

Appendix B: Process to Identify Corridors and Activity Centers

Selection and agreement on the MDOT Corridors of Highest Significance involved a data rich, analytical process that included considerable review and discussion with MDOT’s planning and regional staff represented on a *MI Transportation Plan* Corridor Sub-committee. **Chapter 2** summarizes that decision making process, the research conducted, and conclusions reached in identifying and naming the Corridors of Highest Significance and Activity Centers. This Appendix details and summarizes the research conducted, technical approach, and analytical process.

As part of the development of the *MI Transportation Plan* a Corridors Subcommittee was established. The Subcommittee included planning staff representatives from the MDOT Regions, Bureau of Multi-modal, Bureau of Aeronautics, Highway Bureau, and Bureau of Transportation Planning. The subcommittee members’ role was to review, comment, and contribute ideas and information for the development of this *MI Corridors and International Borders Report*; and to provide information unique to their region or modal expertise.

The first subcommittee meeting was held in early February, 2006. Staff reviewed and compared Corridor selection and evaluation criteria and approaches used by MDOT in their previous long-range plan, *Mobility is Security* to other state corridor based plans. States with statewide priority corridors that were reviewed included: Pennsylvania DOT, Minnesota DOT, Florida DOT, Ohio DOT, North Carolina DOT, Washington DOT, and Colorado DOT. (Only some of these states identified corridors as multi-modal).

B.1 Peer State Reviews and MDOT Regions – Listening Session on Issues and Gaps

A number of states identify statewide High Priority Corridors in their Long-Range Plans. Some were just highway corridors, some multi-modal. A number of states just “segment” their highways and refer to them as corridors (or Highways of Statewide Significance) and prepare separate goals, objectives and strategies for each designated segment. The following tables compare and summarize their approaches.

Table 1 - Corridor Comparisons Number or Percentage Highway miles

<i>State DOT</i>	<i># Corridors</i>	<i>Hwy. or Multi-modal</i>	<i>Hwy. miles / % total mi.</i>	<i>% of VMT</i>	<i>\$ committed to corridor</i>	<i>Related legislation</i>
			9,000 centerline miles / 100% state owned	CO Total miles = 85,000 of local, state and federal roadways	Yes Financially constrained as per STIP	No
Colorado	350	H				Yes-
Delaware	4	H	N/A	N/A	no	Voluntary

						Program for Capacity Preservation
Florida	Hi-level system	M	3,500	54 %	Yes to capacity	Yes
Michigan	11	M				
Minnesota	7	H	2,930 / 2%	33 ¹ / ₃ %	Commit to District	No Yes; Coordinated w/other State Depts.
North Carolina	55	H	5,400 / 7%	45%		TRAC in Legislation
Ohio	26	M	3%	28%	Yes –see note	Yes
Oregon	147	H	N/A	N/A	No	No
Pennsylvania	28	M	N/A	N/A	No	No
Texas	8 to 10	H	N/A	N/A	Yes	Yes; note: Combination of existing and proposed
Washington	80+	H	N/A	N/A		Yes

Table 2 - Criteria Comparison – for selected states

Note: Not all states used quantitative criteria; many used connectivity or public opinion.

Category	MDOT	FDOT	ODOT	MNDOT
Total ADT	Trunklines with 25,000 or more ADT	9,000 AADT on at least 75% of the corridor length	Carry daily volumes exceeding 15,000 passenger car equivalents (PCE) over 50% of their length and min. length over 30 miles	*State-owned principle arterials and higher
Commercial ADT	Trade corridors plus trunklines with 10,000 or more commercial ADT	Interstate w/ 20% truck traffic on at least 75% of corridor length	1 truck = 2 PCE combined w/ above; Corridors w/ annual truck growth rates >3.2%	
International	International truck			

Trade	movements greater than 1,000		
Total Population (Population Centers)	Transportation Management Areas (200,000 or more population)		Link to pop center over 50,000
Population Density	Counties with 1,000 or more population per square mile		w/in 10 miles of 96% of state's pop
Total Employment (Business Centers)	Traffic zones with 10,000 or more employment		w/in 10 miles of 97% of state's jobs
Employment Density	Counties with 1,000 or more employees per square mile		*State ranking – top percentage
Tourism & Convention Centers	Traffic zones with \$100,000 or more annual lodging use tax generated		*State ranking – top percentage
Airports (General Aviation)	Detroit Metro Airport and Willow Run Airport plus other Tier One airports with 100,000 or more annual itinerant operations		
Airports (Air Carrier)	Detroit Metro Airport plus other Air Carrier airports with 100 or more weekly departures	1.8 million Enplanements	connectivity
Cargo Ports	Detroit	200,000 tons of freight and mail	
Carpool Parking Lots	Carpool lots with 150 or more spaces		
Intercity Bus Service	Routes with 42 or more buses per week		
Intermodal Freight	All major intermodal freight terminals (all are located in the greater Detroit area).		Link to - FHWA Intermodal Connectors
Intermodal	Intermodal passenger	100,000 inter -	

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Passenger	terminals with 50,000 or more passengers annually	regional or interstate passengers
Rail (Passenger)	High Speed Rail (HSR) Route	Existing scheduled interregional or interstate passenger service
Rail (Freight)	10 or more trains per day	Freight density of 10 million gross ton miles per track miles
LOS E & F	More than 2 billion miles of congested travel annually	

