

Transportation Asset Management Webinar Series

Webinar 71

Strategy, Planning & Resource Allocation

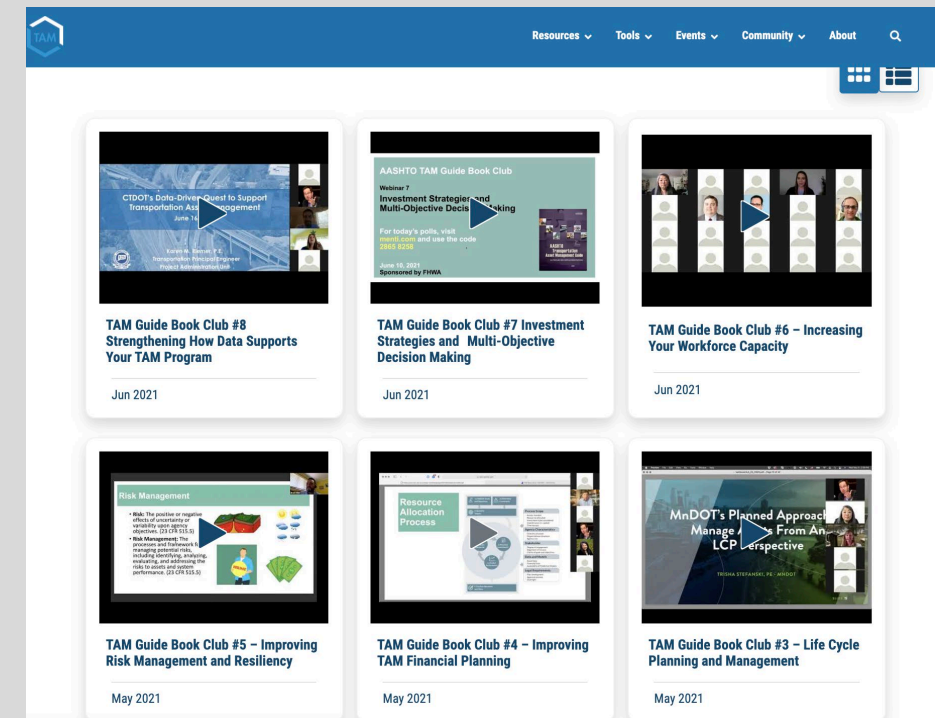
Sponsored by FHWA and AASHTO



October 16, 2024

FHWA/AASHTO Asset Management Webinar Series

- This is the 71st in a webinar series that has been running since 2012
- Webinars are held every two months, on topics such as off-system assets, asset management plans, asset management and risk management, and more
 - Usually, the 3rd Wednesday of the month, 2PM Eastern
- We welcome ideas for future webinar topics and presentations
- Submit your questions using Zoom'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
- FHWA Asset Management Hub: <https://www.fhwa.dot.gov/asset/pubs.cfm>

Webinar Objectives

- Learn about the TAM Guide Chapter 2 – TAM Strategy and Planning and TAM Guide Chapter 5 – Resource Allocation.
- Highlight the implementation of MnDOT's Strategic Action Plan and lessons learned.
- Feature best practices from Utah DOT regarding asset valuation.

Webinar Agenda

- | | | | |
|-------------|---|-------------|--|
| 2:00 | Welcome, Overview, and Agenda
Christos Xenophontos, AASHTO CPBM
Tashia Clemons, FHWA
Hyun-A Park, Spy Pond Partners | 2:40 | TAM Guide Chapter 5: Resource Allocation
William Robert, Spy Pond Partners |
| 2:10 | TAM Guide Chapter 2: TAM Strategy and Planning Overview of Enhancements
Martin Gordon, WSP | 2:55 | Utah DOT Asset Valuation
Chris Whipple, Utah DOT |
| 2:25 | Minnesota TAM Strategic Action Plan
Trisha Stefanski, Minnesota DOT | 3:10 | Q&A, Discussion and Next Steps
Hyun-A Park, Spy Pond Partners
Christos Xenophontos, AASHTO CPBM |

The AASHTO TAM Digital Guide: Overview of Chapter 2

Martin Gordon, Senior Principal, WSP Inc

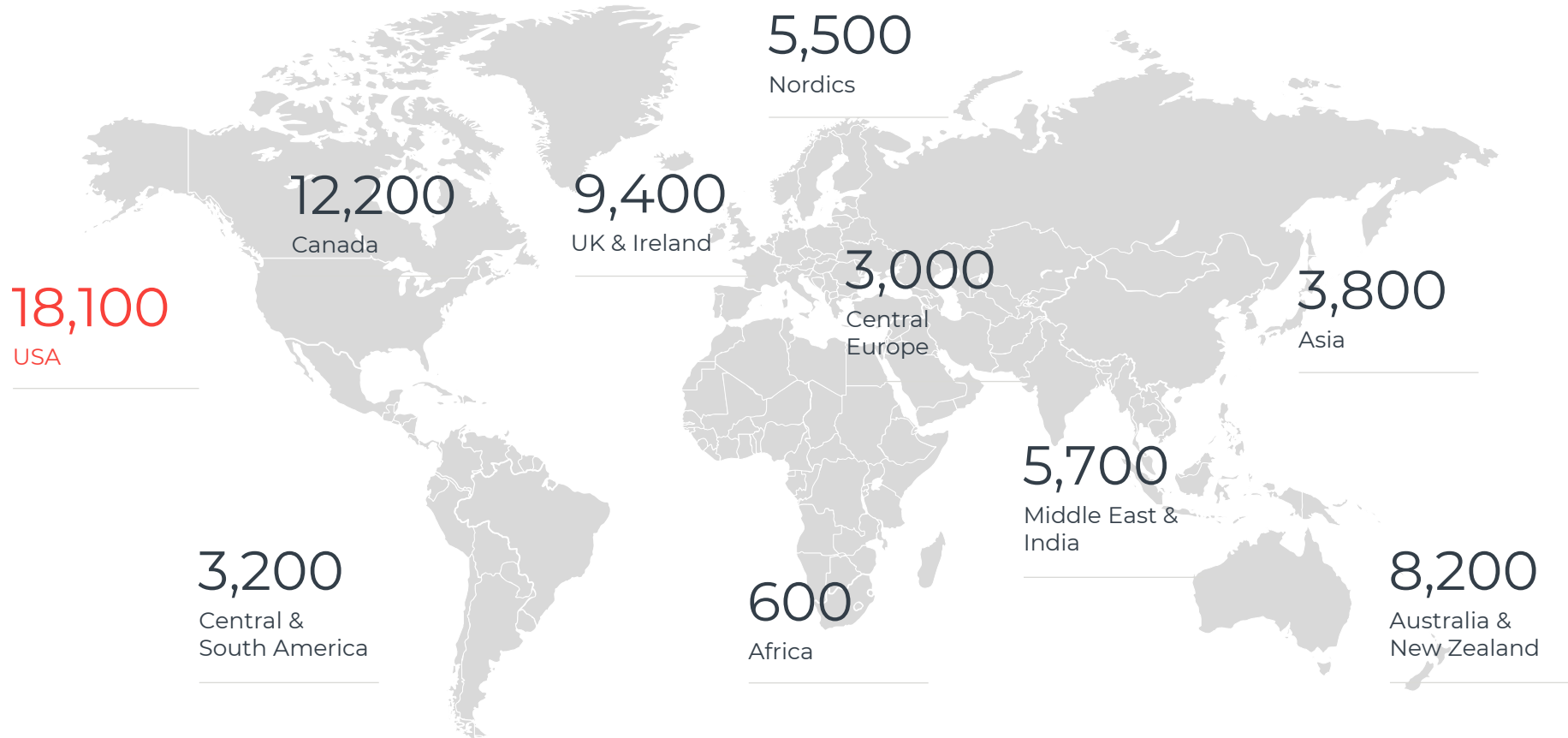
2024/Oct/16



WSP Global

66,500

Employees
Worldwide



What is Chapter 2 All About?

2.1 Developing a TAM Strategy

Linking to agency strategic documents and the AM policy

2.2 TAM Integration

Integrating performance, risk and resilience into how agencies do planning and programming and supporting data / analysis.

2.3 TAM Assessment and Advancement

Assessing agency AM practices and having a plan to improve.

2.4 Developing a TAMP

Elements of a basic TAMP and how to take steps beyond basic.

2.5 Beyond Pavements and Bridges

Ancillary assets, and management considerations

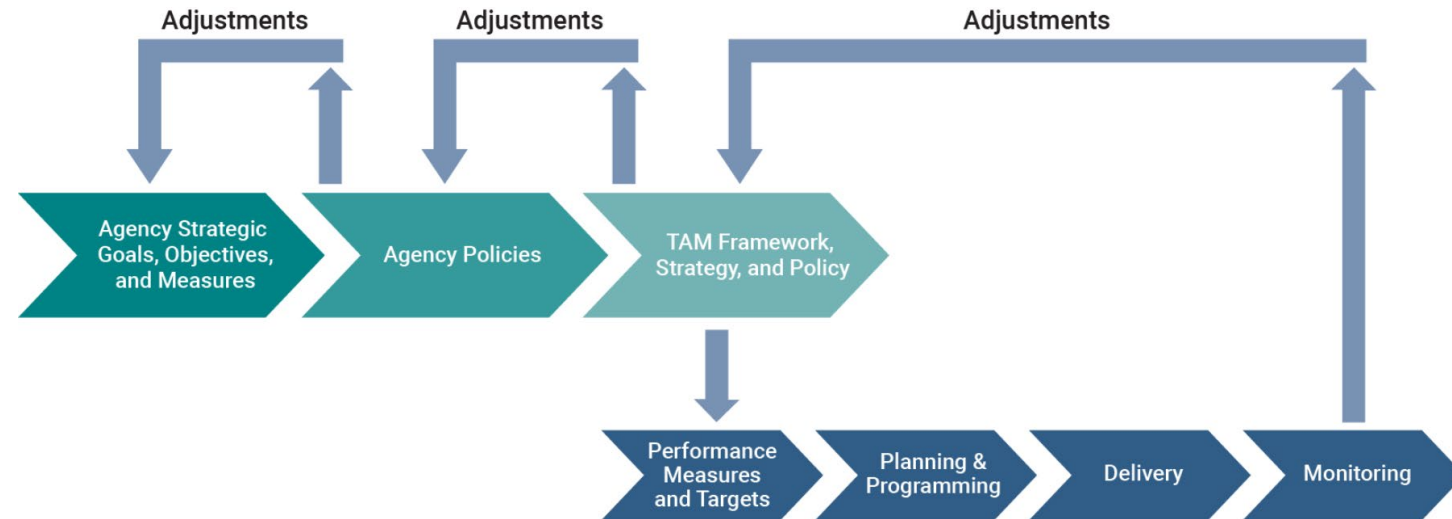
2.6 Incorporating Equity into TAM

Understanding Equity and how to integrating into TAM practices

Section 2.1 Developing a TAM Strategy

New Video Resources

- Integrating PM2 Targets with the TAMP, AASHTO TAM Webinar #34
- Integrating Effective Performance, Risk, and Asset Management, Mara Campbell
- Strategic Framework for Asset Management, Meredith Hill



What's New?

