FLORIDA DEPARTMENT OF TRANSPORTATION
DISTRICT FIVE, SURVEYING & MAPPING

SURVEY DATA PROCESSING AND REVIEW QUALITY ASSURANCE/QUALITY CONTROL MANAGEMENT PLAN

DEPARTMENT OF TRANSPORTATION
DISTRICT FIVE, SURVEYING & MAPPING UNIT
719 S. WOODLAND BLVD.
DELAND, FLORIDA 32720

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1.0 DEFINITIONS

- **ALIGNMENT -** Although this document mentions the Centerline of Survey, the final survey alignment that is stationed and referenced will be clarified in the Scoping Negotiations. During these negotiations, the final survey alignment will be identified as the Centerline of Right-of-Way, Baseline of Construction, Baseline of Survey, etc.

- **CADD GROUP** - Individuals from the D5 Surveying & Mapping unit overseeing the archival of all Surveying and Mapping submittals as well as the verification of each mapping DGN file for CADD standards. (Sean Johnson, Robert Calzaretta, etc.)

- **CONTRACTS GROUP -** Individuals from the D5 Surveying & Mapping unit overseeing the projects activities such as scoping, negotiations, invoices, etc. along with overseeing the Quality Assurance (QA) review of consultant and in-house field survey data that supports Right-of-Way and/or Design Surveys. (Thomas LaCorte, Hernando Salazar, Robert Steele, Heidi Foraker, etc.)

- **D5 SURVEYING & MAPPING UNIT -** The work group/discipline managing all Surveying & Mapping activities for the FDOT District 5.

- **DISTRICT SURVEYOR & MAPPER-** The individual in responsible charge of the work group/discipline managing all Surveying & Mapping activities for the FDOT District 5. (Nicholas Campanile)

- **D5 SURVEY PROJECT MANAGER -** The FDOT District 5 or consultant surveyor assigned to manage and ensure this D5 Survey Data Processing and Review QA/QC Management Plan is followed. (Responsible individual varies by project)

- **D5 SURVEY QA SURVEYOR -** The FDOT District 5 or consultant surveyor assigned to perform Quality Assurance reviews for the FDOT District 5. (Hernando Salazar)

- **EFBP -** One of the many systems available for the reduction and processing of field survey data.

- **FDOT PROJECT MANAGER -** The individual listed by the Florida Department of Transportation as the official Project Manager that coordinates all district disciplines and consultants involved in an FDOT project. (Responsible individual varies by project)

- **IMAGERY -** Field survey data collection methods that include Aerial Photogrammetry and/or Terrestrial Mobile LiDAR (TML). Be sure to coordinate with the Central Office of the FDOT in Tallahassee for assignment of the Mobile Survey Tracking System (MSTS) number for this type of data.

- **LEAD SURVEYOR -** Unless otherwise specified, the following explains the districts intention:

  When a project involves multiple survey entities as part of the Surveying & Mapping "team", one or more of these project surveyors will be identified and scoped to be the "Lead Surveyor".

  - For a typical MAJOR Project, there could be two "Lead Surveyors" as far as certified Survey and Map Reports are concerned, one for the Right-of-Way Control Survey & Mapping (no report) and one for the Design Survey (comprehensive report).

  - For a typical MINOR Project, the surveyor doing the bulk of the Design Survey (for example creates the Digital Terrain Model or the Surface Model or does the final merge) will normally be identified as the "Lead Surveyor".

- **MAJOR PROJECTS -** Projects where at least one of the assigned consultants on the Surveying & Mapping "team" is involved with mapping and/or property acquisition. Many of these projects also involve Design Survey tasks.

- **MINOR PROJECTS -** Typically these projects involve Design Survey tasks only, however some of these projects may be scoped to incorporate R/W tasks.

- **PRIMARY SURVEYS -** Field and office activities dealing with the Project Primary Horizontal Control Network (PPHCN) and/or the Project Primary Vertical Control Network (PPVCN). This phase may also be known as the Primary Network Control (PNC) phase. During this activity no alignment, property or topographic location ties are made. Normally this phase is managed by the Records Group with input from the Contracts Group.

- **PROJECT SPECIFIC NETWORK DESIGN PLAN -** A text document created by each Project Surveyor outlining the approach and intended procedures whenever GPS/GNSS collection is anticipated. **Unless otherwise specified, this document must be submitted to Sean.Prosser@dot.state.fl.us before any field survey data is collected.**

- **PROJECT SPECIFIC QA/QC PLAN -** A text document created by each Project Surveyor outlining the approach and intended procedures that will meet or exceed the FDOT District 5 expectations for all projects. **Unless otherwise specified, this document must be submitted to Sean.Prosser@dot.state.fl.us or to Heidi.Foraker@dot.state.fl.us before any field survey data is collected.**

- **PROJECT SURVEYOR -** The surveyor in responsible charge. The individual responsible for signing and sealing survey products. For further guidance with surveyor certifications made for the Florida Department of Transportation, see Chapter 472.025(1), F.S. and Chapters 5J-17.051(3)(e), 5J-17.060 (acceptable seal designs) and 5J-17.062(2) & (3), and in FDOT Design Manual Topic #625-000-002, section 130.2.1. (Responsible individual varies by project)

- **QC INSPECTOR -** A routine within the FDOT's Computer Aided Design and Drafting (CADD) package used to ensure that proper symbology and other attributes are achieved with every delivery of an electronic drawing file.

- **RECORDS GROUP -** Individuals from the D5 Surveying & Mapping unit overseeing all Primary Network Control activities along with the numerical assignment, tracking, and archival of survey field books. (Beth Bieber, Maria Gonzales, Nikolay Hindalov, Santina Calzaretta, etc.)

- **SECONDARY SURVEYS -** Once the Primary surveys are accepted, all other project activities and locations are considered "**Secondary**".

- **SEGMENTING -** Because of project complexity and length, most survey work done for this district needs to be segregated and stored in field survey data segments containing items such as GPS/GNSS ties, field traverses, ties for topography locations, ties for Right-of-Way locations, manual survey locations, etc.

- **SURVEY DATABASE ARCHIVE -** A ZIP file that is created, maintained, and submitted to the D5 Surveying & Mapping unit by each consultant. This ZIP file must contain **ALL** field survey data (RAW and processed), final Design Survey CADD drawing files, Excel spreadsheets, text documents, Index files, and any other data used to support the project. Please note that Imagery files are not stored inside the survey database archive (ZIP), for direction concerning Imagery data submittals see this documents Section 6.5.1(3).

2.0 OVERVIEW

2.1 The Florida Department of Transportation (FDOT) has set forth basic guidelines for performing field surveys for the Department. These guidelines are found in the "***Surveying and Mapping Handbook***" distributed and updated by the Central Office of the FDOT in Tallahassee.

2.2 The Fifth District of the FDOT has established additional guidelines applicable to any Surveying and Mapping "**Secondary**" survey field work done for this district, these additional guidelines are outlined in the D5 Survey Data Processing and Review QA/QC Management Plan (also known as the D5 Survey QA/QC Management Plan, this document).

2.2.1 It is the intention of this Management Plan and all accompanying reports/forms to supersede all other D5 Surveying QA/QC Management Plans and addendums previously published by the D5 Surveying & Mapping unit.

2.2.2 It is also the intention of this D5 Survey QA/QC Management Plan to agree with, supplement, and exceed the requirements set forth in Chapter 5J-17 of the Florida Administrative Code (F.A.C.), Chapters 177 and 472 of the Florida Statutes, the FDOT "***Surveying and Mapping Handbook***", the FDOT CADD Manual, and the D5 Map Preparation and Review QA/QC Management Plan.

2.3 For information related to map layout, format, and content requirements for production of maps (e.g., Right-of-Way Control Survey, Specific Purpose, Maintenance, Right-of-Way, etc.), refer to the D5 Map Preparation and Review QA/QC Management Plan or contact a D5 Mapping Project Manager.

2.4 The Project Surveyors are always responsible for their own QA/QC including maintaining any support documentation of the field and/or office activities. For the D5 Surveying & Mapping unit to be sure this is accomplished, we may conduct regular QA reviews, regularly communicate with all project team members, periodically visit the job site and/or the Project Surveyor's office for reviewing the QA/QC process and the archived support documentation on project specific activities.

2.5 All project specific correspondence (memos, letters of transmittal, e-mails, survey reports, interim and/or final database deliveries, etc.) must contain, at a minimum, the following in the subject: the five-digit Section/Roadway Identification number, the seven-digit Financial Project (F.P.) number, State Road number and limits, and subject matter.

Example:
Section= 75050, F.P.= 239535-3, SR-50 from SR-429/Western Beltway to Good Homes Rd., database for review (R/W or Design); R/W segment review; Mainline Design submittal; Updated Design submittal; 60% Control Survey map review; or whatever the subject may be.

2.5.1 The correspondence must copy **ALL** project team members such as the Prime Engineers/Designer, FDOT Project Managers, Project Surveyors, D5 Surveying & Mapping Project Managers, etc.

2.6 It is our expectation that all text documents, spreadsheets, ZIP archive files, Project Logs, etc. delivered to the district be fully compatible with the tools found in a standard load of Microsoft Windows.

3.0 PROJECT SPECIFIC PLANS & KICKOFF MEETINGS

3.1 If the Project Surveyor anticipates the use of GPS/GNSS or leveling equipment for setting of control monumentation on Major or Minor Non-PPHCN/PPVCN Projects, this topic must be discussed during Scoping Negotiations. The Project Surveyor must submit to **Sean.Prosser@dot.state.fl.us** a Project Specific Network Design Plan for horizontal and/or vertical control outlining the procedures that will be utilized for collection, processing, adjustment, and deliverables of the control data.

3.1.1 Concerning the districts needs for the Project Specific Network Design Plans and their requirements please see files named: *D5 PPC TEMPLATE with PPC Datasheet.docx* & *D5 Secondary Control TEMPLATE.docx*

3.1.2 All guidelines as set forth in the most up to date versions of the Florida Department of Transportation SURVEYING AND MAPPING HANDBOOK & the D5 Survey Data Processing and Review QA/QC

Management Plan shall be adhered to in the performance of this Plan, including but not limited to data collection, processing, and reporting.

3.1.3 Control Survey locations using GPS/GNSS cannot be utilized without prior written authorization from the District Surveyor & Mapper or appropriate designee.

Both documents noted above will be delivered with any transfer of this D5 Survey Data Processing and Review QA/QC Management Plan. The delivery will also include SAMPLES to help facilitate creation of the Project Specific Network Design Plan.

3.2 Every project done for D5 Surveying & Mapping unit must have a Project Specific QA/QC Plan. This plan must be submitted to Sean.Prosser@dot.state.fl.us and/or to Heidi.Foraker@dot.state.fl.us before submittal to the Engineer of Record/Prime Engineer.

3.2.1 Project Specific QA/QC Plan guidelines for a MAJOR Project

3.2.1.1 Prior to the kickoff meeting and/or any fieldwork (normally within 10 days after Notice to Proceed has been given to the Survey Consultant) the Project Surveyor will submit a Project Specific QA/QC Plan to the D5 Survey Project Manager or appropriate designee. When appropriate this plan will include the final version of the Project Specific Network Design Plan.

3.2.1.2 The Project Specific QA/QC Plan will outline, at a minimum, who will assume the role of Lead Surveyor, which software will be used to collect and process the field survey data, a brief synopsis of the processing software's reports that show how our accuracy expectations will be met, the proposed survey database archive file naming structure, the names and contact information of the key project team members including the Prime Engineer/Designer (consultant/in-house), an itemization of the final-merged Design Survey deliverables sent to the Prime Engineer/Designer and the survey consultant responsible for creating and/or delivering said files, the applicable survey datums, the methods and point naming structure to be utilized in the verification of the final alignment and its references, as well as the date of the latest version of the D5 Survey Data Processing and Review QA/QC Management Plan.

3.2.1.3 The Project Specific QA/QC Plan needs to focus not only on the above requested data, but also on any scoped deviations from the D5 Survey Data Processing and Review QA/QC Management Plan, special requests by the district or by the Prime Engineer/Designer, as well as any other items unique to the project (e.g. Centerline of Survey references to the Right-of-Way line only, specific DTM coverage, whether some of the Design Survey output files will be done in 2D or 3D mode, whether secondary control densification will be performed by GPS/GNSS methods, or by robotic and/or reflector-less distance measuring instrumentation, or by Imagery collection methods, or by a combination of these methods, the Government Sections-Side Street Alignments-Subdivisions to be surveyed, etc.).

3.2.1.4 Be sure the Project Specific QA/QC Plan references all scoping exhibits as well as any other graphics and documents used in the project negotiations. Make sure to name the dates and file names of these referenced documents.

3.2.2 Project Specific QA/QC Plan guidelines for a MINOR Project

3.2.2.1 Delivery of a Project Specific QA/QC Plan must take place at or before the first interim delivery of survey data (also known as Project Suite schedule Activities 106110/106020, or before any required field survey data reviews). Unless otherwise specified these plans do not need to be as detailed as the ones for MAJOR Projects, however, they still need to outline how each item of the negotiated scope is being accomplished, who the Lead Surveyor and the Engineer of Record are, the applicable survey datums, and the name of the database files submitted for review and archival.

3.3 When a Lead Surveyor has been identified all other surveying team members must forward their Project Specific QA/QC Plans to the Lead Surveyor for consolidating into a single document that will be submitted to the D5 Surveying & Mapping unit or appropriate designee.

3.4 Whenever there are procedural modifications to the Project Specific Plans on record due to additional/supplemental surveying services being requested and approved or due to other changes in the projects work requirements, be sure to update any existing plans or create new plans that agree with this D5 Survey QA/QC Management Plan and with section 10.3. of the FDOT ***"Surveying and Mapping Handbook"***, making sure to outline the new surveying services to be done.

3.5 All Project Specific Plans, and their updated versions, must be dated and submitted to the D5 Surveying & Mapping unit for our use and archival.

3.6 A kickoff meeting may be held to review the project requirements. Attendees should include the Project Surveyor(s), the D5 Surveying & Mapping Project Managers, Survey Party Chief(s), the D5 Survey QA Surveyor(s), and any other individuals assigned to the project.

3.7 The Project Surveyor (or appropriate designee) will be required to keep accurate minutes of the kickoff meeting, any other project meetings, and distribute those minutes to all attendees for review and comments within 5 business days.

4.0 PROJECT LOGS

Requirements for MAJOR Projects and for any MINOR Projects where mapping reviews are involved:

4.1 The Project Surveyor for each survey consultant will create and maintain a Project Log of their assigned tasks that will be submitted to **Heidi.Foraker@dot.state.fl.us** or an appropriate designee no later than the last Tuesday of every month or as otherwise specified. Be sure to include **D5-SurveyContracts@dot.state.fl.us** in this delivery.