OTHER

Seaports		250,000 homeport passengers or 6 million tons of inbound and outbound freight or 75,000 containers using 24 foot TEUs
Waterway		Intra-costal waterways and coastal shipping lanes or Inland interregional waterways with > 0.25% of total US inland waterway freight traffic (1.5 million tons)
Highways other		NHS providing connections to major markets in AL and GA Appalachian Highway system and Links to metro centers in neighboring states
Rail Freight Terminal (Bulk or Intermodal)		4 million bulk tons or 360,000 intermodal tons

B.1.1 Peer State Corridor Comparisons – Approaches Used

COLORADO

The 2030 Colorado the Statewide Transportation Plan, for the first time, includes corridor visions for about 350 transportation corridor segments. The segments include 100 percent of the state’s system. The Corridor Vision Plan is a 514 page report detailing the vision, goals, and objects for each of 350 corridors that make-up the state system. The segmentation was to provide “logical termini” for projects. The Corridor Plan is included by reference into the 15 Regional Plans (5 urban/MPO) (10 rural), and the statewide long-range plan. (Colorado created 15 border-to-border regional planning councils each generating their own plan.)

A corridor is defined as a specific geographical area encompassing any number of transportation modes: state highway, local roads, bus, air, rail, bicycle and pedestrian. However – they are primarily highway segments. The longer corridors on their web and in their plan are basically a combination and summary of the individual segments.

Vast amounts of public input went into creating these corridor visions, which allow the state’s many transportation providers to cooperatively address a corridor’s comprehensive transportation needs – from highway to rail to transit to aviation – with community-preferred strategies.

The corridor visions and strategies developed by the public and identified in the Plan provide a context within which to include and prioritize projects in the six-year capital programming document / the Statewide Transportation Improvement Program (STIP).

Projects included in the STIP must be consistent with the corridor visions identified in the Plan. CODOT projected out 30 years what it expects to receive in funding and tried to decide by investment program area (safety, system quality, mobility/capacity, and program delivery) how much would be allocated to each of the six CODOT districts.

DELAWARE

The four corridors designated in the Corridor Capacity Preservation Program grew out of a 1992 voluntary program in which local governments and the public nominated their corridor and agrees to regulate access and land use to improve or maintain mobility. In 1996 the Delaware code was adopted to establish the program. New corridors may be identified in future SLRPs.

FLORIDA

Florida's Strategic Intermodal System is a multi-modal transportation system:

- Made up of statewide and regionally significant facilities and services (**strategic**);
- Contains all forms of transportation for moving both people and goods, including linkages that provide for smooth and efficient transfers between modes and major facilities (**intermodal**); and
- Integrates individual facilities, services, forms of transportation (modes) and linkages into a single, integrated transportation network (**system**).

Florida's Strategic Intermodal System (SIS) was established in 2003 to enhance Florida's economic competitiveness by focusing limited state resources on those transportation facilities that are critical to Florida's economy and quality of life.

The SIS is a statewide network of high-priority transportation facilities, including the state's largest and most significant commercial service airports, spaceport, deepwater seaports, freight rail terminals, passenger rail and intercity bus terminals, rail corridors, waterways and highways. These facilities are the workhorses of Florida's transportation system, carrying more than 99 percent of all commercial air passengers, virtually all waterborne freight tonnage, almost all rail freight, and more than 68 percent of all truck traffic and 54 percent of total traffic on the State Highway System.

Senate Bill 360, passed by the Florida Legislature during the 2005 Legislative session and signed into law by the Governor on June 24, 2005, updates Florida's growth management framework and is intended to "Close the Gap" between new development and construction of needed transportation infrastructure. The bill provides increased funding through new and existing capital investment programs including the state's innovative statewide multi-modal transportation infrastructure program, the Strategic Intermodal System (SIS).

The \$3.1 billion in transportation improvements includes \$2.8 billion in state money and \$351 million in public and private partner funding dedicated to enhance the SIS. Funding is distributed across all SIS modes because:

- 1) The SIS is the state's highest transportation capacity priority;
- 2) Improved access to and on hubs is critical to efficient operation of the SIS; and
- 3) The Department seeks to demonstrate its commitment to the SIS by addressing the highest priority system needs, regardless of mode.

MINNESOTA DOT

Minnesota DOT's statewide long-range plan is a policy plan that includes, by reference, each of their District's long-range plans and the Regional Trade Centers (RTC) plans. The District plans must reflect the SLRP goals and objective, etc. Everything in all plans relates back to the performance measures MnDOT has established. The districts are required to first deal with preservation of their existing system. Districts are allocated funds based on size, need and how well they meet performance metrics. Their goal is to have pavements meet their targets by 2014 and bridges by 2023 (and then be able to just give funding based on size to keep things going equally.)

Minnesota DOT's - Priority Corridor System was developed out of Policy 5 in the SLRP – to promote interconnectivity. Extensive public involvement was used to identify corridor, their vision and strategies. Priority corridor systems include:

1. Interregional Corridors system - these provides statewide and interstate transportation services and is sub-divided into
 - a) High
 - b) Medium Priority Corridors

2. Regional Corridors provide transportation services to communities of regional significance.

Regional Trade Centers (RTC) were defined by the Univ. of Minn. Center for Urban and Regional Affairs based on ranking RTCs in an eight level hierarchy that uses population and diversity of business.

Interregional Corridors were developed to connect the higher order trade centers (levels 0-3) serving larger geographic areas. These include specialized businesses and services to trade area markets beyond the immediate community.

Corridor plans were based on a number of corridor studies conducted by Central Office over the last few years – they were mainly urban areas. The performance metric for these corridors was speed – and what projects were needed to bring the corridor (safely) to its target speed.

