

The Updated Pavement Management Roadmap



U.S. Department
of Transportation

**Federal Highway
Administration**



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Presentation Approach

1.0 Background

2.0 Gap Assessment

3.0 Pavement Management Roadmap Suggestions

4.0 Pavement Management Roadmap Implementation

1.0 Background

Project Objectives

Project Approach

Project Objective

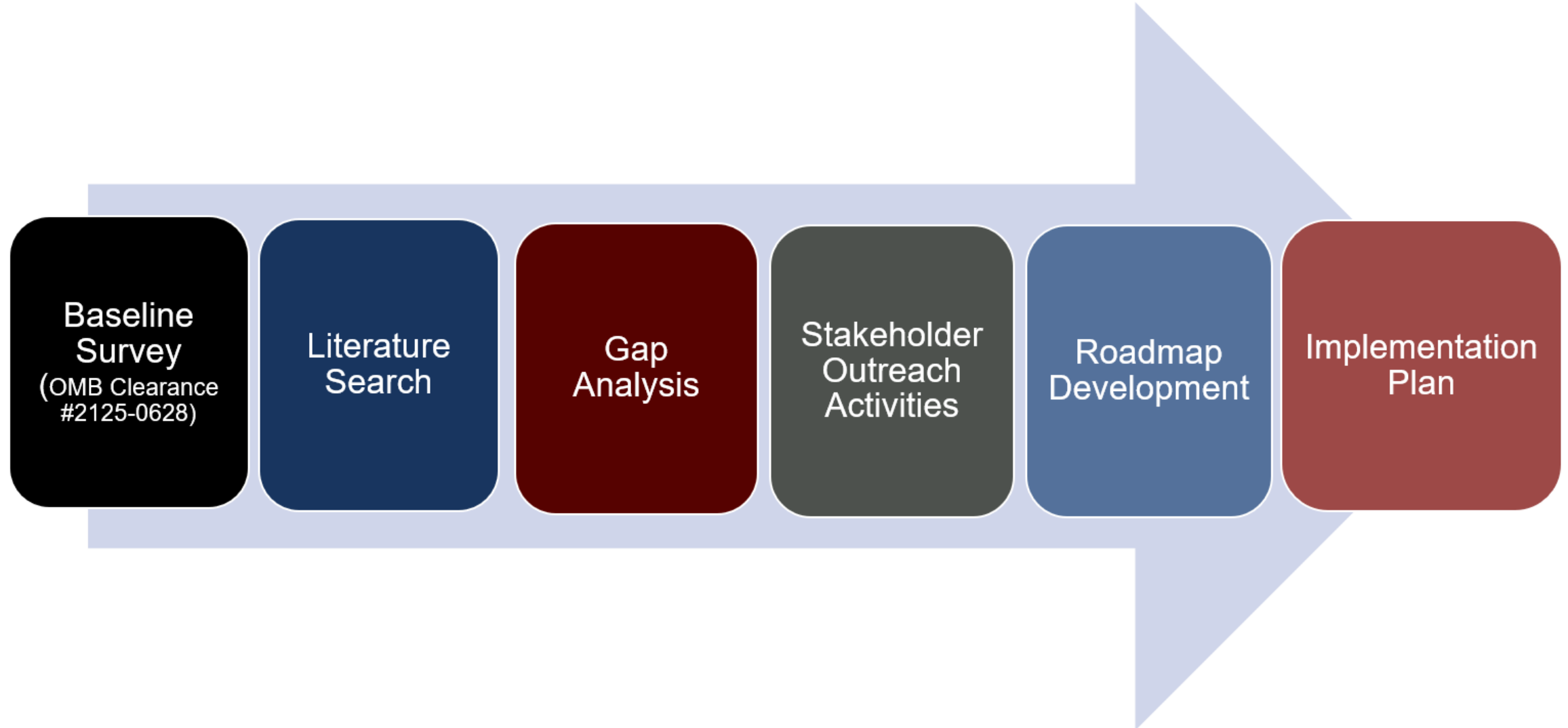
To provide an updated Pavement Management Roadmap that presents a 10-year strategy that can be used by FHWA & other transportation agencies to drive research, transformative innovation development, and technology transfer activities that will continue to improve pavement management practices.

