycle lane. Typical section #2 utilizes a 50-mph design speed. The FDOT PPM specifies that a 40-foot border width be provided for arterials with flush shoulders. This cannot be achieved on the south side of S.R. 40 for typical section #2 for the majority of the corridor. By reducing the median width, the border width between Breakaway Trail and Tymber Creek Road will be 39-feet on both sides of S.R. 40. From Tymber Creek Road to Interchange Boulevard the border width will generally be 42-feet on the north side and 36-feet wide on the south side of S.R. 40. The right-of-way becomes irregular about the roadway center line between Booth Road and Interchange Boulevard, so the border width varies significantly.

The widening for typical section #3 occurs both on the inside and outside of the existing travel lanes, but maintains a 40-foot wide median, including inside shoulders. Curb and gutter are used for the outside shoulder and the median, and the sidewalk and multi-use path are brought in closer to the roadway. By maintaining the wide median and the two existing lanes as the inside travel lanes, the overbuild of the westbound lanes needed for typical section #2 is avoided and an easier maintenance of traffic during construction will be possible. Similar to typical sections #1 and #2, the crown for the westbound direction will be at the outside edge of the inside travel lane. Though an urban cross-section, this typical section still utilizes wide shoulders because of the 50-mph design speed, and thus maintains a wide footprint similar to the suburban typical sections. The wider 6.5-foot outside shoulders also serve as bicycle lanes.
The border width requirement is 14 feet from the edge of pavement to the right-of-way line for roadways with curb or curb and gutter on the outside edge. Typical section #3 meets the border width requirement for the entirety of the study corridor.

The widening for typical section #4 primarily on the inside of the roadway, creating a narrower 22-foot median. Additionally, 5-foot paved shoulders are added on the outside of the roadway to serve as bicycle lanes. The 5-foot shoulder width is wider than the 4-foot minimum width for a bicycle lane in the FDOT PPM. This has been included at the

request of the Volusia TPO Bicycle-Pedestrian Advisory Committee. Curb and gutter are provided both for the outside shoulder and the median, and a sidewalk and multi-use path are provided closer to the travelled way than in the suburban and urban high-speed typical sections. Because of the lower 45 mph design speed, the shoulders are narrower for this typical section, allowing for a smaller overall roadway footprint. Since S.R. 40 is designated as an Emerging SIS facility, the desirable posted speed limit is 50 mph.

Several typical sections were developed for the Tomoka River Bridge, located just east of Tymber Creek Road, to accommodate the widening of S.R. 40. The typical sections for the bridge were coordinated with the roadway typical sections to provide preliminary compatibility.

- ***Bridge Alternative #1 - This typical section for the Tomoka River bridge was developed to be compatible with Roadway Typical Section #4, and provides the lane widening to the inside of the bridge. Approximately 9.5 feet would be added to the inside of the westbound span and approximately 11.5 feet added to the inside of the eastbound span. Approximately 5.5 feet of width is added to the outside of the eastbound span to accommodate a 6-foot wide pedestrian sidewalk., and a separate 14-foot wide structure would be constructed to the north of the westbound span for the shared use path.***
- ***Bridge Alternative #2 - This typical section for the bridge was developed to be compatible with the suburban Roadway Typical Section #2. It provides the lane widening to both the inside and the outside of the bridge spans. The westbound span would be widened by 19.5 feet to the outside and by approximately 13 feet to the inside. The eastbound span would be widened by 13 feet to the outside and by approximately 15 feet to the inside. The widening accommodates the additional lane widths as well as a 5-foot-wide pedestrian sidewalk on the south side and a 12-foot wide shared use path on the north side of the bridge spans.***

Pavement Designs:
Number of Pavement Designs: ***26***

- ***3 pavement designs for the mainline***
- ***1 Pavement design for shared use path***
- ***Additional pavement designs for side streets***
- ***Ramps***

Pavement Type Selection Report(s):
Abbreviated memo for documentation based on existing pavement design

Cross-Slope Correction:
This information is not currently available. Will be obtained during design.

Access Management Classification:

- ***Access Class 3***
- ***Access Class 5***

S.R. 40 is classified by FDOT as an Urban Principal Arterial designated as an emerging Strategic Intermodal System (SIS) highway facility. The FDOT access management classification for S.R. 40 is Class 3 from Breakaway Trail to Tymber Creek Road, and Class 5 from Tymber Creek Road to Williamson Boulevard, according to the FDOT Straight Line Diagrams (SLD).

Transit Route Features:

Transit service is not provided along this section of S.R. 40.

The City of Ormond Beach has identified S.R. 40 from Williamson Boulevard to S.R. A1A to be constrained from capacity improvements only and has designated this corridor to be a multimodal corridor having enhanced transit, pedestrian, and bicycle facilities.

Several multimodal improvements are proposed for all roadway alternatives that were considered. A 12-foot asphalt shared use path is proposed along the north side of S.R. 40 and a 5-foot wide concrete sidewalk is proposed along the south side of S.R. 40 for the majority of the length of the project. The exception to this is between the I-95 southbound ramps and Williamson Boulevard where an 8-foot-wide concrete sidewalk is proposed adjacent to the back of curb on the north side, and a 6-foot wide sidewalk is proposed on the south side of S.R. 40 where the sidewalk is adjacent to the back of curb. Accessible pedestrian ramps will be included where the shared use path or sidewalk intersects with S.R. 40 or the side streets. Accessible pedestrian signal (APS) pushbuttons will also be installed at the pedestrian crossings at the S.R. 40 and Williamson Boulevard intersection. Bicycle lanes with 5-foot minimum width will be included on the outside shoulders of S.R. 40 for all alternatives.

Major Intersections and Interchanges:

Number of Major Intersections and Interchanges: ***7***

SR 40 and:

- ***Breakaway Trail***
- ***Tymber Creek Rd***
- ***Booth Rd***
- ***Interchange Blvd***
- ***I-95 SB Ramps***
- ***I-95 NB Ramps***
- ***Williamson Blvd***

Roadway Alternative Analysis:

Identify proposed speed countermeasures and safety project enhancements in phase I of the design.

Level of Temporary Traffic Control Plan (TTCP): ***2***

The construction of the proposed widening of S.R. 40 through the study area can be achieved while maintaining traffic flow in both directions. Guidance on construction traffic management contained in Federal Highway Administration (FHWA) Manual on Uniform Traffic Control Devices (MUTCD), as well as Index 600 of the FDOT Construction Standards should be used in developing a detailed construction traffic management plan.

Temporary Lighting:
It is anticipated that it may be required for pedestrian crossings

Temporary Signals:
To be determined after MOT plans are completed

Temporary Drainage:
To be determined during the design phase.

Design Variations:

- ***N/A***

Others: ***N/A***

Design Exceptions: ***N/A***
Back of Sidewalk Profiles:
Number of Back of Sidewalk Profiles: ***4***

- ***From the beginning of the project to approximately STA 1340+80.00***
- ***From approximately STA 1405+00 to STA 1405+80.00 there is a stretch of new sidewalk filling in a gap in which the sidewalk grade appears to vary from the PGL.***

Selective Clearing and Grubbing:
Number of acres of Selective Clearing and Grubbing and/or Plant Preservation Area: ***to be determined in design*** acres.

2.2 Drainage (Activities 6a and 6b)

Drainage System Type:
The Drainage System Type is primarily closed with occasional ditches, ponds, and floodplain involvement.

Number of stormwater management facility sites: ***5***
Number of cross drains: ***2***

2.3 Utilities Coordination (Activity 7)

The CONSULTANT is responsible to certify that all necessary arrangements for utility work on this project have been made and will not conflict with the physical construction schedule. The CONSULTANT should coordinate with DEPARTMENT personnel to coordinate transmittals to Utility Companies and meet production schedules.

The CONSULTANT shall ensure FDOT standards, policies, procedures, practices, and design criteria are followed concerning utility coordination.

The CONSULTANT may employ more than one individual or utility engineering consultant to provide utility coordination and engineering design expertise. The CONSULTANT shall identify a dedicated person responsible for managing all utility coordination activities. This person shall be contractually referred to as the Utility Coordination Manager and shall be identified in the CONSULTANT proposal. The Utility Coordination Manager shall be required to satisfactorily demonstrate to the FDOT District Utilities Administrator that they have the following knowledge, skills, and expertise:

- A minimum of 4 years of experience performing utility coordination in accordance with FDOT, Federal Highway Administration (FHWA), and American Association of State Highway and Transportation Officials (AASHTO) standards, policies, and procedures.
- A thorough knowledge of the FDOT plans production process and District utility coordination process.
- A thorough knowledge of FDOT agreements, standards, policies, and procedures.

The Utility Coordination Manager shall be responsible for managing all utility coordination, including the following:

- Assuring that Utility Coordination and accommodation is in accordance to the FDOT, FHWA, and AASHTO standards, policies, procedures, and design criteria.
- Assisting the engineer of record in identifying all existing utilities and coordinating any new installations. Assisting the Engineer of Record with resolving utility conflicts.
- Scheduling and performing utility coordination meetings, keeping and distribution of minutes/action items of all utility meetings, and ensuring expedient follow-up on all unresolved issues.
- Distributing all plans, conflict matrixes and changes to affected utility owners and making sure this information is properly coordinated and documented.
- Identifying and coordinating the completion of any FDOT or utility owner agreement that is required for reimbursement, or accommodation of the utility facilities associated with the project.
- Review and certify to the District Utilities Administrator that all Utility Work Schedules are correct and in accordance with the DEPARTMENT's standards, policies, and procedures.
- Prepare, review and process all utility related reimbursable paperwork inclusive of betterment and salvage determination.

The CONSULTANT's utility coordination work shall be performed and directed by the Utility Coordination Manager that was identified and approved by FDOT's Project Manager. Any proposed change of the approved Utility Coordination Manager shall be subject to review and approval by FDOT's Project Manager prior to any change being made in this contract.

Expected Utilities:

- ***AT&T Florida***
- ***AT&T Corporation***
- ***Aqua Utilities Florida***
- ***Bright House Networks***
- ***City of Ormond Beach***
- ***Florida Power and Light Distribution***
- ***Florida Power & Light Transmission***
- ***Sunesys***
- ***TECO Peoples Gas***

2.4 Environmental Permits and Environmental Clearances (Activity 8)

Expected Permits:

The DEPARTMENT will provide compensatory wetland mitigation in accordance with Section 373.4137, Florida Statutes.

Permits required for this project will include a federal National Pollutant Discharge Elimination System (NPDES) permit, a federal CWA Section 404 Dredge and Fill permit, and a state Environmental Resource Permit (ERP). Additional permits that may be required include a gopher tortoise relocation permit and a construction dewatering permit.
The Tomoka River will be considered Waters of the State and, therefore, a Sovereign Submerged Lands Easement will be required.

Mitigation will be required to off-set unavoidable impacts to jurisdictional wetlands regulated by the SJRWMD and the USACOE.

Mitigation policies have been established by the ACOE, FDEP, and the SJRWMD. Options for mitigating the loss of wetlands include Senate Bill (373.4137, F.S) or purchasing credits from a permitted mitigation bank whose service area includes the proposed project corridor.

2.5 Structures (Activities 9 - 18)

Bridge:

No.	Bridge Number	Length	Description
1	790027	360ft	S.R. 40 WB Over Tomoka River
2	790163	360ft	SR 40 EB Over Tomoka River
3	790193	154ft	I-95 Over S.R. 40

Type of Bridge Structure Work

- BDR (Activity 10)
  BDR Required for either bridge widening or replacement of bridge(s) S.R. 40 WB & EB Over the Tomoka River

- Temporary Bridge (Activity 11): ***N/A***
- Short Span Concrete (Activity 12)
  Two of the options that should be compared is the use of Flat Slabs or Florida Slab Beams

- Medium Span Concrete (Activity 13)
  One of the options that should be compared is the use of Florida I Beams

- Structural Steel (Activity 14): ***N/A***
- Segmental Concrete (Activity 15): ***N/A***
- Movable Span (Activity 16): ***N/A***

Retaining Walls:

No.	Location	Temp Type	Temp Length	Perm Type	Perm Length
1	STA 1360+00 to STA 1363+65.45	N/A	N/A	MSE/Segmental Block Wall	366ft
2	STA 1367+04.37 to STA 1370+00	N/A	N/A	MSE/Segmental Block Wall	296ft

Miscellaneous Structures:

- ***Box Culverts***
- ***Box Culvert Extensions***
- ***Mast Arms***
- ***Strain Poles***

2.6 Signing and Pavement Markings (Activities 19 & 20)

TBD During the design phase

2.7 Signalization (Activities 21 & 22)

Intersections:
No additional intersections are proposed for the project but all of the existing signalized intersections are as follows:

- ***SR 40 & Breakaway Trail***

1 ***Reduce WB right-turn lane length to minimum required***

- ***Walgreens Access (Sta 1344+00)***

1 ***Remove WB right-turn lane into Walgreens site***

- ***SR 40 & Tymber Creek Rd***

1 ***Add 2nd EB left-turn lane***
2 ***Add EB, NB right-turn lane***
3 ***Add 2nd WB right-turn lane (dual WB right-turns to be signalized)***
4 ***Add 3rd SB left-turn lane***

- ***Tymber Creek Plaza Access (Sta 1353+00)***

1 ***Remove EB right-turn lane into Tymber Creek Plaza***

- ***Elder Law Office Access (Sta 1357+00)***

1 ***Remove EB right-turn taper into Elder Law Office site***

- ***SR 40 & Booth Rd***

1 ***Add EB right-turn lane***
2 ***Remove exclusive WB right-turn lane (Calvary Christian Church access)***

- ***Cavalry Christian Church Access (Sta 1381+00)***

1 ***Remove WB right-turn taper at Cavalry Christian Church secondary access***

- ***Interchange Boulevard***

1 ***Extend EB right-turn lane***

- ***SR 40 & I-95 SB Ramps***

1 ***Add EB right-turn lane (through/right-turn lane becomes through lane)***
2 ***Add WB through lane***

- ***SR 40 & I-95 NB Ramps***

1 ***Add WB through lane***

- ***SR 40 & Williamson Blvd***

1 ***Add 2nd EB right-turn lane (dual EB right-turns to be signalized)***
2 ***Add 3rd NB left-turn lane***
3 ***Remove exclusive WB right-turn lane***
4 ***Place NB right-turn under signal control and remove island***

Traffic Data Collection:
The PD&E that was completed in 2014 has traffic data that was collected in November 2011. The selected firm shall redetermine the Average Annual Daily Traffic (AADT), Peak Hour Volumes, and intersection and roadway LOS for the current base year. the selected firm shall develop the design traffic characteristics including Standard K Factor, Design Hour Directional Demand, and percentage of trucks for both the design hours and daily demand for use in the operational analysis of future conditions.

Traffic Studies:

Traffic Level of Service to be reevaluated during the plans update phase when funding becomes available for construction.

Count Stations:

- ***VIII-1 (Loop Volume) - MP 27.686***
- ***VIII-1 (Loop Volume) - MP 28.717***
- ***VIII-1 (Loop Volume) - MP 29.373***

Traffic Monitoring Sites:

- ***VIII-1 (Loop Class) - MP 24.357***
- ***VIII-1 (Loop Class) - MP 26.142***

2.8 Lighting (Activities 23 & 24)

Limits and Proposed Type of Lighting:

Type	Limit
Continuous Roadway Lighting	Tymber Creek to I-95 Sb Ramps
Adequate Roadway Lighting	I-95 to Williamson Blvd.
Intersection Lighting	Six Signalized Intersections

2.9 Landscape (Activities 25 & 26)

Include coordination with existing and/or proposed underground utilities including but not limited to FDOT lighting, drainage and Intelligent Transportation Systems (ITS). Landscape coordination with ITS shall include both underground conflicts and above-ground impacts to existing and/or proposed ITS coverage. The CONSULTANT shall closely coordinate with the Department's ITS units to ensure that all conflicts are identified, addressed and mitigated in the Contract Documents.

Planting Plans:
The rural character of the S.R. 40 corridor from Breakaway Trail to Tymber Creek Road is not expected to change appreciably with the widening from 4-lane to 6-lane. The segment will maintain the existing depressed median, and limited aesthetic or landscaping opportunities are available because of the functional nature of that area for roadside safety and drainage. The outside shoulders will be improved to add a concrete sidewalk on the south side of S.R. 40, and an asphalt shared use path on the north side. Opportunity may exist between the back of the sidewalk and/or shared use path (outside the clear zone) and the right-of-way line to provide enhanced landscaping, if desired. The urban typical section proposed to be constructed east of Tymber Creek Road will reinforce the changing character of the corridor from rural/suburban to urban. The raised median may present opportunities for landscaping that is acceptable within the clear zone and does not impede intersection sight distance. The outside shoulders will be improved with curb and gutter, with a sidewalk on the south side and a shared use path on the north side. Opportunity may also exist between the back of the sidewalk and/or shared use path (outside the clear zone) and the right-of-way line to provide enhanced landscaping, if desired. In the future, aesthetics and landscaping along the project corridor will be reassessed and evaluated as part of the final design phase of this project to take into consideration input from the City of Ormond Beach.

Irrigation Plans: ***N/A***

Hardscape Plans: ***N/A***

Outdoor Advertising: ***N/A***

2.10 Survey (Activity 27)

Design Survey:
Design Survey with full DTM of the entire project limits

Subsurface Utility Exploration:

- ***At signalized intersections where new signal pole (mast arm or strain pole foundations) are being proposed***
- ***At the Tomoka River Bridge where new piles are being driven***

Right of Way Survey:

The four typical sections were considered in relation to the 200-foot roadway right of way that exists, and how the various dimensions fit within the right-of-way. It was found that all four typical sections are expected to be accommodated within the existing right-of-way, though typical section #1 has the greatest limitation due to all of the widening occurring to the outside of the roadway and keeping the existing median width. By accommodating the shared use path outside of the clear zone on the south side of SR 40, only approximately 5 feet is left for buffer and slope tie-in inside the existing right-of-way. This has the potential to create additional right-of-way needs in widening SR 40,

specifically in the outside of the horizontal curve just west of Tymber Creek Road where roadway superelevation is utilized. Additionally, typical sections #1 and #2 do not meet the minimum border width criteria of 40 feet, as specified in the FDOT Plans Preparation Manual.

Vegetation Survey: ***N/A***

2.11 Photogrammetry (Activity 28)

Can be utilized as need to obtain full Design Survey and DTM

2.12 Mapping (Activity 29)

Control Survey Map: ***N/A***

Right of Way Map:
Required anywhere the proposed design impacts the existing right of way

Legal Descriptions:
20

Maintenance Map: ***N/A***

Miscellaneous Items: ***N/A***

2.13 Terrestrial Mobile LiDAR (Activity 30)

Can be utilized as need to obtain full Design Survey and DTM

2.14 Architecture (Activity 31) (N/A)

2.15 Noise Barriers (Activity 32)

Four noise affected sites were identified. No noise barriers are recommended per the PD&E study.

Based on the noise analyses performed to-date, there appears to be no apparent solutions available to mitigate the noise impacts at the four impacted Activity Category B sites represented in this report by receptor TR2; two Category C sites (Children's House Academy playground and Calvary Christian Academy soccer fields); nor to the outdoor eating area affiliated with the Dunkin Donuts, a Category E land use. Project noise impacts will be re-evaluated during the subsequent final design phase, and noise barriers would be deemed warranted contingent upon the following conditions:

- ***Further analysis conducted during the project's final design phase supports the need, feasibility and reasonableness of providing noise abatement;***
- ***Viewpoints of the impacted property owners/renters are in favor of noise barrier construction, where applicable;***
- ***Safety and engineering aspects, as related to the roadway user and adjacent property owners, have been reviewed and any conflict or issues resolved.***

2.16 Intelligent Transportation Systems (Activities 33 & 34)

Any ITS items within the project limits shall be shown on plan sheets that are necessary for other work. Plan sheets are not necessary solely to show ITS elements. ITS Certification Memo will be required at Production. See District Design Memo 09-02.

The Federal Highway Administration issued Rule 940 entitled Intelligent Transportation Systems (ITS) Architecture and Standards to ensure new projects conform to the National ITS Architecture and standards as well as with a regional ITS architecture developed to reflect the local needs, issues, problems, and objectives for implementation.

For all projects with ITS activities, the CONSULTANT shall follow the Rule 940 requirements and use a Systems Engineering approach for determining the requirements for the project. The CONSULTANT shall develop all necessary documents to support the Rule 940 requirements like Concept of Operations (ConOPS), Systems Engineering Management Plan (SEMP), Requirements Traceability Verification Matrix (RTVM) and others as deemed necessary by the Department.

TBD During the design phase

FDOT Project 440270-1-52-01 to install a Traffic Adaptive Signal Control Technology (ASCT) system along SR 40 from Tymber Creek Road to SR A1A and upgrades to existing traffic signal controller cabinet assemblies along the corridor. The project will install of Microwave Vehicle Detectors (MVDS) and BlueTooth Travel Time Sensors (BTTS) to facilitate traffic monitoring and review of the ASCT system performance. New video based vehicle detection, mounted to the existing signal support structures, will be installed at the signalized intersections. No structural analysis of the existing signal support structures will be performed for attaching vehicle detectors to the existing structures. The ASCT system will be managed by FDOT and connected to the DEPARTMENT's fiber optic network. But the traffic signal controllers and UPS will be connected to Volusia County's fiber optic network. The two agencies may share the same fiber optic cabling, but will be provided with separate Ethernet switches.

The ITS shall operate from the ***D5 RTMC*** TMC located at ***4975 Wilson Road, Sanford, FL 32771*** using the SunGuide® (SunGuide) Software

Interchanges:
SR 40 and I-95 Interchange

- ***Coordinate with traffic operations during design if wrong way driving has already been programmed for the I-95 Interchange ramps.***

Traffic Data Collection: ***N/A***
Geographical Information System (GIS) Requirements: CONSULTANT shall include in the design the GIS data collection requirements and deliverables for integration with SunGuide software and other Department GIS based asset management applications like ITS FM software.

All design efforts shall be based on deploying "open architecture" subsystems, while remaining fully compatible with previous designs (as applicable) and the FDOT ITS Specifications. All ITS field devices and support systems shall be designed and located outside of the clear zone, or behind protective barrier, within the right of way. This includes cabinets, poles, and support hardware. Utility conflicts shall be identified and resolved during the design phase. The location of design elements will be coordinated with the District Landscape Architect to optimize landscape opportunities. The design shall minimize theft and vandalism. The CONSULTANT shall include in the design vandal resistant mechanisms to minimize theft. The CONSULTANT shall provide additional redundant power and communications systems to minimize system downtime due to vandalism.

The CONSULTANT shall design the project subsystems such that they will be monitored and controlled from the FDOT's TMC facilities located at ***4975 Wilson Road, Sanford, FL 32771***. The CONSULTANT shall ensure that all ITS field devices and ancillary components comply with the FDOT's Approved Product List (APL) and are supported within the SunGuide software or other specified software, unless otherwise approved by the DEPARTMENT.

The CONSULTANT shall include in the design any required upgrade to the TMC central hardware, equipment racks, and equipment wiring, as directed by the FDOT project manager, to make the subsystems fully operations from the TMC facilities.

For projects with existing ITS, the CONSULTANT shall include in the design any required upgrade to existing ITS equipment to meet the latest FDOT standards, NEC requirements or as directed by the FDOT project manager and to make the subsystems fully operations from the TMC facilities.

ITS coordination with Landscape Architecture shall include both underground conflicts and above-ground impacts to existing and/or proposed Landscaping. The CONSULTANT shall closely coordinate with the Landscape Architect to ensure that all conflicts are identified, addressed, and mitigated in the Contract Documents.

TDB During the design phase

2.17 Geotechnical (Activity 35)

Department

- ***Pavement Cores***

Consultant

- ***All required Geotechnical ReportsRoadway***
- ***Structures***
- ***Ponds***
- ***Lighting***

2.18 3D Modeling (Activity 36)

FDM 900.

2.19 Project Schedule

Within ten (10) days after the Notice-To-Proceed, and prior to the CONSULTANT beginning work, the CONSULTANT shall provide a detailed project activity/event schedule for DEPARTMENT and CONSULTANT scheduled activities required to meet the current DEPARTMENT Production Date. The schedule shall be based upon the ***48***. The current production date is ***June 01, 2027***. The schedule shall be accompanied by an anticipated payout and fiscal progress curve. For the purpose of scheduling, the CONSULTANT shall allow for a ***4***-week review time for each phase submittal and any other submittals as appropriate.

The schedule shall indicate all required submittals.

All fees and price proposals are to be based on the negotiated schedule of ***48*** months for final construction contract documents. However, the contract deadline is ***120*** months from the Notice to Proceed.

Periodically, throughout the life of the contract, the project schedule and payout and fiscal progress curves shall be reviewed and, with the approval of the DEPARTMENT, adjusted as necessary to incorporate changes in the Scope of Services and progress to date.

The approved schedule and schedule status report, along with progress and payout curves, shall be submitted with the monthly progress report.

The schedule shall be submitted in an FDOT system-compatible format.

2.20 Submittals

The CONSULTANT shall furnish construction contract documents as required by the DEPARTMENT to adequately control, coordinate, and approve the work concepts. The CONSULTANT shall distribute submittals as directed by the DEPARTMENT. The DEPARTMENT will determine the specific number of copies required prior to each submittal.

2.21 Provisions for Work

The services performed by the CONSULTANT must comply with all applicable DEPARTMENT's manuals, procedure, policies, and guidelines. Specifically, the CONSULTANT must comply with DEPARMENT's Project Development and Environmental (PD&E) Manual, FDOT Design Manual (FDM), Structures Manual, and Computer Aided Design and Drafting (CADD) Manual. The DEPARTMENT's manuals and guidelines incorporate, by requirement or reference, all applicable federal and state laws, regulations, and Executive Orders. The CONSULTANT will use the latest editions of the manuals, procedures, and guidelines to perform work for this project.

All work shall be prepared with English units (unless otherwise specified) in accordance with the latest editions of standards and requirements utilized by the DEPARTMENT.

