# AASHTO TAM Guide Book Club

## Webinar 8

# Strengthening How Data Supports Your TAM Program

For today's polls, visit
menti.com and use the code
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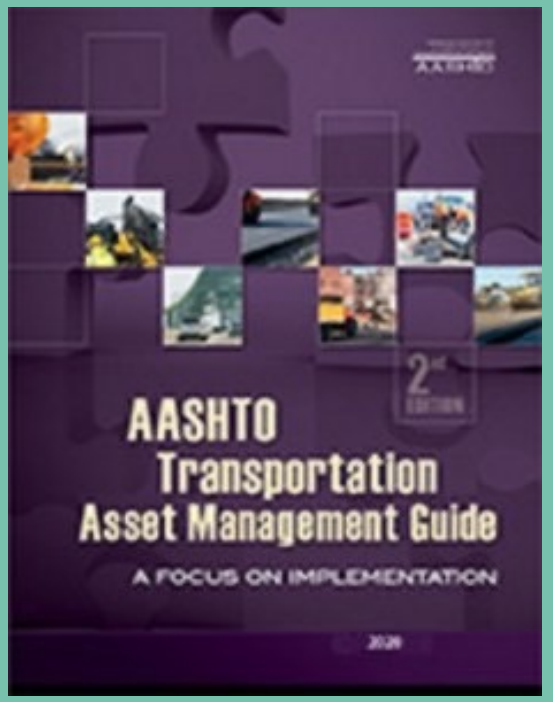


June 16, 2021
Sponsored by FHWA

# AASHTO TAM Guide Book Club
## Welcome

- Welcome to our eighth and final installment of the TAM Guide Book Club
- Visit the AASHTO TAM Portal for the complete archive of past webinars *(and much more!)*


**https://www.tam-portal.com/event-directory/tam-webinars/**

# AASHTO TAM Guide Book Club
## Welcome

FHWA is pleased to sponsor this special TAM Guide Book Club Webinar series

- Sharing knowledge is a critical component of advancing asset management practice
- The AASHTO TAM Guide is a valuable resource for agencies starting to develop their next TAMP
- This series is designed to focus on the areas where agencies will derive the greatest benefit:
  - Eight sessions addressing TAMP Implementation, Life Cycle Planning and Management, Financial Planning, Risk and Resiliency, and more

# AASHTO TAM Guide Book Club
## Agenda

| | |
|---|---|
| **2:00 PM** | **Introduction**<br>Steve Gaj, FHWA |
| **2:05 PM** | **Agenda and Topic Introduction**<br>William Duke, Spy Pond Partners |
| **2:15 PM** | **Use Case Scenarios**<br>Vanloan Nguyen, Virginia DOT<br>Karen Riemer, Connecticut DOT |
| **2:35 PM** | **Guidance Quests – Breakout Sessions** |
| **3:10 PM** | **Breakout Session Feedback** |
| **3:20 PM** | **Open Discussion and Q&A** |

# AASHTO TAM Guide Book Club
## Menti Polls

For today's polls,
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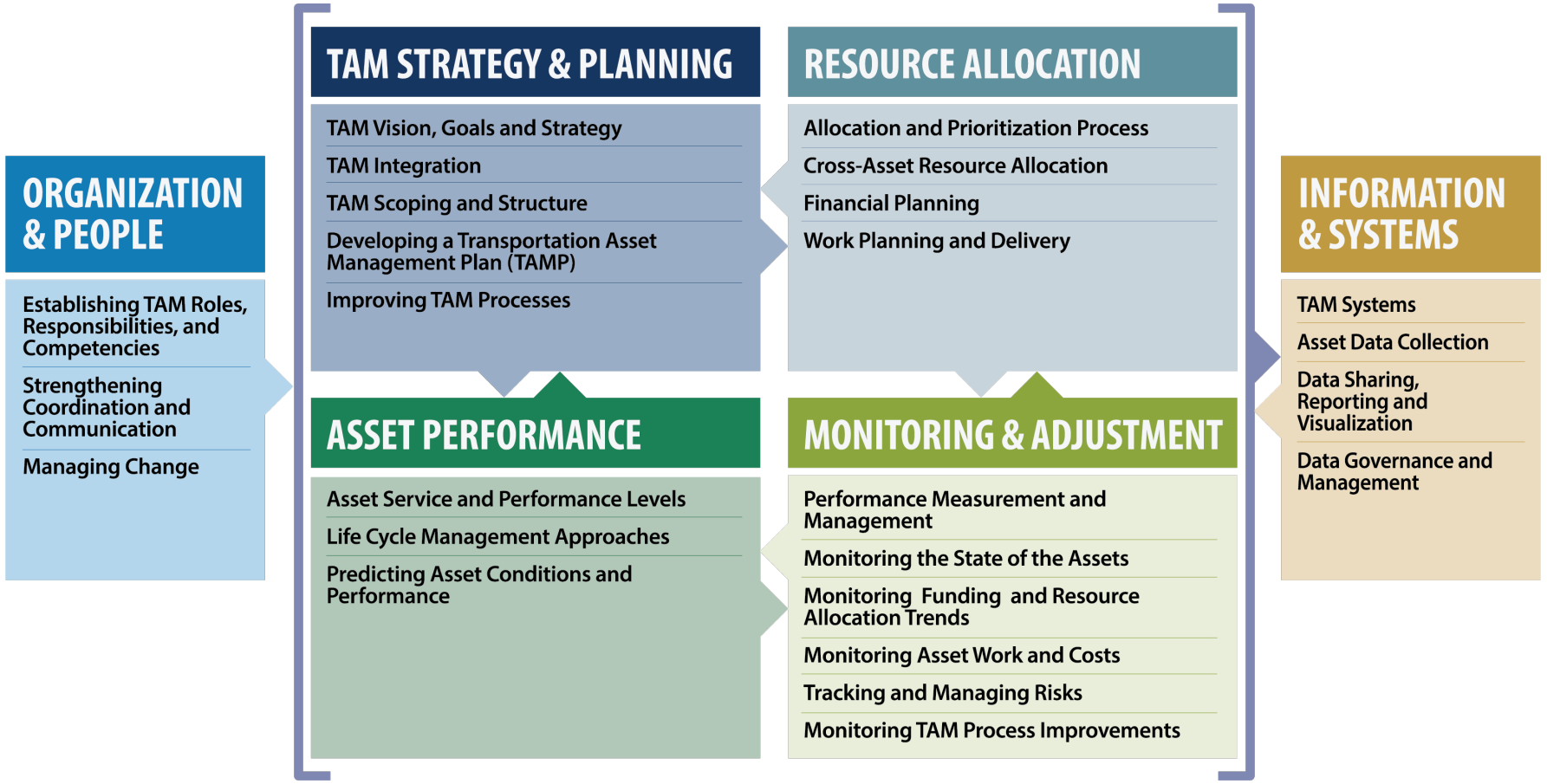
# TAM is a Data-Driven Activity



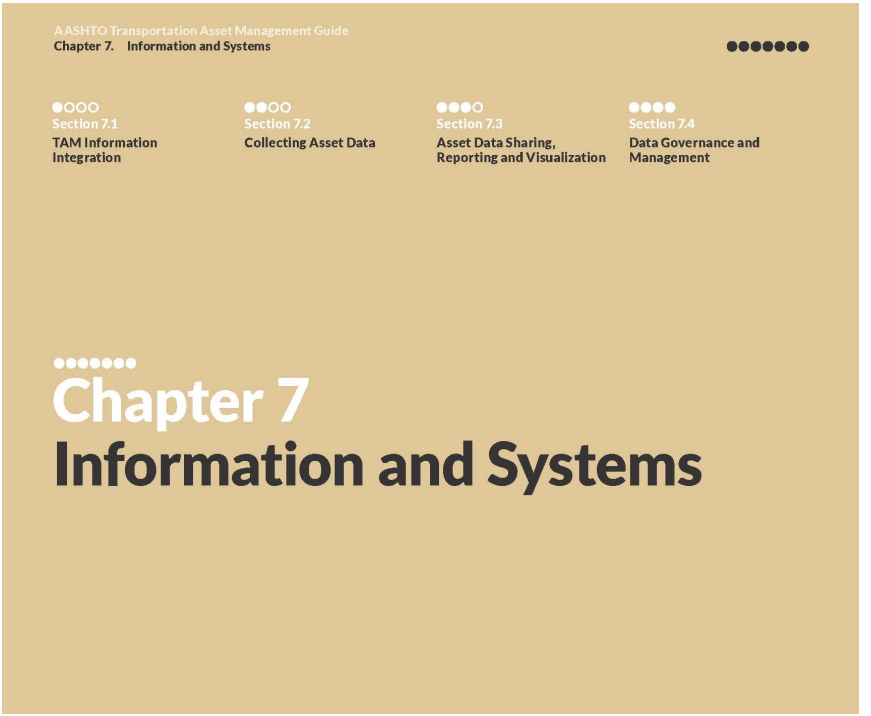

Good information and systems are necessary to meet expectations for:

- Transparency,
- Accountability, and
- To make the best use of limited resources.

# Key Strategies to Strengthen TAM Data

## Chapter 7: Information and Systems

1. TAM Information Integration
2. Collecting Asset Data
3. Asset Data Sharing, Reporting, and Visualization
4. Data Governance and Management



# Key Strategies to Strengthen TAM Data

## TAM Information Integration

Table 7.1 - TAM Data and Systems Overview (example)

| | Asset Inventory, Condition, and Performance | Contextual | Asset Work Information | Revenue and Funding Allocations | Analysis Results |
|---|---|---|---|---|---|
| Asset Management Systems | • | • | • | • | • |
| Maintenance Management Systems | • | | • | • | • |
| Program and Project Management Systems | | | • | • | • |
| Financial Management/ERP | • | | • | • | |
| Road Inventory Systems/HPMS | • | • | • | • | |
| Crash Databases | | • | | | |
| Traffic Monitoring Systems | | • | | | |
| Engineering Design Systems | • | | | | |
| Enterprise GIS Databases | • | • | • | • | |
| Imagery Databases | | • | | | |
| Data Warehouses/BI | • | • | • | • | • |
| Other | | | | | • |

Most agencies have a wealth of data spread out across many systems.