Section 2.2 TAM Integration

New Video Resources

- Using the TAMP Approach to Look at Demand Scenarios, Jack Smith
- Integrating TAM Into the Planning Process, FHWA TAM Expert Task Group
- Improving Risk Management and Resiliency, AASHTO TAM Guide Book Club #5
- Risk Management, AASHTO TAM Webinar #27

New Section: Connecting Resilience with Asset Management

1. **Develop Resilience Objectives and Targets**
2. **Identify Risk**
3. **Assess Risk**
4. **Identify and Implement Resilience Strategies**
5. **Integrate Resilience Strategies into TAM planning**
6. **Monitor and Evaluate Resilience**

Associated New Video Resources

- TAM Resilience Building: Takeaways from the TAM Peer Exchange, AASHTO TAM Webinar #60
- Resiliency and the IIJA, AASHTO TPM Webinar #27

Section 2.3 TAM Assessment and Advancement

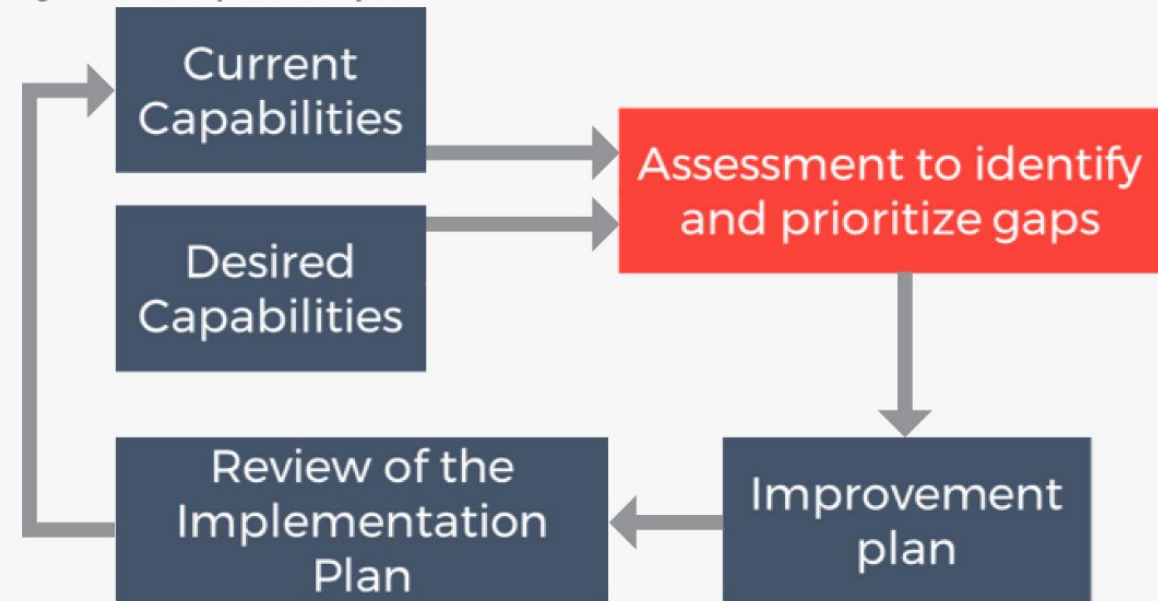
New Video Resources

- TAM Innovations, AASHTOTAM Webinar #31
- TAMP Implementation, AASHTOTAM Webinar #39

Existing Sections

- Assessing Current Practice
- Defining and Prioritizing Improvement in TAM Approaches
- Developing a TAM Implementation Plan
- Monitoring TAM Program Improvements

Figure 2.8 TAM Improvement Cycle



What's New?

Section 2.4 Developing a TAMP

New Video Resources

- The 2022 TAMPs and BIL Requirements, AASHTO TAM Webinar #58
- Developing a Complete TAMP, AASHTO TAM Webinar #35
- Improving Your Next TAMP Miniseries – Overview, AASHTO TAM Webinar #46
- 2022 TAMPs – Lessons from Practitioners, AASHTO TAM Webinar #53
- Preparing for Your 2022 TAMP with the TAM Guide, AASHTO TAM Guide Book Club #1
- TAM Tools Miniseries 02 – Management Systems, AASHTO TAM Webinar #55
- TAMP Implementation and Integration, AASHTO TAM Guide Book Club #2

Existing Sections:

1. The Basic TAMP
 - TAMP Requirements
 - TAM Policies, Goals, and Objectives
 - Asset Inventory and Condition
 - Life Cycle Planning Approach
 - Predicted Asset Condition
 - Investment Plan
 - Risk Management
2. Beyond the Basic TAMP
 - TAMP Scope
 - TAM Implementation Plan
 - TAM-Related Business Processes

What's New?

Section 2.5 Beyond Pavements and Bridges

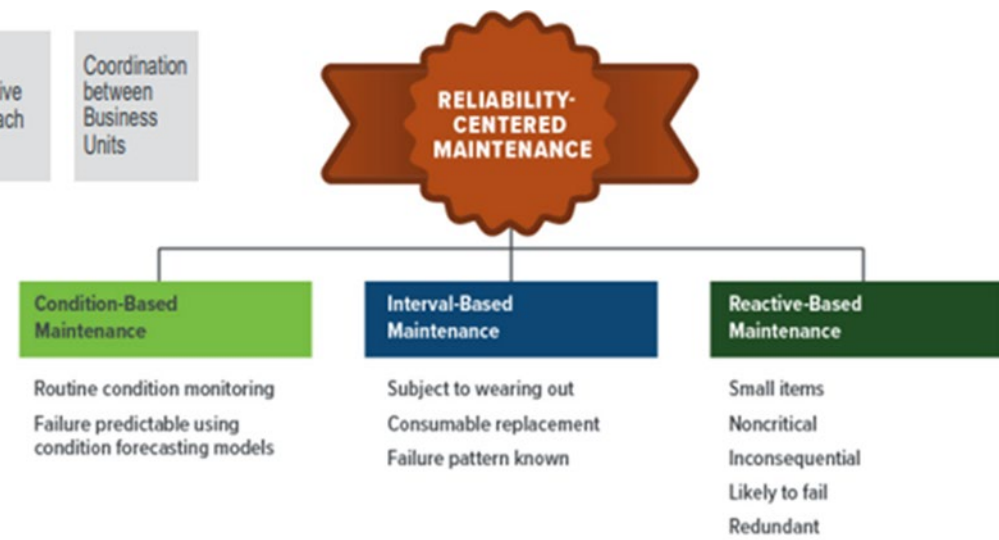


New Section:

1. Drivers for Including Ancillary Assets
2. Selecting Assets for Inclusion in Asset Management Programs
3. Data Collection
4. Data Required for Decision-Making
5. Managing Ancillary Asset Data

New Resources

- Video: Geotechnical Assets and TAM, AASHTO TAM Webinar #43
- Practice Example: Vegetation Control / Yukon Department of Highways and Public Works



Section 2.6 Incorporating Equity into TAM

New Section:

1. Understanding Equity
2. Integration Equity in TAM Practices

New Resources

- Video: TPM and Equity, AASHTO TPM Webinar #11
- Practice Example: Integrating Equity in Transportation Decision-Making

Chapter 2 Knowledge Check

★ Chapter 2 Knowledge Check

1/10

1 2 3 4 5 6 7 8 9 10

1 / 10

Development of a TAM policy relies solely on the input of leadership and asset experts.

True

False

Finish Next

Chapter 2 References

TAM Guide Explore TAM About New Content Search...

Chapter 2 Quick Links

Chapters

Chapter 2 Sections

Chapter 2 Executive Summary

Chapter PDF

Chapter 2 References

Australia State Government Asset Management Accountability Framework
August 1, 2016 | Australia State Government

The asset management accountability framework is a policy that aims to ensure an agency's asset base addresses its service delivery objectives.

External Link: <https://www.dtf.vic.gov.au/infrastructure-investment/asset-management-accountability-framework>

Balanced Scorecard
August 1, 2017 | Balanced Scorecard Institute

The balanced scorecard (BSC) is a strategic planning and management system. The concept of balanced scorecard has evolved beyond the simple use of perspectives and it is now a holistic system for managing strategy.

External Link: <https://www.balancedscorecard.org/BSC-Basics/About-the-Balanced-Scorecard>

City of Townsville Strategic Asset Management Plan
January 1, 2023 | Townsville City Council (AU)



Thank you



wsp.com



TAM Strategic Action Plan

Trisha Stefanski, P.E.
Asset Management Program Office Manager

What Led Up To MnDOT's TAM Strategic Action Plan (AMSIP)?

