State of Florida
Department of Transportation

CADD MANUAL

Engineering / CADD Systems Office

TOPIC NUMBER: 625-050-001

Effective June 19, 2008
Revised May 11, 2010

Contents

CADD MANUAL

The attached revisions to the CADD Manual are approved effective June 19, 2008.
These revisions supersede the January 16, 2003 version of this manual.

Stephanie C. Kopelousos
Secretary
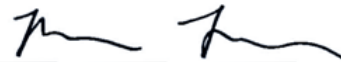
CADD MANUAL

Chapters 2 - 8

Chapter 1 of the subject document was approved by the Executive Committee on June 19, 2008. Chapters 2 - 8 complete the manual as authorized. The effective date of the completed manual is June 19, 2008.

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Bruce Dana, P.E.
Statewide CADD Coordinator

CADD MANUAL
Revised

Chapters 2 - 8

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Bruce Dana, P.E.
Statewide CADD Coordinator

Chapter 1

INTRODUCTION

1.1 PURPOSE

The *CADD Manual* addresses the requirements to effectively utilize Computer Aided Design and Drafting (CADD) for production, delivery and processing of electronic projects for the Florida Department of Transportation (FDOT). In addition to software and configuration requirements, it identifies the tools, techniques, applications, standards and procedures that are to be used to produce quality products in a timely manner.

The *CADD Manual* establishes production standards, procedures and support required for engineering projects.   CADD standards for in-house information technology resources must be in compliance with Department policies, procedures and standards for information technology resources.   The *CADD Manual* also serves to provide professional services administrators, project managers, consultants, in-house designers, and others, a procedure which shall be incorporated by reference into scopes and other contract documents for services.

1.2 AUTHORITY

Subsection 20.23(3)(a), Florida Statutes (F.S.)

Section 334.048 Legislative intent to department management accountability and monitoring systems, Florida Statutes (F.S.)

1.3 SCOPE

The *CADD Manual* is to be used by all in-house personnel producing engineering projects. It is to be included in all contracts requiring engineering plans preparation. This manual will affect all offices of the Department and all consultants, contractors and others who utilize engineering CADD applications or engineering data produced by these applications.

1.4 DEFINITIONS

CADD - (Acronym for Computer Aided Design and Drafting)   Software and methods used to analyze, design and represent transportation facilities graphically. CADD facilitates the presentation of Engineering Data. Electronic engineering data and CADD comprises the Department's Engineering Technology.

Statewide CADD Coordinator – Individual in Central Office responsible for coordinating amongst the Districts to implement a uniform policy and standards for CADD operations for the Department.

CADD Manager - The CADD Manager is responsible for (1) support of the core CADD software products in the work units and (2) a variety of engineering data services functions including but not limited to the receipt, acceptance, and management of electronic deliveries of project data.

CADD Support - The technical and operational support necessary to ensure that a production environment is maintained within the Department, which includes:
(a) Selection, development and distribution of production software, related procedures, criteria and standard operating instructions,
(b) Providing training opportunities to CADD users.
(c) Managing engineering data produced with the software,
(d) Statewide procurement of: CADD software, training services, and software development assistance.

CADD TAC - (Acronym for Technical Advisory Committee) A discipline-based group sanctioned by the Statewide CADD Coordinator consisting of District and Central Office representatives charged to meet and work on statewide technical issues dealing with CADD applications, procedures, testing, and implementation. Management selects the representation in the respective constituency.

Engineering Data - Those digital files which support or represent the intent of the engineering design, or the engineering analysis.

1.5 ORGANIZATION

The Engineering / CADD Systems Office (ECSO), with input from the Districts and industry, will develop and maintain procedures and standards for the Department's CADD production and related activities. The ***CADD Manual*** must be in compliance with Department policies, procedures and standards for information technology resources. These procedures and standards will be organized into numbered chapters within the ***CADD Manual***.

The following chapters are included in the *CADD Manual*:

Chapter 1 **Introduction**: Describes and implements the *CADD Manual*.

Chapter 2 **Computer Systems**: Establishes the requirements for procurement, maintenance and support of CADD systems and services within the Department.

Chapter 3 **Production Standards**: Defines the standards to be used in the production of FDOT CADD projects.