4.1.1 The Project Logs must state, at a minimum, the appropriate percent complete for each assigned task; summarize the reporting period activities and briefly outline the next reporting period activities and expectations.

4.1.2 In addition to the completion percentages, the Project Logs need to reflect the phase submittal dates reported by the Prime Engineer/Designer in the most recent project schedule as well as the actual date these phase submittals occur.

4.1.3 For a blank sample Project Log refer to the FDOT ***"Surveying and Mapping Handbook"***. This sample log reflects TAB 27 for Ground Surveying actions as well as TAB 28 for Aerial Surveying actions. Use the appropriate TAB # to report the period's actions.

4.1.4 For a completed sample Project Log see this documents Appendix A.

4.1.5 When a Lead Surveyor has been identified, all other surveying team members must forward their Project Logs to the Lead Surveyor for consolidating into a single log that will be submitted as noted previously.

4.1.6 As a minimum, be sure the Project Log file name incorporates the assigned Financial Project (F.P.) number for the project, as well as any other information the reporting consultant deems necessary.

5.0 SURVEY DATA & DATABASE ARCHIVE MANAGEMENT

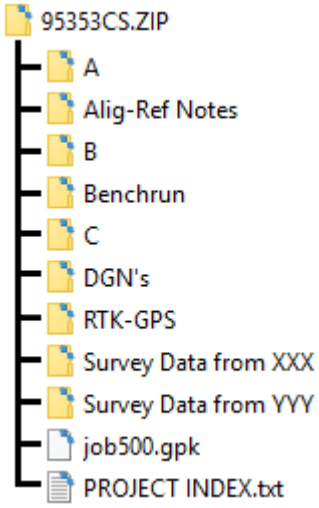
The D5 Surveying & Mapping unit will no longer accept CAiCE based deliverables.

5.1 As noted in this documents Section 1.0, each consultant will create, maintain, and submit to the D5 Surveying & Mapping unit a survey database archive (ZIP).

5.1.1 The name of the survey database archive (also known as a container file) must use all or part of the F.P. number, ensuring use of the segment number (the "seventh digit"), in such a way as to be project specific.

5.1.2 Ensure coordination with all other survey consultants working on this project, and with the D5 Surveying & Mapping unit so duplicate survey database archive names are not submitted.

(*The following sketch shows a sample <u>Control Survey</u> database archive/container file for a project with the identifying F.P. number of 239535-3*)



<u>The name of the survey database archive must be consistent for the life of the project.</u>

5.2 The survey database archive file may contain any combination of Design Survey data and/or Right-of-Way Control Survey data when an individual survey consultant has been tasked to do more than one phase of the project. If this is the case and one phase must be certified before all field work is complete, be sure that for subsequent final deliveries a revised certification report is submitted that notes the title, date, and subject of the original certification as well as what survey data the new certified Survey and Map Report covers.

5.2.1 When multiple survey database archive files are necessary for a certain project, we suggest that additional letters be used to denote the type of field survey data contained inside. It has been our experience that the letters AS for an Aerial Survey, DS for a Design Survey, DR for a Drainage Survey, CS for a Right-of-Way Control Survey, and US for a Utility Survey, clarify the contents well.

5.2.2 Use of other letter suffixes in the naming of survey database archive files to differentiate between survey tasks, consulting firms, or project sites is acceptable, but not mandatory. **Regardless of the method used, ensure consistency, clarity, and uniqueness**.

5.3 The choosing of which digits from the F.P. number and the alphabetical suffix (if one is desired/necessary) to be used in the naming structure of the database/segment files must be the result of a consensus by the survey consultants assigned to the project, must agree with the directions given here, and must ensure that no data collector file or survey point/chain name conflicts will arise.

- **<u>Be sure the survey database archive file name(s) are outlined to the D5 Surveying & Mapping unit before the database is created so we do not overwrite something (see this documents Section 3.2.1(2))/3.2.2(1).</u>**

5.4 Inside the container file will be a survey Project Index file outlining the following information: a brief synopsis of the scope of the project, the status of all the supporting files submitted, the names of the "cell, feature table, seed, QC rules, etc." files used, the State Plane datum used, the names of the various DGN/DTM/TIN files to be used in the Design, along with any other information considered beneficial to the project. Refer to file SAMPLE-PROJECT INDEX in this documents Appendix A.

5.5 Field survey data segment names may incorporate part of the F.P. number (including the "seventh digit"). For example, the database named previously could use the segment name 95353CSA, where CS represents a Right-of-Way Control survey database, and A represents the alpha segment identifier (in this example the survey database archive file is named 95353CS).

5.6 Survey data used to support the control mapping phase of a project will be extracted from the working survey database and be used to create the JOBROW.GPK file. This GPK file will be submitted under the **RWMAP** subdirectory and will not be included in any other subdirectory. This file will contain the final coordinates used in the mapping phase, the monuments description, and all other assigned attributes. This file will also have a complete import history allowing a reviewer to ascertain the electronic file or field book source of the collected data.

5.7 If a level circuit has been collected and/or reduced and adjusted electronically, all raw and reduction data for it will be stored in its own directory of the survey database archive and be named in such a manner so it is not in conflict with any other electronic segment. For example, if there is a horizontal segment named 95353DRA, the level circuit collected to accompany drainage segment A may be named L95353DRA (in this example the survey database archive file is named 95353DR).

6.0 SURVEY DATA & DATABASE ARCHIVE SUBMITTALS

6.1 All submittals will have a Letter of Transmittal that will note the items under this documents Section 2.5, state whether the data submitted pertains to **SURVEY** and/or to **RWMAP**, the applicable phase (Mainline Design, Updated Design, support for 30%, 60%, 90% map, etc.), what needs to be reviewed, and any other information considered beneficial to the purpose of the submittal (e.g., segment review order, origin of control, etc.). The electronic version of each Letter of Transmittal must contain the letters LOT as well as the applicable F.P. number in the file name.

6.1.1 The Letter of Transmittal must specifically note the names of each electronic file and hard copy document being delivered. Don't just mention that the submittal includes a Design Survey database, instead mention the survey database archive name as well as the names of each of the files delivered outside the survey database archive.

6.1.2 Applicable to all Alignment/Control map submittals: Be sure that the Letter of Transmittal clearly notes that "all supporting field survey data utilized in the preparation of this Alignment/Control map has already been submitted, reviewed, and accepted by the Department".

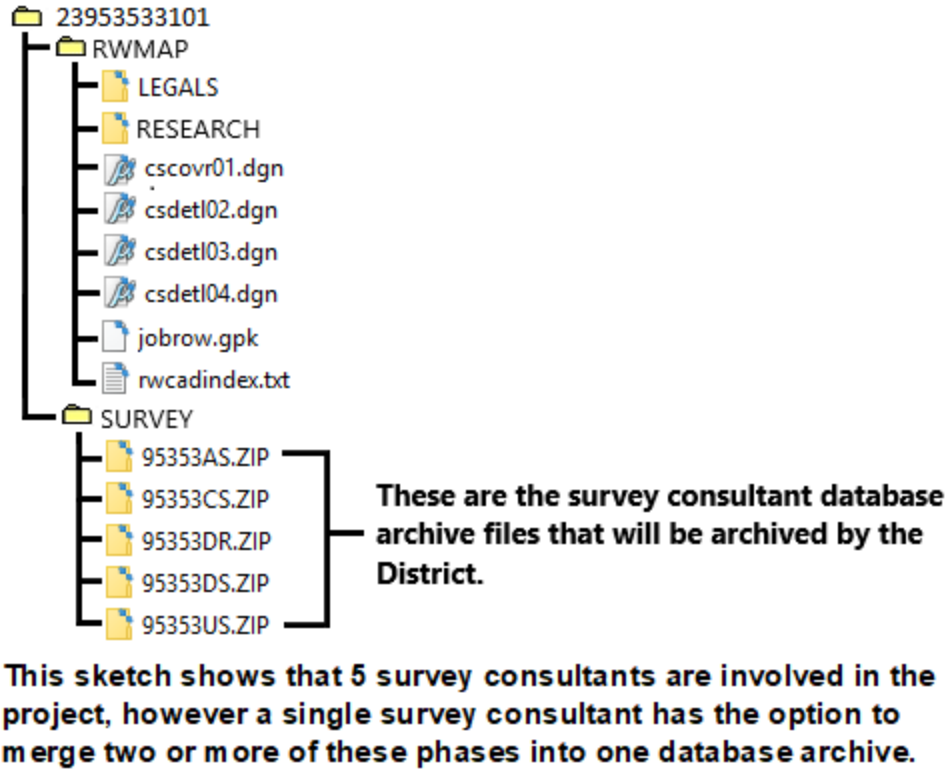
6.2 Deliveries to the district have different formats depending on whether a delivery is via a Digital Storage device (CD/DVD/USB Drive, etc.) or via the internet.

6.2.1 When the delivery is on a Digital Storage device (whether it's for an interim delivery or a final delivery) it must adhere to the following standards:

6.2.1.1 Unless otherwise specified, each project folder must be set-up to contain a main directory in it using the full F.P. number for its name. This directory can have up to two subdirectories under it, one named **RWMAP** and the other **SURVEY**. The name(s) included for a subdirectory(s) is dependent on the nature of the submittal (whether it is for mapping purposes, for surveying purposes, or for both).

6.2.1.2 For example, a project with the identifying F.P. number 239535-3-31-01 will have the main directory-subdirectory structure set up under the root directory as shown:

(The following sketch shows the main directory, its subdirectories, and their individual drawings, GPK, rwcadindex files, along with the various field survey database archive files (also known as container files))



- When delivery to the district is made via a Digital Storage device, be sure all data is in a "Read-Only" state. Be sure to "close" the storage session and/or activate other guards so the data delivered to the district cannot be accidentally erased.

6.2.1.3 Under the **RWMAP** subdirectory will be the up-to-date files associated with the mapping submittal stage for review, for example the MAPPING.DGN's, JOBROW.GPK, RWCADINDEX.TXT, and when needed a sub-sub directory for LEGALS or other RESEARCH. For further direction see the **D5 MAP PREPARATION AND REVIEW QA/QC MANAGEMENT PLAN.**

6.2.1.4 Under the **SURVEY** subdirectory will be the up-to-date survey database archive (ZIP) which contains **ALL** project segments to date, each in its own folder. **All survey segments that have been previously reviewed, are currently being reviewed, or are being submitted for review by the FDOT-D5 must be included.**

a) All original field survey data segments and their final processed results must be stored in a folder carrying the segment identifier and must be delivered to the district inside the survey database archive (ZIP).

b) This survey database archive may also contain individual directories for the Primary Network Control (PNC) data, the Design Survey MicroStation DGN drawings, the GPS/GNSS data, the deliveries of survey data from other consultants, as well as **ALL** other information (CADD

drawings, Excel spreadsheets, text documents, field notes for manual ties, etc.) used to support all phases of the project.

c) For a sample of what this survey database archive could look like, see sketch in this documents Section 5.1.2.

6.2.1.5 All final deliveries to the district of the survey database, of the DGN map drawings, and of other electronic submittals to the D5 Surveying & Mapping unit must be delivered via a Digital Storage device. **We recommend that communication with the district be made before a final submittal, as there may be project specific requirements.**

6.2.1.6 **The main directory-subdirectory structure and name must be consistent for the life of the project**. The District Surveyor & Mapper is the only person who may add additional subdirectories.

6.2.2 When the delivery is via the internet (for field survey data reviews, Design Survey Mainline phase, Design Survey Updated phase, R/W Survey 30%, 60%, 90% map phase, etc.) it will be considered an interim and must adhere to the following standards:

6.2.2.1 The File Transfer Appliance (FTA) is the Districts preferred method for transfer of interim submittals, no proprietary FTP/email/drop-box/etc. transfers to the D5 Surveying & Mapping unit are allowed. Contact the District Surveyor & Mapper or the Administrative Assistant to the D5 Surveying & Mapping unit for FTA access and other protocols. **However, we will accept interim deliveries via Digital Storage devices.**

6.2.2.2 All submittals via the FTA must be sent to **Hernando.Salazar@dot.state.fl.us**, with a courtesy copy to **Susan.Powell@dot.state.fl.us**; **Sean.Johnson@dot.state.fl.us**; **Robert.Calzaretta@dot.state.fl.us**; **William.Murphy@dot.state.fl.us**; and to anyone else deemed appropriate.

6.2.2.3 Submittals via the FTA don't need the directory structure outlined in the sketch seen in this documents Section 6.2.1.2. Any files that are normally stored under the **RWMAP** folder or the **SURVERY** folder would be the files delivered. The Subject line and the Letter of Transmittal for the delivery will alert us where the files delivered need to be archived.

6.3 Field Survey Data Reviews

Unless scoped otherwise or prior direction has been received in writing from the District Surveyor & Mapper, it is our intention that the following review process be followed:

Be sure to communicate with Hernando Salazar at 386-943-5263 or at **Hernando.Salazar@dot.state.fl.us before the initial data submittal, thereby allowing us to properly arrange a field survey data reviewer.**

6.3.1 The location of any survey control as well as the monumentation used to support the derivation/retracement of a Right-of-Way line, Government Section/Grant line, Centerline of Survey, or any other well-established property/boundary line must be submitted for review and acceptance by the D5 Surveying & Mapping unit before submittal of the alignment/map. This applies regardless of the projects labeling as a MAJOR/MINOR, that the data was established during the Design Survey phase, or which NEGOTIATIONS TAB these tasks are listed under.

a) All secondary field survey control set to support the future collection and/or setting of this type of survey data must meet or exceed the requirements noted in the FDOT "***Surveying and Mapping Handbook***", the D5 Survey Data Processing and Review QA/QC Management Plan, and the standards set by Chapter 5J-17, F.A.C.

6.3.2 Interim submittals of all field collected survey data needing review are required at intervals determined by the D5 Survey Project Manager. Unless otherwise specified, these intervals must not exceed two (2) weeks of survey data collection or five (5) field survey data segments.

6.3.3 Each field survey data segment folder (a directory inside the container file, see sketch in this documents Section 5.1.2) submitted to the district will contain the final version, as approved by the Project Surveyor, of every file produced by the coordinate processor. This folder will also contain all the raw/original data files as imported from the data collector, as well as a scan of the survey field notes supporting this data segment. Be sure that a file outlining the raw observations in an unedited fashion, as well as a file of the least-squares adjustment report is included.

6.3.3.1 Evidence of proper QA/QC review must be delivered with each survey data segment, therefore it is our expectation that a README text file be inside each segment folder to explain details of the segments processing, such as control point history, large residuals, large standard errors, questionable closures, additional redundancy or independent verification ties, final chi-square test, and any other information considered beneficial to the reviewer. Be sure this README file specifically outlines where in the adjustment text report some of the required information can be found.