2015

Dedicated Champion & Centralized Staff: Asset Management Program Office

- Planning Division

2016

Data Management: Enterprise Asset & Maintenance Management System

- Ancillary Assets, Damage Restitution, Maintenance Focus

2019

Maturity Assessment: Asset Mgmt "Gap" Workshop

- Long-range planning, TAMP Assets, PM Barriers, Resource Concerns, Responsibilities, Use of Data

2020

Legislative Mandate: Mn State Statute 174.03 Subd. 12

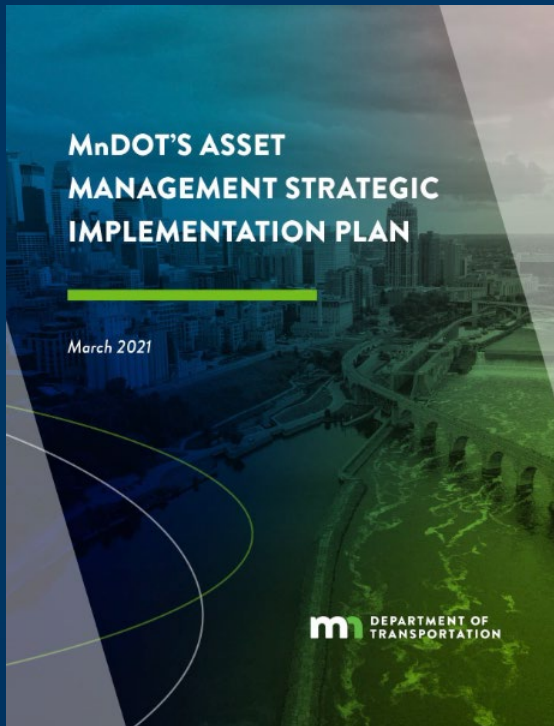
- "Commissioner must... inventory of ... bridge, pavement, geotechnical, pedestrian, bicycle, and transit..."

2021

Asset Mgmt Strategic Implementation Plan (AMSIP)

- Geotechnical, TAMP, Preventive Maintenance, Data, Communication

So Much VALUE in MnDOT's Strategic Plan Process



- Targeted Improvement Areas
- Gain Trust
- Establish Transparency
- Meet State Statute
- Increase Maturity Towards MODA
- Cross-Agency Stakeholder Collaboration
- Dedicated AM District Specialists

Asset Management Strategic Implementation Plan Mission and Objectives

At MnDOT, transportation assets are managed effectively based on risk and return on investment, using the best available information and tools.

Use Data
Effectively

Improve Trade-off
Evaluation

Integrate AM into
MnDOT's Culture

The three strategic objectives led to the development of the five work groups:

- 1. Use data effectively to strategically manage investments and assets, within available resources, in a proactive and wholistic way to reduce life-cycle costs and maintain the value of our most critical assets.*
- 2. Improve the ability to evaluate trade-offs between investment options in a consistent and transparent way that maximizes system performance.*
- 3. Integrate asset management into MnDOT's culture through effective communication and a workforce with the skills needed to successfully fulfill their asset management duties and responsibilities.*

Thank you, AP Tech and Spy Pond Partners for leading the MnDOT AMSIP!



Building Maturity



Communication

Asset Matrix

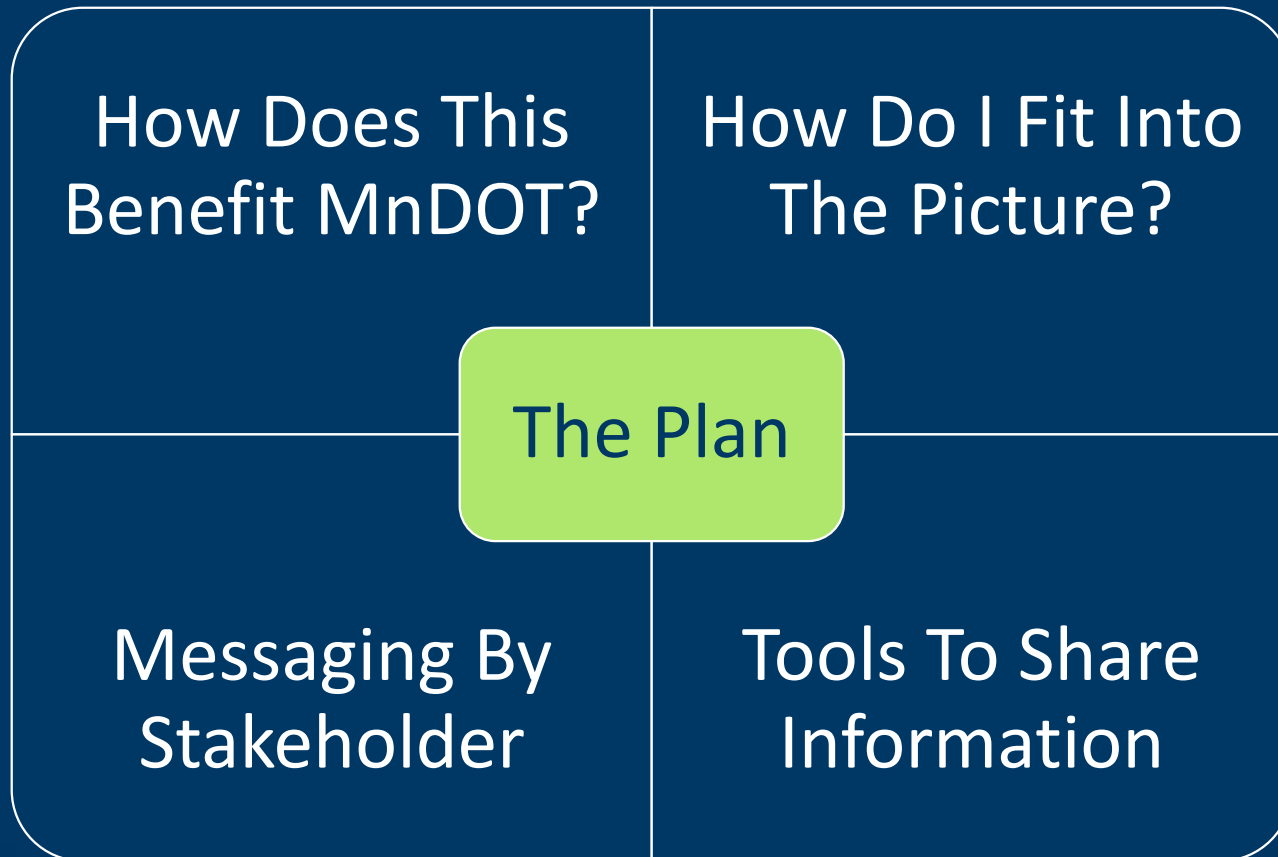
TAMP

Geotechnical
Assets

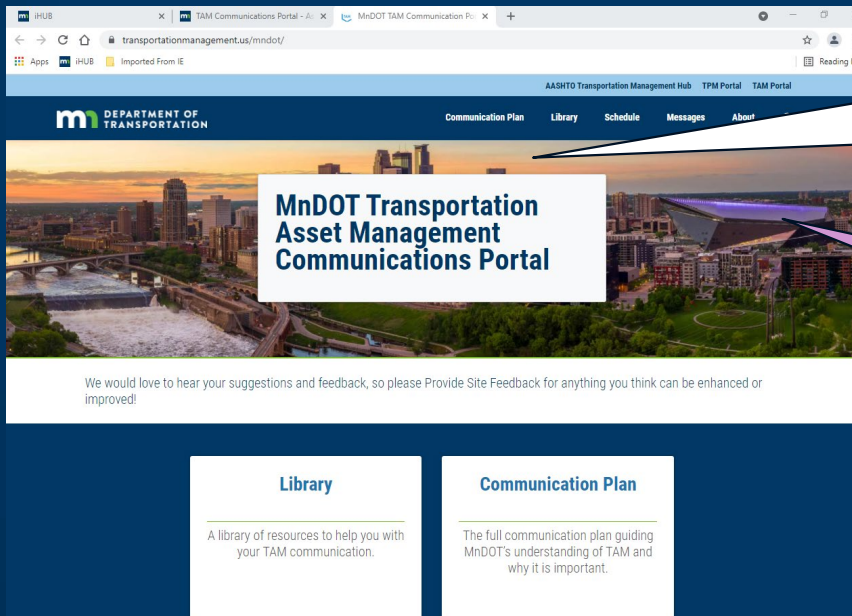
Pavement
Preservation

TAM Communication

The Challenge: The Asset Management discipline engages well over ½ departments' employees at some level and stakeholders have varying levels of information needs.



