

**THE EVOLUTION OF MULTIMODAL TRANSPORTATION  
PLANNING: KEY FACTORS IN SHAPING THE APPROACHES OF  
STATE DOTS**

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STATE DOTs**

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To my grandparents, on whose shoulders I stand.

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# TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS	iv
LIST OF TABLES	vii
LIST OF FIGURES	viii
LIST OF ABBREVIATIONS	x
SUMMARY	xi
 <u>CHAPTER</u>	
1 INTRODUCTION	1
2 BACKGROUND	3
Overview of Transportation Planning	4
Evolution of Federal Transportation Legislation	7
Multimodal Transportation Planning and Current Multimodal Practices	16
Synthesis	41
3 ANALYSIS APPROACH	44
Organizational Structure Analysis	44
Statewide Multimodal Survey	48
In-Depth Case Studies	50
4 RESULTS – NATIONWIDE SURVEY	54
Organizational Structure Analysis	54
Statewide Multimodal Survey	63
5 RESULTS – CASE STUDIES	72
Florida Department of Transportation	72
North Carolina Department of Transportation	87

Oregon Department of Transportation	99
Virginia’s Transportation Structure	112
Maryland Department of Transportation	122
Massachusetts Department of Transportation	130
6 CONCLUSIONS, LIMITATIONS, & FUTURE RESEARCH	141
Conclusions	141
Limitations	143
Future Research	144
APPENDIX A: Statewide Multimodal Survey Instrument	148
APPENDIX B: List of Sources for Organizational Structures	155
REFERENCES	157

## LIST OF TABLES

	Page
Table 2.1: Strengths and Weaknesses of Organizational Structures by Type	19
Table 4.1: Consistency of Responses to Questions on Extent of Multimodal Planning	65
Table 5.1: Allocation of TTF Expenditures for Fiscal Year 2011 (Department of Legislative Service, 2012)	127
Table 5.2: Sources of Revenue and Projected Amounts for FY 2011 (Mullan, 2010)	136

## LIST OF FIGURES

	Page
Figure 2.1: Transportation Planning Process (FHWA and FTA, 2007)	6
Figure 3.1: Basic Example of a State DOT Organizational Chart	48
Figure 3.2: Map of States that Responded to Survey	50
Figure 4.1: Number of Multimodal Divisions by Level	56
Figure 4.2: Distribution of Separate Modal Divisions by Level	58
Figure 4.3: Separate Modal Divisions – Association with Planning and Multimodal	60
Figure 4.4: Separate Modal Divisions – Association with Planning and Multimodal and Multimodal (only considering DOTs with Multimodal Divisions)	61
Figure 4.5: Responses to Question #6	64
Figure 4.6: Extent of MMTP in Relation to Responses to Question #10	67
Figure 4.7: Extent of MMTP in Relation to Responses to Question #11	67
Figure 4.8: Number of Mentions of the “Most Critical Issues” Relating to Statewide Multimodal Transportation Planning (Sonnenberg et al., 2012)	70
Figure 4.9: Number of Mentions of the Characteristics Found Necessary for a State DOT to be Considered a Multimodal Agency (Sonnenberg et al., 2012)	70
Figure 5.1: Simplified Version of FDOT’s Organizational Chart	75
Figure 5.2: Map of FDOT District Offices (FDOT, 2013)	77
Figure 5.3: FDOT Funding Sources (FDOT Office of Financial Development, 2011)	79
Figure 5.4: 2011 FDOT Budget (FDOT, 2012b)	80
Figure 5.5: FY 2011 FDOT Budget (SIS/Non-SIS) (FDOT, 2012b)	82
Figure 5.6: FY 2011 FDOT SIS Expenditures (FDOT, 2012b)	83
Figure 5.7: NCDOT’s Organizational Chart (NCDOT, 2012a)	89



Figure 5.8: Sources of Funds FY 2012-2013 by Major Funding Source (NCDOT, 2012i)	91
Figure 5.9: Projected Uses of NCDOT Appropriations FY 2012-2013 (NCDOT, 2012i)	93
Figure 5.10: NCMIN Classification Framework (NCDOT, 2012j)	95
Figure 5.11: Policy to Projects Conceptual Framework (NCDOT, 2012k)	95
Figure 5.12: NCDOT's Project Scoring Criteria (NCDOT, 2012l)	97
Figure 5.13: ODOT Organizational Chart (ODOT, 2012a)	101
Figure 5.14: ODOT's Budget 2011-2013 (ODOT, 2011)	104
Figure 5.15: 75/25 Funding Split Representation	105
Figure 5.16: Office of Intermodal Planning and Investment Organization (OIPI, 2012)	115
Figure 5.17: FY 2013 CTF Revenue Sources (VDOT, 2012a)	118
Figure 5.18: MDOT's Organizational Structure (MDOT, 2009a)	124
Figure 5.19: MDOT Capital Budget (MDOT, 2011c)	128
Figure 5.20: MDOT Operating Budget (MDOT, 2011c)	128
Figure 5.21: MassDOT Organizational Structure, FY 2011 Transportation Budget (Mullan, 2010)	131
Figure 5.22: CTF - Where the \$1.4B Goes, FY11 (in millions) (Mullan, 2010)	135
Figure 5.23: Operating Budget by Division (MassDOT – Where the \$690M Goes, FY 2011 (in millions)) (Mullan, 2010)	137

## LIST OF ABBREVIATIONS

DOT	Department of Transportation
ISTEA	Intermodal Surface Transportation Efficiency Act
LRTP	Long-Range Transportation Plan
MAP-21	Moving Ahead for Progress in the 21 <sup>st</sup> Century
MMTP	Multimodal Transportation Planning
MPO	Metropolitan Planning Organization
SAFETEA-LU	Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users
STIP	Statewide Transportation Improvement Program
TEA-21	The Transportation Equity Act
TIP	Transportation Improvement Program
TTF	Transportation Trust Fund

## SUMMARY

As a result of the changing needs of society since the early 20<sup>th</sup> century, approaches to transportation planning have been continually shifting from highway-focused to multimodal, an approach which takes multiple modes of transportation into consideration. This evolution has been reflected in federal transportation legislation and continues to have many implications for transportation agencies, especially state departments of transportation (DOTs).

The objective of this thesis is to analyze what state DOTs have done in order to adapt to the shift. More specifically, the project focuses on the organizational and funding structures of state DOTs. First, an organizational structure analysis of all 50 state DOTs was carried out. This analysis looked at how state DOTs incorporate multiple modes of transportation into their organizational structure. Secondly, the results of a statewide multimodal planning survey, to which 35 states responded, were analyzed. The survey gauged to what extent the representative from a given state DOT thought that their agency was conducting multimodal transportation planning. It also analyzed state DOT modal responsibilities, funding options, and characteristics that influence multimodal transportation planning. Lastly, case studies were carried out for six state transportation agencies: Florida DOT, North Carolina DOT, Oregon DOT, Virginia's Transportation Secretariat, Maryland DOT, and Massachusetts DOT. These case studies focused on organizational structure, funding, and multimodal efforts.

Findings from the three different aspects of this thesis support the notion that highway is still the dominant mode in statewide transportation planning in most state DOTs. However, this research also supports the idea that this situation is changing,

though more rapidly in some states than in others. Though it is not evident that one type of organizational structure is better than another, states have used the reorganization of these structures as a method for adapting to multimodal transportation planning. Overall, state DOTs tend to incorporate multiple modes of transportation into their organizational structure through multimodal divisions, separate modal divisions, or a combination of both. In addition to the organizational structures, some states have also restructured their funding mechanisms in order to make funds more flexible across all modes of transportation so that they may be able to better accommodate multimodal transportation planning. Those state DOTs with transportation trust funds and separate modal programs have generally shown more initiative in embracing a more multimodal approach to transportation planning. Besides organizational and funding structures, leadership, organizational culture, and institutional issues have been recognized as factors that influence the extent of multimodal planning.

# **CHAPTER 1**

## **INTRODUCTION**

The origins of state departments of transportation (DOTs) date back to the early 1900s. These DOTs typically started off as state highway departments and have continued to evolve over time. This evolution has been marked by the changing needs of society and the subsequent shifting focuses within the transportation industry. One of the most notable shifts is that which moved transportation planning from being solely highway-oriented to being inclusive of other modes of transportation. To this extent, the integration of highway and mass transit, as well as the coordination of transportation planning with environmental concerns and land use development, came before the 1990s and was reflected in federal legislation (e.g., Federal-Aid Highway Act, National Environmental Policy Act, Clean Air Act, Urban Mass Transportation Assistance Act, Surface Transportation Assistance Act). However, a more dramatic shift was seen as the construction of the Interstate Highway system came to an end. Accordingly, the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 acknowledged and addressed this change in focus. This legislation essentially moved the industry's objective from construction to system preservation. It also called for a more integrated and connected multimodal transportation system. The Transportation Equity Act (TEA-21) of 1998 followed many of the same provisions of ISTEA, but placed a greater emphasis on coordination, public involvement, and environmental consideration. The Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) of 2006 continued the planning factors that were introduced in TEA-21.

SAFETEA-LU, however, allowed for greater funding flexibility. The current legislation, Moving Ahead for Progress in the 21<sup>st</sup> Century (MAP-21) of 2012, aims to build on the previous acts and create a performance-based, multimodal system that addresses the nation's various transportation issues.

Given this evolution, state DOTs have undergone significant changes over the years. One of the most fundamental changes has been the change from conventional (highway-focused) planning to multimodal planning. Transitioning to the latter approach has required DOTs to change the way they operate, which has not been an easy task; each state has met this challenge in a different way. The objective of this thesis is to assess influencing factors that have shaped different approaches to multimodal transportation planning and to determine in what ways these influencing factors are indicative of state DOTs that have been more successful in that area. It evaluates the barriers that state DOTs have faced in transitioning to a multimodal approach and provides insight into what these state transportation agencies have done to overcome these barriers, mainly focusing on organizational structures and funding structures. In order to do this, the thesis analyzes the organizational structure of all 50 state DOTs, evaluates the responses of 35 state DOTs to a statewide multimodal survey with emphasis on funding, and carries out in-depth case studies of six state DOTs.

## **CHAPTER 2**

### **BACKGROUND**

The popularization of the car in the early 1900s and the subsequent enactment of the first piece of federal transportation legislation in 1916 marked the beginning of formal transportation planning in the United States. Transportation planning, during that time, focused solely on automobile travel. By the mid-1990s, this focus shifted to a more integrated approach that considered both highway and transit options, notably within urban areas. Since then, as focuses have continued to shift, the approaches to transportation planning have undergone significant changes. The traditional transportation planning process, which focuses either primarily or solely on the movement of automobiles, has evolved into a multimodal transportation planning process that takes all modes of transportation into consideration. This transition has largely been influenced by changes in transportation needs along with the evolution of federal transportation legislation throughout the mid- to late-1900s and into the 2000s. As a result, the roles as well as the characteristics and practices of state departments of transportation and other transportation-related agencies have evolved.

Although multimodal transportation planning is now the standard, it has not yet been fully realized. That is to say, some states have been more successful than others in transitioning to a multimodal transportation planning approach. These more successful states have generally been more intentional about evaluating the needs, overcoming the obstacles, and implementing the practices that are necessary to make this shift possible. Accordingly, this literature review summarizes the evolution of the federal transportation

legislation and gives an idea of how states have adapted their own transportation planning approaches in response to the change in legislation as well as change in social, environmental, and economic needs. The multimodal characteristics and multimodal practices of these states are key to illustrating what issues have to be addressed and what actions should be taken in order to successfully transition to a multimodal approach.

The following sections move from a summary of the transportation planning process and its evolution via federal legislation, to a focus on the multimodal aspects of the planning process.

## **2.1 Overview of Transportation Planning**

Broadly speaking, transportation planning is the process that connects transportation to other societal goals. “It requires developing strategies for operating, managing, maintaining, and financing the area’s transportation system in such a way as to advance the area’s long-term goals” (FHWA and FTA, 2007). This development requires consideration of potential strategies, an evaluation process to prioritize these strategies, and the participation of the public and various stakeholders.

The transportation planning process involves the following steps (Adapted from FHWA and FTA, 2007):

- Monitoring existing conditions
- Forecasting future population and employment growth
- Identifying transportation problems, needs, and various strategies to meet those needs



- Developing short- and long-range programs that include transportation alternatives that move both people and goods
- Estimating the impact of recommended future transportation projects on the environment
- Developing an effective financial plan in order to create funds that can be used to implement those strategies

This process includes a number of players. The two major types of agencies involved are Metropolitan Planning Organizations (MPOs) and State Departments of Transportation (DOTs). MPOs were created by Federal legislation that was passed in the early 1970s. This legislation required an MPO for any urbanized area with a population of 50,000 people or more. These MPOs had the task of ensuring that “existing and future expenditures for transportation projects and programs were based on a continuing, cooperative, and comprehensive planning process” (FHWA and FTA, 2007). MPOs have various functions. Mainly, they are tasked with identifying and evaluating options for alternative transportation improvements, preparing and maintaining a Metropolitan Transportation Plan (MTP), developing a Transportation Improvement Program (TIP), and involving the public in the transportation planning process. They also play a leading role in air quality conformity and congestion management.

State DOTs are agencies “responsible for transportation planning, programming, and project implementation” for their respective states (FHWA and FTA, 2007). These agencies are also responsible for designing, constructing, operating, and maintaining state facilities for various modes of transportation. The main functions of the state DOTs include preparing and maintaining a long-range statewide transportation plan, developing

a statewide transportation improvement program (STIP), and involving the public in the process. Both MPOs and state DOTs, along with other transportation-related agencies work together to carry out the transportation planning process and to implement the projects. Figure 2.1 shows the basic sequence of steps in the transportation planning process.



**Figure 2.1 Transportation Planning Process (FHWA and FTA, 2007)**

A number of key documents are produced during the transportation planning process: the Unified Planning Work Program (UPWP), the Metropolitan Transportation Plan/Long-Range Transportation Plan (MTP/LRTP), the Transportation Improvement Program (TIP), the State Planning and Research (SPR) Program, the Long-Range Statewide Transportation Plan, and the Statewide Transportation Improvement Program (STIP). Each of these documents is developed either by the MPO or state DOT and approved by the MPO, the state DOT, or the United States DOT (USDOT). These

documents are required by federal law and play a big role in transportation funding. Though transportation funding comes from various sources (federal, state, and local governments, special authorities, tolls, local assessment districts, impact fees), the primary funding source is the federal government. Funding from the federal government is transferred to the state and then distributed to the different metropolitan areas within the state.

## **2.2 Evolution of Federal Transportation Legislation**

### **2.2.1 Pre-1990 Transportation Legislation**

In the United States, transportation planning has always been carried out at the state and local level. The federal input generally comes in through transportation legislation that sets policies and creates programs. In particular, the Federal-Aid Highway Act (FAHA) of 1956 led to the creation of the Interstate Highway System. The act also authorized an expenditure of \$24.8 billion between 1957 and 1969; the federal share was to account for 90 percent of the cost (Wiener, 2008). Though this project came to an end, the federal government continued to play a significant role in transportation by providing the majority of the funding for the transportation projects that local and state governments carried out. In order to receive this funding, the states were required to carry out urban transportation planning as mandated by the FAHA of 1962.

Federal funding continues to be an incentive that encourages transportation planning in accordance with the guidelines set forth in legislation. Such guidelines have, over time, shaped a broader perspective of transportation planning. The FAHA of 1962, for example, addressed the integration of transportation planning and land development.

This broader perspective was further supported by a “cooperative, continuous, and comprehensive” planning process and integrated objectives for highway and mass transit. The FAHA of 1968 went on to require public hearings to get input on the economic, social, and environmental impacts of proposed highway projects as well as their consistency with transportation goals. This dedication to a sustainable and multimodal approach was reaffirmed by the enactment of legislation related to the environment, energy, housing and urban development, and mass transportation. Such legislation includes the National Environmental Policy Act of 1969, the Urban Mass Transportation Assistance Act of 1970, the Clean Air Act Amendments and Surface Transportation Assistance Acts (STAA) that were passed throughout the late 1970s and 1980s. The STAA of 1978 was the first act that combined the issues of highway, public transportation, and safety into one piece of legislation. Transportation legislation that followed the STAA of 1978 continued along this trajectory.

### **2.2.2 Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991**

As the building of the Interstate Highway System came to an end, shifts in the focus of the transportation industry were needed. These needed shifts were addressed in ISTEA by moving from new facility construction to system preservation, changing development patterns, and economic and cultural diversity, as well as shifting to a more regional approach. The legislation looked to achieving this by “strengthening planning practices and coordination between States and metropolitan areas and between private and public sectors, and improving linkages and connections between different forms of transportation” (USDOT, n.d.). Furthermore, ISTEA called for a more integrated

transportation planning process that included more stakeholder involvement, considered diverse interests, and promoted protection of the “human and natural environments and accessibility to – and equity in – the provision of transportation services” (USDOT, n.d.).

ISTEA sets forth six major elements of transportation planning in metropolitan areas. Each of these six aspects feeds into a State’s strategic transportation plan and TIP, two of the key products of the transportation planning process.

- *Public Involvement* – In order to fully consider the social, economic, and environmental impacts of the transportation planning process, public involvement and input is necessary. Public involvement is intended to lead to better decisions that reflect the values, interests, and needs of the community. ISTEA requires a formal public involvement process to be carried out by the MPO.
- *Metropolitan Planning Factors* – There are 15 factors that must be explicitly considered and analyzed. These 15 factors are categorized into three general groups: Mobility and Access for People and Goods, System Performance and Prevention, and Environment and Quality of Life. The integration of all of those factors throughout all of the phases of the planning process ultimately shapes the decisions that are made in regards to the projects and programs included in the plan and the TIP.
- *Major Investment Study (MIS) Requirements* – If a problem in a corridor or certain area is identified to be in possible need of a major investment, then an MIS may be required. In the transportation context, a major investment is defined as the "construction of a large new facility or a substantial expansion of an existing facility" (USDOT, n.d.). The purpose of the MIS is to analyze possible solutions

to an identified problem that can be used to help in the decision-making process. The MIS is not specifically required by ISTEA, but is still necessary in order to meet other requirements of the ISTEA, as well as requirements of the Clean Air Act Amendments (CAAA) and the National Environmental Policy Act (NEPA).