2.22 Services to be Performed by the DEPARTMENT

When appropriate or available, the DEPARTMENT will provide project data including:

- ***Numbers for field books***
- ***Preliminary Horizontal Network Control***
- ***Access for the CONSULTANT to utilize the DEPARTMENT's Information Technology Resources***
- ***All Department agreements with Utility Agency Owner (UAO)***
- ***All certifications necessary for project letting***
- ***Building Construction Permit Coordination (Turnpike)***
- ***All information that may come to the DEPARTMENT pertaining to future improvements***
- ***All future information that may come to the DEPARTMENT during the term of the CONSULTANT's Agreement, which in the opinion of the DEPARTMENT is necessary for the prosecution of the work***
- ***Available traffic and planning data***
- ***All approved utility relocations***
- ***Project utility certification to the DEPARTMENT's Central Office***
- ***Any necessary title searches***
- ***Engineering standards review services***
- ***All available information in the possession of the DEPARTMENT pertaining to utility companies whose facilities may be affected by the proposed construction***
- ***All future information that may come to the DEPARTMENT pertaining to subdivision plans so that the CONSULTANT may take advantage of additional areas that can be utilized as part of the existing right of way***
- ***Systems traffic for Projected Design Year, with K, D, and T factors***
- ***Previously constructed Highway Beautification or Landscape Construction Plans***
- ***Landscape Opportunity Plan(s)***
- ***Existing right of way maps***
- ***Existing pavement evaluation report for all RRR projects***
- ***PD&E Documents***
- ***Design Reports***
- ***Letters of authorization designating the CONSULTANT as an agent of the DEPARTMENT in accordance with F.S. 337.274***
- ***Phase reviews of plans and engineering documents***
- ***Regarding Environmental Permitting Services:***
    - ***Approved Permit Document when available***
    - ***Approval of all contacts with environmental agencies***
    - ***General philosophies and guidelines of the DEPARTMENT to be used in the fulfillment of this contract. Objectives, constraints, budgetary limitations, and time constraints will be completely defined by the Project Manager.***
    - ***Appropriate signatures on application forms***

3 PROJECT COMMON AND PROJECT GENERAL TASKS

Project Common Tasks

Project Common Tasks, as listed below, are work efforts that are applicable to many project activities, 4 (Roadway Analysis) through 36 (3D Modeling). These tasks are to be included in the project scope in each applicable activity when the described work is to be performed by the CONSULTANT.

Cost Estimates: The CONSULTANT is responsible for producing a construction cost estimate and reviewing and updating the cost estimate when scope changes occur and/or at milestones of the project. Prior to Phase II plans or completion of quantities, the DEPARTMENT's Long-Range Estimate (LRE) system will be used to produce a conceptual estimate, according to District policy. Once the quantities have been developed (beginning at Phase II plans and no later than Phase III plans) the CONSULTANT shall be responsible for inputting the category information, pay items and quantities into AASHTOWare Project Preconstruction through the use of the DEPARTMENT's Designer Interface.

Technical Special Provisions: The CONSULTANT shall provide Technical Special Provisions for all items of work not covered by the Standard Specifications for Road and Bridge Construction and the workbook of implemented modifications.

A Technical Special Provision shall not modify the Standard Specifications and implemented modifications in any way.

The Technical Special Provisions shall provide a description of work, materials, equipment and specific requirements, method of measurement and basis of payment. Proposed Technical Special Provisions will be submitted to the District Specifications Office for initial review at the time of the Phase III plans review submission to the DEPARTMENT's Project Manager. This timing will allow for adequate processing time prior to final submittal. The Technical Special Provisions will be reviewed for suitability in accordance with the Handbook for Preparation of Specification Packages. The District Specifications Office will forward the Technical Special Provisions to the District Legal Office for their review and comment. All comments will be returned to the CONSULTANT for correction and resolution. Final Technical Special Provisions shall be digitally signed and sealed in accordance with applicable Florida Statutes.

The CONSULTANT shall contact the appropriate District Specifications Office for details of the current format to be used before starting preparations of Technical Special Provisions.

Modified Special Provisions: The CONSULTANT shall provide Modified Special Provisions as required by the project. Modified Special Provisions are defined in the Specifications Handbook.

A Modified Special Provision shall not modify the first nine sections of the Standard Specifications and implemented modifications in any way. All modifications to other sections

must be justified to the appropriate District and Central Specifications Offices to be included in the project's specifications package.

Field Reviews: The CONSULTANT shall make as many trips to the project site as required to obtain necessary data for all elements of the project.

Technical Meetings: The CONSULTANT shall attend all technical meetings necessary to execute the Scope of Services of this contract. This includes meetings with DEPARTMENT and/or Agency staff, between disciplines and subconsultants, such as access management meetings, pavement design meetings, local governments, railroads, airports, progress review meetings (phase review), and miscellaneous meetings. The CONSULTANT shall prepare, and submit to the DEPARTMENT's Project Manager for review, the meeting minutes for all meetings attended by them. The meeting minutes are due within five (5) working days of attending the meeting.

Quality Assurance/Quality Control: It is the intention of the DEPARTMENT that design CONSULTANTS, including their subconsultant(s), are held responsible for their work, including plans review. The purpose of CONSULTANT plan reviews is to ensure that CONSULTANT plans follow the plan preparation procedures outlined in the FDOT Design Manual, that state and federal design criteria are followed with the DEPARTMENT concept, and that the CONSULTANT submittals are complete. All subconsultant document submittals shall be submitted by the subconsultant directly to the CONSULTANT for their independent Quality Assurance/Quality Control review and subsequent submittal to the DEPARTMENT.

It is the CONSULTANT'S responsibility to independently and continually QC their plans and other deliverables. The CONSULTANT should regularly communicate with the DEPARTMENT's Design Project Manager to discuss and resolve issues or solicit opinions from those within designated areas of expertise.

The CONSULTANT shall be responsible for the professional quality, technical accuracy and coordination of all surveys, designs, drawings, specifications and other services furnished by the CONSULTANT and their subconsultant(s) under this contract.

The CONSULTANT shall provide a Quality Control Plan that describes the procedures to be utilized to verify, independently check, and review all maps, design drawings, specifications, and other documentation prepared as a part of the contract. The CONSULTANT shall describe how the checking and review processes are to be documented to verify that the required procedures were followed. The Quality Control Plan shall be one specifically designed for this project. The CONSULTANT shall submit a Quality Control Plan for approval within twenty (20) business days of the written Notice to Proceed and it shall be signed by the CONSULTANT's Project Manager and the CONSULTANT QC Manager. The Quality Control Plan shall include the names of the CONSULTANT's staff that will perform the quality control reviews. The Quality Control reviewer shall be a Florida Licensed Professional Engineer fully prequalified under F.A.C. 14-75 in the work type being reviewed. A marked up set of prints from a Quality Control Review indicating the reviewers for each component (structures, roadway, drainage, signals, geotechnical, signing and marking, lighting, landscape, surveys, etc.) and a written resolution of comments on a point-by-point basis will be required, if requested by the DEPARTMENT, with each phase submittal. The responsible Professional

Engineer, Landscape Architect, or Professional Surveyor & Mapper that performed the Quality Control review will sign a statement certifying that the review was conducted and found to meet required specifications.

The CONSULTANT shall, without additional compensation, correct all errors or deficiencies in the designs, maps, drawings, specifications and/or other products and services.

Independent Peer Review: When directed by the DEPARTMENT, a subconsultant may perform Independent Peer Reviews.

Independent Peer Review and a Constructability/Bidability Review for design Phase Plans document submittals are required on this project. These separate reviews shall be completed by someone who has not worked on the plan component that is being reviewed. These could include, but are not limited to a separate office under the Prime's umbrella, a subconsultant that is qualified in the work group being reviewed, or a CEI. It does not include persons who have knowledge of the day to day design efforts. The Constructability/Bidability Review shall be performed by a person with experience working on Department construction projects (CEI, Contractor, etc.).

The Independent Peer Review for design Phase Plans submittals shall ensure the plans meet the FDM, Standard Plans and FDOT CADD Manual. The Constructability/Bidability Review shall ensure the project can be constructed and paid for as designed. Constructability/Bidability Reviews should be conducted prior to the Phase III and Phase IV submittals, using the Phase Review Checklist (Guidance Document 1-1-A) from the Construction Project Administration Manual (CPAM) as a minimum guideline. The CONSULTANT shall submit this checklist, as well as the "marked-up" set of plans during this review, and review comments and comment responses from any previous Constructability/Bidability reviews. These items will be reviewed by District Design and District Construction.

Supervision: The CONSULTANT shall supervise all technical design activities.

Coordination: The CONSULTANT shall coordinate with all disciplines of the project to produce a final set of construction documents.

Project General Tasks

Project General Tasks, described in Sections 3.1 through 3.7 below, represent work efforts that are applicable to the project as a whole and not to any one or more specific project activity. The work described in these tasks shall be performed by the CONSULTANT when included in the project scope.

3.1 Public Involvement

Public involvement includes communicating to all interested persons, groups, and government organizations information regarding the development of the project. The CONSULTANT shall provide to the DEPARTMENT drafts of all Public Involvement documents (e.g., newsletters, property owner letters, advertisements, etc.) associated with the following tasks for review and approval at least ***10*** business days prior to printing and / or distribution.

3.1.1 Community Awareness Plan

Prepare a Community Awareness Plan (CAP) for review and approval by the DEPARTMENT within 30 calendar days after receiving Notice to Proceed. The objective of the plan is to notify local governments, affected property owners, tenants, and the public of the DEPARTMENT'S proposed construction and the anticipated impact of that construction. The CAP shall address timeframes for each review and shall include tentative dates for each public involvement requirement for the project. The CAP will also document all public involvement activities conducted throughout the project's duration. In addition to the benefits of advance notification, the process should allow the DEPARTMENT to resolve controversial issues during the design phase. This item shall be reviewed and updated periodically as directed by the DEPARTMENT throughout the life of the project.

3.1.2 Notifications

In addition to public involvement data collection, the CONSULTANT shall assist the DEPARTMENT or prepare notifications, flyers, and/or letters to elected officials and other public officials, private property owners, and tenants at intervals during plans production as identified by the DEPARTMENT. All letters and notices shall be reviewed by the ***DEPARTMENT*** to ensure that they are addressed to the correct and current public officials.

3.1.3 Preparing Mailing Lists

At the beginning of the project, The CONSULTANT shall identify all impacted property owners and tenants (within a minimum of 300 feet of the project corridor) The CONSULTANT shall prepare a mailing list of all such entities and shall update the mailing list as needed during the life of the project.

3.1.4 Median Modification Letters

The CONSULTANT shall prepare a median modification letter to be sent to property owners along the corridor. In addition, the CONSULTANT shall prepare a sketch of each proposed median modification for inclusion in the letter. The letters will be sent on DEPARTMENT letterhead by the ***CONSULTANT***.

3.1.5 Driveway Modification Letters

The CONSULTANT shall prepare a driveway modification letter to be sent to property owners along the corridor. In addition, the CONSULTANT shall prepare a sketch of each proposed driveway modification for inclusion in the letter. The letters will be sent on DEPARTMENT letterhead.

3.1.6 Newsletters

The CONSULTANT shall prepare newsletters for distribution to elected officials, public officials, property owners along the corridor and other interested parties. The letters will be sent by the CONSULTANT.

3.1.7 Renderings and Fly-Throughs

The CONSULTANT shall prepare renderings and fly-throughs for use in public meetings.

3.1.8 PowerPoint Presentations

The CONSULTANT shall prepare PowerPoint presentations for use in public meetings.

3.1.9 Public Meeting Preparations

The CONSULTANT shall prepare the necessary materials for use in public meetings.

The CONSULTANT will investigate potential meeting sites to advise the DEPARTMENT on their suitability. The ***CONSULTANT*** will pay all costs for meeting site rents and insurance. No DEPARTMENT meetings will be held on public school system properties.

3.1.10 Public Meeting Attendance and Follow-up

The CONSULTANT shall attend public meeting(s), assist with meeting setup and take down. The CONSULTANT shall also prepare a summary of the public meeting that includes all copies of all materials shown or provided at the public meeting. The summary shall also include a listing of all written comments made during or after the meeting and responses to those written comments.

The CONSULTANT will attend the meetings with an appropriate number of personnel to assist the DEPARTMENT'S Project Manager.

It is estimated for this project there will be ***1*** Public meetings during the design.

3.1.11 Other Agency Meetings

In addition to scheduled public meetings the CONSULTANT may be required to participate in meetings with local governing authorities and/or Metropolitan Planning Organization (MPO). The CONSULTANT's participation may include, but not be limited to, presentations during the meeting, note taking, and summarizing the meeting in a memo to the file. It is estimated for this project there will be ***8*** meetings (as indicated in Section 2.1 above) with local governing authorities and/or MPOs during the design.

3.1.12 Web Site

The CONSULTANT shall create and/or maintain a web site for the project.

3.2 Joint Project Agreements

When the Joint Project Agreement (JPA) deliverable is not prepared by the CONSULTANT, services may include all coordination, meetings, etc., required to ensure

compatibility, include JPA documents in the contract plans package and include the JPA documents in the digital delivery package.

3.3 Specifications & Estimates

3.3.1 Specifications Package Preparation (N/A)

Specification Package will be prepared with the Plans Update phase

3.3.2 Estimated Quantities Report Preparation

The CONSULTANT shall prepare an Estimated Quantities (EQ) Report in accordance with FDM 902. Includes loading category information, pay items, and quantities into Designer Interface for AASHTOWare Project Preconstruction (PrP), QA/QC efforts associated with AASHTOWare PrP and the EQ Report.

3.4 Contract Maintenance and Project Documentation

Contract maintenance includes project management effort for complete setup and maintenance of files, electronic folders and documents, developing technical monthly progress reports and schedule updates. Project documentation includes the compilation and delivery of final documents, reports or calculations that support the development of the contract plans; includes uploading files to Electronic Document Management System (EDMS) or Project Suite Enterprise Edition (PSEE).

3.5 Value Engineering (Multi-Discipline Team) Review

The design for this project will be subjected to a Value Engineering (VE) review. The VE review will be conducted by a multidiscipline, independent team of DEPARTMENT and CONSULTANT personnel for improving the value of the project.

The CONSULTANT shall develop the design and contract documents using sound value engineering practices to the fullest extent possible, in order to support appropriate design decisions in producing the contract plans for the most efficient and economical design.

Value Engineering is an event-related activity and should occur at a time when it will provide the greatest opportunity for value improvement, as determined by the Department Project Manager and Value Engineering Coordinator. This opportune time during the design phase of a project will generally fall between completion of Phase I design plans and completion of Phase II design plans, but may occur at any time during the development of a project.

Activities required by the CONSULTANT in support of the VE team are:

Providing Materials and Information: The CONSULTANT shall allow ample time for the appropriate knowledgeable members of their staff to present current design documentation and data to the VE team, as deemed necessary for an effective project review.

The Consultant Project Manager and other key members of the design team shall meet with the VE team to explain the development of design features and how and why they were

selected. The information will be provided in the form of a personal verbal presentation and the submittal of a package containing current plans and other documentation. This presentation will take place at the location of the VE study and may be followed up with additional meetings, written communications and phone enquiries.

Information and data that should be available to the VE Team include, but is not limited to the following:

- One copy of all environmental documents
- One copy of the Preliminary Engineering Report
- Three copies of all plan drawings
- Drainage alternatives information
- One copy of Bridge Development Reports
- One copy of Pavement Type Selection Report
- One copy of Pavement Design Package
- One copy of other miscellaneous reports
- Project Cost Estimate

The Project Cost Estimate shall include a tabulation of estimated construction costs for the proposed design. This list shall, at a minimum, contain a breakdown of costs for each major element of the design.

The CONSULTANT shall provide, in the form of a matrix, all criteria and weighted impacts used in arriving at decisions for the selection of specific design features. These criteria must include Safety, Operation, Maintenance and Public Acceptance.

All reports provided by the CONSULTANT will be returned after the VE review has been completed. However, copies of plans and drawings may be kept by the VE team.

3.6 Prime Consultant Project Manager Meetings

Includes only the Prime Consultant Project Manager's time for travel and attendance at Activity Technical Meetings and other meetings listed in the meeting summary for Task 3.6 on tab 3 Project General Task of the staff hour forms. Staff hours for other personnel attending Activity Technical Meetings are included in the meeting task for that specific Activity.

3.7 Plans Update

The effort needed for Plans Update services will vary from project to project, depending on size and complexity of the project, as well as the duration of time spent "on the shelf".

Specific services will be negotiated as necessary as a contract amendment.

3.8 Post-Design Services

Post-Design Services may include, but not limited to, meetings, construction assistance, plans revisions, shop drawing review, survey services, as-built drawings, and load ratings. Specific services will be negotiated as necessary as a contract amendment.

Post-Design Services are not intended for instances of CONSULTANT errors or omissions.

3.9 Digital Delivery

The CONSULTANT shall deliver final contract plans and documents in digital format. The final contract plans and documents shall be digitally signed and sealed files delivered to the DEPARTMENT on acceptable electronic media, as determined by the DEPARTMENT.

3.10 Risk Assessment Workshop

This project will be subject to Risk Assessment (RA) and Management for the purpose of the identifying, quantifying and managing the potential cost and schedule risks of the project. The RA for this project will be managed by the Department Project Manager and supported by a multidiscipline team (RA Team) of DEPARTMENT and CONSULTANT personnel and subject-matter experts (SMEs). The Department Project Manager will be the lead for the RA Team.

There will be a Risk Assessment (RA) Workshop and workshop related meetings during the design. The Workshop will generally occur before completion of Phase I design plans, but may occur at any time during the development of a project as determined by the Department Project Manager. The Department Project Manager will develop a Risk Register following the RA Workshop, and utilize the Risk Register throughout the life of the project to mitigate and manage the risks.

The CONSULTANT (and key subconsultant(s) if applicable), and other key members of the design team will attend and participate in the Risk Assessment Workshop for this project. This will involve a Risk Preparatory Session (half-day to 1 day plus information assessment), a Risk Assessment Workshop (1 to 3 days), and Risk Follow-Up Meeting (half-day to 1 day).

The CONSULTANT and other key members of the design team will attend and participate in associated follow-up RA meetings (approximately one meeting every three to six months as deemed necessary) with the Department Project Manager (and RA team if applicable) to discuss the risks, mitigation strategies and any updates to the Risk Register. This includes written communications and phone inquiries. The CONSULTANT will coordinate with subconsultants who need to attend the Workshop and associated meetings.

CONSULTANT shall provide the RA Team meeting materials that are deemed necessary by the Department Project Manager to conduct the Workshop and associated meetings. The meeting materials include the following:

- One copy of all environmental documents
- One copy of the Preliminary Engineering Report
- One copy of all plan drawings (three copies if a workshop is applicable)
- Drainage alternatives information
- One copy of Bridge Development Reports
- One copy of Pavement Type Selection Report

- One copy of Pavement Design Package
- One copy of other miscellaneous reports
- Project Schedule
- Project Cost Estimate

Project Cost Estimate shall include a tabulation of estimated construction costs for the proposed design, and a breakdown of costs for each major element of the design, such as Right of Way, Design, CEI, Utilities, JPA/LAP funds, etc.

The CONSULTANT shall allow ample time for the appropriate knowledgeable members of their staff to prepare and provide current design documentation and data. All reports provided by the CONSULTANT will be returned after the RA Workshop has been completed; however, copies of plans and drawings may be kept by the RA team. The CONSULTANT will be responsible for providing follow-up actions as necessary.

Reduced effort to only Risk based Graded Approach using FDOT Risk Based Graded Approach worksheet.

3.11 Railroad, Transit and/or Airport Coordination

3.11.1 Aeronautical Evaluation

The Consultant shall be responsible for complying with the requirements of Title 14 of the Code of Federal Regulations Part 77 (14 CFR Part 77), and for determining whether it is necessary to file any Notice of Proposed Construction or Alteration (FAA Form 7460-1) with the Federal Aviation Administration (FAA), utilizing the FAA Notice Criteria Tool. Place a copy of all pertinent documentation in the Project Documentation folder structure; e.g., Notice Criteria Tool inquiries and responses; FAA Form 7460-1 filed with the FAA; Letters of Determination (along with the records demonstrating compliance with the conditions and deadlines). Report any Letters of Determination, designated other than "Does Not Exceed", to the Central Office (Aviation Office, Airspace and Land Use Manager).

3.12 Landscape and Existing Vegetation Coordination

Coordinate to ensure preservation and protection of existing vegetation. Relocation of existing vegetation may be necessary in some cases. Space for proposed landscape should be preserved and conflicts with drainage, utilities, ITS, and signage should be minimized. Coordination with the District Landscape Architect may be necessary as defined in 4.12. Additionally, coordination with the Florida Scenic Highways program should be included to ensure any requirements of the FSH program are met.

3.13 Other Project General Tasks

Contract Time Memo

4 ROADWAY ANALYSIS

The CONSULTANT shall analyze and document Roadway Tasks in accordance with all applicable manuals, guidelines, standards, handbooks, procedures, and current design memorandums.

4.1 Typical Section Package

The CONSULTANT shall prepare a Typical Section Package.

4.2 Pavement Type Selection Report

Pavement Type Selection Reports are required for every project one mile or greater in length where work includes a modification to the base materials. The Pavement Type Selection decision will again be reviewed by FDOT Design at the time the pavement is designed to warrant reconsideration. A letter to the Project Design File documenting the pavement type decision is required, even if no report is performed.

4.3 Pavement Design Package

The CONSULTANT shall prepare a Pavement Design Package.

4.4 Cross-Slope Correction

The CONSULTANT shall coordinate with the DEPARTMENT to obtain existing cross slope data, determine roadway limits where cross slope is potentially out of tolerance and determine a resolution.

4.5 Horizontal/Vertical Master Design Files

The CONSULTANT shall design the geometrics using the Standard Plans that are most appropriate with proper consideration given to the design traffic volumes, design speed, capacity and levels of service, functional classification, adjacent land use, design consistency and driver expectancy, aesthetics, existing vegetation to be preserved, pedestrian and bicycle concerns, ADA requirements, Safe Mobility For Life Program, access management, PD&E documents and scope of work. The CONSULTANT shall also develop utility conflict information to be provided to project Utility Coordinator in the format requested by the DEPARTMENT.

Note: When the project includes a 3D Model deliverable, also include Activity 36 3D Modeling.

4.6 Access Management

The CONSULTANT shall incorporate access management standards for each project in coordination with DEPARTMENT staff. The CONSULTANT shall review adopted access management standards and the existing access conditions (interchange spacing, signalized intersection spacing, median opening spacing, and connection spacing). Median openings that will be closed, relocated, or substantially altered shall be shown on plan sheets and submitted with supporting documentation for review with the first plans submittal.

The DEPARTMENT shall provide access management classification information and information derived from PD&E studies and public hearings to be used by the CONSULTANT.

4.7 Roundabout Final Design Analysis (N/A)

4.8 Cross Section Design Files

The CONSULTANT shall establish and develop cross section design files in accordance with the FDOT CADD Manual.

Note: If the Cross Sections are prepared using a 3D model, use Task 36.5 instead of Task 4.9 for the Cross Section Design Files.

4.9 Temporary Traffic Control Plan (TTCP) Analysis

The CONSULTANT shall design a safe and effective TTCP to move vehicular and pedestrian traffic during all phases of construction. The design shall include construction phasing of roadways ingress and egress to existing property owners and businesses, routing, signing and pavement markings, and detour quantity tabulations, roadway pavement, drainage structures, ditches, front slopes, back slopes, drop offs within clear zone, transit stops, and traffic monitoring sites. Special consideration shall be given to the construction of the drainage system when developing the construction phases. Positive drainage must be maintained at all times. The design shall include construction phasing of roadways to accommodate the construction or relocation of utilities when the contract includes Joint Project Agreements (JPAs).

The CONSULTANT shall investigate the need for temporary traffic signals, temporary highway lighting, detours, diversions, lane shifts, and the use of materials such as sheet piling in the analysis. The Traffic Control Plan shall be prepared by a certified designer who has completed training as required by the DEPARTMENT. Before proceeding with the TTCP, the CONSULTANT shall meet with the appropriate DEPARTMENT personnel. The purpose of this meeting is to provide information to the CONSULTANT that will better coordinate the Preliminary and Final TTCP efforts.

The CONSULTANT shall consider the local impact of any lane closures or alternate routes. When the need to close a road is identified during this analysis, the CONSULTANT shall notify the DEPARTMENT's Project Manager as soon as possible. Proposed road closings must be reviewed and approved by the DEPARTMENT. Diligence shall be used to minimize negative impacts by appropriate specifications, recommendations or plans development. Local impacts to consider will be local events, holidays, peak seasons, detour route deterioration and other eventualities. CONSULTANT shall be responsible to obtain local authorities permission for use of detour routes not on state highways.

4.10 Master TTCP Design Files

The CONSULTANT shall develop master TTCP files showing each phase of the TTCP. This includes all work necessary for designing lane configurations, diversions, lane shifts,

signing and pavement markings, temporary traffic control devices, and temporary pedestrian ways.

4.11 Selective Clearing and Grubbing

Note: Utilize Activities 25 and 26 for Standalone Landscape Projects.

a) Selective Clearing and Grubbing of Existing Vegetation Field Assessment

The CONSULTANT shall review information from the DEPARTMENT and conduct a project field assessment(s) of existing vegetation. At least one field assessment visit is to be attended by the District Landscape Architect.

The Result of the Field Assessment(s) will determine the course of action for Selective Clearing and Grubbing and the extent of the Vegetation Survey under Task 2.10.

b) Selective Clearing and Grubbing Site Inventory Analysis of Existing Vegetation and Cross-Discipline Coordination (OPTIONAL SERVICES)

The CONSULTANT shall coordinate with the District Utility Office, drainage engineers, and traffic engineers to ensure that preservation of existing vegetation is coordinated between all disciplines. Coordinate with the District Landscape Architect.

