Integration of Network Level PMS with Project Selection, Design and Implementation

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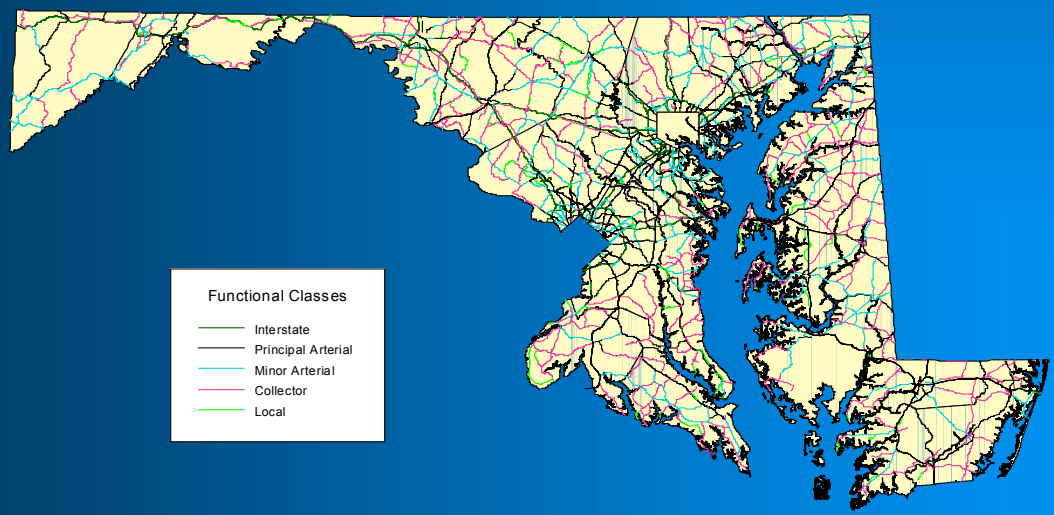
Maryland Pavement Network

- 16,000 Lane Miles
- $100 + Million Pavement Preservation Budget
- Statewide Planning Managed at Chief Engineer's Office
- Project Implementation Managed at Districts
- Maryland Has Seven Districts



Maryland Old Management Process

Road Condition data

100

Performance
Indicators

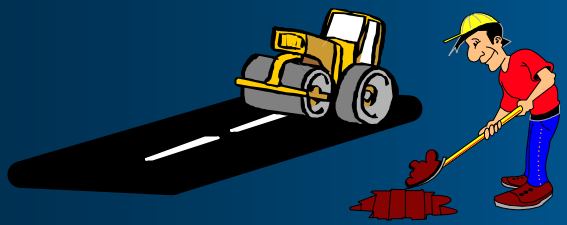
0

Road	Condition	Rank
	45	1
	50	2
	53	3
	61	4
	66	5
	74	6
	80	7

Priority Listing

Annual Meeting

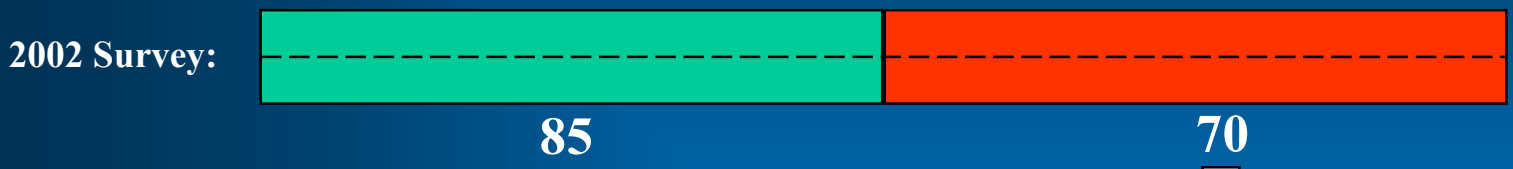
Budget Allocation

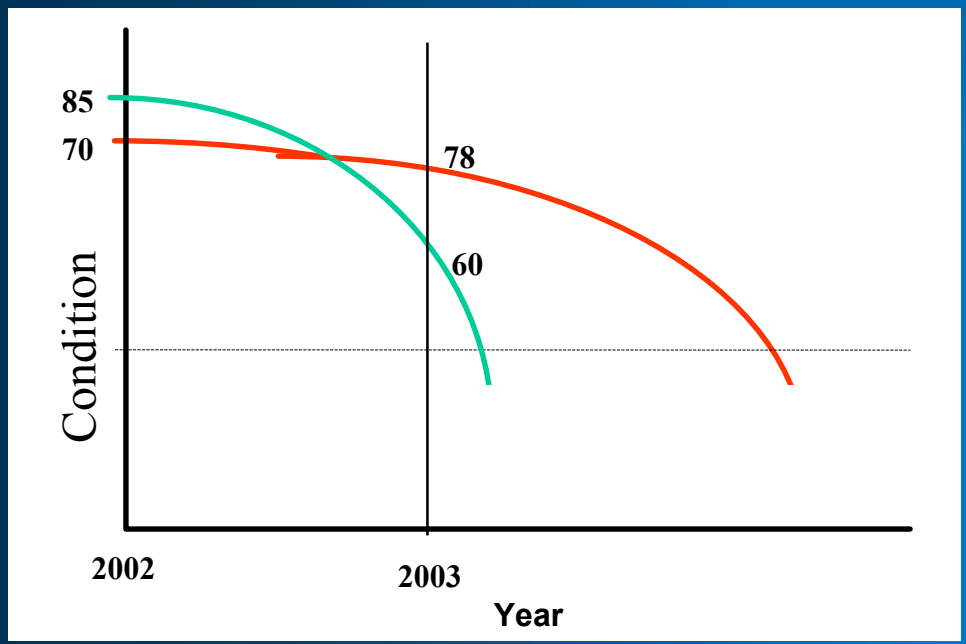


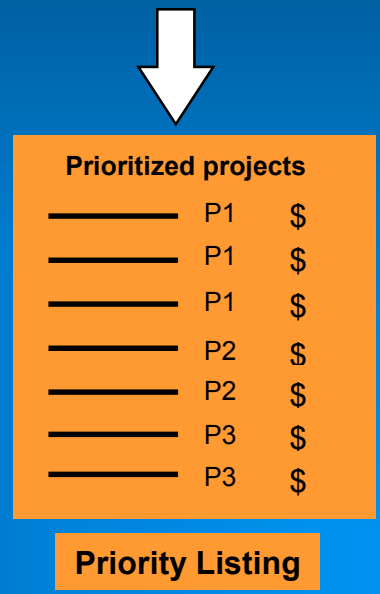
M&R Actions

Old Project Selection Process

- Rank the pavements from worst to best based on current condition
- Create priority lists to fix worst pavements first