2010 Pavement Management Roadmap 10-Year Plan

- Four Theme Areas
- 47 Needs Totaling More Than \$14.5M In Estimated Cost
- Short-Term Needs (<5 years); Long-Term Needs (5 to 10 years)

| Themes | Short-Term # of Projects | Short-Term Estimated Cost | Long-Term # of Projects | Long-Term Estimated Cost | Total # of Projects | Total Estimated Cost |
|---|--------------------------------|---------------------------------|-------------------------------|--------------------------------|---------------------------|----------------------------|
| 1: Use of Existing Technology and Tools | 8 | \$2,180,000 | 2 | \$850,000 | 10 | \$3,030,000 |
| 2: Institutional and Organizational Issues | 5 | \$880,000 | 6 | \$780,000 | 11 | \$1,660,000 |
| 3: The Broad Role of Pavement Management | 5 | \$1,550,000 | 5 | \$1,300,000 | 10 | \$2,850,000 |
| 4: New Tools, Methodologies, and Technologies | 5 | \$1,930,000 | 11 | \$5,100,000 | 16 | \$7,030,000 |
| Totals | 23 | \$6,540,000 | 24 | \$8,030,000 | 47 | \$14,570,000 |

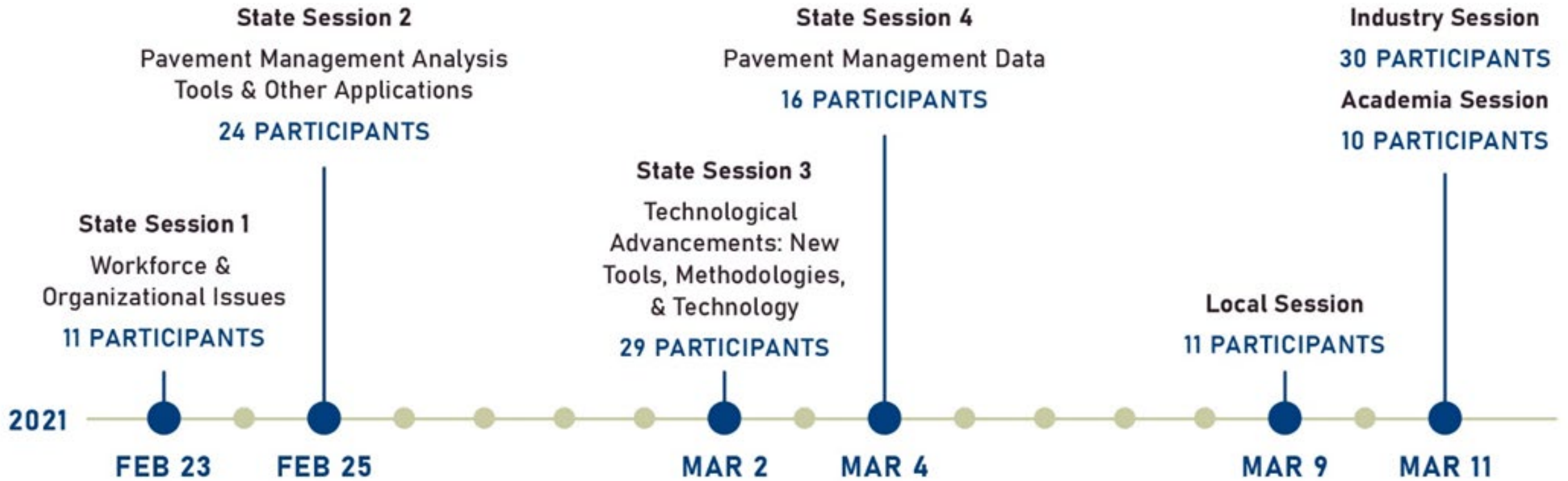
Project Approach



Baseline Survey Approach (Authorized Under OMB Control #2125-0628)

- Assessed the state of practice in pavement management & identified needs in areas such as:
 - » Research
 - » Technology
 - » Education
 - » Workforce Development
- Survey sent to 52 State DOTs plus 25 representatives from local agencies and metropolitan/regional planning organizations

