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Optimizing Highway Funds by Integrating RWD Data into PMS Decision Making

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Presentation Outline

- **Background**
- **Study Objectives and Purpose**
- **Data Collection**
- **Pavement Management Analysis**
- **Findings**
- **Conclusions**
- **Acknowledgements**

Background

Traditional pavement performance monitoring

- Indices based on surface distress & ride quality

Pavement structural response

- Important indicator of performance

Rolling Wheel Deflectometer (RWD)

- Innovative device that efficiently measures structural response

Study Purpose

- ***Evaluate*** the potential benefits of integrating RWD data into agency PMS
- ***Compare*** PM analyses and results performed with and without RWD data
  - Treatment selection
  - Costs
  - Performance

DATA COLLECTION

The RWD

System

- Laser-based system
- 18-kip, single-axle, dual-tire

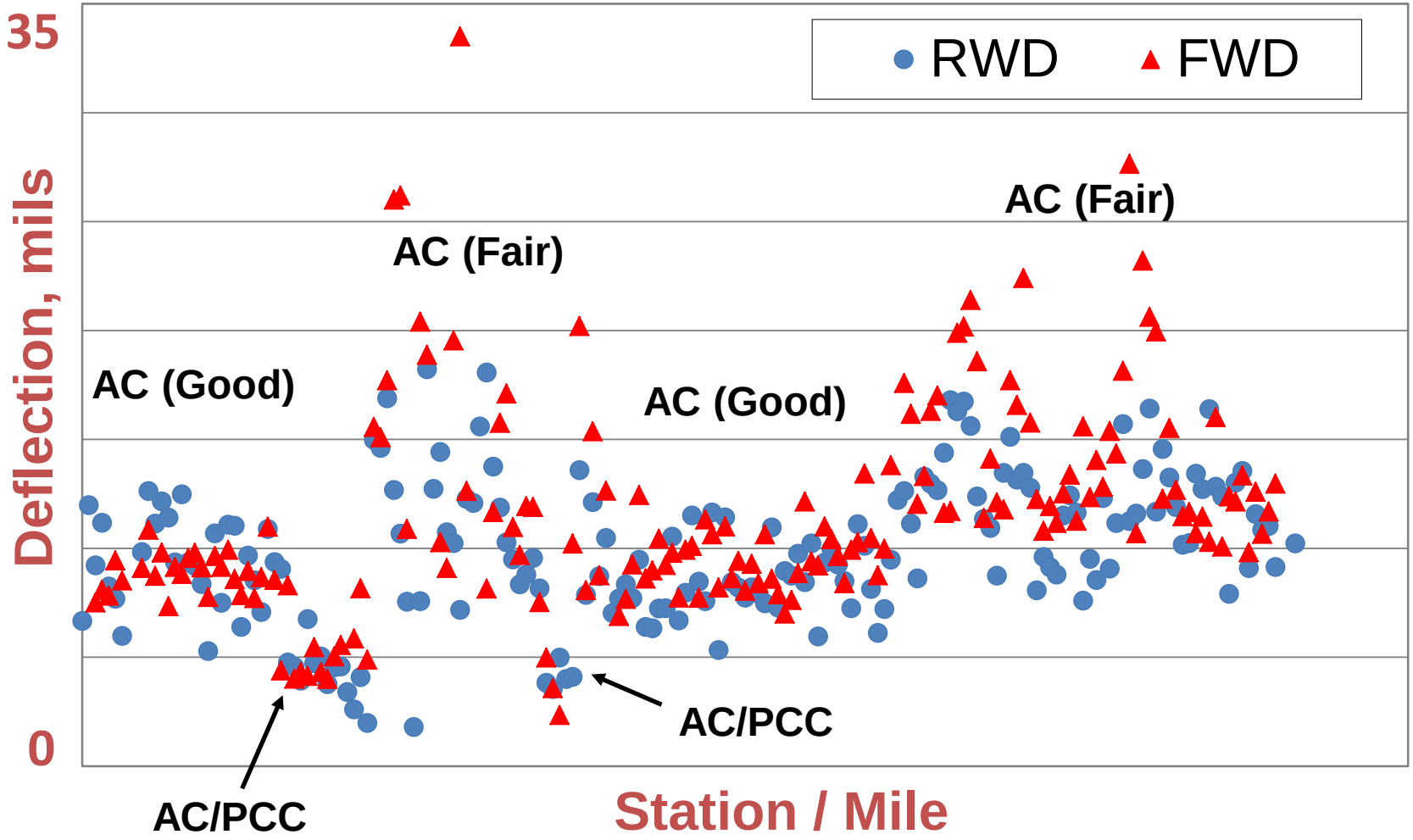
Operation

- Operates at posted speeds
