Background
The Palm Beach Transportation Planning Agency (PBTPA) conducted a corridor study along 42 miles of US-1 within the County of Palm Beach to incorporate a new express bus service as well as facilities to improve pedestrian and bicycle safety and connectivity along the corridor. Workshops were held to obtain feedback from existing multimodal users and stakeholders such as cities and towns. Out of the 42 miles, 3 miles has been selected within the City of Riviera Beach and the Town of Lake Park to kick start implementation of this service and facilities along US-1.

Existing Conditions
State Road US-1 / Broadway Ave. is a C4-Urban General four-lane urban road located in Palm Beach County that goes through the City of Riviera Beach and the Town of Lake Park.

The project length is approximately 3 miles, and extends from 59th Street (M.P. 12.127) through Park Ave. (M.P. 14.558/M.P. 0.00) to SR-850/ Northlake Blvd (M.P. 0.638).

This US-1 corridor contains a missing link for designated bike lanes from E 11th Street (just north of the Port of Palm Beach) to Silver Beach Road (M.P. 14.166 and the City limit of the City of Riviera Beach). These limits currently have the outside lanes with sharrow marks instead. The limits within the Town of Lake Park have a 3ft substandard bike lane width.

All the signalized intersections have mast arms except E 20th Street intersection is still on strain poles. All the crosswalks in the main intersections have decorative stamped asphalt features. Further, there are several traffic monitoring sites through the corridor.

The Town of Lake Park seems to have historical properties on the west side that will need to be taken into consideration for impacts. In addition, there are distribution power poles on the northbound side and transmission poles on the southbound side (on the north end of the project limits). There are decorative light poles on the west side.

Scope of Work
To ensure the selected 3 miles is feasible to be constructed within the existing right of way, a feasibility study will be overseen by FDOT to document the effort involved in the design process including variations from FDOT standards, retrofitting the bridge over Port of Palm Beach, acquiring of any relevant permits, Right of Way (if unaccounted for), utility coordination, assessing tree impacts, and evaluating the existing infrastructure to determine if it needs to be brought up to a level of standard that meet the PBTPA's objectives and vision.

SCOPE OF SERVICES

Project Activity 3: Project General Tasks
3.1.8 PowerPoint Presentation
3.1.11 Other Agency Meetings
3.4 Contract Maintenance and Project Documentation
3.6 Prime Consultant Project Manager Meetings

Project Activity 4: Roadway Analysis
4.1 Typical Section Package
4.5 Horizontal/Vertical Master Design Files
4.6 Access Management
4.9 Cross Section Design File (Ensure harmonization given changes to geometric realignment)
4.13 Tree Disposition Plan
4.14 Design Variations and Exceptions
4.15 Design Report (i.e. Feasibility Study Report)
4.17 Cost Estimate (1 LRE)
4.20 Field Review
4.22 Technical Meetings
4.23 Quality Assurance/Quality Control
4.25 Supervision
4.26 Coordination

Project Activity 5: Roadway Plans
5.9 Plan Sheets (Concept Plans)
5.19 Cross Sections
5.24.1 Tree Disposition Plan
5.25 Project Network Control Sheet(s)
5.28 Quality Assurance/Quality Control
5.29 Supervision

Project Activity 7: Utilities
7.17 Other Utilities

Project Activity 18: Miscellaneous Structures
18.31 Other Structures

Project Activity 19: Signing and Marking Analysis
19.3 Reference and Master Design File
19.13 Quality Assurance/Quality Control
19.15 Supervision
19.16 Coordination

Project Activity 27, 28, and 29: Survey, Photogrammetry, and Mapping

27  SURVEY (06/13/2019) FM# 438386-2 SR 5

   Project Limits: SR 5 59 St to Northlake Blvd 3 miles

   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.

Total station equipment used shall be compatible with the DEPARTMENT’s Electronic Field Book
processing standards. Data for review must be delivered on disk for input into the DEPARTMENT’S
Electronic Field Book Software.

All work shall be accomplished in accordance with the criteria established by the Departments
Highway Field Specifications, Survey Handbook (Survey Procedure Topic No. 550-030-101a) (Chapter
20, sec 23 (3)(a), F.S.), CADD Production Criteria Handbook and must comply with the Standards of
Practice by the Florida Board of Professional Surveyors and Mappers, in Chapter 5J-17.050-052,
Florida Administrative Code pursuant to Section 472.027, Florida Statutes, the latest’s addition of
the DEPARTMENT’s Survey Standards and Guidelines and any special instructions.