6.3.3.2 These README text files must note that the Project Surveyor has verified and accepted the results as meeting or exceeding the requirements noted in the FDOT "***Surveying and Mapping Handbook***", the D5 Survey Data Processing and Review QA/QC Management Plan, and the standards set by Chapter 5J-17, F.A.C.

6.3.3.3 Although some field survey data segments do not receive review on a regular basis (for example Design Survey data and survey point verification segments), be sure a README file is in place so future questions can be avoided when there is a need to look at these segments.

6.3.3.4 Survey consultants using the Electronic Field Book Processing (EFBP) system can find further directions later in this document. See the Software link of the internet website for the Surveying & Mapping Central Office of the FDOT for information about additional utilities/tools that may be used in the QA/QC of the output files from this system.

6.3.3.5 When a Master Control file that houses all Survey Control for segment processing has been created be sure to include a copy of this file in the survey database archive.

6.3.3.6 When any utilities/tools are used in the QA/QC process of the surveying data (coordinate comparison, location verification, proximity to other locations, etc.) be sure to include the output reports from these utilities/tools within the data segment folder submitted for review and archival.

6.3.4 Unless otherwise specified in this documents Section 6.3.1, Design Survey field data collected for a Consultant Prime Engineer/Designer will not receive a QA review on a regular basis. The D5 Surveying & Mapping unit will still collect submittals that are in accord with this documents Section 6.5 at the following pre-determined intervals:

There will be a minimum of three submittals of the Design Survey data. These deliveries must be in accordance with the Project Suite schedule derived by the Prime Engineer/Designer and the FDOT Project Manager.

a) At the date for "Mainline Design Survey Database Submittal" (Schedule Activity 106110)

b) At the date for "Updated Design Survey Database Submittal" (Schedule Activity 106020)

c) At the date for "Certified Design Survey Deliverables" (Schedule Activity 106040)

It is our intention that <u>each</u> of the above noted submittals be accompanied by a certified Survey and Map Report. For example: the first delivery will certify from the first day of the survey through to the date for

the "Mainline" submittal; the second delivery will certify from the day after the "Mainline" submittal through to the date for the "Updated" submittal; and the third delivery will certify from the day after the "Updated" submittal through to the last day of the survey. Be sure that each subsequent certification references the title, date, and subject of any previous certifications.

After these three deliveries, further submittals and certifying reports must be sent to the D5 Surveying & Mapping unit every time supplementary Design Survey tasks are requested, completed, and delivered to the requestor.

For details on the items required with deliveries for the "Mainline" and for the "Updated" phases please refer to this documents Section 6.5. For details on the items required for the "Certified" phase and for any subsequent final deliveries please refer to this documents Section 6.5.1.

The Survey and Map Report can be certified digitally or by signature and raised or computer-generated seal and proper notes, the choice is up to the certifying surveyor.

In cases where a Lead Surveyor for Design Survey has been identified, be sure to coordinate the type of certification required by the Lead Surveyor (either digital or hard copy). This way the Lead Surveyor can include in their comprehensive report all valid reports released by the Design Survey Team.

6.3.5 To expedite the review of any phase submittal, all supporting material (electronic files, databases, responses to field survey data reviews, etc.) must be delivered to the D5 Surveying & Mapping unit no less than two weeks prior to the phase submittal.

6.4 Design Survey MicroStation DGN files to be delivered to D5 Surveying & Mapping unit

6.4.1 Ensure coordination with all other survey consultants so duplicate Design Survey MicroStation DGN file names and QC Inspector reports are not submitted.

6.4.2 It is our expectation that a SURVRD##.DGN (Survey Development Model) be created and stored inside the survey database archive for all design projects regardless of design task. This file will contain the MicroStation survey database, Terrain Model(s), and Horizontal Geometry (where applicable).

6.4.3 The survey consultant merging other survey consultants' data and delivering the fully merged SURVRD##.DGN to the Prime Engineer/Designer, will deliver to the D5 Surveying & Mapping unit a copy of this file, and where necessary the supporting GPK file, outside the survey database archive.

6.4.3.1 To avoid confusion, each survey consultant needs to incrementally number their SURVRD file, the final merged SURVRD needs to be the last increment. For example: in the case of a Design Survey Team with three survey consultants there should be a SURVRD01, a SURVRD02, a SURVRD03, with SURVRD04 being the final merged file. For further direction see the FDOT CADD Manual.

6.4.3.2 Whenever copies of Design Survey MicroStation files are being delivered outside of the projects survey database archive be sure that these files are accompanied by copies of their supporting QC Inspector reports and of the Project Index file. **We expect that the names of these two text files will be preceded by the consultants' name or initials. For example, a QC Inspector report will be named: XXX-QC Inspector report and the Project Index file will be named XXX-Project Index, where XXX represents the consultant initials.**

6.4.4 Any legacy DGN's or supporting files (DAT, TIN, XML, etc.) requested by the Engineer of Record will be extracted from the final fully merged SURVRD##.DGN and can be delivered separately at their request; copies of these files will be delivered to the D5 Surveying & Mapping unit inside the survey database archive.

6.4.5 Legacy design files, except for the RWTOPO##.DGN, are no longer a required deliverable to the D5 Surveying & Mapping unit. The RWTOPO##.DGN will be delivered to the mapper, a copy of this file will be delivered to the D5 Surveying & Mapping unit inside the survey database archive.

6.4.6 Be sure that the final SURVRD##.DGN (Survey Development Model) file includes all the abbreviations, symbols, and line types represented in the digital file. References alone to other documents/files is not acceptable.

6.4.7 Electronic drawing files (MicroStation DGN's) that have been created for the specific purpose of having additional survey data merged into them, that will be edited in any way, or were created for special purposes like the depiction of just the Government Section lines, just the Cross-Sections, just the Test Holes, etc., will be considered Interim Design Survey drawings by the D5 Surveying & Mapping unit. Be sure these files are delivered to the D5 Surveying & Mapping unit inside the survey database archive.

6.4.8 Full compliance, as outlined in the FDOT "***Surveying and Mapping Handbook***", and reported by the QC Inspector report, to the CADD Quality Assurance tools is required every time a design survey drawing file is submitted. If an exception is necessary to fully comply, the FDOT Project Manager and/or the Consultant Prime Engineer/Designer needs to be notified ahead of time so the exception can be approved. Be sure that copies of any documentation concerning the exemption is delivered to the D5 Surveying & Mapping unit inside the survey database archive.

6.4.9 Every Design Survey drawing file being submitted as part of a certified delivery must be a "**stand-alone**" file. All referenced elements that are meant to be part of the final file must be merged into the master file.

6.4.9.1 Separating the deliveries of Utilities, Topo, Drainage, Labels, etc. into different model spaces within one DGN file is acceptable, however, it is our expectation to have a single unified "Default" model with **all** survey data, clarifying notes, defined abbreviations, symbols, and line types merged in and turned on.

6.5 For the Design Survey phase of the project the following documents and files are required as deliverables:

- A Letter of Transmittal
- The survey database archive as outlined in this documents Section 6.2.1 or 6.2.2
- All MicroStation DGN files as outlined in this documents Section 6.4
- A certification report as outlined in this documents Section 6.3.4 and Section 6.5.1.1

6.5.1 At the 100% stage of Design Survey deliverables to the Prime Engineer/Designer, and at the completion of any supplementary Design Survey tasks, the following additional items need to be delivered on a Digital Storage device to the D5 Surveying & Mapping unit by each Design Survey consultant (a delivery via the FTA can be done when a consultant desires a preliminary review of the finals):

6.5.1.1 In accordance with Chapter 5J-17, F.A.C. and with other standards required by the FDOT-D5, a certified Survey and Map Report covering their collected survey data and any other supporting deliverables will be submitted to the district in digital format or in hard copy format. Be sure to mention the date of the survey database archive where the certified data can be found (a screen capture of the ZIP and its contents may be useful here). For further direction concerning these reports and their format see the FDOT "***Surveying and Mapping Handbook***" as well as its accompanying forms found at the Documents & Publications section of the website for the Surveying & Mapping Central Office of the FDOT. Be sure that this report contains an assurance that the supporting field survey data meets or exceeds the requirements noted in the FDOT "***Surveying and Mapping Handbook"***.

a) As previously noted, the Survey and Map Report can also be certified in digital format. If this is the case, be sure the authorization certificate is acquired from an FDOT Public Key Infrastructure (PKI) approved provider.

- For further guidance with the digital certification process please refer to Chapter 472.025(1), F.S. and Chapters 5J-17.051(3)(e), 5J-17.060 (acceptable seal designs) and 5J-17.062(2) & (3), and in FDOT Design Manual Topic #625-000-002, section 130.2.1.

b) To help us manage the final deliverables for any project we request that whenever the certified Survey and Map Report is submitted to the district in digital form, that its file name be preceded by the consultants' name or initials.

c) It is our expectation that every certified Survey and Map Report include all abbreviations, symbols, and line types used in the digital file(s). References to other documents/files is not acceptable.

6.5.1.2 The final signed and certified field books supporting the survey. Refer to this documents Section 8.23.

6.5.1.3 If the project involved Imagery collection be sure to send the D5 Surveying & Mapping unit a copy of the Letter of Transmittal noting that all raw, interim, and final data from these platforms has been submitted to the Central Office of the FDOT. In this case, the district expects that we receive copies of the final MicroStation DGN, TIN, or DAT files derived from these platforms. It's our expectation that the electronic version of the Letter of Transmittal concerning Imagery be stored inside the survey database archive.

a) We also expect that the Certified Survey and Map Report to the district mention that the Central Office of the FDOT has received and archived a separate certified report covering the Imagery data.

6.5.1.4 A Letter of Satisfaction for Design Survey from the Consultant Engineer of Record will be submitted by the Lead Surveyor for Design Survey or by the sole surveying consultant that delivers CADD drawings to the Prime Engineer/Designer. It's our expectation that the electronic version of this document be stored inside the survey database archive. In situations where a Lead Surveyor for Design Surveys has been identified the Letter of Satisfaction should name the individual surveying consultants constituting the Team.

6.5.1.5 If a Lead Surveyor for Design Survey has been identified, following are some clarifications concerning their additional duties:

a) It is the responsibility of the Lead Surveyor for Design Survey to make sure that each time a submittal is made by any Design Survey Team member that they and the district receive a copy of the submitted data.

b) It is the responsibility of the Lead Surveyor for Design Survey to inspect each final certified report and be sure it matches the dates to the electronic files, the design drawings submitted, and that it agrees with other Tallahassee and district expectations.

c) It is the responsibility of the Lead Surveyor for Design Survey to coordinate with all Design Survey Team members and ensure individual naming for all survey database archive files, SURVRD files, and any other files that may cause duplication issues.

d) As outlined in this documents Section 6.3.4, the Lead Surveyor for Design Survey will collect all certification reports released by the Design Survey Team, create a comprehensive report, and submit same to the district once their Letter of Satisfaction from the EOR is received. At this time, submittal of the design drawing files from each Team member may also be included within the survey database archive from the Lead Surveyor. For a sample Letter of Satisfaction, refer to file SAMPLE-LETTER in this documents Appendix A.

e) For further direction concerning submittals of a certified Survey and Map Report where a Lead Surveyor has been identified see section 9. of the FDOT "***Surveying and Mapping Handbook***".

6.5.1.6 As previously noted, if there are additional/supplemental surveying services to be made to a completed project where the database and the certifications have already been accepted and archived, it is our expectation that a new certified Survey and Map Report is created that cross-references the title, date, and subject of any previous certifications, and that it clearly notes the new surveying services.

6.5.1.7 As a separate delivery to the D5 Surveying & Mapping unit, send an e-mail/Digital Storage device/FTA to the Records Group (S-MRecords.D5@dot.state.fl.us) attaching a high quality color PDF scan of each complete signed and certified field book supporting the survey.

Adherence to the above is essential. Inability to fulfill these necessary duties will be addressed by district Survey & Mapping lead to the FDOT Project Manager and/or the Contract Project Engineer of Record until such duties are satisfactorily performed.

6.6 For the Right-of-Way Control Survey phase of the project the following documents and files are required as deliverables:

- A Letter of Transmittal
- The survey database archive as outlined in this documents Section 6.2.1 or 6.2.2

6.6.1 At the 100% Right-of-Way Control Survey/Specific Purpose Survey/Maintenance Survey map (or other control map requested by the D5 Surveying & Mapping unit) submittal the following additional items need to be delivered to the D5 Surveying & Mapping unit on a Digital Storage device (a delivery via the FTA can be done when a consultant desires a preliminary review of the finals):

6.6.1.1 The final signed and certified field books supporting the survey. Refer to this documents Section 8.23.

6.6.1.2 If a survey consultant is only responsible for hard copy control maps (e.g., Right-of-Way Control Survey, Specific Purpose, Maintenance, etc.) and for the field survey locations used to support these maps, the only certification needed from them to cover the maps and the supporting electronic data will be on the cover sheet of the map, however the supporting field books will still need individual certification.

6.6.1.3 If a consultant has not been tasked with being in responsible charge of hard copy control maps but is only supplementing field survey data used to support these control maps, then, in accordance with Chapter 5J-17, F.A.C. and with other standards required by the FDOT, a certified Survey and Map Report covering all collected survey data will be submitted to the district in electronic format or in hard copy format. When applicable, be sure to mention the date of the survey database archive where the certified data can be found (a screen capture of the ZIP's content may be useful here). For further directions concerning these reports and their format see the FDOT "***Surveying and Mapping Handbook***" as well as the Documents & Publications section of the website for the Surveying & Mapping Central Office of the FDOT. Be sure that this report contains an assurance that the supporting field survey data meets or exceeds the expectations of the FDOT "***Surveying and Mapping Handbook***".

6.6.1.4 As a separate delivery to the D5 Surveying & Mapping unit, send an e-mail/Digital Storage device/FTA to the Records Group (S-MRecords.D5@dot.state.fl.us) attaching a high quality color PDF scan of each complete signed and certified field book supporting the survey.

Adherence to the above is essential. Inability to fulfill these necessary duties will be addressed by district Survey & Mapping lead to the FDOT Project Manager and/or the Contract Project Engineer of Record until such duties are satisfactorily performed.

7.0 QA REVIEW LETTERS & RESPONSES

7.1 It is normal practice for the D5 Surveying & Mapping unit to anticipate a written response to a QA review within two weeks of the Project Surveyor's receipt of the review letter.

