NEW YORK STATE | Department of Transportation

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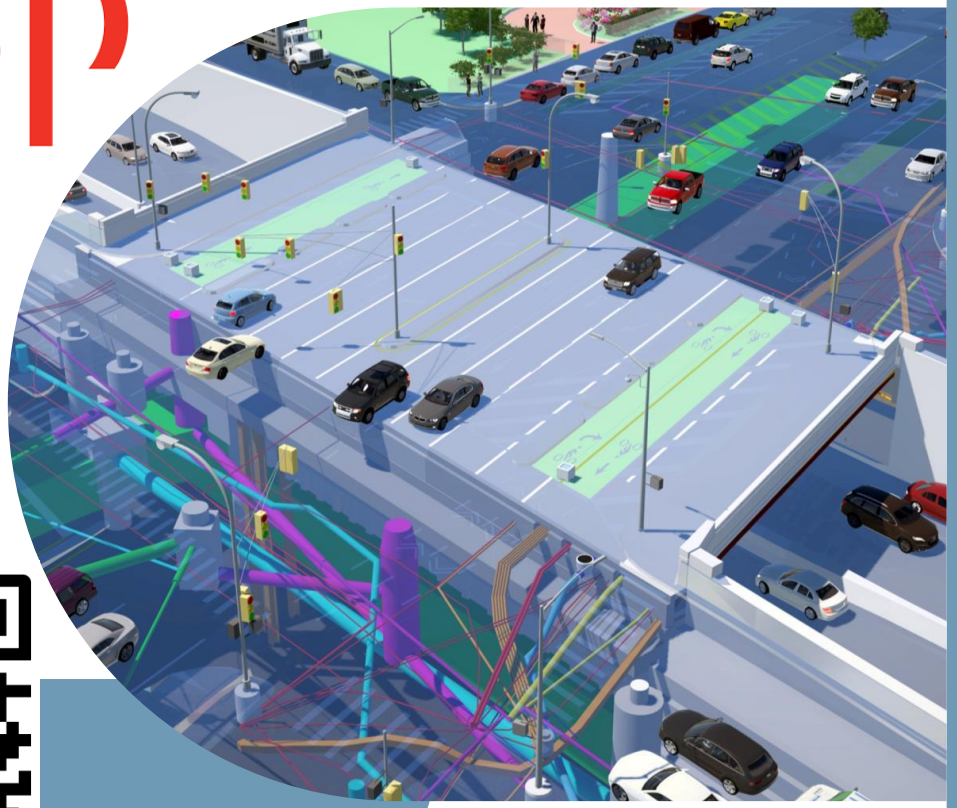
Advance Digital Construction Management Systems (ADCMS)

To Be State Workshop

May 27th 2026



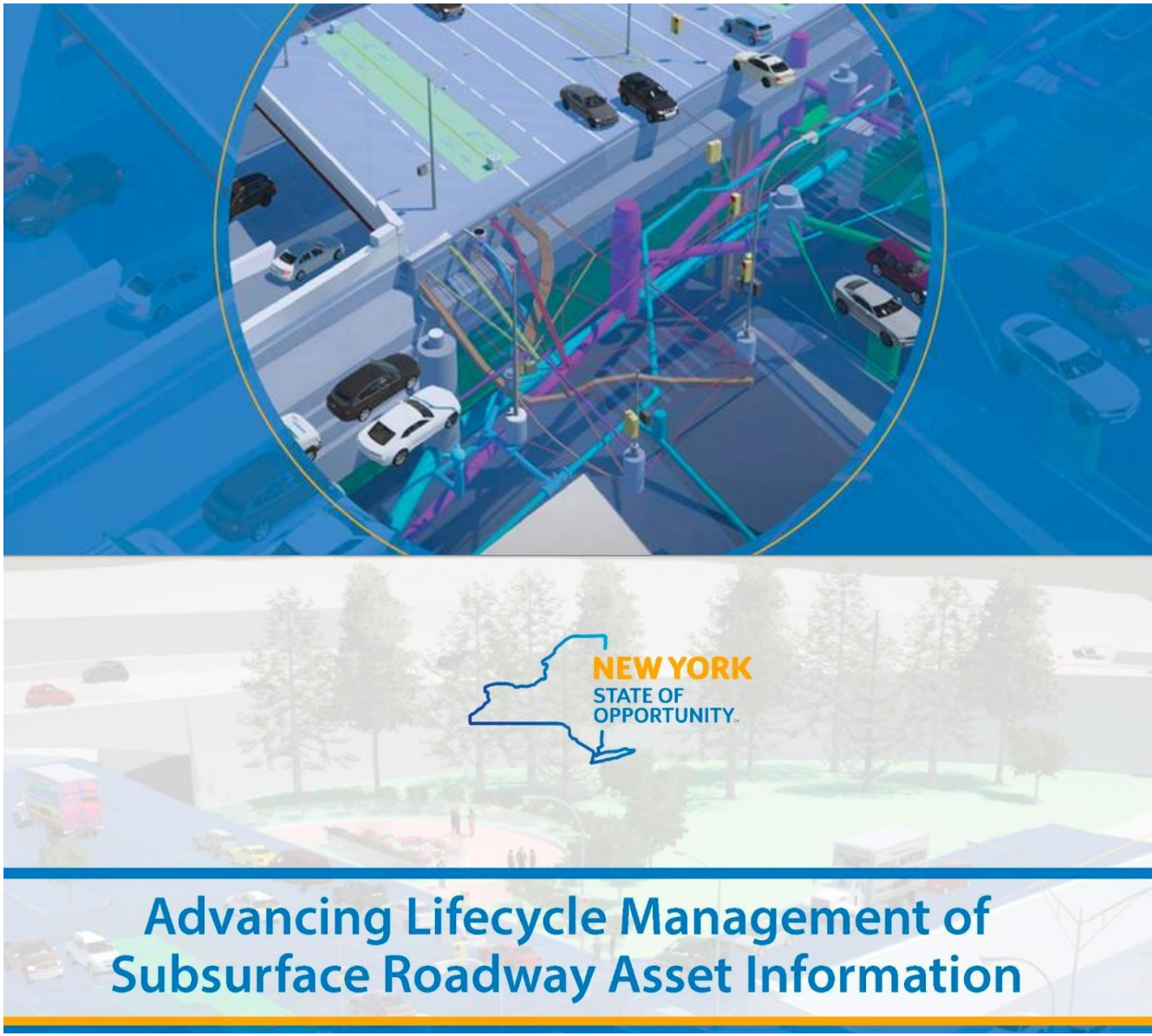
Use QR Code to sign in and enter:
Name, Location, Program Area

Mentimeter

Welcome & Overview of ADCMS

Led by: Eric Coulter

9:00am – 9:10am



Eric Coulter, P.E.

- 22+ Years NYSDOT
- Acting Director – Design Quality Assurance Bureau
- Assistant Director - Design Bureau
- Digital Delivery Committee Co-Chair
- BIM for Infrastructure Pooled Fund Study – Voting Member
- NYSDOT ADCMS - Grant Lead
- Contact: eric.coulter@dot.ny.gov

  or digital.delivery@dot.ny.gov

AGENDA

Topic	Schedule
Welcome and Overview of ADCMS	**9:00 AM – 9:20 AM**
1. Introductions, Workshop Goals and Objectives	9:00 – 9:10 AM
2. ADCMS Grant Award	9:10 – 9:20 AM
3. Survey	
SESSION 1: Current State of Practice	**9:20 AM – 10:00 AM**
1. Presentation & Demo	9:20 – 9:50 PM
2. Open Discussion & Survey: Regional Practices, Challenges, Opportunities, Consensus	9:50 – 10:00 AM
SESSION 2: Digital Delivery and Pilot Projects	**10:00 AM – 10:30 AM**
1. Presentation & Demo	10:00 – 10:20 AM
2. Open Discussion & Survey	10:20 – 10:30 AM
BREAK	**10:30 - 10:45 AM**
SESSION 3: To-Be State of Practice	**10:45 AM – 1:50 PM**
1. Defining To-Be State:	10:45 – 11:15 AM
• *Demo and To-Be State Vision*	*10:45 – 11:00 AM*
• *Open Discussion & Survey*	*11:00 – 11:15 AM*
2. Level of Development, Design/Construction Workspace Design and Asset Information Management	11:15 – 12:00 PM
• *Demo and To-Be State Vision*	*11:15 – 11:25 AM*
• *Open Discussion & Survey*	*11:25 – 12:00 PM*
LUNCH BREAK	**12:00 – 1:00 PM**
3. BIM Execution Plans (BEP)	1:00 – 1:50 PM
• *BIM Workflows, Roles and Responsibilities, Technology Infrastructure*	*1:00 – 1:30 PM*
• *Open Discussion & Survey*	*1:30 – 1:50 PM*
Closing Remarks - Look Ahead: 2026 - 2027	**1:50 PM – 2:00 PM**

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Closing Remarks - Look Ahead: 2026 - 2027	**1:50 PM – 2:00 PM**

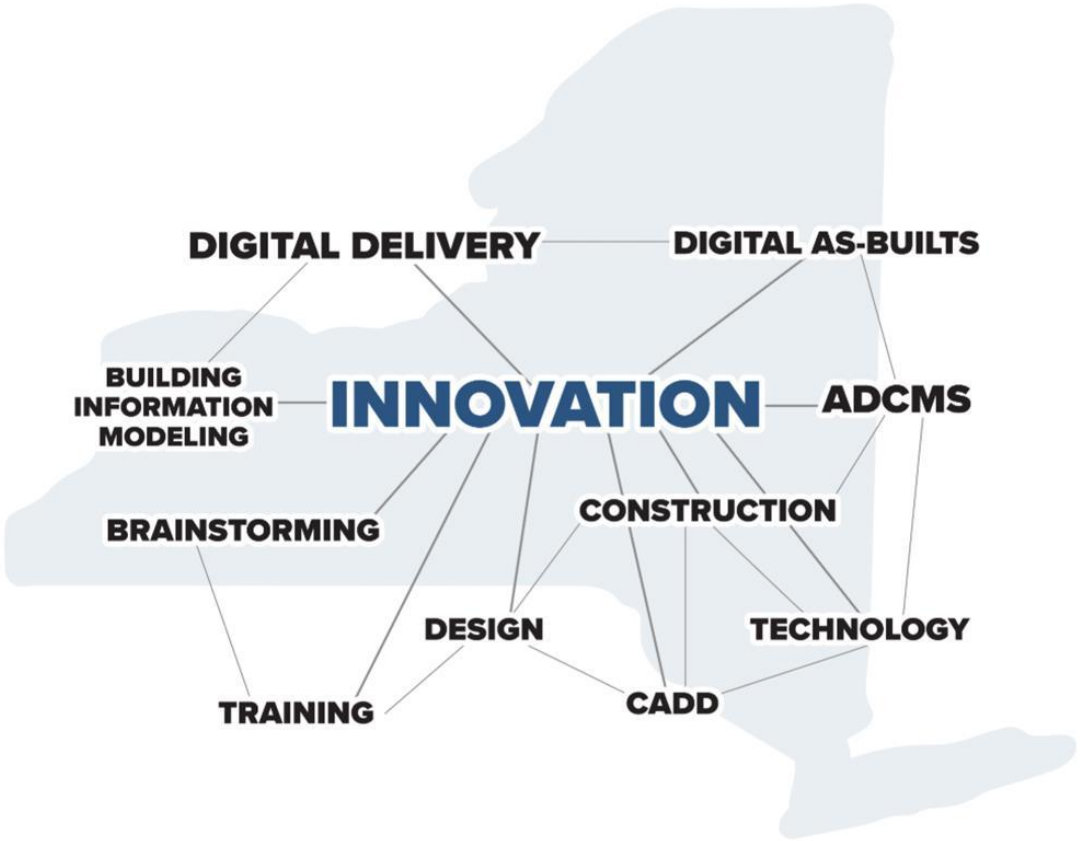
TO BE STATE WORKSHOP – PART 2

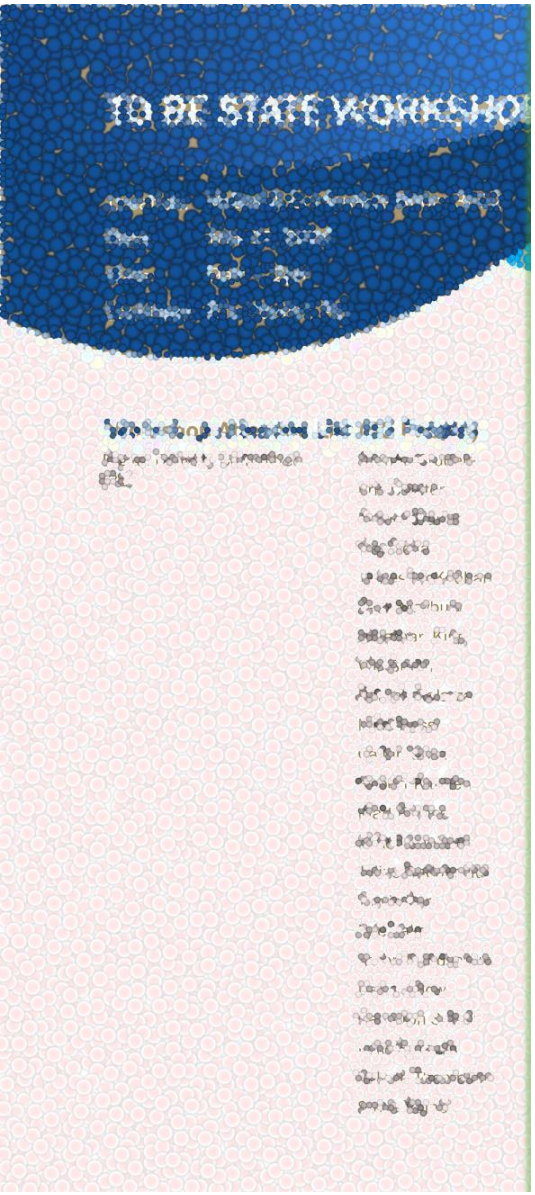
Location: Virtual & Conference Room 3n02
Date: May 27, 2026
Time: 9am – 2pm
Facilitator: Eric Coulter, P.E.

Workshop Attendee List (55 People)

Digital Delivery Committee (31)	Brenda Crudele	MO Structures	In-person
	Eric Coulter	MO Highway	In-person
	Patrick Daunt	MO Highway	In-person
	Troy Soka	MO Structures	In-person
	James McKeehan	MO Structures	Virtual
	Zack Maybury	MO Project Management	In-person
	Jonathan King	MO Construction	In-person
	Will Smith	MO Construction	In-person
	Patrick Galarza	MO Construction	In-person
	Mike Rossi	MO Data Management	In-person
	Caitlin Goss	MO Legal	In-person
	Robert Kitchen	MO Contracts	In-person
	Matt France	R1 Construction	In-person
	Mike Lanphere	R2 Survey	In-person
	Julius Radakovits	R3 Design	In-person
	Travis Corr	R3 Construction	Virtual
	Lyle Lake	R4 Construction	Virtual
	Aaron Bundschuh	R4 Design	Virtual
	Dan Ludlow	R5 Design	Virtual
	Cameron Schulz	R5 Real Estate Officer	Virtual
	Luke Sprowls	R6 Structures	Virtual
	Valerie Thompson	R6 Design	Virtual
	Steve Rajner	R7 Construction	Virtual

Introductions



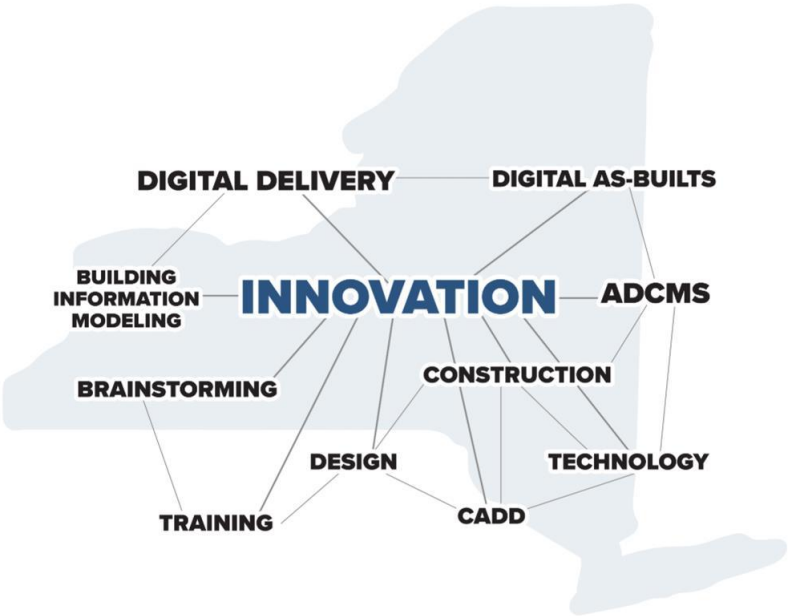


Digital Delivery Committee	Deyla Olarte	R8 Design	In-person
	Jordan Strack	R8 Construction	In-person
	Jayme Szili	R9 Construction	Virtual
	Mike Maltby	R9 Survey	Virtual
	Angela Hui	R10 Design	Virtual
	Krista Vinogradov	R10 Property Acquisition	Virtual
	Anthony Cantone	R11 Design	Virtual
	Ty Parillo	R11 Construction	Virtual
Design Mapping & Automation (5)	Jeff Barth	MO Design	In-Person
	Peter VanKampen	MO Design	In-Person
	Dominick Alteri	MO - Bentley Rep.	In-Person
	Eileen Digioacchino	MO - Bentley Rep.	In-Person
	Modeste Muhire	MO - Bentley Rep.	Virtual
Design Quality Assurance (3)	Rob Howland	MO Design	In-Person
	Sherman Lane	MO Statewide Utility Engr.	In-Person
	Greg Meyers	MO Standards & Specs	In-Person
Design (3)	Brad Bortnick	MO Design	In-Person
	Chris Modafferi	MO Design	Virtual
	Angelica Naumowicz	MO Design	In-Person
Information Technology Services (1)	Kevin Hunt	Geospatial Services	In-Person
Highway Data Services (1)	Patrick Kemble	MO Highway Data Services	In-Person
Asset Owners (4)	Dawn Arnold	MO Program Management	In-Person
	Ellen Kubek	MO Environment	In-Person
	Lubov Koptsev	MO Data & Asset Mgmt.	In-Person
	Stacey Forenz	R6 Operations	Virtual

Consulting Team (7)	Abhishek Bhargava	WSP	In-Person
	Jag Mallela	WSP	In-Person
	Kyle Czora	WSP	In-Person
	Levi Littler	WSP	Virtual
	Tyler Larson	WSP	Virtual
	Leon Nafus	WSP	Virtual
	Chris Harman	WSP	Virtual

To Be State:

The "to be" state refers to the future state of a process after planned improvements or changes have been implemented. It's the desired outcome or the target process that the organization aims to achieve. The "to be" state is often documented and visualized through process maps or diagrams, providing a clear roadmap for implementation.



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	Travis Corr
	Lyle Lake
	Aaron Bundschuh
	Dan Ludlow
	Cameron Schulz
	Luke Sprowls
	Valerie Thompson
	Steve Rajner

Digital Delivery Committee	Deyla Olarte	R8 Design
Design M... Automati... (5)		
Design Q... (3)		
Design (3...		
Informati... Services (...		
Highway ...		
Asset Ow...		

Internal(15 Groups)

- Structures
- Highways
- Survey
- Construction
- Environment
- Legal
- Contracts
- Real Estate
- Geospatial Services
- Maintenance
- Operations
- Data & Assets
- Data Management
- Project Management
- Info. Tech. Services

External(2 Consultants)

- Bentley
- WSP

Consulting Team (7)	Abhishek Bhargava	WSP	In-Person
	Jag Mallela	WSP	In-Person
	Kyle Czora	WSP	In-Person
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	Tyler Larson	WSP	Virtual
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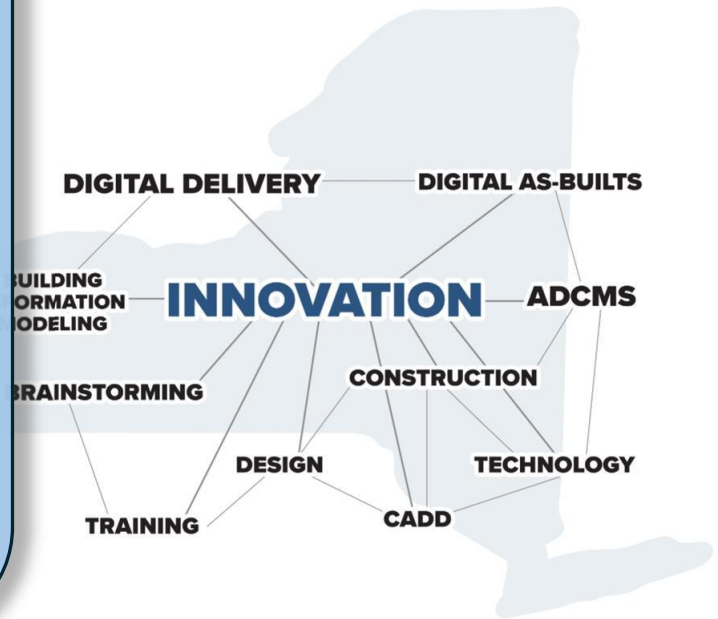

To Be State Workshop – Part 1

Double Click to open

TO BE STATE WORKSHOP – PART 1

Location: Virtual & Conference Room 4s52
Date: September 10, 2025
Time: 10am – 12pm
Facilitator: Eric Coulter. P.E.

*Advance Digital Construction Management Systems (ADCMS)

Agenda Items

10:00a – 10:10a	Introductions – Welcome & Overview	Eric Coulter
10:10a – 10:20a	ADCMS Background Information	Eric Coulter
10:20a – 10:50a	NYSDOT ADCMS Grant Award	Matt France Chris Modafferi James McKeehan
10:50a – 11:10a	Collaboration with Internal Stakeholders	Eric Coulter
11:10a – 11:30a	Model Element Breakdown Demonstration	Patrick Daunt
11:30a – 11:40a	ADCMS Schedule/Reporting/Partners	Eric Coulter
11:30a – 12:00p	Roundtable Discussion	All

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Participate

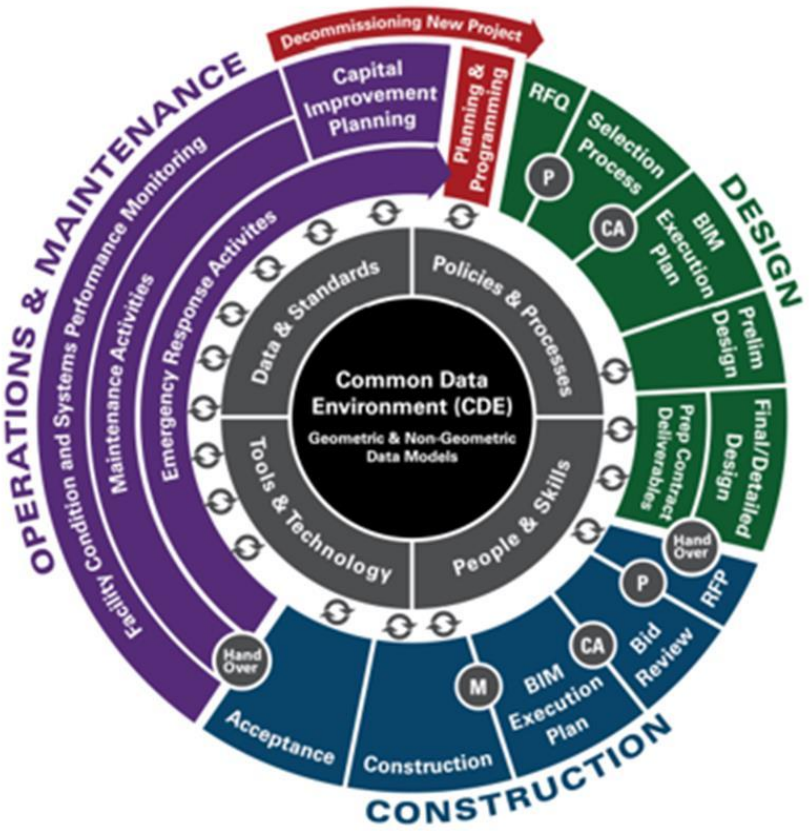
Workshop Goals and Objectives

- **ADCMS Project Introduction** -- Advanced Digital Construction Management System: What? Why? Who?
- **Reviewing Current State of Practice:** Trends, Challenges, Opportunities
- **Update on Digital Delivery and BIM Pilots**: 200 BIM Pilots Projects: Review, Trends, Practices – Lessons Learned
- **Brainstorm -- Define, Review, and Validate "To-Be State"** for Managing and Exchanging Digital Asset Data Lifecycle for Sub-surface Assets
- **ADCMS Project Timeline and Next Steps:** Identify volunteers who want to collaborate in developing the To-Be Business Practice for Asset Data Lifecycle Management

Lots of information flowing your way...

…. but think about these as we go

- Data that needs to be shared (design to construction to asset management)
- What data you need to do your job in your role
- What data others (roles) need to do their job:
  - Designers think about construction engineers
  - Designers, Construction engineers think about Operations & Maintenance (spec. Asset Management)
  - Asset Management think about what planning, scoping and design may need to know about existing assets/conditions
- Where should NYSDOT be in 5 years with Information exchanges across departments/Disciplines
- What should your job role and responsibilities look like if digital, model-centric BIM processes are introduced?

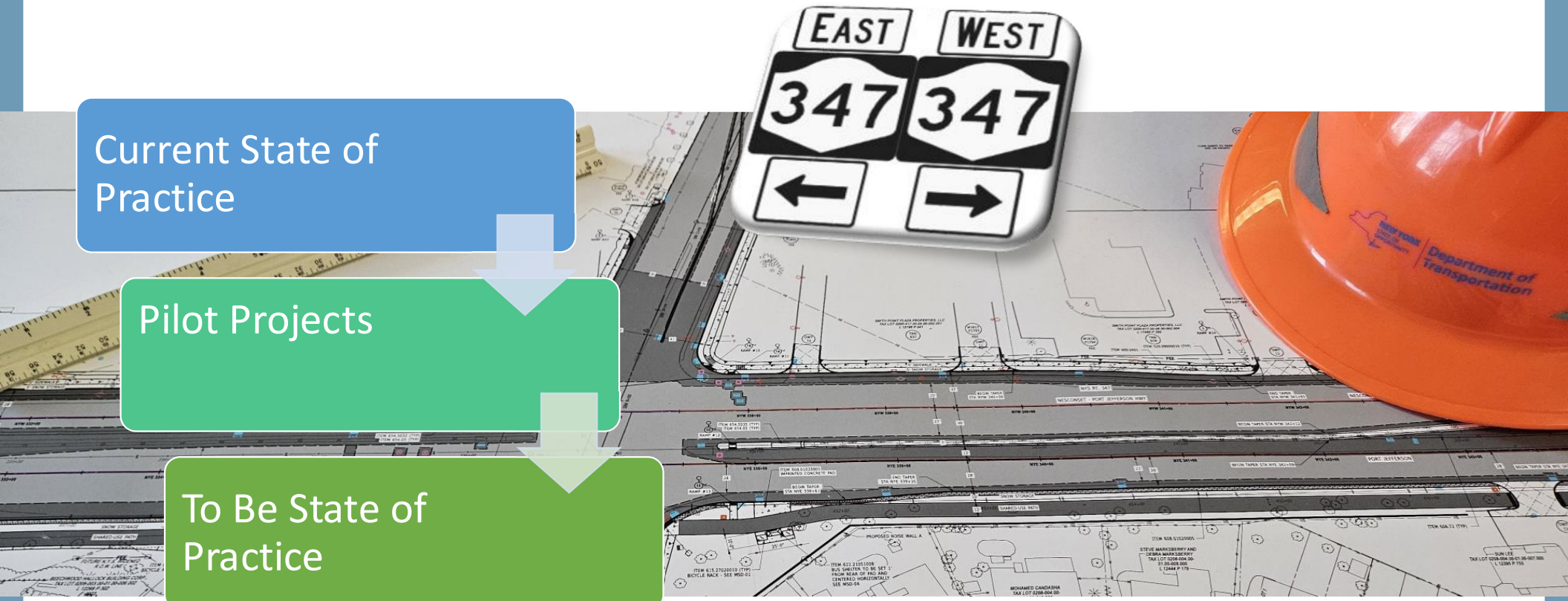


The Focus

Current State of Practice

Pilot Projects

To Be State of Practice



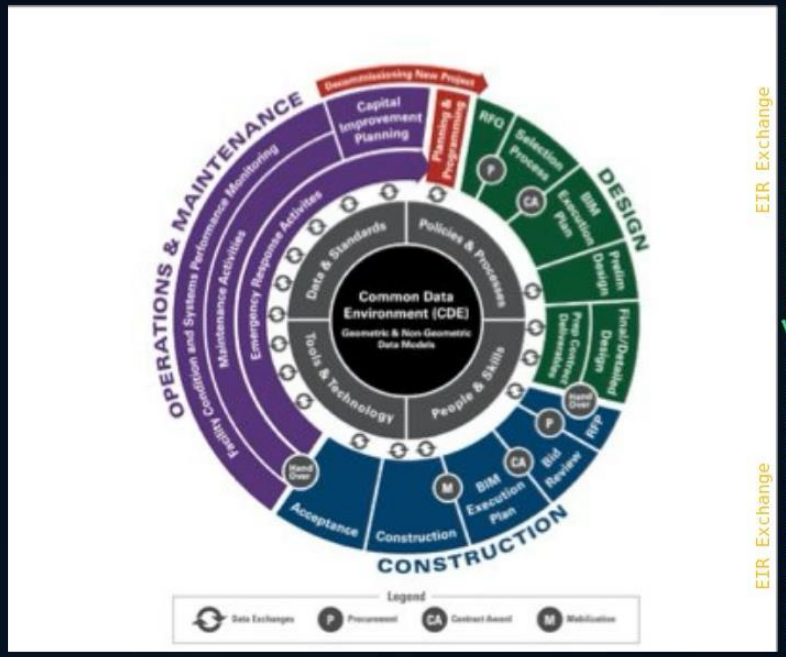
NYSDOT · REGION 10 · SUFFOLK COUNTY

The Data Lifecycle of a Small Culvert

Route NY 347 · Hallock Rd. to CR 97 · D900014

How culvert data is created, siloed, lost — and how BIM liberates it

ISO 19650 · EIR · AIR · PIR · PIM · AIM · CIMS · GIS · OPENROADS · IMODEL



EIR Exchange

EIR Exchange

COMMON DATA ENVIRONMENT (CDE)

DESIGN
BIM Model · Feature Defs · IFC

CONSTRUCTION
As-Built · QC · Serial Nos.

OPERATIONS & MAINT.
CIMS · GIS · AIM · Inspections

Terminology

As-is State

- *The current condition or situation of something, whether it's a physical item, a business process, or a system, without any changes or improvements applied yet. In business, documenting the "as is" state involves mapping and analyzing existing processes, systems, and people to identify inefficiencies, bottlenecks, and opportunities for improvement before moving to a desired "to be" future state.*

To Be State

- *The "to be" state refers to the future state of a process after planned improvements or changes have been implemented. It's the desired outcome or the target process that the organization aims to achieve. The "to be" state is often documented and visualized through process maps or diagrams, providing a clear roadmap for implementation.*

Digital Delivery

- *Is a broad concept involving the use of digital tools, 3D modeling, and data-driven workflows to improve efficiency and collaboration throughout the entire lifecycle of a transportation project.*

Terminology

Digital As-Builts

A digital data-oriented process for tracking, documenting, and archiving asset information created during project delivery. DAB's focus on enhancing access, use, and management of highway project data from design to asset management. All asset data provide useful lifecycle facility asset inventory information for data management, with data that are accessible, searchable, geospatial, contextual, reliable, durable, extractable, and interoperable.

Building Information Modeling(BIM) for Infrastructure

BIM is a collaborative work method for structuring, managing, and using data and information about transportation assets and networks throughout their lifecycles. It liberates data from siloed systems and makes those data available via automated processes to anyone who needs them when they need them.

Level of Development

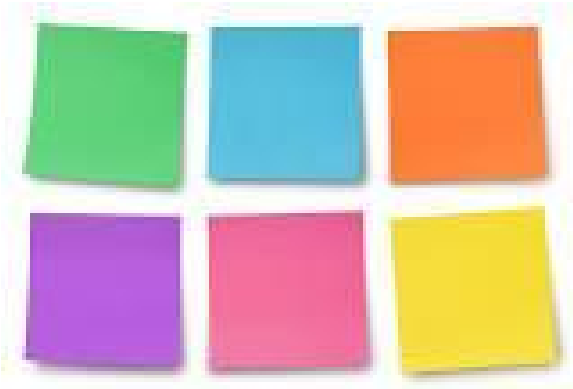
Level of Development (LOD) is the level of completeness and accuracy to which the modeled elements are developed. LOD progresses from the lowest level, LOD 100, to the highest level, LOD 500. The five levels range from conceptual through 'As-Built' with progressively more complete and accurate levels of detail in each level.

Bluebeam

You have been invited by MO-DB-PDaunt to join a Bluebeam Studio Session:

NYSDOT ADCMS Workshop
Session ID: 897-849-291
Session URL: https://studio.bluebeam.com/hyperlink.html?link=studio.bluebeam.com/sessions/897-849-291

See the Slides



Leave a note

This workshop is made possible by FHWA

U.S. Department of Transportation

https://www.fhwa.dot.gov/construction/adcms/

Advanced Digital Construction Management Systems (ADCMS)

DigitalConstruction@dot.gov

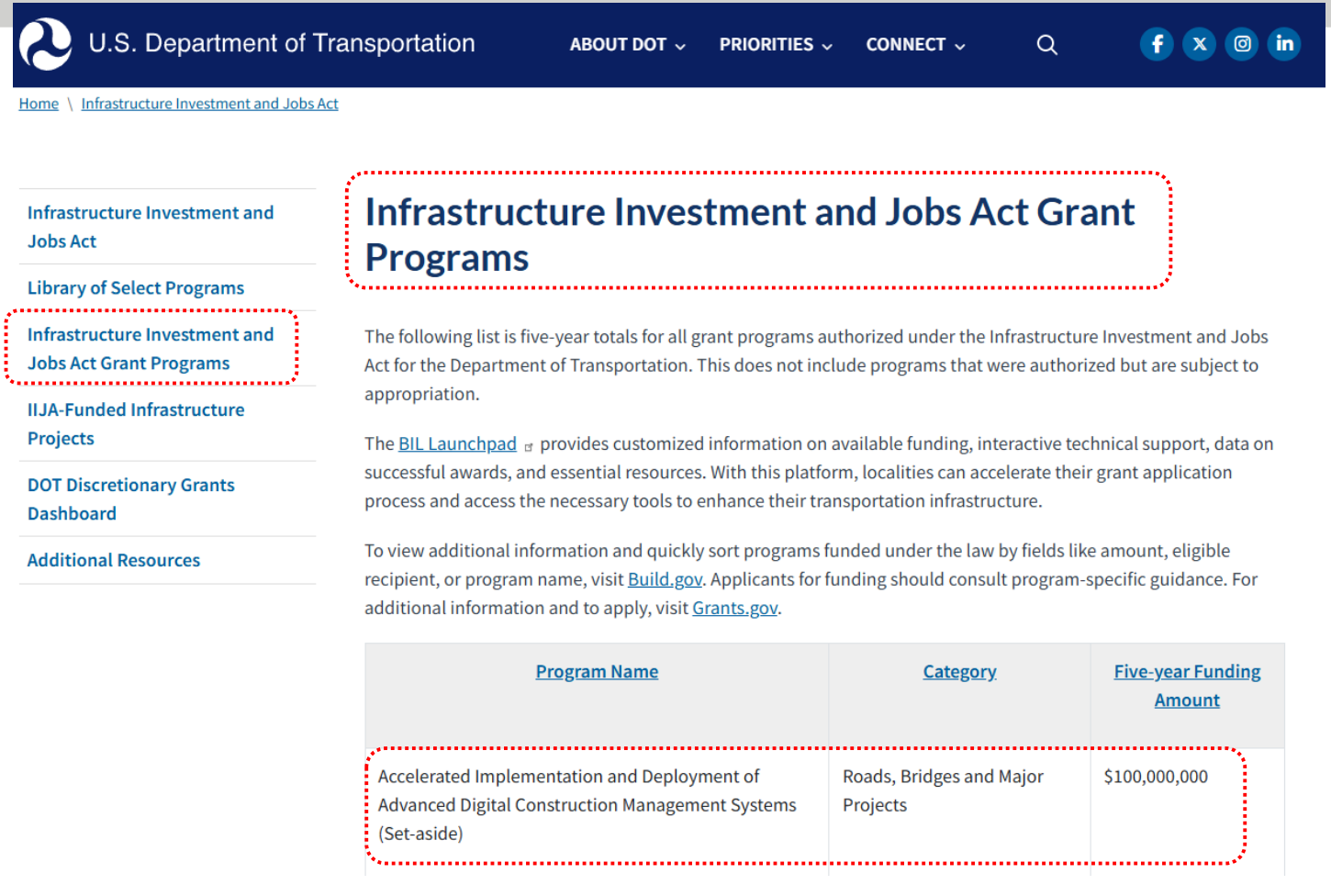
What is ADCMS?

Advanced Digital
ion
ystems

dot.gov

The ADCMS Program is a competitive, discretionary program that focuses on accelerating the adoption of advanced technology that may be applied throughout the construction lifecycle (including through the design and engineering, construction, and operations phases) that maximize interoperability with other systems, products, tools, or applications; boost productivity; manages complexity; reduces project delays and cost overruns; and enhances safety and quality. States may apply alone or in partnership with Local Agencies, Tribes or Private Industry.

How is it Funded?



U.S. Department of Transportation

ABOUT DOT | PRIORITIES | CONNECT

Home \ Infrastructure Investment and Jobs Act

- Infrastructure Investment and Jobs Act
- Library of Select Programs
- Infrastructure Investment and Jobs Act Grant Programs
- IIJA-Funded Infrastructure Projects
- DOT Discretionary Grants Dashboard
- Additional Resources

Infrastructure Investment and Jobs Act Grant Programs

The following list is five-year totals for all grant programs authorized under the Infrastructure Investment and Jobs Act for the Department of Transportation. This does not include programs that were authorized but are subject to appropriation.

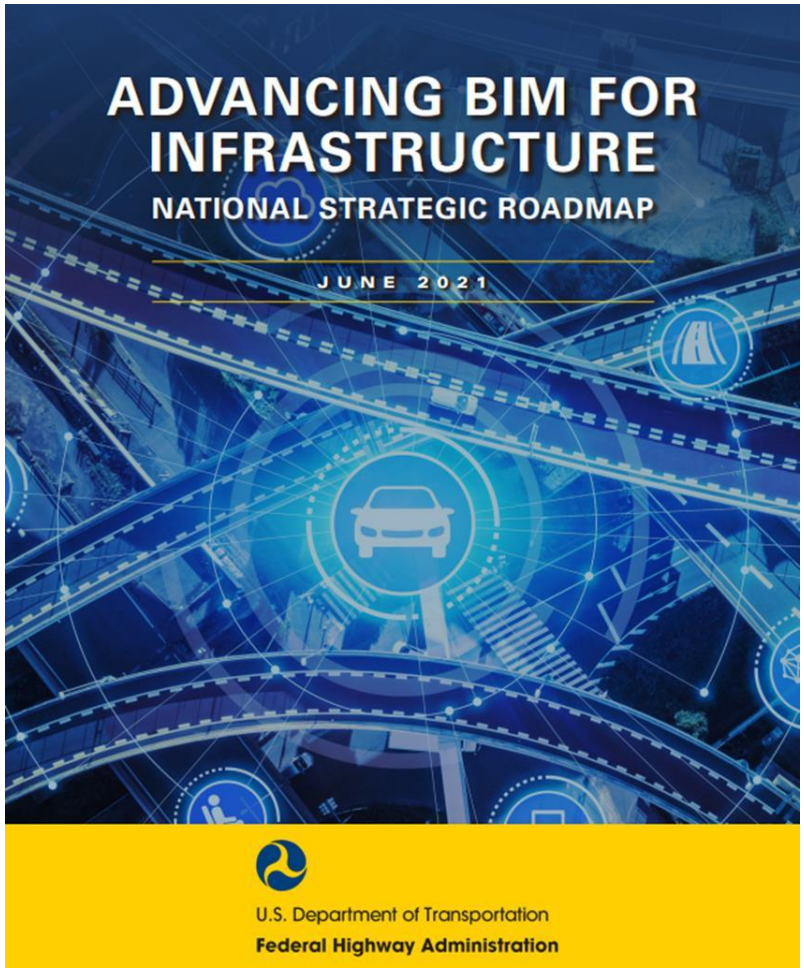
The BIL Launchpad provides customized information on available funding, interactive technical support, data on successful awards, and essential resources. With this platform, localities can accelerate their grant application process and access the necessary tools to enhance their transportation infrastructure.

To view additional information and quickly sort programs funded under the law by fields like amount, eligible recipient, or program name, visit Build.gov. Applicants for funding should consult program-specific guidance. For additional information and to apply, visit Grants.gov.

Program Name	Category	Five-year Funding Amount
Accelerated Implementation and Deployment of Advanced Digital Construction Management Systems (Set-aside)	Roads, Bridges and Major Projects	$100,000,000

Why ADCMS?

https://www.fhwa.dot.gov/publications/research/infrastructure/pavements/21064/index.cfm



Contents

Why ADCMS?

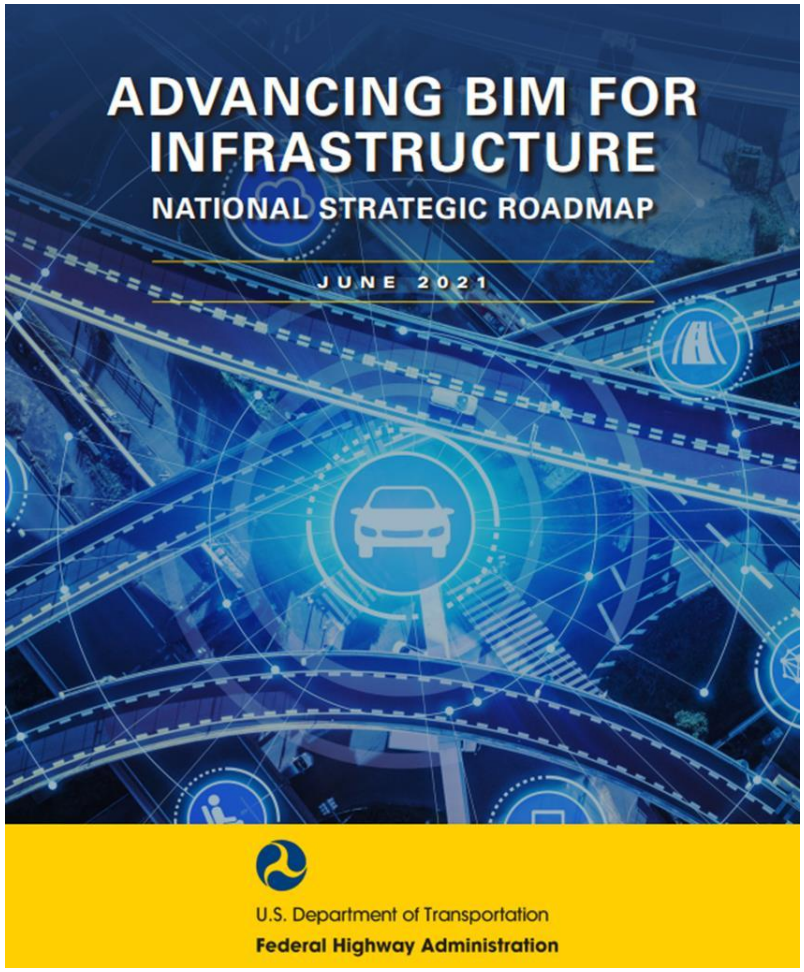
https://www.fhwa.dot.gov/publications/research/infrastructure/pavements/21064/index.cfm

2.0 Purpose and Organization of this Document

Through this document, FHWA articulates a vision and proposes a roadmap of structured activities to advance BIM for Infrastructure in the United States. Using this roadmap, FHWA proposes collaborating with stakeholders on a shared vision, goal, and objective to facilitate BIM for Infrastructure implementation. This document is organized into the following chapters:

- Chapter 3 summarizes the opportunities BIM offers for improving the U.S. highway infrastructure industry as well as the challenges and risks of implementing BIM.
- Chapter 4 defines BIM for Infrastructure, presents its fundamental concepts, and introduces its four elements: policies and processes, people and skills, data and standards, and tools and technologies. Enhancing each of these elements is critical for BIM's growth in an organization.
- Chapter 5 expands on the benefits of deploying BIM summarized in chapter 3 and provides a more in-depth discussion of the BIM benefits for State DOTs. A thorough understanding of the benefits at an elementary level is necessary for articulating the value of BIM for Infrastructure and justifying future investments.
- Chapter 6 assesses the current state of the practice to understand where State DOTs are in terms of deploying and realizing the benefits of BIM for Infrastructure. This assessment forms the basis for the vision statement, goals, and objectives of the roadmap described in chapters 7 and 8.
- Chapter 7 articulates a national vision for BIM for Infrastructure. It introduces the BIM maturity model and defines maturity stages or levels. The chapter then explains how BIM-based data and information exchange fits within and across the various phases of the project and service delivery lifecycle. Finally, the chapter identifies a starter list of BIM for Infrastructure use cases for State DOTs to consider as they plan and develop their BIM-based workflows.
- Chapter 8 presents a roadmap of structured activities that, if performed, can help agencies achieve the various BIM maturity levels articulated in chapter 7. The activities are categorized based on whether they are foundational or contribute to development or deployment. Furthermore, the activities proposed in the roadmap are mapped to objectives that focus on enhancing the current state of the practice regarding BIM policies and processes, people and skills, and data and standards to demonstrate how the structured activities contribute to advancing the agency's BIM maturity.

Why ADCMS?



Technical Report Documentation Page

1. Report No. FHWA-HRT-21-064	**2. Government Accession No.**	**3. Recipient's Catalog No.**	
4. Title and Subtitle Advancing BIM for Infrastructure: National Strategic Roadmap		**5. Report Date** June 2021	
		6. Performing Organization Code	
7. Author(s) Jagannath Mallela and Abhishek Bhargava		**8. Performing Organization Report No.**	
9. Performing Organization Name and Address WSP USA Inc. 1250 23rd Street NW, Suite 300 Washington, DC 20037 National Concrete Pavement Technology Center Iowa State University 2711 South Loop Drive, Suite 4700 Ames, IA 50010		**10. Work Unit No.** **11. Contract or Grant No.** DTFH61-13-D-00009, Task Order 693JJ318F000253	
12. Sponsoring Organization Name and Address Federal Highway Administration 1200 New Jersey Avenue, SE Washington, DC 20590		**13. Type of Report and Period Covered** National Strategic Roadmap **14. Sponsoring Agency Code** HRDI-20	
15. Supplementary Notes This document can be found at https://www.fhwa.dot.gov/construction/bim/. The FHWA Contracting Officer's Representative was Antonio Nieves, and the Federal Task Manager was Connie Yew (HIF).			
16. Abstract Building Information Modeling (BIM) for Infrastructure is an open standards–based collaborative work method for structuring, managing, and using data about transportation assets and networks throughout their lifecycles. It liberates data from siloed systems and makes it easier for automated processes to generate asset information and distribute it to anyone who needs it when they need it. The roadmap outlined in this document is intended to help State departments of transportation (DOTs) strategically develop a uniform, nationwide policy framework related to BIM for Infrastructure, open data–exchange standards and methods for adopting those standards, BIM tools, and a robust personnel training and upskilling program. These State-led and Federal Highway Administration–supported actions can then become the basis for planning and implementing BIM for Infrastructure to better deliver projects and transportation services at the State DOT level.			
17. Key Words BIM deployment, building information modeling, digital data, digitalization, infrastructure lifecycle, return on investment		**18. Distribution Statement** No restrictions. This document is available to the public through the National Technical Information Service, Springfield, VA 22161. http://www.ntis.gov	
19. Security Classification (of this report) Unclassified	**20. Security Classification (of this page)** Unclassified	**21. No. of Pages** 50	**22. Price** N/A

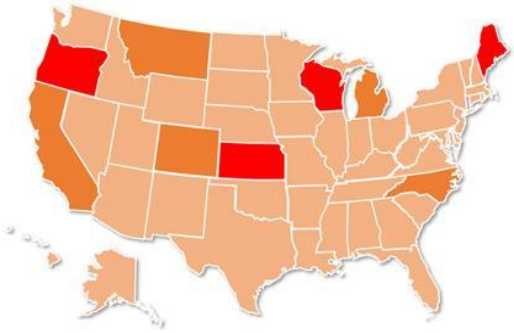
Form DOT F 1700.7 (8-72) **Reproduction of completed page authorized**

Why ADCMS?

2021-2025

EDC-6 DABs Peer Exchanges for 2022-2023

Peer Exchanges: InPerson and Virtual



Dates:

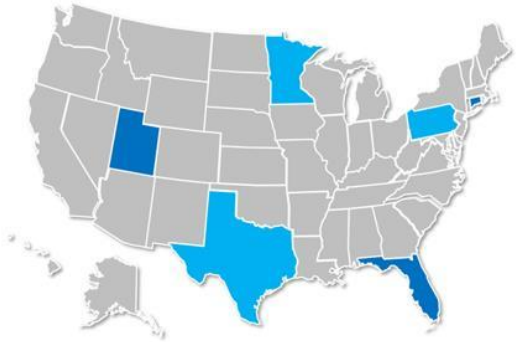
- ORDOT – 11/15-16/2022
- WISDOT – 12/1-2/2022
- MIDOT – 12/6-7/2022
- NCDOT – 2/7-8/2023
- CALTRANS – 3/29-30/2023
- MDT – 5/24-25/2023
- KDOT – 6/6-7/2023
- MEDOT – 6/20-21/2023
- CODOT – 8/8-9/2023
- TBD
- TBD
- TBD

- Peer Exchanges – 3 Pending

Not Participating | In-Person Peer Exchange Participating/Potential DOTs | Host In-Person Peer Exchange | Host Virtual Peer Exchange

EDC-6 DABs Regional Workshops for 2023

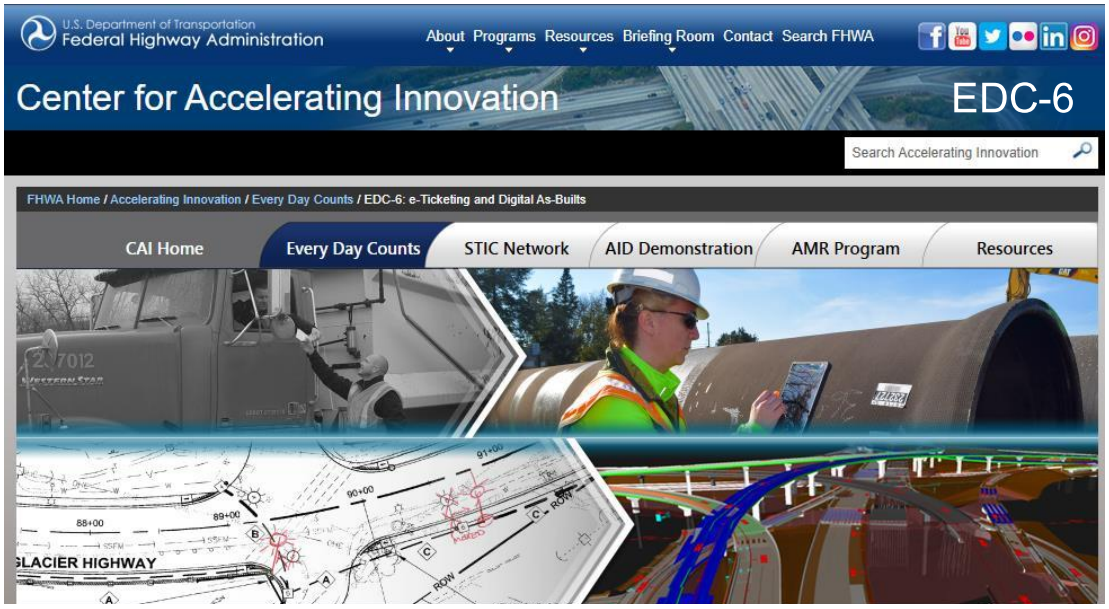
Regional Workshops: In-Person and Virtual



Dates:

- UDOT – 4/18-20/2023
- FDOT – 5/3-4/2023
- MNDOT – 10/24-25/2023
- CTDOT – 11/15-16/2023
- PENNDOT – 12/5-6/2023
- TXDOT – date pending (TBD)

Not Participating | In-Person Regional Workshop Participating/Potential DOTs | Host In-person Regional Workshop | Host Virtual Regional Workshop



DIGITAL AS-BUILTS

Using digital data such as 3D models to build road projects is becoming an industry standard. Sharing the design model and associated digital project data allows agencies and contractors to streamline project delivery and contract administration and to collaborate on challenges "virtually" before they get to the field. The digital information is further leveraged when the model is updated, and other data incorporated, to reflect the project's as-built condition for future maintenance, asset management, and rehabilitation activities.

https://www.fhwa.dot.gov/innovation/everydaycounts/edc_6/

Why ADCMS?