Based on the field assessment, the CONSULTANT may be required do a site inventory analysis of existing vegetation, opportunities for preservation and protection of existing vegetation, relocation options, and selective removal of nuisance and/or non-nuisance vegetation. Coordinate with surveyor to have trees and vegetation tagged and surveyed, per tasks 27.28 or 27.29.

c) Selective Clearing and Grubbing- Existing Vegetation Maintenance Report

The CONSULTANT shall include in the plans instructions for the care and maintenance of the plant preservation areas, and selective clearing and grubbing areas throughout the construction period. The CONSULTANT will coordinate with the District Landscape Architect to ensure that the intent of the plant preservation areas is in alignment with future highway landscape plans. The CONSULTANT should be knowledgeable in arboricultural practices to the extent that they are able to deliver detailed and informed Selective Clearing and Grubbing Plans.

4.12 Tree Disposition Plans

Consultant will prepare a Tree Disposition Plan outlining the requirements for the relocation and protection of trees located within the project boundaries. Will utilize the information collected from the Vegetation Survey and information collected under task 4.12 for Selective Clearing and Grubbing.

4.13 Design Variations and Exceptions

The CONSULTANT shall prepare the documentation necessary to gain DEPARTMENT approval of all appropriate Design Variation Memorandums, Formal Design Variations and/or Design Exceptions.

A Project Design Variation Memorandum (FDM Form 122-B) shall be prepared to document all non-controlling design elements for a project that do not meet Department criteria. Those elements requiring a more detailed analysis, as per FDM Section 122.2, shall be submitted as Formal Design Variations or Design Exceptions.

4.14 Design Report

The CONSULTANT shall prepare all applicable report(s) as listed in the Project Description section of this scope. Reports are to be delivered as a signed and sealed pdf file.

4.15 Roadway Quantities for EQ Report

The CONSULTANT shall determine roadway pay items and quantities and the supporting documentation.

4.16 TTCP Quantities for EQ Report

The CONSULTANT shall determine temporary traffic control pay items and quantities and the supporting documentation.

4.17 Cost Estimate

4.18 Technical Special Provisions and Modified Special Provisions

4.19 Other Roadway Analyses

4.20 Field Reviews

4.21 Monitor Existing Structures

The CONSULTANT shall perform field observations to visually identify existing structures within the project limits which may require settlement, vibration or groundwater monitoring by the contractor during construction in accordance with FDM Chapter 117. The CONSULTANT shall identify the necessary pay items to be included in the bid documents to monitor existing structures.

Optional Services (may be negotiated at a later date if needed): The CONSULTANT shall coordinate with and assist the geotechnical engineer and/or structural engineer to develop mitigation strategies (when applicable).

4.22 Technical Meetings

4.23 Quality Assurance/Quality Control

4.24 Independent Peer Review

4.25 Supervision

4.26 Coordination

5 ROADWAY PLANS

The CONSULTANT shall prepare Roadway, TTCP, Utility Adjustment Sheets, plan sheets, notes, and details. The plans shall include the following sheets necessary to convey the intent and scope of the project for the purposes of construction.

5.1 Key Sheet

5.2 Typical Section Sheets

5.2.1 Typical Sections

5.2.2 Typical Section Details

5.3 General Notes/Pay Item Notes

5.4 Project Layout

5.5 Plan/Profile Sheet

5.6 Profile Sheet

5.7 Plan Sheet

5.8 Special Profile

5.9 Back-of-Sidewalk Profile Sheet

5.10 Interchange Layout Sheet

5.11 Ramp Terminal Details (Plan View)

5.12 Intersection Layout Details

5.13 Special Details

5.14 Cross-Section Pattern Sheets

5.15 Roadway Soil Survey Sheets

5.16 Cross Sections

5.17 Temporary Traffic Control Plan Sheets

5.18 Temporary Traffic Control Cross Section Sheets

5.19 Temporary Traffic Control Detail Sheets

5.20 Utility Adjustment Sheets

5.21 Selective Clearing and Grubbing Sheets

5.21.1 Selective Clearing and Grubbing (N/A)

5.21.2 Selective Clearing and Grubbing Details (N/A)

5.22 Tree Disposition Plan Sheets

5.22.1 Tree Disposition Plan Sheets (N/A)

5.22.2 Tree Disposition Plan Tables and Schedules (N/A)

5.23 Project Control Sheets

5.24 Environmental Detail Sheets

Preparation of detail sheets for potential environmental issues such as, underground fuel tanks and monitoring wells, septic tanks within the proposed right of way. All piping and pumps in association with the above referenced issues shall also be located and identified by the survey. The CONSULTANT shall relay to the DEPARTMENT any findings of contaminated soil, monitoring wells, or any features (particularly springs or sinks) relating to contamination or hazardous material.

Coordination with Permits/Environmental staff and preparing Dredge & Fill Detail sheets where applicable.

5.25 Utility Verification Sheets (SUE Data)

5.26 Quality Assurance/Quality Control

5.27 Supervision

6a DRAINAGE ANALYSIS

The CONSULTANT shall analyze and document Drainage Tasks in accordance with all applicable manuals, guidelines, standards, handbooks, procedures, and current design memorandums.

The CONSULTANT shall be responsible for designing a drainage and stormwater management system. All design work shall comply with the requirements of the appropriate regulatory agencies and the DEPARTMENT's Drainage Manual.

The CONSULTANT shall coordinate fully with the appropriate permitting agencies and the DEPARTMENT's staff. All activities and submittals should be coordinated through the DEPARTMENT's Project Manager. The work will include the engineering analyses for any or all of the following:

6a.1 Drainage Map Hydrology

Create a (pre- and/or post-condition) working drainage basin map to be used in defining the system hydrology. This map shall incorporate drainage basin boundaries, existing survey and/or LiDAR and field observations, as necessary, to define the system. Basin

delineations shall also include any existing collection systems in a logical manner to aid in the development of the hydraulic model. Include coordination hours needed to convey drainage hydrologic features onto produced drainage maps.

6a.2 Base Clearance Calculations

Analyze, determine, and document high water elevations per basin which will be used to set roadway profile grade and roadway materials. Determine surface water elevations at cross drains, floodplains, outfalls and adjacent stormwater ponds. Determine groundwater elevations at intervals between the above-mentioned surface waters. Document findings in a Base Clearance Report.

6a.3 Pond Siting Analysis and Report

Evaluate pond sites using a preliminary hydrologic analysis. Document the results and coordination for all the project's pond site analyses. The Drainage Manual provides specific documentation requirements.

6a.4 Design of Cross Drains

Analyze the hydraulic design and performance of cross drains. Check existing cross drains to determine if they are structurally sound and can be extended. Document the design as required. Determine and provide flood data as required.

6a.5 Design of Ditches

Design roadway conveyance and outfall ditches. This task includes capacity calculations, longitudinal grade adjustments, flow changes, additional adjustments for ditch convergences, selection of suitable channel lining, design of side drain pipes, and documentation. (Design of linear stormwater management facilities in separate task.)

6a.6 Design of Stormwater Management Facility (Offsite or Infield Pond)

Design stormwater management facilities to meet requirements for stormwater quality treatment, attenuation and aesthetics. Develop proposed pond layout (contributing drainage basin, shape, contours, slopes, volumes, tie-ins, aesthetics, etc.), perform routing, pollutant/nutrient loading calculations, recovery calculations, design the outlet control structure and buoyancy calculations for pond liners when necessary.

6a.7 Design of Stormwater Management Facility (Roadside Treatment Swales and Linear Ponds)

Design stormwater management facilities to meet requirements for stormwater quality treatment, attenuation and aesthetics. Develop proposed pond layout (contributing drainage basin, shape, contours, slopes, volumes, tie-ins, aesthetics, etc.), perform routing, pollutant/nutrient loading calculations, recovery calculations and design the outlet control structure.

6a.8 Design of Floodplain Compensation

Determine floodplain encroachments, coordinate with regulatory agencies, and develop proposed compensation area layout (shape, contours, slopes, volumes, etc.). Document the design following the requirements of the regulatory agency.

6a.9 Design of Storm Drains

Delineate contributing drainage areas, determine runoff, inlet locations, and spread. Calculate hydraulic losses (friction, utility conflict and, if necessary, minor losses). Determine design tailwater and, if necessary, outlet scour protection.

6a.10 Optional Culvert Material

Determine acceptable options for pipe materials using the Culvert Service Life Estimator.

6a.11 French Drain Systems

Design French Drain Systems to provide stormwater treatment and attenuation. Identify location for percolation tests and review these, determine the size and length of French Drains, design the control structure/weir, and model the system of inlets, conveyances, French Drains, and other outfalls using a routing program.

6a.11.1 Existing French Drain Systems

Include this task if French Drains are proposed and the existing systems must be analyzed for a pre- versus post comparison of the peak stages and/or discharges.

6a.12 Drainage Wells

Design the discharge into deep wells to comply with regulatory requirements. Identify the location of the well, design the control structure/weir, and model the system using a routing program.

6a.13 Drainage Design Documentation Report

Compile drainage design documentation into report format. Include documentation for all the drainage design tasks and associated meetings and decisions, except for stand-alone reports, such as the Pond Siting Analysis Report and Bridge Hydraulics Report.

6a.14 Bridge Hydraulic Report

Calculate hydrology, hydraulics, deck drainage, scour, and appropriate counter measures. Prepare report and the information for the Bridge Hydraulics Recommendation Sheet.

6a.15 Temporary Drainage Analysis

Evaluate and address drainage to adequately drain the road and maintain existing offsite drainage during all construction phases. Provide documentation.

6a.16 Drainage Quantities for EQ Report

The CONSULTANT shall determine drainage pay items and quantities and the supporting documentation.

6a.17 Cost Estimate

Prepare cost estimates for the drainage components, except bridges and earthwork for stormwater management and flood compensation sites.

6a.18 Technical Special Provisions / Modified Special Provisions

6a.19 Hydroplaning Analysis

Perform a hydroplaning analysis to assist in the determination of the appropriate roadway geometry for all necessary locations (both typical sections and critical cross sections) as needed. See the FDOT Hydroplaning Guidance and FDOT Design Manual (FDM) Chapters 210 and 211 for more information.

6a.20 Existing Permit Analysis

Data gathering including desktop analysis of local, state and federal Drainage permits.

6a.21 Other Drainage Analysis

Includes all efforts for a drainage task not covered by an existing defined task.

6a.22 Noise Barrier Evaluation

Evaluate the capacity of drainage openings in noise barriers and locate them to ensure flows are accommodated.

6a.23 Erosion Control Plan

Includes analysis and design of the Erosion Control Plan. Includes creating the design file.

6a.24 Field Reviews

6a.25 Technical Meetings

Meetings with Department staff, regulatory agencies, local governments such as meetings with District Drainage Engineer, the Water Management District, FDEP, etc.

6a.26 Environmental Look-Around Meetings

Convene a meeting with Department staff, regulatory agencies, local governments and other stakeholders to explore watershed wide stormwater needs and alternative permitting approaches.

6a.27 Quality Assurance/Quality Control

6a.28 Independent Peer Review

6a.29 Supervision

6a.30 Coordination

6b DRAINAGE PLANS

The CONSULTANT shall prepare Drainage plan sheets, notes, and details. The plans shall include the following sheets necessary to convey the intent and scope of the project for the purposes of construction.

6b.1 Drainage Map (Including Interchanges)

6b.2 Bridge Hydraulics Recommendation Sheets

6b.3 Drainage Structures

6b.4 Lateral Ditch Plan/Profile & Cross Sections

6b.5 Retention/Detention/Floodplain Compensation Pond Details & Cross Sections

6b.6 Erosion Control Plan

6b.7 SWPPP

6b.8 Quality Assurance/Quality Control

6b.9 Supervision

7 UTILITIES

The CONSULTANT shall identify utility facilities and secure agreements, utility work schedules, and plans from the Utility Agency Owners (UAO) ensuring all conflicts that exist between utility facilities and the DEPARTMENT's construction project are addressed. The CONSULTANT shall certify all utility negotiations have been completed and that arrangements have been made for utility work to be undertaken.

7.1 Utility Kickoff Meeting

Before any contact with the UAO(s), the CONSULTANT shall meet with the District Utility Office (DUO) to receive guidance, as may be required, to assure that all necessary coordination will be accomplished in accordance with DEPARTMENT procedures. CONSULTANT shall bring a copy of the design project work schedule reflecting utility activities. The Consultant shall be prepared to discuss the projects applied utility schedule logic and current UAO contact information.

7.2 Identify Existing Utility Agency Owner(s)

The Consultant shall identify all Utility Agency Owners (UAOs) in the corridor and within and adjacent to the project limits that may be impacted by the project. Identification shall include the updates UAO contact information. The Consultant shall contact Sunshine 811, perform a field visit, and review prior FDOT utility permits, reports, existing plans, and surveys provided.

7.3 Make Utility Contacts

First Contact: The CONSULTANT shall send letters and plans to each Utility Agency Owner (UAO), one set for the utility office, and one set to the DEPARTMENT Offices as required by the District. Includes contact by phone for meeting coordination. Request type, size, location, easements, and cost for relocation if reimbursement is claimed. Request the voltage level for power lines in the project area. Send UAO requests for reimbursement to FDOT for a legal opinion. Include the meeting schedule (if applicable) and the design schedule. Include typical meeting agenda. If scheduling a meeting, give a 4-week notice.

Second Contact: At a minimum of 4 weeks prior to the meeting, the CONSULTANT shall transmit Phase II plans and the utility conflict information (when applicable and in the format requested by the DEPARTMENT) to each UAO having facilities located within the project limits, and one set to the DEPARTMENT Offices as required by the District.

Third Contact: Identify agreements and assemble packages. The CONSULTANT shall send agreements, letters, the utility conflict information (when applicable and in the format requested by the DEPARTMENT) and plans to the UAO(s) including all component sets, one set for the utility office, one set to construction and maintenance if required. Include the design schedule.

Not all projects will have all contacts as described above.

7.4 Exception Processing

The CONSULTANT shall be responsible for transmitting/coordinating the appropriate design reports including, but not limited to, the Resurfacing, Restoration and Rehabilitation (RRR) report, Preliminary Engineering Report, Project Scope and/or the Concept Report (if applicable) to each UAO to identify any condition that may require a Design Alternative. The CONSULTANT shall identify and communicate to the UAO any facilities in conflict with their location or project schedule. The CONSULTANT shall assist with the processing of design alternative involving Utilities with the UAO and the DEPARTMENT. Assist with processing per the UAM.

7.5 Preliminary Utility Meeting

The CONSULTANT shall schedule (time and place), notify participants, and conduct a preliminary utility meeting with all UAO(s) having facilities located within the project limits for the purpose of presenting the project, review the current design schedule, evaluate the utility information collected, provide follow-up information on compensable property rights from the FDOT Legal Office, discuss the utility work by highway contractor option with each utility, and discuss any future design issues that may impact utilities. This is also an opportunity for the UAO(s) to present proposed facilities. The CONSULTANT shall keep accurate minutes and distribute a copy to all attendees.

7.6 Individual/Field Meetings

The CONSULTANT shall meet with each UAO as necessary, separately or together, throughout the project design duration to provide guidance in the interpretation of plans, review changes to the plans and schedules, standard or selective clearing and grubbing work, and assist in the development of the UAO(s) marked/RGB plans and work schedules.

The CONSULTANT is responsible for motivating the UAO to complete and return the necessary documents after each Utility Contact or Meeting.

7.7 Collect and Review Plans and Data from UAO(s)

The CONSULTANT shall review UAO marked plans and data individually as they are received for content, accuracy, utility type, material, and size. Provide to the EOR (designer) for inclusion in the plans. Forward all requests for UAO reimbursement and supporting documentation to the DUO.

7.8 Subordination of Easements Coordination

The CONSULTANT, if requested by the DEPARTMENT, shall transmit to and secure from the UAO the executed subordination agreements prepared by the appropriate DEPARTMENT office. The CONSULTANT shall coordinate with the DUO the programming of the necessary work program funds to compensate the UAO.

7.9 Utility Design Meeting

The CONSULTANT shall schedule (time and place), notify participants, and conduct a Utility meeting with all affected UAO(s). The CONSULTANT shall be prepared to discuss impacts to existing trees/vegetation and proposed landscape, drainage, traffic signalization, temporary traffic control plans (TTCP) (construction phasing), review the current design schedule and letting date, evaluate the utility information collected, provide follow-up information on compensable property rights from FDOT Legal Office, discuss with each UAO the utility work by highway contractor option, discuss any future design issues that may impact utilities, etc., to the extent that they may have an effect on existing or proposed utility facilities with particular emphasis on drainage and TTCP with each UAO. The intent of this meeting shall be to assist the UAOs in identifying and resolving conflicts between utilities and proposed construction before completion of the plans, including utility adjustment details. Also, to work with the UAOs to recommend potential resolution between known utility conflicts with proposed construction plans as may be deemed practical by the UAO. The CONSULTANT shall keep accurate minutes of all meetings and distribute a copy to all attendees within 3 days. See Task 4.5 (Horizontal/Vertical Master Design File) and Task 4.8 (Cross Section Design Files) for utility conflict location identification and adjustments.

7.10 Review Utility Markups & Work Schedules and Processing of Schedules & Agreements

The CONSULTANT shall review utility marked up plans and work schedules as they are received for content and coordinate review with the designer. Send color markups and schedules to the appropriate DEPARTMENT office(s) such as survey, geotechnical, drainage, structures, lighting, roadway, signals, utilities, landscape architecture, municipalities, maintaining agency, and District Traffic Operations for review and comment if required by the District. Coordinate with the District for execution. Distribute Executed Final Documents. Prepare Work Order for UAO(s). The CONSULTANT shall coordinate with the DUO the programming of necessary Work Program funds.

7.11 Utility Coordination/Follow-up

The CONSULTANT shall provide utility coordination and follow up. This includes follow-up, interpreting plans, and assisting the UAOs with completion of their work schedules and agreements. Includes phone calls, face-to-face meetings, etc., to motivate and ensure the UAO(s) complete and return the required documents in accordance with the project schedule. Ensure the resolution of all identified conflicts. The CONSULTANT shall keep accurate minutes of all meetings and distribute a copy to all attendees. This task can be applied to all phases of the project.

7.12 Utility Constructability Review

The CONSULTANT shall review utility schedules against construction contract time, and phasing for compatibility. Coordinate with and obtain written concurrence from the construction office. See Task 4.5 (Horizontal/Vertical Master Design File) and Task 4.8 (Cross Section Design Files) for utility conflict identification and adjustments.

7.13 Additional Utility Services

The CONSULTANT shall provide additional utility services. Additional services will be determined when the services are required and requested. This item is not usually included in the scope at the time of negotiation. It is normally added as a supplemental agreement when the need is identified.

7.14 Processing Utility Work by Highway Contractor (UWHC)

This includes coordination of utility design effort between the DEPARTMENT and the UAO(s). The CONSULTANT shall conduct additional coordination meetings, prepare and process the agreements, review tabulation of quantities, perform UWHC constructability and bidability review, review pay items, cost estimates and Technical Special Provisions (TSP) or Modified Special Provision (MSP) prepared by the UAO. This does not include the utility design effort. This item is not usually included in the scope at the time of negotiation. It is normally added as a supplemental agreement when the need is identified. Effort for the EOR is not included in this task, see Roadway Analysis Task Group 4.

7.15 Contract Plans to UAO(s)

If requested by the District, the CONSULTANT shall transmit the contract plans as processed for letting to the UAO(s). Transmittals to UAO(s) via electronic delivery or another agreeable format.

7.16 Certification/Close-Out

This includes hours for transmitting utility files to the DUO and preparation of the Utility Certification Letter. The CONSULTANT shall certify to the appropriate DEPARTMENT representative the following:

All utility negotiations (Full execution of each agreement, approved Utility Work Schedules, Technical Special Provisions or Modified Special Provisions written, etc.) have

been completed with arrangements made for utility work to be undertaken and completed as required for proper coordination with the physical construction schedule.

OR

An on-site inspection was made and no utility work will be involved.

OR

Plans were sent to the Utility Companies/Agencies and no utility work is required.

7.17 Other Utilities

The CONSULTANT shall provide other utility services. This includes all efforts for a utility task not covered by an existing defined task. Required work will be defined in the scope and negotiated on a case-by-case basis.

8 ENVIRONMENTAL PERMITS and ENVIRONMENTAL CLEARANCES

The CONSULTANT shall notify the DEPARTMENT Project Manager, Environmental Permit Coordinator, and other appropriate DEPARTMENT personnel in advance of all scheduled meetings with the regulatory agencies to allow a DEPARTMENT representative to attend. The CONSULTANT shall copy in the Project Manager and the Environmental Permit Coordinator on all permit related correspondence and meetings. The Consultant shall use current regulatory guidelines and policies for all permits required as identified in Section 2.4.

8.1 Preliminary Project Research

The CONSULTANT shall perform preliminary project research and shall be responsible for regulatory agency coordination to assure that design efforts are properly directed toward permit requirements. The research shall include but should not be limited to a review of the project's PD&E documents including the Environmental Document, Natural Resources Evaluation Report, and Cultural Resources Assessment Survey Report.

The CONSULTANT shall research any existing easements or other restrictions that may exist both within or adjacent to the proposed project boundary. Project research may include but should not be limited to review of available: District Right of Way files and databases; federal, state, and local permit files and databases; and local government information including county and property appraiser data. The CONSULTANT shall determine if any Sovereign Submerged Lands easements need to be modified or acquired. Any applicable information will be shown on the plans as appropriate.

8.2 Field Work

8.2.1 Pond Site Alternatives:

The CONSULTANT shall review alternative pond sites as directed by the DEPARTMENT and information shall be included in the Pond Siting Report.

8.2.2 Establish Wetland Jurisdictional Lines and Assessments:

The CONSULTANT shall be responsible for, but not limited to, the following activities:

- Determine landward extent of wetlands and other surface waters as detailed in Rule Chapter 62-340, F.A.C., as ratified in Section 373.4211, F.S..; United States Army Corps of Engineers (USACE) Wetland Delineation Manual (Technical Report Y-87-1); Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (ERD/EL TR-10-20).
- Collect all data and information necessary to determine the jurisdictional boundaries of wetlands and other surface waters as defined by the rules or regulations of each permitting agency processing a DEPARTMENT permit application for the project.
- Set seasonal high-water levels in adjacent wetlands with biological indicators
- Obtain a jurisdictional determination as defined by the rules or regulations of each permitting agency processing a DEPARTMENT permit application for the project.
- Prepare aerial maps showing the jurisdictional boundaries of wetlands and other surface waters. Aerial maps shall be reproducible, of a scale of 1"=400'or more detailed and be recent photography. The maps shall show the jurisdictional boundaries of each agency. Photo copies of aerials are not acceptable. When necessary, a wetland specific survey will be prepared by a registered surveyor and mapper. All surveyed jurisdictional boundaries are to be tied to the project's baseline of survey.
- Prepare a written assessment of the current condition and functional value of the wetlands and other surface waters. Prepare data in tabular form which includes the ID number for each wetland (and other surface water, if necessary) impacted, size of wetland to be impacted, type of impact, and identify any wetland (by ID number and size) within the project limits that will not be impacted by the project.
- Prepare appropriate agency forms to obtain required permits. Forms may include but are not limited to the USACE "Wetland Determination Data Form - Atlantic and Gulf Coastal Plain Region"; the USACE "Request for Corps Jurisdictional Determination"; Uniform Mitigation Assessment Method forms and/or project specific data forms.

8.2.3 Species Surveys:

The CONSULTANT shall conduct wildlife surveys as defined by rules or regulations of any permitting agency, or commenting agency that is processing a DEPARTMENT permit.

8.3 Agency Verification of Wetland Data

The CONSULTANT shall be responsible for verification of wetland and other surface water data identified in Section 8.2 and coordinating regulatory agency field reviews, including finalization of assessments and jurisdictional determinations with applicable agencies.

8.4 Complete and Submit All Required Permit Applications

The CONSULTANT shall collect the data and information necessary to prepare the permit applications and obtain the environmental permits required to construct the project as identified in the Project Description and as described in 8.4.1, 8.4.2, and 8.15 (Other Environmental Permits). The CONSULTANT shall prepare each permit application in accordance with the rules and/or regulations of the regulatory agency responsible for issuing a specific permit and/or authorization to perform work. The permit application packages must be approved by the DEPARTMENT prior to submittal to regulatory agencies.

The CONSULTANT will submit all permit applications, as directed by the DEPARTMENT, and be responsible for payment of all permit and public noticing fees, unless directed otherwise by the DEPARTMENT.

8.4.1 Complete and Submit all Required Wetland Permit Applications:

The CONSULTANT shall prepare, complete, and submit required wetland permit (i.e. ERP, Section 404) application packages to the appropriate regulatory agencies. This includes, but is not limited to, applications submitted to WMDs and/or DEP, and USACE. The application package may include but is not limited to attachments (e.g. project location map, aerials, affidavit of ownership, pictures, additional technical analysis, etc.), a cover letter with project description as well as completion of applicable agency forms. The CONSULTANT shall prepare and respond to agency Requests for Additional Information (RAIs), including necessary revisions to the application package. All responses and completed application packages must be approved by the District Permit Coordinator prior to submittal to the regulatory agencies. Geotechnical permitting should also be prepared, submitted, and obtained.

8.4.2 Complete and Submit all Required Species Permit Applications:

The CONSULTANT shall prepare, complete and submit required species permit applications to the appropriate agencies. This includes federal and state protected species permit application packages as required. The work includes completion of application package (e.g. project location map, aerials, affidavit of ownership, pictures, additional technical analysis, etc.), and cover letter with project description as well as completion of applicable forms. The CONSULTANT shall respond to agency RAIs, including necessary revisions to the application package. All responses and completed applications must be approved by the District Permit Coordinator prior to submittal to the regulatory agency.

8.5 Coordinate and Review Dredge and Fill Sketches

The CONSULTANT shall review Dredge and Fill Detail sheets to ensure information on the sketch(es) meet the requirements of the regulatory agencies and are appropriate for environmental permit application submittal and acquisition. The CONSULTANT will also provide environmental data/information as needed to support the preparation of the Dredge and Fill sketches.

8.6 Complete and Submit Documentation for Coordination and/or USCG Bridge Permit Application

The CONSULTANT shall be responsible for the level of effort needed for the USCG authorization in accordance with the regulatory agency requirements.