7.1.1 If this response time is not enough or additional data is required for a satisfactory response, this fact needs to be communicated to the D5 Surveying & Mapping unit within the allotted two-week response period. In case hard copy data needs to be submitted along with a response an electronic response will not be necessary, however, the two-week response period is still expected.

8.0 GENERAL SURVEYING PROCEDURES

All field and office work done for this district must be accordance with the following requirements:

8.1 All control (horizontal and vertical) regardless of its origin must be held fixed during processing.

8.2 Unless otherwise specified, all locations for R/W Survey or Design Survey must use the Florida Permanent Reference Network or similar project specific networks (for example PPHCN/PPVCN). If situations arise where it is necessary to utilize control from a different district network, different datum, or other networks/sources, it is our requirement that communication and written approval from the District Surveyor & Mapper be obtained before any field locations take place. Survey data not meeting these expectations will not be acceptable.

8.3 Unless otherwise specified, all authorized GPS/GNSS locations must agree with Appendix B and Appendix C of the FDOT "***Surveying and Mapping Handbook***". In addition to the deliverables outlined in this handbook, the D5 Surveying & Mapping unit expects all report(s) indicating the accuracy of the points collected (least squares network adjustment, statistical analysis, standard deviation, etc.) to be delivered for archive. The certified Survey and Map Report, and the README text file inside the GPS/GNSS folder of the survey database archive will outline the collection methodology, processing and the network corrector used during data collection.

8.4 When doing surveying locations with optical instruments (transits, theodolites, total stations) the D5 Surveying & Mapping unit considerers an "angle-set" a direct and a reverse telescope observation.

8.4.1 The D5 Surveying & Mapping unit expects that a minimum of two angle-sets of horizontal circle readings be used when establishing traverse control points for Design and/or R/W Survey purposes and that these observations agree with the redundancy requirements set forth by Chapter 5J-17, F.A.C.

8.4.2 The location of any points used to support the derivation/retracement of a Right-of-Way line, Government Section/Grant line, Centerline of Survey, or any other well-established property/boundary line must be done with at least two angle-sets, preferably more. These measurements must be made using horizontal-vertical-slope distance (HVD) methods.

8.4.3 Each horizontal traverse must start and end on two previously established control points.

8.4.4 All angle observations used in locating property or other boundary information must be directly made, left or right eccentricity is not acceptable.

8.4.5 One of the methods used to achieve a Standard Deviation/ Positional Accuracy during traversing and side shots could be that every setup sight at least two other control points. When used in conjunction with multiple angle-sets and each angle-set references a different backsight, this method will result in every survey point located having a computed Standard Deviation/ Positional Accuracy along with the final coordinate values. Observing multiple control points during survey data collecting can also serve as an additional check for ensuring that no control points used have been disturbed. This method could also be utilized when setting and/or verifying property/boundary monuments.

8.4.6 Merging survey segments to achieve a better closure (tighter network) is acceptable; however, submittal of these individual survey segments, as brought in from the data collector, and any other supporting data is still required. The exact placement (storage directory) of these individual survey segments is not a requirement if these files are contained in the final survey archive (zipped container file) and can be easily identified. Please be sure that this event is clarified in the Project Index file.

8.4.7 For the settings used with the EFBP and/or similar processing systems please refer to file EFBP PROCESSING SETTINGS in this documents Appendix A.

8.5 It is our expectation during survey locations for Design Survey and for Right-of-Way Survey purposes that the controlling survey points originate within a closed traverse or from GPS/GNSS observations.

8.6 It is our expectation that pre-established horizontal and vertical control (such as PPHNC and PPVNC stations) not be bypassed during survey control densification activities.

8.7 All newly "set" survey markers/caps must have a minimum stamping of the LB number or firm name or LS number of the certifying surveyor, the FDOT identification, and identify the applicable task (reference, traverse, etc.).

8.8 Each field survey data segment can contain more than one type of Design Survey data (main-line topography, drainage locations, utility locations, etc.); however, this survey segment must not contain both Right-of-Way and Design field data since they require different processing settings and must meet different accuracy requirements.

8.9 The prefix for points collected must include the segment identifier for the segment in which the point was first utilized or tied. For example, if a secondary control point from segment "A" named ACP25 is used in segment "B", it must retain the name ACP25 in segment "B". Any secondary control points created in segment "B" would then be named BCP1, BCP2, etc. Project control points will have only one name for the life of the project. The final database must show only one location and one name for each control point used in the survey.

8.10 Survey point prefixes do not need to contain the full FDOT5PID (Primary Network Control names) in them. When these points are encountered and the point identification needs to be recorded, the full name can be entered in the comments field or some other appropriate area.

8.11 During data collection for topographic purposes, the spacing between data collection points must be mandated by the purpose of the task.

8.12 A resection to determine the position of a setup is acceptable during topographic data collection only. When this is the case, it is our expectation to tie a minimum of three control points whose coordinate positions have been previously established. A resection cannot be used during R/W Survey activities.

8.13 When locating topographic features during Right-of-Way and/or Design surveys pay special attention to items such as encroachments, building overhangs, and easements. Since the exact location of the existing Right-of-Way line is rarely known at the time of field locations be sure to locate items that seem to have the potential of encroaching into, or appear to be evidence of easements outside of, the apparent Right-of-Way. Be sure that any evidence of easements (power lines/poles, trails, manholes, drainage structures, etc.) is located at least to the first power pole, manhole, junction box, etc. outside of the Right-of-Way and further if necessary.

8.14 When locating communication manholes for Design Survey purposes, the outer limits of the "Vault" must be horizontally located as well. The need for elevations at these locations will be driven by the Prime Engineer/Designer.

8.15 All Certified Corner Record forms, as defined in Chapter 177, Part III of the Florida Statutes, must be submitted in accordance with that chapter, a copy of the Letter of Transmittal to the Florida Department of Environmental Protection needs to be submitted to the D5 Surveying & Mapping unit inside the survey database archive file.

8.16 The Digital Terrain Model/Triangulated Irregular Network surface depicting a bridge deck needs to be in a separate zone that sets it apart from the ground DTM/TIN.

8.17 It is our expectation that all point names, zones, feature codes and other survey attributes noted in the field books and any subsequent representations agree with the publications from this district, the FDOT "***Surveying and Mapping Handbook***", and the FDOT CADD Manual.

8.17.1 All points once processed and accepted by the district must hold the same name and coordinate value for the life of the project. If additional observations are made using that point, it must be held fixed in the adjustment and not allowed to float. If a new point must be created after the initial acceptance because of erroneous observations, incomplete observations, or some other reason, then it must be named differently.

8.18 Prior to importing into the working database any field survey data where no emphasis is placed on the vertical datum, the Project Surveyor will ensure removal of all elevations.

8.19 It is our expectation that all newly "set" survey points be independently verified, this information must be found in the GPK file. **Be sure all verification locations are appropriately labeled and managed, so they are not confused with the intended location.**

8.20 All survey monumentation descriptions should substantially agree between the field book, the XYZ file, the GPK file, the final Control Survey map, and any other depiction of this data.

8.21 All locations supporting a Control Survey must hold a Standard Deviation/Positional Accuracy value showing that satisfactory locations were achieved; delivery of this information must be found inside each field survey data segment folder.

8.22 Secondary Control Levels

8.22.1 Two methods that are acceptable for recording level circuits are: raw field observations in traditional 3-Wire field notes or electronically collected by a digital level. In either case the final accuracy must meet or exceed the standards noted in the FDOT "***Surveying and Mapping Handbook",*** Appendix C.

8.22.2 If the recording method chosen is traditional 3-Wire, then all raw observations, closures, adjustments, and final elevations will be recorded in the field book.

8.22.2.1 If a control point with a known elevation is included within a level circuit during fieldwork, during the final adjustment that point will be considered the end of the initial run and the beginning of another run. No vertical control is to be skipped during the level circuit, all project control must be included and held fixed in the adjustment, unless it is found to be erroneous.

8.22.2.2 The use of computerized software (for instance an automated Excel Spreadsheet) for the reduction and adjustment of a traditionally recorded level circuit is acceptable, in that case the field book must contain the error of closure, the electronic file containing the reduction, adjustment data, and final elevations.

8.22.3 If the recording method is digital collection, a reference to the project directory containing the electronic level circuit files, the error of closure, the level circuit reductions, the network adjustments, and the final adjusted elevations must be recorded in the project field book.

8.22.4 When submitting a traditionally collected or a digitally collected level circuit segment for QA review, all project identifying information, control point history, graphic or map of the level circuit so it can be followed through the project must be noted. This can be a simple field book sketch and all other supporting data needed for the review needs to be entered into a README text file that is included in the segment directory.

8.22.5 When submitting a level circuit for review provide a text file with all applicable project information and a brief description of the level circuit. Describe the direction, length of the circuit and its parts, equipment

used, closure results, adjustment method and software used, purpose of the circuit such as Secondary Project Control (SPC), vertical control densification for a retention pond, field book number, etc.

8.23 Field Books

8.23.1 Refer to the FDOT "***Surveying and Mapping Handbook***" for samples of the field book stamps that must be used on all D5 Surveying & Mapping projects. Each stamp must be completed by the appropriate Surveying & Mapping consultant before delivery/submittal for final review of any field book; however, **no permanent markings are to be made to the outside cover of any field book used on FDOT-D5 projects except by the Records Group at the D5 Surveying & Mapping unit**.

8.23.2 DESIGN SURVEY DATA AND RIGHT-OF-WAY SURVEY DATA CANNOT BE RECORDED IN THE SAME FIELD BOOK.

8.23.3 Separate field books will be used for the following purposes:

8.23.3.1 Right-of-Way Survey control densification, boundary/property monument ties, Government Section corner sketches and their validation/check ties, setup data, etc.

8.23.3.2 Separate field book(s) must be used to show the notes and sketches depicting the setting of any alignments/parallel offsets, the alignment references, and the verification ties of these items; to aid future reviewers, these field notes and sketches must contain sufficient information so they can be a good basis for the final mapped depiction of these items with no additional mathematical calculations needed. These field notes should also explain methods used such as "Double Centering", "Closing the Horizon", "Intersecting two tangents to form a Point of Intersection", etc. that may not be explicitly noted.

8.23.3.3 Design Survey control densification, aerial targets, utility-topography-drainage data and sketches, field survey chain lists, setup data, secondary bench levels, benchmark index, cross-sections, etc.

8.23.4 Be sure that each field book contains data specific to one project. Recording data from two or more projects (Section/Roadway Identification numbers and/or Financial Project numbers) into one field book is not acceptable.

8.23.5 The numbering of the pages in a field book must start at the first *full* "blue gridded" page, reserve pages one to five for items such as a book index, sketches, general notes, and other pertinent job information, and then start the surveying notation on page six. The certification will usually be on the first "blue gridded" page (this is usually a *half page* before the "numbered" pages).

8.23.6 Be sure that each page shows the book number, topic heading, date, weather, and field crew names applicable to the page's contents. When necessary, a continuation/reference to other field book pages, plats, or maps used must be made.

8.23.7 Each field book legend must clarify the abbreviations contained in the field notes.

8.23.8 General notes for a field book must include references to the horizontal/vertical network names, to the original Right-of-Way maps, and to any other information necessary for the survey book to agree with Chapter 5J-17, F.A.C.

8.23.9 Each field book index must include enough descriptive information so that anyone would be able to determine the contents from the index. For example: pages 7-12, lot corner ties at Pine Lakes Sub., segment D; pages 13-19, traverse to tie NE corner Section 22-11S-30E, segment E; pages 10-23, topography on SR-50 from stations 12+00 to 14+00, segment E; pages 24-35, utilities on SR-50 from stations 10+00 to 15+00, segment F; etc. We recommend that any time field note pages are submitted as support to a review, that these pages be included in the review package.

8.23.10 It is the expectation of the D5 Surveying & Mapping unit that one page at the beginning of each survey data segment be dedicated to listing all control used and set in the segment. A rough sketch of the traverse will also help make processing and subsequent review more efficient.

8.23.11 The location sketch in each field book must include the County Name, Section-Township-Range, North Arrow and a delineation of the Beginning and End of Survey.

8.23.12 A record of all field survey location activities must be recorded in a field book regardless of the instrumentation method used (transits, automatic levels, total stations, RTK, Static GNSS, etc.).

8.23.13 As field book tracking numbers are assigned by the survey consultant, an e-mail must be sent to the Records Group advising of the Section/Roadway Identification numbers and the seven-digit Financial Project number you are assigning the book number to. When the information is available be sure to identify whether the book is being used for Design or for Right-of-Way purposes.

8.24 Alignments and their References

8.24.1 Radial stakeout of these items is not acceptable except as noted below.

8.24.2 All Centerline of Survey alignments and station references must be established in accordance with section 2. of the FDOT "***Surveying and Mapping Handbook***", with the D5 Map Preparation and Review QA/QC Management Plan, with any appendixes and checklists accompanying these documents, and with the following applicable standards:

8.24.2.1 The staking of the Centerline of Survey or any necessary parallel offset alignments must be done by "double centering", with independent verification ties from the alignment to established control done whenever possible. End points of tangents and additional Points on Tangent can be radially staked from control, however, there needs to be additional independent verification observations to show that all radially staked points are "true" points on the final alignment.

8.24.2.2 The usage of a parallel offset line instead of a Centerline of Survey along the center of a roadway is acceptable. In that case the offset line will not be depicted on the key/detail sheets of the map set but will be depicted in the Reference Point Detail drawings. The final Reference Point Details will show complete geometry allowing a future user to identify the referenced survey alignment position and the offset position. Communication with the D5 Survey Project Manager must be made before the staking and referencing of a parallel offset.

8.24.2.3 All stationing and distance/angular dimensions shown on the final Reference Point Details of the map set must be shown as being in relation to the Centerline of Survey, not to any offset alignment.

8.24.2.4 **It is our expectation that at a minimum three reference points be set on each side of the roadway, and that the setting of these references be in accord with the following standards:**

a) Every change in direction (Point of Curvature, Point of Intersection, and Point of Tangent) as well as the Beginning and Ending of the Centerline of Survey alignment must be referenced. Additional reference stations must be set so there is no more than 1400-feet between them (1000-feet ought to be the goal, but because of obstructions these stations can be slid up or down the alignment).

b) All Centerline of Survey P.I. (Point of Intersection) reference points must be established on the angle bisector line formed by the back and forward tangents at the reference position.

c) Reference points should not be set within the existing Right-of-Way or within the proposed Right-of-Way (if that information is available at the time of the survey). Reference points must not be set within five feet of a Right-of-Way line, Government Section/Grant line, Centerline of Survey, or any other well-established property/boundary line. Any deviations must be cleared in writing by the District Surveyor & Mapper or the D5 Survey Project Manager.

