National BIM for Infrastructure Webinars:

Designer Perspective - Digital Delivery Projects with Model as the Legal Document

Friday, June 10, 2022 | 10am–12pm CDT

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TRANSPORTATION RESEARCH BOARD
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Housekeeping

CALL RECORDING: *We are recording this webinar for future use.*

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No worries, that's how the Teams Live system logs you in.

If you type a message in the Q/A, you can either type your name in or stay as anonymous

ISSUES WITH YOUR AUDIO?

You probably have us muted or your volume is at zero. You'll need to change the settings on your computer's sound.

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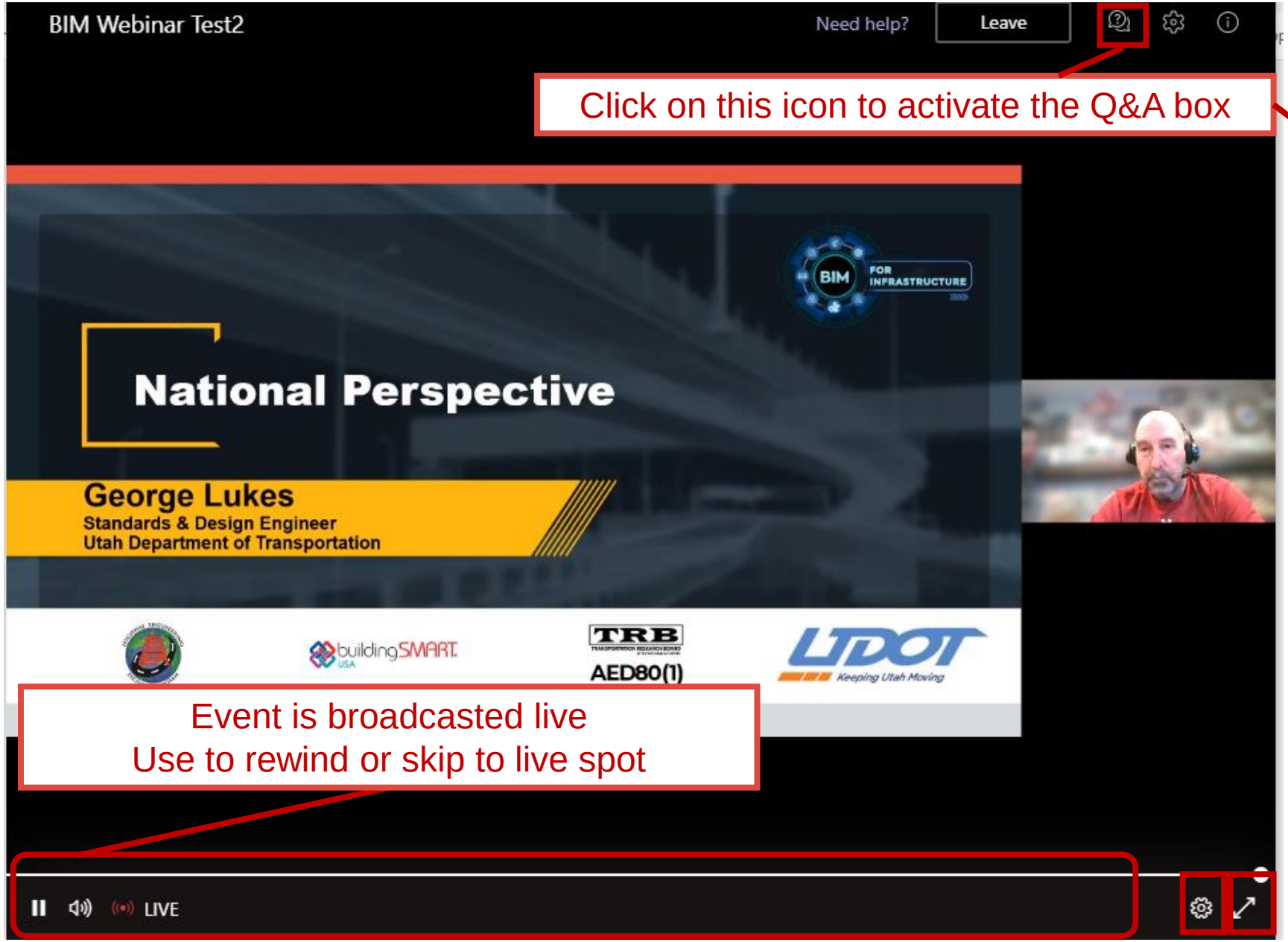

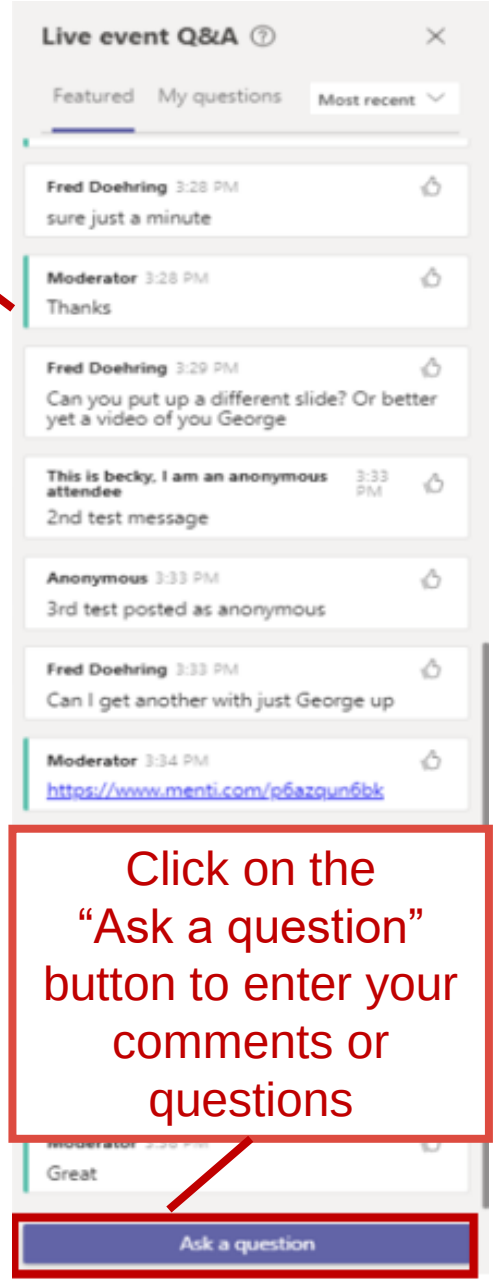

NATIONAL PERSPECTIVE

Overview

This virtual webinar is the fifth in a series that explores opportunities and challenges presented by the shift to Digital Delivery and Digital Twins throughout the project lifecycle in the Transportation Industry in the United States.

This virtual webinar focus area is Designer Perspectives of Digital Delivery Projects with Model as the Legal Document from three different states.

NATIONAL PERSPECTIVE

Agenda

- Introductory Plenary Session – National BIM Perspectives in Transportation
- Designer Perspective – Digital Delivery Projects with Model as the Legal Document
- Panel Discussion with Digital Delivery Design Consultants
- Wrap-Up

National BIM Perspectives in Transportation

Introductory Plenary Session

INCLUDING:

- IHEEP 2022
- 2022 Annual Open Standards Conference
- AASHTO Joint Subcommittee on Data Standardization
- BIM for Bridges and Structures TPF
- ARTBA Update
- ACEC Update

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IHEEP 2022

Vern Danforth
Florida Dept. of Transportation

BIM FOR INFRASTRUCTURE

HIGHWAY ENGINEERING EXCHANGE PROGRAM

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63RD ANNUAL HEEP FLORIDA 2022

THE 63RD ANNUAL INTERNATIONAL HEEP CONFERENCE

Tradewinds in Transportation Technology

September 25 - September 29, 2022 | Fort Myers, FL

Please join us in

Fort Myers, Florida

September 25 - 29, 2022

www.heep.org

Hosted by: FDOT


HEEP
FLORIDA 2020
2022
Sanibel Harbour Marriott Resort & Spa

Agenda

72 - Breakout Sessions

10 - Round-table discussion

FHWA and AASHTO Updates

Student Competition

Awards Banquet

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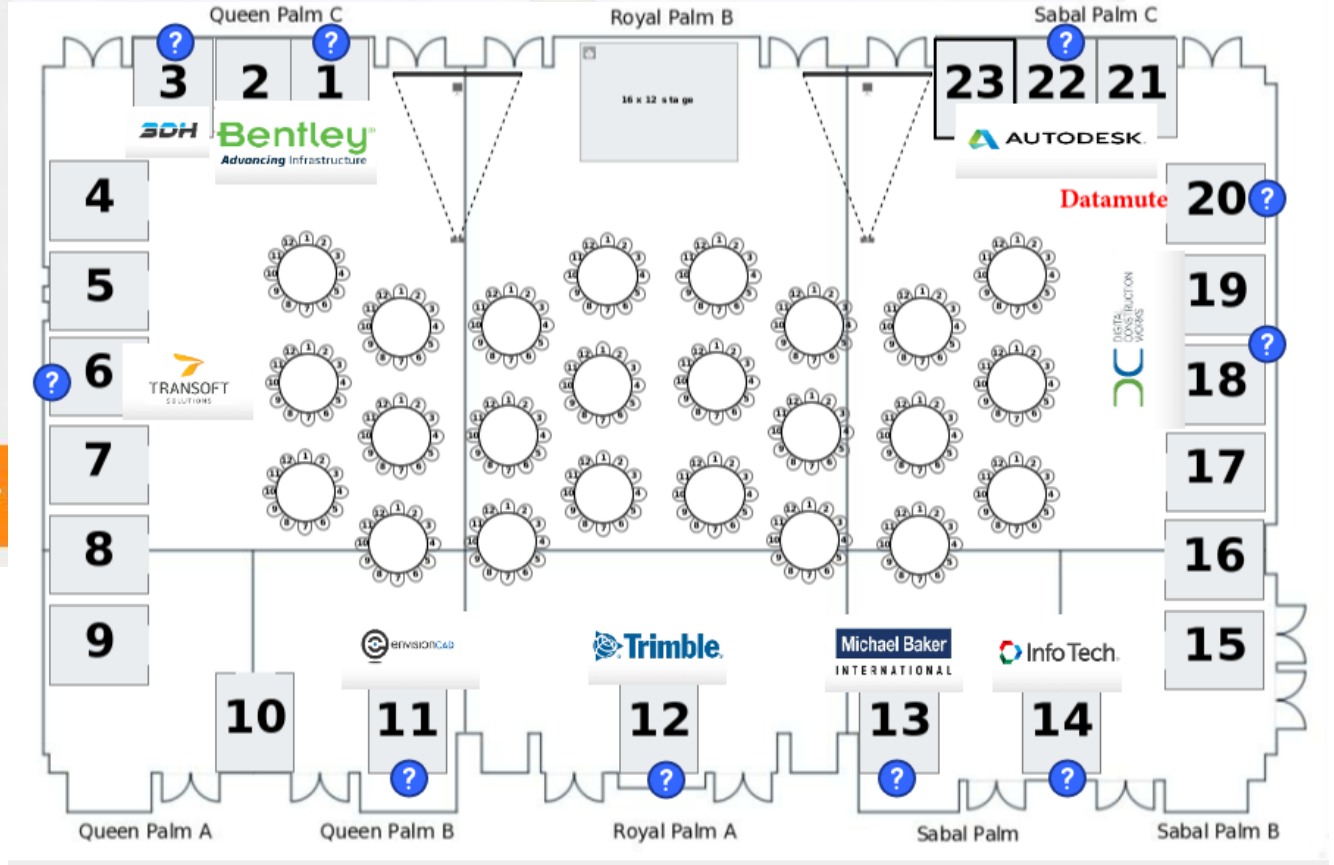
SOLUTIONS

Exhibitor

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NATIONAL WILDLIFE REFUGE
"Ding" Darling Visitor & Education Center
NATIONAL WILDLIFE REFUGE SYSTEM


Edison & Ford
WINTER ESTATES
Welcome ~ Willkommen
Bienvenido ~ Bienvenue
Admission & Information
Straight Ahead
WELCOME
Please help us keep our garden clean and beautiful by observing the following rules:
• No pets


WELCOME TO OUR SANCTUARY ISLAND
SANIBEL FLORIDA
INCORPORATED
1974
DO ENJOY
DON'T DESTROY

buildingSMART USA Annual Open Standards Conference

Ian Howell
buildingSMART USA

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openBIM® USA

Annual Open Standards Conference

hosted by buildingSMART USA and the BIMForum

Digital Built Week Americas

JUNE 14-16, 2022

Anaheim Convention Center, Anaheim, California

openBIM® USA
Annual Open Standards Conference

hosted by buildingSMART USA and the BIMForum

Digital Built Week Americas

Alexa Mitchell, PE
HDR

R David Unkefer
US Department of Transportation
Federal Highway Administration

Jagannath Mallela
WSP

Keynote

U.S. Highways Paving the Way to Open Standards

June 14, 2022 | 8:40am PDT

openBIM® USA
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Digital Built Week Americas

Roger Grant
National Institute of Building Sciences

Kimon Onuma
ONUMA, Inc.

Keynote

Open Data as an Asset for the Lifecycle

June 14, 2022 9:00am PDT

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Digital Built Week Americas

Alexa Mitchell, PE
HDR

Mike Bousliman
Montana DOT

Will Sharp
HDR

Jesus Mora
Caltrans

R David Unkefer
US Department of Transportation
Federal Highway Administration

BIM/Open Standards for Highways

June 14, 2022 | 10:30am PDT

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Digital Built Week Americas

Dennis Shelden
Center for Architecture Science and Ecology

Ian Howell
buildingSMART USA

Dana K. "Deke" Smith, FAIA Emeritus, FbSI
DKS Information Consulting, LLC

Jeffrey Ouellette
jō consulting

The Future of openBIM®

June 14, 2022

1:30pm PDT

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Digital Built Week Americas

Calvin Kam FAIA
Strategic Building Innovation

George Lukes
Utah DOT

Luke Faulkner
American Institute of Steel Construction

Cindy Baldwin
VDCO Tech

Ian Howell
buildingSMART USA

R David Unkefer
US Department of Transportation
Federal Highway Administration

Open Standards for Digital Twins

June 14, 2022 | 3:30pm PDT

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Digital Built Week Americas

Calvin Kam FAIA
Strategic Building Innovation

Renate Fruchter
Stanford University

Dana K. "Deke" Smith, FAIA Emeritus, FbSI
DKS Information Consulting, LLC

Tony Rinella
Strategic Building Innovation

Education & Workforce Development

June 15, 2022 | 1:30pm PDT

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Digital Built Week Americas

Scott Yates
EDI

Cindy Baldwin
VDCO Tech

Esther Chitsinde
HDR

Cameron Shaefer
HDR

Airport Technology Integration and Implementation

June 15, 2022 | 3:30pm PDT

openBIM® USA
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Digital Built Week Americas