8.6.1 Prepare and submit required documents for USCG Coordination

The CONSULTANT shall complete appropriate documentation required for the USCG to determine the navigability of the waterway and whether a USCG permit will be required.

8.6.2 Complete and submit USCG Bridge Permit Application

The CONSULTANT shall prepare and submit required USCG bridge permit application. The CONSULTANT shall be responsible for acquiring the USCG approval.

8.7 Prepare Water Management District or Local Water Control District Right of Way Occupancy Permit Application

The CONSULTANT shall be responsible for the preparation of the ROW Occupancy permit application in accordance with the regulatory agency requirements. The CONSULTANT shall be responsible for acquiring the ROW Occupancy permit.

8.8 Prepare Coastal Construction Control Line (CCCL) Permit Application

The CONSULTANT shall be responsible for the preparation of the CCCL permit application and acquire the final "Notice to Proceed" authorization from the Florida Department of Environmental Protection (FDEP). Legal advertisements shall be published one time in a newspaper that meets the notification requirements of the FDEP.

8.9 Prepare USACE Section 408 Application to Alter a Civil Works Project

The CONSULTANT shall be responsible for the preparation of the Section 408 (33 USC 408) application and obtaining Section 408 permission.

8.10 Compensatory Mitigation Plan

If impacts cannot be avoided, the CONSULTANT shall prepare a mitigation plan to be included as a part of the application(s).

Prior to the development of mitigation alternatives, the CONSULTANT shall meet with the Project Manager and Environmental Permit Coordinator to determine the DEPARTMENT's policies in proposing mitigation. The CONSULTANT shall develop a mitigation plan based upon the general guidelines provided by the DEPARTMENT.

The CONSULTANT will be directed by the DEPARTMENT to investigate the mitigation options that meet federal and state requirements in accordance with section 373.4137, F.S. Below are mitigation options:

- Purchase of mitigation credits from a mitigation bank
- Payment to DEP/WMD for mitigation services
- Monetary participation in offsite regional mitigation plans

- Creation/restoration of wetlands

In the event that physical creation or restoration is the only feasible alternative to offset wetland impacts, the CONSULTANT shall collect all of the data and information necessary to prepare mitigation plans acceptable to all permitting agencies and commenting agencies who are processing or reviewing a permit application for a DEPARTMENT project.

Prior to selection of a final creation/restoration mitigation site, the CONSULTANT will provide the following services in the development of a mitigation plan:

- Preliminary jurisdictional determination for each proposed site
- Selection of alternative sites
- Coordination of alternative sites with the DEPARTMENT/all environmental agencies
- Written narrative listing potential sites with justifications for both recommended and non-recommended sites.

8.11 Mitigation Coordination and Meetings

The CONSULTANT shall coordinate with DEPARTMENT personnel prior to approaching any environmental permitting or commenting agencies. Once a mitigation plan has been reviewed and approved by the DEPARTMENT, the CONSULTANT will be responsible for coordinating the proposed mitigation plan with the environmental agencies. The CONSULTANT will provide mitigation information needed to update the FDOT Environmental Impact Inventory.

8.12 Regulatory Agency Support

The CONSULTANT shall provide regulatory agency support which may include but is not limited to preparing: a Statement of Findings or Memorandum for the Record; Public Notice; Findings of Fact; and Biological Opinion.

8.13 Technical Support to the DEPARTMENT for Environmental Clearances and Re-evaluations (use when CONSULTANT provides technical support only)

The CONSULTANT shall provide engineering and environmental support for the DEPARTMENT to obtain environmental clearances for all changes to the project after the PD&E study was approved. These changes include but are not limited to pond or mitigation sites identified, land use or environmental changes, and major design changes.

8.13.1 NEPA or SEIR Re-evaluation

During the development of the final design plans, the CONSULTANT shall be responsible for coordinating with the District Project Manager to provide necessary engineering information required in the preparation of the re-evaluation by the DEPARTMENT. The preparation of environmental re-evaluations includes those as listed in Part 1, Chapter 13 of the DEPARTMENT's PD&E Manual: Right of Way, Design Change, and Construction Advertisement.

Re-evaluations will be completed in accordance with Part 1, Chapter 13 of the PD&E Manual. The CONSULTANT shall provide information to update the Project Commitment Record for incorporation into the re-evaluation.

It is the responsibility of the CONSULTANT to provide the District Project Manager with engineering information on major design changes including changes in typical section, roadway alignment, pond site selection, right of way requirements, bridge to box culvert, drainage, and traffic volumes that may affect noise models.

8.13.2 Archaeological and Historical Resources

The CONSULTANT shall provide necessary technical information to the District's Project Manager to analyze the impacts to all cultural and historical resources due to changes in the project in accordance with Part 2, Chapter 8 of the PD&E Manual.

8.13.3 Wetland Impact Analysis

The CONSULTANT shall provide necessary technical information to the District's Project Manager to analyze the impacts to wetlands and other surface waters in accordance with Part 2, Chapter 9 of the PD&E Manual due to changes in the project.

8.13.4 Essential Fish Habitat Impact Analysis

The CONSULTANT shall provide necessary technical information to the District's Project Manager to analyze the impacts to essential fish habitat in accordance Part 2, Chapter 17 of the PD&E Manual due to changes in the project.

8.13.5 Protected Species and Habitat Impact Analysis

The CONSULTANT shall provide necessary technical information to the District's Project Manager to analyze the impacts to all protected species and habitat in accordance with Part 2, Chapter 16 of the PD&E Manual due to changes in the project. The CONSULTANT shall perform the necessary analysis to complete agency consultation in accordance with Section 7 or Section 10 of the Endangered Species Act.

8.14 Preparation of Environmental Clearances and Re-evaluations (use when CONSULTANT prepares all documents associated with a re-evaluation)

The CONSULTANT shall prepare reports and clearances for all the changes to the project that occurred after the PD&E study was approved. These changes could include but are not limited to pond and/or mitigation sites identified, land use or environmental changes, and major design changes.

8.14.1 NEPA or SEIR Re-evaluation

During the development of the final design plans, the CONSULTANT shall be responsible for collecting the data and preparing a re-evaluation in accordance with Part 1, Chapter 13 of the PD&E Manual.

8.14.2 Archaeological and Historical Resources

The CONSULTANT shall collect data necessary to completely analyze the impacts, due to changes in the project or project area, to all cultural and historic resources, and prepare a Cultural Resource Assessment Survey Report, in accordance with Part 2, Chapter 8 of the PD&E Manual.

The CONSULTANT will conduct a Cultural Resources Assessment Survey for the project Area of Potential Effect and prepare all required documentation detailing the survey results and assessments of resource significance, to obtain State Historic Preservation Officer concurrence. Personnel performing this work must meet or exceed the minimum criteria for archaeologists, historians, architectural historians, and other professionals as outlined in 36 CFR Part 61 and set forth in the Professional Qualifications Standards section of the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (FR, Vol. 48, No. 190, 44738-44739; September 29, 1983).

8.14.3 Wetland Impact Analysis

The CONSULTANT shall analyze the impacts to wetlands due to changes to the project and complete the wetlands section of a Natural Resources Evaluation Report, in accordance with Part 2, Chapter 9 of the PD&E Manual.

8.14.4 Essential Fish Habitat Impact Analysis

The CONSULTANT shall analyze the impacts to essential fish habitat due to changes to the project and complete the Essential Fish Habitat section of a Natural Resources Evaluation Report, in accordance with Part 2, Chapter 17 of the PD&E Manual.

8.14.5 Protected Species and Habitat Impact Analysis

The CONSULTANT shall collect data necessary to prepare the protected species and habitat section of the Natural Resources Evaluation Report, and analyze the impacts to protected species and habitat by the changes to the project, in accordance with Part 2, Chapter 16 of the PD&E Manual. The CONSULTANT shall perform the necessary analysis to complete agency consultation in accordance with Section 7 or Section 10 of the Endangered Species Act.

8.15 Other Environmental Permits

8.16 Contamination Impact Analysis

The CONSULTANT shall prepare Contamination Screening Evaluation for the project limits including stormwater ponds and floodplain compensation sites as described in Part 2, Chapter 20, of the PD&E Manual. The appropriate level of analysis and deliverable type will be approved by the DEPARTMENT's Project Manager and District Contamination Impact Coordinator. The draft Level 1 Contamination Screening Evaluation document shall be submitted to the DEPARTMENT's Project Manager and District Contamination Impact Coordinator for review and final approval. The CONSULTANT shall include an evaluation of any new contamination impacts due to changes to the project from the PD&E design concept, if applicable, and any new discharges or new potential contamination

impacts not evaluated in any previously completed Contamination Screening Evaluation. The project impacts, conclusions and recommendations, figures, tables and appendices will be provided in a Level I Contamination Screening Evaluation Report.

The DEPARTMENT will provide Level II assessment services. If contamination is identified within the limits of construction, the CONSULTANT shall coordinate with the District Contamination Impact Coordinator to properly mark identified contamination areas in the plans and develop specifications as appropriate.

8.17 Asbestos Survey

The Department will provide asbestos and metal based coatings survey services.

If asbestos or metal based coatings above threshold levels are found on the bridge(s), the CONSULTANT shall coordinate with the District Contamination Impact Coordinator to obtain plan notes, general notes, specifications, pay item notes, and Operation and Maintenance (O&M) plan for any asbestos to remain in place.

8.18 Technical Meetings

8.19 Quality Assurance/Quality Control

8.20 Supervision

8.21 Coordination

9 STRUCTURES - SUMMARY AND MISCELLANEOUS TASKS AND DRAWINGS

The CONSULTANT shall analyze, design, and develop contract documents for all structures in accordance with applicable provisions as defined in Section 2.19, Provisions for Work. Individual tasks identified in Sections 9 through 18 are defined in the Staff Hour Estimation Handbook and within the provision defined in Section 2. 20, Provisions for Work. Contract documents shall display economical solutions for the given conditions.

The CONSULTANT shall provide Design Documentation to the DEPARTMENT with each submittal consisting of structural design calculations and other supporting documentation developed during the development of the plans. The design calculations submitted shall adequately address the complete design of all structural elements. These calculations shall be neatly and logically presented on digital media or, at the DEPARTMENT's request, on 8 ½"x11" paper and all sheets shall be numbered. The final design calculations shall be signed and sealed by a Florida-licensed professional engineer. A cover sheet indexing the contents of the calculations shall be included and the engineer shall sign and seal that sheet. All computer programs and parameters used in the design calculations shall include sufficient backup information to facilitate the review task.

9.1 Key Sheet and Index of Drawings

9.2 Project Layout

9.3 General Notes and Bid Item Notes

9.4 Miscellaneous Common Details

9.5 Incorporate Report of Core Borings

9.6 Standard Plans- Bridges

9.7 Existing Bridge Plans

9.8 Structures Quantities for EQ Report

9.9 Cost Estimate

9.10 Technical Special Provisions and Modified Special Provisions

9.11 Field Reviews

9.12 Technical Meetings

9.13 Quality Assurance/Quality Control

9.14 Independent Peer Review

9.15 Supervision

9.16 Coordination

10 STRUCTURES - BRIDGE DEVELOPMENT REPORT

The Consultant shall prepare a Bridge Development Report (BDR). The BDR shall be submitted as part of the Phase I Roadway Submittal, General Requirements.

General Requirements

10.1 Bridge Geometry

10.2 Ship Impact Data Collection (N/A)

10.3 Ship Impact Criteria (N/A)

Superstructure Alternatives

10.4 Short-Span Concrete

10.5 Medium-Span Concrete

10.6 Long Span Concrete

10.7 Structural Steel

Foundation and Substructure Alternatives

10.8 Pier/Bent

10.9 Shallow Foundations / GRS Abutments

10.10 Deep Foundations

Movable Span

10.11 Data Collection and Design Criteria (N/A)

10.12 Movable Span Geometrics and Clearances (N/A)

10.13 Deck System Evaluation (N/A)

10.14 Framing Plan Development (N/A)

10.15 Main Girder Preliminary Design (N/A)

10.16 Conceptual Span Balance/Counterweight (N/A)

10.17 Support System Development (N/A)

10.18 Drive Power Calculations (N/A)

10.19 Drive System Development (N/A)

10.20 Power and Control Development (N/A)

10.21 Conceptual Pier Design (N/A)

10.22 Foundation Analysis (FL PIER) (N/A)

10.23 Tender Visibility Study (N/A)

Other BDR Issues

10.24 Aesthetics

10.25 TTCP/Staged Construction Requirements

10.26 Constructability Requirements

10.27 Load Rating for Damaged/Widened Structures

10.28 Quantity and Cost Estimates

10.29 Quantity and Cost Estimates - Movable Span

10.30 Wall Type Justification

Report Preparation

10.31 Exhibits

10.32 Exhibits - Movable Span

10.33 Report Preparation

10.34 Report Preparation - Movable Span

10.35 BDR Submittal Package

Preliminary Plans

When ONLY Phase I plans are final deliverable, use Task Nos. as shown for applicable bridge types for project Activities 12 thru 16. Staffhours to be negotiated and scaled appropriately.

11 STRUCTURES - TEMPORARY BRIDGE (N/A)

N/A

12 STRUCTURES - SHORT SPAN CONCRETE BRIDGE

The CONSULTANT shall prepare plans for Short Span Concrete Bridge(s) at the location(s) specified in Section 2.5.

General Layout Design and Plans

12.1 Overall Bridge Final Geometry

12.2 Expansion/Contraction Analysis

12.3 General Plan and Elevation

12.4 Construction Staging

12.5 Approach Slab Plan and Details

12.6 Miscellaneous Details

End Bent Design and Plans

12.7 End Bent Geometry

12.8 End Bent Structural Design

12.9 End Bent Plan and Elevation

12.10 End Bent Details

Intermediate Bent Design and Plans

12.11 Bent Geometry

12.12 Bent Stability Analysis

12.13 Bent Structural Design

12.14 Bent Plan and Elevation

12.15 Bent Details

Miscellaneous Substructure Design and Plans

12.16 Foundation Layout

Superstructure Design and Plans

12.17 Finish Grade Elevation Calculation

12.18 Finish Grade Elevations

Cast-In-Place Slab Bridges

12.19 Bridge Deck Design

12.20 Superstructure Plan

12.21 Superstructure Sections and Details

Prestressed Slab Unit Bridges

12.22 Prestressed Slab Unit Design

12.23 Prestressed Slab Unit Layout

12.24 Prestressed Slab Unit Details and Schedule

12.25 Deck Topping Reinforcing Layout

12.26 Superstructure Sections and Details

Reinforcing Bar Lists

12.27 Preparation of Reinforcing Bar List

Load Rating

12.28 Load Rating

13 STRUCTURES - MEDIUM SPAN CONCRETE BRIDGE

The CONSULTANT shall prepare plans for Medium Span Concrete Bridge(s) at the location(s) specified in Section 2.5.

General Layout Design and Plans

13.1 Overall Bridge Final Geometry

13.2 Expansion/Contraction Analysis

13.3 General Plan and Elevation

13.4 Construction Staging

13.5 Approach Slab Plan and Details

13.6 Miscellaneous Details

End Bent Design and Plans

13.7 End Bent Geometry

13.8 Wingwall Design and Geometry

13.9 End Bent Structural Design

13.10 End Bent Plan and Elevation

13.11 End Bent Details

Intermediate Bent Design and Plans

13.12 Bent Geometry

13.13 Bent Stability Analysis

13.14 Bent Structural Design

13.15 Bent Plan and Elevation

13.16 Bent Details

Pier Design and Plans

13.17 Pier Geometry

13.18 Pier Stability Analysis

13.19 Pier Structural Design

13.20 Pier Plan and Elevation

13.21 Pier Details

Miscellaneous Substructure Design and Plans

13.22 Foundation Layout

Superstructure Deck Design and Plans

13.23 Finish Grade Elevation (FGE) Calculation

13.24 Finish Grade Elevations

13.25 Bridge Deck Design

13.26 Bridge Deck Reinforcing and Concrete Quantities

13.27 Diaphragm Design

13.28 Superstructure Plan

13.29 Superstructure Section

13.30 Miscellaneous Superstructure Details

Reinforcing Bar Lists

13.31 Preparation of Reinforcing Bar List

Continuous Concrete Girder Design

13.32 Section Properties

13.33 Material Properties

13.34 Construction Sequence

13.35 Tendon Layouts

13.36 Live Load Analysis

13.37 Temperature Gradient

13.38 Time Dependent Analysis

13.39 Stress Summary

13.40 Ultimate Moments

13.41 Ultimate Shear

13.42 Construction Loading

13.43 Framing Plan

13.44 Girder Elevation, including Grouting Plan and Vent Locations

13.45 Girder Details

13.46 Erection Sequence

13.47 Splice Details

13.48 Girder Deflections and Camber

Simple Span Concrete Design

13.49 Prestressed Beam

13.50 Prestressed Beam Schedules

13.51 Framing Plan

Beam Stability

13.52 Beam/Girder Stability

Bearing

13.53 Bearing Pad and Bearing Plate Design

13.54 Bearing Pad and Bearing Plate Details

Load Rating

13.55 Load Ratings

14 STRUCTURES - STRUCTURAL STEEL BRIDGE (N/A)

N/A

15 STRUCTURES - SEGMENTAL CONCRETE BRIDGE (N/A)

N/A

16 STRUCTURES - MOVABLE SPAN (N/A)

N/A

17 STRUCTURES - RETAINING WALLS

The CONSULTANT shall prepare plans for Retaining Wall(s) as specified in Section 2.5.

General Requirements

17.1 Key Sheet

17.2 Horizontal Wall Geometry

Permanent Proprietary Walls

17.3 Vertical Wall Geometry

17.4 Semi-Standard Drawings

17.5 Wall Plan and Elevations (Control Drawings)

17.6 Details

Temporary Proprietary Walls

17.7 Vertical Wall Geometry

17.8 Semi-Standard Drawings

17.9 Wall Plan and Elevations (Control Drawings)

17.10 Details

Cast-In-Place Retaining Walls

17.11 Design

17.12 Vertical Wall Geometry

17.13 General Notes

17.14 Wall Plan and Elevations (Control Drawings)

17.15 Sections and Details

17.16 Reinforcing Bar List

Other Retaining Walls and Bulkheads

17.17 Design

17.18 Vertical Wall Geometry

17.19 General Notes, Tables and Miscellaneous Details

17.20 Wall Plan and Elevations

17.21 Details

18 STRUCTURES - MISCELLANEOUS

The CONSULTANT shall prepare plans for Miscellaneous Structure(s) as specified in Section 2.5.

Concrete Box Culverts

18.1 Concrete Box Culverts

18.2 Concrete Box Culverts Extensions

18.3 Concrete Box Culvert Data Table Plan Sheets

18.4 Concrete Box Culvert Special Details Plan Sheets

Strain Poles

18.5 Steel Strain Poles

18.6 Concrete Strain Poles

18.7 Strain Pole Data Table Plan Sheets

18.8 Strain Pole Special Details Plan Sheets

Mast Arms

18.9 Mast Arms

18.10 Mast Arms Data Table Plan Sheets

18.11 Mast Arms Special Details Plan Sheets

Overhead/Cantilever Sign Structure

18.12 Cantilever Sign Structures

18.13 Overhead Span Sign Structures

18.14 Special (Long Span) Overhead Sign Structures

18.15 Monotube Overhead Sign Structure

18.16 Bridge Mounted Signs (Attached to Superstructure)

18.17 Overhead/Cantilever Sign Structures Data Table Plan Sheets

18.18 Overhead/Cantilever Sign Structures Special Details Plan Sheets

High Mast Lighting

18.19 Non-Standard High Mast Lighting Structures

18.20 High Mast Lighting Special Details Plan Sheets

Noise Barrier Walls (Ground Mount)

18.21 Horizontal Wall Geometry

18.22 Vertical Wall Geometry

18.23 Summary of Quantities - Aesthetic Requirements

18.24 Control Drawings

18.25 Design of Noise Barrier Walls Covered by Standards

18.26 Design of Noise Barrier Walls not Covered by Standards

18.27 Aesthetic Details

Special Structures

18.28 Fender System

18.29 Fender System Access

18.30 Special Structures

18.31 Other Structures

18.32 Condition Evaluation of Signal and Sign Structures, and High Mast Light Poles

18.33 Condition Evaluation of Signal and Sign Structures, and High Mast Light Poles (No As built or Design Plans Available)

18.34 Analytical Evaluation of Signal and Sign Structures, and High Mast Light Poles

18.35 Ancillary Structures Report

19 SIGNING AND PAVEMENT MARKING ANALYSIS

The CONSULTANT shall analyze and document Signing and Pavement Markings Tasks in accordance with all applicable manuals, guidelines, standards, handbooks, procedures, and current design memorandums.

19.1 Traffic Data Analysis

The CONSULTANT shall review the approved preliminary engineering report, typical section package, traffic technical memorandum and proposed geometric design alignment to identify proposed sign placements and roadway markings. Perform queue analysis.

19.2 No Passing Zone Study

The CONSULTANT shall perform all effort required for field data collection, and investigation in accordance with the DEPARTMENT's Manual on Uniform Traffic Studies.

The CONSULTANT shall submit the signed and sealed report to the DEPARTMENT for review and approval.

19.3 Signing and Pavement Marking Master Design File

The CONSULTANT shall prepare the Signing & Marking Design file to include all necessary design elements and all associated reference files.

19.4 Multi-Post Sign Support Calculations

The CONSULTANT shall determine the appropriate column size from the DEPARTMENT's Multi-Post Sign Program(s).

19.5 Sign Panel Design Analysis

Establish sign layout, letter size and series for non-standard signs.

19.6 Sign Lighting/Electrical Calculations

The CONSULTANT shall analyze and document Lighting/Electrical Tasks in accordance with all applicable manuals, guidelines, standards, handbooks, procedures, and current design memorandums.

The CONSULTANT shall prepare a photometric analysis to be submitted as part of the Lighting Design Analysis Report. An analysis shall be provided for each new and/or modified sign panel which requires lighting.

The Consultant shall submit voltage drop calculations and load analysis for each new and/or modified sign panel which requires lighting.

19.7 S&PM Quantities for EQ Report

The CONSULTANT shall determine signing and pavement marking pay items and quantities and the supporting documentation.

19.8 Cost Estimate

19.9 Technical Special Provisions and Modified Special Provisions

19.10 Other Signing and Pavement Marking Analysis

19.11 Field Reviews

19.12 Technical Meetings

19.13 Quality Assurance/Quality Control

19.14 Independent Peer Review

19.15 Supervision

19.16 Coordination

20 SIGNING AND PAVEMENT MARKING PLANS

The CONSULTANT shall prepare a set of Signing and Pavement Marking Plans in accordance with all applicable manuals, guidelines, standards, handbooks, procedures, and current design memorandums that includes the following.

20.1 Key Sheet & Signature Sheet

20.2 General Notes/Pay Item Notes

20.3 Project Layout

20.4 Plan Sheet

20.5 Special Details

20.6 Service Point Details

20.7 Guide Sign Data

20.8 Cross Sections (Sign Installations)

20.9 Quality Assurance/Quality Control

The CONSULTANT shall be responsible for the professional quality, technical accuracy and coordination of traffic design drawings, specifications and other services furnished by the CONSULTANT under this contract.

The CONSULTANT shall provide a Quality Control Plan that describes the procedures to be utilized to verify, independently check, and review all design drawings, specifications and other services prepared as a part of the contract. The CONSULTANT shall describe how the checking and review processes are to be documented to verify that the required procedures were followed. The Quality Control Plan may be one utilized by the CONSULTANT as part of their normal operation or it may be one specifically designed for this project.

20.10 Supervision

21 SIGNALIZATION ANALYSIS

The CONSULTANT shall analyze and document Signalization Analysis Tasks in accordance with all applicable manuals, guidelines, standards, handbooks, procedures, and current design memorandums.

21.1 Traffic Data Collection

The CONSULTANT shall perform all effort required for traffic data collection, including crash reports, 24 hr. machine counts, 8 hr. turning movement counts, 7 day machine counts, and speed & delay studies.

21.2 Traffic Data Analysis

The CONSULTANT shall determine signal operation plan, intersection geometry, local signal timings, pre-emption phasing & timings, forecasting traffic, and intersection analysis run.

21.3 Signal Warrant Study

21.4 Systems Timings

The CONSULTANT shall determine proper coordination timing plans including splits, force offs, offsets, and preparation of Time Space Diagram.

21.5 Reference and Master Signalization Design File

The CONSULTANT shall prepare the Signalization Design file to include all necessary design elements and all associated reference files.

21.6 Reference and Master Interconnect Communication Design File

The CONSULTANT shall prepare the Interconnect Communication Design file to include all necessary design elements and all associated reference files.

21.7 Overhead Street Name Sign Design

The CONSULTANT shall design Signal Mounted Overhead Street Name signs.

21.8 Pole Elevation Analysis

21.9 Traffic Signal Operation Report

As defined by the District

21.10 Signalization Quantities for EQ Report

The CONSULTANT shall determine signalization pay items and quantities and the supporting documentation.

21.11 Cost Estimate

21.12 Technical Special Provisions and Modified Special Provisions

21.13 Other Signalization Analysis

21.14 Field Reviews

The CONSULTANT shall collect information from the maintaining agencies and conduct a field review. The review should include, but is not limited to, the following:

- Existing Signal and Pedestrian Phasing
- Controller Make, Model, Capabilities and Condition/Age
- Condition of Signal Structure(s)
- Type of Detection as Compared with Current District Standards
- Interconnect Media
- Controller Timing Data

21.15 Technical Meetings

21.16 Quality Assurance/Quality Control

The CONSULTANT shall be responsible for the professional quality, technical accuracy and coordination of traffic design drawings, specifications and other services furnished by the CONSULTANT under this contract.

The CONSULTANT shall provide a Quality Control Plan that describes the procedures to be utilized to verify, independently check, and review all design drawings, specifications and other services prepared as a part of the contract. The CONSULTANT shall describe how the checking and review processes are to be documented to verify that the required procedures were followed. The Quality Control Plan may be one utilized by the CONSULTANT as part of their normal operation or it may be one specifically designed for this project.

