

PENNSYLVANIA ASPHALT PAVEMENT ASSOCIATION

PennDOT Digital Delivery Program

JANUARY 21, 2026



**Pennsylvania
Department of Transportation**

AGENDA

Introduction to Digital Delivery

Digital Delivery Projects

Impacts to PAPA

Engagement

Summary



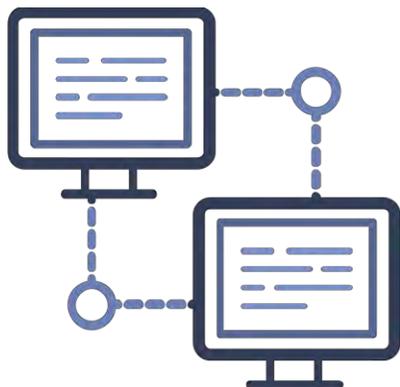
INTRODUCTION TO DIGITAL DELIVERY



Pennsylvania
Department of Transportation

WHAT IS DIGITAL DELIVERY

A modernized approach to project delivery processes and contract media that incorporates digital data.



DIGITAL WORKFLOWS are data-based exchanges, in which information can be easily transferred to a computer system with little to no manual entry.



DIGITAL DELIVERY of project data in which 3D models and other files are created and delivered to enhance design, facilitate construction and incorporate digital information to support the asset management lifecycle

WHAT DOES DIGITAL DELIVERY MEAN TO PENNDOT



Collaboration
through data driven
workflows



Connecting data
rather than
recreating or
manually entry



Providing model
deliverables that
retain a source of
truth with changes

Vision Statement:

By 2025, construction projects will have the ability to be bid using 3D technology and will no longer be in a traditional construction plan format.

2020-2024

Initial Pilots

- Existing Ground Confidence Level (EGCL)
- Bridge
- Drainage and Utilities



2025-2027

Advanced Pilots

- Model as the Legal Deliverable (MALD)
- Advanced Digital Construction Management System (ADCMS) IFC Bridges



2027-2030

Digital Delivery Projects Advertised

- In 2027 – 2 projects per District
- In 2028 – 3 projects per District
- In 2029 – 4 projects per District
- In 2030 – 5 projects per District



2029-2030

Projects Starting Preliminary Design (MALD)

- In 2029, all integral abutment bridges < 90' in length
- In 2030, all new construction or reconstruction



PILOT PROJECTS

Purpose of pilot project program:

- Develop and test design modeling workflows to produce models for construction

New deliverables include:

- 3D model of the project design
- 2D details and exports for surfaces and alignments (.xml files)
- Use of a cloud-based model viewer for non-CADD users which includes data visualization and different views for



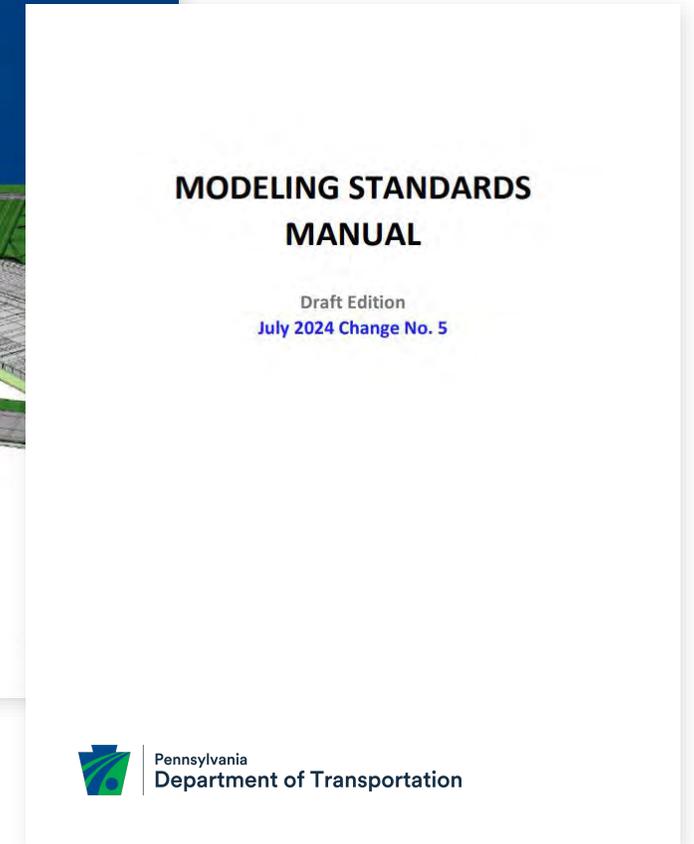
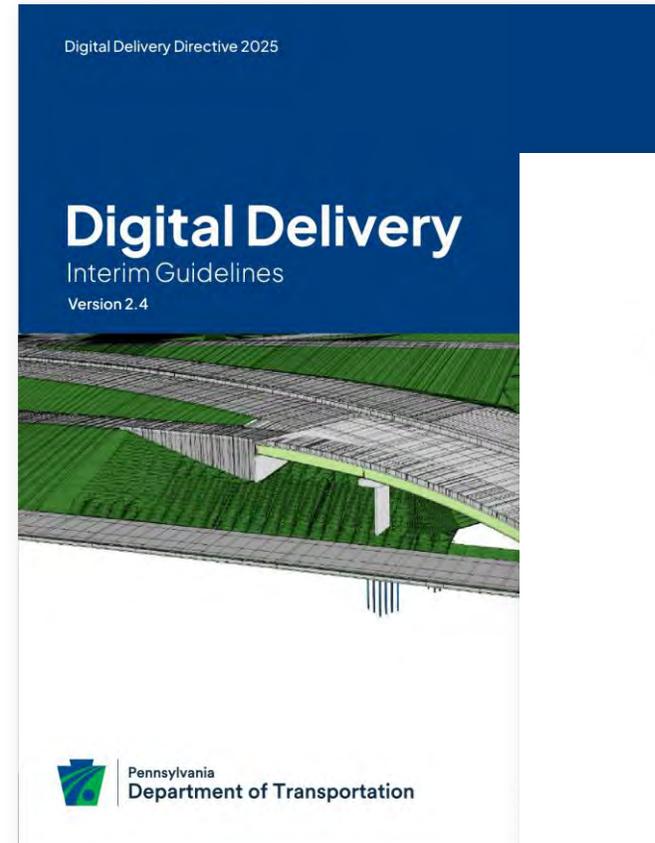
Excavation for new intersection to meet
SR 6 in Tioga County

CREATING DIGITAL DELIVERY GUIDANCE

The guidance documents provide standardized processes for stakeholders to use to produce consistent deliverables.