- *Management Systems Development and Integration into the Planning Process* – ISTEA called for states to develop six management systems to ensure effective and efficient management, maintenance, and operation of its transportation infrastructure. Those that focus on asset management include pavement, bridge, and public transit facilities. The other three systems (intermodal, congestion management, and safety) focus on ensuring efficient transportation system performance. In particular, intermodal management systems (IMS) are meant to ensure a transportation system that makes seamless connections and transitions between modes for both passenger and freight movement.
- *Transportation and Air Quality Considerations (Conformity)* – One of the significant changes to transportation planning that was brought about by ISTEA is the transportation conformity requirements of the CAAA. Transportation conformity generally says that in nonattainment and maintenance areas, transportation plans and programs that are financed by federal dollars have to conform to the provisions of the State Implementation Plan (SIP), the statewide planning document that explains how a state will attain the National Ambient Air Quality Standards (NAAQS). This link between transportation planning and air quality planning has encouraged broader consideration of how the transportation system impacts the environment and how to address these impacts.

- *Financial Planning and Constraints* – One of the requirements of ISTEA is to fully integrate financial planning needs into the plan and TIP development process. This requirement encourages good financial planning and the creation of a realistic list of prioritized and well thought-out projects. The financial plan must include a strategy for securing funding, including the funding sources that will be used to finance the projects. The MPO may also prepare a "vision plan" that includes a list of projects that a region would like to implement without considering financial limitations.

ISTEA also created the Surface Transportation Program. This allowed for flexibility in the use of federal funds. STP dollars could be used for a host of projects including highway, transit, car-pool, safety improvement, bicycle and pedestrian, and transportation control. Overall, ISTEA responded to the need for transportation improvements to be made based on societal values and transportation's connection to other aspects of society, by establishing federal requirements for a more comprehensive transportation planning process. ISTEA set forth various planning factors that must be a part of the transportation planning process as carried out by MPOs and state DOTs. Before ISTEA, state DOTs were not subject to a federal mandate for transportation planning. In the case of MPOs, there was already an established transportation planning process, but after ISTEA was passed, many MPOs considered the planning factors to a greater extent.

### **2.2.3 Transportation Equity Act (TEA-21) of 1998**

There were a number of provisions that were carried from ISTEA into TEA-21. Some of the most significant provisions continued under TEA-21 include a 20-year planning time-frame, air quality standards, fiscal constraint, and public involvement. Other continuing provisions are the role of the MPO in adopting the plan as well as the role of local officials and state and transit operators in "determining the best mix of transportation investments to meet metropolitan transportation needs". The emphasis on alternatives to added capacity and congestion management also remained.

Despite these consistencies, a significant number of modifications were also made to the transportation legislation. The 16 planning factors in ISTEA become seven broad areas of focus in TEA-21. These seven areas are as follows (adapted from FHWA, 1998):

- Support the economic vitality of the metropolitan area
- Increase the safety and security of the transportation system for motorized and non-motorized users
- Increase the accessibility and mobility options available to people and for freight
- Protect and enhance the environment, promote energy conservation, and improve quality of life
- Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight
- Promote efficient system management and operation
- Emphasize the preservation of the existing transportation system



Among other things, TEA-21 also:

- adds transportation system operation and management to the general objectives of the planning process;
- allows for designating multiple MPOs in urbanized areas;
- modifies transportation planning boundaries in accordance with nonattainment area boundaries;
- encourages federally funded non-emergency transportation services such as Welfare to Work;
- gives freight shippers and users of public transit systems a chance to comment on plans and TIPs;
- requires coordination of MPOs, state DOTs, and transit agencies to develop financial estimates for the plan and TIP;
- gives the option to identify additional projects that could be carried out if additional funds and other resources were available;
- requires public involvement during the certification review;
- orders that the major investment study for federally funded highway and transit projects be integrated as a part of the planning and NEPA analyses

(adapted from FHWA, 1998)

#### **2.2.4 Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) of 2006**

The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) was signed into law in 2005. The preceding bills, ISTEA and

TEA-21, "shaped the highway program to meet the Nation's changing transportation needs" (FHWA, 2005). SAFETEA-LU continued in this direction. The legislation promoted more efficient and effective transportation programs by focusing on national transportation issues but at the same time giving the states and localities more flexibility to address issues and make decisions that are specific to the goals and objectives for that area.

The planning factors in SAFETEA-LU were the same factors that were introduced in TEA-21. The only differences include separate factors for safety and security and elaboration on the factor related to protecting and enhancing the environment. The latter factor in SAFETEA-LU reads as follows: "*Protect and enhance the environment, promote energy conservation, improve quality of life, and promote consistency between transportation improvements and State and local planned growth and economic development patterns*". Additional areas of emphasis in SAFETEA-LU include equity (in terms of a state's return on its share of contribution to the Highway Trust Fund), innovative finance, congestion relief, and environmental streamlining.

Given these continued factors, many aspects of transportation planning remained the same. However, SAFETEA-LU allowed for greater flexibility and efficiency. Furthermore, requirements were added "for plans to address environmental mitigation, improved performance, multimodal capacity, and enhancement activities" (FHWA, 2005). The legislation also called for addressing tribal, bicycle, pedestrian, and disabled interests.

### **2.2.5 Moving Ahead for Progress in the 21<sup>st</sup> Century (MAP-21) of 2012**

The most recent federal transportation act, MAP-21, was signed into law in July 2012. This act “creates a streamlined, performance-based, and multimodal program to address the many challenges facing the U.S. transportation system” (FHWA OPGA, 2012). These challenges are addressed through the seven national performance goals for the Federal highway programs that are put forth in MAP-21. These goals include safety, infrastructure conditions, congestion reduction, system reliability, freight movement and economic vitality, environmental sustainability, and reduced project delivery delays.

ISTEA of 1991 introduced various programs and policies for highway, transit, bike, and pedestrian. Like TEA-21 and SAFETEA-LU, MAP-21 continues to build on these programs and policies. MAP-21, however, restructured many of the programs. More specifically, some of the previous formula programs were incorporated into a new formula program structure. Before MAP-21, each program had a separate formula for the distribution of funds for each state. Now under MAP-21, the distribution of formula funds is based on the amount of funds allocated to each state under SAFETEA-LU. Furthermore, MAP-21 allows states to transfer up to 50 percent of any apportionment to another formula program. Such a transfer, however, is not permitted to be done for Metropolitan Planning funds or funds that are distributed based on population (e.g., STP, TA).

In terms of transportation planning, MAP-21 stresses the incorporation of performance goals, measures, and targets. The bill also emphasizes the increasing focus on multimodal and sustainable projects.

## **2.3 Multimodal Transportation Planning and Current Multimodal Practices**

### **2.3.1 Conventional vs. Multimodal**

Conventional transportation planning refers to the traditional practices for making decisions regarding transportation policy, programming, and investment. This type of planning often focuses on the automobile as the primary mode of travel. Multimodal planning, on the other hand, takes various modes and the connections between these modes into consideration. These two approaches to transportation planning differ in a number of ways. While automobile dependency favors high vehicle ownership, high vehicle miles of travel, and free and ample parking, multimodal transportation provides a way to decrease this dependency. Automobile dependency facilitates and often encourages low land use density and single use development while multimodal transportation stimulates higher densities and mixed land uses. Automobile dependency gives little consideration to other modes besides highway while multimodal transportation places a high value on modal diversity and social equity. An effective way to further illustrate the differences between the two approaches is through an explanation of the analysis and modeling done for both.

In conventional transportation planning, transportation models that are commonly used are designed specifically for highway evaluation. These models often consider impacts such as financial costs to governments, vehicle operating costs, travel time, per-mile crash risk, and environmental impacts during construction. With these aspects taken into consideration, conventional planning aims to maximize speed, minimize congestion and travel time, and reduce crash rates. Because the considerations of traditional practice are narrowly confined, however, there are many impacts that are undervalued or

overlooked. These include impacts on non-motorized travel, parking costs, equity impacts, public health impacts, land-use impacts, indirect environmental impacts, and individuals' preferences for other modes. Models that actually take these different elements into consideration and different approaches that encourage alternatives to roadway expansion are newer and less developed. In this way, conventional transportation planning is easily supported while multimodal transportation planning is not as readily accommodated. Nevertheless, transportation planning and the tools associated with the latter approach have been evolving in recent years to better account for alternative modes of transportation and to be more considerate of the impacts of the transportation system on the environment and on public health. The traditional four step transportation planning model, for example, is becoming more mode-sensitive when predicting future travel more accurately. Also, level-of-service ratings, traditionally measured for the roadway, are being considered for modes such as transit, walking, and cycling.

Moving forward with multimodal transportation planning requires looking at transportation in a different way. The analysis will be more complex because of the unique characteristics of each mode. The modes differ in many aspects including costs, speed, convenience, and availability. Accordingly, multimodal transportation planning requires tools that are capable of evaluating the quality of each mode in relation to the other modes. Factors that can be considered for evaluating the quality of non-motorized modes include the following: network continuity, network quality, road crossing, traffic protection, congestion and user conflicts, topography, sense of security, wayfinding, weather protection, cleanliness, attractiveness, and marketing. The factors that can be

considered for evaluating the quality of transit include the following: availability, frequency, travel speed, reliability, boarding speed, safety and security, price and affordability, integration, comfort, accessibility, baggage capacity, universal design, user information, courtesy and responsiveness, attractiveness, and marketing.

### **2.3.2 Transitioning to a Multimodal Approach**

Transitioning to a multimodal approach will require identification of the issues that need to be addressed as well as the development of ways to address them. Some suggestions have already been put forward. A number of these suggestions focus on organizational structure. An organizational structure is defined as “the formal and semi-formal means that organizations use to divide and coordinate their work in order to establish stable patterns of behavior” (Meyer, 2012). These structures are essential in the success of an organization and are typically designed according to the organization’s objectives. Accordingly, they vary greatly from organization to organization. In general, however, they can be grouped into particular categories. The three most common categories are functional, divisional, and matrix (Baker, 2001). Table 2.1 shows some of the strengths and weaknesses of each.

With regard to state DOTs, as put forth in AASHTO’s publication, “Alternative Organizational Processes in State Departments of Transportation”, almost all of the agencies have a divisional structure (2009). Within these divisional structures tasks are typically carried out by function or mode of transportation. In the past, some state DOTs based their tasks on function without regard to modal entities. At the same time, other states recognized separate modal entities and placed them in a position equal and parallel

**Table 2.1: Strengths and Weaknesses of Organizational Structures by Type**

(Adapted from Baker, 2001)

Strengths	Weaknesses
<b>Functional</b>	
<ul style="list-style-type: none"> <li>• Allows economies of scale within functional departments</li> <li>• Enables in-depth knowledge and skill development</li> <li>• Enables organization to accomplish functional goals</li> </ul>	<ul style="list-style-type: none"> <li>• Slow response time to environmental changes</li> <li>• May cause decisions to pile on top, hierarchy overload</li> <li>• Leads to poor horizontal coordination among department</li> <li>• Involves restricted view organizational goals</li> </ul>
<b>Divisional</b>	
<ul style="list-style-type: none"> <li>• Suited to fast change in unstable environment</li> <li>• Involves high coordination across functions</li> <li>• Allows units to adapt to differences in products, regions, and clients</li> <li>• Decentralizes decision-making</li> </ul>	<ul style="list-style-type: none"> <li>• Eliminates economies of scale in functional departments</li> <li>• Leads to poor coordination across product lines</li> <li>• Eliminates in-depth competence and technical specialization</li> <li>• Makes integration and standardization across product lines difficult</li> </ul>
<b>Matrix</b>	
<ul style="list-style-type: none"> <li>• Achieves coordination necessary to meet dual demands from customers</li> <li>• Suited to complex decisions and frequent changes in unstable environment</li> <li>• Provides opportunity for both functional and product skill development</li> </ul>	<ul style="list-style-type: none"> <li>• Causes participants to experience dual authority, which can be frustrating and confusing</li> <li>• Means participants need good interpersonal skills and extensive training</li> <li>• Is time consuming; involves frequent meetings and conflict resolution sessions</li> <li>• Requires great effort to maintain power balance</li> </ul>

to the highway entity. Now, state DOTs are a combination of both modal and functional activities. In this way, most state DOTs have incorporated a multimodal approach by including some or all of the non-highway modes and carrying out specific modal

functions in addition to the basic highway functions. As state DOTs have made these changes to accommodate non-highway modes, many challenges have been introduced. AASHTO (2009) lists some of the key issues related to organizational design that DOTs have faced in the past and continue to face now. Some of these issues are presented below:

- Changing from a modal to a functional structure
- Nature and extent of the planning function
- Finding a home for the non-highway modes
- Inclusion of the maritime/port functions
- Location and prominence of the programming function
- Relationship between central office and the districts
- Adjusting the organization in response to strategic plan implementation
- Increased emphasis on performance measures in the decision-making and resources allocation processes

Organizational structures are critical for adapting to changes in the environment and they are linked to many aspects of an organization. As posited in the literature, “due to declining state and federal revenues and the change in focus and direction of transportation funding priorities, DOTs will likely respond by reorganizing their structures for a new transportation era” (Lindquist, 2009). Overall, “organizational design has a significant impact on the ability of state DOTs to plan, build, operate, and maintain statewide transportation networks that meet the demands of their users” (AASHTO, 2009). While there are strong similarities in state DOT functions especially in regard to highway functions (e.g., design, construction, operation, maintenance), there are also



many differences in terms of the scope of functions as well as the way that state DOTs are structured to carry these functions out.

This same AASHTO report established various recommendations in the following five areas:

- Adapt organization designs to fit particular needs and circumstances
- Develop alternatives and evaluate strengths and weaknesses
- Involve managers and employees as appropriate
- Build ownership and provide support as needed
- Assess the experience and the performance results and modify designs as needed

In moving to a multimodal approach, transportation planning should also (Adapted from Litman, 2011):

- Consider various improvement options
- Consider a comprehensive list of significant impacts
- Carry out comprehensive and marginal multimodal comparisons
- Consider transportation system connectivity and quality
- Consider the quality of accessibility and mobility for those who are physically and economically disadvantaged
- Use comprehensive models that consider various transportation modes

In *Multimodal Transportation Planning at the State Level*, Pedersen highlighted several key transportation issues that practitioners, as well as researchers, will face in statewide multimodal transportation planning (n.d.):

- *Performance-Based Planning* – Statewide transportation planners are to develop measurable goals and assess the progress on meeting these goals. In the case of multimodal transportation, “the focus has shifted from measuring the performance of a single mode to measuring the performance of the entire transportation system”. Accordingly, one of the major challenges has been and continues to be developing objective performance measures that are not mode specific. Performance-based planning and performance measurement will be a major issue in statewide multimodal planning, especially as it is used to guide decisions on investment.
- *Customer-Based Planning and Partnerships* – In the past, stakeholders and users of the system contributed to transportation planning by simply providing comments on the plans developed. Now, however, stakeholders and users take a much more active role in that they are involved in developing the plan and identifying and analyzing issues. Given this change in participation in the planning process, transportation professionals have to make sure that all interests are equitably considered in the planning process.
- *Management and Operations* – There has been a very noticeable shift in the focus on the types of transportation projects. Instead of focus being put on planning and constructing, it has been placed on maintenance and preservation of the existing system.
- *Planning and Programming* – One of the requirements of ISTEA was that long-range plans recognize financial constraints. Even though this requirement was made at the metropolitan level, the state level has adopted financial planning and

programming as an important consideration in planning. This has allowed for more accurate planning on what could more realistically be accomplished during the life of a plan.

- *Multimodal and Intermodal Planning* – “Both ISTEA and TEA-21 intended the federal government, states, and metropolitan areas to level the playing field among the modes by developing solutions to transportation needs without a modal bias, and by using the full range of multimodal and intermodal solutions available.” Although multimodal and intermodal planning have been practiced for a while, the analysis tools and performance measures that make mode-neutral and multimodal evaluation possible are inadequate. What also makes multimodal and intermodal planning difficult is the fact that planning still takes place mostly at the modal level. “Statewide plans often are a compilation of modal plans rather than a series of multimodal and intermodal solutions to identified needs.” Furthermore, modal functions are often fragmented among different transportation agencies. In such cases, state DOTs have difficulty in planning for modes that they have no control over.
- *Goods Movement Planning* – Goods movement planning has received more attention since the passage of ISTEA. For example, access to major intermodal facilities has become an area of focus. Moreover, this increased attention has been accompanied by better data and more resources in this area. Also, there are changes in the economic sphere that affect goods movement (e.g., globalization of the economy, free trade). This and related changes will have a significant implication on freight demand. With these changes, state governments continue to

have difficulty in understanding their appropriate role in providing transportation services.

- *Technology* – Change in technology means change in transportation planning. Technology will increase the availability of data and information that can be used for the transportation planning process. Also, technology will change the nature of trips. The impact of these changes is not fully understood. For that reason, statewide planning processes need to be able to address these issues.
- *Environment and Sustainability* – Sustainability is becoming and will continue to become an important consideration in statewide transportation planning. Environmental impacts will not only be considered during the project development process, but secondary and cumulative effects will also be considered. Notably, land-use/transportation issues, such as sprawl, will become an increasingly important issue.
- *Equity* – The “consideration of how transportation decisions and investments and their effects and benefits are distributed among the diverse socioeconomic groups” will be increasingly important. To do such, the equitable distribution of the benefits and adverse impacts of the transportation investments will have to be assessed. Issues such as mobility and access to jobs, as well as equity in distribution of investments in rural and urban areas, will become more important.
- *Relation to Other Transportation Planning Processes* – Statewide transportation planning requires collaboration with a number of other transportation-related agencies and this collaboration is increasing. In order for collaborative planning to be effective, mechanisms to reach a consensus must be developed.

- *Technical Issues* – The technical tools needed for transportation planning have lagged behind the changes in policy issues. There are many technical issues and research needs that must be addressed. In the context of multimodal, this looks like “developing models that can analyze multimodal alternatives and multimodal investment strategies [and] ...forecasting for modes that have not yet been introduced in the state.”
- *Process Reengineering* – Many states will need to reengineer their process for statewide transportation planning to accommodate a multimodal approach.
- *Staffing Issues* – Issues in statewide transportation planning have increased in complexity. Likewise, the tools to analyze these issues require a greater level of skill and competency. “A major challenge will be to recruit, train, develop, and retain qualified professional staff for state departments of transportation.”