Jim Bedrick FAIA
AEC Process Engineering

Carrie Sturts Dossick
University of Washington

Steven Lewis
Arcadis

John Tocci Sr.
TOCCI

Jan Reinhardt
ADEPT Project Delivery

John Tocci Jr.
PCL Construction

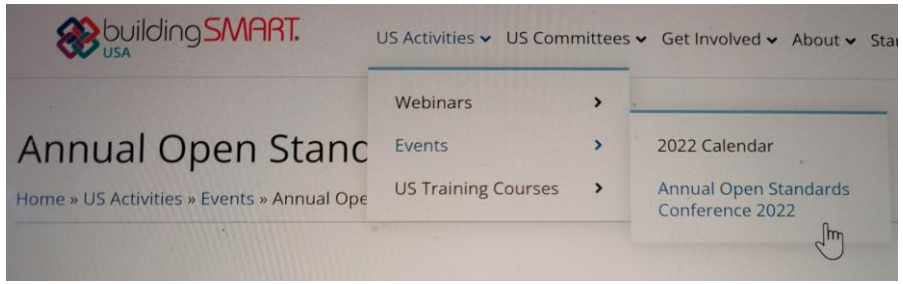
Buildings | BIMForum

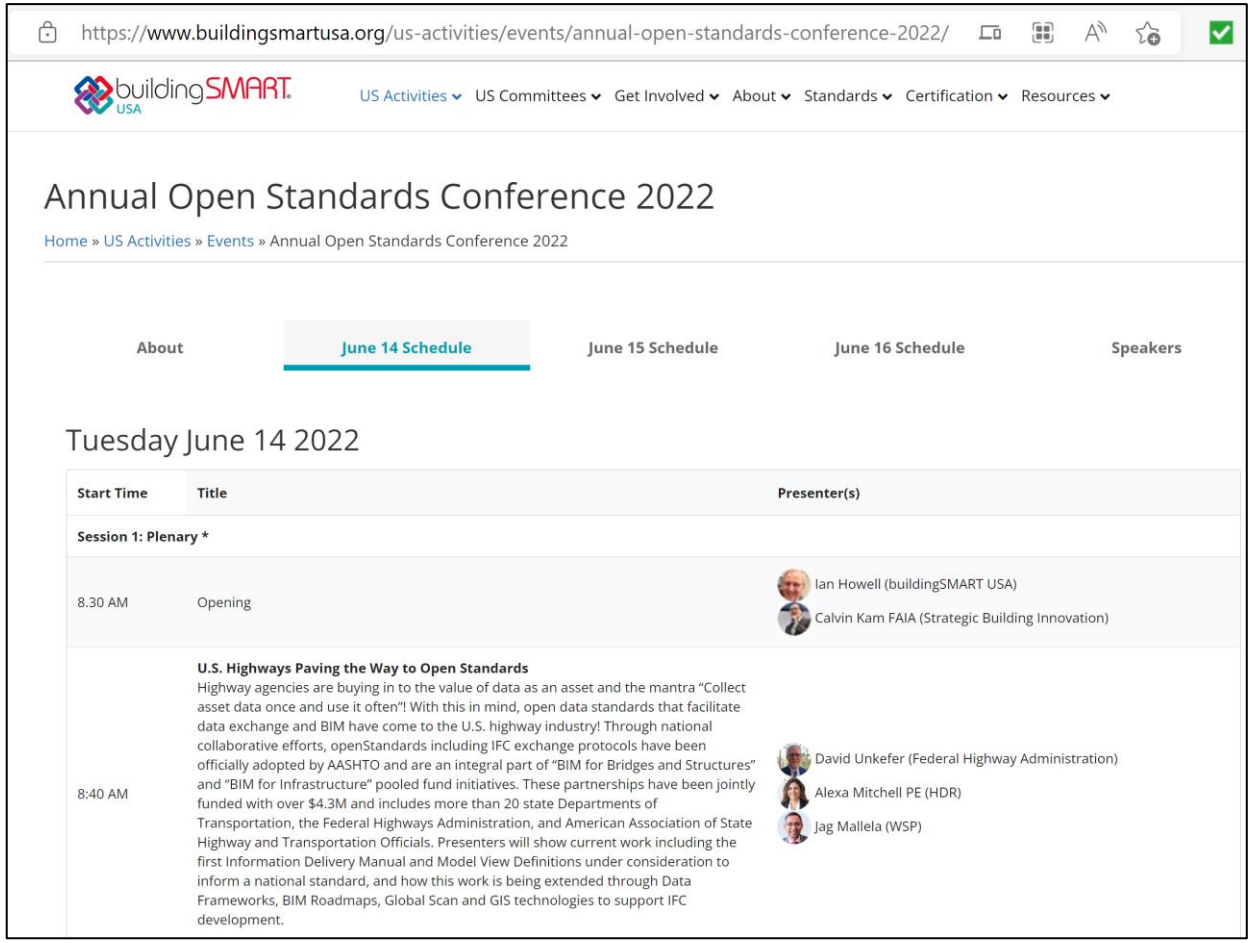
Delivering on Collaboration

June 16, 2022 | 1:30pm PDT

Conference Program

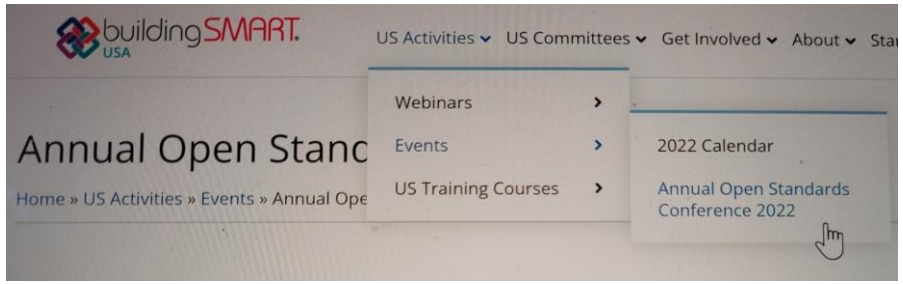
https://www.buildingsmartusa.org/us-activities/events/annual-open-standards-conference-2022/





Conference Registration

https://www.buildingsmartusa.org/us-activities/events/annual-open-standards-conference-2022/



openBIM® USA and AEC-ST 3-Day Pass

3 days of full physical access to AEC program sessions (5 conferences, including the buildingSMART USA Open Standards Conference), exhibition, catering, and social functions. (See details below)

$695 Early Bird (first 40 registrations)
$795 Standard
$895 Late (from June 6)

10% discount for buildingSMART USA Members
(use discount code = **bSUSA** on the second page)

bS-USA Virtual Pass

3 days of full **online** access to the buildingSMART USA Open Standards Conference. (See details below)

$195 Standard

REGISTER NOW!

Learn more about IFC ….

AECMAGAZINE

Building Information Modelling (BIM) technology for Architecture, Engineering and Construction

May/June 2022 Edition

https://aecmag.com/magazines/

AASHTO Joint Subcommittee on Data Standardization

Mike Bousliman,
Montana Dept. of Transportation

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HIGHWAY ENGINEERING EXCHANGE PROGRAM

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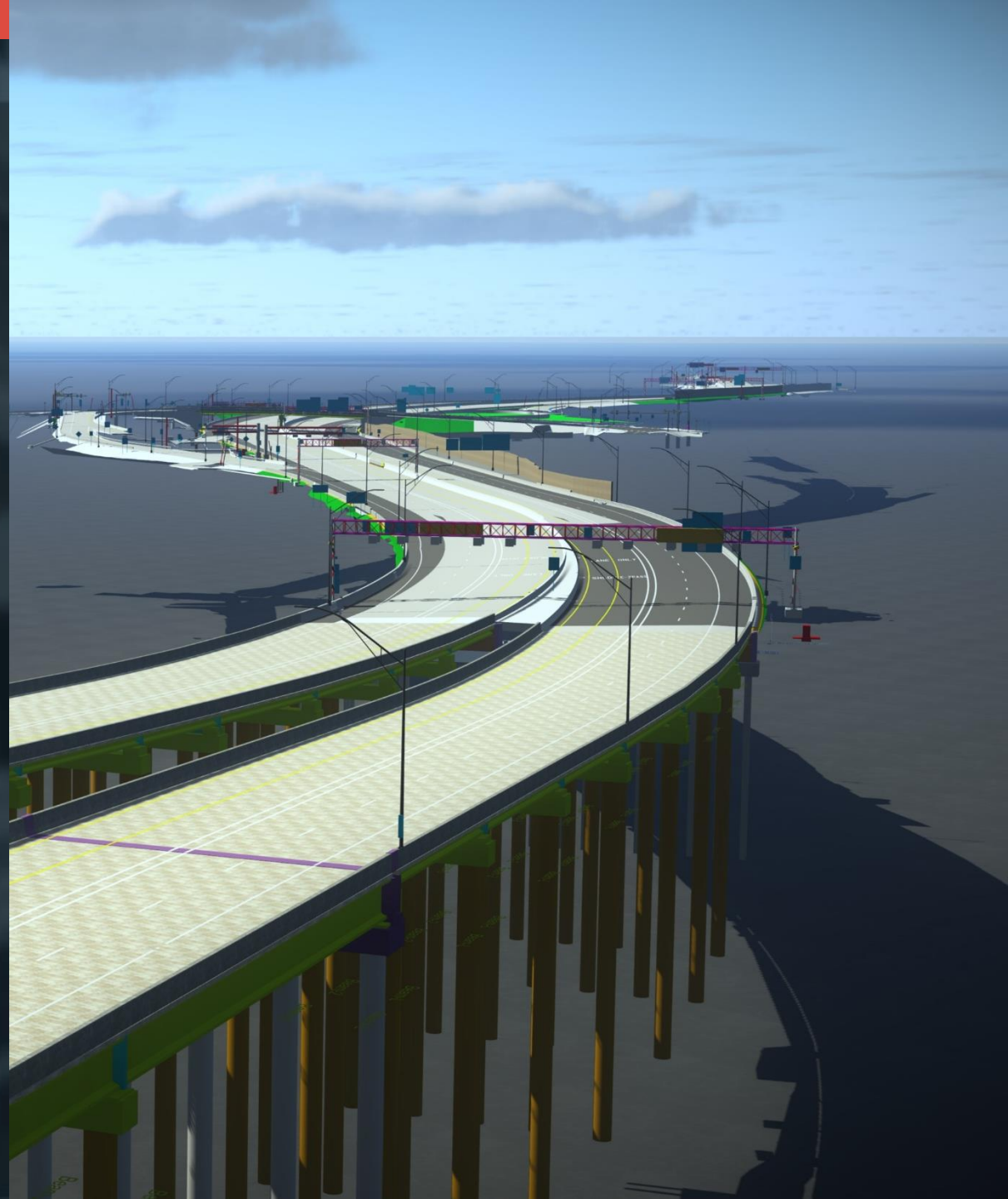
MONTANA Department of Transportation

AASHTO Adoption of IFC

- In October 2019, the Joint Technical Committee on Electronic Engineering Standards introduced a **resolution to adopt IFC** as the standard for State Departments of Transportation.
- The resolution passed unanimously with the following provisions;
  - ***Resolved,*** That the AASHTO Board of Directors **recommends the adoption of IFC Schema** as the national standard for AASHTO States;
  - ***Resolved,*** That an internal, **cross-committee, multi-disciplined** group within AASHTO should be formed to coordinate schema development, identify gaps, resolve any conflicts, and avoid duplication of efforts; and
  - ***Resolved,*** That **possible AASHTO membership in buildingSMART International** should be investigated to provide representation and participation for the state DOTs in schema development.

AASHTO Joint Subcommittee on Data Standardization

- Data Management and Analytics
- Bridges and Structures
- Design
- Construction
- AASHTOWare
- Performance Based Management
- AASHTO Staff
- Stakeholders



Joint Subcommittee on Data Standardization

- High level goals –
- ensure coordination among interested groups and progress in the adoption of standardized data schemas
- coordinate schema development, identify gaps, resolve conflicts, and avoid duplication of efforts

BIM for Bridges and Structures
TPF Update

James Hauber
Iowa DOT

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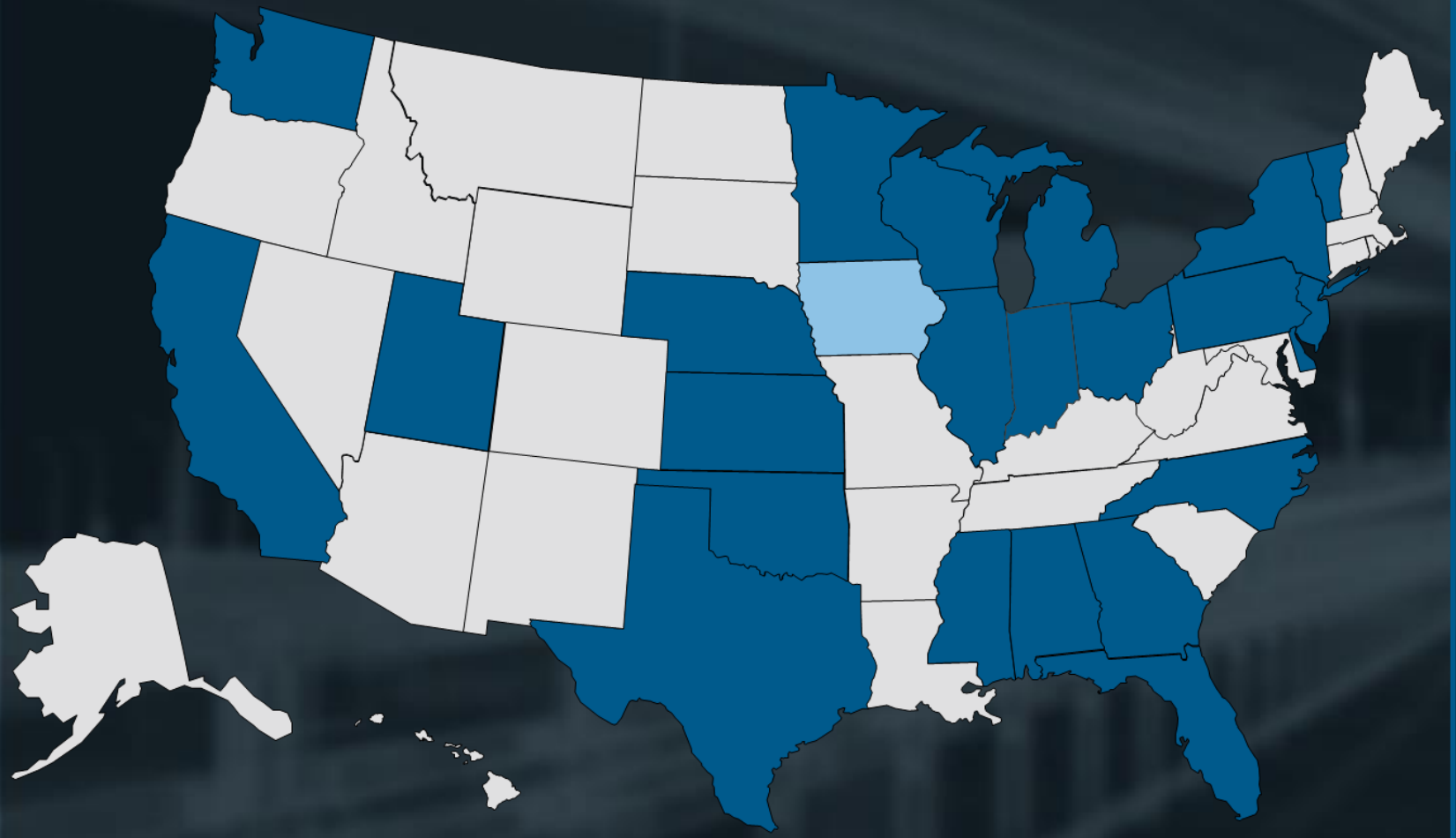
Transportation Pooled Fund – TPF-5(372)