TAM Communication

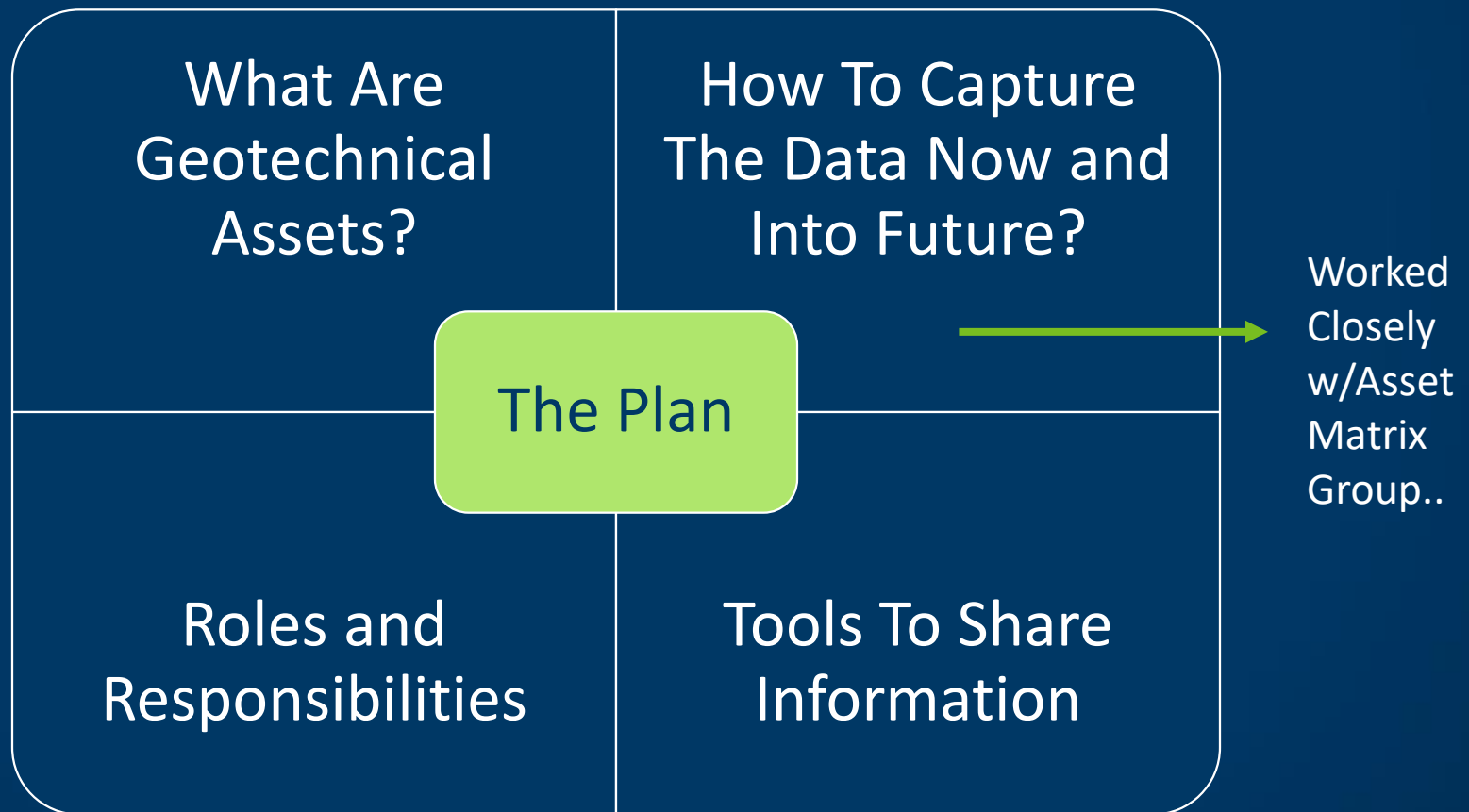


Ahh.. Now I Understand Why Asset Management is Important and What I Can Do To Help.

Have You Heard, The Vikings Are 5-0 This Year!

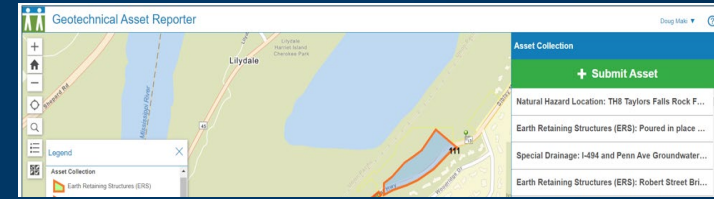
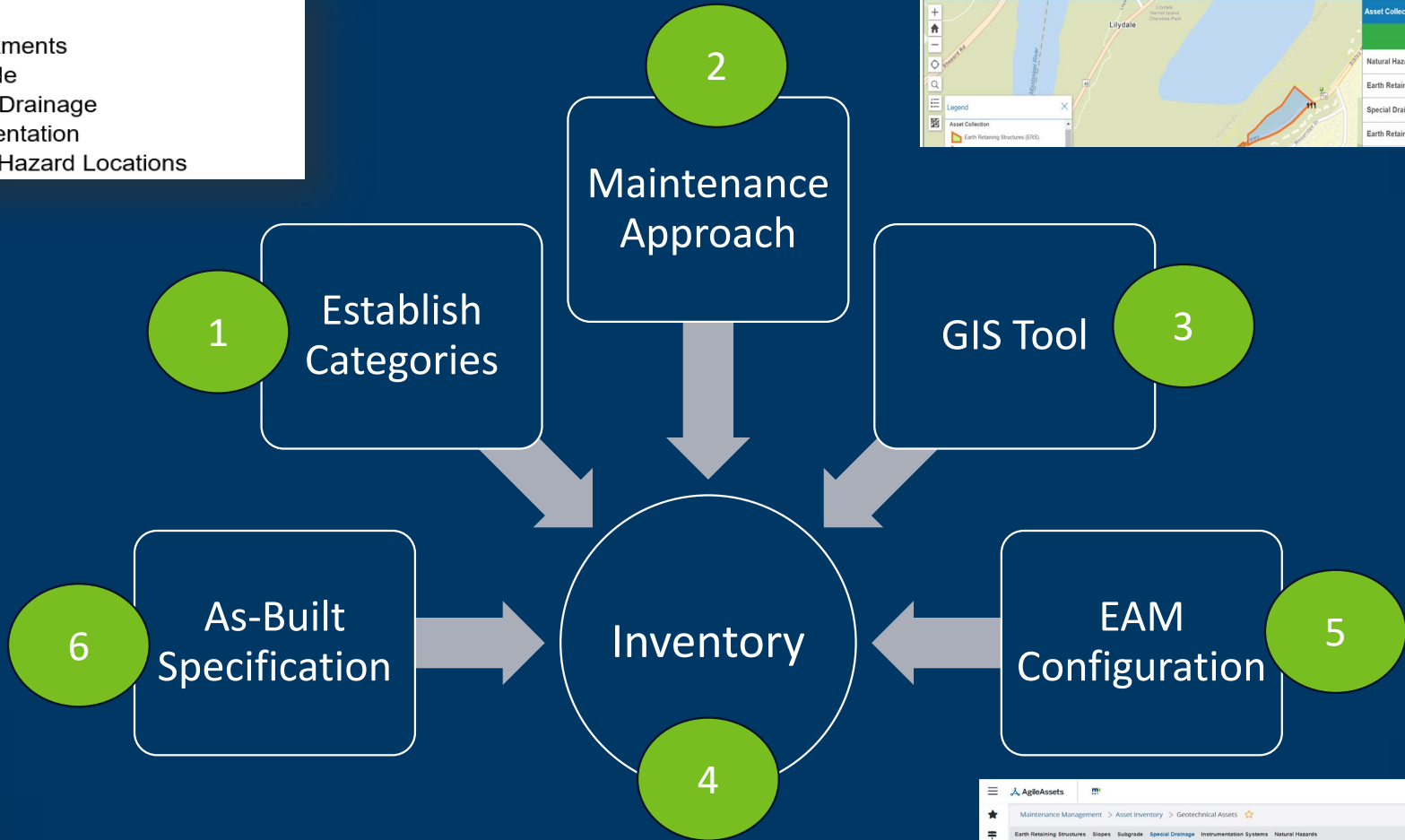
Geotechnical Assets

The Challenge: Evaluate options for MnDOT's response to meet the legislative mandate to manage geotechnical assets.



Geotechnical Assets

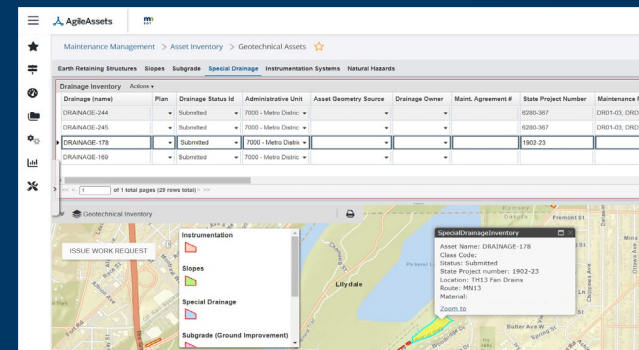
- Earth Retaining Structures (ERS)
- Slopes
- Embankments
- Subgrade
- Special Drainage
- Instrumentation
- Natural Hazard Locations



As-Built Deliverable

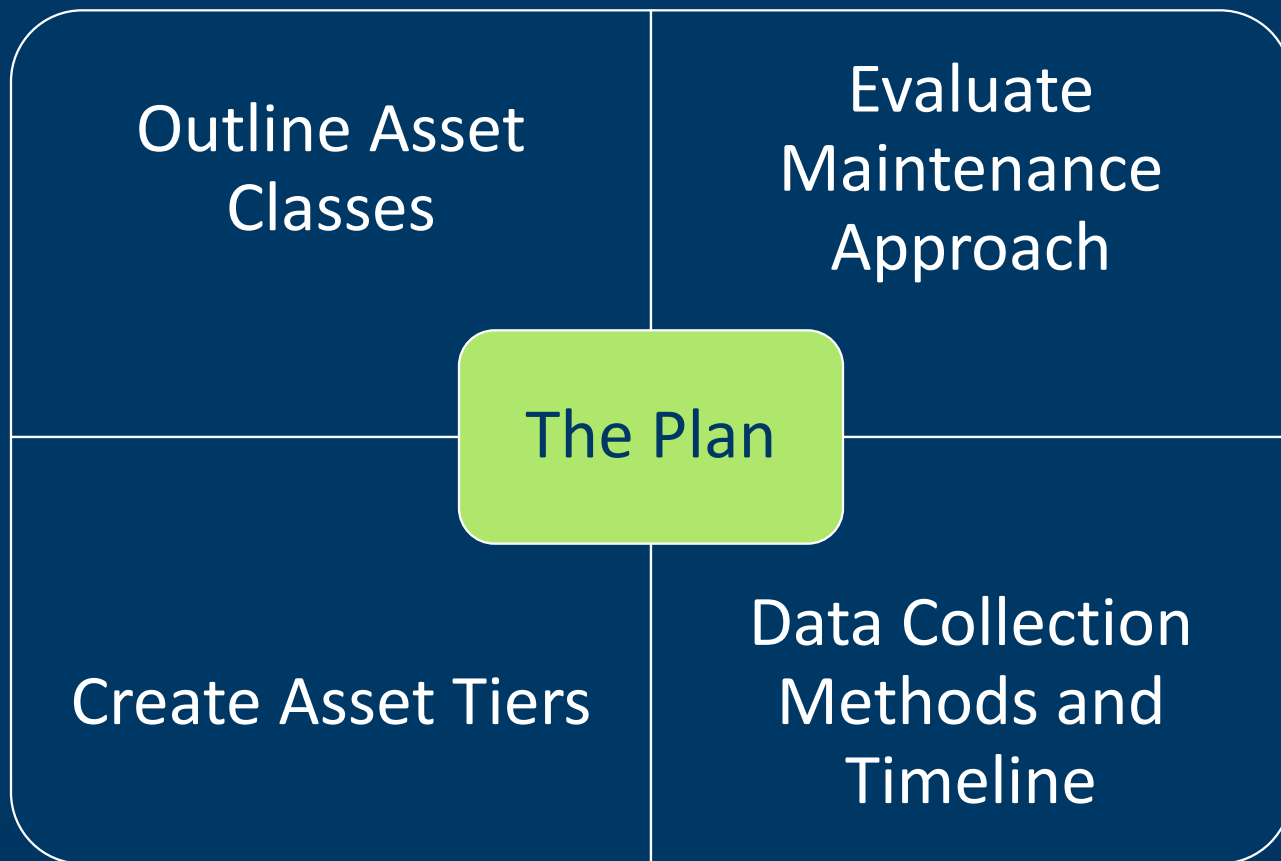
Home Blowing Snow Bridge Drainage Facility Geotechnical Lighting Noise Pvmt. Msg. Rumble Signal

