

Roll Plan Workflow Guidelines Version 2.4

Digital Delivery Directive 2025

Pennsylvania Department of Transportation

June 18, 2024

Revision History

Date	Author	Version	Changes
07/16/2021	HDR	1.0	Initial Draft
08/10/2021	HDR	1.1	Revision to printed page width
09/16/2021	HDR	1.2	Removed printed page length
10/12/2021	HDR	1.3	Added sheet creation and PDF printing section
03/21/2023	HDR	2.0	Revised sections to reflect rollout of One Page PDF to all Districts
04/05/2023	GF	2.1	Revised content to reflect rollout of Roll Plan Workflow Guidelines to Pro-Team
01/09/24	HDR	2.2	Enlarged graphic on page E6
01/09/24	HDR	2.2	Revised “Third Parties” on page E-15 to include examples of “sister agencies”
01/09/24	HDR	2.2	Added reference to appendix B for definitions of various roles
01/10/24	HDR	2.2	Updated Figure E-3 graphic is appropriate Roles
04/03/24	HDR	2.3	Revisions per CT review comments.
06/18/24	HDR	2.4	Revisions per SOL review comments

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Purpose

The purpose of this document is to provide direction for formatting and delivering an un-sheeted, 2D digital deliverable to the contractor in the Portable Document Format (PDF). This plan format does not include plan borders and is intended to present the entire project within one PDF file. There are provisions provided below that outline the process for accommodating longer projects that may require more than one file.

These guidelines cover the formatting of 2D models of typical plan and profile views for Construction Plans and Supplemental Plans into the Roll Plan format, as identified in Publication 14M, Design Manual Part 3 (DM-3), Section 1.5.

Right-of-Way Plans will not be formatted as a Roll Plan due to the requirements of local agencies.

For Supplemental Plans, the use of Roll Plans is optional and will be evaluated per project, especially for Supplemental Plans involving the Public Utility Commission (PUC) and environmental permitting.

These models will be populated with both existing and design elements as required by DM-3. The following section for DM-3 will apply:

- 2.6 Plan Sheets and Profile Sheets

Process Flow

The workflow shown in Figure 1: PennDOT Roll Plan Production Workflow is a high-level diagram of the plan production development and delivery process. This diagram is configured with the processes of the project in the top horizontal lane and the information exchanged by each process is shown in the lower lane. Each blue box, in the Process lane, indicates either one or many tasks to be performed during a phase. The lower lane shows the exchange of data or information between tasks. This diagram is meant to be read from left to right with the arrows indicating the flow of data.

The purpose of the diagram is to highlight the Common Data / Collaborative Environment where the project design documents, and construction deliverables reside. This environment provides access to all stakeholders throughout the design and construction stages. Maintaining an up-to-date design model in a centralized location provides all stakeholders the opportunity to review model progress without the need to interrupt design or construction productivity.