1. Define what questions need answered
2. Take stock of what is available
3. Plan for how data across systems could be integrated

# Key Strategies to Strengthen TAM Data
## Collecting Asset Data

**Collect only…**

What you need

When you need it

To the detail appropriate to the data value and use

Step 1: Coordinate with Stakeholders

- Identify additional needs and collection synergies
- Eliminate duplicative collections

Step 2: Specify

- Establish standards, techniques and plans

Step 3: Contract

- Evaluate whether to outsource/contract collection

Step 4: Train and Monitor

- Ensure collection staff understand expectations
- Implement Quality Control and Assurance plans

# Key Strategies to Strengthen TAM Data

## Asset Data Sharing, Reporting, and Visualization

**Covert raw data into an actionable information**

A variety of tools exist:

- Reports
- Maps
- Charts
- Dashboards
- Infographics
- and Combinations

Consider the Needs of Different Users

- Analysts, Project Engineers, Field Staff
- Managers and Executives
- Oversight Agencies, the Public

Consider the Data Sharing Options

- On Request
- Direct Access (Specialized vs Enterprise Systems)
- Data Portals (GIS vs. General)
- Data Feeds, Services, APIs
- Data Warehouses, Marts, Lakes
- Content Management Systems
- Common Data Environments

Establish a Standard Publication Process

- Ensure quality, documentation, metadata, etc.

# Key Strategies to Strengthen TAM Data
## Data Governance and Management

**Data is an Asset**

Data governance and management are essential for:

- Reliable,
- Consistent,
- Integrated, and
- Accessible data

Identify Key Decision Points for Governance

- Definitions and Standard Code Lists
- Data Standards (e.g. GIS or LRS)
- Data and System Investments
- Modifying Enterprise Data Assets

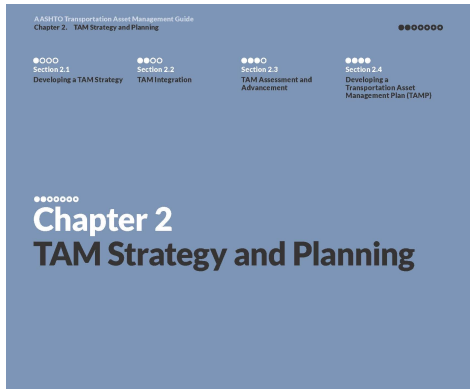
Setup Processes and Structures

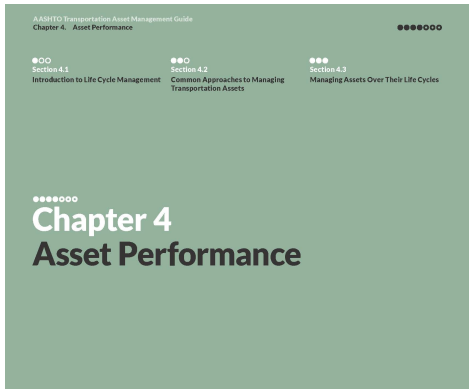
- Governance Bodies and Structures
- Decision-Making Processes/Responsibilities
- Criteria and Guidelines

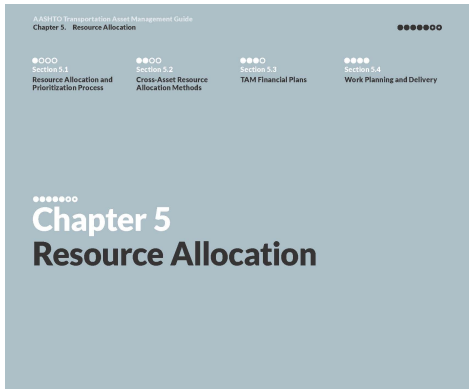
Improve Practices, Maturity and Value

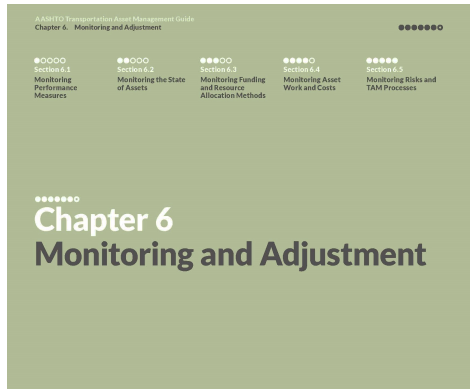
- See NCHRP Projects 08-90, 08-92, 08-115 for tools

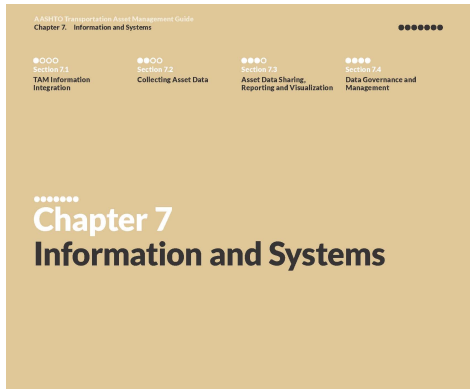
# Data Themes are Throughout the Guide



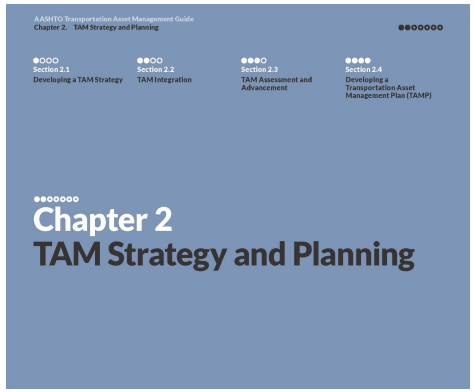

**Interwoven throughout the guidebook are a wealth of supporting information:**

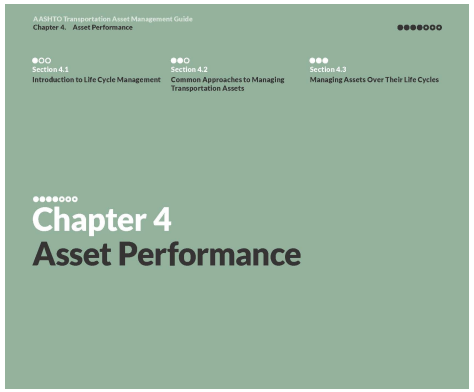
1. How-To-Guides
2. Checklists
3. Practice Examples

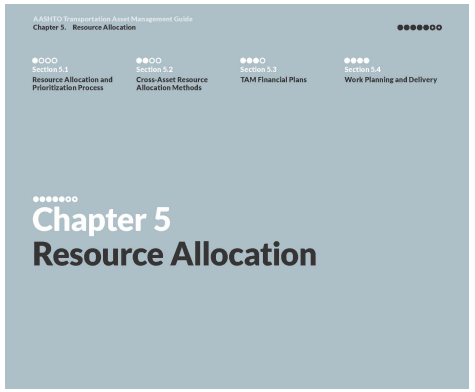
**We covered the highlights of Chapter 7…**

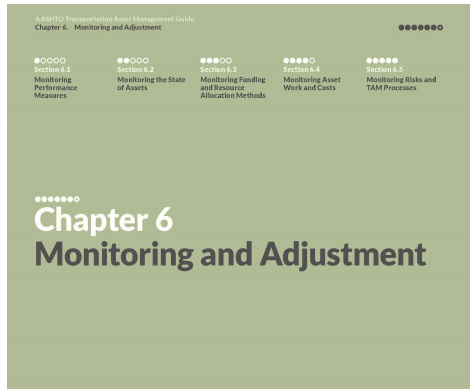
**…but much more can be found in the other sections of the Guide**

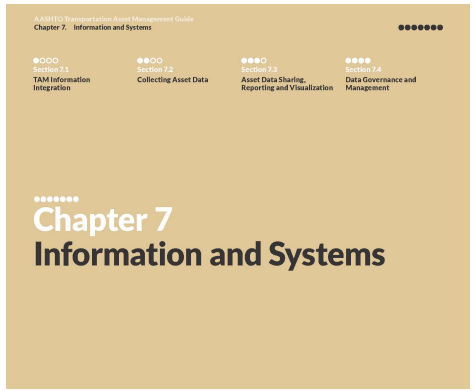
# Data Themes are Throughout the Guide



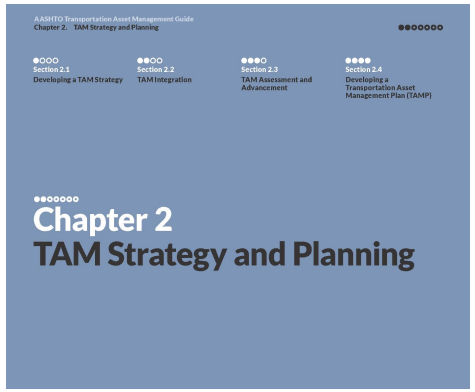



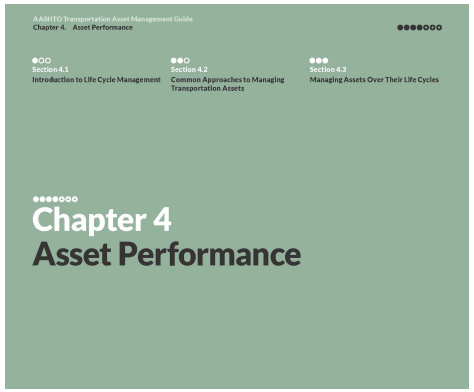



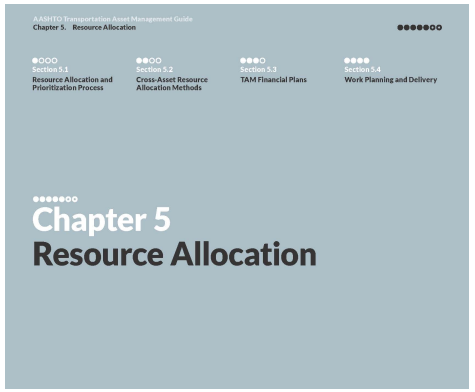



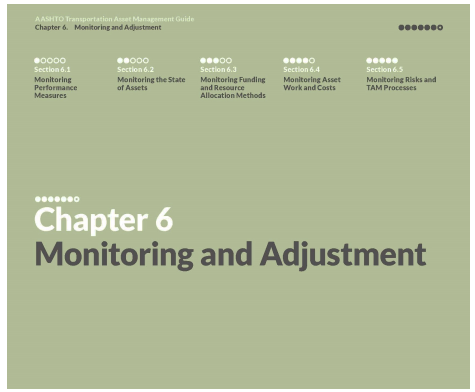

- Establishing Performance Mgmt. Objectives Measures, Targets and Results
- Assessing and Managing Risk
- Integrating Planning and Programming Data
- Assessing Current TAM Practices
- Defining, Prioritizing, and Implementing Improvements in TAM Approaches