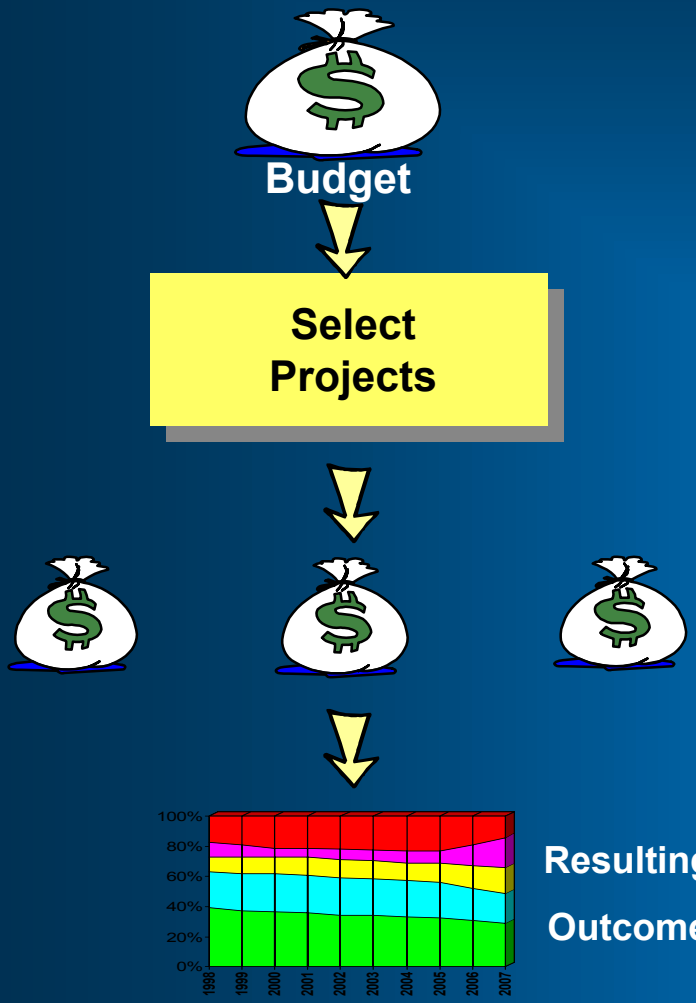




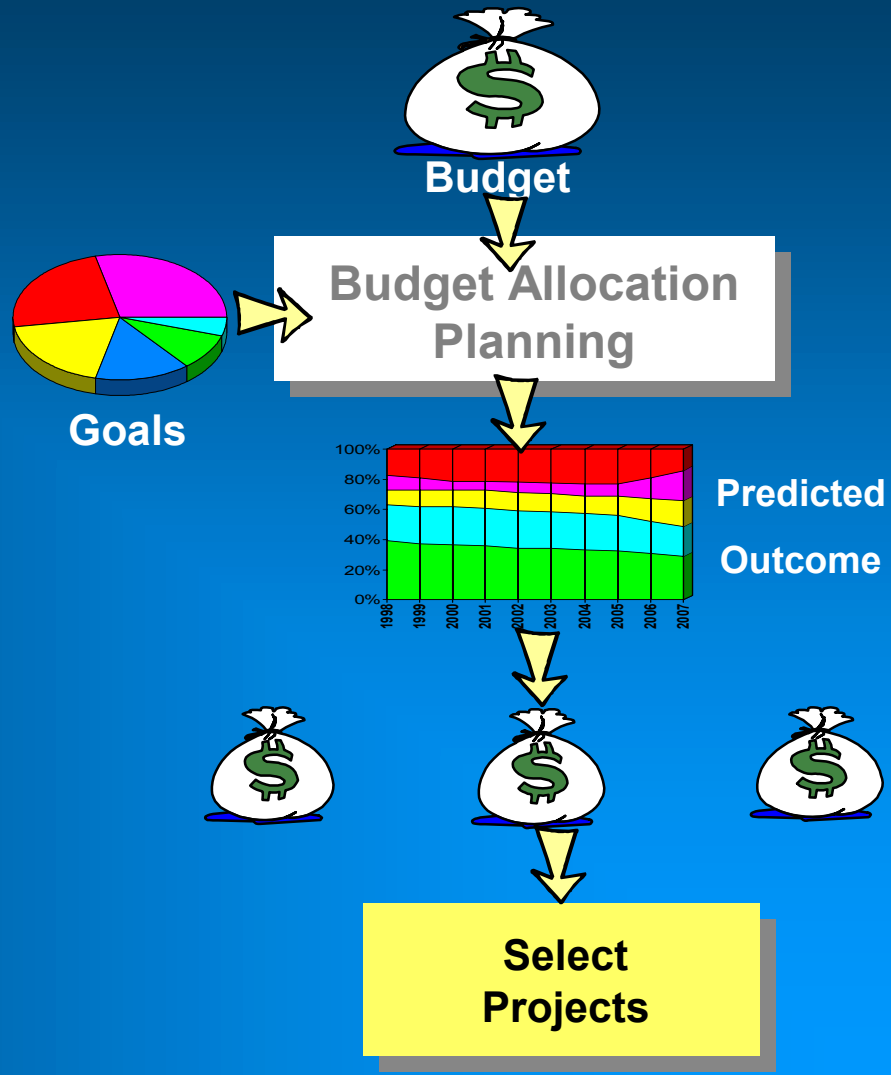


Enhancing the Planning Process

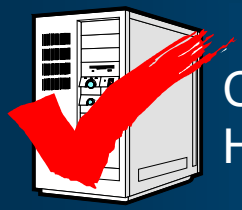
Traditional Planning Process



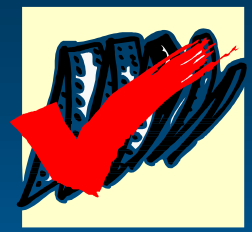
Proactive Planning Process



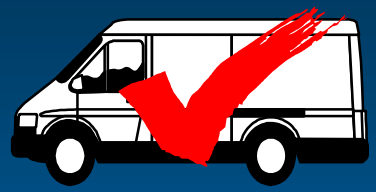
Adding New Management Tools



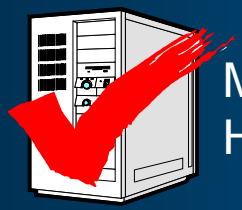
Construction History



Roadway Inventory



Performance Data

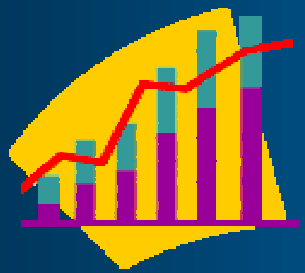


Maintenance History

Local Expertise

Design Tools

Prediction Models



Optimization Tools

Project Selection

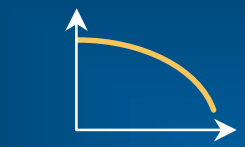
Instituting a Progressive Management System