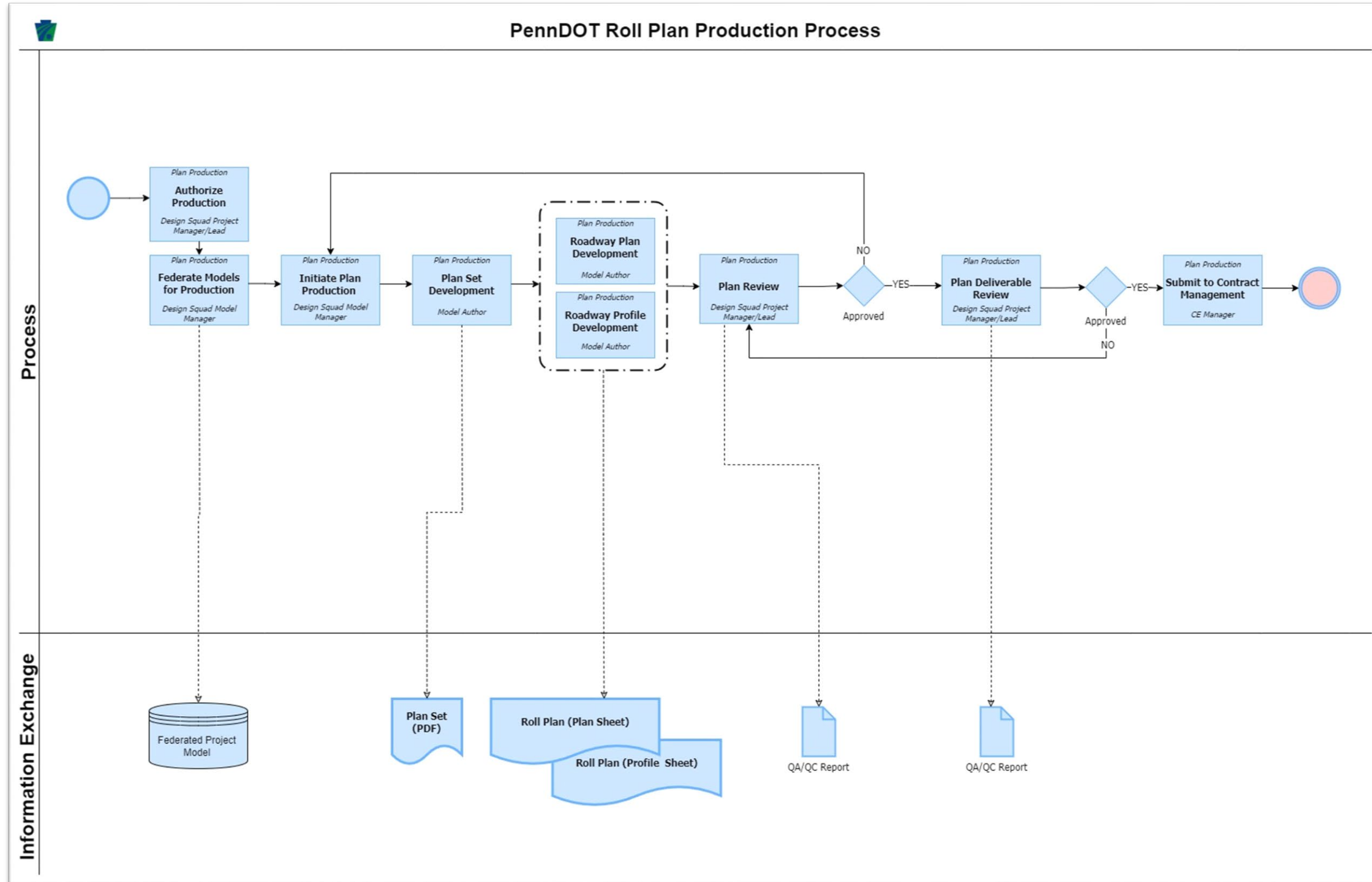


Figure 1: PennDOT Roll Plan Production Workflow

2D Project Model Content and Layout

The project design, Roll Plan will contain the data and information that has been historically presented in the Construction Plan's plan and profile views as identified in Publication 14M (DM-3) Section 2.6 (Plan Sheets and Profile Sheets).

This data covers the following disciplines:

- Roadway
- Drainage
- Signing and Striping
- Traffic
- ESPC & PCSM
- Utilities
- Landscaping

The format of Public Utility Commission (PUC) plans will be evaluated per project. The reviewing agency will need to be consulted prior to development of the plans.

The layout will consist of a minimum of two, full project length, Roll Plans for the Construction Plan's plan sheets and profile sheets. These plan sheets and profile sheets have historically been prepared as 22" x 34" sheets (ANSI D size). Preservation projects will only include a 2D full project length Roll Plan for the plan view. All project design plans, regardless of formatting, will continue to be developed in accordance with DM-3.

The smallest scale for a roll plan is 1" = 100'. A roll plan may be prepared at a larger scale (e.g. 1" = 25'), so long as the project fits within the 34" width of the roll plan sheet(s). If a project has a main geometric alignment length greater than 19,000 ft at 1" = 100' scale or, has a geometric layout that does not allow for the entire length of the project to be logically placed within the space at 1" = 100' scale, then it can be separated into multiple files. PDF's are to be developed in this manner to provide a more manageable file size for mobile application. The use of complex patterning should be minimized to assist in the rendering on mobile devices. Links, as discussed in "PDF Customizations" and shown in Figure 3, should be used to allow easy access to model locations as needed. Annotation for the Roll Plan will be developed at a scale of 1" = 100'.

For all remaining sheets in the Construction Plan that do not require a plan or profile view, they will be developed and formatted for 22" x 34" sheets (ANSI D size) in accordance with DM-3. This includes the following:

- Title Sheet (Section 2.1)
- Index Sheet (Section 2.2) – Note: If a project has only one roll plan sheet, no Index Map will be needed.
- Typical Section Sheet (Section 2.3)
- Summary of Quantities Sheet (Section 2.4)
- Tabulation of Quantities Sheets (Section 2.5)
- Right-of-Way Plans (Chapter 3)

PDF Customizations

To provide an easy to navigate environment within the Roll Plan for contractors and construction inspectors, an index of notable design features that link to locations within the PDF will be developed. The following locations are suggested as the minimum to be provided in the index:

- State Route Intersections
- Each 1000' station interval
- Major design features
- Others as determined by the Project Manager

Hyperlinks to the determined locations can either be developed within Open Roads Designer (ORD) through saved views or during post-production using either Adobe Acrobat or Bluebeam. If the post-production method is used, the links could be added to an index list located in a separate PDF document. The hyperlinks will take the user directly to the desired location in the plan or profile Roll Plan as shown in Figure 2: Hyperlink Development.