BIM for Bridges and Structures



24 STATES PARTICIPATING

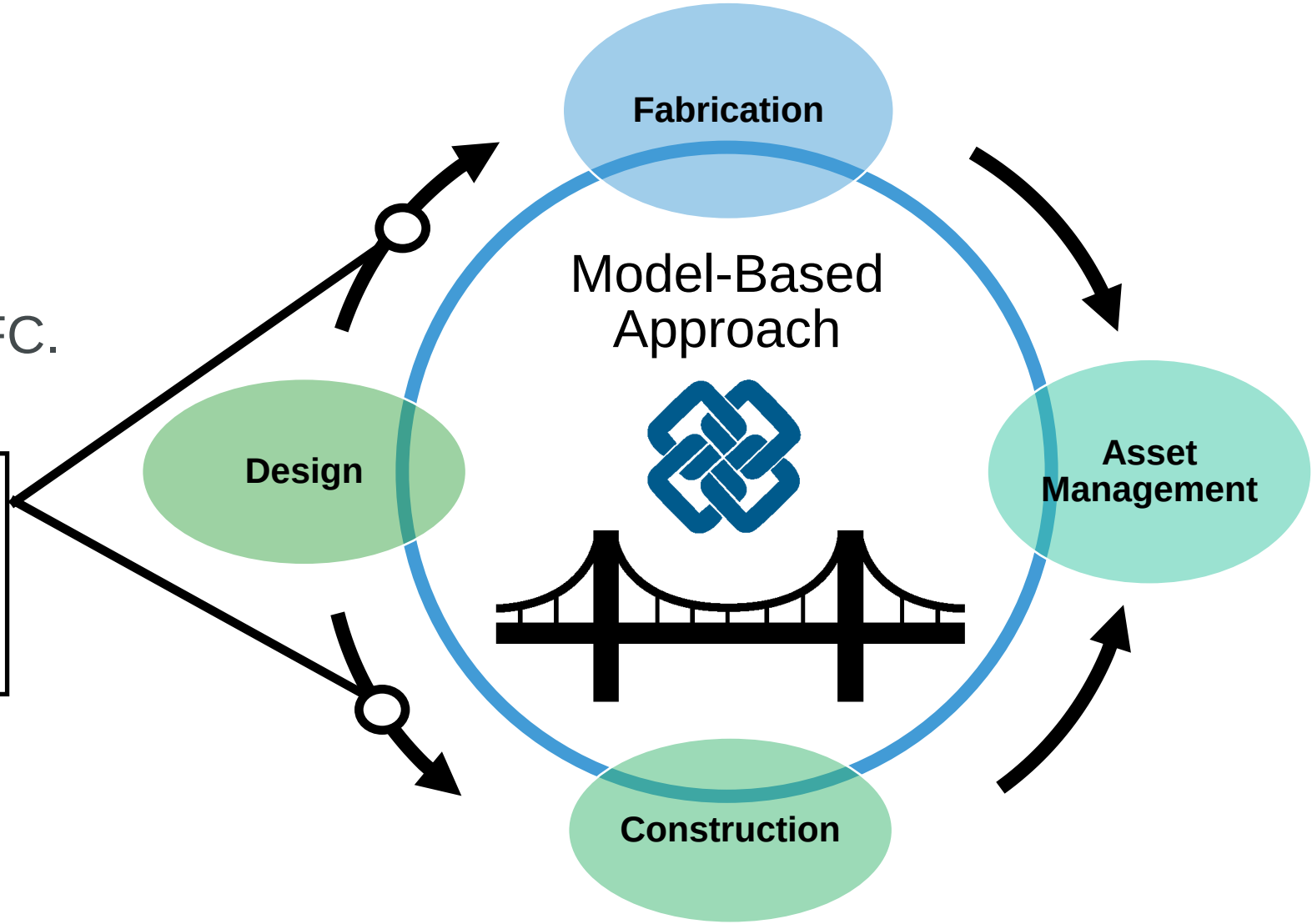
01 Alabama
02 California
03 Delaware
04 Florida
05 Georgia
06 Illinois
07 Indiana
08 Iowa
09 Kansas
10 Michigan
11 Minnesota
12 Mississippi
13 Nebraska
14 New Jersey
15 New York
State
16 North Carolina
17 Ohio
18 Oklahoma
19 Pennsylvania
20 Texas
21 Utah
22 Vermont
23 Washington
24 Wisconsin
FHWA

Project Vision

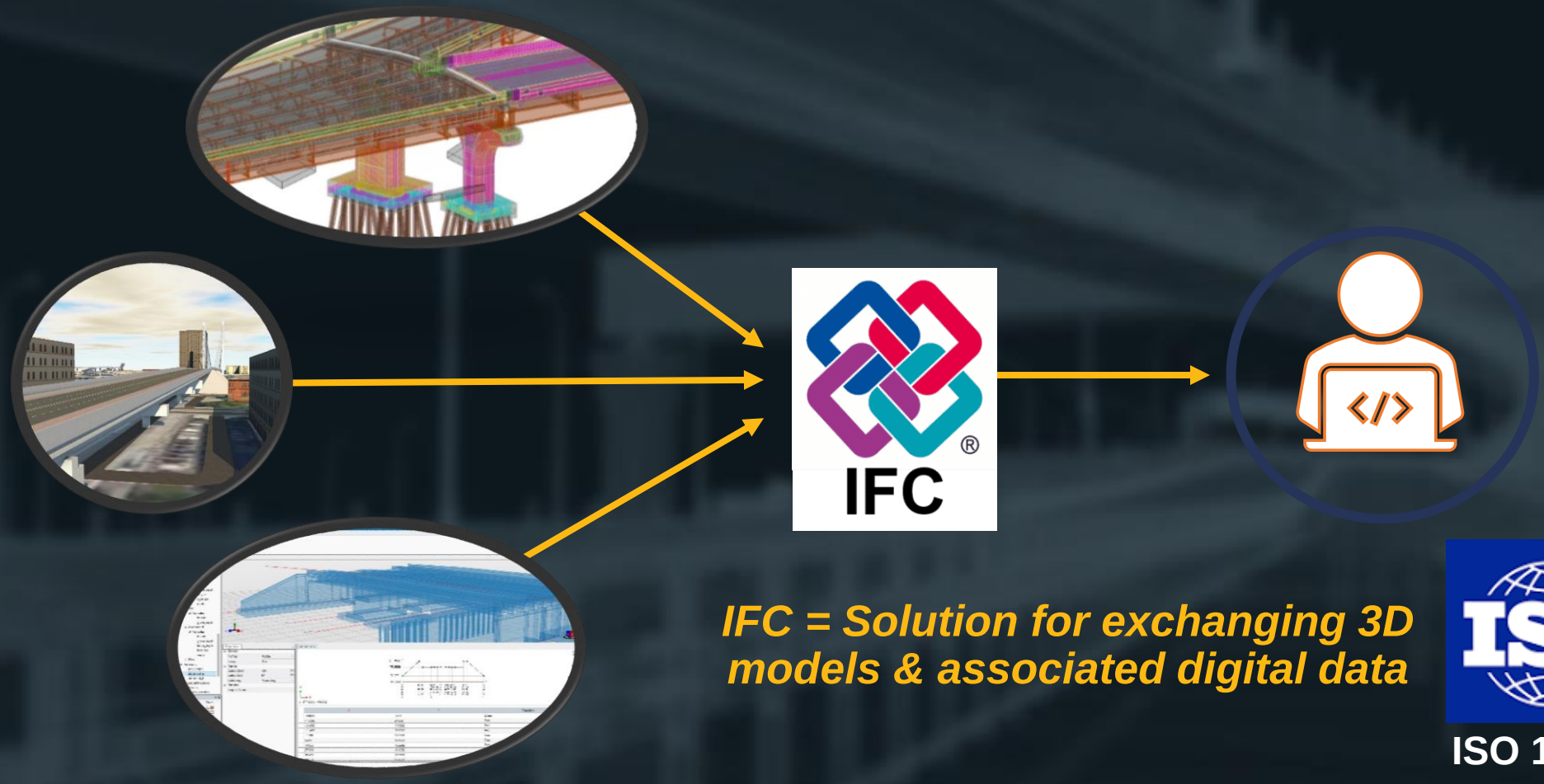
Develop a National Standard for open exchange of bridge and structure data utilizing IFC.

Focus of pooled fund project

BIM FOR BRIDGES AND STRUCTURES
TPF-5(372)



Project Objective



IFC = Solution for exchanging 3D models & associated digital data

ISO 16739

Project Outcomes

To be balloted as a guide specification at that AASHTO Committee on Bridges and Structures Annual Meeting in June 2022

Primary focus of last 18 months

Information Delivery Manual (IDM)

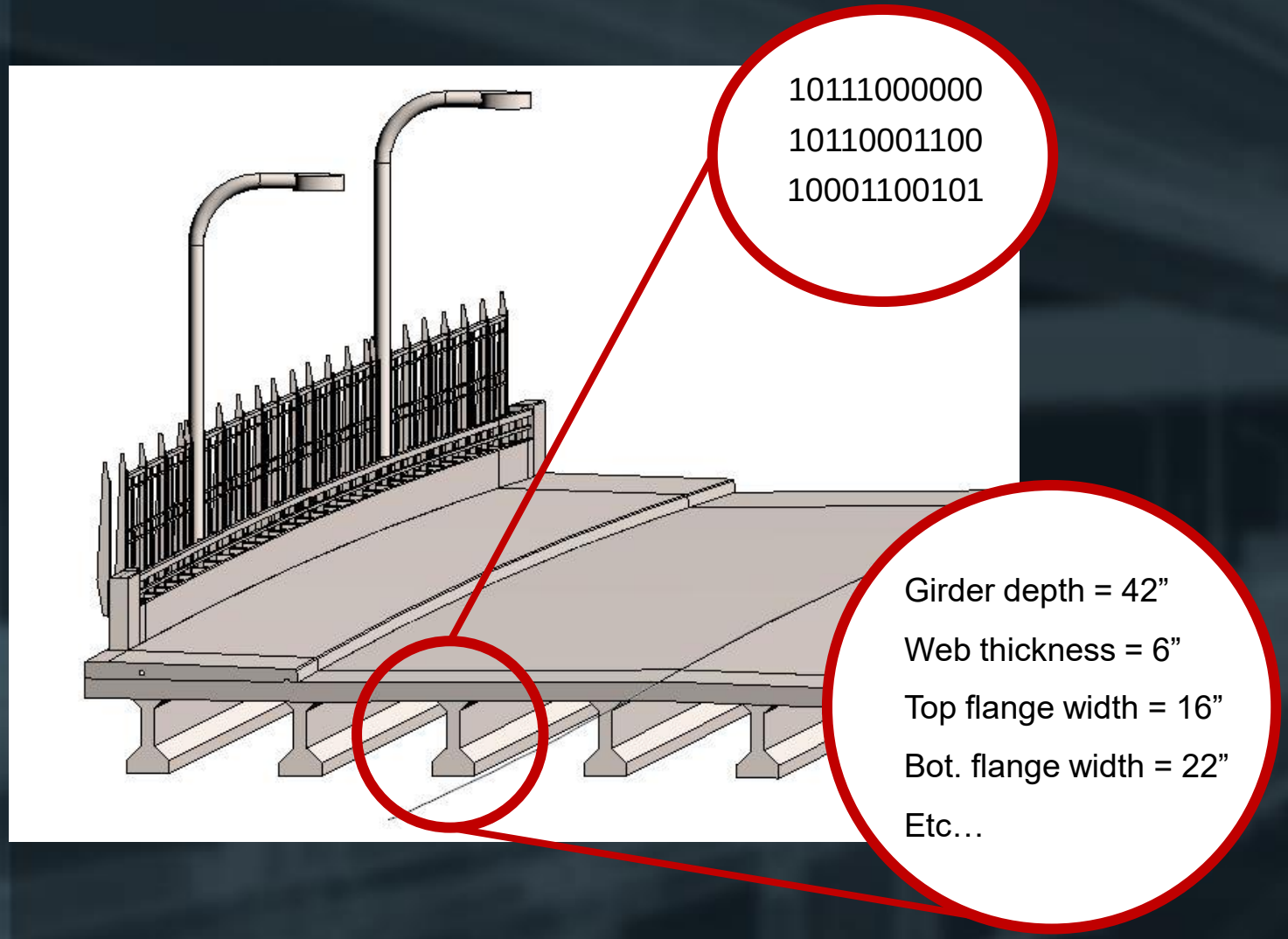
What is an IDM?

Document defines processes and data requirements for a specific transaction.

TPF-5(372) IDM: Scope of the Exchange

- Structure Types
  - Slab bridges
  - Girder (i.e. I-girder, I-beam, box girder, deck beam) bridges
  - Common buried structures (box culverts, three-sided structures, arch-type)
  - Retaining walls associated with or adjacent to a bridge
- Material Types
  - Reinforced Concrete
  - Precast/Prestressed Concrete
  - Post-Tensioned Concrete
  - Steel

Information Delivery Manual (IDM)



Object type:

- Girder

Property types:

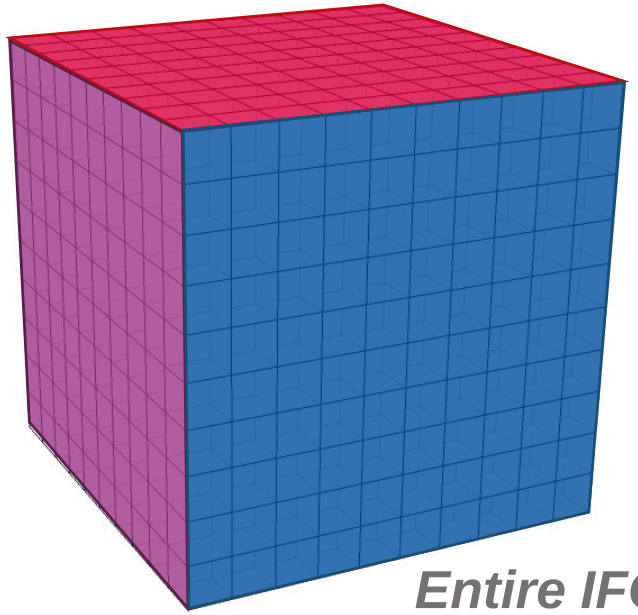
- General properties
  - Identification
  - Type and description
  - Type
  - Quantity and pay item #

Geometry and dimensions

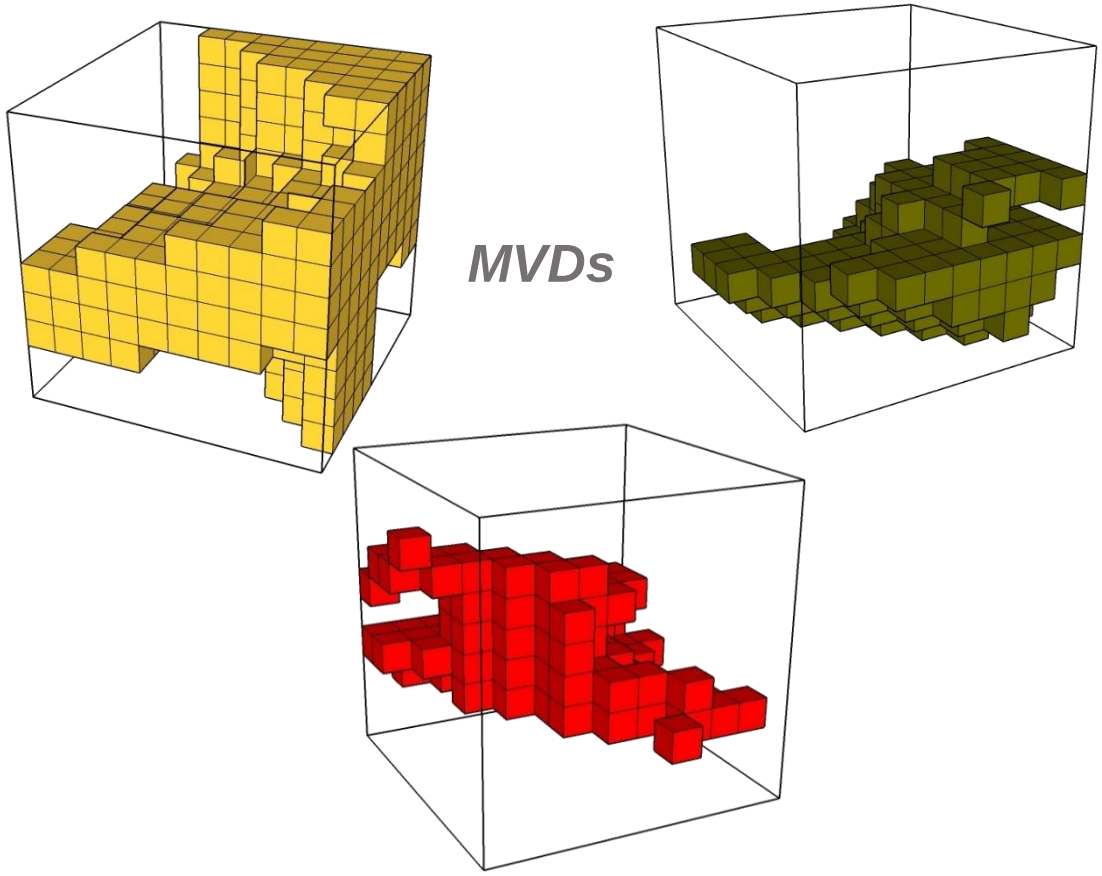
  - Geometric shape
  - Girder length/depth
  - Top/bottom flange width
  - Etc.