Chapter 4 **Production Procedures**: Establishes minimum requirements which must be met for the production of FDOT CADD projects in accordance with the FDOT Plans Preparation Procedures and Practices.

Chapter 5 **Electronic Data Delivery**: Describes how electronic data is to be delivered, archived and made available to customers.

Chapter 6 **Support**: Defines the support structure and services, including CADD training, within the Department, and defines applications and tools supported by the ECSO.

Chapter 7 **Software Development and Distribution**: Defines how CADD software is developed, tested and distributed.

Chapter 8 **Quality Assurance**: Describes how Quality Assurance Reviews are to be used to improve CADD processes and products.

1.6 REFERENCES

Policy No. 001-325-003, Information Systems Roles and Responsibilities

Procedure No. 025-020-002, Standard Operating System

Procedure No. 325-080-010, Software Distribution

Procedure No. 325-080-050, Information Technology Resource Standards

1.7 REVISIONS AND ADDITIONS

CADD Manual holders are encouraged to submit comments and suggestions for improvements to the manual. The Suggestion and Comment sheet at the end of this chapter or ECSO email link listed on the sheet may be used to provide feedback.

This manual applies directly to two distinct functions, the support of CADD and the use of CADD in engineering. These are described in the following sections. Although the majority of proposed changes to the manual originates from these functions, all proposed revisions and additions, either in draft or final form, shall be reviewed by all offices affected by the manual.

Chapter 1 of this manual is the only chapter subject to the Executive Review Process. This chapter authorizes the development and implementation of the *CADD Manual*. The remaining chapters will be updated and approved by the Statewide CADD Coordinator with input from the Districts and offices within the Central Office that may be affected. The intent is to be able to make technical revisions to the manual in a timely manner. Substantive revisions that result in policy change will be coordinated with the Executive Committee in accordance with *Procedure No. 025-020-002, Standard Operating System*.

All revisions and updates will be coordinated with the Forms and Procedures Office prior to distribution to ensure conformance with and incorporation into the Department's Standard Operating System.

1.7.1 Support of CADD

District CADD Managers shall interface between the users of CADD and the ECSO to facilitate input, revisions and additions to this manual. CADD support shall include installation of computer software, electronic data delivery, training and quality control. It shall be the CADD Manager's responsibility to ensure that all offices affected by this manual are informed of FDOT CADD policies, procedures, and standards. The CADD Manager shall forward District recommendations for changes to CADD policies, procedures, and standards to the Statewide CADD Coordinator for consideration.

1.7.2 Use of CADD in Engineering

Engineering disciplines utilizing CADD are represented by a TAC. Each district and the central office shall be represented on the TACs by knowledgeable and proficient CADD users. The purpose of these TACs is to continually improve the CADD procedures, process, standards, and identify users' needs. End user and CADD Manager input for revisions and additions to the *CADD Manual* shall be processed through the TACs. The chairperson shall forward committee recommendations to the Statewide CADD Coordinator and copy the District CADD Manager.

1.8 DISTRIBUTION

The **CADD Manual** is distributed in electronic form and may be downloaded from the following website:

ECSO: *http://www.dot.state.fl.us/ecso/downloads/publications/*

1.9 TRAINING

Training issues and opportunities are identified within the applicable chapters.

1.10 FORMS

Forms required for use with this manual are identified at the end of each chapter.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
SUGGESTION AND COMMENTS
CADD Manual

NAME OF FIRM / FDOT DEPARTMENT & ADDRESS:

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NAME OF PERSON(S) RESPONSIBLE FOR SUGGESTIONS / COMMENTS:

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_____

TELEPHONE NO: (   ) _____ - _____
FAX NO: (   ) _____ - _____
E-MAIL: _____

SUGGESTIONS OR COMMENTS:

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(Comments or Suggestions may be attached as marked up copies of pages from the manual.)

Comments or Suggestions or Questions may be submitted to:

E-mail: *ecso.support@dot.state.fl.us*

Mail: **FLORIDA DEPARTMENT OF TRANSPORTATION**
                   ENGINEERING CADD SYSTEMS OFFICE
                   MAIL STATION 69
                   605 SUWANNEE STREET
                   TALLAHASSEE, FLORIDA 32399-0450

Phone: **ENGINEERING CADD SYSTEMS OFFICE**
                   (850) 245-1600

Chapter 2

COMPUTER SYSTEMS

2.1 PURPOSE

This chapter establishes the minimum requirements for procurement, maintenance and technical support of the Department's Engineering / CADD hardware and software systems.

