LOU LAMBERT, DEPUTY DIRECTOR

BUREAU OF TRANSPORTATION PLANNING

FIVE MAJOR AREAS

- ✓ Evolving Process of Strategic Analysis
- ✓ New Paradigm in Transportation
- ✓ Current Activities in Asset Management
- ✓ Michigan Business Process
- ✓ Emerging Issues

EVOLVING PROCESS OF STRATEGIC ANALYSIS

From Needs Studies to Asset Management

NEEDS STUDIES
Key Objectives

- ✓ Produce for Legislature, Governor and the public a single volume of highway system inventories and revenues needed to retire deficiencies
- ✓ Serve as a backdrop to establish revenue increases and the distribution of funds
- ✓ Michigan conducted several – most extensive in 1984

PROBLEMS

- ✓ The funds needed to retire deficiencies were staggering: over $22 billion just for highways
- ✓ Assessments assumed that all dollar needs were of equal importance
- ✓ No prioritization of needs
- ✓ No standards or performance measures

1980'S
CRUMBLING INFRASTRUCTURE

- ✓ *America in Ruins: Beyond the Public Works Pork Barrel*
- ✓ *Public Works Infrastructure: Policy Considerations for the 1980s*
- ✓ *Federal Policies for Infrastructure Management*
- ✓ *Reinventing Government: How the Entrepreneurial Spirit is Transforming the Public Sector*

1990's
DECADE OF PERFORMANCE

- ✓1991: Passage of ISTEA
- ✓1993: Government Performance & Results Act
- ✓1994: EO 12893 – Principles for Federal Infrastructure Investment
- ✓1995: National Highway System Act
- ✓1998: TEA-21
- ✓1999: GASB Statement 34

WHAT IS DRIVING ASSET MANAGEMENT?

- ✓ Aging infrastructure and mature systems
- ✓ Public expectations
- ✓ Changes in leadership philosophy
  - Customer-driven
  - “Best Management Practices”
- ✓ Advanced management systems and improved technology
- ✓ Productivity of the system and economic growth

ASSET MANAGEMENT BASIC APPROACH

- ✓ Set Goals and Objectives
- ✓ Collect Inventory and Condition Data
- ✓ Rates of Deterioration
- ✓ Performance Standards & Measures
- ✓ Life-Cycle Cost Analysis
- ✓ Investment Strategies
- ✓ Programs, Projects, and Practices
- ✓ Monitoring Feedback and Adjustments

ASSET MANAGEMENT

- ✓ A strategic approach to managing our infrastructure
  - Quality Performance
  - Continuous Improvement
- ✓ Investing wisely
- ✓ Data are “corporate assets”

NEW PARADIGM

NEW PARADIGM IN TRANSPORTATION

- ✓ Transportation Networks viewed as Utilities
- ✓ Investments in Assets rather than the traditional public idea of mere Expenditures of Funds

ASSET MANAGEMENT

- ✓ Asset management is the philosophy that best fits this paradigm
- ✓ A “strategic” approach to managing your infrastructure
- ✓ Provides a systematic process for maintaining, upgrading, and operating the assets cost-effectively

CONSISTS OF

- ✓Thinking long-term rather than immediate need
- ✓Continuous system performance assessment
- ✓Collecting appropriate data
- ✓Using technology and analytical tools
- ✓Monitoring results

GOALS OF ASSET MANAGEMENT

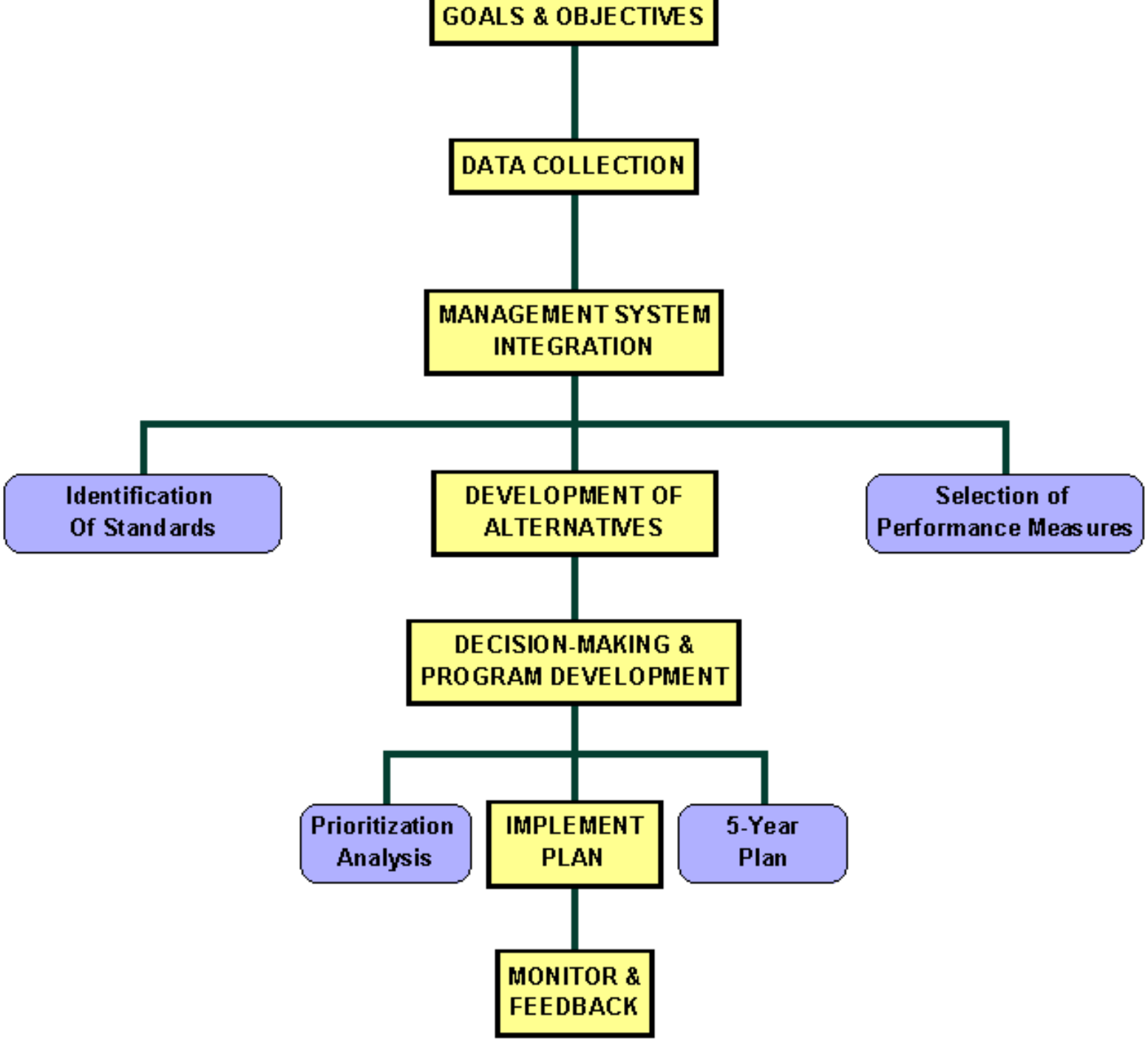
- ✓ Build, preserve, and operate assets cost-effectively with improved performance
- ✓ Deliver to customers the best value for the dollars spent
- ✓ Enhance credibility and accountability