21.17 Independent Peer Review

21.18 Supervision

21.19 Coordination

22 SIGNALIZATION PLANS

The CONSULTANT shall prepare a set of Signalization Plans in accordance with all applicable manuals, guidelines, standards, handbooks, procedures, and current design memorandums, which includes the following:

22.1 Key Sheet & Signature Sheet

22.2 General Notes/Pay Item Notes

22.3 Signalization Plan Sheets

22.4 Interconnect Plans

22.5 Traffic Monitoring Site

22.6 Guide Sign Data

22.7 Special Details

22.8 Service Point Details

22.9 Mast Arm/Monotube Tabulation Sheet

22.10 Strain Pole Schedule

22.11 TTCP Signal

22.12 Temporary Detection Sheet

22.13 Quality Assurance/Quality Control

The CONSULTANT shall be responsible for the professional quality, technical accuracy and coordination of traffic design drawings, specifications and other services furnished by the CONSULTANT under this contract.

The CONSULTANT shall provide a Quality Control Plan that describes the procedures to be utilized to verify, independently check, and review all design drawings, specifications and other services prepared as a part of the contract. The CONSULTANT shall describe how the checking and review processes are to be documented to verify that the required procedures were followed. The Quality Control Plan may be one utilized by the CONSULTANT as part of their normal operation or it may be one specifically designed for this project.

22.14 Supervision

23 LIGHTING ANALYSIS

The CONSULTANT shall analyze and document Lighting Tasks in accordance with all applicable manuals, guidelines, standards, handbooks, procedures, and current design memorandums.

23.1 Lighting Justification Report

The CONSULTANT shall prepare a Lighting Justification Report. The report shall be submitted under a separate cover with the Phase I plans submittal, titled Lighting Justification Report. The report shall provide analyses for mainlines, interchanges, and arterial roads and shall include all back-up data such that the report stands on its own. Back up data shall include current ADT's, general crash data average cost from the Florida Highway Safety Improvement Manual, crash details data from the last three years, and preliminary lighting calculations.

The report shall address warrants to determine if lighting warrants are met, and shall include a benefit-cost analysis to determine if lighting is justified. The report shall include calculations for the night-to-day crash ratio as well as a table summarizing the day-time and the night-time crashes. The report shall follow the procedures outlined in the FDOT Manual on Uniform Traffic Studies (MUTS) manual which utilize ADT, Three Year Crash Data, night/day crash ratio, percentage of night ADT, etc.

23.2 Lighting Design Analysis Report (LDAR)

The CONSULTANT shall prepare a Preliminary Lighting Design Analysis Report in accordance with the requirements of the FDOT Design Manual. The report shall be submitted under a separate cover with the Phase II plans submittal. After approval of the preliminary report, the CONSULTANT shall submit a revised report for each submittal.

23.3 Voltage Drop Calculations

The CONSULTANT shall submit voltage drop calculations showing the equation or equations used along with the number of luminaries per circuit, the length of each circuit, the size conductor or conductors used and their ohm resistance values. The voltage drop incurred on each circuit (total volts and percentage of drop) shall be calculated, and all work necessary to calculate the voltage drop values for each circuit should be presented in such a manner as to be duplicated by the District.

The Voltage Drop Calculations shall be submitted as part of the Lighting Design Analysis Report.

23.4 FDEP Coordination and Report

23.5 Reference and Master Design Files

The CONSULTANT shall prepare the Lighting Design file to include all necessary design elements and all associated reference files.

23.6 Temporary Highway Lighting

The CONSULTANT shall develop a Temporary Highway Lighting design and, when required, a Temporary Highway Lighting design file. The Temporary Highway Lighting design must account for all phases of the TTCP and includes the analysis, calculations, and placement of luminaires, supports, conductors, conduits, pull boxes, and electrical power service.

23.7 Design Documentation

The CONSULTANT shall submit a Design Documentation with each plans submittal under a separate cover and not part of the roadway documentation book. At a minimum, the design documentation shall include:

- Phase submittal checklist.
- Structural calculations for special conventional pole concrete foundations.
- Correspondence with the power company concerning new electrical service.

23.8 Lighting Quantities for EQ Report

The CONSULTANT shall determine lighting pay items and quantities and the supporting documentation.

23.9 Cost Estimate

23.10 Technical Special Provisions and Modified Special Provisions

23.11 Other Lighting Analysis

23.12 Field Reviews

The CONSULTANT shall collect information from the maintaining agencies and conduct a field review. The review should include but is not limited to the following:

- Existing Lighting Equipment
- Load Center, Capabilities and Condition/Age
- Condition of Lighting Structure(s)
- Verification of horizontal clearances
- Verification of breakaway requirements

23.13 Technical Meetings

23.14 Quality Assurance/Quality Control

23.15 Independent Peer Review

23.16 Supervision

23.17 Coordination

24 LIGHTING PLANS

The CONSULTANT shall prepare a set of Lighting Plans in accordance with all applicable manuals, guidelines, standards, handbooks, procedures, and current design memorandums.

24.1 Key Sheet & Signature Sheet

24.2 General Notes/Pay Item Notes

24.3 Pole Data, Legend & Criteria

24.4 Project Layout

24.5 Plan Sheets

24.6 Special Details

24.7 Service Point Details

24.8 Temporary Highway Lighting Plan Sheets

24.9 Quality Assurance/Quality Control

The CONSULTANT shall be responsible for the professional quality, technical accuracy and coordination of traffic design drawings, specifications and other services furnished by the CONSULTANT under this contract.

The CONSULTANT shall provide a Quality Control Plan that describes the procedures to be utilized to verify, independently check, and review all design drawings, specifications and other services prepared as a part of the contract. The CONSULTANT shall describe how the checking and review processes are to be documented to verify that the required procedures were followed. The Quality Control Plan may be one utilized by the CONSULTANT as part of their normal operation or it may be one specifically designed for this project.

24.10 Supervision

25 LANDSCAPE ANALYSIS

The CONSULTANT shall analyze and document Landscape Architecture Tasks in accordance with all applicable manuals, guidelines, standards, handbooks, procedures, and current design memorandums.

25.1 Data Collection

All research required to collect data necessary to complete the initial design analysis. Includes identifying local ordinances and collection of other project data.

25.2 Site Inventory and Analysis for Proposed Landscape

Includes identification of opportunities and constraints for the proposed landscape project based on existing site conditions. Identify available planting areas for nursery landscape material. Summary of analysis, if required, is included in conceptual design. Roll plots may be required.

25.2a Selective Clearing and Grubbing Site Inventory

25.2b Inventory and Analysis

25.2c1 Vegetation Disposition Plan-Mainline

25.2c2 Vegetation Disposition Plan-Interchange

25.3 Planting Design

25.3a Conceptual Planting Design

Includes delineation of all proposed planting types, scheme development and preliminary costs and reports. The design shall be submitted with the Phase I plans.

25.3a1 Report Preparation

25.3a2 Mainline

25.3a3 Interchanges, Intersections, and Rest Areas

25.3a4 Toll Plazas

25.3b Final Planting Design

Includes identifying the species/type, size, location, spacing, and quality of all plants.

25.3b1 Master Design File Creation

25.3b2 Mainline

25.3b3 Interchanges, Intersections, and Rest Areas

25.3b4 Toll Plazas

25.4 Irrigation Design (N/A)

25.5 Hardscape Design (N/A)

25.6 Roll Plots

Task includes any roll plots for the project to aid in developing final plans (landscape opportunity, disposition, site inventory and analysis, etc.)

25.7 Landscape Quantities for EQ Report

The CONSULTANT shall determine landscape pay items and quantities and the supporting documentation.

25.8 Cost Estimates

25.9 Technical Special Provisions and Modified Special Provisions

25.10 Inspection Services

Services may include: on-site inspection, construction, observation, monitoring, supervision, and any reporting requirements.

25.11 Other Landscape Services

25.12 Outdoor Advertising

Includes all work required to determine locations of all outdoor advertising permitted within the roadway project limits. Includes all work required to determine the proposed view zones and the supporting documentation.

25.13 Field Reviews (N/A)

25.14 Technical Meetings / Public Meetings

25.15 Quality Assurance/Quality Control

25.16 Independent Peer Review

25.17 Supervision

25.18 Project Coordination

25.19 Interdisciplinary Coordination

26 LANDSCAPE PLANS

The CONSULTANT shall prepare a set of Landscape Plans which includes the following.

26.1 Key Sheet & Signature Sheet

26.2 Plant Schedule (Sheet no longer produced) (N/A)

26.3 General Notes/Pay Item Notes

26.4 Planting Plans for Linear Areas

26.5 Planting Plans for Non-Linear Areas (Stormwater Facilities, Rest Areas, Interchanges and Toll Plazas)

26.6 Planting Details

26.7 Irrigation Plans for Linear Areas (N/A)

26.8 Irrigation Plans for Non-Linear Areas (Stormwater Facilities, Rest Areas, Interchange and Toll Plazas) (N/A)

26.9 Irrigation Details (N/A)

26.10 Hardscape Plans and Details (N/A)

26.11 Maintenance Plan

The CONSULTANT shall include a written plan for care and maintenance of the plants and beds, hardscape, and irrigation system after the establishment period. The landscape maintenance plan will be developed in performance based language and will be in coordination with the local government entity who assumes the maintenance obligation.

26.12 Quality Assurance/Quality Control

26.13 Supervision

27 SURVEY

The CONSULTANT shall perform survey tasks in accordance with all applicable statutes, manuals, guidelines, standards, handbooks, procedures, and current design memoranda.

The CONSULTANT shall submit all survey notes and computations to document the surveys. All field survey work shall be recorded in approved media and submitted to the DEPARTMENT. Field books submitted to the DEPARTMENT must be of an approved type. The field books shall be certified by the surveyor in responsible charge of work being performed before the final product is submitted.

The survey notes shall include documentation of decisions reached from meetings, telephone conversations or site visits. All like work (such as bench lines, reference points, etc.) shall be recorded contiguously. The DEPARTMENT may not accept field survey radial locations of section corners, platted subdivision lot and block corners, alignment control points, alignment control reference points and certified section corner references. The DEPARTMENT may instead require that these points be surveyed by true line, traverse or parallel offset.

27.1 Horizontal Project Control (HPC)

Establish or recover HPC, for the purpose of establishing horizontal control on the Florida State Plane Coordinate System or datum approved by the District Surveyor (DS) or District Location Surveyor (DLS); may include primary or secondary control points. Includes analysis and processing of all field collected data, and preparation of forms.

27.2 Vertical Project Control (VPC)

Establish or recover VPC, for the purpose of establishing vertical control on datum approved by the District Surveyor (DS) or the District Location Surveyor (DLS).; may include primary or secondary vertical control points. Includes analysis and processing of all field collected data, and preparation of forms.

27.3 Alignment and/or Existing Right of Way (R/W) Lines

Establish, recover or re-establish project alignment. Also includes analysis and processing of all field collected data, existing maps, and/or reports for identifying mainline, ramp, offset, or secondary alignments. Depict alignment and/or existing R/W lines (in required format) per DEPARTMENT R/W Maps, platted or dedicated rights of way.

27.4 Aerial Targets

Place, locate, and maintain required aerial targets and/or photo identifiable points. Includes analysis and processing of all field collected data, existing maps, and/or reports. Placement of the targets will be at the discretion of the aerial firm.

27.5 Reference Points

Reference Horizontal Project Control (HPC) points, project alignment, vertical control points, section, ¼ section, center of section corners and General Land Office (G.L.O.) corners as required.

27.6 Topography/Digital Terrain Model (DTM) (3D)

Locate all above ground features and improvements for the limits of the project by collecting the required data for the purpose of creating a DTM with sufficient density. Shoot all break lines, high and low points. Effort includes field edits, analysis and processing of all field collected data, existing maps, and/or reports.

27.7 Planimetric (2D)

Locate all above ground features and improvements. Deliver in appropriate electronic format. Effort includes field edits, analysis and processing of all field collected data, existing maps, and/or reports.

27.8 Roadway Cross Sections/Profiles

Perform cross sections or profiles. May include analysis and processing of all field-collected data for comparison with DTM.

27.9 Side Street Surveys

Refer to tasks of this document as applicable.

27.10 Underground Utilities

Designation includes 2-dimensional collection of existing utilities and selected 3-dimensional verification as needed for designation. Location includes non-destructive excavation to determine size, type and location of existing utility, as necessary for final 3-dimensional verification. Survey includes collection of data on points as needed for designates and locates. Includes analysis and processing of all field collected data, and delivery of all appropriate electronic files.

27.11 Outfall Survey

Locate all above ground features and improvements for the limits of the project by collecting the required data for the purpose of a DTM. Survey with sufficient density of shots. Shoot all break lines, high and low points. Includes field edits, analysis and processing of all field collected data, existing maps, and/or reports.

27.12 Drainage Survey

Locate underground data (XYZ, pipe size, type, condition and flow line) that relates to above ground data. Includes field edits, analysis and processing of all field collected data, existing maps, and/or reports.

27.13 Bridge Survey (Minor/Major)

Locate required above ground features and improvements for the limits of the bridge. Includes field edits, analysis and processing of all field collected data, existing maps, and/or reports.

27.14 Channel Survey

Locate all topographic features and improvements for the limits of the project by collecting the required data. Includes field edits, analysis and processing of all field collected data, maps, and/or reports.

27.15 Pond Site Survey

Refer to tasks of this document as applicable.

27.16 Mitigation Survey

Refer to tasks of this document as applicable.

27.17 Jurisdiction Line Survey

Perform field location (2-dimensional) of jurisdiction limits as defined by respective authorities, also includes field edits, analysis and processing of all field collected data, preparation of reports.

27.18 Geotechnical Support

Perform 3-dimensional (X,Y,Z) field location, or stakeout, of boring sites established by geotechnical engineer. Includes field edits, analysis and processing of all field collected data and/or reports.

27.19 Sectional/Grant Survey

Perform field location/placement of section corners, 1/4 section corners, and fractional corners where pertinent. Includes analysis and processing of all field-collected data and/or reports.

27.20 Subdivision Location

Survey all existing recorded subdivision/condominium boundaries, tracts, units, phases, blocks, street R/W lines, common areas. Includes analysis and processing of all field collected data and/or reports. If unrecorded subdivision is on file in the public records of the subject county, tie existing monumentation of the beginning and end of unrecorded subdivision.

27.21 Maintained R/W

Perform field location (2-dimensional) of maintained R/W limits as defined by respective authorities, if needed. Also includes field edits, analysis and processing of all field collected data, preparation of reports.

27.22 Boundary Survey

Perform boundary survey as defined by DEPARTMENT standards. Includes analysis and processing of all field-collected data, preparation of reports.

27.23 Water Boundary Survey

Perform Mean High Water, Ordinary High Water and Safe Upland Line surveys as required by DEPARTMENT standards.

27.24 Right of Way Staking, Parcel / Right of Way Line

Perform field staking and calculations of existing/proposed R/W lines for on-site review purposes.

27.25 Right of Way Monumentation

Set R/W monumentation as depicted on final R/W maps for corridor and water retention areas.

27.26 Line Cutting

Perform all efforts required to clear vegetation from the line of sight.

27.27 Work Zone Safety

Provide work zone as required by DEPARTMENT standards.

27.28 Vegetation Survey (N/A)

27.29 Tree Survey

Locate individual trees or palms within the project limits.

27.30 Miscellaneous Surveys

Refer to tasks of this document, as applicable, to perform surveys not described herein. The percent for Supplemental will be determined at negotiations. This item can only be used if authorized in writing by the District Surveyor (DS), District Location Surveyor (DLS) or their representative.

27.31 Supplemental Surveys

Supplemental survey days and hours are to be approved in advance by DS or DLS. Refer to tasks of this document, as applicable, to perform surveys not described herein.

27.32 Document Research

Perform research of documentation to support field and office efforts involving surveying and mapping.

27.33 Field Review

Perform verification of the field conditions as related to the collected survey data.

27.34 Technical Meetings

Attend meetings as required and negotiated by the Surveying and Mapping Department.

27.35 Quality Assurance/Quality Control (QA/QC)

Establish and implement a QA/QC plan. Also includes subconsultant review, response to comments and any resolution meetings if required, preparation of submittals for review, etc.

27.36 Supervision

Perform all activities required to supervise and coordinate project. These activities must be performed by the project supervisor, a Florida P.S.M. or their delegate as approved by the District Surveying Office.

27.37 Coordination

Coordinate survey activities with other disciplines. These activities must be performed by the project supervisor, a Florida P.S.M. or their delegate as approved by the District Surveying Office.

28 PHOTOGRAMMETRY

The CONSULTANT shall perform photogrammetric tasks in accordance with all applicable statues, manuals, guidelines, standards, handbooks, procedures, and current design memoranda.

In addition to the maps and photographic products, the CONSULTANT shall submit all computations to document the mapping. This will include documentation of all decisions reached from meetings, telephone conversations, and site visits.

28.1 Flight Preparation

Review record data, create target diagrams, and plan the mission.

28.2 Control Point Coordination

Determine photo identifiable control points, and mark contact prints.

28.3 Mobilization

Perform pre- and post-flight aircraft inspection; prepare the aircraft and camera for the mission.

28.4 Flight Operations

Operate the aircraft, aerial camera, and other instruments to obtain aerial photography.

28.5 Photo Products

Prepare contact prints, contact diapositives, and photo enlargements.

28.6 LiDAR

Includes data acquisition, post processing of LiDAR data to XYZ coordinates for "bare earth" classification.

28.7 Aerial Triangulation

Measure and adjust control within aerial images.

28.8 Surfaces

Includes collection of break lines and spot elevations.

28.9 Ortho Generation

Includes creation of final images.

28.10 Rectified Digital Imagery (Georeferenced)

Create the rectified digital image.

28.11 Mosaicking

Create the mosaic.

28.12 Sheet Clipping

Create plot files for sheets from the database.

28.13 Topographics (3D)

Prepare topographic maps including surface and planimetrics. (Photogrammetrist will not propose hours for Surfaces and Topographics.)

28.14 Planimetrics (2D)

Prepare 2D planimetric map.

28.15 Drainage Basin

Includes preparing drainage basin maps in clipped "sheet" format.

28.16 CADD Edit

Perform final edit of graphics for delivery of required Microstation design files (.dgn), CADD, and Geopak files.

28.17 Data Merging

Merge photogrammetric files, field survey files, and data from other sources.

28.18 Miscellaneous

Other tasks not specifically addressed in this document.

28.19 Field Review

Perform on site review of maps.

28.20 Technical Meetings

Attend meetings as required.

28.21 Quality Assurance/Quality Control

Establish and implement a QA/QC plan.

28.22 Supervision

Supervise all photogrammetric activities. This task must be performed by the project supervisor, a Florida P.S.M.

28.23 Coordination

Coordinate with all elements of the project to produce a final photogrammetric product.

29 MAPPING

The CONSULTANT will be responsible for the preparation of control survey maps, right of way maps, maintenance maps, sketches, other miscellaneous survey maps, and legal descriptions as required for this project in accordance with all applicable DEPARTMENT Manuals, Procedures, Handbooks, District specific requirements, and Florida Statutes. All maps, surveys and legal descriptions will be prepared under the direction of a Florida Professional Surveyor and Mapper (PSM) to DEPARTMENT size and format requirements utilizing DEPARTMENT approved software, and will be designed to provide a high degree of uniformity and maximum readability. The CONSULTANT will submit maps, legal descriptions, quality assurance check prints, checklists, electronic media files and any other documents as required for this project to the DEPARTMENT for review at stages of completion as negotiated.

Master CADD File

29.1 Alignment

29.2 Section and 1/4 Section Lines

29.3 Subdivisions / Property Lines

29.4 Existing Right of Way

29.5 Topography

29.6 Parent Tract Properties and Existing Easements

29.7 Proposed Right of Way Requirements

The ENGINEER OF RECORD (EOR) will provide the proposed requirements. The PSM is responsible for calculating the final geometry. Notification of Final Right of Way Requirements along with the purpose and duration of all easements will be specified in writing.

29.8 Limits of Construction

The limits of construction DGN file as provided by the EOR will be imported or referenced to the master CADD file. Additional labeling will be added as required. The PSM is required to advise the EOR of any noted discrepancies between the limits of construction line and the existing/proposed right of way lines, and for making adjustments as needed when a resolution is determined.

29.9 Jurisdictional/Agency Lines

These lines may include, but are not limited to, jurisdictional, wetland, water boundaries, and city/county limit lines.

Sheet Files

29.10 Control Survey Cover Sheet (N/A)

29.11 Control Survey Key Sheet (N/A)

29.12 Control Survey Detail Sheet (N/A)

29.13 Right of Way Map Cover Sheet

29.14 Right of Way Map Key Sheet

29.15 Right of Way Map Detail Sheet

29.16 Maintenance Map Cover Sheet (N/A)

29.17 Maintenance Map Key Sheet (N/A)

29.18 Maintenance Map Detail Sheet (N/A)

29.19 Reference Point Sheet

This sheet(s) will be included with the Control Survey Map, Right of Way Map and Maintenance Map.

29.20 Project Control Sheet

This sheet depicts the baseline, the benchmarks, the primary and secondary control points and their reference points including the type of material used for each point, their XYZ

coordinates, scale factors and convergence angles. This sheet(s) may be included with the Control Survey Map, Right of Way Map and Maintenance Map.

29.21 Table of Ownerships Sheet

Miscellaneous Surveys and Sketches

29.22 Parcel Sketches

29.23 TIITF Sketches

29.24 Other Specific Purpose Survey(s)

29.25 Boundary Survey(s) Map

29.26 Right of Way Monumentation Map

29.27 Title Search Map

29.28 Title Search Report

29.29 Legal Descriptions

29.30 Final Map/Plans Comparison

The PSM will perform a comparison of the final right of way maps with the available construction plans to review the correctness of the type of parcel to be acquired and the stations/offsets to the required right of way. The PSM will coordinate with the EOR to resolve any conflicts or discrepancies and provide documentation of the review.

29.31 Field Reviews

29.32 Technical Meetings

29.33 Quality Assurance/Quality Control

29.34 Supervision

29.35 Coordination

29.36 Supplemental Mapping

This task is to cover efforts resulting from major design and/or development changes after 60% map development that affect the right of way requirements/parent tract property lines and may include any number of tasks. Request and approval to utilize the Supplemental Mapping hours will be in writing and approved by the District Right of Way Surveyor prior to any work being done under this task.

30 TERRESTRIAL MOBILE LiDAR

The CONSULTANT shall perform Terrestrial Mobile LiDAR tasks in accordance with all applicable statutes, manuals, guidelines, standards, handbooks, procedures, and current design memoranda.

In addition to the maps and LiDAR products, the CONSULTANT shall submit all computations and reports to support the mapping. This will include documentation of all decisions reached from meetings, telephone conversations, and site visits.

30.1 Terrestrial Mobile LiDAR Mission Planning

Research and prepare materials necessary for the successful execution of the Mobile LiDAR Mission. This includes but is not limited to route and safety planning, GPS /data acquisition scheduling, weather reports, and site terrain research.

30.2 Project Control Point Coordination

All efforts necessary to coordinate the proper placement of project ground control; i.e.g., base stations, transformation control points, and validation points, supporting the Mobile LiDAR survey .

30.3 Terrestrial Mobile LiDAR Mobilization

Prepare the LiDAR sensor and vehicle for project data collection, and get specialized personnel and equipment on site.

30.4 Terrestrial Mobile LiDAR Mission

Perform site calibrations of LiDAR sensor and collect laser survey data, including any simultaneous base station GPS occupations and operation of any necessary safety equipment.

30.5 Terrestrial Mobile LiDAR Processing

Download and post process collected measurement data from Mobile LiDAR vehicle sensors, and any base stations occupied during mission. Analyze Mobile LiDAR measurement points and scan route overlaps. Separate any large point cloud data sets into manageable file sizes with corresponding indexes.

30.6 Terrestrial Mobile Photography Processing

Process, reference, and name digital photographic imagery files collected during Mobile LiDAR mission.

30.7 Transformation / Adjustment

Adjust LiDAR point cloud data to Project Control points. Create point cloud data file(s) in approved digital format. Prepare required reports of precision and accuracy achieved. If this task is performed by separate firm, or is the final product to be delivered, include effort for Survey Report.

30.8 Classification / Editing

Identify and attribute (classify) point cloud data into requested groups. Classify or remove erroneous points.

30.9 Specific Surface Reporting

Prepare reports, data and/or graphics of specific surface details such as, but not limited to pavement rutting, bridge structure clearance to roadway surface.

30.10 Topographic (3D) Mapping

Produce three dimensional (3D) topographic survey map(s) from collected Mobile LiDAR data. This includes final preparation of Construction Information Management (CIM) deliverable, if applicable.

30.11 Topographic (2D) Planimetric Mapping

Produce two dimensional (2D) planimetric map(s) from collected Mobile LiDAR data.

30.12 CADD Edits

Perform final edit of graphics for delivery of required CADD files. This includes final presentation of CIM deliverable, if applicable.

30.13 Data Merging

Merge Mobile LiDAR survey and mapping files, with other field survey files, and data from other sources.

30.14 Miscellaneous

Other tasks not specifically addressed in this document.

30.15 Field Reviews

Perform on site review of maps.

30.16 Technical Meetings

Attend meetings as required.

30.17 Quality Assurance/ Quality Control

Establish and implement a QA/QC plan.

30.18 Supervision

Supervise all Terrestrial Mobile LiDAR activities. This task must be performed by the project supervisor, a Florida P.S.M.

30.19 Coordination

Coordinate with all elements of the project to produce a final product.

31 ARCHITECTURE DEVELOPMENT (N/A)

N/A

32 NOISE BARRIERS IMPACT DESIGN ASSESSMENT IN THE DESIGN PHASE

The CONSULTANT shall fulfill the commitments resulting from the traffic noise analysis and noise barrier evaluation performed during the Project Development and Environment (PD&E) Phase, as directed and clarified by the DEPARTMENT.