<https://www.dot.state.mn.us/gisspec/methods/geotechnical.html>



Asset “Matrix”

The Challenge: Establish a prioritized approach for managing assets that considers the different ways that assets are maintained, their importance to the agency, and the risks associated with their failure.



Asset “Matrix”

Matrix Drivers				Plan summary	Baseline Inventory		Inv. Currency	Condition Inventory	
Asset Group	Asset Class	Tier	Desired AM Approach	Short Description	Timeline To Complete Inventory	Inventory Baseline Cost Estimate	Inventory Currency Annual Cost Estimate	Timeline To Complete Inspection Cycle	Inspection Plan - Annual Cost Estimate (Baseline)
Bike and Ped	Accessible On-street ADA Parking	2	Condition	Add	<1 year	\$ 3,000	\$ 1,000	3 to 5 years	\$ 4,000
Bike and Ped	Bike Lane (not sep) and shared roadways	2	Condition	Add	NA	\$ -	\$ -	3 to 5 years	\$ 20,000
Bike and Ped	Shared use paths, side paths, sep bike lanes	3	Cycle	Add	NA	\$ -	\$ 20,000	3 to 5 years	\$ 20,000
Geotechnical	Earth Retaining Systems (includes gravity, soil	2	Condition	Add	<1 year	\$ 27,000	\$ 8,000	3 to 5 years	\$ 188,000

Priorities :

- ✓ Inventory Side and Mainline Culverts
- ✓ Refresh State’s Sign Inventory and Inventory Above Ground Assets
- ✓ Annual LiDAR Projects To Capture Construction Project Data

Collecting Side and Mainline Culvert Data – ROI yielded net present value of \$23K with 7-year payback period.

Right-Sizing:

- ✓ Discontinue investment in data collection for mowing, embankments, curb and gutter, gravel shoulders, and roadway ditches.

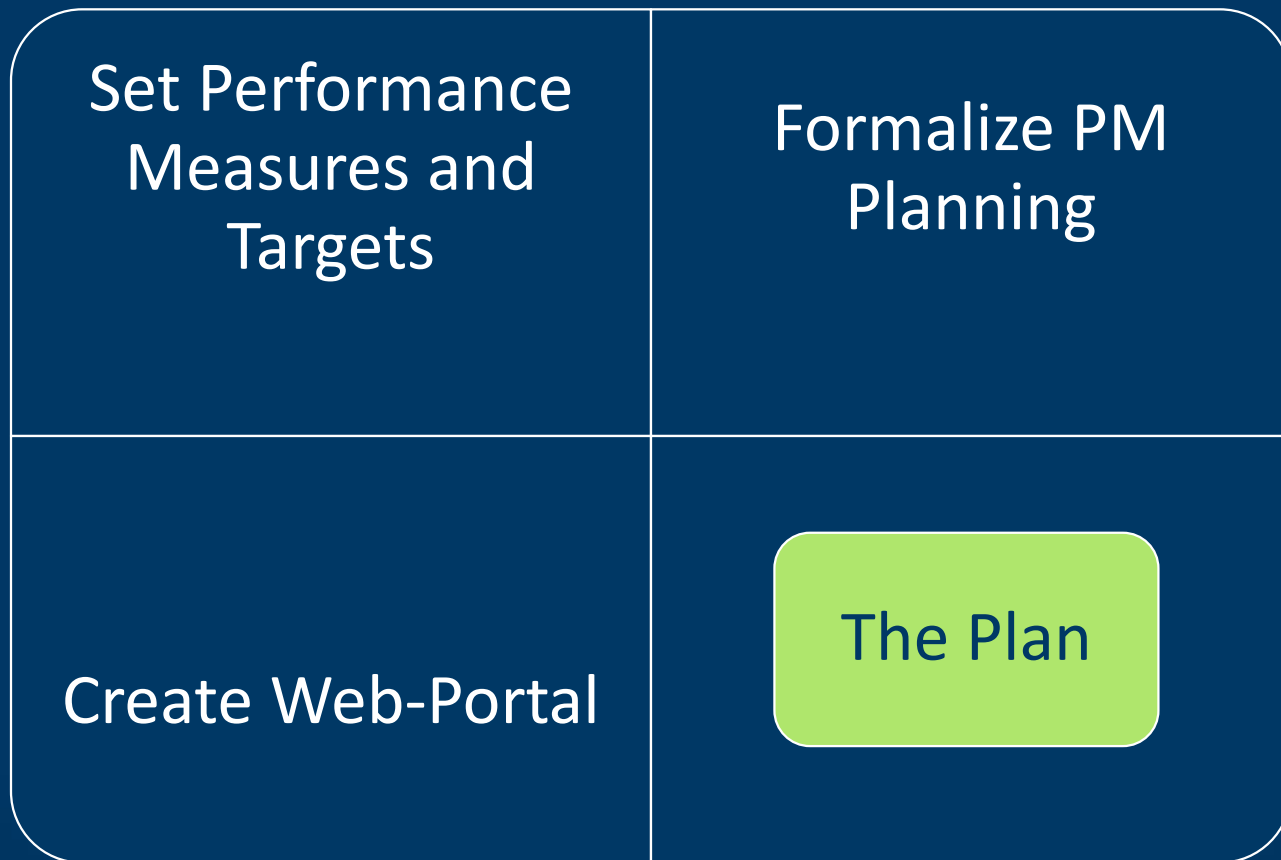
Asset Inventory Collection via lidar is ~½ the cost of GPS field collection.

Connect The Dot’s and Move to Building/Asset Information Modeling:

- ✓ MnDOT Recipient of NiceConnect Advanced Digital Construction Management System Grant

Pavement Preservation

The Challenge: Establish a plan for increasing the reliable use of pro-active preventive maintenance treatments to preserve asset conditions and reduce the life-cycle cost of managing assets.



Pavement Preservation

PM Treatment	Application Guideline	Performance Target
Crack Fill/Rout & Seal	Treat bituminous overlays and new pavements by year five . Exclude super commuter (>30,000 AADT) roadways. Pavements with minor cracking may be excluded from the measure	80%
Bituminous Surface Treatments "BSTs"	Apply full-width thin surface treatments to bituminous pavements by year seven . Target based on seven-year rolling average. (medium overlays >2" and new pavements)	80%
Light CPR, can include Diamond Grinding	Perform minor CPR and/or diamond grinding on concrete pavements when RQI ≤ 3.0 or SR ≤ 2.7 . Exclude urban area pavements with speed limit ≤ 45 mph.	70%
Seal longitudinal edge joint	Seal Longitudinal edge joint between concrete pavement and bituminous shoulder by year 5 and at 5-year intervals thereafter.	80%

✓ Performance Measures

Materials and Road Research

[Materials and Road Research | Pavement Preservation](#)

Pavement Preservation tools and training

If you find any errors or bugs, or if you have suggestions for improvement for these documents, please contact Greg Johnson at gregory.d.johnson@state.mn.us.

[Micro Surfacing Quantity Calculator \(Excel\)](#)

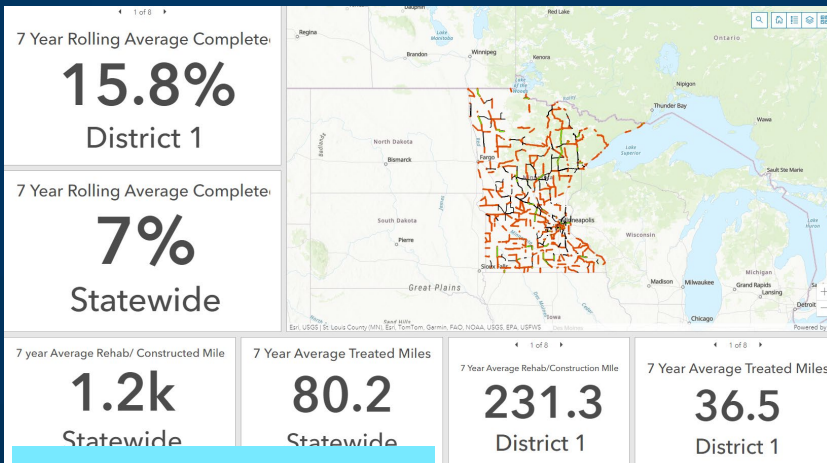
This is a tool used to assist in determining estimated costs and quantities for micro surfacing projects. Be sure to double check the quantities by hand.

[Seal Coat and Fog Seal Quantity Calculator \(Excel\)](#)

This is a tool used to assist in determining estimated costs and quantities for seal coat and fog seal projects. Be sure to double check the quantities by hand.