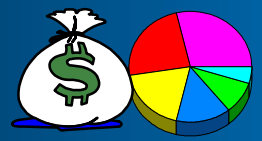
Data

- Inventory Data
- Condition data
- Traffic Data
- Pavement Families
- Environment
- Construction History
- Costs/Benefits

Planning

(Network Level)





Performance Modeling

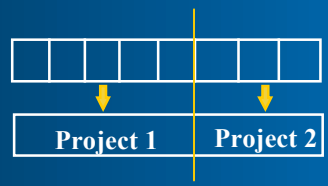
Network Optimization

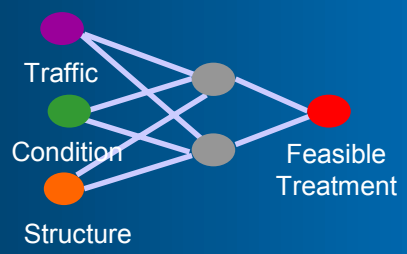
- Generate Prediction Models
- Set Budget Limits
- Define Improvement Goals
- Generate Best M&R Strategies

Optimum Maintenance & Rehab Plan

Implementation

(Project Level)



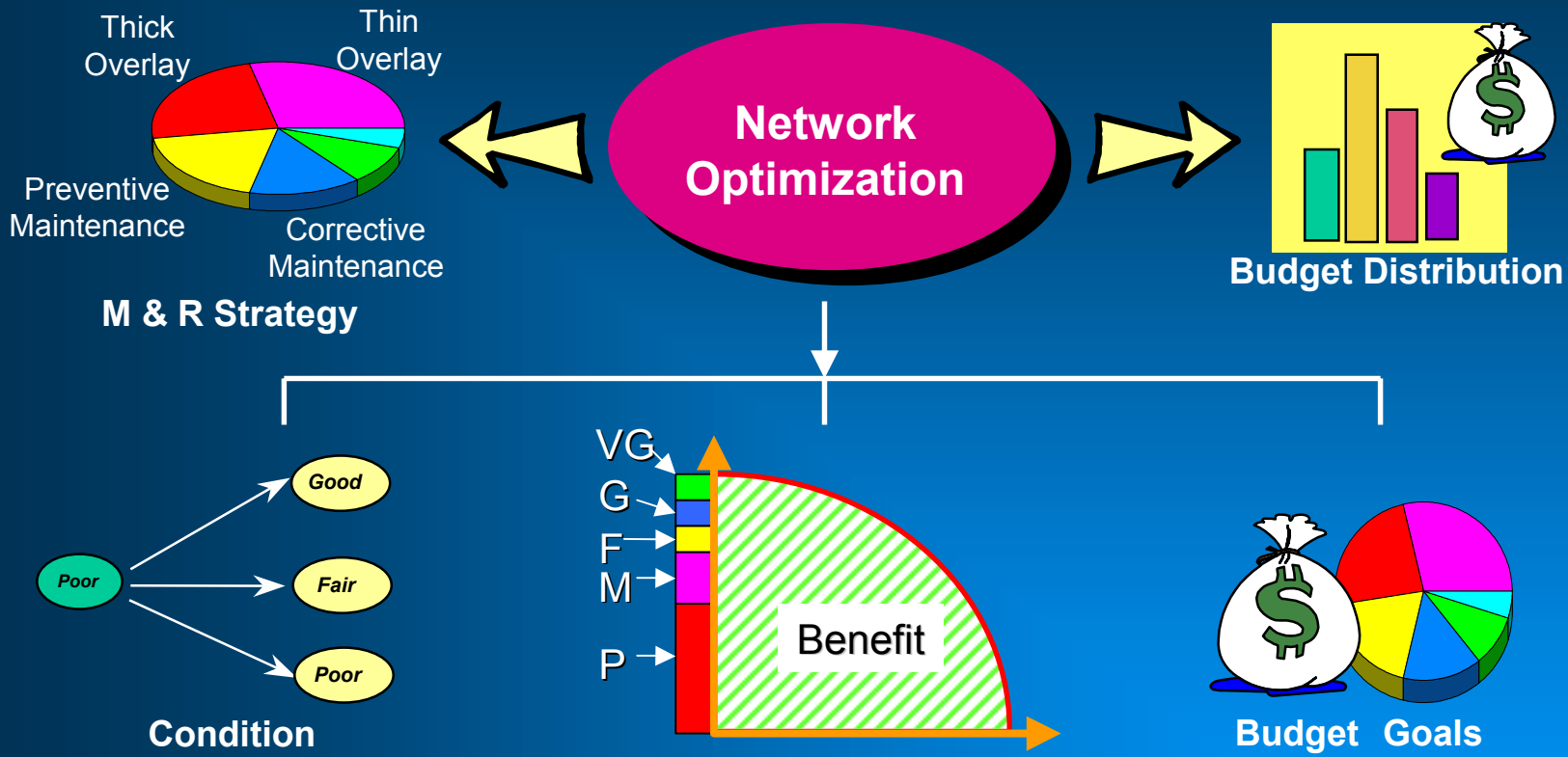


Project Selection

Treatment Assignment

- Identify Project Limits
- Create Projects
- Select Feasible Treatments
- Refine Costs
- Implement Project