The surveyor shall comply at all times with applicable Federal, State, local laws and provisions and
policies governing safety and health. This includes Title 29, Code of Federal regulations, Parts 1910
and 1976, Occupational safety and Health Regulations, including any subsequent revisions and
updates. In order to conduct the public through the work area, full compliance with the current
Department Roadway and Traffic Design Standards (600 Series), Survey Safety Handbook and
current Maintenance of Traffic Training D.O.T. Topic No.625-010-010-a is a minimum requirement.

It will be the aerial firm’s responsibility, not the surveyors, to walk the project identifying and
locating any missing items and describing the items such as sanitary sewer manholes, FPL manholes,
etc. marking all of this information on the check plots. Then the surveyor can take those check plots
and locate the missing items marked on the plots that the aerial cannot locate.

At the completion of all survey and aerial work it is the responsibility of the CONSULTANT to furnish
to the DEPARTMENT’s District Survey Office one CD or DVD with all the surveying and mapping
information (GPS, topography, digital terrain model, project network control, target control, XYZ
etc.) with exception of Raster Images.

27.1 Horizontal Project Control (HPC)

Set approximately 10 BLC points and any needed secondary points

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); will include primary or
secondary control points. The Horizontal Datum to be used is NAD 1983/1990. A minimum of 3 NGS
points of 2nd Order or better must be used. The primary control points must be set near or outside
the R/W Lines. The minimum distance between primary control points is 2000 feet and the maximum distance is 3000 feet. The primary control points must also be inter-visible between each other. Concrete monuments with discs will be used for primary control. All concrete monuments must have a steel rod placed in the concrete for location purposes. Iron rods with caps or PK Nail and Washers (Washers stamped with secondary control number) will be used for secondary control. The Consultant must supply FDOT approved discs, field books and other required items. The Department will supply the stamping information for the disks. The field books must be delivered to the Department first so that they can be numbered correctly. Includes analysis and processing of all field collected data, and preparation of forms.

### 27.2 Vertical Project Control (VCP)

**Set approximately 10 Bench marks every 1000’ +/-**

Establish or recover VCP, for the purpose of establishing vertical control on datum approved by the District Surveyor (DS); will include primary or secondary vertical control points. The Vertical Datum to be used is the NAVD 1988. The bench run must start and end on NGS points of 2nd Order or better. All concrete monuments must have a steel rod placed in the concrete for location purposes. The primary vertical control points must be set outside the limits of construction, at no greater than 1000 feet intervals. Includes analysis and processing of all field collected data, and preparation of forms.

### 27.3 Alignment and/or Existing Right of Way Lines

Compute the Historic Baseline of Survey on and all major side streets. *These lines must be placed on the PNC sheet and the survey database.* 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. In areas where it is apparent that roadway improvements are outside the computed existing R/W lines the surveyor set up a meeting to discuss this with the Project Manager. If reconstruction is to take place in these areas then R/W Reports will be ordered and plotted to verify the existing R/W. Prior to stationing or use of the project alignment, it must be approved in writing by the District IV Survey Office.

Once the R/W lines have been determined by the surveyor; those lines must be overlaid on the topo/raster files to determine if any improvements fall outside the R/W line. This includes building overhangs. The surveyor must flag the areas in question and send that information to the FDOT Survey Department for review. After our review we will make the determination of whether title searches are needed in those areas. Then we will ask the DOT PM for optional services money to take a look at the searches and determine if indeed the improvements are inside or outside of our R/W.

The Historical Baseline will not be staked in the field on this Project

27.4 Aerial Targets

Set 80 LAMP targets per aerial firm request

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.

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 (Not applicable on this project)
27.6  **Topography/DTM (3D)**

*Provide soft shots and Obscured areas*

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.

Effort includes field edits, analysis and processing of all field collected data, existing maps, and/or reports.

27.7  **Planimetric (2D)  N/A**

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.

Optional Services:

Obtain TOPO information which the aerial firm could not obtain. Effort includes field edits, analysis and processing of all field collected data.

27.8  **Roadway Cross Sections/Profiles**

*1 day for DTM checks*

Perform cross sections or profiles every 500’. This may include analysis and processing of all field-collected data for comparison with DTM.

27.9  **Side Street Surveys (Not applicable on this project)**

Refer to tasks of this document as applicable.

27.10 **Underground Utilities Provide designates Test holes Optional**
The SUE consultant, working directly with the Design Engineer of Record (EOR), must clear all sites i.e. quadrants for mast arms, light pole locations, catch basin locations, etc. To help complete this task, the following process will be followed:

Working directly with the Design EOR, the SUE consultant will create Design boundary shapes for each type of utility investigation based on scope of project. (See red border in attachments.)