CRITICAL ELEMENTS

- ✓ Consider a range of alternatives in addressing problems and needs
- ✓ Procedures and evaluation criteria are consistent and reinforce policy goals and objectives
- ✓ Decisions based on relative merit and an understanding of comparative costs and consequences
- ✓ Investing wisely

MANAGING PAVEMENTS NOT ROAD CONDITION

- ✓ Set targets
- ✓ Establish strategy to meet targets
- ✓ Establish cost-effective, long- & short-range programs
- ✓ Maximize benefits to motoring public
- ✓ Maximize pavement condition and minimize costs
- ✓ Maintain and improve future pavements


GOALS & OBJECTIVES
DATA COLLECTION
MANAGEMENT SYSTEM INTEGRATION
Identification Of Standards
DEVELOPMENT OF ALTERNATIVES
Selection of Performance Measures
DECISION-MAKING & PROGRAM DEVELOPMENT
Prioritization Analysis
IMPLEMENT PLAN
5-Year Plan
MONITOR & FEEDBACK

WHAT'S DIFFERENT?

- ***OLD PROCESS***
- ✓ Tactical
- ✓ Reactive
- ✓ Compartmental & Piecemeal
- ✓ Stove Pipes
- ✓ Basic Tools
- ✓ "Slice in Time
- ✓ Deficiencies
- ✓ Retiring Backlog
- ✓ Look Backwards

- ***NEW PROCESS***
- ✓ Strategic
- ✓ Proactive
- ✓ Integrated and Systematic
- ✓ Interdisciplinary
- ✓ Advanced Systems
- ✓ Continuous assessment
- ✓ Function of Road
- ✓ Systems Approach
- ✓ Forward Looking

CURRENT ACTIVITIES IN ASSET MANAGEMENT

CURRENT ACTIVITIES IN ASSET MANAGEMENT

- ✓ Nationally
- ✓ In Michigan – HB 5396
- ✓ Growing Partnerships
  - Universities
  - Industry Representatives
  - Financial Sector
  - Local Governments

MANY PARTNERSHIPS

- ✓ AASHTO Task Force on Asset Management
- ✓ FHWA – Office of Asset Management
- ✓ Other transportation agencies and providers
- ✓ Private Sector
- ✓ Universities – Regional Transportation Centers

AASHTO

- ✓1998: Established Task Force on Asset Management
- ✓1999: NCHRP Project to develop first generation asset management guide
- ✓1999/2000: Adoption of Strategic Plan
- ✓2002: Established a joint website

STRATEGIC PLAN

- ✓ Develop partnerships with public and private entities
- ✓ Develop and document an understanding of asset management
- ✓ Promote the development of tools, analysis methods, and research topics
- ✓ Inform member states on how to utilize asset management
- ✓ Assist member states in assessing and implementing asset management principles

ASSET MANAGEMENT GUIDE

- ✓ First Phase is completed and consists of 3 volumes
  - Synthesis of Asset Management Practice
  - Asset Management Framework
  - Recommended Research Program
- ✓ Second Phase is just beginning
  - Provide state agencies with a “rating” guide to judge how effectively they are implementing asset management principles

FEDERAL HIGHWAY ADMINISTRATION: OFFICE OF ASSET MANAGEMENT

- ✓ Created in response to strategic planning efforts
- ✓ 3 Key Responsibilities:
  - Provide national leadership in asset management principles for highway program administration
  - Develop asset management policies for pavement, bridge, and system preservation
  - Partner with AASHTO, other FHWA offices and others to conduct nationwide programs

MICHIGAN: HB 5396

- ✓ Special Committee issued a report in June 2000 that recommended that all road agencies use an asset management approach
- ✓ HB 5396 was introduced last fall in the Michigan House of Representatives
- ✓ Passed the House last December: 99-0
- ✓ Senate is expected to pass it soon

HB 5396

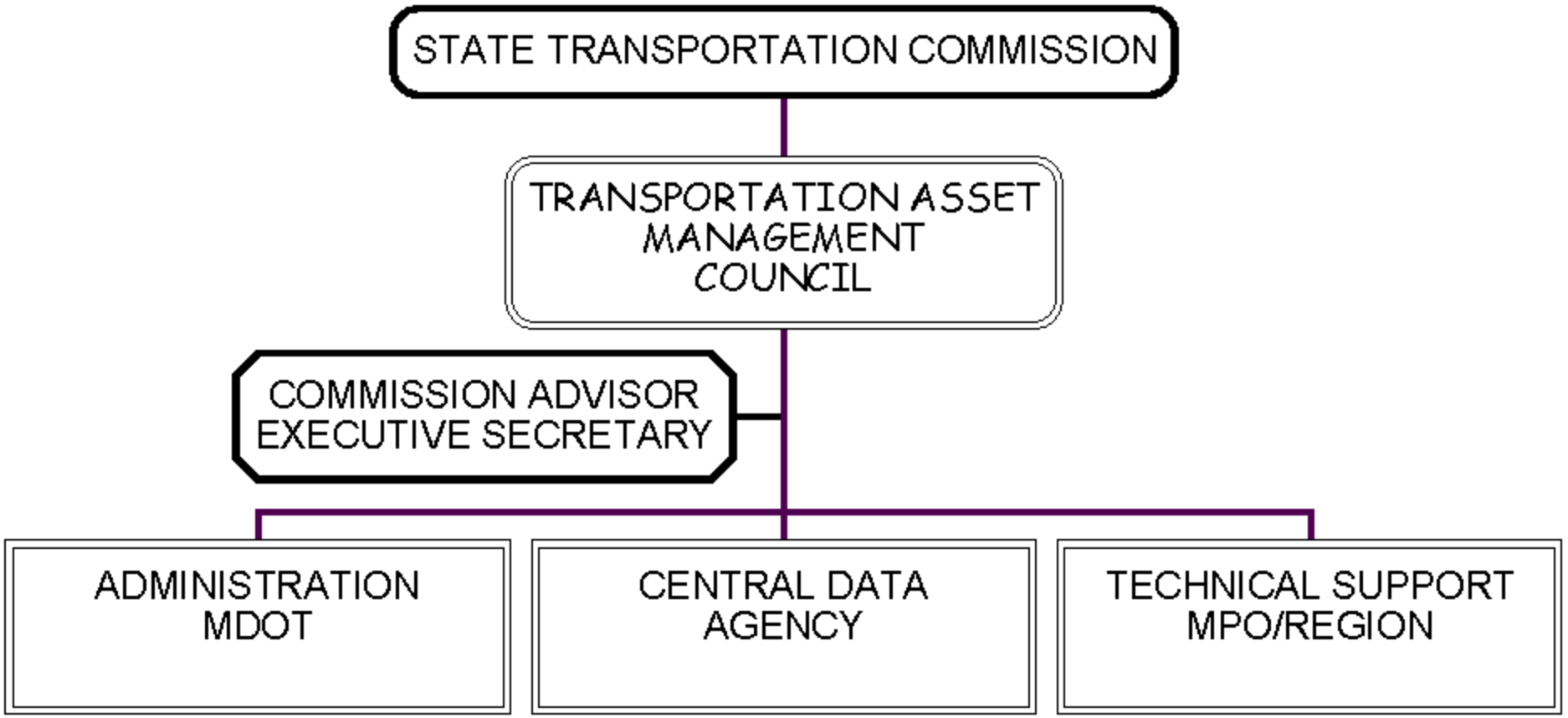
- ✓ Requires asset management approach
- ✓ State Transportation Commission will act as oversight body
- ✓ Sets up an 11-member Transportation Asset Management Council
- ✓ Common condition assessment and data collection process
- ✓ Establish an asset management strategy and common definitions
- ✓ Requires a joint multi-year road & bridge program
- ✓ Annual monitoring and reporting to STC and Legislature
- ✓ Funding will come from Michigan Transportation Fund