Digital Delivery documents:

- Digital Delivery Interim Guidelines
- Modeling Standards Manual
- Model Element Breakdown Structure



QUALITY MANAGEMENT

Quality Management processes to review 3D models & types of model-based reviews:



Model Integrity Review



Modeling Standards Review



Survey Review



Design Compliance / Discipline

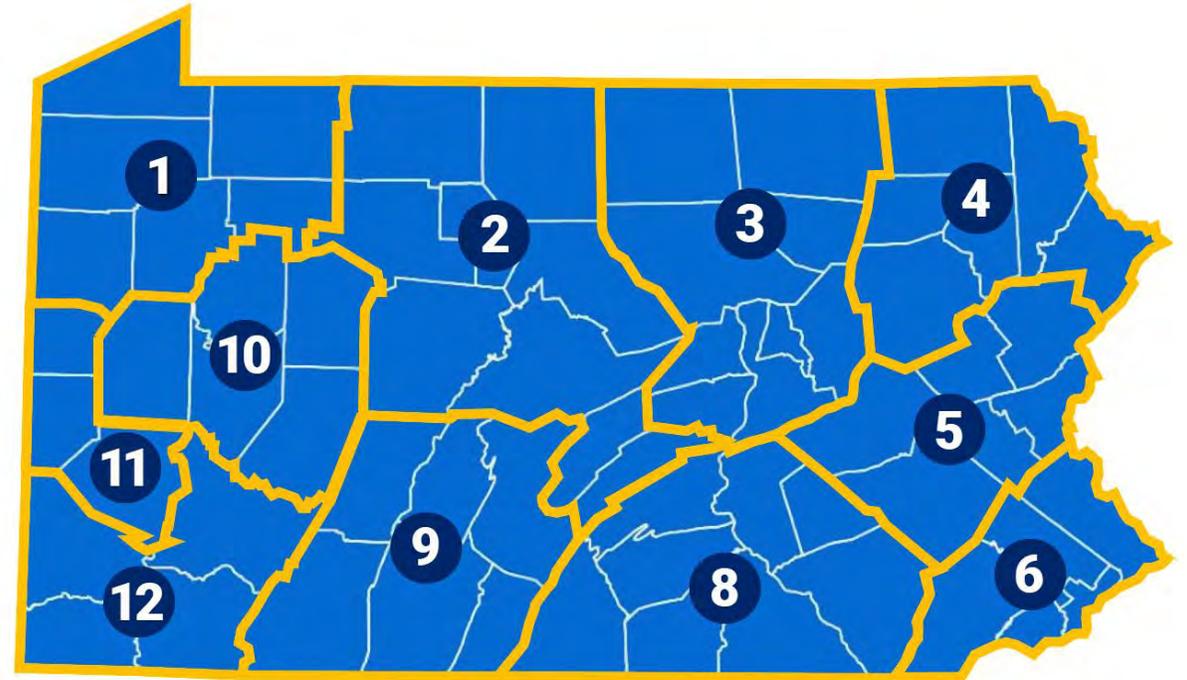


Spatial Coordination



PILOT PROJECT PROGRESS

- 6 projects constructed using digital deliverables
- 5 projects in construction
- Over 40 projects current in design or advertised
- Developed workflows to add pay items to each model element to run quantity and location reports



The pilot project program provided the opportunity to manage the pace of change, making stakeholders feel empowered, which has led to the institutionalization of digital delivery throughout PennDOT

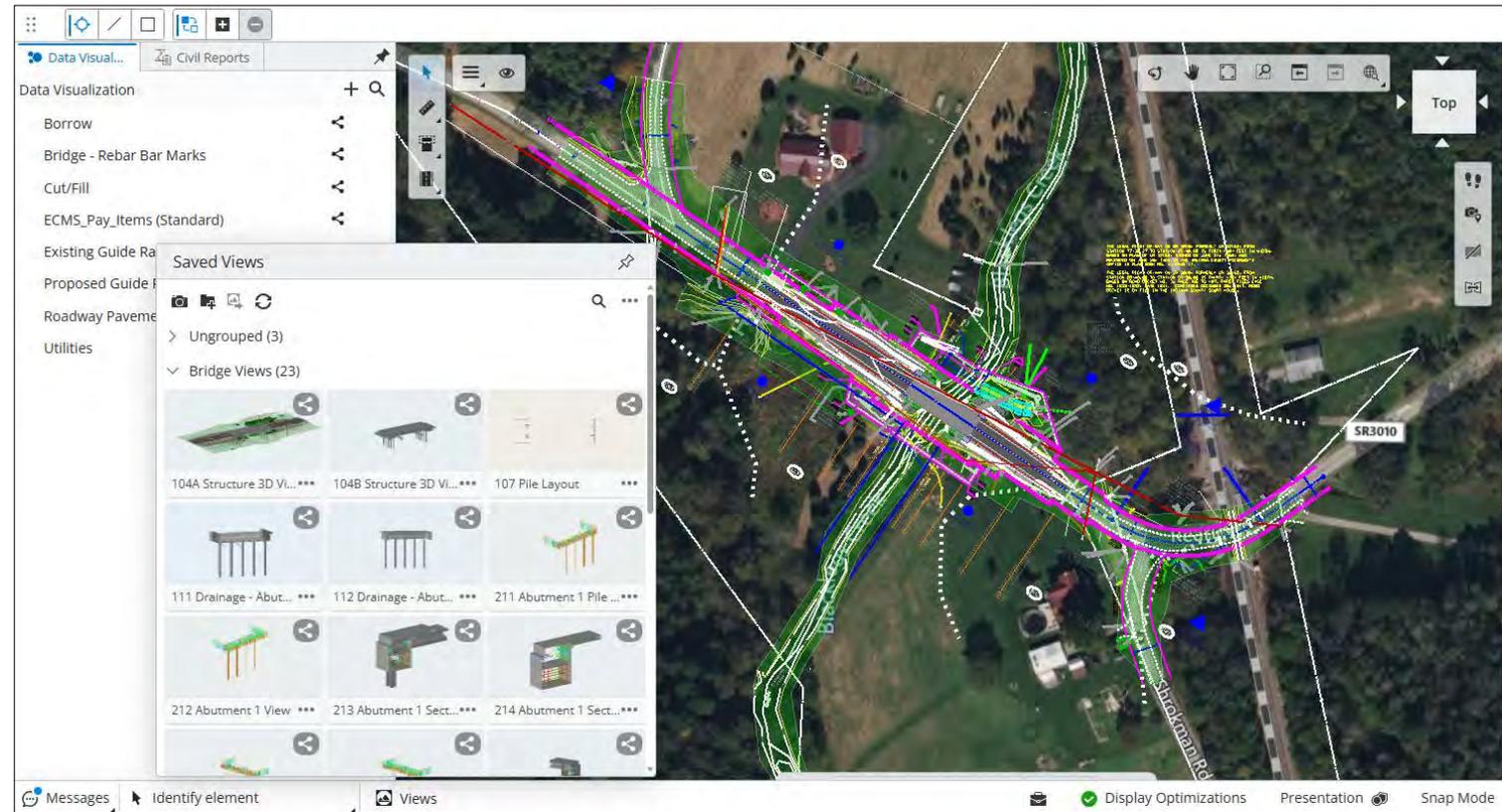
ADCMS BRIDGE PILOTS

Advanced Digital Construction Management Systems Grant

Two Bridge projects using IFC

Deliverables

- IFC Bridge files signed and sealed
- Certification Memo
- Model Element Breakdown Structure
- Digital File Index
- Model Download instructions
- Data visualizations