BIM FOR INFRASTRUCTURE POOLED FUND TPF-5(480)

BIM FOR BRIDGES AND STRUCTURES TPF-5(523)

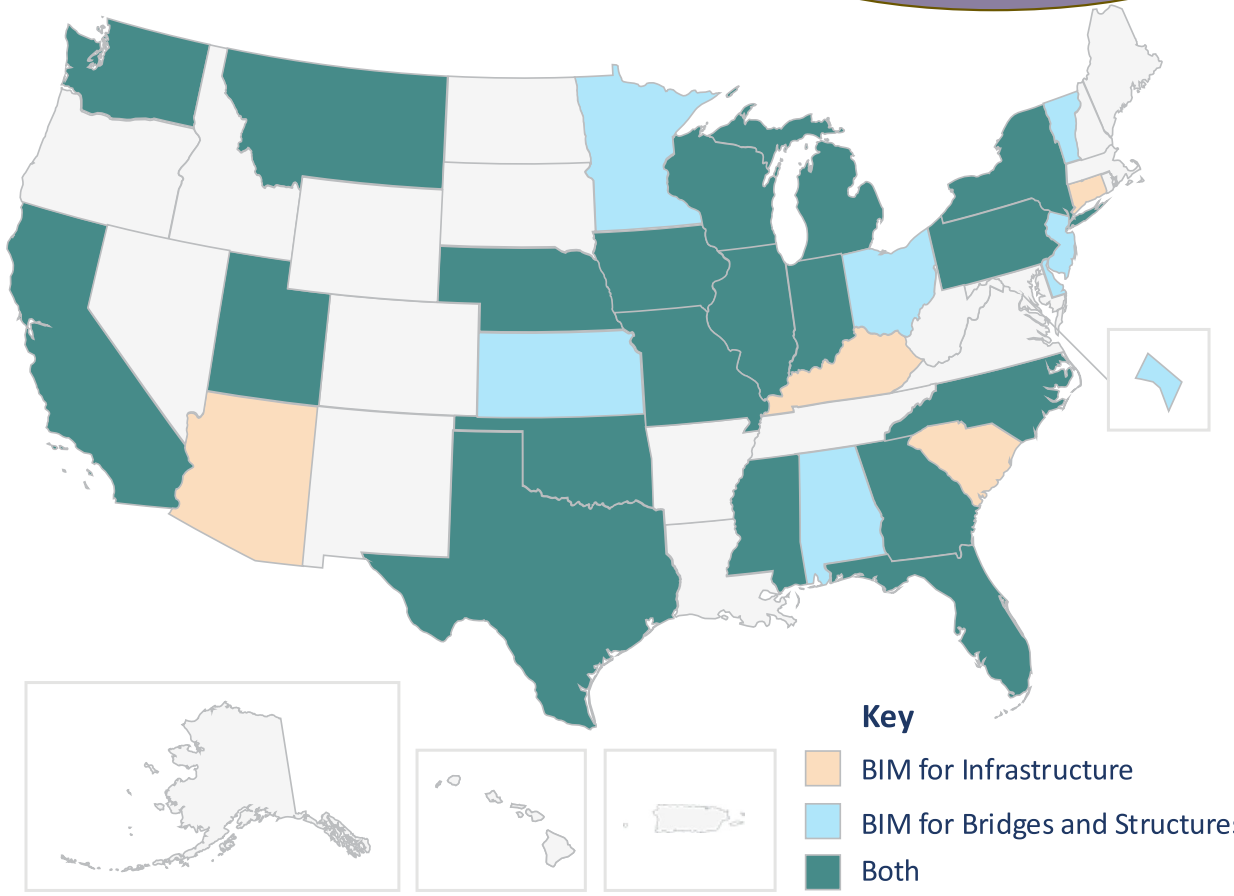
34 DOT's Collaborating

BIM for Infrastructure TPF-5(480)

BIM for Bridges and Structures TPF-5(372) TPF-5(523)

TPF TRANSPORTATION POOLED FUND

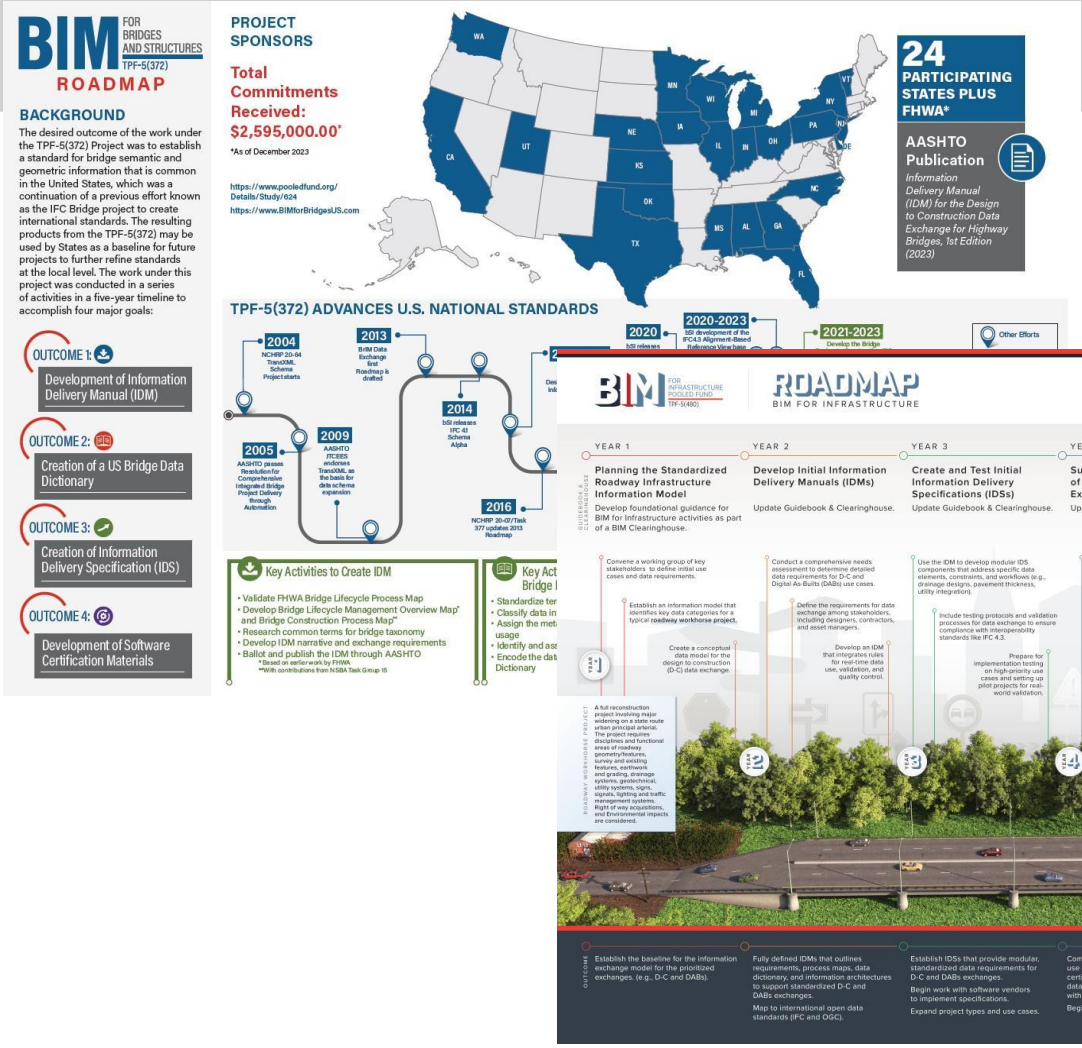
- **Federal Highway Administration (FHWA) administered program in coordination with State departments of transportation (DOT)**
- **Creates an opportunity for partners to pool their funds, subject matter expertise, and resources to conduct high-priority research**



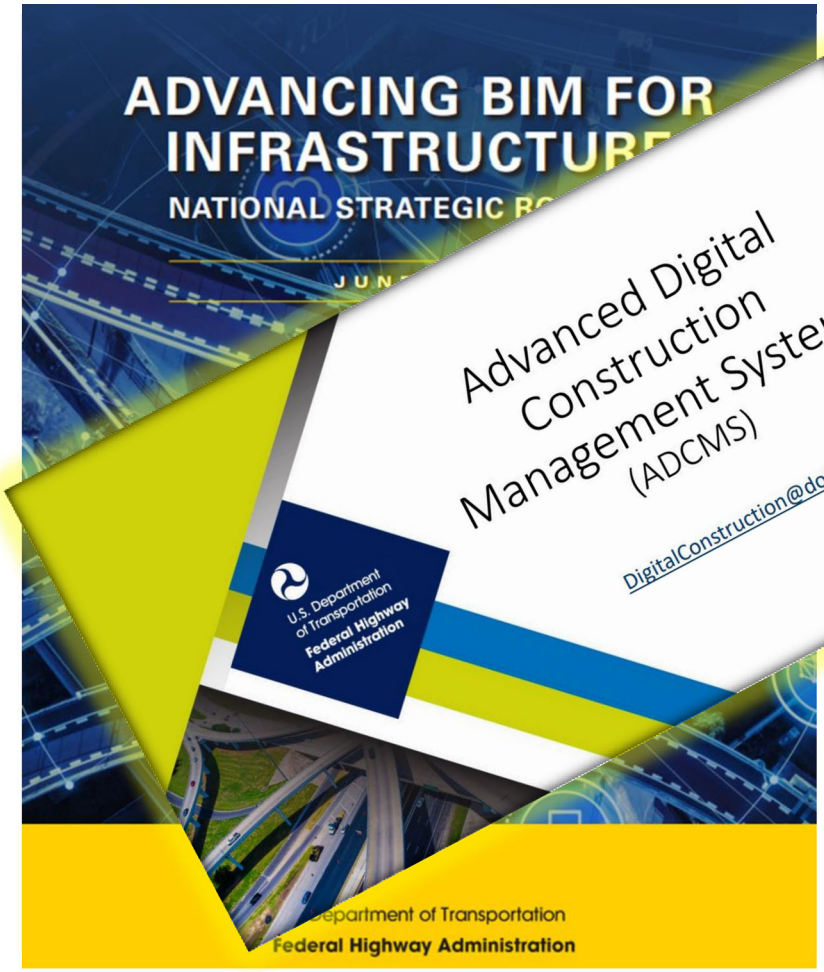
BIM4...

Goals:

- Develop Process Maps
- Identify Data Exchanges
- Create Data Dictionaries
- Create Information Delivery Specifications (IDS)
- Create Information Delivery Manuals (IDM)



Implementation through ADCMS Grants!

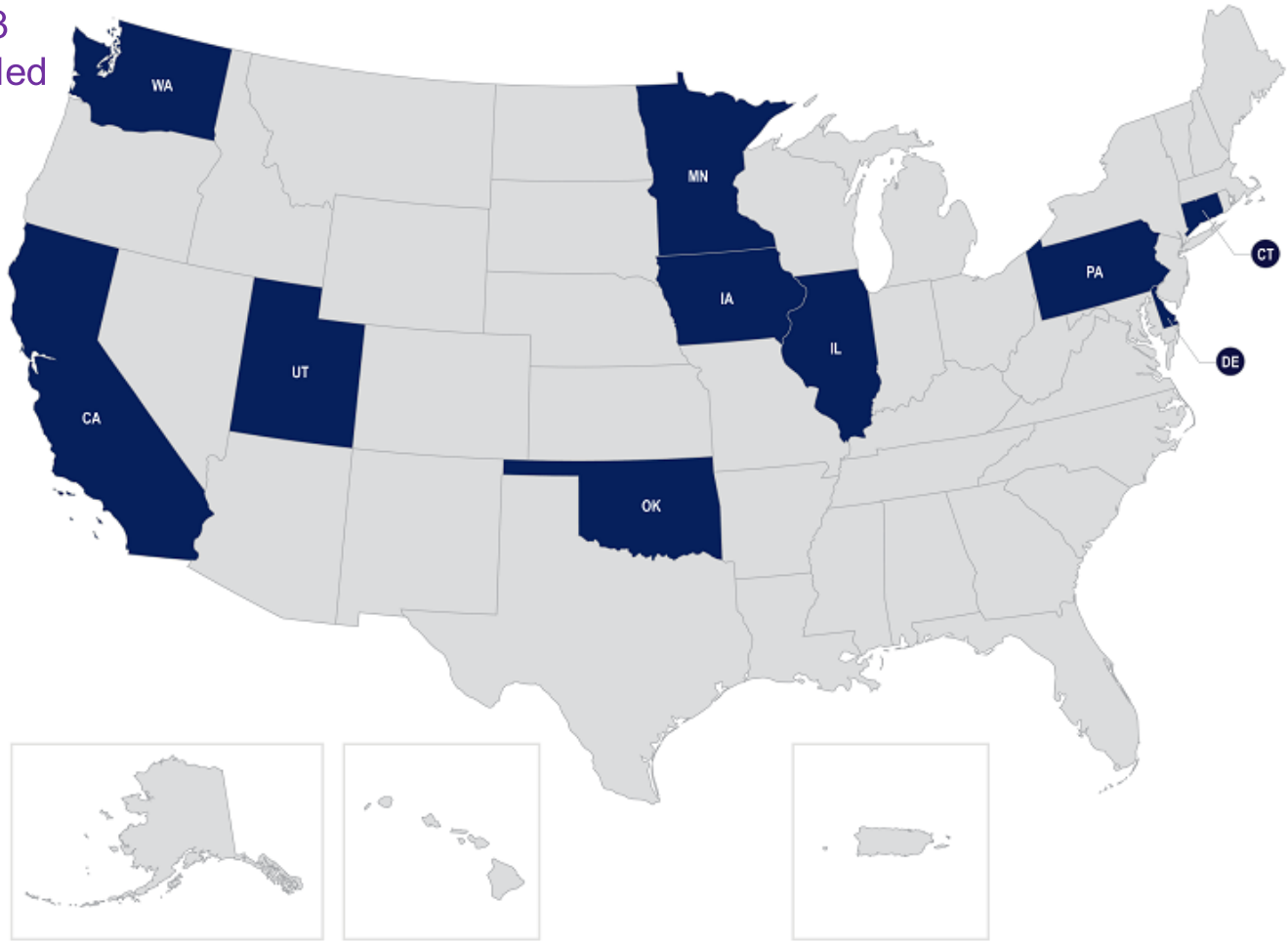


TPF TRANSPORTATION POOLED FUND

Round 1 – Awarded States

https://www.fhwa.dot.gov/construction/adcms/

- SFY 2022 & 2023
- $34 Million awarded
- 10 States



Round 1 Awarded Projects

"digital as-built" "data interoperability" "open data"
"digital delivery" "entire lifecycle"

Project Name	State	Project Description	Grant Award
Caltrans Digital Products Catalog to support Building Information Modeling for Infrastructure (BIM410, IMPROVE Project Asset Lifecycle and facilitate Digital As-builts	California	Fully develop an existing prototype of a data viewer that will allow for combining data from planning, design, and construction, which will facilitate better data management and interoperability across various silos throughout the entire Caltrans project delivery cycle. Proposes using a system successfully developed and deployed by the United Kingdom National Highways Bureau as a model.	$3,920,800
Smart Communication and Reporting Solution (SCORS) add on functionality to CTDOT COMPASS System	Connecticut	Updating CTDOT's existing system COMPASS (a cloud-based, SharePoint project delivery and document management system) to add SCORS functionality. The project goal is to implement standardized COMPASS modules that provide digital smart communications around project delivery and eliminate PDF and paper use.	$4,497,696
Accelerating Digital Inspection Practices with Connected Machinery	Delaware	Proposes to integrate machinery data directly with contract and e-Ticketing driven material data. Material and machine data can be leveraged to begin automated work validation reporting, reducing time spent on low-value inspection activities at worksites, freeing up their time for higher-skilled work.	$4,000,000
IDOT Digital Delivery Implementation	Illinois	Proposes to establish a continuously operating reference system (CORS) network that will work with ongoing implementation of 3D modeling, LiDAR, and small UAS to increase automated machine guidance accuracy, reduce agency costs, and create myriad benefits to other state agencies and the public.	$4,500,000
Advancing Digital Delivery in Iowa and Beyond	Iowa	The project will create the standards, processes, and technology solutions to properly capture, share, and store digital as-built information for State-owned utilities, bridges, and pavement materials.	$1,501,200
Minnesota Nice Connects the DOT's Through the Construction Life Cycle	Minnesota	The NiceConnect project will accelerate the path for asset data interoperability by creating a data map of MnDOT asset data across the construction management system (CMS).	$2,160,000
Cultivating a Connected Environment through Digital Delivery	Oklahoma	Proposes to develop a Digital Delivery Strategic Plan, Project Implementation Plan, Change Management Plan, Communications Plan, and GIS integration plan. Proposes to implement Digital Delivery Design Guidance, Modeling Standards Manual, Software Training Manual and Technology Training, and ProjectWise. Will conduct a pilot project for data exchange between design and construction and procure equipment for construction inspection. Includes mock lettings to understand how contractors would access and use models.	$3,079,440
Advancing Standardized Open-Data As-Built Information Models for Bridges	Pennsylvania	Proposes to apply the use of an open data standard, eliminating the need for expensive proprietary technologies that make it difficult to exchange information between design and construction teams. Builds upon the efforts of the TPF-5(372) BIM for Bridges and Structures Transportation Pooled Fund (to develop the first open data standards for the digital exchange of 3D models for conventional workhorse bridges in the U.S. using the Industry Foundation Classes (IFC) standard).	$3,910,000
Advancing Digital Construction to Support UDOT's Digital Twin	Utah	The project will expand CMaps, a GIS based field data collection tool, piloting CMaps in 2+ 3D modeled construction projects in 2024-2025. The project will train design personnel to prepare files for the tool throughout preconstruction and train designers and project reviewers to use digital design review GIS tools, which are a precursor to using CMaps in construction. By expanding the GIS CMaps tool, UDOT can streamline inspection in the field and provide a predictable, stable, quantity-tracking tool while reducing and/or eliminating PDF plan sets.	$5,000,000
Using LiDAR with Imagery to Extract Roadway Data Elements	Washington	Proposes to create automated processes to extract: (1) MIRE FDE Intersection/Junction Traffic Control attributes from LiDAR; (2) ADA curb ramp location information; and (2) roadway signs from LiDAR and to use this data for the entire lifecycle of a sign. This will create a system that is usable in design, construction, maintenance, and asset management.	$1,350,000
Total			**$33,919,136**

FY2022/23 GRANT RECIPIENTS — 10 STATES | $33.9M

State	Project Name	Focus Area	Award
California	Caltrans Digital Products Catalog (BIM410/IMPROVE)	Data Viewer / BIM Interoperability	$3,920,800
Connecticut	SCORS Add-On to CTDOT COMPASS System	Digital Communications & PM	$4,497,696
Delaware	Accelerating Digital Inspection w/ Connected Machinery	e-Ticketing / IoT / Work Zone Safety	$4,000,000
Illinois	IDOT Digital Delivery Implementation (CORS Network)	3D Modeling / LiDAR / Machine Guidance	$4,500,000
Iowa	Advancing Digital Delivery in Iowa and Beyond	Digital As-Builts / IFC Standards	$1,501,200
Minnesota	NiceConnect: DOT Construction Life Cycle	Asset Data Interoperability / CMS	$2,160,000
Oklahoma	Cultivating a Connected Environment through Digital Delivery	Digital Delivery Strategic Plan / ProjectWise	$3,079,440
Pennsylvania	Advancing Standardized Open-Data As-Built Models for Bridges	Open IFC Standards for Bridges	$3,910,000
Utah	Advancing Digital Construction to Support UDOT's Digital Twin	GIS CMaps / Digital As-Builts / BIM	$5,000,000
Washington	Using LiDAR w/ Imagery to Extract Roadway Data Elements	LiDAR / ADA / Sign Data Extraction	$1,350,000

Source: FHWA — fhwa.dot.gov/construction/adcms/grants/FY22_23.cfm

IOWA | Iowa DOT

Advancing Digital Delivery in Iowa and Beyond — Digital As-Builts for Utilities, Bridges & Pavement

FY2022/23 | $1,501,200

CHALLENGE

Iowa DOT lacked standardized processes and technology solutions for capturing, sharing, and storing digital as-built information for state-owned utilities, bridges, and pavement materials — limiting lifecycle data continuity.

APPROACH

Create standards, processes, and technology solutions for digital as-built data capture across three asset types: state-owned utilities, bridges (using IFC open standards), and pavement materials. Build on TPF-5(372) BIM for Bridges foundation.

KEY ACTIVITIES & DELIVERABLES

- Develop IFC (Industry Foundation Classes) proof of concept for bridge as-builts using TPF-5(372)/Phase I deliverables
- Assess Model as the Legal Document (MALD) feasibility for IFC-based bridge models with contractors
- Collaborate with TPF-5(523) Phase II and PennDOT ADCMS teams on IFC4x3 integration
- Produce IFC models viewable in Trimble Connect and Propeller platforms
- Develop digital delivery standards for state-owned utilities and pavement materials data
- Create roadmap for Digital Delivery and Digital Twin implementation (building on SPR-RE22 roadmap)

TECHNOLOGIES: IFC4x3 | MALD | Trimble Connect | Propeller | LandXML | BIM/GIS

EXPECTED OUTCOMES & SIGNIFICANCE

- Iowa becomes a national leader in IFC-based open-standard bridge as-builts, enabling cross-platform model exchange
- Validated IFC4x3 workflows reducing contractor cost and time for 3D model reconstruction
- Demonstrated multiple digital delivery formats: 3D Models, LandXML, IFC, 2D CAD, spreadsheets, geo-tagged photos
- Supports national adoption of open data standards eliminating vendor lock-in

Ref: Iowa DOT Digital Delivery Site — iowadot.gov/digital-delivery | Iowa DOT Digital Delivery Roadmap SPR-RE22(008) (2022) | Iowa DOT e-Construction Presentation (Oct 2025) | FHWA ADCMS Grants FY22/23

MINNESOTA | MnDOT

Minnesota NiceConnect — Connecting DOTs Through the Construction Life Cycle

FY2022/23 | $2,160,000

CHALLENGE

MnDOT asset data was fragmented across disparate systems with no unified mapping between the construction management system (CMS) and downstream asset management and operations systems — preventing data reuse across the project lifecycle.

APPROACH

Accelerate asset data interoperability by creating a comprehensive data map of MnDOT asset data across the construction management system, enabling seamless data flow from construction to operations and asset management phases.

KEY ACTIVITIES & DELIVERABLES

- Create a data map connecting MnDOT CMS asset data to asset management and operations systems
- Build interoperability pathways between construction management and lifecycle asset systems
- Develop workflows to transfer construction data directly into MnDOT's operations databases
- Engage stakeholders across construction, maintenance, and asset management divisions
- Document best practices for CMS-to-asset-management data connectivity
- Create transferable model for other state DOTs adopting similar interoperability frameworks

TECHNOLOGIES: CMS Integration | Asset Mgmt Systems | Data Mapping | Interoperability | GIS | SQL/Database

EXPECTED OUTCOMES & SIGNIFICANCE

- Elimination of data re-entry between construction and asset management — reducing errors and administrative burden
- Clear data map enabling MnDOT staff to understand where and how asset data flows throughout the organization
- Replicable interoperability framework applicable to other states with similar CMS fragmentation

Ref: FHWA ADCMS Grants FY22/23 — fhwa.dot.gov/construction/adcms/grants/FY22_23.cfm | FHWA ADCMS Report to Congress (2024)

OKLAHOMA | ODOT

Cultivating a Connected Environment through Digital Delivery

FY2022/23 | $3,079,440

CHALLENGE

ODOT lacked a comprehensive Digital Delivery program — including standards, plans, systems, and trained workforce — to enable modern digital construction management and transition away from paper-based processes.

APPROACH

Develop a complete Digital Delivery ecosystem from the ground up, including strategic plans, modeling standards, software systems, and GIS integration, validated through mock lettings and pilot projects with actual contractors.

KEY ACTIVITIES & DELIVERABLES

- Develop Digital Delivery Strategic Plan, Project Implementation Plan, Change Management Plan, and Communications Plan
- Create GIS integration plan and deploy ProjectWise for document and model management
- Develop Digital Delivery Design Guidance, Modeling Standards Manual, and Technology Training resources
- Conduct pilot data exchange project between design and construction phases
- Procure advanced field equipment for construction inspection (rovers, mobile devices)
- Conduct mock lettings to understand how contractors access and use digital models

TECHNOLOGIES: ProjectWise | 3D Modeling | GIS Integration | Digital As-Builts | Change Management | e-Inspection

EXPECTED OUTCOMES & SIGNIFICANCE

- Oklahoma DOT establishes a complete foundational Digital Delivery program usable for all future projects
- ProjectWise deployment enables statewide document management and model-based design delivery
- Contractors trained and ready for digital model-based construction contracts — reducing rework and errors
- Transferable plan structure serving as a template for other emerging-stage state DOTs

Ref: FHWA ADCMS Grants FY22/23 | ACEC/ODOT/OTA 3D Working Group Meeting Minutes (Mar & Jul 2024) | FHWA ADCMS Peer Exchange San Diego (2024)

PENNSYLVANIA | PennDOT

Advancing Standardized Open-Data As-Built Information Models for Bridges (3D2025 Directive)

FY2022/23 | $3,910,000

CHALLENGE

Bridge design and construction data was locked in proprietary software formats, making it expensive to exchange between design and construction teams and preventing interoperability — requiring costly 3D model reconstruction by contractors.

APPROACH

Apply the open IFC (Industry Foundation Classes) standard — adopted by AASHTO — to create contractual bridge models that can be shared freely across software platforms. Build on TPF-5(372) BIM for Bridges and Structures pooled fund work.

KEY ACTIVITIES & DELIVERABLES

- Develop IFC files for bridge construction contracts using Bentley OpenBridge Designer with ISO 16739-1:2024 standard
- First-ever contractual IFC model delivery on a U.S. highway construction project (milestone achieved 2025)
- Provide bridge IFC models including geometry, location, relationships, pay items, and material properties
- Partner with TPF-5(523) and Iowa DOT ADCMS for coordinated open standards adoption
- Develop training initiatives for contractors, designers, and state/local entities
- Build utility data accessibility for local governments using PennDOT as data host

TECHNOLOGIES: IFC/openBIM | OpenBridge Designer | ISO 16739-1 | AASHTO IDM | 3D2025 | BIM4Bridges

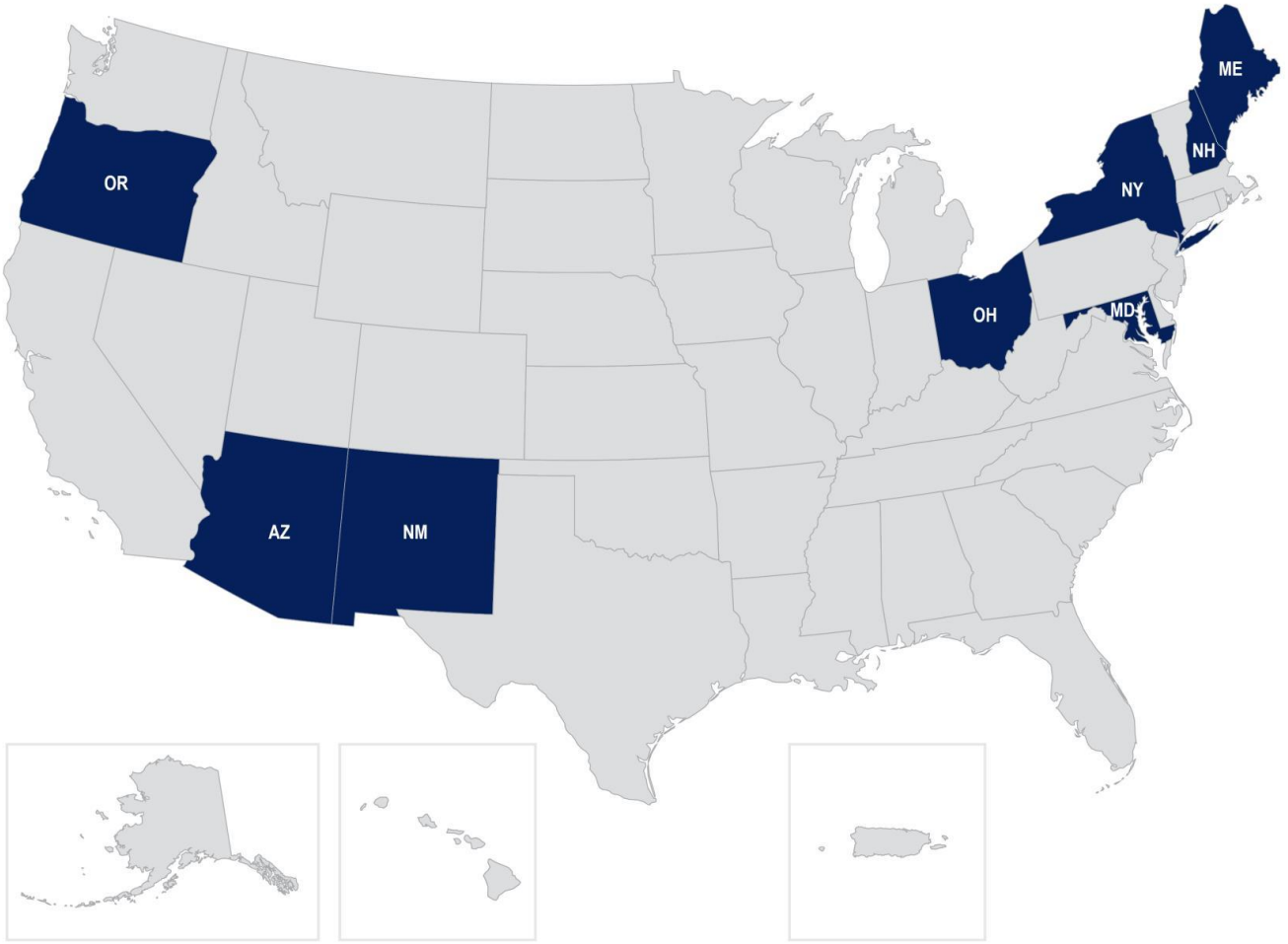
EXPECTED OUTCOMES & SIGNIFICANCE

- National first: IFC contractual bridge model delivered — establishing precedent for open standard model-based delivery
- Eliminates proprietary technology lock-in, enabling any contractor to open models in their preferred software
- AASHTO-adopted IFC standard becomes usable in real U.S. construction contracts for the first time
- Benefits extend to public outreach, environmental protection, and work zone safety reduction

Ref: PennDOT ADCMS Grant Page — pa.gov | APC First IFC Model Press Release (Aug 2025) | TPF-5(372) BIM for Bridges Final Report (Mar 2024) | BuildingSMART IFC Mandate 2025 | PennDOT ADCMS Pilot — pa.gov/penndot/digital-delivery

Round 2 – Awarded States

- SFY 2024
- NYSDOT awarded $3.4M
  - Largest award in Round 2
- $17M total awarded
- 8 States



Round 2 Awarded Projects

"digital as-built" "data governance" "data interoperability" "digital delivery" "digital twins" "asset mgmt"

Project Name	State	Project Description	Grant Award
Igniting Arizona's Digital Delivery Revolution	Arizona	Develop modeling and delivery standards (i.e. manuals). Pilot the use of modern digital delivery practices on ADOT project and share lessons learned. Lead development of a digital delivery workforce through outreach to educational partners, industry partners.	$1,360,000
DIRIGO 2030: Digital Delivery for Asset Management	Maine	Digital Results and Innovation are a GO for 2030 (DIRIGO 2030), 7 outcomes: Roadmap Plan, Communication Plan, Data Governance Standard, Asset Management Process Documentation, Pilot Projects (2) using 3D model, Improved staff safety, Increased capabilities for digital as-builts.	$1,516,200
MCDOT P3DSETI Pilot Expansion Project	Maryland	Precise 3D Survey and Engineering of Transportation Infrastructure (P3DSETI), integrated storage or buckets for housing 3D scans, 2D line drawings, as-builts, etc. Will validate standards, processes, and workflows for adoption by others.	$1,000,000
Using Digital Project Delivery as a Catalyst for Recruitment and Retention at NHDOT	New Hampshire	Establish digital workflows and data standards for better info management. Will combine data from current silos. Develop new survey and design standards. Develop project management and contract management standards with construction inspection standards. Standards for digital as-builts and three pilot projects. Procure advanced field equipment aimed at enhancing the accuracy, tooling options, and reporting capabilities of current inspection tools.	$3,200,000
NMDOT Advanced Digital Construction Management Systems Implementation Plan	New Mexico	Develop workflow and standards to enable seamless data interoperability across survey, design, construction, planning, and asset mgt. Expand LiDAR data connection as a standard practice. Support creation and extraction of asset data in survey, design, and post construction. Implement pilot projects and demonstrate sharing of digital as-builts and extracted asset data.	$1,858,335.45
Advancing Lifecycle Management of Subsurface Roadway Asset Information	New York	Develop asset and exchange requirements. Develop data modeling specifications and standards. Establish data integration and a Common Data Environment (CDE). Build prototype BIM and digital as-built models. Integration with NYSDOT operations (mainstreaming).	$3,400,000
ODOT Workflows Optimization for Real-time Knowledge Sharing (WORKS)	Ohio	Further develop iModel technology to accelerate Model as a Legal Document and link information from digital twins. iModel is open-source code.	$3,292,000
Item Type Library	Oregon	Proposed solution is an open standards-based collaborative item type library for structuring, managing, and using transportation assets item features throughout their lifecycles. Develop features for 15 commonly used features. Anticipated features include: signing, guardrail, traffic barrier, impact attenuators, end terminals, lighting, stormwater, and other assets to be identified.	$1,020,000
Total			**$16,646,535.45**

OHIO | ODOT

ODOT WORKS — Workflow Optimization for Real-time Knowledge Sharing Using iModel Technology

FY2024 | $3,292,000

CHALLENGE

ODOT had no process for delivering BIM models as legal contract documents (MALD), limited grasp of regulatory barriers, and no framework for real-time design-to-construction data exchange — requiring contractors to rebuild 3D models from 2D plans at significant cost.

APPROACH

Further develop iModel technology (open-source) to accelerate the Model as a Legal Document (MALD) framework — linking information from digital twins and enabling real-time data exchange between design and construction teams.

KEY ACTIVITIES & DELIVERABLES

- Support stakeholder engagement and sandbox testing for iModel MALD workflows
- Develop and document workflows, training, standards, and specifications for iModel-based delivery
- Investigate additional model use cases for ODOT beyond bridges — roadway, drainage, utilities
- Provide workforce training and upskilling opportunities across ODOT design and construction divisions
- Implement structured change management practices for organizational transition
- Recommend future development strategies and best practices for model-based delivery

TECHNOLOGIES: iModel Technology | MALD | Digital Twin | ProjectWise | Open Source BIM | Change Management

EXPECTED OUTCOMES & SIGNIFICANCE

- Ohio DOT establishes a legal and technical pathway for BIM models as contract documents — replacing 2D plan sets
- iModel open-source technology enables ODOT to avoid vendor lock-in while achieving digital twin integration
- Real-time knowledge sharing between design and construction reduces costly information gaps
- Research study on MALD legislative and regulatory pathways ($373K) running concurrently via TRB

Ref: FHWA ADCMS Grants FY24 | ODOT WORKS Scope of Services (PID 123152) — ODOT FTP | ACEC/ODOT 3D Working Group Minutes 2024 | TRB Research — rip.trb.org (ODOT MALD Study)

ARIZONA | ADOT

Igniting Arizona's Digital Delivery Revolution — Standards, Pilots & Workforce Development

FY2024 | $1,360,000

CHALLENGE

ADOT lacked comprehensive digital delivery standards and manuals, limiting its ability to adopt modern construction management technologies and preventing contractors and staff from leveraging 3D model-based delivery on state projects.

APPROACH

Develop complete digital delivery standards and manuals, pilot modern digital practices on an ADOT project with shared lessons learned, and lead workforce development through partnerships with educational and industry partners.

KEY ACTIVITIES & DELIVERABLES

- Develop comprehensive modeling and delivery standards manuals for ADOT-wide use
- Pilot modern digital delivery practices on a selected ADOT construction project
- Share detailed lessons learned from pilot with state and national audiences
- Build digital delivery workforce through educational outreach to universities and community colleges
- Partner with Arizona construction industry for contractor readiness training
- Establish baseline metrics for tracking digital delivery adoption progress

TECHNOLOGIES: 3D Modeling | Digital Delivery | BIM Standards | Workforce Training | Pilot Projects | LiDAR

EXPECTED OUTCOMES & SIGNIFICANCE

- Arizona transitions from ad-hoc digital practices to a standardized, documented digital delivery program
- Workforce pipeline established — next-generation engineers trained in digital delivery from the start
- Pilot project provides concrete evidence base for statewide rollout of digital delivery

Ref: FHWA ADCMS Grants FY24 — fhwa.dot.gov/construction/adcms/grants/FY24.cfm | FHWA ADCMS Program Announcement (Nov 2024)

FY2024 GRANT RECIPIENTS — 8 STATES | $16.6M

State	Project Name	Focus Area	Award
Arizona	Igniting Arizona's Digital Delivery Revolution	Standards Manuals / Workforce / Pilots	$1,360,000
Maine	DIRIGO 2030: Digital Delivery for Asset Management	Roadmap / Data Governance / Pilot Projects	$1,516,200
Maryland	MCDOT P3DSETI Pilot Expansion Project	3D Survey / Scan Storage / Standards Validation	$1,000,000
New Hampshire	Digital Project Delivery as Catalyst for Recruitment	Digital Workflows / Survey Standards / Pilots	$3,200,000
New Mexico	NMDOT ADCMS Implementation Plan	LiDAR / Data Interoperability / Asset Data	$1,858,335
New York	Advancing Lifecycle Mgmt of Subsurface Roadway Assets	BIM / Digital As-Builts / CDE / NYSDOT Ops	$3,400,000
Ohio	ODOT WORKS: Workflow Optimization for Real-Time Knowledge Sharing	iModel Technology / Digital Twins / Legal Model	$3,292,000
Oregon	Item Type Library	Open Standards Asset Library for 15 Features	$1,020,000

Source: FHWA — fhwa.dot.gov/construction/adcms/grants/FY24.cfm

Mentimeter

What does building information modeling (BIM) mean to you?

Of those terms, which means the most to you?

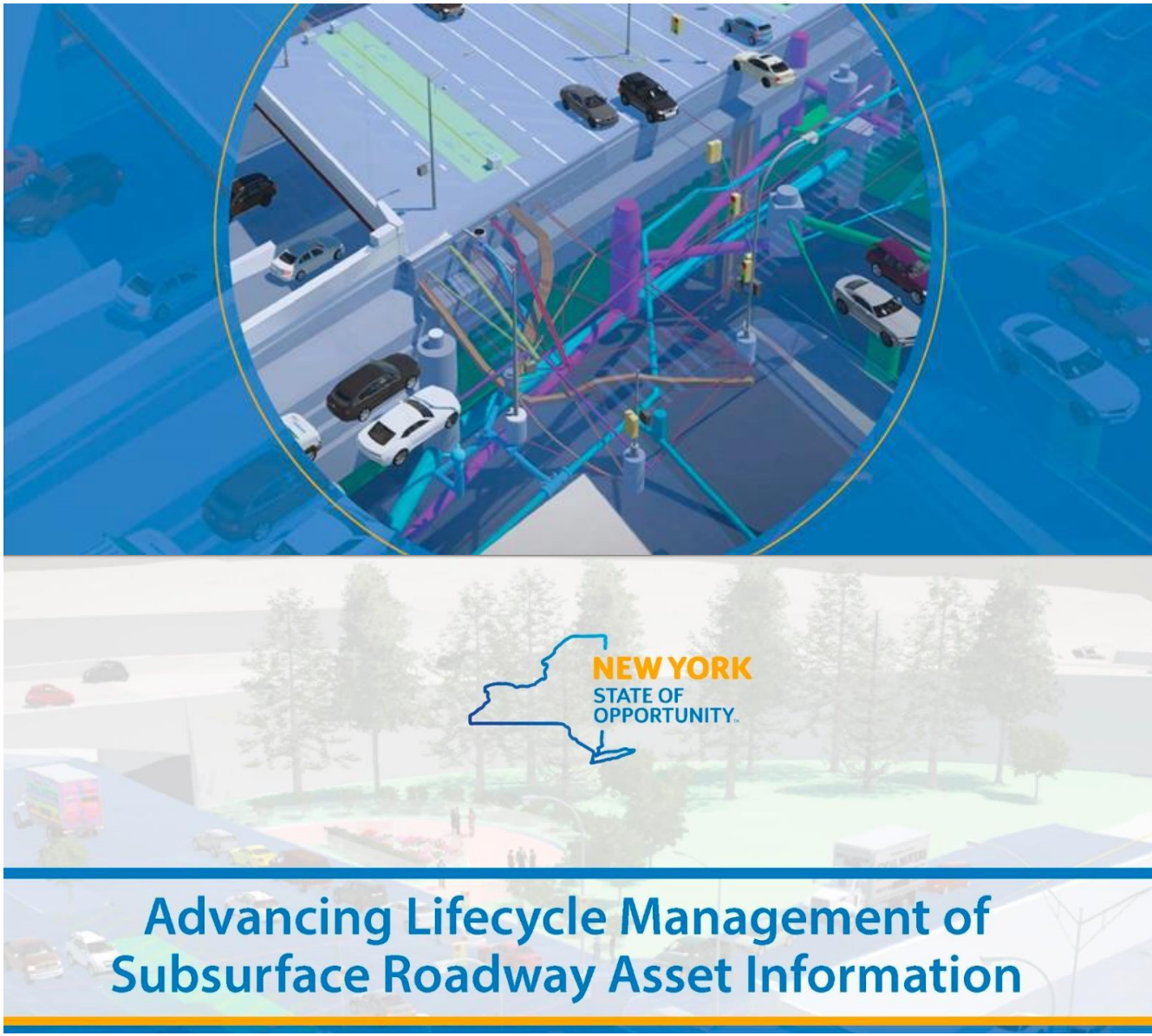
How well do we share data between design, construction, operations and maintenance, asset management?

https://www.mentimeter.com/app/presentation/alp5w2qg2b8w3ri6srqjujhvbg4indpq/edit?source=share-modal

NYSDOT ADCMS Grant Award

Led by: Eric Coulter

9:10am – 9:20am



NYSDOT ADCMS Grant Award

Project Name:

Advancing Lifecycle Management of Subsurface Roadway Asset Information

Project Overview: Award: October 2024

- Develop asset and exchange requirements.
- Develop data modeling specifications and standards.
- Establish data integration and a Common Data Environment (CDE).
- Build prototype BIM and digital as-built models. Integration with NYSDOT operations (mainstreaming).

Funds Obligated:

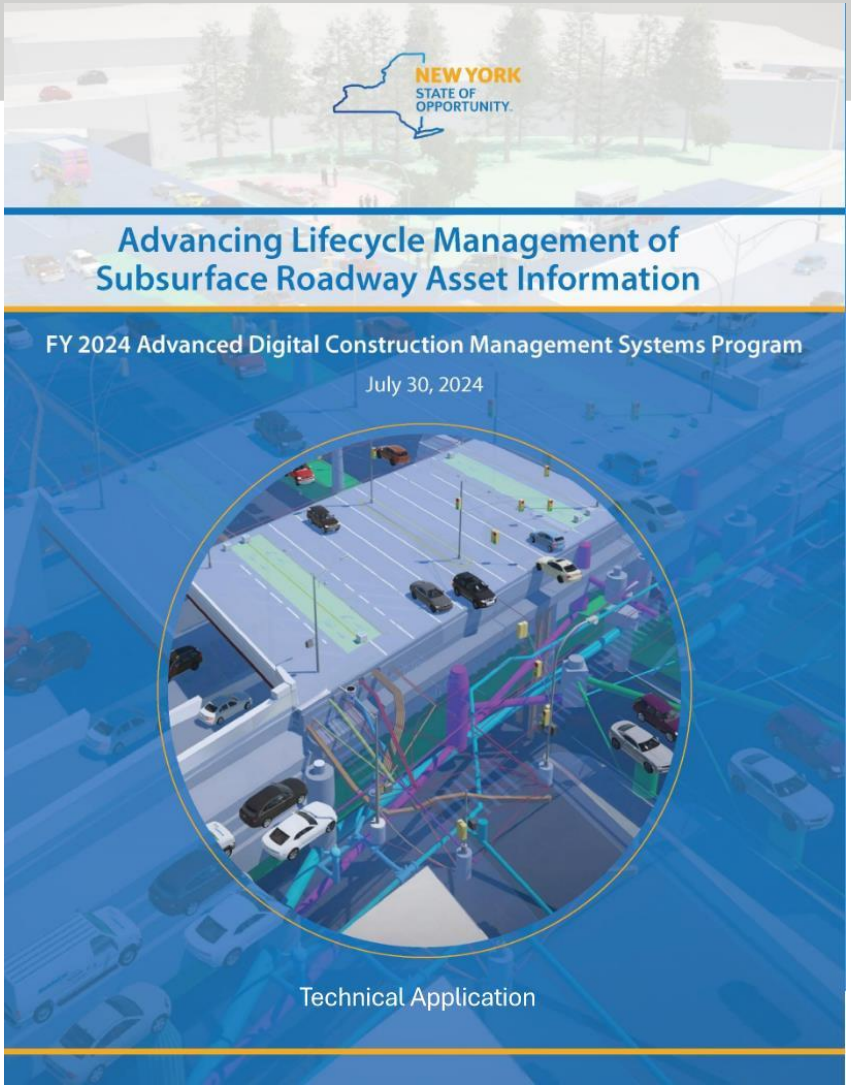
$3.4 M (Federal)

$0.85 M (State)

Partners:

WSP

University at Buffalo



NEW YORK | NYSDOT

Advancing Lifecycle Management of Subsurface Roadway Asset Information — CDE and BIM As-Builts

FY2024 | $3,400,000

CHALLENGE

NYSDOT's subsurface roadway asset data was fragmented without exchange requirements, data modeling specifications, or a Common Data Environment — creating costly unknowns for construction, maintenance, and future project planning.

APPROACH

Develop asset and exchange requirements, data modeling specifications and standards, a Common Data Environment (CDE), and prototype BIM and digital as-built models — then mainstream these tools into NYSDOT operations.

KEY ACTIVITIES & DELIVERABLES

- Develop asset and exchange requirements for subsurface roadway asset information
- Develop data modeling specifications and standards for subsurface infrastructure BIM
- Establish a Common Data Environment (CDE) for NYSDOT digital asset data
- Build prototype BIM models and digital as-built models for subsurface assets
- Integrate prototype tools into mainstream NYSDOT operations
- Create transferable documentation for other state DOTs managing complex urban subsurface infrastructure

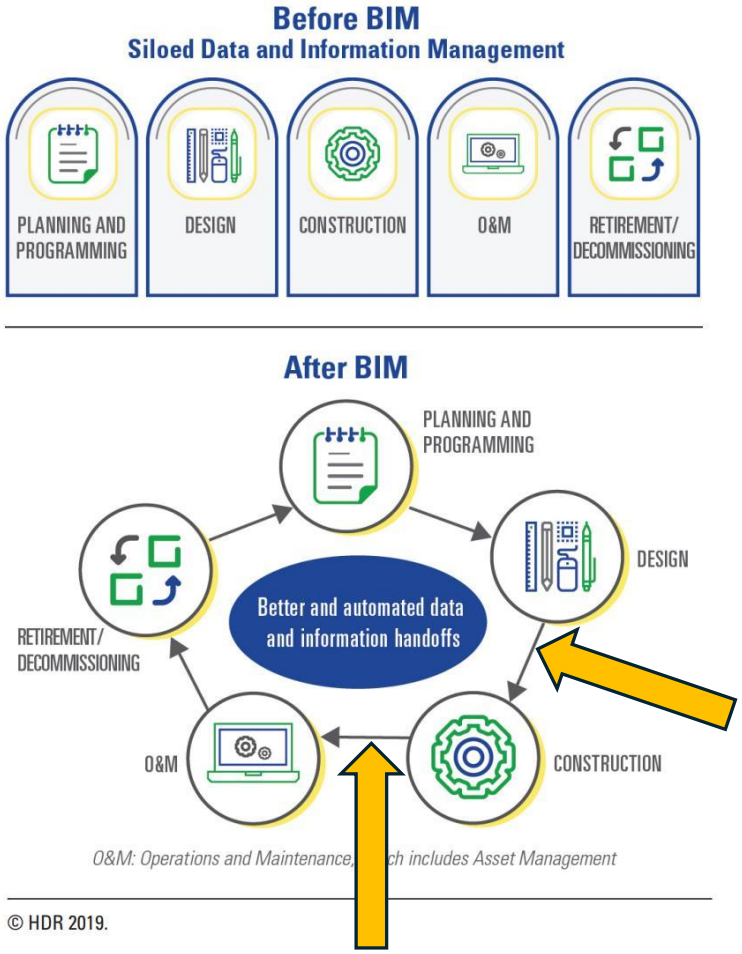
TECHNOLOGIES: BIM | Common Data Environment | Subsurface Modeling | Digital As-Builts | Data Standards | Asset Management

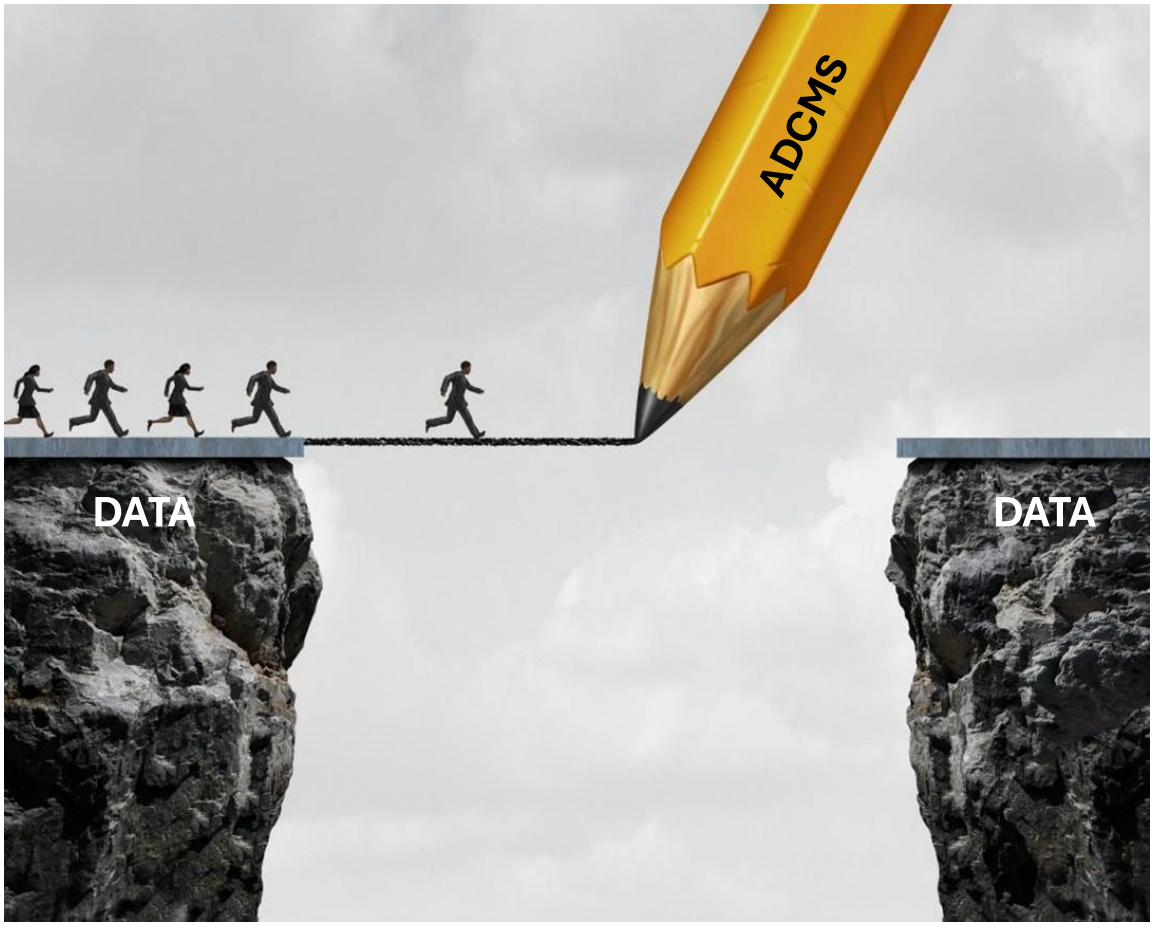
EXPECTED OUTCOMES & SIGNIFICANCE

- NYSDOT gains first-ever standardized subsurface asset data management capability
- CDE enables multi-stakeholder access to subsurface infrastructure data across NYSDOT divisions
- BIM prototype models for subsurface assets enabling clash detection and better construction planning
- Significant cost avoidance: better subsurface data reduces costly surprises during construction

Ref: FHWA ADCMS Grants FY24 — fhwa.dot.gov/construction/adcms/grants/FY24.cfm | FHWA ADCMS Nov 2024 Announcement

At a High Level…





At a High Level…

This grant is focused on creating a process for a small group of assets that can be repeated and scaled up to include other assets.

A New Process Requires New Tools

- We can't implement BIM, Digital Delivery & Digital As-Builts utilizing existing tools and processes.

Project Task Categories Overview

I. To-Be State Definition

Task 1: Project Management: Kickoff, Coordination, and Communication

Task 2: Evaluate Current Design Standards and Specifications

Task 3: Prepare for and Conduct To-Be State Definition Workshop

II. Data Architecture

Task 4: Develop Asset and Exchange Information Requirements (AIR, EIR)

Task 5: Embed Model Element Table into Geospatial Data Environment

Task 6: Build Enterprise Data Dictionary

III. Data Modeling Specifications and Standards

Task 7: Architect Future Design Standards and Specifications

Task 8: Create Information Delivery/Exchange Specifications Documentation

IV. Information Systems and Workflows

Task 9: Establish Data Integration & Common Data Environment

Task 10: Design and Construction Data Model Validation Tools

V. Implementation Pilot

Task 11: Building Information Modeling and Digital As-Built Pilot

Task 12: Data Conversion Tool Pilot

Task 13: Data Provisioning to Common Data Environment Pilot

Task 14: Document data migration process

VI. Mainstreaming

Task 15: Full Integration with NYSDOT Operations

Task 16: Training Material and Documentation

NYSDOT ADCMS Schedule

I. To-Be State Definition Tasks (Tasks 1-3)

Task 1: Project Management: Kickoff, Coordination, and Communication
Task 2: Evaluate Current Design Standards and Specifications
Task 3: Prepare for and Conduct To-Be State Definition Workshop

II. Data Architecture Tasks (Tasks 4-6)

Task 4: Develop Asset and Exchange Information Requirements (AIR, EIR)
Task 5: Embed Model Element Table into Geospatial Data Environment
Task 6: Build Enterprise Data Dictionary

III. Data Modeling Specifications and Standards Tasks (Tasks 7-8)

Task 7: Architect Future Design Standards and Specifications
Task 8: Create Information Delivery/Exchange Specifications Documentation

IV. Information Systems and Workflows Tasks (Tasks 9-10)

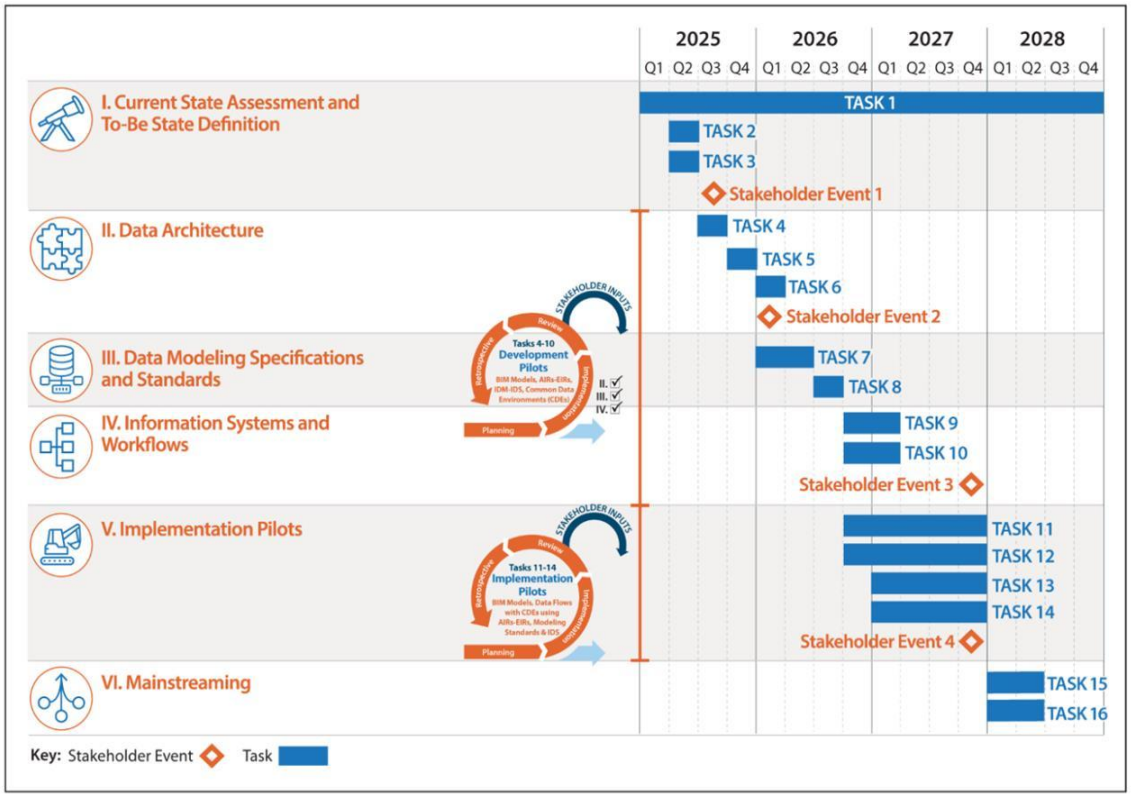
Task 9: Establish Data Integration & Common Data Environment
Task 10: Design and Construction Data Model Validation Tools

V. Implementation Pilot Tasks (Tasks 11-14)

Task 11: Building Information Modeling and Digital As-Built Pilot
Task 12: Data Conversion Tool Pilot
Task 13: Data Provisioning to Common Data Environment Pilot
Task 14: Document data migration process

VI. Mainstreaming Tasks (Tasks 15-16)

Task 15: Full Integration with NYSDOT Operations
Task 16: Training Material and Documentation



Increase NYSDOT's BIM Maturity through ADCMS

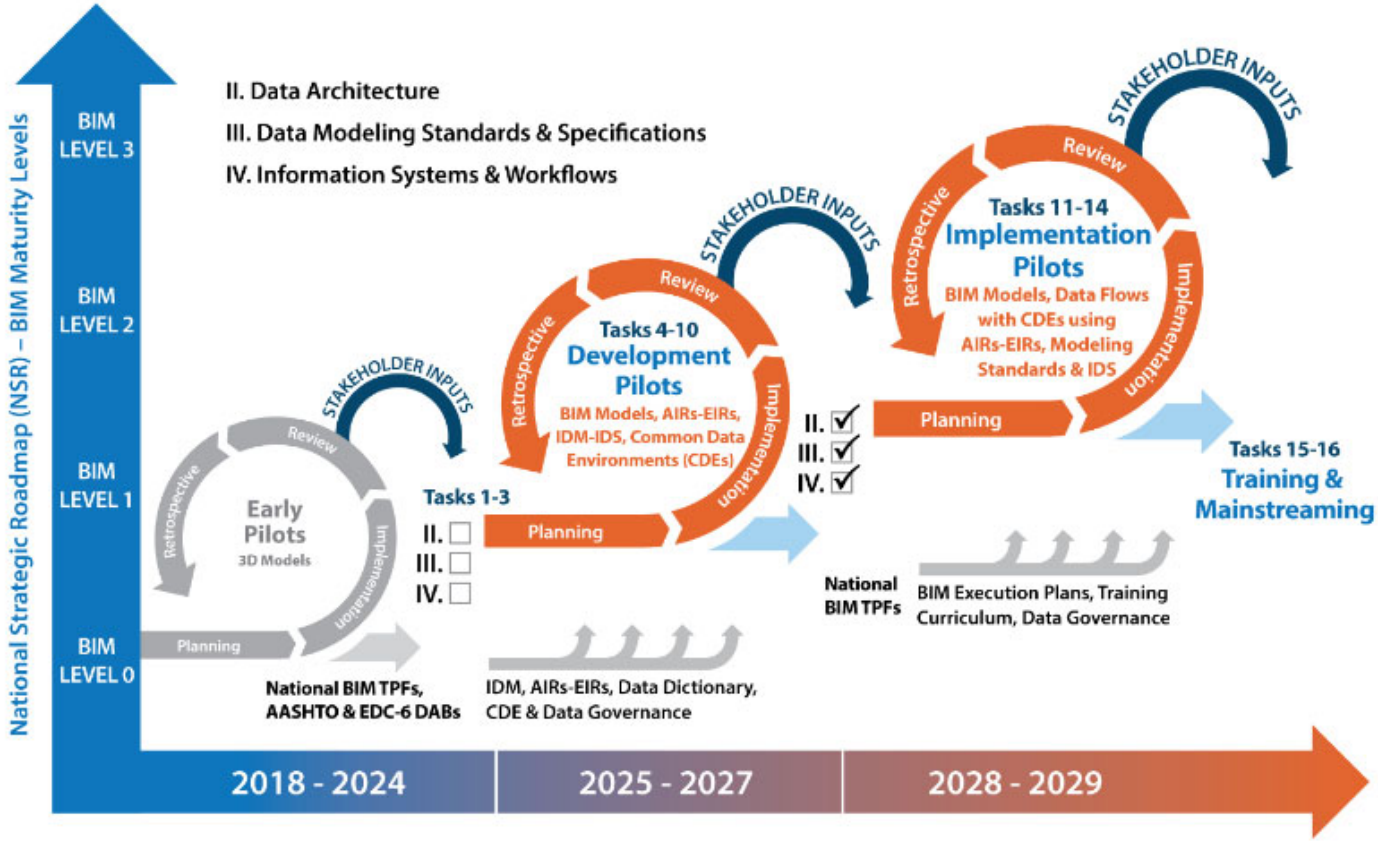


Figure 1: Digital Delivery Program Capability and ADCMS Project Progression

Workforce Development (NOFO Criterion)

NYSDOT ADCMS Grant Application FY 2024

Advancing Lifecycle Management of Subsurface Roadway Asset Information

4.5 Criterion 5- Workforce Development, Job Quality and Wealth Creation

NYSDOT has secured a partnership letter from the University at Buffalo, which will, as described in 2.1 Staffing Plan, develop two new graduate courses to aid in training NYSDOT staff in key digital delivery areas. This partnership will ensure that knowledge creation and sharing occurs both within NYSDOT and with external partners, enabling collaboration and building redundancy of crucial technological skills that will advance BIM at NYSDOT and throughout the transportation industry.