Stakeholder Outreach Activities



2.0 Gap Assessment

Theme 1: Pavement Management Data

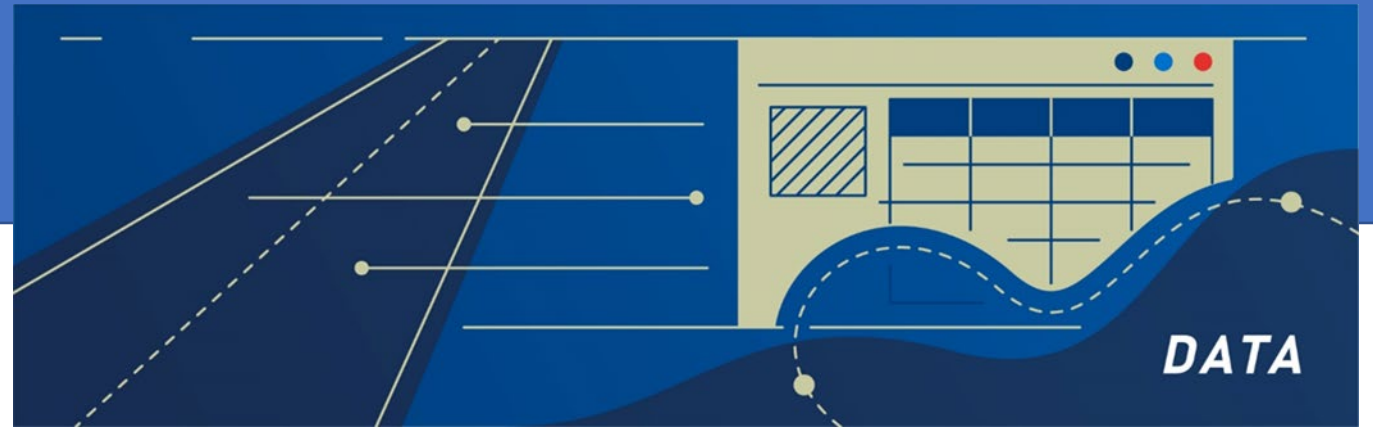
Theme 2: Pavement Management Analysis Tools & Other Applications

Theme 3: Workforce & Organizational Issues

Theme 4: Technological Advancements – New Tools, Methodologies, & Technology

Gap Assessment: Themes





Theme 1: Pavement Management Data

Topic Area 1-1: Data

Topic Area 1-2: Data Quality



Theme 2: Pavement Management Analysis Tools & Other Applications

Topic Area 2-1: Modeling

Topic Area 2-2: Support for Transportation Performance Management (TPM) and Transportation Asset Management (TAM)

Topic Area 2-3: Project Selection

Topic Area 2-4: Other Applications for PMS Data & Analysis



Theme 3: Workforce & Organizational Issues

3-1: People

3-2: Funding Uncertainties

3-3: Integration into Existing Systems & Processes

3-4: Data & Technology

3-5: Communication & Outreach



Theme 4: Technological Advancements (New Tools, Methodologies, & Technology)

- 4-1: Advancements in Automated Pavement Data Collection Technology
- 4-2: Technologies to Assess Pavement Subsurface Characteristics & Structural Properties
- 4-3: Emerging Pavement Data Collection Technologies & Methodologies for Assessing Distresses & Other Surface Characteristics
- 4-4: Improving Pavement Management Data & Analysis Tools
- 4-5: Next-Generation Performance Measures

3.0 Pavement Management Roadmap Suggestions

Note: The suggested activities are based on the gap assessment and outreach activities. There are no commitments to funding the suggestions implied by the FHWA or any other agency.



Long-Term Vision For Pavement Management

Pavement management supports agency investment decisions using quality data and analysis tools that encourage the consideration of long-term consequences on pavement and system performance in alignment with building safe, sustainable, and equitable transportation systems.

This vision is achievable with the following:

- Efficient and effective data collection and analysis procedures that take advantage of promising new technologies to produce the most reliable data possible within resource constraints.
- Access to data and analytical tools that are robust, comprehensive, and credible.
- The ability to communicate effectively with stakeholders using performance data that consider strategic objectives (such as economic and financial sustainability, risk and resilience, and social equity) in addition to pavement condition.
- Deployment of a well-trained and effective work force with access to resources that build and enrich the skills needed to effectively manage a pavement network.
- Internal and external support for pavement management that recognizes the benefits and value provided through its use in supporting planning, programming, design, construction, and maintenance activities.

Improvement Areas – Themes 1 & 2



DATA

Data Collection – Improve the efficiency and reliability of existing data collection.

Data Quality – Improve the quality of data collection using traditional processes.

Data Management – Support efforts to improve data processes and management.



ANALYSIS

Performance Modeling – Enhance the reliability and level of confidence in pavement performance models.

Treatment Rules and Impacts – Refine treatment rules and impacts to improve project and treatment suggestions.

PMS Analysis – Strengthen the use of pavement management software to support agency investment- and project-planning decisions.

Performance Measures – Support the expanded use of existing performance measures at the Federal, State, and local levels.

Improvement Areas – Themes 3 & 4



WORKFORCE

Training – Develop and deploy content to support workforce development.

