

4.1 **For Plans, Specifications & Estimate (PS&E) Submittal**

A. File Formats for PS&E

1. Acceptable Formats

Caltrans only accepts 100% electronic submittals. The standard file format for all PS&E submittals is a MicroStation design file with a .dgn extension. All Caltrans resource files used for PS&E submittal are for MicroStation. Caltrans does not provide AutoCAD resource files.

a) MicroStation File Format

On February 1, 2008, Caltrans began accepting MicroStation V8 format files for PS&E submittals. Caltrans will continue to accept earlier MicroStation file format versions (5 through 7). Final contract plans (MicroStation design files with no reference files attached) may be submitted, if necessary, as a mix of V7 and V8 file formats as part of the PS&E submittal (for the same project) as long as both plot correctly using the current Caltrans standards. MicroStation V7 format files do not need to be converted to a V8 format for PS&E submittal. Districts should plot each project before sending it to the Division of Engineering Services – Office Engineer (DES-OE) Project Plans unit. DES-OE Project Plans unit can handle V8 format files if Caltrans' current standards and restrictions on certain extended features available in MicroStation V8 are observed. If problems occur (plotting or missing information) with the V8 format files during final review at DES-OE, the project will be returned to the District that created or converted the files to a V8 format to be corrected.

If there is a need to facilitate the sharing of electronic data among Caltrans functional units and /or consultants, best practice procedures would have all participants involved on the project using the same file format, either V7 or V8. The Caltrans preference would be the use of V8 file format in order to take advantage of new extended features available with MicroStation V8. As stand-alone legacy files, V7 format files will always be acceptable, but when working on new projects, the format should be V8.

The goal of Phase 2 of the Caltrans implementation of MicroStation V8 is to use the V8 format file and not to have to convert back to a V7 file format. The only time conversion back to a V7 file format would be necessary is if someone did not have V8 loaded on his or her workstation (V8 is not backward compatible). There are several methods to convert a V7 file to a V8 file, therefore careful evaluation and discussion of the most appropriate method needs to be considered. If V8 files need to be shared with functional units that do not have MicroStation V8 loaded on their workstation, then the appropriate Administration Support staff should install MicroStation V8 on the workstation.

b) Variations with Prior Approval

The following variations, with prior approval at approximately 60% completion, from Division of Design, Office of CADD and GIS Support will also be acceptable for PS&E Submittal. Specific circumstances are listed below:

- **MicroStation design files** with imbedded or imported raster data (aerial photographs or digital pictures). Raster data should be limited to detail sheets that require enhancing or emphasizing of a detail or a unique location (i.e. toll plaza at the San Francisco/Oakland Bay Bridge) that the contractor might need to see. The need for imported raster data should be based on an engineering need, not for aesthetics or location identification. Contract plans should first and foremost be engineered plans, not photogrammetric plans. Aerial photographs were designed for preliminary plans not final contract plans. If aerial mapping is needed for identifying specific locations, plan sheets have been established to handle the raster data. These sheets are called "Aerial Identification" and follow the "Key Map and Line Index" sheets. Raster data should not be used as background for other plan sheets such as layouts, drainage, utilities, pavement delineation, etc.
- **(Tiff) or Tagged Image File Format** is acceptable where legacy plans (in most cases this refers to Log of Test Boring sheets) are being considered for submission as part of a new CADD submittal. This is a single, complete plan sheet with borders intact, submitted as a tiff raster image. The legacy sheet is to be scanned, sized (cropped), de-speckled and de-skewed before submittal. The preferred size of the finished Tiff plot is 22 inches x 34 inches and for special circumstances the maximum allowable size is 23 inches x 35 inches. These will be raster edited.

2. Non-Acceptable Formats

- **Hard Copy Originals**
- **Reference Files** (neither vector or raster)
- **Cadd Generated Raster-** Any file that was created as a MicroStation design file, but converted to raster for convenience or expediency, will not be accepted for PS&E Submittal.
- **Models-** use the “Default” model for final submittals only. Submittals must be one MicroStation design file for each contract plan sheet.
- **AutoCad Files-** Files started with AutoCad (.dwg or .dxf file) must be converted into a MicroStation design file under the direction of the engineer of record.