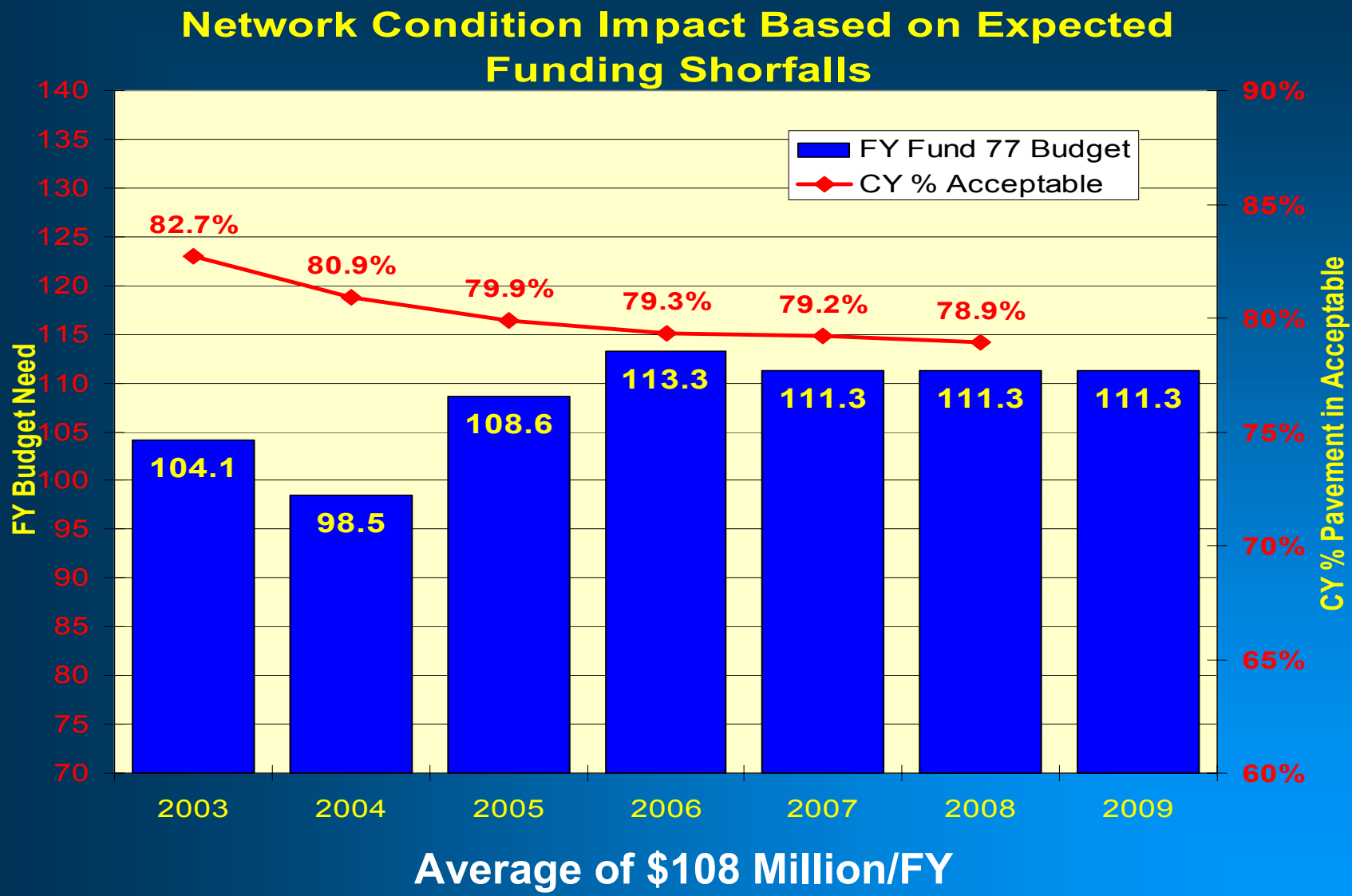
Network Optimization



Generate the Best M&R Plan