### **2.3.3 Current Multimodal Transportation Planning Practices**

As noted earlier, ISTEA and TEA-21 played a big role in shifting focus to multimodal transportation by requiring states to give “equitable consideration” to other transportation modes besides the automobile during the planning process. This meant that there needed to be a level playing field among transportation modes when considering ways to improve the transportation system. This also meant better connections among different modes. In attempts to meet these requirements, states have taken various approaches. These approaches include changing the organization of the department, improving methods for assessing needs and selecting projects, finding different ways to

fund multimodal transportation planning, and creating innovative methods to increase stakeholder involvement.

Since ISTEA in 1991, several studies have looked at the progress being made towards truly multimodal transportation planning, including a handful of studies that made use of transportation agency (DOT, MPO) surveys.

NCHRP 404 (Transmanagement et al., 1998), highlighted several characteristics common among states that were said to be successful in institutionalizing multimodal transportation. These characteristics include partnerships with MPOs, strong modal advocacy groups within the DOT, educational efforts to teach personnel about multimodal planning and programming, and funding flexibility. Further, this report identified characteristics of successful multimodal planning programs. These characteristics include use of “modally blind” multimodal planning practices, simultaneous analysis of modes and examination of interaction between modes, and use of planning models to aid in the decision-making process.

NCHRP Synthesis 286 (Peyrebrune, 2000) lays out the results of a national state DOT survey that was conducted in 1999 to determine best practices in multimodal planning. This report summarized the findings of the survey in three categories: 1) the affect of the organizational structures on multimodal planning, 2) the multimodal planning practices employed by the state DOTs, and 3) the various techniques for increasing public involvement. Reporting that the majority of states now engaged in multimodal planning, the synthesis draws conclusions regarding which factors influence the successful introduction of multimodal issues into the planning process:

- The decision to embrace multimodal transportation planning has to come from the highest level of decision-making. It also includes a change in the mindsets of individuals and the organizations as a whole.
- Successful multimodal planning is best carried out with a state or regional vision, economic development policy, and sustainability considerations.
- The multimodal planning process should be appropriate for each state given that there is a minimum multimodal level that is appropriate for each state.
- Multimodal planning should be institutionalized throughout the agency such that it is considered not only in planning, but also in design, construction, maintenance, operations, and in modal divisions.
- Funding limitations and issues, organizational and institutional challenges, and the lack of technical tools can be overcome.
- The first step towards multimodal planning is conversation with the stakeholders and the users of the system.
- Data collection and technical processes should be appropriate to the multimodal planning scale.
- The focus of statewide multimodal planning activities has moved from meeting ISTEA requirements to developing appropriate processes for a given state.
- States are struggling with how to provide various mode choices, which has significant fiscal implications.

Fontaine and Miller (2002) also identify a number of factors that have encouraged a shift from more highway-focused to multimodal transportation planning, identifying states that have been recognized as exemplary in carrying out multimodal transportation

planning, and discuss the best practices in 10 of state DOTs. Nine of these DOTs were successfully interviewed. Some of the findings of the study are summarized below.

### Florida DOT

- Multimodal planning at FDOT is done at the central and district offices. FDOT is moving towards an organizational structure in which the modal and planning offices are less separate. FDOT is also improving coordination among its modal offices.
- There are 25 MPOs in Florida, so regional planning throughout the state is well-established. Overall, the MPOs have good methods and techniques for multimodal planning.
- The Florida Transportation Plan has two goals that are directly related to improving multimodal transportation in the state. These goals are to improve the state transportation system in order to improve Florida's economic competitiveness and to create travel choices.
- Florida developed the Strategic Intermodal System (SIS) as a tool to integrate highway planning with planning for other modes.
- FDOT tries to take all modes of transportation into consideration during their planning process, but they are limited because they do not have control over all of the modes.
- FDOT implements performance-based multimodal planning. In the past, level of service was used to evaluate proposed development in order to comply with the statewide growth management legislation. Even though local governments make



their own requirements for transportation systems now, congestion management systems (CMSs) are required in all urban areas. These CMSs are now driving the factors for developing performance measures.

### Maine DOT

- Maine's Sensible Transportation Act of 1992 mandated that multimodal planning be carried out at the state level. The act also emphasized system preservation and road repair over new construction. The act required Maine DOT to do the following:
  - Evaluate alternatives to highway construction and reconstruction.
  - Establish a public participation process that seeks input into transportation planning.
  - Emphasize energy-efficient modes and avoid modes that rely on foreign oil.
- Multimodal planning activities are carried out at the central office. Multimodal planning activities are divided among three offices: the Bureau of Planning, the Office of Freight Transportation, and the Office of Passenger Transportation. The Bureau of Planning performs highway planning activities and coordinates with the other two offices. The Office of Passenger Transportation is responsible for planning for rail, transit, ferry, port, aviation, bicycle, pedestrian, and intermodal facilities. Maine DOT coordinates its multimodal planning activities with local governments through direct communication during projects and through ongoing advisory committees.

- In order to remove barriers to multimodal planning, the [former] commissioner eliminated the offices for different modes and concentrated all passenger transportation planning in one office. Having different modal experts work closely together encouraged a lot of interaction between modes and allowed for more consideration of multimodal projects.
- Initially, there was resistance to multimodal planning. It was noted that the likely reason for the decrease in this resistance was because funds for multimodal planning and projects are not being taken from highway funds. Instead, Maine DOT is using funds from the Federal Transit Administration, the Congestion Mitigation Air Quality Program, and bonds to fund multimodal activities

#### Maryland DOT

- The Maryland DOT is made up of five modal administrations and a semi-independent transportation authority. Maryland DOT owns and operates the state's highway, transit, airport, and port facilities.
- Although, most of the department's resources are concentrated in the Maryland State Highway Administration, all of the modal administrations have a strong identity. The DOT's organization has the following characteristics:
  - *Strong modal units.* All of the modal units have a high level of independence and they all have some planning functions for their particular mode. The central offices of each of the modal units retain the planning role while the district offices have little planning responsibility.

- *Multimodal decision making.* The Maryland DOT developed multimodal planning teams for corridor projects. The teams brought together planners from the different modal administrations, local governments, and MPOs.
- *Flexible funding source.* Maryland has a transportation trust fund that can be used to fund all modes. The only restriction on the use of the flexible funds is that fare box revenues have to cover at least 50 percent of transit operating expenses.
- The statewide transportation plan is coordinated with local plans by getting input from regional planning organizations as well as from representatives of Maryland DOT's modal administrations through regional standing committees. Also, local governments directly review the planning documents.
- One of the issues that Maryland faced was integrating the different modal administrations into the multimodal planning process. Flexible funding through the transportation fund has encouraged multimodalism and eased the competition between the different modal administrations.
- The Maryland DOT has planning responsibilities for all modes. Planning for modes is done at the state level, with the exception of transit. Transit planning is typically carried out at the regional level and then integrated at the statewide level. It was noted that having all of the modes in the same department encourages cooperation.
- Maryland uses a set of multimodal performance measures, including the following:
  - accessibility to economic development areas

- reduction in travel times
- increase in the efficiency of the transportation system
- increase in multimodal options

### Michigan DOT

- Michigan DOT's central office is responsible for all multimodal planning. At the time of the study, the department was developing a plan that would allow urban planning work to be done in the regional offices.
- Michigan's coordination with local governments during the planning process varies based on mode. If the department has direct responsibility for the ownership or operation of a particular mode, then it takes a more active role in planning.
- The Michigan DOT is responsible for including the modes of highway, public transportation, and aviation in its statewide plan. The department is also responsible for planning for rail and ports, but to a lesser extent. The department acknowledges that there are limitations when it comes to planning for modes they do not own, but they still attempt to develop objectives for these modes.
- In response to ISTEA requirements, Michigan developed an Intermodal Management System (IMS) to help integrate the management of air, rail, marine, and non-motorized transportation with the traditional highway mode. The IMS was retained even though the ISTEA requirements were lifted. The IMS is primarily used by the Michigan DOT bureaus to analyze data and identify deficiencies in non-highway facilities to help them make asset management

decisions. The IMS uses performance measures to determine if an asset is deficient.

### Minnesota DOT

- After ISTEA was passed, Minnesota DOT restructured the agency to fully consider all modes. One significant change was the grouping of modal units such that transit, railway, waterway, aeronautics, and highway modes were grouped together under a new division. This brought the department's various modal planning functions under a single administrative group and moved highway operations and maintenance to the district offices. This change has made it easier for planners to consider other modes since there is more interaction between specialists from different modes.
- Multimodal transportation planning activities are performed in the central office. Coordination between state, local, and regional governments is accomplished through participation in state MPO and Regional Development Commission committees.
- The Minnesota DOT is moving toward a performance-based planning process that allows for cross-modal analysis of all modes. Minnesota developed a set of outcome-based performance measures to assess the effectiveness of the system. It was noted that it took a significant amount of time and commitment to develop the performance-based planning program and fully integrate it into the department's culture.

- The Minnesota DOT noted resistance to moving toward a multimodal planning approach. This resistance mostly came from suburban and rural areas that preferred the traditional highway planning process.

#### New Jersey DOT

- New Jersey's statewide transportation plan considers a number of alternatives including investments in highway capacity, transit, and travel demand management (TDM) measures. The plan examines the impact of these different multimodal alternatives on the number of congested vehicle miles traveled (VMT) and vehicle hours of travel.
- All regional transportation plans developed by the MPOs in the state have a multimodal component.
- Transit, pedestrian, and bicycle alternatives are examined at the project level when these alternatives are favorable. NJDOT uses context sensitive design to increase the consideration of pedestrian and bicycle modes on highway projects.

#### North Carolina DOT

- NCDOT's transportation planning activities are based at the central office. Most of the multimodal planning is done within the different modal divisions. At the time of the report, there was discussion about centralizing the planning functions for transit, bicycle, and pedestrian modes within the NCDOT Statewide Planning Branch while allowing ferry, aviation, and rail planning to continue to reside in separate modal divisions.

- NCDOT has incorporated mode choice into its planning models. Logit models, for example, take pedestrian and transit trips into consideration.
- There is improved coordination between the various planning entities in the state. The goal is for the roles and responsibilities of NCDOT divisions, MPOs, and transit authorities to be better delineated.
- NCDOT created the North Carolina Multimodal Investment Network (NCMIN), a tool that helps allocate responsibilities and resources for transportation improvements between the state and the MPO. The NCMIN aims to identify which infrastructure elements are the responsibility of the state and which are the responsibility of the MPO. At the time of the report, the NCMIN had yet to be approved.

#### Oregon DOT

- Most of ODOT's multimodal planning activities are performed at the central office. Other planning activities are performed at the five regional offices. The amount of work performed at the regional offices is proportional to the amount of multimodal traffic in that region.
- Oregon has a Transportation and Growth Management (TGM) program that integrates transportation planning with the statewide land use planning program in order to encourage pedestrian-, bicycle-, and transit-friendly development.
- ODOT considers cars, trucks, rail, transit, pedestrians, and bicycles in their planning process. There are six major documents that make up Oregon's transportation plan. The Oregon Transportation Plan (OTP) is the statewide

transportation plan. There are separate modal plans for bicycles and pedestrians, transit, highways, aviation, and rail. In addition to the statewide plan and the separate modal plans, counties and larger cities are required to develop multimodal Transportation System Plans (TSPs).

- ODOT believes that funding, staff expertise, commitment from the public- and private-sector to multimodal planning, and commitment of the citizens to a multimodal transportation system are important factors for a successful multimodal planning system.
- ODOT developed a set of performance measures for freight and passenger transportation. These performance measures reflect the performance of specific links and facilities.
- ODOT has various modal advisory committees. In 1998, ODOT established the Oregon FAC. The FAC gives ODOT and the Oregon Transportation Commission advice on issues related to multimodal freight mobility in the state.
- ODOT retained their Intermodal Management System (IMS) even though the federal requirement for an IMS was removed in 1995.

#### Washington DOT

- In 1990, the legislature passed the Growth Management Act, which mandated that the transportation system be coordinated as a single system. This was achieved by forming Regional Transportation Planning Organizations (RTPOs) throughout the state. RTPOs carry out planning for the development and use of facilities in the transportation system.



- In 1993, legislation was passed that required WSDOT to prepare a policy plan, a statewide multimodal transportation plan, and mode-specific plans. This legislation also led to the following:
  - *Creation of the Office of Urban Mobility* – This office increased coordination between WSDOT, its modal offices, and regional planning bodies.
  - *Creation of Public Transportation and Rail Division and Freight Mobility and Economic Partnerships Division* – These two divisions advocate for their modes in the transportation planning process.
  - *Expansion of the role of regional offices* – These regional offices, along with the MPOs and RTPOs, are required to develop a multimodal regional transportation plan.
- In changing to a multimodal agency in a rapid time frame, WSDOT has experienced internal confusion regarding the roles of the branches in the department. There were also issues with coordination.

#### Wisconsin DOT

- WisDOT's central office is responsible for carrying out multimodal planning activities. WisDOT uses on-on-one meetings and a series of advisory committee meetings to help coordinate the department's plans with local and regional plans.
- In order to better integrate freight into the multimodal statewide planning process WisDOT incorporated simulations of freight flows into the state's multimodal transportation plan. The process simultaneously analyzes all modes and examines

the interactions between modes. The process also created a Freight Expert Panel and led to the implementation of a number of innovative practices.

Recommendations for Virginia were made based on the findings from this study. Virginia itself, however, is noted as a state that is successful in multimodal transportation planning. Some of the multimodal characteristics of the state include the following:

- Virginia has an Office of Intermodal Planning and Investment (OIPI) which is located within the Office of the Secretary of Transportation. The office coordinates the multimodal and intermodal planning for transportation modes in the state. OIPI is made up of the Governor and the General Assembly, the Secretary and Deputy Secretary of Transportation, a multimodal advisory committee, and the following agencies:
  - Department of Rail and Public Transportation (DRPT)
  - Department of Aviation (DOAV)
  - Department of Motor Vehicles (DMV)
  - Metropolitan Planning Organizations (MPOs)
  - Virginia Municipal League (VML)
  - Virginia Department of Transportation (VDOT)
  - Virginia Port Authority (VPA)
  - Federal Highway Administration (FHWA)
  - Virginia Association of Planning District Commissions (VAPDCs)
  - Virginia Association of Counties (VACo)

- Virginia’s transportation plan, VTrans, is a “statewide long-range multimodal policy plan that establishes the vision, goals and investment priorities for the Commonwealth’s transportation systems” (OIPI, 2012). This plan provides overall guidance to the state transportation agencies that make up the Office of the Secretary of Transportation.

In addition to the states mentioned above, the Massachusetts DOT is cited as a state that is performing well in multimodal planning.

- MassDOT was created by the merger of a variety of transportation agencies: Executive Office of Transportation and Public Works, the Massachusetts Turnpike Authority, the Massachusetts Highway Department, the Registry of Motor Vehicles, the Massachusetts Aeronautics Commission, and the Tobin Bridge. The Massachusetts Bay Transportation Authority and Regional Transit Authorities are overseen by MassDOT.
- MassDOT has four divisions: highway, rail and transit, aeronautics, and Registry of Motor Vehicles. This new organizational structure was intended to “foster a better multimodal perspective on transportation decision-making and planning in Massachusetts, and to provide an organizational structure more conducive to integrated transportation investment decision-making.”

Another report, “Assessing Intermodal Transportation Planning at State DOTs” (Goetz et al., 2004), presented the findings of a project that focused on the progress that state DOTs had made in implementing intermodal planning as a response to the requirements of ISTEA and TEA-21. In particular, it consisted of interviews,

questionnaires, and surveys of transportation leaders in different state transportation agencies as well as in-depth analyses of the transportation planning processes at seven different state DOTs – Alabama, Arizona, Colorado, Florida, Louisiana, Mississippi, and Texas. Quantitative and qualitative feedback was received about each of these states.

The quantitative aspect gauged the level of intermodal planning, based on a 1 to 5 ranking scale. Respondents tended to rate the intermodal planning efforts of state DOTs from about 2 (to a little degree) to slightly over 3 (to some degree). The average ratings ranged from a low of 2.10 (Arizona) to a high of 3.22 (Florida). In regard to the qualitative results, there were consistent themes among the responses. Many respondents complained about the lack of funding in transportation in general and in intermodal transportation in particular, despite the growing number of multimodal funding programs. “Many respondents claimed that the state DOTs are still largely focused on roads, and that there is much less investment in transit, bicycle, pedestrian, and intermodal connectors” (Goetz et al., 2004). In addition to this sentiment related to funding, many respondents believed that even though comprehensive plans are explicitly intermodal, the mindset within state DOTs is still largely road-oriented. Lack of cooperation and coordination with other stakeholders, especially MPOs, was also mentioned as a barrier. Furthermore, while institutional structures have changed to reflect the changing role of DOTs, organizational structures have not always followed suit. As noted in the report, there are some DOTs that have formally integrated intermodal planning into their organizational structure but there are others that still have in place the old organizational structures that were designed to address the issues of roadway and highway travel. Overall, the project concluded that since ISTEA, “some states have more fully embraced

the intermodal initiatives and have developed exemplary plans and programs. Others have lagged in adopting an intermodal approach to planning” (Goetz et al., 2004).