Workforce Development – Reduce barriers to ready access to training and information needed to support workforce transitions.

Technical Assistance – Provide support to promote the use of pavement management concepts.

Tools – Support the development of software tools to supplement existing capabilities.

Communication – Develop effective tools for strategies for communicating pavement management results to different stakeholders.

Organizational Challenges – Address organizational challenges that hinder the use of pavement management



NEW TECHNOLOGY

New Technology – Promote strategies for using new technology to support pavement management data collection and analysis.

Next Generation Performance Measures – Implement next generation performance measures into pavement management programs.

Types of Actions Suggested



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Roadmap Suggestions



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Action Items By Theme

| Theme | Number of Improvement Areas | Number of Action Items | Number of Short-Term Action Items | Number of Long-Term Action Items |
|--|-----------------------------|------------------------|-----------------------------------|----------------------------------|
| 1: Data | 3 | 20 | 14 | 6 |
| 2: Pavement Management Analysis Tools and Other Applications | 4 | 20 | 16 | 4 |
| 3: Workforce and Organizational Issues | 6 | 24 | 14 | 10 |
| 4: Technological Advancements: New Tools, Methodology, and Technology | 2 | 8 | 2 | 6 |
| Totals | 15 | 72 | 46 | 26 |

Action Items By Type

| Activity Type | Number of Action Items | Number of Short-Term Action Items | Cost of Short-Term Action Items | Number of Long-Term Action Items | Cost of Long-Term Action Items | Total Cost |
|----------------------|------------------------|-----------------------------------|---------------------------------|----------------------------------|--------------------------------|------------------|
| Research | 28 | 13 | \$4.725M | 15 | \$6.275M | \$11.000M |
| Deployment | 14 | 13 | \$3.525M | 1 | \$0.250M | \$3.775M |
| Technical Assistance | 5 | 2 | \$1.000M | 3 | \$7.900M | \$8.900M |
| Synthesis | 4 | 4 | \$0.200M | 0 | \$0 | \$0.200M |
| Peer Exchange | 6 | 6 | \$0.450M | 0 | \$0 | \$0.450M |
| Training | 10 | 5 | \$3.000M | 5 | \$1.200M | \$4.200M |
| Case Studies | 1 | 1 | \$0.150M | 0 | \$0 | \$0.150M |
| Tool Development | 4 | 2 | \$1.050M | 2 | \$0.500M | \$1.550M |
| Totals | 72 | 46 | \$14.100M | 26 | \$16.125M | \$30.225M |

Example Short-Term Research Action Items Suggested by Stakeholders

- Improve 3D data collection & interpretation technologies
- Develop consistent nonregulatory distress descriptions & criteria using automated data collection procedures
- Develop consistent nonregulatory criteria for rutting certification & verification
- Identify cost-effective data storage & archiving methods
- Develop & pilot a framework for consideration of extreme weather, traffic variability, and other risk factors in performance modeling
- Develop & pilot a framework for consideration of social equity, sustainability, & resilience in an analysis
- Develop an online, searchable Pavement Management Guide to address current topics
- Develop templates for documenting models, processes, & procedures
- Enhance local access to training materials

Example Short-Term Deployment Topics Suggested by Stakeholders

- Strategies for data collection, use of TSDD & GPR, using existing equipment to build ancillary asset inventories, & streamlining data collection activities
- Strategies for addressing transitions in equipment, automated data quality checks, using acceptance criteria, and using data sampling
- Strategies for developing performance models, evaluating model reasonableness & reliability, incorporating risks into models
- Strategies for incorporating TSDD results into decision trees
- Strategies for using new technology and developing precision/bias statements

Example Technical Assistance Topics Suggested by Stakeholders

- Short-term
 - » Pilot & implement technical assistance programs on data management, data quality, and performance modeling
 - » Develop an equipment loan program to test new technology
- Long-term
 - » Develop a National Equipment Certification Center
 - » Pilot programs to demonstrate the use of new technology, next generation performance measures, & return on investment from GPR & TSDD data
 - » Develop a program to support new technology trials

Example Short-Term Training Action Items Suggested by Stakeholders

- Develop training on basic statistics, data quality management plans, equipment calibration & certification, & performance modeling
- Conduct workshops on how to use GPR & TSDD data, data integration, life cycle planning, & use of leading performance measures
- Redesign the PMS User's Group webinar series to focus on training
- Create on-the-job and just-in-time training materials
- Create sharable materials for public messaging of pavement management information

