



Smart Growth America

Making Neighborhoods Great Together

**Making your case for active
transportation projects**



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MnDOT – Making the case

Return on Investment (ROI) Approach

- “ROI” concept borrowed from financial investment analysis – a measure of feasibility and profitability
- Expanded in the public investment and public decision-making context to include broader economic and other non-financial measures
- Now common in establishing and evaluating federal, statewide, regional, and local transportation investment priorities and funding

Return on Investment (ROI) Approach

- MnDOT has previously evaluated its State Highway Program with ROI measures focusing on life cycle cost and benefit/cost measures
- Current effort explores expanding ROI evaluation to include broader economic, social, environmental criteria

Rationale for ROI Evaluation in Transportation

- Increasing diversity of transportation investments
- Increasing concern for environmental, economic, and social effects of transportation investments
- Increasing demand for “transparency” in setting transportation investment priorities

Rationale for ROI Evaluation in Transportation

- Concern that limited funding is invested in the most cost-effective and efficient manner
- Need to bolster public support for adequate transportation system funding

How is Transportation ROI Typically Used?

- Providing a public case for transportation investments and related public funding and financing measures
- Guiding long-range transportation planning efforts
- Setting investment priorities and benchmarks based upon rational policy-based criteria and technical metrics

How is Transportation ROI Typically Used?

- Engaging stakeholders in transportation policy through analysis and disclosure of ROI results
- Allocating given funding source(s) to the best performing (given the ROI criteria) transportation projects

Key ROI System Components and Procedures

Criteria: ROI evaluation requires articulation of measurable criteria corresponding to the matters of concern and linkage of these criteria to the underlying policy objectives, statutory requirements, engineering standards, and established methods of measurement

Weighting: Some criterion may be determined to be more important relative to the other criteria so a “weighing factor” is applied that affects the composite score and ranking

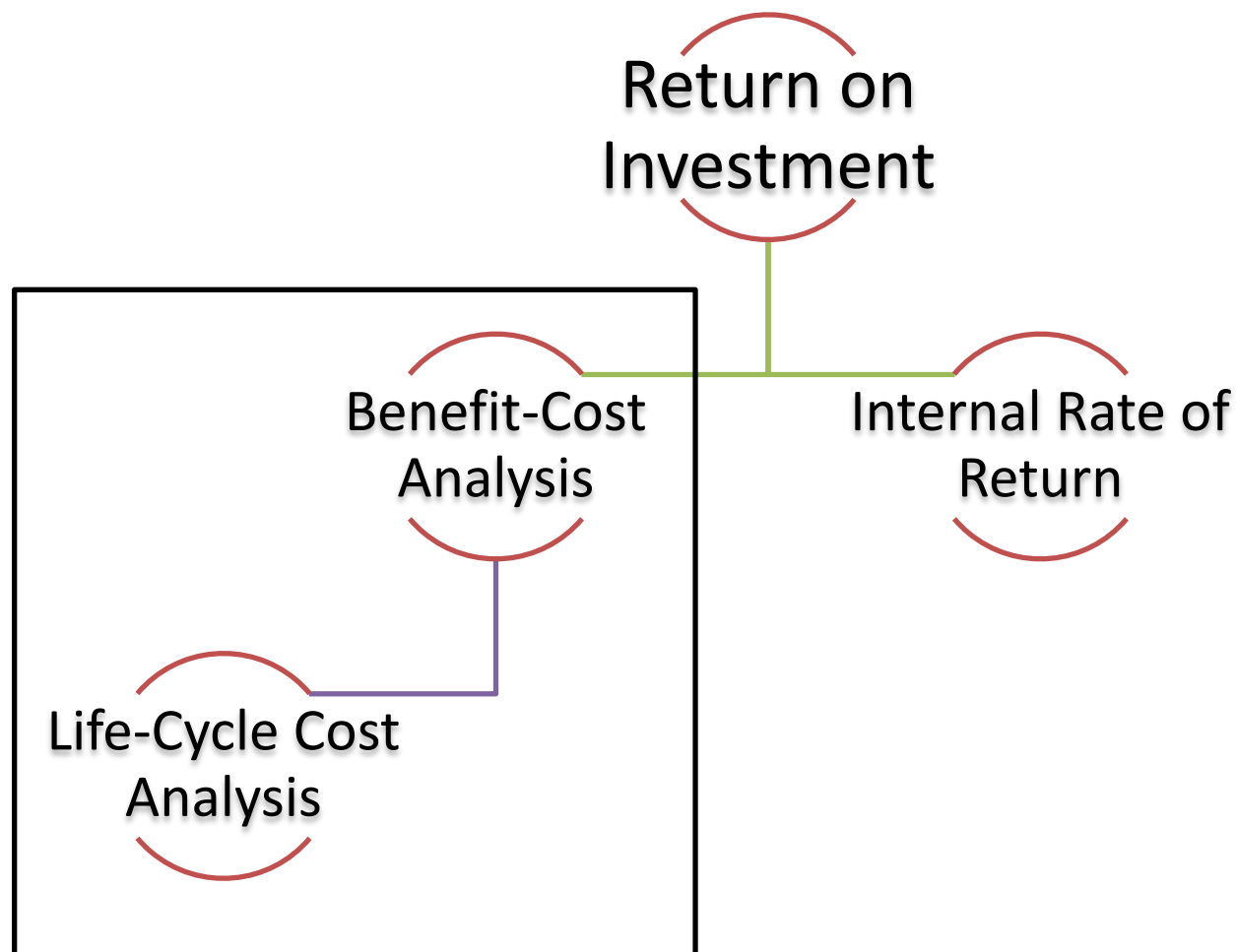
Metrics: Each criterion must have a clear and objective method of “quantification”