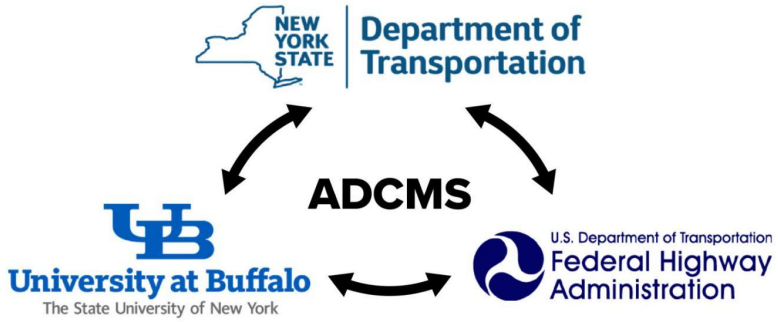
NYSDOT ADCMS Grant Award

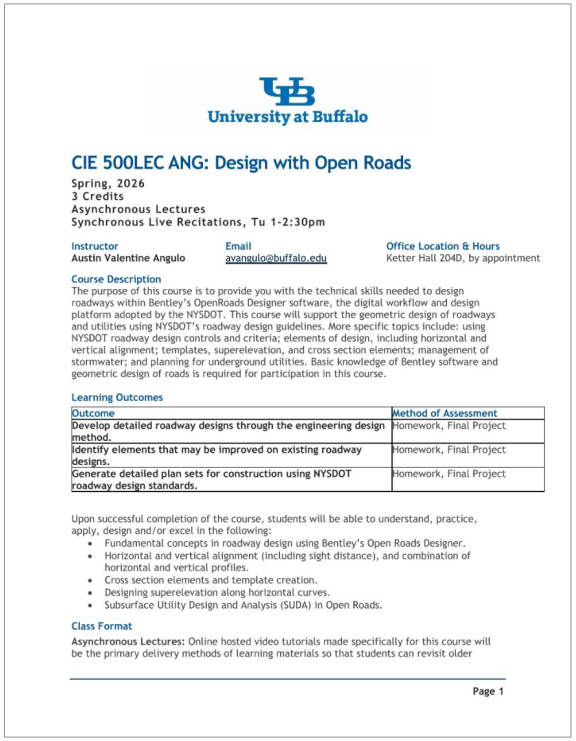
- University of Buffalo (UB) has entered into agreement with NYSDOT to administer two graduate level courses:
  - Bentley OpenRoads Designer (ORD) including Subsurface Utility Design and Analysis
  - Bentley OpenBridge Modeler (OBM)

University at Buffalo

NYSDOT ADCMS Grant Award

NYSDOT ~ 40 Seats





University at Buffalo

CIE 500LEC ANG: Design with Open Roads

Spring, 2026
3 Credits
Asynchronous Lectures
Synchronous Live Recitations, Tu 1-2:30pm

Instructor	Email	Office Location & Hours
Austin Valentine Angulo	avangulo@buffalo.edu	Ketter Hall 204D, by appointment

Course Description

The purpose of this course is to provide you with the technical skills needed to design roadways within Bentley's OpenRoads Designer software, the digital workflow and design platform adopted by the NYSDOT. This course will support the geometric design of roadways and utilities using NYSDOT's roadway design guidelines. More specific topics include: using NYSDOT roadway design controls and criteria; elements of design, including horizontal and vertical alignment; templates, superelevation, and cross section elements; management of stormwater; and planning for underground utilities. Basic knowledge of Bentley software and geometric design of roads is required for participation in this course.

Learning Outcomes

Outcome	Method of Assessment
Develop detailed roadway designs through the engineering design method.	Homework, Final Project
Identify elements that may be improved on existing roadway designs.	Homework, Final Project
Generate detailed plan sets for construction using NYSDOT roadway design standards.	Homework, Final Project

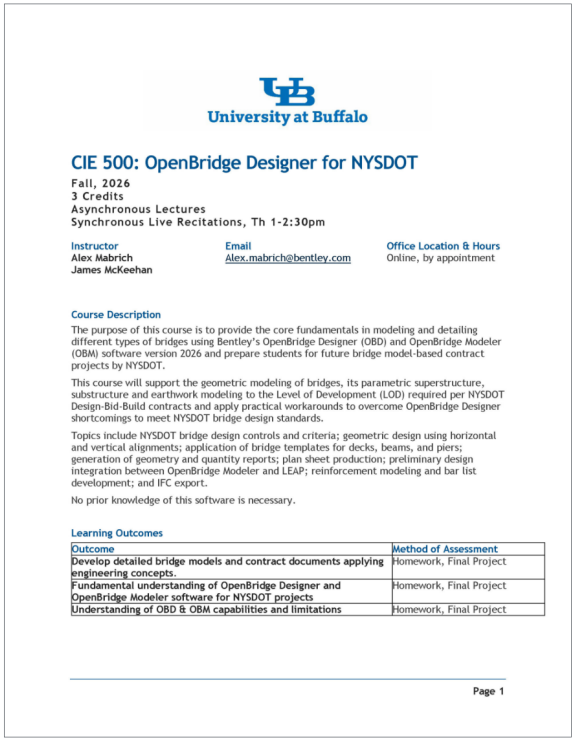
Upon successful completion of the course, students will be able to understand, practice, apply, design and/or excel in the following:

- Fundamental concepts in roadway design using Bentley's Open Roads Designer.
- Horizontal and vertical alignment (including sight distance), and combination of horizontal and vertical profiles.
- Cross section elements and template creation.
- Designing superelevation along horizontal curves.
- Subsurface Utility Design and Analysis (SUDA) in Open Roads.

Class Format

Asynchronous Lectures: Online hosted video tutorials made specifically for this course will be the primary delivery methods of learning materials so that students can revisit older

Page 1



University at Buffalo

CIE 500: OpenBridge Designer for NYSDOT

Fall, 2026
3 Credits
Asynchronous Lectures
Synchronous Live Recitations, Th 1-2:30pm

Instructor	Email	Office Location & Hours
Alex Mabrich James McKeehan	Alex.mabrich@bentley.com	Online, by appointment

Course Description

The purpose of this course is to provide the core fundamentals in modeling and detailing different types of bridges using Bentley's OpenBridge Designer (OBD) and OpenBridge Modeler (OBM) software version 2026 and prepare students for future bridge model-based contract projects by NYSDOT.

This course will support the geometric modeling of bridges, its parametric superstructure, substructure and earthwork modeling to the Level of Development (LOD) required per NYSDOT Design-Bid-Build contracts and apply practical workarounds to overcome OpenBridge Designer shortcomings to meet NYSDOT bridge design standards.

Topics include NYSDOT bridge design controls and criteria; geometric design using horizontal and vertical alignments; application of bridge templates for decks, beams, and piers; generation of geometry and quantity reports; plan sheet production; preliminary design integration between OpenBridge Modeler and LEAP; reinforcement modeling and bar list development; and IFC export.

No prior knowledge of this software is necessary.

Learning Outcomes

Outcome	Method of Assessment
Develop detailed bridge models and contract documents applying engineering concepts.	Homework, Final Project
Fundamental understanding of OpenBridge Designer and OpenBridge Modeler software for NYSDOT projects	Homework, Final Project
Understanding of OBD & OBM capabilities and limitations	Homework, Final Project

Page 1

Course Offerings:

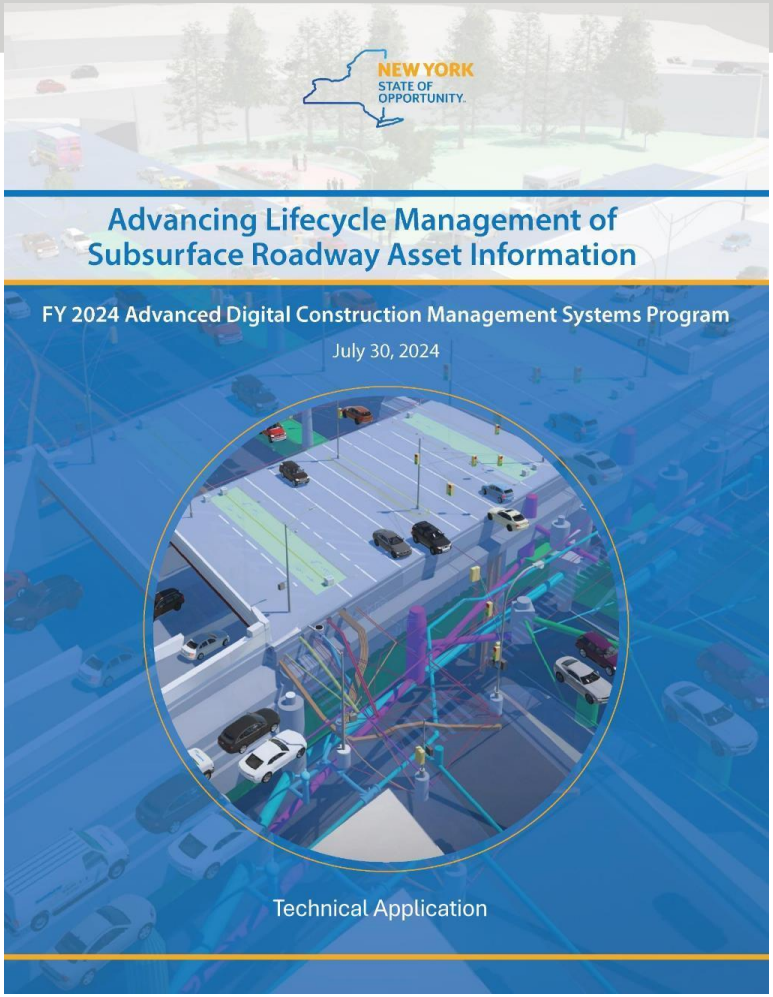
- Spring 2026 (8 staff)
- Spring 2027
- Spring 2028

Course Offerings:

- Fall 2026 (10 staff)
- Fall 2027

ADCMS Year 1 Accomplishments

- ✓ Grant Awarded (October 2024)
- ✓ NYSDOT PIN Created
- ✓ $3.4M FHWA Funds Obligated
- ✓ Regional Design Services Agreement (RDSA)
  - ✓ Scope of Services
  - ✓ Advertised
  - ✓ Proposal
  - ✓ Early Start Request
  - ✓ Consultant Kick-off
- ✓ Internal NYSDOT To Be State Workshop
- ✓ UB Workforce Development
  - ✓ ORD/SUDA Course Development
    - ✓ Spring 2026
    - ✓ Fall 2026
- ✓ External NYSDOT To Be State Workshop



Mentimeter

How well do we share data between design, construction, operations and maintenance, asset management?

https://www.mentimeter.com/app/presentation/alp5w2qg2b8w3ri6srqjujhvbg4indpq/edit?source=share-modal

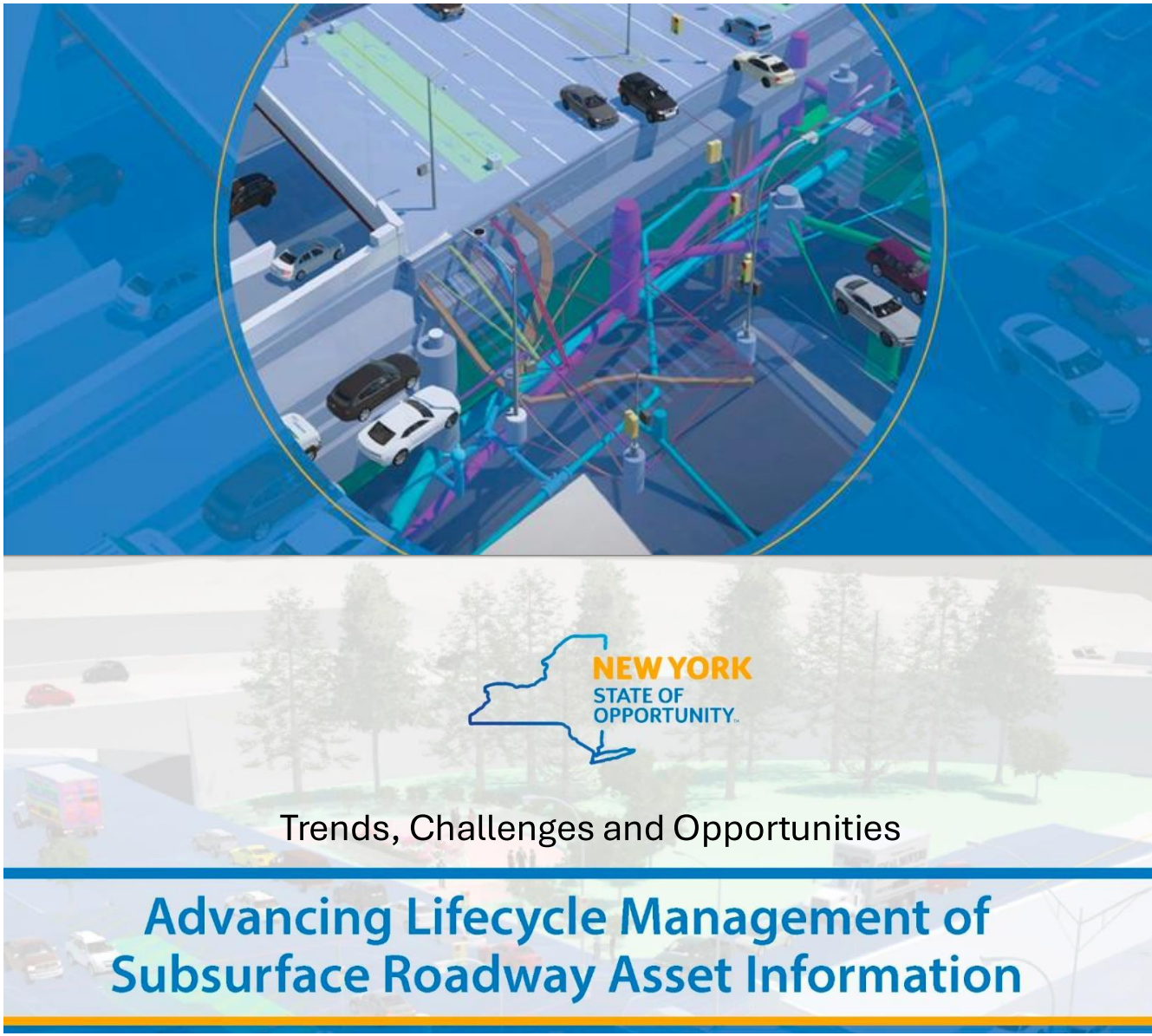
NEXT.. Session 1

Topic	Schedule
Welcome and Overview of ADCMS	**9:00 AM – 9:20 AM**
1. Introductions, Workshop Goals and Objectives	9:00 – 9:10 AM
2. ADCMS Grant Award	9:10 – 9:20 AM
3. Survey	
SESSION 1: Current State of Practice	**9:20 AM – 10:00 AM**
1. Presentation & Demo	9:20 – 9:50 PM
2. Open Discussion & Survey: Regional Practices, Challenges, Opportunities, Consensus	9:50 – 10:00 AM
SESSION 2: Digital Delivery and Pilot Projects	**10:00 AM – 10:30 AM**
1. Presentation & Demo	10:00 – 10:20 AM
2. Open Discussion & Survey	10:20 – 10:30 AM
BREAK	**10:30 - 10:45 AM**
SESSION 3: To-Be State of Practice	**10:45 AM – 1:50 PM**
1. Defining To-Be State:	10:45 – 11:15 AM
• *Demo and To-Be State Vision*	*10:45 – 11:00 AM*
• *Open Discussion & Survey*	*11:00 – 11:15 AM*
2. Level of Development, Design/Construction Workspace Design and Asset Information Management	11:15 – 12:00 PM
• *Demo and To-Be State Vision*	*11:15 – 11:25 AM*
• *Open Discussion & Survey*	*11:25 – 12:00 PM*
LUNCH BREAK	**12:00 – 1:00 PM**
3. BIM Execution Plans (BEP)	1:00 – 1:50 PM
• *BIM Workflows, Roles and Responsibilities, Technology Infrastructure*	*1:00 – 1:30 PM*
• *Open Discussion & Survey*	*1:30 – 1:50 PM*
Closing Remarks - Look Ahead: 2026 - 2027	**1:50 PM – 2:00 PM**

I. Current State of Practice

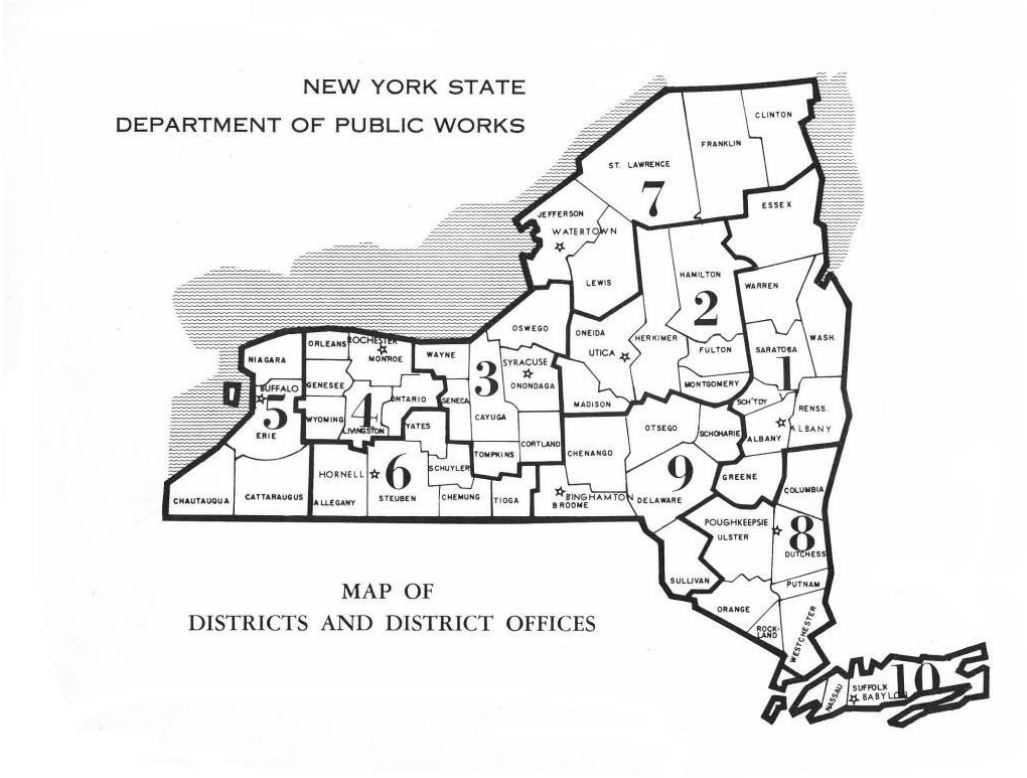
Led by: Matt France

Session 1 9:20am – 10:00am

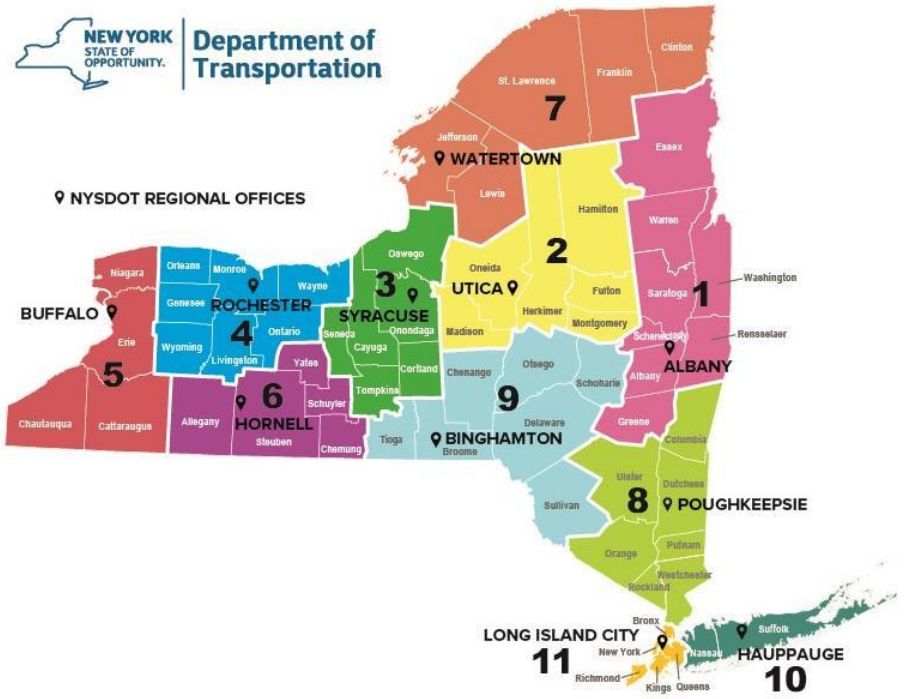


Where we started…

- Department of Public Works 1878
  + Department of Highways 1909

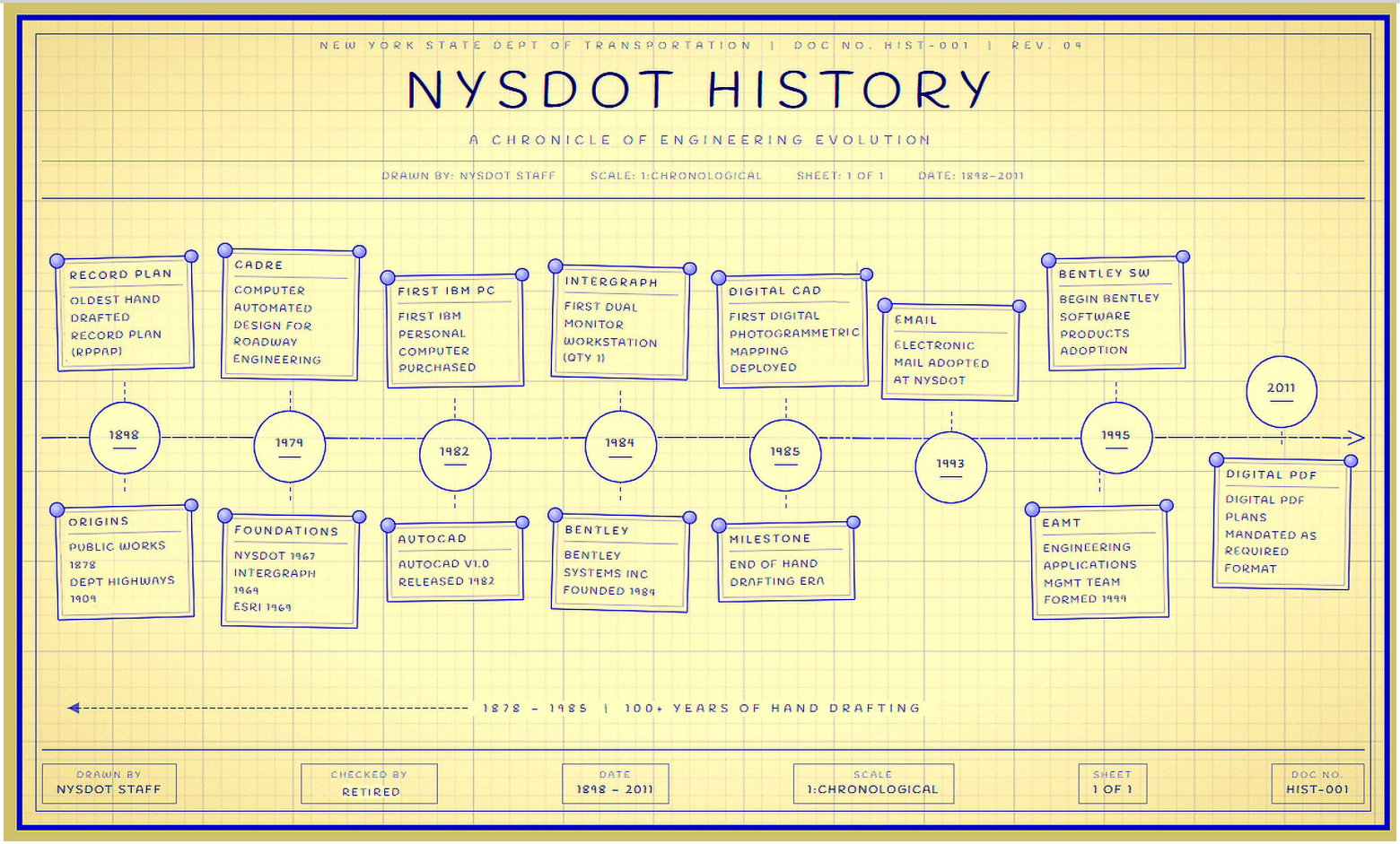


- Department of Transportation 1967 to Present Day



Where we've been…

#paperbasedlife #change

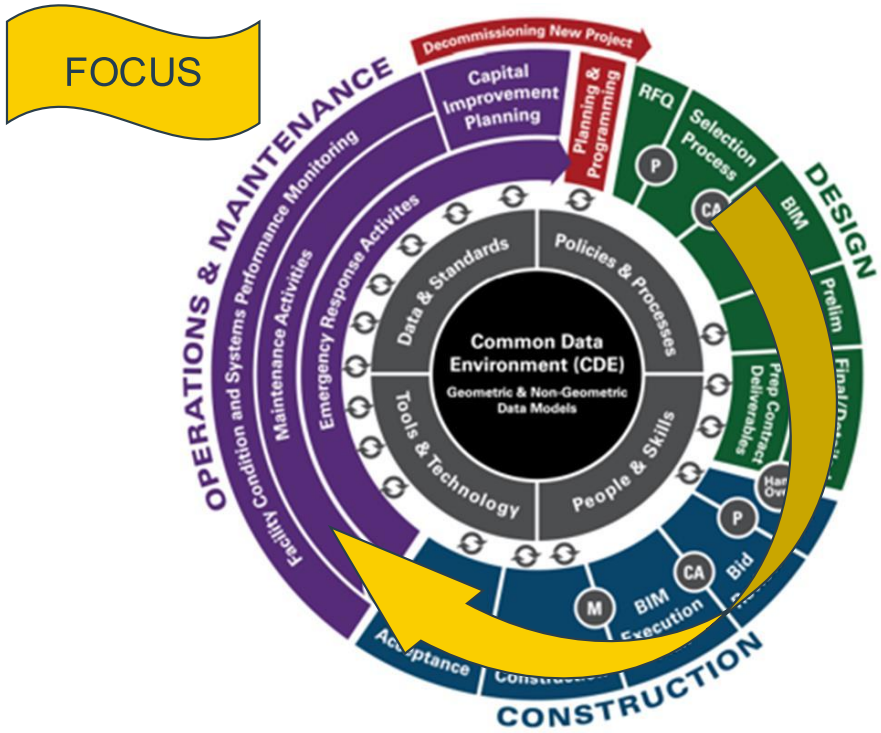


Current State of Practice at NYSDOT

#opportunities

Project Lifecycle Portions in Focus:

- Design
- Construction
- Operations & Maintenance
  - with a focus on Asset Management



For Each, We'll Review:

- Standards
  - Traditional Standards
  - Digital Standards
- Widely Known Digital Workflows (~80% user awareness)
- Lesser-Known Digital Workflows (~20% user awareness)

Brainstorm Slide 2: How would you rate/assess the current state-of-practice for creating design and construction plans/models for assets?

- **Poll 1 – How complete/comprehensive do you feel NYSDOT's Standards are?**
  - Not at all
  - Fairly complete/comprehensive
  - Reasonably complete/comprehensive
  - Gold standard of standards
- **Poll 2 – How well do you feel NYSDOT Staff adhere to NYSDOT's Standards?**
  - Not at all
  - We have 12 or more ways of doing the same thing
  - Most adhere but room for improvement
  - You're kidding, right? No one is this good…
- **Poll 3 – What do you feel is NYSDOT's Current State of Practice?**
  - See next slide
- **Poll 4 – What words come to mind when you hear the term "Traditional Standards"?**
  - Type in
- **Poll 5 – What words come to mind when you hear the term "Digital Standards"?**
  - Type in

Brainstorm Poll 3 – What do you feel is NYSDOT's Current State of Practice?

- **3.1 Design**
  - Use CADD to draft and deliver Paper/PDF Plans
  - Use CADD and other software to model design elements to deliver a mix of digital data and PDF plans
  - Use CADD and other software to model all aspects of a project and exchange project information through semi or fully automated data transfers
  - I don't usually participate in this portion of the project lifecycle and am unsure
- **3.2 Construction**
  - Use paper or PDF plans and paper forms to deliver construction projects
  - Use PDF plans, CADD files, paper and fillable PDF forms and record keeping software to deliver construction projects
  - Use software platforms and files that streamline the exchange of information between Design, Construction and Asset Managers to deliver construction projects
  - I don't usually participate in this portion of the project lifecycle and am unsure
- **3.3 Asset Management**
  - Use paper forms and manually enter data into GIS and asset management software
  - Use GIS field applications, statewide asset collections and paper forms only when necessary to update changes to our assets
  - Use software integrations to exchange information from Design and/or Construction, GIS field applications and statewide asset collections to update changes to our assets
  - I don't usually participate in this portion of the project lifecycle and am unsure

Mentimeter

Current State of Practice - Foundation - - Traditional Standards

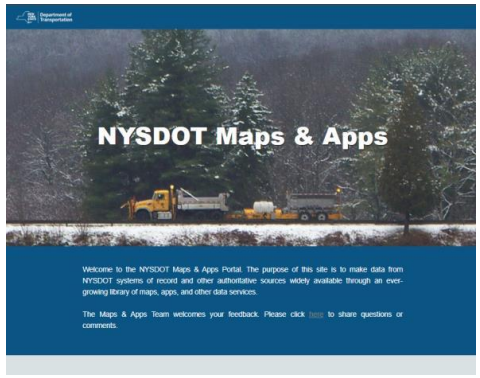
Traditional Standards:

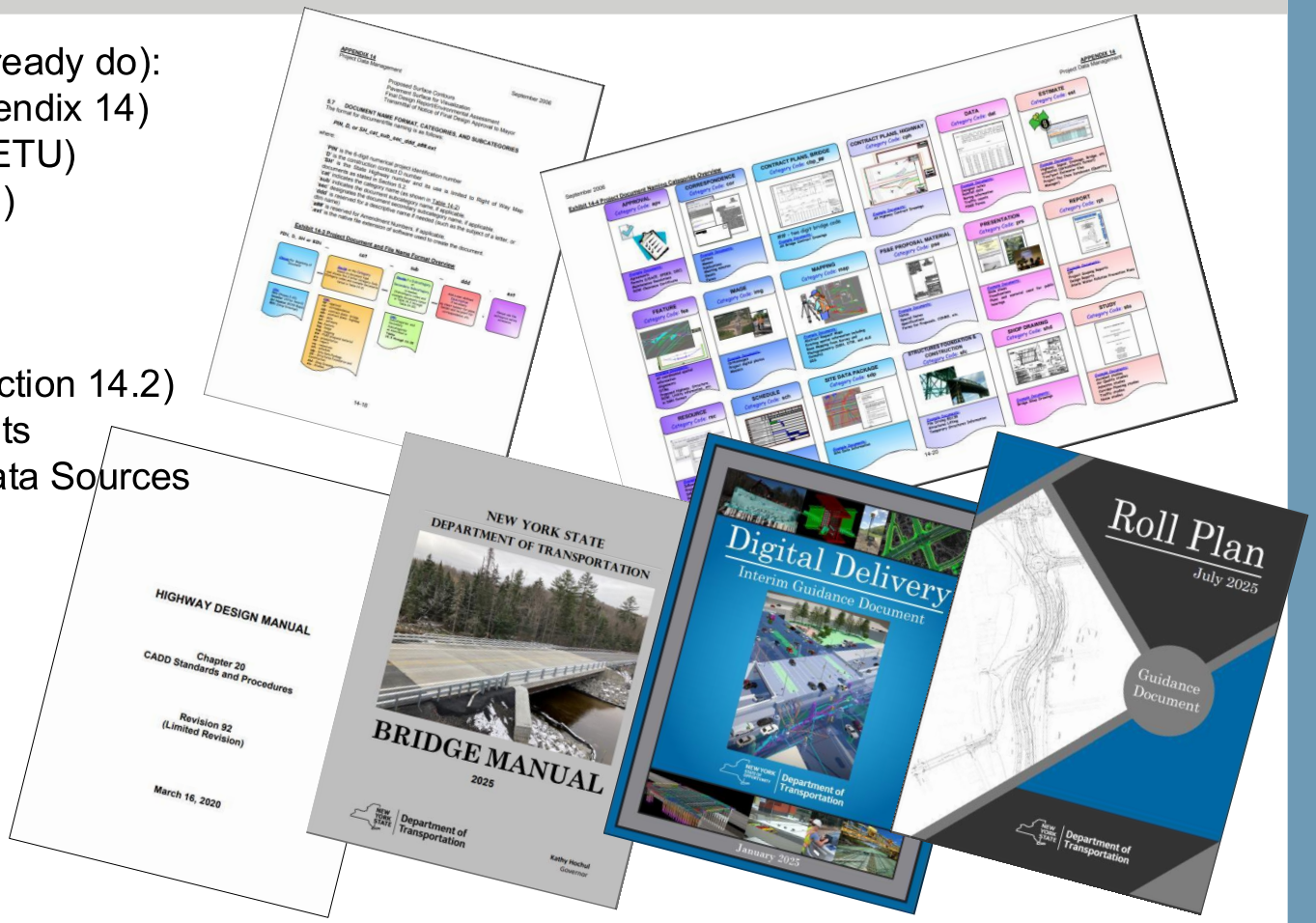
- Lots of:
  - Manuals
  - Specifications
  - Guidance
  - Documentation
- Guides the General Design Process
- Guides General Construction Inspection/Administration

Foundation - - Digital Standards

Digital Standards (defining what we already do):

- File Naming Convention (PDM Appendix 14)
- Standardized CADD Workspaces (ETU)
- CADD Standards (HDM Chapter 20)
  - Existing Levels
  - Proposed Levels
  - As-built Levels
- Bridge Model Management (BM Section 14.2)
- Digital Delivery Guidance Documents
- Asset Management Authoritative Data Sources (NYSDOT Maps & Apps)





Current State of Practice – Core Structure - - Digital Workflows

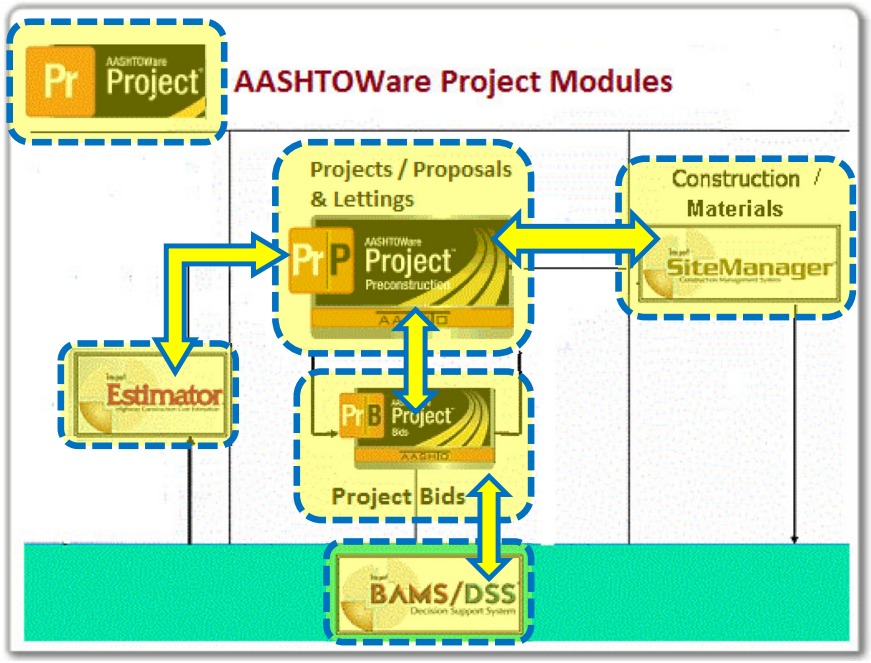
Digital Workflows (~ >80% of users are aware)

- Digital basemapping workflows
  - Leica Captivate/Infinity
  - V8i (past)/ORD (present)
- Analysis Software
  - MathCAD/STAAD/ProStructures
  - SUDA
  - AutoTurn
- PDF Markup Tools
  - Adobe Acrobat
  - Bluebeam
- 3D modeling
  - V8i (past)/ORD (present)/OBM (present)
- CADD-based quantity estimating
  - V8i (past)/ORD (present)/OBM (present)
- Calculating/tracking/paying contractors
  - Leica Captivate/Infinity
  - AWP SiteManager/MobileInspector (past)
  - AWP Construction & Materials (present)
- Robust GIS datasets/viewers for enterprise use
  - Esri ArcGIS
  - NYSDOT Maps & Apps

Core Structure - - Digital Workflows

Digital Workflows (~ >80% of users are aware)

- AASHTOWare Project
  - Streamlines
    - Generation and maintenance of project cost estimating data
    - Project bidding and letting
    - Administration of construction activities and contractor payments
    - Data-driven decision making
    - Transfer of data between project phases
- AASHTOWare Project Legacy Modules
  - Estimator (desktop)
  - Preconstruction (desktop)
  - SiteManager (desktop)/MobileInspector (mobile app)
- AASHTOWare Project Current Modules
  - Estimator (desktop)
  - Preconstruction (web)
  - Construction & Materials (web)



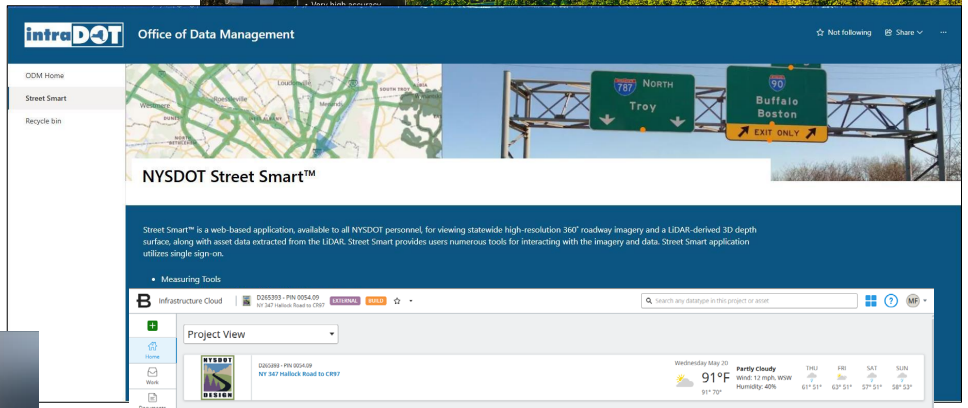
(NYSDOT External "DOING BUSINESS WITH NYSDOT" – AASHTOWARE PROJECT web page)

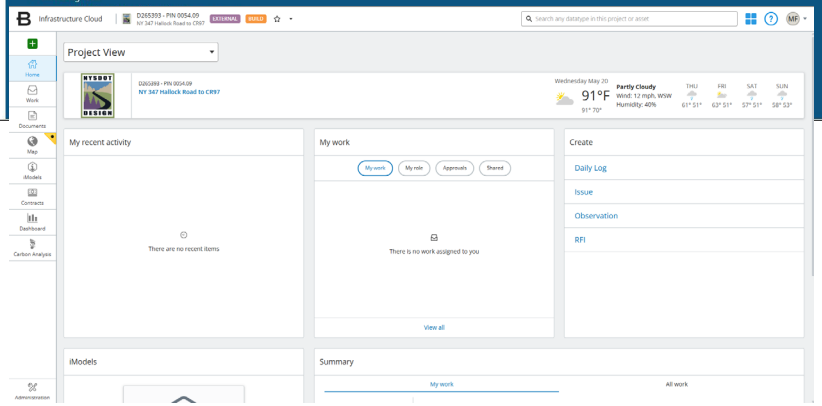
Core Structure - - Advanced Digital Workflows

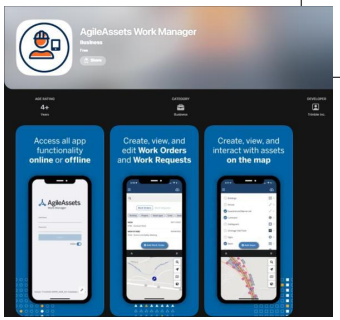
#change

Advanced Digital Workflows (~ 20% of users are aware)

- LiDAR collection/Point Cloud generation – Terrestrial, Aerial, Mobile/Photogrammetry
- Street Smart – review planning level imagery/LiDAR
- Bentley Item Types
- Bentley Infrastructure Cloud
- Agile Assets
- Esri Field Maps/Survey 123 apps







Core Structure - - Advanced Digital Workflows

Opportunity 1: Data Collection

LiDAR/Point cloud collection:

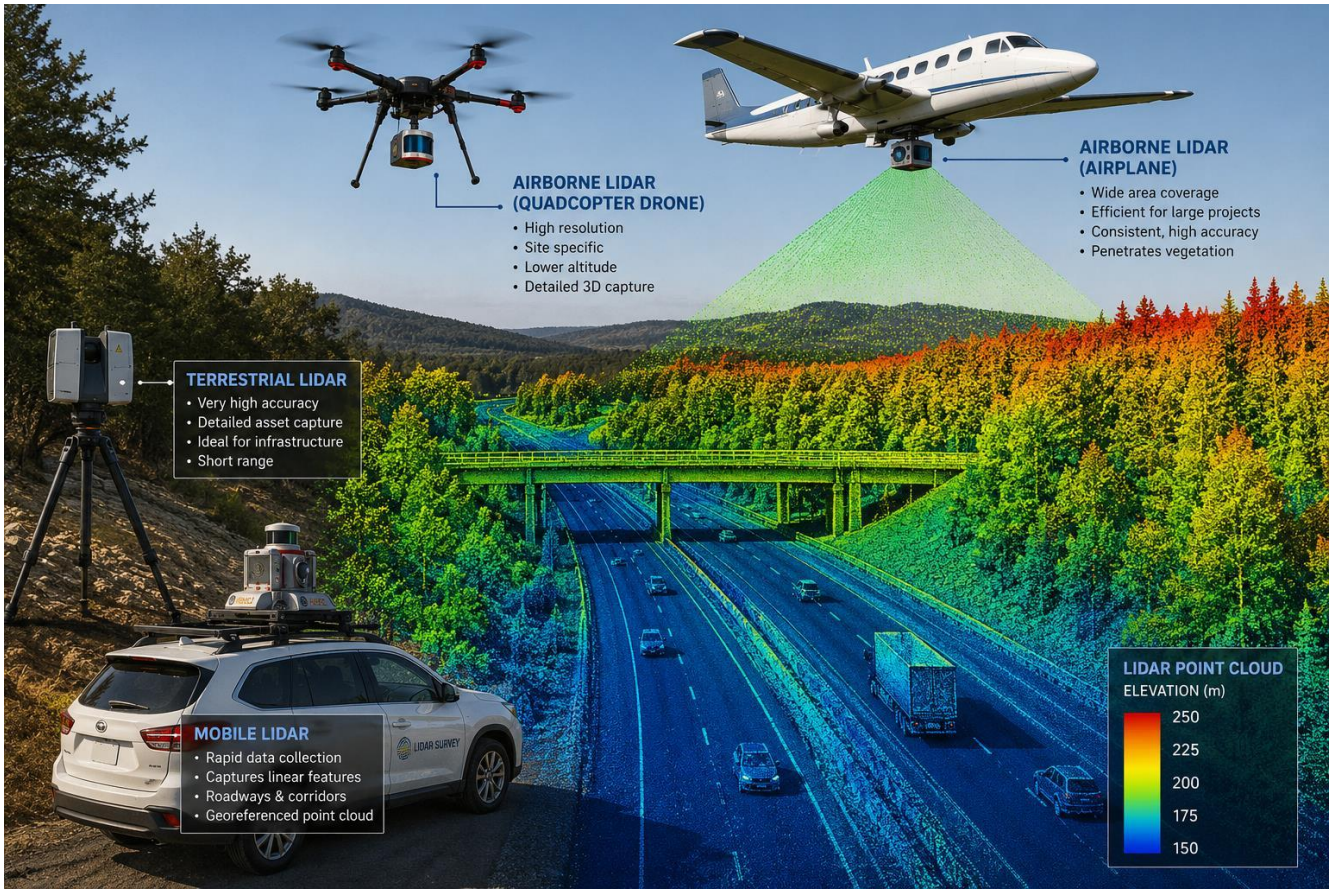
- Terrestrial
- Mobile
- Aerial
- Long-range photogrammetry
- Close-range photogrammetry

Pros:

- Survey grade data
- Rapid data collection
- More complete picture

Cons:

- Large datasets
- Requires thoughtful data management
- Point clouds typically require specialized software/performance hardware



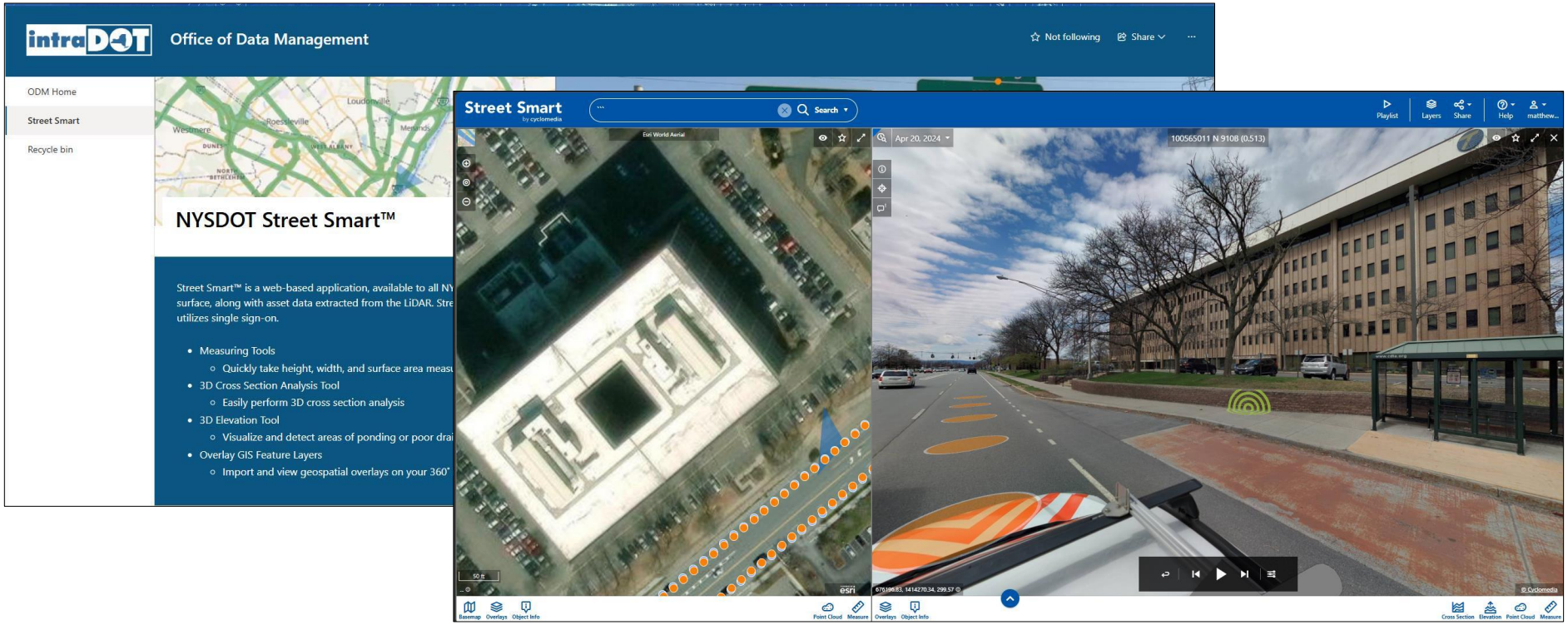
Core Structure - - Advanced Digital Workflows

Opportunity 2: Data Consumption

Street Smart:

- Review of imagery and mapping grade LiDAR
- Immersive user interface/experience (UI/UX)

- Extraction of select assets for our statewide transportation network (primary & secondary highways)



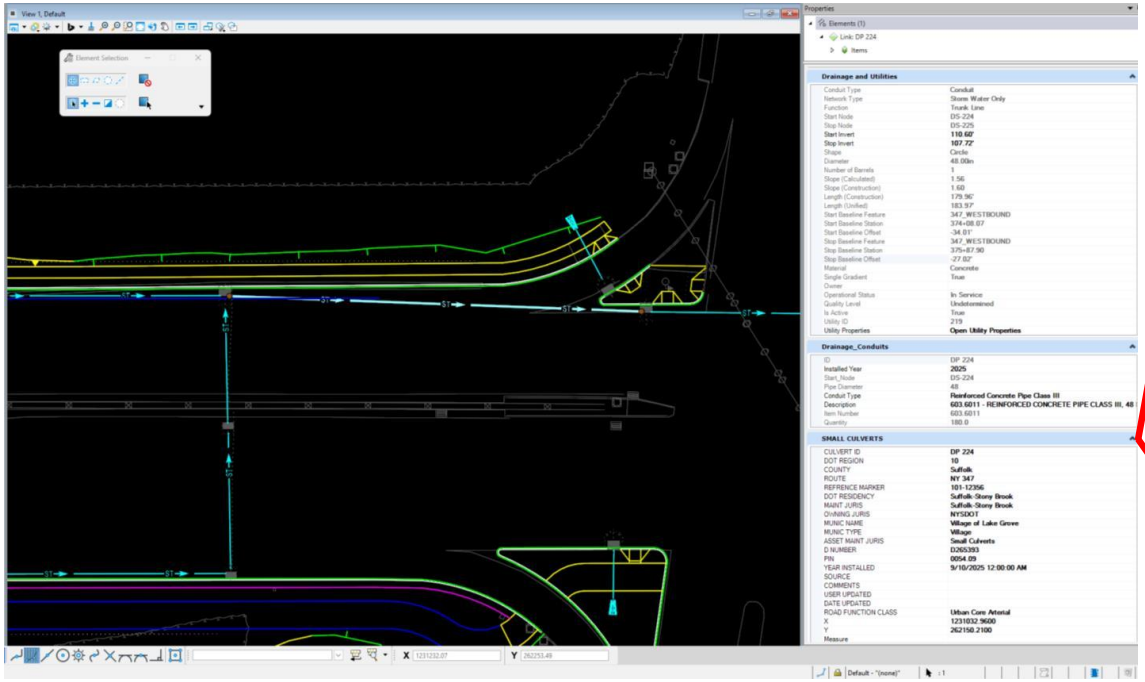
Core Structure - - Advanced Digital Workflows

Opportunity 3: Info. Exchange

Bentley Item Types:

- Attribute information, not just labels
- Drop down lists that apply to relevant objects

- List selection populates accurate 3D objects in design model along with calculated properties
- Attribute table can be exchanged with others



Drainage_Conduits

ID	DP 224
Installed Year	2025
Start_Node	DS-224
Pipe Diameter	48
Conduit Type	Reinforced Concrete Pipe Class III
Description	603.6011 - REINFORCED CONCRETE PIPE CLASS III, 48
Item Number	603.6011
Quantity	180.0