Districts get up to 10 percent discretionary funds but they must prove their entire preservation need has been addressed before they can use these funds for other projects.

NORTH CAROLINA

North Carolina DOT Strategic Highway Corridors (SHC) are set of 55 primarily existing highway corridors and spurs that exemplify the long-term potential to serve passenger and freight movement in a high-speed manner. These facilities, upon some level of improvement, will substantially increase the mobility and connectivity of travel to destinations within and just outside North Carolina, while helping foster economic prosperity and promoting environmental stewardship. The Board of Transportation adopted the SHC concept as a part of the Statewide Transportation Plan in September 2004.

In a renewed effort to enhance and preserve the backbone of the highway system, the Department of Transportation in collaboration with the Department of Commerce and Department of Environment and Natural Resources created the Strategic Highway Corridors (SHC) initiative. The SHC initiative represents a timely effort to protect and maximize the mobility and connectivity on a core set of highway corridors throughout North Carolina, while promoting environmental stewardship through maximizing the use of existing facilities to the extent possible, and fostering economic prosperity through the quick and efficient movement of people and goods. Each Corridor represents an opportunity for NCDOT, partnering agencies, and other stakeholders to consider a long-term vision, consistency in decision-making, land use partnerships, and overarching design and operational changes.

This initiative has undergone a number of changes over the course of the past two years. Initially, a set of criteria was developed to guide the Corridor selection process. These criteria focused on mobility, connectivity to activity centers, connectivity to interstates, interstate relief routes, major hurricane evacuation routes, and corridors that are part of a national or statewide highway system. Activity centers include urban areas with a population of 20,000 or greater, state seaports, major airports, major intermodal terminals, major military installations, University of North Carolina system campuses, trauma centers, and major tourist attractions. Inputs from public forums and from members of the North Carolina Board of Transportation

(BOT) and NCDOT Operations staff have also been instrumental in further refining and improving this concept. The result is a long-range highway planning vision for the state, illustrated by a vision map with the proposed facility types and documented as a set of recommended corridors. The 5400 miles of designated Strategic Highway Corridors, which include existing and proposed interstates, account for only 7 percent of the State's Highway System, but carry 45 percent of the traffic.

The selection of the corridors is characterized by one or more of the following primary criteria:

- **Mobility.** This criterion focuses on whether a corridor currently serves or has the potential to expeditiously move large volumes of traffic. These include facilities that are vital to the state's and/or region's interest and serves long-distance and/or regional travel, whose users may be long haul trucks, tourists, and motorists passing through a region.
- **Connectivity.** This criterion focuses on whether a corridor provides a vital connection between Activity Centers.
- **Interstate Connectivity.** This criterion focuses on whether a corridor provides an important connection between existing and/or planned interstates. Interstates, as routes of national significance, primarily move people, goods, and military units between states and across the country.
- **Interstate Reliever.** This criterion focuses on whether a corridor currently serves or has the potential to serve as a reliever route to an existing interstate facility. A reliever route is considered to be an alternate facility (typically running parallel to the facility for a long-distance) to the interstate(s). Facilities that relieve interstates for short distances or are used as alternates in the event of an incident or construction are not considered Interstate relievers.

Additional elements were also taken into consideration to support the corridor selection process. These include the following:

- **Hurricane Evacuation Route.** This criterion focuses on whether a corridor is considered a major route from the NC Emergency Management's Coastal Evacuation Route Map.
- **Cited in a Prominent Report.** Certain reports list the need for improvements along major corridors in the state, mainly to improve economic conditions in a particular area. One such report is the Rural Prosperity Task Force Report (8.5MB), completed in 2000, which supports improvements for three prominent corridors in rural North Carolina.
- **Part of Major Highway System.** This criterion focuses on whether a corridor is part of a national, statewide, economic, or military highway system. Major highway systems include the Dwight D. Eisenhower National System of Interstate and Defense Highways, the National Highway System, the North Carolina Intrastate System, the Appalachian Development Highway System, and the STRAHNET. STRAHNET is the Department of Defense's Strategic Highway Network for moving military personnel and equipment.

Implementation efforts of the initiative focus on six different areas:

- **Education.** Educating all stakeholders on the initiative on a continual basis to ensure those involved are aware of the latest activities and policies.
- **Long-Range Planning.** Individual Comprehensive Transportation Plans will incorporate the long-term vision of each Corridor. Additionally, a series of corridor studies may be undertaken to define needs, issues, and unique challenges of each Corridor. These studies provide all stakeholders an opportunity to be involved at the beginning of the planning process.
- **Project Planning and Design.** Projects along corridors will be developed in a manner to achieve the long-term vision and goals of the initiative.
- **Land Use.** Consistent and compatible land use decisions are needed to support the goals of the initiative. Mechanisms will be developed to assist local jurisdictions in helping to protect mobility along the corridors.
- **Corridor Protection.** Managing development along the corridors is essential for achieving the long-term vision for each facility. Tools, techniques, and strategies will be identified for protecting the corridors, such as the use of access management.
- **Driveway Permit and Traffic Signals.** All driveway permits and traffic signal requests along the corridors will be carefully examined for consistency with the long-term vision for the corridor. Driveway consolidation and sharing will be highly encouraged, and alternative solutions to traffic signals will be sought.