- Location
- Material properties
- Sub-component information (camber, flange, haunch, etc.)
- Conceptual erection sequence

Model View Definition (MVD)



Entire IFC Schema



MVDs

Source: Mark Baldwin (Mensch & Maschine)

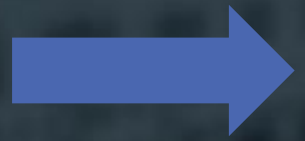
BIM for Bridges and Structures Year 5

- Task 2: IFC Development
- Bridge Data Dictionary – Prepare files for upload to buildingSMART Data Dictionary
- Economic Analysis ROI
- Industry Organization
- Implementation and Collaboration
  - Develop IFC implementation guide for State DOTs.

Second BIM for Bridges and Structures Pooled Fund

- Potential Activities
  - Training materials leveraging the outcomes of TPF-5(372)
  - Support for pilot projects implementing the standard from TPF-5(372)
  - Re-prioritization of future IDMs, MVDs, and data validation for IFC exchanges
  - Develop additional IDMs and MVDs such as Construction-to-Asset Management
  - Coordination with related initiatives

IFC Export



Owner

Uses IFC Data for Asset Management

American Road & Transportation Builders Association Update

Brian McInnis

Trimble

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Innovation & Technology Forum

- Established in September 2020 after ARTBA's Strategic Plan was implemented.
- Includes ARTBA members from all Divisions.
  - Contractors Division
  - Planning and Design Division
  - Equipment Manufacturers Division
  - Materials and Services Division
  - Research and Education Division
  - P3s in Transportation Division
  - Traffic Safety Industry Division
  - Transportation Officials Division

- Mission:

  "We hope to identify best practices around technology advancements in our industry and to maximize the benefits that can be achieved through a wide range of innovations."

  – Steve Berglund, Executive Chairman at Trimble & Chair of this forum

Digital Construction is the first initiative.

Digital Construction Policy Statement

Digital Construction is defined as commercially proven digital technologies and processes for management of construction and engineering activities, including systems for infrastructure project procurement, planning and coordination, construction, Digital As-Builts, e-Ticketing, operations and maintenance, modernization and management, asset management systems for machines, site equipment, and personnel.

Digital Construction technologies will provide mechanisms and processes to decrease and more properly allocate project risk, reduce schedule uncertainty, increase productivity and efficiency, lower cost, and deliver safer, higher quality, and environmentally sustainable infrastructure projects.

In order to accelerate innovation in the U.S. transportation design and construction industry, ARTBA supports the adoption of open data standards, the model as the legal document (MALD), and modern, commercially-proven, and competitively acquired digital construction technologies and processes for infrastructure projects.

Next Steps

- Approved by ARTBA Board in May 2021
- Develop Recommendations and “Best Practices”
- Working with FHWA, Associations and Industry Groups
- Ongoing Education including Webinars, ARTBA conferences and articles

American Council of Engineering Companies Update

Will Sharp
HDR

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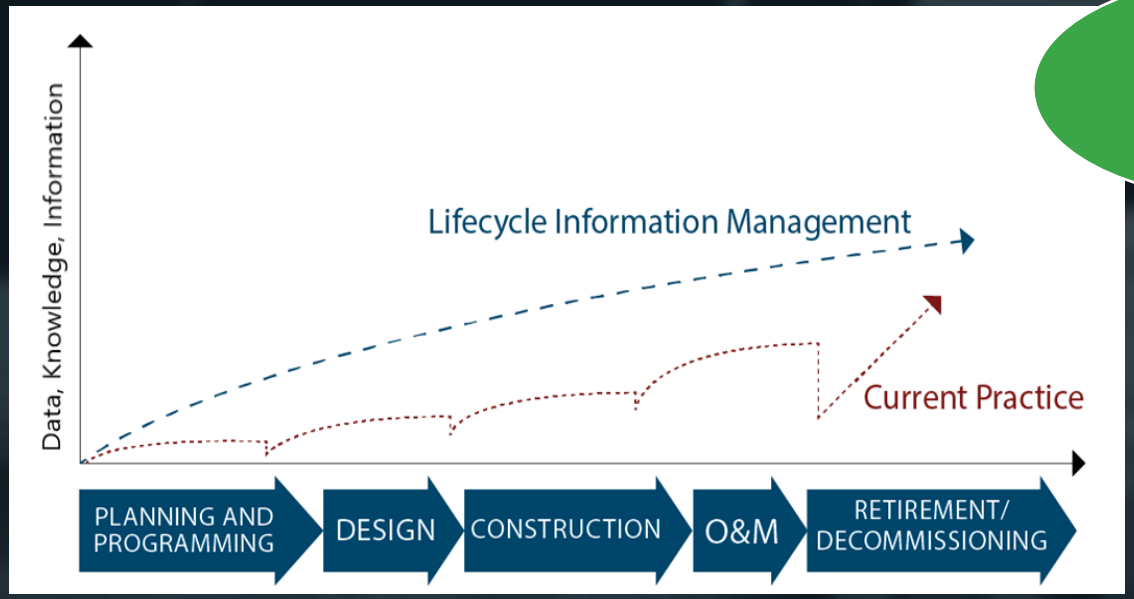
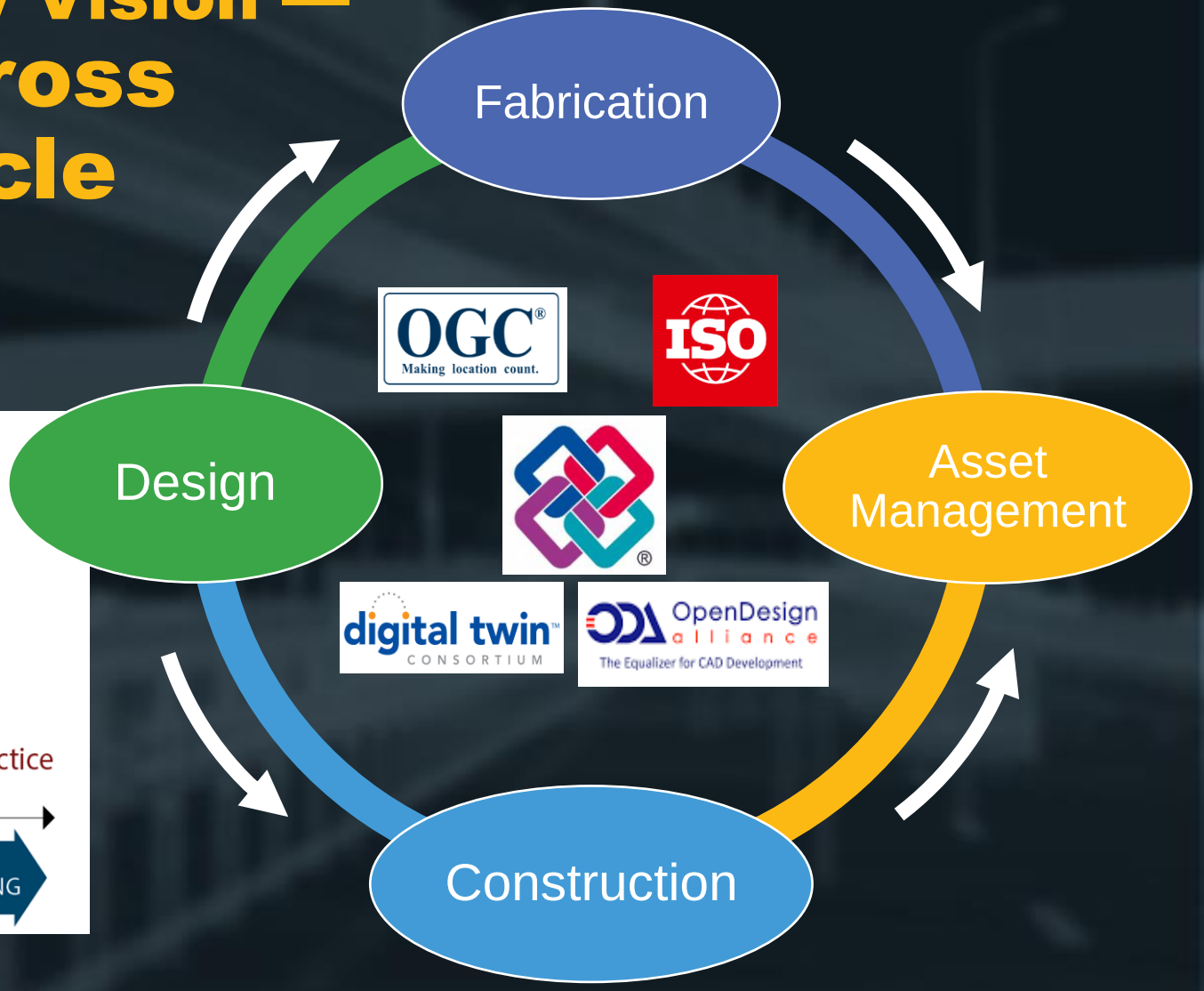
Transportation Industry Vision — Leverage Data Across the Project Lifecycle

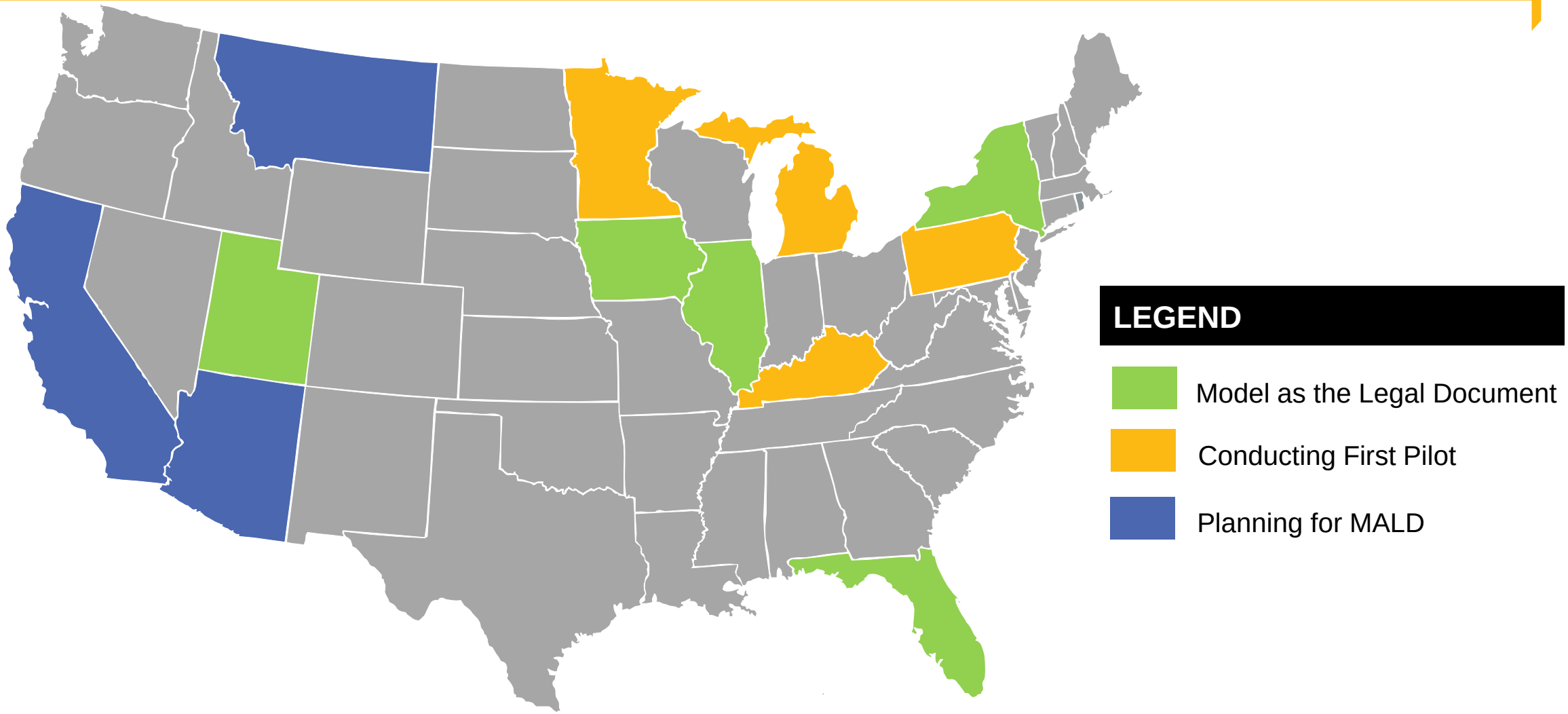




Source: FHWA, BIM for Infrastructure National Webinar 2/2/22

Model Based Digital Delivery

Model as the Legal Document



HOW IS RISK DIFFERENT WHEN USING BIM AS A CONTRACTUAL DELIVERABLE?

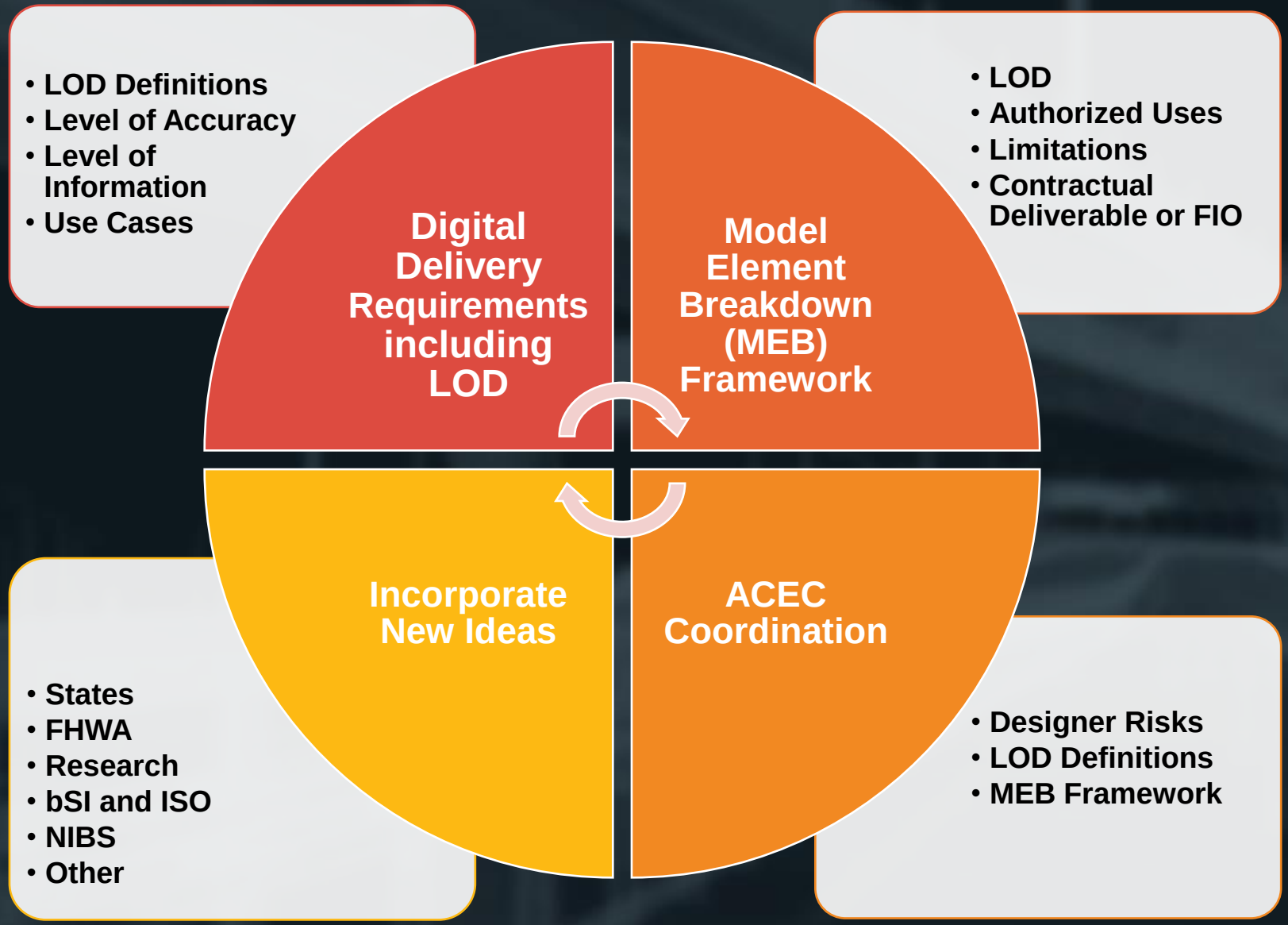
Top 5 Risks/Concerns for Consultants Model as the Legal Document