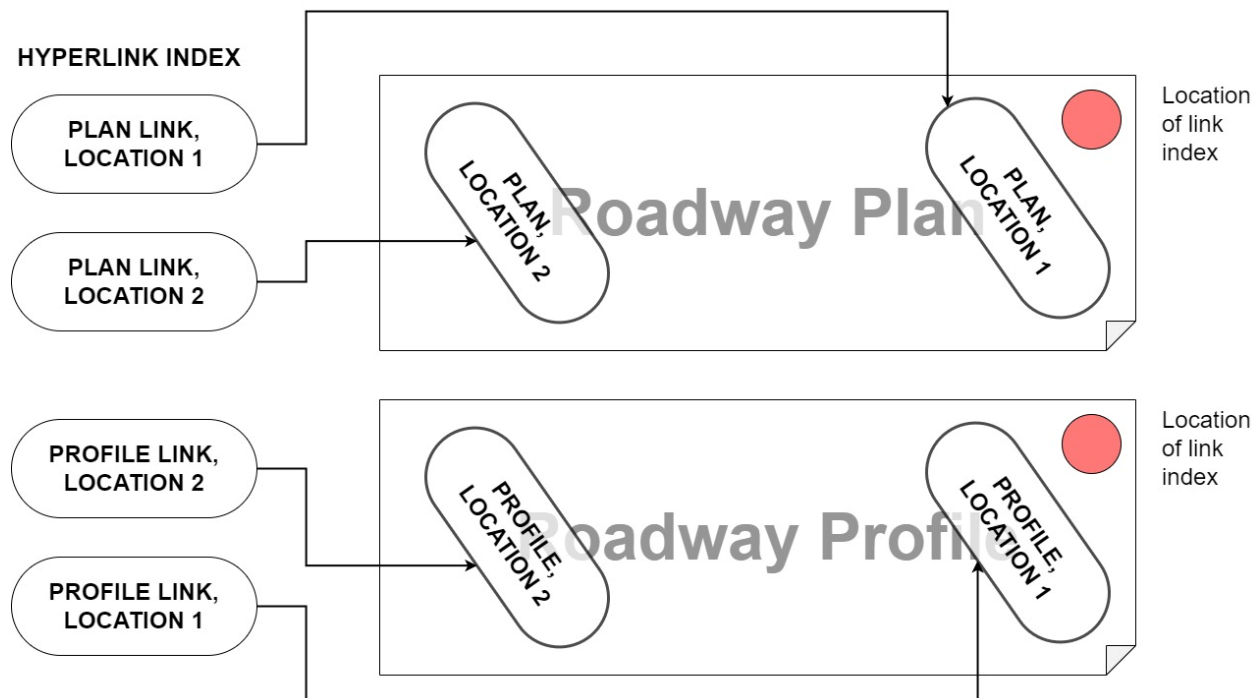


Figure 2: Hyperlink Development

The following links provide instruction for the post-production method:

[Links in Adobe Acrobat \(Requires a licensed copy of Adobe\)](#)

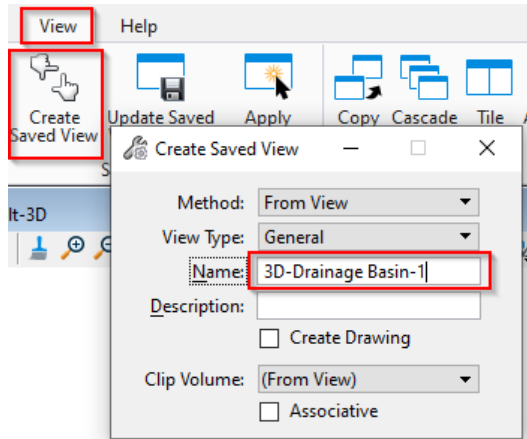
[Links in Bluebeam \(Requires a licensed copy of Bluebeam\)](#)

Links are usable in both Adobe and Bluebeam.

