Transportation Asset Management Webinar Series

Webinar 57

TAM Tools Webinar Miniseries

Webinar 4: Techniques

Sponsored by FHWA and AASHTO

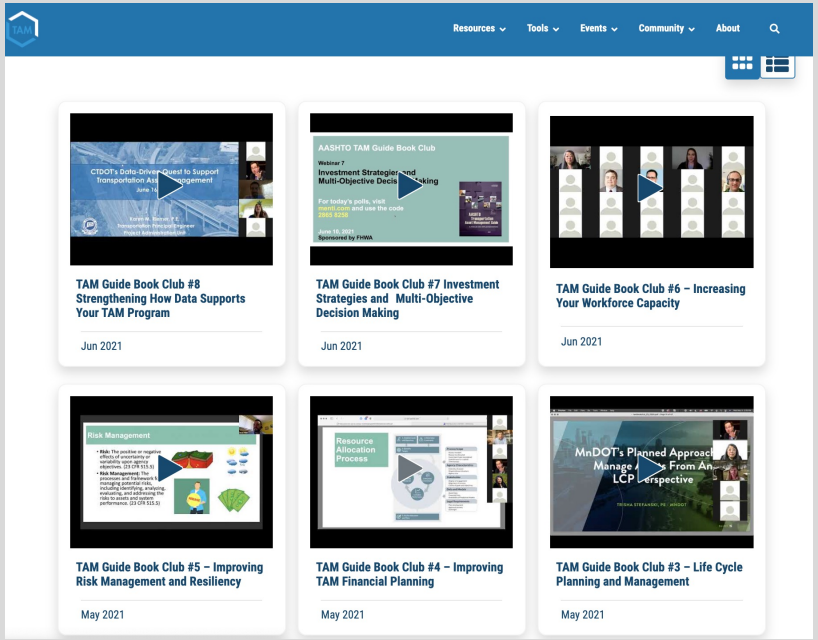
U.S. Department of Transportation
Federal Highway Administration

AASHTO
The Voice of Transportation

May 12, 2022

FHWA/AASHTO Asset Management Webinar Series

- The TAM Webinar Series has been running since 2012
- **Special miniseries on TAM Tools**
  - Regular bi-monthly webinars resume in July
- We welcome ideas for future webinar topics and presentations
- Submit your questions via the webinar's chat feature



Welcome

FHWA and the AASHTO Sub-Committee on Asset Management are pleased to sponsor this webinar series

Sharing knowledge is a critical component of advancing asset management practice

Webinar Objectives

- Raise awareness of the roll of strong processes and practices in supporting effective use of asset management tools
- Understand how and why TAM tools are being used today by transportation agencies
- To hear from the TAM community

Webinar Agenda

2:00 **Welcome and Introduction**
Matt Hardy, AASHTO, Tashia Clemons, FHWA and Hyun-A Park, Spy Pond Partners

2:20 **TAM Tools Presentations**

TRB Standing Committee on Visualization in Transportation
Charles R. Lattimer, UMD CATT Lab

TAM Data and Information System Investments
Matt Haubrich, Iowa DOT

Bridge and Pavement Dashboards
Sage Donaldson, Arizona DOT

Asset Update Tracking Dashboard
Joshua Lafond, New Hampshire DOT

Caltrans MPO Coordination
Michael Johnson, Caltrans

3:10 **Q&A and Dialogue**
Matt Haubrich

3:30 **Wrap-Up**

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Menti Poll

Visit Menti.com and enter the code:

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TRB Standing Committee on Visualization in Transportation

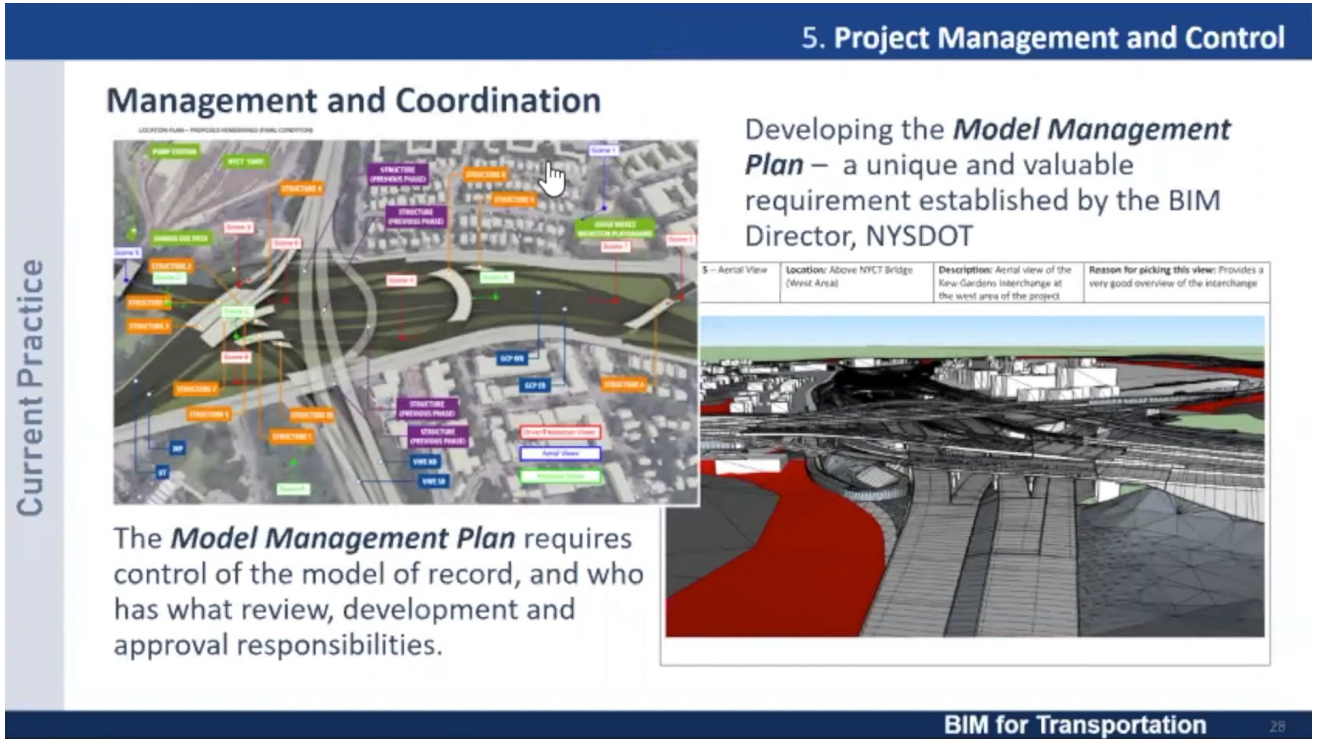
Charles R. Lattimer, PE, PMP – Vice Chair, AED80
CATT Laboratory (University of Maryland)
Lattimer@umd.edu

About the Committee

- Our goal: to use visualization to identify and address critical transportation issues of today, and to develop innovative visualization approaches to meet society's transportation needs of the future.

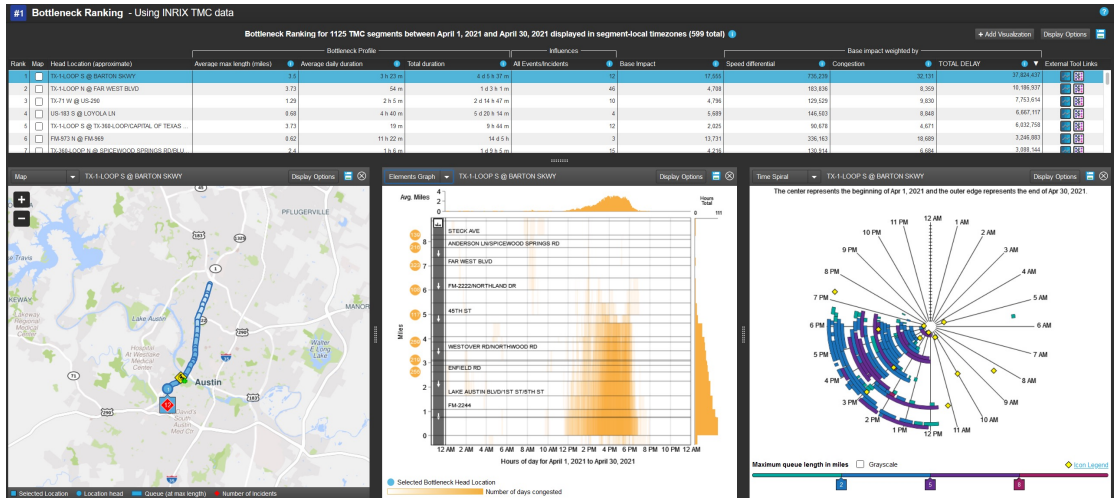
Subcommittee on Building Information Modeling (BIM) for Infrastructure

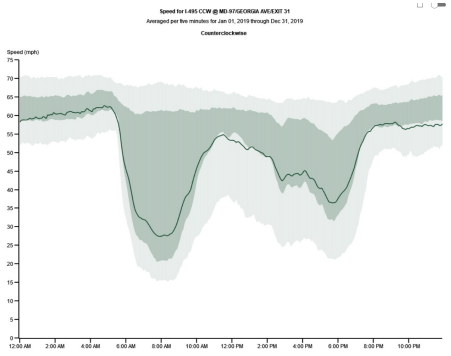
- To implement and integrate BIM into the entire transportation infrastructure project delivery and lifecycle asset management process. Identify ways to help guide and inform transportation agencies on how to implement the technology.