OHIO DOT

Ohio's 26 multi-modal Trade and Travel Corridors are the second generation of the Macro Highway Corridors identified in the 1998 ODOT SLRP. Specific objectives, priority projects and their funding commitments were identified for each corridor through MPO and public involvement. The goals and overall strategies presented in the statewide plan were applied to the corridors. (A process for funding highway capacity additions is based in legislation.)

PENNSYLVANIA DOT

28 Corridors - Subjectively selected Interstates and higher functional classification roadways. Extensive public involvement to establish corridor objectives based on statewide goals. No specific legislation or funding commitments are in the Plan.

TEXAS DOT

The Trans-Texas Corridor (TTC) is a proposed multi-use, statewide network of transportation routes in Texas that will incorporate existing and new highways, railways and utility right-of-ways. Specific routes for the TTC have not been determined.

As envisioned, each route will include:

- Separate lanes for passenger vehicles and large trucks;
- Freight railways;
- High-speed commuter railways;

- Infrastructure for utilities including water lines, oil and gas pipelines; and
- Transmission lines for electricity, broadband, and other telecommunications services.

Plans call for the TTC to be completed in phases over the next 50 years with routes prioritized according to Texas' transportation needs. TxDOT will oversee planning, construction, and ongoing maintenance, although private vendors will be responsible for much of the daily operations.

WASHINGTON DOT

Highway segments identified by DOT staff and designated by Resolution 660 adopted by Washington State Legislatures House Bill 1433, March 31, 2004. Not applicable as a true corridor based plan.

B.1.2 Lessons and Ideas Worth Considering

Colorado DOT

- Calculate from past STIP how much money went to each Corridor; use as a benchmark for future allocations; and
- Future strategies could include doing Corridor Planning Studies.

Delaware DOT

- "Voluntary Capacity Program" – strategy / concept could be explored during public involvement – this would provide a role for local governments who control land-use.

Florida DOT

- Concept of a specialized source of program money, ex. "75 percent of the capacity funding available statewide" being dedicated to the corridors.

Minnesota DOT

- Define corridor goals based on performance metrics; assign funds based on program areas with small percent discretionary if meet targets.

North Carolina DOT

- Define a corridor based on the role it plays;
- Involve other state departments such as the department of development, the highway patrol, or others in developing implementation strategies;
- Dedicating funds to specific corridors; and
- Implementation Strategy for each corridor could address (have same headings/subheadings, e.g. mobility, safety, connectivity strategy).

Ohio DOT

- Involve the Districts and MPOs in defining the corridor vision.

Pennsylvania DOT

- Keep it simple.

Texas DOT

- Define a big vision.

MDOT modal and Region Planners discussed how they used, found beneficial, what they would like to change about the corridors based on the previous statewide plan, *Mobility is Security*.

In general, subcommittee members agreed that “Corridor of Highest Significance” should be multi-modal. They agreed that several approaches should be applied to identify and validate the Corridors of Highest Significance for the *MI Transportation Plan* under development. They agreed that one approach should include replicating the previous approach with updated data. They discussed and agreed to keep the criteria used for the previous plan in this analysis. They agreed another evaluation process should be designed that considers “activity centers.”

B.1.3 Listening Session Results

The following table summarizes the comments made by the MDOT Region staff concerning the use of corridors during the February 9, 2006 listening session.

This information was considered in developing the corridor strategies.

Table 3: MDOT Region Staff – February 9, 2006 Listening Session Summary

<i>* ISSUE:</i>	<i>Superior</i>	<i>North</i>	<i>Bay</i>	<i>Grand</i>	<i>University</i>	<i>Southwest</i>	<i>Metro</i>
Needs Changed	<ul style="list-style-type: none"> ▪ Canadian traffic cuts through ▪ Logging and paper mill traffic conflicts w/ tourist traffic 	<ul style="list-style-type: none"> ▪ How longer distance traffic inter faces/ integrates with local traffic 	<ul style="list-style-type: none"> ▪ Commuter traffic growth ▪ 75,000+ commute outside region to work 	<ul style="list-style-type: none"> ▪ Cannot just focus on roads ▪ Must be multi-modal 	<ul style="list-style-type: none"> ▪ Raceway growth ▪ Tourism, Univ/capital – traffic conflicts 	<ul style="list-style-type: none"> ▪ Keep connections to Indiana ▪ Growth, population shifting ▪ High volumes of traffic 	<ul style="list-style-type: none"> ▪ All the same – just more of everything (congestion etc.) ▪ Except pop. decreasing / reverse commute
Gaps	<ul style="list-style-type: none"> ▪ US- 41 ▪ Trucks and tourists – mph/ speed difference ▪ CN – not enough train cars ▪ 39 problem areas on their maps 	<ul style="list-style-type: none"> ▪ No gaps ▪ E/W issues 	<ul style="list-style-type: none"> ▪ No physical gaps ▪ Gaps in getting elderly out of the thumb ▪ US-20 ▪ CN multi-modal / rail capacity 		<ul style="list-style-type: none"> ▪ 27,53 ▪ Bypasses /connectivity ▪ Capacity, Operations ▪ Safety ▪ Lane continuity on 127 to US12 ▪ M59 – growth ▪ I94 & 23 	<ul style="list-style-type: none"> ▪ ITS, need regional architecture ▪ I-94 need to maintain 2 lanes while doing maintenance – widen bridges ▪ Make routes “all season” 	<ul style="list-style-type: none"> ▪ MOT ▪ Bridges ▪ No commuter rail or options other than a car to get around ▪ Rehab of I96
Opportunities	<ul style="list-style-type: none"> ▪ Short line opportunities (no train cars) 	<ul style="list-style-type: none"> ▪ Long-distance bicycle trips off main roads 	<ul style="list-style-type: none"> ▪ Air freight and truck growth 	<ul style="list-style-type: none"> ▪ Emerging health care Industry ▪ Interchange Improvements ▪ Tourism 	<ul style="list-style-type: none"> ▪ US-23 ▪ Need passing lanes ▪ Need commuter transit ▪ Tourism 	<ul style="list-style-type: none"> ▪ Interchange improvements ▪ Trucks want safety and place to rest 	<ul style="list-style-type: none"> ▪ Operational issues ▪ Access Management