SMALL CULVERTS

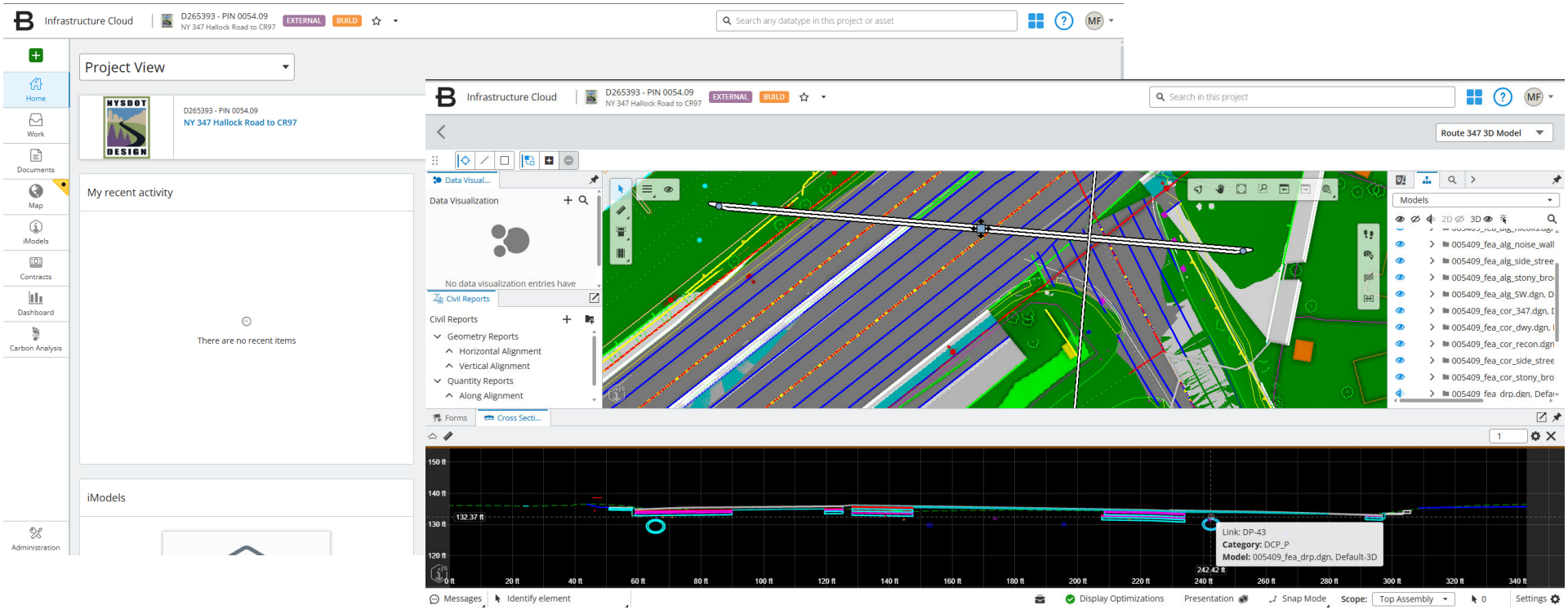
CULVERT ID	DP 224
DOT REGION	10
COUNTY	Suffolk
ROUTE	NY 347
REFRENCE MARKER	101-12356
DOT RESIDENCY	Suffolk-Stony Brook
MAINT JURIS	Suffolk-Stony Brook
OWNING JURIS	NYSDOT
MUNIC NAME	Village of Lake Grove
MUNIC TYPE	Village
ASSET MAINT JURIS	Small Culverts
D NUMBER	D265393
PIN	0054.09
YEAR INSTALLED	9/10/2025 12:00:00 AM
SOURCE	
COMMENTS	
USER UPDATED	
DATE UPDATED	
ROAD FUNCTION CLASS	Urban Core Arterial
X	1231032.9600
Y	262150.2100
Measure	

Core Structure - - Advanced Digital Workflows

Opportunity 4: Field Efficiencies

Bentley Infrastructure Cloud:

- Integrated construction management
- Visualization and measurements
- Streamlined tools = user friendly
- Web and Mobile modules

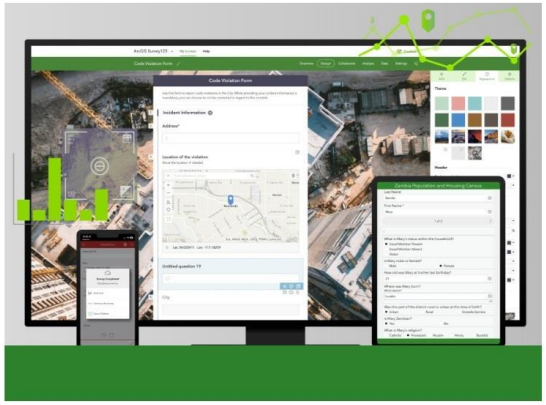


Core Structure - - Advanced Digital Workflows

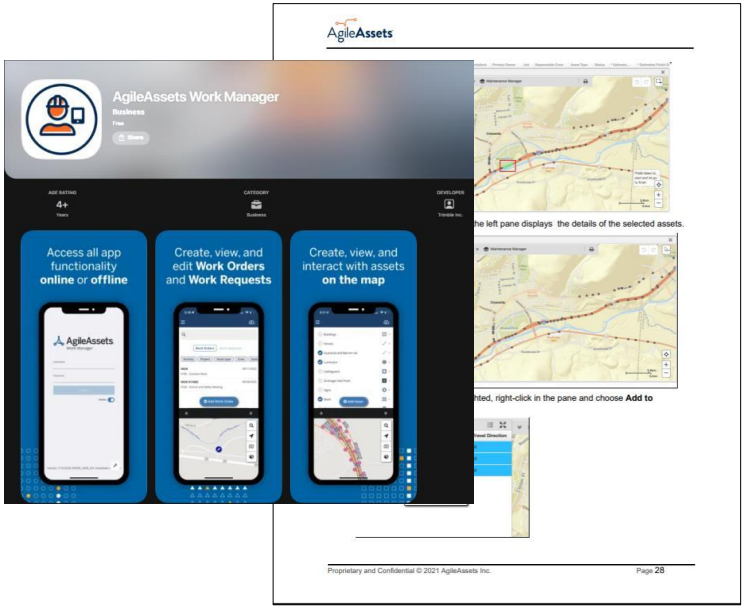
Opportunity 5: Authoritative Data

Agile Assets/Esri Field Maps/Esri Survey 123 apps:

- Field editing of authoritative asset data
- Mobile work order management
- Efficient data collection/entry
- Feeds into NYSDOT Maps and Apps Viewers



ArcGIS Survey123



Case Study - NY-347: Nesconset Highway / Smithtown Bypass

Region 10, Suffolk County

#challenges #change

Segment	From	To	Approx Route Milepoint (MP)	Approx Station Range	Phase	Letting	Construction Complete	Delivery	Bentley Platform	Major Assets	Drainage Assets & Work
1	Northern State Pkwy	NY-454 Split	MP 0.0 – 2.0	0+00 – 105+00	Early Works	2009–2012	2012–2013	DBB	Bentley InRoads / GEOPAK 2D + Partial 3D	Pavement rehab, Signals, Signs	**Local drainage fixes, pipe replacements, catch basin rehab, ditch grading**
2	NY-454	Mount Pleasant Rd	MP 2.0 – 4.0	105+00 – 210+00	Phase 1	~2013	~2015	DB	Bentley InRoads → early OpenRoads	Lane additions, Sidewalks, Landscaping	**New storm sewer network, RCP pipes, curb inlets, minor culvert rehab, outfalls**
3	Mount Pleasant Rd	Terry Rd	MP 4.0 – 6.0	210+00 – 315+00	Phase 2	~2014	~2016	DB	Bentley GEOPAK / InRoads Corridor Model	Widening, Medians, Lighting, Signals	**Pipe upsizing, new manholes, junction boxes, culvert extensions**
4	Terry Rd	Gibbs Pond Rd	MP 6.0 – 7.5	315+00 – 395+00	Phase 3	~2015–2016	~2017	DB	Bentley InRoads (SELECTseries)	Added lane, shared-use path, Utilities relocation	**Full drainage reconstruction, pipes, precast manholes, underdrains, culvert rehab**
5	Gibbs Pond Rd	NY-112	MP 7.5 – 10.0	395+00 – 525+00	Phase 4–5	~2017–2018	~2021–2022	DBB	Bentley InRoads (SELECTseries)	Major reconstruction, ITS, Multimodal	**Large trunk storm lines, culvert replacements, recharge basins, outfalls**
6	Gibbs Pond Rd	Hallock Rd	MP 10.0 – 12.0	525+00 – 630+00	Phase 6	~2020–2021	2024	DBB	Bentley InRoads 3D Objects (SELECTseries)	Full corridor rebuild, Signals, Sidewalks	**Comprehensive system: culverts, headwalls, wingwalls, manholes, inlets, underdrains**
7	Hallock Rd	Nicolls Rd	MP 12.0 – 13.5	630+00 – 710+00	Phase 7	~2023–2024	~2026–2027 (est.)	DBB	Bentley OpenRoads 3D Objects Designer (Model centric)	Widening, Safety Upgrades, Interchange prep	**Advanced drainage: culvert replacement, smart drainage, stormwater quality systems**
8	Nicolls Rd	NY-25A	MP 13.5 – 15.0	710+00 – 790+00	Future	TBD	TBD	TBD	OpenRoads Designer + iTwin Platform (Planned)	Future roadway + possible grade separation	**Future large culverts, watershed-scale drainage systems**

Case Study - NY-347: Gibbs Pond – Hallock Road Project/Hallock Road – Nicolls Road

Demo – Review of Different Tools and Deliverables between Phase 6 & Phase 7

Highlights:

- Gibbs Pond to Hallock Rd
  - V8i, Traditional Plan Set, 1084 Sheets, Mostly 2D line work
  - 3D base mapping
- Hallock Rd to Nicolls Rd/CR 97
  - ORD, Roll Plot Plans, 12 Roll Plots, 103 Traditional Sheets, Minimal 2D (alignments, ROW, etc.), 3D roadways, noise walls, drainage, etc., Bentley Infrastructure Cloud Test setup

Current State of Practice – Core Structure - - Level of Development

Table: Level of Development Descriptions

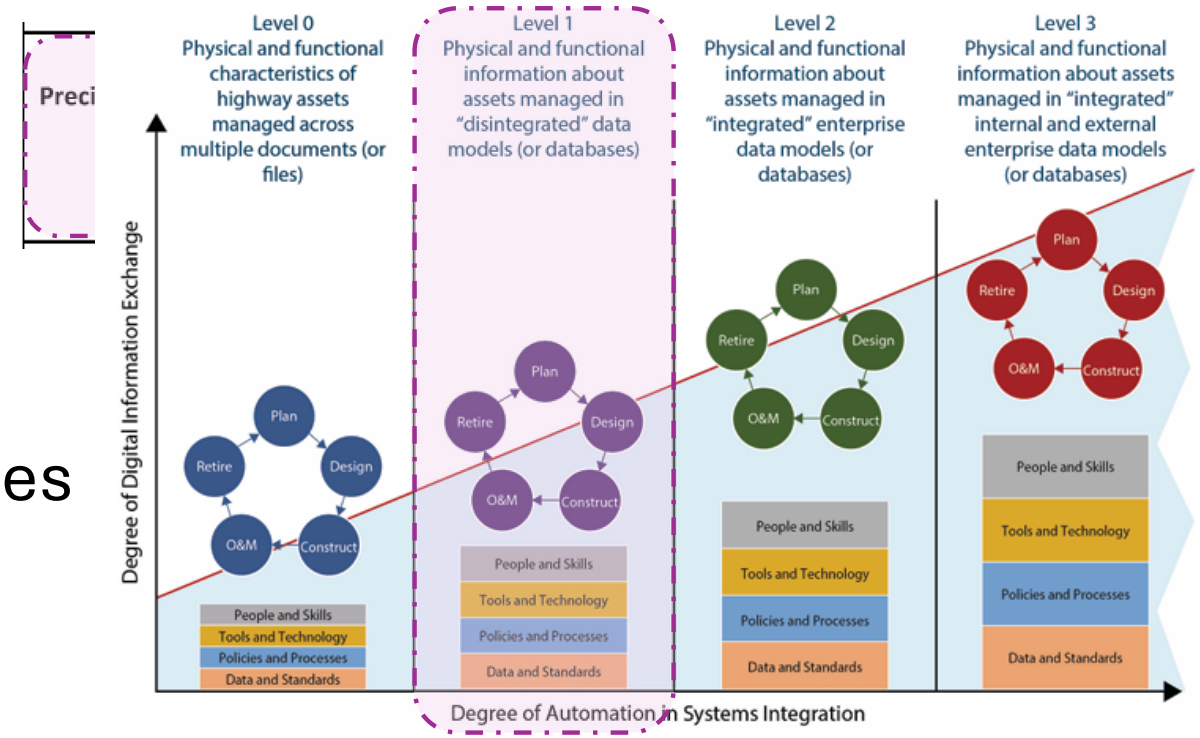
Level of Development (LOD)	Model Content Requirements	Authorized Uses
Conceptual LOD 100	Overall massing indicative of height, volume, location and orientation. Massing will be three dimensional and may include other data.	Limited analysis, aggregate preliminary cost estimating, conceptual level scheduling and staging.
Approximate Geometry LOD 200	Elements are modeled as generalized assemblies or systems with approximate quantities, size, shape, location and orientation. Attributes may be linked to model elements.	Preliminary analysis, accurate for cost estimating and scheduling.
Precise Geometry LOD 300	Elements are modeled as specific assemblies and are accurate in quantity, size, shape, location and orientation. Attributes may be linked to model elements and as required by the Engineer.	Construction documents, detailed quantity take offs, analysis and project management and controls.
Fabrication LOD 400	As per LOD 300 plus complete fabrication, assembly and detailing information.	Model based fabrication Actual cost tracking look-aheads and virtual mock-ups.
'As-Built' LOD 500	Elements are modeled as constructed or 'As-Built', field verified accurate assemblies, quantities, dimensions, shapes, location and orientation. Major transportation asset class attributes are linked to modeled elements and as required by the Engineer.	Maintenance and operations asset management applications and future planning.

Level of Development

Level of Development (LOD) is the level of completeness and accuracy to which the modeled elements are developed. LOD progresses from the lowest level, LOD 100, to the highest level, LOD 500. The five levels range from conceptual through 'As-Built' with progressively more complete and accurate levels of detail in each level.

Where does this put our Current State in terms of BIM?

- Level of Development
- BIM Maturity Level
- Data Exchange Pipelines



Source: FHWA.
Note: This phase includes asset management of facilities as well as facility maintenance management.

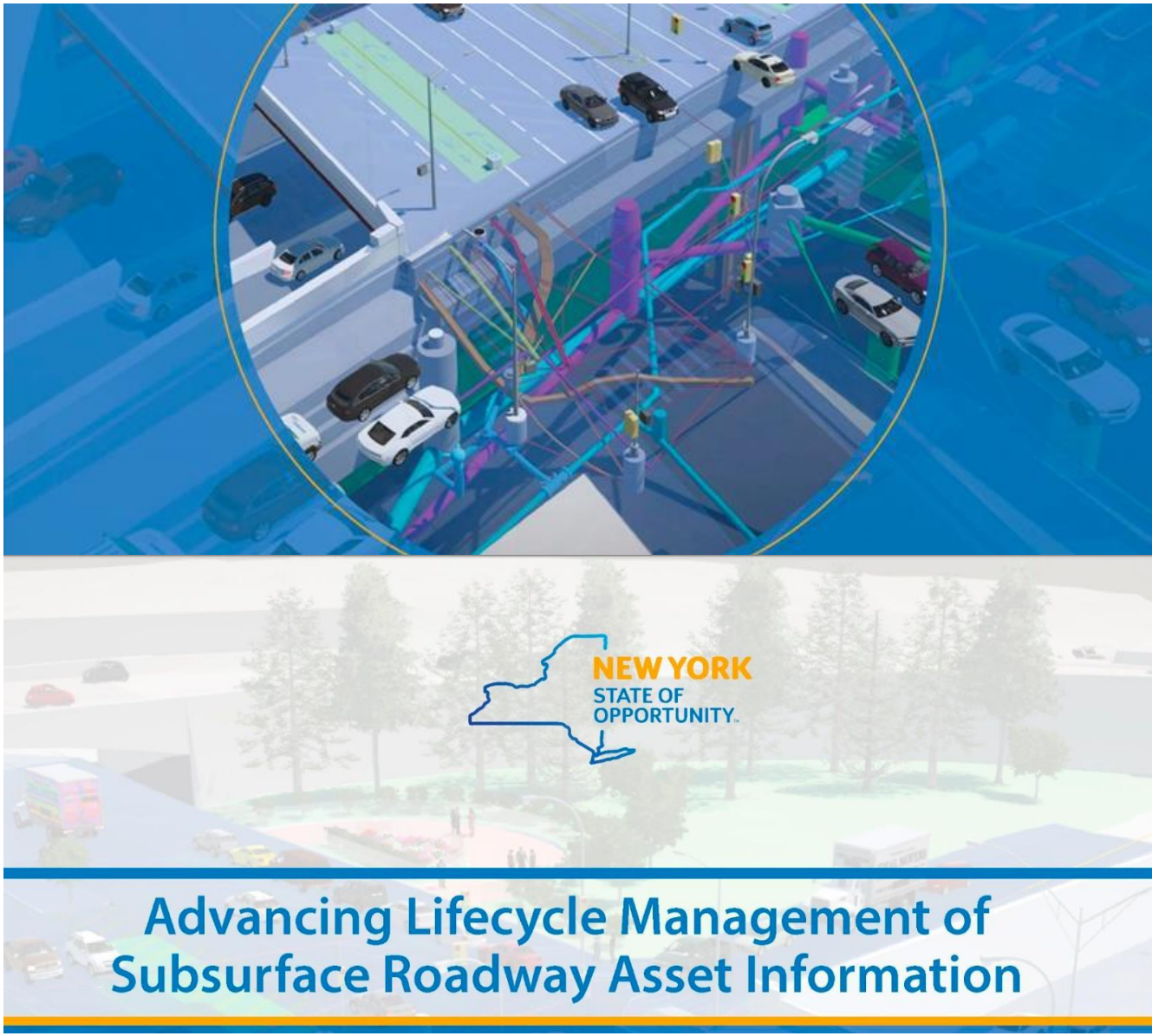
Figure 7. Illustration. BIM for Infrastructure maturity model and maturity levels.

NEXT .. Session 2

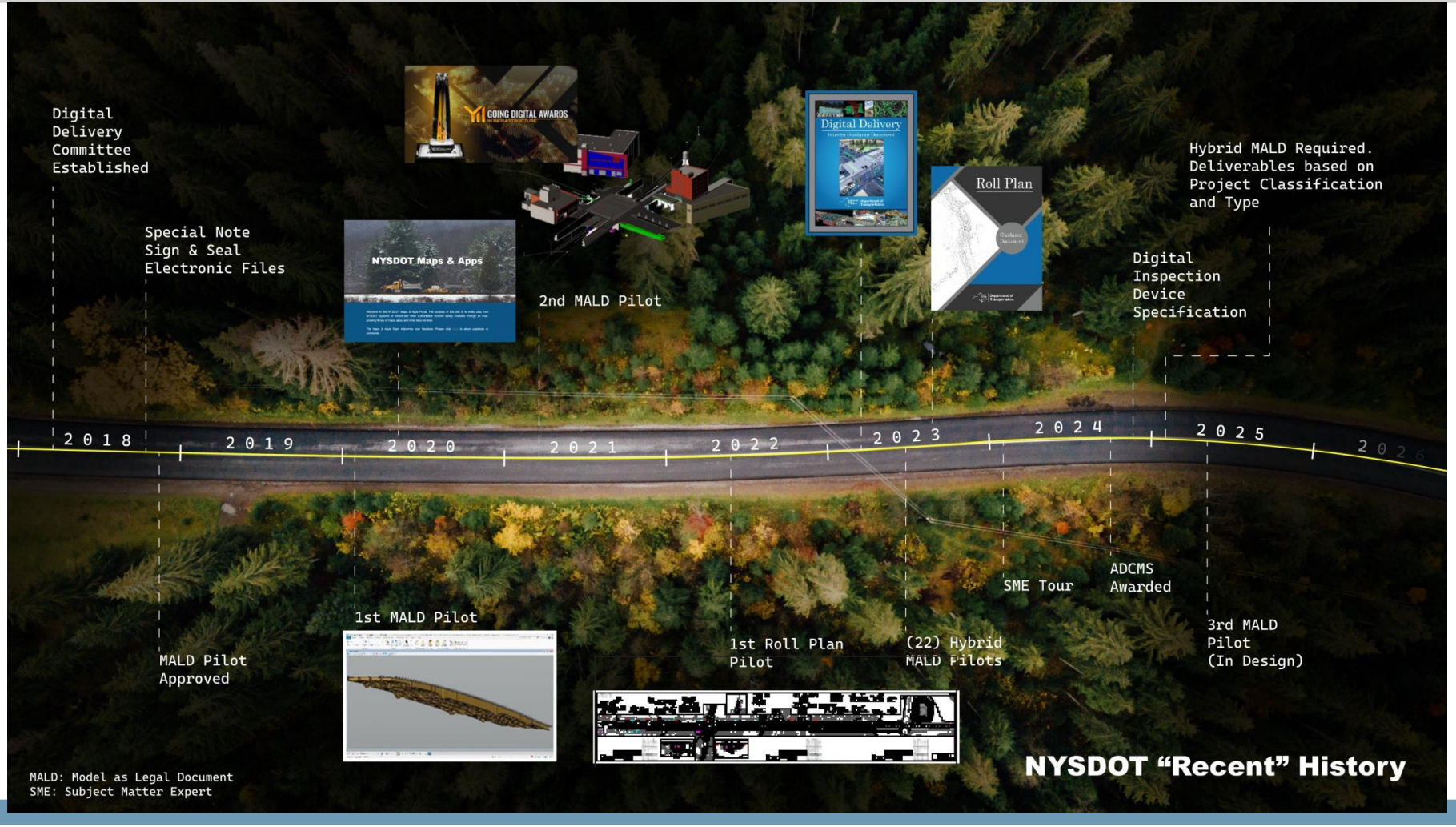
Topic	Schedule
About ADCMS and this Workshop	**9:00 AM – 9:20 AM**
1. Introductions – Welcome and Overview, Workshop Goals and Objectives	9:00 – 9:10 AM
2. ADCMS Grant Award	9:10 – 9:20 AM
3. Survey	
SESSION 1: Current State of Practice	**9:20 AM – 10:00 AM**
1. Presentation & Demo	9:20 – 9:50 PM
2. Open Discussion & Survey: Regional Practices, Challenges, Opportunities, Consensus	9:50 – 10:00 AM
SESSION 2: Digital Delivery and Pilot Projects	**10:00 AM – 10:30 AM**
1. Presentation & Demo	10:00 – 10:20 AM
2. Open Discussion & Survey	10:20 – 10:30 AM
BREAK	**10:30 - 10:45 AM**
SESSION 3: To-Be State of Practice	**10:45 AM – 1:50 PM**
1. Defining To-Be State:	10:45 – 11:15 AM
• *Demo and To-Be State Vision*	*10:45 – 11:00 AM*
• *Open Discussion & Survey*	*11:00 – 11:15 AM*
2. Level of Development, Design/Construction Workspace Design and Asset Information Management	11:15 – 12:00 PM
• *Demo and To-Be State Vision*	*11:15 – 11:25 AM*
• *Open Discussion & Survey*	*11:25 – 12:00 PM*
LUNCH BREAK	**12:00 – 1:00 PM**
3. BIM Execution Plans (BEP)	1:00 – 1:50 PM
• *BIM Workflows, Roles and Responsibilities, Technology Infrastructure*	*1:00 – 1:30 PM*
• *Open Discussion & Survey*	*1:30 – 1:50 PM*
Closing Remarks - Look Ahead: 2026 - 2027	**1:50 PM – 2:00 PM**

II. NYSDOT Pilot Projects

Session 2 10 AM – 10:30 AM



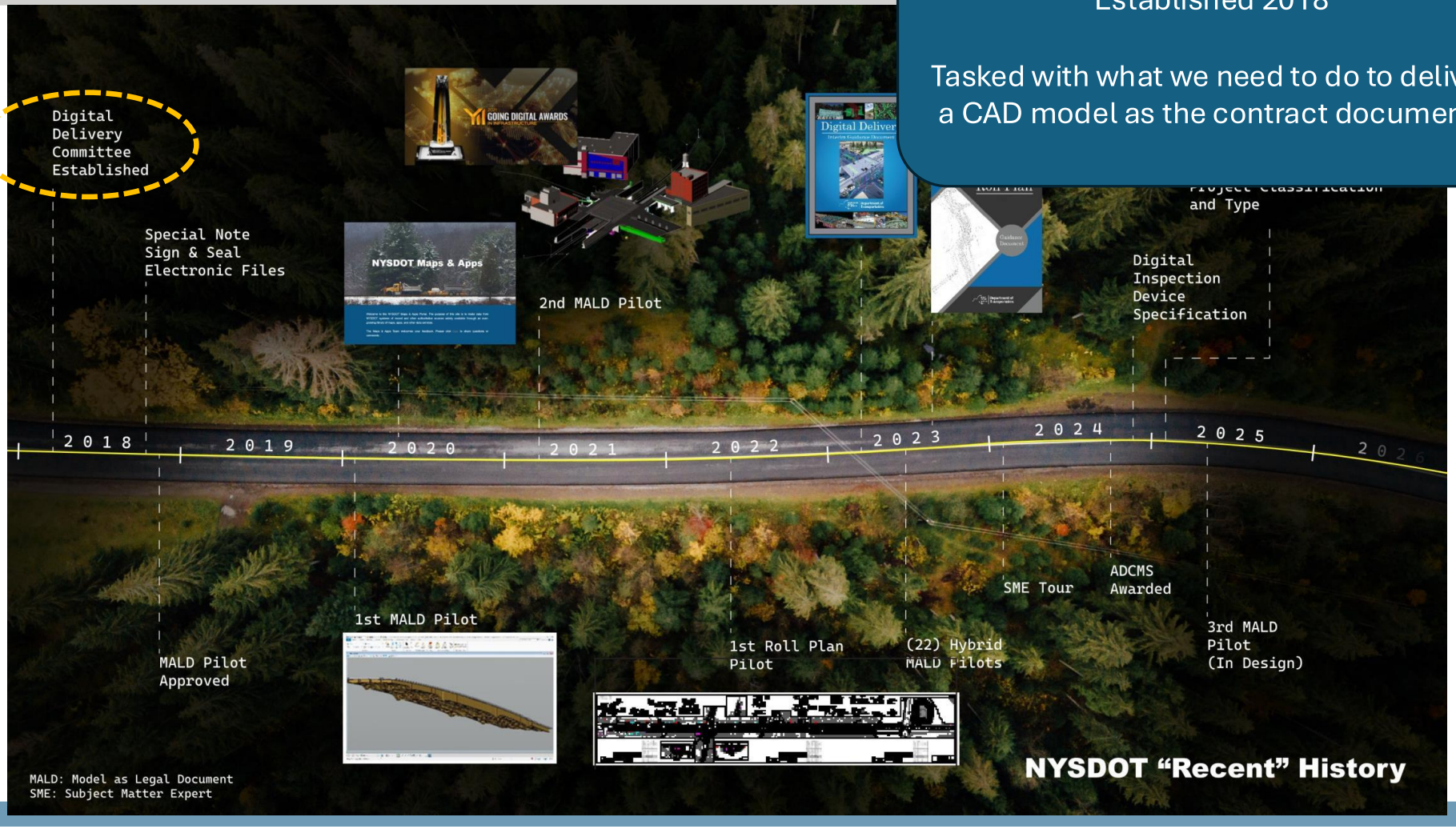
NYSDOT Pilot Projects (2018-2026)



Pilot Projects

Model Based Contracting Committee Established 2018

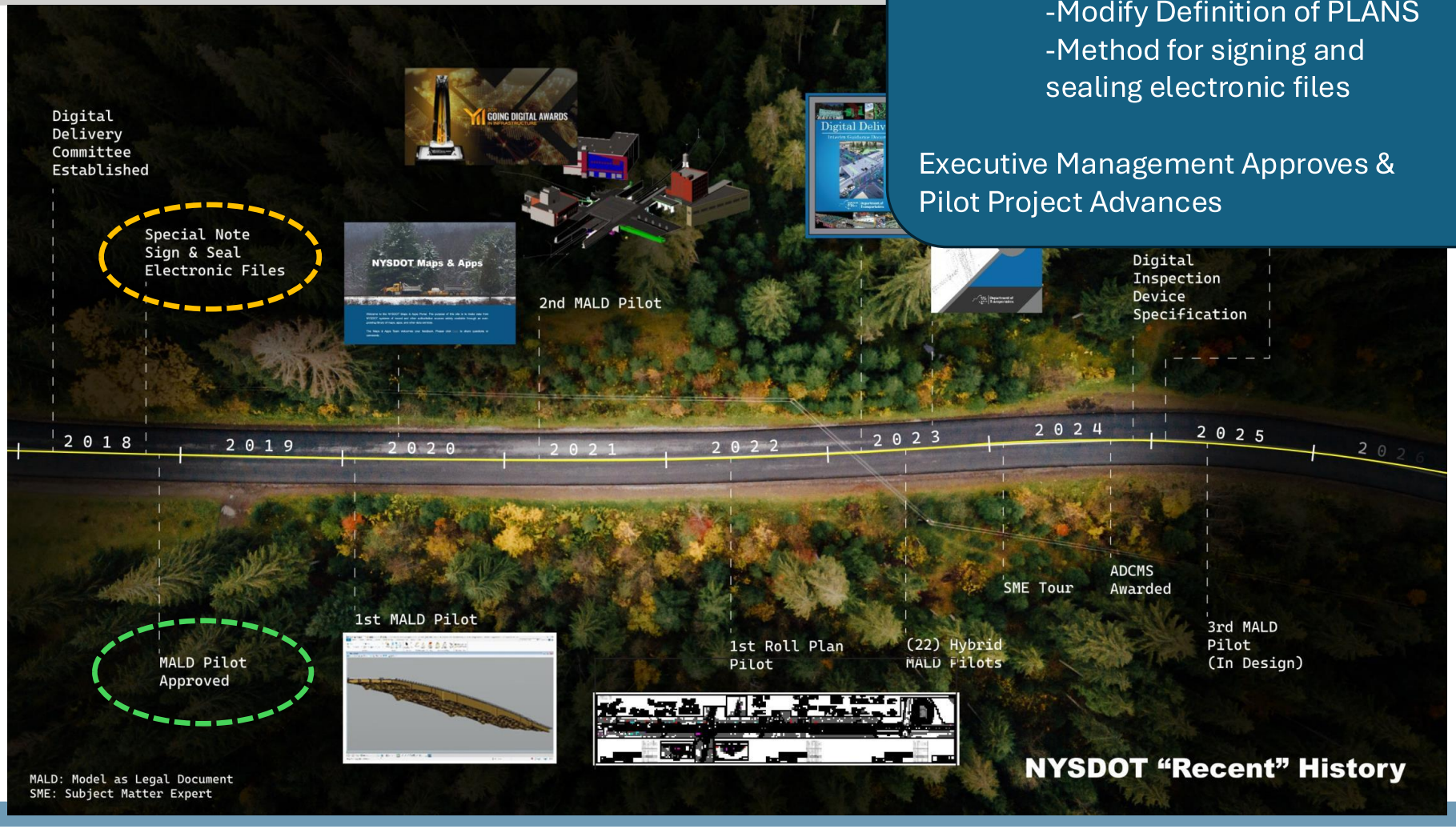
Tasked with what we need to do to deliver a CAD model as the contract document.



Pilot Projects

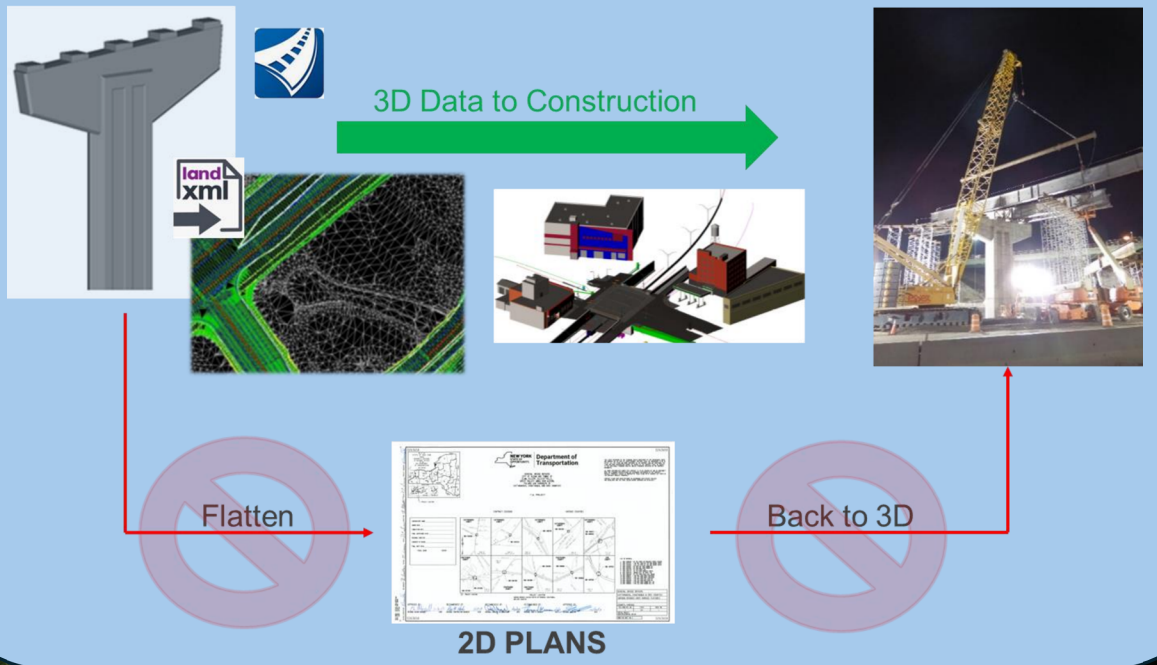
Committee Recommendation:
- -Special Note
- -Modify Definition of PLANS
- -Method for signing and sealing electronic files

Executive Management Approves & Pilot Project Advances



1st Pilot Project

- Specifying contractual work with a variety of relevant electronic files (DGN, XLS, XML, PDF, etc.)
- Reduce or eliminate corresponding 2D plans



1st Pilot Project

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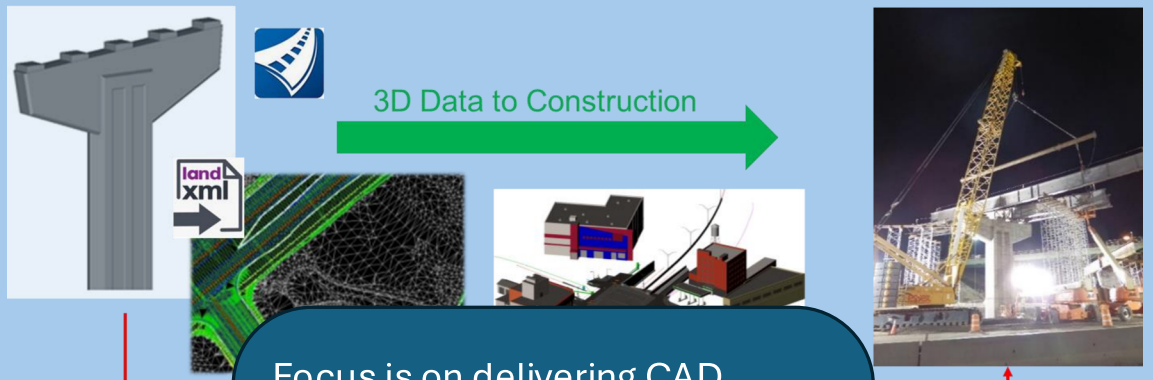
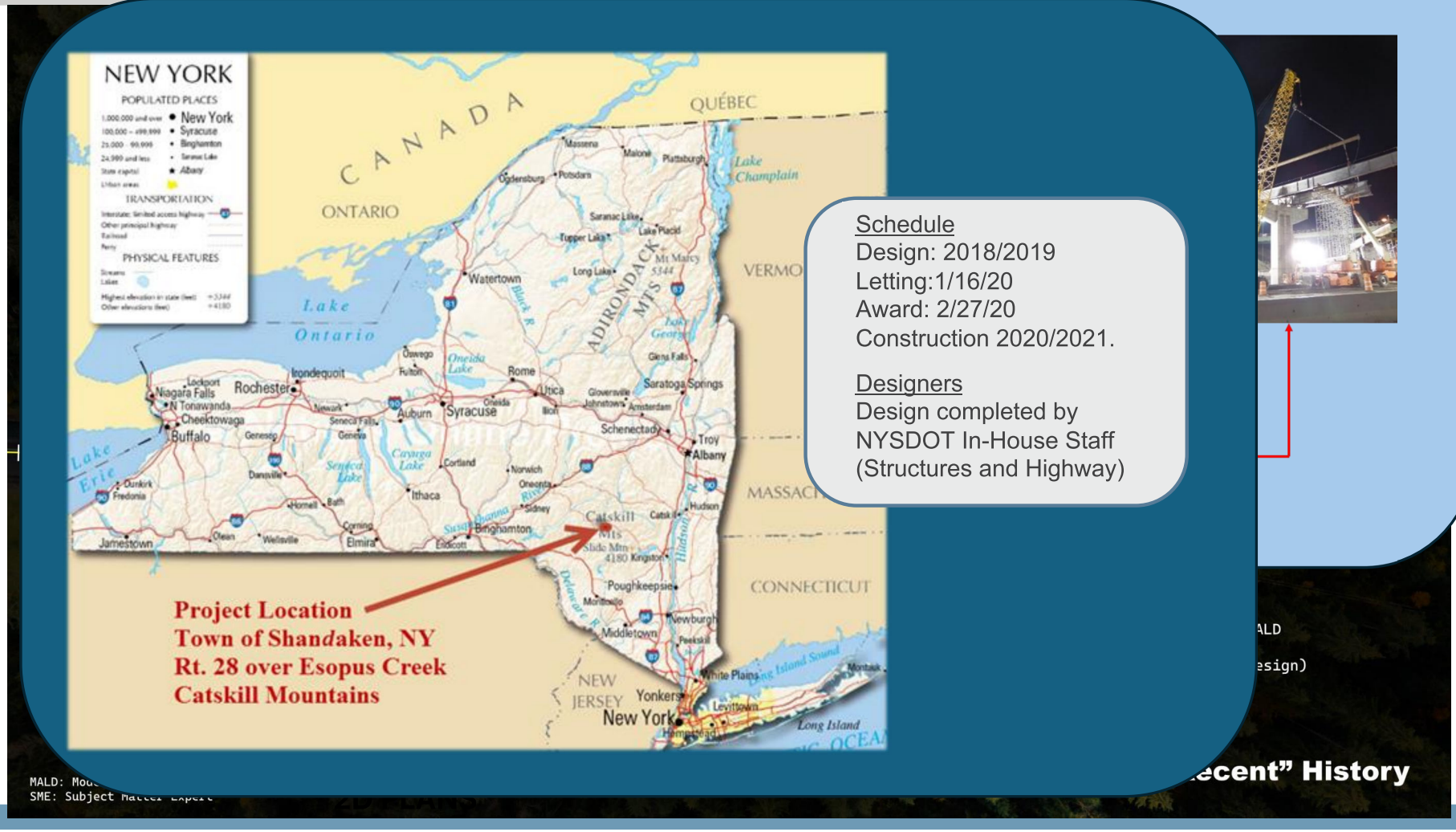


Focus is on delivering CAD model to Construction to build.

- *No focus on digital as-builts*
- *No focus on exchange information requirements*
- *No focus lifecycle asset management*

1st Pilot Project

- Specifying contractual work with a variety of relevant electronic files (DGN, XLS, XML, PDF, etc.)



Schedule
Design: 2018/2019
Letting:1/16/20
Award: 2/27/20
Construction 2020/2021.

Designers
Design completed by NYSDOT In-House Staff (Structures and Highway)

MALD: Mod
SME: Subject Matter Expert

ecent" History

1st Pilot Project

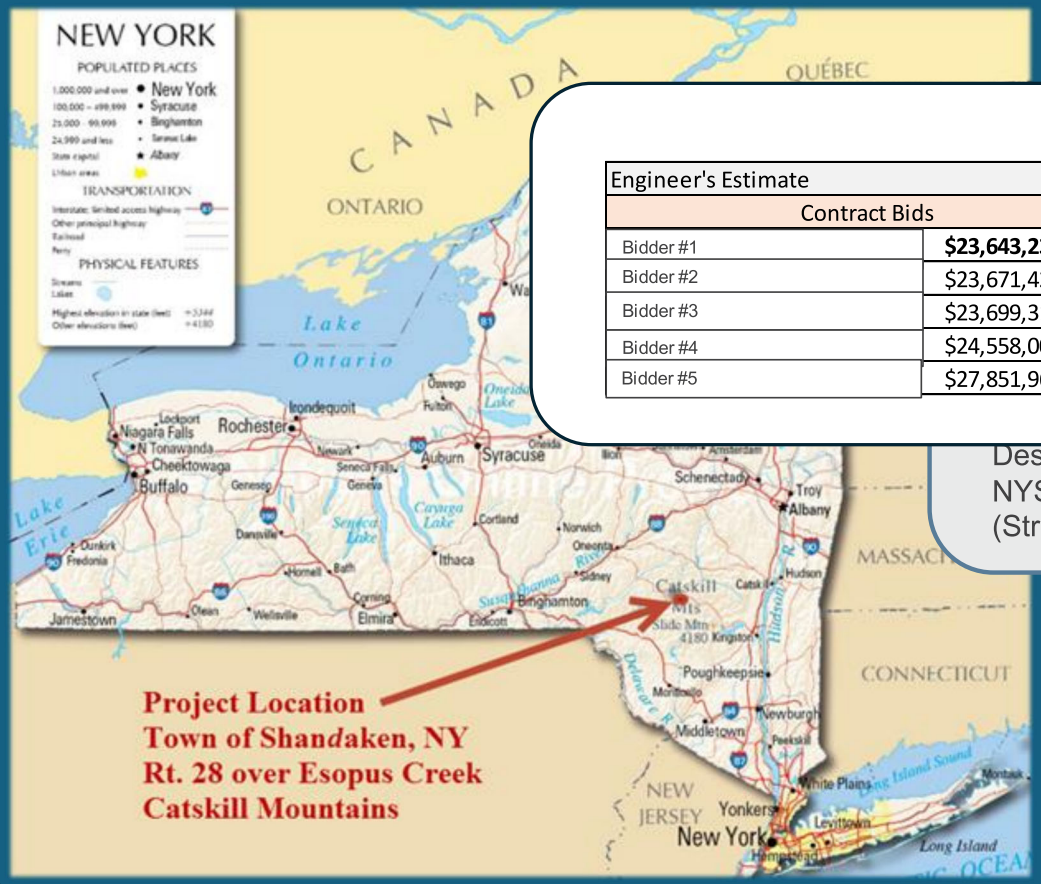
- Specifying contractual work with a variety of relevant electronic files (DGN, XLS, XML, PDF, etc.)

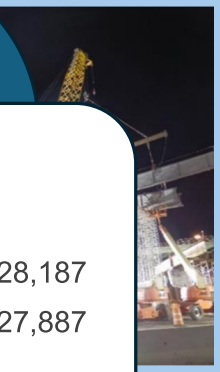
Engineer's Estimate	$24,184,125.77	
Contract Bids		% of EE
Bidder #1	**$23,643,236.43**	**-2.24%**
Bidder #2	$23,671,422.96	-2.12%
Bidder #3	$23,699,310.08	-2.00%
Bidder #4	$24,558,000.00	1.55%
Bidder #5	$27,851,965.00	15.17%

$28,187

$27,887

Design completed by NYSDOT In-House Staff (Structures and Highway)





MALD: Mod…
SME: Subject Matter Expert

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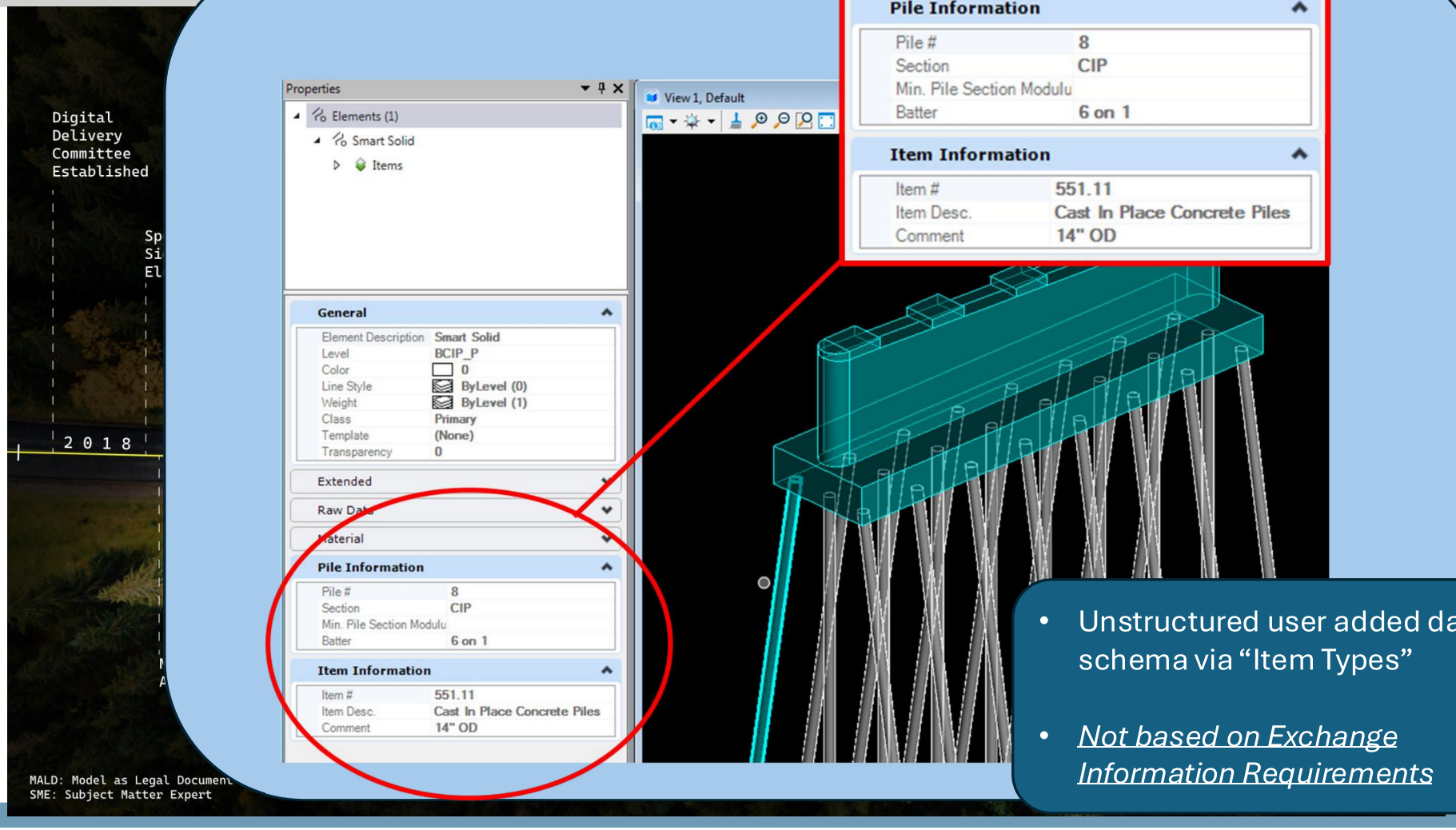
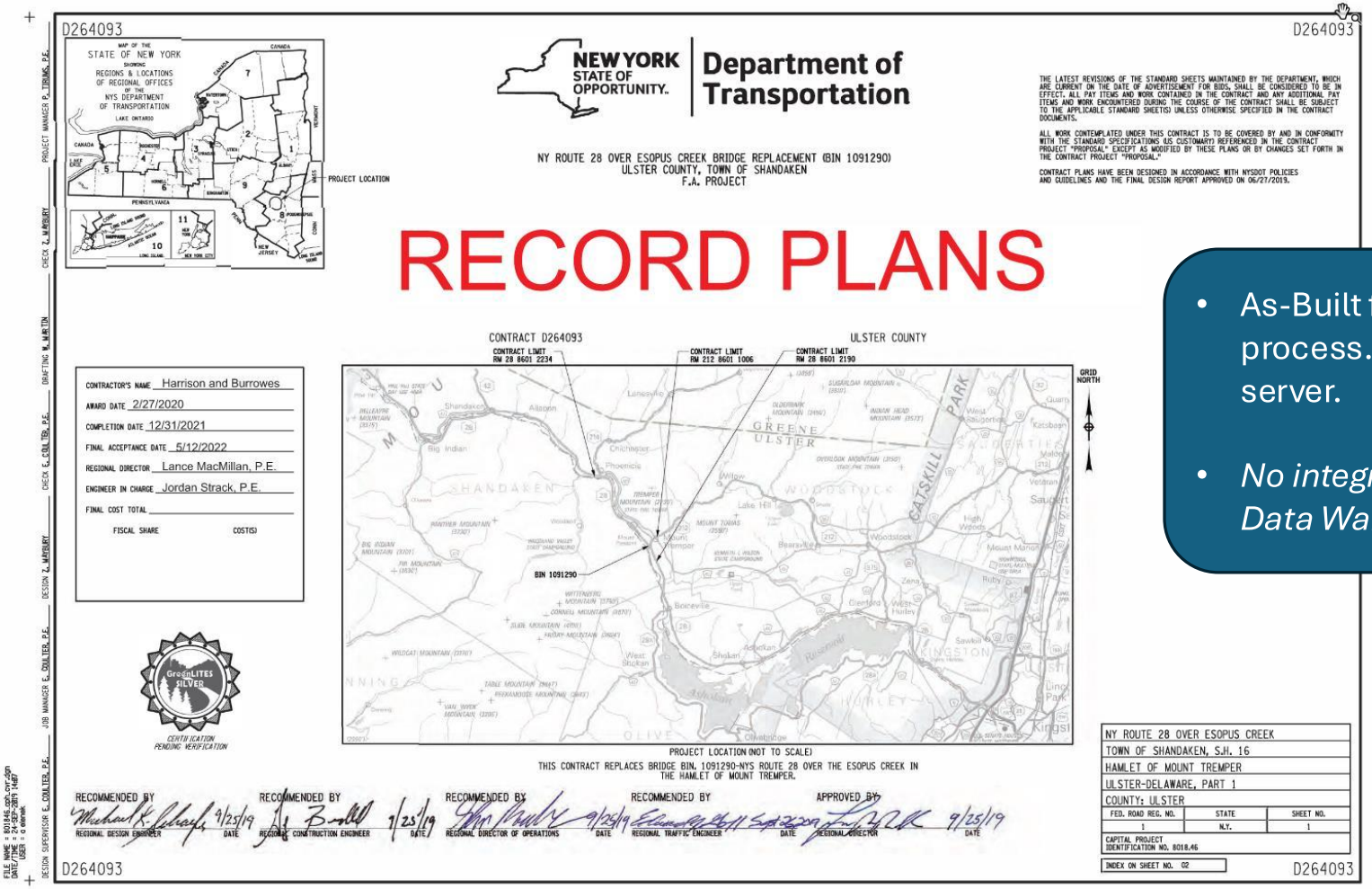
1st Pilot Project



- Unstructured user added data schema via “Item Types”
- *Not based on Exchange Information Requirements*

1st Pilot Project – Complete!



- As-Built follows traditional process. Posted to NYSDOT server.
- *No integration with Geospatial Data Warehouse*

2nd Pilot Project – Run it Back!

Digital Delivery Committee Established

Hybrid MALD Required. Deliverables based on Project Classification and Type

2nd MALD Pilot

2021

1st MALD Pilot

MALD Pilot Approved

Focus is on delivering CAD model to Construction to build.

- *No focus on digital as-builts*
- *No focus on exchange information requirements*
- *No focus lifecycle asset management*

- Specifying contractual work with a variety of relevant electronic files (DGN, XLS, XML, PDF, etc.)
- Reduce or eliminate corresponding 2D plans

3D Data to Construction

Flatten

Back to 3D

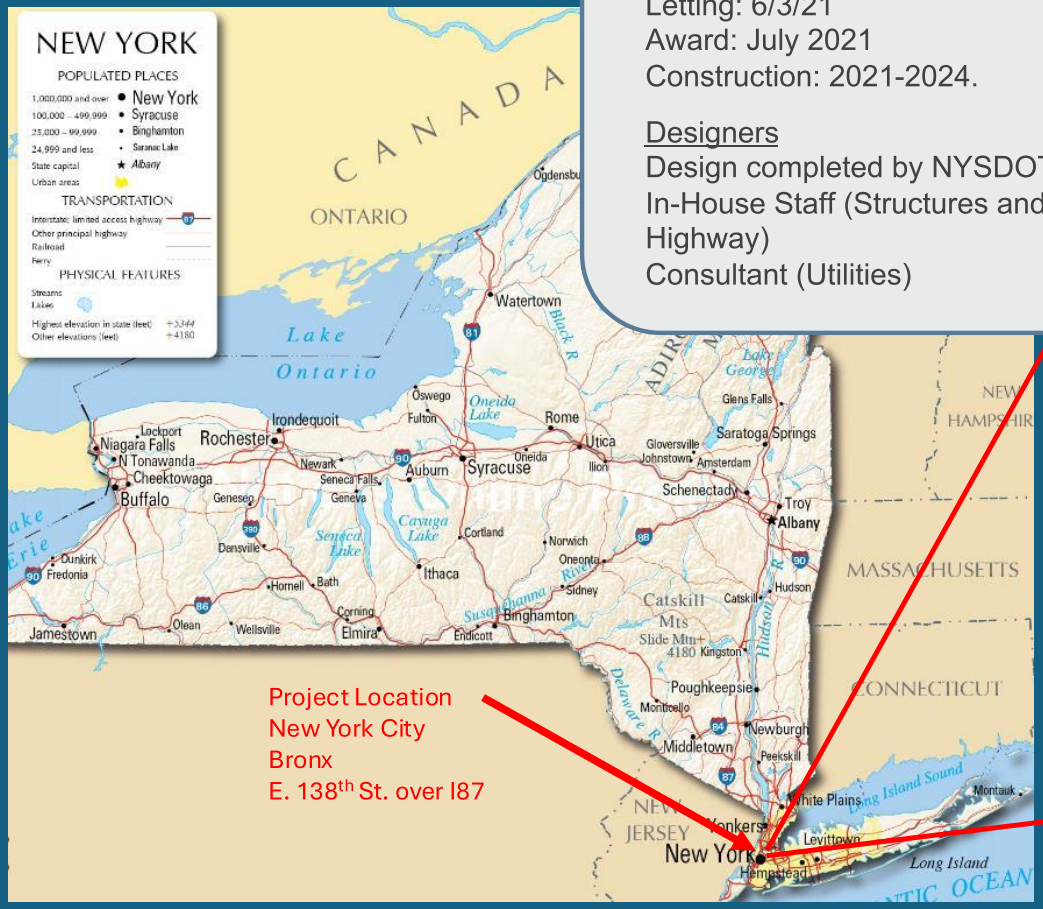
2D PLANS

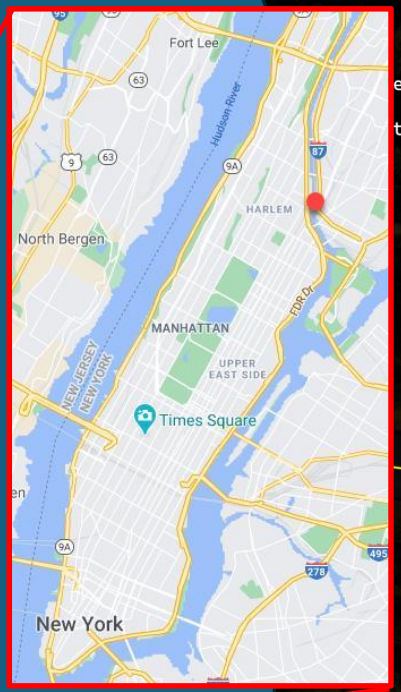
MALD: Model as Legal Document
SME: Subject Matter Expert

2nd Pilot Project

Schedule
Design: 2020
Letting: 6/3/21
Award: July 2021
Construction: 2021-2024.