- No lane closures

Measurements

- Spatially-coincident method
- Averages deflections over 0.1-mile intervals

Sample Deflection Profile



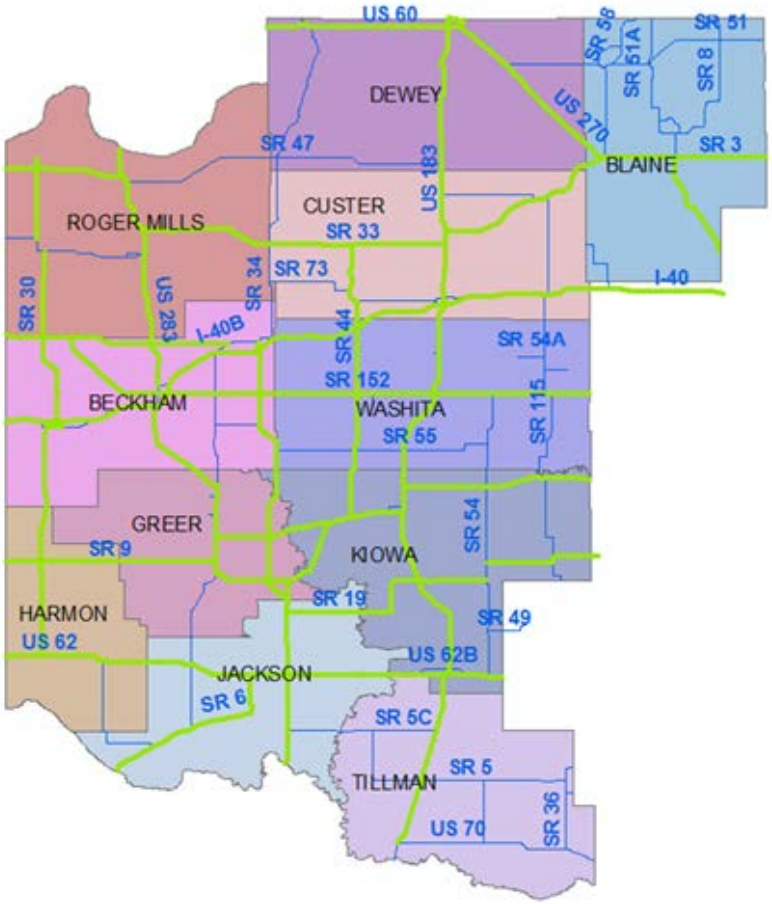
Test Roads

Test Network

- 1,000 lane-miles (ODOT D-5)
- Primarily flexible pavements
- Wide range of functional classifications and traffic

Data Collection

- Continuous data collection
- Averaged data at 0.1-mile intervals
- Testing duration: 4.5 days



Agency PMS Data

Composition / Use

- Pavement age
- Layer types and thicknesses
- Classification, traffic (ADT)

Condition

- Pavement Quality Index (PQI):
  - Ride quality
  - Rutting
  - Distress
- Structural condition
  - FWD data (interstate only)
  - Structural rating (subjective)

Agency PMS Methodology

Software

- Deighton software (dTIMS)

Performance Modeling

- Defined sectioning
- Performance models for each pavement type

Decision Models

- 3 Treatment categories
  - Preservation, rehabilitation, and replacement
- Decision trees
  - PQI, traffic, and structural condition