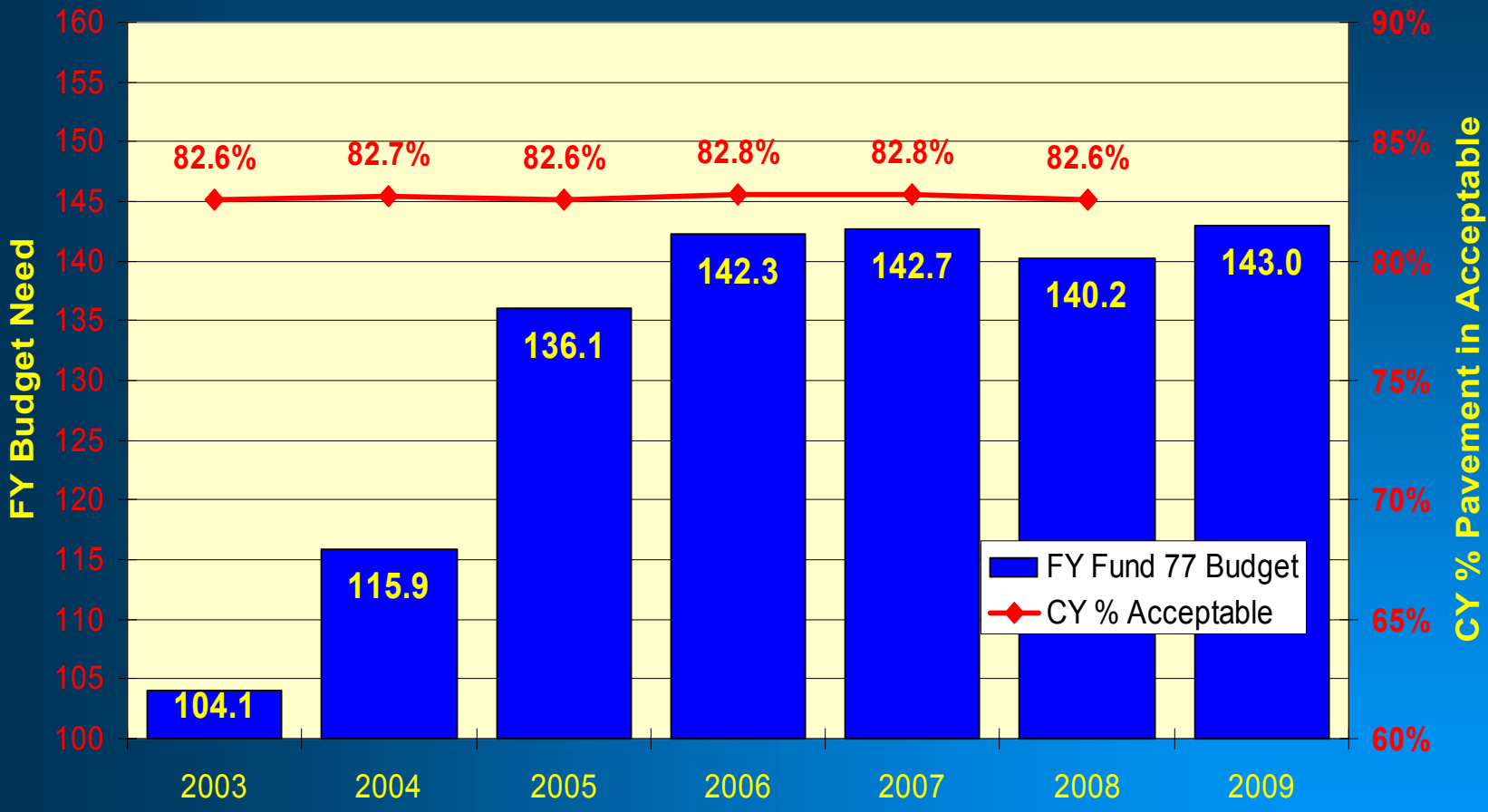
Provide Capability to Justify Budget Needs