Designate all tonable and non-tonable utilities running through the above areas using standard designation equipment and Ground Penetrating Radar (GPR) to determine where the utilities are located (Show the verified utility information at any location that intersects the boundary borders.)

If the GPR identifies any area that may contain a utility; a letter must be sent to the Department along with a DGN file showing the utility designates and the GPR line

Staff hours will be provided for potholes/locates work on the designates and the GPR lines to determine if a utility exists. Holes on the GPR indications will be paid for even though no utility is found (a dry hole)

Pothole all utilities as per the attached drawings.

All locate/pothole information along with the type, size and utility owner information must be placed on a CD/DVD with X, Y & Z coordinates. This file must be PEDD’s (signed & sealed) by the PLS in charge of the field work and delivered to the District IV Survey Office for placement on the District IV GIS.

If a utility is identified but cannot be physically found, that needs to be identified on the design boundary and the EOR and Utility owner need to be notified of this issue.

Keep the lines of communication open with the EOR. When in doubt, talk with EOR about the intent of the search and location process.

27.11 Outfall Survey (Not applicable on this project)

27.12 Drainage Survey

Inverts and sizes on 60 structures

Locate underground data (XYZ, pipe size, type, condition and flow line)( top of structure, bottom of structure) that relates to above ground data. Includes field edits, analysis and processing of all field collected data, existing maps, and/or reports. 85+- Structures
27.13 Bridge Survey (Minor/Major)
27.14 Channel Survey (Not applicable on this project)
27.15 Pond Site Survey (Not applicable on this project)
27.16 Mitigation Survey (Not applicable on this project)
27.17 Jurisdiction Line Survey (Not applicable on this project)
27.18 Geotechnical Support (Not applicable on this project)
27.19 Sectional/Grant Survey

15 section corners

Includes field location, placement and referencing of section corners, ¼ section corners, and fractional corners where pertinent. Includes analysis and processing of all field collected data and/or reports. Includes delivery of all appropriate electronic files, forms, and/or field notes. Prepare and submit to appropriate agencies.

*Tie in approximately 15 section corners and ¼ section corners on the Project to the Survey.*

27.20 Subdivision Location

20 subdivisions

Survey all existing recorded subdivision/condominium boundaries, tracts, units, phases, blocks, street R/W lines, and common areas. Includes analysis and processing of all field collected data and/or reports. Includes delivery of all appropriate electronic files, forms, and/or field notes. If unrecorded subdivision is on file in the public records of the subject county, survey the beginning and end of unrecorded subdivision. (For staff hour negotiations, each unrecorded subdivision is equivalent to one block of a recorded subdivision.)

27.21 Maintained R/W (Not applicable on this project)
27.22 Boundary Survey (Not applicable on this project)
27.23 Water Boundary Survey (Not applicable on this project)
27.24 Right of Way Staking / Right of Way Line (Not applicable on this project)
27.25 Right of Way Monumentation (Not applicable on this project)
27.26 Line Cutting (Not applicable on this project)
27.27 Work Zone Safety
Provide work zone as required by DEPARTMENT standards.

27.28 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) or their representative.

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

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

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

27.32 Technical Meetings
Attend meetings as required and negotiated by the Surveying and Mapping Department. Attend one Survey Kickoff Meeting with the FDOT Survey Department.

27.33 Quality Control/Quality Assurance
Establish and implement a QAQC plan. Also includes sub-consultant review, response to comments and any resolution meetings if required, preparation of submittals for review, etc.

27.34 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.

27.35 Coordination

Coordinate survey activities with other disciplines. Unit is based on 3 percent of office support hours from tasks 1 through 28, (where applicable). 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

Provide RASTERS and LAMP survey

Provide Aerial Planimetrics to be used for 1”=40’ scale mapping and Rasters in color are requested on.

It will be the responsibility of the aerial firm to merge all survey and aerial data. A flight plan must be delivered along with the cost/staff hours.

Furnish both TIFF and HMR files.

The AERIAL CONSULTANT must have the ability to perform all tasks associated with the Standard Scope of Services and Staff Hour Estimation form Tab 28. Also, establish state plane coordinates (X, Y & Z if necessary) for targets and or picture points (Survey Spread Sheet # 27.4) on the ground using Global Positioning System (GPS) equipment, place conventional elevations on aerial targets and or picture points, field up-date digital mapping (Survey Spread Sheet # 27.6), field check aerial Digital Terrain Models (DTM’s), field check aerial cross sections (Survey Spread Sheet # 27.8), acquire elevations using a prism-less instrument or identify a sub-consultant who will perform these tasks.