Scoring: Scoring is the application of the metrics to the selected list of projects and referencing the linked or related data sets or information to produce a composite score

Ranking: Following scoring candidate projects can be compared based upon their individual composite criteria score

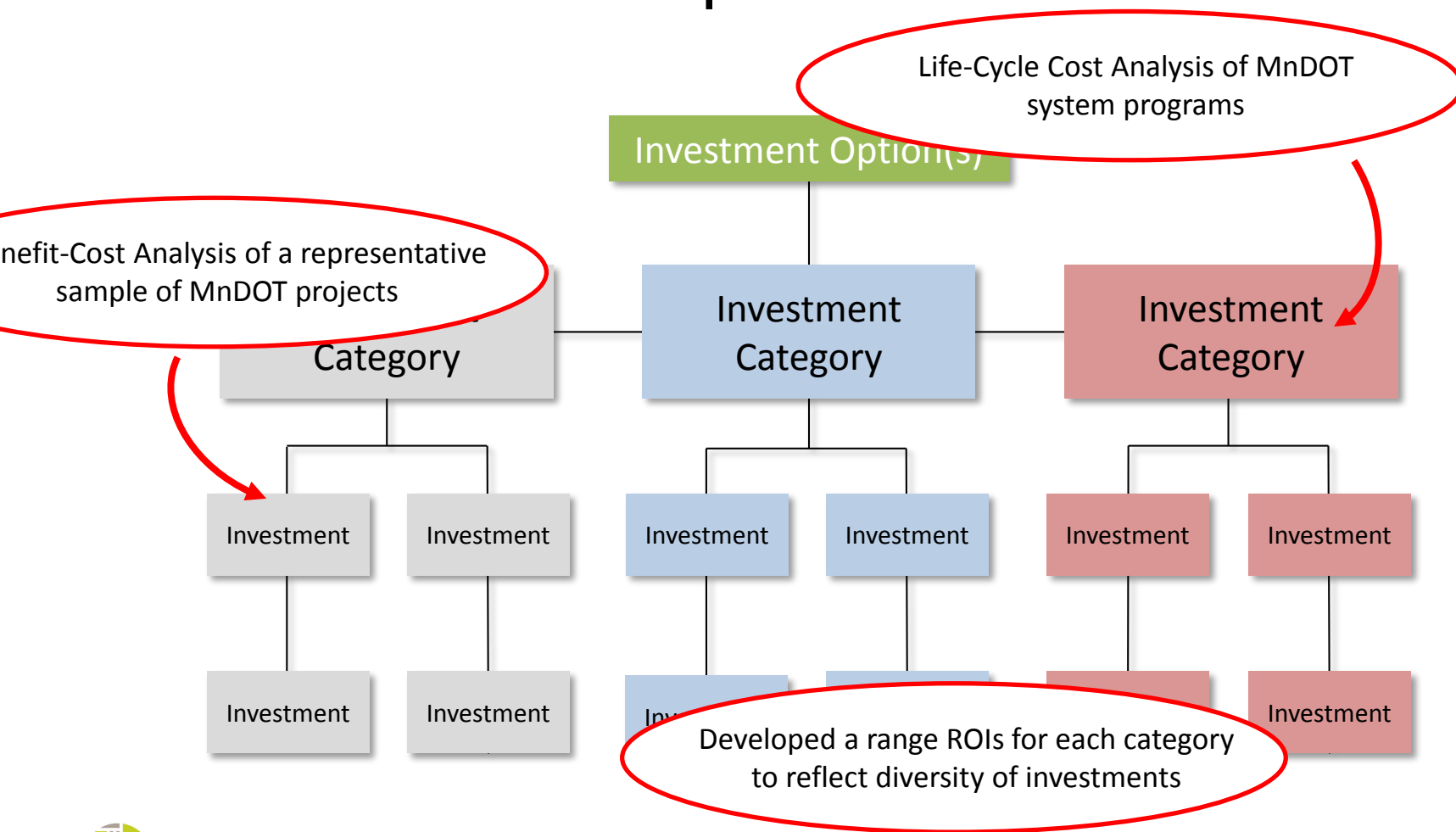
Vetting: Initial scoring often leads to questions regarding the application of criteria, weighting, and scoring. It is necessary to review the method in view of the results

ROI Methodology & Analysis



ROI Methodology & Analysis

■ Investment Option Framework

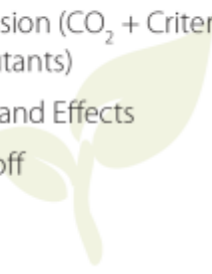


ROI Methodology & Analysis

■ Typical Benefits & Costs

Benefits	Costs
Travel time savings	Capital costs
Vehicle operating cost savings	Major rehabilitation costs
Safety benefits	Routine annual maintenance costs
	Remaining capital value