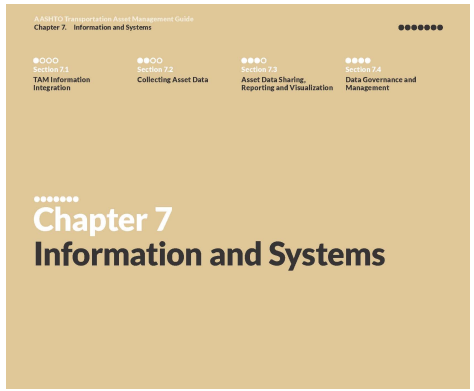
# Data Themes are Throughout the Guide



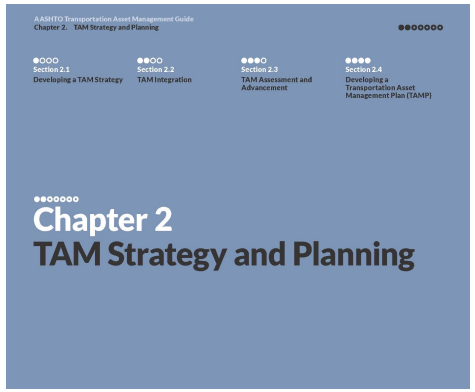



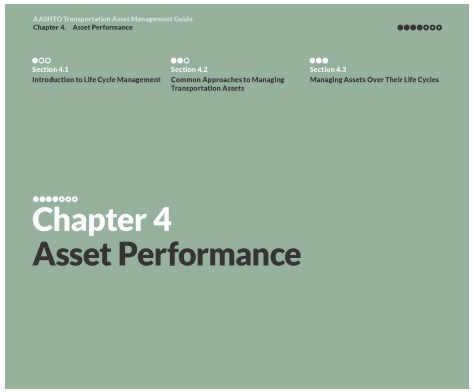



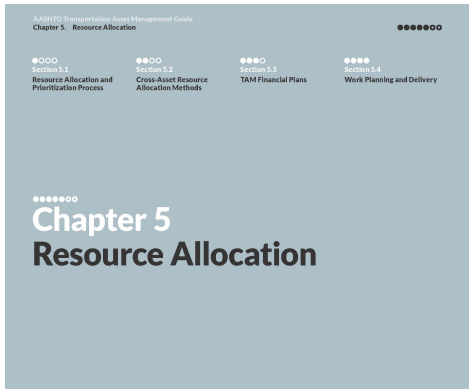



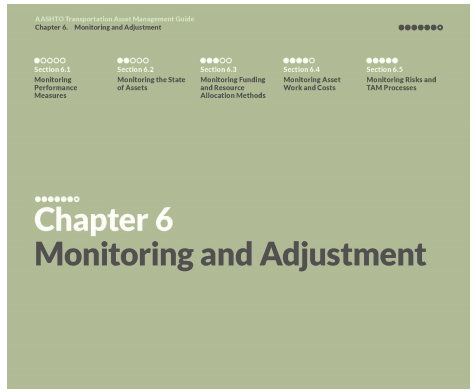

- Assessment of Asset Condition, Performance, and Reliability
- Defining Asset Service and Performance Levels
- Capture of Operations and Maintenance Cost
- Selecting Interventions
- Modeling and Forecast of Performance
- Valuing Assets and Services

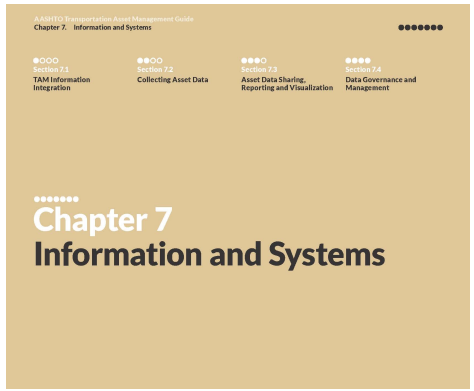
# Data Themes are Throughout the Guide



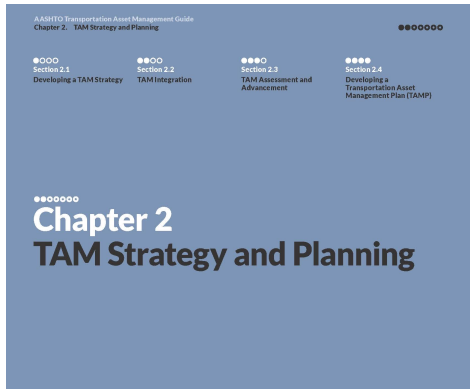



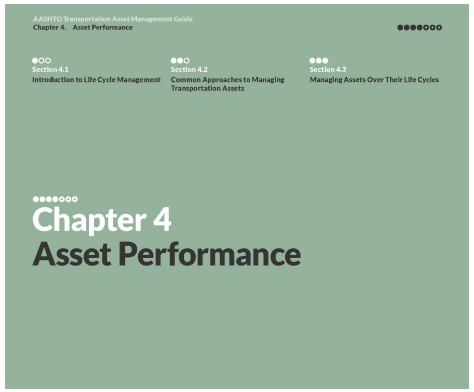



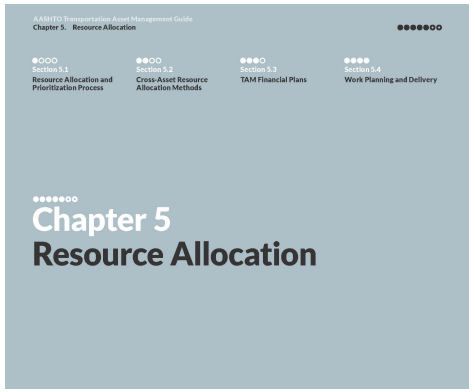



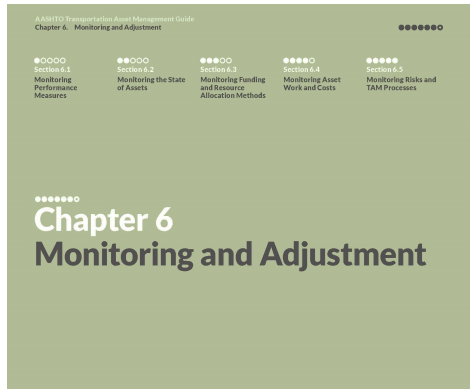

- Considering Risk in Resource Allocations
- Work Planning and Timing
- Allocating Resources within an Asset Program
- Allocating Resources across Asset Programs
- Financial Planning

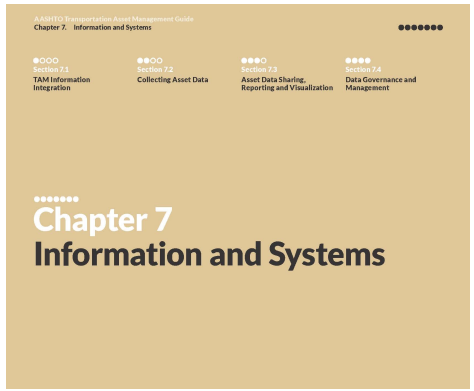
# Data Themes are Throughout the Guide



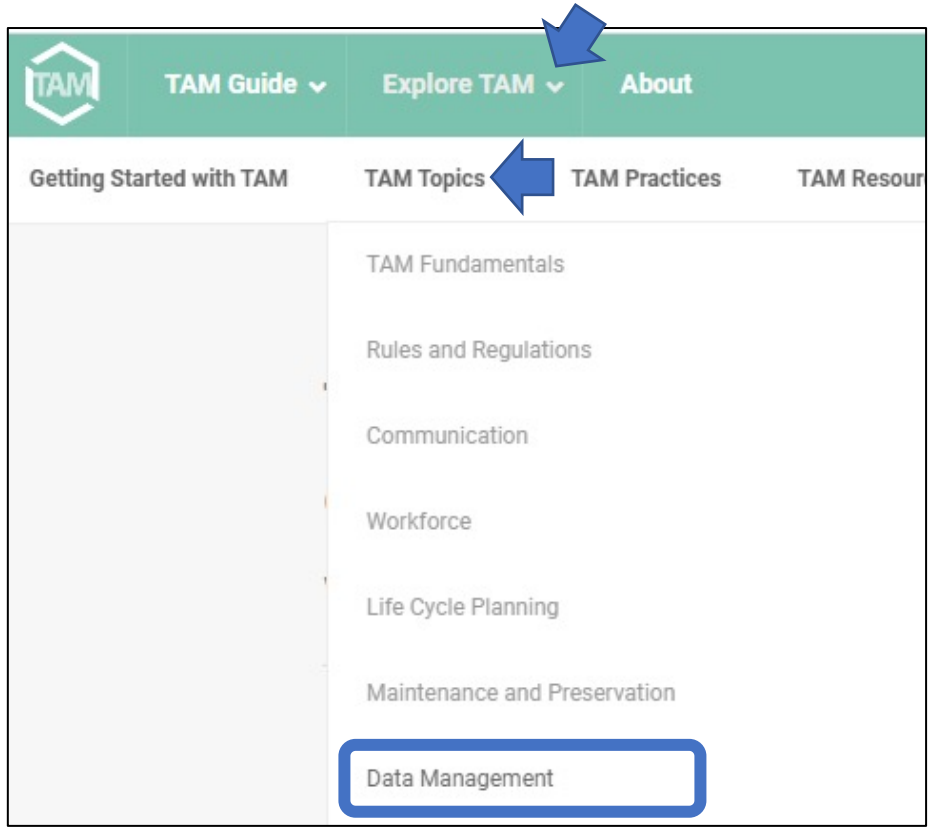




- Selecting, Using and Monitoring Performance Measures
- Monitoring and Maintaining Performance and Risk Data
- Using Trend Analysis for Program Adjustment
- Tracking Work Activities and Treatment Costs
- Improving Asset/Treatment Models
- Monitoring, Improving, and Managing Responsibilities for TAM Processes

# Data Themes are Throughout the Guide

**The guide includes a cross-cutting "Data Management" view.**

- Identify specific data-related sections of each Chapter
- Access relevant "How to Guides" and "Checklists"
- Consider "Emerging", "Strengthening", "Advanced" practice examples
- Review real-world practices and implementations