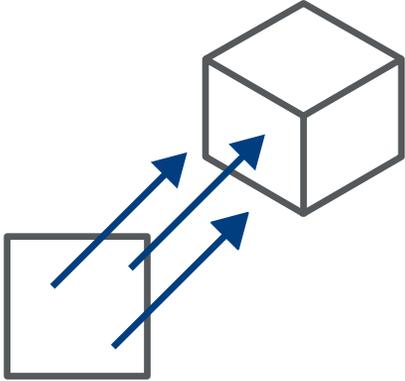


D1 – Crawford County – Steel Bridge
D10 – Indiana County – Integral Abutment

National Impacts

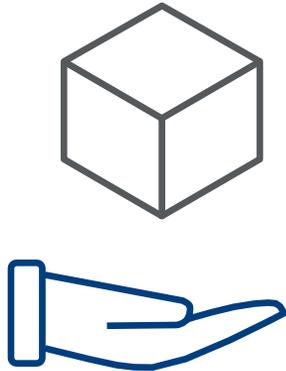
Model-Based Deliverable Maturity Framework

AASHTO JTCEES – August 2022



LEVEL 1

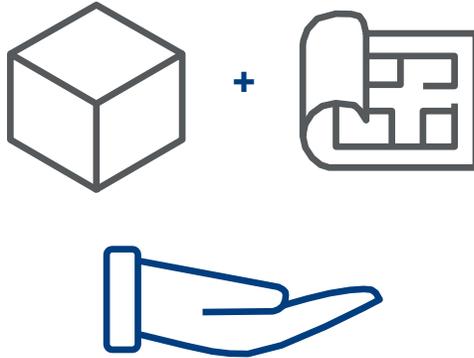
Transition from 2D to 3D for plan production



For Information Only

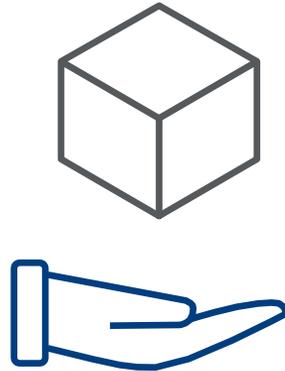
LEVEL 2

Deliver 3D model for information only



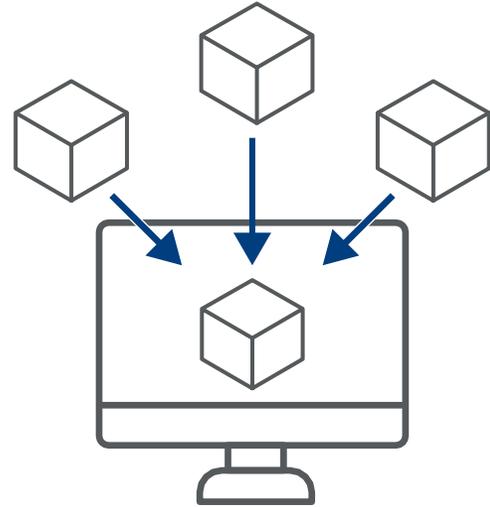
LEVEL 3

Deliver 3D model contractually with conventional plans



LEVEL 4

Deliver 3D model contractually without plans

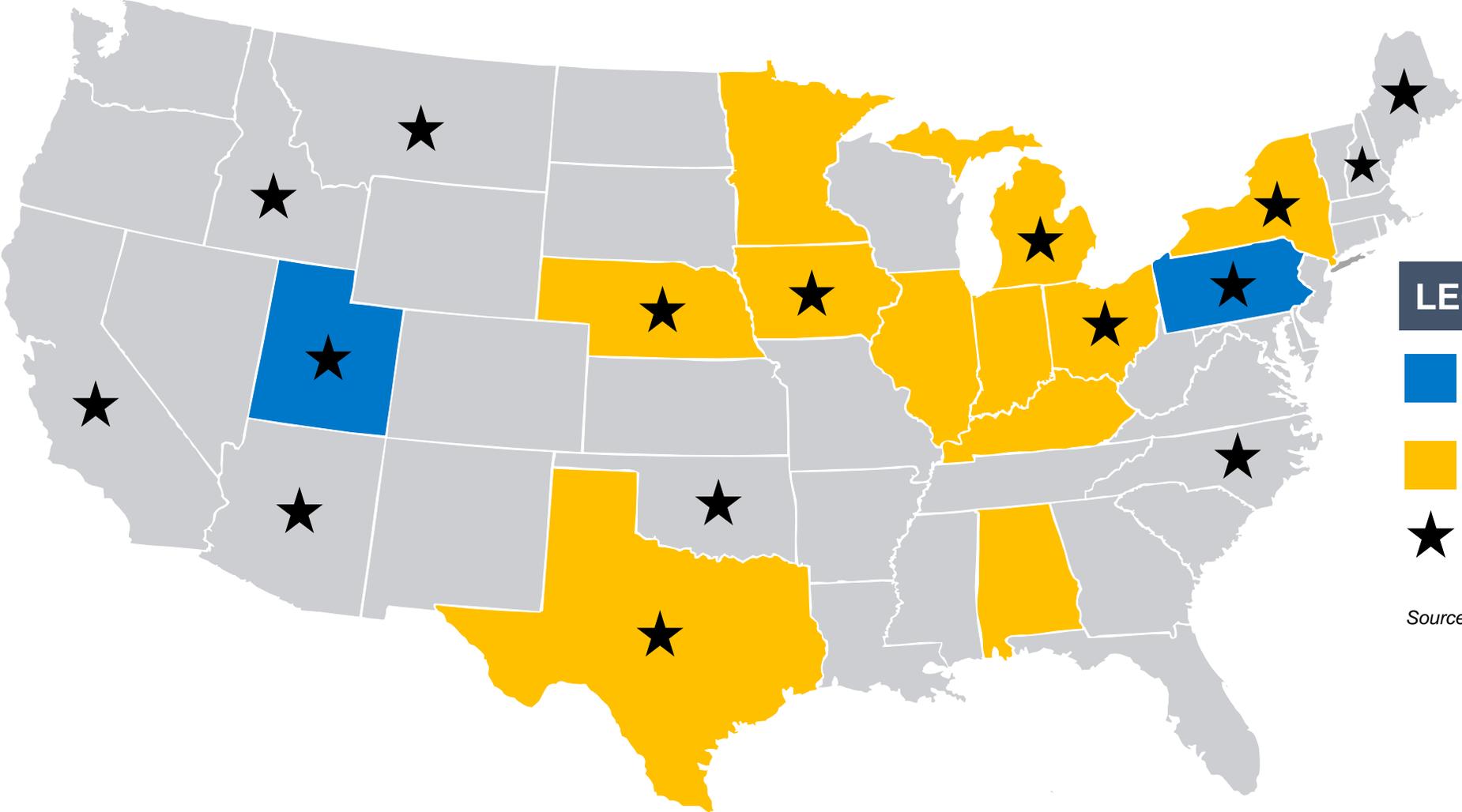


Digital As-Built using the 3D model

LEVEL 5

Collect digital as-builts

National Impacts



LEGEND

- Level 4 – Contractual Model Deliverables
- Level 3 – Contractual Models and Plans
- ★ Strategically Planning for Digital Delivery