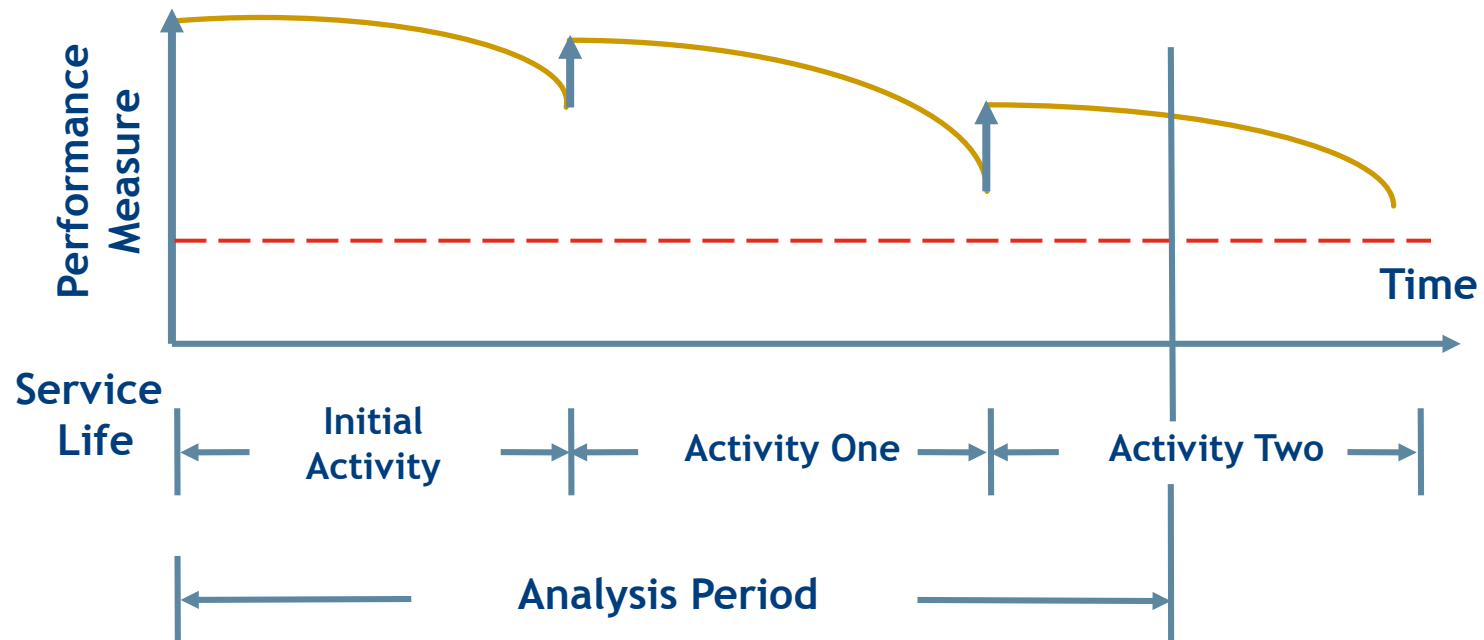
■ Benefit & Cost Factors (PRISM)

Social	Economic	Environmental
• Safety • Bicycle/Pedestrian Health Effects • Noise 	• Travel Time • Travel Time Reliability • Vehicle Operating Costs • Life Cycle Costs • Loss of Agricultural Land 	• Emission (CO₂ + Criteria Pollutants) • Wetland Effects • Runoff 



ROI Methodology & Analysis

- Life-Cycle Cost Analysis: Applying the right treatment to the right facility at the right time