* ISSUE:	<i>Superior</i>	<i>North</i>	<i>Bay</i>	<i>Grand</i>	<i>University</i>	<i>Southwest</i>	<i>Metro</i>
How define corridor	<ul style="list-style-type: none"> ▪ More than just roads ▪ Need subjective criteria ▪ Need to value UP different than rest of state 	<ul style="list-style-type: none"> ▪ OK - existing 	<ul style="list-style-type: none"> ▪ Urban areas ▪ Activity Centers ▪ Hubs ▪ Tourist/Commuter ▪ Truck & commercial ▪ Main highway corridors bases on high VMT 	<ul style="list-style-type: none"> ▪ Link major facilities ▪ Urban areas ▪ Look at hierarchy (traffic volume connectivity, proximity) ▪ Consider all modes & economic sectors ▪ Access, crossings ▪ Military routes 	<ul style="list-style-type: none"> ▪ Connectivity ▪ Links to major centers 		<ul style="list-style-type: none"> ▪ Need to identify how / what to do after we prioritize
What/how used from last round	<ul style="list-style-type: none"> ▪ Focused funding, looked to economic impact ▪ Access management studies 	<ul style="list-style-type: none"> ▪ Not used but found that what is showing up is on these corridors 		<ul style="list-style-type: none"> ▪ Focused on EIS area, freeways ▪ Created a hierarchy of function based on activity centers ▪ As a strategy that feeds economic centers 	<ul style="list-style-type: none"> ▪ Access Management studies for the corridors ▪ Feasibility studies for capacity issues, interchanges and bridges 	<ul style="list-style-type: none"> ▪ Public involvement explanations ▪ Maintenance of traffic justification ▪ Preserve 1st priority 	<ul style="list-style-type: none"> ▪ Not really used much ▪ Access management ▪ Too close to last plan to see impacts of implementation

<i>* ISSUE:</i>	<i>Superior</i>	<i>North</i>	<i>Bay</i>	<i>Grand</i>	<i>University</i>	<i>Southwest</i>	<i>Metro</i>
Performance Measures	<ul style="list-style-type: none"> ▪ Preserve and maintain ▪ Tourism is #1 industry 			<ul style="list-style-type: none"> ▪ Don't lose focus that we own entire system 	<ul style="list-style-type: none"> ▪ Population shifts ▪ Traffic ▪ Operations ▪ Safety ▪ Land use ▪ Policies and strategies 	<ul style="list-style-type: none"> ▪ Mobility 	<ul style="list-style-type: none"> ▪ How to prioritize within and between corridors
Policies / Strategies to support	Acknowledge there's a difference in magnitude for UP		<ul style="list-style-type: none"> ▪ Multi-modal connection ▪ Integration 	<ul style="list-style-type: none"> ▪ Need to balance the program, not put all resources on highest functional class ▪ Bridge widening 	<ul style="list-style-type: none"> ▪ Interchange policy and ▪ Public/private partnerships 		<ul style="list-style-type: none"> ▪ MOT ▪ Feel there is a need for a regional LRP ▪ Need to close freeway to complete projects ▪ Bridges ▪ Emphasis on reconstruction but need to know how to prioritize

<i>* ISSUE:</i>	<i>Superior</i>	<i>North</i>	<i>Bay</i>	<i>Grand</i>	<i>University</i>	<i>Southwest</i>	<i>Metro</i>
International Border	<ul style="list-style-type: none"> ▪ Trucks just passing through region & really going a long-distance in Canada 	<ul style="list-style-type: none"> ▪ Systems communication issues ▪ Improve crossing times ▪ Parity ▪ Educate public on why it takes so long to cross 					<ul style="list-style-type: none"> ▪ Gap in the system – heavy traffic
Other	<ul style="list-style-type: none"> ▪ How to tie together with subjective economic need ▪ Passing reliever lanes have been successful – 8 planned 	<ul style="list-style-type: none"> ▪ Non-motorize, long-distance routes on Lower level Functional Class ▪ Passing and reliever lanes have been successful 	<ul style="list-style-type: none"> ▪ Senior/elderly ▪ Bicycle / trail inter connections ▪ Saginaw River 	<ul style="list-style-type: none"> ▪ QOU focus ▪ Need to widen bridges & increase bridge clearances ▪ Support ITS 	<ul style="list-style-type: none"> ▪ ITS 	ITS	<ul style="list-style-type: none"> ▪ Dealing with safety, reconstruction, MOT issues ▪ Timeframes between plans do not leave enough time to advance their vision

B.2 Analytical Approaches Preliminary Findings – Pros and Cons

Vendor staff performed each of these two analytical approaches using MDOT supplied updated data and applying GIS and transportation modeling techniques. In conducting these analyses, a number of strengths and weaknesses or pros and cons of each methodology became evident.