## **2.4 Synthesis**

In the evolution of transportation legislation, there has been a conscious move towards a more multimodal and sustainable system. Though the legislations have shifted in focus over time, emphasis has continually and increasingly been placed on certain areas. These areas include:

- Safety and security
- Mobility and accessibility
- Efficiency and effectiveness
- Performance-based planning
- Integration and connectivity of modes
- Public involvement
- Quality of life
- System preservation and enhancement
- Financial planning
- Flexible funding
- Economic vitality
- Coordination between various transportation-related agencies (e.g., state DOTs, MPOs, transit agencies)
- Coordination of transportation with land use and urban development
- Environmental protection

In order to reach the goals set forth in these areas, states are changing their approach to planning. The states mentioned in this paper in particular have made many changes in their organizational structures, and implemented a number practices in order to be more effective in multimodal transportation planning. These states have:

- Restructured their organizations in order to improve modal coordination within the department
- Developed multimodal tools that foster the integration of modes into the transportation planning process
- Created flexible funding structures and considered other funding options
- Implemented performance-based planning
- Designed more extensive public involvement processes
- Coordinated with land-use agencies
- Created modal advisory committees
- Considered alternatives to highway construction
- Coordinated with local governments and MPOs

While many states have employed some of these same practices, those that have been more successful in multimodal transportation planning have been intentional and innovative. In doing so, they have found ways to overcome barriers such as modal competition, urban-rural clash, internal and external coordination issues, limited ownership of modes, and departmental culture incompatibilities. Even though each of these states has its own unique approach to multimodal transportation planning, they

share some common characteristics. This literature review gives an idea of what these common characteristics are. Going forward, this research looks more in depth at certain characteristics in order to analyze their connection to successful multimodal transportation planning.

## **CHAPTER 3**

### **ANALYSIS APPROACH**

#### **3.1 Organizational Structure Analysis**

The purpose of this analysis is to examine how multimodal planning is integrated into the organizational structure of state DOTs. Initially, the organizational charts for all 50 state DOTs were obtained. These were obtained by searching online for the most recent charts that could be found on the departments' websites. For the cases in which an organizational chart could not be found on a state DOT's website, the charts were obtained from external online sources. In both cases, many of the organizational charts did not accurately or completely reflect the actual structure of the organization. For this reason, the information from the website of each state DOT was investigated in order to compare what was on the website with what was illustrated in the organizational chart. If the information in the chart and the information on the website conflicted, further research was carried out and correspondence with the DOTs was made in order to gain a more accurate understanding of how the department was organized. After the information was collected, a classification system for the organizational structures was developed. This involved using the obtained information to identify the presence or absence of a multimodal division and separate modal divisions as well as the location of those divisions within the structure.



### **3.1.1 Multimodal Division or Equivalent**

The working definition of “multimodal division” is a division that carries out explicitly stated multimodal functions for both passenger and freight transportation. This includes divisions that explicitly state “multimodal”, “intermodal”, “modal”, or “integrated” in their title but are not exclusive to freight transportation. It also includes divisions that do not explicitly state the above mentioned terms in their titles but do carry out explicitly stated multimodal functions. The following questions were used to guide the analysis of multimodal divisions:

- Does the structure have a multimodal division?
  - If so, where is the division located within the structure?
  - Is the multimodal division incorporated into the planning division?

### **3.1.2 Separate Modal Divisions**

Separate modal divisions for highway, aviation, rail, transit, marine, and bicycle and pedestrian were considered in this analysis. The following questions were used to guide the analysis for separate modal divisions:

- Does the structure have separate modal divisions?
  - If so, where are the divisions located within the structure?
  - Are the separate modal divisions incorporated into the planning and multimodal divisions?

### 3.1.3 Division Level

After “locating” the multimodal and separate modal divisions, each division was assigned a level within its respective organizational structure. Several approaches were used in order to determine how the level would be assigned. Each of these approaches was intended to develop a hierarchical classification system that could be used to identify the level of the divisions in relation to the other entities in the organizational structure and in relation to the divisions of other state DOTs. The approaches are briefly explained below:

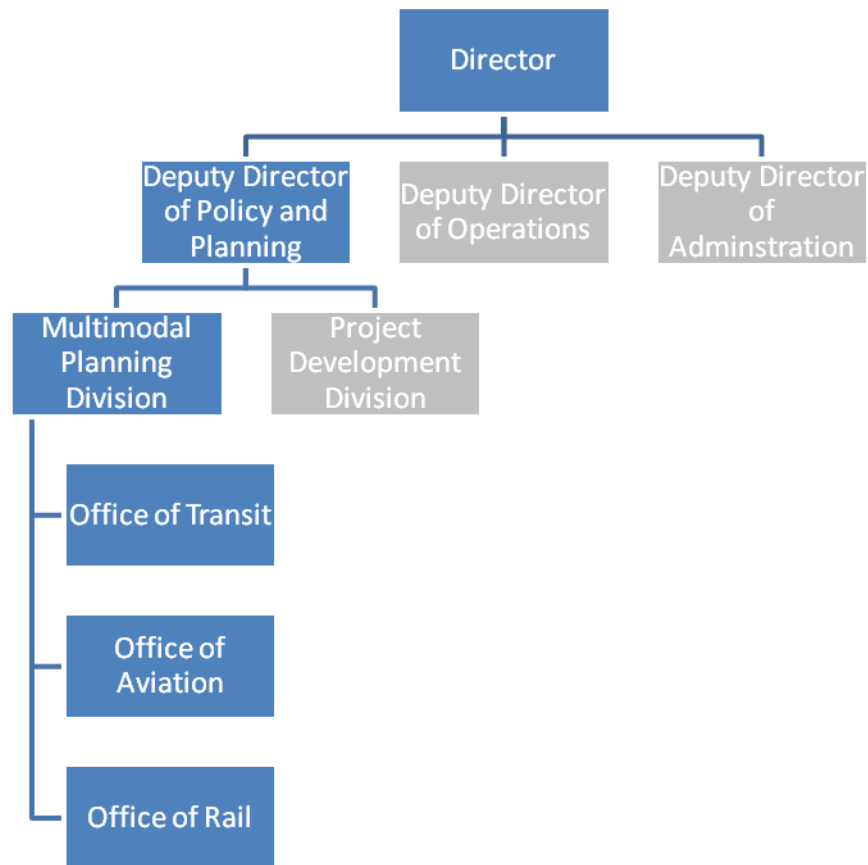
- *Approach #1* – The terms that are used to describe the entities (e.g., director, secretary, division, office, bureau) that make up a state DOT vary from state to state. In order to develop consistency across all of the different organizational structures, four terms (Director, Division, Office, and Section) were standardized. “Director” refers to a deputy director, assistant secretary, or the like who oversees a broad function of the DOT. A “Division” is an entity that carries out work in a specific functional area. “Office” is an arm of the division and “Section” is a unit or program within the office. Based on the example of the organizational chart in Figure 3.1, Deputy Director is the “Director”, Multimodal Planning Division is the “Division”, and Transit Office is the “Office”. The “Section”, which is not typically shown in the organizational chart, may be an entity such as Transit Programs. The multimodal and separate modal divisions within the DOTs were assigned one of these four terms based on how they fit the description.
- *Approach #2* – For this approach, level one was identified as the first level in the organizational structure at which the span of control was greater than one. In the

figure below, this level would be that of the Deputy Directors. There are three Deputy Directors under the Director, so the span of control is three. The other entities would be assigned levels based on their relation to the Deputy Directors. For example, Deputy Director of Policy and Planning is level one and Multimodal Planning Division is level two.

- *Approach #3* – In this approach, the position of the department head (Director, Secretary, or Commissioner) was considered to be level one. All of the other entities were assigned levels based on their relative position to the department head. In the organizational structure shown below, Director, Deputy Director of Policy and Planning, and Multimodal Planning Division would be assigned level one, level two, and level three, respectively. Office of Transit, Office of Aviation, and Office of Rail would all be assigned level four because they are all at the same level under Multimodal Planning Division.

The organizational chart shown in Figure 3.1 is simplified to better illustrate the three approaches. The actual charts are more complex and they all vary significantly from each other. For approach #1, all of the terms were not applicable to all of the organizational structures. Some of the DOTs, for example, do not have deputy directors (which would be assigned the term of “Director”). Moreover, the DOTs have varying numbers of levels, so the four terms did not accurately reflect all of the organizational structures. For approach #2, the first level at which the span of control was greater than one was not always at the level of the deputy directors. This made it difficult to fairly compare the organizational structures. The approach that was ultimately used for the analysis was approach #3. This approach involved the least amount of subjectivity. It

assigned levels based on the chain of command which starts at the head of the department.



**Figure 3.1 Basic Example of a State DOT Organizational Chart**

### **3.2 Statewide Multimodal Survey**

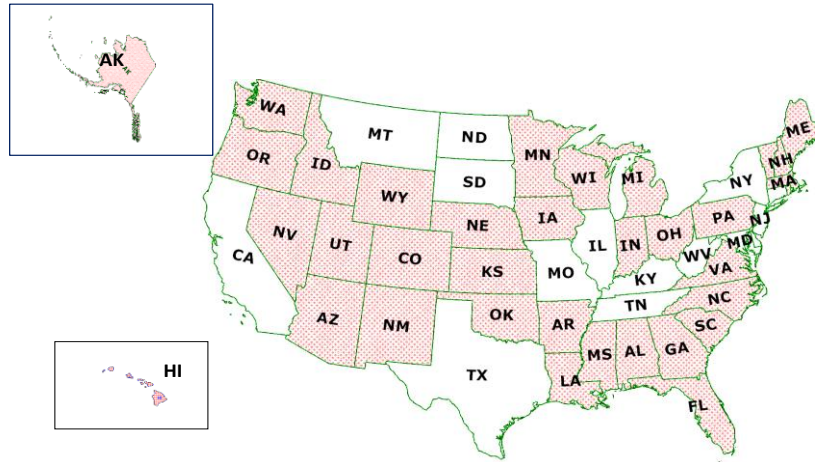
While the first part of the analysis focused on organizational structure, this part considered other factors of multimodal planning that were assessed through a statewide multimodal survey. The survey was carried out as a part of a larger project for the Georgia Department of Transportation (GDOT) from which this project stems. This

section explains the survey methodology and how the survey results were used for this project.

### **3.2.1 Survey Methodology**

The statewide multimodal survey was designed using *SurveyMonkey*, an online survey development tool. After the questions were formulated and the survey was completed, the survey link along with a brief explanation of the purpose of the survey was e-mailed to the main contacts of the multimodal planning division (or the closest equivalent) at each of the 50 state DOTs. The survey was also sent to other select transportation agencies. The survey asked questions regarding modal responsibility, multimodal planning and practices, funding, and staffing. These questions were given in the forms of free response, matrix questions, selective response, and qualitative ranking (on a scale from 1 to 5). The full survey, which is comprised of 19 questions, can be found in Appendix A.

Survey responses were collected from April 27<sup>th</sup> through August 31<sup>st</sup> of 2012. This resulted in a total of 40 surveys. In order to be consistent, only the responses from state DOTs were used. Accordingly, a total of 35 usable responses were received. The shaded states shown in Figure 3.2 indicate the state DOTs that responded to the survey.



**Figure 3.2: Map of States that Responded to Survey**

### **3.2.2 Use of Survey Results**

Survey responses from each of the 35 participants were evaluated in order to assess the current state of multimodal planning within state DOTs. This assessment looked at the connection between various characteristics of state DOTs and successful multimodal transportation planning practices. More specifically, the analysis focused on the extent to which state DOTs conduct multimodal planning and how this is influenced by certain characteristics, funding in particular. Additionally, the analysis allowed for an evaluation of the relationship between these characteristics and aspects of the organizational structure that were examined in the first part of the analysis.

### **3.3 In-Depth Case Studies**

For the last part of this thesis, in-depth case studies of state DOTs were carried out. This part is in line with the GDOT project. One of the main parts of the GDOT project was to research and report on state DOTs that were noted as being successful in multimodal transportation planning. These states were selected based on literature and on

common industry perspectives. Furthermore, the states that were selected responded to the statewide multimodal survey. These states include Florida, North Carolina, Oregon, and Virginia. Maryland and Massachusetts were also considered and researched, but did not respond to the survey and were not included in the report for GDOT. For this thesis, however, those states are included.

### **3.3.1 Sources of Information**

Information about each of these state DOTs was obtained from interviews (in person and over the telephone), emails and telephone calls, state DOT websites, and transportation-related documents.

- *Interviews* – Prior to the interviews a set of questions was drafted by the project staff and refined by staff from GDOT’s Intermodal Division. Once the questions were refined, the questions were e-mailed to the interviewees from the DOTs. During the interviews, at which at least two project staff members were present, the questions were used to guide the conversation. This allowed for open-ended conversation on topics such as planning and investment, statewide transportation plans, organizational barriers, and funding.
- *E-mails and Telephone Calls* – E-mail and telephone correspondence was made with DOTs in order to get staffing information. Correspondence was also made to get clarification on aspects of the organizational structure that were not included in the organizational chart and were not clearly explained on the DOT’s website.

- *State DOT Websites* – The state DOT websites contained a significant amount of information. The information from these websites that was used for the case studies includes agency history, organizational charts, division responsibilities, projects, and programs. The websites also provided access to various planning documents.
- *Transportation-Related Documents* – State DOT documents such as planning documents and budget reports provided relevant information in relation to multimodal planning. In addition to state DOT documents, there were a number of academic papers that contained information on the state DOTs in regards to organizational structures, planning practices, and multimodal efforts.

### **3.3.2 Overview of In-Depth Case Studies**

Much of the research that was obtained about these states for the GDOT project was used for the in-depth studies for this thesis. The case studies reported here, though, put more emphasis on organizational structure and funding and how each of those aspects have evolved over time in order for the state to better carry out multimodal planning. Additional information from the above mentioned sources was obtained to get more information for those aspects.

The case studies, which are presented in Chapter 5 of this paper, are organized into four parts:

- Brief Overview
- Organizational Structure



- Funding
- Example Multimodal Efforts

*It should be noted that none of the individuals that were interviewed or contacted are identified in these case studies. Furthermore, the information in the case studies is expressed from the perspective of the project staff and does not necessarily reflect the views of the individuals or of the DOTs.*

## **CHAPTER 4**

### **RESULTS – NATIONWIDE SURVEY**

The results of this thesis and the accompanying discussion are based on available information that was obtained through the various research methods discussed in the previous chapter. Accordingly, the information may not be exhaustive. However, the results do offer a solid representation of the current practices of state DOTs. In this chapter, the major findings are presented from the organizational structure analysis and the 2012 nationwide survey of state DOTs multimodal planning activities. The results of the detailed state DOT case studies are presented in Chapter 5.

#### **4.1 Organizational Structure Analysis<sup>1</sup>**

For the organizational structures, it should be noted that there are some state DOTs that do not have multimodal or particular mode-specific divisions, but do have multimodal or mode-specific advisory committees. In order to remain consistent in comparing state DOTs, these committees were not included in the analysis. However, they are mentioned because their presence or absence may have significant implications for statewide multimodal planning. There is one DOT, in particular, that does not have a multimodal division but does have the equivalent of a multimodal advisory committee that carries out multimodal planning. Mode-specific advisory committees are also

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<sup>1</sup> Information regarding organizational structures was obtained from the DOTs' websites. These sources are listed in Appendix B.

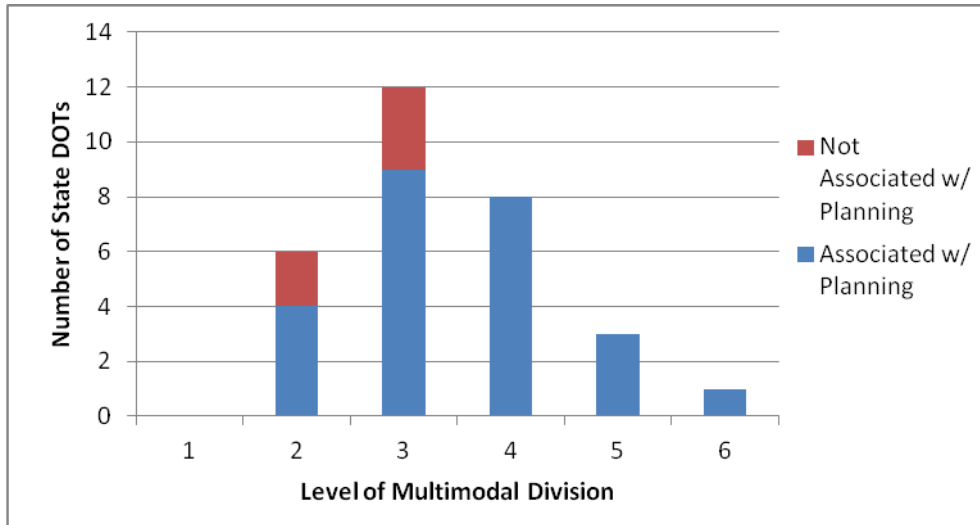
common. For bicycle and pedestrian, in particular, there are at least 21 states that have active bicycle and pedestrian advisory committees; some of these are part of the DOTs' structures while the others are not. In both cases, the committees do receive staff support and/or resources from the DOTs.

#### **4.1.1 Multimodal Divisions**

As stated earlier in the report, the working definition of a “multimodal division” is *“a division that carries out explicitly stated multimodal functions for both passenger and freight transportation. This includes divisions that explicitly state “multimodal”, “intermodal”, “modal”, or “integrated” in their title but are not exclusive to freight transportation. It also includes divisions that do not explicitly state the above mentioned terms in their titles but do carry out explicitly stated multimodal functions.”* Based on this definition, there are 30 state DOTs that have a multimodal division in their organizational structure. Figure 4.1 shows the distribution of the 30 multimodal divisions based on their level within their respective organizational structures. It also shows the number of multimodal divisions in relation to whether or not they are associated with the planning division within their respective state DOT.

The major findings about the level of multimodal divisions include the following:

- There are no multimodal divisions located at level 1 of the organizational structure. This is expected since level 1 is the level of the department head. The highest level at which a multimodal division is located, then, is level 2 and the lowest level is level 6.



**Figure 4.1: Number of Multimodal Divisions by Level**

- Level 3 has the greatest distribution of multimodal divisions.
- The multimodal divisions at levels 2, 3, and 4, account for 87 percent or 26 of the 30 multimodal divisions. All except one of these 26 divisions is shown in the organizational chart. Alternatively, none of the four multimodal divisions at levels 5 and 6 are shown. Multimodal divisions that are lower in the organizational structure tend not to be shown on the organizational chart.