PMS ANALYSIS

Approach

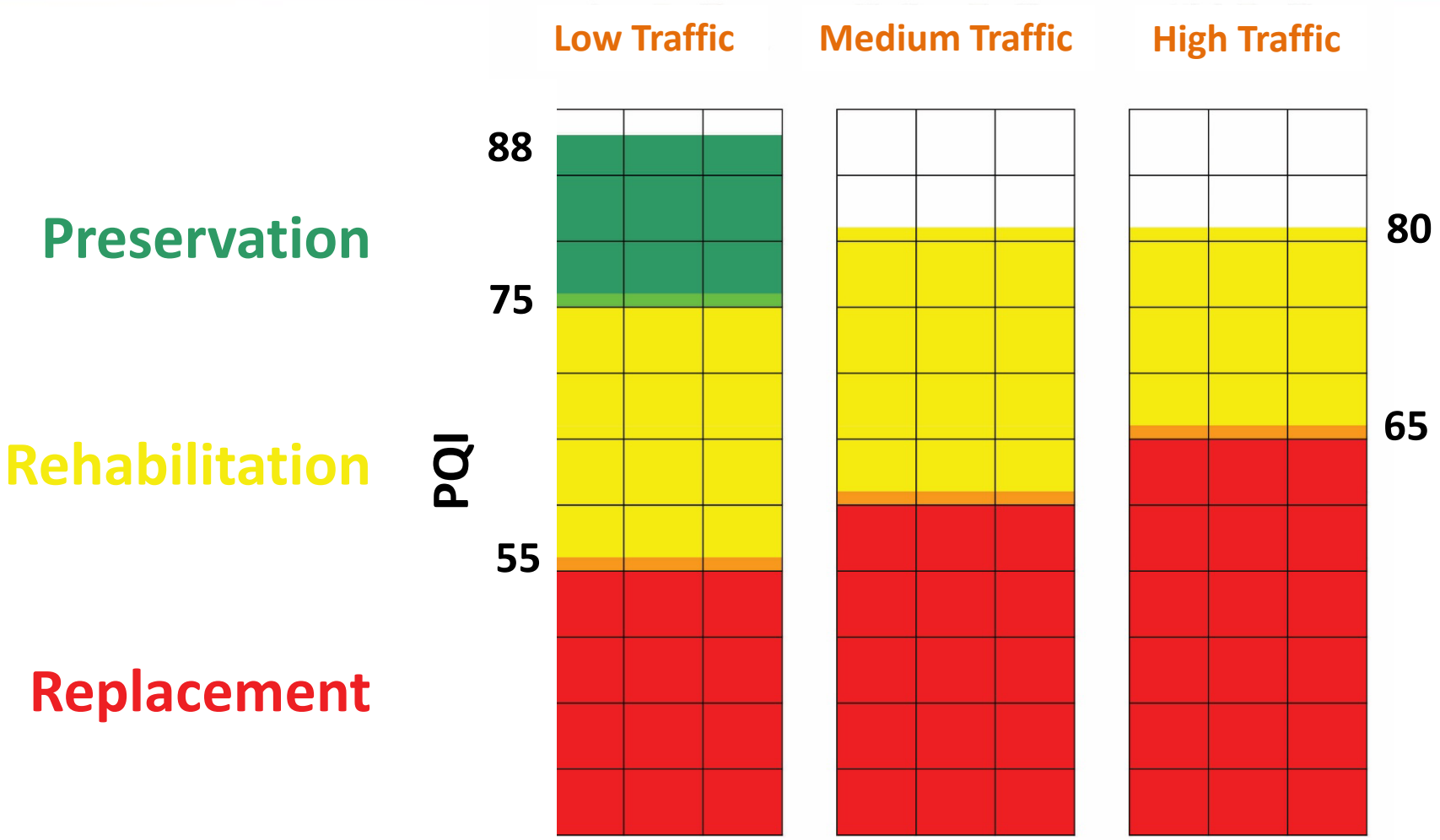
Evaluate multiple M&R treatment strategies