TRANSPORTATION ASSET MANAGEMENT COUNCIL

MISSION STATEMENT

To advise the State Transportation Commission on a statewide asset management strategy and the necessary procedures and analytical tools to implement such a strategy on Michigan's highway system in a cost-effective, efficient manner

ORGANIZATION CHART



GROWING PARTNERSHIPS
UNIVERSITIES

- ✓Regional Transportation Centers
- ✓Local Technical Assistance Program (LTAP)
- ✓Need for developing curricula for training a new generation of engineers and planners

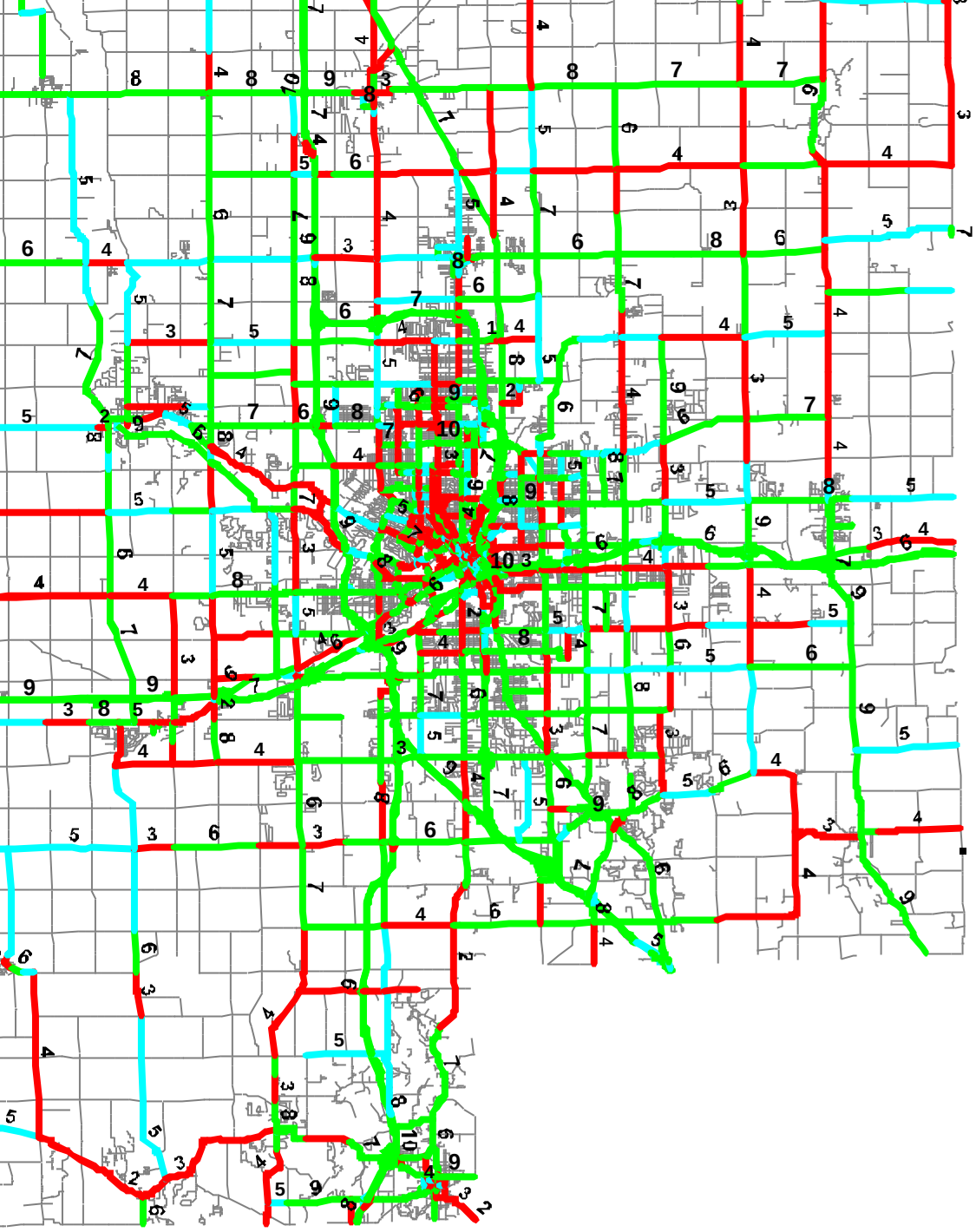
GROWING PARTNERSHIPS
PRIVATE & FINANCIAL SECTORS

?