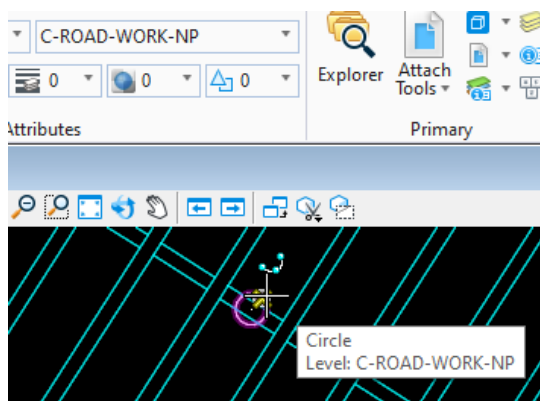
Developing Saved Views in the Design Software:

OpenRoads Designer CONNECT Version 2021 R1 or higher:

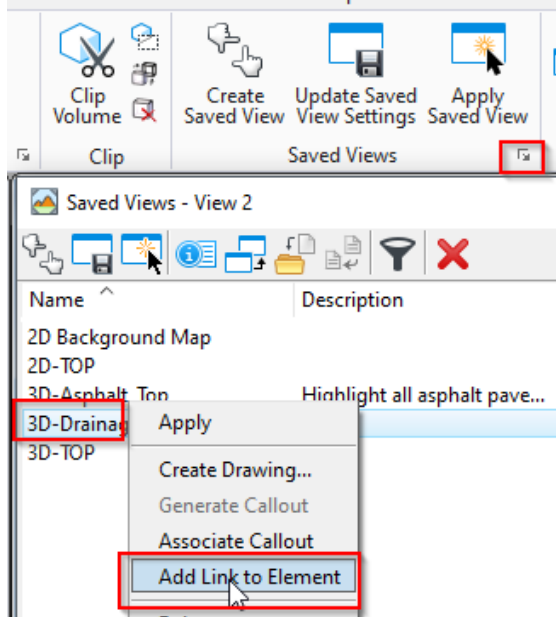
1. Saved views must be developed in the Federated (container) file in order for them to be used as links in the Adobe and Bluebeam products.
2. Adjust the program view that you want the user to zoom to.
3. Adjust layer visibility if needed.
4. Create the saved view and give it a logical name preceded with 2D- for 2D views and 3D- for 3D views.



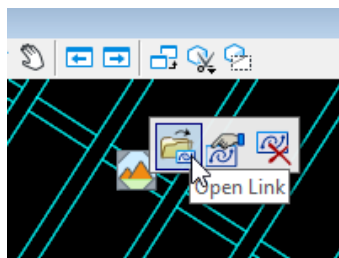
5. You are only able to add a link to a live object in the file. In order to place the link, you will need to create an object such as, a line, or circle where you want to place the link. If this is something you want to do, then select a “NP” layer such as C-ROAD-WORK-NP to place the small object on.



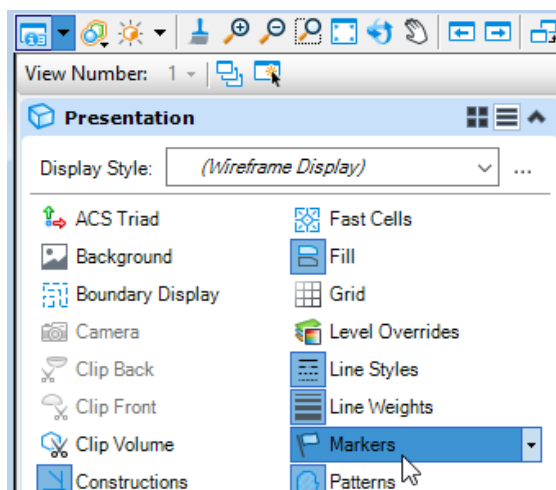
6. While still in the Federated (container) file, open the Saved Views dialog, select the view you want to get the link from, right click the view and select “Add Link to Element”. Go to the file element you want to attach the link to and select it. You will see a “link” marker at the location you selected.



7. Test the link by hovering over the link icon and selecting the “Open Link” option. This should take you to you desired location.



8. Link markers can be toggled off by selecting “Markers” in View Attributes



Plan and Profile Production Workflow:

The Roll Plan production workflow, shown in Figure 3: Roll Plan Production Workflow, proceeds as follows:

- 2D model, developed per the current DM-3 and formatted as stated in this document.
- Annotations will be prepared in the Drawing Model that will be referenced, along with the Default Model to the Sheet Model (2D Project Model).
- The Sheet Model (will be printed to a PDF file using the custom printing routine, RollPlan_PDF, developed by PennDOT).
- A list of selected stations, major design features, intersecting roadways, and other design features will be prepared and used to create hyperlinks to saved views in the 2D Project Model.
- The 2D Project Model PDF will be checked prior to its delivery for bidding.