ACEC
American Council of Engineering Companies

- **DATA SECURITY** (CONTRACTURAL DELIVERABLES)
- **CLEAR DEFINITION OF MODEL ACCURACIES AND TOLERANCES**
- **QUALITY CONTROL PROCESS FOR 3D MODELS**
- **LACK OF CONTRACTOR EXPERIENCE** (3D MODEL INFORMATION)
- **INVESTMENT** (LEARNING CURVE, SOFTWARE, TRAINING)

Source: *ACEC Consultant Survey – February 2020*

Level of Development (LOD)



Designer Perspective

Digital Delivery Projects with Model as the Legal Document

Tyler Turner, Civil Science
Nicole Williams, Kimberly Horn
Gordon Green, Patel, Greene & Assoc.
Grant Schmitz, P.E., HDR

INCLUDING:

- Design Firm Presentations
- Q&A

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Introduction

George Lukes
Utah Department of Transportation

BIM FOR INFRASTRUCTURE

HIGHWAY ENGINEERING EXCHANGE PROGRAM

buildingSMART USA

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UDOT Keeping Utah Moving

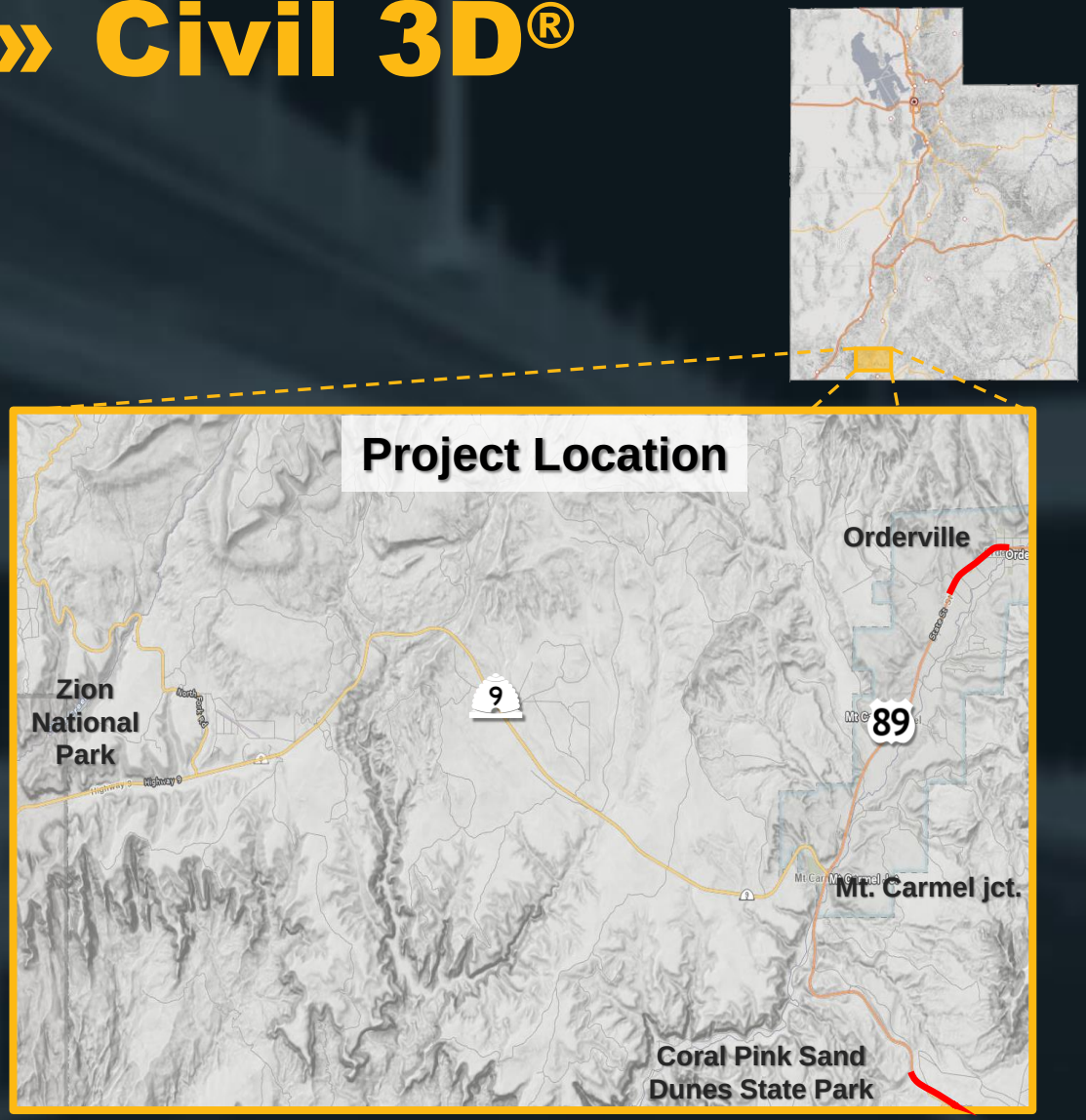
Design Firm Presentation

Tyler Turner
Civil Science

UDOT Pilot Project » Civil 3D®

Why Civil 3D® ?

- Software Agnostic – Implement UDOT's Digital Delivery Procedures and Model Development Standards with Limited Deviations
- Repeatable Process – Develop and Document MALD Processes and Standards for Civil 3D
- Office-to-Field – Improve Survey Data Workflow for Construction

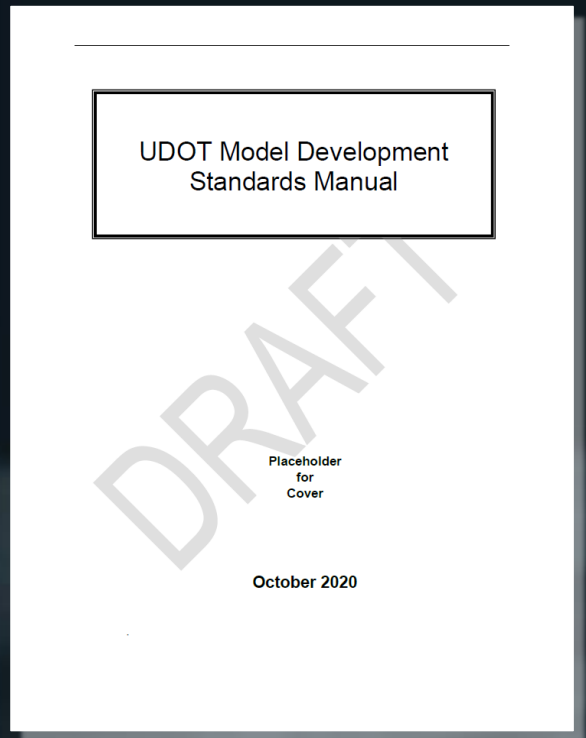


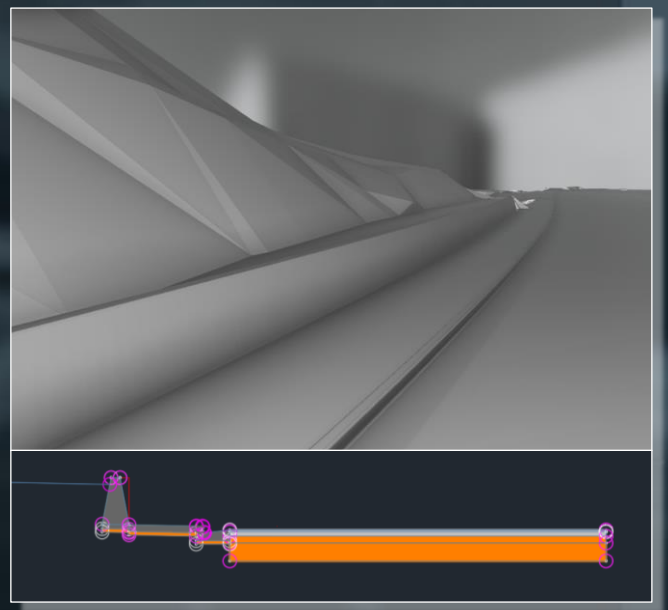
US-89; Orderville TWTLT & Sands Passing Lane

Procedures & Standards Adaptation

Bentley Workspace to
AutoCAD State Kit
Standards Development

Lessons Learned





US-89; Orderville TWTLT & Sands Passing Lane

Pilot Project » Team Effort

UDOT
Keeping Utah Moving

CivilScience
Design & EOR

Kiewit
File & Data Review
(Consumable for Construction)

AUTODESK
Software Support

Brown Brothers Construction
Prime Contractor

US-89; Orderville TWTLT & Sands Passing Lane

Digital Design Reviews

AUTODESK® BIM 360® DOCS

CREATED HOW-TO

- "How-To" Document for BIM 360 Review Workflow
- List of Review Documents with Content
- Training Videos

DESIGN REVIEW

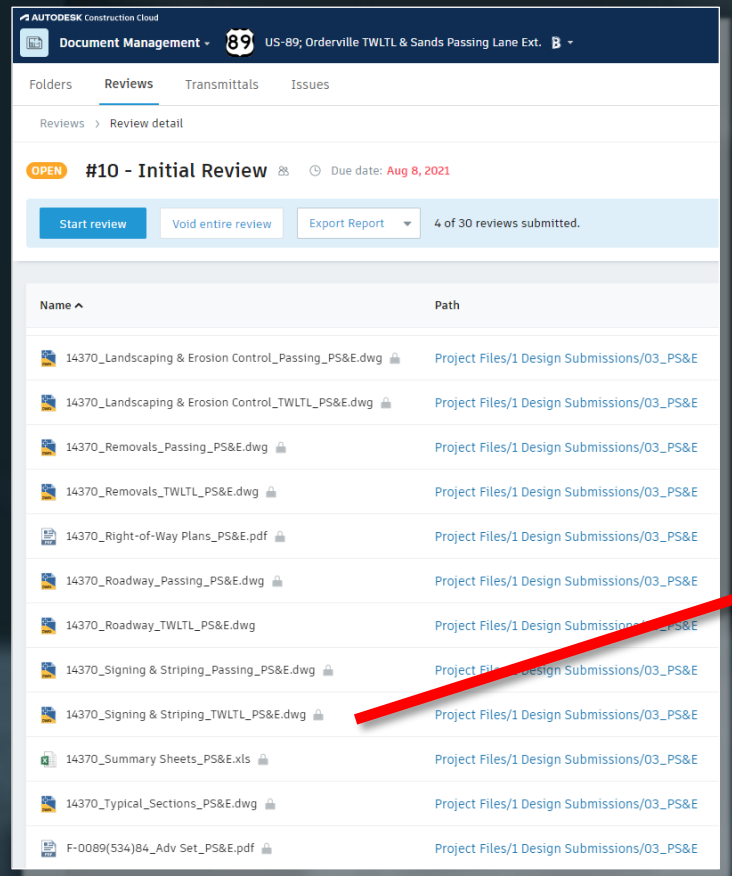
- Created Template to Follow Standard Review Procedures
- Provided Added Assistance to Reviewers
- Used as Internal Design QC Process

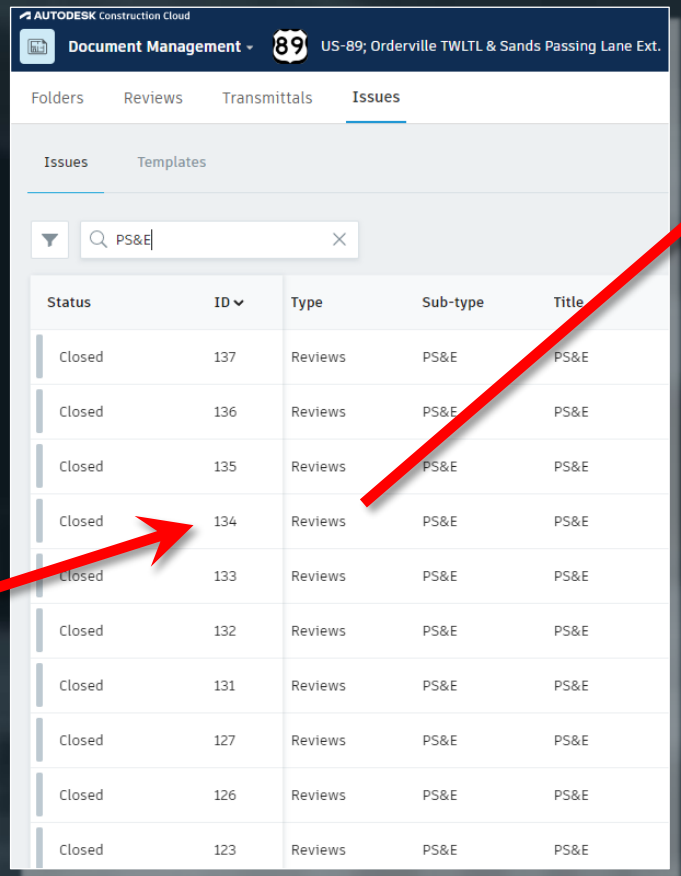
COMMENT RESOLUTION

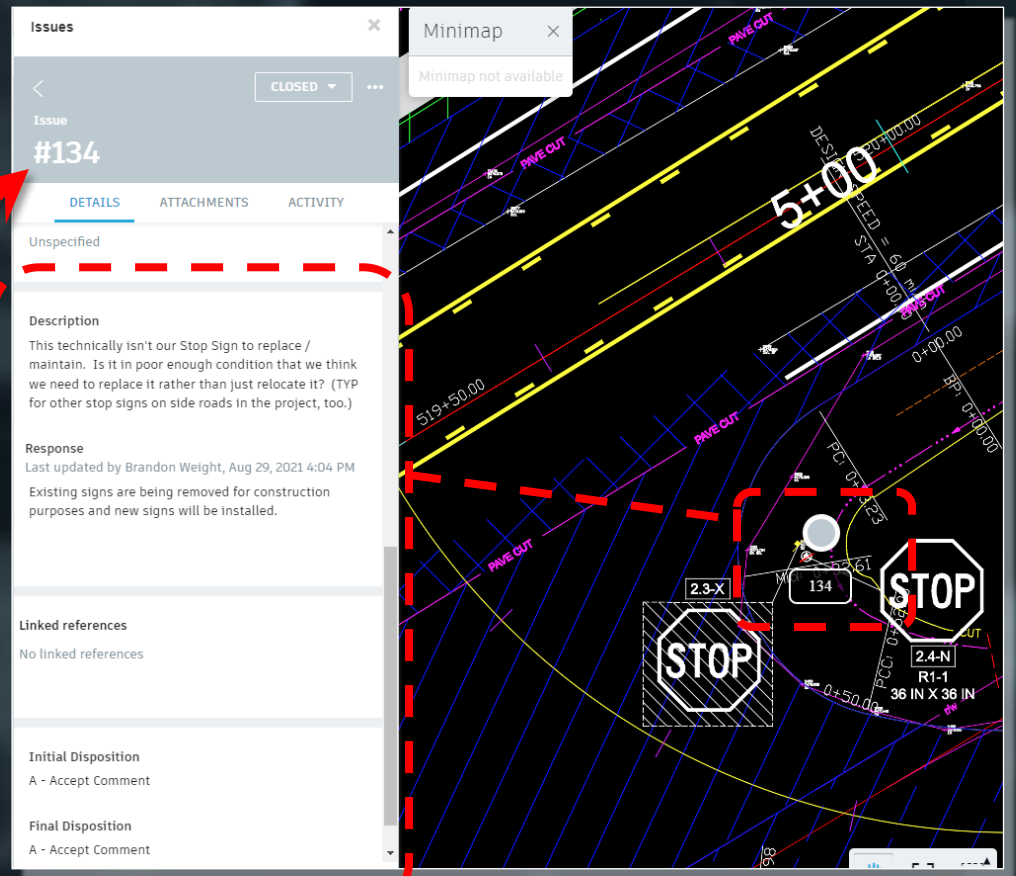
- Able to Review Comments (Issues) Digitally During Design Review Meetings
- Issues Exportable to Follow Typical Documentation Procedures