(1) When POL's (Points on Line) are established between primary and/or secondary control stations to set alignment and reference points, a "FDOT REF LB xxxx" cap and/or disc shall be used for those monuments. This information will be included in the field notes and shown on the Reference Point Details of the map. Be sure this new POL is not within five feet of a well-established property/boundary line and that this additional information is not depicted on any detail sheet of the map set. See sample reference point detail J.

(2) Since this additional POL is within the Right-of Way and has a greater chance of being destroyed, be sure that there are at least three more reference points set outside the Right-of Way.

d) It is our expectation that the first reference point be outside of the existing Right-of-Way and no less than 50-feet away from the Centerline of Survey, however, be sure not to be within five feet of the existing or proposed Right-of-Way (if that information is available at the time of survey). The remainder of the reference points should be about 50-feet apart.

e) All Centerline of Survey reference points must produce a single straight reference line from the left side of the Centerline of Survey to the right side; a minimum of two angles is required for showing this relationship, both in the field book and in the Reference Point Details of the map.

f) In situations where there needs to be two or more lines of reference points for a single station, no fewer than three reference points must to be set on each line (see sample reference point detail L).

g) If the above procedures cannot be met at regular 1000-foot intervals during establishment of the previously noted stations, we request that:

(1) An angular deviation (not greater than 30 degrees from the bisector line) be made to avoid setting reference points that cannot produce a sufficiently strong reference line and/or the proposed station be moved up or down along the Centerline of Survey to position the station at places where the reference points can be set at the expected angular and/or distance standard.

(2) A depiction or note in the field book and on the map reference sheet(s) must be made if there are any reasons for the references not being established at the expected angular and/or distance standard.

h) All Centerline of Survey station references set from an offset must establish the reference line so that it passes thorough the intended Centerline of Survey station.

i) All survey points not on the actual Centerline of Survey, for example on an offset line or within the existing Right-of-Way line, that can also serve as additional reference points that will help strengthen the reference line will be set with caps, disks or plates containing a minimum stamping of FDOT REF with an LB or LS number.

j) Unless otherwise specified, it is our expectation that every station being referenced has at least six reference positions that have a high probability of remaining in place after any known construction. If field conditions or other circumstances prevent this, note so in the field book and in the Reference Point Details of the map.

k) If existing reference monumentation (historic evidence) has been used to set/reset the alignment, these positions must be shown in the field book and Reference Point Details of the map as found or set. In these cases, the direction of the reference line(s) will already be fixed and may not agree with the preferred methods given previously. When necessary, the reference line(s) must be strengthened to contain at least six reference points per station.

l) To help in retracing the reference points be sure to note sufficient topographic features such as areas of asphalt parking, gravel yards, building addresses, pasture fields, etc.

8.24.2.5 Each mapped depiction of the Reference Point Details must show and dimension the existing Right-of-Way lines, a set or found label for each survey point, and a north arrow. The sheet block of the map set containing the Reference Point Details needs to reflect a "Not to Scale" or an "N/A" note.

8.24.2.6 The final field staked alignment and its references will be verified. This information must be found in the GPK file.

a) The D5 Surveying & Mapping unit recommends measuring at each P.I., the delta connecting the tangents (using the longest possible backsight and/or foresight), the distances between any P.C., P.I., P.T., P.O.T. and P.O.C., verifying that each of the points is on the alignment and on proper station value.

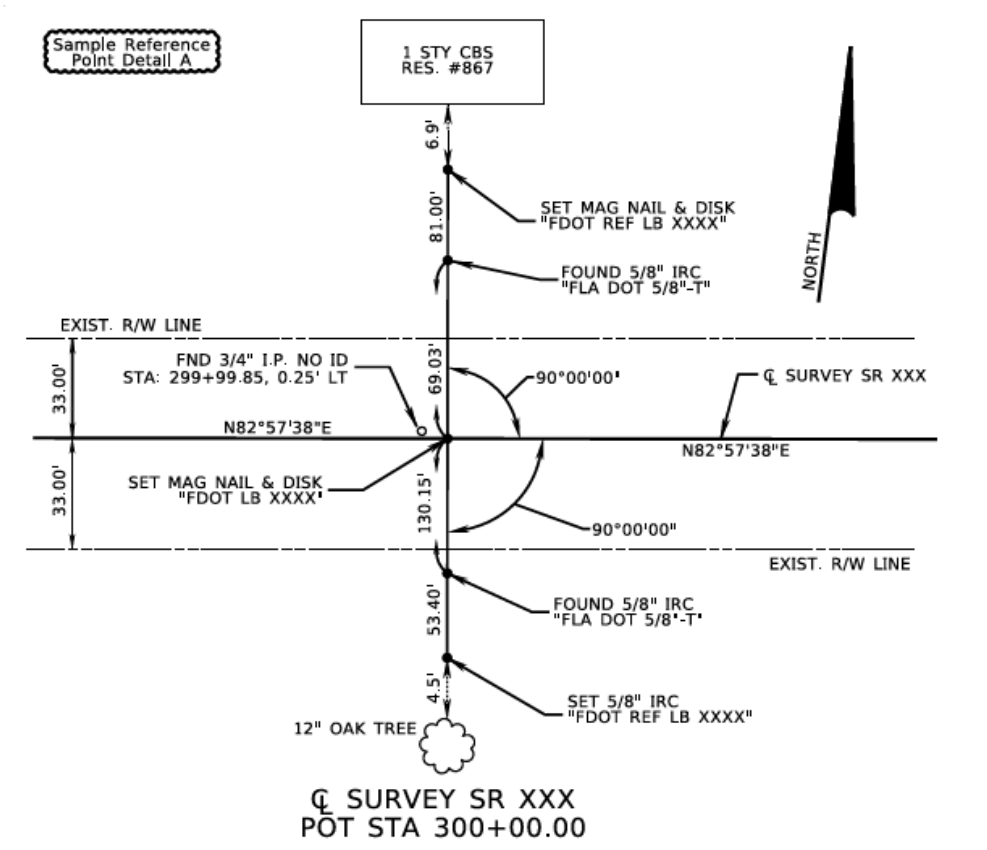
b) Each reference line will be verified by ensuring all set/found points creating that line are angularly accurate in relation to the alignment, that each point is on-line and on the intended distance.

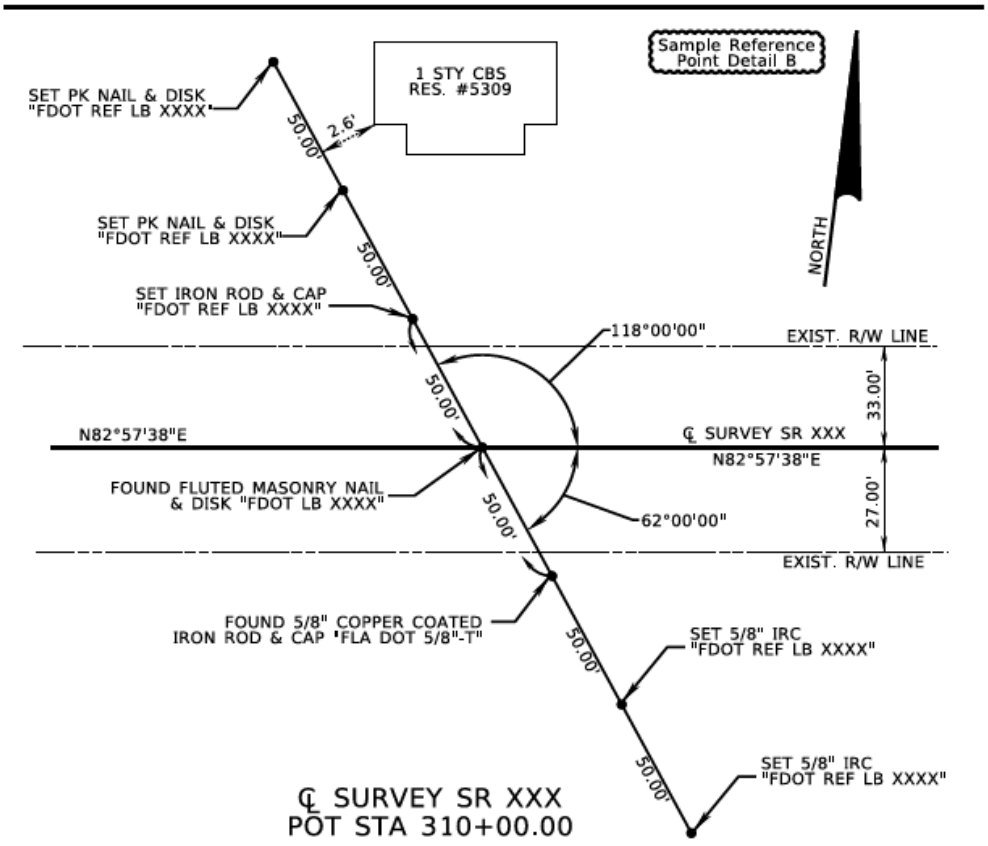
c) It is our expectation that these verification ties be made and electronically collected. In the unusual instance that the verification data is recorded manually each field book page must be complete (no additional calculations need to be done by district staff). When necessary, a continuation/reference to other field book pages/electronic files must be made. These pages must bear some type of different color note signifying the data has been verified by the Project Surveyor.

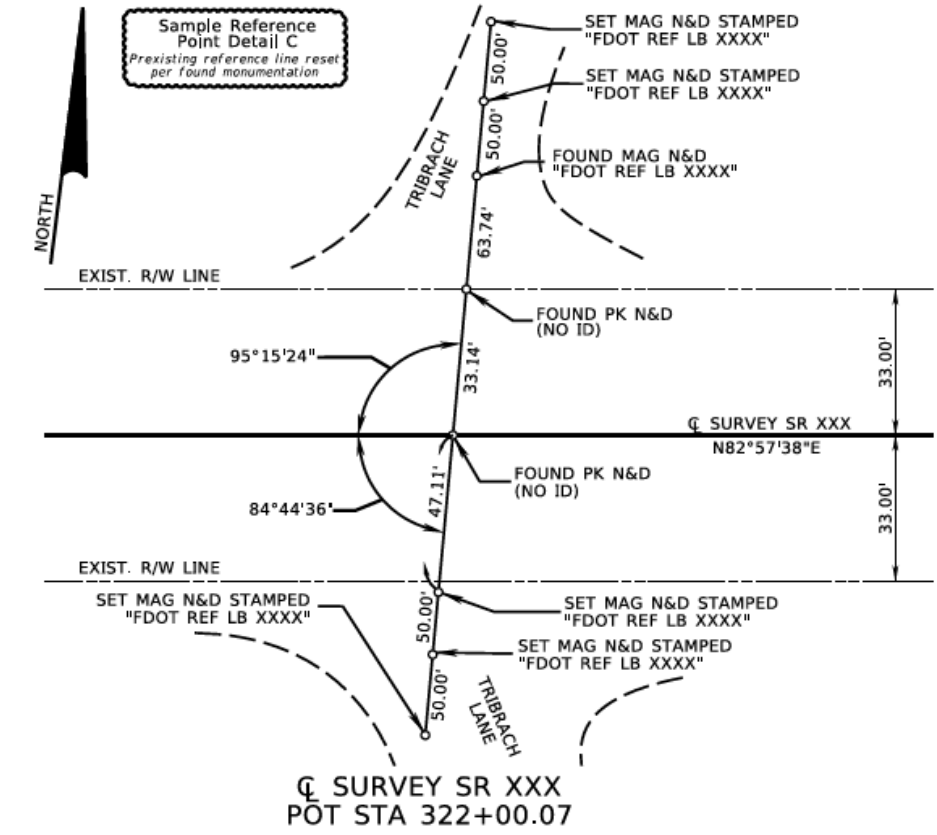
8.25 Copies of the field book(s)/electronic files containing the stake-out of the alignment, its references, and the validation point names must be delivered to the D5 Surveying & Mapping unit before, or along with, the first map submittal where these items are shown as being completed, and anytime thereafter the field book(s) is revised. Be sure this delivery includes the pages containing any general notes that would help clarify the stake-out and its verification.
(These copies should be scanned and stored in their own directory of the container file).