The noise analysis shall be performed in accordance with the FDOT's Noise Policy (Part 2, Chapter 17 of the FDOT's PD&E Manual) and the FDOT's Traffic Noise Modeling and Analysis Guidelines. The noise analysis and noise abatement evaluation shall be performed by or supervised/reviewed by a person(s) who has attended the Department's Traffic Noise Analysis training course or has attended and successfully completed the National Highway Institute's Highway Traffic Noise Course (FHWA-NHI-142051). The Federal Highway Administration (FHWA) approved noise model, the Traffic Noise Model (TNM) Version 2.5 (or most current version) shall be used for the noise analysis, unless otherwise directed by the DEPARTMENT.

32.1 Noise Analysis

The CONSULTANT shall review the preferred PD&E alternative to identify any design changes that would require a reanalysis of traffic noise. Coordination will be held with the District Environmental Management Office, prior to initiating any reanalysis, to discuss possible effects of design changes on the validity of in the noise study performed during PD&E.

The CONSULTANT shall perform a land use review to identify noise sensitive sites that may have received a building permit subsequent to the PD&E noise study but prior to the Date of Public Knowledge (DPK), or to identify areas where the land use may have changed or is subject to change. New noise sensitive sites meeting DPK requirements that were not considered during the PD&E phase will be subject to a traffic noise analysis to be performed by the CONSULTANT. Additionally, noise sensitive sites analyzed in the PD&E phase may have to be re-analyzed if affected by design changes.

The CONSULTANT shall review any commitments made during the PD&E phase regarding possible traffic noise impacts to special use locations. Analysis of special use locations shall be performed using the DEPARTMENT's "A Method to Determine Reasonableness and Feasibility of Noise Abatement at Special Use Locations" document and shall be coordinated with the District Environmental Management Office.

The CONSULTANT shall review the commitments made during the PD&E phase regarding noise barrier concepts determined to be potentially feasible and reasonable. The CONSULTANT will update the analysis of feasibility and reasonableness for noise barriers recommended for further consideration during the design phase and for any additional noise barriers required, using design information (e.g., profile data, horizontal alignment data, etc.) and incorporate into the analysis any new conditions or additional costs related to noise barrier construction that have been identified during design. A design phase noise analysis will be performed at any additional locations required (based on DPK

requirements or roadway design changes). Additional survey may also be required at proposed barrier locations.

Changes to, or fulfillment of, the original noise abatement commitments made during PD&E shall be documented in a Noise Study Report (NSR) Addendum to be prepared by the CONSULTANT in coordination with the District Environmental Management Office. A copy of the final NSR Addendum shall be provided to the District Environmental Management Office.

Traffic Data: The CONSULTANT shall review the traffic data obtained during the PD&E phase to determine if the data remains valid for design phase reanalysis. If the traffic data is no longer valid, the CONSULTANT shall provide to the noise analyst the following data for each road segment (i.e. intersection to intersection) for the design year with the proposed improvements to the road:

- Level of Service C (LOS C) directional volumes
- Demand peak hour volumes (peak and off-peak directions)
- Posted speed
- Percentage of heavy trucks (HT) in the design hour
- Percentage of medium trucks (MT) in the design hour
- Percentage of buses in the design hour
- Percentage of motorcycles (MC) in the design hour

Except for LOS C volumes, the data above shall also be provided for all interchange/highway ramps. The District Noise Specialist may also identify cross streets for which the same data is necessary. (i.e., a cross street for which noise sensitive sites are in close proximity to the project). The CONSULTANT shall contact the District Noise Specialist for direction on the format to be used for providing the traffic data and any requirements regarding approval of the data prior to its use for noise analysis. The traffic data to be used in the noise analysis must be generated by a qualified traffic engineer/planner who works for the DEPARTMENT or is a DEPARTMENT consultant.

32.2 Noise Barrier Evaluation

The CONSULTANT will present the data along with recommendations to the DEPARTMENT for selection of the noise barrier's locations, barriers heights and lengths to be incorporated into the design plans. These recommendations shall consider the noise barrier feasibility and reasonableness.

An evaluation of proposed noise barriers will be performed to identify any engineering conflicts or constraints. The CONSULTANT will be responsible for documenting any resolutions to engineering conflicts or issues that require modification to or preclude construction of a noise barrier. At a minimum, the engineering review will consider the following:

- Right of way needs including access rights (air, light, view, ingress/egress, outdoor advertising conflicts)
- Limited access issues
- Necessary construction and maintenance easements

- Safety issues (e.g., line of sight)
- Maintenance issues
- Structural and vegetative restrictions within easement
- Utility conflicts
- Drainage issues
- Environmental issues
- Other criteria as applicable

The CONSULTANT shall re-analyze noise barrier(s) for feasibility and reasonableness and re-establish barrier height and length if design constraints require alteration in a barrier's location or dimensions.

After reestablishing the recommended height and length of the barrier(s), the CONSULTANT shall coordinate with design engineers and the District Planning and Environmental Office to include the barrier(s) on the design plans. In addition, the CONSULTANT will present a memo to the DEPARTMENT Project Manager containing a recommendation for selection of the barrier height and length to be carried forward for public input. This recommendation shall consider amount of noise reduction provided, engineering constraints and cost (reasonableness). In addition, the CONSULTANT will also consider the overall visual appearance in relation to the existing and proposed site conditions. This includes smoothing the profile along the top of a noise barrier to the extent possible while minimizing any loss in the amount of noise reduction provided and extending the ends of a noise barrier to cover additional receivers. Extending the ends of a noise barrier will not exceed the cost criteria and will only be performed when it is appropriate and in the public interest.

32.3 Public Involvement

If noise barriers are determined to be feasible and cost reasonable, the CONSULTANT shall carry out the public involvement and surveys necessary to report to the DEPARTMENT whether or not the majority of the impacted and/or benefited receptors desire the construction of a noise barrier. Input shall also be obtained from the public regarding barrier aesthetics (color and texture) on one or both sides of the barrier. The CONSULTANT shall be responsible for coordinating with local government officials.

As a minimum, the following tasks shall be completed by the CONSULTANT for public involvement purposes:

- Identification of impacted and/or benefited property owners
- Identification of renters and non-residing property owners (for a property that may be rented)
- Preparation of a mailing list (property owners, renters and non-residing property owners)
- Preparation of a summary package (including an information letter, aerial showing the noise barrier location and a survey form to document the recipients position to be sent to property owners, and occupants/non-residing property owners informing them of the proposed noise barrier

- If necessary, preparation of additional mailings and/or door-to-door/telephone surveys until a majority decision is obtained or until directed by the District Noise Specialist
- Tallying of survey results
- Noise barrier aesthetics coordination
- Public meetings coordination (including arranging the meeting location, advertisements, displays, etc.)
- Responding to public inquiries on an individual basis in coordination with the DEPARTMENT.

The CONSULTANT shall bring to the attention of the DEPARTMENT unforeseen conditions and issues which are relevant to the project decision. Other than noise barrier length, height and location, the CONSULTANT shall abstain from indicating preferences for any of the barrier options prior to or during contact with the property owners unless specifically requested to do so by the DEPARTMENT. Following the public involvement process, the CONSULTANT shall produce a final noise barrier recommendation that identifies the starting and ending points for all noise barriers, the top elevation(s), and the aesthetic elements to be provided (e.g. - color, texture, graphics).

32.4 Outdoor Advertising Identification

The CONSULTANT shall identify potential noise barriers that may block the view of an existing lawfully erected sign that is governed by and conforms to state and federal requirements for land use, size, height and spacing consistent with the requirements of Florida Statute (FS) 479.25 and the FDOT Noise Policy (Part 2, Chapter 17 of the PD&E Manual). The CONSULTANT shall notify the Department's Project Manager of a potential noise barrier(s) that may affect the visibility of a legally permitted outdoor advertising sign. Resolution of the potential conflict shall be documented in the NSR and included in the environmental document.

32.5 Noise Study Report (NSR) Addendum

The results of noise barrier evaluations performed by the CONSULTANT shall be documented in the NSR Addendum (in accordance with Chapter 264 of the FDOT Design Manual (FDM)) and shall include the results of the computer modeling (electronically), public involvement activities and final noise abatement commitments.

32.6 Technical Meetings

Prior to proceeding with the noise barrier analysis, the CONSULTANT shall discuss and coordinate with the appropriate District Project Manager and the District Environmental Management Office staff. The purpose of this discussion will be for the DEPARTMENT to provide the CONSULTANT with all pertinent project information and to confirm the methodologies to be used to conduct the noise analysis. This meeting is mandatory and should occur after the Notice to Proceed is given to the CONSULTANT. It is the responsibility of the CONSULTANT to undertake the necessary action (e.g. phone calls, meetings, correspondence, etc.) to ensure that District Project Manager and the District Environmental Management Office staff is kept informed of the noise analysis efforts so

that these tasks are accomplished in a manner that will enhance the overall success of the project.

32.7 Quality Assurance/Quality Control

QA/QC reviews will be performed for all NSR Addendums submitted to the DEPARTMENT. Documentation of the QA/QC will be provided to the District Project Manager.

The **CONSULTANT** shall ensure that the noise barrier(s) location(s), length, height and aesthetics as shown on the final design plans are consistent with the results of the noise barrier evaluation and recommendation documented in the original NSR and/or the NSR Addendum.

32.8 Supervision

32.9 Coordination

33 INTELLIGENT TRANSPORTATION SYSTEMS ANALYSIS

The CONSULTANT shall analyze and document Intelligent Transportations System (ITS) Analysis Tasks in accordance with all applicable manuals, guidelines, standards, handbooks, procedures, existing ITS standard operating procedures, ITS master and strategic plans, Florida's SEMP guidelines, National, statewide and/or regional ITS architectures, and current design bulletins.

33.1 ITS Analysis

The CONSULTANT shall review the previously prepared and approved preliminary engineering report(s), typical section package, traffic technical memorandum, adjacent projects programmed by the DEPARTMENT and other local highway agencies and proposed geometric design alignment to identify impacts to existing ITS components (if applicable) and proposed ITS field device placements. The CONSULTANT shall review the project intelligence files provided by the District's asset maintenance agent(s) related to all previously constructed ITS projects and maintenance documentation for the project corridor to ensure all cited ITS elements are included in this project for replacement and/or restoration.

Systems Engineering Analysis

The CONSULTANT shall perform a systems engineering analysis including a Concept of Operations (ConOps), Project Systems Engineering Management Plan (PSEMP), Requirements Traceability Verification Matrix (RTVM), and other documents as necessary based on project complexity and risk as required by Florida Department of Transportation Systems Engineering and Intelligent Transportation Systems (ITS) Architecture Procedure (Procedure Number 750-040-003).

Design Guidelines

The CONSULTANT shall use applicable DEPARTMENT requirements and guidelines, including, but not limited to, the FDM, Standard Plans, and Standard Specifications for Road and Bridge Construction in the design of ITS. The CONSULTANT design is expected to include the following attributes, facilities, infrastructure, ITS devices, systems, and associated work: ***TBD***

The CONSULTANT shall review the existing TMC Operations and develop additional incident management service requirements as necessary to support during the Construction Phase of the Project. The CONSULTANT shall coordinate with District's TSM&O Office for additional information regarding existing Incident Management and TMC Operational Procedures (If desired by the District).

All ITS devices shall be compatible with the latest version of the National Transportation Communications for ITS Protocol (NTCIP) and compatible with SunGuide software platform.

The CONSULTANT shall design the project such that all ITS field devices and ancillary components comply with FDOT's Approved Product List (APL) or, when applicable and approved by the DEPARTMENT, FDOT's Innovative Product List (IPL) and are supported within the SunGuide software or other software approved by the DEPARTMENT.

Closed Circuit Television (CCTV) Subsystem

CCTV devices shall be spaced and located as required to meet the Project requirements, Standard Specifications, FDM Section 233.10, District-specific requirements, guidance from the ConOps, and as approved by the DEPARTMENT. The CONSULTANT shall be responsible for the design and exact field locations for the camera assemblies. The camera subsystem shall provide overlapping coverage to overcome visual blockage and to monitor DMS messages, and toll-amount DMS, as directed by the DEPARTMENT.

The CONSULTANT shall select CCTV technologies to meet the Project needs, ConOps requirements, and as approved by the DEPARTMENT. CCTV assemblies may include a camera lowering device (CLD), as directed by the DEPARTMENT.

Per FDM 233.6 and FDM 233.10, the position, height, and design of each camera pole shall be finalized during the design phase of the project. The maximum distance of this type of camera from the DMS sign is specified in FDM. The minimum distance from the DMS sign shall be determined by the CONSULTANT to provide full viewing of the DMS legends based on the analysis performed and approved by the District ITS office. Such analysis includes viewing angle, horizontal and vertical control determination based on the CCTV camera manufacturers that are on APL.

If required by the DEPARTMENT, the CONSULTANT shall determine the camera location by performing a videography study at each proposed camera site. The study shall include video at the proposed camera location and elevation with respect to the roadway elevation. The CONSULTANT shall identify the final number and locations of the camera assemblies based on the videography study.

The camera system design shall ensure that the video quality is not degraded due to wind or vibration. The CONSULTANT shall be responsible for the design of the poles and foundations to minimize the potential for vibration. The CONSULTANT shall prepare cross section plan sheets showing details of horizontal and vertical clearances of the proposed equipment with identified utilities.

Vehicle Detection Subsystem

Vehicle detection devices shall be spaced as required to meet the Project requirements (speed, volume, and occupancy detection), Standard Specifications, FDM Section 233.9, District-specific requirements, guidance from the ConOps, and as approved by the DEPARTMENT.

The CONSULTANT shall select vehicle detection technology to meet the Project needs, ConOps requirements, and as approved by the DEPARTMENT. Detection technologies include induction loops, video imaging, microwave, thermal imaging, wireless magnetometer, and vehicle probe detection systems. In the case of the arterial management systems with a systemwide signal controlled intersections, the CONSULTANT shall select vehicle detection technology type that is currently being used by the local maintaining agencies, if applicable.

The CONSULTANT shall be responsible for the design of a non-intrusive vehicle detection subsystem for the limited access roadway facilities, arterials and sub-arterials with signalized intersections as required by the DEPARTMENT and by local maintaining agencies and specified in the scope of services. The detectors shall be positioned near other ITS field device infrastructure including the fiber-optic splice vaults when feasible to reduce cost. Final detection station locations shall be based on the number of location variables identified during the design phase.

Automatic Vehicle Identification (AVI) Subsystem

AVI detection devices shall be spaced as required to meet the Project requirements, Standard Specifications, FDM 233.9.5, District-specific requirements, guidance from the ConOps, and as approved by the DEPARTMENT.

The CONSULTANT shall select AVI technology to meet the Project needs, Standard Specifications, FDM, District-specific requirements, ConOps requirements, and as approved by the DEPARTMENT.

The CONSULTANT shall coordinate all design efforts for use of SunPass AVI transponders with the Florida's Turnpike Enterprise (FTE) Tolls technical personnel.

Dynamic Message Sign (DMS) Subsystem

The CONSULTANT shall be responsible for the design of the DMS subsystem for the roadway facilities. Both expressway and arterial dynamic message signs (DMS) shall be located to meet the Project requirements, Standard Specifications, FDM 233.11, District-specific requirements, guidance from the ConOps, and as approved by the DEPARTMENT. All FDOT FDM requirements shall be met for DMS locations. DMS

locations shall be designed in conjunction with the Project's master signing design. The position of each DMS shall be finalized during the design phase of the project.

The CONSULTANT shall select DMS technology, type, and display to meet the Project requirements and ConOps requirements.

The CONSULTANT shall locate the DMS to satisfy the required sign functionality and to provide the required visibility of the signs. The project communications system shall enable full control of the DMS from the TMC facilities. All DMS hardware, software and related infrastructure components shall be fully compatible with SunGuide software. All DMS shall include a dedicated confirmation CCTV camera that allows for visual verification of the messages posted on the DMS by a TMC Operator (if desired by the District).

The CONSULTANT shall design support structures to accommodate the specified DMS to meet the design functional, operational, and maintenance requirements.

Arterial Dynamic Message Sign (ADMS) Subsystems (Front Access)

ADMS shall be spaced as required to meet the Project requirements, Standard Specifications, FDM Section 233.11, District-specific requirements, guidance from the ConOps, and as approved by the DEPARTMENT.

The CONSULTANT shall select ADMS technologies to meet the Project needs, ConOps requirements, and as approved by the DEPARTMENT.

The ADMS shall be placed for the purpose of Traffic Incident Management (TIM), Integrated Corridor Management (ICM), Active Arterial Management (AAM), and other applications as directed by the DEPARTMENT. ADMS on arterial roadways are to be placed at a distance from the on-ramps of the limited access facilities determined by traffic analysis of the arterial back of queue and to allow time for the motorists to read the sign messages. Communication with ADMS shall be designed so that they can be managed and maintained by the District TMC. All FDOT FDM requirements shall be met for ADMS locations. ADMS locations shall be designed in conjunction with the Project's master signing design on major widening projects. All ADMS shall include a dedicated confirmation CCTV camera that allows for visual verification of the messages posted on the DMS by a TMC Operator (if desired by the District).

Embedded Dynamic Message Signs

Embedded DMS shall be spaced as required to meet the Project requirements, Standard Specifications, FDM Section 233.11, District-specific requirements, express lanes requirements, guidance from the ConOps, and as approved by the DEPARTMENT.

The CONSULTANT shall select Embedded DMS technologies to meet the Project needs, ConOps requirements, and as approved by the DEPARTMENT.

The CONSULTANT design shall include Embedded DMS signs when the project is part of a toll facility, part of an express lanes facility, part of a truck parking availability system, or other usage described in the ConOps, as required by the DEPARTMENT. The

Embedded DMS signs are comprised of DMS panels embedded in a static sign panel. The Embedded DMS may have one or more line of text depending upon the application. Embedded DMS are to be located on the main line, express lanes, ramps, and on the crossroads as required to meet the project needs.

All Embedded DMS shall include a dedicated confirmation CCTV camera that allows for visual verification of the messages posted on the Embedded DMS by a TMC Operator (if desired by the District).

Dynamic Trailblazing Sign Subsystems (DTBS)

DTBS shall be spaced as required to meet the Project requirements, Standard Specifications, FDM, District-specific requirements, guidance from the ConOps, and as approved by the DEPARTMENT to support evacuation, incident management, detour management, special event traffic management, active arterial management and/or integrated corridor. If directed by the DEPARTMENT, the CONSULTANT shall develop the well-defined active traffic management detour plan.

The CONSULTANT shall select DTBS technologies to meet the Project needs, ConOps requirements, and as approved by the DEPARTMENT.

The CONSULTANT shall design the DTBS to recommend directions of travel to motorists. The active DTBS Embedded DMS and/or blank-out signs shall be sized based on the proposed legends or cardinal directions used for the active traffic management detour plans. The DTBS shall be connected to the fiber optic network to be operated and managed at the TMC. The DTBS will be mounted on new support structure or if mounted on existing structure, the required structural analysis shall be performed for the existing structure. The size and types of dynamic and active portion of the signs shall be coordinated with the District ITS office prior to design.

Roadway Weather Information Systems (RWIS)

RWIS shall be spaced as required to meet the Project requirements, Standard Specifications, FDM 233.12.1, District-specific requirements, guidance from the ConOps, and as approved by the DEPARTMENT.

The CONSULTANT shall select RWIS technologies to meet the Project needs, ConOps requirements, and as approved by the DEPARTMENT.

The CONSULTANT shall develop or modify Technical Special Provisions or Modified Special Provisions for RWIS based upon the unique needs of the project. The CONSULTANT shall ensure that, each RWIS site consists of a remote processing unit (RPU), communication hardware, and determine the site-specific components from below, , as required by the DEPARTMENT::

- Fog/Smoke Detection sensor;
- Classifying Precipitation;
- Precipitation Occurrence Sensor;
- Water Film Height Sensor;
- Air Temperature/Relative Humidity Sensor;

- Wind Speed and Direction Sensor;
- RWIS Tower/Pole Structure, foundation, base, and cabinet with electrical service, and lightning protection & grounding assembly; and,
- Communication hardware.

When required by the DEPARTMENT, the Water Film Height Sensor shall be included in the RWIS design for hydroplaning detection and to activate advance warning signs with flashing beacons. The RWIS Water Film Height Sensor shall be a fully autonomous Non-Invasive Road Weather Intelligent Sensor (NIRS) with optical principles mounted above the roadway that can measure the water film depths and temperature for the purpose of determining hydroplaning conditions and warning the motoring public. In addition, it shall communicate via 120 volts active current (VAC) Web Relay Controller with one (1) or more Flashing Beacon Warning Signs, and Fiber Optic-Based Communications to the TMC. It shall include all ancillary components required for a complete and acceptable operational system. This ITS subsystem shall be connected to the existing Department ITS and fiber optic network via a proposed new Managed Field Ethernet Switch (MFES) inside a proposed local hub. This ITS subsystem shall provide real time data and analog outputs for roadway water film height and ice detection layer thickness and values.

Traffic Signal Data Subsystem

The Traffic Signal Data Subsystem shall be provided at locations as required to meet the Project requirements, Standard Specifications, FDM, District-specific requirements, guidance from the ConOps, and as approved by the DEPARTMENT.

The CONSULTANT shall select Traffic Signal Data Subsystem technologies to meet the Project needs, ConOps requirements, and as approved by the DEPARTMENT.

The CONSULTANT shall design the Traffic Signal Data Subsystem to include, as a minimum, Advance Transportation/Traffic Controllers (ATC) provided at the signalized intersections. The ATC shall include an open architecture hardware and software platform to interface with the latest network-wide supervisory Advanced Traffic Management System (ATMS) software currently being used by the local highway agencies supporting a wide variety of Intelligent Transportation Systems (ITS) applications. This includes traffic management, safety, and security.

The CONSULTANT shall design other data-related applications for the Traffic Signal Data Subsystem, as directed by the DEPARTMENT, such as for basic Connected and Automated Vehicles (CAV) elements, ramp signaling, reliable data collection and analytics using Automated Traffic Signal Performance Measures (ATSPM), and edge computing capabilities.

Connected and Automated Vehicles (CAV) Subsystems

The CAV Subsystem shall be provided at locations as required to meet the Project requirements, Standard Specifications, District-specific requirements, guidance from the ConOps, and as approved by the DEPARTMENT.

The CONSULTANT shall select CAV Subsystem technologies to meet the Project needs, ConOps requirements, and as approved by the DEPARTMENT.

The CONSULTANT shall develop or update CAV Subsystem Technical Special Provisions or Modified Special Provisions (MSP/TSP) for Roadside Units (RSU) and other CAV Subsystem features based upon the unique needs of the project. The CONSULTANT shall ensure that each RSU site consists of a remote processing unit (RPU), communication hardware, mounting hardware, cabling, power supply, and other site-specific components as required. The CONSULTANT shall develop RSU requirements for communication between connected vehicles and roadside equipment such as ATC, detection systems, and warning beacons that are compatible with both Cellular Vehicle to Everything (C-V2X) communication and Dedicated Short Range Communication (DSRC) national standards and protocols. The CONSULTANT shall also coordinate FCC licensing requirements for two-way real-time C-V2X communication and DSRC, depending on national standards and policies, with the DEPARTMENT's Statewide TSM&O program office. The MSP/TSP shall address integration with the DEPARTMENT's Security Management Credential System (SCMS) requirements.

The MSP/TSP shall require RSU field equipment to be on the FDOT APL, the FDOT IPL or, as a minimum, tested at the Traffic Engineering Research Laboratory (TERL) prior to approval for use on the project. The MPS/TSP shall require RSU field equipment to be supported by the central system in the TMC and to be capable of transmitting required messages and data to and from the roadway and users via vehicle on-board units (OBU) and other mobile devices over the applicable communication schema in compliance with industry standards.

When used inside a traffic signal cabinet, the CONSULTANT shall ensure the cabinet is equipped with ATC and the RSU is connected to the signal controller, Ethernet switch, and the above ground radio, and GPS antennas.

When used on the interstate, the CONSULTANT shall develop the TSP/MSP to ensure the RSU is housed inside a corrosion-resistant enclosure that is NEMA 4X with IP66 rating, and meets the system requirements broken into the following categories:

- Power
- Environmental
- Physical
- Functional
- Performance
- Interface

Wrong-way Vehicle Detection Systems (WWVDS)

The WWVDS shall be provided at locations as required to meet the Project requirements, Standard Specifications, FDM, Traffic Engineering and Operations Bulletin 19-03, District-specific requirements, guidance from the ConOps, and as approved by the DEPARTMENT.

The CONSULTANT shall select WWVDS technologies to meet the Project needs, ConOps requirements, Traffic Engineering and Operations Bulletin 19-03, and as approved by the DEPARTMENT.

The CONSULTANT shall select the WWVDS technology for compatibility with the District SunGuide software version and to meet the project needs. The WWVDS shall collect and process data locally prior to sending a notification to the TMC. The CONSULTANT shall design the WWVDS for remote configuration, calibration, monitoring, and diagnostic of real-time traffic activities from the TMC using the SunGuide software and software provided by the detection system vendor. The WWVDS shall perform to meet the project requirements under all environmental and traffic conditions expected for the corridor. The WWVDS shall detect wrong way drivers within the specified accuracy. Vibration and shocks shall not affect the performance of the system. The WWVDS and highlighted signs shall be hardwired for power and communications to the main controller. Design shall be in accordance with Traffic Engineering and Operations Bulletin 19-03.

Structural Health Monitoring System (SHMS) Connectivity Subsystem

The SHMS connectivity shall be provided at locations as required to meet the Project requirements, Standard Specifications, FDM, District-specific requirements, guidance from the ConOps, and as approved by the DEPARTMENT.

The CONSULTANT shall select SHMS connectivity technologies to meet the Project needs, ConOps requirements, and as approved by the DEPARTMENT.

The CONSULTANT shall design the SHMS connectivity subsystem which includes a fully operational ITS cabinet containing the data acquisition logger, MFES, UPS, RPMU, and all necessary surge protection devices to receive the data from various optical sensors or non- optical sensors connected to the local data acquisition enclosures installed inside the bridge arches, attached inside the girders, and the stayed cables supporting the main spans. The CONSULTANT shall coordinate with the structural and SHMS disciplines to provide for a collapsed ring topology of the communication scheme and provide for connectivity to the fiber optic network. The SHMS data shall be transmitted via the existing and proposed 10 Gigabits per second fiber optic cable plant to the designated remote operation center for monitoring by the District Bridge Operations and Maintenance.