Predicted Conditions



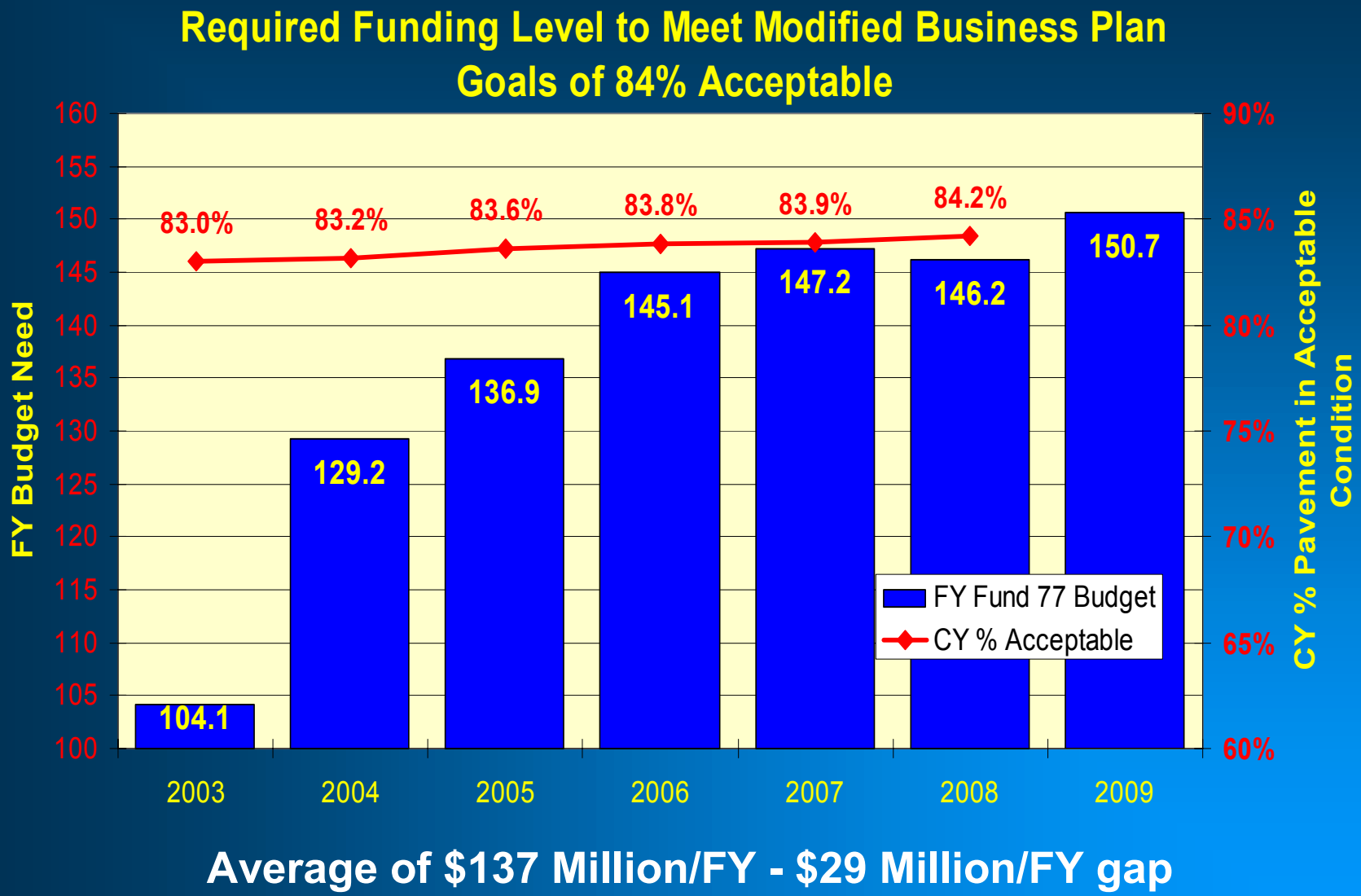
Predicted Conditions

Required Funding Level to Maintain Existing Conditions



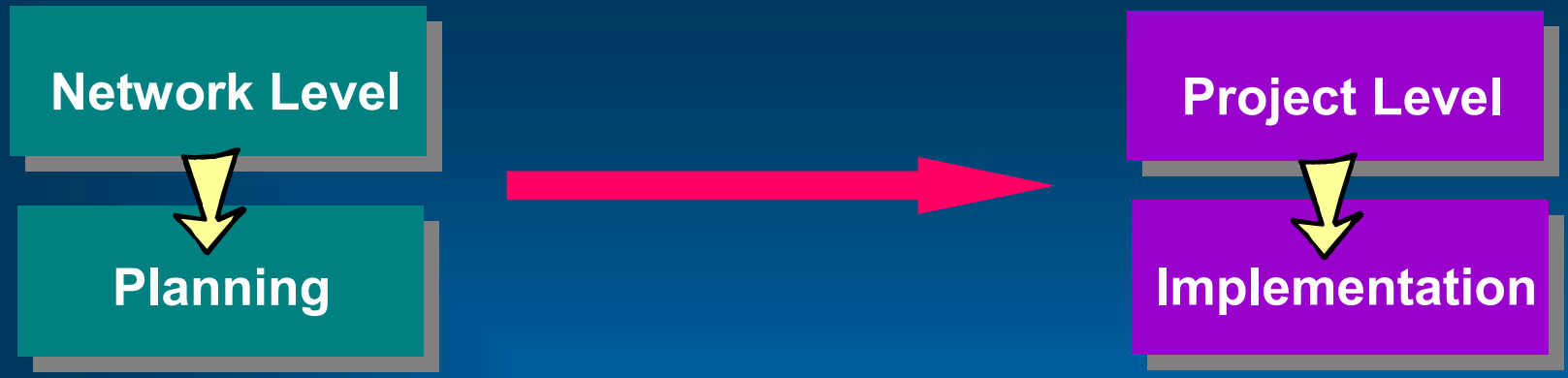
Average of $132 Million/FY - $24 Million/FY gap

Predicted Conditions



Average of $137 Million/FY - $29 Million/FY gap

Making the Connection



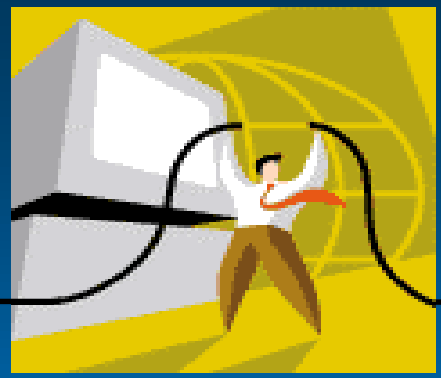
Develop Statewide M&R Recommendations

Transform Recommendations Into Projects

- Network Level Phase Synthesizes Data into General Terms and Distributions
- Project Level Phase Uses More Detailed Input and Relies on a More Specific Analysis of Data

Establishing a Functional Link

Network



Project

- Determine Budget Allocation Strategy
- Determine M&R Distributions
- Estimate Costs and Benefits
- Predict Overall Conditions

- Select Specific Projects
- Evaluate Project Detailed Condition
- Finalize Accurate Costs

Network Analysis Must Encompass a Degree of Variability to Account for Deviations that Occur When Projects are Selected

Include Aspects of the Project Level Process into Network Formulation

Synchronizing the Two Phases of Analysis

Computing Costs

- **Network:** Average Cost Estimates
- **Project:** Detailed Cost Calculations

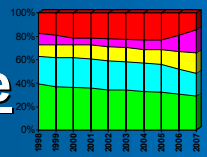
Use Variable Cost Values at the Network Level

