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Chapter 6 - PRINTING IMAGE FILES

CADD Production Criteria Handbook

6.1 PRINTS

The Florida Department of Transportation (FDOT) Computer Aided Design and Drafting (CADD) Manual requires all print images used as electronic plans sheets to be generated from the native MicroStation or AutoCAD graphics design files. This applies whether the project is a Classical Electronic Delivery, with a sheet print image files produced as an individual file for each sheet in the plans, or a Digital Delivery where multi-sheet Portable Document Format (PDF) file(s) are produced for the plans set. To assist users producing paper prints of the images for Classical Electronic Delivery, FDOT developed utilities that complement printing and are included with the FDOT CADD software. These utilities support the production of the required images. In addition, they facilitate the creation of the print files in accordance with the file name standards.

All sheet images are produced to scale. Note that not all printer hardware will print paper sheets exactly to scale, even if the source print image file is to scale. Standard FDOT sheet borders are defined for each discipline. Sample print drivers are also provided to generate “drawn to scale” sheet images. Standard sheet borders delivered with the FDOT CADD Software comply with the FDOT sheet formats as defined in the Plans Preparation Manual and other controlling procedure and reflects the file name, directory path and the date and time of the print.

6.2 PRINT BORDERS

FDOT standard sheets have a print border embedded in the each sheet cell. The FDOT predefined search criteria is illustrated in the table below.

Note *PlotBorder_dp* and *ShtPlotBorder_c* are the current print border level symbologies used in the FDOT Software.

	Border 1	Border 2	Border 3	Border 4	Border 5
Type	Shape	Shape			Shape
Level	PlotBorder_dp	PlotBorderSht	PlotShape	ShtPlotBorder_c	51
Color	BYLEVEL	BYLEVEL	BYLEVEL	BYLEVEL	3

Note Typical print border size for 11x17 prints: 16.5” x 10.6”.

6.3 IMAGE FILES

The Adobe PDF format print drivers are implemented by both Bentley and Autodesk as a leading print format. Therefore FDOT now prefers PDF as the format over PostScript.

For those sheets that are electronically signed and sealed by a Professional Engineer, the following note shall be placed legibly on the sheet. See the Plans Preparation Manual, Volume 1, Chapter 19, section 19.2.2, for further information.

“NOTICE: THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE SIGNED AND SEALED UNDER RULE 61G15-23.003, F.A.C.” *

Note The Rule number referenced is determined by the discipline of the professional that is signing and sealing (i.e. for Architects, this Rule is 61G1-16.005, F.A.C.; for Geologists, this Rule is 61G16-2.005, F.A.C.; for Landscape Architects the Rule is 61G10-11.011, F.A.C.; and for Surveyors, this Rule is 5J-17.062, F.A.C.).

6.4 FOREIGN PLAN SHEETS

In some cases, users have no choice but to scan pre-existing hardcopy foreign plan sheets to create electronic sheet files. For example, some plan sheets may already exist as hardcopies, and were signed & sealed conventionally by wet ink signature and impression seal. This can occur when either pre-existing plans are incorporated into the electronic delivery, or a professional discipline does not have legal authority to sign and seal their plans electronically. In such cases, those plans should be scanned at minimum of 300 DPI resolution (or higher if warranted), to PDF, or Group-4 TIFF format, according to [State of Florida Electronic Records and Records Management Practices](#). When scanning, use the lightest contrast setting possible such that reprints from the electronic scans have a minimum of scanned artifacts and speckling and print legibly.

When PDF files are produced, the user must ensure that no encryption or other PDF security is embedded in the PDF (see Document Restriction Summary in the Security Tab of the PDF file properties). File naming of the scanned sheet files should closely follow the conventions described in Chapter 5 of this Handbook, and names shall contain no spaces or special characters, with the exception of the underscore “_” or dash “-” characters.

If scanning hardcopy plans that bear a raised seal, then the raised seal should be shaded / burnished with a pencil or by other means before scanning so the seal appears clearly in the scanned image. Scanned existing plan sheets that are already signed and sealed on paper will not also be signed and sealed electronically - with either PEDDS or Digital Signature. However they may be signed-only (not sealed) by a responsible party to take accountability only for their inclusion within a contemporary electronic plans set (using the appropriate qualifiers or exculpatory language).

The user must also ensure that the result of the scan bears a legible image when viewed on the computer screen, as well as the image can be re-printed to a legible print hardcopy.

6.5 FDOT PRINT DRIVERS

The print drivers and the sheet cells provided with the FDOT software are used to generate plots to scale. All Bentley print drivers now have raster printing enabled. These drivers are called “examples,” due to the various site-specific configurations and types of printers that may be encountered. The print drivers have been tested and work with the printers for which they were developed. Each printer has its own “printable” area defined for a paper size which may differ slightly from printer model to printer model. It is the sole responsibility of the person performing the prints to ensure hardcopy printing is operating acceptably for their hardware.

Note See the CPCH Chapter 3, Section 3.5, Print Driver Configuration Files, for a list of the FDOT delivered print drivers.

6.5.1 MicroStation Half-Toning

The color 20 is used to define half-toning in the printer driver files supplied by FDOT. Half-toning of the minor grid lines on the cross section sheets, the profile portion of the plan/profile sheet and the profile sheet has been approved by FDOT as shown in the *Plans Preparation Manual, Volume II* exhibits. The FDOT Project Manager must approve half-toning of any other graphical element in the design file.

Some FDOT districts have specified the half-toning of certain reference files from one discipline to another. For example, the topography file could be half-toned when referenced to the proposed design. This must be approved on a per district basis.

A pen table can be set up to equate any referenced file to color 20, thus half-toning the entire reference file at print time.

6.5.2 Quality and Reproduction

Printed output from the design files and plan sheet image files must be legible and of a quality to be reproducible on 2nd generation copies. Line weights/thicknesses as defined in CPCH Chapter 3.8.4 are default settings in the print drivers, but may need to be adjusted, depending on printer hardware, to product the required quality of printed documents.

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