B. Reference Files

No reference files of any kind will be accepted with the PS&E Submittal. All information that is pertinent to any specific contract plan sheet needs to reside in just one specific MicroStation design file. This helps convey the fact that all final contract plan sheets are “legal contract documents” and should not be changed because a change was made in a reference file (or model). However, the use of reference files is a very important tool during the course of developing and designing any project. Reference files should stay referenced until just before PS&E submittal, so any change made in a reference file will automatically be reflected in all files that have the reference file attached (not already copied in).

C. Requirements for PS&E

1. General Requirements

All projects, whether completed by Caltrans or consultants, shall be submitted by the district to DES-OE. A PS&E CADD Submittal Form and a Project Plans Review Checklist must accompany the PS&E submittal.

For electronically generated plan sheet signatures and project plans development names, see Section 2-1.6 of the Plans Preparation Manual for detailed instructions.

2. Caltrans Current Standards

- Files only accepted in a MicroStation design file format with a *.DGN extension.
- One MicroStation design file per “contract plan sheet”.
- Each MicroStation design file must have an accompanying Interplot parameters file.
- Must use the standard Caltrans MicroStation resource files (fonts, line styles, cell library, etc.).
- Use only the standard Caltrans Interplot design scripts (pen tables).
- The current plotting requirements are still to be utilized (see Chapter 5 of the CADD Users Manual).
- All necessary information shall be in the “contract plan sheet”, no reference files are to be attached for PS&E submittal.
- Must use the latest Caltrans borders sheets, which are provided in the latest updated Caltrans MicroStation Cell Library (ctcellib.cel).
- Compliance with all prescribed Caltrans text sizes and drafting conventions.
- Compliance with Caltrans leveling convention, colors, line weights, line codes, file naming convention, standard abbreviations and symbols.

3. General Plotting Requirements

All PS&E submittals (whether V7 or V8) must conform to Caltrans plotting standards. See below for some specific plotting requirements.

- The official Caltrans plotting application is “Interplot.”
- For each MicroStation design file submitted for PS&E (contract plan sheet), an Iplot parameters file (called an Iparm with an *.i extension) needs to be created and submitted with the MicroStation design file for a final PS&E submittal.
- Snap to outside edges of the border sheet (from lower left to upper right) when defining a plot region. Plot size should equal exactly 34 inches x 22 inches.
- All 63 levels in a V7 file and all used levels in a V8 file (must use the Caltrans DGNLIB) are to be turned on. Make sure only the information pertinent to that specific sheet is in the MicroStation design file. Too much information distracts from the real purpose of the sheet. But missing information may lead to inaccurate cost estimates and bids.
- Rotation. The plot view (not the design file) with respect to the monitor needs to be at zero degrees.
- The accepted number of views for a PS&E submittal to DES-OE is a full plan view of the border sheet and contents displayed in one monitor.
- Use Pen Table “fullbw.pen” for PS&E Submittals.

- Prior to PS&E, “halfbw.pen” may be used to create half-size review check prints.
- One important reason that Caltrans uses a leveling convention is to properly show existing information that is contained in the Master Topographic file. Solid (as well as dashed) lines on levels 2-9 and 11 will be plotted as dotted lines. See Appendix A9 in the CADD Users Manual for additional dropout levels. Existing information located on non-dropout levels are to be shown with a dashed line.
- It is recommended that the lparms delivered with the PS&E submittal be created after the naming of all MicroStation design files so the lparms will reflect the correct name for each MicroStation design file (thus avoiding a plotting failure.) See Section 2.2 of the CADD Users Manual for the appropriate Caltrans naming convention. Full-size test prints of the Contract Plans should be made prior to PS&E submittal for plot verification.
- Construction Class Elements should not plot for PS&E submittals. Interplot should be configured to comply with this standard.
- Only Caltrans custom linestyles can be used with PS&E submittals. The Caltrans linestyle resource file is “ctlstyle.rsc”.