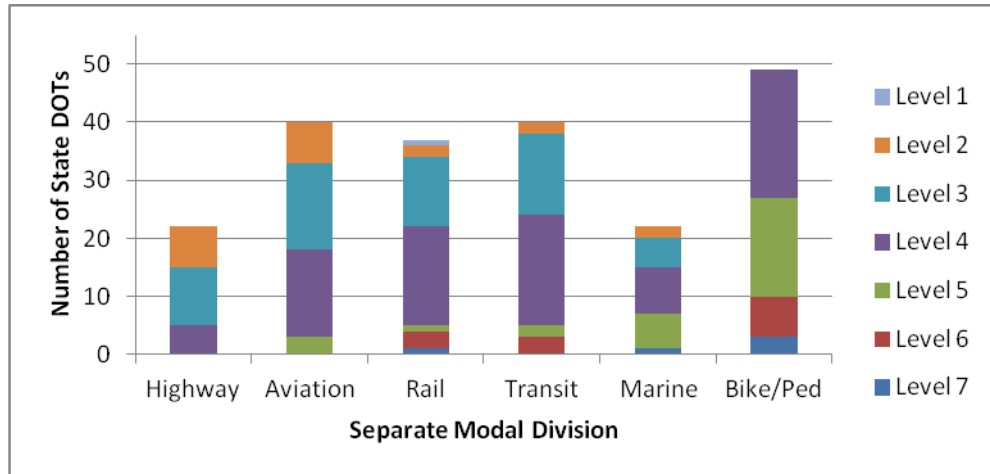
In addition to the level of the multimodal divisions, the analysis provided information regarding the association between a state DOT’s multimodal division and planning division. “Associated with planning” means one of the following: 1) the multimodal division and planning division are the same entity, 2) the multimodal division and planning division are under the same immediate oversight, or 3) the multimodal division is under the planning division.

- Based on those terms, 25 out of the 30 multimodal divisions are associated with their respective DOT's planning entity.
- Of the five divisions that are not associated with planning divisions, two of them are at level 2 and three of them are at level 3 of the organizational structure.

#### **4.1.2 Separate Modal Divisions**

The separate modal divisions that were considered in this analysis include highway, aviation, rail, transit, marine, and bicycle and pedestrian. In regards to bicycle and pedestrian, the extent to which state DOTs carry out planning varies greatly. However, these two modes are typically incorporated into the organizational structure through the Bicycle and Pedestrian Program, which is required by federal legislation. The other modes, in contrast, are primarily incorporated through divisions even though they may have accompanying programs. For this reason, bicycle and pedestrian entities are distinguished from the other modal divisions which will be referred to throughout this section as “separate modal divisions”.

Given all of the “separate modal divisions”, there are three states for which information about separate modal divisions could not be found. Of these three DOTs, one had a multimodal division. The other 47 state DOTs have at least one separate modal division in their organizational structure and altogether the state DOTs have an average of three separate modal divisions. Figure 4.2 shows a more detailed distribution of these separate modal divisions by level.



**Figure 4.2: Distribution of Separate Modal Divisions by Level**

The major findings related to level include the following:

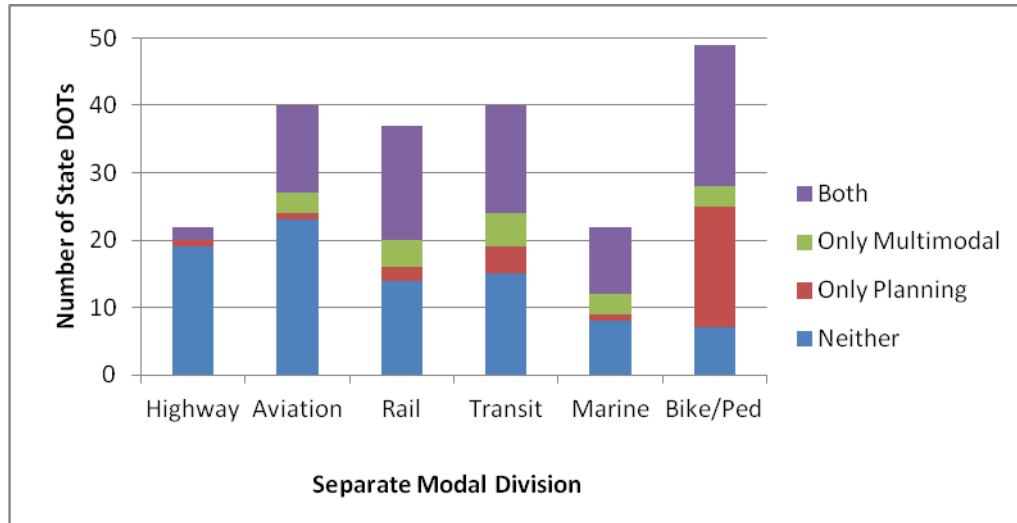
- Out of the 22 state DOTs that have highway divisions, 12 out of those 22 have other separate modal divisions that are all at the same level as the highway division. The other 10 are higher than one or more of the other separate modal divisions within their respective DOTs.
- Out of the 40 states that have aviation divisions, there are 30 that have their aviation division at the same level as their rail, transit, and marine divisions.
- Of the 19 states that have both a highway and aviation division, 13 of those are on the same level as each other. The remaining six states have aviation divisions that are one level lower than their respective highway division. For rail, transit, and marine divisions the levels are up to 5 levels lower than their respective highway division.
- Highway and aviation divisions are, on average, at higher levels in the organizational chart than the other modes. The average level at which the

highway and aviation divisions are located is level 3 while the average for rail, transit, and marine divisions is level 4. Accordingly, highway and aviation have the largest proportions of divisions that are shown in the organizational chart.

- For states that have more than one separate modal division, there are 29 states with multiple modal divisions that have all of their modal divisions on the same level. When highway divisions are excluded, this number becomes 34.
- For the 35 cases in which a state DOT has rail and transit divisions, those divisions are always (with one exception) at the same level. The exception is with a state that has an independent rail agency within the DOT.
- The levels of the bicycle and pedestrian entities range from 4 to 7 and the average level is 5. Out of the 19 bicycle and pedestrian entities, four of those are shown in the organizational chart and only one of those is at the same level as the highway division.

Information regarding planning and multimodal was also considered. There are some separate modal divisions that are associated with a multimodal division, a planning division, or both. There are also some divisions that are not associated with either. Figure 4.3 shows the breakdown based on the type of modal division. The major findings include the following:

- The majority of the highway divisions (19 out of 22) and aviation divisions (23 out of 40) are not associated with either multimodal or planning.
- The rail, transit, and marine divisions are associated with multimodal or planning within the majority of the DOTs.

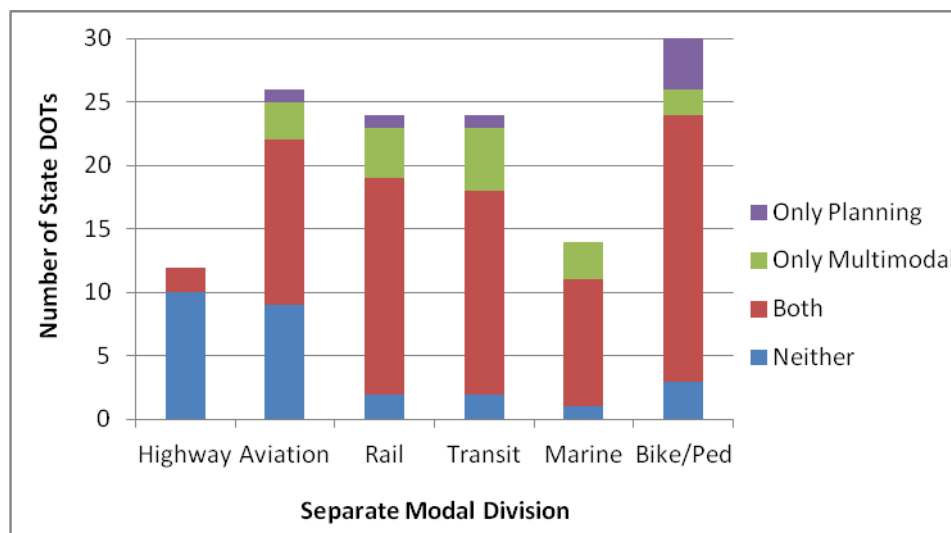


**Figure 4.3: Separate Modal Divisions – Association with Planning and Multimodal**

- 49 state DOTs currently have a bicycle and pedestrian coordinator that carries out the Bicycle and Pedestrian program. The programs are typically housed as a unit or office under a larger division. For 42 out of 49 of the programs, these divisions tend to be planning, multimodal, or multimodal planning divisions. The other seven programs are typically housed under a highway or highway-related division.

When considering the subset of the 50 state DOTs that have a multimodal division, the distribution levels of the separate modal divisions do not change much. However, the absence or presence of a multimodal division has significant implications for whether or not the separate modal divisions are associated with planning or multimodal. Figure 4.4 illustrates the association of these separate modal divisions with the other divisions.





**Figure 4.4: Separate Modal Divisions – Association with Planning and Multimodal (only considering DOTs with Multimodal Divisions)**

The main observations when considering only the state DOTs with multimodal divisions include the following:

- All except for one of the state DOTs with multimodal divisions have one or more separate modal divisions.
- All 12 of the state DOTs that have both highway divisions and a multimodal division have those two divisions on the same level. Still, only two of the highway divisions are associated with multimodal planning divisions. The other 10 are not associated with either multimodal divisions or planning divisions.
- The proportions of divisions that are associated with either multimodal or planning increase when considering only state DOTs with multimodal divisions.
  - Highway: 14 to 17 percent
  - Aviation: 42 to 65 percent
  - Rail: 62 to 92 percent

- Transit: 62 to 92 percent
- Marine: 64 to 93 percent
- Bicycle and Pedestrian: 86 to 90 percent

### **4.1.3 Discussion**

Though there are a significant number of state DOTs that have highway-specific divisions, the majority of them do not. However, many of the divisions within organizational structures pertain to highway related functions even though they are not explicitly designated as “highway”. Furthermore, of the state DOTs that do have a highway division, these divisions are typically at higher levels than the other modal divisions. They also tend not to be associated with these other modal divisions or the multimodal and planning divisions. Collectively, these findings support the notion that most DOTs are inherently highway focused.

However, most DOTs have incorporated other modes into their organizational structures through various methods. The organizational structure analysis showed that the majority of state DOTs have a multimodal division. A larger majority of state DOTs have one or more separate modal divisions as well as bicycle and pedestrian entities. These entities all have a stated purpose and work with other related entities within their departments in order to carry out their goals. Most of the multimodal divisions, for example, are associated with their respective planning divisions. There are also a significant number of separate modal divisions that are associated with planning, multimodal, or both. That is not to say that the divisions that are not associated with planning divisions do not have planning functions. Additionally, a state DOT not having

a specified multimodal division or a particular separate modal division does not equate to that state DOT not having some level of responsibility in those areas. Accordingly, the analysis did not point to a particular type of organizational structure as being better or worse than others in relation to multimodal planning. Nevertheless, certain aspects of the organizational structure, including the presence or absence of certain entities, the level of an entity in an organizational structure, and the interaction between these entities all have significant implications for multimodal planning within a particular DOT. The statewide multimodal survey and the case studies look more into these implications.

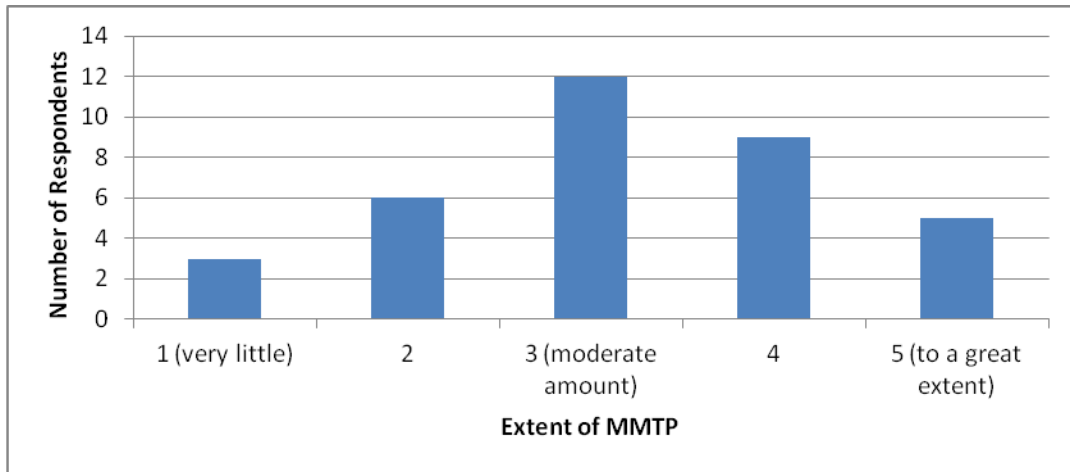
## **4.2 Statewide Multimodal Survey**

While the organizational structure analysis considered all 50 states, this part of the analysis focused on the 35 states that responded to the 2012 statewide multimodal survey. The responses were evaluated in order to assess the perceived extent of multimodal planning in the state DOTs. The responses were also evaluated in order to observe the various characteristics that influence the success of multimodal planning, focusing mainly on funding. Such an analysis allows for a more in-depth look at the current state of multimodal planning and considers the relationships between the extent of multimodal planning, organizational structure, and funding.

### **4.2.1 Extent of Multimodal Planning**

There were three questions in the survey that explicitly asked the respondents about the extent of multimodal planning within their agency. These questions were asked using a five point scale, where 1 was the lowest and 5 was the highest. Of the 19

questions put to respondents (See Appendix A) question #6 asked about the extent to which an agency conducted multimodal planning that examines different modal strategies. As shown in Figure 4.5, the two ratings with the highest number of respondents were 3 and 4, respectively. That is, the majority of the respondents felt that their agency was conducting multimodal transportation planning to a moderate or very good extent. A similar sentiment was reflected in the responses to question #9 (“In your opinion, over the past 10 years, to what extent has your agency been incorporating a more multimodal approach into transportation planning and programming?”). Only six respondents rated the progress as less than moderate (1 or 2).



**Figure 4.5: Responses to Question #6 (In your opinion, to what extent does your agency conduct multimodal transportation planning that examines different modal strategies among the state-responsible modes?)**

The responses to question #7 (which is “To what extent are different modal options compared to one another in the planning/programming process to determine the most cost effective investment for the state?”) showed that even though the respondents

thought that their agencies were making good progress towards conducting multimodal transportation planning, most respondents nevertheless believed that their agency was only to a limited extent comparing different modal options to determine the most cost effective investment. Most of the respondents rated their state DOTs at a 1, 2, or 3 for question #7. Despite question #7 receiving lower ratings than questions #6 and #9, the respondents answered consistently for all three questions. This consistency is shown in Table 4.1. For respondents who rated their state at 5 for question #6, they rated their state between 3 and 5 for question #7 and between 4 and 5 for question #9.

**Table 4.1: Consistency of Responses to Questions on Extent of Multimodal Planning**

Rating for Question #6	Rating for Question #7		Rating for Question #9	
	<i>Range</i>	<i>Average</i>	<i>Range</i>	<i>Average</i>
1	1 to 2	1.33	1 to 2	1.33
2	1 to 3	2.00	1 to 4	3.17
3	1 to 3	2.17	2 to 5	3.33
4	2 to 4	3.11	3 to 5	4.11
5	3 to 5	3.60	4 to 5	4.80

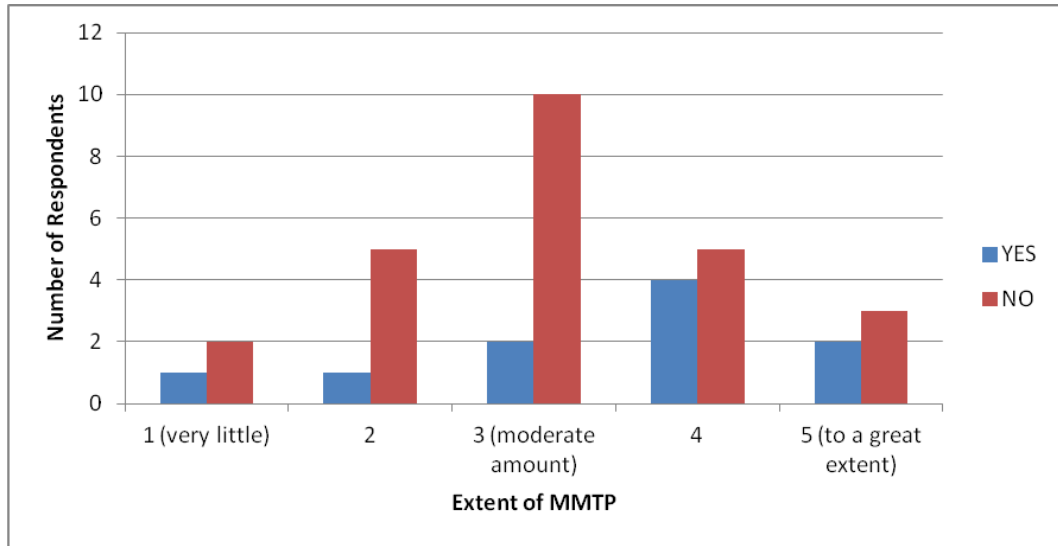
In addition to these findings, the responses to these three questions were evaluated in relation to the information obtained from the organizational structure analysis. Out of the 35 state DOTs that responded to the survey, 21 had multimodal divisions. This is consistent with the proportion of all of 50 state DOTs that have a multimodal division (60%). Collectively, states with multimodal divisions tended to have slightly higher ratings for questions #6, #7, and #9, in comparison to the states without multimodal divisions. There were five respondents that rated their state DOTs at a 5 for question #6. All five of those states have a multimodal division. However, there were a significant

number of states with multimodal divisions that rated their state DOTs at a 1, 2, 3, or 4. So despite the aforementioned correlation, the presence or absence of a multimodal division did not overwhelmingly influence how well the respondents felt that their state DOT was performing in carrying out multimodal planning. When it comes to separate modal divisions, neither the absence or presence nor the level of these divisions seems to be correlated with the perceived extent of multimodal planning.

