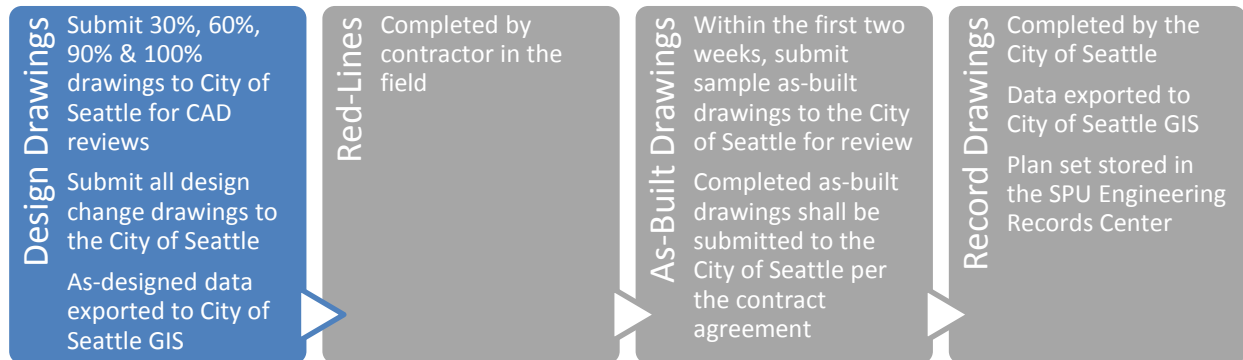


SPU/SDOT Design Drafting Guidelines



Design Drafting Checklists

Prior to setting up drawing files:

- Download CAD support files at: Seattle.gov/util/CAD
- Become familiar with the latest version of the CAD Manual and fill out a BIM Execution Plan.
- Acquire a Project Tracking Number (PTN) for file-naming purposes.

SDOT Projects:

Contact the SDOT Project Manager for the “SpeedType” (charge code).

SPU Projects:

Contact SPU_CADsupport@Seattle.gov with the following information to obtain a PTN:

- SPU Project Manager (PM) Name
- Project Name
- Project Location
- “SpeedType” (charge code; obtain from PM)

During 30% Design Development

- Setup project folders and drawings (see Section 3 of the CAD Manual).
 - Set up the sheet set with Sheet Set Manager:
 - Update “project milestone” field to 30% DESIGN DRAWINGS (NOT FOR CONSTRUCTION).
 - Fill in the “Job Number - PC” field with the SpeedType.
 - Leave the “Job Number - CO” field blank—only used for the construction SpeedType (if applicable).
 - Fill in the “Project Title” field.
 - Fill in the “Total Number of Sheets” field (if known).
- Create cover sheet.

- Add/modify PE stamp (color 254).
- Vicinity Map
- Location Map
- Sheet Index
- Datum Block (if applicable)
- Detail & Section Referencing Block
- Create notes sheet (see [SIP web page](#) for sample notes) with PE stamp (color 254).
- Setup survey control drawing with PLS stamp (color 254).
- Set up a “view” drawing (XREF) that contains match lines on even stations and model space views. This drawing will be used to save-as and create all other plan/profile XREFs.
- XREF base map into sheets and create plan viewports based on the “view” drawing using Sheet Set Manager.
- Create design XREFs (save-as the “view” drawing to create each design drawing).
 - Layout the design under the direction of the project engineer.
 - Create profiles (with match lines that match stationing on plan) if required.
 - Add annotation based on planned viewport scale(s).
- Overlay design XREFs in sheets and create viewports for profiles if required.
- Add/modify PE stamps (color 254) on all sheets.
- Update “description” fields for each sheet in Sheet Set Manager.
- Review checklists in Section 4 of the CAD Manual for planning purposes.
- Check SPU [Design Standards & Guidelines](#) for 30% drawing requirements.
- Check and plot drawing set for interdepartmental plans circulation (make PDF and DWF snapshots) per Section 8 of the CAD Manual.
- Send the DWG files and PDF file(s) to the City per Section 10 of the CAD Manual. Send files to Project Manager and **SPU_CADsupport@Seattle.gov** for review.

During 60% Design Development

- Update “project milestone” field in Sheet Set Manager to 60% DESIGN DRAWINGS (NOT FOR CONSTRUCTION).
- Continue developing the drawings under the direction of the project engineer.
 - Track and log changes during design development.
 - Check design sketch for constructability throughout drafting progress, remind designer of any noted interference or constructability concerns.
- Follow the drafting & presentation guidelines (see Section 4 of the CAD Manual).
 - Setup detail numbers and titles using Sheet Set Manager (add cross-referencing blocks containing fields linked to Sheet Set Manager).
 - Lock Viewports.
- Acquire Vault Plan Index (VPI) and serial numbers from SPU [Engineering Records Center](#) (Records Vault) and add them to the title blocks via Sheet Set Manager (“Vault Plan Number” and “Vault Serial Number” fields).
- If SIP is required, ensure drawings meet the [60% SIP checklist requirements](#).
- Check SPU [Design Standards & Guidelines](#) for 60% drawing requirements.