Digital Design Reviews

AUTODESK® BIM 360® DOCS







US-89; Orderville TWTLT & Sands Passing Lane

Design Firm Presentation

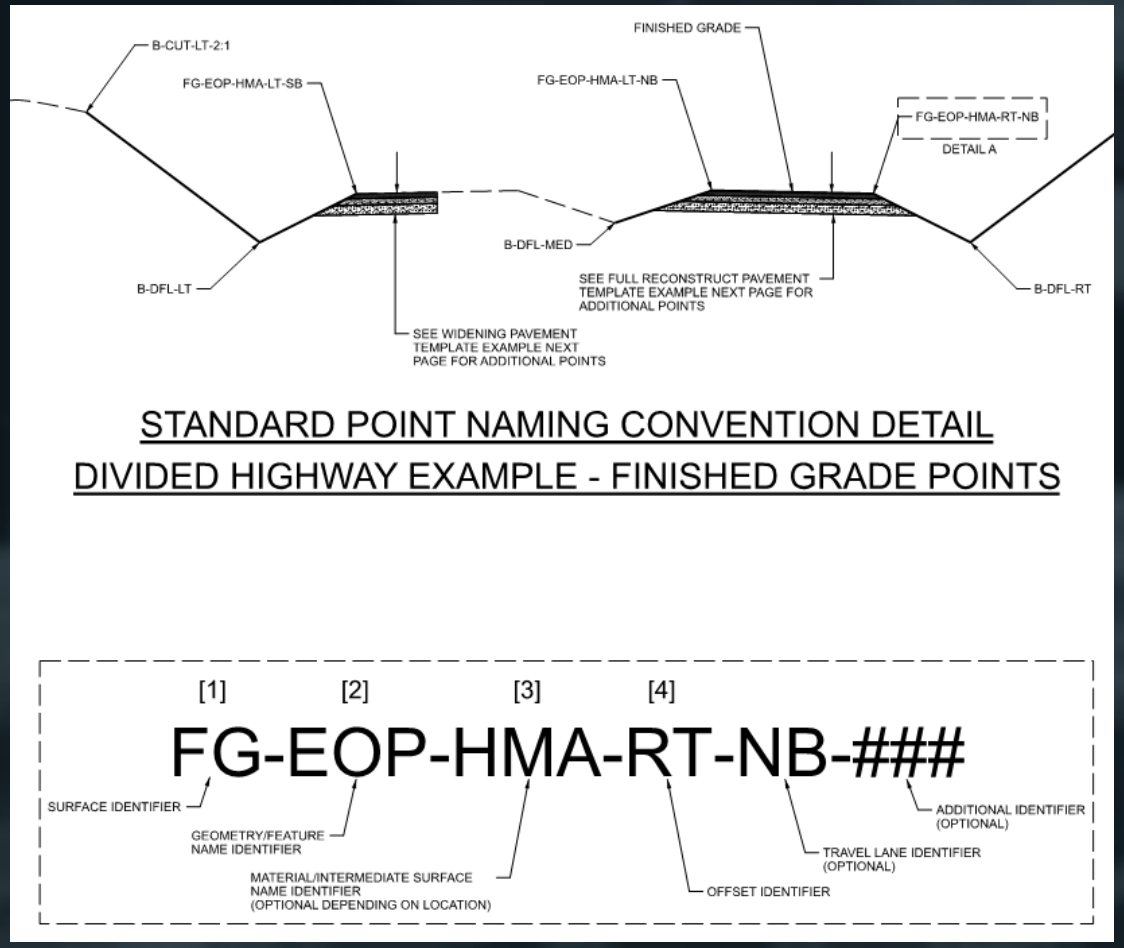
Nicole Williams
Kimberly Horn

Project Experience

Project Name/ Type/ Role	Const. Total ($)	Scope	DD Elements
I-80 Climbing Lanes / CMGC / PM	$20M	3.5 miles new truck climbing lane widening, noise wall	MALD, no plan sheets (except noise wall details)
SR-209 (9000 South) / DBB / PM	$13M	1-mile of urban widening from 5 to 7 lanes	MALD, no plan sheets
SR-36 Acceleration / CMGC / PM	$1.5M	1-mile new acceleration lane widening	MALD, no plan sheets
5600 West / DBB / Design Lead	$53M	3.5 miles of widening 5600 W from 2 to 5 lanes, new grade separated RR bridge, DDI retrofit at I-80 interchange	MALD, no plan sheets
SR-30 / DBB / QC	$50M	6 miles rural widening and reconstruction	MALD, plan sheets FIO
I-15 S/SF Interchange / DBB / Design Lead	$124M	New interchange on I-15 and 3 miles of widening 1600 S from 2 to 5 lanes	MALD, no plan sheets (except structures – traditional)

Challenges

- Translation between software



Solutions

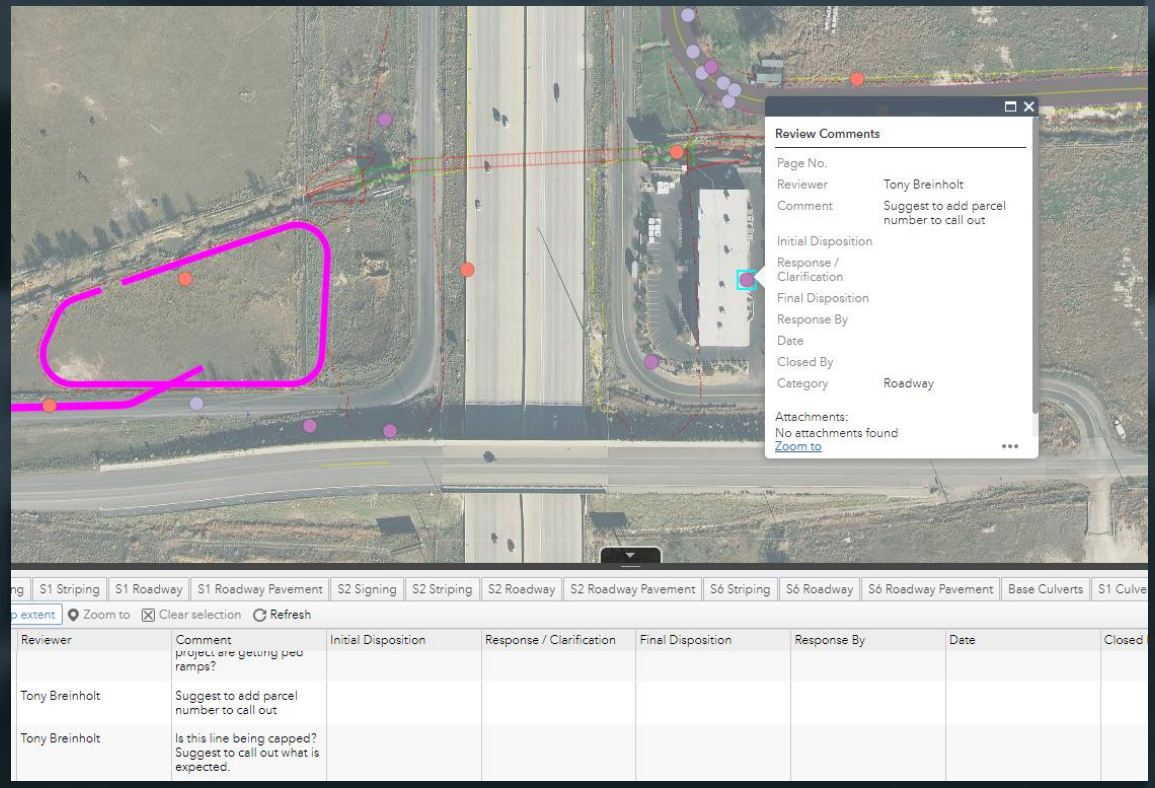
- Template Point Naming Convention ➡ 3D Breaklines
- File Naming Convention
- CADD Validation and FME GIS Conversion

Challenges

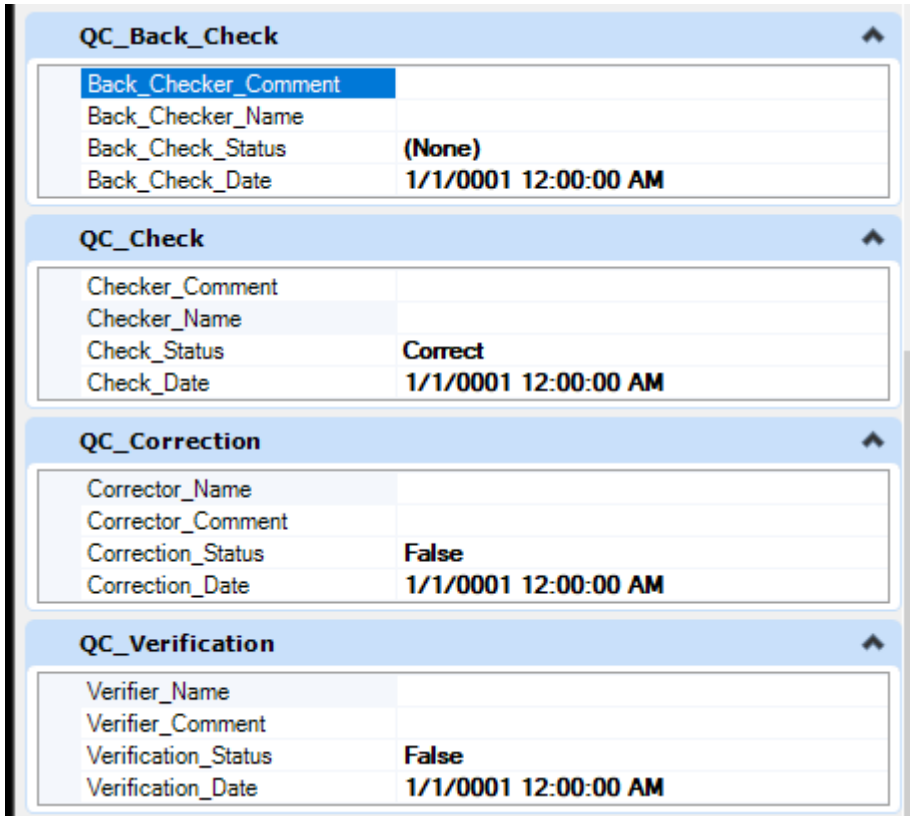
- Design Review for UDOT, Cities, Utility Owners, Key Stakeholders

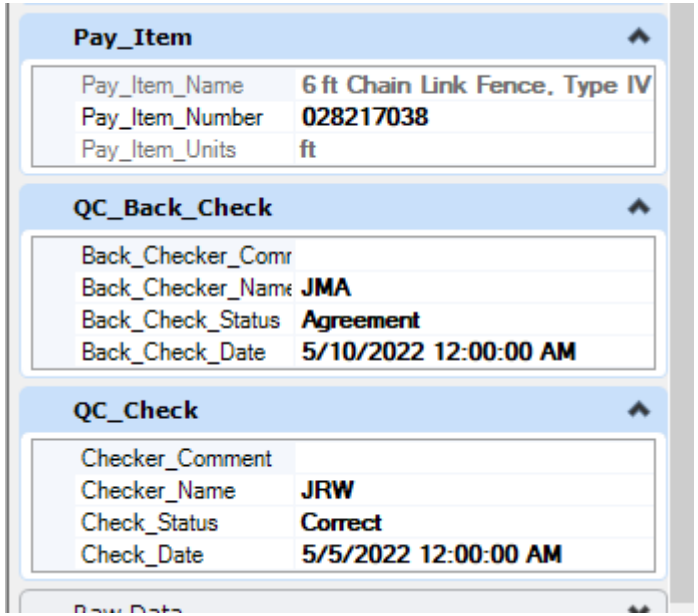
Solutions

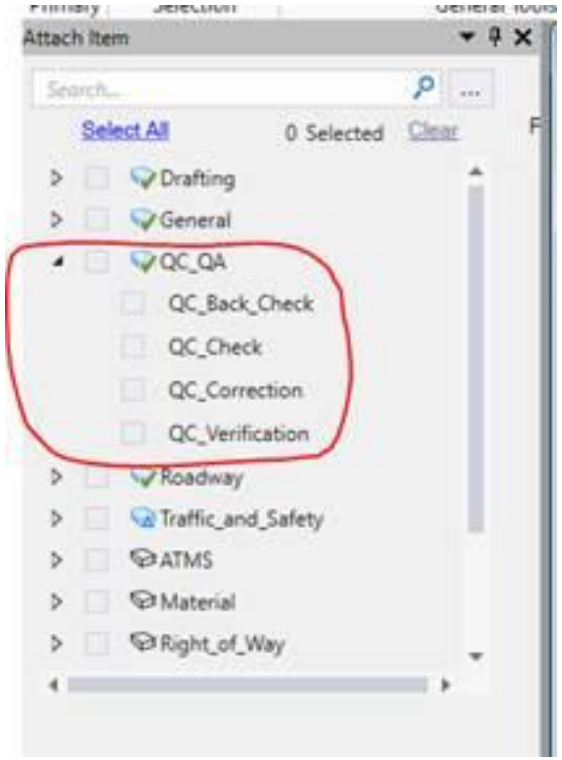
- Provided Trainings before review
- Developed PDFs, Google Earth (kmz) files and GIS maps



Quality Control







Other Things to Consider

- File Delivery ⇨ 3 Files (Plans, Specs, Estimate) to hundreds of files (.dgn, .xls, .dtm, .pdf, etc.)
- Clash Detection helps reduce change orders for subsurface conflicts
  - Utilities, streetlights, storm drain, signal poles, signs
- UDOT's Website: https://digitaldelivery.udot.utah.gov/
  - Digital Delivery Process Changes
  - ORD Workspace and Sample Package Downloads
  - Guidance Documents and Tips and Tricks
  - Training Videos
  - Validation and Conversion Tools

Design Firm Presentation

Gordon Greene
Patel, Greene & Associates, LLC

BIM FOR INFRASTRUCTURE

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PCA

Polk Parkway 3D/AMG Pilot Project

Basic Scope

- Milling and resurfacing and safety upgrades on Polk Parkway from MP 0-8
- Signing and Pavement Markings, Signalization, Lighting
- 3D survey provided, obtained using mobile LiDAR

3D and NexGen Plans

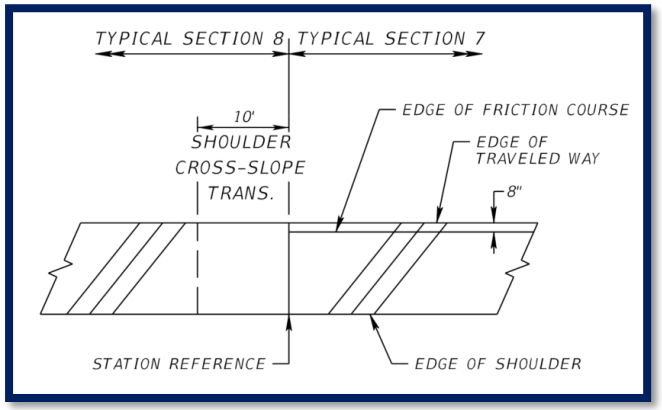
- Sign and seal 3D model for roadway and drainage
- Reduce the number of sheets that are produced
- Reduce the amount of labeling included in the plans
- Maintain a product that is biddable
- Maintain a product that is constructible