At the completion of all of the survey and aerial work it is the responsibility of the CONSULTANT to furnish to the District IV Survey Office two CD’s with all the surveying and mapping information (GPS, TOPO, DTM, PNC, Target control XYZ etc.) with exception of Raster Images.

Furnish both TIFF and HMR files.

Also, a Surveying and Mapping Report must accompany all of the above information along with an electronic copy of the report placed on the electronic information (file) supplied to the Department.
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 Film Processing
Process, check, and annotate the aerial film.

28.6 Photo Products
Prepare contact prints, contact diapositives, and photo enlargements.

28.7 Scanning
Scan photographic images.

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

28.9 Aerial Triangulation
Measure and adjust control within aerial images.

28.10 Surfaces
Includes collection of break lines and spot elevations.
28.11  **Ortho Generation**
Includes creation of final images.

28.12  **Rectified Digital Imagery (Georeferenced)**
Create the rectified digital image.

28.13  **Mosaicking**
Create the mosaic.

28.14  **Sheet Clipping**
Create plot files for sheets from the database.

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

28.16  **Planimetrics (2D)**
Prepare 2D planimetric map.

28.17  **Drainage Basin**
Includes preparing drainage basin maps in clipped "sheet" format.

28.18  **CADD Edit**
Perform final edit of graphics for delivery of required Microstation .dgn, CADD, and Geopak files.

28.19  **Data Merging**
Merge photogrammetric files, field survey files, and data from other sources.

28.20  **Miscellaneous**
Other tasks not specifically addressed in this document.

28.21  **Field Review**
Perform on site review of maps.

28.22 Technical Meetings

Attend meetings as required.

28.23 Quality Control/Quality Assurance

Establish and implement a QC/QA plan.

28.24 Supervision

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

28.25 Coordination

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

29 MAPPING

Master CADD File

29.1 Alignment (Not applicable on this project)

29.2 Section and 1/4 Section Lines (Not applicable on this project)

29.3 Subdivisions / Property Lines (Not applicable on this project)

29.4 Existing Right of Way (Not applicable on this project)

29.5 Topography (Not applicable on this project)

29.6 Parent Tract Properties and Existing Easements (Not applicable on this project)

29.7 Proposed Right of Way Requirements (Not applicable on this project)

29.8 Limits of Construction (Not applicable on this project)

29.9 Jurisdictional/Agency Lines (Not applicable on this project)

Sheet Files

29.10 Control Survey Cover Sheet (Not applicable on this project)
29.11 Control Survey Key Sheet (Not applicable on this project)
29.12 Control Survey Detail Sheet (Not applicable on this project)
29.13 Right of Way Map Cover Sheet (Not applicable on this project)
29.14 Right of Way Map Key Sheet (Not applicable on this project)
29.15 Right of Way Map Detail Sheet (Not applicable on this project)
29.16 Maintenance Map Cover Sheet (Not applicable on this project)
29.17 Maintenance Map Key Sheet (Not applicable on this project)
29.18 Maintenance Map Detail Sheet (Not applicable on this project)
29.19 Reference Point Sheet (Not applicable on this project)
29.20 Project Network 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.

The Project Network Control Sheet will be used primarily with the construction plans and thus must be legible when plotted on an 11’ X 17” paper. The CONSULTANT shall contact the DEPARTMENT District Surveyor if the electronic drawing cell and the requirements for the Project Network Control Sheet are needed.

29.21 Table of Ownerships Sheet (Not applicable on this project)

Miscellaneous Surveys and Sketches (Not applicable on this project)
29.22 Parcel Sketches (Not applicable on this project)
29.23 TIITF Sketches (Not applicable on this project)
29.24 Other Specific Purpose Survey(s) (Not applicable on this project)
29.25 Boundary Survey(s) Map (Not applicable on this project)
29.26 Right of Way Monumentation Map (Not applicable on this project)
29.27 Title Search Map (Not applicable on this project)
29.28 Title Search Report (Not applicable on this project)
29.29 Legal Descriptions (Not applicable on this project)
29.30 Final Map/Plans Comparison (Not applicable on this project)
29.31 Field Reviews (Not applicable on this project)
29.32 Technical Meetings (Not applicable on this project)
29.33 Quality Assurance/Quality Control (Not applicable on this project)
29.34 Supervision (Not applicable on this project)
29.35 Coordination (Not applicable on this project)
29.36 Supplemental Mapping (Not applicable on this project)