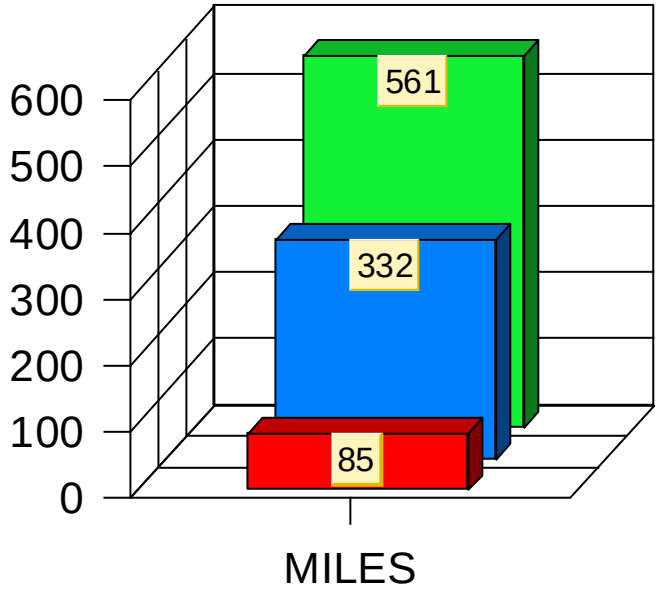
- ✓Opportunities

GROWING PARTNERSHIPS
LOCAL GOVERNMENTS

- ✓Pilot study with 5 counties, several cities and regional planning commissions
- ✓Collection of road condition data on the federal-aid system
- ✓Used PASER rating system



PASER CONDITION RATING



GOOD

FAIR

POOR

Genesee County Federal Aid PASER Condition Ratings

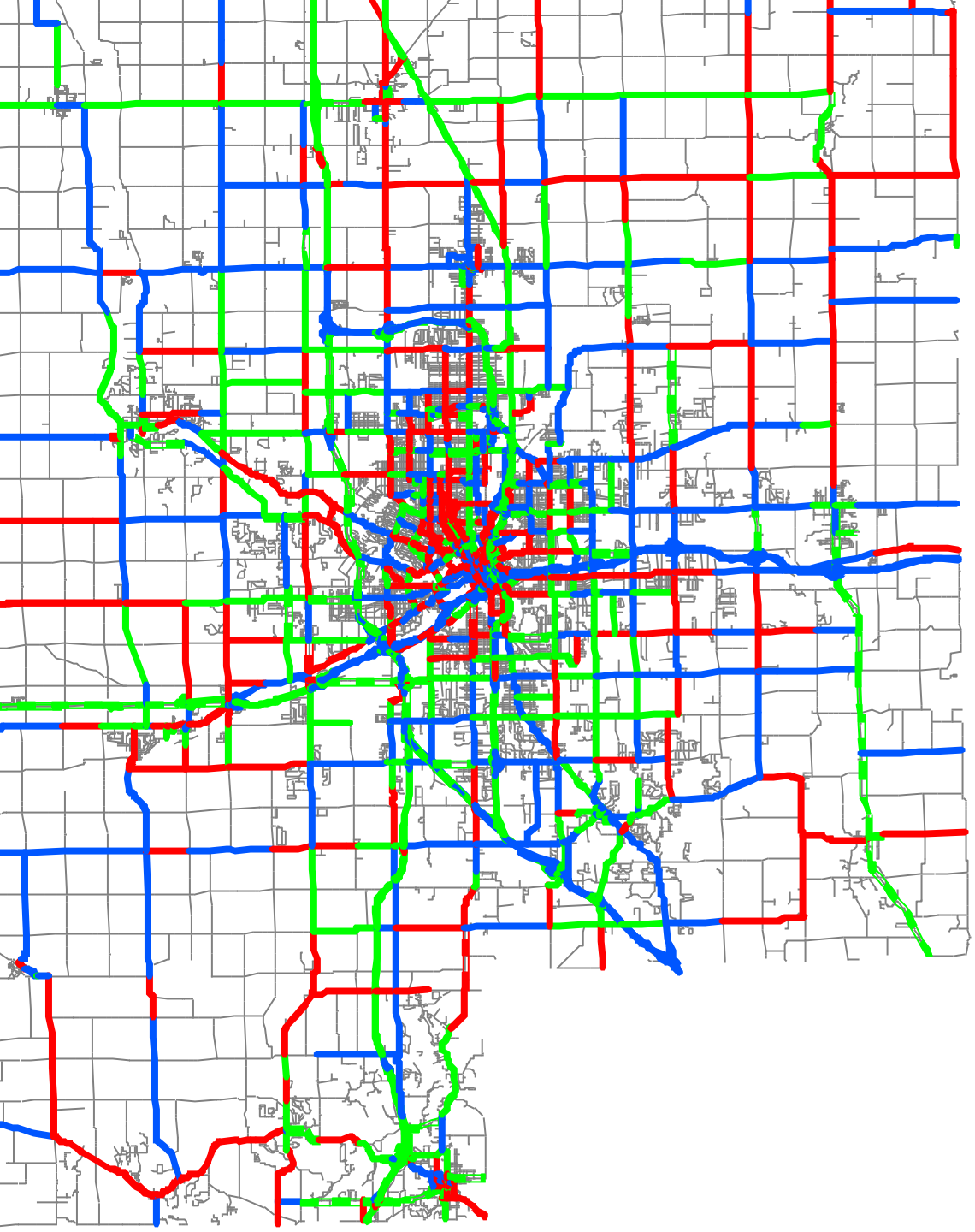
Good

Fair

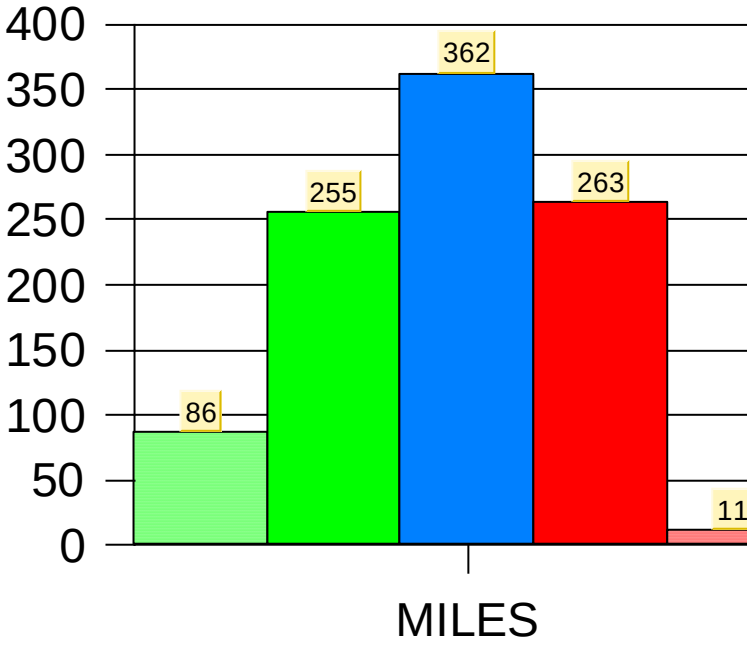
Poor

0 2 4 6

Miles



ASSET MANAGEMENT SCALE



- CATEGORY 1 (PASER Ratings 9 -10)
- CATEGORY 2 (PASER Ratings 7 - 8)
- CATEGORY 3 (PASER Ratings 5 - 6)
- CATEGORY 4 (PASER Ratings 3 - 4)
- CATEGORY 5 (PASER Ratings 1 - 2)