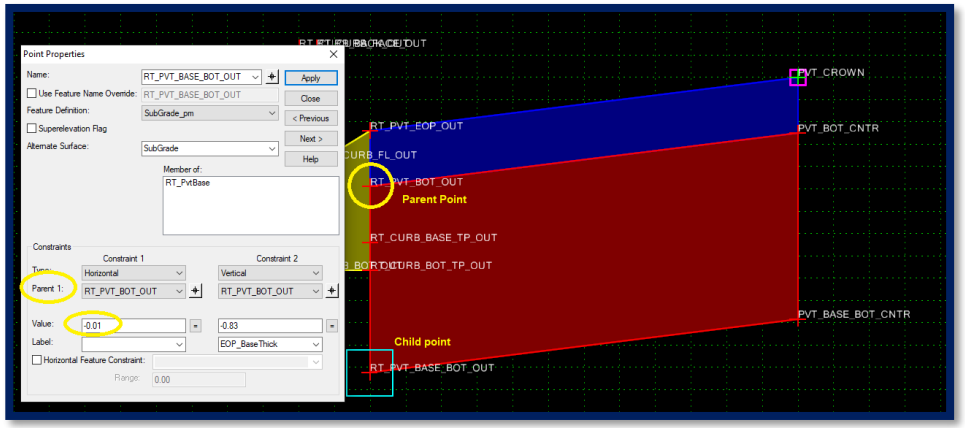
Automated Machine Guidance

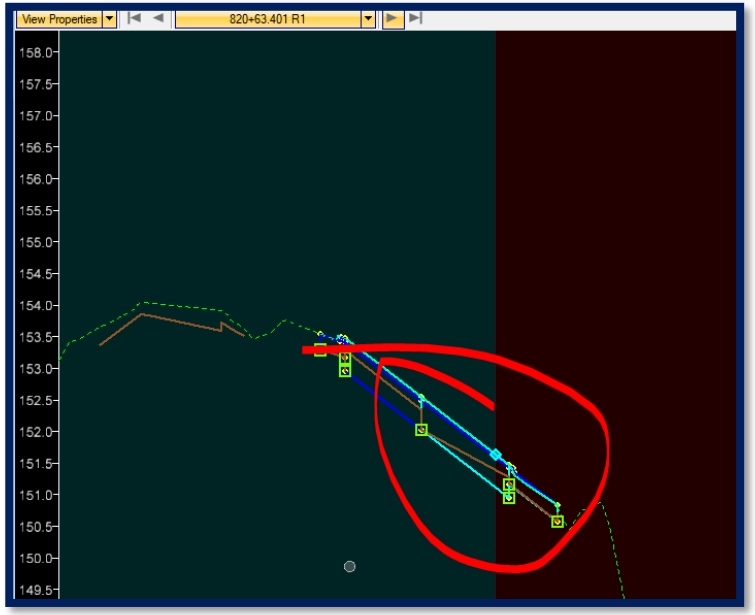
- Prepare modified special provisions (MSPs) that require the use of AMG during construction
- Consult with construction industry on development of AMG MSPs
- Realize a smoother pavement that is constructed in close conformance with the proposed design

Challenges with MALD

- Simple details require detailed modeling
- No vertical faces for XML conversions
- Additional QC required for XML surfaces

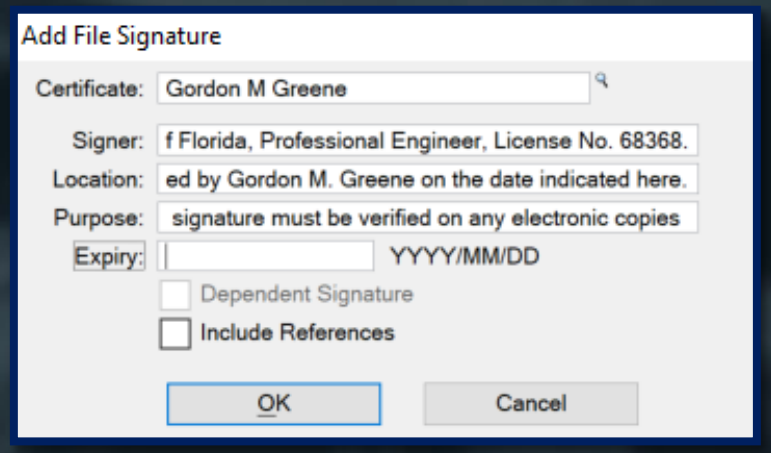






Challenges with MALD

- Bentley digital signature tool buggy and not set up to accommodate required language
  - No batch signing
- FDOT tools for XML signing much better
- FDOT now puts manifest on Signature Sheet in the plans

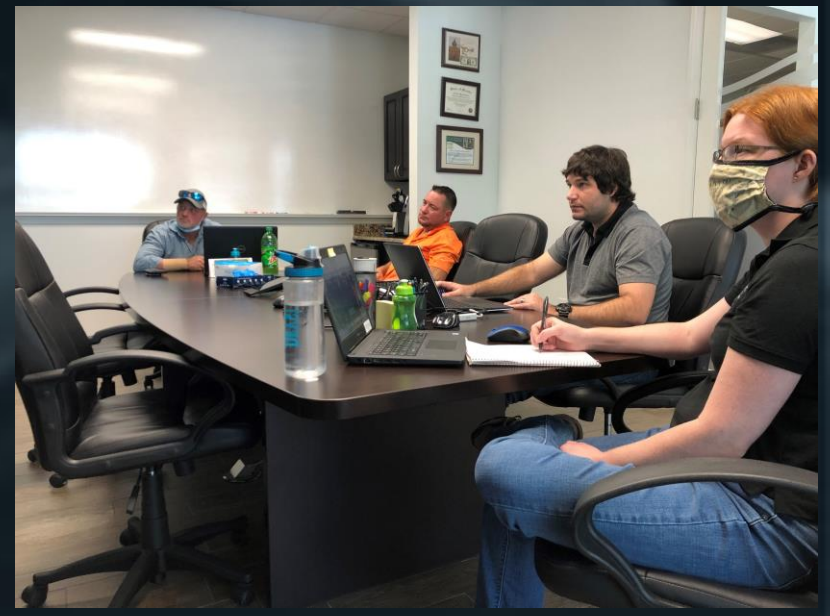


Construction Lessons Learned

- AMG Performance: Milling vs. Paving
  - Milling very responsive and accurate
  - Paving less responsive, ride can suffer
  - “Match existing” and superelevation transition areas challenging for paver
- Lessons Learned
  - AMG for correction only
  - AMG for milling only

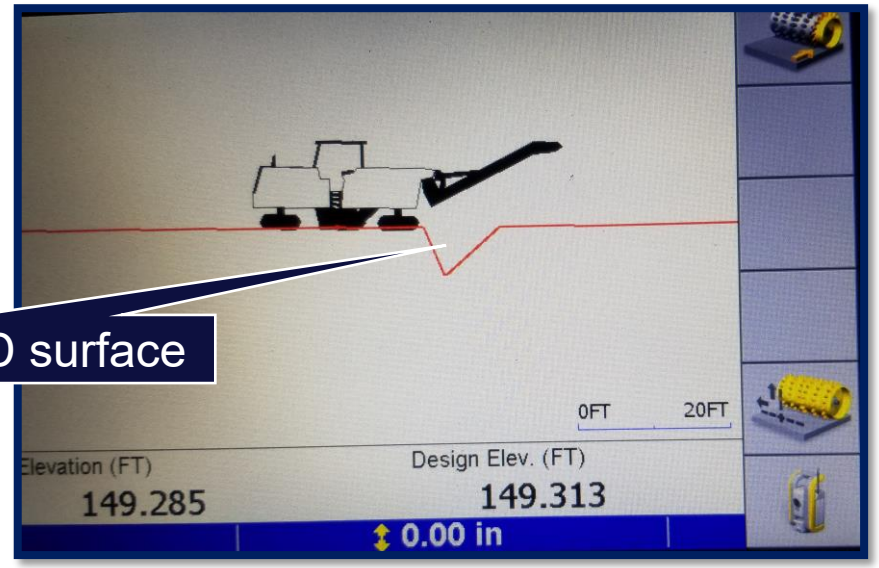
Construction Lessons Learned

- Data Interoperability
  - S&S XML files had to be converted by Contractor's vendor
  - Ideally, our S&S deliverables should feed right in
- Model Review by Contractor
  - Construction staff very limited (to zero) CADD proficiency
  - Crash course in MicroStation to CEI staff
  - Attempted to use Bentley i-models

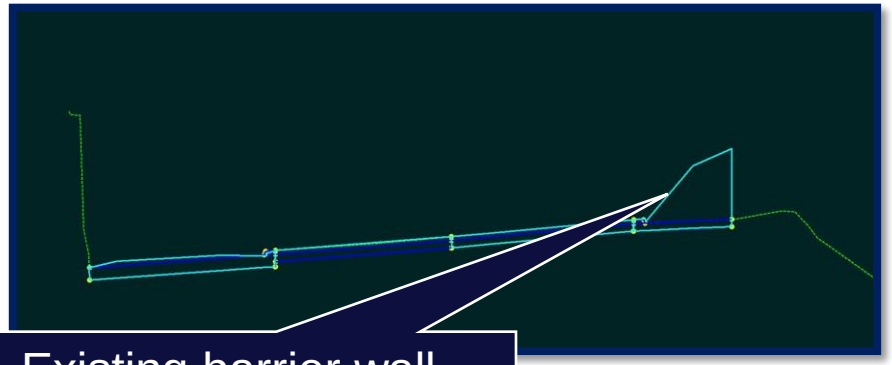


Construction Lessons Learned

- "Holes" in the 3D Model
  - Occurred at template transitions
  - Contractor turned off AMG to cross
- Survey Anomalies
  - Occurred primarily at bridge approaches
- Lesson Learned
  - Include profile check in QC process
  - Pay special attention to the edges of the DTM



"Hole" in the 3D surface



Existing barrier wall confused with pavement

Design Firm Presentation

Grant Schmitz, P.E.
HDR

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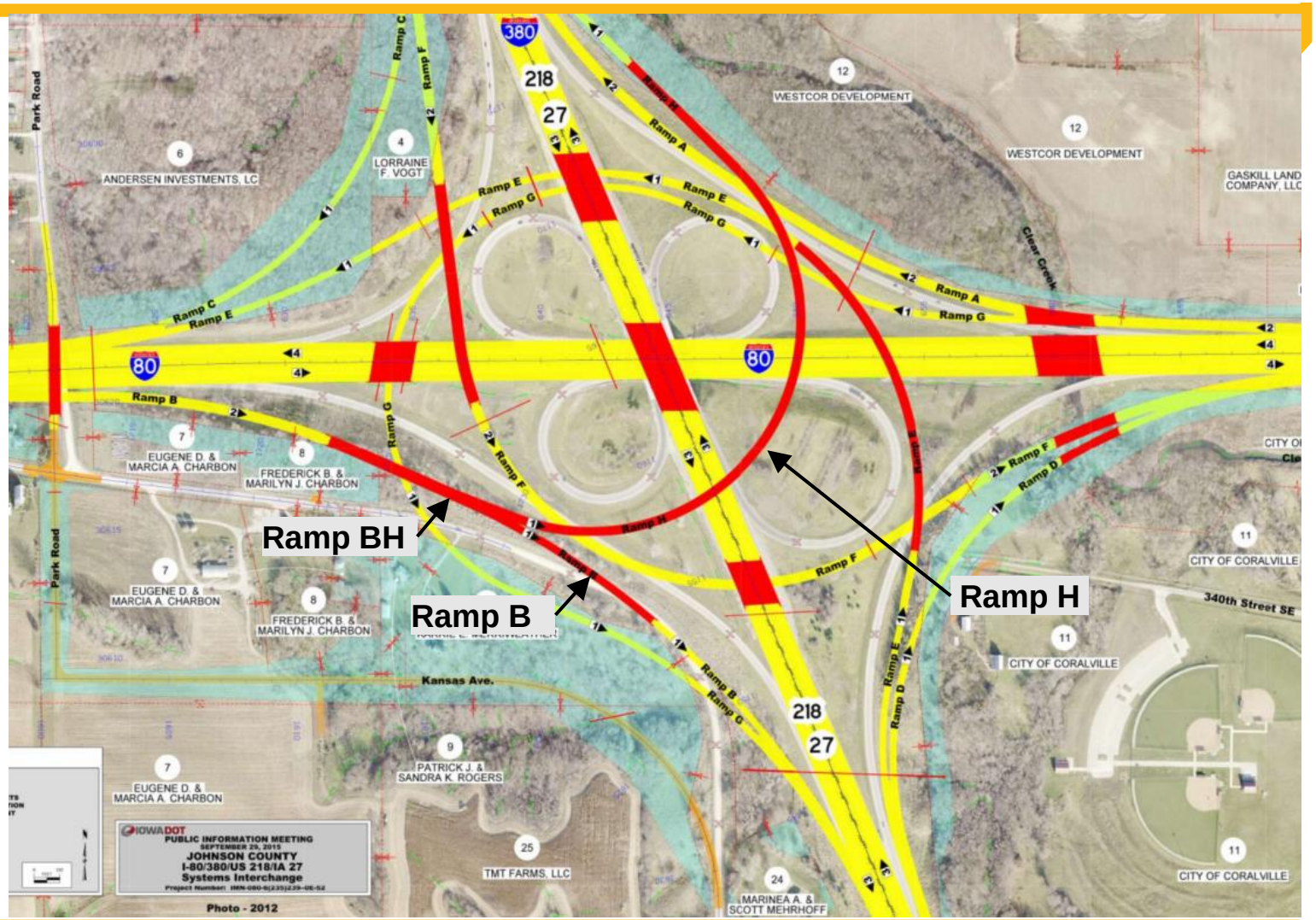
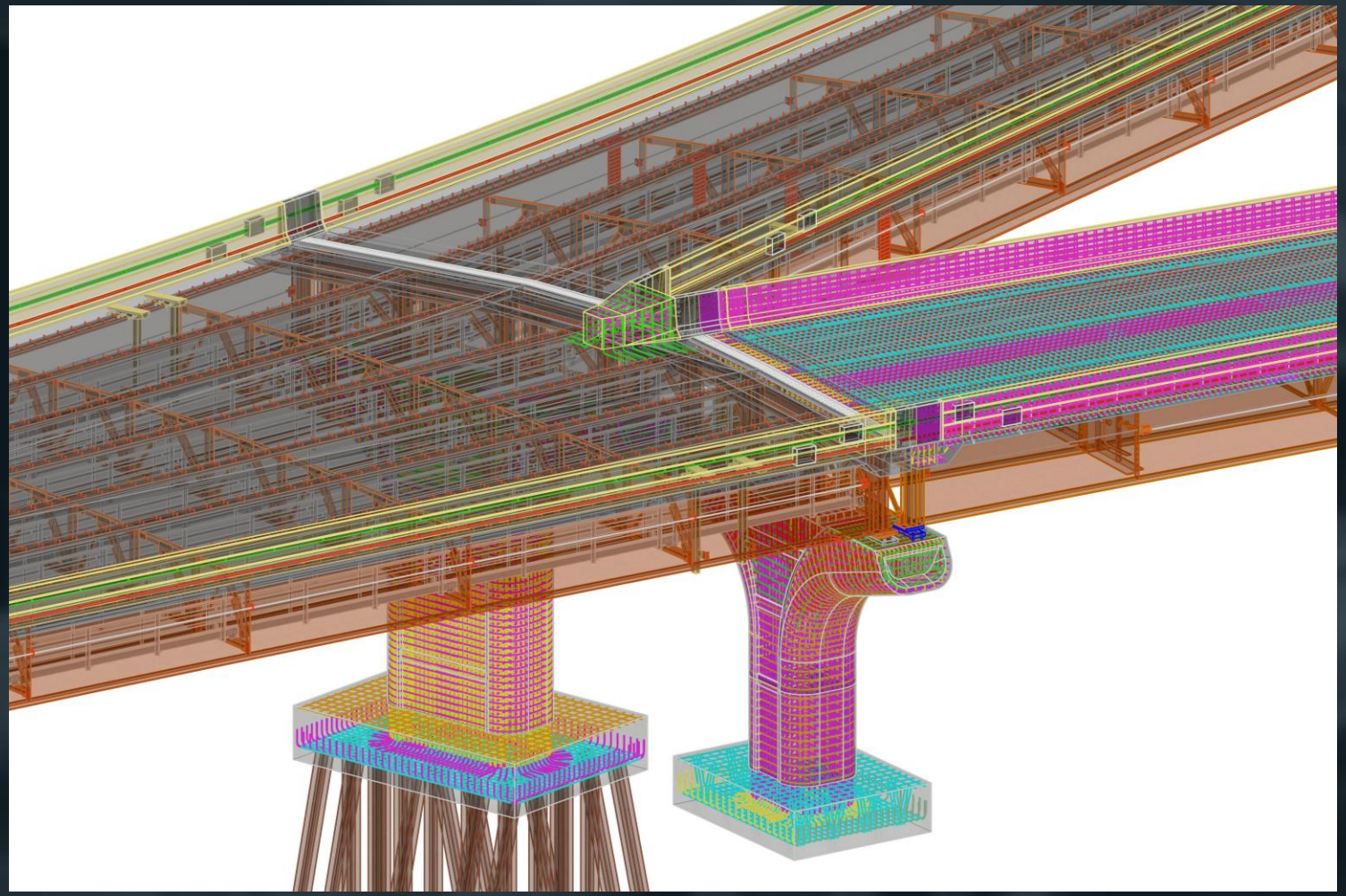
Iowa DOT BIM Pilot Project