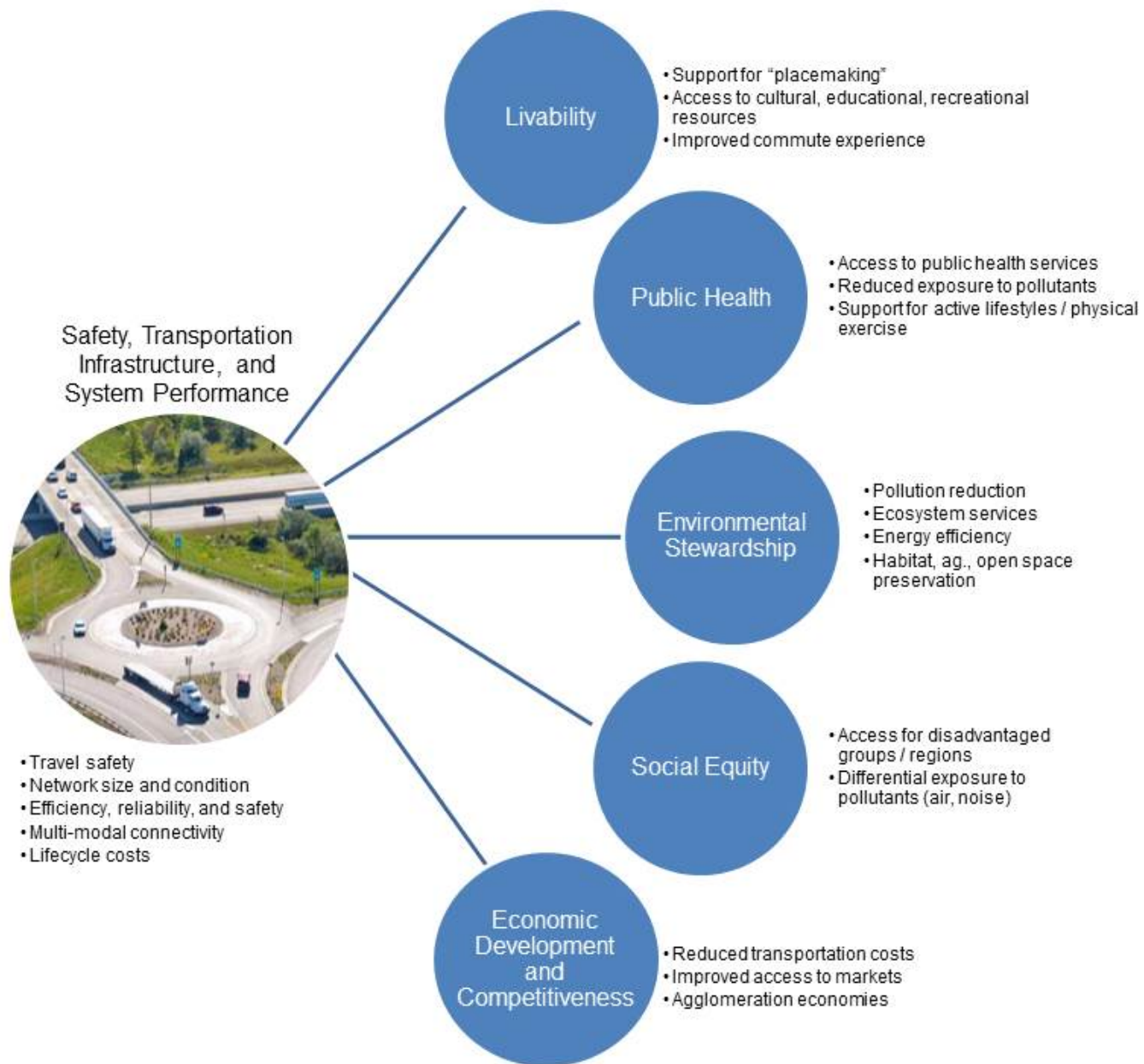


Source: FHWA

ROI Methodology & Analysis

- Which kinds of projects and programs offer the highest ROI?

ROI Category	Average Investment (millions)	ROI Point Estimate	Low/High ROI Range
Safety-Spot Improvement at High-Risk Locations	\$1,240	4.1	2.2 to 6.6
Pavement Preservation-Corridor	\$2,641	2.0	1.4 to 2.8
Pavement Reconstruction-Corridor	\$394	0.9	0.4 to 1.5
Pavement Reconstruction-Urban/Main Street	\$683	1.4	0.6 to 2.5
Bridge-Repair	\$622	1.5	1.1 to 1.9
Bridge-Replacement	\$1,451	1.0	0.4 to 1.8
Congestion Mitigation-General	\$1,351	5.5	2.5 to 9.6
Capacity Development	\$2,392	1.2	0.6 to 2.0
Active Traffic Management (ATM)	\$193	8.9	6.7 to 12.0
MnPASS	\$1,544	3.5	2.3 to 5.1
Total	\$12,510	2.5	2.0 to 3.2



Selected MnDOT “Test Case” Projects

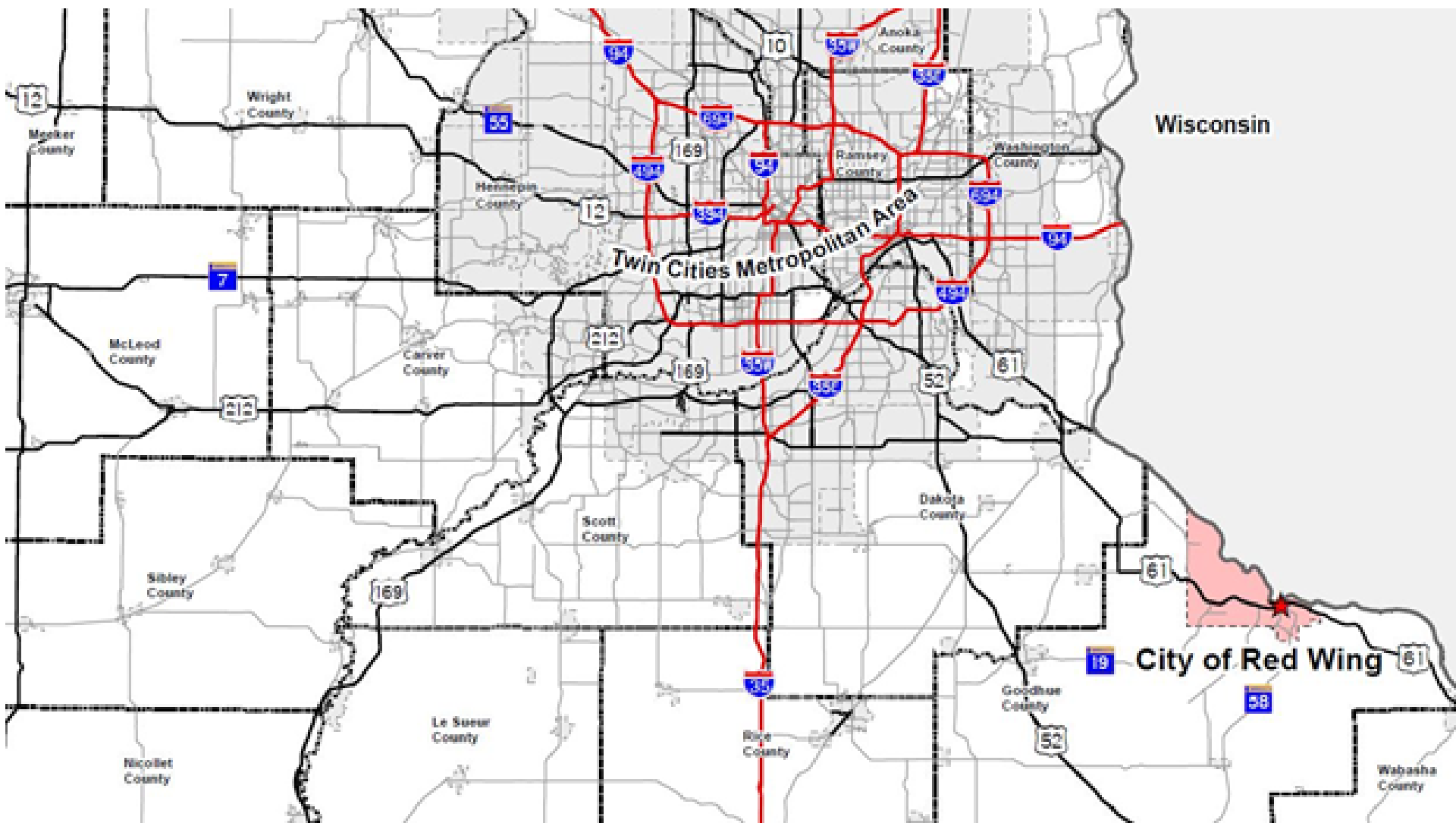
- **Downtown Red Wing Main Street/US 61 “Complete Streets”:** Multiple improvements to section of US 61 in downtown Red Wing that support multi-modal accessibility, safety, economic development, and the environment.
- **Winona Bridge Rehabilitation and Expansion:** Rehab of a historic and potentially unsafe bridge over the Mississippi and construct separate and adjacent span with improved bike/ped facilities.