- Check and plot drawing set for interdepartmental plans circulation (make PDF and DWF snapshots) per Section 8 of the CAD Manual.
- Send the DWG files and PDF file(s) to the City per Section 10 of the CAD Manual. Send files to Project Manager and **SPU_CADsupport@Seattle.gov** for review and **asset onboarding**.

During 90% Design Development

- Update “project milestone” field in Sheet Set Manager to 90% DESIGN DRAWINGS (NOT FOR CONSTRUCTION).
- Go through the checklists in Section 4 of the CAD Manual.
- Prepare utility linework per Section 6 of the CAD Manual.
- If SIP is required, ensure drawings meet the [90% SIP checklist requirements](#).
- Check SPU [Design Standards & Guidelines](#) for 90% drawing requirements.
- Check and plot drawing set for interdepartmental plans circulation (make PDF and DWF snapshots) per Section 8 of the CAD Manual.
- Send the DWG files and PDF file(s) to the City per Section 10 of the CAD Manual. Send files to Project Manager and **SPU_CADsupport@Seattle.gov** for review and **asset onboarding**.

At 100% or Production of Conformed Drawing Set

- Update the “project milestone” field in Sheet Set Manager to be blank (ALT+032) or with CONFORMED DRAWING SET (MM/DD/YYYY).
- Prepare project data for transmittal to the City.
 - Export data from Civil 3D source drawings to LandXML.
 - Ensure all utility linework is classified (per Section 6 of the CAD Manual) and data filled in.
- Transmit drawings & data (per Sections 9 and 10 of the CAD Manual) to the Project Manager and **SPU_CADsupport@Seattle.gov** for archival and **asset onboarding** (applies to both SPU and SDOT projects).
 - PDFs of sheets.
 - ZIP file of drawing package including drawing (DWG) and Sheet Set Manager (DST) files.
 - LandXML of proposed pipe alignments/profiles (horizontal & vertical data).
 - LandXML of proposed surfaces.
- Incorporate all design changes into the CAD files as they occur and send updated CAD files to **SPU_CADsupport@Seattle.gov** on an ongoing basis (applies to both SPU and SDOT projects).

As-Built and Record Drawings

For As-Built and Record Drawing requirements, see:

<http://www.seattle.gov/utilities/construction-and-development/consultants/contractors/drafting-consultants>

Frequently Asked Questions

Q. Why is it required to follow CAD standards?

A. There are four main reasons:

1. Readability: drawings conform to [STANDARD PLAN NO 003](#).
2. Consistent Plotting: lineweights are controlled by the SPU/SDoT color table (CTB) file.
3. Ease of Data Transfer: drawing data is easily exported for field verification and GIS.
4. Project Efficiency: maintaining coherence, minimizing wasted effort in recreating design, and maximizing the effectiveness of a project team.

Q. Why is Sheet Set Manager required?

A. There are many benefits to using Sheet Set Manager including easy sheet data management, detail and section referencing blocks containing dynamic fields that automatically get updated, dynamic bar codes that automatically get updated (required for archival), updatable sheet index table and batch plotting. See Section 2 in the CAD Manual for more information on setting up and using Sheet Set Manager.

Q. How does file-naming work?

A. Every project has a Project Tracking Number (PTN) that is used for file-naming (see the first page of this document for info on requesting a PTN for your project).

Replace [PTN] with the Project Tracking Number for these types of file names:

<u>Sheet Sets:</u>	[PTN]_[project_name].dst
<u>Title block sheets* (Section 3 of CAD Manual):</u>	# [DWG].dwg
<u>XREF drawings** (Section 3 of CAD Manual):</u>	[PTN]_X-[XXXX]-[optional_description].dwg
<u>PDF plan set for review:</u>	[PTN]_[milestone]-[project_name].pdf
<u>Final PDF submittal (Section 8 of CAD Manual):</u>	[VPI #]-[Sheet #].pdf

*replace [DWG] with drawing number as defined in Section 3 of the CAD Manual.

**replace [XXXX] with a major layer field defined in Section 5 of the CAD Manual.

Q. Why are DWFs requested?

A. Many reviewers ask to see comparisons of a submittal to previous version and you can use Autodesk Design Review to compare one DWF to another. This is why we may request DWF files of the drawing set for every submittal. Also DWF files plot with the same fidelity as AutoCAD. See Section 8 of the CAD Manual for more information.