4. Limitations/Restrictions when using V8 File Format

- Only the “Default” model space shall be used, no extra model spaces shall be contained in the contract plan sheets. PS&E submittals must be one MicroStation design file for each “contract plan sheet”.
- Use California State Plane Coordinates.
- If starting a new project, use only the V8 seed files as supplied by Caltrans-HQ CADD. For every MicroStation highway design file the resolution of **10,000** for the “Working Units” is still required.
- In the Units.def file, “U.S. Survey Foot” must be defined as the default for the **“foot unit”**.
- Must use the **DGNLIB** supplied by Caltrans-HQ CADD.
- When creating a full V8 format design file, a new DGNLIB will be called upon or can be attached, which was created by Caltrans HQ CADD. This new DGNLIB will incorporate all of the levels necessary for the various Caltrans’ functional units. Only HQ CADD can add or change any information for these levels in the DGNLIB.

- ▶ Roadway will remain with levels **1-63, plus 64-100**
- ▶ Right of Way will now have levels **101-163 & 164-200**
- ▶ Structures Design will now have levels **201-263 & 264-300**
- ▶ Structures Architectural Plans will now have levels **301-363 & 364-400**
- ▶ Structural Plans will now have levels **401-463 & 464-500**
- ▶ Structures Mechanical Plans will now have levels **501-563 & 564-600**
- ▶ Structures Electrical Plans will now have levels **601-663 & 664-700**
- ▶ Structures Sanitary Plans will now have levels **701-763 & 764-800**
- ▶ Utilities will now have levels **801-870**
- ▶ Dropout levels **871-900**
- ▶ Structures Rebar will now have levels **901-965**
- ▶ Stage Construction (non-dropout) will now have levels **966-999**

Levels beyond 63 (or 163, 263, etc.) have, in most cases, been named as undefined. In the Caltrans DGNLIB, levels 1 through 999 have been given a unique name. For a detailed list of those unique level names see Appendix A9 in this manual.

D. Consultant Prepared Projects

Consultant prepared projects must comply with the requirements set forth in the Plans Preparation Manual (PPM) and CADD Users Manual. The latest version of these two manuals are located on the Caltrans website and should be reviewed and followed by both Caltrans and consultants for any changes, deletions or additions.

CADD Users Manual: www.dot.ca.gov/hq/oppd/cadd/usta/caddman/default.htm

PPM: www.dot.ca.gov/hq/oppd/cadd/usta/ppman/default.htm

Consultants are to adhere to the same requirements as any Caltrans project engineer, being guided by the Highway Design Manual, Project Development Procedures Manual and any directive Memorandums. This includes advance-planning studies, preliminary design, Plans, Specifications and Estimate (PS&E) submittals, support through the construction of the project and completion of the as-built plans.

All consultant prepared projects are to be submitted to the district administering the oversight contract at the agreed upon stages of the project (30%, 60%, 90%, etc.). The district is responsible for verifying (both electronic files and plotted plan sets) and submitting a consultant project to Division of Engineering Services – Office Engineer (DES-OE) and then keeping the consultants informed on comments, reviews or questions from DES-OE. Likewise, consultants are responsible for informing Caltrans Oversight staff of any modifications and/or additions during the various preliminary and final stages of project plan development. Any questions or requests by consultants should first be directed to the appropriate Caltrans' District Design Oversight Engineer.

Consultants can obtain the Caltrans resource files at the following website:

http://www.dot.ca.gov/hq/oppd/cadd/rsc_files/webpage.htm

Cooperative Agreements and Contract Agreements should state that the latest standards, identified in the CADD Users Manual and PPM (the latest versions being on the Caltrans website), are to be followed for all final products (deliverables) throughout the Project Delivery Process.