2025 STATE TRANSPORTATION COMMISSION MEETING

PENNDOT LOCAL BRIDGE INSPECTION & SNBI

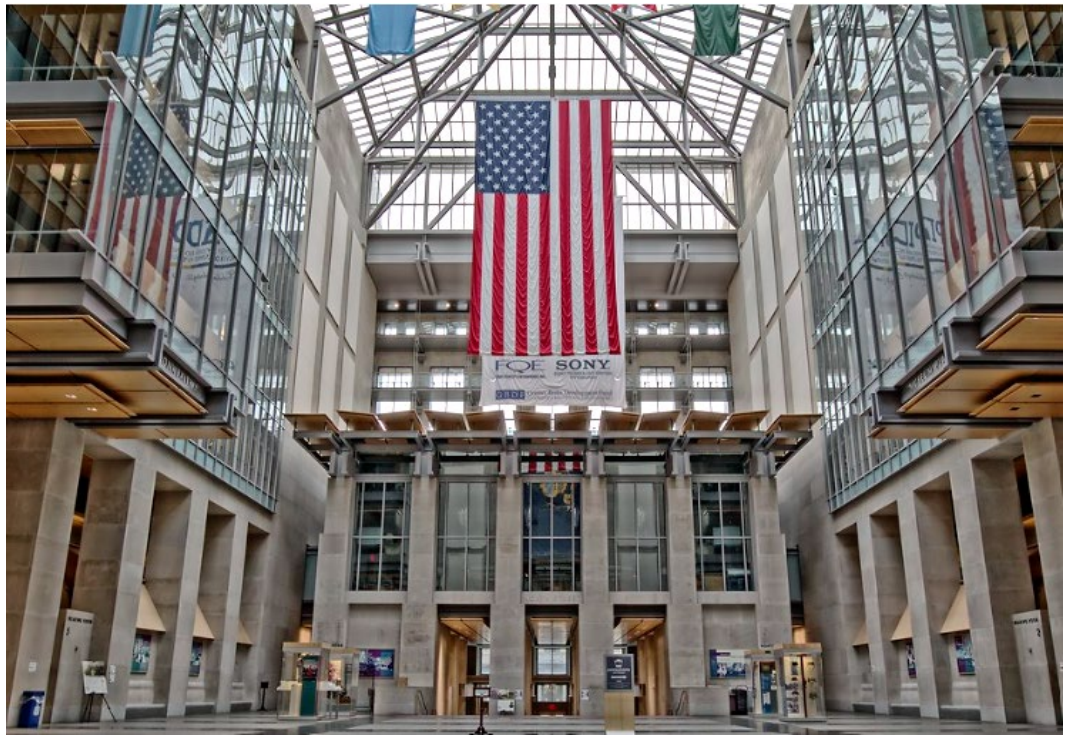
JONATHAN MOSES

Pennsylvania
Department of Transportation

PRESENTERS

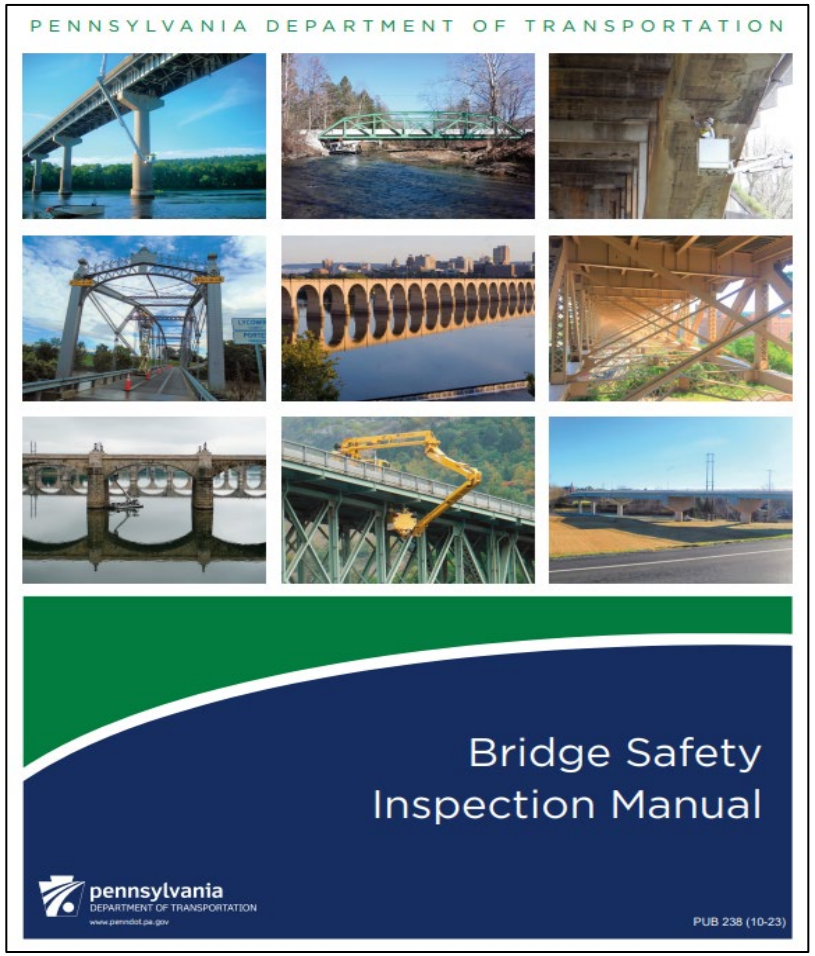
PENNDOT Bureau of Bridge

Jonathan Moses, P.E. – Assistant Chief Bridge Engineer – Bridge Inspection



NBIS NATIONAL BRIDGE INSPECTION STANDARDS

- DEPARTMENT OF TRANSPORTATION: §650.313 of the NBIS (§650.513 of the NTIS) requires that each state…
  - Provide an inspection organization capable of performing inspections, preparing reports, and determining ratings in accordance with NBIS/NTIS. In PA, the Department of Transportation was named and empowered to perform these duties as necessary for all public road bridges greater than 20’ in length through Act 44 of 1988.
- Publication 238 – Bridge Safety Inspection Manual



BRIDGE WEIGHT LIMITS

- Publication 238 – Chapter 4.3 - Bridge Posting Evaluations
- Posting "Bridge Weight Limit" sign installations have two install date requirements per Federal Highway regulations
  - New weight limit signs (from a revised load rating engineering analysis) are required to be installed within **30 Calendar Days**
  - Missing or Illegible weight limit signs need installed within **30 Calendar Days** (inspection finding)

BRIDGE WEIGHT LIMITS

Typical **30-Day** Repair Item (Missing, Damaged, Illegible)

NEAR ADVANCE BRIDGE LOAD POSTING ASSEMBLY, LOOKING RIGHT
Note: Leaning and twisted. Distance plaque has fallen on the ground.