Designers
Design completed by NYSDOT In-House Staff (Structures and Highway)
Consultant (Utilities)

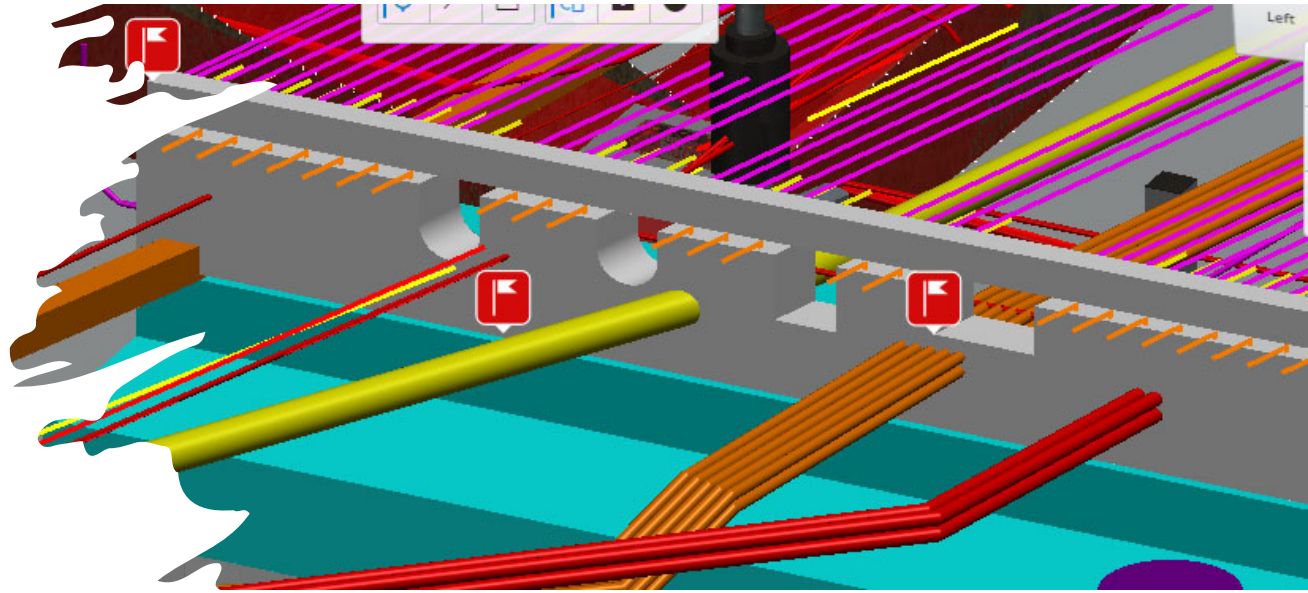


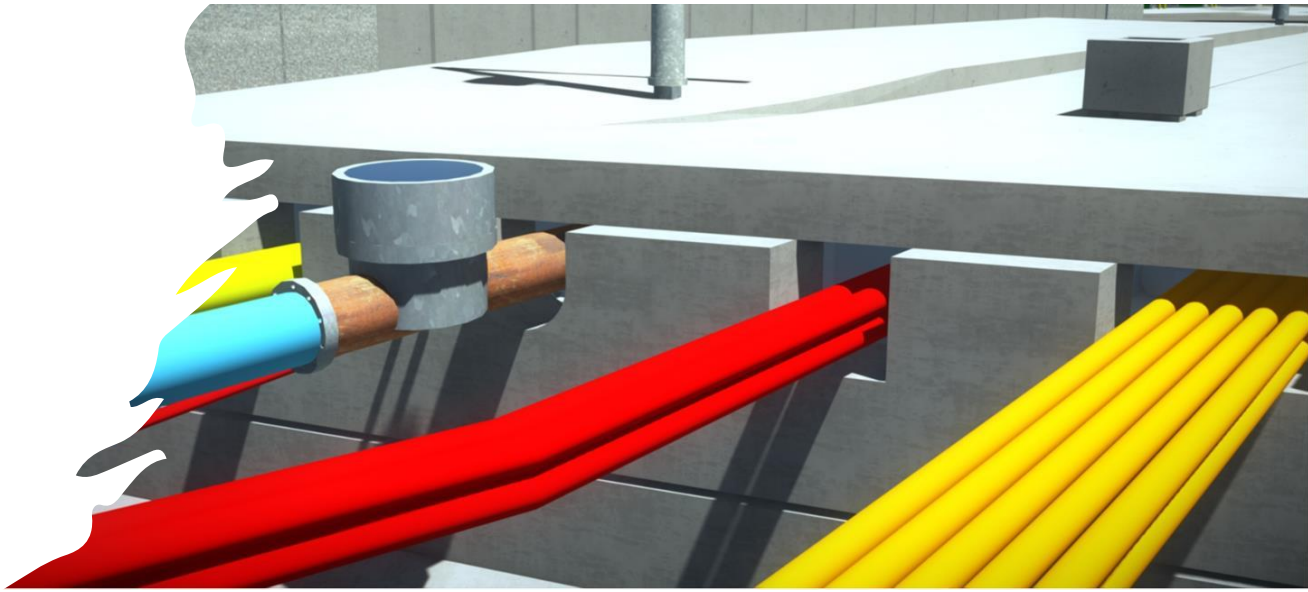


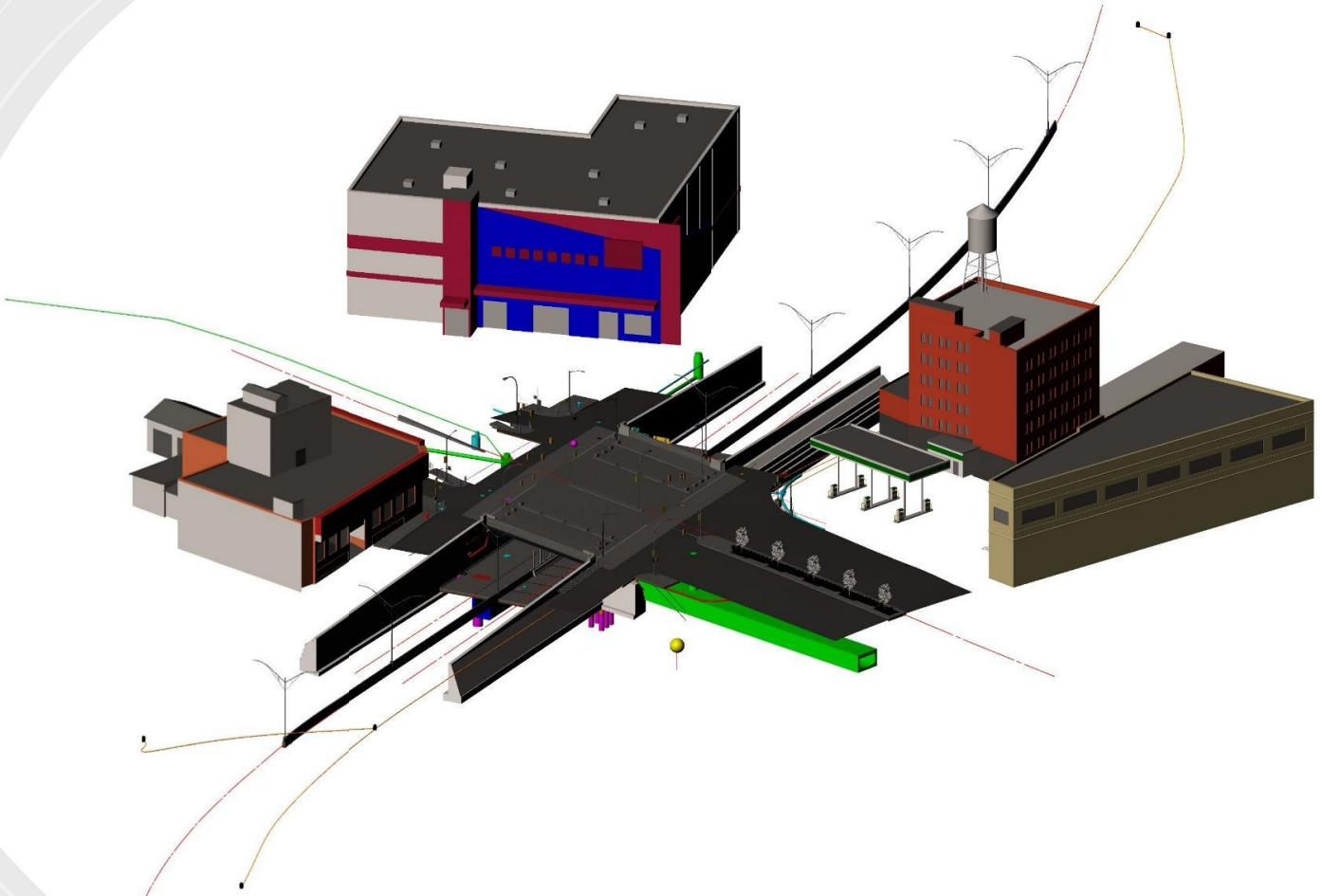
"Recent" History

- Unstructured user added data schema via “Item Types”
- Model is more comprehensive

- *Not based on Exchange Information Requirements*







Level of Development – Pilot Projects

Table: Level of Development Descriptions

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Recap Pilot #1 & #2

- Proved the concept
- Biddable
- Buildable
- Lessons Learned

Recap Pilot #1 & #2

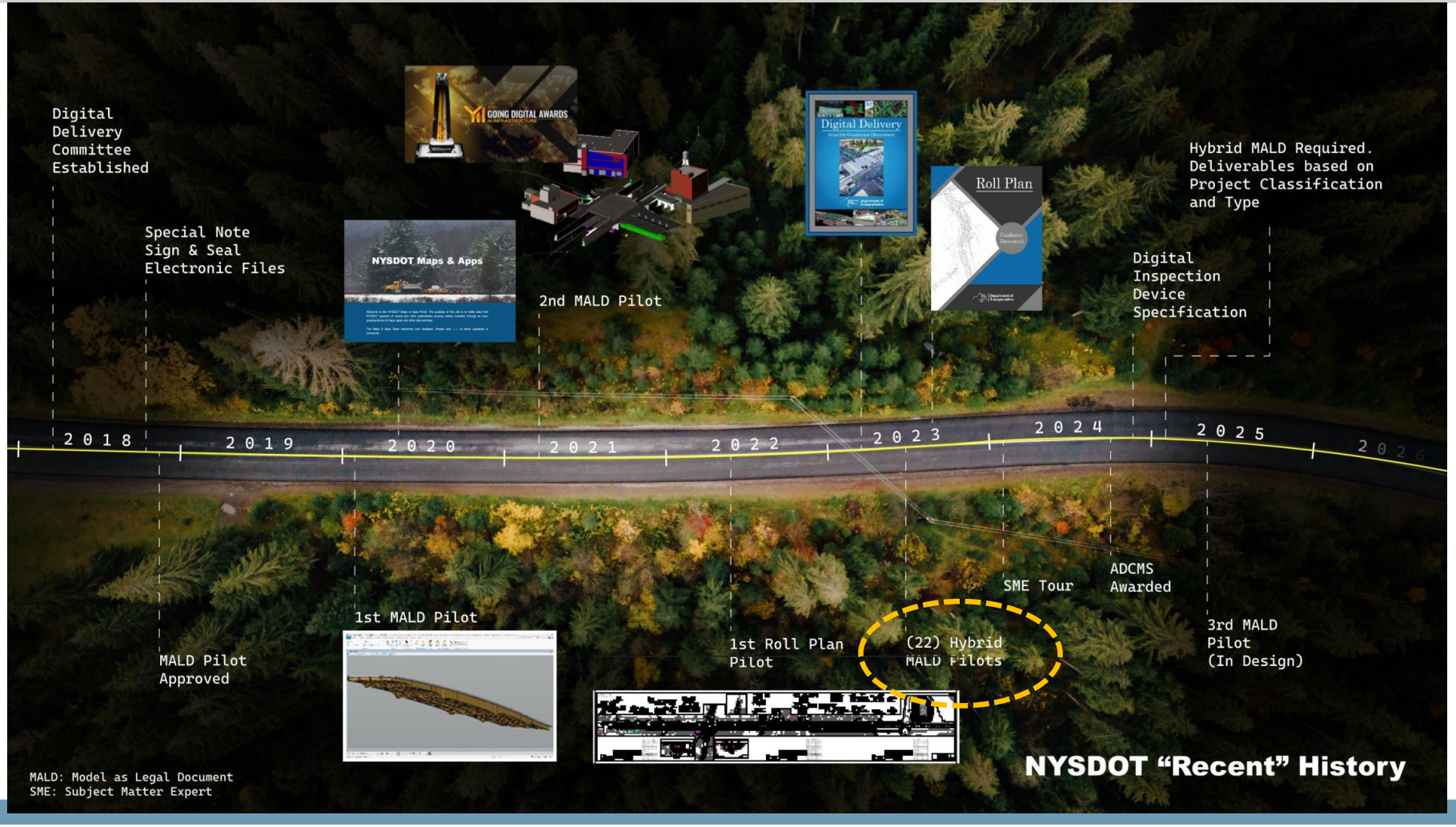
- Workflows are not established
- CAD Workspace not fully configured (Item Types)
- Milestone review hardships
- Hardware not available
- Software solutions not ideal
- Difficult to extract information
- Staff burnout

Work = Force x Distance

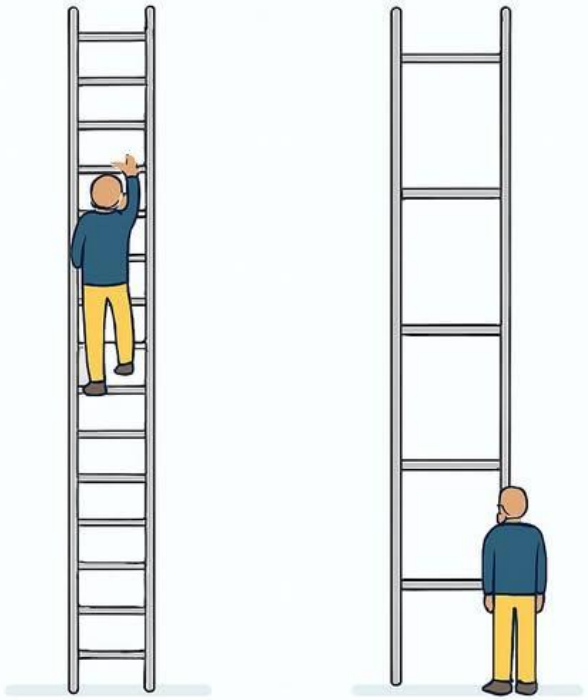
$$W = F.d$$


WHERE DO
WE GO
FROM HERE?

Hybrid Digital Delivery Pilots



THE IMPORTANCE OF SMALL STEPS



Small Steps Are Manageable
And Help You Progress

Hybrid Digital Delivery Pilots

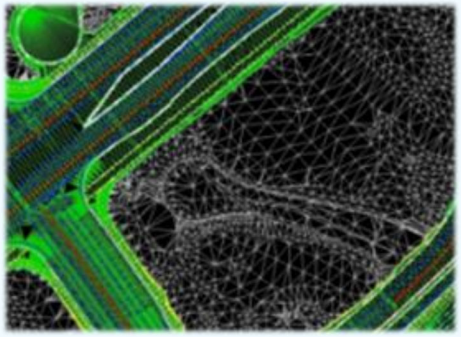
HYBRID DIGITAL DELIVERY

- All project types
- Enables “Electronic Files as Plans”
- Supports Global Positioning Systems and Automated Machine Guidance use
- No comprehensive 3D Solid Model
- Scalable deliverable

Versus

MODEL BASED DIGITAL DELIVERY

- Complex project types only
- Enables “Electronic Files as Plans”
- Supports Global Positioning Systems and Automated Machine Guidance use
- Comprehensive 3D Solid Model
- Not a scalable deliverable



Hybrid Digital Delivery Pilots

*No 3D CAD model

- Reduced set of 2D Plans

- Tabular Data for Element Specific Work
  (i.e. Pavement Repairs, Guiderail, etc.)
- Bridge Data (Bearings, Camber, Haunch, etc.)
- Superelevation

- Roadway Geometry
- Final Grade Surface

Hybrid Digital Delivery Pilots

*No 3D CAD model

- Reduced set of 2D Plans
- Tabular Data for Element Specific Work (i.e. Paveme
- Bridge Data (Bea
- Superelevation
- Roadway Geometry
- Final Grade Surface

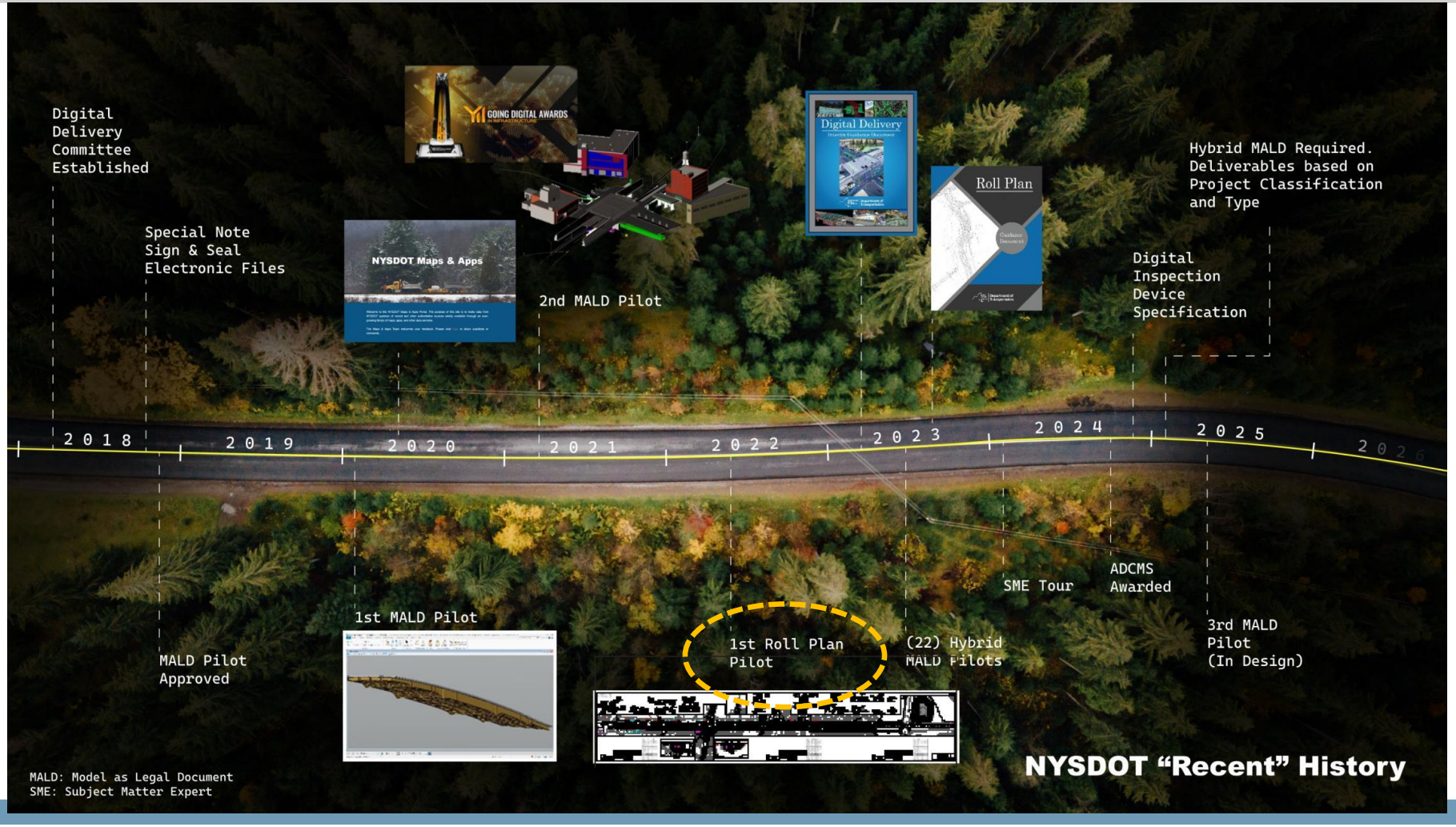
Focus is <u>STILL</u> on delivering electronic information to Construction to build.

- *No focus on digital as-builts*
- *No focus on exchange information requirements*
- *No focus lifecycle asset management*

Hybrid Digital Delivery Pilots (23)

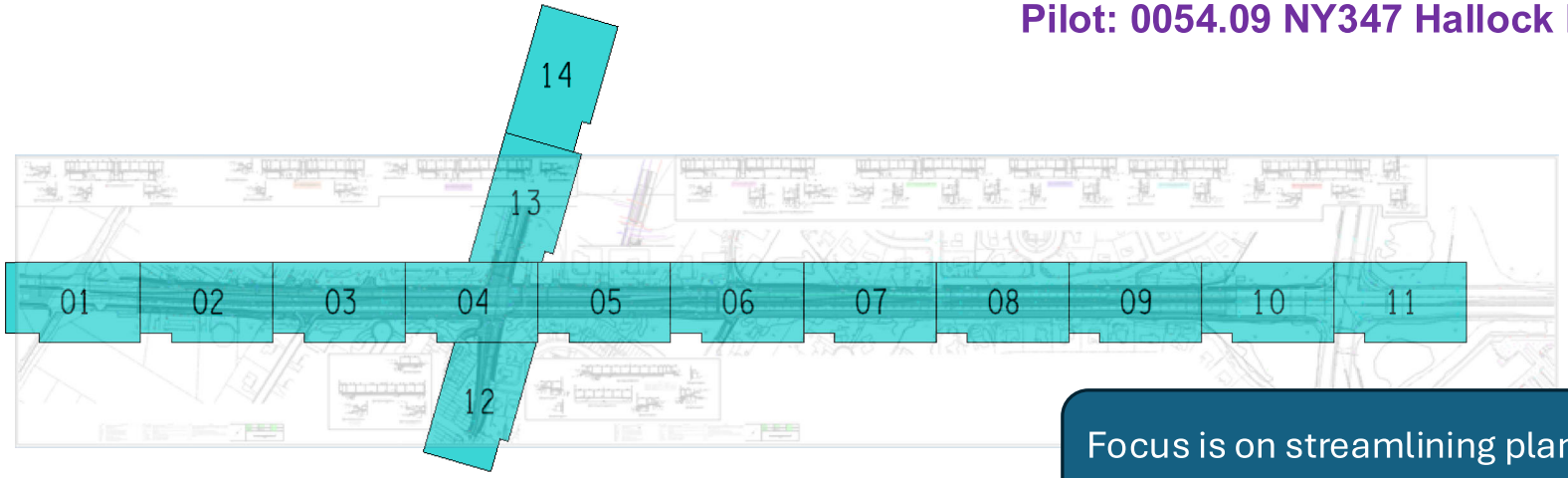
Project Information					Letting Information		
Region	PIN	D #	Project Description	Letting	# Bids	Bid/Est.	Case II?
MO	3037.71	D265023	Route 31 at Thompson Road and South Bay Rd Intersection Improvements	6/29/2023	10	0.93	No
5	5813.73	D265034	Large Culvert Rep. & Rehab. in Catt. Chau. & Erie Co.	6/29/2023	4	0.94	No
5	5814.20	D265055	Large Culvert Rep. & Rehab. in Niagara & Erie Co.	6/29/2023	3	0.94	No
7	7088.35	D265048	Rte 58 over Chippewa Creek	7/13/2023	4	1.07	No
3	3501.87	D265045	I-81 over E. Colvin St Bridge Rehab	7/27/2023	6	0.88	No
9	9501.25	D265070	I-81 Over Loughlin Road, Pile Retrofit	8/24/2023	9	1.09	No
6	6010.19	D265097	NY 54 Over Willow Grove Bridge Replacement	10/12/2023	6	1.26	Yes
4	4018.28	D265089	RT 18 (Latta RD) at North Greece Rd Intersectino Safety Enhancements	10/19/2023	4	1	No
7	7780.09	D265076	Rte 12E over Black River (Brownville)	10/26/2023	5	0.75	No
10	O810.01	D265109	OT2227 - Safety Improvement Project	11/9/2023	7	0.81	No
2	2806.24	D265131	Culvert Repair/ Replacement Herkimer County	11/30/2023	9	0.85	No
6	6001.25	D265139	NY 14A Over Rock Stream Bridge Replacement	11/30/2023	5	1.04	No
8	8393.26	D265201	Route 376 at Hooker Ave/Raymond Ave Intersection Improvements	2/8/2024	11	0.98	No
4	4250.11	D265124	RT 250 Over Thomas Creek Bridge Replacement (BIN 1022160)	2/29/2024	1	1.48	Yes
11	X807.38	D265155	Safety and Operational Improvements on Jackie Robinson Parkway	2/29/2024	5	1.18	Yes
MO	3043.65	D265190	Rt 11 Over Oneida River	3/14/2024	4	1.03	No
MO	4490.16	D265213	I-490 Over the Erie Canal and Kraeg Road	3/14/2024	3	1.11	No
MO	9166.43	D265086	RT 80 Over Hayden Creek	3/28/2024	3	1	No
2	2806.46	D265181	Culvert Repair/ Replacement 23	3/28/2024	4	0.96	No
3	3807.7O	D265243	Regional Pavement Markings & Audible Roadway Delineator Project	4/25/2024	2	1.03	No
MO	3501.94	D265138	I-81 Viaduct Project	7/11/2024	2	0.82	No
1	1236.29	D265261	Route 29 at Rowland Street	7/11/2024	3	1.13	No
1	1130.73	D265277	Route 22 over White Creek	7/25/2024	3	1	No
23		**23**	**<-----TOTALS ----->**		**4.91**	**1.01**	**13.04%**

Roll Plan Pilot



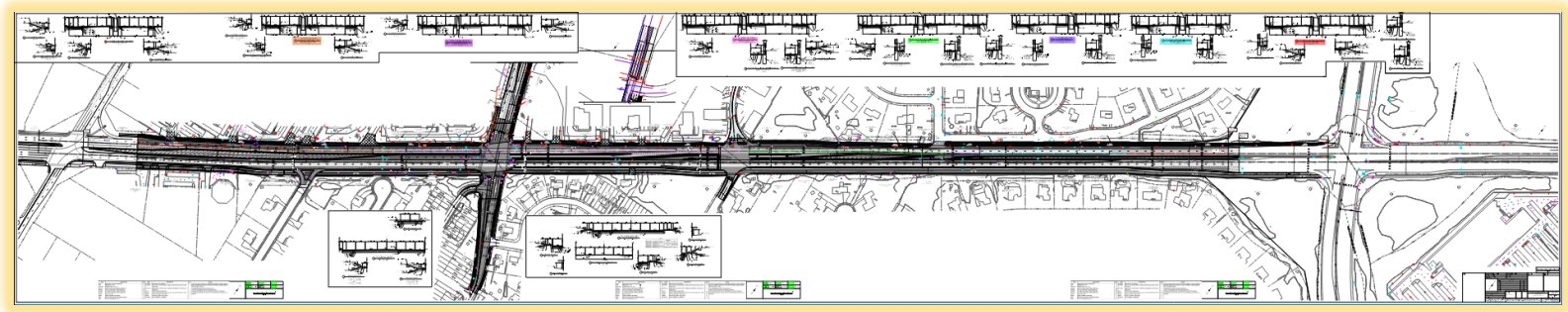
Roll Plan Pilot

Pilot: 0054.09 NY347 Hallock Rd to CR 97

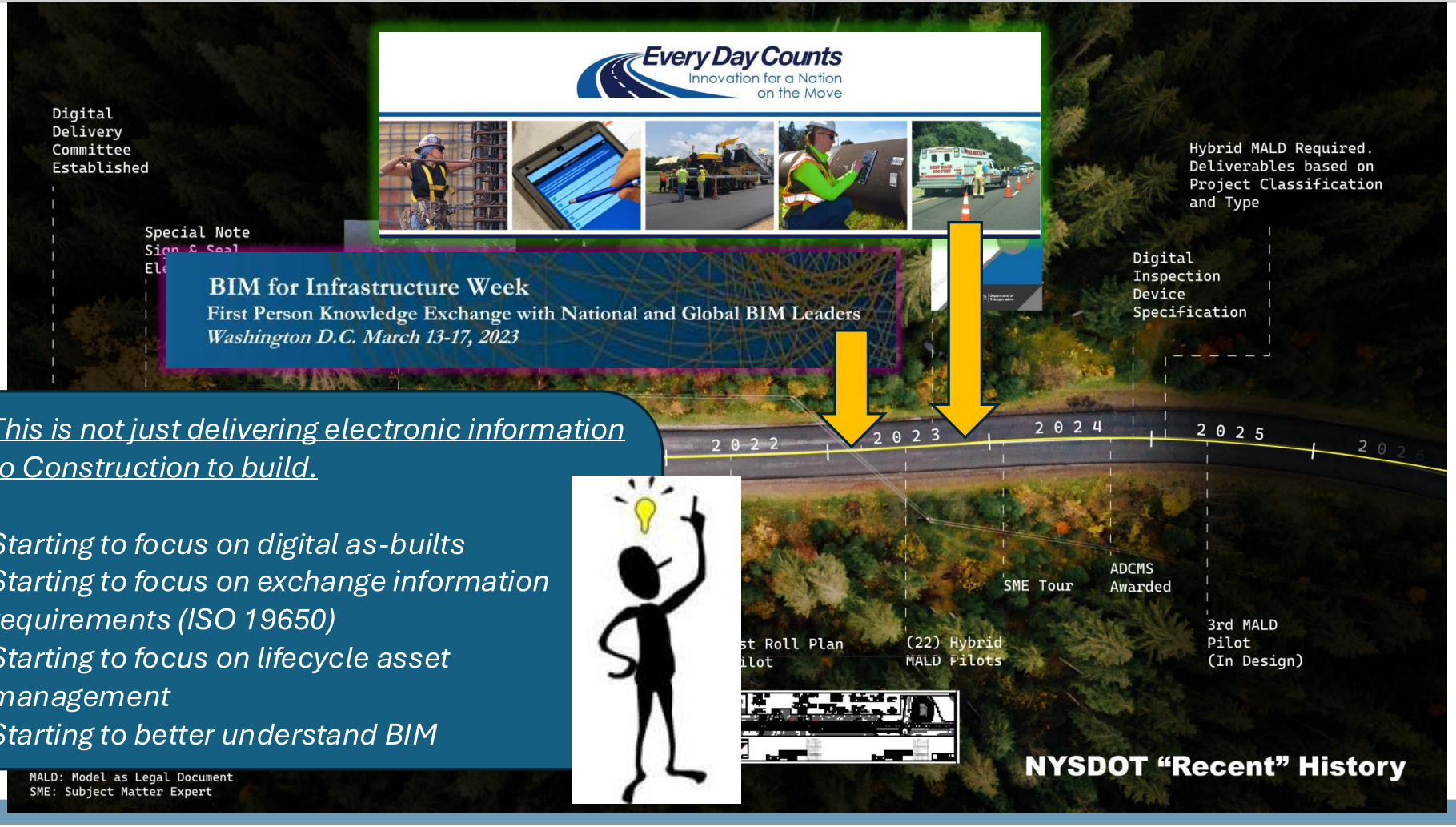


Focus is on streamlining plan production and driving the need to use digital devices.

36” x 180”

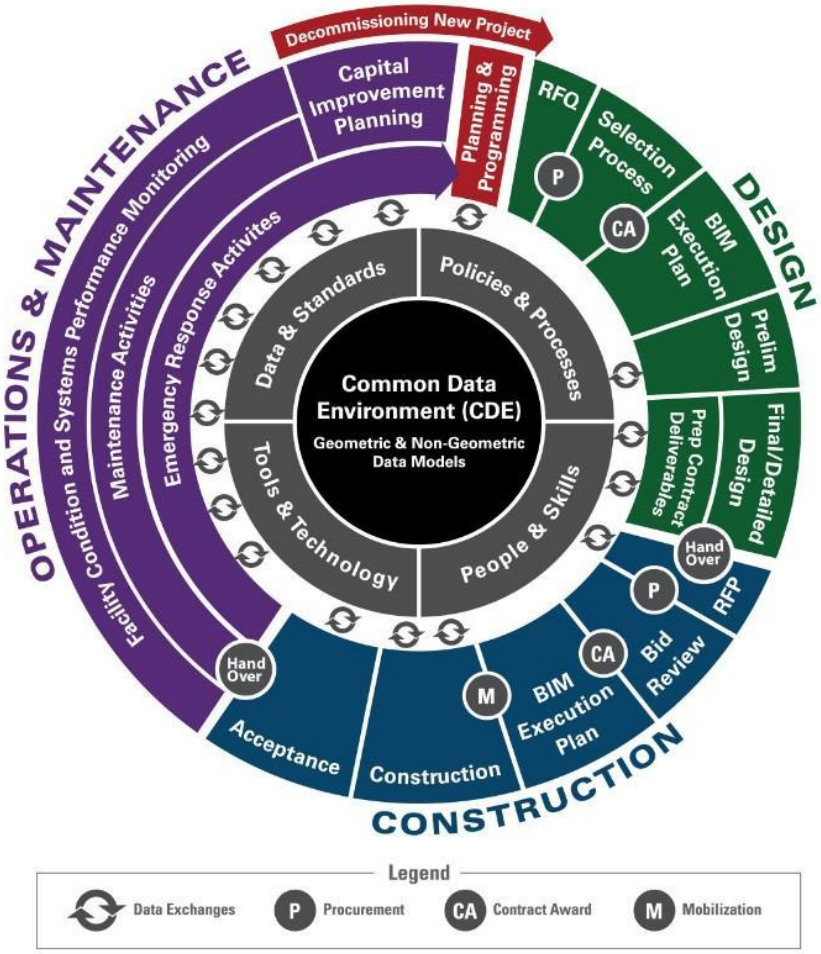


BIM Week March 2023 & EDC-6 (CTDOT November 2023)



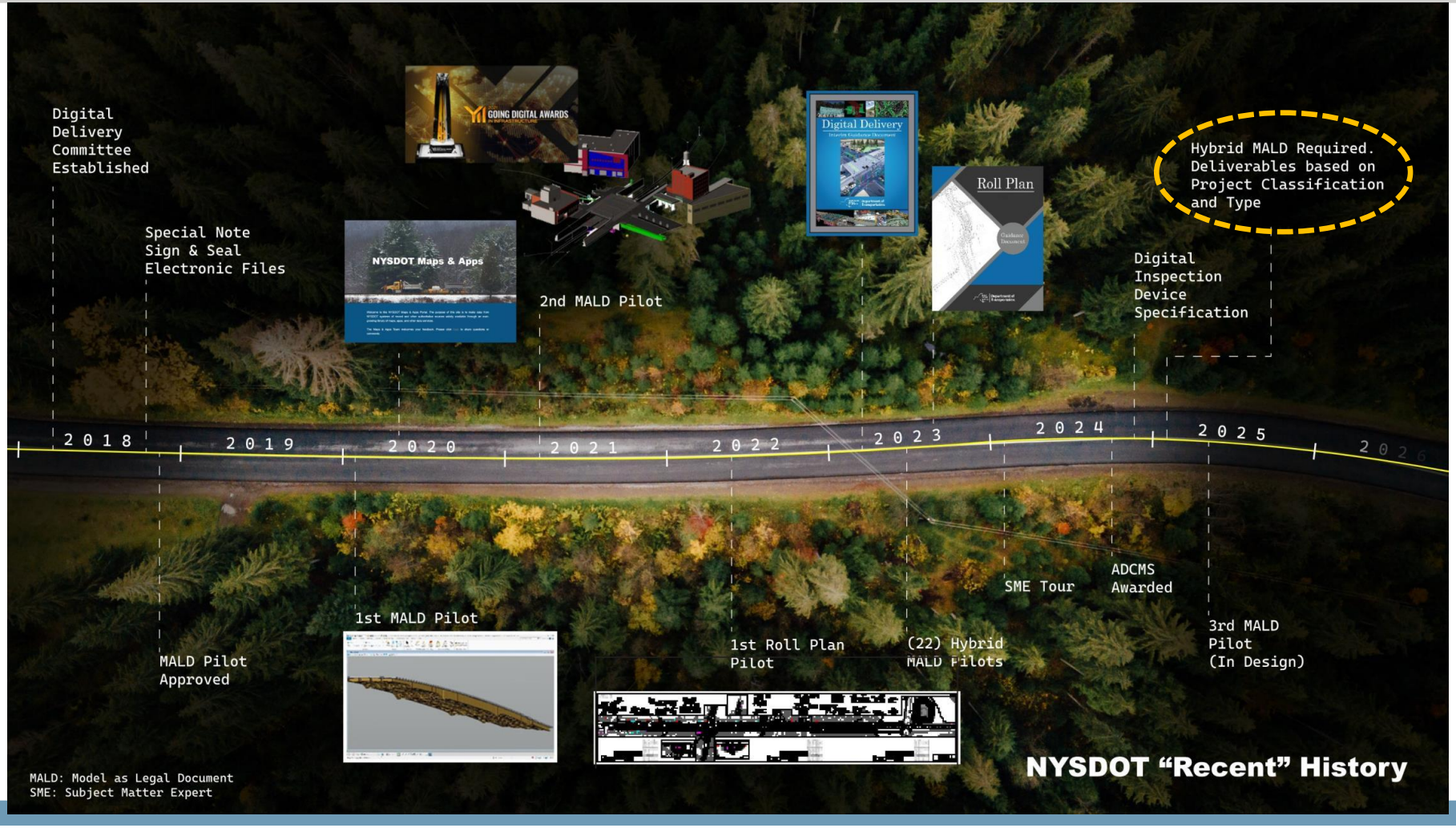
- *<u>This is not just delivering electronic information to Construction to build.</u>*

- *Starting to focus on digital as-builts*
- *Starting to focus on exchange information requirements (ISO 19650)*
- *Starting to focus on lifecycle asset management*
- *Starting to better understand BIM*


Decommissioning New Project
OPERATIONS & MAINTENANCE
Capital Improvement Planning
Planning & Programming
DESIGN
RFQ
Selection Process
P
CA
BIM Execution Plan
Prelim Design
Final/Detailed Design
Prep Contract Deliverables
Hand Over
P
RFP
Bid Review
CA
BIM Execution Plan
M
Construction
Acceptance
Hand Over
CONSTRUCTION
Facility Condition and Systems Performance Monitoring
Maintenance Activities
Emergency Response Activites
Data & Standards
Policies & Processes
Tools & Technology
People & Skills
Common Data Environment (CDE)
Geometric & Non-Geometric Data Models
Legend
Data Exchanges
P Procurement
CA Contract Award
M Mobilization

ADCMS – Help Wanted!

Hybrid Digital Delivery Pilots



Digital Delivery Pilots

- Deliverables required based on Project Classification & Type

- Starting to define exchange information requirements!

LEGEND:		
Required[1]	Optional	Not Applicable

[1] - *This deliverable is only required if you are providing it on your project.*

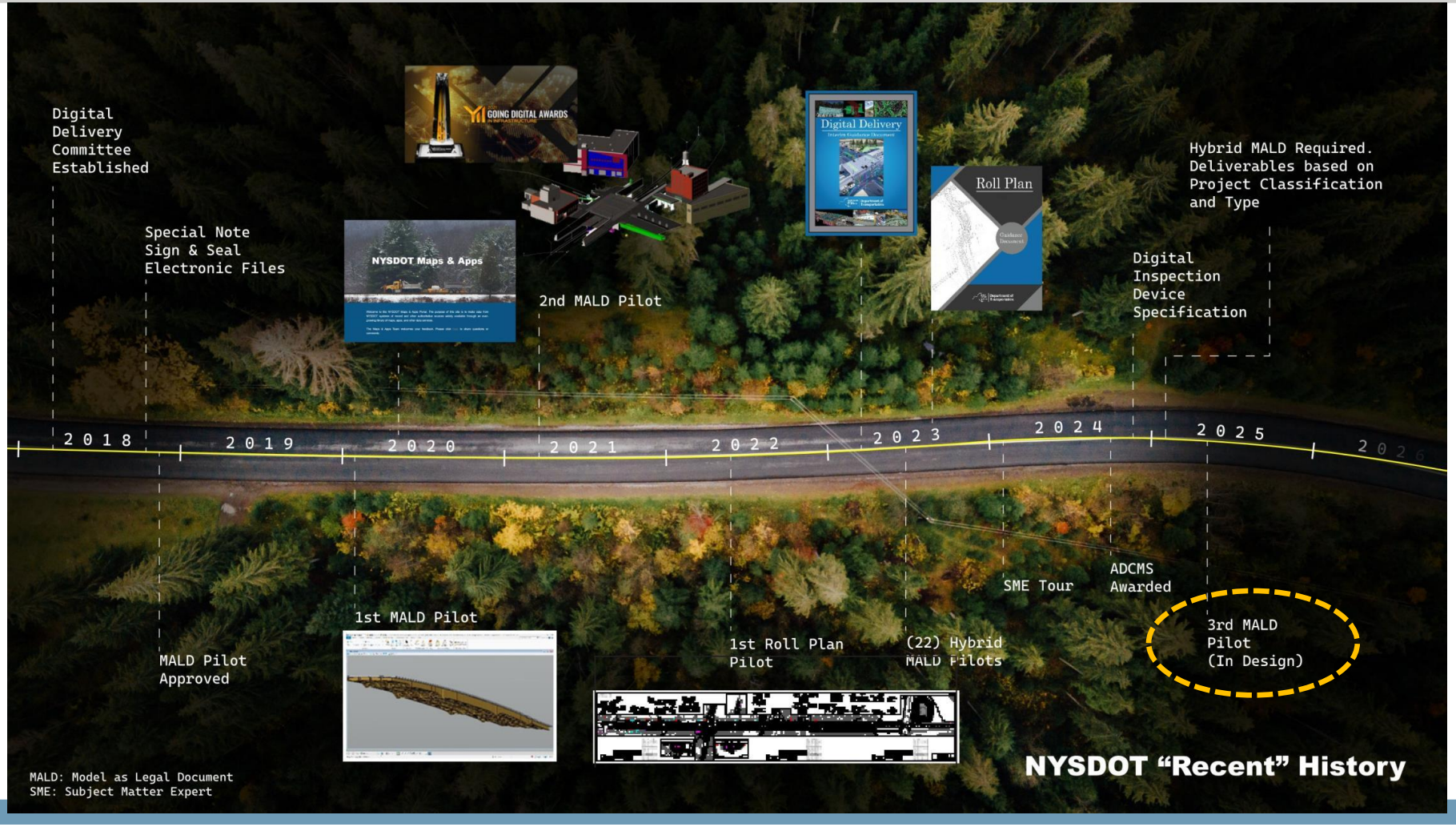
STEP 2: Determine the Digital Delivery deliverable requirement *(if providing)* based on project type

DELIVERABLE MATRIX FOR DIGITAL DELIVERY

(Requirements by Project Type - Including File Format)

	Contract Plans		Electronic Files Identified as Plans												
PROJECT TYPE *(PDM Ch 1.4 & PDM Appendix 7 Exhibits 7-4 and 7-5)*	8.5x11 or 11x17	Roll Plot[5]	Roadway Geometry	Roadway Superelevation	Survey Baseline Geometry	Drainage Pipe Inverts	Drainage Pipe Inlets	Guiderail	Pavement Markings	Rigid Pavement Repairs	Final Grade Surface	3D CAD Model	Bearing Table	Design Tabl
Highway Reconstruction/New Construction	PDF	PDF	LandXML	Excel	LandXML	LandXML	LandXML	n/a	n/a	n/a	LandXML	DGN[3]	n/a	n/a
Resurfacing Projects (1R)	PDF	PDF	n/a	Excel	LandXML	n/a	n/a	n/a	Excel	n/a	LandXML	n/a	n/a	n/a
Resurfacing, Restoration & Rehabilitation (2R/3R)[4]	PDF	PDF	LandXML	Excel	LandXML	LandXML	LandXML	n/a	n/a	n/a	LandXML	n/a	n/a	n/a
Intersection or Interchange Reconstruction/New Construction	PDF	PDF	LandXML	Excel	LandXML	LandXML	LandXML	n/a	n/a	n/a	LandXML	DGN[3]	n/a	n/a
New Bridge/Bridge Replacement	PDF	PDF	LandXML	Excel	LandXML	LandXML	LandXML	n/a	n/a	n/a	LandXML	DGN[3]	Excel	Exc
Bridge Rehabilitation Projects	PDF	PDF	LandXML	Excel	LandXML	n/a	n/a	n/a	n/a	n/a	LandXML	n/a	Excel	Exc
Park and Ride Lots	PDF	PDF	LandXML	Excel	LandXML	LandXML	LandXML	n/a	n/a	n/a	LandXML	n/a	n/a	n/a
Rest Areas/Comfort Stations	PDF	PDF	LandXML	Excel	LandXML	LandXML	LandXML	n/a	n/a	n/a	LandXML	n/a	n/a	n/a
Bicycle & Pedestrian Facilities	PDF	PDF	LandXML	Excel	LandXML	LandXML	LandXML	n/a	n/a	n/a	LandXML	n/a	n/a	n/a
Separate Landscape Development Projects	PDF	PDF	LandXML	Excel	LandXML	LandXML	LandXML	n/a	n/a	n/a	LandXML	n/a	n/a	n/a
Fishing, Boating and Hiking Access	PDF	PDF	LandXML	Excel	LandXML	LandXML	LandXML	n/a	n/a	n/a	LandXML	n/a	n/a	n/a
Safety Improvements	PDF	PDF	LandXML	Excel	LandXML	LandXML	LandXML	n/a	n/a	n/a	LandXML	n/a	n/a	n/a
Intelligent Transportation Systems (ITS) Projects	PDF	PDF	LandXML	Excel	LandXML	LandXML	LandXML	n/a	n/a	n/a	LandXML	n/a	n/a	n/a
Signalization, Signing and Delineation Projects	PDF	PDF	LandXML	Excel	LandXML	LandXML	LandXML	n/a	n/a	n/a	LandXML	n/a	n/a	n/a
Noise Walls	PDF	PDF	LandXML	Excel	LandXML	LandXML	LandXML	n/a	n/a	n/a	LandXML	n/a	n/a	n/a
Drainage Projects	PDF	PDF	LandXML	Excel	LandXML	LandXML	LandXML	n/a	n/a	n/a	LandXML	n/a	n/a	n/a
Element Specific Work - Highway Cyclical	PDF	PDF	LandXML	n/a	n/a	n/a	n/a	n/a	Excel[2]	n/a	LandXML	n/a	n/a	n/a
Element Specific Work - Highway	PDF	PDF	LandXML	Excel	LandXML	LandXML	LandXML	Excel[2]	n/a	Excel[2]	LandXML	n/a	n/a	n/a
Element Specific Work - Bridge Cyclical	PDF	PDF	LandXML	n/a	n/a	n/a	n/a	n/a	n/a	n/a	LandXML	n/a	n/a	n/a
Element Specific Work - Bridge	PDF	PDF	LandXML	n/a	n/a	n/a	n/a	n/a	n/a	n/a	LandXML	n/a	Excel	Exc
Airport Projects	PDF	PDF	LandXML	Excel	LandXML	LandXML	LandXML	n/a	n/a	n/a	LandXML	n/a	n/a	n/a
Rail/Highway Grade Crossing and other Rail Improvements	PDF	PDF	LandXML	Excel	LandXML	LandXML	LandXML	n/a	n/a	n/a	LandXML	n/a	n/a	n/a
Transit Projects	PDF	PDF	LandXML	Excel	LandXML	LandXML	LandXML	n/a	n/a	n/a	LandXML	n/a	n/a	n/a
Enhancement and other Locally Administered Projects	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Hybrid Digital Delivery Pilots

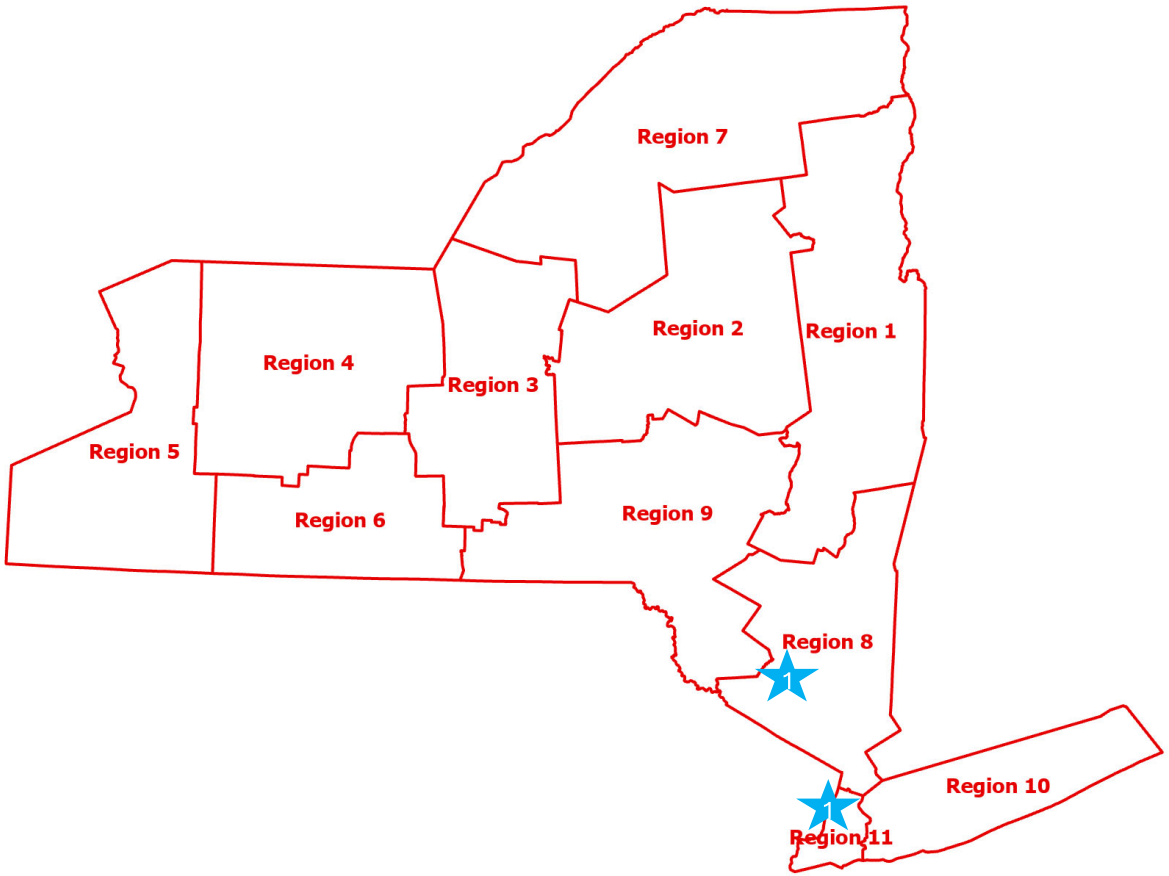


NYSDOT 3rd Model Based Digital Delivery Project

What do we want this project “to be”??