2.2 SCOPE

These requirements apply to all computer technology and services within the responsibility of the Engineering / CADD Systems Office (ECSO), the CADD Managers of each district, Office of Information Systems (OIS), and Information Technology (IT) personnel assigned to support the CADD program.

2.3 DEFINITIONS

CADD Hardware: The workstations, servers, printers, plotters and all other computer equipment used in the Department's production effort.

CADD Server: A computer dedicated to the storage and management of FDOT Engineering / CADD data or the execution of specific production applications.

CADD Software: Any software procured, developed, distributed and supported by ECSO.

CADD Systems: All of the CADD hardware and CADD software that support the CADD production effort.

CADD Workstation: A computer running CADD software used for the development of CADD drawings and documents.

Engineering Data Services: A function or functions within the Department for handling and re-distributing Engineering / CADD data, including consolidation, packaging, archiving, and distribution of all data belonging to a project.

OIS IT Personnel Supporting CADD: OIS IT personnel assigned to support the CADD program to perform the role of management and related tasks of the FDOT IT infrastructure.

2.4 REFERENCES

Information Systems Roles and Responsibilities, Topic No. 001-325-003

Information Technology Resource Standards, Topic No. 325-080-050

2.5 PROCUREMENT OF ENGINEERING/CADD HARDWARE AND SOFTWARE

The CADD Managers and OIS IT personnel evaluate the needs for computer hardware to provide recommendations for procurement of any CADD hardware where appropriate, and will be in accordance with *Procedure No. 325-080-050, Information Technology Resource Standards*, to insure consistency with current technology. The ECSO participates with OIS in the development of the Information Technology Resource Standards and evaluation of hardware to be procured for use in CADD.

The ECSO, in conjunction with the TACs and CADD Managers, review the statewide CADD software needs to support the Department's production efforts.

Chapter 3

PRODUCTION STANDARDS

3.1 PURPOSE

This chapter establishes the critical Computer Aided Design & Drafting (CADD) requirements (Production Standards) used in the production of projects for the Department in compliance with the procedures of each discipline of the Department.

3.2 SCOPE

These Production Standards apply to all CADD projects produced by and for the Department in addition to the criteria, standards and procedures of the various disciplines within the Department included in the *CADD Production Criteria Handbook* **(CPCH)**.

3.3 DEFINITIONS

The following definitions relate to electronically generated project data and deliverables. For the definition of other common terms and acronyms used in this *CADD Manual*, refer to Chapter 1.

CADD Production Criteria Handbook (CPCH): The Department's specifications and requirements defining the Department CADD Standards to meet the *CADD Quality Assurance Monitoring Plan*. The CPCH establishes the CADD Production Standards for the Department.

CADD Production Standards: Established specific requirements to achieve a desired level of quality or outcome, which impacts current or future operations and user applications. This chapter constitutes the CADD Production Standards.

Chief Information Officer (CIO): The senior manager of the Office of Information Systems

Document Image File: An electronic file from which a hard copy of a project document could be produced.

Electronic Journal: Electronic file(s) that document development, correspondence, decisions made, methodology used, exceptions to standards, and other descriptive information about the project. The Electronic Journal includes details that will give future users insight about the project data.

Electronic Project: All electronic files, reports, documents, databases, images and other electronic information representing a project, sometimes called a CADD project.

Engineering Data: Those electronic files that represent the critical geometric and quantitative controls or other engineering calculations supporting the graphical representation of a project.

Graphics Design File: An electronic file that conforms to MicroStation® (DGN) or AutoCAD (DWG) graphics formats.

PEDDS: Acronym for Professionals' Electronic Data Delivery System. PEDDS is a computer program that generates a unique digital identification for each file in an electronic data transmittal. PEDDS produces a report of the files secured, some of which may be certified by the signature and seal of a professional practitioner.

PEDDS Information: The electronic files and paper documents created by PEDDS to secure the delivery and sign / seal selected files.

Project Component: All electronic files that represent and support a delivery by a discipline as part of a project.

Project Component Directory: The data structure and organization of electronic files on storage media.