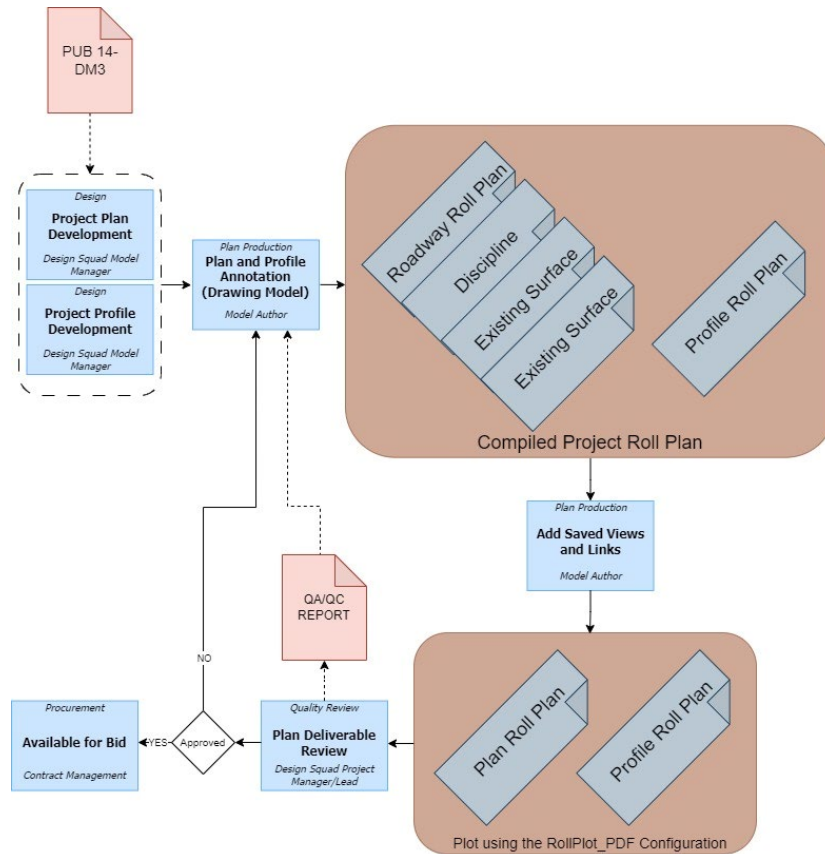


Figure 3: Roll Plan Attribution Workflow

Creating and Printing the Roll Plan

The PennDOT ORD workspace has been configured to produce and print the Roll Plan. The following outline provides a step-by-step process.

Step 1: Place Named Boundary

Begin in the 2D plan (Default Model). Select the Drawing Production Workflow and then select “Place Named Boundary” from the “Drawing Production” ribbon.

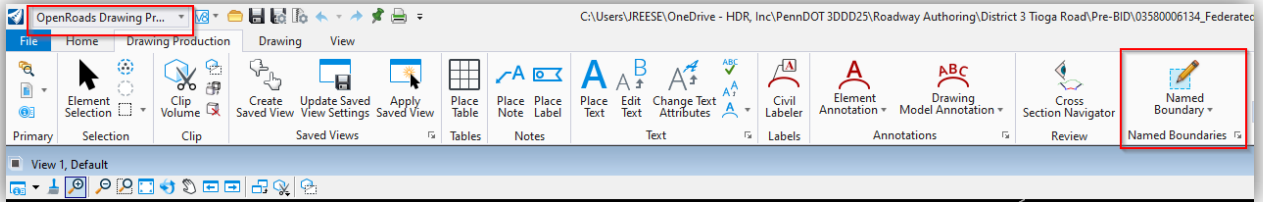


Figure 4: Place Named Boundary

Click on the “Drawing Seed” drop-down list and select “Rolled Plan”. Contact the ORD Workspace administrator if the “Rolled Plan” is not seen in the drop down.

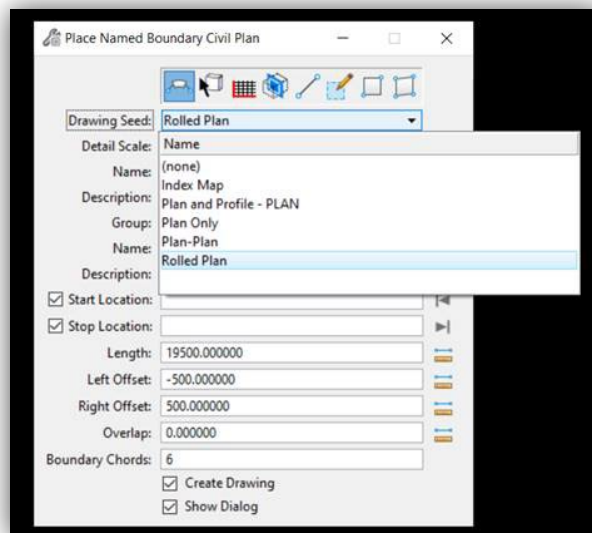


Figure 5: Select Drawing Seed

Selecting the Rolled Plan Drawing Seed sets the detail scale to 1”bot=100’ and prompts the user to identify the path element, which is the controlling alignment. (see left bottom corner of ORD window for command prompts).