In terms of the first methodology, replicating the previous approach, it can be said that the original plan's (method) is simple and common sense based. The corridors that resulted seem to make sense. Using this method again would provide consistency with the previous plan. The weakness is that the non-highway modes are difficult to "count" and integrate into the same scoring as the highways. The reason for this is that categorical data is less rigorous.

In terms of the activity center approach, identifying the connectivity between activity centers is logical and simple. Highways, transit, rail, air, and water can be treated separately. This method lends itself to valuing and classification options. However, like the previous approach, combining data from across modes is challenging and it represents a departure from the previous methodology.

Preliminary findings from each approach were presented to the subcommittee on May 5, 2006.

B.3 Replicating Previous Approach

MDOT's previous plan, *Mobility is Security 2000-2025* applied 18 Corridor Criteria categories with three possible corridor classifications. The Corridors of Highest Significance and criteria identified in *Mobility is Security*, pp 56-60 included:

1. I-94
2. I-75
3. I-96
4. I-69
5. US-131
6. I-196 / US-31
7. US-23 (Ohio to I-75)
8. M-72 (I-75 to Traverse City)
9. US-127
10. US-2 / US-41
11. US-23 (I-75 to Alpena)

While the criteria covered all modes, most criteria were applied to identify / classify highway corridors. The vendor team replicated the 2000-2025 *Mobility is Security* approach using updated data (total traffic, tourism, total employment, Commercial ADT, Intercity Bus, Freight Rail, etc.). Not all data was available for 2005 so the latest and best data was used for each category. In replicating the approach, the team adjusted the scoring to using a sum of squares method rather than a pure additive method to avoid a bias in scoring, which gave the longer corridors, a higher ranking. This was also used in order to combine modes into a single scoring methodology. Using the additive method, even with new data, the corridors from the previous plan were the same. With sum of squares method even with new data – the top 10 were the same.

B.4 Activity Center Approach

The Activity Center Approach is focused on identifying the places, from the perspective of the state of Michigan, where population, employment, tourism, transportation, and other economically important activities are concentrated. The approach begins with the premise that the Michigan transportation system, the Trunkline highway routes and other modal facilities (bus, rail, water, air), exist to serve as the connecting linkages between these centers of economic activity. Identification and classification of activity centers and connecting transportation corridors was conducted via a technical process using the extensive datasets and modeling outputs developed by the Michigan Department of Transportation (MDOT).

The Activity Center method involved two steps. First was to identify where economic activity is concentrated. A total of 50 activity centers were identified within Michigan and another seven located outside of Michigan. Second, connections were made between all activity centers via the various modes. Individual corridors were identified and classified by the types, quantities, and value of flows (commuters, visitors, freight, etc.). The classification effort provided the information discussed in B.5 where the level of significance of a given corridor is discussed.

B.4.1 Activity Center Identification

For the activity center identification, individual activities were aggregated into groups, creating centers. “Activity” was defined using 10 categories and 23 sub-categories. The activities considered included: Urban areas, inside and outside Michigan; commercial and retail centers; industrial and business centers; tourism attractions; education and research facilities; passenger facilities; medical facilities; and freight and intermodal facilities. These are listed below along with a discussion of thresholds for each of the sub-categories. **Appendix C** also contains a listing of the selection criteria, data sources, and detailed activity center profiles.

B.4.1.1 Urban Areas

Urban areas represent the nucleus of each activity center. These are the areas where households are located, and account for the vast majority of the travel demand on the transportation system. Places with a minimum total resident population, and with the Census defined density

level of 1,000 persons per square-mile to qualify as “urban”, are both needed to establish an activity center. Urban areas/urban clusters inside Michigan automatically qualified as an activity center if they had a population of at least 5,000 in 2005. Some activity centers have less than 5,000 persons at an urban density, but qualify via the other selection criteria. There are also several major urban areas outside the state boundaries that are important to the Michigan economy. Several, like Toledo, Ohio or South Bend, Indiana have metropolitan areas that spill into Michigan. Others, like Chicago, Illinois or Toronto, Ontario are more distant but are tremendously important to Michigan. These areas outside Michigan were included as external activity centers. Originally, the external activity centers were delineated as the nearest Transportation Management Areas (TMA) in the neighboring states of Minnesota, Wisconsin, Illinois, Indiana, and Ohio plus an activity center in Ontario (Toronto). Later the criteria were relaxed to allow for inclusion of Green Bay, Wisconsin and Fort Wayne, Indiana.

B.4.1.2 Commercial Areas

Another important measure of general economic activity and by extension, travel demand, is employment. General economic activity, defined by total employment greater than 2,500 jobs in a MDOT statewide model Traffic Analysis Zone (TAZ), qualifies an area as an activity center. Additionally, retail employment concentrations of at least 1,000 employees per TAZ were included as a qualifier for activity centers because of the disproportionate impact on travel and local economics that regional retail activity has on an area.

B.4.1.3 Tourism

The tourism component of the economy is tremendously important and thus this was included as measure for identifying activity centers. This is especially true in the rural northern areas of Michigan that do not have large concentrations of urban activity, instead the urban areas tend to be smaller, more widely dispersed, and the economy is more focused on tourism and natural resource extraction. For the purposes of identifying activity centers, tourism activity was quantified by the number of hotel units available, revenue from the Annual Lodging Use Tax, Number of annual visitor person trips, number of annual visitor person days, presence of state or national parks, and presence of major gaming centers.