Project Directory: The parent directory containing all project component directories and ancillary data.

Project Index File: A file that lists and briefly describes critical files contained in a computer generated delivery. The Project Index file is part of the Electronic Project Delivery.

Project Manager: The person responsible for ensuring that the scope of work is accomplished for a project and the receipt, acknowledgment, validation and acceptance of the project data.

Supporting CADD Files: Any files, including Resource Files (such as fonts, line styles, pen tables, cell/block libraries, etc.) that are required to reproduce the sheet images.

3.4 REFERENCES

Chapter 1B-26.003(10), Florida Administrative Code

CADD Production Criteria Handbook (CPCH)

3.5 DEPARTMENT RESOURCE STANDARDS

The Department's *Information Technology Resource Standards, Procedure No. 325-080-050*, includes the Department's CADD Hardware and Software Standards used and supported by the Engineering CADD Systems Office (ECSO). The Department's Chief Information Officer (CIO) establishes and maintains the procedure requiring the definition of such standards.

3.5.1 Graphics Software

The drafting software deliverables of the Department are defined in the *CPCH*.

3.5.2 Civil Engineering Software

The principal civil engineering software deliverables required by the Department are defined in the *CPCH*. Other Department approved software standards includes those listed in *Procedure No. 325-080-050*, *Information Technology Resource Standards*, issued by the CIO of the Department.

The Department does not restrict the use of software packages by the private sector, but requires the delivery of project data to adhere to the standards and formats as specified.

3.6 PROJECT DIRECTORY STRUCTURE

All projects shall have a standard project directory structure. Data from each discipline shall be maintained as individual sub-directories under the project directory. The Departments standard project directory is provided in the *CPCH*.

3.7 CADD RESOURCE FILES AND STANDARDS

The Department makes available standard supporting CADD resource files distributed in the FDOT CADD software delivery. All projects commenced shall do so with the contemporary standards and resources as applicable. The version used shall be current with the version available at the time of project commencement. Exceptions to the standard supporting CADD resource files, or user customization, shall be approved by the Department's Project Manager and shall be documented and delivered as part of the project.

3.8 FILE NAMING CONVENTIONS

Files shall be named in accordance with the naming conventions in the *CPCH*.

3.9 DELIVERY COMPONENTS

All CADD projects delivered will have the following components:

- Engineering Data files

- Graphics design files

- Image files of plan sheets generated from component (2)

- Electronic Journal

- Project Index

- Quality Control Reports

- Compliance Certification

- Secured with PEDDS and include Manifest and Signature documents

3.9.1 Engineering Data

The Department requires that all data files used or produced in conjunction with a project be delivered in the native format of the system used to produce it, in addition to the standard formats required in the *CPCH*.

3.9.1.1 Geometric Controls

Files will be created representing the controlling geometrics of the project. These files will contain the points, curves, spirals, chains, alignments, profiles, cross-sections, surfaces and other critical geometric data necessary for the construction of the project. These files will be in addition to the native format files referenced above and are described in the *CPCH*.

3.9.1.2 Quantity Data

The file formats shall conform to the formats specified in the Department's Standard Electronic Engineering Data formats found in the *CPCH*.

3.9.2 Graphics Design Files

Graphics design files shall be prepared using the file naming conventions, symbology standards and software resources defined in the *CPCH*.

3.9.3 Image Files

The sheet images are document image files that can be used to produce hardcopies. The sheet image files are generated from graphics design files, and produced where they may be plotted to scale.

Any documents that are scanned into electronic format from paper shall comply with *Chapter 1B-26.003(10), Florida Administrative Code*.

3.9.4 Electronic Journal

An electronic journal will be produced in accordance with the *CPCH* and will be delivered with the project.

3.9.5 Project Index

A project index will be produced in accordance with the *CPCH* and will be delivered with the project.

3.9.6 Quality Control Reports

Reports documenting the project's conformance to standards shall be produced in accordance with the *CPCH* and will be delivered with the project.

3.9.7 Compliance Certification

At the completion of the project, a Compliance Certification will be signed by the data producer and delivered with the project.

3.9.8 PEDDS and Supporting Documents

All producers of electronic data for the Department will use PEDDS to sign and seal such data in accordance with the *Plans Preparation Manual Vol. I & II, Topic No.625-000-007 & 625-000-008*. Signed and sealed documents generated by PEDDS will accompany the prescribed media and be part of the delivery. PEDDS will also be used to secure the entire project directory for delivery.