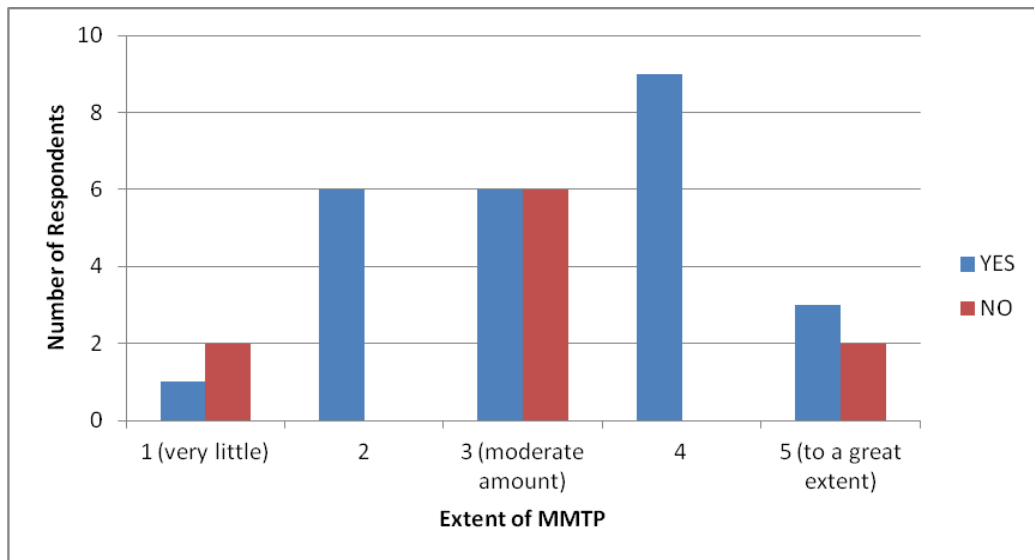
#### **4.2.2 Funding**

There is much that points to funding as the main factor that influences the extent to which state DOTs conduct multimodal transportation planning. This relationship is investigated by comparing the perceived extent of multimodal planning with the responses to survey questions on funding. The first of these questions (question #10) asked whether or not the state had a multimodal transportation trust fund (TTF). The second question (questions #11) was asked whether a DOT had separate funding programs for non-highway modes. Figures 4.6 and 4.7 show the extent of multimodal planning in relation to the responses to these questions.

Given the 10 states that have a TTF, 7 of them (70%) rated the extent of multimodal planning at a 4 or 5. Only 8 out of the 25 states (32%) that do not have a TTF gave those same ratings. There were similar findings when the extent of multimodal planning was compared to states with separate funding programs. There were a total of 25 states responding “yes” to having separate funding programs for non-highway modes.



**Figure 4.6: Extent of MMTP in Relation to Responses to Question #10 (Does your state have a transportation trust fund whose funds can be used for any mode of transportation?)**



**Figure 4.7: Extent of MMTP in Relation to Responses to Question #11 (Does your state have separate funding programs for non-highway modes, such as a freight rail investment program, ports program, airport improvements, etc?)**

Twelve (12) out of those 25 states (48%) rated the extent of multimodal planning at a 4 or 5. Only 2 out of the 10 states (20%) that do not have separate funding programs rated the extent of multimodal planning at a 4 or 5. Furthermore, all of the states that have a TTF, except for one, have separate funding programs for non-highway modes.

In relation to the findings on organizational structures described in Section 4.1, 9 out of the 10 states that have a TTF also have a multimodal division within their organizational structure. For the 25 states that do not have a TTF, 12 of them have a multimodal division. And while all of the DOTs that have a separate modal division have separate modal funding programs, there are also 10 states that specify separate funding programs for certain modes that do not have separate modal divisions within their organizational structures.

#### **4.2.3 Critical Issues and Success Factors**

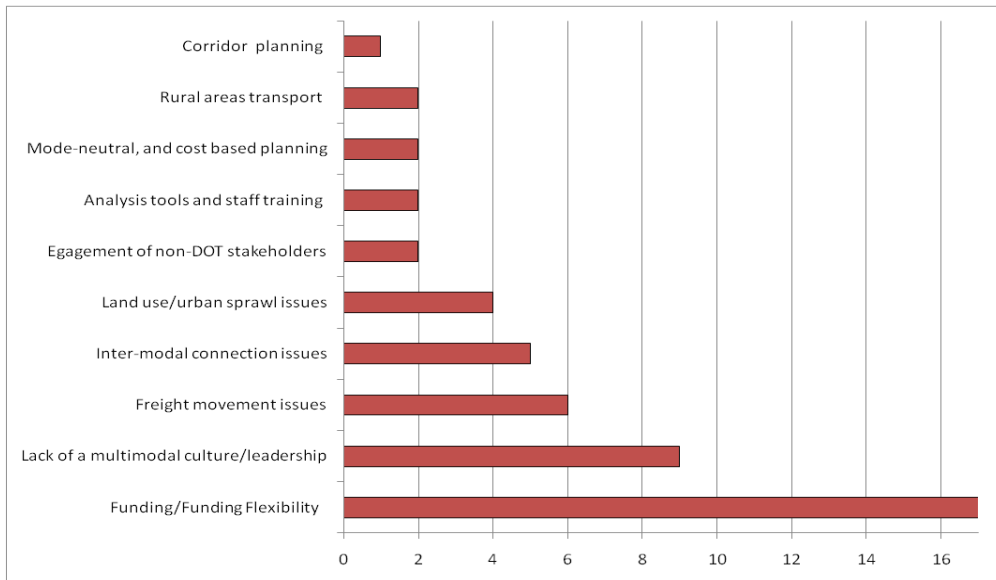
In addition to funding, there are a number of other factors that influence the extent to which state DOTs carry out multimodal planning. In the survey, the respondents were asked to comment on these factors. More specifically, they were asked the following questions:

- Question #13: Given your experience with multimodal transportation planning, identify three of the most important reasons that can explain why such planning has not been undertaken more fully in your agency.
- Question #16: What do you think are the most critical issues relating to statewide multimodal transportation planning in your state?

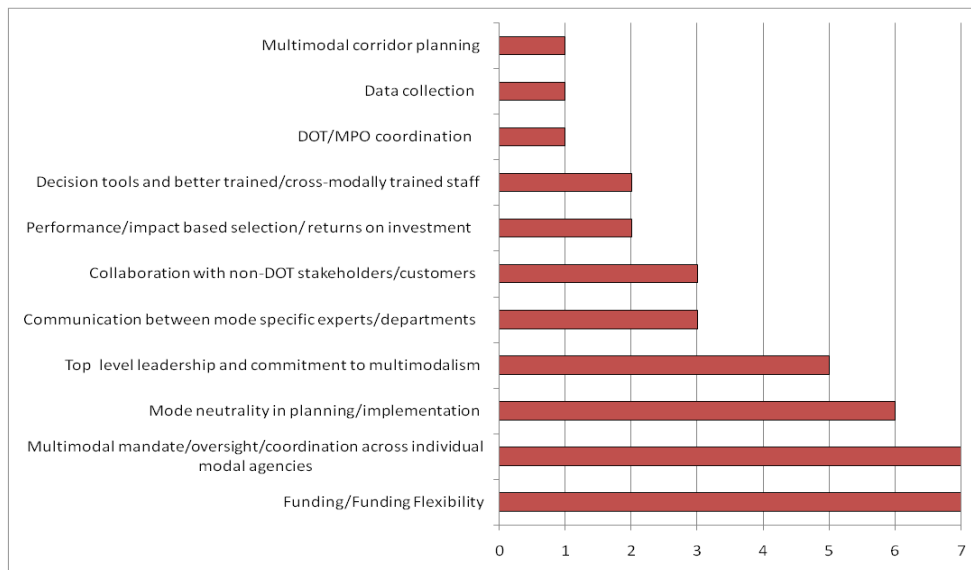


- Question #17: What are the characteristics that are necessary in a state DOT to be considered a multimodal agency?

For Question #13, respondents were instructed to identify three of the most important reasons (from a list of created by the survey's authors). The most frequently identified issues include: modal funding categories focus attention on mode-specific plans; agency standard operating procedures are mode-specific; and agency history and culture are not conducive to multimodal planning. Question #16 and #17 were open-ended questions. The most frequent responses to these two questions, which are shown in Figures 4.8 and 4.9, provide a good representation of the issues related to multimodal planning as well as the characteristics that are necessary to overcome those issues. The answers for issues and characteristics were consistent across respondents. Based on the responses to these questions, the following themes were summarized in the paper *Statewide Multimodal Planning: Current Practice at State DOTs* (Sonnenberg et al., 2012): funding, culture, leadership, institutional issues, communication, mode-neutral planning, and staff and tools. In order for multimodal planning to be carried out successfully, a state must have the necessary resources. It must also have top-down institutional support as well as a culture within the agency that supports alternative modal choices.



**Figure 4.8: Number of Mentions of the “Most Critical Issues” Relating to Statewide Multimodal Transportation Planning (Sonnenberg et al., 2012)**



**Figure 4.9: Number of Mentions of the Characteristics Found Necessary for a State DOT to be Considered a Multimodal Agency (Sonnenberg et al., 2012)**

#### **4.2.4 Discussion**

Based on the responses from the 2012 nationwide survey, there is a common notion that substantial progress in multimodal planning has been made over the last decade. The survey responses show that there is a connection between funding availability and also funding flexibility and the extent of multimodal planning. Furthermore, there is a correlation between the extent of multimodal planning and certain aspects of the organizational structure. Given the limited number of responses and the various aspects that influence multimodal planning, however, it may be too early to reach a definite conclusion on the relationships between organizational structure, extent of multimodal planning, and funding, among other factors. Looking further into these relationships, the case studies give deeper insight into how multimodal planning in particular DOTs is influenced by these factors.

## **CHAPTER 5**

### **RESULTS - CASE STUDIES**

This chapter presents case studies for the following state transportation agencies: Florida Department of Transportation (FDOT), North Carolina Department of Transportation (NCDOT), Oregon Department of Transportation (ODOT), Virginia's Transportation Secretariat, Maryland Department of Transportation (MDOT), and Massachusetts Department of Transportation (MassDOT). The sections for Florida, North Carolina, Oregon, and Virginia are adapted from the case studies in *Multimodal Needs* (Southworth et al, 2012). Additional case studies for Maryland and Massachusetts were added.

The following case studies are organized in the following format:

1. Brief Overview
2. Organizational Structure
3. Funding
4. Example Multimodal Efforts

Through the information presented in each of those sections, these case studies offer insight into each of these state agencies.

#### **5.1 Florida Department of Transportation**

##### **5.1.1 Brief Overview of FDOT**

The Florida State Road Department was created in 1915 and reorganized as the State Road Board in 1955. In 1968, state legislation was passed which limited the number

of agencies that the state could have. As a result “the Department of Transportation was created in 1969 by the reorganization of eight state agencies into one single department to manage Florida’s transportation systems” (Florida Department of State, n.d.). Following the reorganization, FDOT successfully transitioned into a multimodal agency as put forth in a 1971 AASHO (American Association of State Highway Officials) report. This report, “Florida’s Multi-modal Mix,” described the reorganization of the department and praised “the department’s accomplishments in mass transit, aviation and environment and its potential rail projects” (Mueller, 1971). The department has since remained committed to multimodal planning for both passenger and freight transportation. As expressed in the most recent Florida Transportation Plan, the vision for Florida’s transportation system is "a statewide, multimodal transportation system of trade gateways, logistics centers, and transportation corridors to position Florida as a global hub for commerce and investment" (FDOT, 2010a). Furthermore, the plan acknowledges the transportation system’s key role in supporting “Florida's economic and livability goals by providing better connectivity to urban and rural areas" (FDOT, 2010a).

### **5.1.2 FDOT’s Organizational Structure<sup>2</sup>**

FDOT has a central office in Tallahassee which is headed by the Secretary. Under the Secretary are three Assistant Secretaries who carry out tasks in three different areas: Engineering and Operations; Finance & Administration; and Intermodal Systems Development. The Intermodal Systems Development offices include the Transportation

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<sup>2</sup> Information about FDOT’s organizational structure was retrieved from the agency’s website: <http://www.dot.state.fl.us/publicinformationoffice/moreDOT/mission.shtm>.

Development Office and the Office of Freight, Logistics, & Passenger Operations. The former office carries out planning and policy related functions, while the latter is responsible for modal activities. Though FDOT has a central office, it is a decentralized agency, comprised of seven districts and a turnpike system (Florida Turnpike Enterprise). Each of the district offices carries out functions that are specific to their designated area and reports back to the central office. FDOT's organizational chart is shown in Figure 5.1.

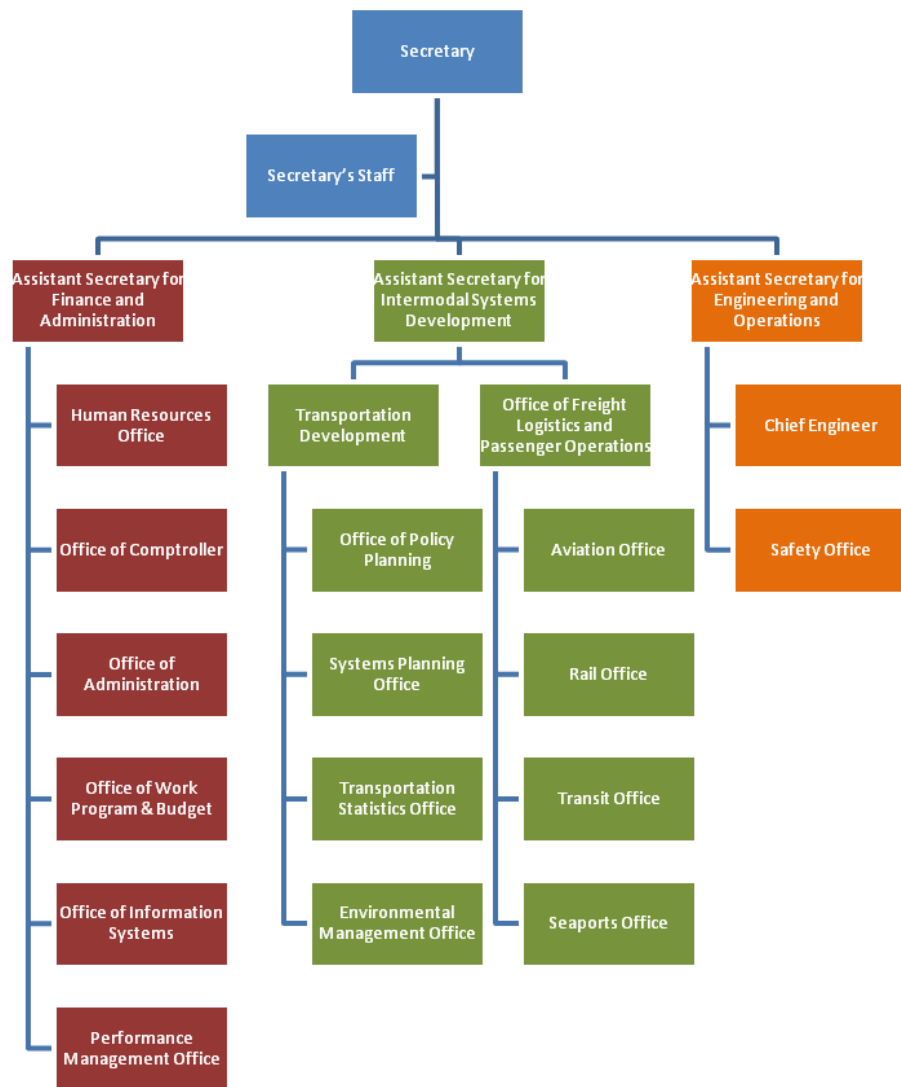
### Intermodal Systems Development

Intermodal Systems Development is in charge of planning, environmental management, performance management, and the modal offices for aviation, rail, transit, and seaports.

- *Transportation Development* – This division conducts policy planning, systems planning, transportation statistics, and environmental management through its four offices. Collectively, these offices provide information and coordinate activities pertaining to planning and environmental management.
  - *Office of Policy Planning (OPP)* – The OPP has 14 areas of responsibility. Some of these areas include: policy guidance and coordination; statewide and metropolitan planning; Florida Transportation Plan development; and demographic and economic analyses. Additionally, the Florida Bicycle and Pedestrian Partnership Council is housed within the OPP.
  - *Systems Planning Office* – The major areas of the Systems Planning Office include systems traffic modeling, systems management, and Strategic Intermodal System (SIS) planning. The SIS serves as a way to integrate

different forms of transportation in order to efficiently meet the mobility needs for both passenger and freight. The system is discussed more in detail in Section 5.1.4.

- *Transportation Statistics Office (TranStat)* – TranStat is the principal source for highway and traffic data in the state. The office gathers data and provides the tools and training that are needed to analyze and evaluate the data.