Source : HDR – December 2025

DIGITAL DELIVERY PROJECT IN DEPTH



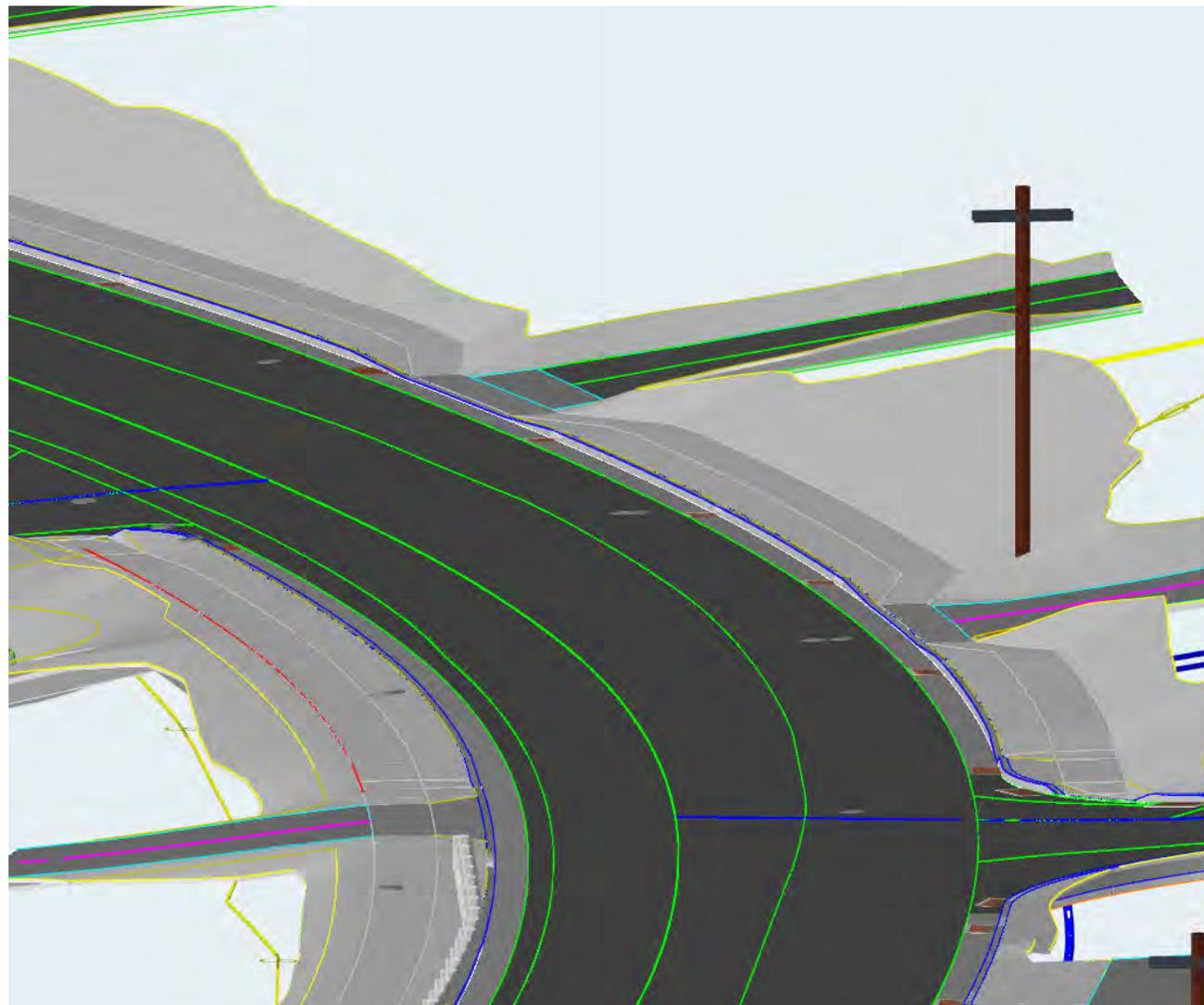
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DIGITAL MODELS

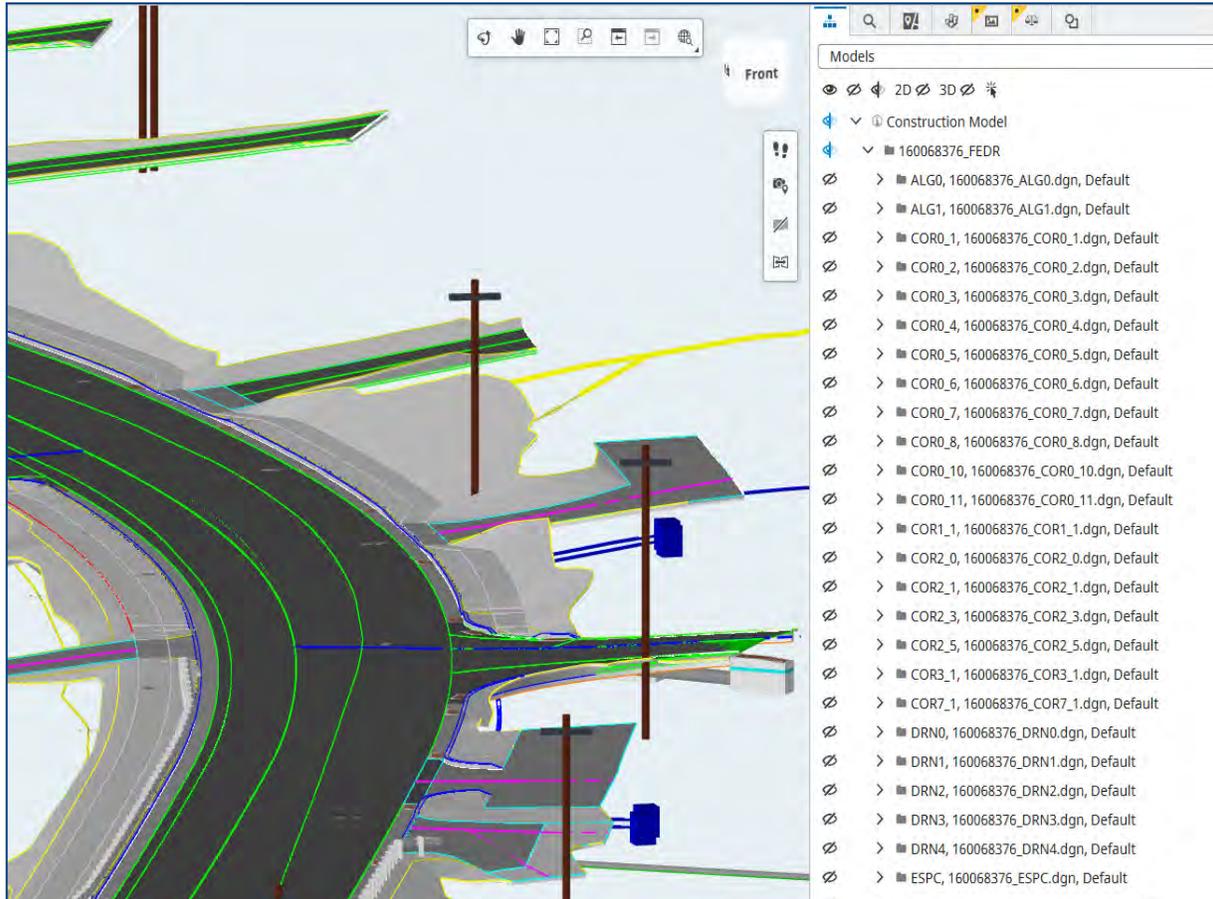
Digital Model is a structured representation of an infrastructure asset or system that integrates geometric, spatial, and attribute data.