Photo Damaged Bridge Weight Limit Posting Signage

CRITICAL & HIGH PRIORITY MAINTENANCE ITEMS

- **Critical** -Priority 0 (**7-Day** Mitigation) or **High** Priority 1 (Maximum **6 Month** Repair) priorities for maintenance activities are defined as having deficiencies that threaten either the structural integrity of the bridge (or other structures) or public safety
- Damaged or missing vertical clearance or load limit signs are examples where there may be no immediate structure safety problem, but where public safety is compromised, and immediate action is required.
- **The local owner is responsible for and can be held legally liable for not having proper posting signs erected!**

CRITICAL & HIGH PRIORITY MAINTENANCE ITEMS

- Priority 0 - Critical Priority Maintenance Item Repair:
  - Reinforced Concrete Deck Hole (view from underside of deck)

CRITICAL & HIGH PRIORITY MAINTENANCE ITEMS

- Priority 0 - Critical Priority Maintenance Item Repair:
  - Reinforced Concrete Deck Hole – Repaired - Under & Top Side Views

CRITICAL & HIGH PRIORITY MAINTENANCE ITEMS

- Priority 1- High Priority Maintenance Item Repair:
  - Abutment Foundation and Stem Concrete Underpinning

Near abutment. Note the abutment has been underpinned and a reinforced concrete apron has been installed.

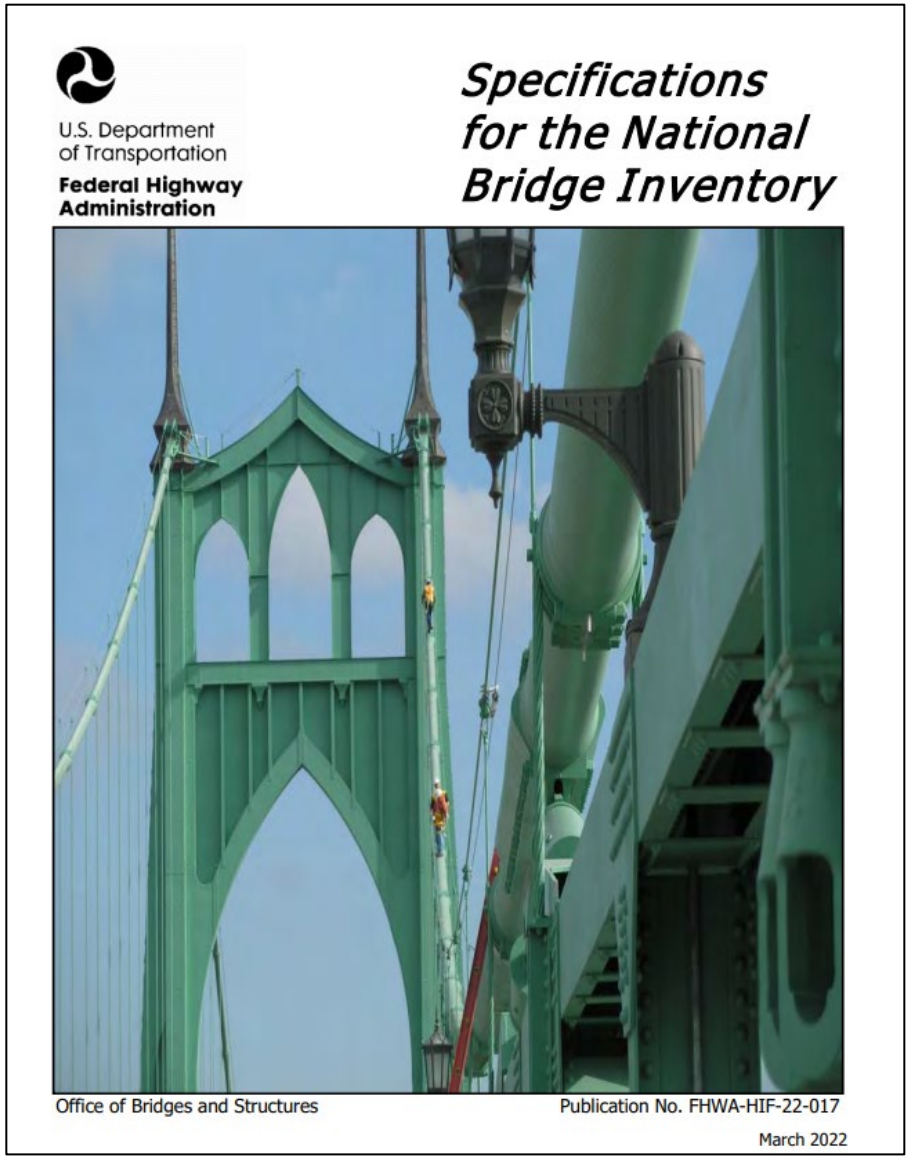
CRITICAL & HIGH PRIORITY MAINTENANCE ITEMS

- For **Non-Department** bridges (including those owned by municipalities, counties and other agencies), critical or high priority maintenance needs pose the same possible threats to public safety.
- In the Department's overarching role and responsibilities for the safety of public highway bridges:
  - PennDOT must take additional steps to see that the local bridge owner has had the public safety issues fully explained to them along with the need to take appropriate action to mitigate or correct them.

How do we better convey this to municipal bridge owners?

SNBI

- Background
  - New NBIS took effect June 6, 2022 with some parts effective June 6, 2024.
  - FHWA provided PennDOT with a list of proposed steps required to implement the new NBIS and ensure PennDOT's policies and procedures align with the regulation
  - A total of sixty (60) individual steps/requirements for PennDOT to work on and implement; 15 of 60 are completed to date



Major Categories

- Applicability of NBIS
- Definitions
- Border Agreements
- Maintain Registry of TLs
- Delegation of Functions
- Qualifications
- Inspection Training
- Inspection Intervals
- Inspection Procedures
- Load Ratings
- Closed Bridges
- Scour Appraisals
- QC/QA Procedures
- Critical Findings
- Inventory
- Implementation of SNBI

- Applicability of the NBIS
  - NBIS now applicable to private bridges that are connected to a public road on <u>both ends</u> of the bridge. PennDOT must perform, or cause to be performed, proper inspection and evaluation of all highway bridges - now includes non-public highway bridges.
  - Does PennDOT have authority over private bridges on local roads?
    - **<u>Yes</u>**

- New Definitions
  - Complex Bridge Feature(s)
    - Bridge component(s) or member(s) with advanced or unique structural members or operational characteristics, construction methods, and/or requiring specific inspection procedures. Up to PennDOT to define features.
  - Fracture Critical (FC) designation revised to “Non-Redundant Steel Tension Member” (NSTM)

SNBI

- Inspection Intervals
  - Already incorporated by PennDOT
  - All bridges must be in compliance by end of June 2024

- Inspection Procedures
  - Ensure inspections comply with the Manual for Bridge Evaluation (MBE) Section 4.2
  - Require to have procedures spelled out for NSTM, UW, In-Depth, and Complex Feature inspections
- NSTM – F & F Plan
    - Complex Features & In-Depth – Need a defined plan
    - UW – use scope notes field (Comment Type 481)

SNBI

- Additional SNBI Inventory fields
  - BMS3 release late 2025/early 2026
    - New inventory fields can be coded with this new system
  - This will be a one time increase in hours for local bridge inspection consultants.
    - Total extra time depends on the size of the bridge.