B.4.1.4 Education/Technology Centers

Educational and technology centers make up another critical category used to identify activity centers. All community colleges and universities were identified statewide and used in the descriptive profiles for each activity center. Similarly included were, all of Michigan’s officially designated Smart Zone technology centers. Interestingly, use of both of these education/technology centers did not result in qualifying additional activity centers (they had already qualified based on population, employment, or tourism). Nonetheless, these are important categories to break out in the descriptive profiles.

B.4.1.5 Life Sciences Facilities

Life science facilities make up another critical category used to identify activity centers. These facilities in particular are very sensitive to travel times, travel reliability, and other measures of the performance of the transportation system. In the case of regional trauma centers, a few minutes of delay can make the difference between life and death. All major trauma centers, hospitals, and major medical facilities were identified statewide and used in the descriptive profiles for each activity center. As was true with education/technology centers, inclusion of the life science facilities did not result in additional activity centers being added.

B.4.1.6 Correctional Facilities

Correctional facilities were added as a category used to identify activity centers later in the process based on stakeholder feedback. These facilities can be of critical importance to some regional economies. All major correctional facilities were identified statewide and used in the descriptive profiles for each activity center. Inclusion of correctional facilities did not result in additional activity centers being added.

B.4.1.7 Passenger Facilities

The location of passenger facilities was used as an identifying criterion for activity centers. All passenger facilities that were active in 2005, as defined by the various MDOT datasets, were identified statewide and used in the descriptive profiles for each of the activity centers. Passenger facilities are made up of car pool lots, intercity bus stations, Amtrak stations, and commercial airports with active air carrier service.

B.4.1.8 Freight Facilities

The location of freight facilities was also an identifying criterion in development of the activity centers. All freight facilities that were active in 2005, as defined by the various MDOT datasets, were identified statewide and used in the descriptive profiles for each of the activity centers. Freight facilities are made up of marine cargo ports, and commercial airports with active air freight service.

B.4.1.9 International Border Crossings

Locations where international border crossings exist were used as criteria to identify activity centers. These facilities are obviously important not only to Michigan and Ontario, but also to the overall economy of the Great Lakes region, and to several manufacturing sectors in the United States and Canada as a whole. All major border crossing facilities were identified statewide and used in the descriptive profiles for each activity center. Inclusion of border crossings did not result in qualifying additional activity centers.

B.4.1.10 Military Bases

Based on stakeholder feedback later in the process, Military Bases were added as a category used to identify activity centers. These facilities can be of critical importance to some regional economies. The only activity center that was added based on a military facility was Grayling. It

was added based on the Michigan Army National Guard base. Inclusion of military bases as selection criteria only resulted in adding this activity center.

The activity center identification process was subjected to corridor subcommittee review at the May 5, 2006 meeting, again at the August 30, 2006 meeting, and via other review opportunities. Some modifications and additions of “activities” were made to the approach, several of which resulted in the creation of additional activity centers. One major change to note, made as a result of subcommittee review, is the splitting of the Detroit metropolitan area into multiple activity centers. In terms of geographic boundaries for the designated activity centers, in most cases these are county boundaries. However, several are made up of aggregations of MDOT TAZs where a county-based boundary would not be appropriate.

The 50 activity centers inside Michigan and seven centers outside Michigan used as the basis of this approach are listed in **Table 4**.

Table 4: Final Activity Center Listing

<i>Inside Michigan</i>		<i>Outside Michigan</i>
1) Adrian	26) Houghton	1) Chicago, Ill.
2) Allegan	27) Ionia/Greenville	2) Green Bay, Wis.
3) Alma	28) Iron Mountain	3) Fort Wayne, Ind.
4) Alpena	29) Jackson	4) Minneapolis, Minn.
5) Ann Arbor	30) Kalamazoo	5) Toledo, Oh.
6) Battle Creek	31) Lansing	6) Toronto, Ont.
7) Bay City	32) Lapeer	7) South Bend, Ind.
8) Benton Harbor	33) Livonia-Canton-Westland	
9) Big Rapids	34) Ludington	
10) Brighton	35) Mackinaw City-St. Ignace	
11) Cadillac	36) Marquette	
12) Cheboygan	37) Menominee	
13) Coldwater	38) Midland	
14) Dearborn-Taylor-Radford Twp	39) Monroe	
15) Detroit (City)	40) Mt. Pleasant	
16) Detroit Metro Airport	41) Muskegon	
17) Escanaba	42) Owosso	
18) Farmington Hills-Royal Oak	43) Petoskey	
19) Flint	44) Port Huron	
20) Fremont	45) Saginaw	
21) Gaylord	46) Sault Ste Marie	
22) Grand Rapids	47) Sturgis	
23) Grayling	48) Traverse City-Frankfort	
24) Hastings	49) Troy-Rochester	
25) Holland	50) Warren-Sterling-Clinton Twp	

B.4.2 Activity Center Connections

After activity centers were identified, the process of evaluating the connections between them was undertaken. The process begins with the assumption that there should be a connection between any given activity center and any other. These idealized “desire” lines were then evaluated over the real-world transportation system to see which corridors are being used to serve as these linkages, and to quantify the magnitude of these connections for various segments in the transportation network.