- Base strategy: PQI only
- Two modified strategies: add RWD data

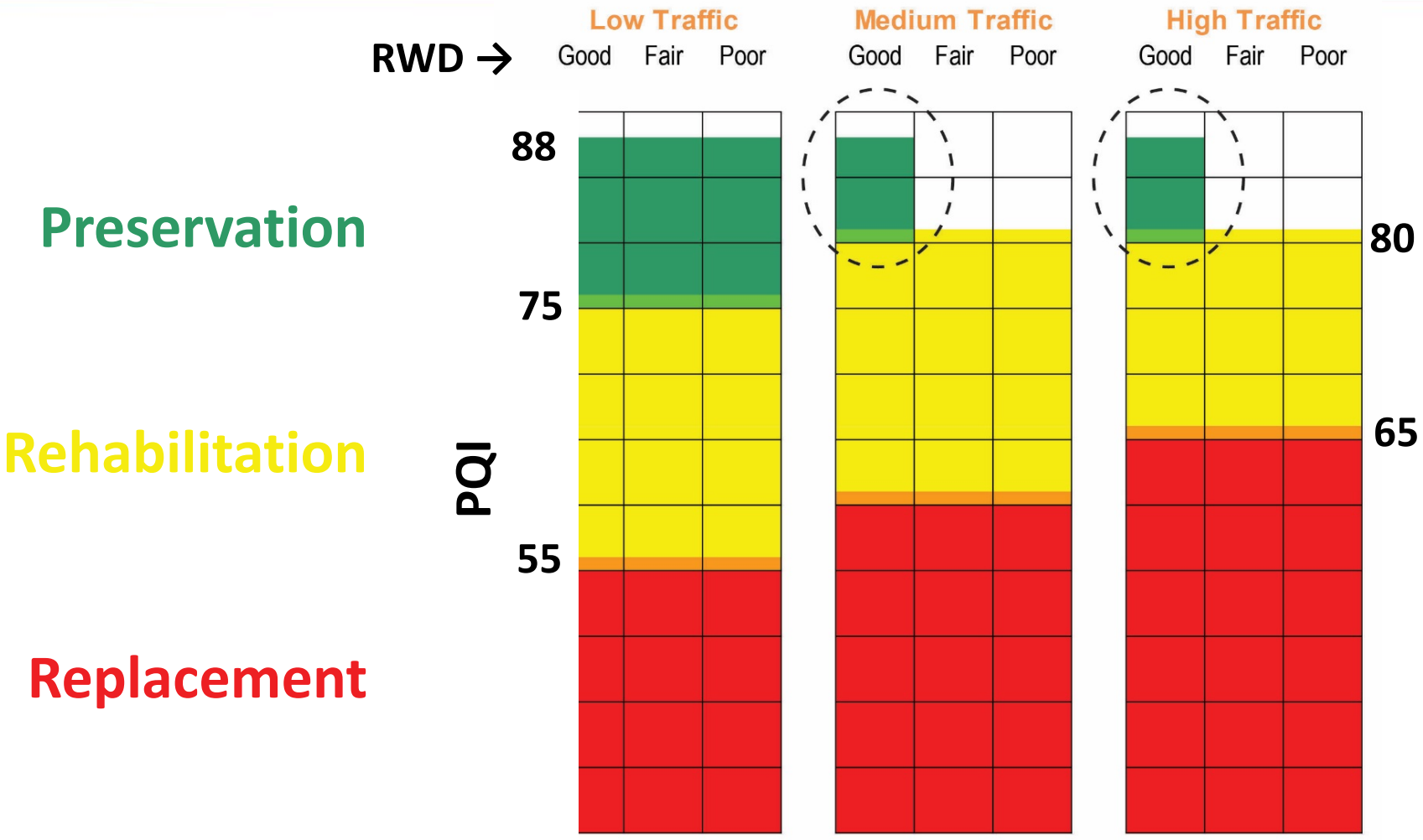
Compare results

- Costs
- Performance (in terms of PQI)