RAILROADS

- Railroad coordination has been an issue
- New NBIS has a start date and end date for each inspection
- Tolerance is 3 months for inspection frequencies ≥24 months
- Tolerance = 2 months for inspection frequencies <24 months
- Previously, FHWA only looked at single inspection date. This hid the issue of how bad RR coordination was

RAILROADS

- PennDOT Bridge Inspection Section (BIS) is meeting regularly w/ RRs and internal personnel
- Plans being formulated to work with the RR's to get bridge inspections performed timely
- Locals may see some "duplicate" inspections as first inspection did not get proper access to the structure due to lack of flagger present

DESIGN SECTIONS

- Guiderails for Local Bridges
- New Product Approvals
- New DM-4 design criteria
- *What else do you need from us?*

QUESTIONS

Any Questions??

STATE TRANSPORTATION COMMISSION MEETING

PennDOT Digital Delivery Program

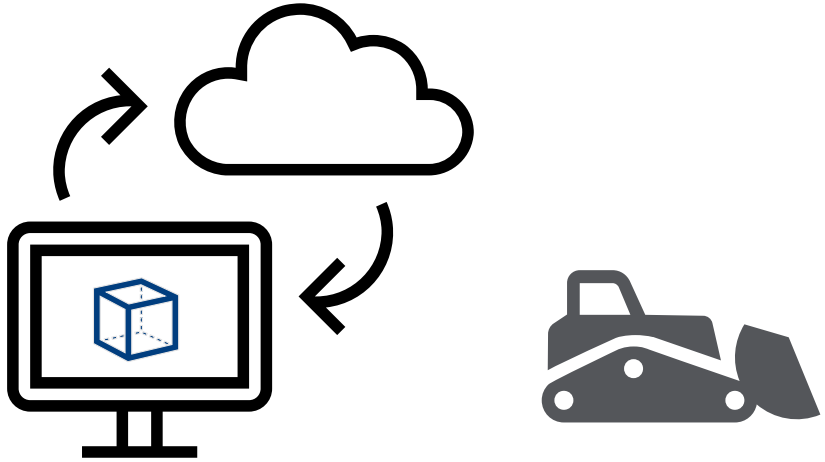
DECEMBER 17, 2025

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

Transformation from the Past

From paper to e-construction

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.

Achieving the Vision

Digital Delivery Program Roadmap

Pennsylvania Department of Transportation

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

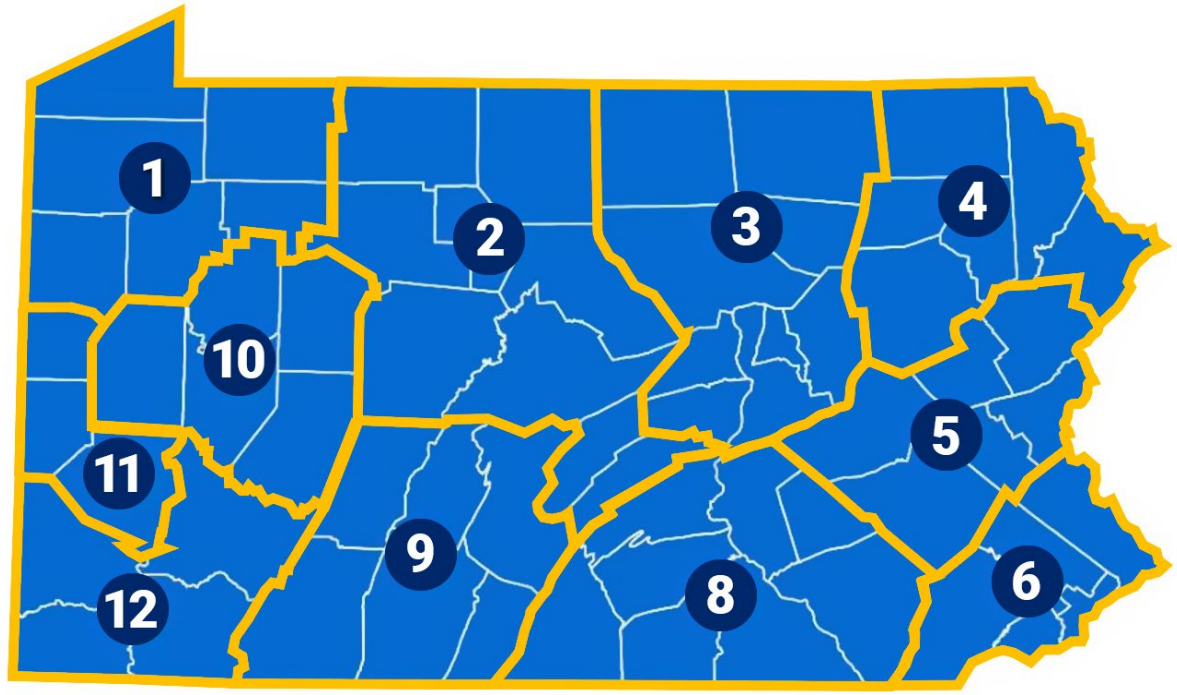
2029-2030

Projects Starting Preliminary Design (MALD)

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

Current Pilot Project Progress

- 8 projects constructed using digital deliverables
- 4 projects in construction
- Over 40 projects current in design or advertised
- Contractor bids have been within 1% on average of the designer estimate



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

Advanced Digital Construction Management Systems Grant

PennDOT received a **5 million dollar grant** in 2023 from FHWA to advance standardized open data for as-built information models for bridges

Project Objectives:

- Improve data interoperability
- Improve export and quality of Industry Foundation Classes (IFC) models
- Support the transition to Model as the Legal Deliverable (MALD)

OPEN BIM™

The purpose of the project is to pilot the use of open BIM standards to deliver model-based deliverables and collect digital as-built models for bridge projects.

