Illinois Department of Transportation

To:	Studies and Plans Squads	PPM 10-12
From:	Dennis L. Markwell	By: Justin Cearlock
Subject:	CADD Guidelines	
Date:	August 16, 2010	Revision Date: August 16, 2010

PLAN PREPARATION MEMORANDUM 10-12

BACKGROUND

Electronic Plan Coordination

This memorandum supercedes Plan Preparation Memorandum 98.250P, 87.187P(Rev) and supplements Chapter 63 of the BDE manual for uniformity in preparing electronic plans.

PROCEDURE

Responsibilities (BDE 63-1)

If CADD is used for drafting, coordination is needed between the designer and CADD Unit. The BDE Manual places the designer responsible to discuss the degree of work and scheduling requirements needed by the District Computer-Aided Drafting Unit (CADD) to complete electronic drafting of plans. These guidelines supplement BDE manual requirements to assist the designer in providing the necessary information to the CADD operator, so that the plans can be properly prepared using the CADD system.

The District CADD Unit provides drawing. This work provides a technique of representing highway details portrayed by lines and sketches. CADD drawing should not be confused with computer-aided design. Computer-aided design uses mathematical models to ensure engineering concepts fit with both precision and accuracy. Examples of computer-aided design include creating continuous alignments and profiles, creating station cross-sections for earthwork. All computer-aided design work is the responsibility of the designer.

CADD Coordination (BDE 63-1.03)

All submittals of information to CADD require identification of the designer by full name with telephone extension number and the needed completion time frame. The completion time frame shall specify when the designer needs the CADD work to continue the design. Acceptable time frames shall be “within the next half day”, “within the next day”, Within the next 2 days”, within the next week. PROVIDE THE CORRECT CONTRACT NUMBER, Route, Section and involved counties with each submittal.

SQUAD LEADERS SHOULD INITIAL AND BE AWARE OF ALL CADD SUBMITTALS. The CADD unit's schedule does not allow the time to redo complex sheets. It is imperative to avoid checking the final product only, to minimize wasted effort. Any problems with CADD submittals, or CADD work should be brought to the attention of the squad leader.

Use common sense in providing enough information to CADD to draw the plan or detail. "Warped in" pictures cannot be drafted by CADD and cannot be constructed correctly in the field.

Be sure the print used for mark-up matches the most current file on MicroStation. CADD will print a new sheet if you are uncertain you have the most up to date print.

All dimensions given to CADD need to be neat and legible, and should be in the same units as the plans. Metric plans use only metric units and English plans use only English units.

Never use white-out on a CADD working drawing

Items drawn in red require CADD drafting. Items drawn in blue provide comments and clarifications for CADD's use.

Provide portions of drawings as steps to simplify complicated drawings. Too much information on a sheet becomes illegible and confusing.

File Management (BDE 63-2.03)

The District CADD Unit keeps and maintains the official files for our projects. Consulting firms keep official CADD files until submitted with final documents.

Plan files are required to follow the CADD Roadway Drafting Reference guide, and shall be organized and saved in accordance with the CADD Roadway and Structure Project Deliverables Policy.

In accordance and/or addition to the CADD Roadway and Structure Project Deliverables Policy, the official files shall be organized and saved using the following conventions:

- All files shall be named and contain the appropriate plan information according to Appendix A. File names shall be no more than 35 characters. Do not use spaces or special characters, except for dashes and/or underscores, in file or folder names.

- All existing project topography data shall be placed in one design file (D5#####-topo.dgn) and shall be stored in the survey folder.

- All proposed improvements shall be place in one design file (D5#####-Design.dgn) and shall be stored in the Design folder.

- All Plan sheets shall be grouped by type of sheet and by scale into one file per location.

  Examples of groupings shall be:

  One file for all 20-scale plan sheets;
  One file for all 50-scale plan sheets;
  One file for all 20-scale plan-profile sheets;
  One file for all 50-scale plan-profile sheets;
  One file for all details used on the project (both District details and job specific drafted details)

- Files shall include the appropriate sheet border with the data - no referencing of sheet borders is allowed.

- Each sheet shall document the file in which it is located.

- All files submitted for review and/or addition to the official files shall include a submittal of all appropriate reference files

- In conjunction with the BDE Submittal, all contract plan sheet files shall be stored in the CADsheets folder, and shall contain only the contract plans sheets.

DRAFTING GUIDELINES (BDE 63-3)

Sheet Layout

- CADD requires the beginning and ending stations of the project and the sheet scale, before setting up any plan sheets.
- Plan sheets should only be set up after the scope of work has been finalized.

Interstate Plans

- Existing information provided by CADD should be field checked if the information is from old plans, not an actual survey.
- Additional existing features can be added as needed, but all stations and offsets will be provided by the designer.

Plan Reviews

- Necessary plan changes resulting from plan reviews should be compiled on one set of plans. At no time should CADD be making plan revisions from an actual review set.

Text Files for Index of Sheets, General Notes, Commitments, Schedules, and Summary of Quantities

- Consult your Squad Leader if you are unsure whether the Squad or secretary should be typing plan notes. Remember that CADD operators are not secretaries.
- Text files can be inserted in MicroStation from either Microsoft Word or Excel.
- All text files shall be stored in the "O:\Studies and Plans\" directory under the squad leader or designer name, then by Contract Number (Most Studies & Plans Squads have O:\Studies and Plans\ setup as their "S" drive).
- The text file's location shall be provided to the CADD Unit and its title and location should not change once linked into MicroStation.
- Once linked into MicroStation, changes/corrections shall be made in the Excel or Word file. The file needs to be saved and close before CADD can update the plan sheet. Notify CADD if changes include an increase of columns and/or lines.