Benefits for users:

- Simulate real world conditions
- Enables analysis and visualization
- Promotes earlier collaboration and decision making

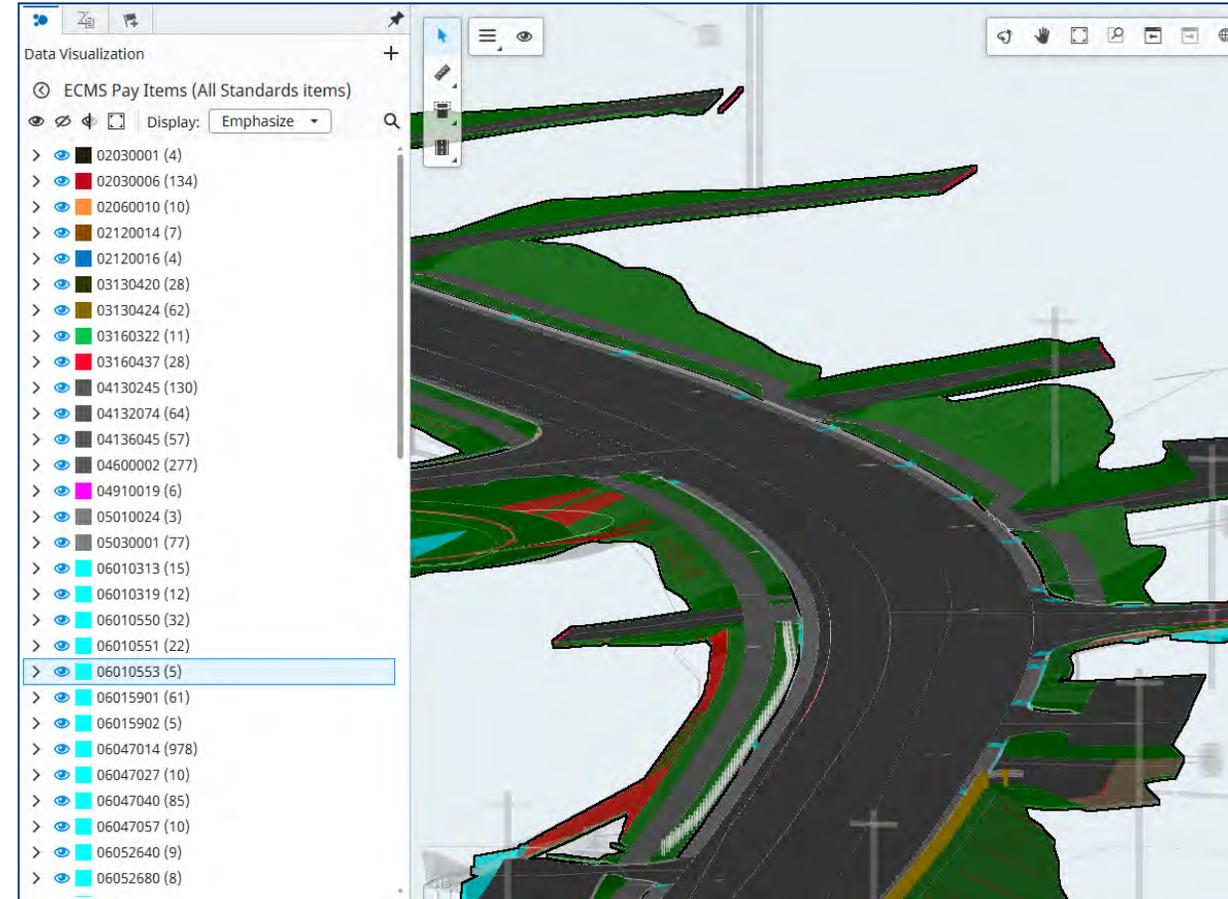


DIGITAL MODELS



Federated Model

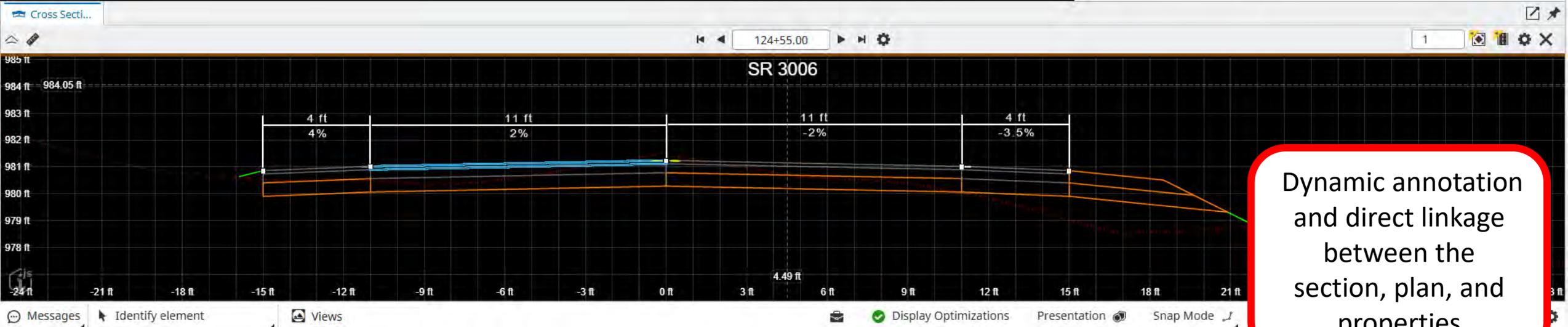
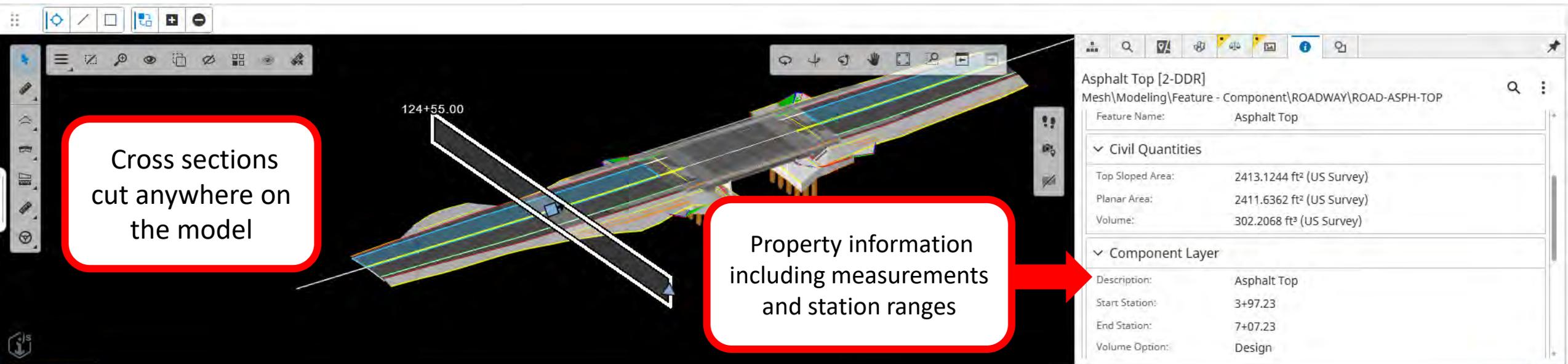
Aggregated from multiple design files