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

CONSTRUCTED PILOTS

Roadway – Existing Ground Confidence Level Pilots

Deliverables

- Earthwork exports
- .DGN files for Roadway design
- No cross sections
- Traditional plans for Also Plan sets

Lessons Learned

- Identified the need for Partnering meetings to discuss design intent
- Identified the need for additional existing survey at tie in points

D1 – Mercer County - PA 173 Intersection

D3 – Tioga County - SR 6 Intersection

CONSTRUCTED PILOTS

Bridge Pilot Projects

Deliverables

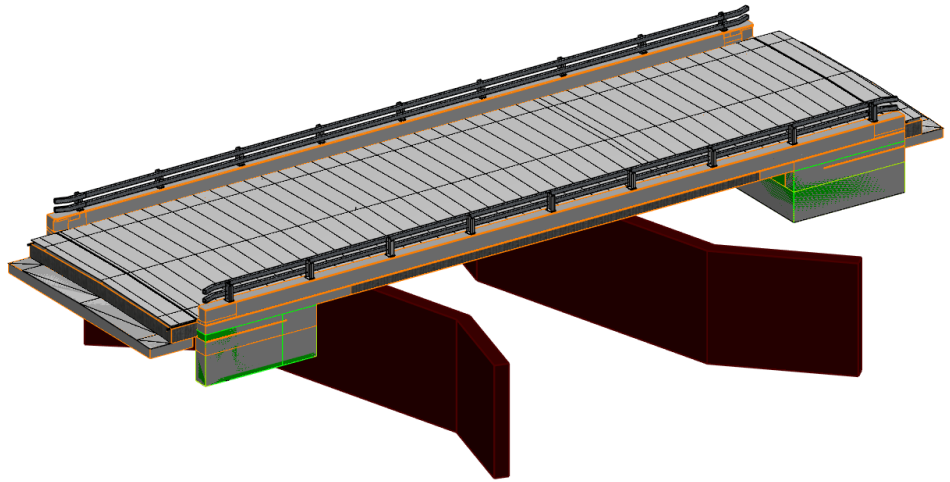
- Structure model and rebar
- Approach Roadway models
- No Cross Sections

Lessons Learned

- Addendum process and communication
- Licensing for model viewers
- No 2D sheets that aren't derived from the model

D1 – Crawford County – SR 1032

D3 – Lackawanna County - SR 3006



CURRENT PILOTS IN CONSTRUCTION

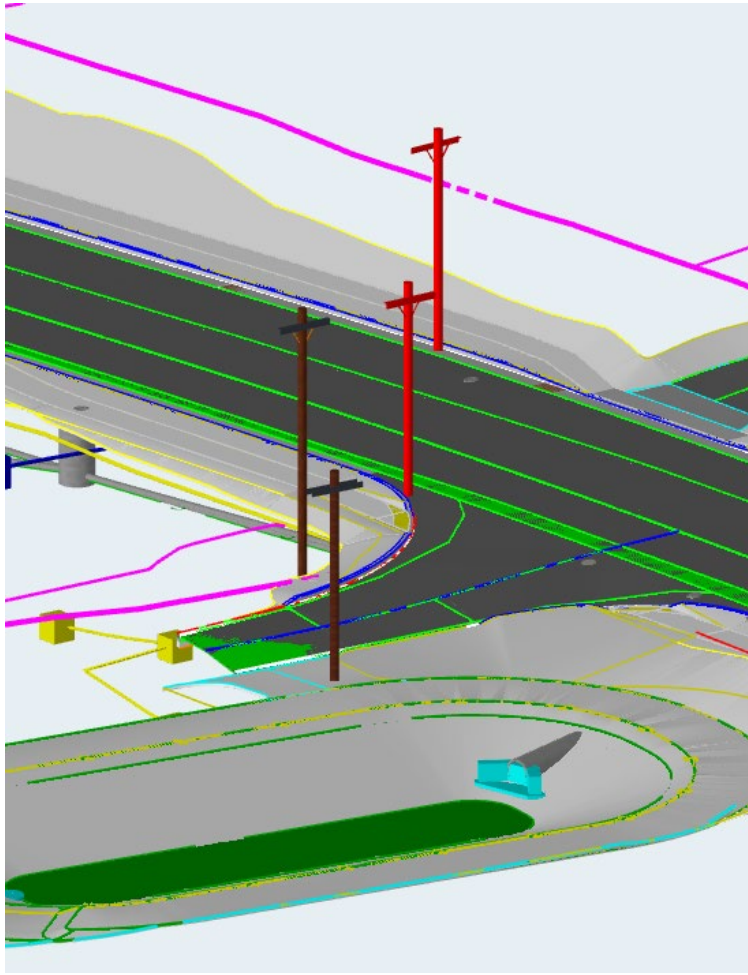
District 10 – MALD Pilot

Deliverables

- Federated model files
- 2D model views
- No plan sets

Lessons Learned

- Utility field meetings and data collection
- Model viewer enhancements
- Contractor coordination