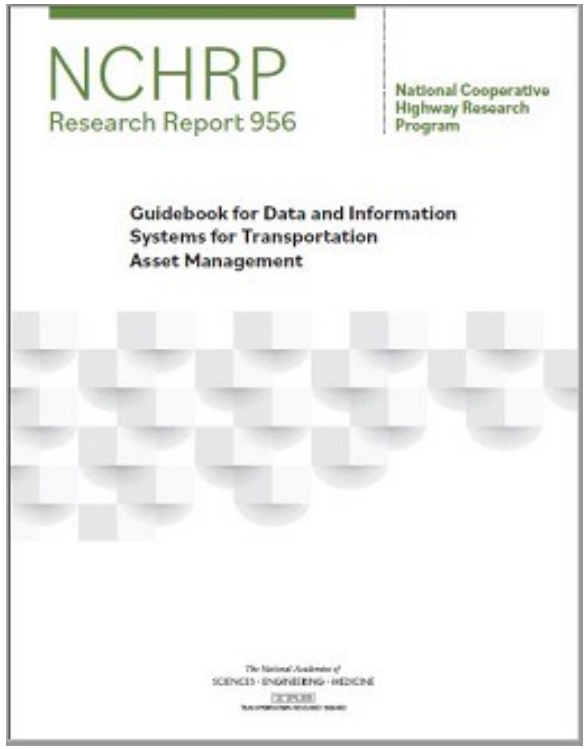


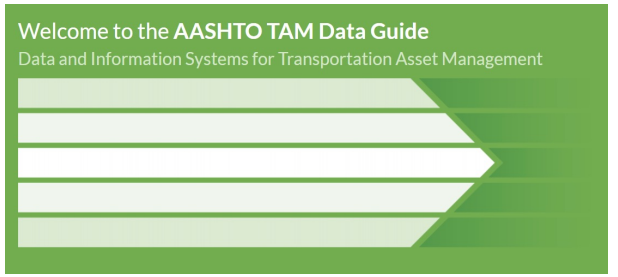
# AASHTO TAM Guide Book Club
## Additional TAM Data Resources

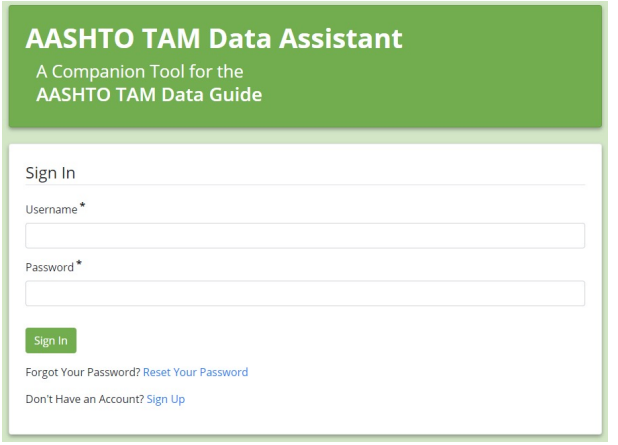
**NCHRP Research Report 956**
https://http://www.trb.org/Highways1/Blurbs/181816.aspx

**AASHTO TAM Data Guide**
https://www.tamdataguide.com/

**AASHTO TAM Data Assistant**
https://dataassessment.tam-portal.com/



# AASHTO TAM Guide Book Club
## Today's Speakers

- **Vanloan Nguyen,** Virginia DOT
- **Karen Riemer,** Connecticut DOT


VDOT
Virginia Department of Transportation

# STRENGTHENING USE OF DATA IN VDOT'S TRAFFIC ASSET PROGRAMS

TAM Book Club Presentation

Vanloan Nguyen, Traffic Engineering Division

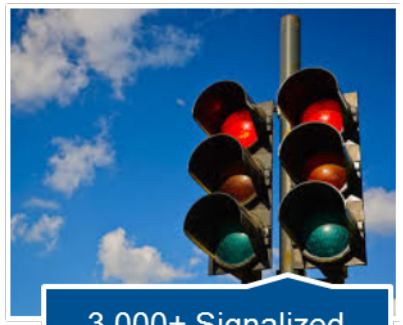
June, 2021

# Traffic Assets in Virginia


1 Million+ Signs

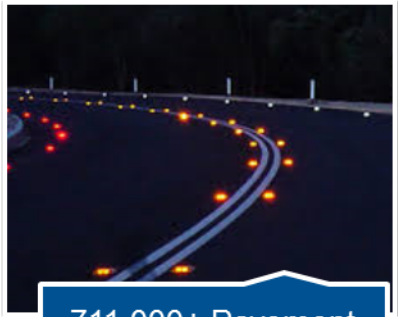
34,000+ Traffic Ancillary Structures

7,400+ Miles of Guardrail



3,000+ Signalized Intersections

50,000+ Roadway Lighting Fixtures



711,000+ Pavement Markers

137,000+ Pavement Messages

69,000+ Linear Miles of Pavement Markings

## Critical to the Safety and Operation of Our Highway System

# VDOT Mission: Keep Virginia Moving

**VDOT Operations Vision: Provide and optimize an integrated, world class transportation system that moves people and goods safely and reliably.**

### Goal 1

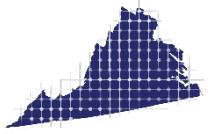
**Safety**

Reduce crashes and fatalities through continuous improvement of traffic management systems and procedures.

### Goal 2

**Mobility**

Maintain reliable travel times on transportation systems in critical corridors to ensure travelers are reaching their destinations in the amount of time expected.



### Goal 3

**Statewide Alignment and Coordination**

Proactively manage an integrated transportation system across Districts, other localities, Virginia agencies and private sector.

### Goal 4

**Infrastructure Systems Management**

Ensure a resilient, secure transportation system ready for all incidents. Maximize ROI by preserving system capacity.

### Goal 5

**Support**

Provide the workforce, research and innovation to advance core programs and services.

# Advancing the Statewide Program

## Collecting, Managing, and Communicating Data has been a Focus

| | |
|---|---|
| **Strategy and Planning** | • Connecting traffic assets to agency goals<br>• Establishing program direction for Districts |
| **Asset Performance** | • Capturing inventory and condition information<br>• Quantifying safety / operational performance |
| **Resource Allocation** | • Competing with Bridges and Pavement<br>• Identifying strategy investments |
| **Monitoring / Adjustment** | • Tracking District work accomplishments<br>• Guiding ongoing plans/priorities to goals |

# Keys Aspects of the Traffic Asset Data Programs

## GIS-Based Asset Inventories

- Initial, statewide asset extractions provide baseline data
- Develop network-level prioritization and screening tools
  - Integrate external data (e.g. traffic, crash, roadway characteristics, paving conditions)
  - Expose combined data in map-based platform for office and/or field access

## Incremental Data Update and Upkeep

- Distribute data update/upkeep into initiative/project specific workflows
  - Office activities (e.g. planning/project development)
  - Field activities (e.g. windshield assessments, site visits, project delivery)
- Automate and prepopulate inventory and condition updates where possible

**Performance Dashboards and Reporting**

Field adoption is dependent on regular monitoring and reporting – ideally with recurring executive progress reporting.

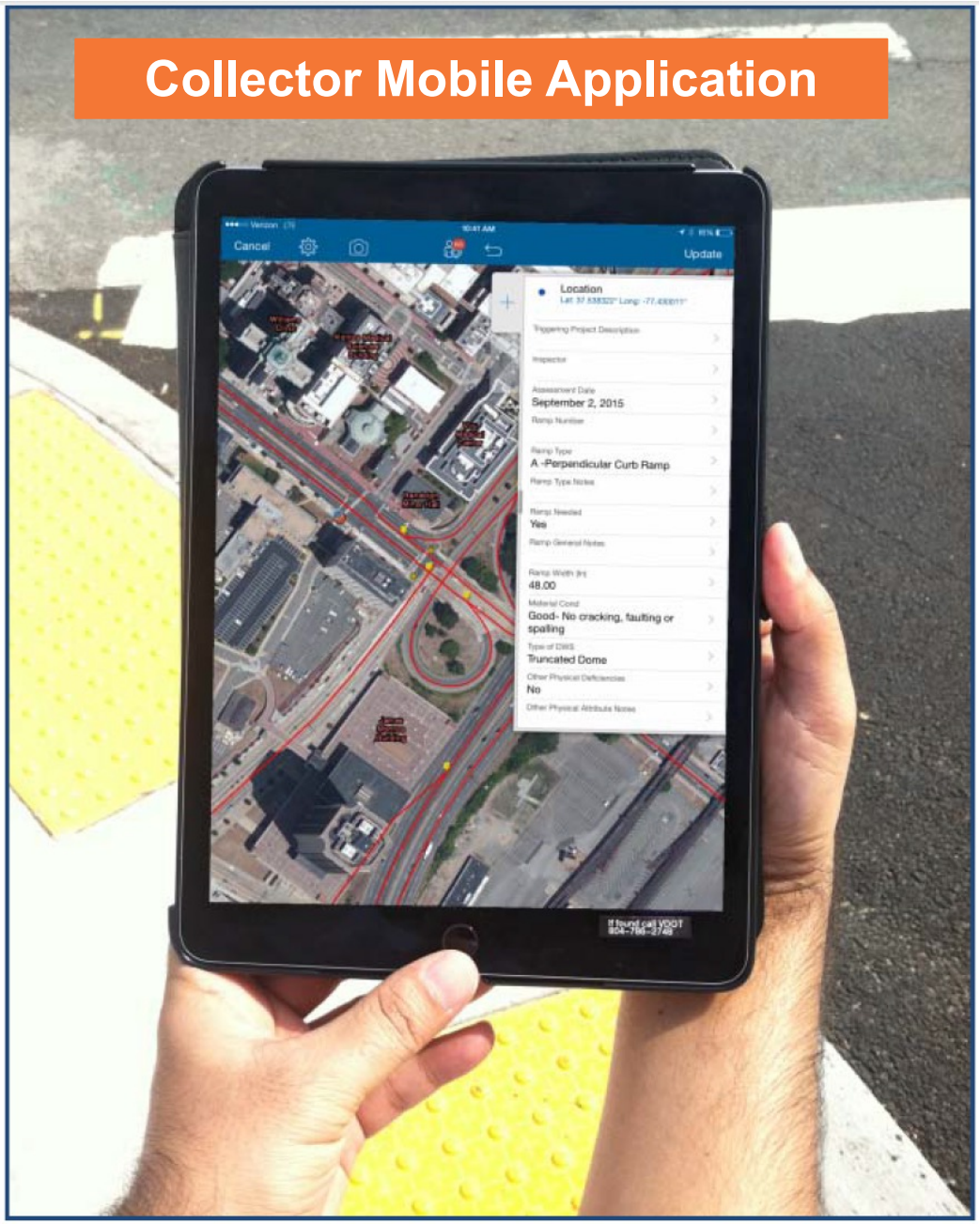
# ADA Tracker

*Supports*

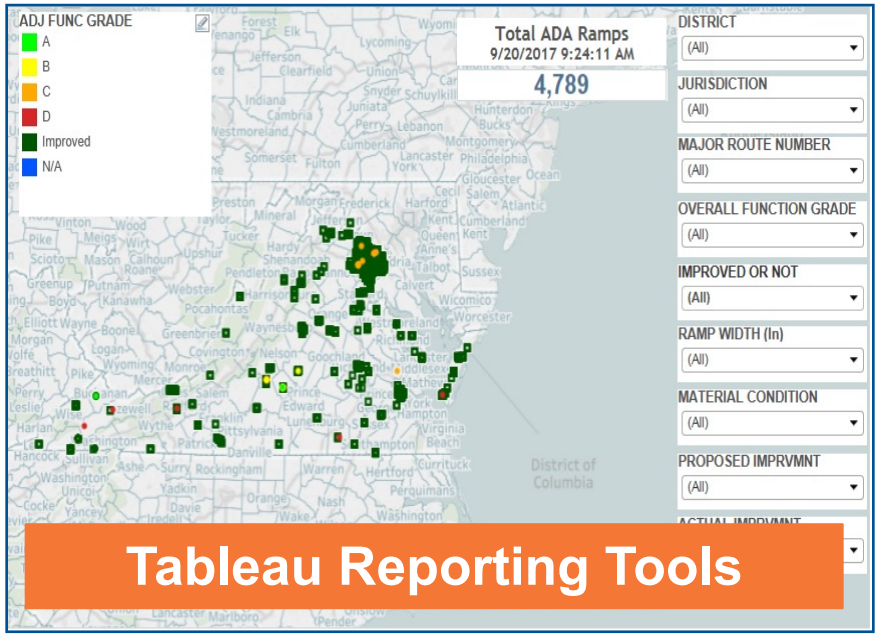
**ADA Compliance on Alteration Projects**