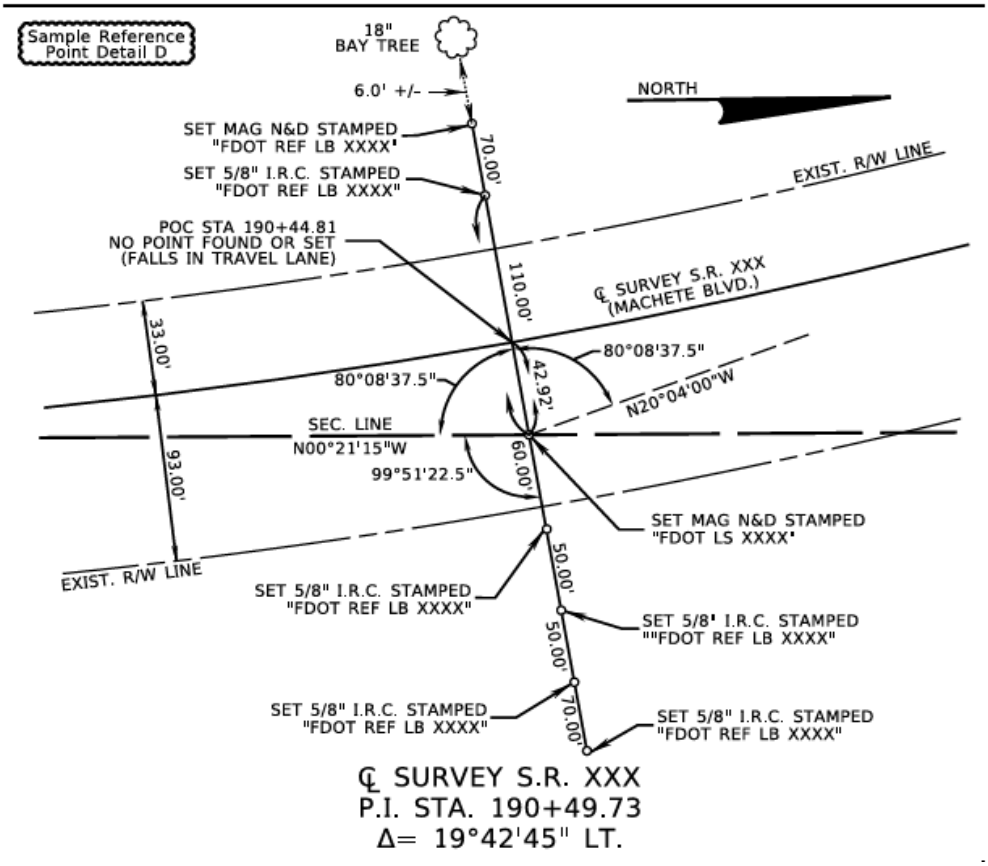
FOLLOWING ARE SAMPLE SKETCHES OF THE FINAL REFERENCE POINT DETAILS

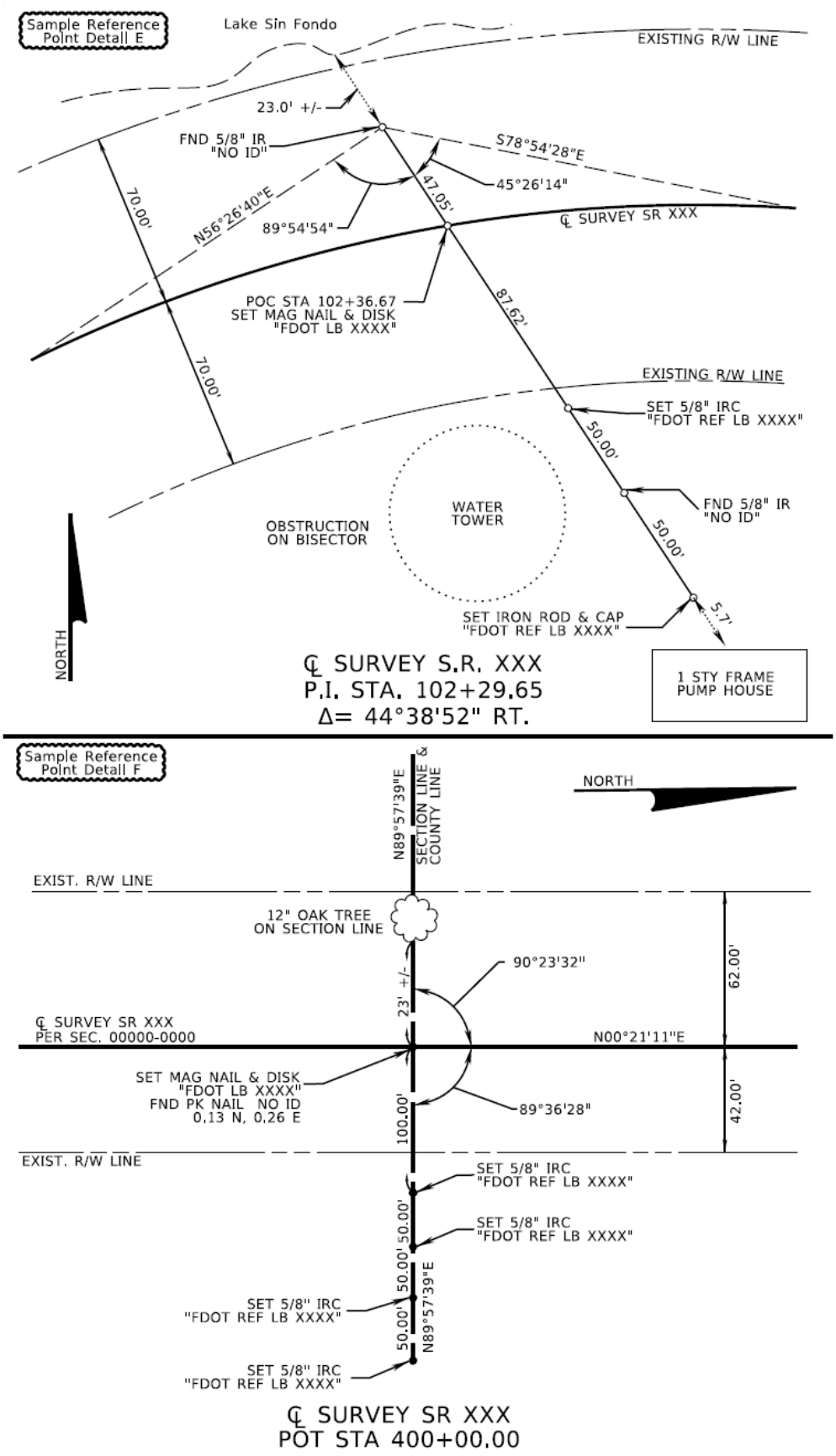
(Be sure that field personnel locate enough information when setting these references so an office CADD technician will be able to draw the final point details matching the following as closely as possible)

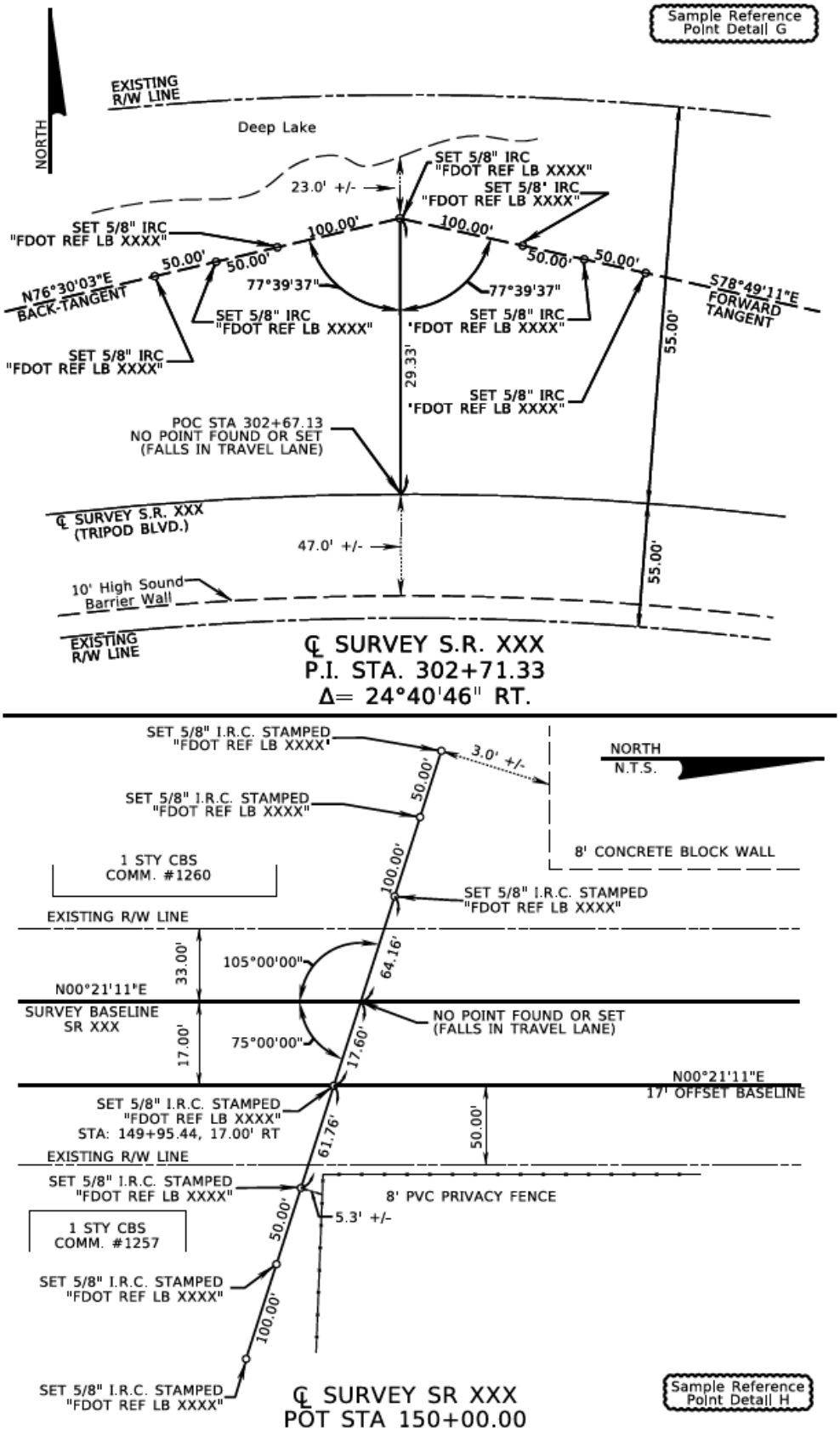

Sample Reference Point Detail A
1 STY CBS RES. #867
6.9'
81.00'
SET MAG NAIL & DISK "FDOT REF LB XXXX"
FOUND 5/8" IRC "FLA DOT 5/8"-T"
NORTH
EXIST. R/W LINE
33.00'
FND 3/4" I.P. NO ID STA: 299+99.85, 0.25' LT
69.03'
90°00'00"
℄ SURVEY SR XXX
N82°57'38"E
N82°57'38"E
33.00'
SET MAG NAIL & DISK "FDOT LB XXXX"
130.15'
90°00'00"
EXIST. R/W LINE
53.40'
FOUND 5/8" IRC "FLA DOT 5/8"-T"
4.5'
SET 5/8" IRC "FDOT REF LB XXXX"
12" OAK TREE
℄ SURVEY SR XXX
POT STA 300+00.00

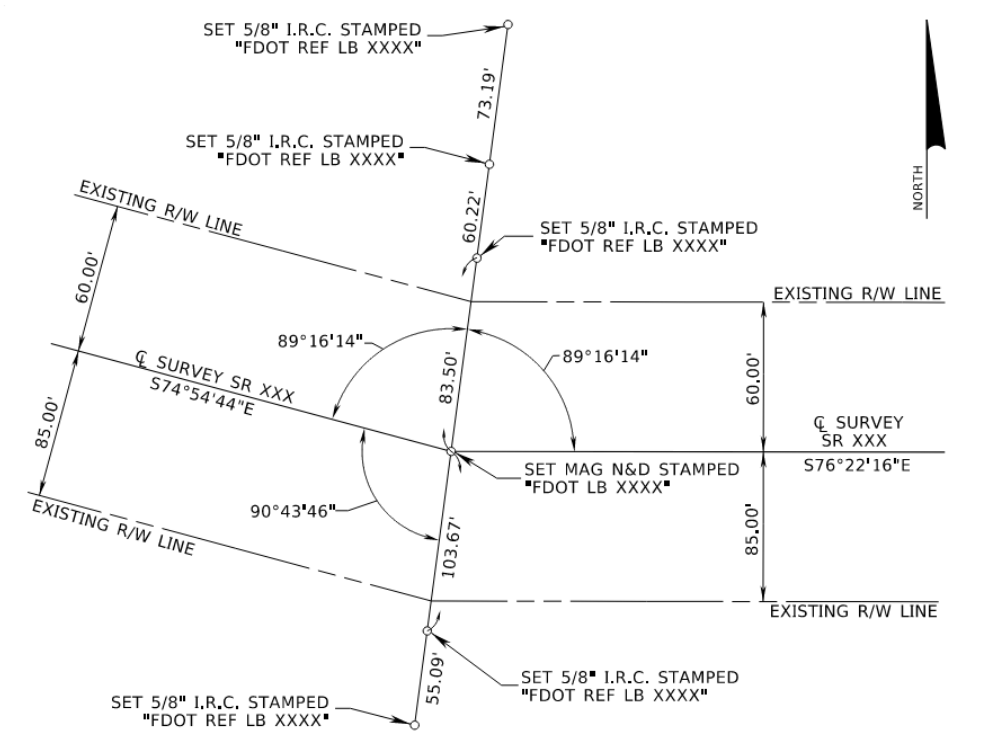

Sample Reference Point Detail B
1 STY CBS RES. #5309
SET PK NAIL & DISK "FDOT REF LB XXXX"
50.00'
2.6'
SET PK NAIL & DISK "FDOT REF LB XXXX"
50.00'
NORTH
SET IRON ROD & CAP "FDOT REF LB XXXX"
118°00'00"
EXIST. R/W LINE
50.00'
33.00'
N82°57'38"E
℄ SURVEY SR XXX
N82°57'38"E
FOUND FLUTED MASONRY NAIL & DISK "FDOT LB XXXX"
50.00'
62°00'00"
27.00'
EXIST. R/W LINE
FOUND 5/8" COPPER COATED IRON ROD & CAP "FLA DOT 5/8"-T"
50.00'
SET 5/8" IRC "FDOT REF LB XXXX"
50.00'
SET 5/8" IRC "FDOT REF LB XXXX"
℄ SURVEY SR XXX
POT STA 310+00.00


Sample Reference Point Detail C
Prexisting reference line reset per found monumentation
NORTH
SET MAG N&D STAMPED "FDOT REF LB XXXX"
SET MAG N&D STAMPED "FDOT REF LB XXXX"
FOUND MAG N&D "FDOT REF LB XXXX"
50.00'
50.00'
63.74'
TRIBRACH LANE
EXIST. R/W LINE
FOUND PK N&D (NO ID)
95°15'24"
33.14'
33.00'
℄ SURVEY SR XXX
N82°57'38"E
FOUND PK N&D (NO ID)
84°44'36"
47.11'
33.00'
EXIST. R/W LINE
SET MAG N&D STAMPED "FDOT REF LB XXXX"
SET MAG N&D STAMPED "FDOT REF LB XXXX"
SET MAG N&D STAMPED "FDOT REF LB XXXX"
50.00'
50.00'
TRIBRACH LANE
℄ SURVEY SR XXX
POT STA 322+00.07


Sample Reference Point Detail D
18" BAY TREE
6.0' +/-
NORTH
SET MAG N&D STAMPED "FDOT REF LB XXXX"
SET 5/8" I.R.C. STAMPED "FDOT REF LB XXXX"
70.00'
EXIST. R/W LINE
POC STA 190+44.81
NO POINT FOUND OR SET
(FALLS IN TRAVEL LANE)
110.00'
℄ SURVEY S.R. XXX
(MACHETE BLVD.)
33.00'
80°08'37.5"
80°08'37.5"
42.92'
N20°04'00"W
SEC. LINE
N00°21'15"W
99°51'22.5"
93.00'
60.00'
SET MAG N&D STAMPED "FDOT LS XXXX"
EXIST. R/W LINE
SET 5/8" I.R.C. STAMPED "FDOT REF LB XXXX"
50.00'
SET 5/8" I.R.C. STAMPED ""FDOT REF LB XXXX"
50.00'
SET 5/8" I.R.C. STAMPED "FDOT REF LB XXXX"
70.00'
SET 5/8" I.R.C. STAMPED "FDOT REF LB XXXX"
℄ SURVEY S.R. XXX
P.I. STA. 190+49.73
Δ= 19°42'45" LT.