D10 – Clarion County – PA 68 Dolby Street

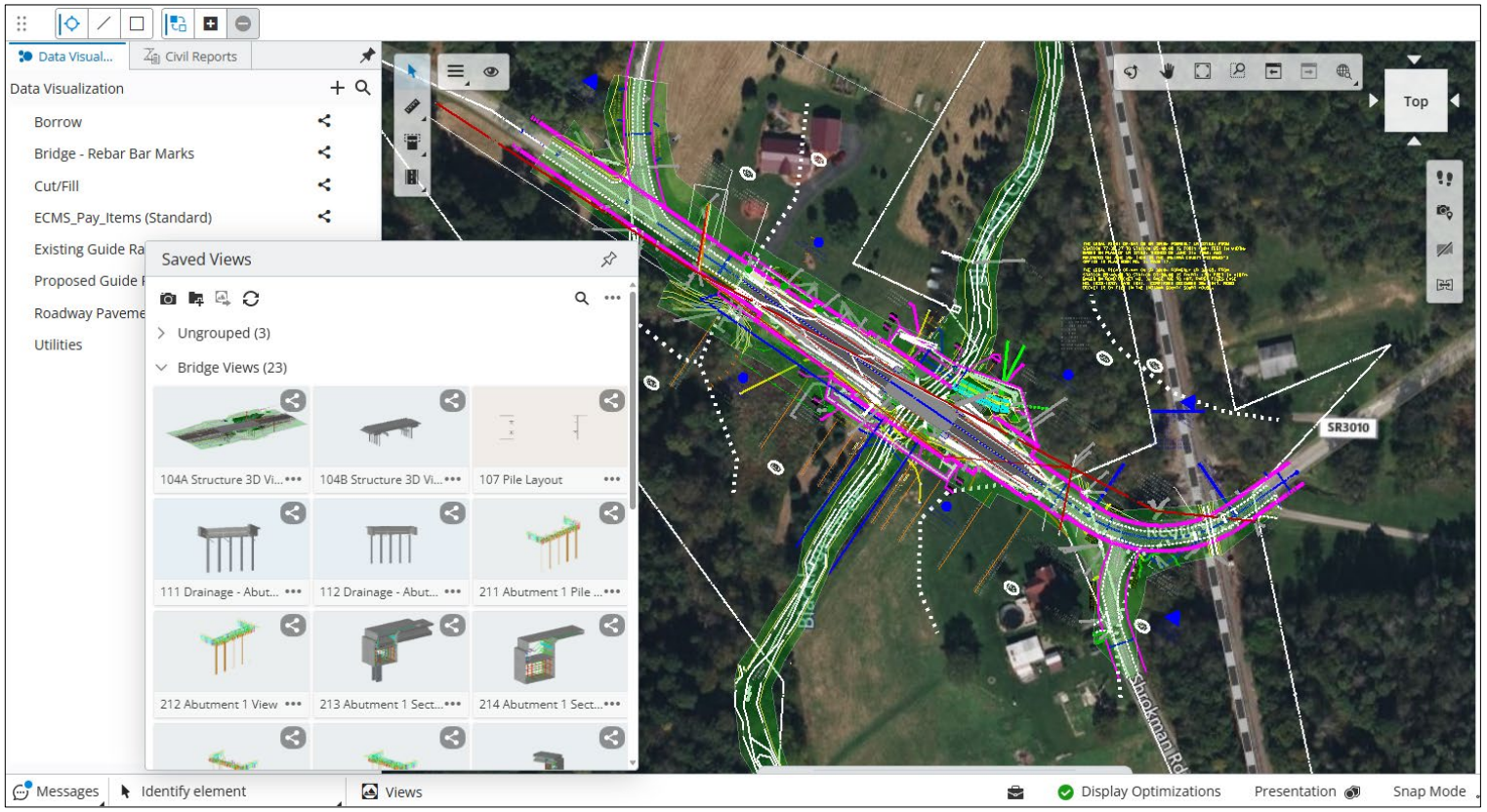
ADCMS BRIDGE PILOTS

Advanced Digital Construction Management Systems Grant

Two Bridge projects using IFC

Deliverables

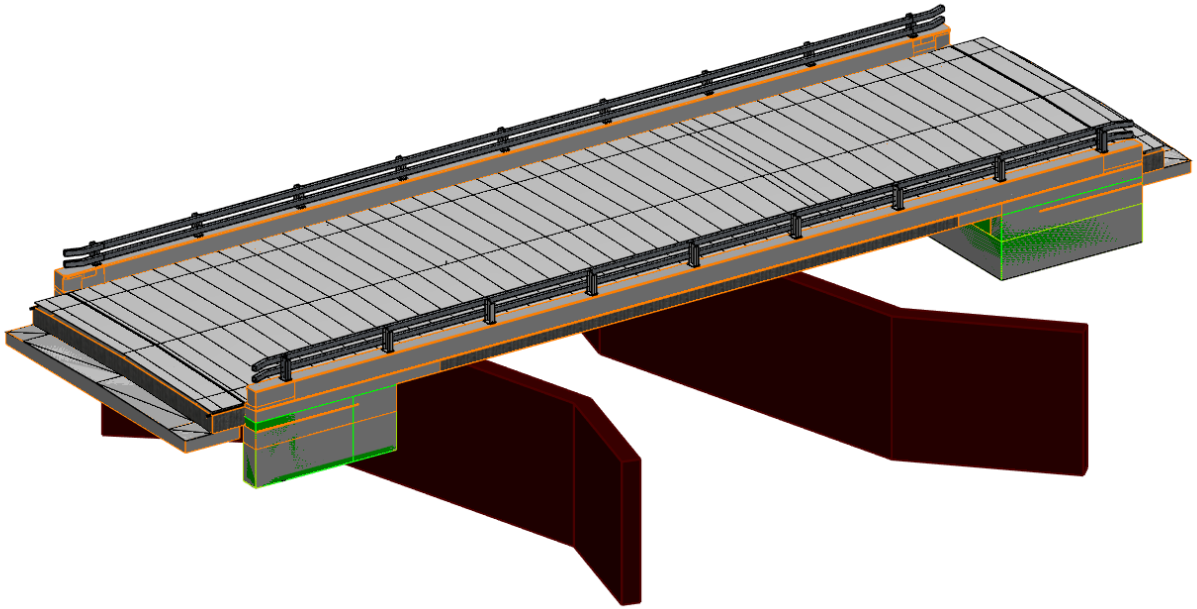
- IFC Bridge files signed and sealed
- Certification Memo
- Model Element Breakdown Structure
- Digital File Index
- Model Download instructions
- Data visualizations