**VDOT's Federally Required ADA Transition Plan**

**Civil Rights Division Performance Measures**







# Guardrail Tracker

*Supports*

**Strategic Guardrail Management Program**

**Monitoring Federal PM/3R Agreement**

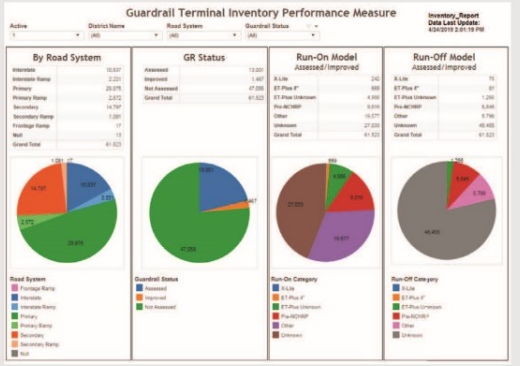
**Safety Upgrades for Paving Projects**

## Data-Driven Investment: Focusing on the Highest Return

| Guardrail Improvement Benefit Factor (BF) (by Guardrail Condition, Crash Risk and Pavement Condition) | | | | | | Crash Priority (and CPF) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Lowest | Low | Medium | High | Highest |
| | | | | | | 0.50 | 0.75 | 1.00 | 1.25 | 1.50 |
| Guardrail Condition (and Guardrail Condition Factor) | Condition A (Fully Functional) | 0.10 | Pave Condition (and PCM) | Very Poor | 1.00 | 0.05 | 0.08 | 0.10 | 0.13 | 0.15 |
| | | | | Poor | 1.00 | 0.05 | 0.08 | 0.10 | 0.13 | 0.15 |
| | | | | Fair | 1.00 | 0.05 | 0.08 | 0.10 | 0.13 | 0.15 |
| | | | | Good | 1.10 | 0.06 | 0.08 | 0.11 | 0.14 | 0.17 |
| | | | | Excellent | 1.10 | 0.06 | 0.08 | 0.11 | 0.14 | 0.17 |
| | Condition B (Adequate) | 0.50 | Pave Condition (and PCM) | Very Poor | 1.00 | 0.25 | 0.38 | 0.50 | 0.63 | 0.75 |
| | | | | Poor | 1.00 | 0.25 | 0.38 | 0.50 | 0.63 | 0.75 |
| | | | | Fair | 1.00 | 0.25 | 0.38 | 0.50 | 0.63 | 0.75 |
| | | | | Good | 1.10 | 0.28 | 0.41 | 0.55 | 0.69 | 0.83 |
| | | | | Excellent | 1.10 | 0.28 | 0.41 | 0.55 | 0.69 | 0.83 |
| | Condition C (Deficient) | 1.50 | Pave Condition (and PCM) | Very Poor | 1.00 | 0.75 | 1.13 | 1.50 | 1.88 | 2.25 |
| | | | | Poor | 1.00 | 0.75 | 1.13 | 1.50 | 1.88 | 2.25 |
| | | | | Fair | 1.00 | 0.75 | 1.13 | 1.50 | 1.88 | 2.25 |
| | | | | Good | 1.10 | 0.83 | 1.24 | 1.65 | 2.06 | 2.48 |
| | | | | Excellent | 1.10 | 0.83 | 1.24 | 1.65 | 2.06 | 2.48 |
| | Condition D (Obsolete) | 2.00 | Pave Condition (and PCM) | Very Poor | 1.00 | 1.00 | 1.50 | 2.00 | 2.50 | 3.00 |
| | | | | Poor | 1.00 | 1.00 | 1.50 | 2.00 | 2.50 | 3.00 |
| | | | | Fair | 1.00 | 1.00 | 1.50 | 2.00 | 2.50 | 3.00 |
| | | | | Good | 1.10 | 1.10 | 1.65 | 2.20 | 2.75 | 3.30 |
| | | | | Excellent | 1.10 | 1.10 | 1.65 | 2.20 | 2.75 | 3.30 |

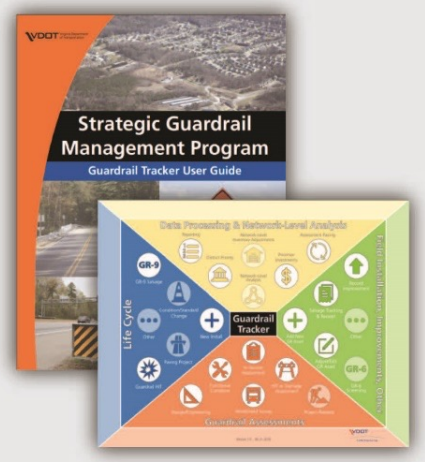
**Benefit factor calculated for each guardrail**