ASSET MANAGEMENT SCALE

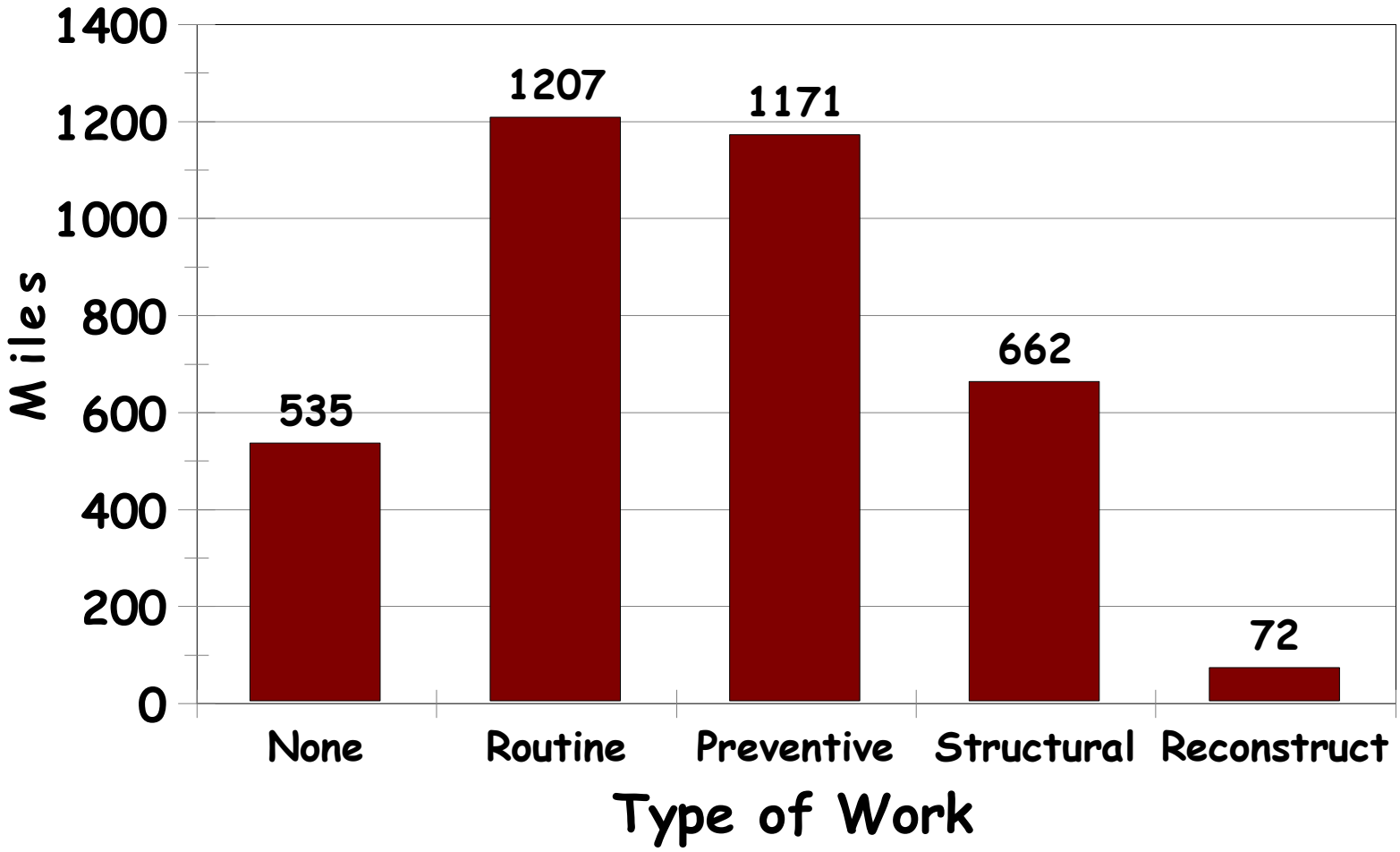
CATEGORIES

- 1 = No Maintenance Needed
- 2 = Routine Maintenance
- 3 = Preservative Treatments
- 4 = Structural Rehab
- 5 = Reconstruction

0 2 4 6

Asset Management: Totals

Federal-Aid System



MICHIGAN'S ASSET MANAGEMENT PROCESS

MICHIGAN BUSINESS PROCESS

- ✓ Five Major Components:
  - •Policy Goals & Objectives
  - •Information & Data Collection
  - •Planning & Programming
  - •Program Delivery
  - •Monitoring & Reporting
- ✓ Cash Flow Model
- ✓ Call for Projects
- ✓ 5-Year Road & Bridge Program

MDOT ASSETS

- ✓ Over 9,700 miles of road (27,000 lane miles) and 5,679 bridges
- ✓ 215 park-and-ride lots
- ✓ 2,400 trucks, maintenance vehicles, vans and cars
- ✓ 450,000 signs; 4,025 traffic lights; 8 million linear feet of guardrails
- ✓ 83 rest areas and 13 travel information centers
- ✓ 85 roadside parks and 27 scenic turnouts; 41 picnic sites and 2,400 picnic tables
- ✓ 163 pump houses; 188 water wells; 54 sewage disposal facilities and 64,000 catch basins
- ✓ Nearly 2,000 miles of non-motorized facilities; 700 miles of rail lines; 4,500 miles of fences

MDOT'S CONSTRUCT

- ✓Policy goals and objectives
- ✓Information and data collection
- ✓Planning and programming
- ✓Program delivery
- ✓Monitoring and reporting

POLICY GOALS & OBJECTIVES

- ✓Reflect a comprehensive, long-term view of asset performance and cost
- ✓Development of a strategic plan
- ✓Managing for results
- ✓Focus on performance

POLICY GOALS & OBJECTIVES

- ✓ Michigan Transportation Policy Plan
- ✓ State Long Range Plan
- ✓ MDOT's Business Plan
- ✓ Program Specific Strategies
  - Strategy for Repairing & Rebuilding Roads
  - Freeway Modernization Strategy
  - Corridor Management Strategy
  - Access Management Strategy
  - Border Crossing & Trade Corridor Strategy

INFORMATION & DATA

- ✓ Maintain high-quality information that supports asset management and business process
- ✓ Collect and update data cost-effectively
- ✓ Data viewed as “corporate asset”
- ✓ Information automated and accessible to all parties
  - GIS Framework Project
  - Global Positioning Satellite (GPS)

PLANNING & PROGRAMMING

- ✓ Consider a range of alternatives in addressing problems and deficiencies
- ✓ Procedures and evaluation criteria are consistent and reinforce policy goals and objectives
- ✓ Decisions based on relative merit and an understanding of comparative costs and consequences