3.9.9 CADD Production Criteria Handbook

The *CADD Production Criteria Handbook (CPCH)* is published on the Department's Internet Website at:

http://www.dot.state.fl.us/ecso/downloads/publications/CriteriaHandBook/.

The ***CPCH*** contains:

- Drawing standards for element symbology, including: required fonts, level/layer, color, weight, and line-styles for discipline specific files.

- Electronic plans production and delivery specifics, such as directory structure requirements, file formats and file naming requirements

- References to supporting applications and drafting aids

- References to documented help, operating instructions and guidelines

Chapter 4

PRODUCTION PROCEDURES

4.1 PURPOSE

This chapter establishes the minimum requirements for the production of the Department's Computer Aided Design and Drafting (CADD) projects in accordance with the Department's Plans Preparation Procedures and Practices.

4.2 SCOPE

These procedures are applicable to the CADD applications utilized by and for the Department in the production process. They are intended to complement and support the policies, procedures and standards of the Department in accordance with *Procedure No. 025-020-002, Standard Operating System*.

4.3 ACCOUNTABILITY

These procedures do not exempt the professional from performing responsible engineering, surveying and mapping or architecture. The policies and procedures of the Department and appropriate professional practice take precedence when providing professional services for the Department. The professional shall have final responsibility for the accuracy of all input and output of CADD applications.

4.4 DEFINITIONS

CADD Production: The development of Electronic Projects utilizing CADD applications, software and discipline processes.

Standard Operating Instructions: Instructions for operating CADD applications intended to help guide the user in CADD production activities.

4.5 REFERENCES

Procedure No. 025-020-002, Standard Operating System

Plans Preparation Manual Vol. I & II, Topic No.625-000-007 & 625-000-008

4.6 FDOT CADD RESOURCES

The Department has established the *CADD Production Criteria Handbook (CPCH)*, which is produced and maintained by ECSO as described in Chapter 3 of this manual. ECSO updates and distributes the CPCH in conjunction with FDOT CADD Software maintenance releases to the Department's CADD community and consultants. The CADD users are responsible for acquiring and using the appropriate version of FDOT CADD Software and resources. It is the responsibility of FDOT CADD Managers to provide the latest FDOT CADD software and resources for their users within the Department.

4.7 PRODUCING THE ELECTRONIC PROJECT

All Electronic Projects for the Department shall be created recognizing the requirements as set forth in the *CADD Production Criteria Handbook (CPCH)*.

Chapter 5

ELECTRONIC DATA DELIVERY

5.1 PURPOSE

This chapter establishes the minimum requirements and functions necessary for the Department's Electronic Delivery, Disposition and Archival of electronic data.

5.2 SCOPE

This chapter covers the Department's functions to receive, authenticate, integrate, package, and distribute electronic data.

5.3 REFERENCES

Plans Preparation Manual Vol. I, Topic No.625-000-007

CADD Production Criteria Handbook (CPCH)

5.4 RECEIPT AND ACCEPTANCE OF ELECTRONIC DATA

The Project Manager is responsible for ensuring that the terms of the scope of services of a project have been met, including the assurance that the Department's Quality Control requirements were fulfilled during production of the electronic data.

5.4.1 Receipt of Data

The Project Manager will receive electronic data under a letter of transmittal.

5.4.2 Authentication

Upon receipt of the delivery media, the Department will authenticate the project data using the signed (and sealed) documents provided with the delivery.

5.4.3 Acceptance

The Project Manager ensures that the electronic delivery is checked for completeness and meets the terms, conditions and requirements outlined in this manual and set forth in the **CADD Production Criteria Handbook (CPCH)**. Once the electronic delivery has been determined to be in compliance, a record of acceptance will be made.

5.5 ENGINEERING DATA SERVICES

Engineering Data Services is a function or functions within the Department for handling and re-distributing engineering and CADD data, including consolidation, packaging, archiving, and distribution of all data belonging to a project.