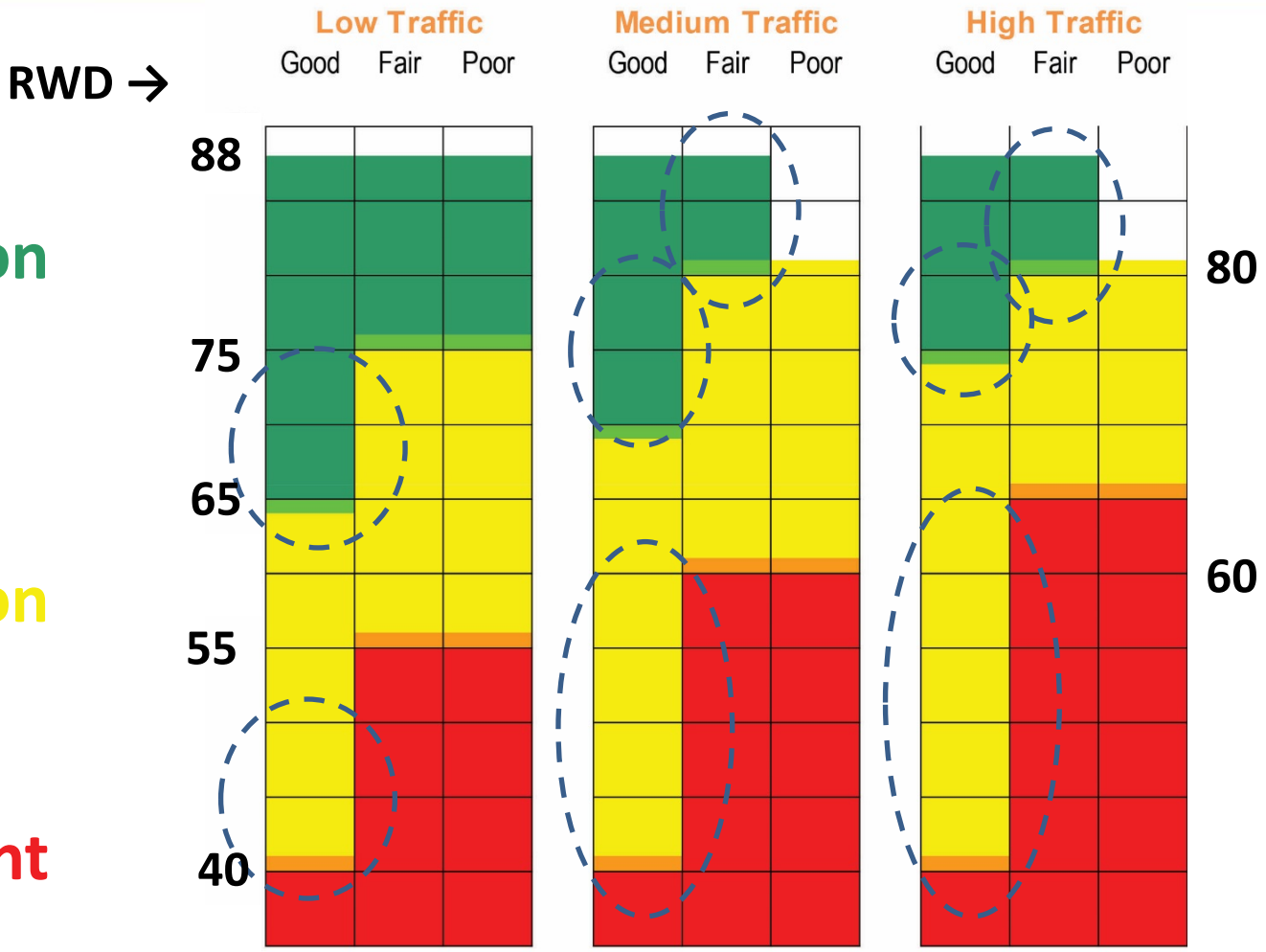
PQI Only – Treatment Matrix



RWD #1 – Treatment Matrix



RWD #2 – Treatment Matrix



Budget Scenarios

Target PQI Analysis

- Target network PQI = 92
- Compare costs of strategies

Unconstrained Funding Analysis

- Unlimited funds
- Select all triggered treatments
- Compare PQI performance and/or costs

FINDINGS

Results

Budget Scenario	Percent change in cost (relative to "PQI Only" base case)		
	PQI Only	RWD Option 1	RWD Option 2
Target PQI = 92	0.0 %	-10.6 %	-11.5 %

Results

Budget Scenario	Percent change in cost (relative to "PQI Only" base case)		
	PQI Only	RWD Option 1	RWD Option 2
Target PQI = 92	0.0 %	-10.6 %	-11.5 %
Unconstrained	0.0 %	-25.4 %	-28.9 %
	PQI = 95	PQI = 96	PQI = 96

Conclusions

RWD allows broader, more reliable use of pavement preservation

- Identifies candidate roads in *GOOD* and *FAIR* structural conditions
- Prevent use on roads in *POOR* structural condition

Cost savings can be significant

- More than 10 percent, in certain cases
- Depends on agency's base case scenario and current road conditions

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Thank You

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