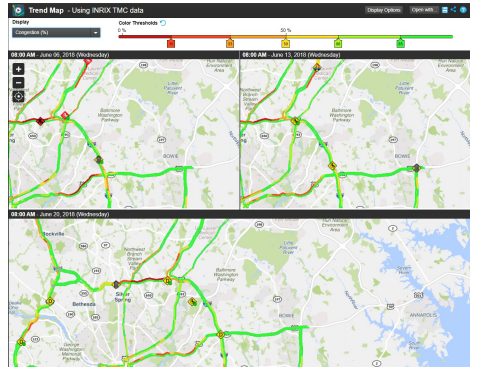


Subcommittee on Performance Visualization

- To disseminate effective visualization strategies to communicate the performance and management of all transportation modes.

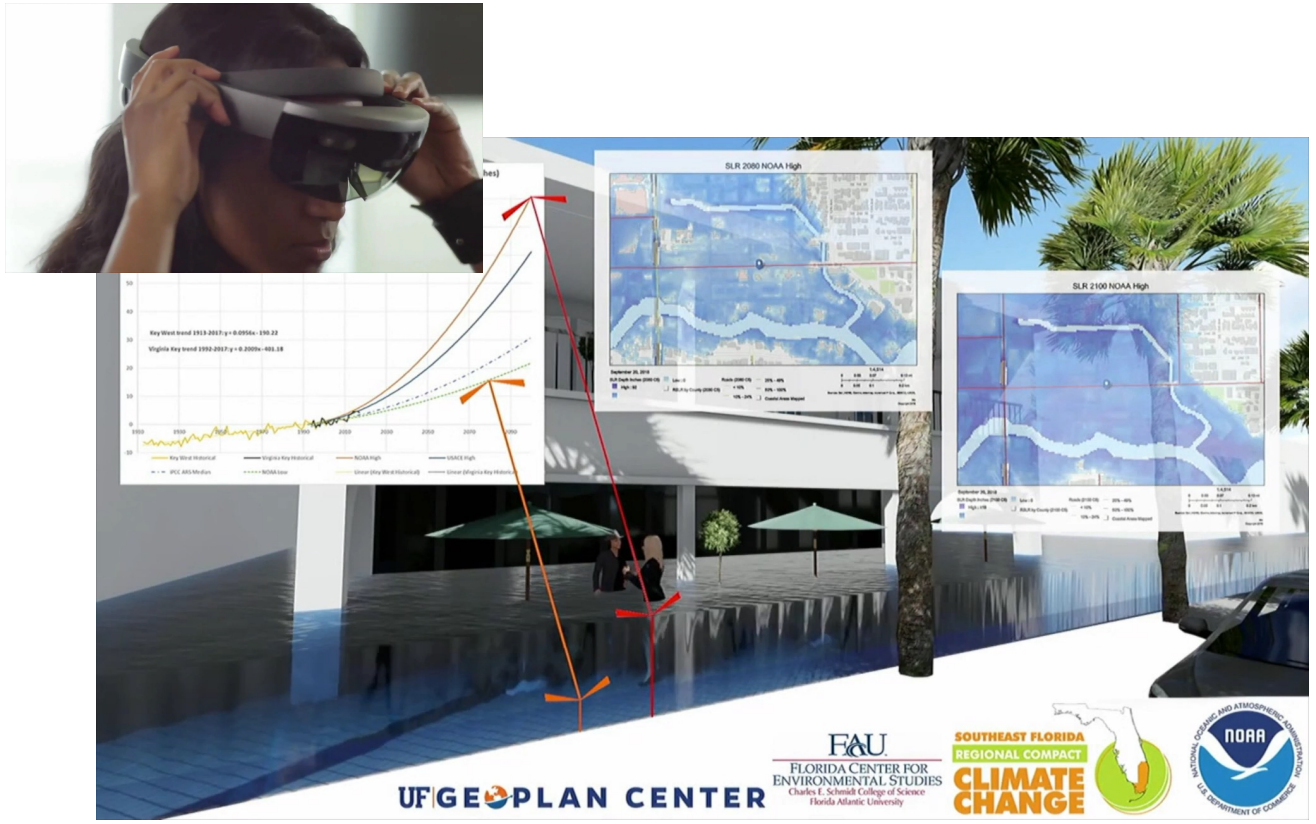






Subcommittee on Interactive Visual Simulation

- To disseminate effective uses of interactive communication through visual tools that engage users in the process of learning and discovery.

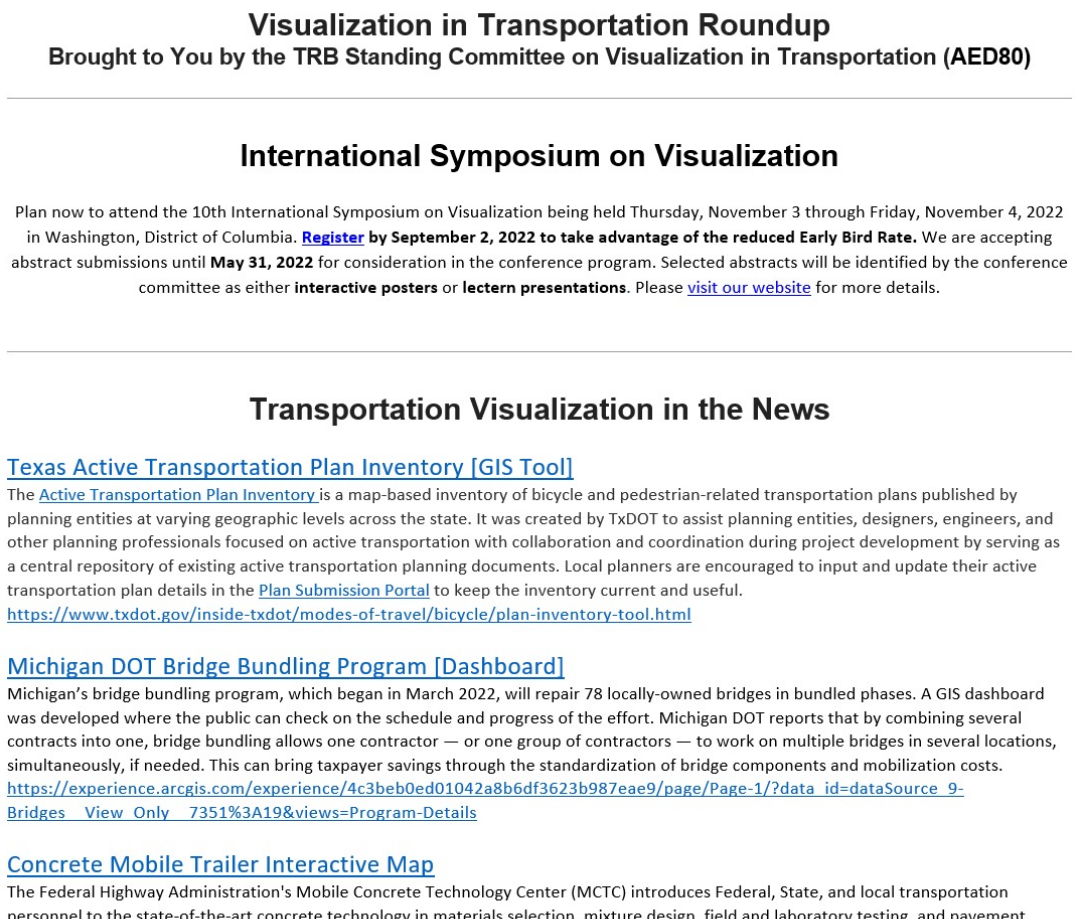


Webinars

- Visualizing Transportation System Performance
- Visualizing Effects of COVID-19 on Transportation: A One-Year Retrospective
- Delivering Bridge Projects with Building Information Modeling (BIM)
- Visualization for Transportation Decision-Making, Operations, and Safety

Visualization Roundup

- Monthly e-newsletter featuring transportation visualization in the news
- Contact Lattimer@umd.edu to be added to our list!