5.5.1 Contract Packaging

Engineering Data Services will coordinate regarding contract packaging requirements for a delivery or a letting found in the *Plans Preparation Manual Vol. I & II, Topic No.625-000-007 & 625-000-008*

5.5.2 Archive and Security of Data

Engineering Data Services will insure prescribed safeguards for the data have been met. The archival package or data set includes all electronic data available for a project.

5.6 PUBLICATION AND DISTRIBUTION

Engineering Data Services is responsible for publication and distribution of electronic data in accordance with procedures or requests, including but not limited to publishing electronic data to different media.

Chapter 6

SUPPORT

6.1 PURPOSE

This chapter establishes the primary components of the Computer Aided Design and Drafting (CADD) support structure, and services, including the statewide training, within Florida Department of Transportation (FDOT) and defines the applications and tools supported by the Engineering / CADD Systems Office (ECSO).

6.2 SCOPE

This procedure establishes the hierarchy of CADD-related support roles and responsibilities from the peer level to the statewide level of the ECSO, the District CADD support function, and the Technical Advisory Committees (TAC).

FDOT supports all CADD software and hardware used for in-house CADD production. Consultant support is limited to FDOT's developed software, interfaces, and configurations

6.3 REFERENCES

Engineering / CADD Systems Office Customer Support Guide

6.4 COMPONENTS OF CADD SUPPORT

The primary components of the Engineering / CADD Support structure include:

6.4.1 Systems Support:

Test, select, procure, and maintain CADD applications. This component is coordinated with OIS and the district CADD Managers and/or OIS IT personnel assigned to support CADD.

6.4.2 Operational Support:

Develop, enhance, and support the software applications used by the engineering community to perform CADD production. This component is coordinated and supported by ECSO with assistance from the district CADD Managers and/or OIS IT personnel assigned to support CADD.

6.4.3 Training:

Provide CADD technical materials and education to assist in maintaining user proficiency . This component is coordinated and supported by ECSO with assistance from the district CADD Managers and/or OIS IT personnel assigned to support CADD.

6.5 HIERARCHY OF CADD SUPPORT

CADD support is handled at different levels in the CADD statewide support structure. Users will seek support at the lowest level before escalating a support request to the next level. The Engineering/CADD Systems Office ECSO Customer Support Guide addresses how support is handled for each component.

6.5.1 Systems Support

6.5.1.1 First Level

The First Level of Systems Support is the District OIS staff. The district CADD IT contact or CADD Manager is the primary liaison with Central Office OIS for addressing CADD systems issues. District CADD systems support activities involving the CADD Manager and/or OIS IT personnel include the following:

- Assist with identifying the users' hardware and software needs

- Distribute and setup equipment and software

- Provide input for the statewide procurement

- Provide day-to-day technical support of the computer hardware and software systems used in the district.

6.5.1.2 Second Level

The Second Level of Systems Support is the OIS staff. The CO OIS support responsibilities include the following:

- Manage the OCO budget for procurement of CADD hardware.

- Procure CADD hardware and maintenance.

- Provide inventory management associated with the statewide CADD hardware.

- Provide as-needed technical support of the hardware. Contacts from within the Department for this level of support are only from the TAC's, delegates from the TAC's, CADD Managers or support staff authorized by the CADD Managers.

6.5.2 Operational Support

6.5.2.1 First Level

The First Level of Operational Support is *Peer Support.*

6.5.2.2 Second Level

The Second Level of Operational Support is through the *Technical Advisory Committee (TAC) Members Support*, who represents the districts and disciplines on task teams to communicate and resolve support issues of statewide interest.

6.5.2.3 Third Level

The Third Level of Operational Support is the *District Support Staff*, including, but not limited to, CADD IT contacts, CADD Managers, and engineering services personnel. These support personnel, collectively, are responsible for supporting the core CADD software products for each respective district.

6.5.2.4 Fourth Level

The Fourth Level of Operational Support is the *ECSO Support Staff*. The ECSO is responsible for FDOT's application development, enhancements, and support. ECSO will provide support assistance or will contract for required services as necessary, coordinating all support requests, including those to CADD software vendors.

6.5.3 Training

ECSO manages and coordinates the statewide CADD training program for FDOT personnel. Training will encompass the core CADD Software and CADD production procedures as set forth in the ***CPCH***.

The District CADD Managers and/or OIS IT personnel assigned to support CADD are responsible for all respective District CADD training coordination.