4.0 Pavement Management Roadmap Implementation

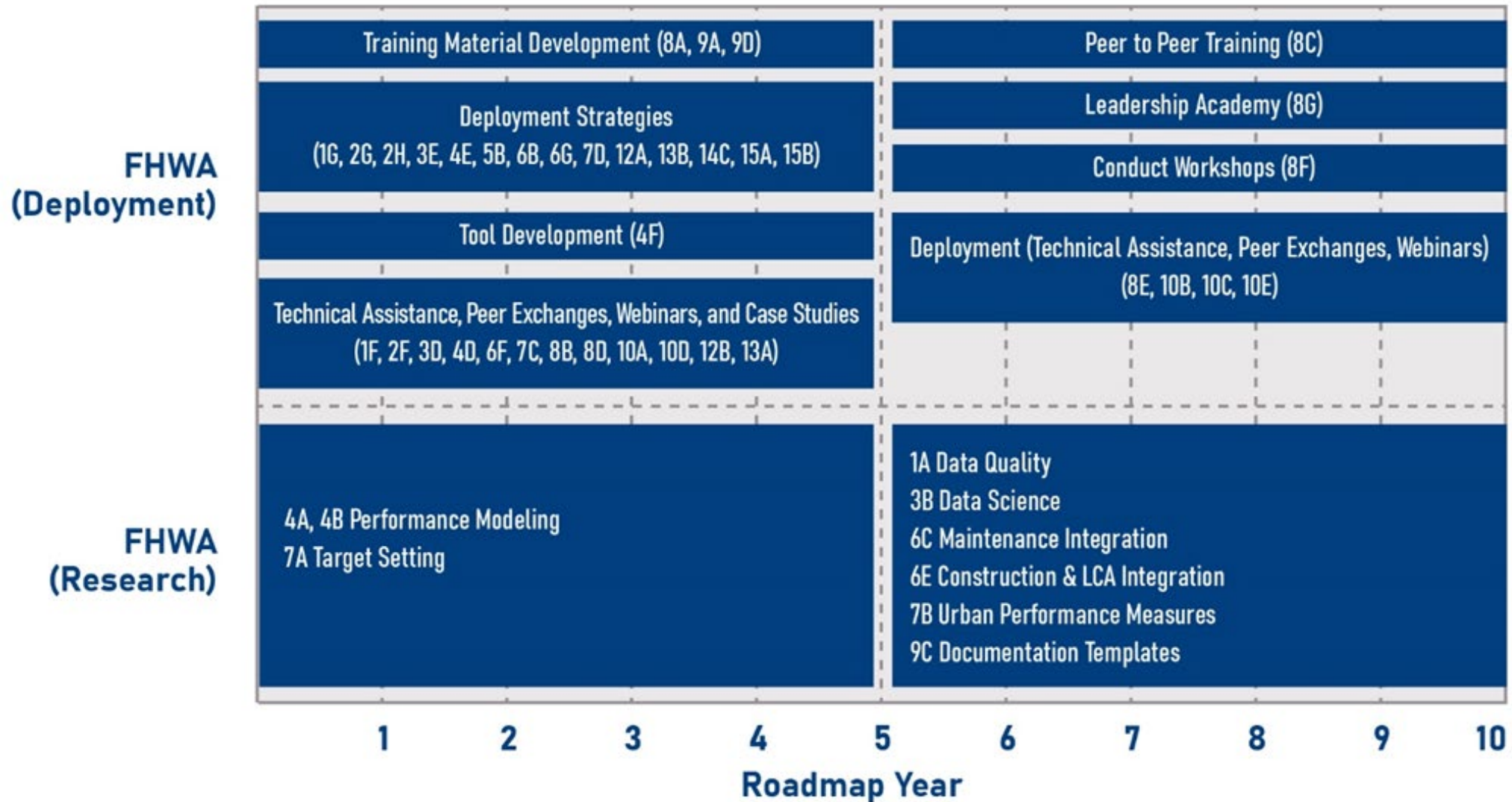
Possible Stakeholder Assistance Areas (1/2)

- FHWA – Research studies, deployment activities, training, technical assistance, peer exchanges, case studies, regional workshops, & tool development
- National Cooperative Highway Research Program (NCHRP) – Research studies & syntheses
- American Association of State Highway & Transportation Officials (AASHTO) – Support and deployment of research products
- Pooled Funds – Research, deployment activities, tool development