The procedure worked as follows; first a matrix of each activity center to all other activity centers was created in TransCAD. The final version yielded a 57 by 57 matrix, with each trip exchange being equal to 1. This matrix represents the idealized “desire” lines where all activity centers are connected to all others. Next, the matrix trip exchanges were assigned to the highway and rail networks so that the likely paths between each activity center and the others were identified. This procedure used the MDOT statewide travel demand model network for the highway and rail networks. The impedances used were not purely based on travel time, but instead used a composite impedance in an effort to replicate actual travel paths. In this case, the highway impedance was a composite of travel time and link desirability, with each given equal weight (similar to the procedures used in internet-based mapping and driving directions engines). Link desirability in this case gives preference to travel on multilane and divided arterial highways between origin and destination based on the theory that drivers perceive these facilities as safer and more reliable. The resulting traffic assignments gave a magnitude value (not actual traffic) describing how important a corridor is for providing connections between activity centers. In some cases, the magnitude value was zero, indicating that the highway segment is not serving as a connection between activity centers. However, for many segments the number of connections it is serving is quite high. For example, the I-94 corridor is serving a large number of combinations of city pairs (e.g. Detroit-Chicago, Ann Arbor-Detroit, Jackson-Ann Arbor, Kalamazoo-Chicago, Kalamazoo-Detroit, etc.)

Whenever the set of activity centers was changed, there was also a necessary repetition of the connections procedure.

B.4.3 Corridor Identification

After the connections between activity centers were identified and measured, the process of final corridor identification and classification was conducted. Final corridor identification and classification involved combining traffic flow data with the activity center connection data and aggregating this information into logical corridor segments classified by Local, Regional, Statewide, or National significance levels.

Link specific flow data for year 2005 was assembled and coded as attributes to the “connections” loaded network. Flow data was composed of separate attribute items for average daily traffic (ADT), commercial ADT, commodity value, commercial tonnage, international flow, intercity bus flow, and roadway capacity. These values along with the “connections” data were normalized and then combined into individual elements of a link-specific utility vector (similar to an economic utility vector used in choice modeling). The magnitude of this utility

vector describes the relative importance of a given road link compared to others. Network links were then “stuck” together into an initial grouping by aggregating by route numbers grouped by economic region, and simultaneously aggregating the vector results by route segment.

The route segment classification process could not use simple threshold values to classify segments into the four levels of significance because of the use of utility vectors instead of a segment “score”. The classification used an iterative probabilistic classifier procedure. In this procedure, through a series of iterations, a *Mahalanobis Distance* between the 4 classification categories mean vector and a segment’s utility vector was measured. The segment was then assigned to the category that had the shortest *Mahalanobis Distance*. The process is repeated until the segments are no longer changing to new categories in successive iterations. *Mahalanobis Distance* is based on correlations between variables by which different patterns can be identified and analyzed. It is a useful way of determining patterns and is not dependent on the scale of measurements. The entire classification procedure has the advantage of allowing the vector components to be collinear (e.g. truck ADT, commodity value, tonnage) without biasing the results.

The resulting corridor identification/classification process was subjected to corridor subcommittee review at the May 5, 2006 meeting, again at the August 30, 2006 meeting, and via other review opportunities by MDOT. Some modifications and upgrading of corridors occurred as a result. Some major changes included; upgrade of US-23 between Bay City and Alpena to a Statewide Significance corridor, and an upgrade of US-31 between Muskegon and Traverse City to a Statewide Significance corridor. A few small adjustments were also made to raise the level of significance a variety of segments (mainly rural areas) from Local to Regional.

Final corridor classification results and mapping are summarized in the main document.

B.5 Corridor Nomenclature

In addition to agreeing on and applying the process to identify the Corridors of Highest Significance, consideration was given to what or how to name the corridors and whether to create prioritized or stratified categories. Categories classifications and stratifications considered include:

- Magnitude / tiered - based on previous *Mobility is Security* Plan – Corridors were labeled as High, Medium, or Low-Significance;
- Magnitude / tiered - based on origin/destination factors plus value and volume (International, National, State, Regional, Local Significance);
- Future - Emerging corridors; and
- Functional Categories (Agriculture, Automotive Technology, Life Science, etc.).

Based on the application of the process and discussion at the May 5, 2006 meeting, the MDOT Corridor subcommittee agreed that all identified corridors will be ranked as corridors of “highest significance.” No sub-categories such as mid- or low-significance will be developed. No “emerging corridor” category will be used. The plan is redone every five years; new corridors will be identified and included in it then. Corridors will be designated or named based on the primary origin/destination they serve – international, national, statewide, regional, and local. Corridors will be not named by the economic market they support (such as technology, automotive, life-science, commuter or agriculture and wood products corridor, etc.) This simplified naming is intended to describe the movements along the corridor and not imply a prioritization.

The MDOT Corridor Subcommittee agreed that:

- Corridors will be referred to as Corridors of Highest Significance;
- No sub-categories such as mid- or low-significance will be used;
- No emerging corridor category will be used; and
- Corridors will be designated, named, or labeled based on the primary origin/destination they serve – international, national, statewide, regional, and local.

The reasoning behind these decisions included a discussion of the pros and cons of each concept.

- Some naming of corridors has already taken place by other governmental agencies and public interest groups. For example, Life Sciences Corridors, University / (Smart Zones), Technology Corridors, etc. have been defined by the Michigan Economic Development Commission (MEDC) and other Michigan governmental agencies. MDOT wants to compliment and does not want to conflict with the state’s economic development names and initiatives.
- MDOT does not want to imply or give the impression that any single corridor is more important than another. This is important so that MDOT does not un-intentionally re-direct development or investments to move from one part of the state to another.
- The emerging corridors category was dropped for several reasons. First, based on the activity center approach, and review of the travel growth, the corridors identified as Highest Significance are the ones that will continue to grow. Also, the *MI Transportation Plan* is updated every five years. Analysis is conducted on trends every year. These processes would identify any new or emerging corridors.