Chapter 7

SOFTWARE DEVELOPMENT AND DISTRIBUTION

7.1 PURPOSE

This chapter establishes how CADD software is developed, tested, approved and distributed.

7.2 SCOPE

This chapter applies to all Florida Department of Transportation (FDOT) supported CADD Software products procured or developed to produce FDOT projects and covers the steps used to develop, test, approve and distribute these CADD Software products. This CADD Software is the responsibility of the Engineering / CADD Systems Office (ECSO) and other designated offices.

7.3 DEFINITIONS

Alpha Testing: Initial testing of CADD software products or enhancements by the development staff and testing by the support staff outside of the development environment.

Beta Testing: Secondary testing of CADD software products performed in a production-like environment by end-users.

Beta Testing Coordinator: An individual responsible for facilitating the beta testing of CADD software.

7.4 DEVELOPMENT

Development encompasses new CADD software applications, enhancements to existing CADD software (added features), and the maintenance (bug fixes) of CADD software. Development is based upon needs identification and may include the purchase of commercial software when appropriate.

7.4.1 **Need Identification**

CADD software needs are communicated to the ECSO by user requests or by Technical Advisory Committee(s) (TACs). The ECSO also identifies needs based upon experiences with CADD support activities and the evolution of trends in the CADD software industry.

Development request specifications compiled by ECSO may be coordinated with the appropriate TAC(s), CADD Managers and OIS IT personnel assigned to support CADD.

7.4.2 **Development or Acquisition**

The Statewide CADD Coordinator will decide whether to develop CADD software in-house, contract for development services, or purchase a CADD software commodity. The ECSO will keep the user community informed as to the status (including training and implementation schedules) of major CADD development projects of statewide interest.

7.5 SOFTWARE TESTING

ECSO, or the designated office, performs alpha testing of CADD software products during software development as required. Beta testing is to be performed prior to the general release of CADD software.   The ECSO will track the progress of testing for CADD software.

7.5.1 **Beta Testing**

When alpha testing demonstrates CADD software believed to be in working order for the features intended, the software will be beta tested by end users prior to release. The "beta testing coordinator," from the ECSO or the designated office, will facilitate these activities.

The beta testing by any of the Department's disciplines shall only be initialized following review and approval by either CADD IT contacts or the CADD Manager.

The request for approval to proceed with beta testing, based on the appropriate recommendation, will be initialized by ECSO.

7.5.2 Beta Testing Coordinator

Each CADD product shall have a primary support contact assigned by the ECSO. This person, or their delegate, may also serve as the Beta Testing Coordinator and will be responsible for:

- **Participating as an alpha tester for the developer**
  The Beta Testing Coordinator shall participate in alpha testing of the CADD software, discussions and review of alpha test results with the developer and other support staff members to determine the readiness of the product for beta testing.

- **Requesting approval to proceed with beta testing**
  The Beta Testing Coordinator will coordinate with ECSO for the appropriate recommendation for Beta testing to proceed or recommend additional alpha testing.

- **Coordinating the production of preliminary documentation**
  The Beta Testing Coordinator will make available any documentation required to support the beta testing.

- **Coordinating the identification of the beta testers**
  The Beta Testing Coordinator, with assistance of CADD Managers and OIS IT personnel assigned to support CADD, will solicit Beta testers from FDOT and the consultant user community.

- **Hosting Beta Testing Orientation / Training**
  If necessary, the Beta Testing Coordinator will host an orientation / training session for the beta testers to acquaint them with the software and other issues relevant to the beta testing process, such as reporting test results, beta software updates, and additional training that may be required.

- **Testing Process and Reporting**
  The Beta Testing Coordinator will work with the testers and members of the development staff to define the testing process and the reporting method.

- **Notifying and Distributing to Testers**
  The Beta Testing Coordinator will notify the CADD IT contacts or the CADD Manager that testing materials are ready for distribution. The coordination and distribution of materials to testers will be the responsibility of the CADD IT contacts or CADD Managers. Where appropriate, ECSO may also distribute testing materials to Beta testers.

- **Compiling of Beta Test Results**
  The Beta Testing Coordinator is responsible to compile the results of Beta testing so a recommendation may be formulated for production.

7.6 TAC REVIEW AND RECOMMENDATION

ECSO may coordinate with the TACs seeking recommendation for distribution and production use after conclusion of Beta testing.