[Pavement Preservation Checklist Series - FHWA](#)

✓ Preservation Website



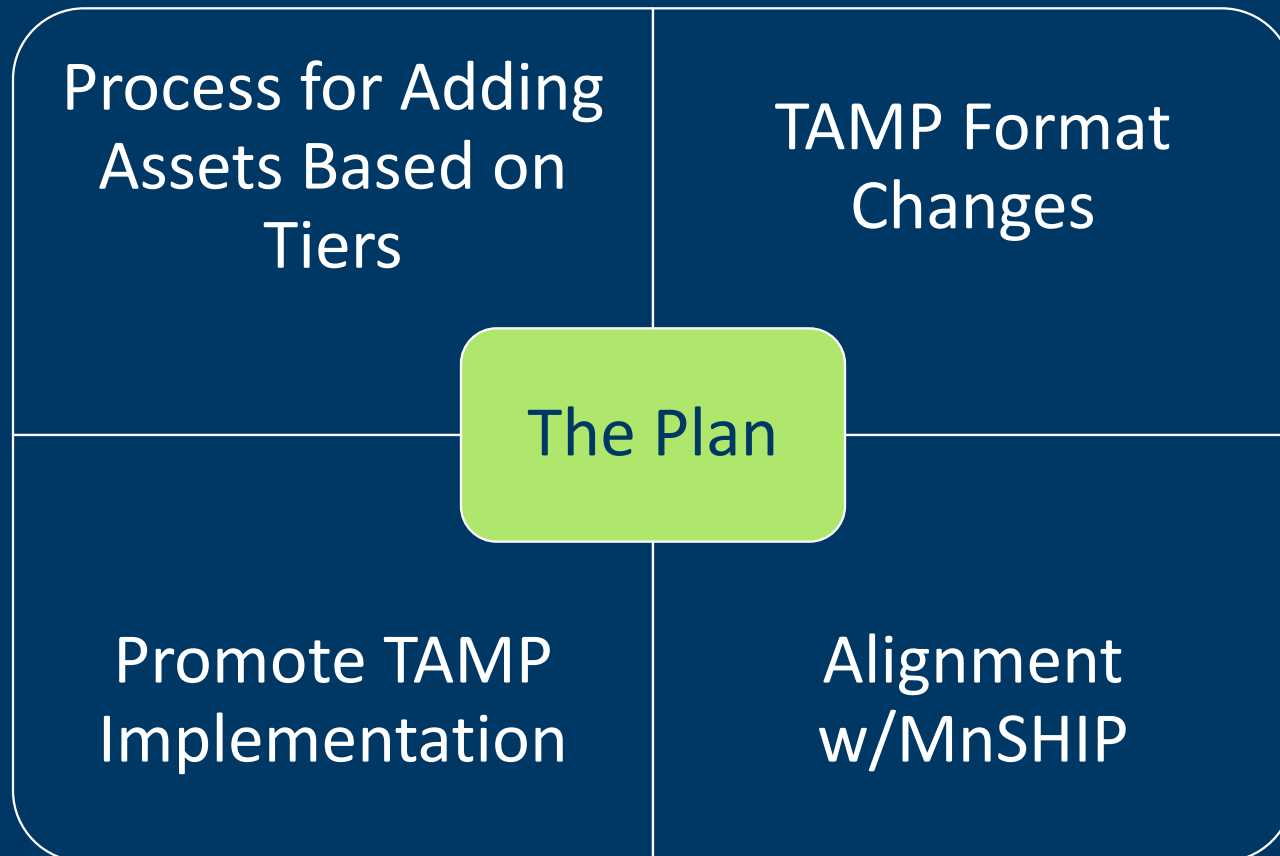
✓ Dashboards

- PM Solidified Lighting/Signals/OSS
- Utilize Management Systems Outputs to support District Planning efforts
- Include in STIP development guidance in future years
- Integrate Maint. & Capital investments

To Do List

Transportation Asset Management Plan

The Challenge: Recommend changes to the TAMP that improve life-cycle implementation, increase effectiveness, and strengthen MnSHIP interrelationship.



Transportation Asset Management Plan

Asset Addition Criteria

Tier 1 or 2 Asset
Data Readiness
Key Expert Willingness



Adding
Ground Mounted
Sign Structures 2026

TAMP 2026 Enhancements

1. Risk and Resilience Strategies and Mitigation Scoring Process
2. Asset Valuation
3. Life-cycle Analysis For All Assets
4. Equity in Transportation Asset Management
5. Implementation of TAMP

Take Away's

- Identify Gap Areas and Champions
- Communication is Key
- Start Small Just To Get Started
- Include Decision Makers
- Dedicated Commitment (for example, Matrix)
- Strategic Implementation Plan (Action Plan)
- Request Funding and/or Resource Needs
- Help Set Individual Asset Data Resource Allocation, TAMP/District/Maintenance Asset Performance Targets & LOS. Next step; MODA.



Thank you!

What Can Asset Management Do For You?

trisha.stefanski@state.mn.us



NCHRP 08-137

Updates to the Digital Edition of the AASHTO Transportation Asset Management Guide

October 16, 2024

.....

Chapter 5

Resource Allocation

TAM Guide Framework

ORGANIZATION & PEOPLE

Establishing TAM Roles, Responsibilities, and Competencies

Strengthening Coordination and Communication

Managing Change

TAM STRATEGY & PLANNING

TAM Vision, Goals and Strategy

TAM Integration

TAM Scoping and Structure

Developing a Transportation Asset Management Plan (TAMP)

Improving TAM Processes

RESOURCE ALLOCATION

Allocation and Prioritization Process

Cross-Asset Resource Allocation

Financial Planning

Work Planning and Delivery

INFORMATION & SYSTEMS

TAM Systems

Asset Data Collection

Data Sharing, Reporting and Visualization

Data Governance and Management

ASSET PERFORMANCE

Asset Service and Performance Levels

Life Cycle Management Approaches

Predicting Asset Conditions and Performance

MONITORING & ADJUSTMENT

Performance Measurement and Management

Monitoring the State of the Assets

Monitoring Funding and Resource Allocation Trends

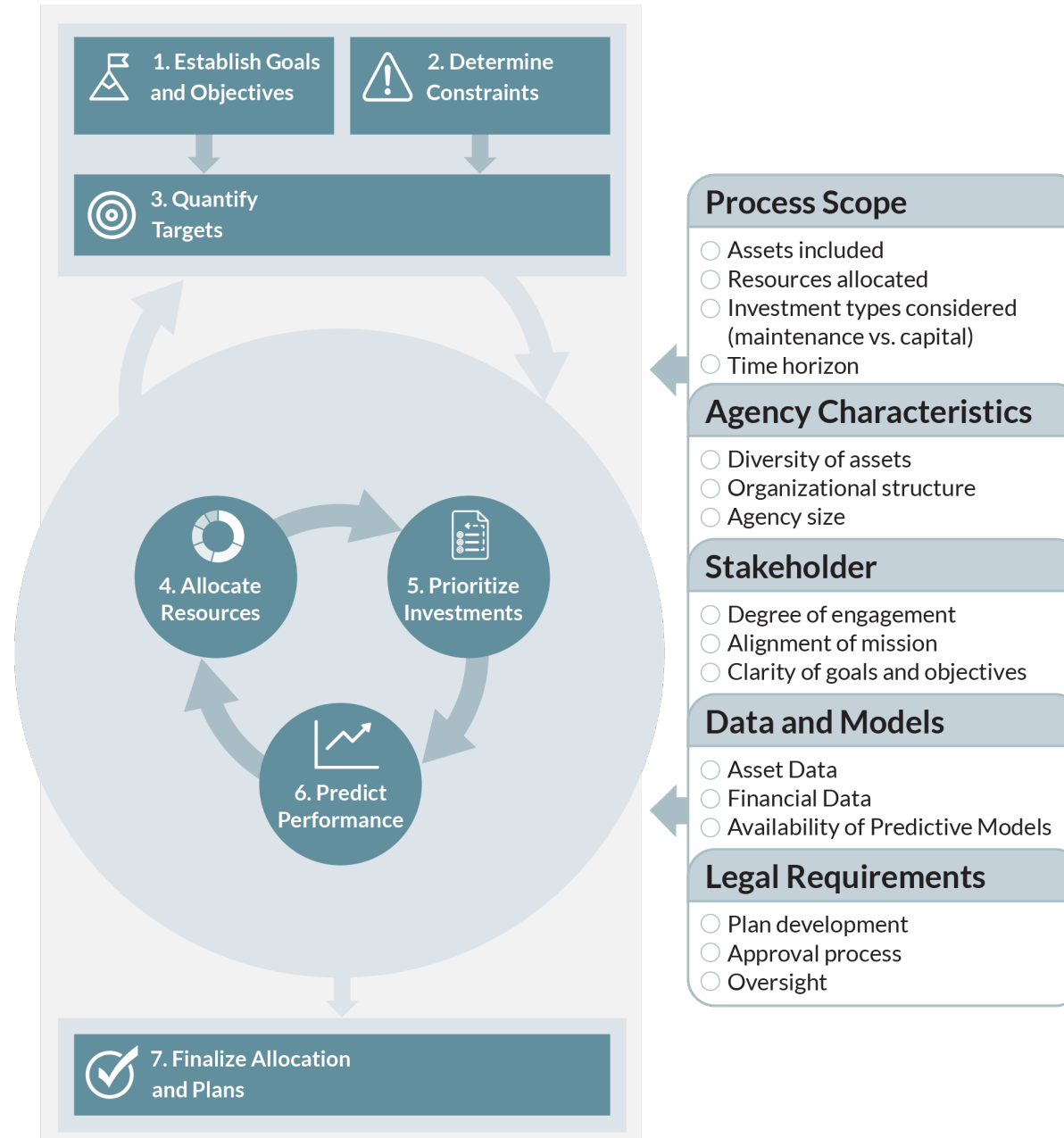
Monitoring Asset Work and Costs

Tracking and Managing Risks

Monitoring TAM Process Improvements



Resource Allocation Process



Chapter 5: Overview of New Materials

Chapter 5

Sections ▾

5.1 **NEW/UPDATED CONTENT**

Resource Allocation and Prioritization Process

5.2

Cross-Asset Resource Allocation Methods

5.3

Financial Planning

5.4

Work Planning and Delivery

5.5 **NEW SECTION!**

Asset Valuation

- **Resource Allocation and Prioritization**
 - New discussion on consideration of risk
 - Links back to the risk risk management process described in Chapter 2
- **Asset Valuation**
 - New section
 - Describes approaches for valuing assets to support TAM
 - Adapts materials from the Asset Valuation Guide developed through NCHRP Project 23-06
- **Other updates**
 - Asset Valuation Checklist
 - Videos
 - References



Content Addition: Section 5.5 - Asset Valuation

Section 5.5 **NEW SECTION**

Asset Valuation

Asset value is an important piece of financial reporting and TAM. It can be used in financial statement balance sheets, it communicates what an agency owns and maintains, and it supports investment decisions. Financial reporting standards and requirements dictate how to perform the calculations; however, in practice, there is no single correct way to measure an asset's value.