<u>Word</u>

- The font for the file shall be Arial.
- The text height of titles shall not be larger than 16pt., and the text height of the body of the text shall be 10pt.
- Tabs cannot be used (Excel should be used if columns are needed).

<u>Excel</u>

- The font for the file shall be Arial.
- The title of the schedule shall be 16pt., the pay item names shall be 14pt., and the body of the schedule shall be 10pt. Bold text will import as weight 2 and regular text will import as weight 1 in MicroStation.
- Do not wrap text in rows.
- Each row of text shall be in a separate row of the spreadsheet.
- All text shall be centered vertically.
- Column width shall be sized to best fit on the Excel screen.
- Cells can be merged horizontally to center titles.
- Cells cannot be merged vertically.
- When preparing a schedule or summary, one column of information should only take up one column in the file. For example, if you are preparing a summary with the pay code in column "D", the pay item names should be in column "E" and the unit in column "F". Do not let the pay item name stretch across several columns. Column "E" should be resized to fit the text and start the next column of info in column "F".

A guide for the format of text documents to be inserted into MicroStation is attached.

District Details (BDE 63-4.03b)

District Details are sheets created in addition to the *IDOT Highway Standard*s. The designer shall provide CADD a list containing the detail numbers of the desired details.

- A link to the details is located on the D5 Home page.

Typical Cross Sections (BDE 63-4.05)

Sample Existing and Proposed Typical Cross Sections are attached. CADD needs to know:

- What format would you like the sheets? (1 or 2 per sheet, Existing Typicals together or Existing Typical above the Proposed Typical)
- For existing Typical Cross Sections all CADD needs is a legible marked up copy of the as-built plans. Metric conversions shall be given (If Necessary).
- For proposed Typical Cross Sections, request that CADD give you base sheets from the existing. They will dash the lines and delete all the notes and dimensions, as necessary.
- DO NOT DRAW THE PROPOSED TYPICAL CROSS SECTION ON THE EXISTING TYPICAL CROSS SECTION. Drawing proposed typical information on the existing typical confuses the information required for CADD.
- Watch for redundant dimensions. This is confusing for CADD as well as construction.
- The edge of proposed bituminous widening shall be shown as a vertical line below the existing ground line. This also applies to Cross Sections.

GEOPAK

The CADD Unit can insert Squad designed profiles on plan-profile sheets, provided the information is GEOPAK profile information supplied to CADD in the correct format.

Examples of GEOPAK input files for reduced field notes, unreduced field notes, and profiles are attached.

- GEOPAK is very picky about the format for the input file. Ask your Squad Leader or CADD for more information if you have any questions.
- Multiple profiles for the same alignment may be included in the same input file.
- A separate input file is needed for each alignment.
- GEOPAK input files for use by CADD are text files and should be checked in Notepad.
- The input file can be created as a spreadsheet or Word document.

A GUIDE FOR SAVING TEXT DOCUMENTS FOR CADD USE

Word

- The font for the file should be Arial.
- The font size of the body of the text should be 10pt., and the title should be no larger than 16pt.
- Tabs cannot be used.

Excel

- The font for the file should be Arial.
- The font size of the body of the text should be 10pt., the pay item name 14pt., and the title no larger than 16pt..
- Do not wrap text.
- Cells can be merged horizontally but not vertically.
- All text should be centered vertically.
- The width of the column should be large enough to contain all of the text within it.

Files should be stored in the "O:\Studies and Plans\" directory under the squad leader or designer name.

Once linked into MicroStation the name and location of the file should not be changed.

Notify the CADD unit after all changes/additions have been made and saved in the text file.

Input file for existing cross sections from REDUCED field notes

The required format is:

XS station offset elevation-offset elevation …
XS station offset elevation-offset elevation …
XS station offset elevation-offset elevation…

Example:

```
XS 101+00  -40  105.12  -20  102.10  0  100.15  10  99.67  15  99.35  20  96.67
XS 101+08  -50  104.25  -25  101.22  0  100.20  10  99.58  15  99.02  20  97.50
XS 101+12  0  100.22  5  99.99  10  99.54  15  98.85  20  98.24  27  97.72
END GRO
```

Input file for existing cross sections from UNREDUCED field notes

The required format is:

HI elevation
GL Station reading distance reading distance reading distance reading distance…
GL Station reading distance reading distance reading distance reading distance…
GL Station reading distance reading distance reading distance reading distance…
HI elevation
GL Station reading distance reading distance reading distance reading distance…
GL Station reading distance reading distance reading distance reading distance…
GL Station reading distance reading distance reading distance reading distance…

Example:

```
HI 229.301
GL 26+25  2.28  20.0  2.13  10.3  2.41  7.7  1.96  5.1  1.96  3.7  1.993  0
GL 26+50  1.80  1.72  11.7  2.16  9.6  1.81  7.3  1.817  3.7  1.831  0  1.985  3.7
GL 26+60.58  1.26723.7  1.353  18.7  1.470  13.7  1.593  8.7  1.757  3.7  1.763  0
HI 229.071
GL 26+67.95  RT  1.503  0  1.568  3.7  1.45  8.3  1.18  19.5
HI 229.301
GL 26+75  1.44  20.0  1.58  11.0  1.97  8.6  1.78  7.3  1.680  3.7  1.700  0 1.763  3.7
END GRO
```

Input file for existing or proposed profiles.

The required format is:
STO PRO name
VPI S station E elevation
VPI S station E elevation
VPI S station E elevation
END PRO

Example:

STO PRO EXCL
VPI 1 S 22+39.522 E 223.717
VPI 2 S 22+41.322 E 223.718
VPI 3 S 22+50.247 E 223.723
VPI 4 S 22+56.953 E 223.727
VPI 5 S 22+65.878 E 223.733
END PRO