Red Wing Main “Complete Streets” Project Context

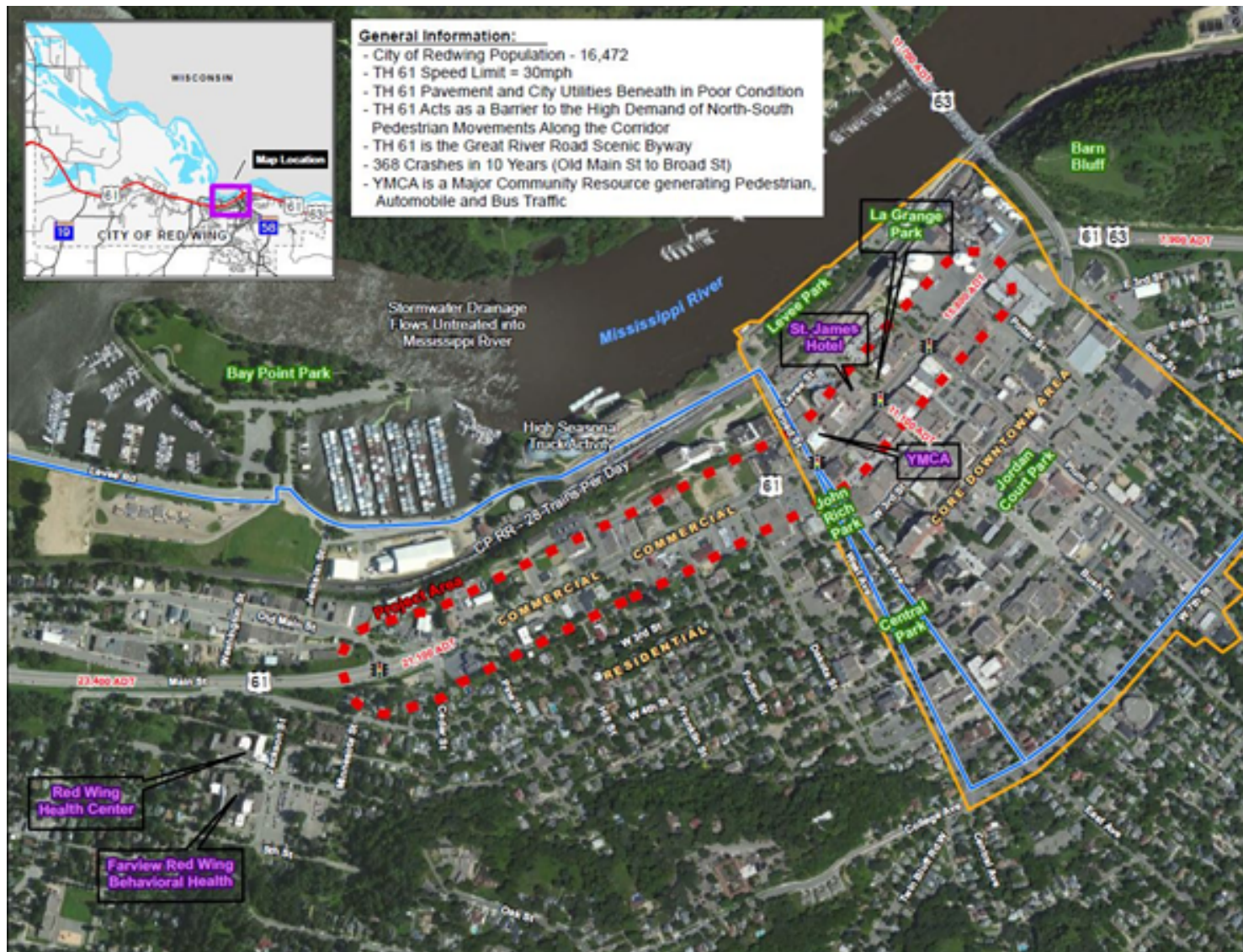
- .7 mile segment of Hwy 61 (aka Main St.) is poorly configured and unsafe
- Serves as the primary transportation corridor through a thriving downtown, that is:
 - A unique, historic tourist destination
 - Linked to nearby residential and recreational amenities



Red Wing “Complete Streets” Project Location



Red Wing “Complete Streets” Project Area



Red Wing Main “Complete Streets” Project Components

\$5.4 million joint MnDOT/City investment includes:

- Pavement reconstruction and utilities replacement
- New median islands, ADA facilities, bike/ped amenities (bump-outs, seating, waste receptacles, bike racks)
- Closure of 12 driveway accesses, narrowing overall roadway
- Mid-block pedestrian crossings, including median refuge and HAWK signal system

Overview of Red Wing “Complete Streets” ROI

ROI Category	Monetized Impacts	Equity
<u>Economic Competitiveness</u>		
• Travel time savings	\$2,423,000	• The primary beneficiaries are residents of rural communities in and around Red Wing with a mean household income of ≈ 95% of State Avg.
• Improved travel reliability	\$626,000	
• Vehicle operating costs	Likely small	
• Improved market access	Potentially high but overlap with	
• Market agglomerations	livability estimates below	
<u>Environmental Stewardship</u>		
• Pollution reduction	Likely moderate	
• Land preservation	Likely small	
• Stormwater run-off	\$722,000	
• Habitat preservation	Negligible	