ALTERNATIVE ANALYSES

- ✓ Strategic rather than tactical
- ✓ Decisions made with regard to the long-range condition of the entire system
- ✓ Assessing improvements based on desired outcomes
- ✓ Tools
  - Road Quality Forecasting System
  - Bridge Condition Forecasting System

PROGRAM DELIVERY

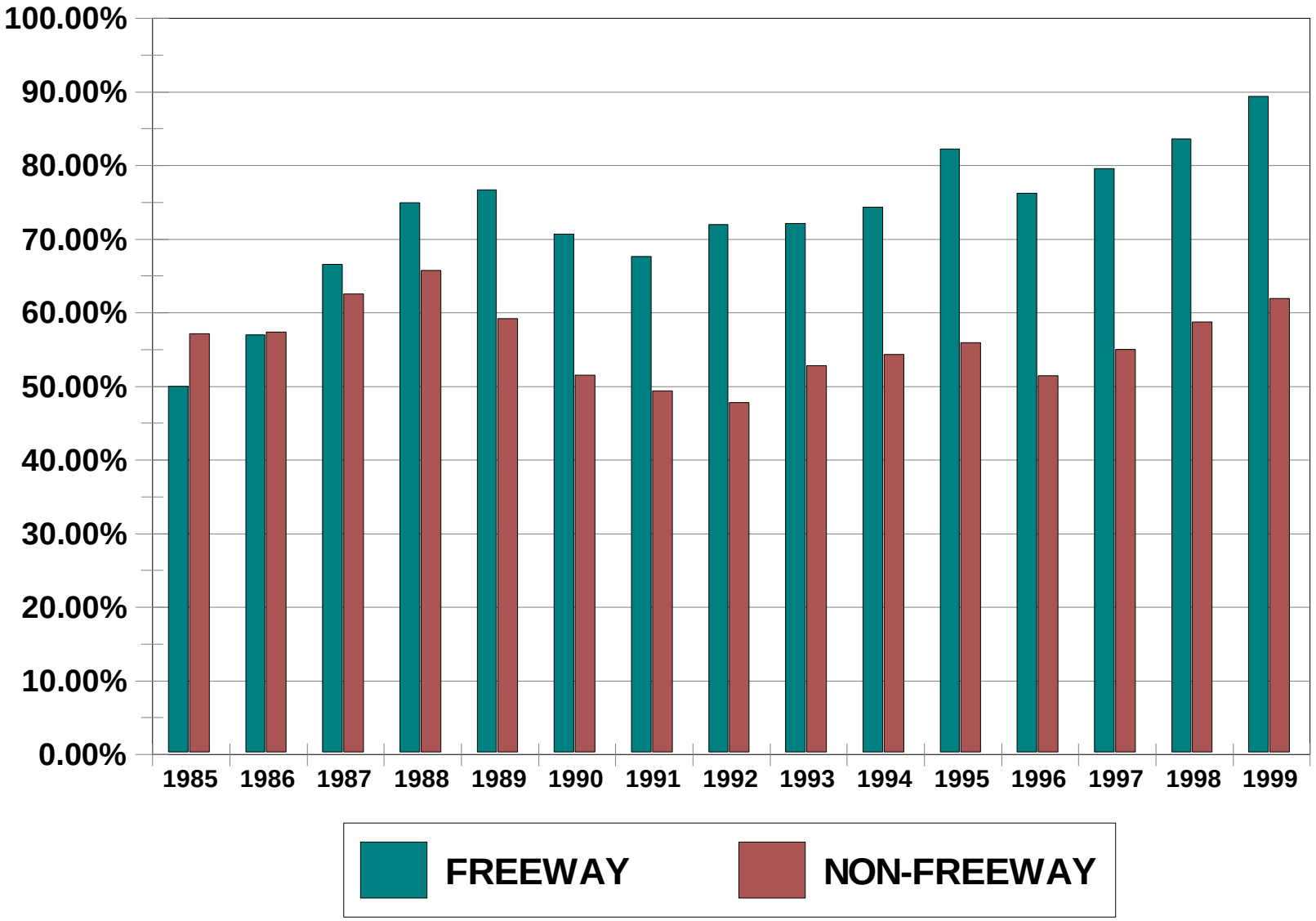
- ✓ Consider all available program delivery methods
  - Cost tracking
  - Options for delivery
- ✓ Track program output and outcomes
  - Feedback mechanism
  - Change process
- ✓ Communicate and apply outcomes internally and externally
- ✓ Deliver the approved program
  - Delivery measures
  - Change management

MONITORING & REPORTING

- ✓ Monitoring directly relates to selected performance measures
- ✓ Provide feedback on whether the activities undertaken are moving you toward achieving your goals and objectives
- ✓ Analysis feeds into the next round of proposed projects

SUFFICIENCY: ROUTE MILES GOOD

UNIVERSITY REGION



MDOT PROCESS
HIGHWAYS & BRIDGES

- ✓ Strategic Analysis
- ✓ Ride Quality Forecasting/Remaining Service Life/Bridge Condition Forecasting
- ✓ Multi-Year Strategy
- ✓ Call for Projects
- ✓ Candidate List of Projects
- ✓ Prioritization Process
- ✓ 5-Year Program
- ✓ Monitor Progress

BASIS FOR DECISIONS

- ✓Cash Flow Model
- ✓Road Quality Forecasting System & Bridge Condition Forecasting System
- ✓Call for Projects
  - Corridor Approach
  - Capital Preventive Maintenance Strategy
- ✓Five-Year Road & Bridge Program

CASH FLOW MODEL

- ✓ Provides an evaluation of the amount and type of road & bridge projects that can be built with a given funding amount
- ✓ Calculates the expected expenditures and revenues for 7-10 years
- ✓ Revenues less expenditures yields the expected cash balance at the end of the year
- ✓ Allows management to approximate impact of:
  - New revenue sources
  - Changes in cost of projects
  - Change in timing of federal-aid reimbursements and lagged effect of expenditures
- ✓ Talk with Governor and Legislature about financial expectations and the resulting condition

RIDE QUALITY FORECASTING SYSTEM

- ✓ Strategy analysis tool to project results of pavement rehabilitation policies
- ✓ Remaining Service Life
- ✓ Collection of fixes that will extend the life of the road
- ✓ Analyze various pavement strategies and funding scenarios

PAVEMENT PRESERVATION
STRATEGIC OBJECTIVES

- ✓ Establish cost-effective, long- and short-range programs
- ✓ Maximize benefits to the motoring public
- ✓ Maximize pavement condition and minimize costs
- ✓ Manage pavements not road condition

STRATEGY ELEMENTS

- ✓Mix of fixes
- ✓Varying fix lives
- ✓Short-term versus long-term
- ✓Meet condition goals