After identifying the alignment, set the location by either clicking the back or forward arrows to lock the start or stop location to the begin or end of the path or enter the begin and end stations. The Create Drawing box should be toggled on.

Left clicking twice places the Named Boundary in the view, and a third left click opens the Create Drawing Dialog box.



Figure 6: Drawing Box

Step 2: Create Drawing

The Create Drawing dialog box is based on the Rolled Plan Drawing Seed and should only require clicking OK to create this sheet. However, if it is desired to place the drawing models or sheet models in different DGNs, the boxes must be toggled next to Filename in the Drawing Model and Sheet Model sections to create or select desired files.

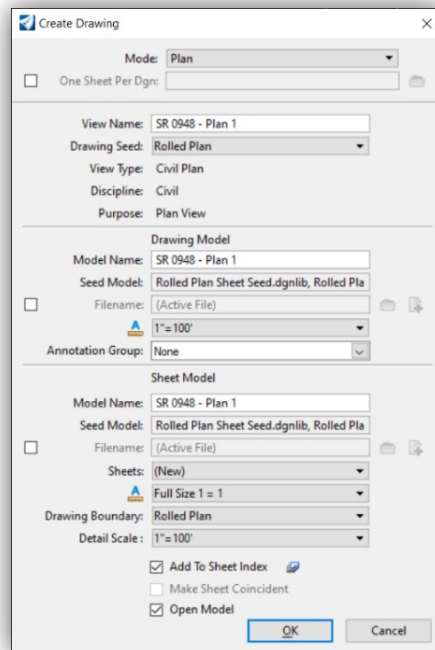


Figure 7: Create Drawing Dialog

Clicking OK will produce the 34" x 200" sheet model. If the topography is not centered or requires adjustments, use the reference dialog box to move or adjust.

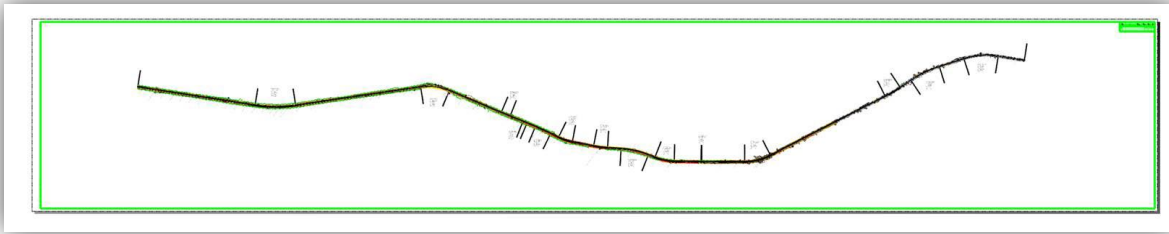


Figure 8: PDF Sheet

Step 3: Printing

Make sure all desired levels to be present in the Roll Plan are turned on in the Sheet Model before clicking Print. Only levels visible at the time of printing will appear in the Roll Plan. Select Print and the dialog box opens. Select the RollPlan_PDF print driver and click Print to File. The RollPlan_PDF driver, located in the PennDOT workspace, is configured to give the view access to turning levels on and off in both Adobe and Bluebeam.