Overview of Red Wing “Complete Streets” ROI -- Continued

ROI Category	Monetized Impacts	Equity
<u>Public Health</u>		
• Travel safety	\$5,395,000	• Project also improves ADA facilities.
• Active transportation choices	\$1,600,000	
• Access to health care	Likely small	
• Exposure to contaminants	Negligible	
<u>Livability</u>		
• "Place-making" efforts	Captured below	
• Access to Amenities	\$1,900,000	
• The commute experience	Likely moderate	

Red Wing Main “Complete Streets” Public Health Benefits

- Accessibility improvements increases walking rates over baseline with monetary health benefits calculated using third party research data.

Item	Assumptions	Estimate
Average Red Wing Miles Walked Per Year		9,051,832
Walking Mile Impact for Project	2% Increase	181,037
Value of Increased Walking on Health Impacts	\$0.55 per Mile	\$100,000
Net Present Value		\$1,600,000

Red Wing “Complete Streets” Livability Benefits

- Improved bike/ped circulation and amenities supports a “sense of place” that is projected to increase adjacent / nearby property values.

Item	Assumption	Estimated Valuation
Impacted Commercial Property	46 Properties	\$68,400,000
Impacted Residential Property	820 Single Family Homes	\$122,500,000
Property Value Impact	1% Increase	
Increase in Commercial Property Value		\$700,000
Increase in Residential Property Value		<u>\$1,200,000</u>
Total Increase for Impacted Properties		\$1,900,000

Red Wing ROI Methodological Considerations

Findings rely on “benefit transfer” methodology, with uncertainties related to:

- How comparable are the improvements?
- How similar are the affected populations?
- Other similarities / differences (e.g. existing uses, climate)?

Use of property value impacts in ROI must be cognizant of potential “double counting”:

- Market access
- Stimulus effect
- Market capture from other locations

Implications for Future MnDOT Analysis

- **Comprehensive ROI analysis can help document broad based, multi-dimensional benefits of “complete streets” and related projects**
- **Monetization of livability and public health impacts generally requires more nuanced, case specific analysis**
- **Future ROI accuracy can be improved with better tracking, data, and analysis of “before-after” conditions including:**
 - **Bike/ped participation rates**
 - **Amount, type, and economic performance of affected land uses**

Winona Bridge Project Context

- 1.5-mile Bridge provides only crossing of Mississippi for 25 - 35 miles, connecting rural communities and important regional routes in MN and WI
- State laws passed in aftermath of I-35W collapse requires Bridge be brought up to higher safety standard
- Built in 1942, Bridge is eligible for listing on the [National Register of Historic Places](#), and contributes to a larger district that includes Downtown.



Image courtesy of MnDOT

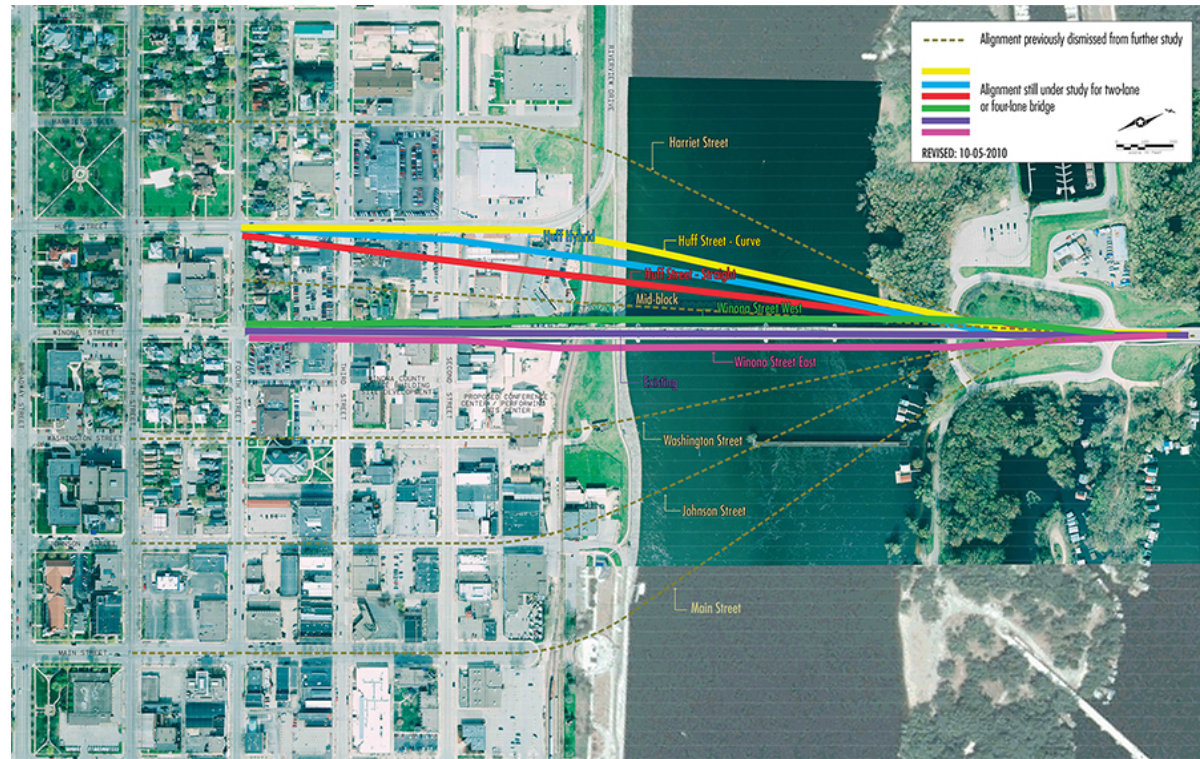
Winona Bridge Project Location



Winona Bridge Project Components

Numerous alternatives Considered. The \$150-\$175 million “Recommended Alternative” calls for “two-bridge solution”:

- Rehabilitate existing bridge to carry 2-lanes of traffic while maintaining historic character.
- Build new, 2-lane girder-type bridge immediately upstream with significantly enhanced bike / ped accommodations



Overview of Winona Bridge ROI Results

ROI Category	Monetized Impacts	Equity
<u>Economic Competitiveness</u>		
Travel time savings	Likely high	 • The primary beneficiaries are residents of relatively rural communities with a mean household income $\approx$ 80% of State Avg. 
Improved travel reliability	Likely moderate	
Vehicle operating costs	Negligible	
Improved market access	Likely small	
Market agglomerations		
<u>Environmental Stewardship</u>		
Pollution reduction	Likely moderate / Short-term	
Land preservation	Likely small	
Stormwater run-off	Likely moderate (-)	
Habitat preservation	Likely moderate (-)	

Overview of Winona Bridge ROI -- Continued

ROI Category	Monetized Impacts	Equity
<u>Public Health</u>		
Improved Travel Safety	Likely Significant	• According to the EA "There are no readily-identifiable low-income or minority populations (adversely) affected by the Project"
Active transportation choices	\$2,600,000	
Access to health care	Likely small	
Exposure to contaminants	Negligible	
<u>Livability</u>		
Supporting "Place-making"	\$1,700,000	
Access to local amenities	Likely high	
The commute experience	Likely small	

Winona Bridge Public Health Benefits

- Improvements to active transportation infrastructure lead to increased bicycle and pedestrian participation for local population, improving public health outcomes.

Item	Assumption	Estimate
Annual Recreational Walking Miles		10,980,472
Annual Ride Miles		7,016,078
Increase Due to Winona Bridge Project	2%	
Value of Increased Walking on Health Impacts	\$0.55 per Mile	\$120,000
Value of Increased Biking on Health Impacts	\$0.22 per Mile	<u>\$30,000</u>
Annual Bike/Ped Health Benefits		\$150,000
Net Present Value		\$2,600,000

Winona Bridge Rehabilitation “Historic Value”

Cultural Asset	Willingness to Pay		Translation to Winona Bridge	
	Amount	/ Unit	County (20,000 residents)	State (2.1 million households)
Preservation of Bulgarian Monasteries	\$0.80	annual / household	\$272,377	\$28,599,589
Preservation of Hulton Getty Picture Library, UK	\$7.00	annual / household	\$2,383,299	\$250,246,404
Value of Surrey Histry centre, UK	\$26.83	annual / household	\$9,133,143	\$958,979,971
Preservation of Northern Hotel, Fort Collins	\$106.00	One-time / household	\$2,120,000	\$222,600,000
Value of St. Louis public libraries,	\$4.00	annual / household	\$1,361,885	\$142,997,945
Preservation of St. Genevieve Academy	\$5.50	One-time / household	\$110,000	\$11,550,000
Preservation of Monuments in Washington, DC	\$23.00	One-time / household	\$460,000	\$48,300,000
Civilisation, Quebec, Canada	\$8.00	annual / household	<u>\$2,723,770</u>	<u>\$285,995,891</u>
Median			\$1,740,943	\$182,798,973

Winona Bridge ROI Methodological Considerations

- **While cost of Recommended Alternative far exceed monetized benefits, ROI excludes:**
 - Safety benefits
 - Benefits of avoided detour (e.g. travel time, O&M)
 - Benefits from increased bridge capacity / market access
- **Monetary value of historic preservation and public health highly dependent on size of affected populations**
 - Additional considerations may be appropriate for poor, under-served, rural communities

Implications for Future MnDOT Analysis

- Winona Bridge excellent example of the important role ROI can play in evaluating the relative merits of various project alternatives and attributes.
 - Environmental Assessment included less expensive alternatives consistent with State law
 - Recommended Alternative justified based on historic preservation, bike / ped. Improvements, avoided detour, and capacity expansion
 - An itemized cost / benefit analysis of each of these components would inform MnDOT policy and budgeting
- Distributional and equity considerations, including economic development, while legitimate, can be more explicit

Next Steps

- Partnership for implementation
- Scope and schedule
 - Standard guidance
 - Competitive grant programs
 - MnSHIP update
- Stakeholder engagement



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WMATA – Making the case

WMATA “making the case”

Increases Property Value Around Transit

- An analysis of parcel-level property tax assessments for all properties within a half-mile of Metrorail stations shows:
 - \$235 billion of property value is within a half-mile of Metrorail stations.
 - This land generates \$3.1 billion annually in property tax revenues.
 - This land represents 28% of the jurisdictions’ property tax base, but only 4% of their land.
 - Proximity to Metrorail increases property values by 7-9%.

WMATA “making the case”

Increases Access to Jobs and Business

- An analysis of the surrounding land uses shows that two million jobs or 54% of all jobs in the region, are within a half mile radius of all Metrorail stations and Metrobus stops

WMATA “making the case”

Moves the Region Forward: What if There Were No Transit?

- An analysis of congestion and trip making patterns if there were no transit in the region shows:
 - Vehicle-miles traveled would increase by 7-8%.
 - Congestion would increase by 25%, costing more than \$1.5 billion annually in wasted time and fuel.
 - The region would fragment into several smaller economies resulting in the loss of regional economic competitiveness.
 - Employers would have access to a much smaller pool of employees and residents would have fewer jobs within an acceptable commuting distance.