Assessing Condition

- **Network:** One Condition Index
- **Project:** Several Condition Indices

Evaluate Multiple Indicators at the Network Level

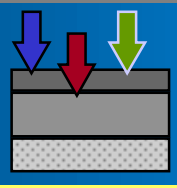
Predicting Performance



- **Network:** Average Performance
- **Project:** Variable Performance

Use Probabilistic Models to Account for Variability

Defining Action Options



- **Network:** Thickness-Based Actions
- **Project:** Life-Based Actions

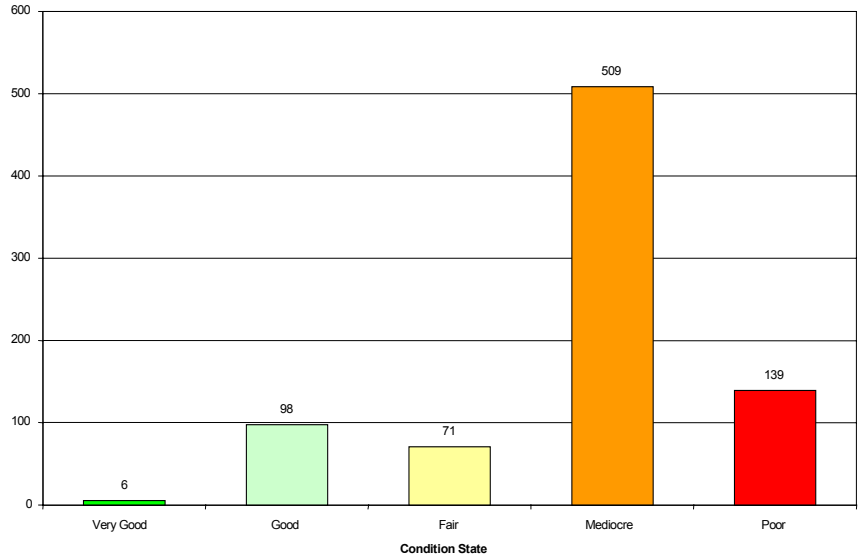
Use Same Action Classification Scheme

Linking Network and Project Level Plans

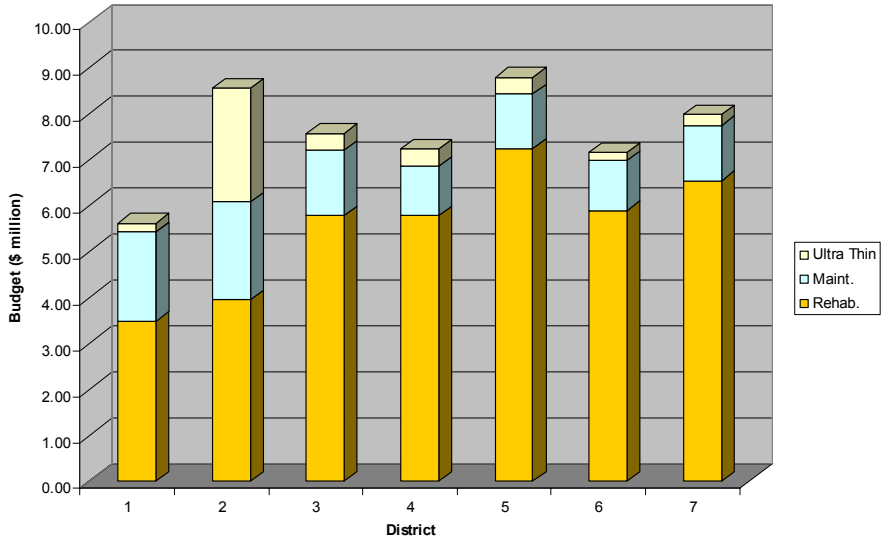
Challenge:

How to consolidate network level results into information that can guide the Project Level Analysis ?

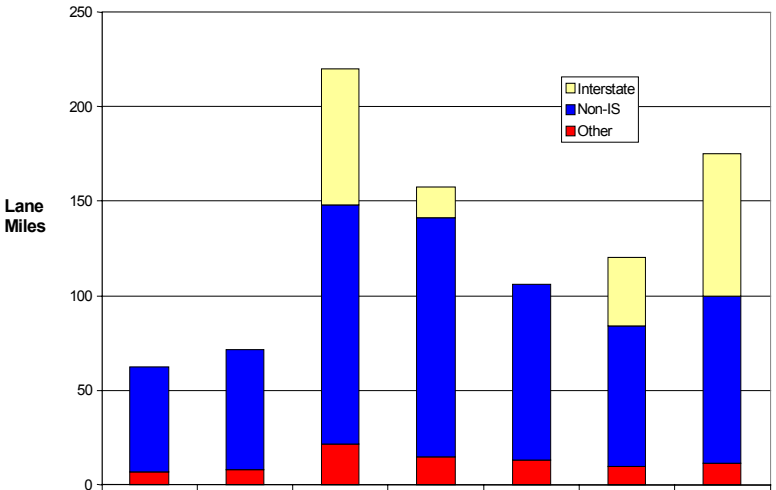
Recommended Lane-Miles by Pavement Condition



Budget Distribution by District FY 2004

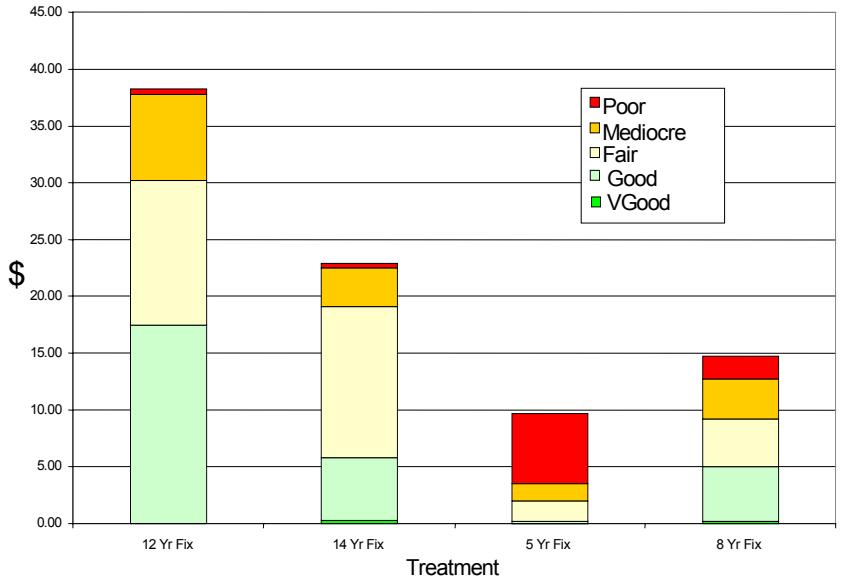


FY 2004 Lane Miles Plan per Road Type



	1	2	3	4	5	6	7
Interstate	0	0	72	16	0	36	75
Non-IS	56	64	127	126	93	74	89
Other	7	8	21	15	13	10	11