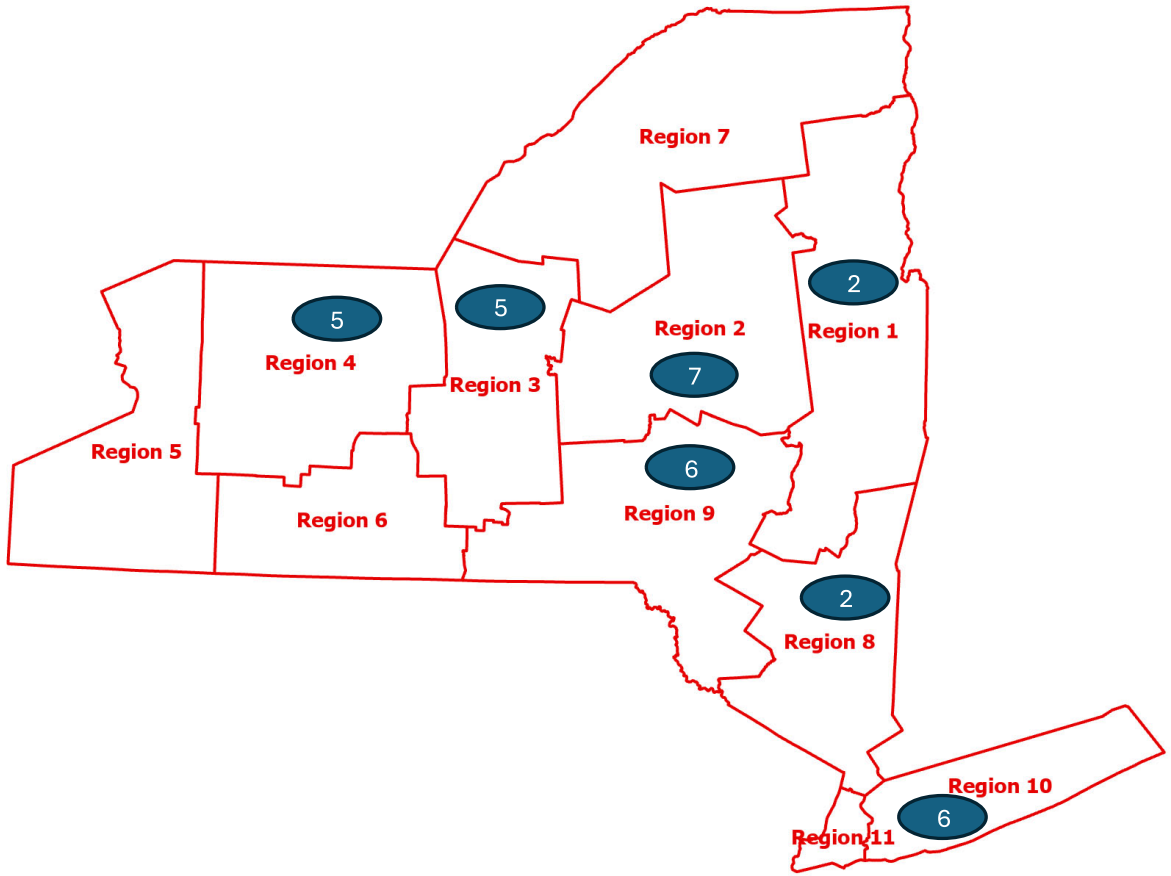
U.S. Route 9/20 Over I-90 Bridge Replacement BIN 1092730 PIN: 1043.57

Model Based Digital Delivery Projects (As of 4/27/26)



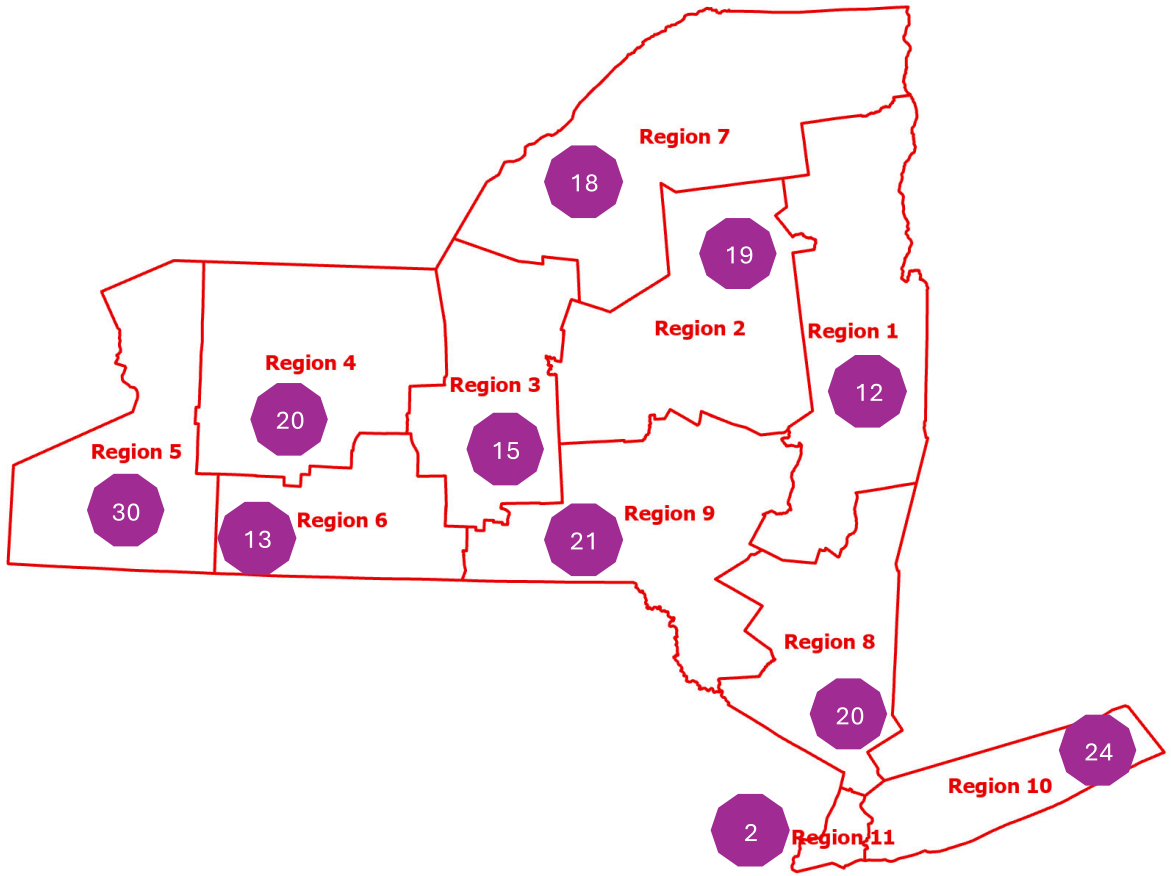
(2) Projects
2019-2026

Roll Plan Projects (As of 4/27/26)



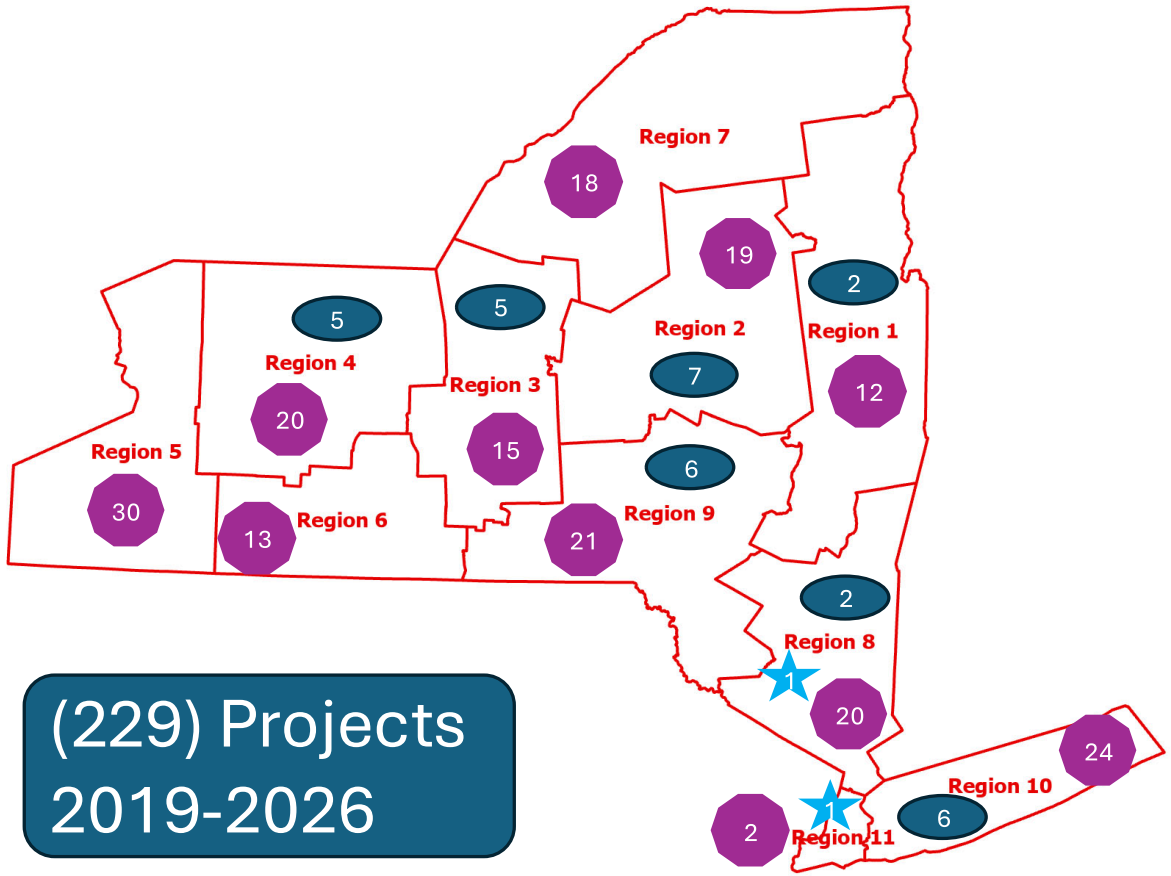
(33) Projects 2022-2026

Hybrid Digital Delivery Projects (As of 4/27/26)



(194) Projects
2023-2026

All Projects(As of 4/27/26)



(229) Projects
2019-2026

HDD = Hybrid Digital Delivery Project
MBDD = Model Based Digital Delivery Project

Summary:
194 - HDD Projects (15 of 176 Proposal Only)
2 - MBDD Projects
33 - Roll Plan Projects

Digital Delivery Projects By Region:
R1 - 12
R2 - 19
R3 - 15
R4 - 20
R5 - 30
R6 - 13
R7 - 18
R8 - 21
R9 - 21
R10 - 24
R11 - 3

Mentimeter

What suggestions would you have for future pilots?

https://www.mentimeter.com/app/presentation/alp5w2qg2b8w3ri6srqjujhvbg4indpq/edit?source=share-modal

Break...

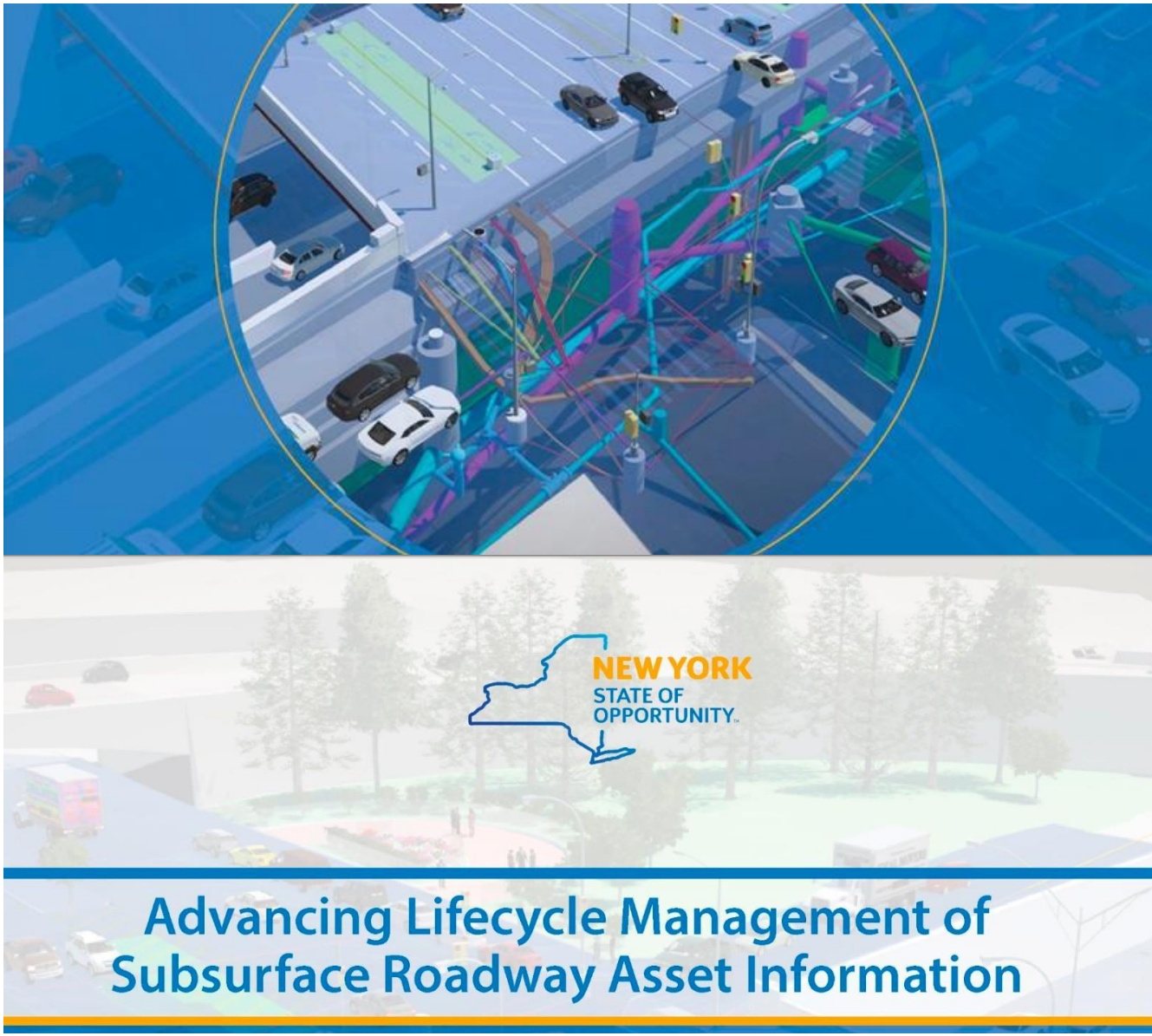
10:30-10:45a

NEXT... Session 3: To-Be State of Practice

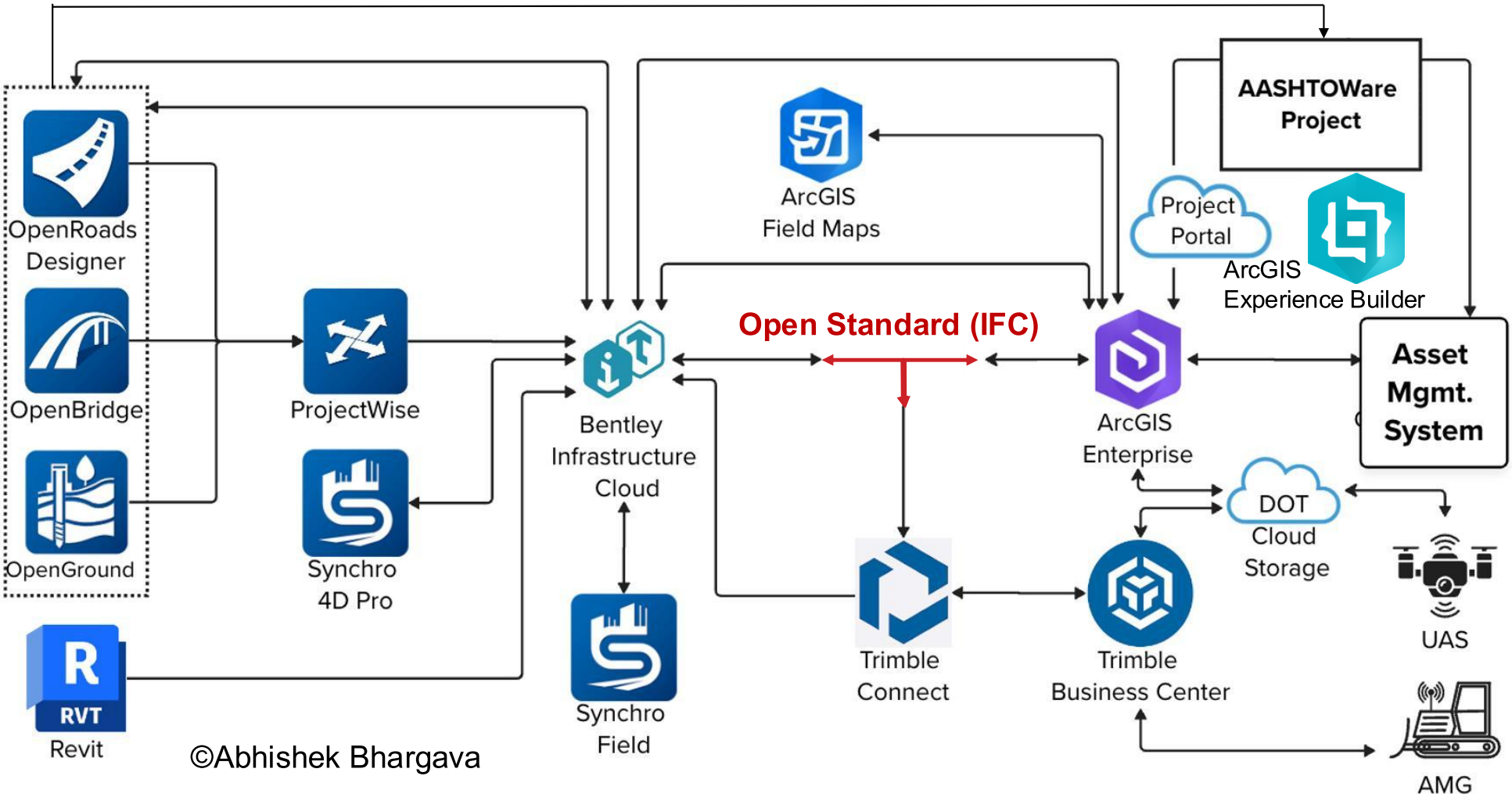
Topic	Schedule
Welcome and Overview of ADCMS	**9:00 AM – 9:20 AM**
1. Introductions, Workshop Goals and Objectives	9:00 – 9:10 AM
2. ADCMS Grant Award	9:10 – 9:20 AM
3. Survey	
SESSION 1: Current State of Practice	**9:20 AM – 10:00 AM**
1. Presentation & Demo	9:20 – 9:50 PM
2. Open Discussion & Survey: Regional Practices, Challenges, Opportunities, Consensus	9:50 – 10:00 AM
SESSION 2: Digital Delivery and Pilot Projects	**10:00 AM – 10:30 AM**
1. Presentation & Demo	10:00 – 10:20 AM
2. Open Discussion & Survey	10:20 – 10:30 AM
BREAK	**10:30 - 10:45 AM**
SESSION 3: To-Be State of Practice	**10:45 AM – 1:50 PM**
1. Defining To-Be State:	10:45 – 11:15 AM
• *Demo and To-Be State Vision*	*10:45 – 11:00 AM*
• *Open Discussion & Survey*	*11:00 – 11:15 AM*
2. Level of Development, Design/Construction Workspace Design and Asset Information Management	11:15 – 12:00 PM
• *Demo and To-Be State Vision*	*11:15 – 11:25 AM*
• *Open Discussion & Survey*	*11:25 – 12:00 PM*
LUNCH BREAK	**12:00 – 1:00 PM**
3. BIM Execution Plans (BEP)	1:00 – 1:50 PM
• *BIM Workflows, Roles and Responsibilities, Technology Infrastructure*	*1:00 – 1:30 PM*
• *Open Discussion & Survey*	*1:30 – 1:50 PM*
Closing Remarks - Look Ahead: 2026 - 2027	**1:50 PM – 2:00 PM**

III. To-Be State of Practice

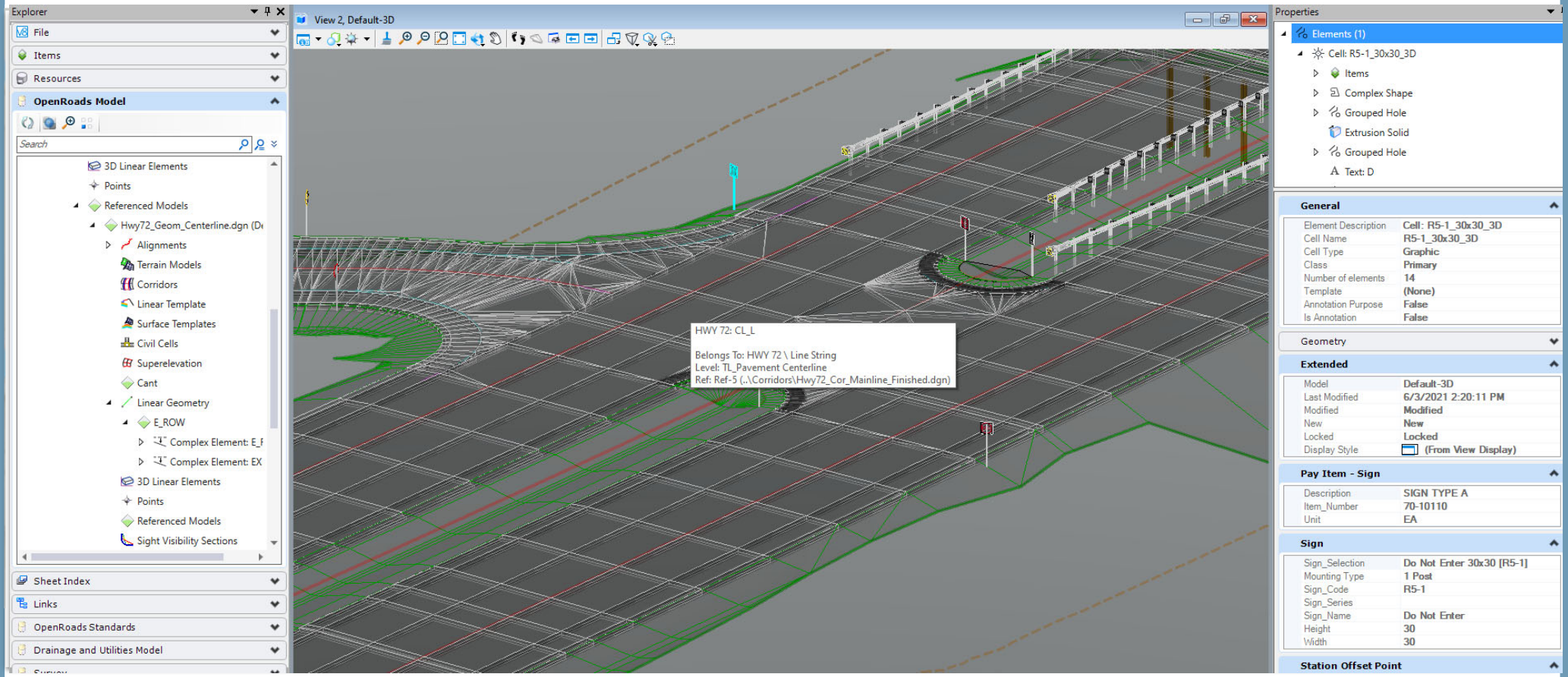
Session 3 10:45 AM – 1:50 PM

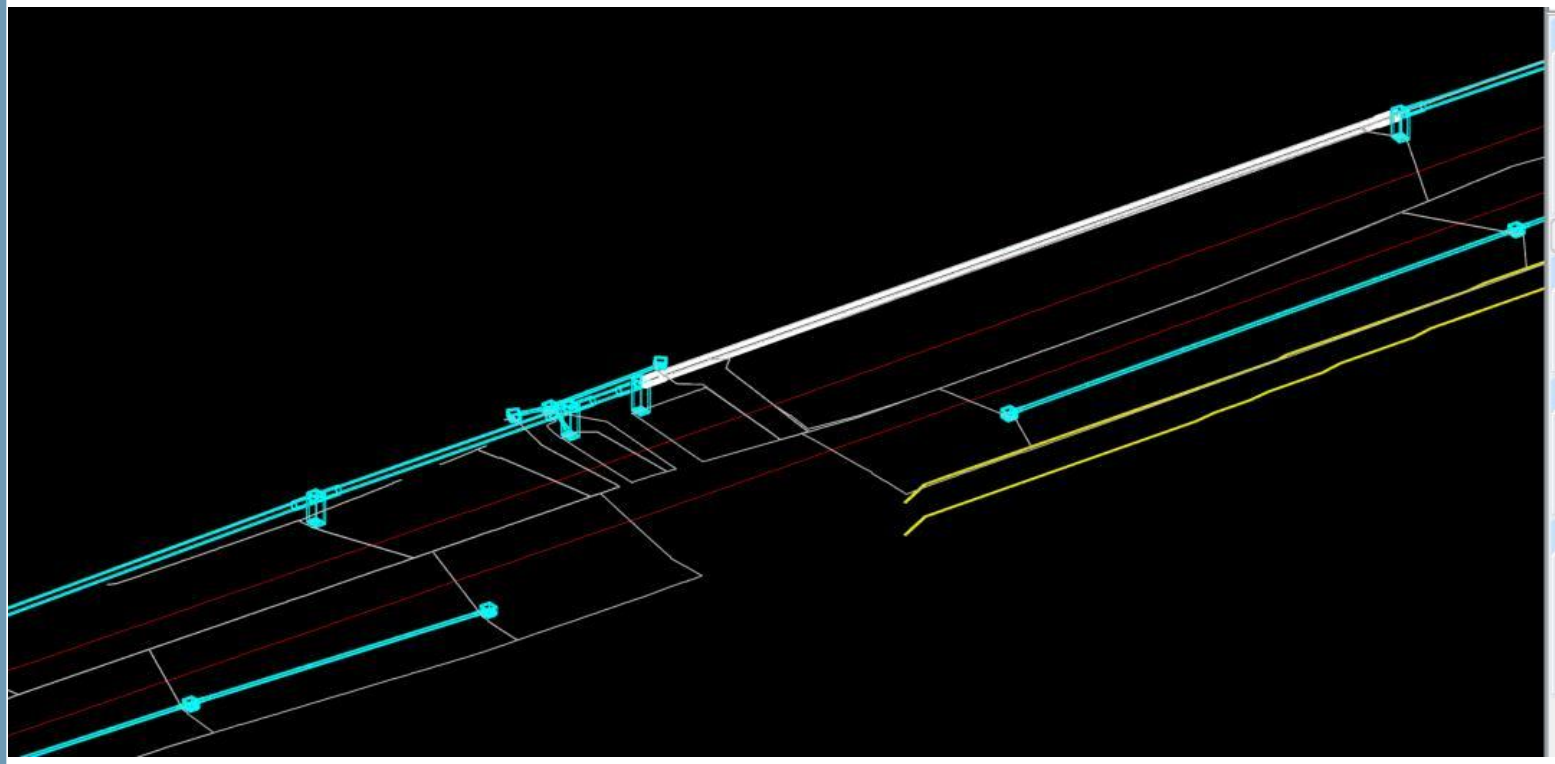


Open BIM Digital Workflow



DEMO: To-Be State Demo with Models





General	
Element Description	Link: DP 213
Level	DCP_P
Color	ByLevel (7)
Line Style	ByLevel (DCP_P)
Weight	ByLevel (2)
Class	Primary
Template	(None)
Transparency	0

Drainage and Utilities

Feature	
Feature Definition	Concrete (Round)
Feature Name	DP 213
Description	42"
Create Trench	False

Drainage Results	
Capacity (Full Flow)	54.92
Flow	33.99
Depth (Normal)	1.99'
Velocity	360.56
Flow Direction	Positive

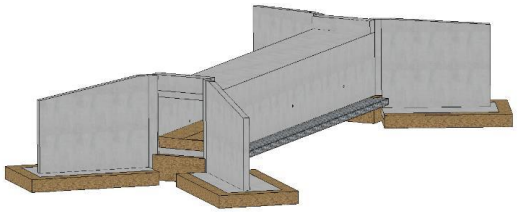
Extended	
Model	Default-3D
Last Modified	10/31/2025 1:04:35 PM
Snappable	Snappable
Modified	Modified
New	New
Locked	Unlocked
Display Style	(From View Display)

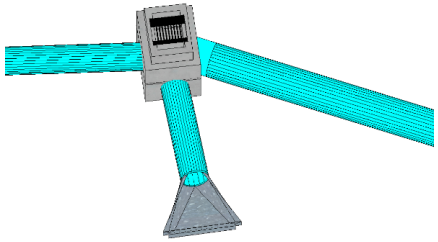
Drainage Asset Class Inventory

Highway drainage assets mapped under ISO 19650 / IFC 4.3

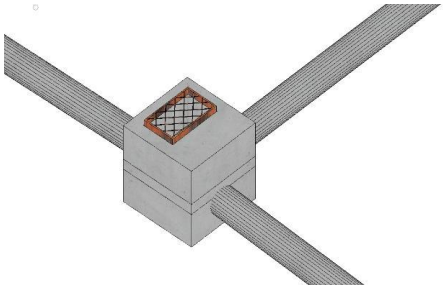
PIPE	**Storm Drain Pipe** IFC: IfcPipeSegment HDPE, RCP, VCP, CMP, PVC	**OUTFALL**	**Outfall Structure** IFC: IfcFlowTerminal Flared end, headwall, riprap
CULV	**Small Culvert** IFC: IfcCulvert (IFC 4.3 new) Span ≤20 ft; box, pipe arch, arch	**POND**	**Detention / Retention Pond** IFC: IfcReservoir (IFC 4.3 new) Wet, dry, bioretention
INLET	**Catch Basin / Inlet** IFC: IfcDistributionChamberElement GULLYHOLE; curb, grate, combo	**OCS**	**Outlet Control Structure** IFC: IfcFlowController Riser, weir, gates, orifice
DITCH	**Open Channel / Ditch** IFC: IfcFlowSegment + Pset_Open Roadside, median, swale, bio	**APS**	**Access Point Structure** IFC: IfcDistributionChamberElement Manhole, cleanout, junction box

NYSDOT Culverts, Inlets, Manholes, Grates Modeling

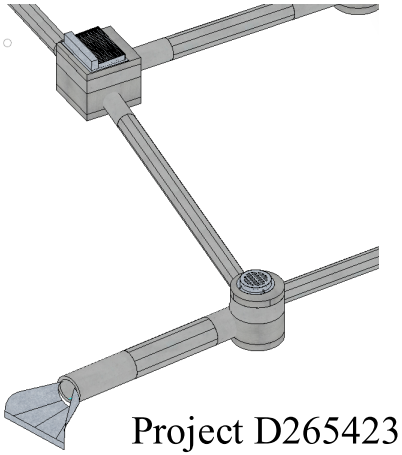




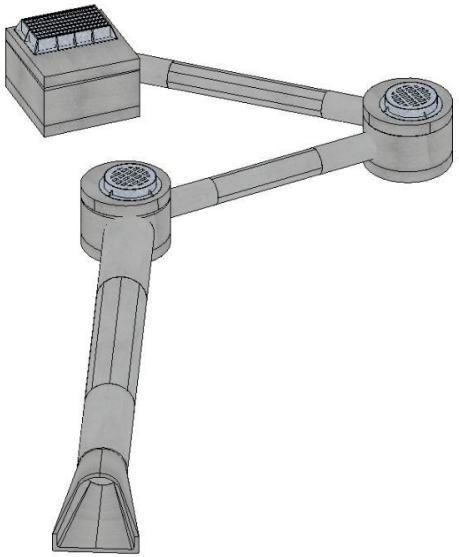
Project D264093-8018.46 - Rt 28 Over Esopus Creek



Project D265393-0054.09 -
Rt 347 Hallock Rd to CR97

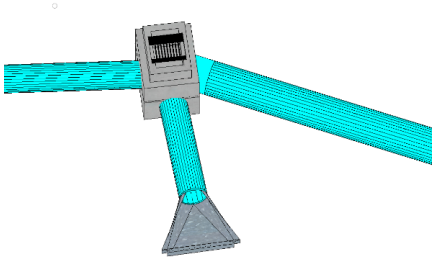


Project D265423-3827.22 -
Route 370 Liverpool

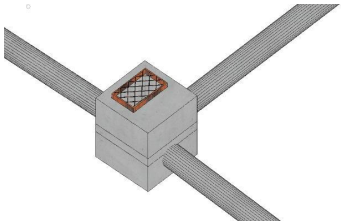


Project D265393-0054.09 -
Rt 347 Hallock Rd to CR97

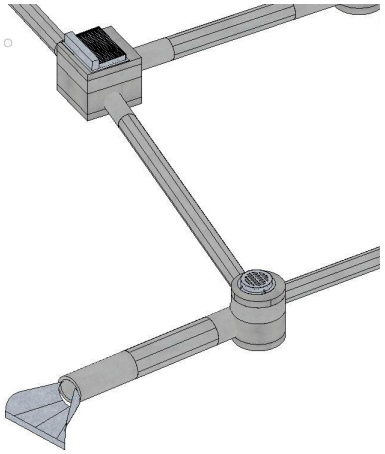
Pipes Asset Attributes



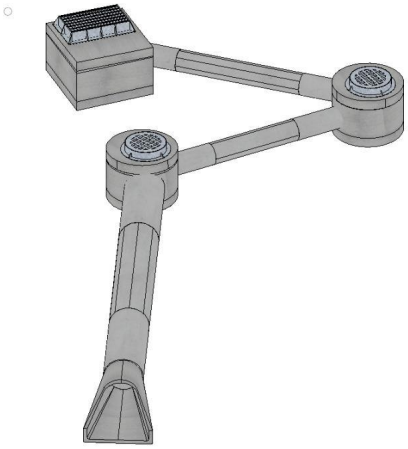
Project D264093-8018.46 -
Rt 28 Over Esopus Creek



Project D265393-0054.09 -
Rt 347 Hallock Rd to CR97



Project D265423-3827.22 -
Route 370 Liverpool



Project D265393-0054.09 -
Rt 347 Hallock Rd to CR97

Property Set	Property	Definition
Identification	Object ID	Unique identifier in owner's asset database
	Feature ID	DOT asset feature number or designation
	Feature Description	Detailed description of drainage pipe feature
	Survey Feature Code	Surveyor abbreviation (e.g., RCP, DIP, HDPE)
	Alignment ID Reference	Road alignment ID referenced for pipe layout
Alignment	Station Begin	Survey station at upstream end of pipe
	Station End	Survey station at downstream end of pipe
	Station Offset Begin	Lateral offset from alignment at upstream end
	Station Offset End	Lateral offset from alignment at downstream end
Georeferencing	Northing Begin	State Plane Y coordinate at upstream end (ft)
	Easting Begin	State Plane X coordinate at upstream end (ft)
	Northing End	State Plane Y coordinate at downstream end (ft)
	Easting End	State Plane X coordinate at downstream end (ft)
	Latitude Begin	WGS84 latitude at upstream end (decimal degrees)
	Longitude Begin	WGS84 longitude at upstream end (decimal degrees)
LRS Data	Postmile Begin	Linear Reference System milepost at pipe start
Pipe Features	Pipe Shape	Cross-section: Circular, Rectangular, Arch, Elliptical, Pipe-Arch
	Pipe Material	RCP, HDPE, PVC, CMP, RCBC, Ductile Iron, etc.
	Pipe Diameter / Size	Internal diameter (circular) or span×rise (non-circular)
	Wall Thickness	Nominal wall thickness of pipe
	Flow Direction	Intended flow direction in pipe
Pipe Type	Pipe Class / ASTM	Structural class (e.g., Class III) or ASTM designation (C76)
	Underdrain Flag	Is this a perforated underdrain pipe?
	Pipe Class Function	Storm sewer, sanitary, combined, underdrain
Connectivity	Start Pipe Node	Upstream node or connection point (structure ID)
	End Pipe Node	Downstream node or connection point (structure ID)
Pipe Layout	Pipe Length 2D	Horizontal plan length between nodes
	Pipe Length Actual	True 3D length along pipe path (as-laid)
	Pipe Slope	Longitudinal slope (ft/ft)
	Pipe Skew Angle	Angle between pipe axis and road perpendicular
	Cover Depth	Depth from pipe crown to finished grade
Pipe Elevations	Start Invert Elevation	Flowline (interior bottom) at upstream end (NAVD 88)
	End Invert Elevation	Flowline (interior bottom) at downstream end (NAVD 88)
	Crown Elevation	Top exterior of pipe elevation
	Soffit Elevation	Interior top of pipe elevation
Hydraulics	Manning's n	Roughness coefficient for hydraulic calc
	Design Storm Return	Design storm recurrence interval (e.g., 10-yr, 25-yr)
	Design Flow Rate (Q)	Peak discharge for design storm (cfs)
	Flow Velocity	Design flow velocity in pipe (fps)
	Upstream HGL	Hydraulic Grade Line elevation at upstream end
	Downstream HGL	Hydraulic Grade Line elevation at downstream end
	Upstream EGL	Energy Grade Line elevation at upstream end
	Downstream EGL	Energy Grade Line elevation at downstream end
Drainage Area	Drainage Area	Contributing watershed area (acres)
	Flow Method	Hydrologic method for peak flow calc
Pay Item	Pay Item Code	Owner agency pay item code
	Pay Item Description	Description of pay item
	Unit of Measure	Measurement unit (LF, EA, CY, etc.)
	Pay Quantity	Quantity of pay item
	Specification URL	URL to specification section

Example Data Pipeline - Culvert

Current Small Culvert Inventory

SCIN :	R2-148224
Legacy Culvert ID :	167124
Route :	NY5S
Traveling :	
Reference Marker :	5S25031169
Ref Marker Offset (Ft) :	
DOT Region :	R2 - Utica
County :	MONTGOMERY
DOT Residency :	254-FULTON-MONTGOMERY RESIDENCY
Maintenance Jurisdiction :	
Contract :	
Year Built :	
Span Shape :	Other
Span Material :	Other
Relined Span Material :	
Span Coating :	Other
Span Width :	2.5
Span Height :	2.5
Length :	58
Skew :	Less than 45
Depth :	3
Inlet Ext Shape :	
Inlet Treat Type :	
Inlet Ext Material :	Metal

Overall Rating :	3
Functioning as Designed :	
Serious Condition Flag :	
Previous Inspector Name :	K TRIPOLI
Previous Inspection Date :	5/3/2011 20:00
Previous Inspection Comments :	
2026 Inspector Name :	
2026 Inspection Date :	
2026 Inspection Comments :	
Photo URL :	View Photos/Info
User Updated :	GIS
Date Updated :	8/16/2019 18:36

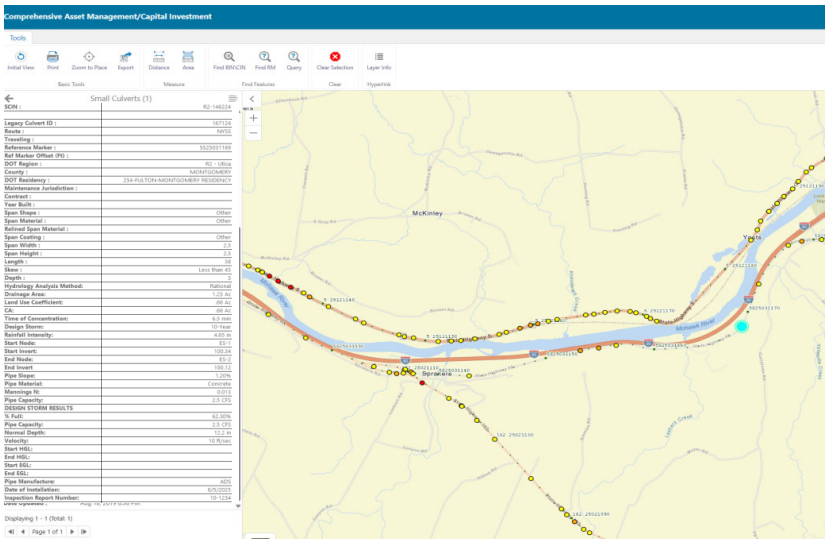
Design Results

Hydrology Analysis Method:	Rational
Drainage Area:	1.25 Ac
Land Use Coefficient:	.66 Ac
CA:	.66 Ac
Time of Concentration:	6.5 min
Design Storm:	10-Year
Rainfall Intensity:	4.65 in
Start Node:	ES-1
Start Invert:	100.34
End Node:	ES-2
End Invert	100.12
Pipe Slope:	1.20%
Pipe Material:	Concrete
Mannings N:	0.013
Pipe Capacity:	2.5 CFS
DESIGN STORM RESULTS	
% Full:	62.30%
Pipe Capacity:	2.5 CFS
Normal Depth:	12.2 in
Velocity:	10 ft/sec
Start HGL:	
End HGL:	
Start EGL:	
End EGL:	

Construction Information

Pipe Manufacture:	ADS
Date of Installation:	6/5/2025
Inspection Report Number:	10-1234

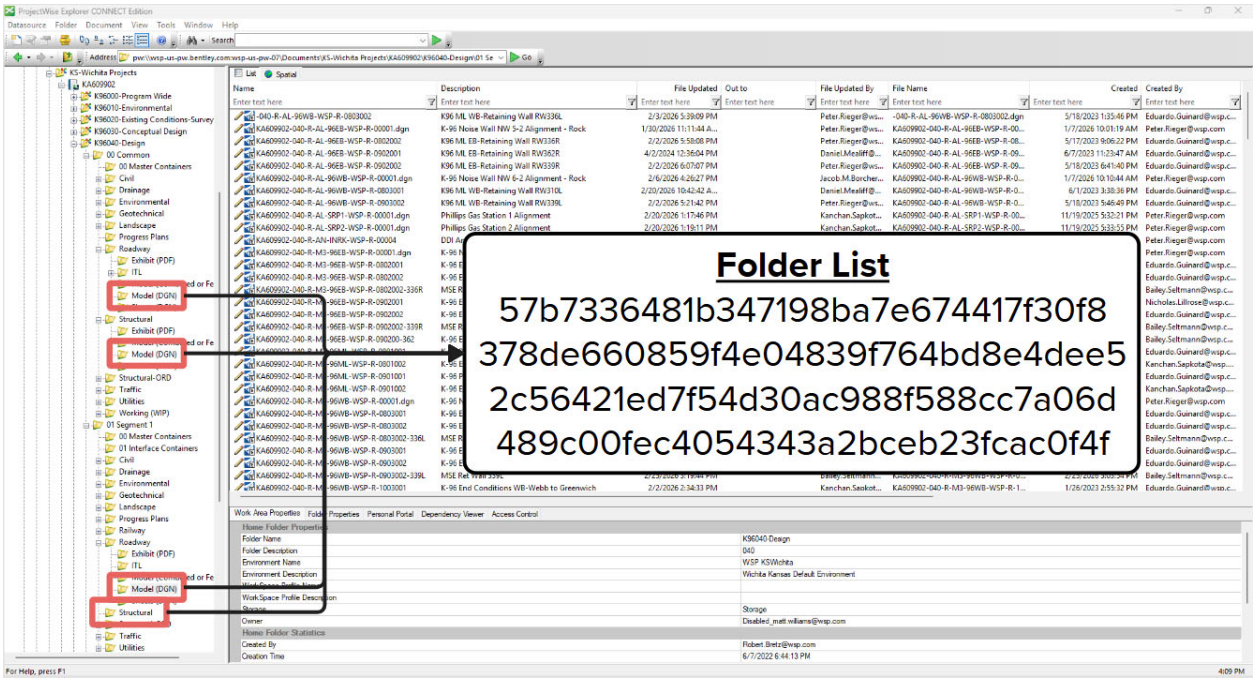
Complete Inventory



Workbench Run: Outputs & Run Stats

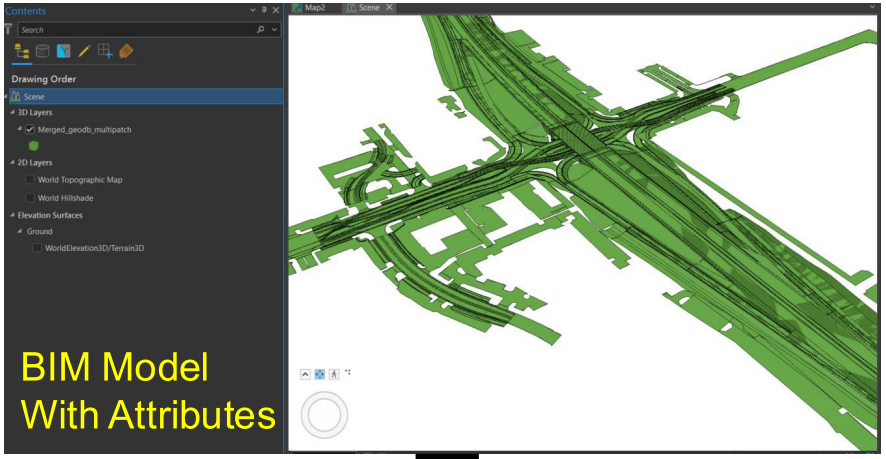
- **Inputs (from ProjectWise)**
  - 4 folders processed containing 386 CAD/BIM files (DGN).
  - 360 files contained usable data; non-data files were excluded.

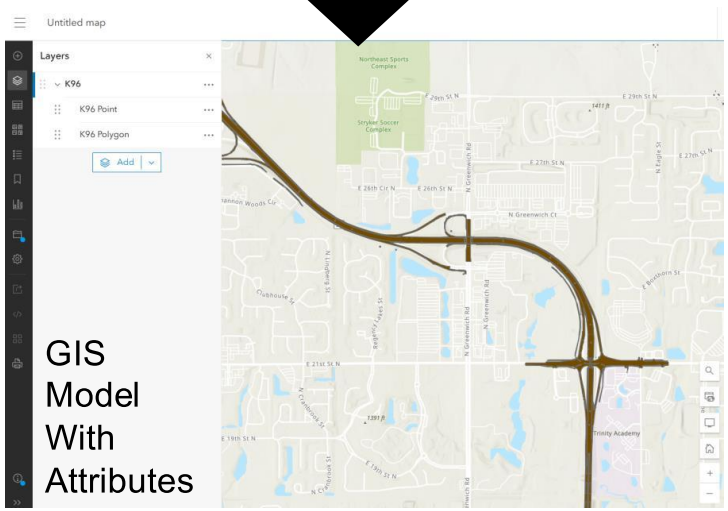
- **Processing choices (early-phase approach)**
  - Level search = Contain.
  - Non-matching level names were filtered out.
  - Custom project CRS.



Workbench Run: Outputs & Run Stats

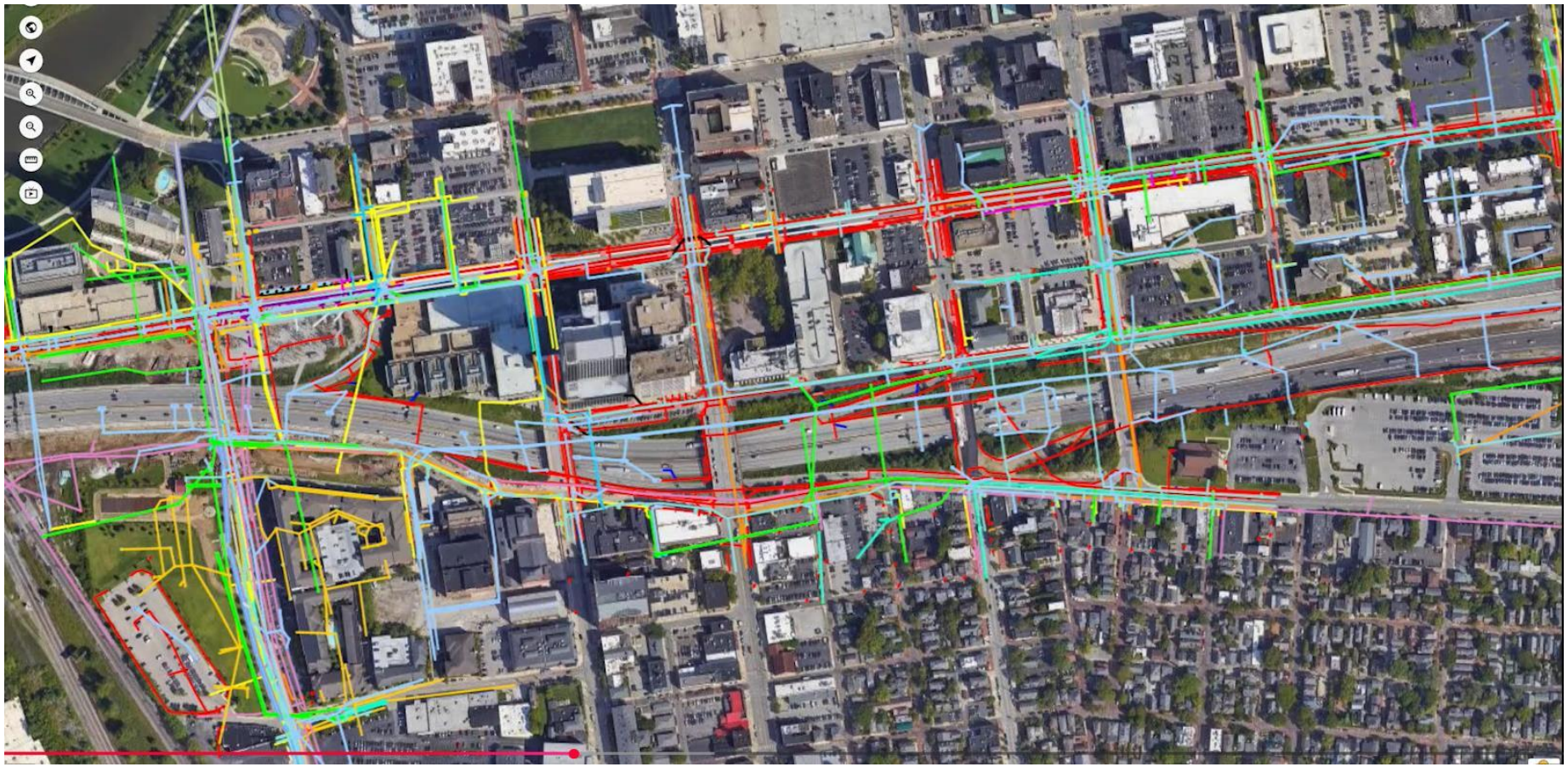
- **Runtime & performance (this run)**
  - 380 files processed in ~45 minutes
- **What this enables next**
  - Begin building the Cost/Quantity dashboard, followed by ROW Acquisition and Utility dashboards—with faster updates powered by the same automated pipeline.



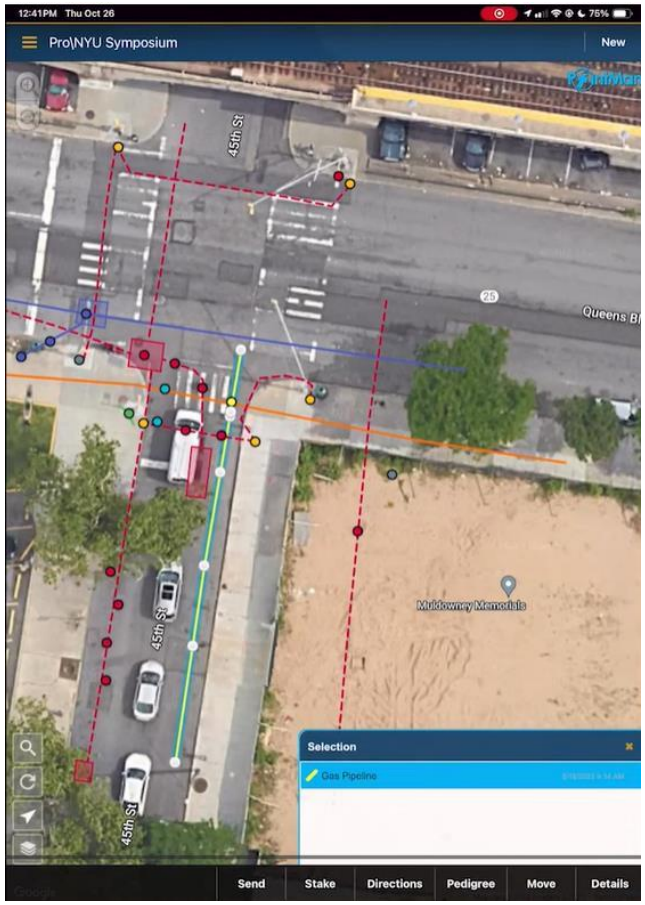


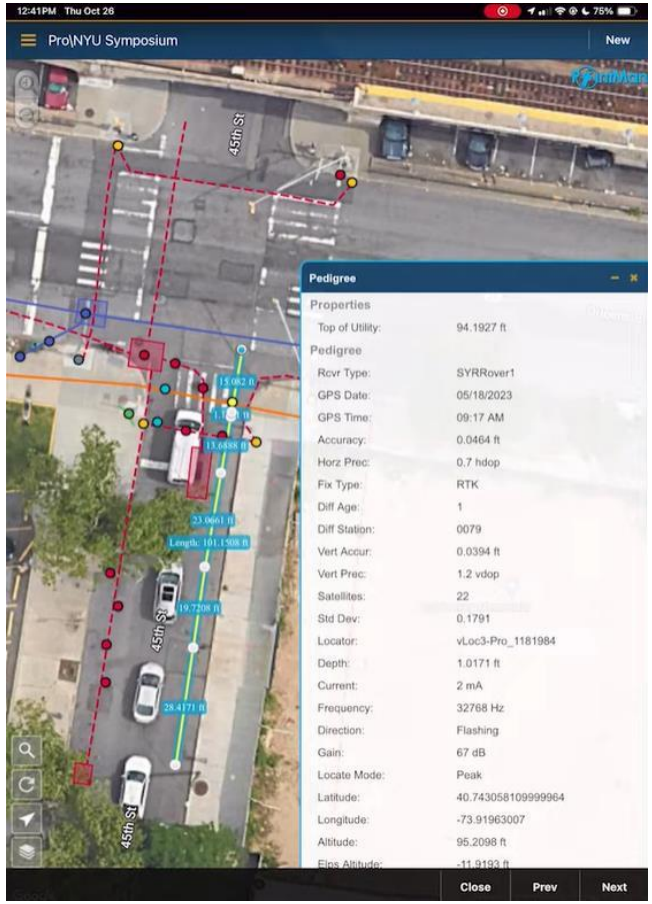
Asset Geodatabase, Cloud-Based Mobile

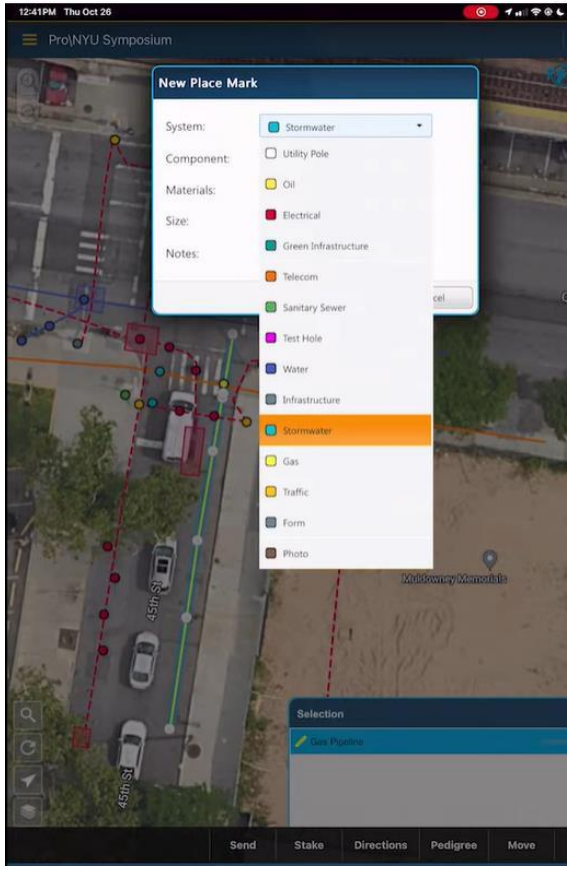
Sub-surface Asset Mapping Software, Colorado

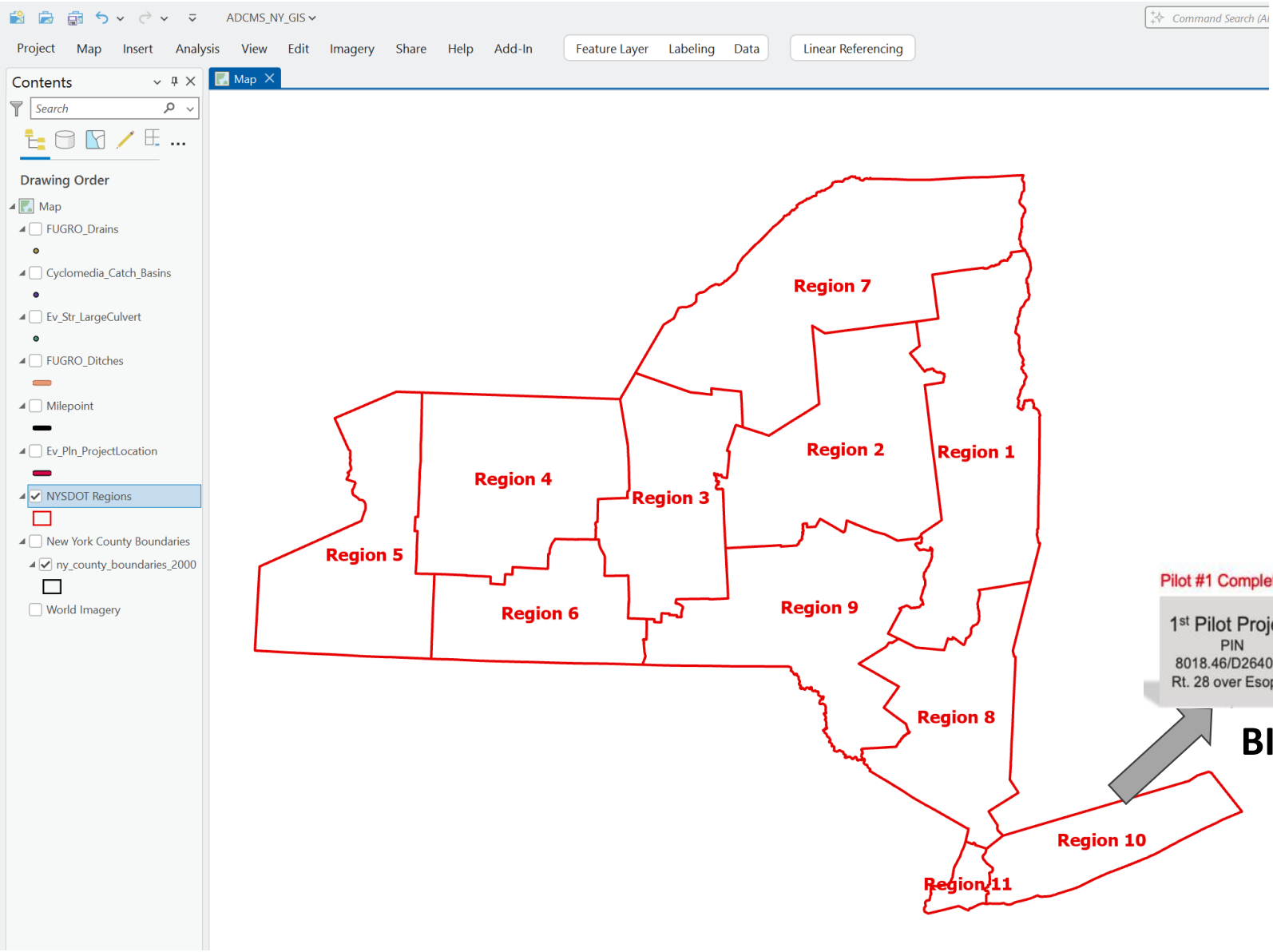


Sub-surface Assets Mapping Software, Colorado









Pilot #1 Complete

1st Pilot Project
PIN
8018.46/D264093
Rt. 28 over Esopus

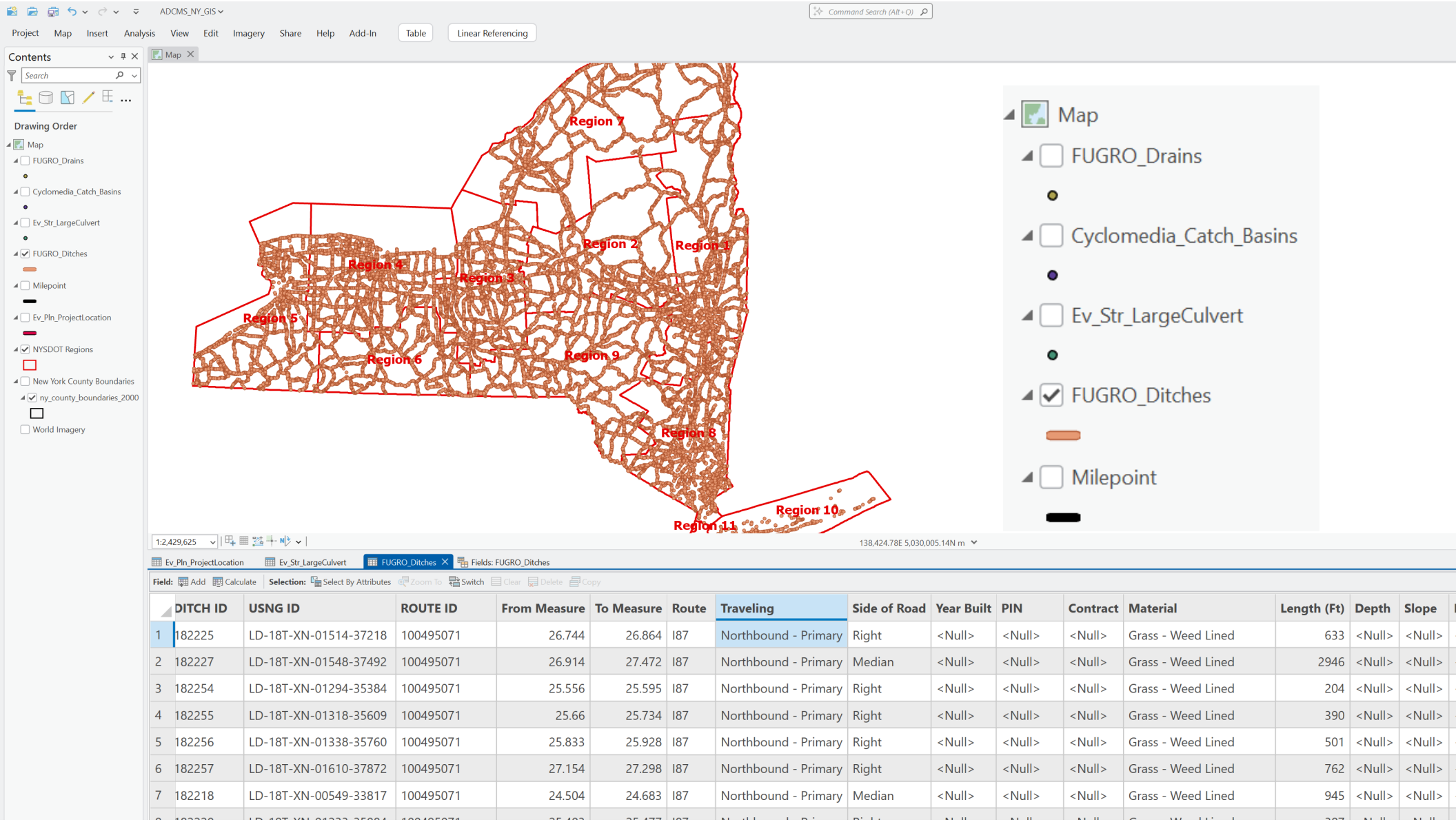
Pilot #2 in Const.