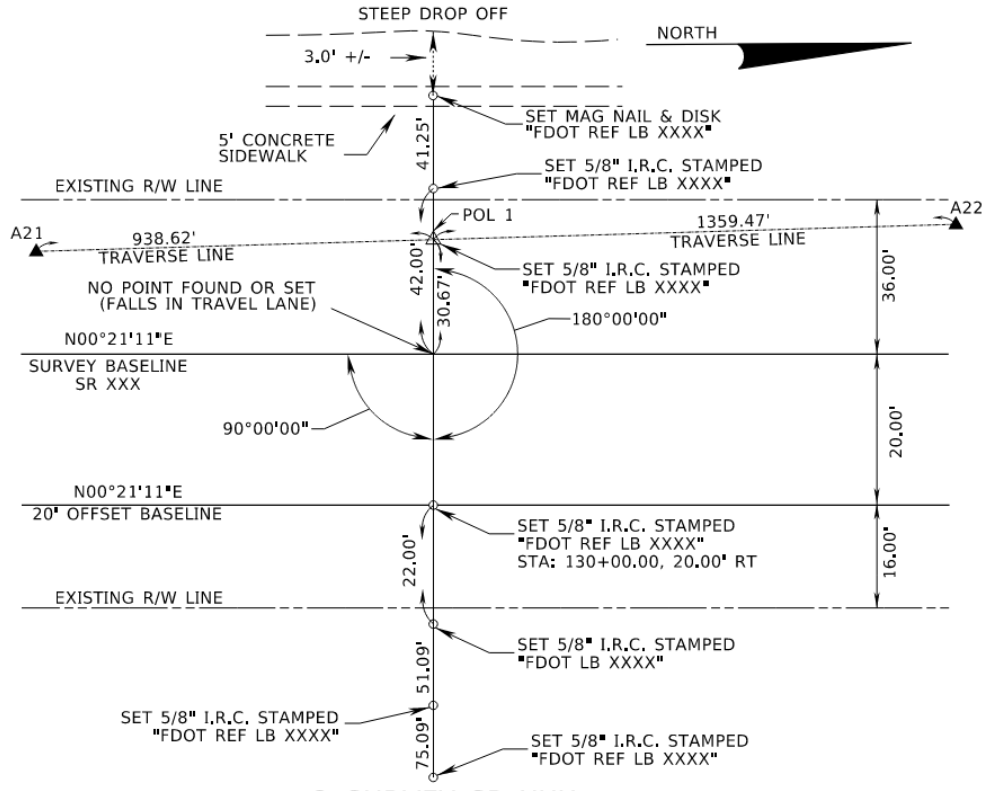

Sample Reference Point Detail E
Lake Sin Fondo
EXISTING R/W LINE
23.0' +/-
FND 5/8" IR "NO ID"
S78°54'28"E
45°26'14"
47.05'
70.00'
N56°26'40"E
89°54'54"
℄ SURVEY SR XXX
POC STA 102+36.67
SET MAG NAIL & DISK
"FDOT LB XXXX"
87.62'
70.00'
EXISTING R/W LINE
SET 5/8" IRC
"FDOT REF LB XXXX"
50.00'
FND 5/8" IR
"NO ID"
WATER TOWER
OBSTRUCTION ON BISECTOR
50.00'
SET IRON ROD & CAP
"FDOT REF LB XXXX"
5.7'
NORTH
℄ SURVEY S.R. XXX
P.I. STA. 102+29.65
Δ= 44°38'52" RT.
1 STY FRAME PUMP HOUSE
Sample Reference Point Detail F
N89°57'39"E
SECTION LINE & COUNTY LINE
NORTH
EXIST. R/W LINE
12" OAK TREE ON SECTION LINE
23' +/-
90°23'32"
62.00'
℄ SURVEY SR XXX
PER SEC. 00000-0000
N00°21'11"E
SET MAG NAIL & DISK
"FDOT LB XXXX"
FND PK NAIL NO ID
0.13 N, 0.26 E
100.00'
89°36'28"
42.00'
EXIST. R/W LINE
SET 5/8" IRC
"FDOT REF LB XXXX"
50.00'
SET 5/8" IRC
"FDOT REF LB XXXX"
50.00'
50.00'
N89°57'39"E
SET 5/8" IRC
"FDOT REF LB XXXX"
50.00'
SET 5/8" IRC
"FDOT REF LB XXXX"
℄ SURVEY SR XXX
POT STA 400+00.00


Sample Reference Point Detail G
NORTH
EXISTING R/W LINE
Deep Lake
SET 5/8" IRC "FDOT REF LB XXXX"
23.0' +/-
100.00'
50.00'
N76°30'03"E BACK-TANGENT
77°39'37"
S78°49'11"E FORWARD TANGENT
29.33'
55.00'
POC STA 302+67.13
NO POINT FOUND OR SET
(FALLS IN TRAVEL LANE)
℄ SURVEY S.R. XXX
(TRIPOD BLVD.)
47.0' +/-
10' High Sound Barrier Wall
EXISTING R/W LINE
℄ SURVEY S.R. XXX
P.I. STA. 302+71.33
Δ= 24°40'46" RT.
SET 5/8" I.R.C. STAMPED "FDOT REF LB XXXX"
3.0' +/-
NORTH
N.T.S.
8' CONCRETE BLOCK WALL
1 STY CBS
COMM. #1260
105°00'00"
64.16'
N00°21'11"E
SURVEY BASELINE SR XXX
33.00'
17.00'
75°00'00"
17.60'
NO POINT FOUND OR SET
(FALLS IN TRAVEL LANE)
N00°21'11"E
17' OFFSET BASELINE
STA: 149+95.44, 17.00' RT
61.76'
50.00'
8' PVC PRIVACY FENCE
5.3' +/-
1 STY CBS
COMM. #1257
℄ SURVEY SR XXX
POT STA 150+00.00
Sample Reference Point Detail H



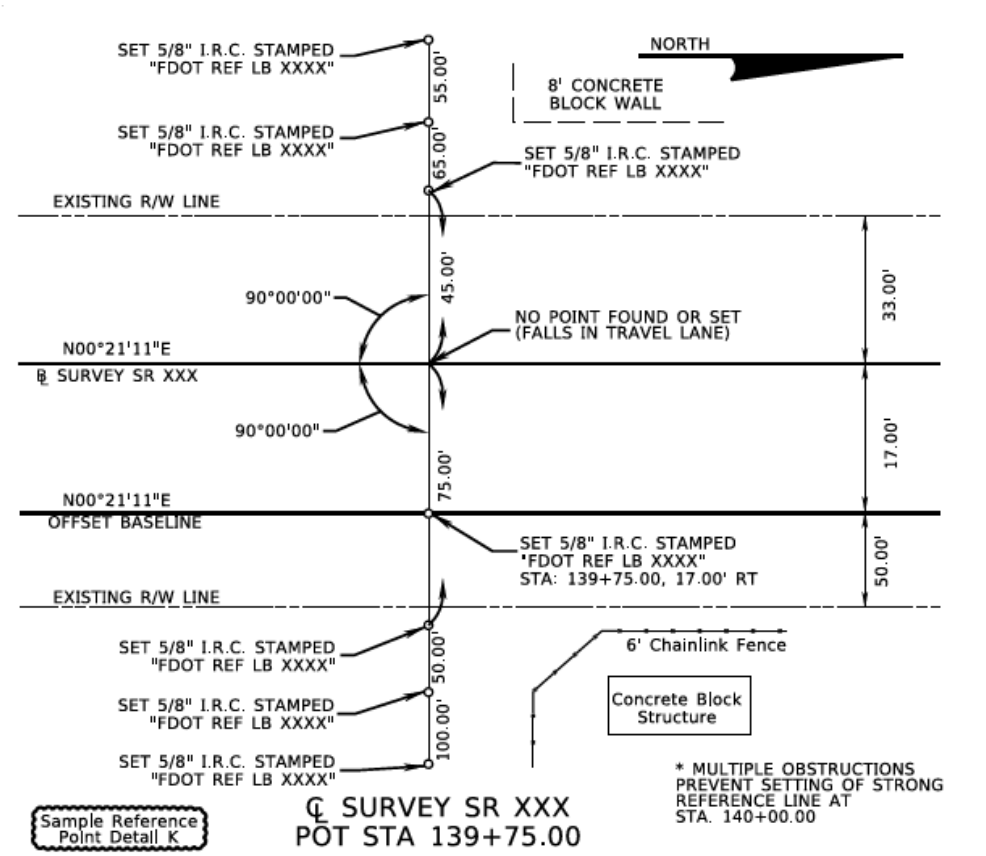
℄ SURVEY S.R. XXX
P.I. STA. 317+21.89
Δ= 1°27'32" LT. (NO CURVE)

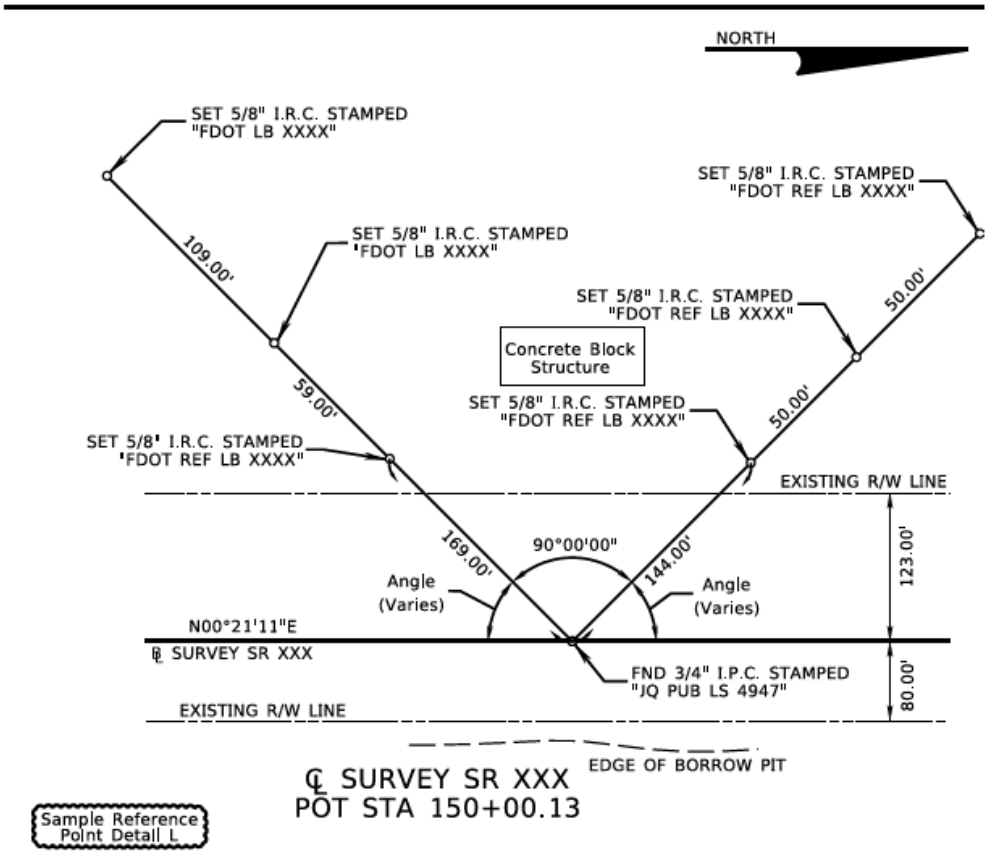
Sample Reference Point Detail I



℄ SURVEY SR XXX
POT STA 130+00.00

Sample Reference Point Detail J


SET 5/8" I.R.C. STAMPED "FDOT REF LB XXXX"
SET 5/8" I.R.C. STAMPED "FDOT REF LB XXXX"
NORTH
8' CONCRETE BLOCK WALL
SET 5/8" I.R.C. STAMPED "FDOT REF LB XXXX"
55.00'
65.00'
EXISTING R/W LINE
45.00'
33.00'
90°00'00"
NO POINT FOUND OR SET (FALLS IN TRAVEL LANE)
N00°21'11"E
℄ SURVEY SR XXX
90°00'00"
17.00'
75.00'
N00°21'11"E
OFFSET BASELINE
SET 5/8" I.R.C. STAMPED 'FDOT REF LB XXXX" STA: 139+75.00, 17.00' RT
50.00'
EXISTING R/W LINE
SET 5/8" I.R.C. STAMPED "FDOT REF LB XXXX"
SET 5/8" I.R.C. STAMPED "FDOT REF LB XXXX"
SET 5/8" I.R.C. STAMPED "FDOT REF LB XXXX"
50.00'
100.00'
6' Chainlink Fence
Concrete Block Structure
* MULTIPLE OBSTRUCTIONS PREVENT SETTING OF STRONG REFERENCE LINE AT STA. 140+00.00
Sample Reference Point Detail K
℄ SURVEY SR XXX
POT STA 139+75.00


NORTH
SET 5/8" I.R.C. STAMPED "FDOT LB XXXX"
SET 5/8" I.R.C. STAMPED "FDOT REF LB XXXX"
109.00'
SET 5/8" I.R.C. STAMPED 'FDOT LB XXXX"
SET 5/8" I.R.C. STAMPED "FDOT REF LB XXXX"
50.00'
Concrete Block Structure
59.00'
SET 5/8" I.R.C. STAMPED "FDOT REF LB XXXX"
50.00'
SET 5/8' I.R.C. STAMPED 'FDOT REF LB XXXX"
EXISTING R/W LINE
169.00'
90°00'00"
144.00'
123.00'
Angle (Varies)
Angle (Varies)
N00°21'11"E
℄ SURVEY SR XXX
FND 3/4" I.P.C. STAMPED "JQ PUB LS 4947"
80.00'
EXISTING R/W LINE
EDGE OF BORROW PIT
Sample Reference Point Detail L
℄ SURVEY SR XXX
POT STA 150+00.13

APPENDIX A

September 30, 2024

Mr. Anthony I. Owens, P.L.S.
District Surveyor & Mapper
Florida Department of Transportation
719 South Woodland Blvd., MS 559
DeLand, Florida 32720

RE: Road Section #: 70020
F.P. #: 237576-1
SR-5 (US-1) from Barnes Blvd. to Rosa L. Jones Dr.
Brevard County
Approval of Survey Data

Dear Mr. Owens:

YHWH Surveying and Mapping, Inc. has provided me with digital copies of the Design Survey database for the referenced project.

By way of this letter, we are advising you that the survey is complete as outlined in the Scope of Services. We further confirm that the data provided is complete and deemed suitable for the purposes of this project.

Should you have any questions or require additional information regarding this matter, please do not hesitate to contact me.