7.7 CADD PRODUCT APPROVAL AND DISTRIBUTION

Major releases of CADD Software are approved by ECSO and notice to the District Information Systems Managers made using the Software Distribution Notification Application (SDNA).   ECSO may also use other means of notification for CADD Managers, CADD IT Contacts and Consultants.

The CADD Managers and / or CADD IT Contacts are responsible for distributing the approved software for production use to the end users. The vehicle of distribution for internal FDOT production is defined in the SDNA and external distribution will be at the discretion of ECSO.

Chapter 8

QUALITY ASSURANCE

8.1 PURPOSE

This chapter establishes the basis for Quality Assurance (QA) monitoring of the Department's District Computer Aided Design and Drafting (CADD) functions, including the areas of responsibility, frequency of monitoring and reporting methods.

8.2 AUTHORITY

Section 20.23(3), Florida Statutes (F.S) states that the Department shall ensure quality and monitor implementation of policies and procedures.

Quality Assurance and Quality Control Policy, Topic No. 001-260-001 states that it is the policy of the Florida Department of Transportation (FDOT) to use a systematic but flexible approach to Quality Assurance (QA) and Quality Control (QC) to monitor work processes to implement laws, rules, procedures, policies and standards. This is intended to ensure compliance and quality performance by the Central Office and District units responsible for the delivery of transportation products, services and information.

8.3 SCOPE

Each central office function has the responsibility of monitoring the implementation of policies, procedures and standards established for their particular processes. The ***CADD Manual*** and required standards apply to all CADD functions and will be monitored in accordance with these procedures by the Engineering / CADD Systems Office (ECSO).

8.4 REFERENCES

Subsection 20.23(3), Florida Statutes (F.S.)

Quality Assurance and Quality Control Policy, Topic No. 001-260-001

CADD Quality Assurance Monitoring Plan

8.5 DEFINITIONS

Quality Assurance (QA): The planned, coordinated and continued activities performed to measure processes against predetermined critical requirements.

Quality Control (QC): The planned, integrated activities performed during work processes to ensure completeness, accuracy, proper decision making, and conformance with all other valid requirements.

Monitoring Plan: A QA work plan for CADD developed with District input that identifies what, where, when and how monitoring, reporting, tracking and follow up are to be performed.

Critical Area: Those steps in the CADD process where significant problems may be introduced unless the Production Criteria and Standards are followed.

Critical Requirement: A decision, standard or process operation that will substantially and negatively affect the quality of the product or results if omitted or not performed to the expected level.

Compliance Indicator: Evidence that the critical requirements which are being applied are producing the desired result.

8.6 QA MONITORING PLAN

The ECSO monitoring plan identifies the critical areas of CADD to be monitored, critical requirements and the criteria to measure process compliance. Compliance indicators will be used by the ECSO to determine how well the process is performing.

The monitoring plan provides the method for monitoring CADD processes, the frequency of team visits, the method for reporting and sharing monitored results with the districts, and the method for tracking and eliminating non-compliance issues.

The plan covers the major delivery requirements of CADD, but users are reminded that quality CADD production is the result of doing many individual CADD activities correctly and in accordance with the current criteria and standards.

The *CADD Quality Assurance Monitoring Plan* is published on the Department's intranet per Department policy.

8.7 ACCOUNTABILITY

The ECSO issues the *CADD Production Criteria Handbook (CPCH)* and application software resources with operating instructions so that all CADD production can be based on predetermined requirements. Input for these requirements is solicited from the CADD user communities, especially from the Technical Advisory Committees (TACs).

District production units shall follow the procedures for preparing plans and maps in the preparation of all projects. Each district shall establish quality compliance indicators for all projects and monitor performance and compliance using those indicators.

Consultants are agents of the Department and are responsible for the quality of projects they prepare. They shall comply with the Department's CADD requirements, and will perform Quality Control activities to ensure the completeness and accuracy of services performed for the Department.

8.8 QUALITY ASSURANCE (QA) REVIEWS

A CADD QA review will be conducted in each District per Department requirements. The ECSO will report the results of these reviews to the District Secretary. These reviews will be for the purpose of measuring compliance with the critical requirements as outlined in the annual *CADD Quality Assurance Monitoring Plan*.