The CONSULTANT is not responsible for the design and location of the SHMS sensors, sensor types, electrical, and data acquisition enclosures and hardware.

Ramp Signaling Subsystem (RSS)

The RSS shall be provided at locations as required to meet the Project requirements, Standard Specifications, FDM 233.12.2, District-specific requirements, guidance from the ConOps, and as approved by the DEPARTMENT.

The CONSULTANT shall select RSS technologies to meet the Project needs, ConOps requirements, and as approved by the DEPARTMENT.

The CONSULTANT shall design the Ramp Signaling Subsystem at the locations determined by the Department as part of previous traffic studies that justified the installation. The RSS shall provide the TMC the ability to remotely control the RSS via current controlling software supported by the SunGuide. The RSS shall include the following components:

- Cabinet equipment including: controller, modem, display panel, detector amplifiers, output/power distribution assembly, load switches, current monitor, flasher for warning sign beacon, ability to support continuous operation for a minimum 2 hours in the event of power loss, and report power management unit.
- Supporting infrastructure including: conduits; RSS monitoring CCTV; two-head (red and green) LED signal display; and, LED flashing beacons.
- Detection including: mainline (upstream and downstream), RSS demand and passage, and ramp queue detectors.
- Signing including: Ramp Signaled When Flashing (W3-4); One Vehicle per Green (R10-13); Two Vehicle per Green (Modified R10-13), if needed; All Vehicles Stop on Red; One car per Green Each Lane (R89-1); Right Lane Ends (W4-2R); Merging Traffic (W4-1)
- Pavement markings including: 12-inch-wide stop bar running from edge line to edge line and 6-inch-wide solid white centerline for a minimum distance of 250 feet upstream of the stop bar and terminated at the stop bar on two-lane metered ramps.

Truck Parking Availability System (TPAS)

The TPAS shall be designed at locations as required to meet the Project requirements, Standard Specifications, FDM, District-specific requirements, guidance from the ConOps, and as approved by the DEPARTMENT.

The CONSULTANT shall select TSPA Subsystem technologies to meet the Project needs, ConOps requirements, and as approved by the DEPARTMENT.

ITS Software Subsystem

The ITS Software Subsystem shall be provided as required to meet the Project requirements, Standard Specifications, FDM, District-specific requirements, guidance from the ConOps, and as approved by the DEPARTMENT.

The CONSULTANT shall develop ITS Software Subsystem requirements to meet Project needs, the ConOps, and as approved by the DEPARTMENT.

33.2 Communications Subsystem Analysis

See FDM 233.4, 233.5, and 233.8 for communication systems design requirements. The CONSULTANT shall review the existing communication files in GIS or PDF format provided by the DEPARTMENT and or the local highway agencies and create an overall communication map to summarize mapping data associated with the fiber optic conduits and cables connectivity. This provides a communication location-based intelligence for the project and will be used in the communication design. In addition, the CONSULTANT

shall include high level overview of how the project corridor(s) are connected to the TMC communication network including the existing and proposed master communication hubs.

The CONSULTANT shall develop a communications plan to determine the optimal communications medium for the project corridor. The plan shall be developed prior to submittal of Phase I plans. The plan shall identify communications media alternatives and provide a cost estimate that includes initial, operations and maintenance cost for the life cycle of the communications network. The plan shall ensure that video, voice, and data will be communicated in real-time between center to-field and center-to-center (C2C) nodes as applicable. The communications system design must utilize non-proprietary, open-architecture, standards-based, robust, scalable, and proven technology. The communication plan analysis shall address communication and connections between field devices, communications and connections between field devices and the TMC, center-to-center communications between TMCs, and any other communication links or connections required to meet project goals and ConOps guidance. The plan must include bandwidth analysis and recommendations, needs assessment, and provide recommendations regarding minimum requirements, media, network devices, protocols, network topology, communication redundancy, future needs, spare capacity, and any communications or data sharing with other agencies.

The plan must include loss budget analysis and calculations for the optical cable lengths and bandwidth. The CONSULTANT shall provide the calculations confirming the loss budgets are in conformance with allowable values established in the standard specifications. The CONSULTANT shall calculate the loss budgets based on distance, anticipated fusion splices, and connectors to ensure the cabling will work with the links intended to be used. After installation, the loss budget for the cabling is compared to the actual test results during final acceptance to ensure the cable plant is installed properly.

For major widening projects where the existing underground fiber optic communication cables and ITS sites are impacted, the CONSULTANT shall review the roadway, drainage, and TTCP plans to analyze and identify the magnitude of impact to the existing ITS infrastructure. The CONSULTANT shall prepare the Maintenance of Communication (MOC) concept that supports the final design in efforts to maintain and sustain center-to-field device connectivity and operability to the existing ITS field devices previously deployed along the project corridor. The MOC analysis shall consider and mitigate the impacts of the project's various construction phases so as to sustain center-to-field devices connectivity and operability in order to maintain operational quality as a minimum at the level provided prior to construction start and minimizing down time of the critical devices.

After approval of the plan, the CONSULTANT shall submit a revised plan including a detailed design analysis for each submittal. The CONSULTANT's communications design shall include multiple redundant paths for each location, which allows for automatic switching of communications path onto a secondary path, if the primary path is impacted (if desired by the District).

33.3 Grounding, Surge Suppression, and Lightning Protection Analysis

The CONSULTANT shall be responsible for a complete and reliable grounding, surge suppression, and lightning protection design to provide personnel and equipment protection against faults, surge currents and lightning transients. When Standards Plans depicting air terminal device heights above poles or equipment are not available, the height of the air terminal above poles or equipment shall be determined using applicable standards. See FDM 233.3.8 for additional design requirements.

33.4 Power Subsystem

See FDM Section 233.3 for ITS Power Design Requirements. The CONSULTANT shall be responsible for an electrical design in accordance with all NEC requirements. No solar power should be utilized as a power solution for the Project unless otherwise approved by the DEPARTMENT. To enhance power reliability, the CONSULTANT shall design a power distribution and backup system consisting of, at a minimum, underground power conduits and conductors, transformers, diesel fuel generators, automatic transfer switches (ATS), uninterruptable power supply (UPS), electrical distribution panel, equipment framing, reinforced concrete pad for the generator, site drainage, site security fencing and security camera (as directed by the DEPARTMENT), power command and control, Ethernet-based Modbus, and ITS Cabinet with Remote Power Management Unit (RPMU), and all associated equipment. The power backup system shall supply electrical power in event of commercial power supply failure for all system components. Power equipment shall be installed in areas to avoid wet locations. All connections and equipment shall be protected from moisture and water intrusion. The CONSULTANT shall ensure that vandal resistant mechanisms for all electrical infrastructure shall be included as part of the Design.

The CONSULTANT shall submit the power system design and voltage drop calculations for the power distribution system as part of phase II, III, and IV design submittals. The CONSULTANT shall conduct a short circuit and protection coordination study for the designed power system and document the study as part of the power system design report.

33.5 Voltage Drop Calculations

See FDM Section 233.3.6 for voltage drop design requirements. The electrical design shall address allowable voltage drops per the NEC. The CONSULTANT shall submit voltage drop calculations for any electrical circuit providing power to the ITS field devices beyond the electric utility service point. The calculations shall document the length of each circuit, its load, the size of the conductor or conductors and their ohm resistance values and the required voltages from the service point to the respective ITS devices to maintain voltage drops within allowable limits. The voltage drop incurred on each circuit (total volts and percentage of drop) shall be calculated, and all work necessary to calculate the voltage drop values for each circuit should be presented in such a manner as to be duplicated by the District. Load analysis calculations shall be submitted covering electrical path from all power sources to each ITS site connected to each power source. All voltage drop calculations shall allow for future expansion of ITS infrastructure, if identified in the Project ConOps.

33.6 Design Documentation

The CONSULTANT shall submit a Design Documentation Book with each plan submittal under separate cover and not part of the roadway documentation book. At a minimum, the design documentation book shall include:

- Quantities and engineers estimate for all applicable items on plans.
- Phase submittal checklist.
- Three-way quantity check list
- Structural calculations for all structures
- Power Design Analysis, voltage drop calculations, and load analysis calculations.
- Correspondences including utility design meeting and conflict resolutions.
- Electrical Power Service Letter of Confirmation.
- Subsurface Utility Exploration tables for each ITS support structure.

33.7 Existing ITS

The CONSULTANT shall research any required legacy system or system components that may be impacted by new work, such as: existing communications; existing types, numbers, locations, models, manufacturers, and age of ITS devices; as-built plans; existing operating software; existing center-to-field devices; and C2C communications and capabilities.

The project intelligence files provided by the DEPARTMENT and researched by the CONSULTANT may include the following documents:

- Existing ITS field devices compared to the latest FDOT Standards and District requirements: device type, model, manufacturer, capabilities, condition, date installed, and historical maintenance logs. The DEPARTMENT will provide the ITS FM data, when available, to the CONSULTANT upon request.
- Condition of support structure(s), and associated mechanical brackets, and vertical hangers.
- Electrical power related to the existing demand loads, sizes of the main and branch circuit breakers for the service disconnect, underground or overhead service feeder sizes from the power company transformer to the meter base.
- Existing fiber optic allocation as a graphical display of the existing buffer tube for the ITS devices at the Managed Field Ethernet Switch points, the buffer allocated for the existing local communication hubs, given number of connections within a corridor while maintaining the maximum number of physical connection on a specific Local Area Network (LAN), and local hubs to existing master communication hubs.
- A KMZ file of the existing fiber optic pull and splice boxes, ITS devices, local hubs, power service poles with latitudes and longitudes data.
- Underground infrastructure.
- Proximity to utilities.
- Other field reconnaissance as necessary to develop a complete ITS design package.

33.8 Queue Analysis

The CONSULTANT shall perform a queue analysis at high volume interchanges and high frequency conflict / crash locations to determine optimal placement of DMS using project forecasted traffic volumes. This analysis shall be performed prior to submittal of the Phase I plans. The Consultant shall perform other traffic engineering analysis as necessary to

ensure that the DMS locations are selected based on optimum message delivery to the motorists.

The CONSULTANT shall perform field observation of the existing traffic patterns during the normal peak hours to determine the optimal placement of DMS, ADMS, CCTV cameras, and detection sites.

The CONSULTANT shall perform lane closure analysis and determine the time periods where construction activities can be performed. The lane closure analysis shall be performed using the available traffic data.

In cases when traffic technical memorandums have been performed by others and are available through the DEPARTMENT, or available from TMC CCTV camera surveillance sites, the CONSULTANT shall use these reports and information in lieu of performing traffic engineering and safety analysis.

The CONSULTANT shall coordinate with District's TSM&O Office for additional information regarding existing Incident Management and TMC Operational Procedures to address maintenance of ITS and post construction requirements.

33.9 Reference and Master ITS Design File

The CONSULTANT shall prepare the ITS design file to include all necessary design elements and the reference files for topo, R/W roadway, utilities files, etc. This effort includes the design and layout of all proposed ITS devices and electrical service points, conduits, pull boxes, conductor sizing, generators, and transformers. All existing ITS infrastructure shall be referenced to the new ITS plan sheets (if applicable).

33.10 Reference and Master Communications Design File

The CONSULTANT shall prepare the communication design file to include all necessary design elements and all associated reference files as well as reference files of topo, R/W, roadway, utilities files, existing ITS communications infrastructure, etc. This effort includes design and layout of proposed communications conduit, cabinet, pull boxes, splice boxes, standard route markers, communications plan overview, fiber optic sizing, fiber optic splicing, connections, communications hubs, etc.

33.11 ITS Poles and Overhead Structures Elevation Analysis

See FDM Section 233.6 for ITS Poles and Structures design requirements. The CONSULTANT shall evaluate pole elevation requirements and design pole heights to meet the Project requirements including field of view; elimination of occlusion; site access for maintenance vehicles and personnel; access to pole mounted equipment, such as CCTV cameras, traffic detectors, and cabinets; and probability of lightning strike.

The CONSULTANT shall coordinate with roadway, structures, and drainage disciplines to confirm that the elevations are updated during various design phases, and the ITS poles and overhead structure details are revised and designed with the correct heights, lengths, foundation depths and sizes.

33.12 DMS Sign Panel Design Analysis

The CONSULTANT shall design all ITS signing in conjunction with the Roadway Master Signing. This includes any static sign panel that includes changeable message elements. Expressway and arterial full size DMS shall not be co-located with other static signs. [If desired by the District].

The DMS sign panel analysis applies to walk-in DMS, front access ADMS, and embedded Toll Amount and Status DMS and Dynamic Trail Blazing Signs. The CONSULTANT shall provide the following design information for the DMS sign design basis and fabrication:

- Pixel Pitch
- Number of display messages
- Character height
- Number of characters per line
- Character spacing
- Mechanical properties of the sign such as weight, height, width, depth, and not including the vertical hanger size and weight.

33.13 ITS Quantities for EQ Report

The CONSULTANT shall determine ITS pay items and quantities and the supporting documentation.

33.14 Cost Estimate

The CONSULTANT shall prepare an engineer's cost estimate for the project using historical data from the FDOT or from other Industry sources. The CONSULTANT shall also load the category information, pay items and quantities into AASHTOWare Project Preconstruction.

33.15 Technical Special Provisions and Modified Special Provisions

The CONSULTANT shall develop Technical Special Provisions (TSP) and Modified Special Provisions (MSP) for the specific items or conditions of the project that are not addressed in the FDOT's Standard Specifications, Supplemental Specifications and Special Provisions.

33.16 Other ITS Analyses

TBD During the design phase

33.17 Field Reviews

The CONSULTANT shall conduct a field review for the required phase submittals. The review shall identify necessary data for all elements of the project including, but not limited to, the following:

- Existing ITS Field Devices as compared with the latest FDOT standards and District requirements

- Device Make, Model, Capabilities, Condition / Age, Existence of SunGuide Software Driver
- Condition of Structure(s), cabinets, and other above-ground infrastructure and devices
- Type of Detection as Compared with Current District Standards and preferences.
- Underground Infrastructure
- Proximity of other utilities
- Any other field reconnaissance as necessary to develop a complete ITS design package

33.18 Technical Meetings

The CONSULTANT shall attend meetings as necessary to support the project.

33.19 Quality Assurance / Quality Control

The CONSULTANT shall be responsible for the professional quality, technical accuracy and coordination of designs, drawings, specifications, and other services and work furnished by the CONSULTANT under this contract.

The CONSULTANT shall provide a Quality Control Plan that describes the procedures to be utilized to verify, independently check, and review all design drawings, specifications, and other documentation prepared as a part of the contract. The CONSULTANT shall describe how the checking and review processes are to be documented to verify that the required procedures were followed. The Quality Control Plan may be one utilized by the CONSULTANT as part of their normal operation or may be one specifically designed for this project. The CONSULTANT shall utilize the District's quality control checklist. The responsible Professional Engineer that performed the Quality Control review shall sign a statement certifying that the review was conducted.

The CONSULTANT shall, without additional compensation, correct all errors or deficiencies in their works.

33.20 Supervision

The CONSULTANT shall provide all efforts required to supervise all technical design activities.

33.21 Coordination

The CONSULTANT shall coordinate with Survey, Geotech, Drainage, Structures, Lighting, Roadway Design, Utilities, municipalities, maintaining agencies and Traffic Operations to produce a final set of construction contract documents and to ensure that a high degree of accuracy for the design plans is achieved. The CONSULTANT shall coordinate with the roadway Utility Adjustment Plan to incorporate all ITS support structural foundations symbols drawn to scale in the Utility Adjustment Plans and attend the utility design meetings conveying the information to all utility owners to preserve the location of the proposed foundations and avoid any conflicts.

34 INTELLIGENT TRANSPORTATION SYSTEMS PLANS

The CONSULTANT shall prepare a set of ITS Plans in accordance with the FDOT Design Manual that includes the following:

34.1 Key Sheet

The CONSULTANT shall prepare the key sheet in accordance with the latest format depicted in the FDM.

MUTCD

Standard Specifications, Developmental Specifications

Standard Plans

34.2 General Notes / Pay Item Notes

The CONSULTANT shall include all pertinent general notes and pay item notes as deemed fit and as established by the District.

34.3 Project Layout

The CONSULTANT shall prepare plan sheet(s) with an overview of the entire project that include stations and offsets, project limits, intersection locations, ramps, railroads crossings, devices, device identification using SunGuide nomenclature, and plan sheet numbering and coverage.

34.4 Typical and Special Details

The CONSULTANT shall prepare typical and / or special details for conditions in the project not addressed by the DEPARTMENT's Standard Plans for Design, Construction, Maintenance, and Utility Operations on the State Highway System. The CONSULTANT shall prepare special details not addressed by FDOT Standard Plans, including block diagrams, hub cabinets, wiring diagrams, solar power service, and special mounting details, horizontal directional drilling at critical crossings, wireless ethernet equipment for local and broadband communication, Ethernet based Blue Toad, Ramp Signaling System, RSU block diagrams, Power station site plan, Field Equipment Shelters for master hubs, electrical and communication conduit, equipment inside box girders..

34.5 Plan Sheet

The CONSULTANT shall prepare the ITS plan sheets utilizing the Design file to include all necessary information related to the project design elements and all associated reference files. The plan sheets shall include general and pay item notes and pay items. The plans shall depict the location of ITS devices and cabinets, pull boxes, splice boxes, conduit runs, electrical service points, conduit, pull boxes, and conductors, and underground and overhead utilities, if applicable. Devices shall be located by station and offset as well as setback from the travel way. The CONSULTANT shall ensure the ITS sites and ground mounted cabinets locations are not in wetlands or wet drainage channels, do not interfere

with protected species, meet the OSHA circle of safety from the overhead energized lines, and do not conflict with underground utilities.

34.6 ITS Communications Plans

The CONSULTANT shall prepare plans for the communications network. These plans shall consist of block diagrams, splicing diagrams, port assignments, wiring diagrams, and all other information necessary to convey the design concept to the contractor. These plans shall be included in the ITS plan set and be prepared in a manner consistent with immediately adjacent ITS project installations (planned or installed). Communication plans shall include conduit, fiber, pull and splice boxes, ITS devices, communication lateral drops, fiber connection hardware, pay items etc.

The communication system shall be an open-architecture, non-proprietary, real-time, multimedia communications network. The communication system design must be compatible and completely interoperable with the existing systems.

TBD During the design phase

The CONSULTANT's design shall include protecting and maintaining the existing ITS infrastructure. For locations where existing ITS infrastructure is impacted, the CONSULTANT's design shall include mitigation to minimize the downtime of existing system as per the District's requirements and prepare the Maintenance of Communication (MOC) plans. The CONSULTANT shall develop the MOC sheets for the project, providing temporary communications as necessary, notes, details, and direction applicable to the ITS elements and associated communications for inclusion in the MOC plans. The MOC plans shall include the notes, plan sheets, cross sections showing existing and proposed grades with the tables defining the stations limits for the conduit depths below existing and proposed grades for various construction phases.

If applicable, the CONSULTANT shall review the roadway TTCP, drainage, structures, and landscaping plans and prepare the MOC plans for each construction phase. The MOC plans shall include construction phasing notes, half cross sections depicting existing and proposed grades, roadway templates, drainage ponds, flood mitigation zones, provide tables depicting the station range, location and depth of the proposed fiber optic trunk line below existing and proposed grades. The MOC plans shall optimize the reliable field-to-center (F2C) connectivity and operability of the ITS field devices previously deployed along the project corridor. The MOC design effort shall mitigate the impacts of the project's various construction phases so as to sustain center-to-field devices connectivity and operability, maintaining operational quality as a minimum at the level provided prior to construction start and minimizing down time as much as possible.

In cases, where major alteration to the existing roadway begins in the areas where the existing ITS devices and underground communication will be impacted at the initial construction phase, the CONSULTANT shall include the permanent ITS and communication and electrical power work to be constructed in the early phase and stage of the construction to activate the devices. The notes referencing the MOC plan details shall be included in the TTCP plans alerting the CONTRACTOR and emphasizing the

importance of keeping the ITS devices operational. Subsequently, the CONSULTANT shall attend the utility design and pre-construction meeting conveying the importance of the MOC and operability of the overall system. The CONSULTANT shall include the MOC plan sheets in the beginning of the ITS plans.

The CONSULTANT is responsible for the design of the communication infrastructure and its integration with the DEPARTMENT's communication system. Additionally, the CONSULTANT shall determine the most cost effective, best performing, communication connectivity option. The communication system must allow command and control as well as data and video transmission between the field devices and the TMC(s) at [*Location*] and when applicable master communication hub(s) at [*Location*].

Conduit paths shall be selected to provide a continuous duct system on one side of the road unless otherwise requested by the DEPARTMENT. The various components of ITS sites will be located on both sides of the freeway and therefore under pavement bore and lateral conduits will be necessary to access equipment locations. The CONSULTANT is responsible to locate the ITS sites so they are accessible by maintenance vans.

34.7 Fiber Optic Splice Diagrams

The CONSULTANT shall produce fiber optic cable splicing diagrams to show the connectivity of the fiber optic cable from its termini at field devices to the TMC. The diagrams shall denote new and existing fiber routes, splices, and terminations involved in the work. The diagrams shall identify cables by size, tube color / number and stand colors / numbers. All cables shall be identified either by numbering system identified either by numbering system identified on the plans or by bounding devices. The diagrams shall denote the types of connectors in the patch panels.

The CONSULTANT shall determine physical connection points and methods between the existing project limits to make the desired physical connection. The CONSULTANT shall determine and identify the Buffer Tube/Fiber and Ring allocation to maintain acceptable maximum number of the local intersection per ring before redundant ringing to a master communication hub and manage the transmission bandwidth. The CONSULTANT shall analyze existing and proposed fiber optic communication infrastructure for physical and logical connectivity into existing infrastructure.

34.8 Grounding and Lightning Protection Plans

The CONSULTANT shall include efforts to design a complete and reliable lightning protection design for each pole and associated devices, ITS device installation, as well as device cabinets and communications hubs, etc. if not already addressed in the FDOT's Standard Plans for Design, Construction, Maintenance and Utility Operations on the State Highway System. Where the ITS site is located on viaducts and bridges, the CONSULTANT shall provide the grounding and lightning protection details in the plans and show the work that is integral to the elevated superstructure and substructure.

34.9 Cross Sections

The CONSULTANT shall prepare cross sections for all ITS devices and support structures including the ground mounted cabinets or local hubs. The cross section shall include the underground and overhead utilities with utility relocation provisions.

34.10 Guide Sign Work Sheets

The CONSULTANT shall prepare the guide sign work sheets to include all necessary information related to the design of the static and DMS, Embedded DMS, and DTBS in the project corridor.

34.11 Special Service Point Details

The CONSULTANT shall design any special service point and electrical distribution system beyond the electric utility company's service point. The plan shall depict with pay items, general and plan notes the locations of transformers, switches, disconnects, conduits, pull boxes and power conductors. The plans shall identify the location of underground and overhead service points with identifying pole and transformer numbers. The CONSULTANT shall prepare the plan sheets depicting the electrical riser diagram and the line diagram for each location.

34.12 Strain Pole Schedule

The CONSULTANT shall incorporate the schedule detail chart for concrete or steel strain poles in the plan set. The strain pole schedule details shall include stations, offsets, the ground elevations, proposed elevations, top of foundation elevation, all attachment tie-in heights, pole length, and embedment length.

34.13 Overhead / Cantilever Sign Structure

The CONSULTANT shall be responsible for preparing the civil and structural plans of the overhead/cantilever structures, for proper installation of the DMS on the horizontal truss, viewing angle and decision site distance as per Chapter 2e - Guide Signs-Freeways and Expressways in the Manual on Uniform Traffic Control Devices (MUTCD) and Florida Department of Transportation FDOT Design Manual (FDM) and all other applicable manuals and guidelines as per governing regulations.

The details shall include stations, offsets, the existing ground elevations, proposed elevations, top of drilled shaft foundation elevation, all attachment tie-in heights, upright length, and drilled shaft embedment length. The CONSULTANT shall coordinate the design with the roadway, structural, and MSE wall disciplines and cross reference the critical information on the respective plans for installation, routing of conduits for electrical power and communication inside the substructure and superstructure, and parapets and pilasters. In segments where concrete median barrier walls are proposed, The CONSULTANT shall coordinate the design with the roadway, drainage, and structural disciplines to design the drilled shafts integral to the barrier walls and minimizing the shoulder width reduction.

34.14 Other Overhead Sign Structures (Long Span, Monotube, etc.)

The CONSULTANT shall be responsible for preparing the civil and structural plans when determining the requirements for other type of structures (long span, monotube, etc) used as part of the project for proper installation of the DMS, viewing angle and decision sight distance requirement as per AASHTO Green Book, Chapter 2e - Guide Signs-Freeways and Expressways in the Manual on Uniform Traffic Control Devices (MUTCD) and Florida Department of Transportation FDOT Design Manual (FDM) and all other applicable manuals and guidelines as per governing regulations.

The details shall include stations, offsets, the existing ground elevations, proposed elevations, top of drilled shaft foundation elevation, all attachment tie-in heights, upright length, and drilled shaft diameter and embedment length. The CONSULTANT shall coordinate the design with the roadway, drainage, structural, and MSE wall disciplines and cross reference the critical information in the respective plans for installation, routing of conduits for electrical power and communication inside the substructure and superstructure, bridge deck, and parapets with pilasters.

34.15 Temporary Traffic Control Plans

The CONSULTANT shall prepare Temporary Traffic Control Plans (TTCP) to minimize impact to traffic during the construction of ITS field devices and associated communications infrastructure that will be deployed along the project corridor.