Visualization in Transportation Roundup
Brought to You by the TRB Standing Committee on Visualization in Transportation (AED80)

International Symposium on Visualization

Plan now to attend the 10th International Symposium on Visualization being held Thursday, November 3 through Friday, November 4, 2022 in Washington, District of Columbia. **Register by September 2, 2022 to take advantage of the reduced Early Bird Rate.** We are accepting abstract submissions until **May 31, 2022** for consideration in the conference program. Selected abstracts will be identified by the conference committee as either **interactive posters** or **lectern presentations**. Please visit our website for more details.

Transportation Visualization in the News

Texas Active Transportation Plan Inventory [GIS Tool]
The Active Transportation Plan Inventory is a map-based inventory of bicycle and pedestrian-related transportation plans published by planning entities at varying geographic levels across the state. It was created by TxDOT to assist planning entities, designers, engineers, and other planning professionals focused on active transportation with collaboration and coordination during project development by serving as a central repository of existing active transportation planning documents. Local planners are encouraged to input and update their active transportation plan details in the Plan Submission Portal to keep the inventory current and useful.
https://www.txdot.gov/inside-txdot/modes-of-travel/bicycle/plan-inventory-tool.html

Michigan DOT Bridge Bundling Program [Dashboard]
Michigan's bridge bundling program, which began in March 2022, will repair 78 locally-owned bridges in bundled phases. A GIS dashboard was developed where the public can check on the schedule and progress of the effort. Michigan DOT reports that by combining several contracts into one, bridge bundling allows one contractor — or one group of contractors — to work on multiple bridges in several locations, simultaneously, if needed. This can bring taxpayer savings through the standardization of bridge components and mobilization costs.
https://experience.arcgis.com/experience/4c3beb0ed01042a8b6df3623b987eae9/page/Page-1/?data_id=dataSource_9-Bridges__View_Only__7351%3A19&views=Program-Details

Concrete Mobile Trailer Interactive Map
The Federal Highway Administration's Mobile Concrete Technology Center (MCTC) introduces Federal, State, and local transportation personnel to the state-of-the-art concrete technology in materials selection, mixture design, field and laboratory testing, and pavement

Research

NCHRP Project 20-05
(Synthesis Topic 52-16)

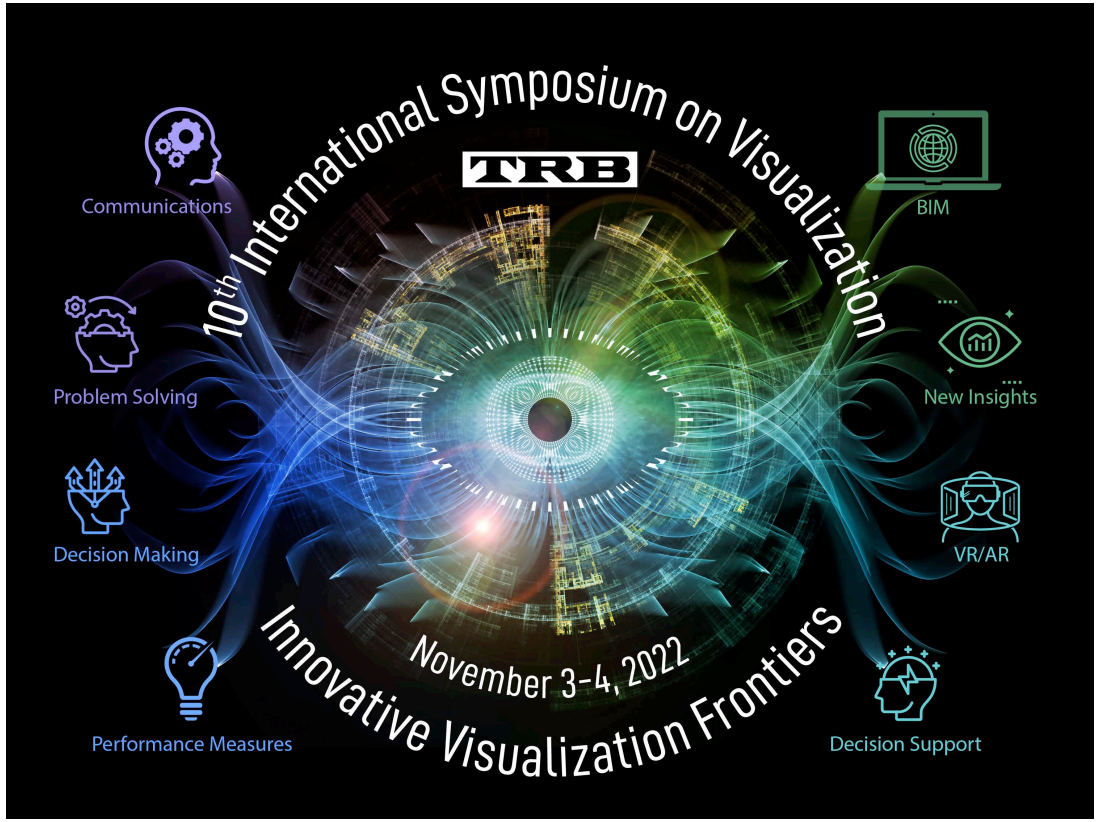
VISUALIZING
HIGHWAY
PERFORMANCE
MEASURES

- RNS: “A Guide for Creating Effective Visualizations”

Submitted

2022 Visualization Symposium

- November 3 – 4, 2022
- Historic NAS, Washington, DC
- Theme: Innovative Visualization Frontiers
- Committee meetings: Nov. 2 (PM)



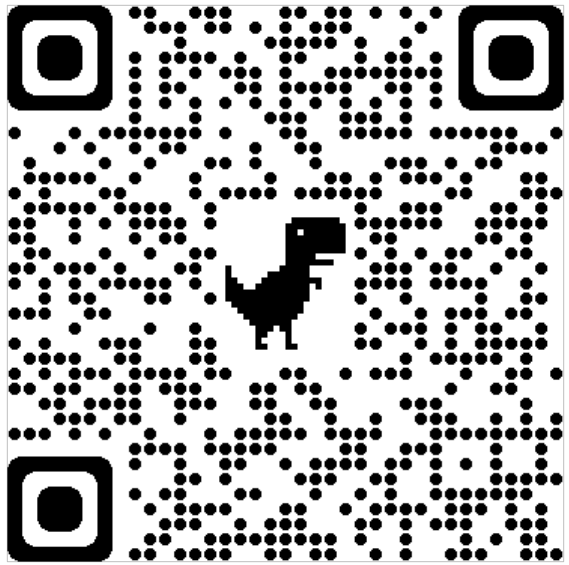
2022 Visualization Symposium

- Registration is open!
- Abstracts for presentations accepted through May 31!