Note: This section was derived from the [web version of NCHRP Web-Only Document 335: A Guide to Computation and Use of System Level Valuation of Transportation Assets](#). More detailed information is available in this NCHRP Report. A summary is provided below to provide an overview and context.

Section 5.5 Home

5.5.1

5.5.2

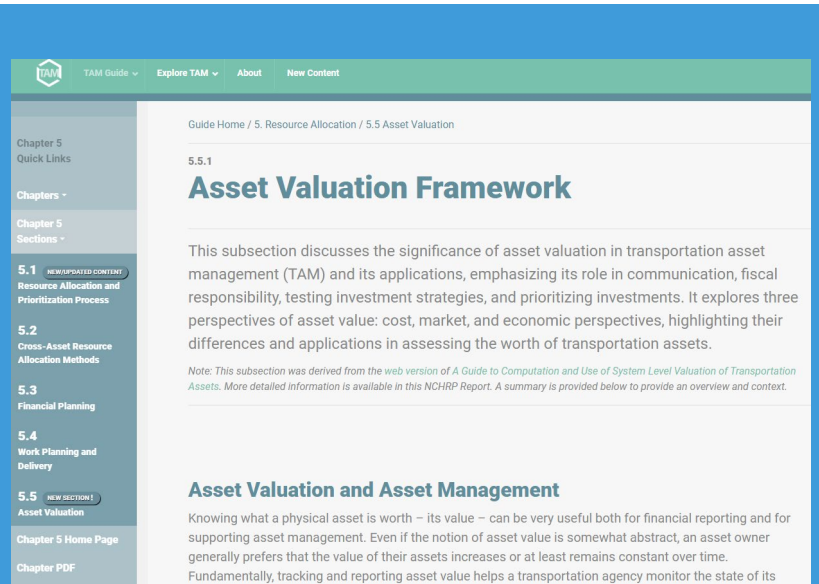
This section has the following parts:

1. **Asset Valuation Framework.** This section provides a framework approach for Asset Valuation and Asset Management.
2. **Using Asset Value to Support TAM Decisions.** This section details how Asset Valuations can be used to inform TAM Decision-Making.



Subsection 5.5.1

Asset Valuation Framework

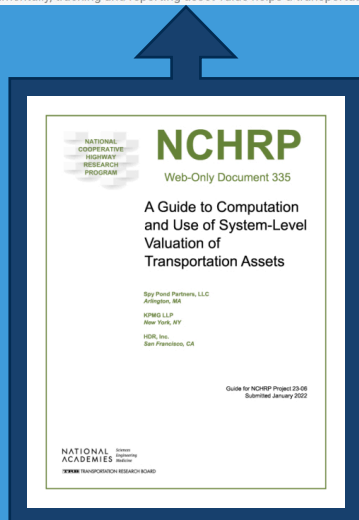


- **Outlines three perspectives on value**

- Cost Perspective
- Market Perspective
- Economic Perspective

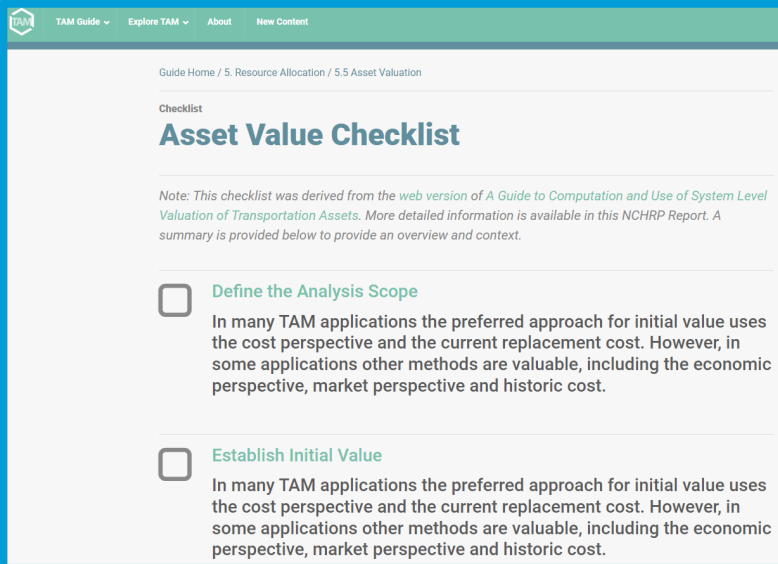
- **Discusses the motivation for using asset valuation in TAM**

- Communication
- Fiscal responsibility
- Testing investment strategies
- Prioritizing investments



Asset Valuation Checklist

- Define the analysis scope
- Establish initial value
- Determine treatment effects
- Calculate depreciation
- Calculate value and supporting measures
- Communicate and apply the results



The screenshot shows a web page titled "Asset Value Checklist" from the TAM Guide. The page includes a navigation bar with "TAM Guide", "Explore TAM", "About", and "New Content". The breadcrumb trail is "Guide Home / 5. Resource Allocation / 5.5 Asset Valuation". The checklist is titled "Asset Value Checklist" and includes a note: "Note: This checklist was derived from the web version of A Guide to Computation and Use of System Level Valuation of Transportation Assets. More detailed information is available in this NCHRP Report. A summary is provided below to provide an overview and context." The checklist items are:

- Define the Analysis Scope**
In many TAM applications the preferred approach for initial value uses the cost perspective and the current replacement cost. However, in some applications other methods are valuable, including the economic perspective, market perspective and historic cost.
- Establish Initial Value**
In many TAM applications the preferred approach for initial value uses the cost perspective and the current replacement cost. However, in some applications other methods are valuable, including the economic perspective, market perspective and historic cost.

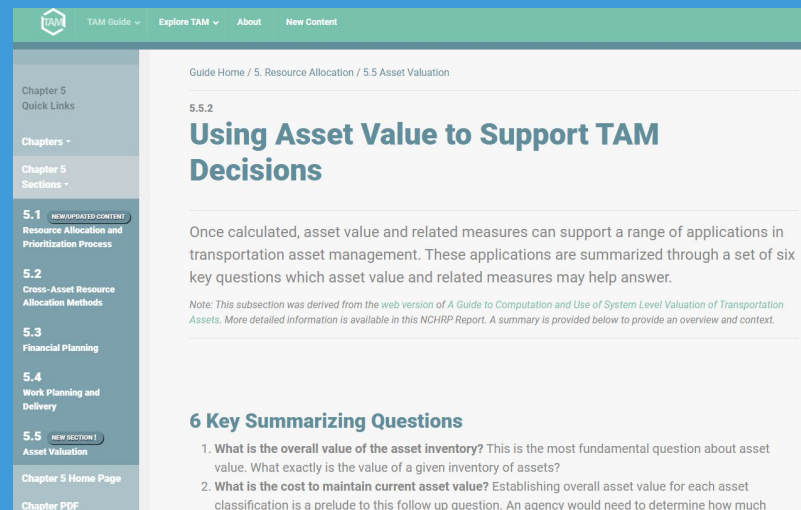


Subsection 5.5.2

Using Asset Value to Support TAM Decisions

Key questions asset valuation can help address

1. What is the overall value of the asset inventory?
2. What is the cost to maintain current asset value?
3. How much should an agency invest in existing assets?
4. How should funds be allocated between different assets or networks?
5. What's the best life cycle strategy for our assets?
6. What is the value generated by the asset?



The screenshot shows a web page from the NCHRP TAM Guide. The navigation bar includes 'TAM Guide', 'Explore TAM', 'About', and 'New Content'. The left sidebar lists 'Chapter 5 Quick Links' and 'Chapter 5 Sections' with sub-sections 5.1 through 5.5. The main content area is titled '5.5.2 Using Asset Value to Support TAM Decisions'. It contains a paragraph: 'Once calculated, asset value and related measures can support a range of applications in transportation asset management. These applications are summarized through a set of six key questions which asset value and related measures may help answer.' Below this is a note: 'Note: This subsection was derived from the web version of A Guide to Computation and Use of System Level Valuation of Transportation Assets. More detailed information is available in this NCHRP Report. A summary is provided below to provide an overview and context.' The section is followed by '6 Key Summarizing Questions' and a list of two questions: '1. What is the overall value of the asset inventory?' and '2. What is the cost to maintain current asset value?'. The page also includes links for 'Chapter 5 Home Page' and 'Chapter PDF'.