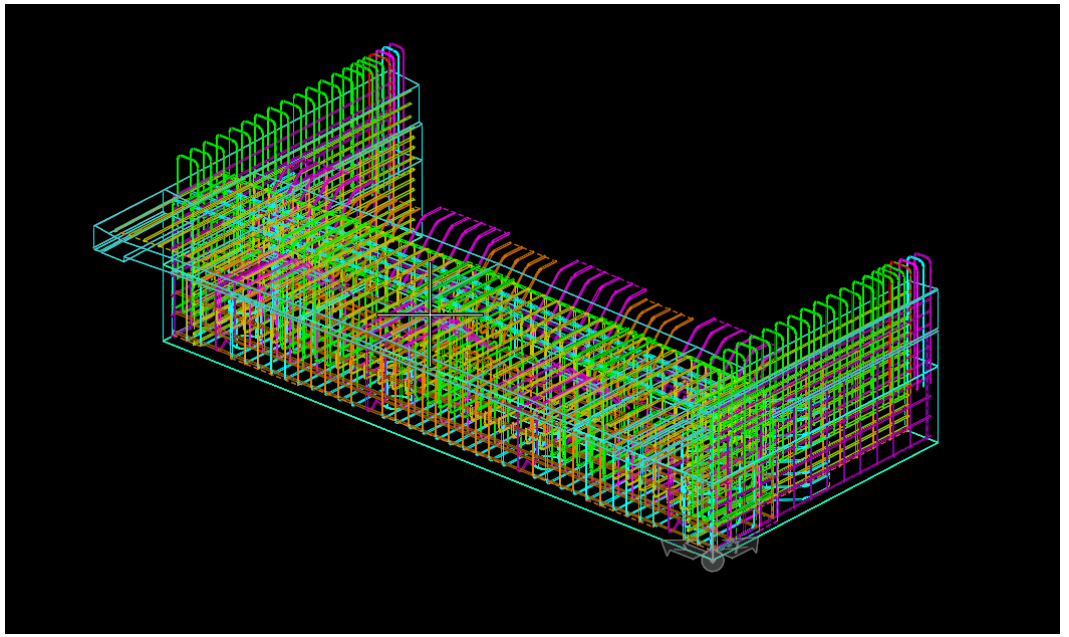


D1 – Crawford County – Steel Bridge

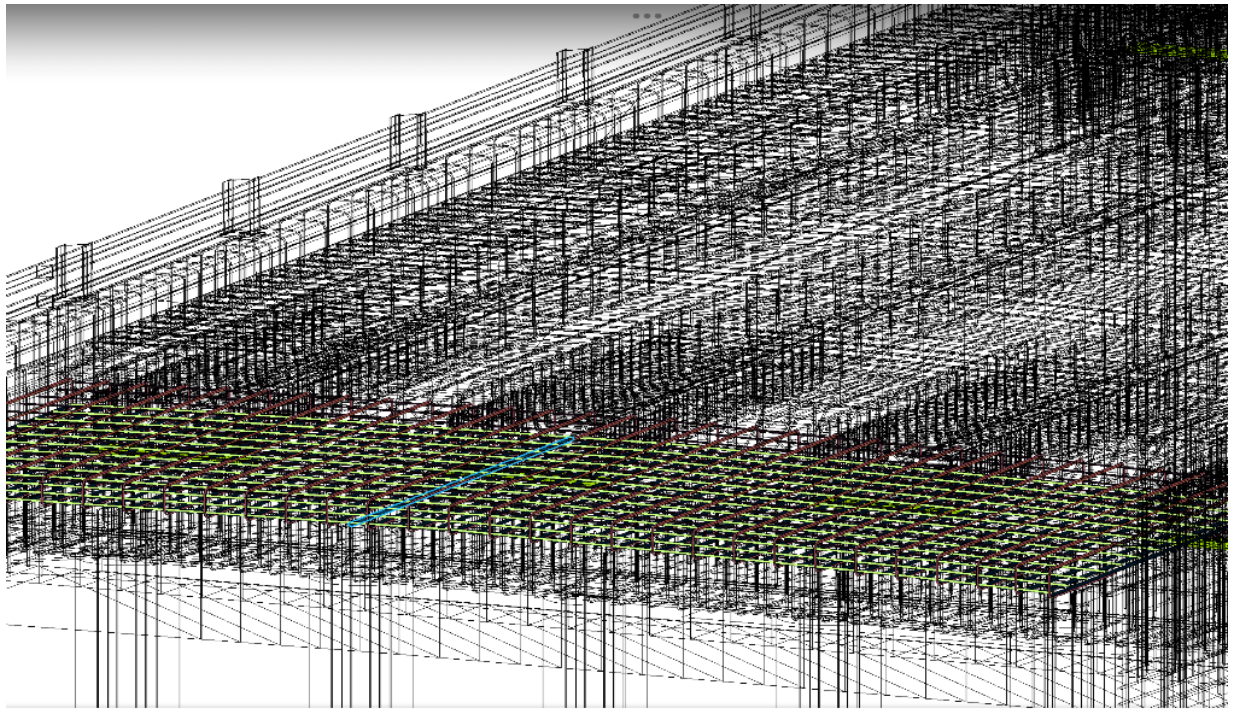
D10 – Indiana County – Integral Abutment

Constructing from the 3D model





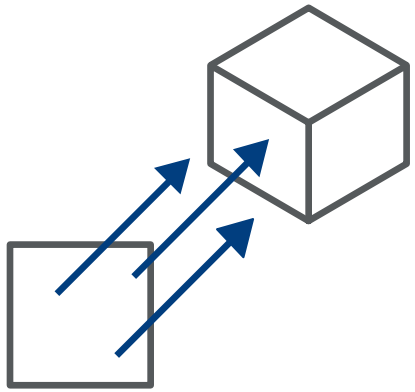
FROM MODEL TO MATERIAL

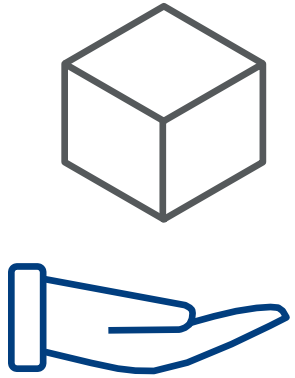


National Impacts

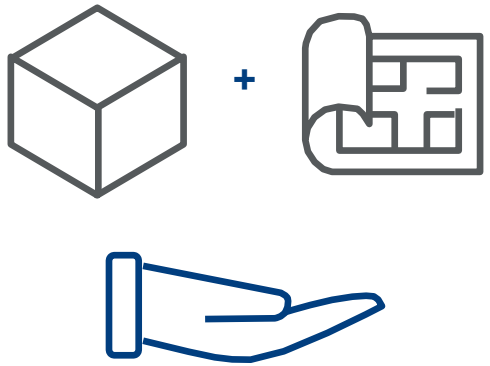
Model-Based Deliverable Maturity Framework