https://trb.secure-platform.com/a/page/VisualizationSymposium

Presentations from Last Symposium

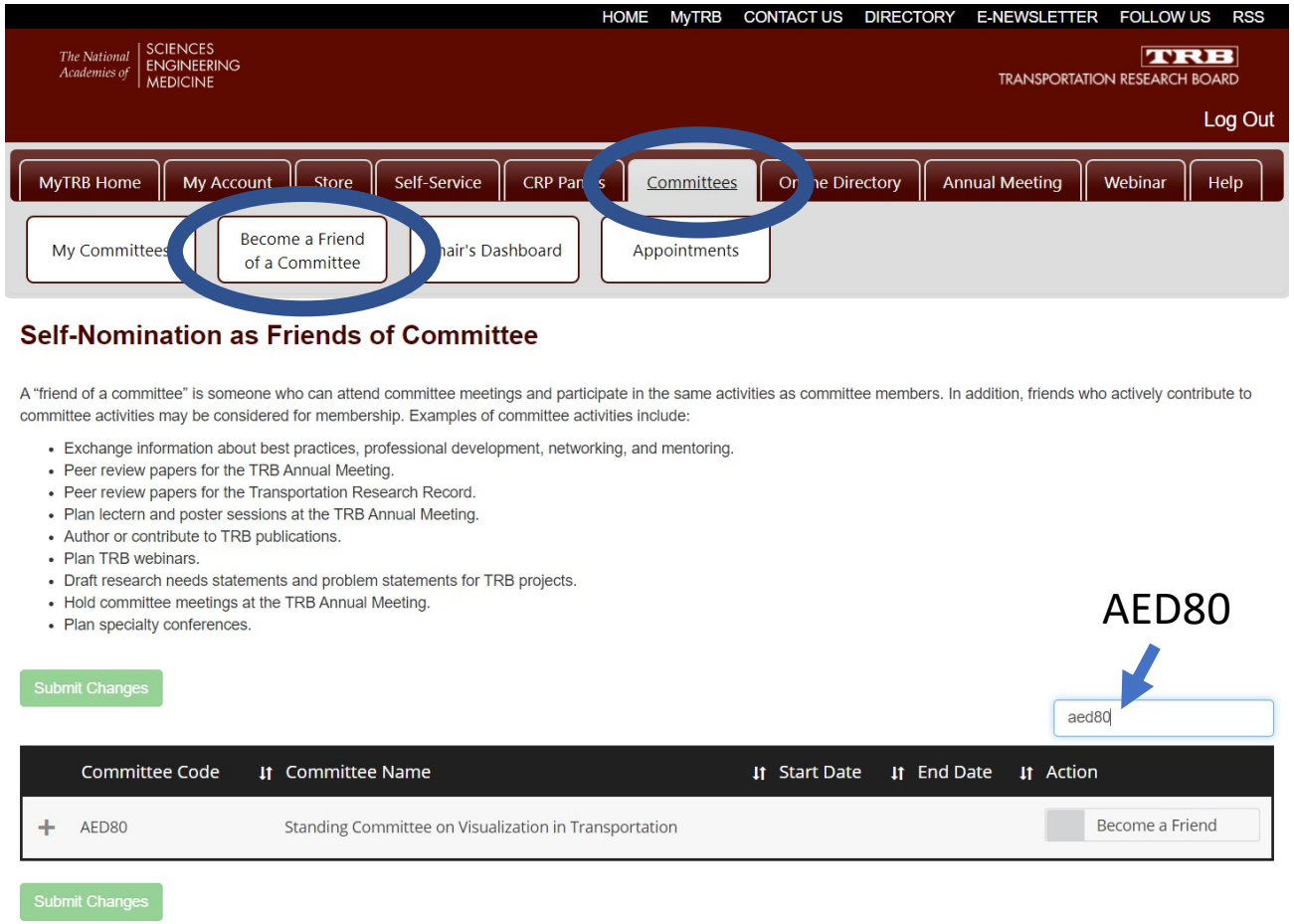
- Immersive VR/AR Tools for Infrastructure Management
- Immersive VR/AR Tools for Infrastructure Visualization - Session 1 of 2
- Immersive Interactive 3D Tools for Infrastructure
- Visualization Tools for Infrastructure Project Management



https://sites.google.com/view/trbabj95/viz19?authuser=0

How to Get Involved

- Become a friend of the Committee
- Create an account at mytrb.org and search for “AED80”



Questions?

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IADOT's Strategic Framework for:

TAM Data and Information System Investments

Matthew Haubrich, IADOT

May 12, 2020

Motivation for the Framework

Become more ***strategic*** when investing in…

TAM Data,
Systems, and
Processes.

IADOT's TAM program is working to prioritize and tier its assets.

A systematic approach is needed to align:

- New and ongoing data collection
- Enhancements to systems and tools
- Limited data management resources
- Investments across program silos

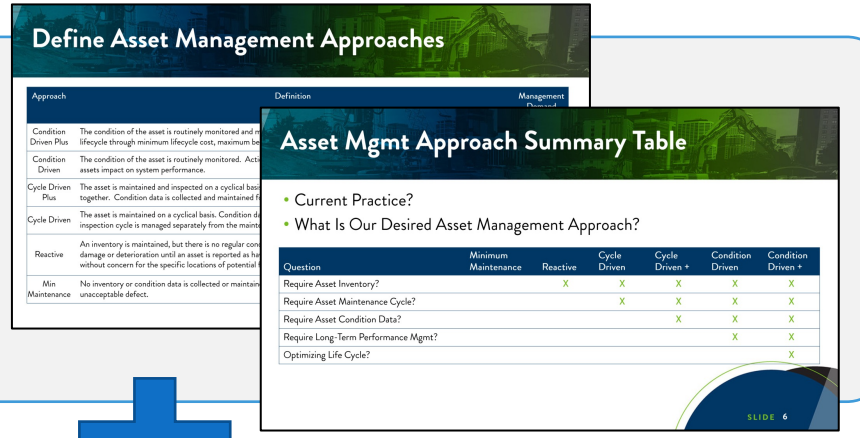
We should be *confident* our asset data and system capabilities *meet our intended management approach*.

IADOT's Solution

Connects two recently developed tools

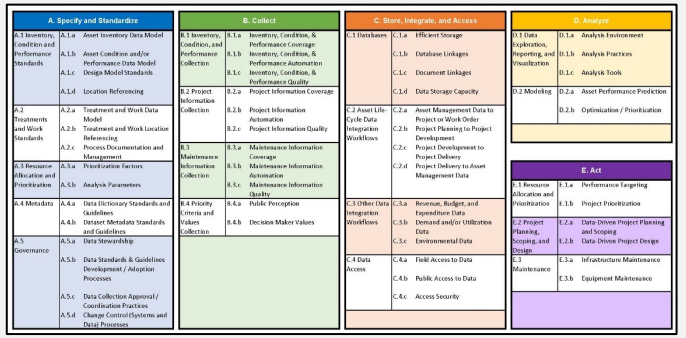
MN DOT Framework

- Asset Management Approach Concepts
- Matrixed Checklist Organization



AASHTO TAM Data Guide

- Detailed Practice and Capability Benchmarks for TAM Data and Information Systems



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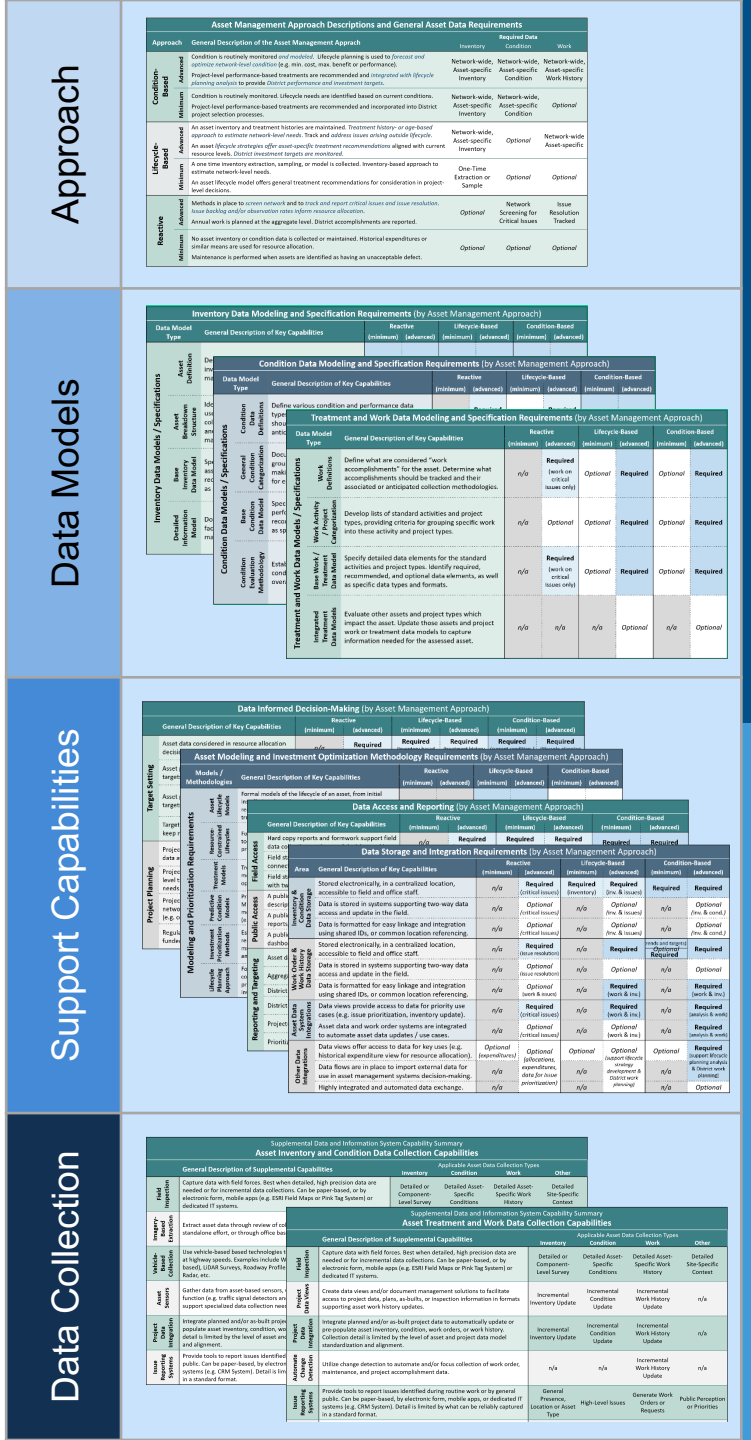
The Developed Framework

A Series of Matrices

- Organized by tiered management approaches.
- Linked to potential data and information system capabilities.