2nd Pilot Project
PIN X720.31
E. 138th St. over
Major Deegan

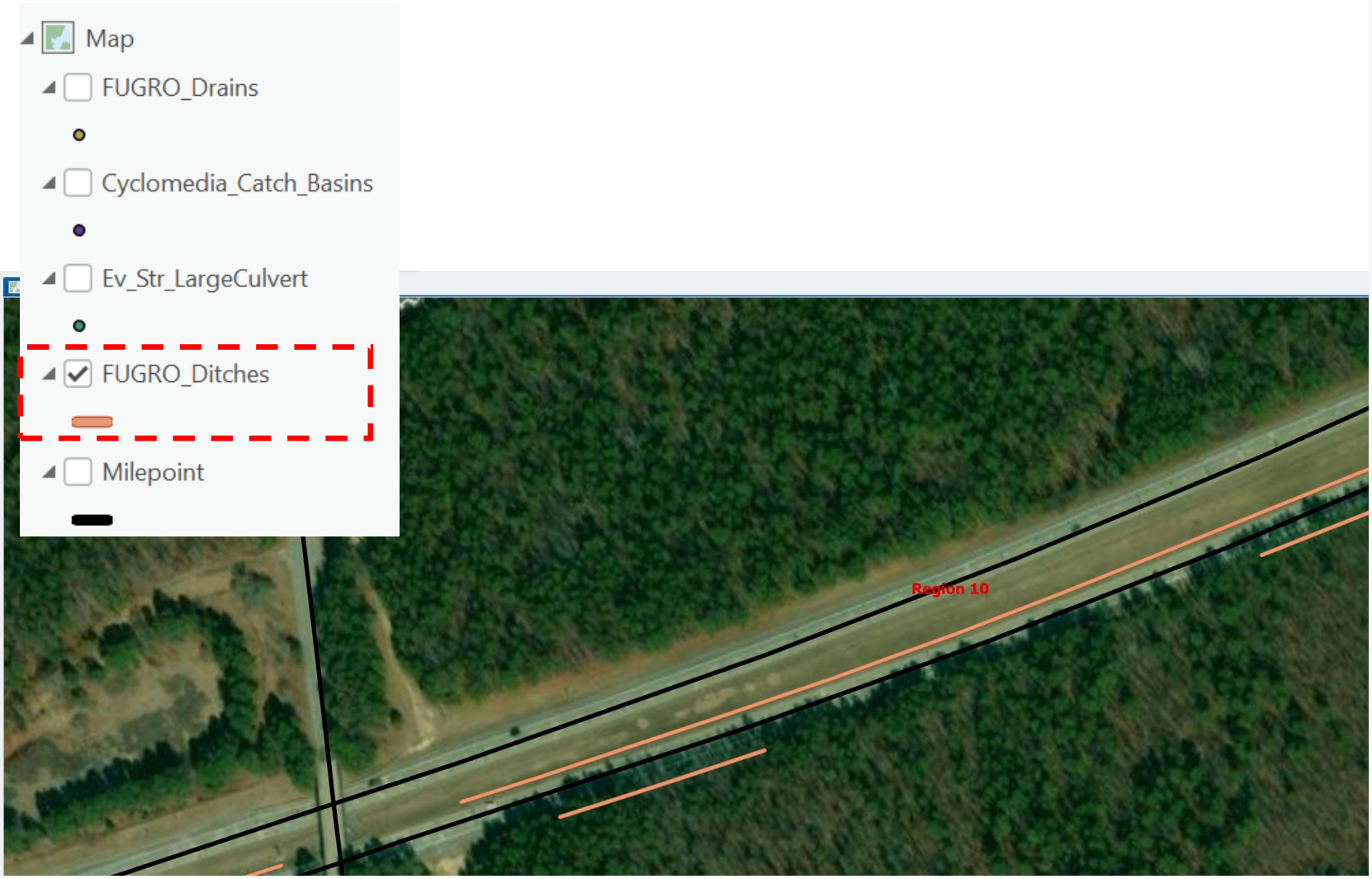
Pilot #3 In Design

3rd Pilot Project
PIN 0054.09
NY 347 Hallock Rd
to CR 97

BIM Pilots



	DITCH ID	USNG ID	ROUTE ID	From Measure	To Measure	Route	Traveling	Side of Road	Year Built	PIN	Contract	Material	Length (Ft)	Depth	Slope
1	182225	LD-18T-XN-01514-37218	100495071	26.744	26.864	I87	Northbound - Primary	Right	<Null>	<Null>	<Null>	Grass - Weed Lined	633	<Null>	<Null>
2	182227	LD-18T-XN-01548-37492	100495071	26.914	27.472	I87	Northbound - Primary	Median	<Null>	<Null>	<Null>	Grass - Weed Lined	2946	<Null>	<Null>
3	182254	LD-18T-XN-01294-35384	100495071	25.556	25.595	I87	Northbound - Primary	Right	<Null>	<Null>	<Null>	Grass - Weed Lined	204	<Null>	<Null>
4	182255	LD-18T-XN-01318-35609	100495071	25.66	25.734	I87	Northbound - Primary	Right	<Null>	<Null>	<Null>	Grass - Weed Lined	390	<Null>	<Null>
5	182256	LD-18T-XN-01338-35760	100495071	25.833	25.928	I87	Northbound - Primary	Right	<Null>	<Null>	<Null>	Grass - Weed Lined	501	<Null>	<Null>
6	182257	LD-18T-XN-01610-37872	100495071	27.154	27.298	I87	Northbound - Primary	Right	<Null>	<Null>	<Null>	Grass - Weed Lined	762	<Null>	<Null>
7	182218	LD-18T-XN-00549-33817	100495071	24.504	24.683	I87	Northbound - Primary	Median	<Null>	<Null>	<Null>	Grass - Weed Lined	945	<Null>	<Null>



OBJECTID	90328
DITCH ID	207796
USNG ID	LD-18T-XL-87031-27561
ROUTE ID	100423041
From Measure	36.107
To Measure	36.457
Route	I495
Traveling	Eastbound - Primary
Side of Road	Median
Year Built	<Null>
PIN	<Null>
Contract	<Null>
Material	Grass - Weed Lined
Length (Ft)	1848
Depth	<Null>
Slope	<Null>
Damaged	<Null>
Maintenance Need	<Null>
Add'l Maintenance Need	<Null>
Add'l Maintenance Need	<Null>
Env Sensitive Area	<Null>
Outfall ID	<Null>
Watershed ID	<Null>

Recommendations — Priority Actions for DOTs and Industry

Prioritized by impact and feasibility based on gap analysis findings

1. **Level of Development (LOD) with Level of Information Need (LOIN)**
   Establish Statewide LOD Definitions

2. **Digital Delivery Execution Plan - BIM Execution Plan (BEP)**
   Project-Level Plan Templates

3. **Model Production and Delivery**
   Build ISO-19650 Compliant Information Requirements and Enterprise Data Dictionary driven Workspaces and Geodatabases

4. **Common Data Environments (CDEs)**
   Deploy Data Storage and Publication Systems

5. **Model as Legal Document (MALD)**
   Develop MALD for Design-Construction Letting

6. **LOD-500 Digital As-Built (DAB) Standard**
   Develop LOD-500 Digital As-Built Standard

Recommendations — Priority Actions for DOTs and Industry

Prioritized by impact and feasibility based on gap analysis findings

1 **Level of Development (LOD) with Level of Information Need (LOIN)**
Establish Statewide LOD Definitions

2 **Digital Delivery Execution Plan - BIM Execution Plan (BEP)**
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5 **Model as Legal Document (MALD)**
Develop MALD for Design-Construction Letting

6 **LOD-500 Digital As-Built (DAB) Standard**
Develop LOD-500 Digital As-Built Standard

T3 **To-Be State Definition Workshop**
Prepare for and Conduct To-Be State Definition Workshop

National Standards Applied to Drainage Modeling

A1

AIA G202-2013

LOD 100–500 definitions. Model Element Author matrix. Contractual BIM framework.

A2

BIMForum LOD 2024

G3030 Storm Drainage Utilities LOD per element. LOD-350 system interfaces.

A3

ASCE 38-22

Quality Levels D/C/B/A for existing utilities.
QL-D≈LOD-100, QL-A≈LOD-300. 3D utility model guidance.

A4

ASCE 75-22

CAD/GIS data exchange schema for drainage assets. Enables ORD → GIS/asset mgmt.

Standard Guideline for Recording and Exchanging Utility Infrastructure Data

A5

AASHTO Drainage Manual

Chapter 11: Culverts policy. Chapter 13: Storm Drainage. Design storm frequency table.

A6

FHWA HDS-5

Hydraulic Design of Highway Culverts. HY-8 equivalent implemented in ORD D&U tools.

A7

FHWA HEC-22

Urban Drainage Design Manual. Rational method, inlet design, storm sewer analysis.

LOD-100 to LOD-500: Definitions for Drainage Infrastructure

Per AIA G202-2013 [A1], BIMForum LOD Spec 2024 [A2], ASCE 38-22 QL mapping [A3]

LOD Level	Geometric Content	Non-Graphic Data	Drainage Application	ASCE 38-22
LOD-100 Conceptual	2D symbol or single line. Location approximate. No accurate dimensions.	Derived only. No hydraulic data, no material spec, no invert elevations.	Planning-level maps. NEPA hydrology. Existing culvert from record drawings.	QL-D
LOD-200 Approximate	Generic 3D object. Approximate size/shape. Orientation established. ±30% dimensions.	Pipe material type (approx.). Diameter range. Hydraulic capacity class.	Preliminary design. 30% submittal. Schematic drainage network. Catchment areas.	QL-B/C
LOD-300 Design Intent	Specific 3D geometry — accurate X,Y,Z. Measurable directly from model. Pipe shape, size, invert elev., slope all defined.	Material class (e.g. RCP Cl.III), Size, Length, Slope, HW/TW elevations, Outlet Velocity, Design Q.	Final design. PS&E deliverable. All ORD D&U Node+Conduit placements. Plan/profile sheets generated.	QL-A
LOD-350 Coordinated	All LOD-300 geometry + connection geometry, wingwall details, riprap extents, utility conflict envelopes.	Joint details, fish passage provisions, scour analysis, safety grate specs, conflict clearances.	Clash detection. Multi-utility corridor coordination. FDOT & FLH approach this level.	QL-A+
LOD-400 Fabrication	Fabrication-level. Rebar layout, precast dims, joint details, wall thickness, all tolerances.	ASTM spec (C76, A760, D3350), rebar schedule, precast class, bedding/backfill spec, load rating.	Shop drawings. Precast culvert fabrication. OpenBridge Modeler — NOT in ORD D&U. No DOT standard published.	—
LOD-500 As-Built	Field-verified geometry. GPS-accurate X,Y,Z (NAVD88). Survey-confirmed inverts. GIS-linked.	Install date, contractor, PACP condition rating, CCTV inspection, maintenance history, ASCE 75-22 attributes.	Asset management. FHWA NBI/culvert inventory. GIS database. No DOT ORD workflow published yet.	QL-A

Table: Level of Development Descriptions

Level of Development (LOD)	Model Content Requirements	Authorized Uses
Conceptual LOD 100	Overall massing indicative of height, volume, location and orientation. Massing will be three dimensional and may include other data.	Limited analysis, aggregate preliminary cost estimating, conceptual level scheduling and staging.
Approximate Geometry LOD 200	Elements are modeled as generalized assemblies or systems with approximate quantities, size, shape, location and orientation. Attributes may be linked to model elements.	Preliminary analysis, accurate for cost estimating and scheduling.
Precise Geometry LOD 300	Elements are modeled as specific assemblies and are accurate in quantity, size, shape, location and orientation. Attributes may be linked to model elements and as required by the Engineer.	Construction documents, detailed quantity take offs, analysis and project management and controls.
Fabrication LOD 400	As per LOD 300 plus complete fabrication, assembly and detailing information.	Model based fabrication Actual cost tracking look-aheads and virtual mock-ups.
'As-Built' LOD 500	Elements are modeled as constructed or 'As-Built', field verified accurate assemblies, quantities, dimensions, shapes, location and orientation. Major transportation asset class attributes are linked to modeled elements and as required by the Engineer.	Maintenance and operations asset management applications and future planning.

Source: https://www.dot.ny.gov/divisions/engineering/design/dqab/hdm/hdm-repository/Digital%20Delivery%20Guidance.pdf

LOD Definition

Model Development Stages

- Preliminary Plans for Design Approval (30%)
- Advance Detail Plans (80%)
- Final Plans (95%) (Pre-PSE)
- PS&E: Plan Specifications and Estimates (100%)

Model Element	Preliminary Plans for Design Approval (30%)			Advance Detail Plans (80%)			Final Plans (95%) (a.k.a. Pre-PSE)			Plans, Specifications & Estimate (100%)			Figure Representation
	Min. Detail	Min. Information	2D/3D	Min. Detail	Min. Information	2D/3D	Min. Detail	Min. Information	2D/3D	Min. Detail	Min. Information	2D/3D	
Inlets													
Grate Inlet	D-1	I-1	3D	D-2	I-2	3D	D-3	I-3	3D	D-3	I-3	3D	Figure 31 - Frames, Covers, and Inlets
Inlet Box	D-1	I-1	3D	D-2	I-2	3D	D-3	I-3	3D	D-3	I-3	3D	
Slotted Drain	N/R	N/R	N/R	D-2	I-2	2D	D-3	I-3	3D	D-3	I-3	3D	
Spring Box	N/R	N/R	N/R	D-2	I-2	2D	D-3	I-3	3D	D-3	I-3	3D	
Apron	N/R	N/R	N/R	D-2	I-2	2D	D-3	I-3	3D	D-3	I-3	3D	
Manholes and Junction Boxes													
Manhole	D-1	I-1	3D	D-2	I-2	3D	D-3	I-3	3D	D-3	I-3	3D	Figure 32 - Manholes, and Junction Boxes
Junction Box	D-1	I-1	3D	D-2	I-2	3D	D-3	I-3	3D	D-3	I-3	3D	
Headwalls and End Walls													
End Section	D-1	I-1	3D	D-2	I-2	3D	D-3	I-3	3D	D-3	I-3	3D	Figure 33 - Headwall, End walls, and End Sections
End Wall	D-1	I-1	3D	D-2	I-2	3D	D-3	I-3	3D	D-3	I-3	3D	
Wingwall	D-1	I-1	3D	D-2	I-2	3D	D-3	I-3	3D	D-3	I-3	3D	
End Transition	D-1	I-1	3D	D-2	I-2	3D	D-3	I-3	3D	D-3	I-3	3D	
Flared End Transition	N/R	N/R	N/R	D-2	I-2	2D	D-3	I-3	3D	D-3	I-3	3D	
Cross Sections													
Inlet Section	N/R	N/R	N/R	D-2	I-2	2D	D-3	I-3	3D	D-3	I-3	3D	
Outlet Section	N/R	N/R	N/R	D-2	I-2	2D	D-3	I-3	3D	D-3	I-3	3D	
Outlet Structure	N/R	N/R	N/R	D-2	I-2	2D	D-3	I-3	3D	D-3	I-3	3D	
Energy Dissipater	N/R	N/R	N/R	D-2	I-2	2D	D-3	I-3	3D	D-3	I-3	3D	Figure 34 - Rock Apron and Energy Dissipator
Pipes and Culverts													
Box Culvert	D-1	I-1	2D	D-2	I-2	2D	D-3	I-3	3D	D-3	I-3	3D	
Culvert	D-1	I-1	2D	D-2	I-2	2D	D-3	I-3	3D	D-3	I-3	3D	Figure 35 - Culvert and Pipe
Pipe	D-1	I-1	2D	D-2	I-2	2D	D-3	I-3	3D	D-3	I-3	3D	
Cross Pan	N/R	N/R	N/R	D-2	I-2	2D	D-3	I-3	3D	D-3	I-3	3D	
Swales	D-1	I-1	2D	D-2	I-2	2D	D-3	I-3	3D	D-3	I-3	3D	
Pond	D-1	I-1	2D	D-2	I-2	2D	D-3	I-3	3D	D-3	I-3	3D	
Conveyance Channel	D-1	I-1	2D	D-2	I-2	3D	D-3	I-3	3D	D-3	I-3	3D	Figure 36 - Conveyance Channel
Stream Relocation (Permanent)	D-1	I-1	2D	D-2	I-2	3D	D-3	I-3	3D	D-3	I-3	3D	Figure 37 - Stream Relocation (Permanent)

LOD Definition

Element Detail Designation (D) and Element Information Designation (I) per PennDOT Digital Delivery V2.4 Ch.3

ELEMENT DETAIL DESIGNATION (EDD / D)

Controls GEOMETRY fidelity and 2D/3D representation type

D-1

Preliminary Plans for Design Approval (30%)

Preliminary General Location

Model element represents the preliminary, approximate location and shape of the element. Geometry sufficient to show general design intent. Typically a single-line or simplified solid representation.

D-2

Advance Detail Plans (80%)

Approximate Final Location

Model element represents the approximate final location. Geometry is more precise, showing final alignment and connectivity within the network. Suitable for field review and coordination.

D-3

Final Plans (95%) + Plans, Specifications & Estimate (100%)

Final Location

Model element represents the final, definitive location, geometry, and shape. Geometry is construction-ready — fully defined in 3D. Matches construction specifications.

ELEMENT INFORMATION DESIGNATION (EID / I)

Controls ATTRIBUTES / INFORMATION attached to model elements

I-1

Preliminary Plans for Design Approval (30%)

Minimum Information (Identification & Location)

Minimal attributes attached: asset ID, general location reference, invert elevation, size/material. Sufficient for network identification only. Attributes are preliminary estimates.

I-2

Advance Detail Plans (80%)

Design Attributes (Size, Material, Hydraulics)

Attributes include pipe/culvert size, shape, material, invert elevations, slope, pipe connections, hydraulic design criteria. Sufficient for hydraulic calculations and design review.

I-3

Final Plans (95%) + Plans, Specifications & Estimate (100%)

Full Construction Attributes (ECMS Pay Items)

Complete attribute set including all construction parameters: final invert elevations, material roughness, end wall type, ECMS pay item codes, quantities, and all design information for contract bidding.

N/R = Not Required at this milestone · The same D-3 / I-3 designation applies at both the 95% Final Plans and the 100% PS&E milestone.

NYSDOT Drainage Model Element Breakdown Structure

Based on NYSDOT Highway Design Manual (HDM) Chapters 8 & 19 — Drainage element taxonomy

DRAINAGE: PIPES & CULVERTS

Small Culverts (span ≤ 20 ft) — CULVERT

- Concrete Box Culvert
- Concrete Pipe Culvert
- Corrugated Metal Pipe
- HDPE/PE Culvert
- Reinforced Concrete Pipe (RCP)

Storm Drain Pipes — PIPE

- Storm Drain Pipe
- Underdrain Pipe
- Edge Drain Pipe
- Slotted Drain Pipe

DRAINAGE: END STRUCTURES

End / Head Structures — HEADWALL

- End Section
- Headwall
- Wingwall
- Endwall
- Flared End Section (FES)

DRAINAGE: APPURTENANCES

Misc. Drainage Items — MISC

- Underdrain
- Pipe Safety End Treatment
- Scour Protection / Riprap
- Energy Dissipater
- Outlet Protection

DRAINAGE: DITCHES

Open Channels — DITCH

- Roadside Ditch: Grass-Lined
- Roadside Ditch: Stone-Lined
- Roadside Ditch: Concrete-Lined
- Median Ditch
- Bio-Swale / Vegetated Swale

DRAINAGE STRUCTURE

Point Drainage Structures — INLET/ MANHOLE

- Drainage Structure: Inlet
- Drainage Structure: Manhole
- Drainage Structure: Slotted Drain
- Drainage Structure: Catch Basin
- Drainage Structure: Combination Inlet

LOD Definition — Culverts & Pipes

What D-1/I-1, D-2/I-2, D-3/I-3 mean for Headwalls & End Walls across all four milestones

Elements covered: Box Culvert · Culvert · Pipe · Cross Pan · Slotted Drain (pipe)

Preliminary Plans for Design Approval (30%)	Advance Detail Plans (80%)	Final Plans (95%) (a.k.a. Pre-PSE)	Plans, Specifications & Estimate (100%)
D-1 3D Geometry / Detail	**D-2 3D Geometry / Detail**	**D-3 3D Geometry / Detail**	**D-3 3D Geometry / Detail**
Single line for preliminary general location of culvert or pipe.	Single line for general location of culvert or pipe.	Single line for final location of culvert or pipe.	Single line for final location of culvert or pipe.
I-1 Information / Attributes	**I-2 Information / Attributes**	**I-3 Information / Attributes**	**I-3 Information / Attributes**
None — no information attributes required at 30% milestone for pipes/culverts.	Attributes for pipe/culvert size, shape, invert elevations, and slope.	Attributes for pipe/culvert size, shape, material, roughness, invert elevations, and slope. Attach ECMS item attributes.	Attributes for pipe/culvert size, shape, material, roughness, invert elevations, and slope. (Contract documents.)

What are your thoughts on the geometry and attribute LOD details presented in the LOD Definition for **Culvert and Pipe**? What would you change?

Note: Pipes & Culverts start at N/R (Not Required) at 30% for I-1 — no information attributes until 80%. Only D-1 basic geometry line is required at 30%.

Culvert and Pipe

Preliminary Plans for Design Approval (30%)

D-1 criteria: Single line for preliminary general location of culvert or pipe.

I-1 criteria: None

3D Representation: 2D representation

Advance Detail Plans (80%)

D-2 criteria: Single line for general location of culvert or pipe.

I-2 criteria: Attributes for pipe/culvert size, shape, invert elevations, and slope.

3D Representation: Use feature definition with 3D solid for pipe/culvert

Final Plans (95%): Pre-PSE

D-3 criteria: Single line for final location of culvert or pipe.

I-3 criteria: Attributes for pipe/culvert size, shape, material, roughness, invert elevations, and slope. Attach ECMS item attributes.

3D Representation: Use feature definition with 3D solid for pipe/culvert

PS&E: Plan Specifications and Estimates (100%)

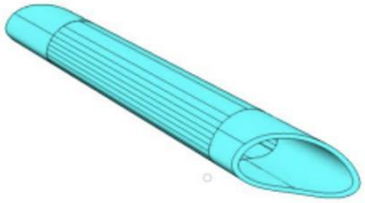
D-3 criteria: Single line for final location of culvert or pipe.

I-3 criteria: Attributes for pipe/culvert size, shape, material, roughness, invert elevations, and slope. Attach ECMS item attributes.

3D Representation: Use feature definition with 3D solid for pipe/culvert

What are your thoughts on the geometry and attribute LOD details presented in the LOD Definition for **Culvert and Pipe**? What would you change?

2D Representation



3D Representation

Mentimeter

LOD Definition — Headwalls & End Walls

What D-1/I-1, D-2/I-2, D-3/I-3 mean for Headwalls & End Walls across all four milestones

Elements covered: End Section · End Wall · Wingwall · End Transition · Flared End Transition

Preliminary Plans for Design Approval (30%)	Advance Detail Plans (80%)	Final Plans (95%) (aka Pre-PS&E)	Plans, Specifications & Estimate (100%)
D-1 3D Geometry / Detail	**D-2** 3D Geometry / Detail	**D-3** 3D Geometry / Detail	**D-3** 3D Geometry / Detail
General location of pipe and end wall. Pipe connected to end section at outlet of storm sewer network.	Approximate final location of pipe and end wall. Pipe connected to end section at outlet of storm sewer network.	Final location of pipe and end wall. Pipe connected to end section at outlet of storm sewer network. Matches outlet elevation of stream or channel surface.	Final location of pipe and end wall. Pipe connected to end section. Matches outlet elevation of stream or channel surface.
I-1 Information / Attributes	**I-2** Information / Attributes	**I-3** Information / Attributes	**I-3** Information / Attributes
Attributes for invert elevation and size.	Attributes for invert elevation and size.	Attributes for invert out elevation, end wall type, and size. Attach ECMS item attributes.	Attributes for invert out elevation, end wall type, and size. No ECMS attachment required at PS&E (contract docs only).

What are your thoughts on the geometry and attribute LOD details presented in the LOD Definition for **Culvert and Pipe**? What would you change?

What are your thoughts on the geometry and attribute LOD details presented in the LOD Definition for **Headwalls, End walls, and End Sections**? What would you change?

Headwalls, End walls and End Sections

Preliminary Plans for Design Approval (30%)

D-1 criteria: General location of pipe and end wall, Pipe connected to end section at outlet of storm sewer network.

I-1 criteria: Attributes for invert elevation and size.

3D Representation: Use feature definition with 3D solid for end wall.

Advance Detail Plans (80%)

D-2 criteria: Approximate final location of pipe and end wall. Pipe connected to end section at outlet of storm sewer network.

I-2 criteria: Attributes for invert elevation and size.

3D Representation: Use feature definition with 3D solid for end wall.

Final Plans (95%): Pre-PSE

D-3 criteria: Final location of pipe and end wall. Pipe connected to end section at outlet of storm sewer network. Matches outlet elevation of stream or channel surface

I-3 criteria: Attributes for invert out elevation, end wall type, and size. Attach ECMS item attributes.

3D Representation: Use feature definition with 3D solid for end wall.

PS&E: Plan Specifications and Estimates (100%)

D-3 criteria: Final location of pipe and end wall. Pipe connected to end section at outlet of storm sewer network. Matches outlet elevation of stream or channel surface

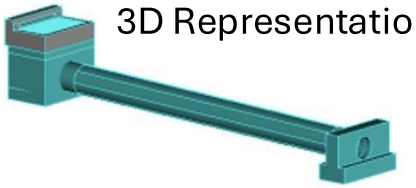
I-3 criteria: Attributes for invert out elevation, end wall type, and size.

3D Representation: Use feature definition with 3D solid for end wall.

What are your thoughts on the geometry and attribute LOD details presented in the LOD Definition for **Headwalls, End walls, and End Sections**? What would you change?

2D Representation

3D Representation



Mentimeter

LOD Definition — Frames, Covers & Inlets

What D-1/I-1, D-2/I-2, D-3/I-3 mean for Headwalls & End Walls across all four milestones

Elements covered: Grate Inlet · Inlet Box · Slotted Drain · Spring Box · Apron · Manhole · Junction Box

Preliminary Plans for Design Approval (30%)	Advance Detail Plans (80%)	Final Plans (95%) (a.k.a. Pre-PSE)	Plans, Specifications & Estimate (100%)
D-1 3D Geometry / Detail	**D-2 3D Geometry / Detail**	**D-3 3D Geometry / Detail**	**D-3 3D Geometry / Detail**
General location of inlets at sag points, intersections, crosswalks, bridges, cross slope reversals, and strategic locations. Pipes connected to inlets to create storm sewer network.	Approximate final location of inlets at strategic locations, inlets based on gutter spread criteria, and flanking inlets at sag points. Pipes connected to inlets to create network of storm sewers.	Final location of all inlets at all strategic locations and where required by spread and sag criteria. Display inlet top unit type and grate type. Pipes connected to inlets to create network of storm sewers.	Final location of all inlets at all strategic locations and where required by spread and sag criteria. Display inlet top unit type and grate type.
I-1 Information / Attributes	**I-2 Information / Attributes**	**I-3 Information / Attributes**	**I-3 Information / Attributes**
Attributes for inlet top of grate elevation, outlet pipe elevation, and pipe size.	Attributes for inlet size, top of grate elevation, bottom of box elevation, outlet pipe elevation, pipe material, shape, and size.	Attributes for inlet box size and depth, inlet top unit type, top of grate elevation, grate type, bottom of box elevation, outlet pipe elevation, pipe material, roughness, shape, and size. Attach ECMS item attributes.	Attributes for inlet box size and depth, inlet top unit type, top of grate elevation, grate type, bottom of box elevation, outlet pipe elevation, pipe material, roughness, shape, and size. (Contract documents.)

What are your thoughts on the geometry and attribute LOD details presented in the LOD Definition for **Frames, Covers and Inlets**? What would you change?

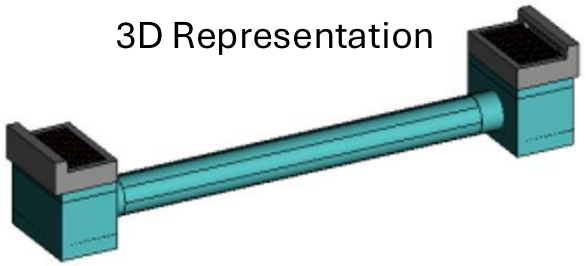
Frames, Covers and Inlets

What are your thoughts on the geometry and attribute LOD details presented in the LOD Definition for **Frames, Covers and Inlets**? What would you change?

Mentimeter

2D Representation

3D Representation



Preliminary Plans for Design Approval (30%)

D-1 criteria: General location of inlets at sag points, intersections, crosswalks, bridges, cross slope reversals, and other strategic locations not based on drainage area size. Pipes connected to inlets to create a network of storm sewers.

I-1 criteria: Attributes for inlet top of grate elevation, outlet pipe elevation, and pipe size.

3D Representation: Use feature definition with 3D solid for inlet and pipe

Advance Detail Plans (80%)

D-2 criteria: Approximate final location inlets at strategic locations, inlets based on gutter spread criteria, and flanking inlets at sag points. Pipes connected to inlets to create a network of storm sewers.

I-2 criteria: Attributes for inlet size, top of grate elevation, bottom of box elevation, outlet pipe elevation, pipe material, shape, and size.

3D Representation: Use feature definition with 3D solid for inlet and pipe

Final Plans (95%): Pre-PSE

D-3 criteria: Final location of all inlets at all strategic locations and where required by spread and sag criteria. Display inlet top unit type and grate type. Pipes connected to inlets to create a network of storm sewers.

I-3 criteria: Attributes for inlet box size and depth, inlet top unit type, top of grate elevation, grate type, bottom of box elevation, outlet pipe elevation, pipe material, roughness, shape, and size. Attach ECMS item attributes.

3D Representation: Use feature definition with 3D solid for inlet and pipe

PS&E: Plan Specifications and Estimates (100%)

D-3 criteria: Final location of all inlets at all strategic locations and where required by spread and sag criteria. Display inlet top unit type and grate type. Pipes connected to inlets to create a network of storm sewers.

I-3 criteria: Attributes for inlet box size and depth, inlet top unit type, top of grate elevation, grate type, bottom of box elevation, outlet pipe elevation, pipe material, roughness, shape, and size.

3D Representation: Use feature definition with 3D solid for inlet and pipe

Recommendations — Priority Actions for DOTs and Industry

Prioritized by impact and feasibility based on gap analysis findings

1 Level of Development (LOD) with Level of Information Need (LOIN)

Establish Statewide LOD Definitions

2 BIM Execution Plan (BEP)

Project-Level BEP Templates

3 Model Production and Delivery

Build ISO-19650 Compliant Information Requirements and Enterprise Data Dictionary driven Workspaces and Geodatabases

4 Common Data Environments (CDEs)

Deploy Data Storage and Publication Systems

5 Model as Legal Document (MALD)

Develop MALD for Design-Construction Letting

6 LOD-500 Digital As-Built (DAB) Standard

Develop LOD-500 Digital As-Built Standard

→

T4 **Asset & Exchange Information Requirements**
Develop AIR and EIR documentation

T5 **Embed Model Element Table**
Integrate into Geospatial Data Environment

T6 **Build Enterprise Data Dictionary**
Comprehensive data dictionary development

SMALL CULVERT – Asset Information Requirements (AIR-CULV) | IFC: IfcCulvert (IFC 4.3) | OmniClas

ISO 19650 AIR/OIR | IFC 4.3 Mapped | EIR Flags | Standards Cross-Reference

Definition	Cardinality	Data Type	Units / Enum Values	IFC 4.3 Class	IFC Property / Pset	EIR-01 Survey	EIR-02 Hydraulic	EIR-03 30% Design
Unique identifier in owner's database	Required	String	—	IfcCulvert	IfcRoot.GlobalId	✓		✓
FHWA National Bridge Inventory number	Conditional	String	—	IfcCulvert	Custom: Pset_NBI.StructureNumber			
Owner's internal culvert tag number	Optional	String	—	IfcCulvert	Custom: Pset_AssetID.DOT_ID	✓		
DOT feature designation	Optional	String	—	IfcCulvert	Pset_ElementAssemblyCommon.Reference	✓		
Circular, Box, Arch, Elliptical, Pipe-Arch, Bottomless Arch	Required	Enumeration	Circular | Box/Rectangular | Arch | Elliptical | Pipe-Arch | Bottomless Arch | Structural Plate Arch | Other	IfcCulvert	Pset_CulvertCommon.Shape	✓		✓
RCP, RCBC, CMP, HDPE, Structural Plate Steel/Aluminum	Required	Enumeration	RCP | RCBC | CMP | HDPE | PVC | Struct. Plate Steel | Struct. Plate Aluminum | Cast Iron | Other	IfcCulvert	IfcMaterial.Name			✓
Internal horizontal dimension (diameter for circular)	Required	Real	Inches or Feet	IfcCulvert	Pset_CulvertCommon.Span	✓		✓
Internal vertical dimension (for non-circular)	Conditional	Real	Inches or Feet	IfcCulvert	Pset_CulvertCommon.Rise			✓
Count of parallel culvert openings	Required	Integer	Count	IfcCulvert	Custom: Pset_CulvertDesign.NumBarrels	✓		✓
Length between face walls (along pipe axis)	Required	Real	Feet	IfcCulvert	Derived from IfcCulvert geometry			✓
Angle from road perpendicular to culvert axis	Required	Real	Degrees	IfcCulvert	Custom: Pset_CulvertDesign.SkewAngle			✓
Roughness coefficient	Optional	Real	Dimensionless	IfcCulvert	Custom: Pset_Hydraulic.ManningsN		✓	✓
Projecting, mitered, headwall w/wingwalls, beveled ring	Required	Enumeration	Projecting | Mitered | Headwall | HW+WW 30° | HW+WW 45° | HW+WW 60° | Beveled Ring | Side-Tapered | Slope-Tapered | Other	IfcCulvert	Custom: Pset_CulvertDesign.InletType			✓
Square, groove end, beveled, side-tapered edge	Optional	Enumeration	Square Edge | Groove End | Groove End Projecting | Beveled 33.7° | Beveled 45° | Side-Tapered | Slope-Tapered	IfcCulvert	Custom: Pset_CulvertDesign.InletEdgeType			
None, precast concrete, CIP, CMP, masonry	Conditional	Enumeration	None | Precast Concrete | Cast-in-Place | CMP | Stone Masonry | Other	IfcCulvert	Custom: Pset_CulvertDesign.HeadwallType			✓
Energy dissipation / scour protection type	Required	Enumeration	None | Riprap Apron | Riprap Basin | Concrete Apron | Plunge Pool | Stilling Basin | Bioengineered | Other	IfcCulvert	Custom: Pset_CulvertDesign.OutletProtection			✓
Flare angle of inlet wingwalls	Optional	Real	Degrees	IfcCulvert	Custom: Pset_CulvertDesign.WingwallAngle			

Brainstorm

1. What data do you need in your program area to make more informed decisions?

2. Do you need to collect data from other program areas to do your job? What program area and what data?

3. Would you like to standardize what/how data is exchanged / delivered across planning & scoping, design, construction, asset management, operations & maintenance?

Mentimeter

Brainstorm

4. What data should design and construction be handing over to asset management for the following assets?
   - ❑ Small Culverts
   - ❑ Pipes
   - ❑ Catch Basins
   - ❑ Manholes
   - ❑ Drains
   - ❑ Ditches
   - ❑ Utilities: Electric, Communications

Mentimeter

5. What data does planning, scoping and design need from asset management, operations and maintenance – and how do you currently get this information?

Recommendations — Priority Actions for DOTs and Industry

Prioritized by impact and feasibility based on gap analysis findings

1. **Level of Development (LOD) with Level of Information Need (LOIN)**
   Establish Statewide LOD Definitions

2. **Digital Delivery Execution Plans – The BIM Execution Plan (BEP)**
   Project-Level Plan Templates

3. **Model Production and Delivery**
   Build ISO-19650 Compliant Information Requirements and Enterprise Data Dictionary driven Workspaces and Geodatabases

4. **Common Data Environments (CDEs)**
   Deploy Data Storage and Publication Systems

5. **Model as Legal Document (MALD)**
   Develop MALD for Design-Construction Letting

6. **LOD-500 Digital As-Built (DAB) Standard**
   Develop LOD-500 Digital As-Built Standard

T3

To-Be State Definition Workshop

Prepare for and Conduct To-Be State Definition Workshop

BIM EXECUTION PLAN

FOR HIGHWAY TRANSPORTATION PROJECTS`

BLANK TEMPLATE | All Sections Included

Document Title	[Project Name] BIM Execution Plan
Version	[e.g., 1.0 — Initial Post-Award Draft]
Project Name	[Full Project Title]
Owner / DOT	[State Department of Transportation / District]
Contract No.	[DOT Contract Number]
Prepared By	[Design Firm / BIM Manager]
Approved By	[DOT Project Manager]
Date	[MM/DD/YYYY]

Template based on: PSU CIC BIM Project Execution Planning Guide v2.2 (2019) | NIBS NBIMS-US v4 (2022)
ISO 19650-2:2018 | FHWA BIM for Infrastructure Program | AASHTO Digital Delivery Standards

BIM EXECUTION PLAN TEMPLATE | Highway Department of Transportation

TABLE OF CONTENTS

What is a BIM Execution Plan (BEP)?

Definition & Purpose

"A BIM Execution Plan (BEP) is a comprehensive project document that defines how Building Information Modeling will be implemented, managed, and monitored throughout the full lifecycle of a transportation project — from planning through design, construction, and asset management."

Why It Matters

- Establishes a shared vision for digital delivery
- Prevents information silos across disciplines
- Defines data standards before work begins
- Reduces rework, change orders, and cost overruns
- Supports asset lifecycle management beyond construction

When Is It Created?

- Pre-award: Owner issues BEP requirements in RFP
- Pre-BEP: Initial framework by the DOT project manager
- Post-award: Design team refines and finalizes BEP
- Updated at key milestones (30%, 60%, 90% design)
- Living document throughout project lifecycle

DOT Context

- Used on federally funded highway projects
- Increasingly required by state DOT specifications
- Tied to digital delivery contract requirements
- Referenced in FHWA guidance and AASHTO standards
- Aligned with ISO 19650 and NBIMS-US v4

Sources: FHWA BIM for Infrastructure Program (2020); PSU CIC BIM PXP Guide v2.2 (2019); NIBS NBIMS-US v4 (2022); FHWA HRTD-21-064 National Strategic Roadmap (2021)

BEP in the Digital Delivery Ecosystem

How the BEP relates to other project documents

Owner Information Requirements (OIR) → **Project Information Requirements (PIR)** → **BIM Execution Plan (BEP)** → **Common Data Environment (CDE)**

OIR → Sets Owner Needs

The DOT/owner defines what information it needs for operations, maintenance, and asset management. This drives BEP requirements.

PIR → Project-Level Requirements

Project Information Requirements translate OIR into specific deliverables and data for a single project.

BEP → Delivery Blueprint

The BEP explains HOW the project team will meet the PIR. It covers roles, workflows, software, LOD standards, and QA/QC.

CDE → Execution Platform

The BEP specifies which Common Data Environment (e.g., ProjectWise, Bentley Infrastructure Cloud) and how it is managed.

Sources: ISO 19650-2:2018; NIBS NBIMS-US v4 BEP Requirements (2022); Kentucky Transportation Cabinet DPD Definition (2024); FHWA BIM National Strategic Roadmap (2021)

BEP Section Outline for DOT Projects

Complete section-by-section structure

A **Plan Overview & Purpose**
Document purpose, scope, version history, and relationship to contract requirements

B **Project Information**
Project name, description, location, contract number, owner, funding source, delivery method

C **Key Project Contacts & Roles**
DOT PM, BIM Manager, Design Lead, Contractor BIM Coordinator, QA/QC lead, CDE administrator

D **Project Goals & BIM Uses**
Enumerated BIM uses (3D design, clash detection, quantity takeoff, AMG, digital as-builts, etc.)

E **BIM Process Design**
Process maps, information flows, milestone triggers, LOD matrix per discipline and phase

F **Information Exchanges**
Exchange schedule: who provides what data, in what format (IFC, OpenRoads, Civil 3D), at what milestone

G **Organizational Roles & Staffing**
Responsibility matrix (RACI): DOT, designer, contractor, subconsultants

H **Delivery Strategy & Contracts**
How BEP is incorporated into contract documents; design-build vs. DBB vs. CMGC provisions

I **Collaboration & Communication**
Meeting cadence, model review process, RFI workflow, CDE protocols, file naming conventions

J **Technology Infrastructure**
Approved software, hardware, CDE platform, interoperability requirements (IFC, LandXML)

K **Model Structure & Standards**
Model breakdown, coordinate systems, units, LOD definitions, discipline model responsibilities

L **Quality Control**
Model audit checklists, clash detection protocols, submittal review, compliance verification

M **Attachments**
Referenced standards, LOD matrix tables, software list, CDE access instructions

Adapted from: PSU CIC BIM PXP Guide v2.2 (2019); NIBS NBIMS-US v4 Section 5 (2022); ISO 19650-2; FHWA Demonstration of Bridge Project Delivery Using BIM (2021, FHWA-HIF-21-031)

Key Information Contained in a DOT BEP

Critical data elements and their purpose

BIM Uses Matrix

Lists every intended use of BIM (clash detection, quantity takeoff, 4D scheduling, automated machine guidance, digital as-builts). Each use is mapped to responsible party, phase, and LOD requirement.

Level of Development (LOD)

Specifies modeling precision per element per phase. Ranges from LOD 100 (conceptual) to LOD 500 (as-built). DOT contracts specify minimum LOD per discipline.

Information Exchange Schedule

Who submits what data, in which format (IFC, OpenRoads .dgn, Civil 3D .dwg, LandXML), at each project milestone (30/60/90/Final/As-Built).

Model Structure & Coordinates

Defines geospatial coordinate system (state plane zone), units (US survey feet/meters), model breakdown (alignment, terrain, drainage, structures, utilities), naming conventions.

Roles & Responsibility Matrix

RACI matrix: DOT BIM Manager, design BIM Coordinator, contractor BIM Coordinator. Identifies who creates, reviews, approves, and archives each model and data set.

Technology & CDE

Lists approved design/review software, the Common Data Environment (CDE) platform, access protocols, version management, and data retention policies for record-keeping.

Sources: PSU CIC BEP Guide v2.2 (2019); NIBS NBIMS-US v4 BEP Information Requirements (2022); FHWA Bridge BIM Delivery Case Study – UDOT Tooele Interchange (FHWA-HIF-21-031, 2021)

How Is a BEP Created?

Step-by-step process for transportation projects

1

OWNER PLANNING

DOT Issues Digital Delivery Requirements

The state DOT defines OIR/PIR in its design manual, contract provisions, or digital delivery directive. FHWA guidance and AASHTO standards inform these requirements.

2

PRE-AWARD

BEP Requirements Included in RFP/RFQ

Contract documents specify that a BEP must be submitted. The DOT may provide a template (pre-BEP) or outline minimum required sections for the design team to complete.

3

POST-AWARD KICKOFF

Design Team Prepares Initial BEP Draft

The design firm's BIM Coordinator/Manager drafts the BEP based on DOT templates, project scope, and agreed BIM uses. Initial draft submitted within 30–60 days of NTP.

4

REVIEW & APPROVAL

DOT Reviews and Approves the BEP

The DOT Project Manager and BIM Manager review the BEP for compliance with agency standards. Multiple rounds of comments and revisions may occur before formal approval.

5

ONGOING UPDATES

BEP Updated at Key Milestones

Living document: updated at 30%, 60%, 90% design completion and again at construction mobilization. Contractor BIM Coordinator updates construction-phase sections post-award.

6

CLOSEOUT

Final BEP Archived with As-Built Deliverables

At project closeout, the final BEP is archived in the CDE alongside as-built models, digital as-built drawings, and asset data, per DOT records retention policies.

Sources: PSU CIC BIM Project Execution Planning Guide v2.2 (2019); PennDOT Digital Delivery Directive 2025 (2020); FHWA ADCMS Program Guidelines; SDOT BIM Protocol Tech Memo (2024)

Who Creates & Enforces the BEP?