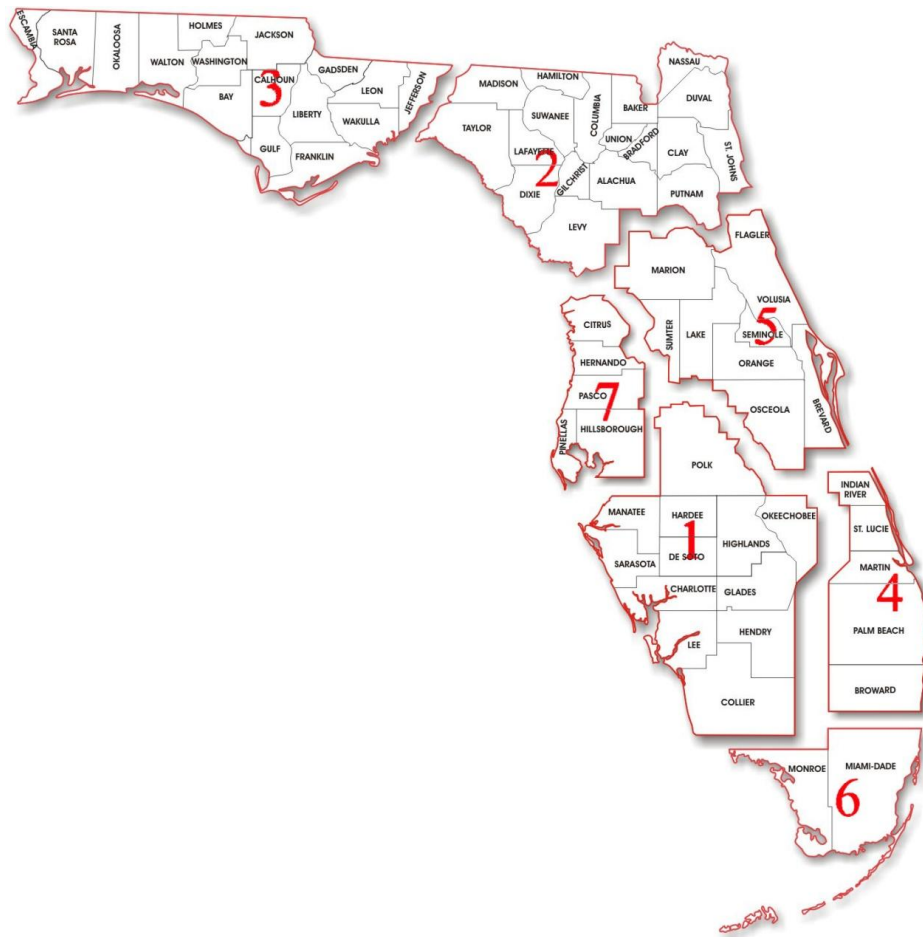
**Figure 5.1: Simplified Version of FDOT’s Organizational Chart (FDOT, 2013)**

- *Environmental Management Office (EMO)* – EMO provides guidance for integrating environmental management and project development principles into programs and functional areas throughout the Department.
- *Office of Freight, Logistics, & Passenger Operations* – This office was formed in 2012 out of the recognition of freight mobility as a vital part of the state’s economy. The goal of the office is to "better connect, develop, and implement a freight planning process that will maximize the use of the existing facilities and integrate and coordinate the various modes of transportation" (FDOT, 2012a). This office oversees the activities of FDOT’s four modal offices: aviation, rail, transit, and seaports.
  - *Aviation Office* – The Aviation Office oversees airport planning, operations, and safety, and assists in aviation system development.
  - *Rail Office* – The Rail Office is in charge of policy development, planning functions, quality assurance, safety inspections, and technical assistance. The district offices are responsible for operations.
  - *Transit Office* – The Transit Office is in charge of transit operations, safety, planning, and grants administration.
  - *Seaports Office* – The Seaport Office coordinates planning activities and funding with the Florida Seaport Transportation and Economic Council and the Florida Ports council to develop the state’s 14 deepwater ports.



## District Office Multimodal Divisions

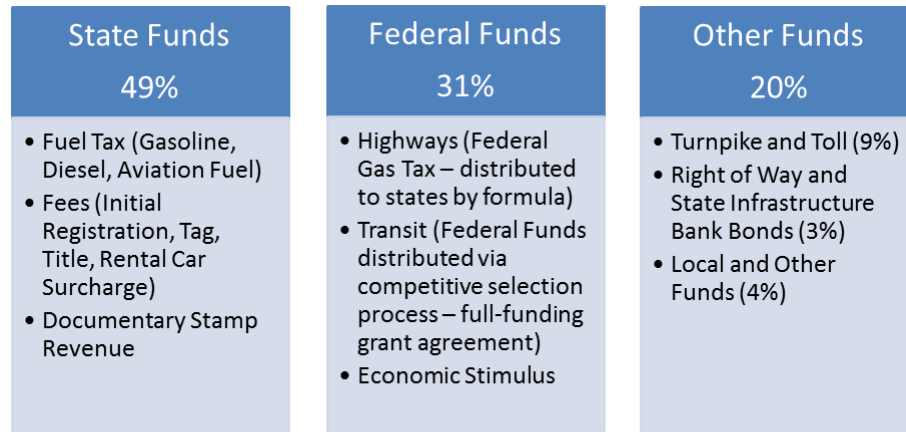
In addition to the intermodal and multimodal efforts at the central office, FDOT has multimodal divisions at the district level that vary in organizational structure. These districts have oversight and provide guidance and assistance to various transit agencies, public and private airports, rail lines, and ports. The district offices have staff members that are specifically assigned to a particular mode. Figure 5.2 shows the location of the districts and the counties that each district has jurisdiction over.



**Figure 5.2: Map of FDOT District Offices (FDOT, 2013)**

### **5.1.3 Funding for FDOT**

Funding for FDOT comes from various sources. These sources are grouped under three categories: state funds, federal funds, and other funds. A further breakdown of those three categories is shown in Figure 5.3. State funds make up almost half of all of the funds that are available to the agency. A significant proportion of these state funds come from taxes, which include the state fuel sales tax and the State Comprehensive Enhanced Transportation System (SCETS) tax, as well as other fuel taxes that are distributed to local governments. The state fuel sales tax is currently 12.2 cents per gallon for all fuels but is adjusted on an annual basis to take inflation into consideration (FDOT, 2011a). The SCETS tax, which ranges from 5.6 to 6.8 cents per gallon for gasoline and is 6.8 cents per gallon for diesel, must be spent in the district where it is collected. In addition to this restriction, there is a 2 cent per gallon constitutional fuel tax collected by the state and distributed to the counties to be used only on highways. The state also collects a 4 cent per gallon tax that goes to local governments. In addition to that amount, local governments are able to levy local option transportation taxes of up to 12 cent per gallon. All other taxes kept by the state, including motor vehicle fees and state aviation fuel taxes, are put into the State Transportation Trust Fund. There is a requirement for 15 percent of FDOT expenditures from the State Transportation Trust Fund to be spent on public transportation, which includes aviation, transit, rail, and seaports (FDOT, 2011a).



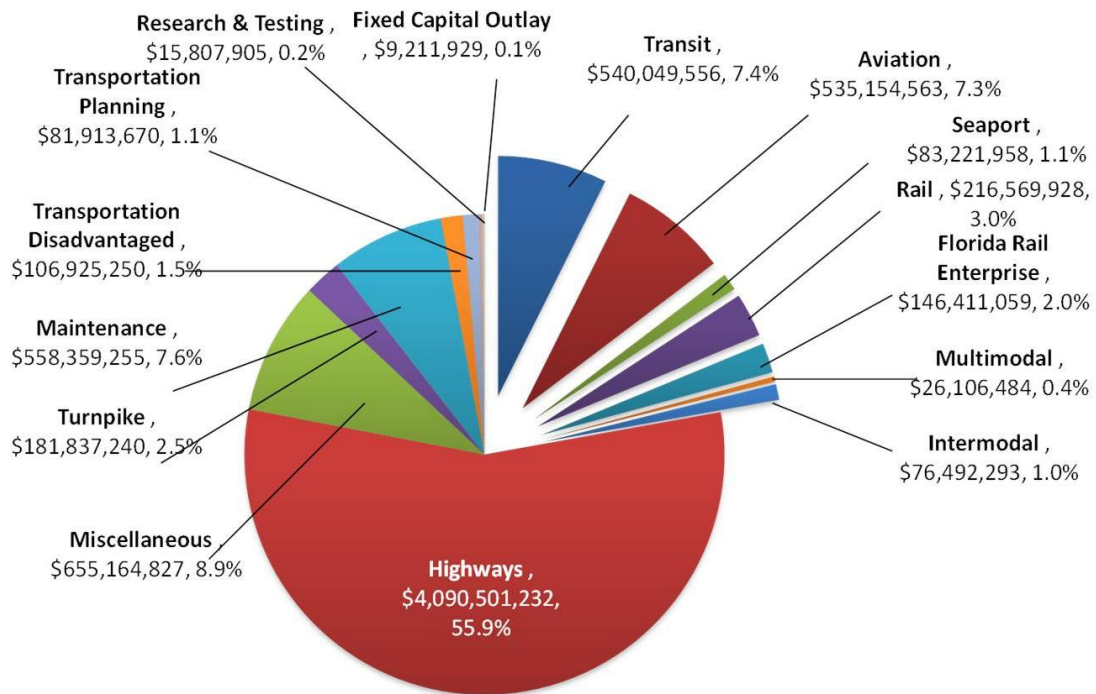
**5-Year Adopted Work Program FY12-16**

**\$36,588M**

**Figure 5.3: FDOT Funding Sources (FDOT Office of Financial Development, 2011)**

Given the funds that are available to FDOT, the budget for the agency’s 5-year adopted work program FY12-16 is \$36,588 million. This equates to an average annual budget of \$7,316.6 million. In 2011, about \$4.1 billion, or 56 percent, was spent on highways. Despite the large amount of money spent on highways, non-highway modes of transportation received a significant portion of the budget, totaling approximately \$1.6 billion or 22.2 percent. Of the non-highway modes, the programs receiving the most money were the transit and aviation programs. The transit program received over \$540 million, or 7.4 percent of the budget, which was primarily spent on operations, capital, and planning costs. The aviation program received approximately \$535 million dollars, or 7.3 percent of the budget, and directed the majority of the money to capital and administrative costs. The other non-highway programs that received money were seaports with 1.1 percent of the budget, rail with 3 percent, the Florida Rail Enterprise with 2 percent, multimodal projects with 0.4 percent, and intermodal projects with 1 percent.

The remaining portion of FDOT’s budget that did not directly go to highway or non-highway programs made up 21.9 percent of the total budget. This money went to the Turnpike, maintenance, transportation disadvantaged, transportation planning, research, fixed capital outlay, and other miscellaneous programs (FDOT, 2012b). Figure 5.4 shows this breakdown of expenses in FDOT’s FY 2011 Budget.



**Figure 5.1: 2011 FDOT Budget (FDOT, 2012b)**

### 5.1.4 Example Multimodal Efforts<sup>3</sup>

#### Florida’s Strategic Intermodal System (SIS)

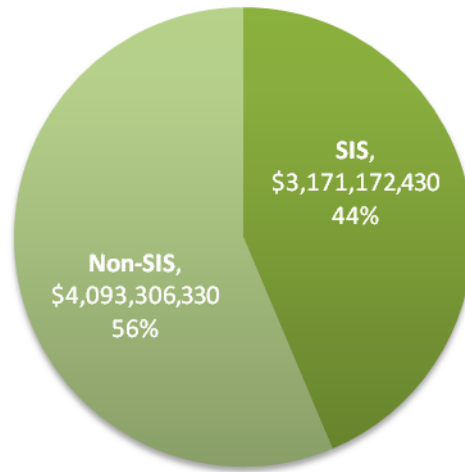
The Strategic Intermodal System (SIS) is a designated network of transportation facilities for all modes that are of statewide importance. In 2000, the 2020 Florida

<sup>3</sup> Excerpt taken from Multimodal Needs (2012)

Transportation Plan (FTP) urged the creation of the SIS, and by 2003, legislation establishing the SIS was passed (FDOT, 2010b). This SIS includes three different types of facilities, namely hubs, corridors, and connectors. As of today, transportation facilities designated as part of the SIS account for 99 percent of commercial air passengers and cargo, practically all waterborne and rail freight, 89 percent of rail and bus passengers, and 55 percent of all traffic and 70 percent of all truck traffic on the State Highway System (FDOT, 2010b). These facilities are designated based on an established set of criteria that relate to the SIS objectives. These objectives consist of interregional connectivity, efficiency, choices, intermodal connectivity, economic competitiveness, energy, air quality, and emergency management. The benefit of a transportation facility being designated as part of the SIS is the availability of statewide managed SIS funds and a greater chance of receiving funds from other sources, including local, federal and private sector funding (FDOT, 2010b). As shown in Figure 5.5, 44 percent of FDOT spending in 2011 was on SIS facilities (FDOT, 2012b).

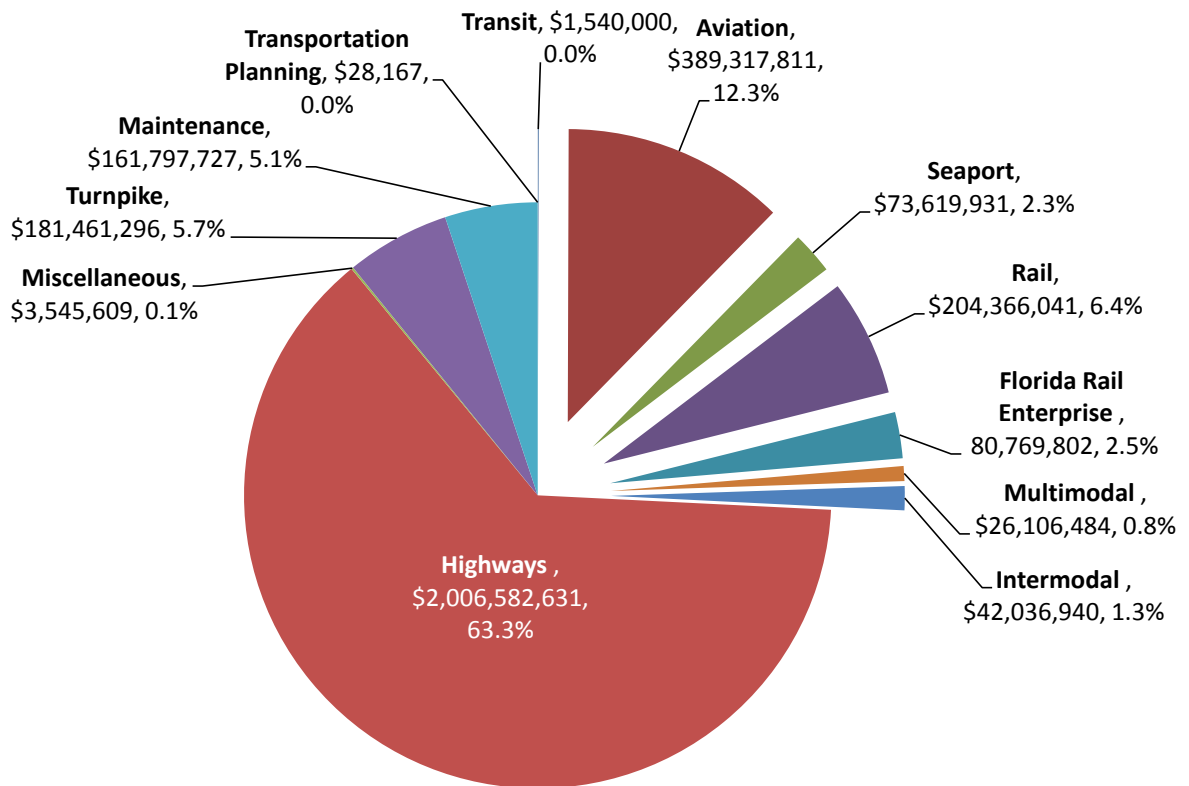
The FDOT Systems Planning Office produces a document set known as the SIS Funding Strategy, which includes three inter-related sequential documents that identify potential SIS capacity improvement projects in various stages of development. The combined document set includes an adopted 5-year Work Program (\$7 billion), a Second Five Year Plan (\$5.2 billion) for 5 years beyond the Work Program, and a SIS Cost Feasible Plan for the 2020-2035 timeframe (\$10 billion). This office also produces a fourth document which is related to, but not part of, the SIS Funding Strategy: the SIS 2040 Multimodal Unfunded Needs Plan. This plan, prepared in coordination with the MPOs and modal partners, identifies transportation projects on the SIS that help meet

mobility needs, but where funding is not expected to be available during the 25 year time period of the SIS Funding Strategy (FDOT, 2011b). The current estimate of unfunded needs is \$131.2 billion.



**Figure 5.2: FY 2011 FDOT Budget (SIS/Non-SIS) (FDOT, 2012b)**

Of the money spent on the SIS, the majority goes to highways. However, a larger share of the money goes toward non-highway modes in the SIS budget than in the overall budget. In the SIS expenditures, non-highway modes account for 25.6 percent. Aviation at 12.3 percent and rail at 6.4 percent account for the largest shares of SIS non-highway expenditures (FDOT, 2012b). A chart of the SIS expenditures for 2011 is shown in Figure 5.6.



**Figure 5.3: FY 2011 FDOT SIS Expenditures (FDOT, 2012b)**

### SIS Project Prioritization

In order to prioritize SIS projects and make investment decisions for Statewide SIS Funds, FDOT uses a combination of a bottom up and top down approach, using district input from MPOs, local governments and other partners as well as statewide input. In addition, FDOT has developed the Strategic Investment Tool (SIT) used as input for priority setting. The SIT is a transparent coordinated and automated tool that evaluates how candidate projects meet FTP and SIS goals and objectives and allows project comparisons across the state based on objective measures. SIT includes 24 measures analyzing five FTP/SIS goals: safety and security, system preservation,

mobility, economics, and quality of life. The measures include emphasis on interregional connectivity, economic competitiveness, intermodal connectivity, support for more than one mode, leverage of different funding sources and high return on investment. SIT is used when projects are added to the different SIS plans, when deferring projects due to decreased revenue forecasts, or when money becomes available during a given year (Wilbur Smith, 2010). FDOT is actively trying to improve the SIT and the investment decision process in order to address issues related to multimodal data, return on investment, changes in future (freight) trends, inclusion of hubs, and increased flexibility of the tool.

#### Land Use-Transportation Interaction

In 1999 the Florida legislature amended Chapter 163, Florida Statutes, commonly known as the Growth Management Act, authorizing local governments to establish Multimodal Transportation Districts (MMTDs). The purpose of the legislation was to provide a planning tool that Florida communities could use to systematically reinforce community design elements that support walking, bicycling and transit use. FDOT produced the *Multimodal Transportation Districts and Areawide Quality of Service Handbook* (FDOT, 2003) and other supporting technical documents to provide guidance on the designation and planning of MMTDs (see Williams et al., 2004). The Handbook characterized a good candidate as having “a mix of mutually supporting land uses, good multimodal access and connectivity, an interconnected transportation network and the provision of alternative modes of transportation to the automobile”. This legislation also enabled Florida communities to advance the cause of *transportation concurrency* — a



growth management policy which at that time required transportation and other public facilities to be concurrent with the impacts of a land development. To carry out transportation concurrency, local governments must define what constitutes an adequate level of service (LOS) and measure whether the infrastructure and service needs of a new development exceed existing capacity and/or new capacity created by any scheduled improvements. MMTDs are encouraged to address this issue through development of a high quality multimodal environment, rather than the typical approach involving road widening for automobile capacity (see FDOC, 2007 for some best practice examples).

While the Florida growth management/concurrency legislation, and FDOT's role in it, has gone through a number of changes over the past decade (see Williams et al., 2011) the legislation driven links established between community development, land use planning and multi-modal transportation investment solutions continue to involve FDOT at the local and district-wide as well as corridor-wide scale (see FDOT/CUTR, 2009).