## Performance Management Framework

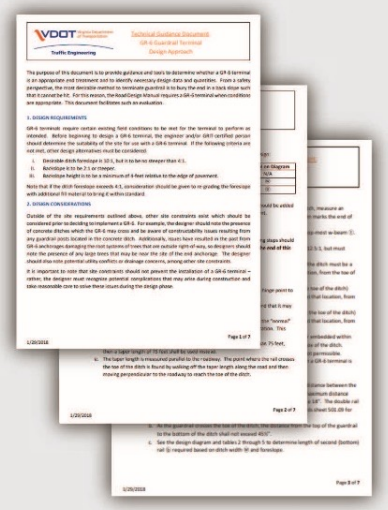



**Statewide Business Intelligence Reporting**

## Knowledge Management Framework

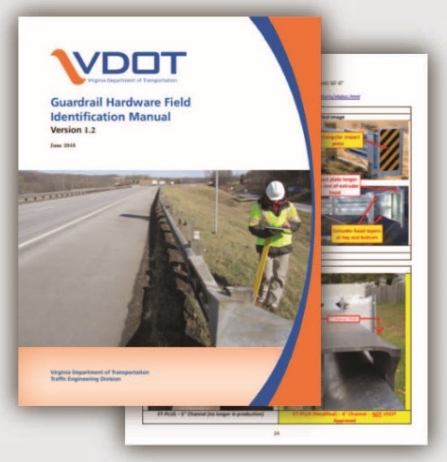



**Guardrail Tracker User Guide**



**Standardized templates for processes and assessments**

## Innovative Inventory Approach




**Guardrail Hardware Field Identification Manual**


**Enter, track and view inventory through desktop and mobile web interfaces**

# Guardrail Tracker

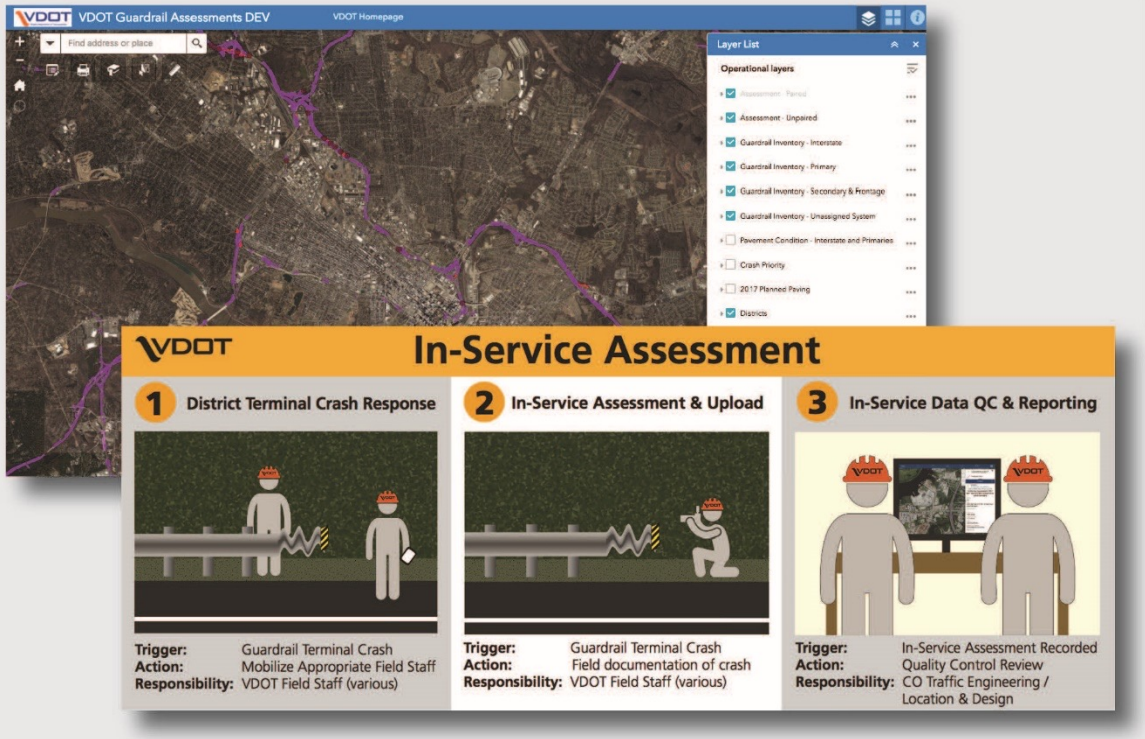
*Supports*

**Strategic Guardrail Management Program**

**Monitoring Federal PM/3R Agreement**

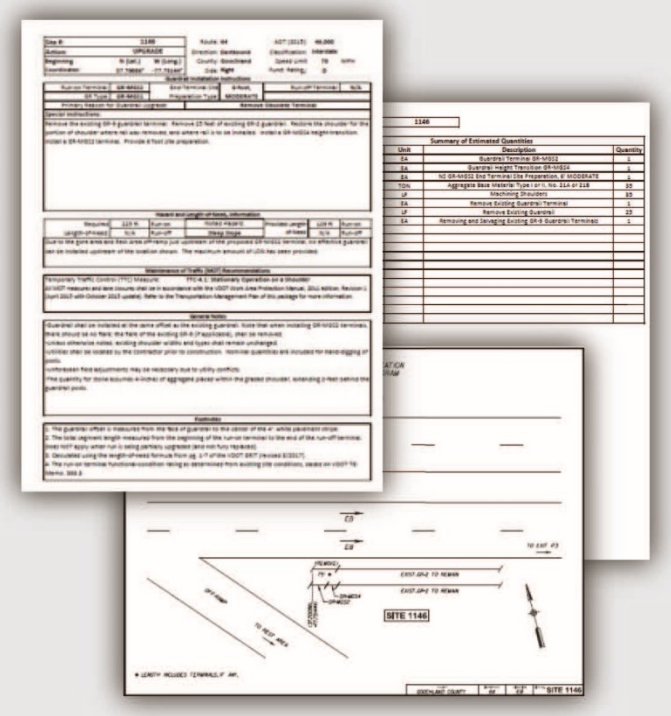
**Safety Upgrades for Paving Projects**

## Innovative Field Applications




- Simple to use
- Mobile & Desktop options
- Data stored & available in real- time
- Precise location collection using GPS and aerial imagery
- Report District, Product, Quality Control results, and more!
- Over 130 users statewide
- Over 100 users trained using the simple, easy-to-follow instruction guides

## Process Improvements



Consistent interpretation of design through

- Consistent format
- Geographical coordinates
- Detailed, site-specific instructions
- Items and quantities
- Site-specific Straight Line Diagram

# Lessons Learned

## Don’t wait for your agency to invest in an Enterprise AMS

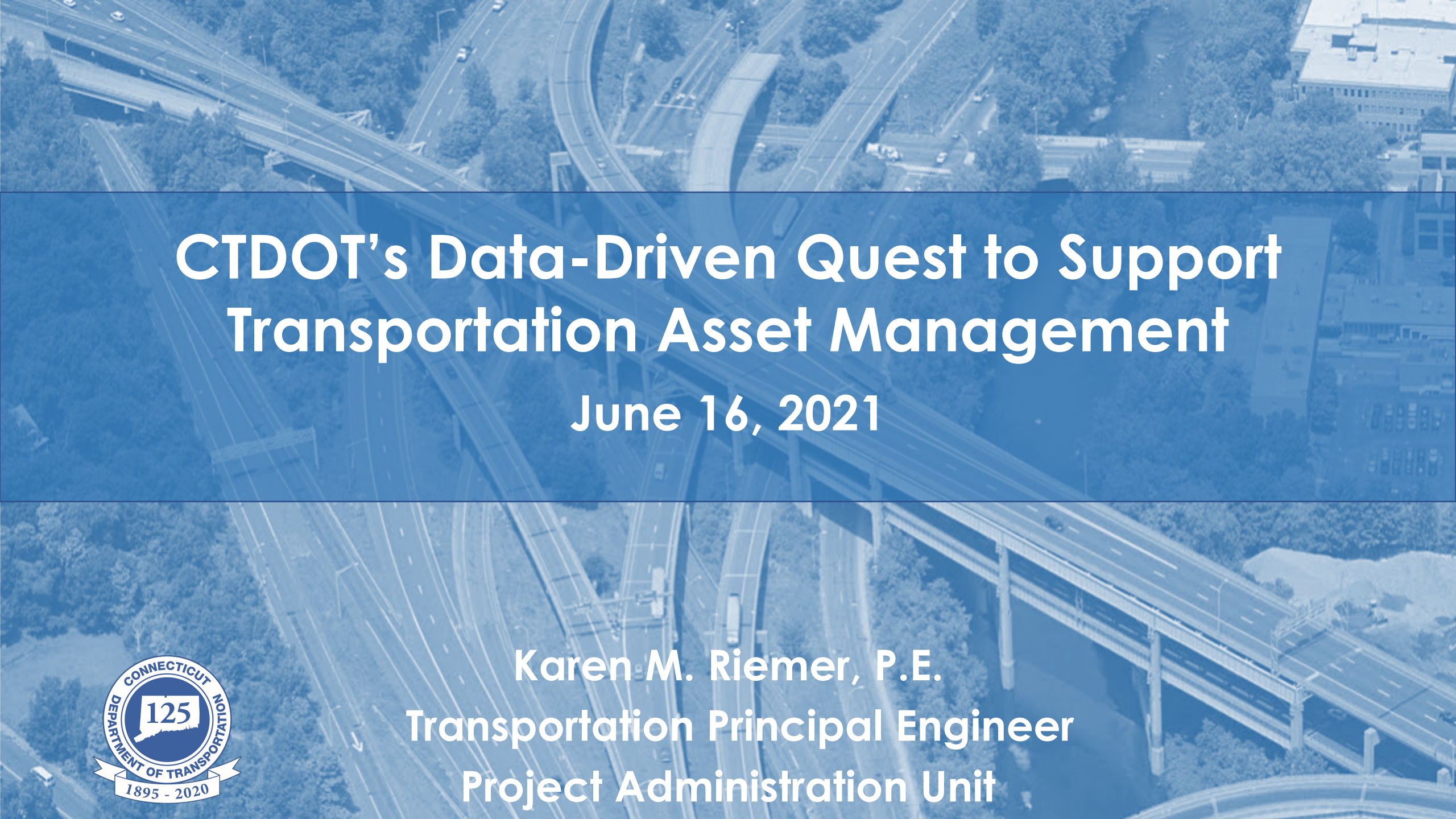
- Configurable GIS tools and BI reports are powerful solutions

## Think it through before you collect

- Make sure understand your data uses
- Evaluate your data model for long-term sustainability

## Incorporate performance management into any new data-driven process

- It’s the best way to keep your stakeholders engaged and accountable



# CTDOT's Data-Driven Quest to Support Transportation Asset Management

June 16, 2021


Karen M. Riemer, P.E.
Transportation Principal Engineer
Project Administration Unit

# CTDOT TAMP Chapter

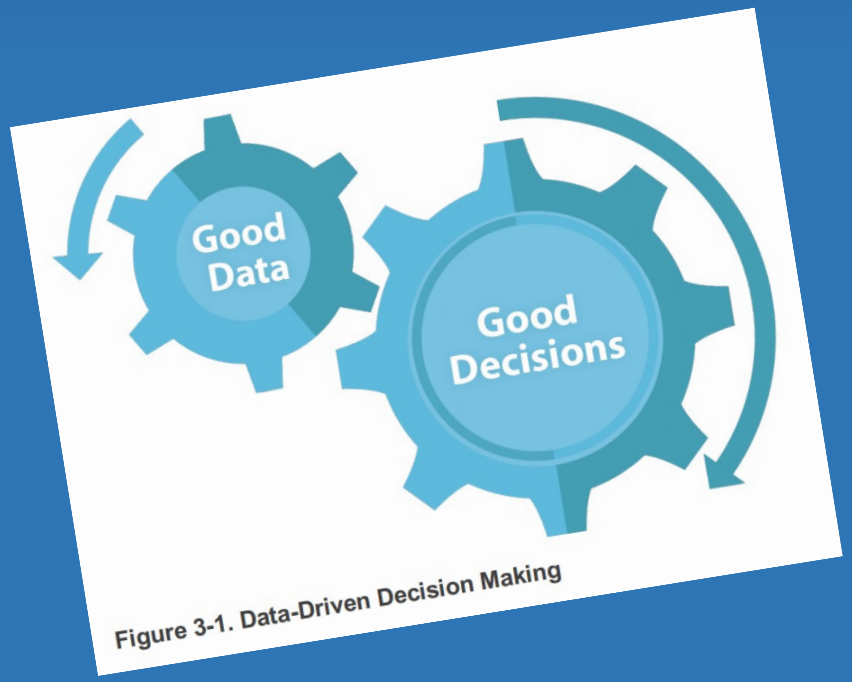
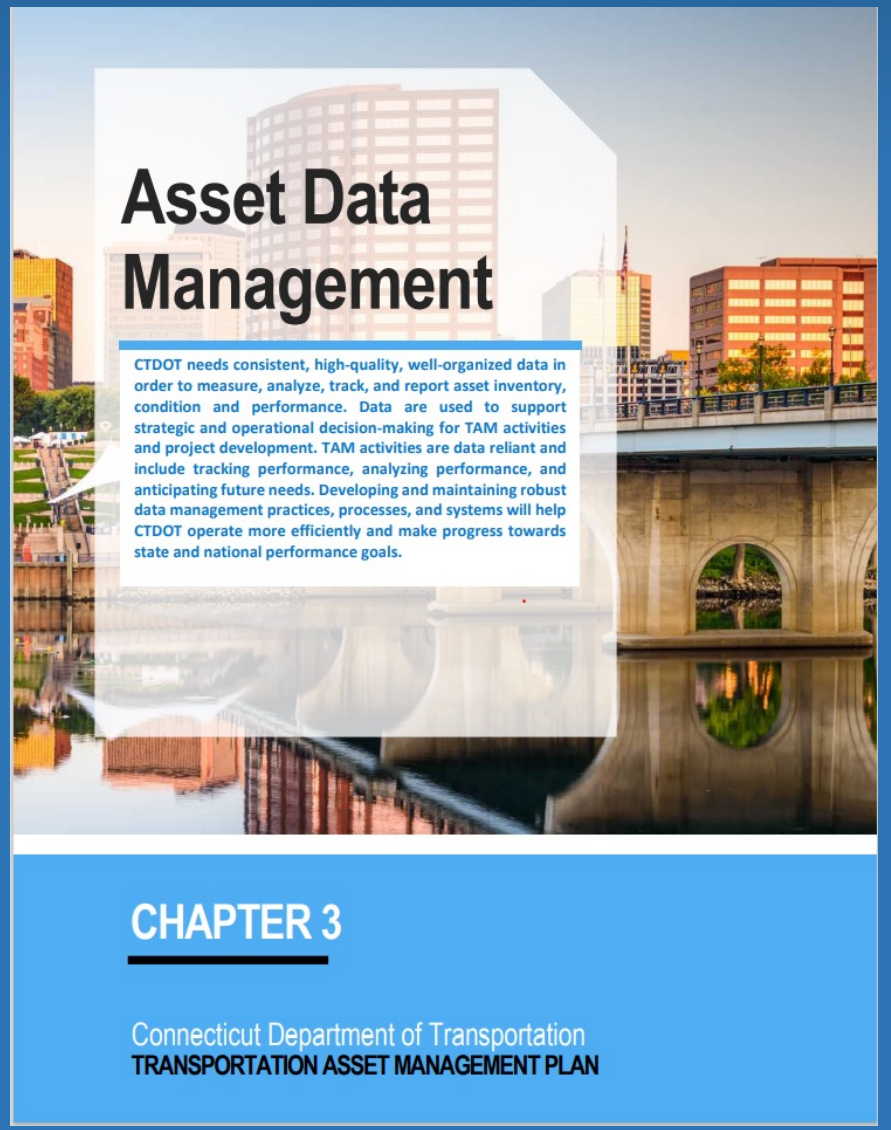