Other Updates

Integration of Videos

TAM Guide Book Club #4: Improving TAM Financial Planning

Resource Allocation Process

1. Establish Goals and Objectives

2. Determine Constraints

3. Quantify Targets

4. Prioritize Investments

5. Predict Performance

6. Finalize Allocation and Plans

Process Scope

- Assets included
- Resources allocated
- Investment types considered (maintenance vs. capital)
- Time horizon

Agency Characteristics

- Diversity of assets
- Organizational structure
- Agency size

Stakeholder

- Degree of engagement
- Alignment of mission
- Clarity of goals and objectives

Data and Models

- Asset Data
- Financial Data
- Availability of Predictive Models

Legal Requirements

- Plan development
- Approval process
- Oversight

Watch later

Share

Watch on YouTube

- 4 videos added

References

TAM Guide | Explore TAM | About | New Content

Chapter 5 References

Performance-Based Planning and Programming Guidebook
August 1, 2013 | FHWA
The FHWA Performance Based Planning and Programming (PBPP) Guidebook outlines common performance management practices including goals, performance measures, targets, strategies, and more.
External Link: https://www.fhwa.dot.gov/planning/performance_based_planning/pbpp_guidebook/

Best Practices in Performance Measurement for highway Maintenance and Preservation
March 1, 2012 | TRB
This report provides an overview of maintenance quality assurance approaches established by several state DOTs.
External Link: http://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP20-68A_10-03.pdf

Guidebook on Risk Analysis Tools and Management Practices to Control Transportation Project Costs
June 1, 2010 | TRB
Summarizes the risk management process and describes how to apply the process to reducing risks of project cost overruns.
External Link: <https://www.nap.edu/read/14391/chapter/1>

ISO Standard 31000
August 1, 2018 | International Standard Organization
This resource describes a generic process for risk management applicable across industries.
External Link: <https://www.iso.org/iso-31000-risk-management.html>

- 15 references added



Thank You

William Robert
Spy Pond Partners, LLC
wrobert@spypondpartners.com





UDOT Asset Valuation Process

AASHTO/TRB TAM Webinar 10-16-24



where we were

valuation challenges

The chalkboard contains a dense array of mathematical content:

- Complex Numbers:** $z_1 + z_2 = z_1 + z_2$, $z \in \mathbb{R} \Leftrightarrow z = \bar{z}$, $|z| = \sqrt{a^2 + b^2}$, $|z_1 z_2| = |z_1| |z_2|$, $|z_1 + z_2| \leq |z_1| + |z_2|$.
- Algebra:** $x^2 - 6x + 6 = 0$, $x^2 + 3x - 14 > 0$, $x^2 + 3x - 14 = 0$, $\Delta = 9 - 4 \cdot (-14) = 65$.
- Calculus:** $\frac{d}{dx} \left[\begin{matrix} x & m & 4 \\ 3 & -1 & 5 \\ m & -5 & -1 & -5 \end{matrix} \right]$, $\log(x^2 + 3x - 14) = 2 \log(x - 2) + \log(x + 7)$.
- Geometry:** Triangle ABC with $BM = MC$, $AM = \frac{AB + AC}{2}$, $2AM = AB + AC$.
- Trigonometry:** $\sin^2 \theta = \frac{1 - \cos(2\theta)}{2}$, $\cos^2 \theta = \frac{1 + \cos(2\theta)}{2}$.
- Calculus (Integration):** $\int_{h_1}^{\infty} \frac{1}{t^4} dt = \frac{1}{3} \frac{1}{t^3} \Big|_{h_1}^{\infty} = \frac{1}{3h_1^3}$.
- Probability/Statistics:** $\frac{1}{n} \sum_{i=1}^n x_i^2 = \frac{1}{n} \sum_{i=1}^n x_i^2 + \frac{1}{n} \sum_{i=1}^n x_i^2$.
- Diagrams:** A bar chart showing an upward trend, a coordinate plane with a parabola $y = -x^2 + 4x$, and a complex geometric diagram of a cube-like structure.
- Other:** $\frac{1}{x} = x^{-1}$, $\frac{d}{dx} x^{-1} = -x^{-2} = -\frac{1}{x^2}$, $\frac{d}{dx} \ln x = \frac{1}{x}$.

the process

valuation insights

what

exists

is needed

is available

can we do now

can we do in the future



where we are

valuation established

UDOT Asset Valuation Instructions

UDOT Asset Management

Updated 8/26/24

These calculations serve as the basis for the UDOT asset valuation **required annually by FHWA** for the UDOT Transportation Asset Management Plan (TAMP). For consistency across asset classes, **the methodology for calculating the replacement will be defined or referenced on the individual tab for the asset.** [For applications of asset value, see the AASHTO Asset Value Guide, Chpt. 8.](#)

The asset value is used to demonstrate fiscal responsibility. As assets deteriorate or depreciate, investments should be made to maintain their value.

Each asset tab will have additional valuation calculation exclusions and inclusions defined on the individual tab. Unit cost calculations **for all assets, exclude** the following:

Design	Detour Costs
Mobilization	Field Office
Demolition / removal of existing	Construction Engineering
Earthwork	Training
Site prep	Right-of-Way
Clearing and Grubbing	Utility Relocation
Maintenance of Traffic	Contingencies

The following assets **include depreciation** calculations, and current value:

Asset	Management Approach	Tier
Pavement (NHS and Non-NHS)	Performance Driven +	1
Bridge (NHS and Non-NHS)	Performance Driven +	1
ITS Devices	See Assets List for Mgmt	1
Signals	Performance Driven	1
Pavement Marking Message	Interval Driven +	1
Durable Pavement Marking	Performance Driven	1
Waterborne Pavement Marking	Interval Driven	1

where we are

valuation established

Pavement Asset Valuation

UDOT Pavement Group

Updated 11/15/23

Parameters	Value
<u>Useful Life & Residual Value</u>	
End of useful life (OCI)	50
Residual (salvage) value (%)	50%
<u>Unit Costs (\$/SY)</u>	
Weighted avg replacement cost	\$161.98
N11-High Volume	\$150.00
N12-Low Volume	\$128.00
INT-Interstate	\$202.00
<u>Conversion</u>	
1 area unit to square yards	7040

[See "Instructions" tab for general valuation exclusions](#)

Valuation Exclusions	Inclusions
Trail and local, non-NHS pavement	NHS and Non-NHS Pavements
Unpaved shoulders	Paved shoulders
Approach slabs	Pavement section (PCCP, HMA, UTBC, GB)
Paved medians and turnarounds	Ramps
	Pavement to curb returns on side streets

Assumptions

- Includes all State routes, except for institutional roads and gravel roads
- Linear depreciation until end of useful life
- Depreciation based on OCI

Asset Value (using unit costs by road volume)

System	Volume	Area (sq yd)	% Remaining Value	Current Value	Replacement Value
1-NHS	All	112,223,760	88.9%	\$17,418,085,275	\$19,543,725,893
	High Volume	57,786,439	87.5%	\$7,582,459,286	\$8,667,965,856
	Low Volume	1,629,443	85.1%	\$177,565,853	\$208,568,730
0-Non NHS	Interstate	52,807,878	90.5%	\$9,658,060,136	\$10,667,191,308
	All	58,504,343	85.8%	\$6,960,840,137	\$8,111,431,075
	High Volume	28,312,508	85.9%	\$3,649,855,275	\$4,246,876,128
All	Low Volume	30,191,836	85.7%	\$3,310,984,863	\$3,864,554,947
	All	170,728,103	87.8%	\$24,378,925,413	\$27,655,156,968
	High Volume	86,098,947	87.0%	\$11,232,314,561	\$12,914,841,984
	Low Volume	31,821,279	85.6%	\$3,488,550,716	\$4,073,123,676
	Interstate	52,807,878	90.5%	\$9,658,060,136	\$10,667,191,308

Sign Asset Valuation

Central Traffic and Safety

Updated 8/26/24

[Source Calculations](#)

Asset Category	Mount Type	Replacement Unit Cost	Inventory (sign faces)	Replacement Value
Overhead Sign	Cantilever Truss	\$9,000.00	61	\$549,000
Overhead Sign	Cantilever Tube	\$10,000.00	970	\$9,700,000
Overhead Sign	Double Cantilever	\$15,000.00	188	\$2,820,000
Overhead Sign	Structure Mounted	\$6,000.00	475	\$2,850,000
Overhead Sign	Truss Sign Bridge	\$9,000.00	32	\$288,000
Overhead Sign	Tube Sign Bridge	\$10,000.00	1,170	\$11,700,000
Overhead Sign	Tube Sign Bridge with Cantilever	\$9,000.00	140	\$1,260,000
Multi-Post Signs	Double Post	\$1,000.00	9,312	\$9,312,000
Multi-Post Signs	Five Post	\$1,600.00	3	\$4,800
Multi-Post Signs	Four Post	\$1,400.00	129	\$180,800
Multi-Post Signs	Triple Post	\$1,200.00	903	\$1,083,600
Single-Post Signs	One Post	\$400.00	97,996	\$39,198,000
Single-Post Signs	Utility Pole	\$400.00	3,567	\$1,426,800
Other	Gate	\$200.00	101	\$20,200
Other	Mast Arm	\$300.00	6,198	\$1,858,800
Other	Signal Pole	\$300.00	3,051	\$915,300
Other	Span Wire	\$250.00	5	\$1,250
Other	Other	\$400.00	1,048	\$419,200
	Overhead Sign		3,036	\$29,167,000
	Multi-Post Signs		10,347	\$10,581,000
	Single-Post Signs		101,562	\$40,624,800
	Other		10,401	\$3,214,750
	Total		125,346	\$83,587,550

where we are headed

valuation application

Table 8-1. Asset Value-Related Measures and Mapping to Key Questions

Key Questions	Asset Value	Cost to Maintain Current Value	Asset Sustainability Ratio (ASR)	Asset Consumption Ratio (ACR)	Asset Funding Ratio (AFR)	Net Present Value (NPV)
Q1: Overall Inventory Value	X			X		
Q2: Cost to Maintain		X	X	X		
Q3: Needed Spending					X	X
Q4: Allocating Funds		X	X	X	X	X
Q5: Life Cycle Strategy						X
Q6: Value Generated						X



Q&A and Discussion

Submit your questions using the Webinar's chat feature

All webinars available online:

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

Save the Dates!

A bimonthly webinar series, Wednesdays at 2:00 PM EST

Next Webinar

Wednesday, December 18, 2024 – 2:00 PM EST

Topic: Asset Performance, Monitoring & Adjustment

More to follow!



For more information or to register:

<https://www.tam-portal.com>