Bridge Features

- Steel Plate Girder
- Total Length = 4,200 FT
- Diverging Gore
- Discontinuous Girders
- Complex Superelevation
- Inspection Walkways
- Aesthetic Substructure and Barrier Elements



Iowa DOT BIM Pilot Project



Develop BIM Model

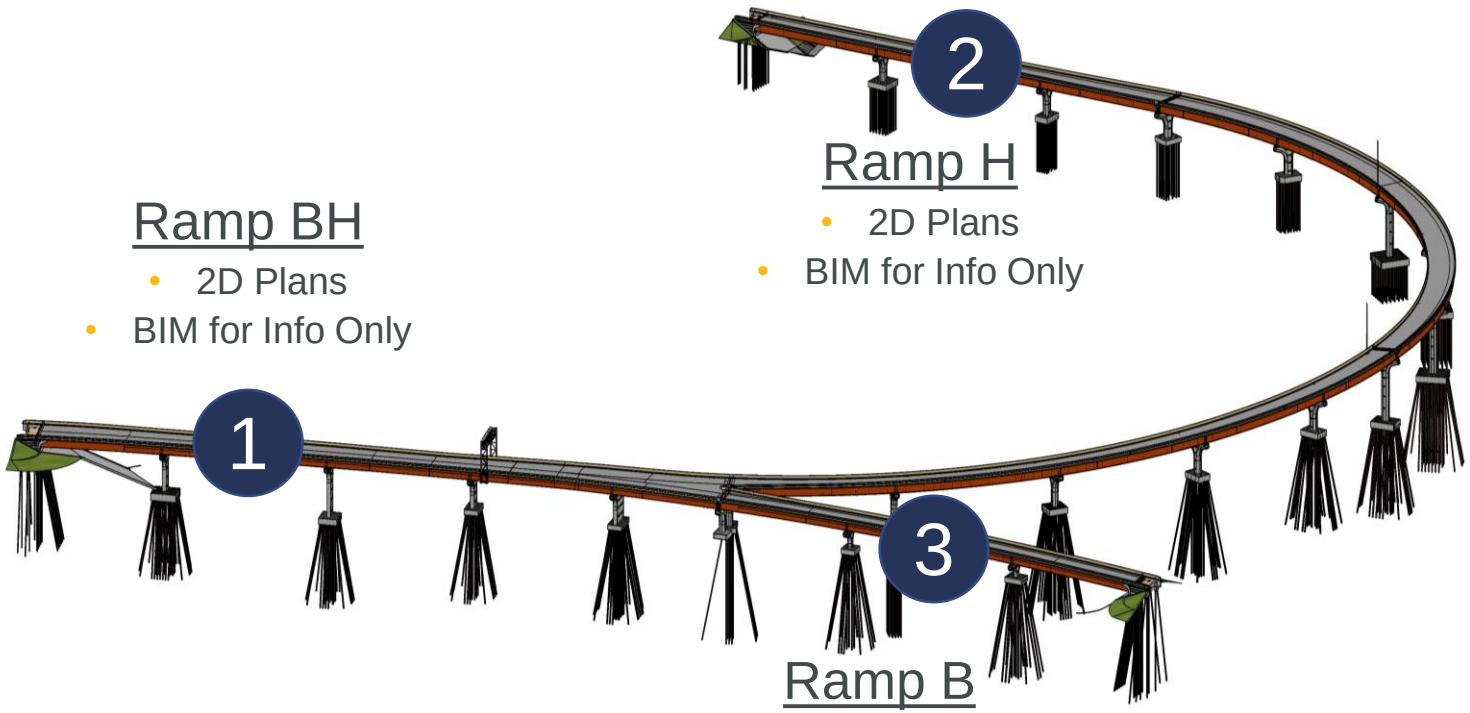
- As Complete as Possible

Evaluate Bentley Software

- OpenBridge Modeler
- ProStructures
- Navigator Connect

Encourage Contractor Use

Iowa DOT BIM Pilot Project



Ramp BH
- 2D Plans
- BIM for Info Only

Ramp H
- 2D Plans
- BIM for Info Only

Ramp B
- BIM Deliverable

BIM Method of Delivery

- Combination of “For Information Only” and MALD
- Satisfies Goals of Contractor Engagement
- Use of BIM as the Legal Document Encouraged by Local Contractors
- Signing and Sealing of the Model Handled Through Special Provision
- Design/Bid/Build Project
- Designer Led Training Sessions Before Advertisement Period

Iowa DOT BIM Pilot Project

Contractor Feedback:

- Construction Completed in Fall 2020
- Used Repeatedly for Visualization
- Challenges Pulling Certain Information from Model
- Difficulty working with iPads/Laptops in lieu of 2D plans

Post Construction Uses:

- Designer Updated Model to include As-Built Information
- Explore Options for Utilizing Model for Asset Management

Iowa DOT BIM Pilot Project

Digital As-Builts

- Received STIC Funding to Incorporate As-Builts
- Objectives
  - Update Model Elements
  - Incorporate non-model-based data
  - Explore options to ensure future accessibility

Updated Model Elements
• Pier Elevations • Disc Bearings, Anchor Bolts & Wells • Girder Haunch Reinforcing • Survey Pins

Linked Construction Documentation
• Shop Drawings • Material Certifications • Construction Photos • RFIs • Special Provisions • Developmental Specifications

Questions & Answers

George Lukes
Utah Department of Transportation

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PANEL DISCUSSION

Digital Delivery Design with Model as the Legal Document

MODERATORS:

George Lukes, Utah DOT

Alexa Mitchell, HDR

INCLUDING:

- Introduction
- Panel Discussion
- Q&A

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UDOT Keeping Utah Moving

Our Panelists

Tyler Turner
Civil Science

Nicole Williams
Kimberly Horn

Gordon Green
Patel Green

Grant Schmitz
HDR

Questions & Answers

George Lukes, Utah DOT

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Wrap Up

Matt Reiffer

ACEC

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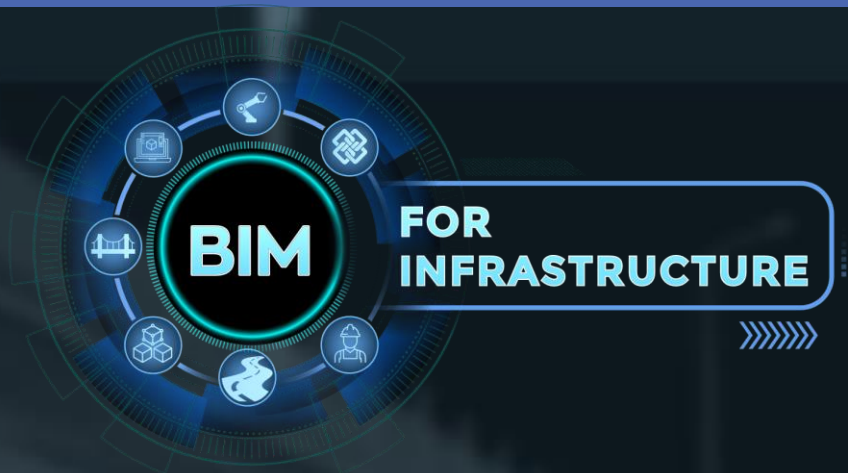
ACEC AMERICAN COUNCIL OF ENGINEERING COMPANIES

Future Webinars



- Quarterly Events Planned
- Future Topics Include –
  - Contractor Perspective – Digital Delivery Projects
  - BIM Transportation Pooled Fund Updates
  - JTCEES Updates
  - Digital Delivery
  - Digital Construction
  - Digital As-Builts
  - Asset Management
  - Digital Twins
- All registered participants will receive an invitation for future events

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The Highway Engineering Exchange Program (HEEP)

Promotes use of technology in the transportation engineering industry
Through **peer** exchange of:

Knowledge **Experience** **Best practices**

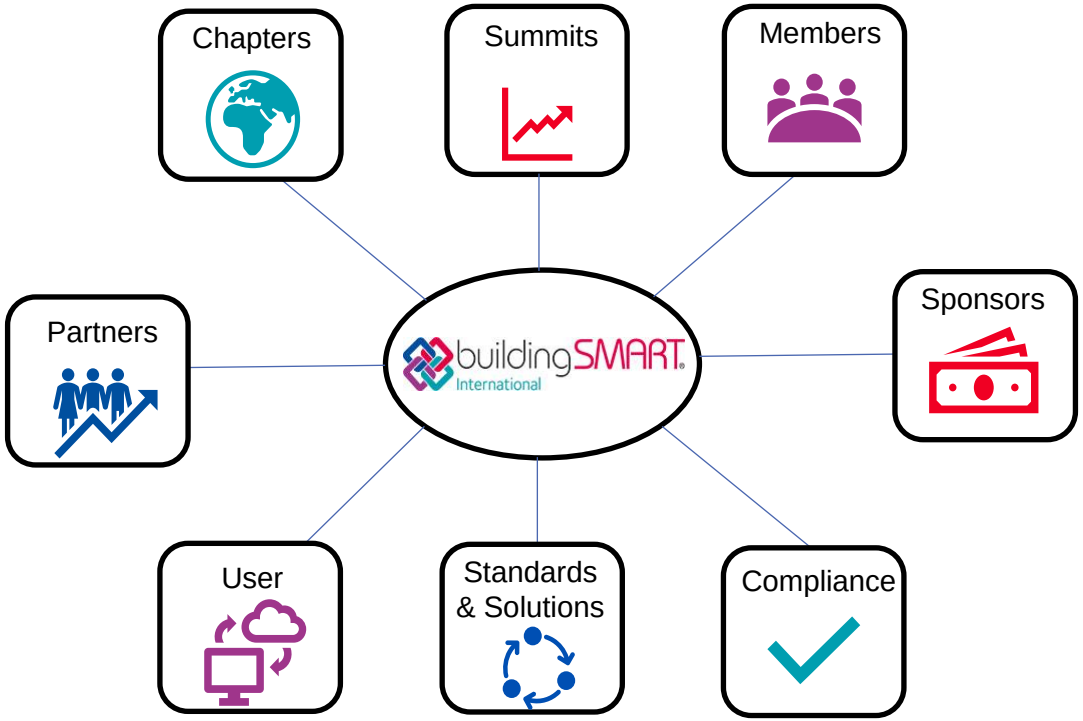
- 60+ years
- Non-profit International Organization
- Forum for Civil Engineers and IT Professional
- Managed by its members elected from the Transportation Agencies
- No membership fees

For more information visit WWW.HEEP.ORG

Sponsors and Collaborators

buildingSMART International

Mission: Enable full benefits from digital ways of working in the built asset industry through use of international open standards



buildingSMART USA

Mission: Engage US industry stakeholders

Website:
www.buildingSMARTusa.org

Email:
USA@buildingSMART.org

LinkedIn:
buildingSMART-USA

Sponsors and Collaborators

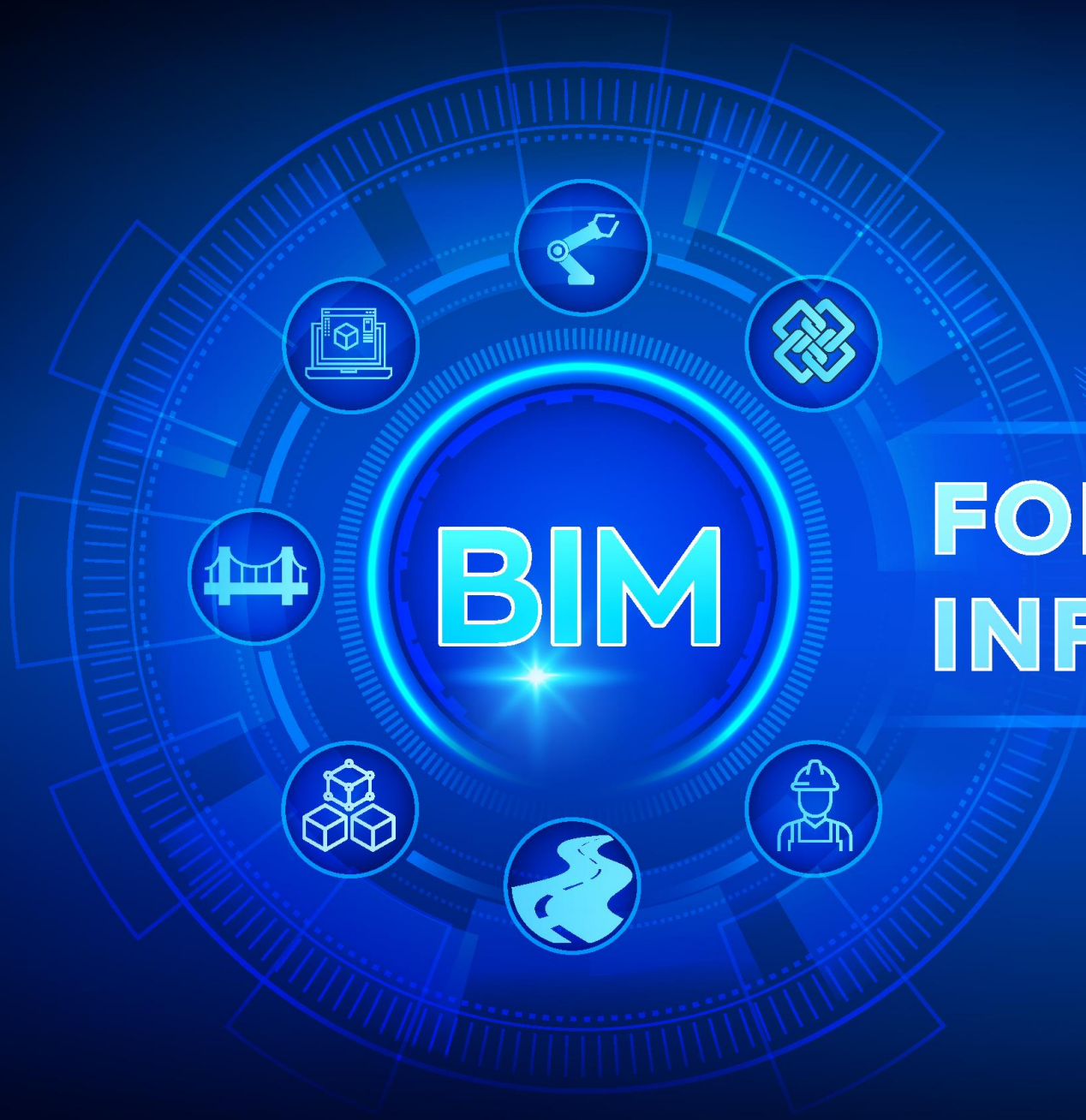
TRB AED80(1) - BIM for Infrastructure Sub-Committee

Fostering Applied Research and Development for the Implementation of BIM for Infrastructure within the Transportation Industry

Focus Groups

- BIM - Highway Project Delivery-Design/Survey/Construction
- BIM - Asset Management/Operations & Maintenance
- BIM - Rail/Transit/Aviation/Marine Project Delivery
- BIM - Digital Delivery/Open Standards
- BIM - Performance/Data Analytics/AI
- BIM - Data Governance/Data Management/Big Data

https://www.trbviz.org



FOR INFRASTRUCTURE