Figure 3-1. Data-Driven Decision Making

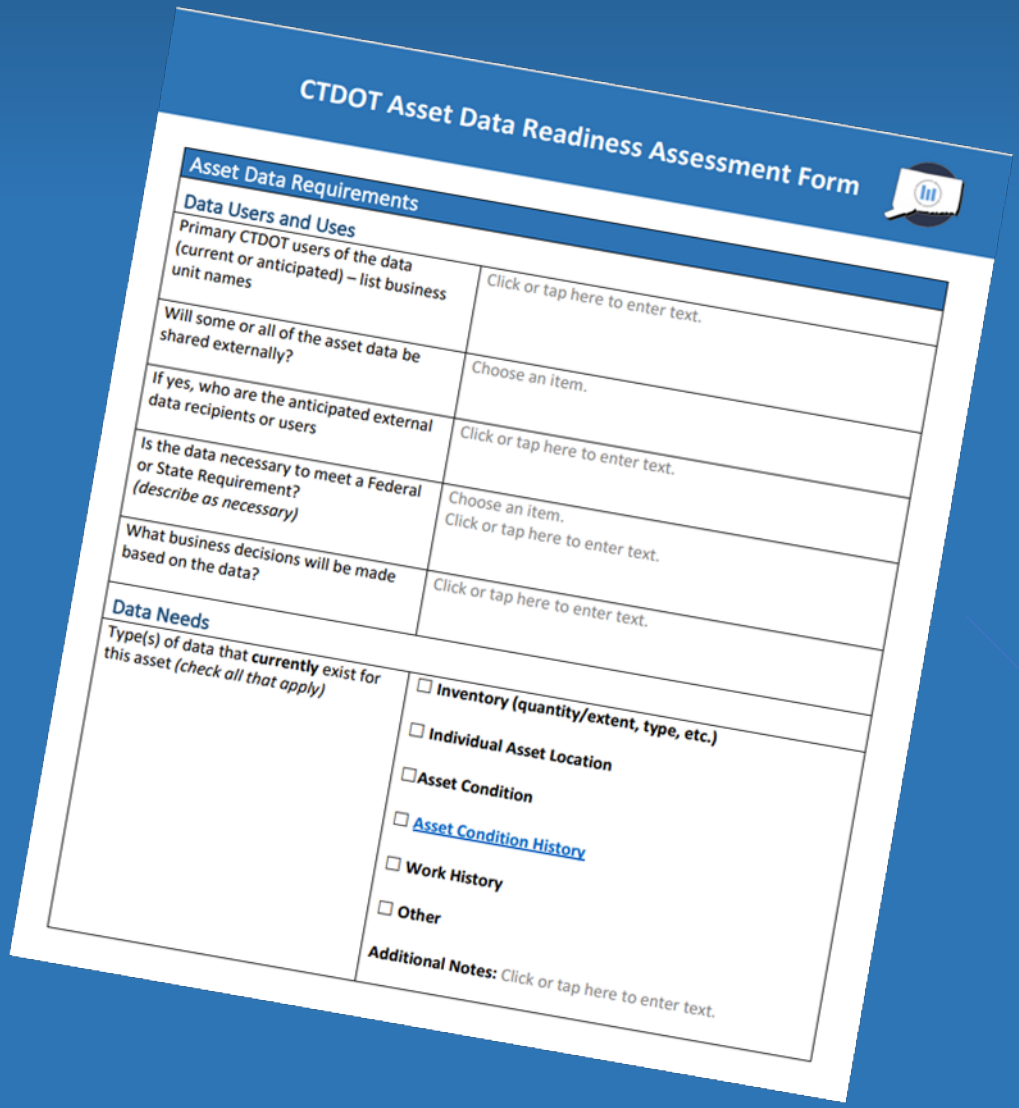


# Data Assessment Form

**CTDOT Asset Data Readiness Assessment Form**

## Readiness Form Sections





# TAM Systems Summary

## TAM Information Management Systems

This section summarizes the key asset and project-related information systems used and the data held within them. This summary includes a description of how each type of data are collected, analyzed, managed, housed, and used within the CTDOT. Figure 3-3 shows the assets in the Connecticut TAMP and the systems used to manage those assets. The data within these systems are also used to generate annual Federal submittals for NBI and HPMS. Additional applications, such as ESRI Collector, are being used for other assets that may be included in future TAMPs.

| | Bridges | Pavement | Traffic Signals | Signs | Sign Supports | Pavement Markings | Highway Buildings |
|---|---|---|---|---|---|---|---|
| InspectTech | • | | - | | • | | • |
| dTims | • | • | | | - | | |
| EXOR | - | - | - | • | - | - | |
| Traffic Signals Database | | | • | | | | |
| Transportation Enterprise Database (TED) | • | - | • | • | - | - | - |
| CT ATLAS | • | | • | | | - | - |
| ProjectWise (PW) | • | - | • | | • | | • |
| Composite Project Database (CPD) | • | - | • | - | - | - | - |
| DigitalHIWAY | • | • | • | • | • | • | |
| Maintenance Management System (MMS) | - | - | - | • | - | - | |

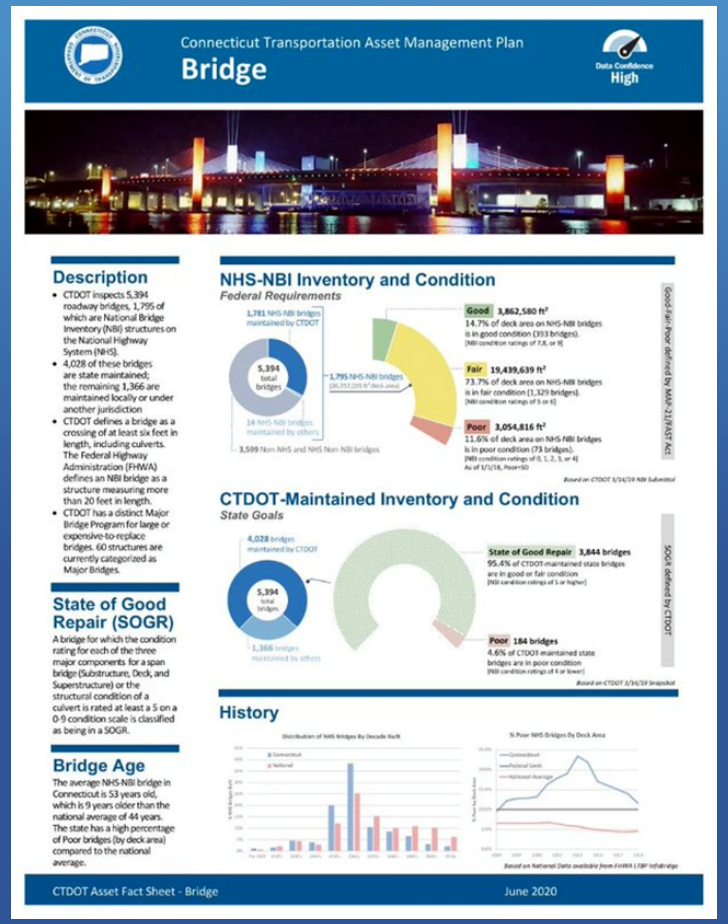
- Considered for future deployment.

Figure 3-3. TAM Information Management Systems

- Description
- Contents
- Functions/Uses
- Data Sources
- Improvement Needs

# The Data-Driven Quest Continues …

- Update asset inventory, condition, performance projections and financials for annual Asset Fact Sheet updates and annual FHWA Consistency Review




# The Data-Driven Quest Continues …

- Update asset inventory, condition, performance projections and financials for annual Asset Fact Sheet updates and annual FHWA Consistency Review
- Capture Assets in Capital Program Enhancements by FHWA Work Types, Work Codes and Asset Costs

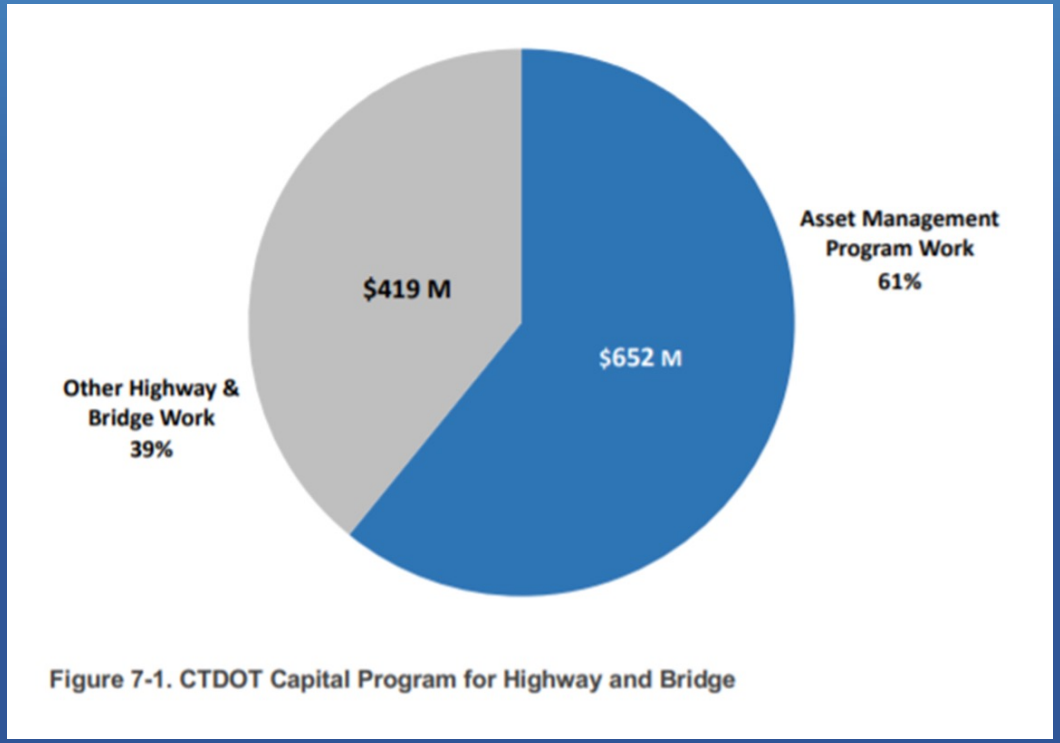
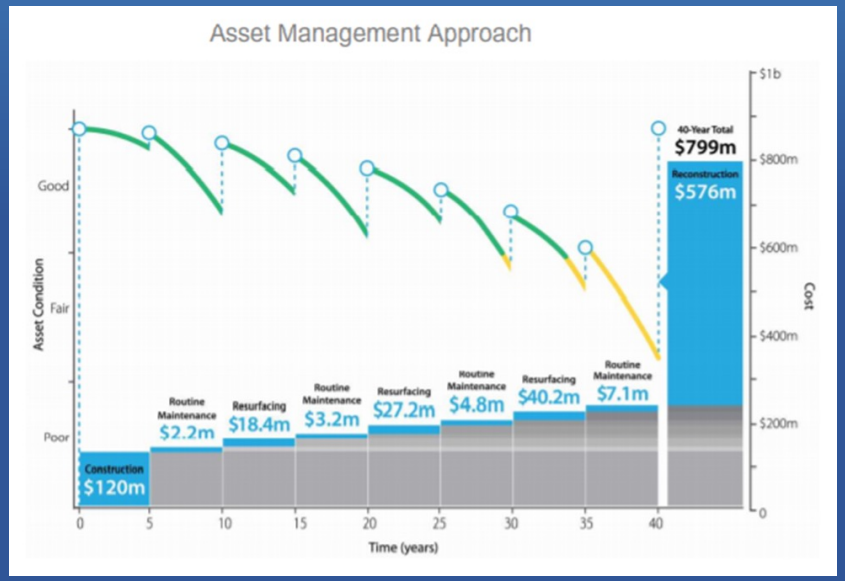