Providing a structured approach to identify:

- What management approach is intended for your asset?
- What data is required, optional, or not needed for the approach?
- What data informed decisions are intended to be supported?
- What analytical methodologies should be in place?
- What data access and reporting is expected?
- How are data stored and integrated?
- What data collection methodologies may be appropriate?



Applying the Framework

Pre-Requisite Activities

Step 1: Identify the Targeted Asset

Step 2: Gather Stakeholders and Decision-Makers

- TAM Program Leadership
- Data Stewards / Systems Owners
- Asset-Specific SMEs
- Field Representatives
- District Management
- Executive Management

Step 3: General Framework Review and Discussion

- Be sure everyone understands what is being decided!

Framework Application

Step 4: Select Desired Management Approach

- Be sustainable – consider resources, current data and tools, culture, asset priority, etc.

Step 5 & 6: Evaluate Data and Capabilities

- Address all required / optional elements for the selected approach

Assessment Outcomes

Step 7: Gap Analysis

- Compare current vs. desired data / capabilities
- Document gaps and identify opportunities
- Recommend actions to streamline current state and expand into desired capabilities

Anticipated Next Steps

1 **Ongoing Actions:**

- Engage the TAM Implementation Team
- Prioritize and tier our assets

2 **Assessment**

- Pilot test and refine the framework
- Complete assessments

3 **Implementation**

- Streamline data collections
- Close gaps in systems/tools
- Align dedicated resources

Entirely Hypothetical!!!

An Example Application of the Framework

Entirely Hypothetical!!!

Approach Definition and Data Requirements Evaluation

Selecting an Approach

An application example for **Guardrail**

Asset Management Approach Descriptions and General Asset Data Requirements					
Approach		General Description of the Asset Management Apprach	Required Data: Inventory	Condition	Work
Condition-Based	Advanced	Condition is routinely monitored *and modeled*. Lifecycle planning is used to *forecast and optimize network-level condition* (e.g. min. cost, max. benefit or performance). Project-level performance-based treatments are recommended and *integrated with lifecycle planning analysis* to provide *District performance and investment targets*.	Network-wide, Asset-specific Inventory	Network-wide, Asset-specific Condition	Network-wide, Asset-specific Work History
	Minimum	Condition is routinely monitored. Lifecycle needs are identified based on current conditions. Project-level performance-based treatments are recommended and incorporated into District project selection processes.	Network-wide, Asset-specific Inventory	Network-wide, Asset-specific Condition	*Optional*
Lifecycle-Based	Advanced	An asset inventory and treatment histories are maintained. *Treatment history- or age-based approach to estimate network-level needs*. Track and *address issues arising outside lifecycle*. An asset *lifecycle strategies offer asset-specific treatment recommendations* aligned with current resource levels. *District investment targets are monitored*.	Network-wide, Asset-specific Inventory	*Optional*	Network-wide Asset-specific
	Minimum	A one time inventory extraction, sampling, or model is collected. Inventory-based approach to estimate network-level needs. An asset lifecycle model offers general treatment recommendations for consideration in project-level decisions.	One-Time Extraction or Sample	*Optional*	*Optional*
Reactive	Advanced	Methods in place to *screen network* and to *track and report critical issues and issue resolution*. *Issue backlog and/or observation rates inform resource allocation*. Annual work is planned at the aggregate level. District accomplishments are reported.	*Optional*	Network Screening for Critical Issues	Issue Resolution Tracked
	Minimum	No asset inventory or condition data is collected or maintained. Historical expenditures or similar means are used for resource allocation. Maintenance is performed when assets are identified as having an unacceptable defect.	*Optional*	*Optional*	*Optional*

Selected Approach:

Reactive (Advanced)

- Limited asset data collection – GR investments will be driven by non-lifecycle needs.
- Identification, tracking and resolution of safety issues
- Option for a simple inventory (i.e. track end terminal products and locations)

Entirely Hypothetical!!!

Approach Definition and Data Requirements Evaluation

Evaluating the Inventory Data Model

An application example for **Guardrail**

Inventory Data Modeling and Specification Requirements (by Asset Management Approach)

Data Model Type		General Description of Key Capabilities	Reactive (minimum)	Reactive (advanced)	Lifecycle-Based (minimum)	Lifecycle-Based (advanced)	Condition-Based (minimum)	Condition-Based (advanced)
Inventory Data Models / Specifications	Asset Definition	Define the "asset" and determine if/how asset inventory data should be collected to support asset management practice.	**Required**	**Required**	**Required**	**Required**	**Required**	**Required**
	Asset Breakdown Structure	Identify specific asset "sub-types" or "components" useful in asset inventory and condition data collection and reporting, performance modeling and treatment selection, and other critical asset management functions.	*Optional*	*Optional*	**Required**	**Required**	**Required**	**Required**
	Base Inventory Data Model	Specify detailed inventory data elements for each asset, sub-type and component. Identify required, recommended, and optional data elements, as well as specific data types and formats.	*n/a*	*n/a*	**Required**	**Required**	**Required**	**Required**
	Detailed Information Model	Document a detailed asset information model facilitating direct integration of asset inventory with maintenance work orders and/or project files.	*n/a*	*n/a*	*n/a*	*Optional*	*n/a*	*Optional*

Address **Required** and **Optional** items for the selected approach

Define the asset.

- Traffic barrier systems installed to contain and redirect vehicles from departing the road, not including concrete barrier systems.

Should inventory data be collected?

- ***Optional:*** High-level run-on end terminal type, product and location should be maintained

Identify asset types / components.

- W-beam / cable guardrail
- Run-on and run-off terminals, rail

Any key data elements?

- Run on terminal type and product
- Terminal GPS location

Entirely Hypothetical!!!

Approach Definition and Data Requirements Evaluation

Evaluating the Condition Data Model

An application example for **Guardrail**

Condition Data Modeling and Specification Requirements (by Asset Management Approach)

Data Model Type		General Description of Key Capabilities	Reactive		Lifecycle-Based		Condition-Based	
			(minimum)	(advanced)	(minimum)	(advanced)	(minimum)	(advanced)
Condition Data Models / Specifications	Condition Data Definitions	Define various condition and performance data types applicable to the asset. Determine which data should be collected and their associated or anticipated collection methodologies.	*n/a*	**Required** (critical issues only)	*Optional*	**Required** (critical issues only)	**Required**	**Required**
	General Condition Categorization	Document general condition or performance groupings to support reporting and decision making. Set general criteria (e.g. condition ranges) for each grouping.	*n/a*	*Optional*	*Optional*	*Optional*	**Required**	**Required**
	Base Condition Data Model	Specify detailed data elements for each condition or performance data type. Identify required, recommended, and optional data elements, as well as specific data types and formats.	*n/a*	**Required** (critical issues only)	*Optional*	**Required** (critical issues only)	**Required**	**Required**
	Condition Evaluation Methodology	Establish detailed methodologies to evaluate asset condition or performance and its contribution to overarching agency strategic priorities.	*n/a*	*n/a*	*n/a*	*Optional*	*n/a*	*Optional*

Address **Required** and **Optional** items for the selected approach

Define condition data types.

- Windshield screening assessment
- Issue report
- Detailed field inspection

Should condition data be collected?

- Windshield screening – recurring
- Reported issues – when reported
- Inspections – by project

Identify condition types.

- Obsolete – no longer acceptable
- Severe Condition Issue – e.g. damage, steel blockouts, concrete post, major rust/rot, low height

Any key data elements?

- Observation GPS, Side of Road
- Issue Type (LOV)

Entirely Hypothetical!!!

Approach Definition and Data Requirements Evaluation

Evaluating the Work Data Model

An application example for **Guardrail**

Treatment and Work Data Modeling and Specification Requirements (by Asset Management Approach)

Data Model Type		General Description of Key Capabilities	Reactive		Lifecycle-Based		Condition-Based	
			(minimum)	(advanced)	(minimum)	(advanced)	(minimum)	(advanced)
Treatment and Work Data Models / Specifications	Work Definitions	Define what are considered "work accomplishments" for the asset. Determine what accomplishments should be tracked and their associated or anticipated collection methodologies.	*n/a*	**Required** (work on critical issues only)	*Optional*	**Required**	*Optional*	**Required**
	Work Activity / Project Categorization	Develop lists of standard activities and project types, providing criteria for grouping specific work into these activity and project types.	*n/a*	*Optional*	*Optional*	**Required**	*Optional*	**Required**
	Base Work / Treatment Data Model	Specify detailed data elements for the standard activities and project types. Identify required, recommended, and optional data elements, as well as specific data types and formats.	*n/a*	**Required** (work on critical issues only)	*Optional*	**Required**	*Optional*	**Required**
	Integrated Treatment Data Models	Evaluate other assets and project types which impact the asset. Update those assets and project work or treatment data models to capture information needed for the assessed asset.	*n/a*	*n/a*	*n/a*	*Optional*	*n/a*	*Optional*

Address **Required** and **Optional** items for the selected approach

Define work accomplishments.