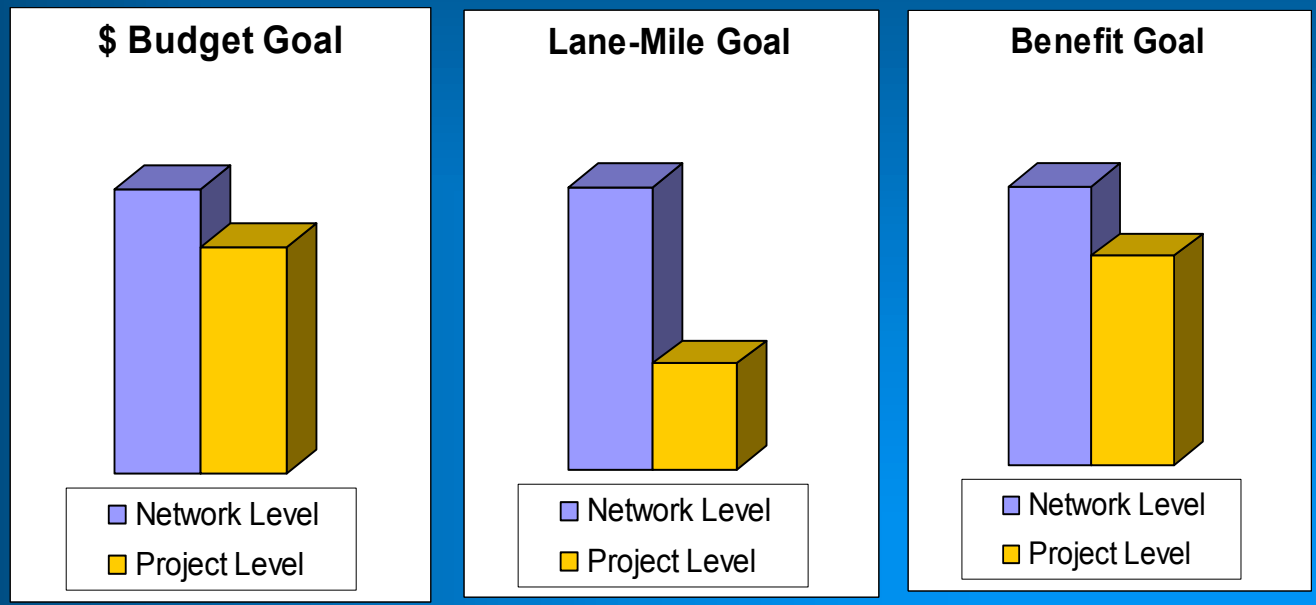
Budget Distribution per Treatment Level and Condition



Linking Network and Project Level Plans

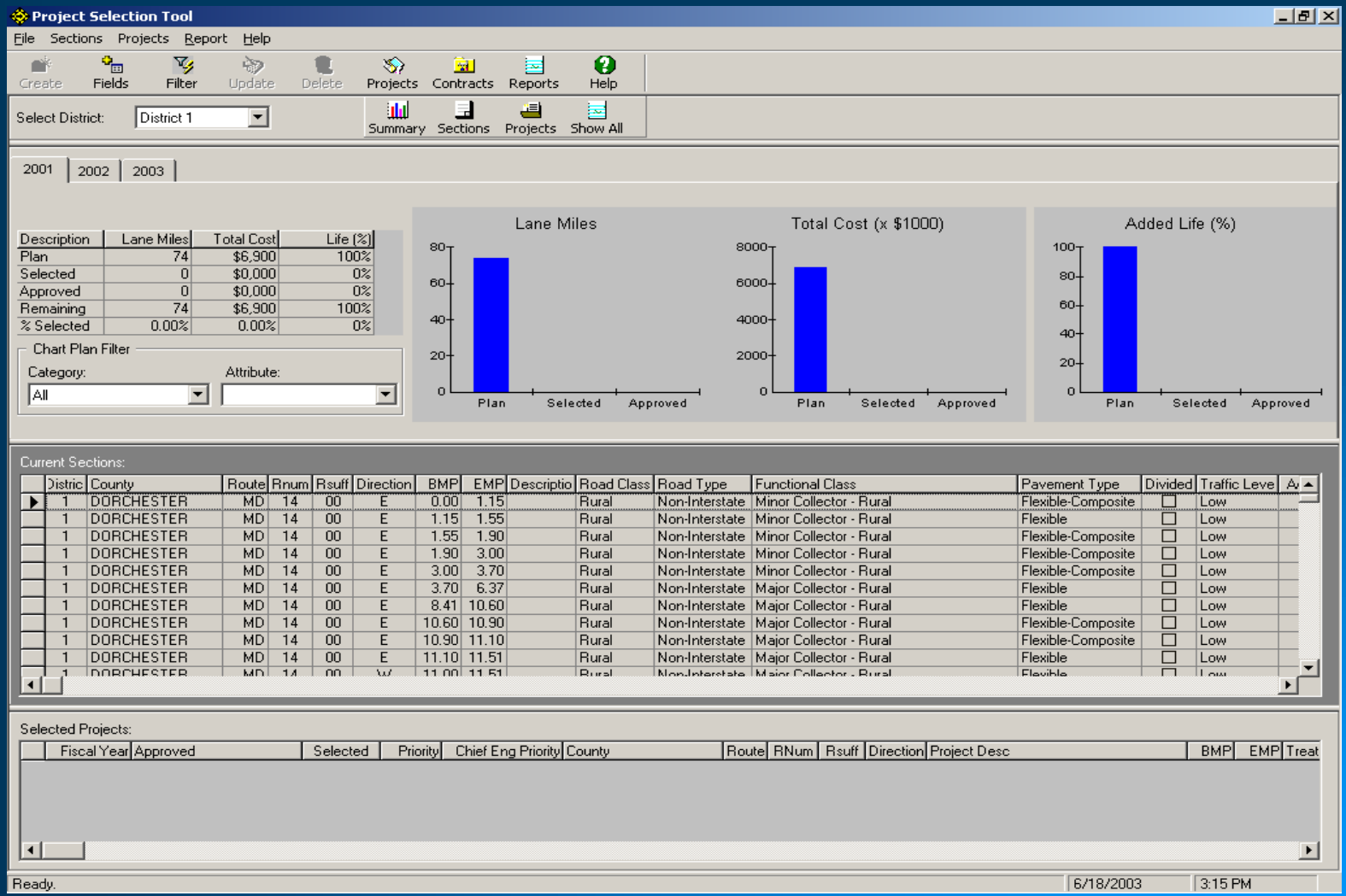
- **Objective:** Create Project Level Plans in Correspondence with Network Level Recommendations
- **Approach:** Provide Simple Network Assessment Attributes that can guide the Project Selection Process

Select Projects to Achieve Network Level Goals



Budget, Lane-Mile, and Life Goals Ensure Funding, Type, and Timing of Work Will be Met

The Application: Project Selection Tool



PST Demo

Thank You

Questions?

Comments?

Feedback?