Pay Items Association

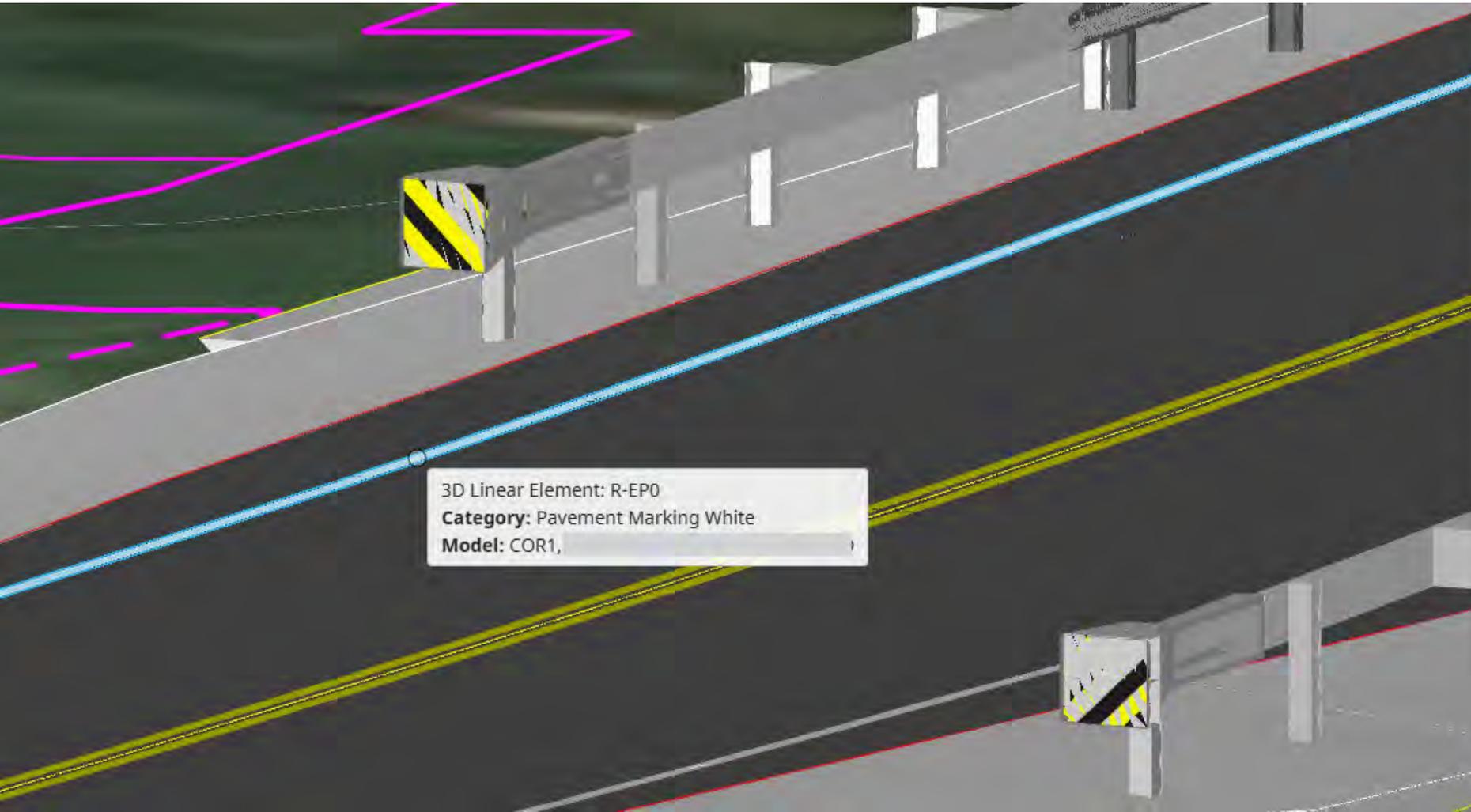
Assigned through item types

MODEL INFORMATION



STRIPING AND DIGITAL DELIVERY

Traffic striping elements can be added to design models as 3D linear elements or 3D cells. 2D details can be created for signal designs that are associated to 3D objects for connection to the models. Phasing can be modeled for complex projects



3D Linear Element: R-EP0
Category: Pavement Marking White
Model: COR1,

3D Linear Element: R-EP0 [3-EC9]
Linear\Pavement Marking\Single Solid\Pavt Marking ...

Selected Item(s)

Category: Pavement Marking White
Model: COR1,
User Label: 3D Linear Element: R-EP0

Geometry

Start Point: X: 1526323.1821 ft (US S...
End Point: X: 1526683.0227 ft (US S...
Length: 344.0033 ft (US Survey)

Feature

Feature Definiti... Linear\Pavement Marki...
Feature Name: R-EP0

> Corridor

> Source Information

PAVEMENT INFORMATION

The screenshot displays the Bentley Infrastructure Cloud interface. At the top, the browser address bar shows the URL: `infrastructurecloud.bentley.com/b7d3f796-72bb-4ee1-838f-84e569506c17/home`. The page header includes the Bentley logo, the text "Infrastructure Cloud", and project identifiers: "20 0006 B12 (57945) Const" and "D01 20 0006 B12 (57945) Const". A search bar is located on the right side of the header.

The main content area is divided into several sections:

- Home:** A sidebar on the left contains navigation icons for Home, Work, Documents, Map, iModels, Contracts, Dashboard, and Carbon Analysis.
- Map:** A small map view shows the project location with a red line indicating a road or path.
- Weather:** A weather widget displays "Sunday Jan 11" with a temperature of "26°F" (40° 25°). It also shows "Cloudy" conditions, "Wind: 10 mph, W", and "Humidity: 78%". A weekly forecast is provided for Monday (33° 26°), Tuesday (44° 38°), Wednesday (41° 16°), and Thursday (19° 13°).
- My recent activity:** A section titled "My recent activity" with a clock icon and the text "There are no recent items".
- My work:** A section titled "My work" with filter buttons for "My work", "My role", "Shared", and "All". It contains a message "There is no work assigned to you" and a "View all" link.
- Create:** A vertical list of actions: "Bidder Access", "Daily Log", "Issue", "Observation", and "RFI".
- iModels:** A section titled "iModels" with a small map thumbnail.
- Summary:** A section titled "Summary" with two columns: "My work" and "All work". Each column contains five metrics, all showing "0":
 - My work: 0 All open items, 0 Open Daily Log, 0 Open Issue
 - All work: 0 Open Observation, 0 Open RFI

The bottom of the screen shows a Windows taskbar with a search bar and the system clock displaying "8:16 PM 1/11/2026".

TYPICAL SECTIONS

The screenshot displays the Bentley Infrastructure Cloud user interface. At the top, the browser address bar shows the URL `infrastructurecloud.bentley.com/b7d3f796-72bb-4ee1-838f-84e569506c17/home`. The page header includes the Bentley logo, the text "Infrastructure Cloud", and project details: "20 0006 B12 (57945) Const" and "D01 20 0006 B12 (57945) Const". A search bar is located on the right side of the header.