- Full replacement of any component
- Any spot repair >100'

Should work data be collected?

- Work Orders completed against priority issues / observations
- ***Option:*** Track aggregated quantities of other work

How is work data captured?

- Priority issue resolution – AMS work order completion
- Quantities – planned projects

Any key data elements?

- Related Observation
- Work Order Completion Date

Entirely Hypothetical!!!

Data and Information System Capabilities Evaluation

Decision-Making Capabilities

An application example for **Guardrail**

Data Informed Decision-Making (by Asset Management Approach)								
	General Description of Key Capabilities	Reactive		Lifecycle-Based		Condition-Based		
		(minimum)	(advanced)	(minimum)	(advanced)	(minimum)	(advanced)	
Target Setting	Asset data considered in resource allocation decisions.	*n/a*	**Required** (issue backlog)	**Required** (inventory-based needs estimate)	**Required** (treatment history or age-based)	**Required** (current condition / trends)	**Required** (lifecycle planning analysis)	
	Asset program performance / investment targets are set based on available resources.	*n/a*	*Optional* (issue resolution targets)	*n/a*	**Required** (based on lifecycle strategies)	*n/a*	**Required** (based on lifecycle planning analysis)	
	Asset program performance / investment targets are set based on forecasted needs.	*n/a*	*n/a*	*n/a*	**Required** (District investment targets based on lifecycle strategy)	*n/a*	**Required** (lifecycle planning analysis)	
	Target monitoring and adjustment processes keep resources aligned with performance.	*n/a*	*n/a*	*n/a*	*Optional* (as strategies are updated)	*n/a*	**Required** (performance monitoring)	
Project Planning	Project plans and scopes are based on asset data available within business systems.	*n/a*	*Optional* (issue data)	*n/a*	**Required** (treatment history and issues)	**Required** (condition-based)	**Required** (lifecycle planning & conditions)	
	Project plans and scopes incorporate project-level treatment recs (e.g. unconstrained needs analysis based on site-specific data).	*n/a*	*n/a*	*n/a*	**Required** (lifecycle strategies)	**Required** (condition-based)	**Required** (condition-based)	
	Project plans and scopes incorporate network-level treatment recommendations (e.g. constrained investment optimizations).	*n/a*	*n/a*	*n/a*	**Required** (lifecycle strategies & targets)	*n/a*	**Required** (lifecycle planning analysis & targets)	
	Regular maintenance/preservation programs funded based on lifecycle costs and benefits.	*n/a*	*n/a*	*n/a*	**Required** (lifecycle strategies & targets)	*Optional*	**Required** (lifecycle planning analysis & targets)	

Address **Required** and **Optional** items for the selected approach

Resource Allocation Method

- Set annual budget based on issue backlog and previous investments

Investment Targets

- ***Option:*** Set targets for number of priority issues address with funds

Forecasting / Monitoring

- No capabilities necessary for selected management approach

Project Planning

- ***Option:*** Pre-populate work orders in the AMS / MMS / WMS based on priority issues

Treatment Recommendations

- No capabilities necessary for selected management approach

Entirely Hypothetical!!!

Data and Information System Capabilities Evaluation

Modeling and Prioritization

An application example for **Guardrail**

Asset Modeling and Investment Optimization Methodology Requirements (by Asset Management Approach)

Models / Methodologies		General Description of Key Capabilities	Reactive		Lifecycle-Based		Condition-Based	
			(minimum)	(advanced)	(minimum)	(advanced)	(minimum)	(advanced)
Modeling and Prioritization Requirements	Asset Lifecycle Models	Formal models of the lifecycle of an asset, from initial installation through removal, replacement or reconstruction. Includes ideal timing and/or triggers for treatments.	*n/a*	*n/a*	**Required**	**Required**	*Optional*	*Optional*
	Resource-Constrained Lifecycles	Formal lifecycle investment models for an asset, adjusted to align with available resources and agency investment priorities.	*n/a*	*n/a*	*Optional*	**Required**	*Optional*	*Optional*
	Treatment Models	Treatment-specific cost, benefit, and selection criteria and models. May be based historical data, research, or expert opinion, and may be refined with other data.	*n/a*	*Optional* (treatment cost only)	**Required** (treatment cost only)	**Required**	**Required**	**Required**
	Predictive Condition Models	Predictive models for key condition and performance data. May be based on historical data, external research or models or expert opinion. May incorporate of other data (e.g. utilization or environmental factors).	*n/a*	*n/a*	*n/a*	*n/a*	**Required**	**Required**
	Investment Prioritization Methods	Established approach for prioritizing network-level resource allocations and investment priorities. Methods may range in complexity based on asset-specific context and need.	*n/a*	*Optional* (critical issues only)	*n/a*	*Optional* (critical issues only)	**Required**	**Required**
	Lifecycle Planning Approach	Formal approach to leverage current and predicted conditions, treatment models, and investment prioritization methodologies to connect network-level investment optimizations with project-level decisions.	*n/a*	**Required** (aggregated targets)	**Required** (lifecycle options)	**Required**	**Required** (condition-based recs)	**Required**

Address **Required** and **Optional** items for the selected approach

Asset Lifecycle Modeling

- No capabilities necessary for selected management approach

Treatment Modeling

- ***Option:*** model typical activities – use bid tabs or state force material, equipment, labor costs

Predictive Condition Models

- No capabilities necessary for selected management approach

Investment Targets

- ***Option:*** Prioritize known issues – severity, traffic, accident data

Lifecycle Planning Approach

- District and system-specific targets– based on allocations

Entirely Hypothetical!!!

Data and Information System Capabilities Evaluation

Data Access and Reporting

An application example for **Guardrail**

Data Access and Reporting (by Asset Management Approach)								
	General Description of Key Capabilities	Reactive		Lifecycle-Based		Condition-Based	
		(minimum)	(advanced)	(minimum)	(advanced)	(minimum)	(advanced)
Field Access	Hard copy reports and formwork support field data collection, review, and decision-making.	*n/a*	**Required** (issue/resolution)	**Required** (inventory)	**Required** (inventory & issues)	**Required**	**Required**
	Field staff have laptops/devices but no field connectivity (office download/upload).	*n/a*	*Optional* (issue/resolution)	*n/a*	*Optional* (inventory & issues)	*n/a*	*Optional* (inv. & condition)
	Field staff are equipped with mobile devices with two-way system connectivity in the field.	*n/a*	*Optional* (issue/resolution)	*n/a*	*Optional* (inventory & issues)	*n/a*	*Optional* (inv. & condition)
Public Access	A public website provides a program description, key contacts and select materials.	**Required**	**Required**	**Required**	**Required**	**Required**	**Required**
	A public website provides summary data and reports, and downloadable datasets.	*n/a*	*Optional* (accomplishments)	*Optional* (inventory & needs)	*Optional* (inventory & needs)	*Optional* (condition & needs)	**Required** (condition & needs)
	A public website provides a performance dashboard (objectives, targets, and metrics).	*n/a*	*n/a*	*n/a*	*Optional* (investment target)	*Optional* (condition trends)	**Required** (trends and targets)
Reporting and Targeting	Asset data/program summaries and trends.	*Optional* (expenditures)	**Required** (issue/resolution)	**Required** (inventory & needs)	**Required** (inv., issues, needs)	**Required** (condition & needs)	**Required** (condition & needs)
	Aggregated work and/or investment targets.	*n/a*	**Required**	*Optional* (investment target)	**Required** (investment target)	*Optional* (investment target)	**Required**
	District performance forecasts and targets.	*n/a*	*n/a*	*n/a*	*n/a*	*Optional*	**Required**
	District investment/performance monitoring.	*n/a*	*n/a*	*n/a*	**Required** (investment target)	*n/a*	**Required** (investment target)
	Project-level treatment recommendations.	*n/a*	*n/a*	**Required** (lifecycle model)	**Required** (lifecycle strategies)	**Required** (condition-based)	**Required** (lifecycle planning)
	Prioritized, project-level investment priorities.	*n/a*	**Required** (issue backlog)	*n/a*	**Required** (lifecycle strategies)	*Optional* (condition-based)	**Required** (lifecycle planning)

Address **Required** and **Optional** items for the selected approach

Field Access

- Windshield data collection form (supporting 2-person, vehicle based issue tracking)
- Mobile tools to capture and review issues
- Mobile tools to create, update and complete work orders

Public Access

- Website with GR program description and contacts
- ***Option:*** include summary data regarding past accomplishments

Reporting and Targeting

- District- and system-specific reporting of issue backlog, work accomplishments and trends
- ***Option:*** priority issue lists

Entirely Hypothetical!!!