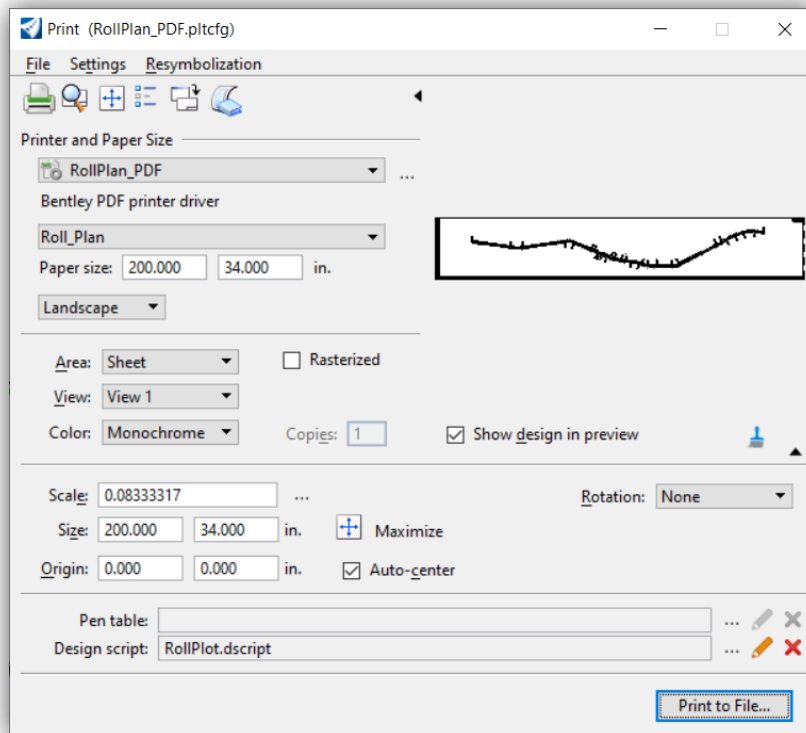


Figure 9: Printing

Next use the No Wizard selection to create PDF in ProjectWise.



Figure 10: Select Wizard

Select the desired folder location in ProjectWise, and assign a file name for the PDF document per standard plan sheet naming.

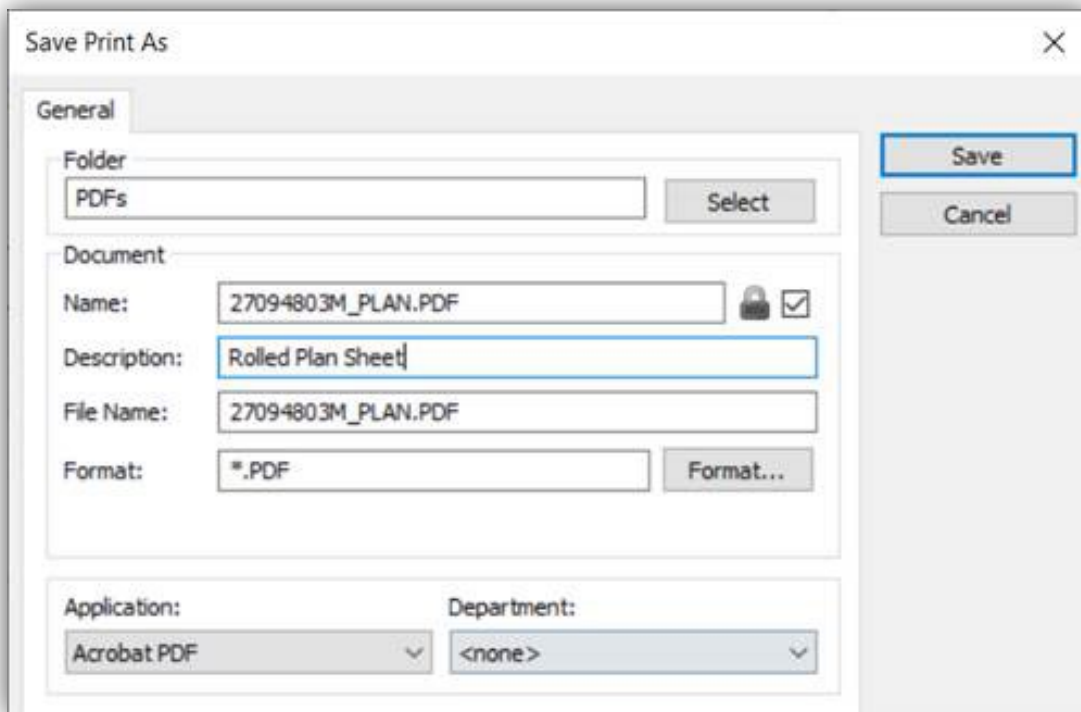


Figure 11: Save PDF

The PDF has now been created, and levels will appear and can be turned on or off in Bluebeam REVU or Adobe PDF Reader.