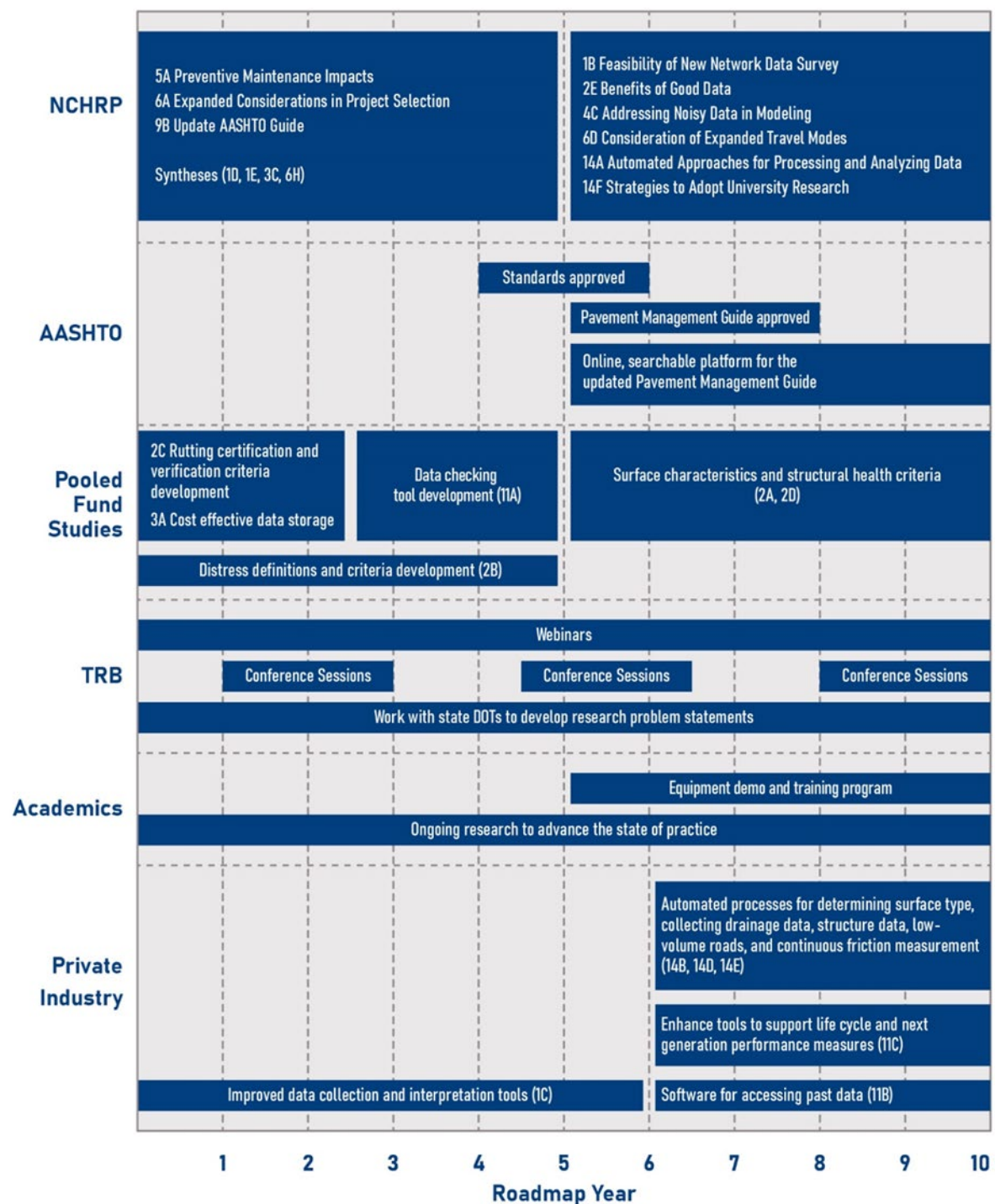
Possible Stakeholder Assistance Areas (2/2)

- Transportation Research Board (TRB) – Research Needs Statements, NCHRP project administration, webinars, workshops at conferences
- Private Industry – Equipment & software development
- Academia – Research & training programs

Example Strategy for Implementation (1/2)



Example Strategy for Implementation (2/2)



Get Your Copy of These Documents!

- Pavement Management Roadmap
- Pavement Management Roadmap Executive Summary

Documents located on the Pavement Management Roadmap webpage:

<https://www.fhwa.dot.gov/pavement/management/roadmap/roadmap2022.cfm>



Questions?

FHWA Pavements webpage:
<https://www.fhwa.dot.gov/pavement/>



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