Data and Information System Capabilities Evaluation

Data Storage and Integration

An application example for **Guardrail**

Data Storage and Integration Requirements (by Asset Management Approach)							
Area	General Description of Key Capabilities	Reactive		Lifecycle-Based		Condition-Based	
		(minimum)	(advanced)	(minimum)	(advanced)	(minimum)	(advanced)
Inventory & Condition Data Storage	Stored electronically, in a centralized location, accessible to field and office staff.	*n/a*	**Required** (critical issues)	**Required** (inventory)	**Required** (inv. & issues)	**Required**	**Required**
	Data is stored in systems supporting two-way data access and update in the field.	*n/a*	*Optional* (critical issues)	*n/a*	*Optional* (inv. & issues)	*n/a*	*Optional* (inv. & cond.)
	Data is formatted for easy linkage and integration using shared IDs, or common location referencing.	*n/a*	*Optional* (critical issues)	*n/a*	*Optional* (inv. & issues)	*n/a*	*Optional* (inv. & cond.)
Work Order & Work History Data Storage	Stored electronically, in a centralized location, accessible to field and office staff.	*n/a*	**Required** (issue resolution)	*n/a*	**Required**	*Optional*	**Required**
	Data is stored in systems supporting two-way data access and update in the field.	*n/a*	*Optional* (issue resolution)	*n/a*	*Optional*	*n/a*	*Optional*
	Data is formatted for easy linkage and integration using shared IDs, or common location referencing.	*n/a*	*Optional* (work & issues)	*n/a*	**Required** (work & inv.)	*n/a*	**Required** (work & inv.)
Asset Data System Integrations	Data views provide access to data for priority use cases (e.g. issue prioritization, inventory update).	*n/a*	**Required** (critical issues)	*n/a*	**Required** (work & inv.)	*n/a*	**Required** (analysis & work)
	Asset data and work order systems are integrated to automate asset data updates / use cases.	*n/a*	*Optional* (critical issues)	*n/a*	*Optional* (work & inv.)	*n/a*	**Required** (analysis & work)
Other Data Integrations	Data views offer access to data for key uses (e.g. historical expenditure view for resource allocation).	*Optional* (expenditures)	*Optional* (allocations, expenditures, data for issue prioritization)	*Optional*	*Optional* (support lifecycle strategy development & District work planning)	*Optional*	**Required** (support lifecycle planning analysis & District work planning)
	Data flows are in place to import external data for use in asset management systems decision-making.	*n/a*		*n/a*		*n/a*	
	Highly integrated and automated data exchange.	*n/a*		*n/a*		*n/a*	*Optional*

Address **Required** and **Optional** items for the selected approach

Inventory & Condition Data Storage

- Centralized, map-based, field accessible repository for GR issues (e.g. ArcGIS Online app)
- Post process LRS to provide route and milepoint information

Work Order & History Data Storage

- Track issue resolution (tool above)
- Calculate and store aggregated GR work in a central repository

Asset Data System Integration

- Integrate GR issues / work orders

Other Data Integration

- ***Option:*** Import traffic, crash history to support prioritization
- ***Option:*** Import CRM requests for issue creation / prioritization

Entirely Hypothetical!!!

Data and Information System Capabilities Evaluation

Inventory & Condition Data Collection

An application example for **Guardrail**

Supplemental Data and Information System Capability Summary

Asset Inventory and Condition Data Collection Capabilities

	General Description of Supplemental Capabilities	Applicable Asset Data Collection Types			
		Inventory	Condition	Work	Other
Field Inspection	Capture data with field forces. Best when detailed, high precision data are needed or for incremental data collections. Can be paper-based, or by electronic form, mobile apps (e.g. ESRI Field Maps or Pink Tag System) or dedicated IT systems.	Detailed or Component-Level Survey	Detailed Asset-Specific Conditions	Detailed Asset-Specific Work History	Detailed Site-Specific Context
Imagery-Based Extraction	Extract asset data through review of collected imagery. May be collected as standalone effort, or through office based tools referencing available imagery.	High-Level Visual Survey	High-Level Observable Conditions	n/a	High-Level Site-Specific Context
Vehicle-Based Collection	Use vehicle-based based technologies to collected detailed data and imagery at highway speeds. Examples include Windshield Surveys (manual or imagery based), LiDAR Surveys, Roadway Profilers, Skid Testers, Ground Penetrating Radar, etc.	Detailed Network-Level Survey	Detailed Network-Level Conditions	n/a	High-Level Site-Specific Context
Asset Sensors	Gather data from asset-based sensors, which may already exist for the asset function (e.g. traffic signal detectors and controllers) or are instrumented to support specialized data collection needs.	n/a	Detailed Asset-Specific Conditions	n/a	Operational Performance
Project Data Integration	Integrate planned and/or as-built project data to automatically update or pre-populate asset inventory, condition, work orders, or work history. Collection detail is limited by the level of asset and project data model standardization and alignment.	Incremental Inventory Update	Incremental Condition Update	Incremental Work History Update	n/a
Issue Reporting Systems	Provide tools to report issues identified during routine work or by general public. Can be paper-based, by electronic form, mobile apps, or dedicated IT systems (e.g. CRM System). Detail is limited by what can be reliably captured in a standard format.	General Presence, Location or Asset Type	High-Level Issues	Generate Work Orders or Requests	Public Perception or Priorities

Identify Collection Methods for Required Inv. and Condition Data

Field Inspection

- Issue / basic inventory mobile app
- ***Option:*** detailed GR inspection form (for project-specific data)

Imagery-Based Extraction

- Virtual GR windshield assessment tool – use with pavement imagery

Vehicle-Based Collection

- Paper-based GR windshield assessment form (w/ upload tool)

Asset Sensors

- No capabilities necessary

Project Data Integration

- No capabilities necessary

Issue Reporting System

- ***Option:*** CRM – GR request form

Entirely Hypothetical!!!

Data and Information System Capabilities Evaluation

Treatment and Work Data Collection

An application example for **Guardrail**

Supplemental Data and Information System Capability Summary

Asset Treatment and Work Data Collection Capabilities

	General Description of Supplemental Capabilities	Applicable Asset Data Collection Types: Inventory	Condition	Work	Other
Field Inspection	Capture data with field forces. Best when detailed, high precision data are needed or for incremental data collections. Can be paper-based, or by electronic form, mobile apps (e.g. ESRI Field Maps or Pink Tag System) or dedicated IT systems.	Detailed or Component-Level Survey	Detailed Asset-Specific Conditions	Detailed Asset-Specific Work History	Detailed Site-Specific Context
Project Data Views	Create data views and/or document management solutions to facilitate access to project data, plans, as-builts, or inspection information in formats supporting asset work history updates.	Incremental Inventory Update	Incremental Condition Update	Incremental Work History Update	n/a
Project Data Integration	Integrate planned and/or as-built project data to automatically update or pre-populate asset inventory, condition, work orders, or work history. Collection detail is limited by the level of asset and project data model standardization and alignment.	Incremental Inventory Update	Incremental Condition Update	Incremental Work History Update	n/a
Automate Change Detection	Utilize change detection to automate and/or focus collection of work order, maintenance, and project accomplishment data.	n/a	n/a	Incremental Work History Update	n/a
Issue Reporting Systems	Provide tools to report issues identified during routine work or by general public. Can be paper-based, by electronic form, mobile apps, or dedicated IT systems (e.g. CRM System). Detail is limited by what can be reliably captured in a standard format.	General Presence, Location or Asset Type	High-Level Issues	Generate Work Orders or Requests	Public Perception or Priorities

Field Inspection

- Issue resolution mobile app

Project Data Views / Integration

- ***Option:*** map-based overlay and/or integration of GR project locations & known issue locations – to support issue resolution

Automated Change Detection

- No capabilities necessary

Issue Reporting System

- **Option:** CRM – GR request form

Identify Collection Methods for Required Work Data

Bridge and Pavement Dashboards

Sage Donaldson, Arizona DOT

Asset Update Tracking Dashboard

Discussion of tool for tracking asset updates for NHDOT.