WMATA “making the case”

Moves the Region Forward: What If Roads Were Built Instead of Transit?

- An analysis was conducted to ascertain the amount of auto-oriented infrastructure that would have been needed to accommodate all of the trips that are currently on transit. It shows:
 - More than 1,000 lane-miles of new pavement on highways and arterials would be needed, which is the equivalent of two new Beltways. All river crossings would need 4-6 additional lanes.
 - One million more auto trips per day would be made.
 - Two hundred thousand more parking spaces in the core would be needed, which would be the equivalent of 166 blocks of five-story garages.
 - Commercial and residential development opportunities would be lost. Existing neighborhoods would be fragmented or lost.



WMATA “making the case”

Makes the Region Affordable and Livable

- An analysis of trip patterns and travel times shows:
 - Metro saves all households \$705 million/year in time savings, whether they take Metro or not.
 - Households using Metro save \$342 million/year in auto expenditures due to reduced car ownership, operating, and maintenance costs. This includes saving 40.5 million gallons of fuel annually.
 - Each weekday morning, Metrorail riders walk a combined 33,000 miles to a station, burning 2.2 million calories.
 - Metro enables 360,000 trips by transit dependents per day.
 - Metro enables 20% of rail riders and 53% of bus riders to live a car-free lifestyle.
 - Transit improves air quality by avoiding 260 tons of VOCs, 22 tons of PM, and 0.5 million tons of CO₂ due to reduced auto use.

WMATA “making the case”

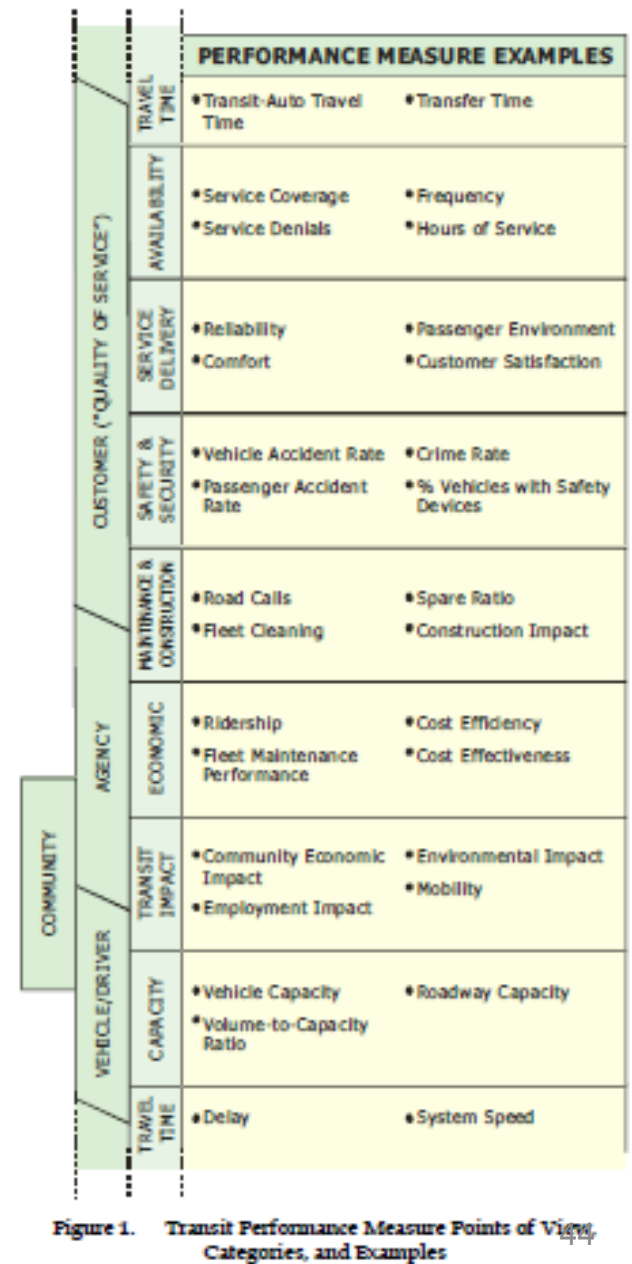
Creates a Capital Region that Works

- Metro helps the nation’s capital region by:
- Moving employees of 277 federal agencies daily.
- Serving the federal workforce, who represent 35% of the morning peak period commuters.
- Enabling special events like festivals, sporting events, and inaugurations. Metro provided 1.1 million rail trips and 423,000 bus trips on Inauguration Day 2009.
- Enabling the evacuation of more than 120,000 people per hour on Metrorail.

Measuring transit performance

- Linked to purpose and functionality desired
- Variable, based on point of view – which “performance” is being measured?
- Data integrity and management can be challenging
- Choice rider service versus captive rider service debate

Figure from TCRP 88, A Guidebook for Developing a Transit Performance Management System, 2003



How should FDOT measure transit performance?

Performance Highlights		Our Goals	Core Measure Highlights
Safety		Providing a safe and secure transportation system for all users	Fatalities and Serious Injuries
Maintenance		Proactively maintaining and operating Florida's transportation system	Pavement Condition Bridge Condition Maintenance Transit
Mobility		Improving mobility and connectivity for people and freight	Travel Quantity Travel Quality Accessibility Utilization
Economy		Investing in transportation to support a prosperous globally competitive economy	Return on Investment Projects On-Time Projects Within Budget
Environment		Making transportation decisions that support communities and promote responsible environmental stewardship	Air Quality

Last updated 3/12/15

Source: FDOT



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