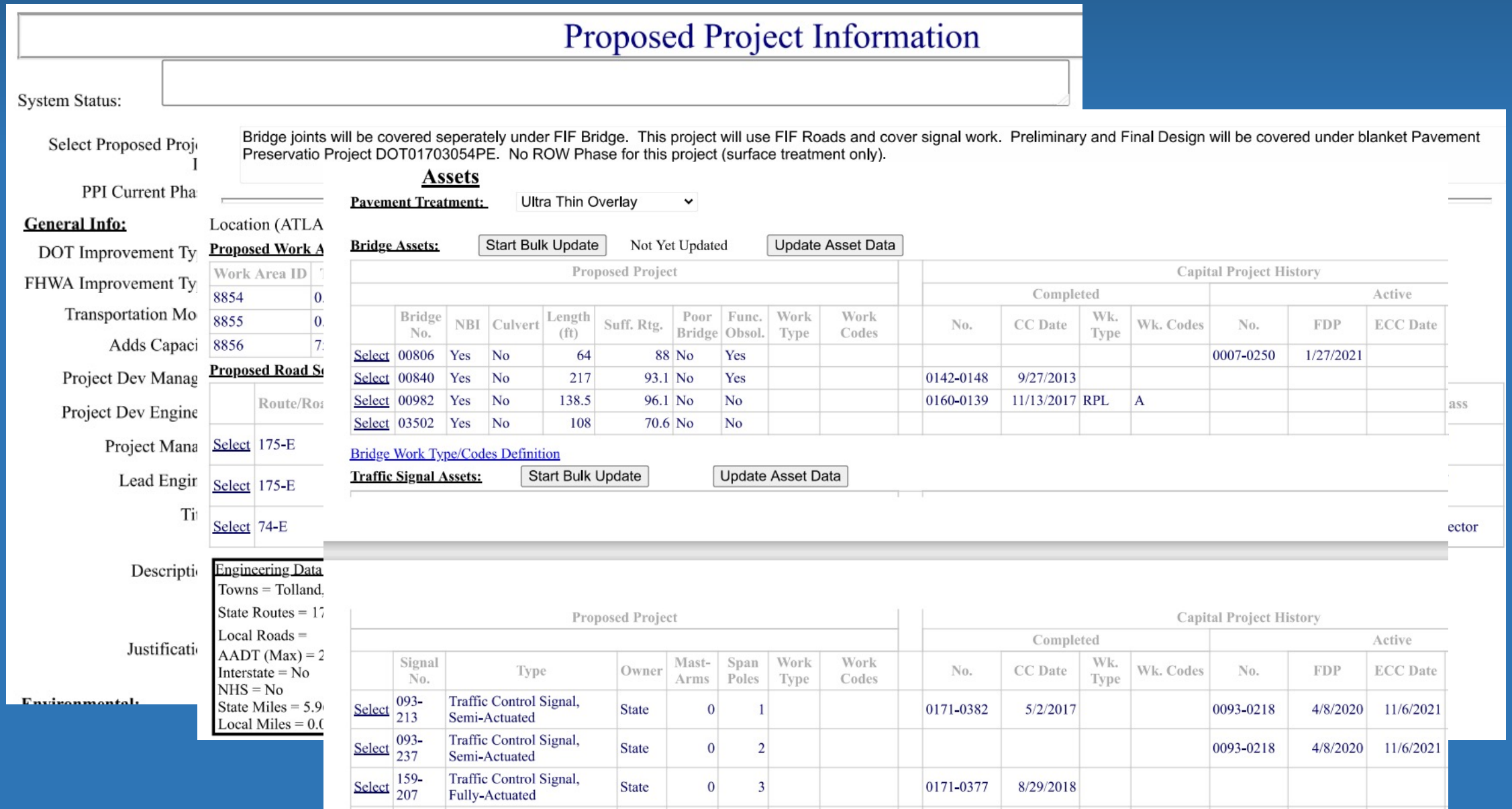

Figure 7-1. CTDOT Capital Program for Highway and Bridge

# The Data-Driven Quest Continues …

- Update asset inventory, condition, performance projections and financials for annual Asset Fact Sheet updates and annual FHWA Consistency Review
- Capture Assets in Capital Program Enhancements by FHWA Work Types, Work Codes and Asset Costs
- Validate Treatment Performance on Life Cycle



# TAM Information Integration



## Proposed Project Information

System Status:

Select Proposed Proj
I

PPI Current Pha

**General Info:**

DOT Improvement Ty

FHWA Improvement Ty

Transportation Mo

Adds Capaci

Project Dev Manag

Project Dev Engine

Project Mana

Lead Engi

Ti

Descripti

Justificati

**Environmental:**

Bridge joints will be covered seperately under FIF Bridge. This project will use FIF Roads and cover signal work. Preliminary and Final Design will be covered under blanket Pavement Preservatio Project DOT01703054PE. No ROW Phase for this project (surface treatment only).

Location (ATLA

**Proposed Work A**

| Work Area ID | |
|---|---|
| 8854 | 0 |
| 8855 | 0 |
| 8856 | 7 |

**Proposed Road Se**

| | Route/Roa |
|---|---|
| Select | 175-E |
| Select | 175-E |
| Select | 74-E |

Engineering Data
Towns = Tolland,
State Routes = 17
Local Roads =
AADT (Max) = 2
Interstate = No
NHS = No
State Miles = 5.9
Local Miles = 0.0

### Assets

**Pavement Treatment:** Ultra Thin Overlay

**Bridge Assets:** Start Bulk Update | Not Yet Updated | Update Asset Data

| | Proposed Project | | | | | | | | | Capital Project History | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Completed | | | | Active | | |
| | Bridge No. | NBI | Culvert | Length (ft) | Suff. Rtg. | Poor Bridge | Func. Obsol. | Work Type | Work Codes | No. | CC Date | Wk. Type | Wk. Codes | No. | FDP | ECC Date |
| Select | 00806 | Yes | No | 64 | 88 | No | Yes | | | | | | | 0007-0250 | 1/27/2021 | |
| Select | 00840 | Yes | No | 217 | 93.1 | No | Yes | | | 0142-0148 | 9/27/2013 | | | | | |
| Select | 00982 | Yes | No | 138.5 | 96.1 | No | No | | | 0160-0139 | 11/13/2017 | RPL | A | | | |
| Select | 03502 | Yes | No | 108 | 70.6 | No | No | | | | | | | | | |

Bridge Work Type/Codes Definition

**Traffic Signal Assets:** Start Bulk Update | Update Asset Data

| | Proposed Project | | | | | | | Capital Project History | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Completed | | | | Active | | |
| | Signal No. | Type | Owner | Mast-Arms | Span Poles | Work Type | Work Codes | No. | CC Date | Wk. Type | Wk. Codes | No. | FDP | ECC Date |
| Select | 093-213 | Traffic Control Signal, Semi-Actuated | State | 0 | 1 | | | 0171-0382 | 5/2/2017 | | | 0093-0218 | 4/8/2020 | 11/6/2021 |
| Select | 093-237 | Traffic Control Signal, Semi-Actuated | State | 0 | 2 | | | | | | | 0093-0218 | 4/8/2020 | 11/6/2021 |
| Select | 159-207 | Traffic Control Signal, Fully-Actuated | State | 0 | 3 | | | 0171-0377 | 8/29/2018 | | | | | |

# The Data-Driven Quest Continues …

- Update asset inventory, condition, performance projections and financials for annual Asset Fact Sheet updates and annual FHWA Consistency Review
- Capture Assets in Capital Program Enhancements by FHWA Work Types, Work Codes and Asset Costs
- Validate Treatment Performance on Life Cycle
- Monitor Financials for Asset SOGR Program Placeholders
- Capture Maintenance Work by Asset Id and Costs

# AASHTO TAM Guide Book Club
## Break-Out Group Conversation

You are the TAM lead in your agency and you have been asked to consider collection of data for a new asset (pick one of the following: crosswalks, highway lighting or rumble strips).

You are preparing for a meeting with the asset owner.

- Make a list of questions that you will ask them to help you recommend whether and how to collect this data.
- Note sections of the TAM Guide where you found information to help you do this.

# Breakout Session
## Feedback

# Open Discussion

# Q & A

**This was the final of eight webinars planned for the AASHTO TAM Guide Book Club.**

**To review materials from this and previous sessions, please visit:**
https://www.tam-portal.com/event-directory/tam-webinars/

**To register:**
**https://www.tam-portal.com/event-directory/tam-webinars/**

**To access the Guide:**
**TAMGuide.com**

**Questions?**
**Contact Hyun-A Park or Matt Hardy for more information:**
hpark@spypondpartners.com
mhardy@aashto.org