May 12th, 2022

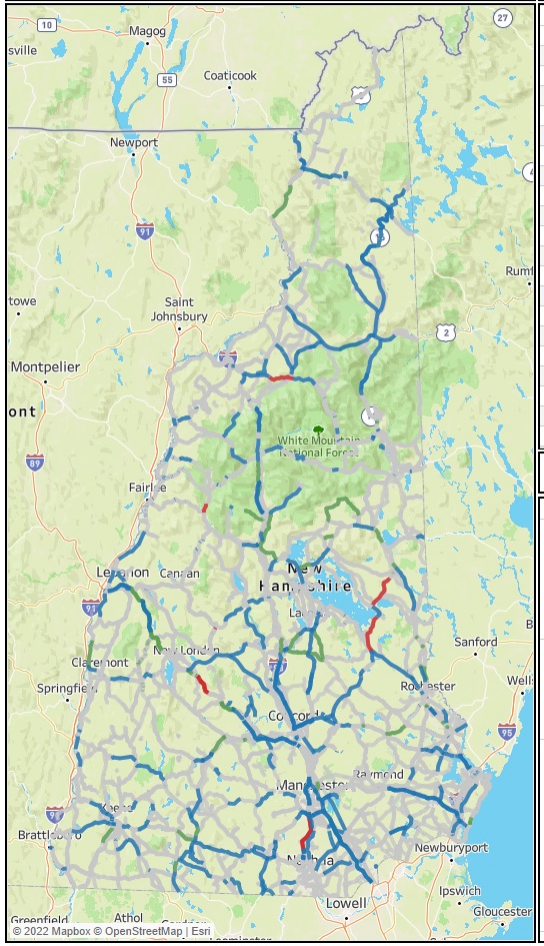
Overview

- The Need?
  - Drainage Assets - In the process of data collection including location, condition, material, size, etc.
  - Guardrail Assets – data throughout the state, but the original information was created over a decade ago.
- A process was necessary to update these assets, so the respective databases did not become stale with no confidence in the data.
- Decision was made to create a dashboard that multiple bureaus could reference for their respective tasks in the update process.

Asset Update Status Dashboard

Asset Update Status Dashboard(Draft)

Project Location



Project Asset Status Information

Contract Number	Name	Month of Ad Date	Month of Bid Open Date	Project Manager	Drainage Status	Guardrail Status
16154	SANBORNTON	Null	September 2017	Joseph Adams	N/A	SADES Pending
40518	DIXVILLE-COLEBROOK	Null	June 2016	Margarete Baldwin	SADES Pending	SADES Pending
16444	SEABROOK X-A002(76..	December 2015	January 2016	Victoria Chase	SADES Pending	N/A
27873	ROCHESTER X-A003(6..	December 2015	January 2016	Mike Dugas	SADES Pending	N/A
28655	STATEWIDE X-A003(7..	December 2015	January 2016	Tobey Reynolds	N/A	Existing
40316G	EXETER - ROULEAU SA..	December 2015	March 2017	Roger Appleton	SADES Pending	N/A
40316H	BARRINGTON - FORTI..	December 2015	March 2017	Roger Appleton	SADES Pending	N/A
13692B	MILFORD	February 2016	March 2017	Ronald Grandmaison	SADES Pending	Existing
14633H	SALEM TO MANCHEST..	February 2016	March 2017	Wendy Johnson	SADES Pending	SADES Pending
16470	MEREDITH	February 2016	March 2017	Tobey Reynolds	SADES Pending	Existing
29530	BELMONT-GILFORD	February 2016	March 2017	Tobey Reynolds	N/A	Existing
40178	CANTERBURY	February 2016	March 2017	William Rollins	SADES Pending	N/A
26765	KEENE	March 2016	March 2016	Ronald Grandmaison	SADES Pending	Existing
40316I	CHESTER - SCOTT SAL..	March 2016	March 2016	Roger Appleton	SADES Pending	N/A
40423	BELMONT-LACONIA	March 2016	April 2016	Tobey Reynolds	SADES Pending	Existing
13857A	PINKHAMS GRANT - G..	April 2016	April 2016	Tobey Reynolds	SADES Pending	Existing
11238Q	NEWINGTON - DOVER	May 2016	June 2016	Jennifer Reczek	SADES Pending	Existing
29024	CENTRAL TURNPIKE D..	May 2016	May 2016	David Smith	SADES Pending	SADES Pending
29533	CHICHESTER-EPSOM	May 2016	June 2016	Tobey Reynolds	SADES Pending	Existing
40405	CONCORD-PEMBROKE	May 2016	June 2016	Tobey Reynolds	SADES Pending	Existing
16146	Farmington	June 2016	July 2016	Don Lyford	SADES Pending	SADES Pending

Project Asset Information

Contract Number	Item Num	Item Description	Quantity	Unit
10136C	202.41	REMOVAL OF EXISTING PIPE 0-24" DIAMETER	300	LF
	603.00215	15" R.C. PIPE 2000D	130	LF
	603.00218	18" R.C. PIPE 2000D	130	LF
	603.00315	15" R.C. PIPE 3000D	80	LF
	603.82212	12" PE PIPE (TYPE S)	110	LF
	603.82215	15" PE PIPE (TYPE S)	40	LF
10418H	202.41	REMOVAL OF EXISTING PIPE 0-24" DIAMETER	105	LF
	603.00215	15" R.C. PIPE 2000D	600	LF
	603.00218	18" R.C. PIPE 2000D	265	LF
	606.127	BEAM GUARDRAIL (TERMINAL UNIT TYPE G-2) (STEEL POST)	1	U
	606.18001	31" W-BEAM GUARDRAIL WITH 8" OFFSET BLOCK (STEEL POST)	475	LF
10430	202.7	REMOVAL OF GUARDRAIL	350	LF
	602.60936	CLOSE-FIT PIPE LINER 36" RCP (CONTRACTOR'S OPTION)	260	LF
	603.00212	12" R.C. PIPE 2000D	21	LF
	603.00215	15" R.C. PIPE 2000D	20	LF
	603.00218	18" R.C. PIPE 2000D	30	LF
	603.00224	24" R.C. PIPE 2000D	20	LF
	603.11012	12" CORR. STEEL PIPE .064"	5	LF
	603.80215	15" PLASTIC PIPE (SMOOTH INTERIOR)	20	LF
	603.81015	15" PVC PIPE	15	LF
	606.1461	WOOD GUARDRAIL STEEL BACKED (TERMINAL UNIT - TL 2)	4	U

New Hampshire DOT
Department of Transportation

Project Progress
- (All)
- Design Ready
- Construction Ready
- As-Built Complete

Ad Year
- (All)
- 2015
- 2016
- 2017
- 2018
- 2019
- 2020
- 2021
- 2022

Project Manager
(All)

Project Progress
- Design Ready
- Construction Ready
- As-Built Complete
- Null

Asset Check

Notes

Project Asset Status Information

Project Asset Status Information

Contract Number	Name	Month of Ad Date	Month of Bid Open Date	Project Manager	Drainage Status	Guardrail Status
12210C	HINSDALE NH - BRATT..	March 2021	April 2021	David Scott	Existing	Proposed New
42363	NORTHWOOD	March 2021	April 2021	Kirk Mudgett	SADES Pending	SADES Pending
43031	MILFORD-AMHERST	March 2021	March 2021	Ronald Grandmaison	SADES Pending	Proposed New
43288	STATEWIDE TIER 2 (N)	March 2021	April 2021	Ronald Grandmaison	N/A	As-Built
43289	STATEWIDE TIER 2 (S)	March 2021	April 2021	Ronald Grandmaison	N/A	As-Built
41483	MEREDITH-GILFORD	April 2021	May 2021	Jennifer Reczek	SADES Pending	SADES Pending
42266	STATEWIDE GUARDRA..	April 2021	April 2021	Sam Newsom	SADES Pending	As-Built

- Allows Managers/Supervisors to check on status from design through construction as-built.

Project Asset Information

Project Asset Information

Contract Number	Item Num	Item Description	Quantity	Unit
12210C	202.7	REMOVAL OF GUARDRAIL	2,050	LF
	202.31	FILL ABANDONED PIPE	10	CY
	202.41	REMOVAL OF EXISTING PIPE 0-24" DIAMETER	560	LF
	202.42	REMOVAL OF EXISTING PIPE OVER 24" DIAMETER	140	LF
	203.55553	GUARDRAIL EAGRT OFFSET PLATFORM TL 2	3	U
	510.6230	FURNISH INSTALL AND BACKFILL STEEL PIPE PILES (30" DIA.)	3,902,458	LB

- Can track construction items and quantities per project and download for yearly tracking.

Questions/Comments?

MPO Coordination

Michael Johnson, Caltrans

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