Sincerely,

Ralph E. Brown, P.E.
Engineer of Record
Rt.-66 Engineering & Design, Inc.
4947 Curry Ford Road
Orlando, Florida 32812

cc: Cornelius Ackerson, P.E., FDOT Project Manager
Laura S. Heiser, R.L.S., YHWH Surveying Inc., Project Surveyor

SAMPLE-PROJECT INDEX Sample Project Index file (delivered inside the survey database archive, and both inside and outside by the Lead Surveyor for Design Survey or by the sole Design Survey consultant assigned to the project)

XXX-PROJECT INDEX FILE FOR ARCHIVE 95353CS
ELECTRONIC FIELD SURVEY FILES AND DATABASE

THIS FILE CONTAINS INFORMATION ON THE PROJECT AND ON THE VARIOUS ELECTRONIC FILES IN THIS SURVEY DATABASE ARCHIVE. IT IS FOR INFORMATIONAL PURPOSES ONLY; IT MUST BE KEPT UP TO DATE AND DELIVERED INSIDE THE SURVEY DATABASE ARCHIVE (WHEN NECESSARY, A COPY WILL BE OUTSIDE THE SURVEY DATABASE ARCHIVE).

FILE UPDATED 2/14/2023.

==========

PROJECT DESCRIPTION

==========

PROJECT NAME	: SR-50
ROAD SECTION NUMBER	: 75050
FINANCIAL PROJECT NO.	: 239535-3
COUNTY	: Orange
PROJECT LIMITS	: SR-429/Western Beltway to Good Homes Road
PROJECT SURVEYOR	: Joseph P. Jolly
FDOT PROJECT MANAGER	: Yah-Tang Cheng
SURVEY BOOK NUMBERS	: 2417317, 2417318, 2417319, 2417320, 2417369, 2417371, 2417372, 2417373, 2417374, 2417376

==========

SCOPE OF WORK

==========

Perform right of way survey in support of right of way mapping efforts within the above project limits. Included in this database is the secondary horizontal and vertical control for the overall project, the aerial target location, ties to existing right of way monumentation, sectional survey, subdivision and property line survey, and final project alignment.

Primary control derived from (FDOT-5 PNC, in-house GPS missions, etc.)

All Design Survey tasks, including topography, drainage, and utility verification, are contained in a separate database and/or MicroStation file.

Consultant XXX	- Secondary Horizontal and Vertical Control
Consultant XXX	- Right of Way Survey
Consultant XXX	- Right of Way Mapping
Consultant YYY	- Utility Survey (see database 95353US.ZIP)

==========

DATABASE FILES

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List and describe the consultants' survey database archive and drawing files, along with their status.

Please note, final drawing files must be "stand-alone", they cannot have references to other elements or drawing files.

If the reporting consultant has been identified as the Lead Surveyor for Design Survey or is the sole Design Survey consultant assigned to the project, be sure this section notes the name of the merged drawing file delivered to the Prime Engineer/Designer.

==========
SEGMENT FILES
==========

SEGMENT DESCRIPTION

95353CSA Secondary control and aerial target location – Completed/Archived

95353CSB Existing right of way ties - Completed/Archived

95353CSC Existing right of way ties - Completed/Archived

95353CSD Section ties - Completed/Archived

95353CSE Section ties - Completed/for review by FDOT

95353CSF Section ties – Completed/for review by FDOT

95353CSG Subdivision ties - Completed/for review by FDOT

95353CSH Subdivision ties - Completed/need EFBP

95353CSI Subdivision ties – Active, in field

==========
OTHER FILES
==========

2395353.CTL Project master control file - to be used for all survey tasks for this project. Right-of-Way Survey and Design Survey segments will obtain existing control from this file. New control points created as necessary will be imported into this file for future use.

COMP-F.TXT Copy of coordinate comparison sheet (segment 95353CSF).

Manual-GPS/RTK ties.xlsx Secondary ties not made via EFB data collector.

(Details explaining CADD compliance reports; text files; output files from QA/QC utilities; and other files supporting the project).

==========
SPECIAL INFORMATION/COMMENTS
==========

HORIZONTAL DATUM: NAD 1983/2011; VERTICAL DATUM: NAVD 1988

The survey work for this project is based on Primary Network Control points provided by FDOT-D5, control points 7502I021 through 7502I028 (Horizontal) and 7502J068 through 7502J089 (Vertical). See PPHNC and PPVNC data sheets for specific data.

Please describe the FDOT Connect (ORD) version, the seed file used, as well as any other files unique to the creation and proper interpretation of this project).

****

PROJECT DESCRIPTION

****

STATE ROAD NO. : 33 Bridge Replacement over Green Swamp
LIMITS : From 1500' south of to 1500' north of Bridge 110002
F.P. NO. : 433860-1
COUNTY : LAKE
SECTION : 11020
REPORTING CONSULTANT : YHWH SURVEYING
ENGINEER OF RECORD : FDOT District 5 Roadway Design

****

BEGIN REPORTING PERIOD LOG

****

REPORTING PERIOD: FROM: 12-27-14 to 1-27-15

MAJOR PROJECT MILESTONES

1) NTP (under contract) 11-24-14

AUTHORIZED DESIGN & RIGHT OF WAY SURVEY SERVICES

TASK NO.	TASK	% COMPLETE
27.1	HORIZONTAL PROJECT CONTROL	70%
27.2	VERTICAL PROJECT CONTROL	15%
27.3	ALIGNMENT AND EXISTING R/W LINES	70%
27.4	AERIAL TARGETS	NA
27.5	REFERENCE POINTS	0%
27.6	TOPOGRAPHY/DTM (3D)	0%
27.7	PLANIMETRIC (2D)	NA
27.8	ROADWAY CROSS-SECTIONS	NA
27.9	SIDE STREET SURVEYS	NA
27.10	UNDERGROUND UTILITIES	0%
27.11	OUTFALL SURVEY	NA
27.12	DRAINAGE SURVEY	NA
27.13	BRIDGE SURVEY	75%
27.14	CHANNEL SURVEY	0%
27.15	POND SITE SURVEY	NA
27.16	MITIGATION SURVEY	NA
27.17	JURISDICTION LINE SURVEY	0%
27.18	GEOTECHNICAL SUPPORT	0%
27.19	SECTIONAL / GRANT SURVEY	85%

27.20	SUBDIVISION LOCATION	NA
27.21	MAINTAINED R/W	NA
27.22	BOUNDARY SURVEY	NA
27.23	WATER BOUNDARY SURVEY	NA
27.24	R/W STAKING, PARCEL / R/W LINE	NA
27.25	R/W MONUMENTATION	NA
27.26	LINE CUTTING	NA
27.27	WORK ZONE SAFETY	NA
27.28	VEGETATION SURVEY	NA
27.29	TREE SURVEY	00%
27.30	MISCELLANEOUS SURVEYS	NA
27.31	SUPPLEMENTAL SURVEYS	NA
27.32	DOCUMENT RESEARCH	NA
27.33	FIELD REVIEWS	NA
27.34	TECHNICAL MEETINGS	NA
27.35	QUALITY ASSURANCE/QUALITY CONTROL	NA
27.36	SUPERVISION	NA
27.37	COORDINATION	NA

MAPPING TASK/PHASE	SCHEDULED	ACTUAL
ALIGNMENT REVIEW SUBMITTAL	02/06/15	00/00/00
MAINLINE DESIGN SURVEY SUBMITTAL	03/16/15	00/00/00
30% CONTROL SURVEY SUBMITTAL	No 30% Map	00/00/00
60% CONTROL SURVEY SUBMITTAL	No 60% Map	00/00/00
UPDATED DESIGN SURVEY SUBMITTAL	03/10/16	00/00/00
90% CONTROL SURVEY SUBMITTAL	03/15/15	00/00/00
100% CONTROL SURVEY SUBMITTAL	08/11/16	00/00/00
CERTIFIED DESIGN SURVEY SUBMITTAL	12/05/16	00/00/00

ACTIONS FOR CURRENT REPORTING PERIOD:

FIELD:

1- Horizontal PNC: recovered and traversed through FDOT established HPNC
2- Vertical PNC: Completed Phase 1 and have commenced work on Phase 2
3- Alignment: recovered and traversed through historical GBLC traverse control and references and tied to HPNC
4- Bridge Survey: performed detailed bridge survey of existing structure
5- Sectional/Grant Survey: have located, through use of GPS technology, existing PLSS corners, including center of section, of Section 17, T24S, R25E

OFFICE:

1- Horizontal PNC: processed traverse work through FDOT established HPNC
2- Vertical PNC: Completed Phase 1 and developed plan for remaining Phases
3- Alignment: have processed traverse work through historical GBLC traverse control and references and tied to HPNC. Developed initial alignment.
4- Sectional/Grant Survey: have processed field survey data of existing PLSS corners, including center of section, of Section 17, T24S, R25E.

ACTIONS BY OTHERS FOR CURRENT REPORTING PERIOD:

Received direction from FDOT D5 Surveying & Mapping PNC group regarding proceeding with development of VPNC for this project.

Received direction from FDOT D5 Surveying & Mapping staff to coordinate efforts in flagging limits of wetlands.

ACTIONS EXPECTED FOR NEXT REPORTING PERIOD:

FIELD:

1- Horizontal PNC: densify control as needed to support design survey
2- Vertical PNC: Complete Phases 2-5
3- Alignment: upon approval, stake Centerline alignment points
4- References: upon alignment approval, begin setting reference points
5- Topography/DTM: begin design survey
6- Underground Utilities: begin designation, VVH and survey of utilities
7- Bridge Survey: complete any detail work necessary
8- Channel Survey: begin survey of 5 designated x-sections across channel
9- Jurisdictional Survey: coordinate with FDOT to have wetlands flagged and begin survey
10- Geotechnical Support: coordinate with FDOT as to Geotech boring schedule
11- Sectional/Grant Survey: finalize location of PLSS corners of Section 17, T24S, R25E

OFFICE:

1- Horizontal PNC: process any additional control work
2- Vertical PNC: Complete Phases 2-5
3- Alignment: upon approval, calculate Centerline alignment points for stakeout
4- References: upon alignment approval, begin setting reference points
5- Topography/DTM: begin processing design survey segments
6- Underground Utilities: begin processing utility survey segments
7- Bridge Survey: compile mapping products as necessary
8- Channel Survey: begin processing designated x-sections across channel
9- Jurisdictional Survey: begin processing data segments
10- Geotechnical Support; process data as it becomes available
11- Sectional/Grant Survey: finalize location of PLSS corners of Section 17, T24S, R25E
12- ROW Control Mapping:
    A. Develop cover sheet
    B. Upon approval of alignment begin development of key and detail sheets

ACTIONS EXPECTED OF OTHERS FOR NEXT REPORTING PERIOD:

1- FDOT D5 Survey and Mapping to review and accept Centerline alignment

2- FDOT D5 Survey and Mapping PNC group to coordinate, review and accept VPNC products being developed for this project.

3- Coordination with FDOT D5 to have wetlands flagged and geotechnical boring sites identified.

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END REPORTING PERIOD LOG

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EFBP PROCESSING SETTINGS Recommended for the processing of surveying locations with optical instruments or other similar methods

SUGGESTED SETTINGS FOR DEFAULT FILES IN EFBP

PROJECT CONTROL AND RIGHT-OF-WAY DATA PROCESSING

(1) PROJECT NAME IS
(2) USE REPETITION ERRORS PLUS ADD-ONS IN ERROR ESTIMATION
(3) COMPUTE COORDINATE STANDARD ERRORS AND ERROR ELLIPSES
(4) CORRECT FOR EARTH CURVATURE AND ATMOSPHERIC REFRACTION
(5) ROBUST ERROR ESTIMATE PROMPT WILL NOT APPEAR
(6) PROCESS TO FINAL COORDINATE. XYZ FILE

FOLLOWING USED AS ADD-ONS TO ERROR FROM REPETITION						
DISTANCE CONSTANT	DISTANCE PPM	HORIZ. ANGLE (SEC)	AZIMUTH (SEC)	TRIG.LEV. CONSTANT	TRIG.LEV. PPM	DIFF.LEV. CONSTANT
(7) .015	(8) 5.00	(9) 4.0	(10) .1	(11) .065	(12) 20.00	(13) .035

FOLLOWING ARE USER DEFINED ERROR ESTIMATES					
DISTANCE CONSTANT	DISTANCE PPM	HORIZ. ANGLE (SEC)	AZIMUTH (SEC)	TRIG.LEV. CONSTANT	DIFF.LEV. CONSTANT
(14) .015	(15) 5.00	(16) 4.0	(17) .1	(18) .065	(19) .035

(20) SETUP ERROR (ALWAYS USED) = .015
(21) READ ERROR ESTIMATE ADD-ONS FROM DIFFERENT DEFAULT.CON
(22) READ USER DEFINED ERROR ESTIMATES FROM DIFFERENT DEFAULT.SD
FLAG MAXIMUM SPREADS ABOVE
(23) DISTANCE = .035 (24) ANGLES = 5.0 (25) ELEV. DIFFERENCES = 1.00
ENTER A # TO CHANGE, OR PRESS ENTER TO START PROCESSING

PROJECT TOPOGRAPHIC DATA PROCESSING

(1) PROJECT NAME IS
(2) USE REPETITION ERRORS PLUS ADD-ONS IN ERROR ESTIMATION
(3) COMPUTE COORDINATE STANDARD ERRORS AND ERROR ELLIPSES
(4) CORRECT FOR EARTH CURVATURE AND ATMOSPHERIC REFRACTION
(5) ROBUST ERROR ESTIMATE PROMPT WILL NOT APPEAR
(6) PROCESS TO FINAL COORDINATE. XYZ FILE

FOLLOWING USED AS ADD-ONS TO ERROR FROM REPETITION						
DISTANCE CONSTANT	DISTANCE PPM	HORIZ. ANGLE (SEC)	AZIMUTH (SEC)	TRIG.LEV. CONSTANT	TRIG.LEV. PPM	DIFF.LEV. CONSTANT
(7) .020	(8) 5.00	(9) 5.0	(10) .1	(11) .066	(12) 20.00	(13) .035

FOLLOWING ARE USER DEFINED ERROR ESTIMATES					
DISTANCE CONSTANT	DISTANCE PPM	HORIZ. ANGLE (SEC)	AZIMUTH (SEC)	TRIG.LEV. CONSTANT	DIFF.LEV. CONSTANT

(14) .050	(15) 5.00	(16) 10.0	(17) .1	(18) .065	(19) .035

(20) SETUP ERROR (ALWAYS USED) = .015
(21) READ ERROR ESTIMATE ADD-ONS FROM DIFFERENT DEFAULT.CON
(22) READ USER DEFINED ERROR ESTIMATES FROM DIFFERENT DEFAULT.SD
FLAG MAXIMUM SPREADS ABOVE
(23) DISTANCE = .065 (24) ANGLES = 20.0 (25) ELEV. DIFFERENCES = .050
ENTER A # TO CHANGE, OR PRESS ENTER TO START PROCESSING

If any of the above settings are not used during processing, please note this in the segments README file.