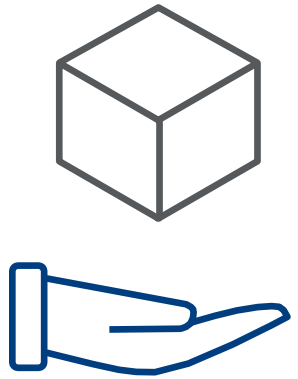
AASHTO JTCEES – August 2022

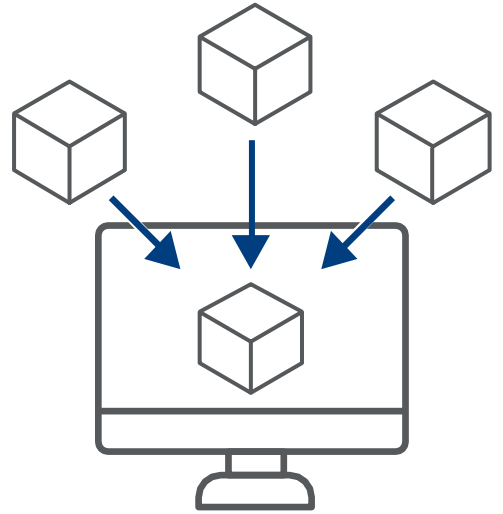




For Information Only







Digital As-Built using the 3D model

LEVEL 1
Transition from 2D to 3D for plan production

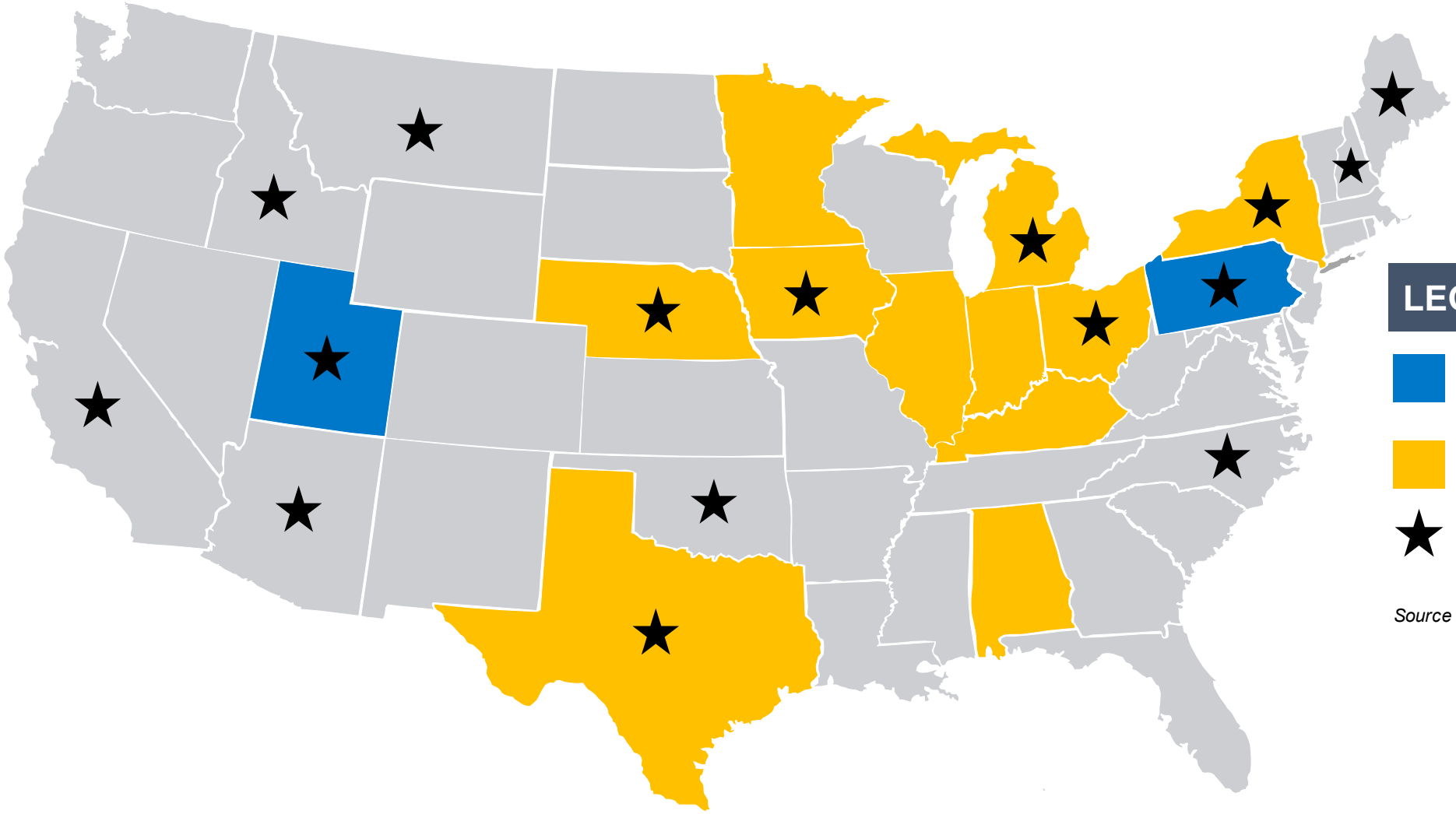
LEVEL 2
Deliver 3D model for information only

LEVEL 3
Deliver 3D model contractually with conventional plans

LEVEL 4
Deliver 3D model contractually without plans

LEVEL 5
Collect digital as-builts

National Impacts



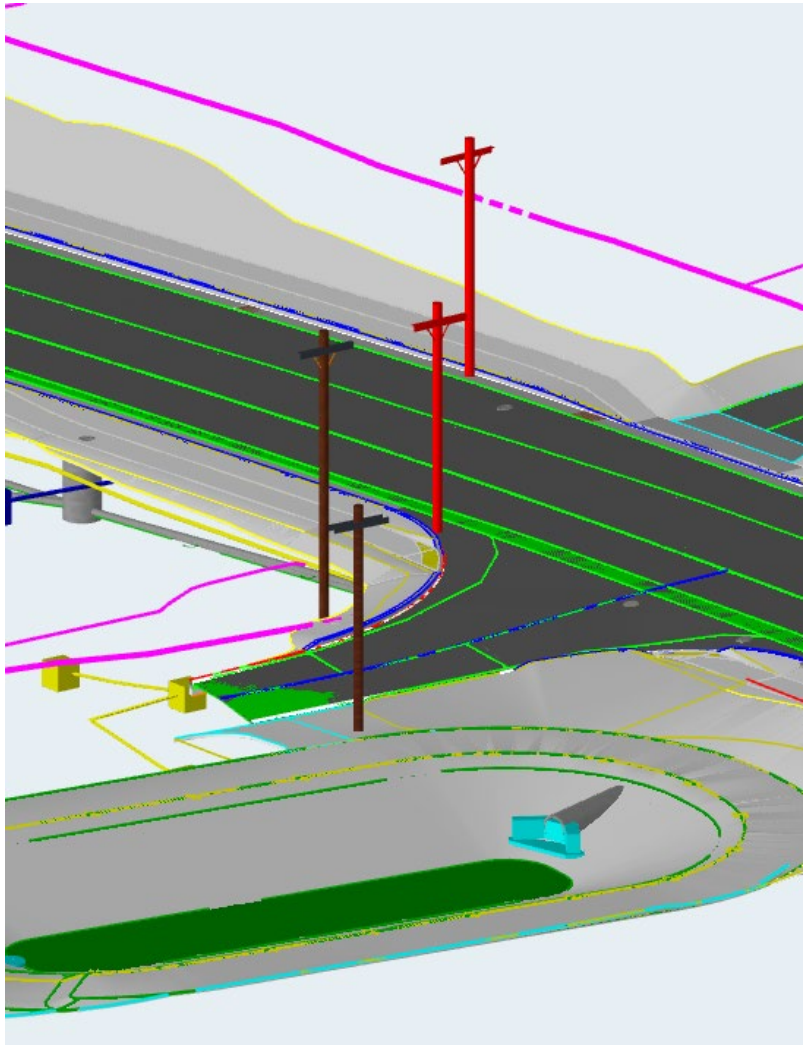
LEGEND

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

Source : HDR – December 2025

Moving Forward with Lessons Learned

- Identifying and avoiding conflicts early in design and construction with 3D modeled utilities
- Communication and partnering with the design team and contractor in the field



DIGITAL DELIVERY IMPLEMENTATION POLICY

Purpose: Institutionalize digital delivery methods for PennDOT design and construction projects.