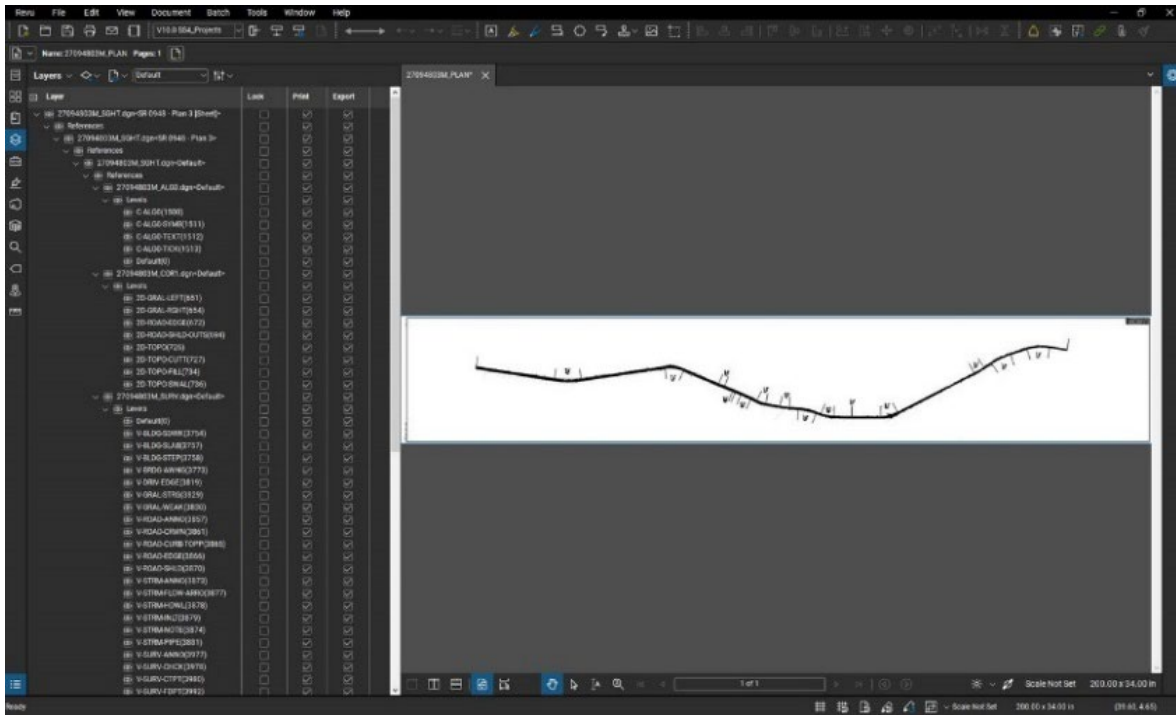


Figure 12: PDF in Bluebeam Revu

PennDOT's Construction Application

Construction teams will be using the Roll Plans (plan sheet and profile sheet) to locate, measure and comment on constructed elements. Cross sections of the roadway will be available in the 22" x 34" format (ANSI D size).

Bidding

A pre-bid meeting may be held to notify potential bidders and answer questions about the use of the Roll Plan. Additional questions can be submitted through ECMS during the advertisement period.

Internal or Semi-Formal Facilitation Construction Partnering (Pay Items 0690-0001 or 0690-0002) should be added to the contracts for these pilot projects to facilitate collaboration and optimize successful outcomes.

Inspections

Construction staff will be able to access the Roll Plans via the Mobile Construction Documents (MCDocs) application. Staff will continue to be able to use the MCDocs key features using iPads in the field. As the use of this plan format progresses, it will be important to document any challenges and lessons learned to improve future project user experience. Please access the Roll Plan Workflow Guidelines Comments survey located in the Feedback section of this document.

Third Parties

Right-of-Way plans will be formatted in the 22" x 34" format (ANSI D size) due to the requirements of the local agencies. External parties such as PUC (railroad authorities), utility companies, FHWA PA Division Office, and any other regulatory sister agencies (e.g. DEP, Country Conservation Districts, etc.) should be consulted prior to preparing the review submittal. The design team is encouraged to reach out to external parties in advance of submissions to confirm Roll Plans will be acceptable.

Contractor's Participation

The Roll Plan product will be issued in lieu of plan sheets and profile sheets in the 22" x 34" format (ANSI D size) as part of the Contract Drawings, as specified in Publication 408, Section 105.02(a).

During the Pre-Construction Meeting, the Department will provide a short demonstration on accessing and using the Roll Plan product. Subsequent meetings will be scheduled as part of the Construction Partnering requirements of the contract to request feedback on the user experience and effectiveness of the Roll Plan product. A minimum of two partnering meetings will be required, including the initial kickoff to answer any questions, and a closeout meeting to collect final feedback from the project team on this pilot project.

Roll Plan As-Built Plans

"As-Built" drawings shall be prepared according to Publication 10, Design Manual Part 1 (DM-1) and Publication 10C, Design Manual Part 1C (DM-1C) with the following exceptions:

1. Instead of a full-size set of Construction Plans, the contractor shall use the Roll Plan products (plan and/or profile as applicable) as the basis for the edits.
2. Final "As-Built" drawings shall be completed electronically using a PDF editing software to note the changes on the original Roll Plan product and other PDF sheets, such as the Title Sheet.