HIGHWAYS: MIX OF FIXES

- ✓CAPITAL PREVENTIVE MAINTENANCE:
  - Short-term fix: 10 years or less
- ✓REHABILITATION:
  - Medium-term fix: 10-20 years
- ✓RECONSTRUCTION:
  - Long-term fix: 20 years or more

CAPITAL PREVENTIVE MAINTENANCE TREATMENTS

FLEXIBLE & COMPOSITE

- Non-Structural Bituminous Overlay
- Surface Milling
- Chip Seals
- Micro-Surfacing
- Overband Crack Filling
- Bituminous Shoulder Ribbons
- Ultra Thin Overlay

- RIGID PAVEMENTS
- Full Depth Concrete Pavement Repair
- Joint Resealing
- Spall Repair
- Crack Sealing
- Diamond Grinding
- Dowel Bar Retrofit
- Bituminous Shoulder Ribbons
- Open-graded Underdrain Cleaning and Repair

FIX LIVES: Bituminous

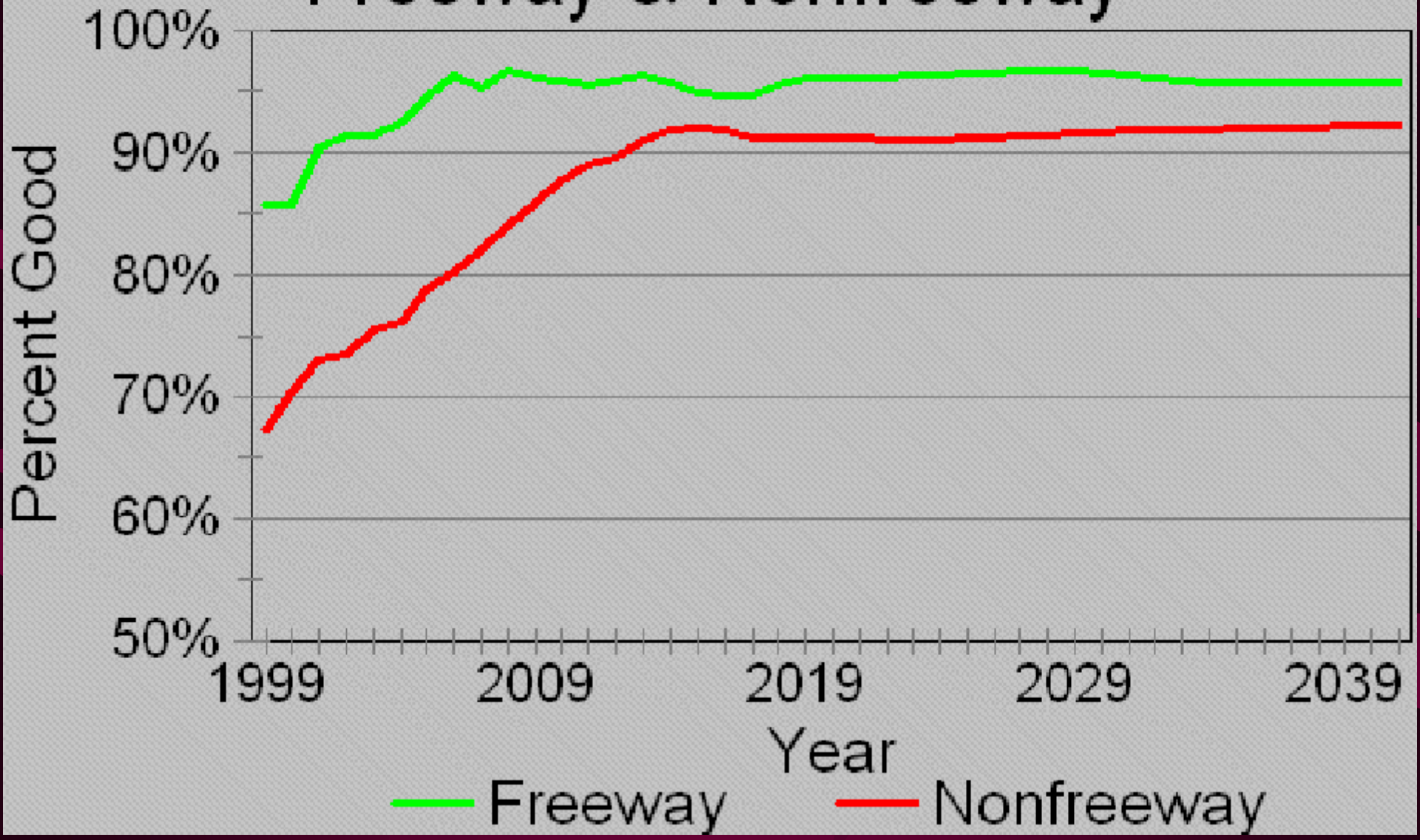
- ✓ Non-structural Bituminous Overlay
  - Flexible: 5-10 years
  - Composite: 4-9 years
- ✓ Surface Milling
  - Flexible: 5-10 years
  - Composite: 4-9 years
- ✓ Chip Seal
  - Flexible Single Seal: 3-6 years
  - Flexible Double Seal: 4-7 years
- ✓ Micro-Surfacing: Flexible
  - Single Course: 3-5 years
  - Double Course: 4-6 years
- ✓ Ultra-Thin Bituminous Overlay
  - Flexible: 3-5 years
  - Composite: 3-5 years

FIX LIVES: Concrete

- ✓Full Depth Concrete Repair: Rigid
  - 3-10 years
- ✓Diamond Grinding: Rigid
  - 3-5 years
- ✓Concrete Pavement Restoration: Rigid
  - 3-5 years

Road Quality Forecast

Freeway & Nonfreeway



BRIDGE STRATEGY HISTORIC APPROACH

- ✓ Structure-by-structure basis
- ✓ Preservation strategies were reactive
- ✓ Limited investment on “good” and “fair” structures
- ✓ Maintenance was also reactive rather than preventive

BRIDGE CONDITION FORECASTING SYSTEM

- ✓Need for a network modeling tool
  - Modeling information
  - Deterioration rates
  - Historic cost data
- ✓Network impacts of work activities
- ✓Assess current business practices