Q. Why are 3D surfaces and 3D utility data required?

A. At the time of advertisement project surveyors often ask for a LandXML file containing Civil 3D Surfaces of proposed finished grade and Civil 3D Pipe Networks or Civil 3D Profiles with PVI's matching vertical and horizontal locations pipeline inverts. A full-size DWF and PDF of the plan set should also be included with the data. See Section 6 in the CAD Manual for more information.

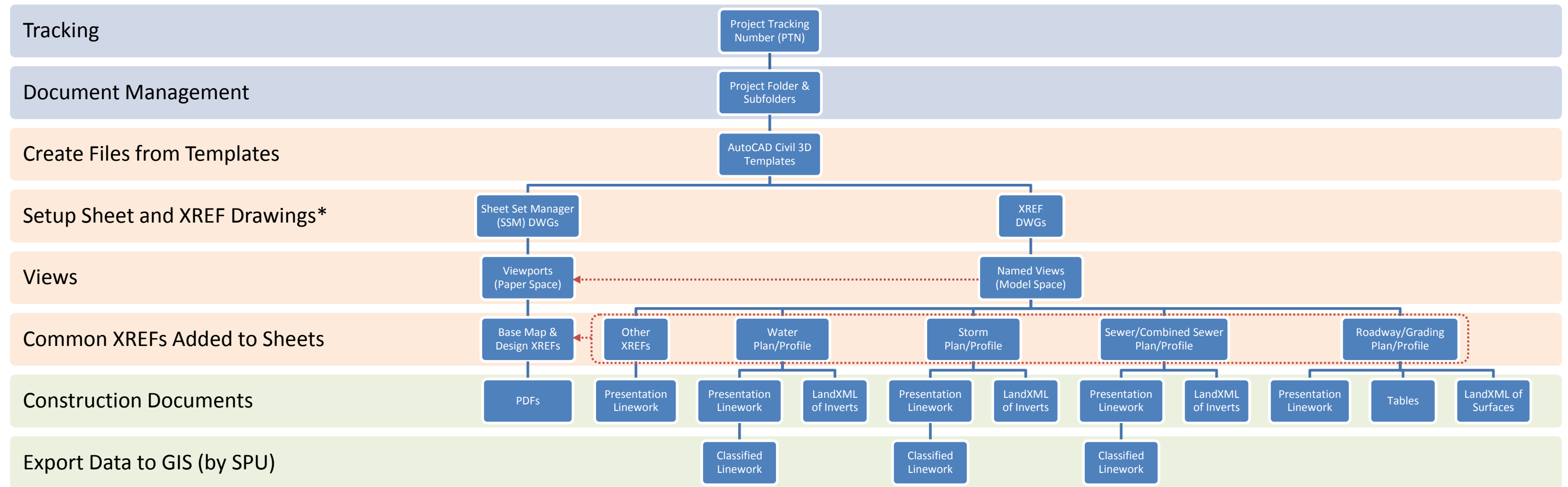
Q. Why are classified georeferenced 2D utility linework required for plans?

A. 2D classified horizontal/conveyance linework is required for asset onboarding. Seattle Public Utilities exports CAD data to GIS at 100% design (time of advertisement) and when Record Drawings are complete but the GIS system only accepts lines, points and polygons. In order for 2D utility linework to be exported into our GIS system, "Object Data Tables" need to be added to each 2D utility pipe ("Polylines" and "Multilines") and structure ("Blocks" or "Closed Polylines"). This process is called "Object Classification". See Section 6 in the CAD Manual for more information. Another benefit to drafting 2D linework in plan, is because you have more control over the presentation of the drawing.

Q. Am I allowed to create new layers for disciplines not defined in the CAD Manual?

A. Layer names for disciplines not specifically defined in the CAD Manual (such as architectural, structural or mechanical) must use layer fields shown in Section 5 of the CAD Manual or follow the naming conventions as defined in the [National CAD Standards \(NCS\)](#). All layers must use colors shown in the plot style tables in Section 8 of the CAD Manual.

Typical Project Setup



*What Goes in Drawings:

Civil 3D® DREFs

- Corridors/Grading Objects/Feature Lines
- Alignments
- Surfaces
- Pipe & Pressure Networks
- Data Shortcuts

Presentation XREFs

- named plan, profile and civil section views
- Data References
- classified linework w/ data
- annotation & SSM reference callouts
- notes and legends

Detail XREFs

- named detail & section views
- linework
- annotation & SSM reference callouts
- detail & section titles inserted via SSM "Sheet Views" tab

Sheet Drawings (Paper Space) via SSM

- project data (via DST file)
- title block w/ fields
- profile/section grids
- viewports added via SSM "Model Views" tab
- street names
- north arrows & bar scales