Each district is required to have a minimum number of fully designed and modeled projects **let** each year

- Most project types will be considered
- Projects can be either internally, or consultant designed

Calendar Year	Minimum # of Projects/ District	Project Phase Completion	Submit for Approval no later than
2027	2	Advertisement	October 15, 2025
2028	3	Advertisement	March 1, 2026
2029	4	Advertisement	March 1, 2027
2030	5	Advertisement	March 1, 2028

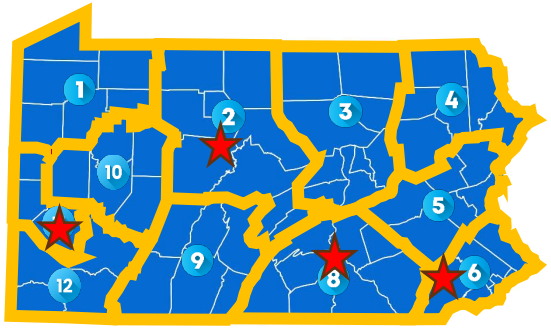
CONTRACTOR SUMMITS

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

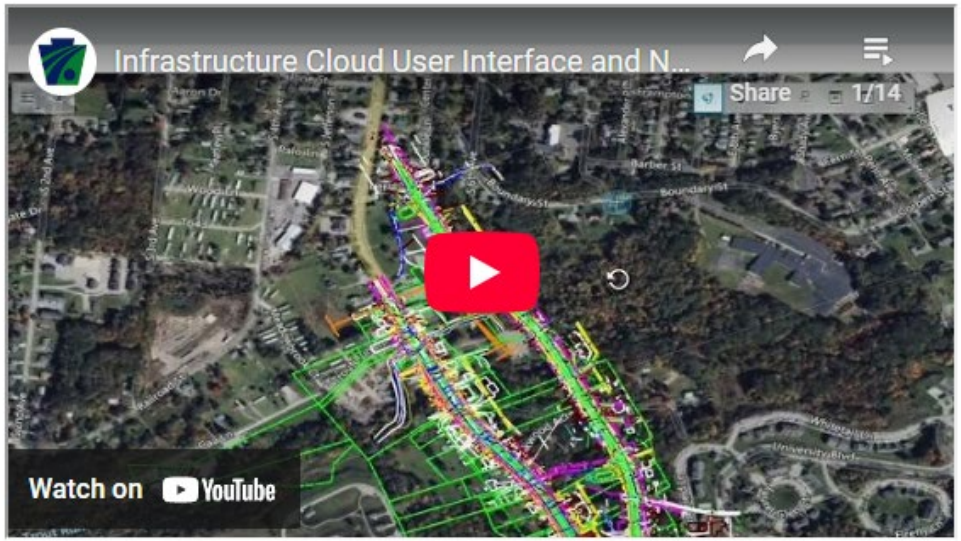
Quarterly Session Demonstrations & Updates

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.



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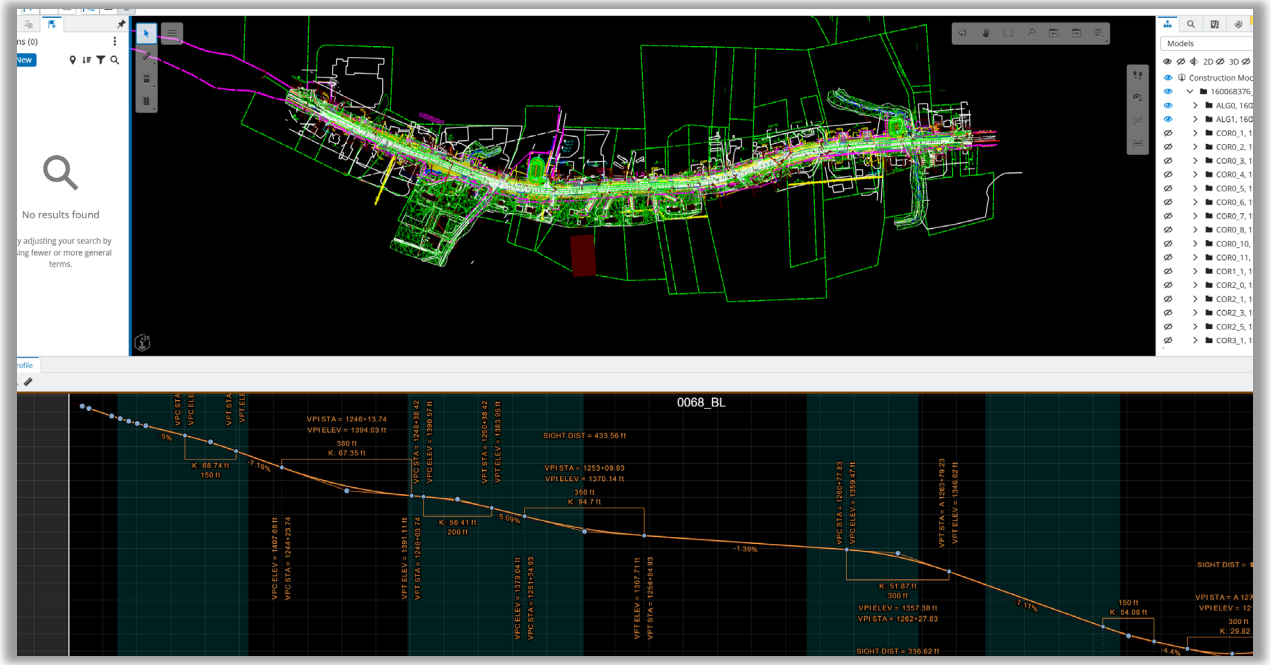


HIGHER EDUCATION INITIATIVE

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.

2025 AWARDS

ACEC/PA Diamond Award

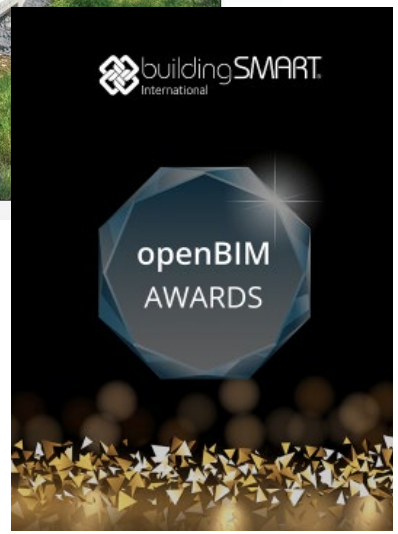
- 2025 Small Project Category
- Designer - Pennoni
- Owner - PennDOT

2025 America's Transportation NASTO Award

- Best Use of Technology & Innovation
- First Digital Delivered Bridge

buildingSMART International OpenBIM Award

- Finalist in Professional Research Category
- In collaboration with HDR



QUESTIONS

Digital Delivery

PennDOT Digital Delivery Website

Digital Delivery Email:
RA-PDDigitalDelivery@pa.gov

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