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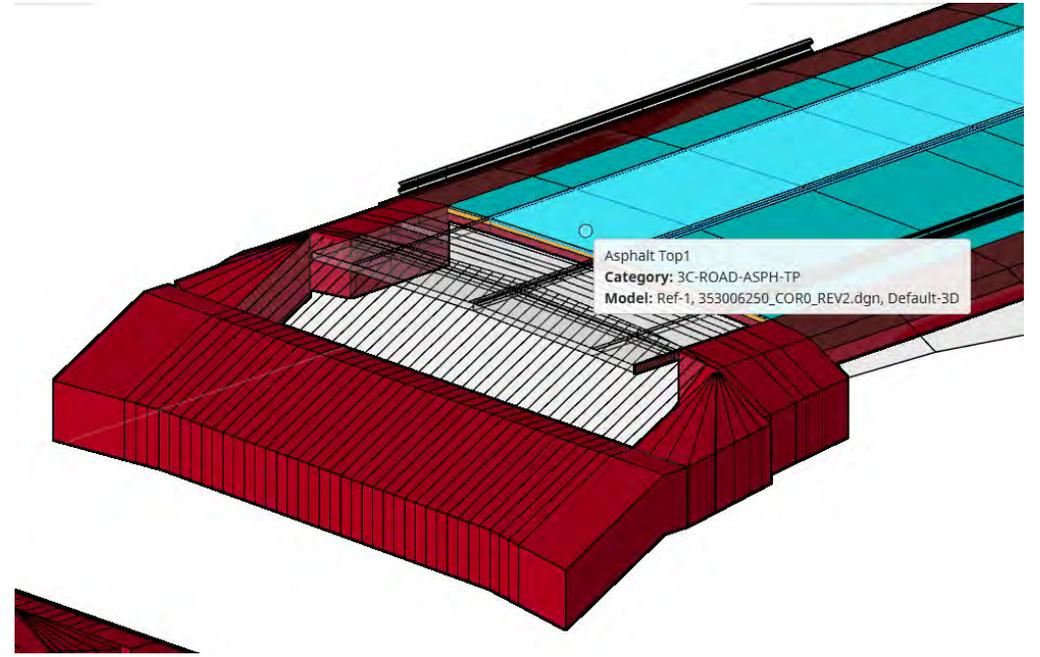
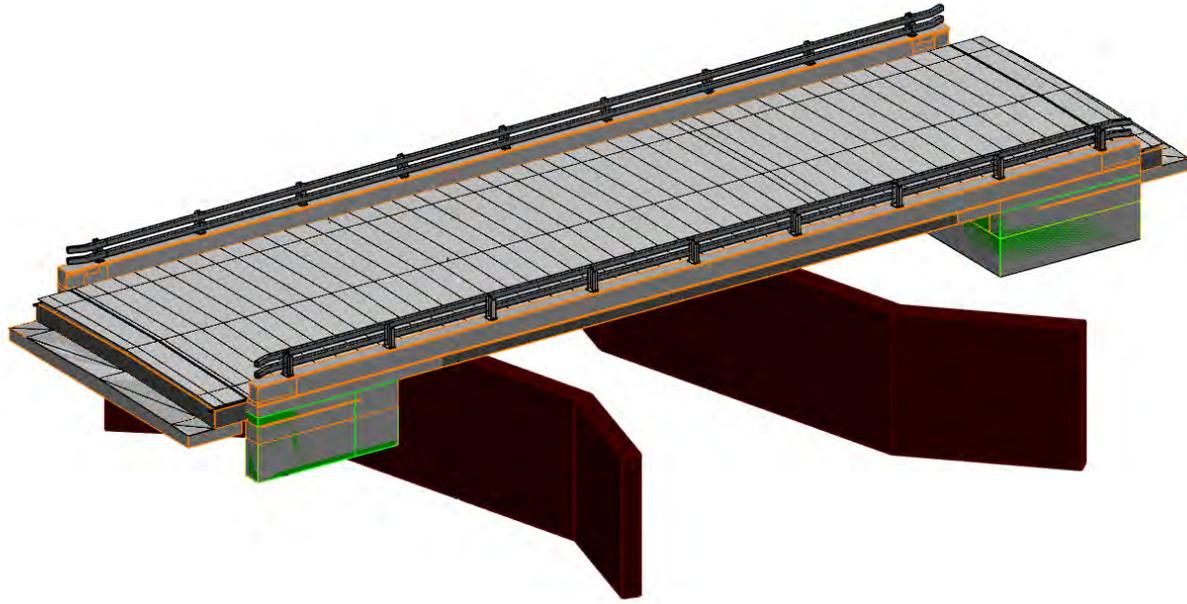
- Home:** A navigation menu on the left side with icons for Home, Work, Documents, Map, iModels, Contracts, Dashboard, and Carbon Analysis.
- Weather:** A weather widget in the top right corner showing "Sunday Jan 11", "28°F", "Cloudy", "Wind: 12 mph, W", "Humidity: 86%", and a 4-day forecast for Monday through Thursday.
- My recent activity:** A section with a clock icon and the text "There are no recent items."
- My work:** A section with filter buttons for "My work", "My role", "Shared", and "All". It contains a mail icon and the text "There is no work assigned to you". A "View all" link is at the bottom.
- Create:** A vertical list of action items: "Bidder Access", "Daily Log", "Issue", "Observation", and "RFI".
- iModels:** A section with an "i" icon and a notification badge.
- Summary:** A section with two tabs: "My work" and "All work". Below the tabs are five metrics, each with a large "0" and a label: "All open items", "Open Daily Log", "Open Issue", "Open Observation", and "Open RFI".

The bottom of the screen shows the Windows taskbar with the search bar and the system tray displaying the time "9:25 AM" and date "1/11/2026".

PAVEMENT SECTIONS

The screenshot displays the Infrastructure Cloud software interface. At the top left, the logo 'B Infrastructure Cloud' is visible, followed by project information: '20 0006 B12 (57945) Const' and 'D01 20 0006 B12 (57945) Const'. A 'BUILD' status indicator and a star icon are also present. A search bar on the top right contains the text 'Search any datatype in this project or asset'. Below the search bar, the current model is identified as 'Construction Model Addendum 1'. The main workspace shows a 3D aerial view of a road construction site. A bridge structure is highlighted in white, with red lines indicating the pavement sections. Labels for 'Black Rd', 'Brake Shoe Rd', 'Morris Rd', and 'French Creek' are visible on the map. A toolbar on the left side of the map includes various navigation and visualization tools. On the far left, a 'Data Visualization' panel lists several categories with expandable arrows: Bridge - Rebar Bar Marks, Cut/Fill, ECMS Pay Items (Bridge and Causeway Exc...), ECMS Pay Items (Bridge), ECMS Pay Items (Structure Foundation Dra...), ECMS_Pay_Items (Drainage), ECMS_Pay_Items (Excavation/Borrow), ECMS_Pay_Items (Pavement), ECMS_Pay_Items (Standard & 4000s), Existing Utilities, Guide Rail, IFC (Bridge), Proposed Utilities, and Drainage. The 'Existing Utilities' category is currently selected. On the right side, an 'Index Map' panel shows a hierarchical tree structure: Index of Sheets (30), ROADWAY (7), BRIDGE (18), TRAFFIC SIGNALS, TRAFFIC CONTROL (5), TRAFFIC, CROSS SECTIONS, E AND S, and MISC. At the bottom of the interface, a status bar includes 'Messages', 'Identify element', 'Views', 'Display Optimizations', 'Presentation', 'Snap Mode', 'Scope: Element', and 'Settings'.