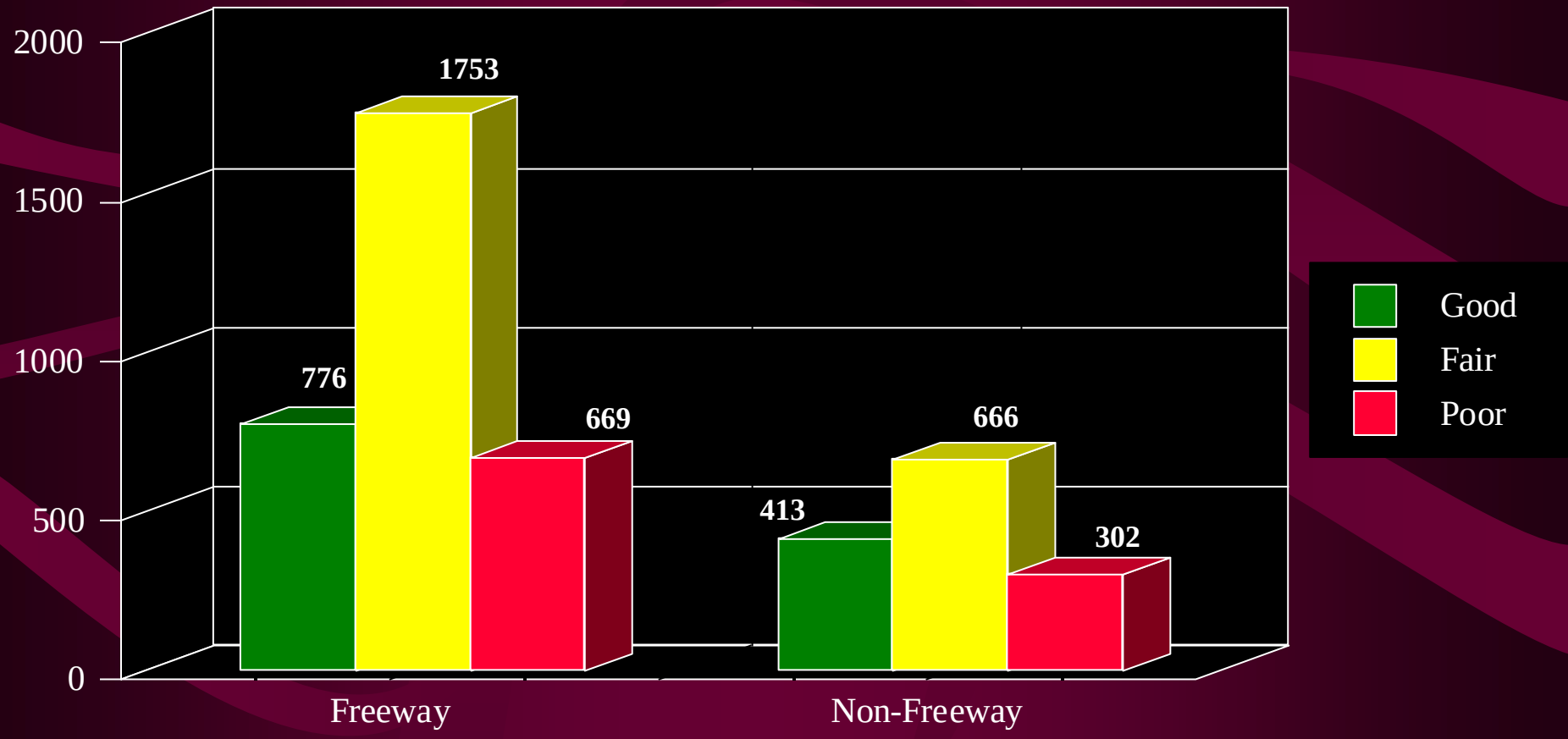
BCFS PROVIDES A NEW APPROACH

- ✓ Address all structures of critical concern
- ✓ Develop long-term network goals
- ✓ Emphasize preservation
- ✓ Pro-actively manage deterioration
- ✓ Develop comprehensive maintenance plan
- ✓ Commitment to allocate necessary resources
- ✓ Strengthen organizational commitment

BRIDGE PRESERVATION EFFORTS INCLUDE:

- ✓ Capital Scheduled Maintenance: Regularly scheduled activities that maintain serviceability
- ✓ Capital Preventive Maintenance: Scheduled work activities that restore element integrity
- ✓ Rehabilitation: Programmed work activities that improve element integrity
- ✓ Replacement: Replace various elements

BRIDGE CONDITION



CALL FOR PROJECTS

- ✓Heart of our asset management process!
- ✓Project lists developed based on identified investment strategies
- ✓Fiscally-constrained

5-YEAR ROAD & BRIDGE PROGRAM

- ✓Identifies current investment strategies
- ✓Specific list of road and bridge projects
- ✓Rolling 5-year period

PROGRAM TARGETS PERCENT RATED "GOOD"

- ✓HIGHWAYS:
  - 95% of trunk line freeways
  - 85% of trunk line non-freeways
- ✓BRIDGES:
  - 95% of trunk line freeway bridges
  - 85% of trunk line non-freeway bridges

BENEFITS OF STRATEGY

- ✓ Systematic approach to network
- ✓ Pro-actively manages deterioration rates
- ✓ Commitment to do the right work at the right time
- ✓ Ability to meet established network goals
- ✓ Integrating regional strategies

EMERGING ISSUES

EMERGING ISSUES

- ✓ GASB Statement 34
- ✓ Safety & Security
- ✓ Reauthorization of Federal Program
- ✓ Role of Technology in Managing Transportation Systems

GOVERNMENT ACCOUNTING STANDARDS BOARD
STATEMENT 34

- ✓ Recommends that infrastructure investments be included in typical government financial reports
- ✓ Depreciate infrastructure assets
- ✓ Having an asset management process will allow you to use a “modified” approach

MODIFIED APPROACH

- ✓ Manage the system using a “management” system
- ✓ On-going, up-to-date inventory and condition assessment
- ✓ Identification and use of performance measures
- ✓ Assessing results of on-going maintenance and preservation activities

SAFETY & SECURITY

- ✓9-11 highlighted need for enhanced security
- ✓Michigan – Extensive border crossings with Canada
  - 3 Major Locations
  - Bridges, Tunnels, Soo Locks
  - Leading state in terms of trade and crossings

AREAS OF CONCERN

- ✓ Make the border crossings safe without hampering the flow of trade
  - Biometric identifiers – retinal scans
  - Electronic systems
  - Inspections on both sides
  - Joint facilities
- ✓ Movements of hazardous and nuclear wastes and possible sabotage

FEDERAL RE-AUTHORIZATION

- ✓ Continue the momentum we began with ISTEA and carried on in TEA-21

ROLE OF TECHNOLOGY

- ✓ Smart cars, smart roads
- ✓ Aging population
- ✓ Hybrid vehicles and impact on revenues
- ✓ Fuel cell development
- ✓ Taxing miles driven rather than fuel consumed

CONCLUDING OBSERVATIONS

- ✓ A way of strategically managing our system in a cost-effective, efficient manner
- ✓ Investing rather than simply spending
- ✓ Managing pavements
- ✓ It's using data and technology in a proactive rather than reactive way
- ✓ It is a sensible way of conducting business

IT'S THE WAY WE DO BUSINESS