Roles and responsibilities on DOT digital delivery projects

Role	Organization	Responsibilities	Enforcement Authority
BIM Program Manager / Digital Delivery Director	State DOT (HQ)	Develops agency BIM standards, BEP templates, training; oversees statewide digital delivery program	Sets policy; approves BEP framework
Project Manager (PM)	State DOT (District)	Ensures BEP is included in contracts; reviews/approves BEP at milestones; enforces contractual BEP requirements	Contractual — can withhold payment for non-compliance
Design BIM Coordinator / BIM Manager	Design Consultant Firm	Drafts and maintains the BEP; manages CDE; coordinates discipline BIM leads; conducts QA/QC model reviews	Leads execution; accountable to DOT PM
Discipline BIM Leads	Design Subconsultants	Produce models per BEP LOD requirements for roadway, bridge, drainage, utilities disciplines	Accountable to Design BIM Coordinator
Contractor BIM Coordinator	Prime Contractor	Updates construction-phase BEP sections; manages construction models, AMG data, and as-built digital deliverables	Contractual obligation; QA by DOT
FHWA Division Office	Federal	Reviews compliance with federal digital delivery requirements on federally funded projects; supports oversight	Federal-aid approval authority

Brainstorm

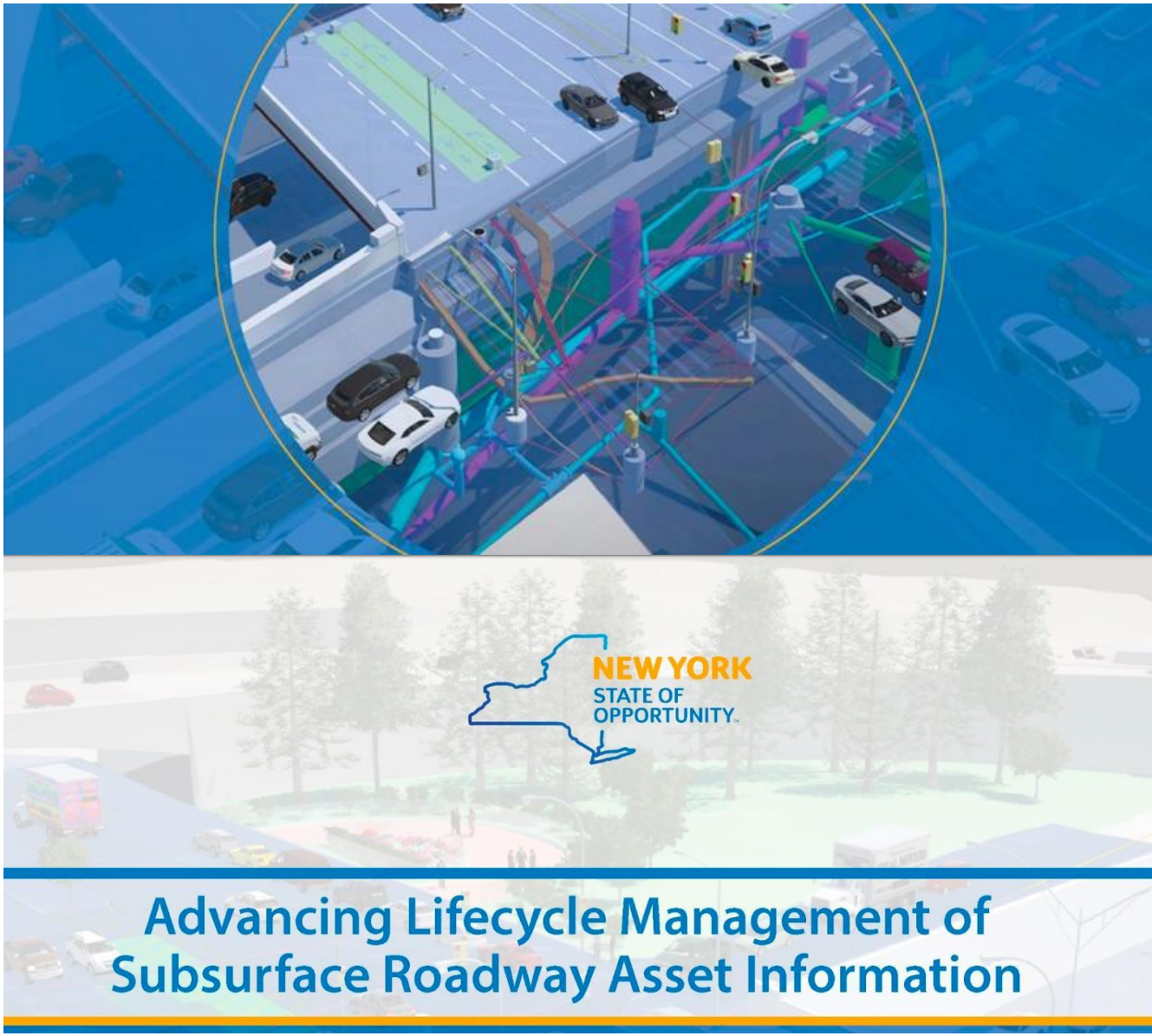
6. Is a project execution plan created for digital delivery projects? If yes, what is in it? Are the plans similar/same across projects (within/across regions)
7. Do you agree with including the following information in digital delivery project execution plans (BEPs):
   - ❑Project Roles and Responsibilities, Key Contacts
   - ❑Model structure and standards
   - ❑Quality control (model audit checklist, clash detection protocols, submittal review, compliance requirements, etc.)
   - ❑Information Exchanges and Schedule
   - ❑Technology infrastructure (Approved Software, Hardware, CDE etc.)
   - ❑Collaboration and Communication Process (reviews, CDE protocols, file naming conventions)

Mentimeter

Closing Remarks

Led by: Eric Coulter

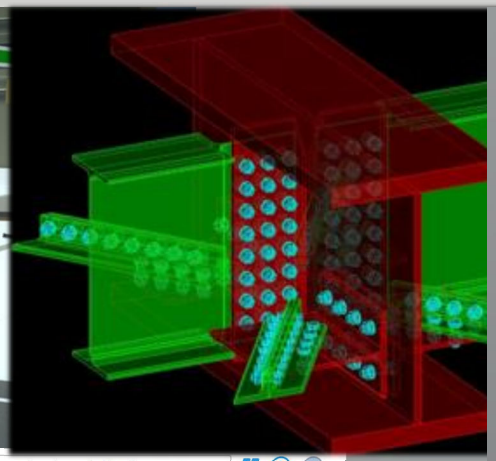
1:50 PM – 2:00 PM

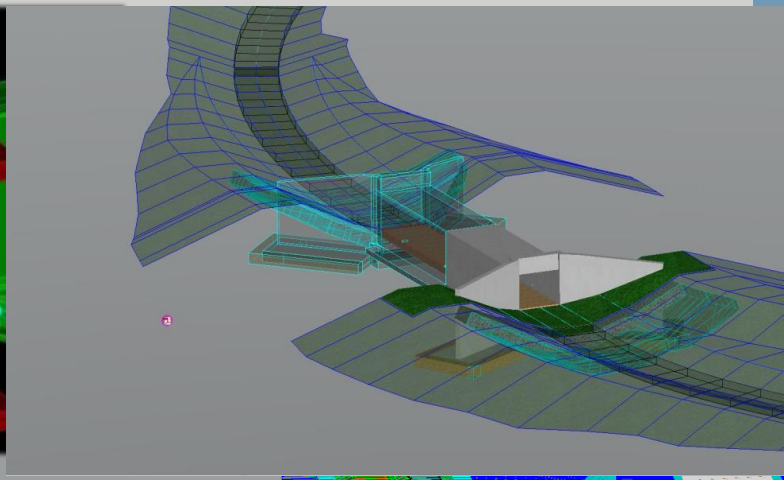


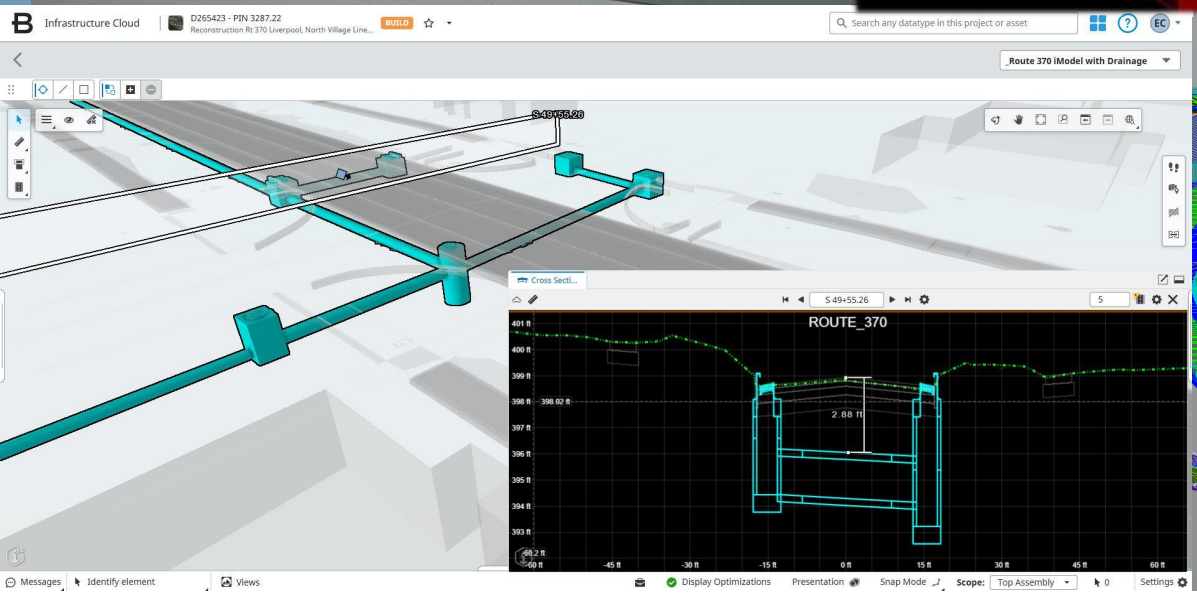
NEXT... Session 3

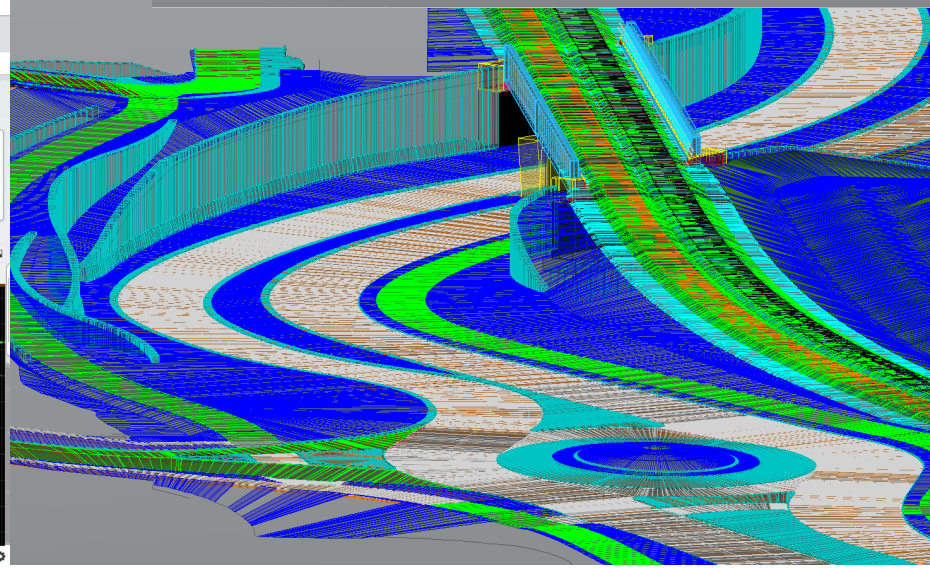
Topic	Schedule
Welcome and Overview of ADCMS	**9:00 AM – 9:20 AM**
1. Introductions, Workshop Goals and Objectives	9:00 – 9:10 AM
2. ADCMS Grant Award	9:10 – 9:20 AM
3. Survey	
SESSION 1: Current State of Practice	**9:20 AM – 10:00 AM**
1. Presentation & Demo	9:20 – 9:50 PM
2. Open Discussion & Survey: Regional Practices, Challenges, Opportunities, Consensus	9:50 – 10:00 AM
SESSION 2: Digital Delivery and Pilot Projects	**10:00 AM – 10:30 AM**
1. Presentation & Demo	10:00 – 10:20 AM
2. Open Discussion & Survey	10:20 – 10:30 AM
BREAK	**10:30 - 10:45 AM**
SESSION 3: To-Be State of Practice	**10:45 AM – 1:50 PM**
1. Defining To-Be State:	10:45 – 11:15 AM
• *Demo and To-Be State Vision*	*10:45 – 11:00 AM*
• *Open Discussion & Survey*	*11:00 – 11:15 AM*
2. Level of Development, Design/Construction Workspace Design and Asset Information Management	11:15 – 12:00 PM
• *Demo and To-Be State Vision*	*11:15 – 11:25 AM*
• *Open Discussion & Survey*	*11:25 – 12:00 PM*
LUNCH BREAK	**12:00 – 1:00 PM**
3. BIM Execution Plans (BEP)	1:00 – 1:50 PM
• *BIM Workflows, Roles and Responsibilities, Technology Infrastructure*	*1:00 – 1:30 PM*
• *Open Discussion & Survey*	*1:30 – 1:50 PM*
Closing Remarks - Look Ahead: 2026 - 2027	**1:50 PM – 2:00 PM**

We do 3D CAD Modeling well…



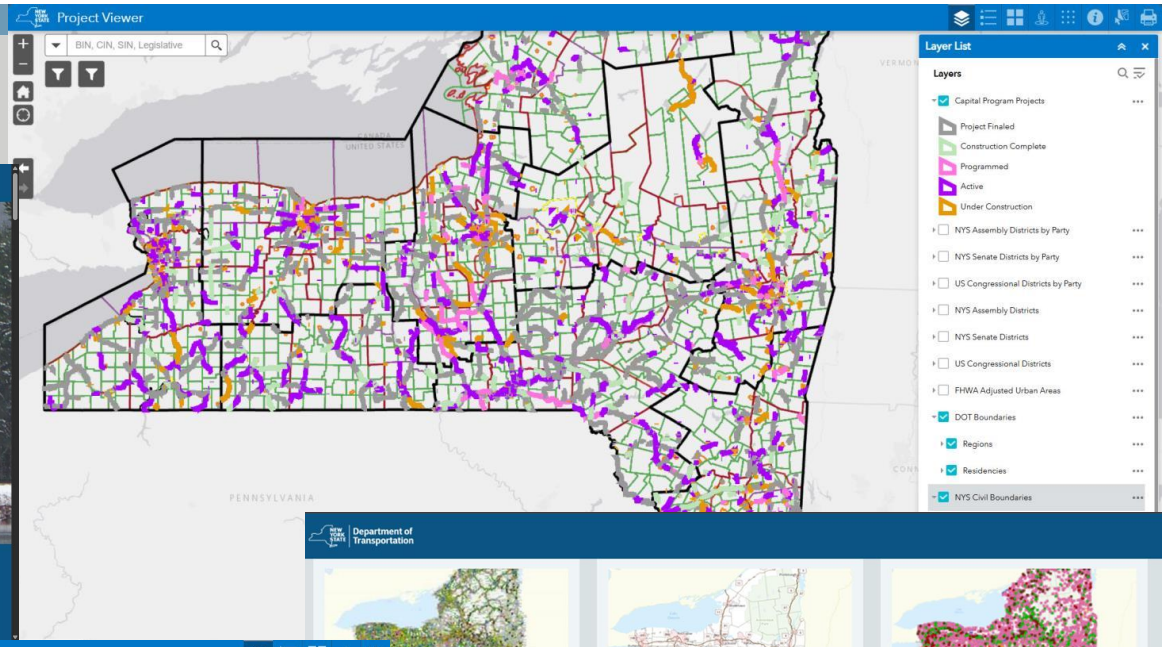






We do Construction well…

We do Data Viewers well…



Maintenance Viewer

SEE INFO | OPEN APP

Material Suppliers Viewer

OPEN APP

NYS Bike Route Vi

OPEN APP

Pavement Viewer

SEE INFO | OPEN APP

Project Viewer

SEE INFO | OPEN APP

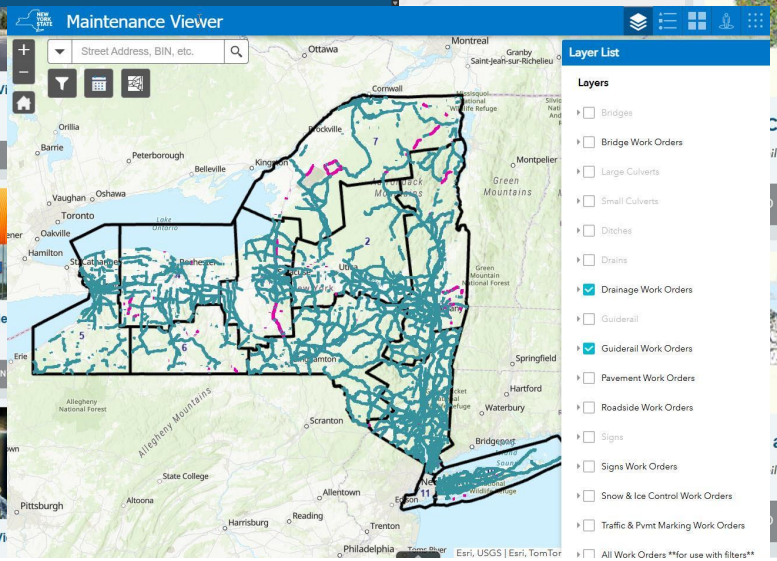
ROW Permits Vie

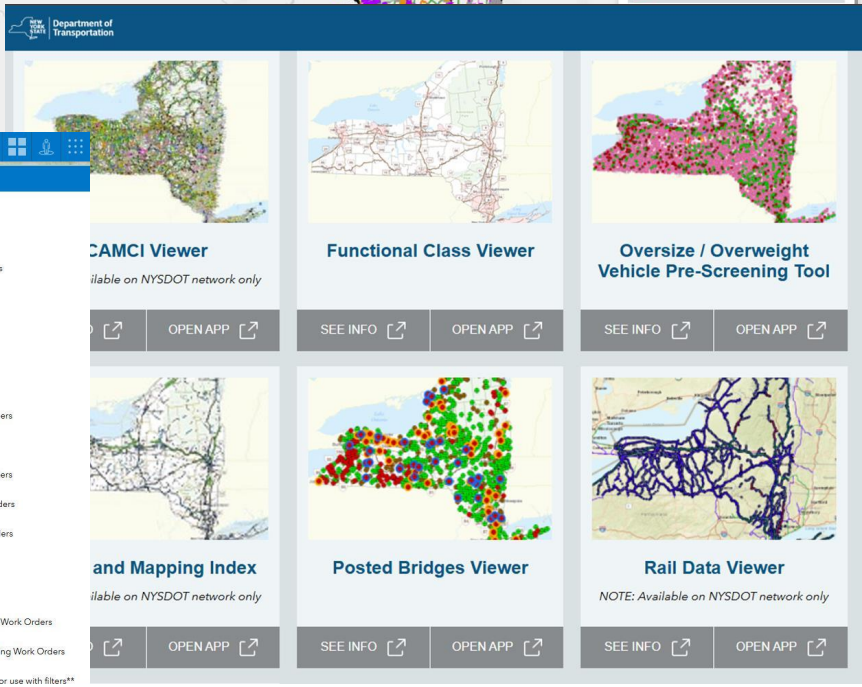
SEE INFO | OPEN

Situational Assets Viewer

Stakeholder Viewer

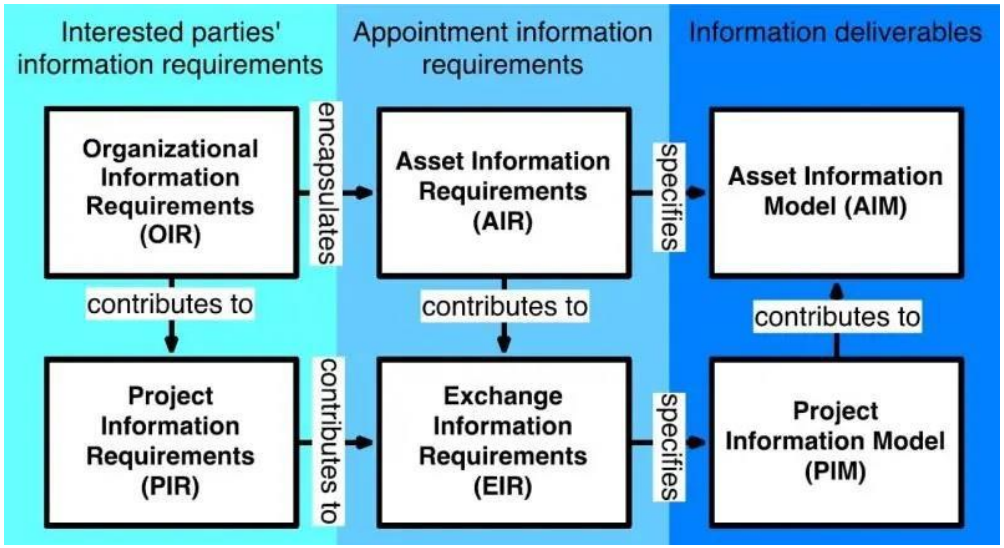
Surface Waters Vi





But we don't do data exchanges well…

ISO 19650 is the international standard for managing information over the lifecycle of a built asset using Building Information Modelling (BIM). It unifies global practices to improve collaboration, reduce errors, and streamline data exchange across architecture, engineering, and construction (AEC) projects



ISO 19650

Organizational Information Requirements (OIR) define the high-level data and information an organization needs to meet its overarching strategic goals, manage physical assets, and support operational decision-making

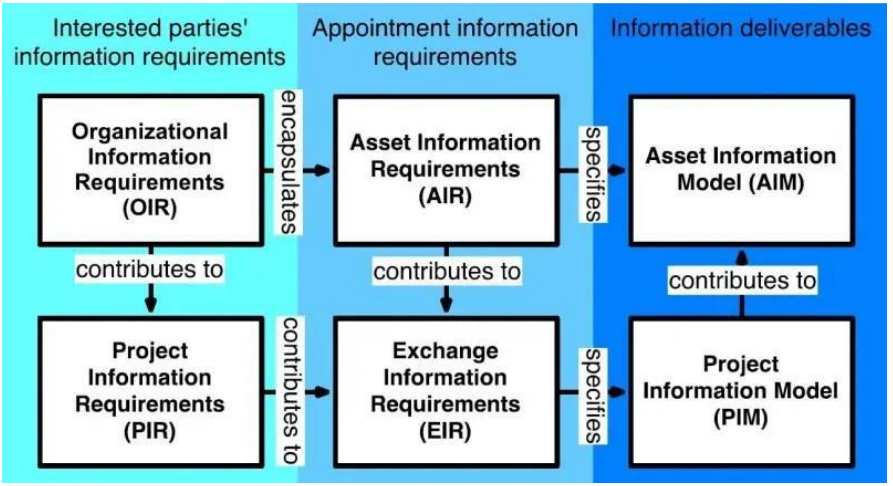
Project Information Requirements (PIR) define the exact data, documentation, and digital deliverables a project needs to support key strategic decisions and milestones

Asset Information Requirements (AIR) are the graphical, non-graphical, and documentation details required by an organization to operate and maintain a physical asset.

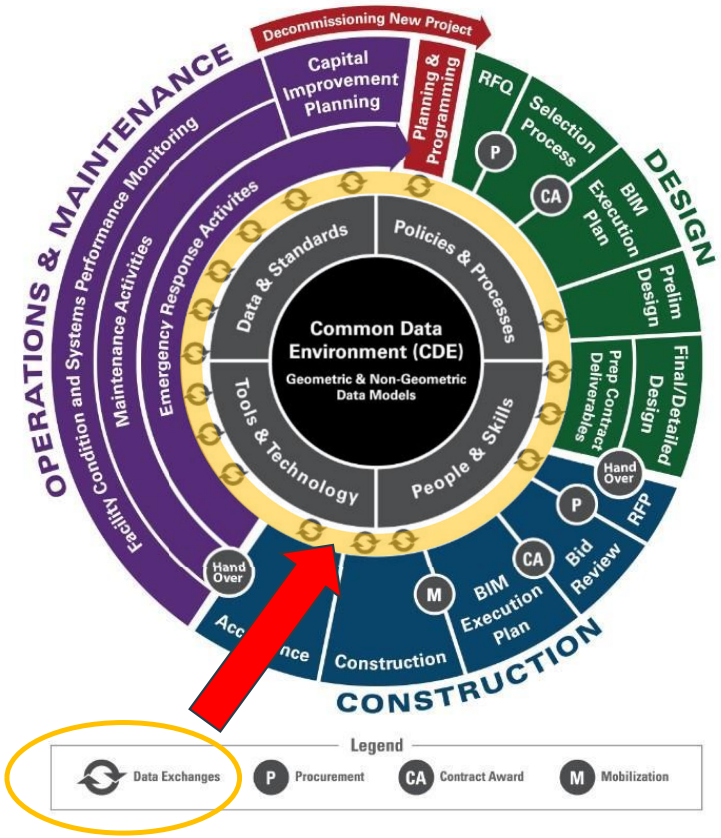
Exchange Information Requirements (EIR) are the specific specifications—primarily used in construction and Building Information Modeling (BIM)—that detail what information must be exchanged, by whom, when, and in what format

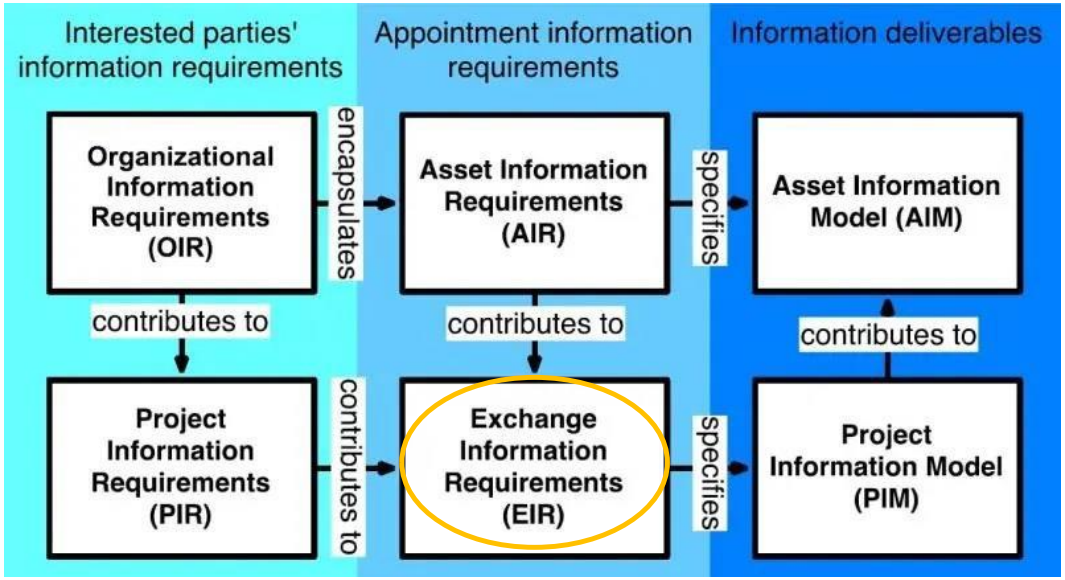
Asset Information Model (AIM) is a centralized data repository that compiles all graphical and non-graphical data, documents, and metadata needed to operate and maintain a physical asset

Project Information Model (PIM) is a comprehensive digital database created during the design and construction phases of an asset.

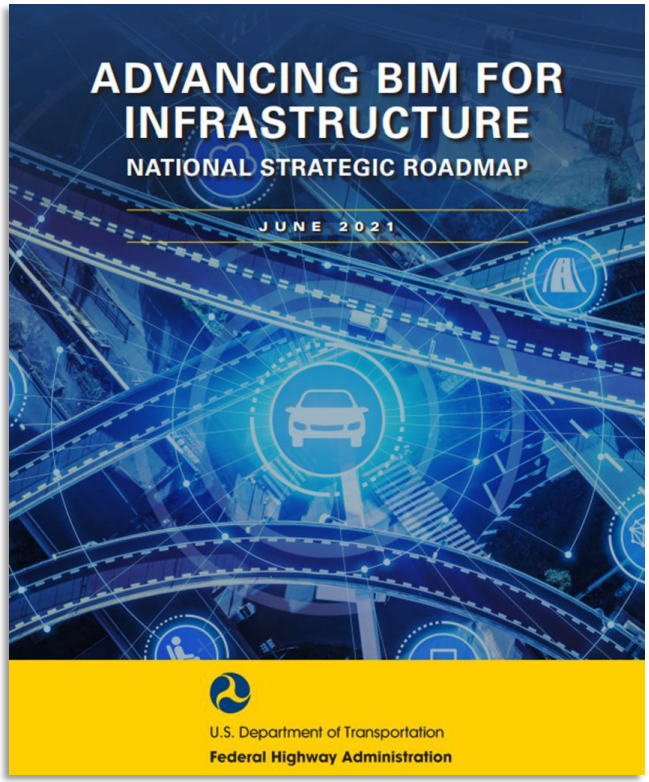


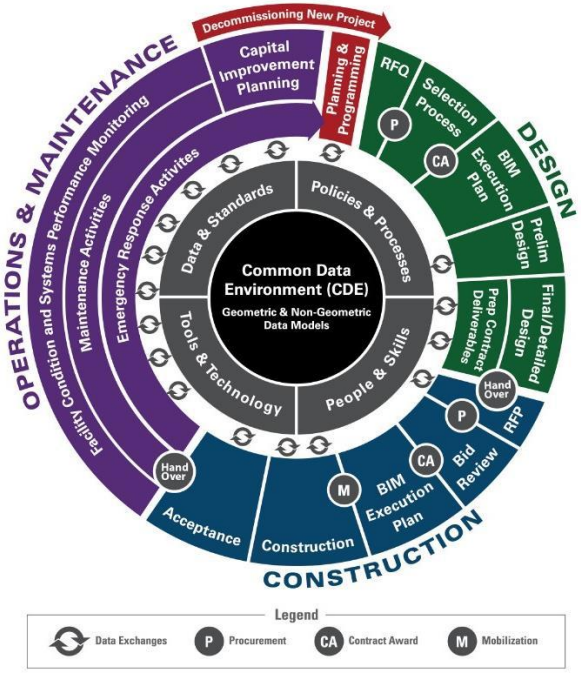
Data Exchanges



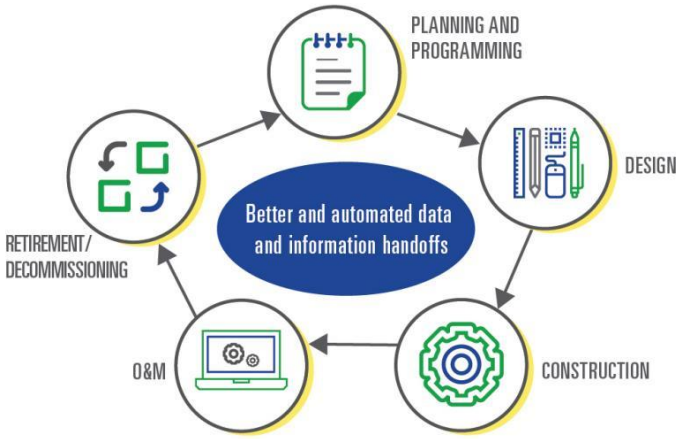


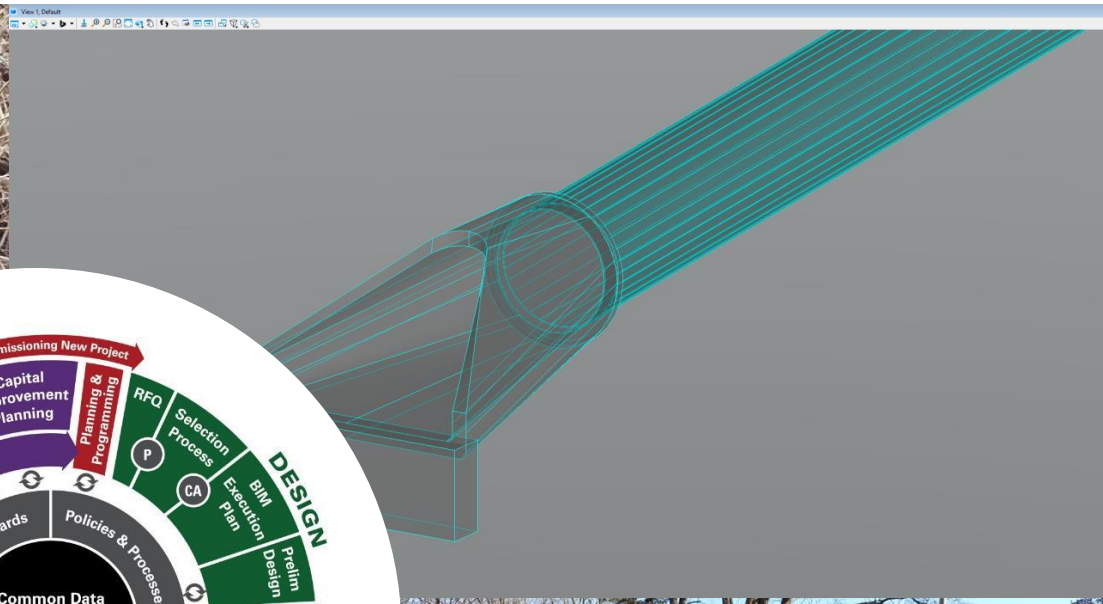
The BIM question is…How does this benefit me?

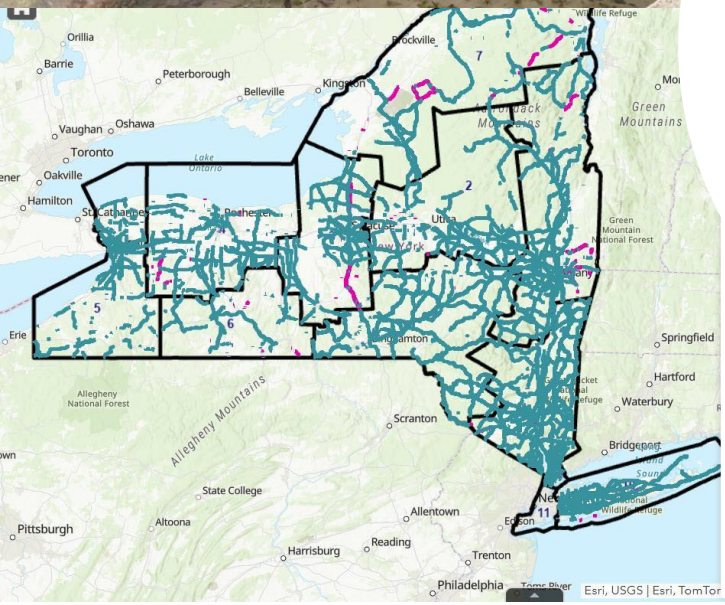




BIM is a collaborative work method for structuring, managing, and using data and information about transportation assets and networks throughout their lifecycles. It liberates data from siloed systems and makes those data available to anyone who needs them when they need them.






Orillia
Barrie
Peterborough
Belleville
Kingston
Brockville
Vaughan
Oshawa
Toronto
Oakville
Hamilton
St Catharines
Rochester
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Binghamton
Springfield
Hartford
Waterbury
Scranton
Bridgeport
State College
Allentown
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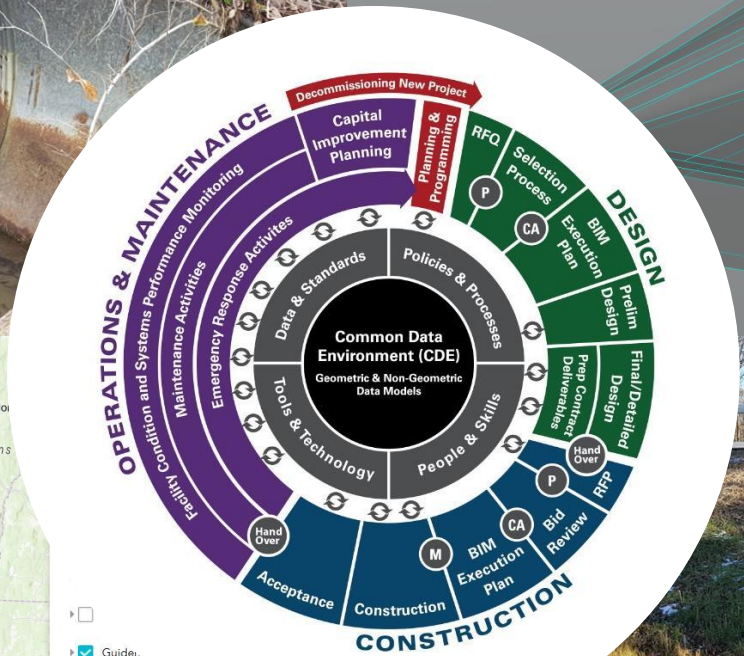
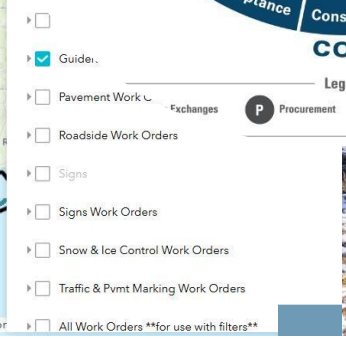
Philadelphia
Allegheny Mountains
Green Mountains
Lake Ontario
Esri, USGS | Esri, TomTom


Decommissioning New Project
OPERATIONS & MAINTENANCE
Capital Improvement Planning
Planning & Programming
Facility Condition and Systems Performance Monitoring
Maintenance Activities
Emergency Response Activites
DESIGN
RFQ
Selection Process
P
CA
BIM Execution Plan
Prelim Design
Final/Detailed Design
Prep Contract Deliverables
Hand Over
RFP
Bid Review
Data & Standards
Policies & Processes
Common Data Environment (CDE)
Geometric & Non-Geometric Data Models
Tools & Technology
People & Skills
Acceptance
Construction
M
BIM Execution Plan
CONSTRUCTION


Guide
Pavement Work
Roadside Work Orders
Signs
Signs Work Orders
Snow & Ice Control Work Orders
Traffic & Pvmt Marking Work Orders
All Work Orders **for use with filters**
Legend
Exchanges
P Procurement
CA Contract Award

Planning

SCIN :	R2-148224
Legacy Culvert ID :	167124
Route :	NY5S
Traveling :	
Reference Marker :	5S25031169
Ref Marker Offset (Ft) :	
DOT Region :	R2 - Utica
County :	MONTGOMERY
DOT Residency :	254-FULTON-MONTGOMERY RESIDENCY
Maintenance Jurisdiction :	
Contract :	
Year Built :	
Span Shape :	Other
Span Material :	Other
Relined Span Material :	
Span Coating :	Other
Span Width :	2.5
Span Height :	2.5
Length :	58
Skew :	Less than 45
Depth :	3
Hydrology Analysis Method:	Rational
Drainage Area:	1.25 Ac
Land Use Coefficient:	.66 Ac
CA:	.66 Ac
Outlet Ext Width :	
Outlet Ext Height :	
Outlet Drop :	
Channel Alignment :	
Scour :	Yes
Pool Depth :	
Previous Modification :	
2026 Modified :	
2026 Mod Type :	

How does this benefit me?
Planning decisions(projects, funding, etc.) based on more complete information

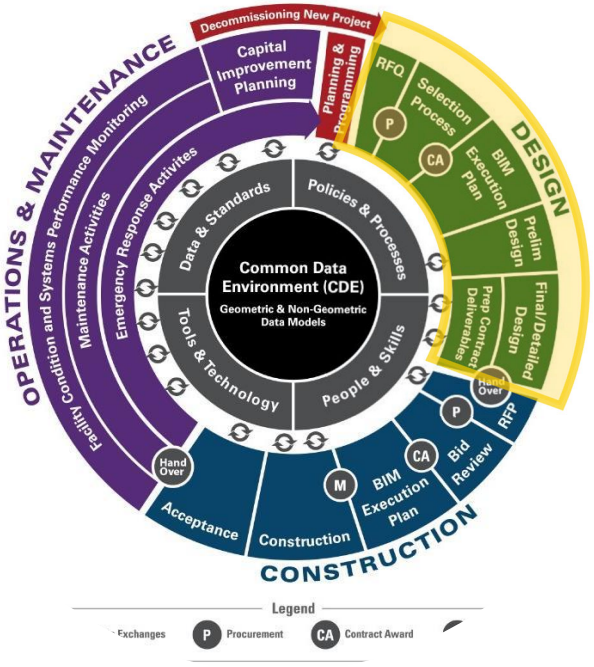
What can I contribute?
More informed project proposals

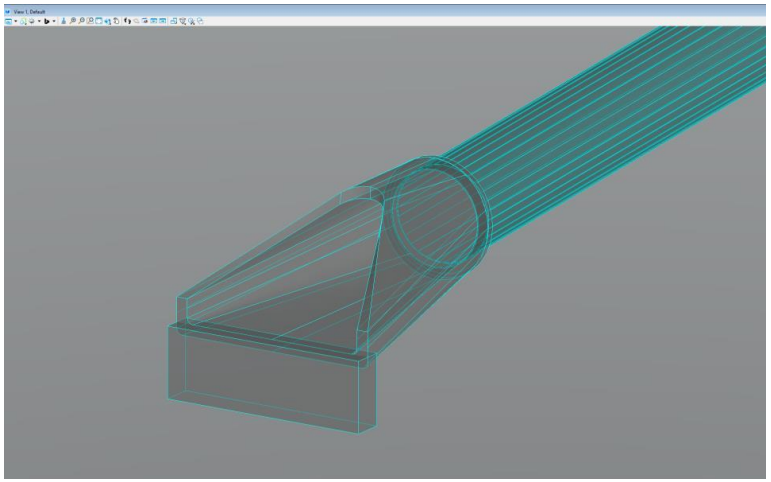
What do I need to complete my tasks?
Complete and up-to-date data set.

Design

Length :	58
Skew :	Less than 45
Depth :	3
Hydrology Analysis Method:	Rational
Drainage Area:	1.25 Ac
Land Use Coefficient:	.66 Ac
CA:	.66 Ac
Time of Concentration:	6.5 min
Design Storm:	10-Year
Rainfall Intensity:	4.65 in
Start Node:	ES-1
Start Invert:	100.34
End Node:	ES-2
End Invert	100.12
Pipe Slope:	1.20%
Pipe Material:	Concrete
Mannings N:	0.013
Pipe Capacity:	2.5 CFS
DESIGN STORM RESULTS	
% Full:	62.30%
Pipe Capacity:	2.5 CFS
Normal Depth:	12.2 in
Velocity:	10 ft/sec
Start HGL:	
End HGL:	
Start EGL:	
End EGL:	
Pipe Manufacture:	ADS
Date of Installation:	6/5/2025
Inspection Report Number:	10-1234
Inlet Ext Shape :	
Inlet Treat Type :	

Hydraulic Analysis Data???





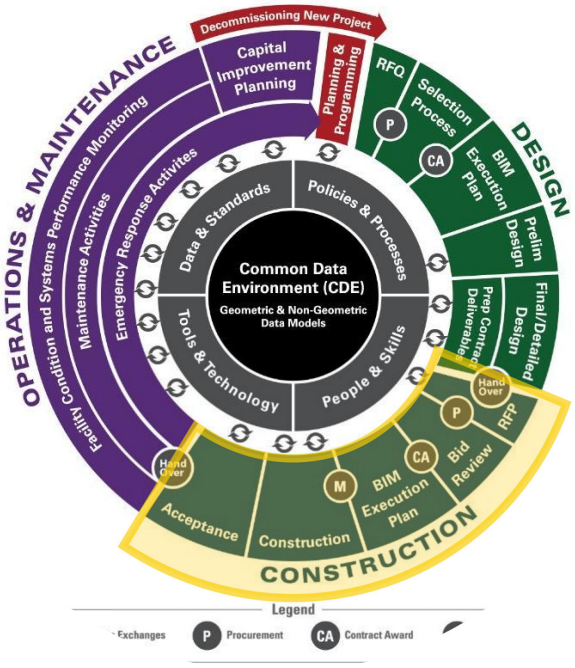
How does this benefit me?
Complete existing condition information.

What can I contribute?
Design calculations and results.

What do I need to complete my tasks?
Complete and up-to-date data set.

Construction

Normal Depth:	12.2 in
Velocity:	10 ft/sec
Start HGL:	
End HGL:	
Start EGL:	
End EGL:	
Pipe Manufacture:	ADS
Date of Installation:	6/5/2025
Inspection Report Number:	10-1234
Inlet Ext Shape :	
Inlet Treat Type :	
Inlet Ext Material :	Metal
Relined Inlet Ext Material :	
Inlet Ext Coating :	
Inlet Ext Width :	
Inlet Ext Height :	
Outlet Ext Shape :	
Outlet Treatment Type :	
Outlet Ext Material :	Metal
Relined Outlet Ext Material :	
Outlet Ext Coating :	
Outlet Ext Width :	
Outlet Ext Height :	
Outlet Drop :	
Channel Alignment :	
Scour :	Yes
Pool Depth :	
Previous Modification :	
2026 Modified :	
2026 Mod Type :	



How does this benefit me?
More efficient communication of the design intent

What can I contribute?
Digital As-Builts with material certifications

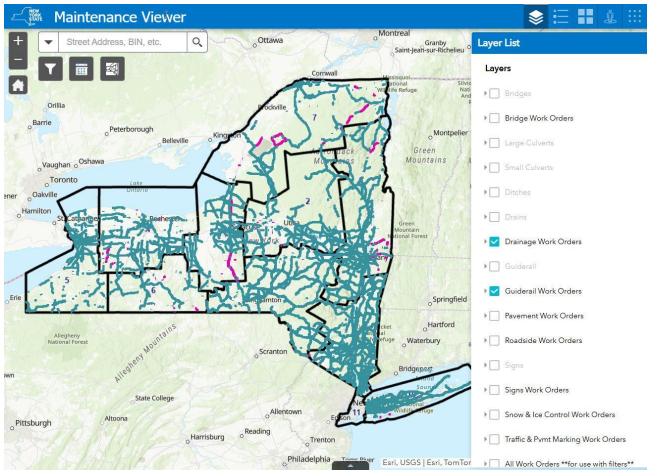
What do I need to complete my tasks?
CADD model with specified item numbers and accurate quantity estimates

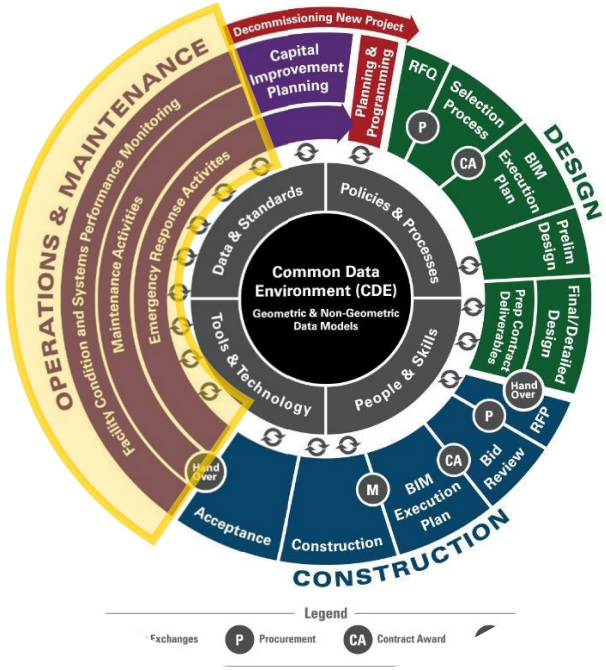
Operations and Maintenance

How does this benefit me?
Data set to allow for quick and accurate responses to emergencies.

What can I contribute?
Continued evaluation of asset conditions.

What do I need to complete my tasks?
Accurate and reliable GIS data.





Normal Depth:	12.2 in
Velocity:	10 ft/sec
Start HGL:	
End HGL:	
Start EGL:	
End EGL:	
Pipe Manufacture:	ADS
Date of Installation:	6/5/2025
Inspection Report Number:	10-1234
Inlet Ext Shape :	
Inlet Treat Type :	
Inlet Ext Material :	Metal
Relined Inlet Ext Material :	
Inlet Ext Coating :	
Inlet Ext Width :	
Inlet Ext Height :	
Outlet Ext Shape :	
Outlet Treatment Type :	
Outlet Ext Material :	Metal
Relined Outlet Ext Material :	
Outlet Ext Coating :	
Outlet Ext Width :	
Outlet Ext Height :	
Outlet Drop :	
Channel Alignment :	
Scour :	Yes
Pool Depth :	
Previous Modification :	
2026 Modified :	
2026 Mod Type :	

Example Culvert

Current Small Culvert Inventory

SCIN :	R2-148224
Legacy Culvert ID :	167124
Route :	NY5S
Traveling :	
Reference Marker :	5S25031169
Ref Marker Offset (Ft) :	
DOT Region :	R2 - Utica
County :	MONTGOMERY
DOT Residency :	254-FULTON-MONTGOMERY RESIDENCY
Maintenance Jurisdiction :	
Contract :	
Year Built :	
Span Shape :	Other
Span Material :	Other
Relined Span Material :	
Span Coating :	Other
Span Width :	2.5
Span Height :	2.5
Length :	58
Skew :	Less than 45
Depth :	3
Inlet Ext Shape :	
Inlet Treat Type :	
Inlet Ext Material :	Metal

Overall Rating :	3
Functioning as Designed :	
Serious Condition Flag :	
Previous Inspector Name :	K TRIPOLI
Previous Inspection Date :	5/3/2011 20:00
Previous Inspection Comments :	
2026 Inspector Name :	
2026 Inspection Date :	
2026 Inspection Comments :	
Photo URL :	View Photos/Info
User Updated :	GIS
Date Updated :	8/16/2019 18:36

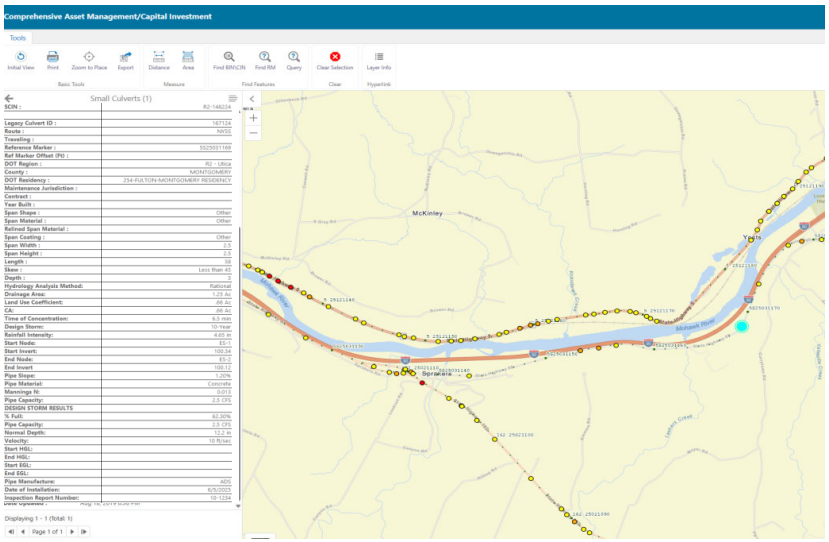
Design Results

Hydrology Analysis Method:	Rational
Drainage Area:	1.25 Ac
Land Use Coefficient:	.66 Ac
CA:	.66 Ac
Time of Concentration:	6.5 min
Design Storm:	10-Year
Rainfall Intensity:	4.65 in
Start Node:	ES-1
Start Invert:	100.34
End Node:	ES-2
End Invert	100.12
Pipe Slope:	1.20%
Pipe Material:	Concrete
Mannings N:	0.013
Pipe Capacity:	2.5 CFS
DESIGN STORM RESULTS	
% Full:	62.30%
Pipe Capacity:	2.5 CFS
Normal Depth:	12.2 in
Velocity:	10 ft/sec
Start HGL:	
End HGL:	
Start EGL:	
End EGL:	

Construction Information

Pipe Manufacture:	ADS
Date of Installation:	6/5/2025
Inspection Report Number:	10-1234

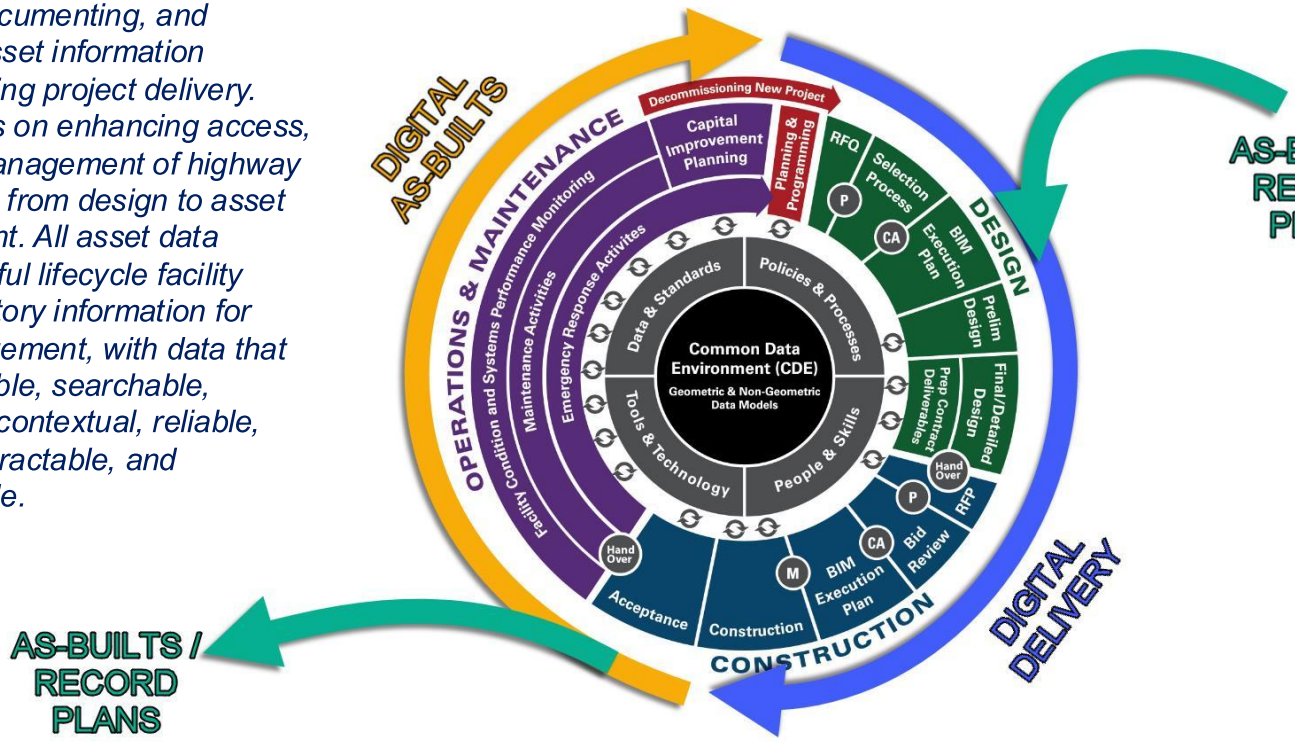
Complete Inventory



SCIN	R1-130186
Legacy Culvert ID	C110163
Route	NY9R
Traveling	
Reference Marker	9R11011025
Original Contract Number	
County	ALBANY
Ref Marker Offset (Ft)	
DOT Region	R1 - Albany
DOT Residency	114-ALBANY RESIDENCY
Maintenance Jurisdiction	
Year Built	1910
Span Shape	Box
Span Material	Concrete
Relined Span Material	
Span Coating	Other
Span Width	4
Span Height	4
Length	39
Skew	Less than 45
Depth	2
Inlet Ext Shape	
Inlet Treatment Type	
Inlet Ext Material	Other
Relined Inlet Ext Material	
Inlet Ext Coating	
Inlet Ext Width	
Inlet Ext Height	
Outlet Ext Shape	
Outlet Treatment Type	
Outlet Ext Material	Other
Relined Outlet Ext Material	
Outlet Ext Coating	
Outlet Ext Width	
Outlet Ext Height	
Outlet Drop	
Channel Alignment	
Scour	
Pool Depth	
Functioning as Designed	
Embankment Rating	
Roadway Rating	
Channel Rating	
Channel Blockage (Pct)	
Structure Align Rating	
Structure Blockage (Pct)	
Span Barrel Rating	
Ext Rating	
End Treatment Rating	
Overall Rating	4
Serious Condition Flag	
Previous Modification	
2026 Modified	
2026 Mod Type	
Photo URL	
Previous Inventory Comments	
2026 Inventory Comments	
Previous Inspector Name	10
Previous Inspection Date	12/28/1994, 7:00 PM
Previous Inspection Comments	
2026 Inspector Name	
2026 Inspection Date	
2026 Inspection Comments	
User Updated	GIS
Date Updated	8/16/2019, 6:34 PM

Open Discussion… How do these terms FIT together?

Digital As-Builts:
A digital data-oriented process for tracking, documenting, and archiving asset information created during project delivery. DAB's focus on enhancing access, use, and management of highway project data from design to asset management. All asset data provide useful lifecycle facility asset inventory information for data management, with data that are accessible, searchable, geospatial, contextual, reliable, durable, extractable, and interoperable.



Digital Delivery:
Is a broad concept involving the use of digital tools, 3D modeling, and data-driven workflows to improve efficiency and collaboration throughout the entire lifecycle of a transportation project.

BIM:
BIM is a collaborative work method for structuring, managing, and using data and information about transportation assets and networks throughout their lifecycles. It liberates data from siloed systems and makes those data available via automated processes to anyone who needs them when they need them.

We all have to work together for this to succeed !!

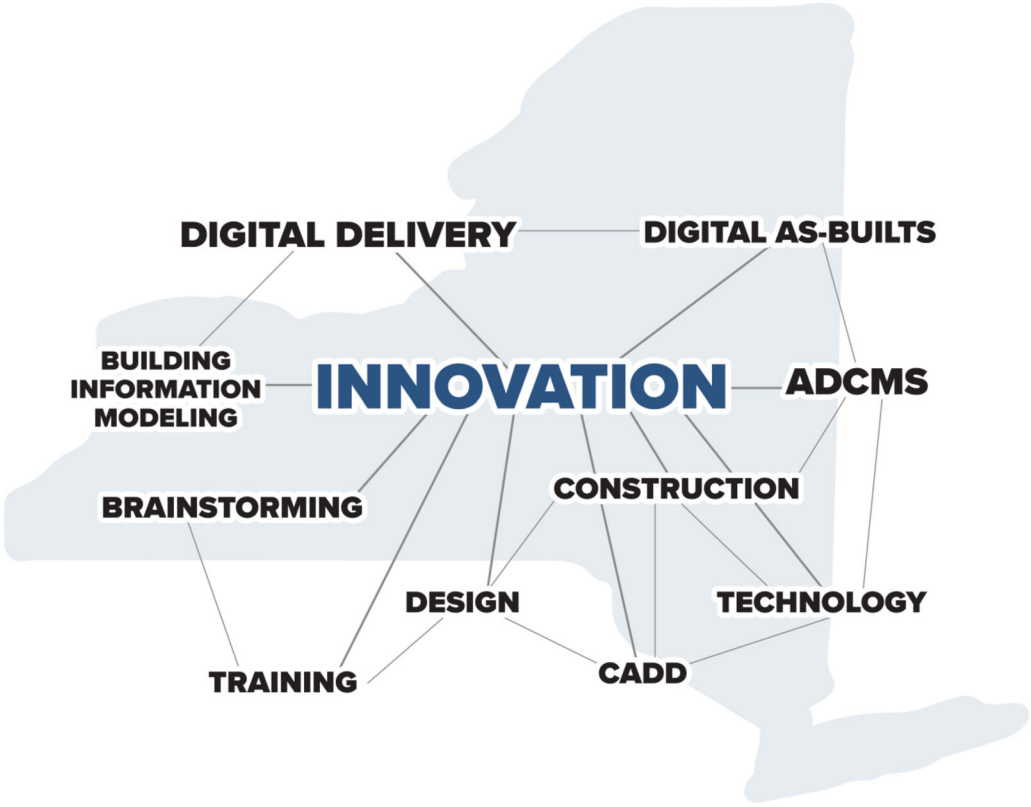
What benefits do you see in your program area if digital delivery is implemented ?

What comes to mind when you think about To-be State for NYSDOT to Implement BIM?

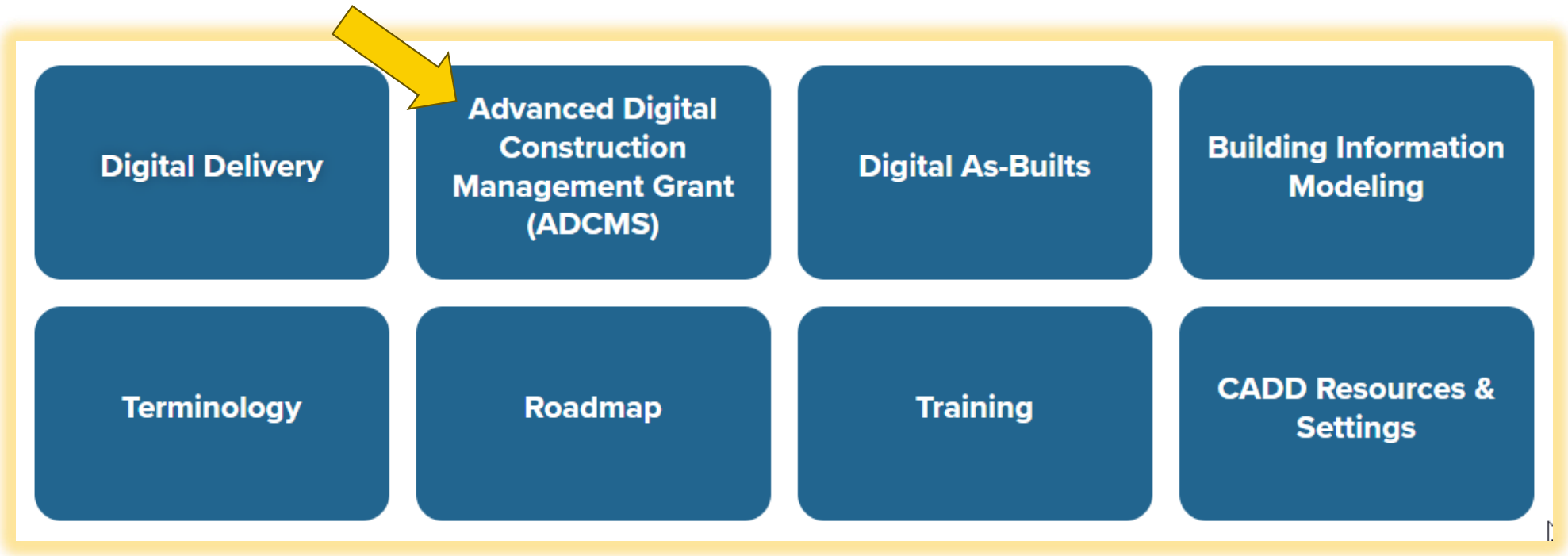
Would you like to be one of the champions driving the To-Be State?

Mentimeter

www.innovation.dot.ny.gov



ADCMS Updates

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YORK
STATE
Department of
Transportation