CONSTRUCTION



IMPACTS TO PAPA



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WORKING ON A DIGITAL DELIVERY PROJECT

- During Construction
 - Technology ingesting model information
 - Paving information, striping
 - Pavement ticketing - finding ways to connect data rather than manual entry
- How are you viewing and what additional info can you get to make your job easier.
- Post construction – feed digital data back into the ecosystem for asset mgmt.

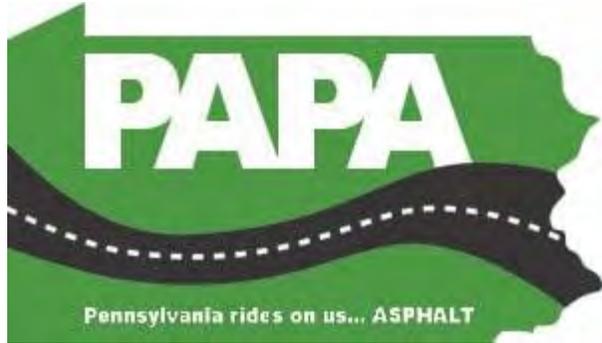


ENGAGEMENT



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ENGAGING WITH PENNDOT AND THE INDUSTRY



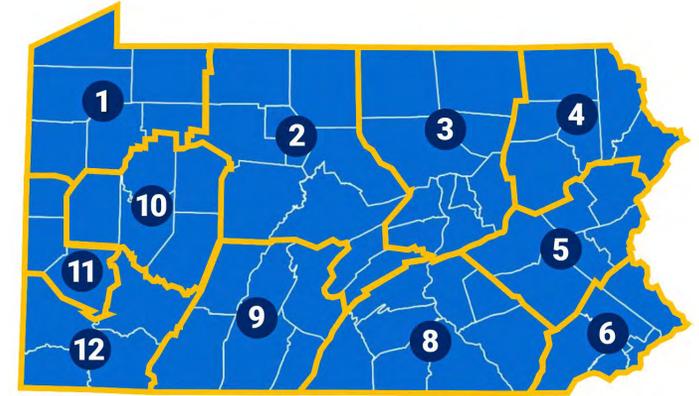
INTERACTION WITH PAPA

The Central Office DD team can provide presentations and demonstrations at upcoming meetings



INTERACTION WITH ASPHALT INDUSTRY

Provide updates on pilot projects and advancements with model-based deliverables in terms of paving and striping



PILOT PROJECT OPPORTUNITIES

Opportunity to test out digital workflows on upcoming pilot projects for striping and pavement

CONTRACTOR SUMMITS

Summits provided education and training to industry partners regarding the Digital Delivery Directive

- Provided understanding of terminology
- Hands on training with Synchro Control
- Information about pilot project workflows



Locations

- January 21, 2025 – Pittsburgh
- January 22, 2025 – Clearfield
- January 23, 2025 – Harrisburg
- January 24, 2025 – King of Prussia



CONTINUAL OUTREACH

Quarterly Session Demonstrations & Updates

Informational Videos

Infrastructure Cloud and Synchro

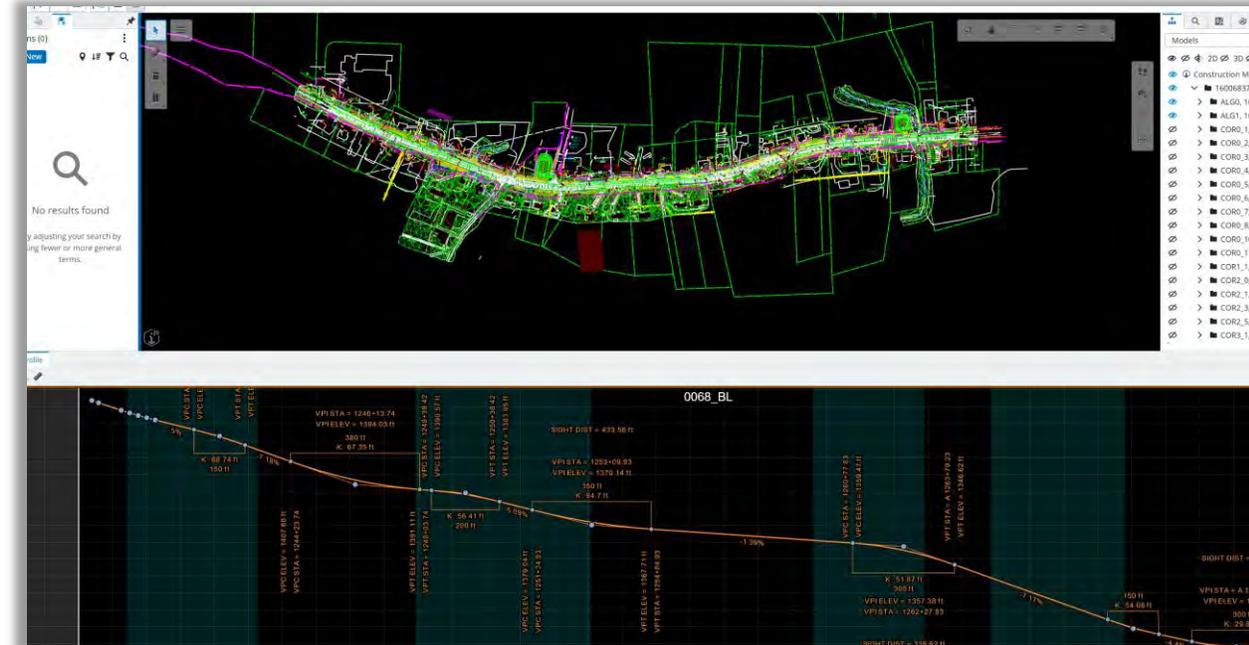
Infrastructure Cloud Review Manual

→ Synchro User Guide

Infrastructure Cloud Sandbox – Anyone can be invited into the sandbox environment to test out how the model viewing tools and construction information can be utilized by different stakeholders.



Click the playlist icon in the upper right corner of the video to view the playlist.



HIGHER EDUCATION INITIATIVE

Vision – Digital 3-D workflows are promoted in curriculum development across the Commonwealth.

Mission – Our mission is to provide a platform for educators to advance digital delivery with students and industry professionals through educational and professional development activities.

- 1. Curriculum Development Support** – Develop the process and information for the Digital Delivery Directive that supports educators in curriculum development.
- 2. Project Database** – Consolidate a database of example projects to be used in student projects and professional development.
- 3. Professional Development** – Develop, organize, and promote lunch-and-learn activities, webinars, and guest lectures.



SUMMARY



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SUMMARY

PennDOT is advancing digital delivery through pilot projects

3D models includes 2D details and 2D information

Working with industry partners

Working to plan opportunities for 2026/2027

QUESTIONS



Digital Delivery

PennDOT Digital
Delivery Website



Digital Delivery Email:
RA-PDDigitalDelivery@pa.gov

Allen Melley, P.E.
Chief of Digital Delivery