The TTCP shall strive to maintain and sustain center-to-field device connectivity and operability to the ITS field devices previously deployed along the project corridor. The TTCP effort shall consider and mitigate the impacts of the project's various construction phases so as to sustain center-to-field devices connectivity and operability, maintaining operational quality as a minimum at the level provided prior to construction start and minimizing down time as much as possible. The CONSULTANT shall develop the TTCP sheets for the project, providing temporary communications as necessary, notes, details, and direction applicable to the ITS elements and associated communications for inclusion in the TTCP.

The CONSULTANT shall review the existing TMC Operations and develop additional incident management service requirements as necessary to support during the Construction Phase of the Project. The CONSULTANT shall coordinate with District's Traffic Operations ITS Office for additional information regarding existing Incident Management and TMC Operational Procedures.

34.16 Interim Standards

The CONSULTANT shall adhere to all Department's Interim Standards for ITS applications.

34.17 GIS Data and Asset Management Requirements

The CONSULTANT is responsible for providing Geographic Information System (GIS), spatial data, for the ITS components design. This information is required to integrate ITS components to the SunGuide software. A coordinate point compatible with the Florida State Plane System or FDOT's current coordinate plane system shall be collected for all

ITS components part of the Project design. All GIS information provided shall be compatible with the FDOT's ITS FM asset management software.

The information shall be transferred to the as-built plans and submitted to the District in electronic format along with the as-built plans.

The Global Positioning System (GPS) unit shall be provided by the CONSULTANT and used to collect data with a minimum accuracy of three (3) meters when differentially corrected. The CONSULTANT shall collect spatial data points and physical address location for:

- DMS, Embedded DMS, ADMS, DTBS location (mainline and arterial)
- Vehicle detection pole location
- CCTV camera pole location
- WWVDS sites
- Ramp Signal system sites
- RWIS locations
- RSU sites
- Ground mounted cabinets
- Fiber optic cable path (fiber backbone)
- Communications hubs
- Standard route markers
- Lateral fiber optic cable connections
- Lateral power cable connections
- Pull boxes (power and fiber)
- Splice boxes
- Power drops (service point and cable path)
- Power station site equipment (Generator, Power Distribution, ITS Cabinet, Pad Mounted Transformers, power service pole)

34.18 Quality Assurance / Quality Control

The CONSULTANT shall utilize the District's quality control checklist for traffic design drawings in addition to the QC effort described in section three.

34.19 Supervision

The CONSULTANT shall supervise all technical design activities.

35 GEOTECHNICAL

The CONSULTANT shall, for each project, be responsible for a complete geotechnical investigation. All work performed by the CONSULTANT shall be in accordance with DEPARTMENT standards, or as otherwise directed by the District Geotechnical Engineer. The District Geotechnical Engineer will make interpretations and changes regarding geotechnical standards, policies and procedures and provide guidance to the CONSULTANT.

Before beginning each phase of investigation and after the Notice to Proceed is given, the CONSULTANT shall submit an investigation plan for approval and meet with the

DEPARTMENT's Geotechnical Engineer or representative to review the project scope and DEPARTMENT requirements. The investigation plan shall include, but not be limited to, the proposed boring locations and depths, and all existing geotechnical information from available sources to generally describe the surface and subsurface conditions of the project site. Additional meetings may be required to plan any additional field efforts, review plans, resolve plans/report comments, resolve responses to comments, and/or any other meetings necessary to facilitate the project.

The CONSULTANT shall notify the DEPARTMENT in adequate time to schedule a representative to attend all related meetings and field activities.

35.1 Document Collection and Review

CONSULTANT will review printed literature including topographic maps, county agricultural maps, aerial photography (including historic photos), ground water resources, geology bulletins, potentiometric maps, pile driving records, historic construction records and other geotechnical related resources. Prior to field reconnaissance, CONSULTANT shall review U.S.G.S., S.C.S. and potentiometric maps, and identify areas with problematic soil and groundwater conditions.

Roadway

The CONSULTANT shall be responsible for coordination of all geotechnical related field work activities. The CONSULTANT shall retain all samples until acceptance of Phase IV plans. Rock cores shall be retained as directed in writing by the District Geotechnical Engineer.

Obtain pavement cores as directed in writing by the District Geotechnical Engineer.

If required by the District Geotechnical Engineer, a preliminary roadway exploration shall be performed before the Phase I plans submittal. The preliminary roadway exploration will be performed and results provided to the Engineer of Record to assist in setting roadway grades and locating potential problem areas. The preliminary roadway exploration shall be performed as directed in writing by the District Geotechnical Engineer.

CONSULTANT shall perform specialized field-testing as required by project needs and as directed in writing by the District Geotechnical Engineer.

All laboratory testing and classification will be performed in accordance with applicable DEPARTMENT standards, ASTM Standards or AASHTO Standards, unless otherwise specified in the Contract Documents.

35.2 Develop Detailed Boring Location Plan

Develop a detailed boring location plan. Meet with DEPARTMENT Geotechnical Project Manager for boring plan approval. If the drilling program expects to encounter artesian conditions, the CONSULTANT shall submit a methodology(s) for plugging the borehole to the DEPARTMENT for approval prior to commencing with the boring program.

35.3 Stake Borings/Utility Clearance

Stake borings and obtain utility clearance.

35.4 Muck Probing

Probe standing water and surficial muck in a detailed pattern sufficient for determining removal limits to be shown in the Plans.

35.5 Coordinate and Develop TTCP for Field Investigation

Coordinate and develop Temporary Traffic Control Plan (TTCP). All work zone traffic control will be performed in accordance with the DEPARTMENT's Standard Plans Index 102 series.

35.6 Drilling Access Permits

Obtain all State, County, City, and Water Management District permits for performing geotechnical borings, as needed.

35.7 Property Clearances

Notify property tenants in person of drilling and field activities, if applicable. Written notification to property owners/tenants is the responsibility of the DEPARTMENT's Project Manager.

35.8 Groundwater Monitoring

Monitor groundwater, using piezometers.

35.9 LBR / Resilient Modulus Sampling

Collect appropriate samples for Limerock Bearing Ratio (LBR) testing. Deliver Resilient Modulus samples to the District Materials Office or the State Materials Office in Gainesville, as directed by the DEPARTMENT.

35.10 Coordination of Field Work

Coordinate all field work required to provide geotechnical data for the project.

35.11 Soil and Rock Classification - Roadway

Refine soil profiles recorded in the field, based on results of laboratory testing.

35.12 Design LBR

Determine design LBR values from the 90% and mean methods when LBR testing is required by the DEPARTMENT.

35.13 Laboratory Data

Tabulate laboratory test results for inclusion in the geotechnical report, the report of tests sheet (Roadway Soil Survey Sheet), and for any necessary calculations and analyses.

35.14 Seasonal High Water Table

Review the encountered ground water levels and estimate seasonal high ground water levels. Estimate seasonal low ground water levels, if requested.

35.15 Parameters for Water Retention Areas

Calculate parameters for water retention areas, exfiltration trenches, and/or swales.

35.16 Delineate Limits of Unsuitable Material

Delineate limits of unsuitable material(s) in both horizontal and vertical directions. Assist the Engineer of Record with detailing these limits on the cross-sections. If requested, prepare a plan view of the limits of unsuitable material.

35.17 Electronic Files for Cross-Sections

Create electronic files of boring data for cross-sections.

35.18 Embankment Settlement and Stability

Estimate the total magnitude and time rate of embankment settlements. Calculate the factor of safety against slope stability failure.

35.19 Monitor Existing Structures

Provide Roadway EOR guidance on the radius to review existing structures for monitoring.

Optional services (may be negotiated at a later date if needed): Identify existing structures in need of settlement, vibration and/or groundwater monitoring by the contractor during construction and coordinate with the EOR and structural engineer (when applicable) to develop mitigation strategies. When there is risk of damage to the structure or facility, provide recommendations in the geotechnical report addressing project specific needs and coordinate those locations with the EOR. See FDM Chapter 117 and Chapter 9 of the Soils and Foundations Handbook.

35.20 Stormwater Volume Recovery and/or Background Seepage Analysis

Perform stormwater volume recovery analysis as directed by the DEPARTMENT.

35.21 Geotechnical Recommendations

Provide geotechnical recommendations regarding the proposed roadway construction project including the following: description of the site/alignment, design recommendations and discussion of any special considerations (e.g. removal of unsuitable material, consolidation of weak soils, estimated settlement time/amount, groundwater control, high groundwater conditions relative to pavement base, etc.) Evaluate and recommend types of geosynthetics and properties for various applications, as required.

35.22 Pavement Condition Survey and Pavement Evaluation Report

If a pavement evaluation is performed, submit the report in accordance with Section 3.2 of the Materials Manual: Flexible Pavement Coring and Evaluation. Enter all core information into the Pavement Coring and Reporting (PCR) system.

35.23 Preliminary Roadway Report

If a preliminary roadway investigation is performed, submit a preliminary roadway report before the Phase I plans submittal. The purpose of the preliminary roadway report will be to assist in setting road grades and locating potential problems.

- Copies of U.S.G.S. and S.C.S. maps with project limits shown.
- A report of tests sheet that summarizes the laboratory test results, the soil stratification (i.e. soils grouped into layers of similar materials) and construction recommendations relative to Standard Plans Indices 120-001 and 120-002.
- The results of all tasks discussed in all previous sections regarding data interpretation and analysis.
- An appendix that contains stratified soil boring profiles, laboratory test data sheets, sample embankment settlement and stability calculations, design LBR calculation/graphs, and other pertinent calculations.
- The CONSULTANT will respond in writing to any changes and/or comments from the DEPARTMENT and submit any responses and revised reports.

35.24 Final Report

The Final Roadway Report shall include the following:

- Copies of U.S.G.S. and S.C.S. maps with project limits shown.
- A report of tests sheet that summarizes the laboratory test results, the soil stratification (i.e. soils grouped into layers of similar materials) and construction recommendations relative to Standard Plans Indices 120-001 and 120-002.
- The results of all tasks discussed in all previous sections regarding data interpretation and analysis.
- An appendix that contains stratified soil boring profiles, laboratory test data sheets, sample embankment settlement and stability calculations, design LBR calculation/graphs, and other pertinent calculations.
- The CONSULTANT will respond in writing to any changes and/or comments from the DEPARTMENT and submit any responses and revised reports.

35.25 Auger Boring Drafting

Draft auger borings as directed by the DEPARTMENT.

35.26 SPT Boring Drafting

Draft SPT borings as directed by the DEPARTMENT.

Structures

The CONSULTANT shall be responsible for coordination of all geotechnical related fieldwork activities. The CONSULTANT shall retain all samples until acceptance of Phase

IV plans. Rock cores shall be retained as directed in writing by the District Geotechnical Engineer.

CONSULTANT shall perform specialized field-testing as required by needs of project and as directed in writing by the District Geotechnical Engineer.

All laboratory testing and classification will be performed in accordance with applicable DEPARTMENT standards, ASTM Standards or AASHTO Standards, unless otherwise specified in the Contract Documents.

The staff hour tasks for high embankment fills and structural foundations for bridges, box culverts, walls, high-mast lighting, overhead signs, mast arm signals, strain poles, buildings, and other structures include the following:

35.27 Develop Detailed Boring Location Plan

Develop a detailed boring location plan. Meet with DEPARTMENT Geotechnical Project Manager for boring plan approval. If the drilling program expects to encounter artesian conditions, the CONSULTANT shall submit a methodology(s) for plugging the borehole to the DEPARTMENT for approval prior to commencing with the boring program.

35.28 Stake Borings/Utility Clearance

Stake borings and obtain utility clearance.

35.29 Coordinate and Develop TTCP for Field Investigation

Coordinate and develop TTCP plan. All work zone traffic control will be performed in accordance with the DEPARTMENT's Standard Plans Index 102 series.

35.30 Drilling Access Permits

Obtain all State, County, City, and Water Management District permits for performing geotechnical borings, as needed.

35.31 Property Clearances

Notify property tenants in person of drilling and field activities, if applicable. Written notification to property owners/tenants is the responsibility of the DEPARTMENT's Project Manager.

35.32 Collection of Corrosion Samples

Collect corrosion samples for determination of environmental classifications.

35.33 Coordination of Field Work

Coordinate all field work required to provide geotechnical data for the project.

35.34 Soil and Rock Classification - Structures

Soil profiles recorded in the field should be refined based on the results of laboratory testing.

35.35 Tabulation of Laboratory Data

Laboratory test results should be tabulated for inclusion in the geotechnical report and for the necessary calculations and analyses.

35.36 Estimate Design Groundwater Level for Structures

Review encountered groundwater levels, estimate seasonal high groundwater levels, and evaluate groundwater levels for structure design.

35.37 Selection of Foundation Alternatives (BDR)

Evaluation and selection of foundation alternative, including the following:

- GRS-IBS
- Spread footings
- Prestressed concrete piling - various sizes
- Steel H- piles
- Steel pipe piles
- Drilled shafts
- Foundation analyses shall be performed using approved DEPARTMENT methods. Assist in selection of the most economical, feasible foundation alternative.

35.38 Detailed Analysis of Selected Foundation Alternate(s)

Detailed analysis and basis for the selected foundation alternative. Foundation analyses shall be performed using approved DEPARTMENT methods and shall include:

- GRS-IBS (including the parameters identified in the Instructions for Developmental Design Standard D6025 to be provided by the Geotechnical Engineer)
- Spread footings (including soil bearing capacity, minimum footing width, and minimum embedment depth).
- For pile and drilled shaft foundations, provide graphs of ultimate axial soil resistance versus tip elevations. Calculate scour resistance and/or downdrag (negative skin friction), if applicable.
- CONSULTANT shall assist the Engineer of Record in preparing the Pile Data Table (including test pile lengths, scour resistance, downdrag, minimum tip elevation, etc.)
- Provide the design soil profile(s), which include the soil model/type of each layer and all soil-engineering properties required for the Engineer of Record to run the FBPier computer program. Review lateral analysis of selected foundation for geotechnical compatibility.
- Estimated maximum driving resistance anticipated for pile foundations.
- Provide settlement analysis.

35.39 Bridge Construction and Testing Recommendations

Provide construction and testing recommendations including potential constructability problems.

35.40 Lateral Load Analysis (Optional)

Perform lateral load analyses as directed by the DEPARTMENT.

35.41 Walls

Provide the design soil profile(s), which include the soil model/type of each layer and all soil engineering properties required by the Engineer of Record for conventional wall analyses and recommendations. Review wall design for geotechnical compatibility and constructability.

Evaluate the external stability of conventional retaining walls and retained earth wall systems. For retained earth wall systems, calculate and provide minimum soil reinforcement lengths versus wall heights, and soil parameters assumed in analysis. Estimate differential and total (long term and short term) settlements.

Provide wall construction recommendations.

35.42 Sheet Pile Wall Analysis (Optional)

Analyze sheet pile walls as directed by the DEPARTMENT.

35.43 Design Soil Parameters for Signs, Signals, High Mast Lights, and Strain Poles and Geotechnical Recommendations

- Provide the design soil profile(s) that include the soil model/type of each layer and all soil properties required by the Engineer of Record for foundation design. Review design for geotechnical compatibility and constructability.

35.44 Box Culvert Analysis

- Provide the design soil profile(s) that include the soil model/type of each layer and all soil properties required by the Engineer of Record for foundation design. Review design for geotechnical compatibility and constructability.
- Provide lateral earth pressure coefficients.
- Provide box culvert construction and design recommendations.
- Estimate differential and total (long term and short term) settlements.
- Evaluate wingwall stability.

35.45 Preliminary Report - BDR

The preliminary structures report shall contain the following discussions as appropriate for the assigned project:

- Copies of U.S.G.S. and S.C.S. maps with project limits shown.
- Summary of structure background data, S.C.S., U.S.G.S., geologic and potentiometric data.

- The results of all tasks discussed in all previous sections regarding data interpretation and analysis).
- Recommendations for foundation installation, or other site preparation soils-related construction considerations with plan sheets as necessary.
- Any special provisions required for construction that are not addressed in the DEPARTMENT's Standard specification.
- An Appendix which includes SPT and CPT boring/sounding profiles, data from any specialized field tests, engineering analysis, notes/sample calculations, sheets showing ultimate bearing capacity curves versus elevation for piles and drilled shafts, a complete FHWA check list, pile driving records (if available), and any other pertinent information.

35.46 Final Report - Bridge and Associated Walls

The final structures report shall include the following:

- Copies of U.S.G.S. and S.C.S. maps with project limits shown.
- Summary of structure background data, S.C.S., U.S.G.S., geologic and potentiometric data.
- The results of all tasks discussed in all previous sections regarding data interpretation and analysis.
- Recommendations for foundation installation, or other site preparation soils-related construction considerations with plan sheets as necessary.
- Any special provisions required for construction that are not addressed in the DEPARTMENT's Standard specification.
- An Appendix which includes SPT and CPT boring/sounding profiles, data from any specialized field tests, engineering analysis, notes/sample calculations, sheets showing ultimate bearing capacity curves versus elevation for piles and drilled shafts, a complete FHWA check list, pile driving records (if available), and any other pertinent information.

35.47 Final Reports - Signs, Signals, Box Culvert, Walls, and High Mast Lights

The final reports shall include the following:

- Copies of U.S.G.S. and S.C.S. maps with project limits shown.
- Summary of structure background data, S.C.S., U.S.G.S., geologic and potentiometric data.
- The results of all tasks discussed in all previous sections regarding data interpretation and analysis).
- Recommendations for foundation installation, or other site preparation soils-related construction considerations with plan sheets as necessary.
- Any special provisions required for construction that are not addressed in the DEPARTMENT's Standard specification.
- An Appendix which includes SPT and CPT boring/sounding profiles, data from any specialized field tests, engineering analysis, notes/sample calculations, sheets showing ultimate bearing capacity curves versus elevation for piles and drilled shafts, a complete FHWA check list, pile driving records (if available), and any other pertinent information.

Final reports will incorporate comments from the DEPARTMENT and contain any additional field or laboratory test results, recommended foundation alternatives along with design parameters and special provisions for the contract plans. These reports will be submitted to the District Geotechnical Engineer for review prior to project completion. After review by the District Geotechnical Engineer, the reports will be submitted to the District Geotechnical Engineer in final form and will include the following:

- All original plan sheets (11" x 17")
- One set of all plan and specification documents, in electronic format, according to DEPARTMENT requirements
- Two sets of record prints
- Six sets of any special provisions
- All reference and support documentation used in preparation of contract plans package

Additional final reports (up to four), aside from stated above, may be needed and requested for the DEPARTMENT's Project Manager and other disciplines.

The final reports, special provisions, as well as record prints, will be signed and sealed by a Professional Engineer licensed in the State of Florida.

Draft the detailed boring/sounding standard sheet, including environmental classification, results of laboratory testing, and specialized construction requirements, for inclusion in final plans.

35.48 SPT Boring Drafting

Prepare a complete set of drawings to include all SPT borings, auger borings and other pertinent soils information in the plans. Include these drawings in the Final Geotechnical Report. Draft borings, location map, S.C.S. map and U.S.D.A. map as directed by the DEPARTMENT. Soil symbols must be consistent with those presented in the latest Florida Department of Transportation Soils and Foundations Handbook.

35.49 Other Geotechnical

Other geotechnical effort specifically required for the project as determined by the Department, and included in the geotechnical upset limit.

35.50 Technical Special Provisions and Modified Special Provisions

35.51 Field Reviews

Identify and note surface soil and rock conditions, surface water conditions and locations, and preliminary utility conflicts. Observe and note nearby structures and foundation types.

35.52 Technical Meetings

35.53 Quality Assurance/Quality Control

35.54 Supervision

35.55 Coordination

36 3D MODELING

The CONSULTANT shall analyze and document Roadway Tasks in accordance with all applicable manuals, guidelines, standards, handbooks, procedures, and current design memorandums.

The CONSULTANT shall deliver all master design files, 3D surface design models, and all supporting digital files for the development of plans as required in the FDOT CADD Manual.

The CONSULTANT shall prepare a 3D model using the latest FDOT software in accordance with the FDOT CADD Manual. Includes all efforts required for developing files for 3D deliverables supporting automated machine guidance for design models. This includes importing survey data and creation of existing 3D surface features and models, and developing proposed corridor models with necessary detail of features to depict the proposed project in 3D to comply with the FDOT CADD Manual.

The CONSULTANT shall add detail to the corridor and design model for 3D design. Includes many elements that contribute to this including but not limited to slope transitions, typical section transitions, changes in pavement depth, berms, swales/ditches, and other feature transitions. Extra corridor structure leads to extra assemblies, extra targeting, etc.

The CONSULTANT shall create an accurate roadway design model which includes modeling the intersections.

The CONSULTANT shall submit .dgn files associated with the 3D Model and their respective components.

36.1 Phase I 3D Design Model

The CONSULTANT shall prepare, submit and present for review by the DEPARTMENT, Phase I 3D interactive model, comprised of, but not limited to: Existing features (pavement, shoulders, sidewalk, curb/gutter, utilities-if required per scope, drainage - if required per scope) and proposed corridor(s).

36.2 Phase II 3D Design Model

The CONSULTANT shall prepare, submit and present for review by the DEPARTMENT, Phase II 3D model, comprised of, but not limited to: Modification of the Phase I model to update the model to comply with changes based on the Phase I review comments and to include the addition of ponds, floodplain compensation sites, retaining walls, barrier walls, guardrail terminals, cross overs, gore areas, side street connections, roundabouts, and driveways.

TBD during the design phase. With the sunsetting of FDM 300, the use of FDM 900 series is encouraged.

36.3 Phase III 3D Design Model

The CONSULTANT shall prepare, submit and present for review by the DEPARTMENT, Phase III 3D model and 3D deliverables files for review, comprised of, but not limited to: Modification of the Phase II model to update the model to comply with changes based on the Phase II review comments and to further refine areas of transition between templates, detailed grading areas, bridge approaches and end bents, median noses, shoulder transition areas, retaining walls, barrier walls and guardrail.

36.4 Final 3D Model Design

The CONSULTANT shall prepare for review by DEPARTMENT, the Phase IV 3D model and deliverables, comprised of, but not limited to: Modification of the Phase III model to update the model to comply with changes based on the phase III review comments and to accurately generate, export and otherwise prepare the final 3D deliverable files as described in the FDOT CADD Manual.

36.5 Cross Section Design Files

The CONSULTANT shall establish and develop cross section design files in accordance with the FDOT CADD manual and FDOT Design Manual. Includes all work required to establish and utilize intelligent/automated methods for creating cross sections including determining the locations for which all cross sections will be shown, existing and proposed features, cross section refinement, placement of utilities and drainage, soil boxes, R/W lines, earthwork calculations, and other required labeling.

36.6 Template and Assembly Development (Optional)

The CONSULTANT shall prepare for approval by DEPARTMENT, project specific templates/assemblies needed to develop the features required to deliver the 3D model.

36.7 Quality Assurance/Quality Control

36.8 Supervision

36.9 Coordination

37 PROJECT REQUIREMENTS

37.1 Liaison Office

The DEPARTMENT and the CONSULTANT will designate a Liaison Office and a Project Manager who shall be the representative of their respective organizations for the Project. While it is expected the CONSULTANT shall seek and receive advice from various state, regional, and local agencies, the final direction on all matters of this project remain with the DEPARTMENT Project Manager.

37.2 Key Personnel

The CONSULTANT's work shall be performed and directed by the key personnel identified in the proposal presentations by the CONSULTANT. Any changes in the indicated personnel shall be subject to review and approval by DEPARTMENT.

37.3 Progress Reporting

The CONSULTANT shall meet with the DEPARTMENT as required and shall provide a written monthly progress report with approved schedule, schedule status, and payout curve or by using the earned value method that describe the work performed on each task. The report will include assessing project risk through monthly documentation of identifying and updating the risk category and approach for monitoring those tasks. Invoices shall be submitted after the DEPARTMENT approves the monthly progress report and the payout curve or with earned value analysis. The Project Manager will make judgment on whether work of sufficient quality and quantity has been accomplished by comparing the reported percent complete against actual work accomplished.

37.4 Correspondence

Copies of all written correspondence between the CONSULTANT and any party pertaining specifically to this contract shall be provided to the DEPARTMENT for their records within one (1) week of the receipt or mailing of said correspondence.

37.5 Professional Endorsement

The CONSULTANT shall have a Licensed Professional Engineer in the State of Florida sign and seal all reports, documents, Technical Special Provisions and Modified Special Provisions, and plans as required by DEPARTMENT standards.

37.6 Computer Automation

The project will be developed utilizing Computer Aided Drafting and Design (CADD) systems. The DEPARTMENT makes available software to help assure quality and conformance with policy and procedures regarding CADD. It is the responsibility of the CONSULTANT to meet the requirements in the FDOT CADD Manual. The CONSULTANT shall submit final documents and files as described therein.

37.7 Coordination with Other Consultants

The CONSULTANT is to coordinate his work with any and all adjacent and integral consultants so as to effect complete and homogenous plans and specifications for the project(s) described herein.

37.8 Optional Services

At the DEPARTMENT's option, the CONSULTANT may be requested to provide optional services. The fee for these services shall be negotiated in accordance with the terms detailed in Exhibit B, Method of Compensation, for a fair, competitive and reasonable cost, considering the scope and complexity of the project(s). Additional services may be authorized by Letter of Authorization or supplemental amendment in accordance with paragraph 2.00 of the Standard Consultant Agreement. The additional services may include

Construction Assistance, Review of Shop Drawings, Final Bridge Load Rating, update (Category II) bridge plans electronically (CADD) for the Final "As-Built" conditions, based on documents provided by the DEPARTMENT (CADD Services Only) or other Services as required.

38 INVOICING LIMITS

Payment for the work accomplished shall be in accordance with Method of Compensation of this contract. Invoices shall be submitted to the DEPARTMENT, in a format prescribed by the DEPARTMENT. The DEPARTMENT Project Manager and the CONSULTANT shall monitor the cumulative invoiced billings to ensure the reasonableness of the billings compared to the project schedule and the work accomplished and accepted by the DEPARTMENT.

The CONSULTANT shall provide a list of key events and the associated total percentage of work considered to be complete at each event. This list shall be used to control invoicing. Payments will not be made that exceed the percentage of work for any event until those events have actually occurred and the results are acceptable to the DEPARTMENT.