#### Other Multimodal Efforts

In addition to the aforementioned efforts, the following examples further illustrate FDOT's commitment to establishing and maintaining a multimodal transportation system:

- *Intermodal Networks* – FDOT increasingly focuses on regional intermodal networks as was called for by many partners, including the Florida Chamber of Commerce, and regional and local stakeholders and landowners. Florida aims to be a competitive global hub that focuses on connecting economic activities and

moving people and freight through Intermodal Logistics Centers (ILCs) and ‘Future Corridors’.

- *Intermodal Logistics Centers* - Intermodal Logistics Centers (ILCs) are expected to facilitate the movement of freight and improve the connectivity throughout the region while reducing coastal congestion problems. The development of ILCs was an idea that came from private stakeholders like railroads and ports and landowners/developers and is an example of a bottom up approach. All stakeholders are closely involved in FDOT's planning activities.
- *Future Corridors* – The ‘Future Corridors’ program aims to improve regional connectivity and relieve congestion while supporting growth in demand by transforming existing corridors, maximizing use of and adding capacity to existing facilities, and by considering new facilities when needed.
- *Miami Intermodal Center* – FDOT is currently developing the Miami Intermodal Center (MIC), a centralized multimodal transportation hub located adjacent to Miami International Airport that will provide access to multiple modes of ground transportation (MIC, 2012).
- *Multimodal Performance Measures* – Multimodal performance measures are formally integrated into FDOT's business practices and planning activities as a function of its Performance Management Office. FDOT uses performance measures at three levels: 1) at the strategic level to establish transportation goals and objectives and to monitor progress towards achieving them; 2) at the decision-making level to inform financial policies that determine fund allocation;

3) and at the project delivery level to monitor the efficiency and effectiveness of projects in the Five Year Work Program.

## **5.2 North Carolina Department of Transportation**

### **5.2.1 Brief Overview of NCDOT**

The history of the North Carolina Department of Transportation (NCDOT) dates back to the 1915 founding of the State Highway Commission. By the Executive Organization Act of 1971, the Commission was combined with the Department of Motor Vehicles to create the North Carolina Department of Transportation and Highway Safety. “Highway Safety” was eventually dropped from the department’s name in 1979, giving NCDOT its current name (NCDOT, 2012a). Throughout that evolution, there were various events that led to NCDOT becoming a more multimodal agency, including the creation of the Public Transportation Division in 1974 (NCDOT, 2012b) and the passage of the Bicycle and Bikeway Act in 1974 (NCDOT, 2012c). Since then, NCDOT’s responsibilities in multimodal planning and project implementation have expanded to include the oversight of aviation, ferry, rail, public transportation, highway, bicycle, and pedestrian transportation (NCDOT, 2012a).

### **5.2.2 NCDOT’s Organizational Structure<sup>4</sup>**

NCDOT’s structure is divided into six units, each organized around the agency’s strategic functions. These functions include: Organization, Monitoring, Communication

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<sup>4</sup> Information about NCDOT’s organizational structure was retrieved from the agency’s website: <http://www.ncdot.gov/about/structure/>.

and Control; Transportation and Investment Analysis; Transportation Business Administration; Process Management; Transportation Program and Asset Management; and Transportation Program Delivery (NCDOT, 2012c). Pertaining to multimodal functions, the Deputy Secretary for Transit and the State Highway Administrator are located within the Transportation Program and Asset Management unit. The Deputy Secretary for Transit oversees the Aviation Division, Public Transportation Division, Rail Division, Ferry Division, and Bicycle and Pedestrian Division. The State Highway Administrator is responsible for the Division of Highways. While the multimodal programs are centralized in Raleigh, the Division of Highways is decentralized such that the division is spread across 14 district offices (NCDOT, 2012d). The complete organizational chart is shown in Figure 5.7.

#### Modal Divisions

- *Division of Highways* – The Division of Highways includes the Pre-Construction Division, the Transportation Mobility and Safety Division, and the Chief Engineer, who is over Asset Management and Operations Program Management. The Division of Highways is broken into 14 district offices each carrying out activities in planning, design, construction, and maintenance.
- *Aviation Division* – The Aviation Division is responsible for the development and maintenance of North Carolina's aviation system. The division manages various programs, including the State Aid to Airports program and the Federal State Block Grant program. It also assists the private aviation sector in various capacities and identifies and addresses safety concerns in the state aviation system. The aviation

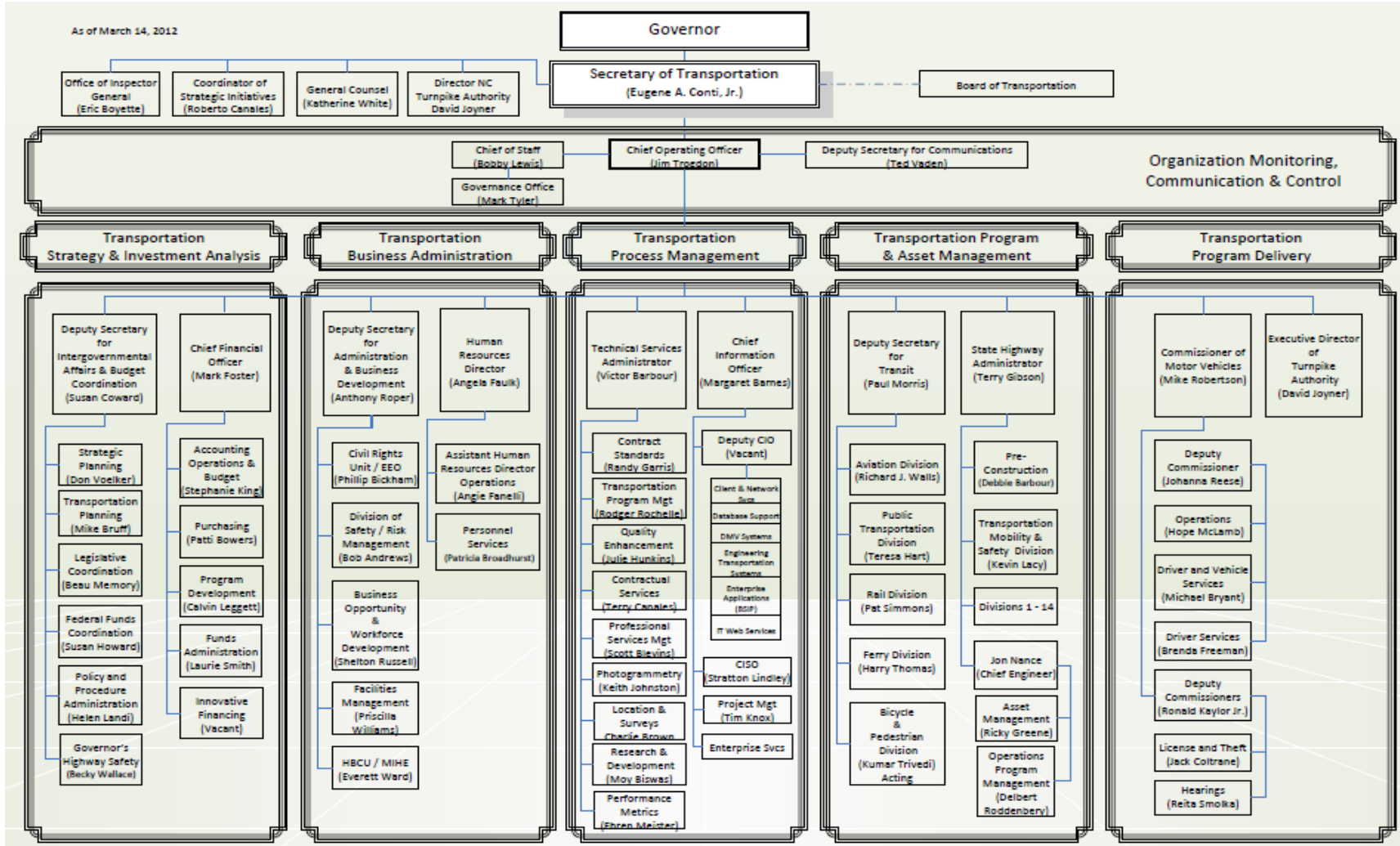


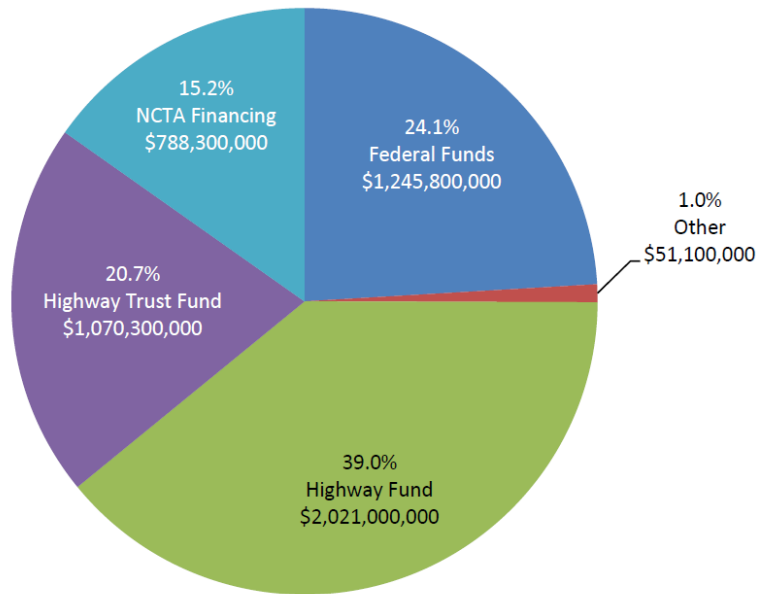
Figure 5.7: NCDOT's Organizational Chart (NCDOT, 2012a)

system is composed of 72 public airports and nearly 300 private airports (NCDOT, 2012e).

- *Rail Division* – The key areas of the Rail Division include the following: passenger trains, high speed rail, station improvements, safety initiatives, track improvements, industrial access, and corridor preservation. In addition to these areas, the division works with the rail industry to attract economic development and create jobs, works with shortline railroads to retain jobs outside of large urban areas, and promotes the use of intercity passenger rail service (NCDOT, 2012f).
- *Ferry Division* – The Ferry Division operates 22 ferries on seven routes and across five different bodies of water. The ferries carry over one million vehicles and over 2.5 million passengers each year. The division also has a full service shipyard, dredge, tugs, and barges to support this operation (NCDOT, 2012g).
- *Public Transportation Division* – The Public Transportation Division was created to foster the growth of transit development in urban and rural communities. This division carries out the following functions: provides planning and technical assistance, administers federal and state grants, and offers professional training and safety opportunities (NCDOT, 2012b).
- *Division of Bicycle and Pedestrian Transportation (DBPT)* – The DBPT is responsible for all aspects of bicycling and walking. These aspects include facility planning, design, safety, and training, among others. Overall, the division carries out tasks in order to encourage a multimodal network that integrates bicycling and walking (NCDOT, 2012h).

### 5.2.3 Funding For NCDOT

NCDOT operates on an annual budget of \$5.2 billion (NCDOT, 2012i). As shown in Figure 5.8, the sources of funding for NCDOT come primarily from the Highway Fund, the Highway Trust Fund, the North Carolina Turnpike Authority (NCTA), and federal funds.



**Figure 5.8: Sources of Funds FY 2012-2013 by Major Funding Source**  
(NCDOT, 2012i)

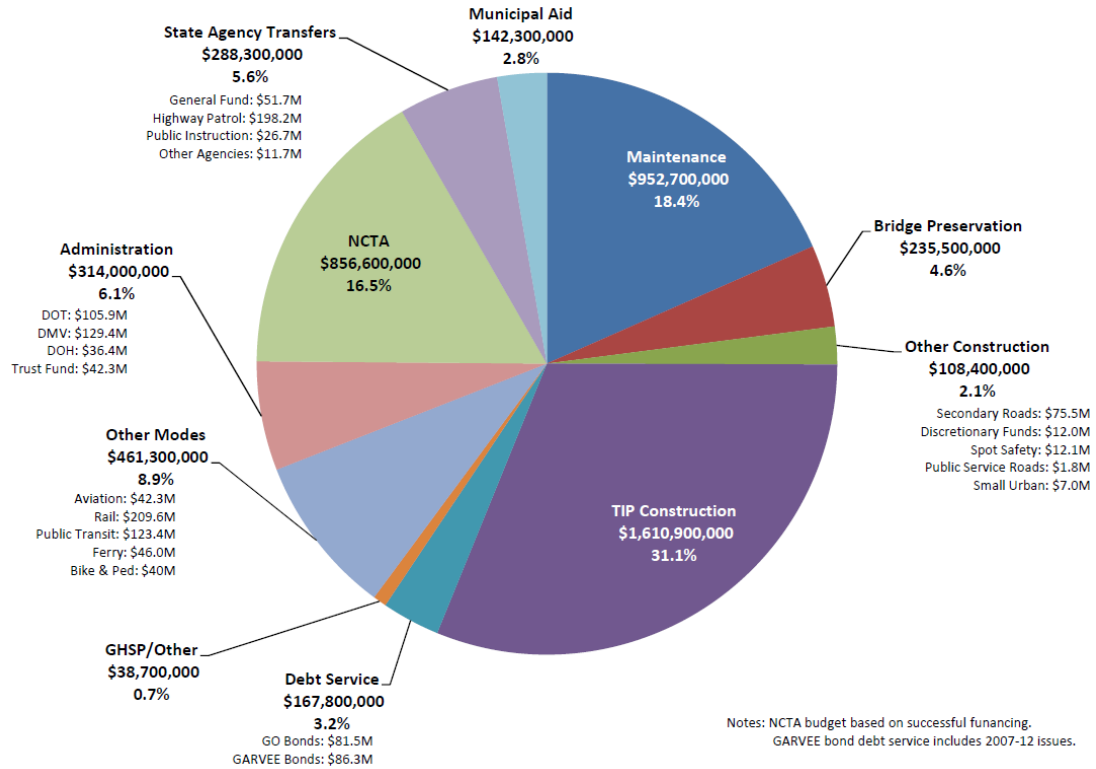
- The Highway Fund dates back to 1921 when North Carolina started collecting a gas tax. The tax rate started off at 1 cent per gallon. (NCDOR, 2012). The current tax rate is 37.5 cents per gallon and is adjusted every six months. Today, the Highway Fund has other sources of revenue in addition to the gas tax. These sources include vehicle registration fees, title fees, and federal aid. Altogether, the Highway Fund contributes \$2.02 billion, 39 percent of total

funding sources, to the NCDOT budget (NCDOT, 2012i). Historically, this fund was reserved for construction and maintenance of highways, the State Highway Patrol, and the Department of Motor Vehicles. However, in the 1990s, the Highway Fund began supporting public transportation and rail.

- The Highway Trust Fund was established by law in 1989 for the purpose of improving and maintaining the intrastate highway system and urban loops around nine of the state’s largest cities. The fund provides money to complete the paving of secondary roads throughout the state and provides money to cities and towns for maintenance. NCDOT’s Highway Trust Fund provides \$1.07 billion towards the annual budget, approximately 20.7 percent of total funding sources (NCDOT, 2012i).
- The North Carolina Turnpike Authority was created by the General Assembly in 2002 as a response to growth and congestion in a time of limited resources. Essentially, the Authority has the responsibility of carrying out various projects, accelerating the delivery of the projects through alternative financing options. “In most cases, NCTA sells bonds to private investors and repays those bonds with the tolls collected on the new roadway” (NCDOT, 2012i).
- The remaining funds supporting NCDOT come from federal funds for highways, transit, rail, and airports or other sources (NCDOT, 2012i).

Uses of the funds are broken down into 11 categories (Figure 5.9). The category that is appropriated the largest amount is “TIP Construction”, followed by “Maintenance” and “NCTA”. “Other Modes”, which include aviation, rail, public transit, ferry, and bike & ped, have an appropriation \$461.3 million, or 8.9 percent.





**Figure 5.9: Projected Uses of NCDOT Appropriations FY 2012-2013**  
(NCDOT, 2012i)

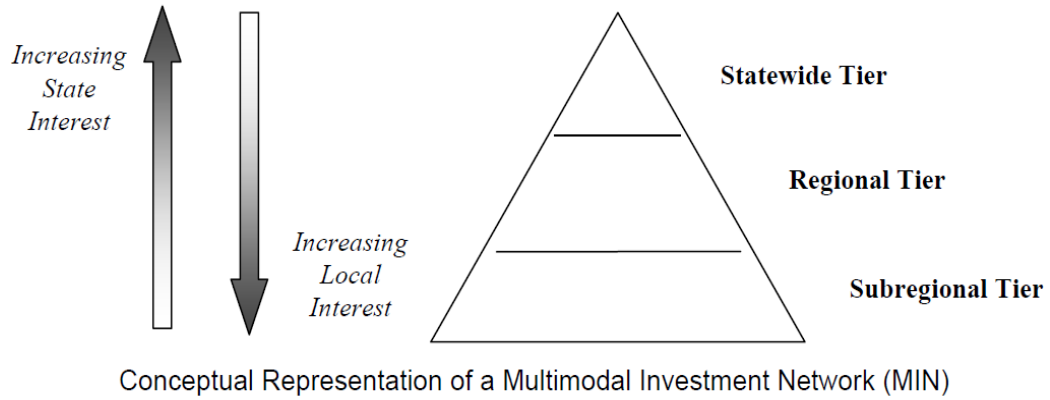
NCDOT’s 5-year work program provides mode specific funding information for administration, construction and engineering, maintenance, and operations. When only considering the items that are explicitly designated to a particular mode of transportation, slightly over 90 percent of NCDOT’s “mode-specific” budget, or about \$3.2 billion, goes towards highways while the remaining 9.3 percent goes to non-highway modes (NCDOT, 2011). The rail program receives the largest share of these non-highway funds, at \$121.7 million, or a 3.4 percent share of the department’s budget. Public transportation receives 2.7 percent, or \$95.4 million, of the budget. The aviation, bicycle/pedestrian, and ferry programs each receive about a one percent share. Aviation receives \$39.2 million, the

bicycle/pedestrian program is allocated \$40.1 million, and the ferry program has a budget of \$35.3 million (NCDOT, 2011).

#### **5.2.4 Example Multimodal Efforts**

##### North Carolina Multimodal Investment Network (NCMIN) (2004)

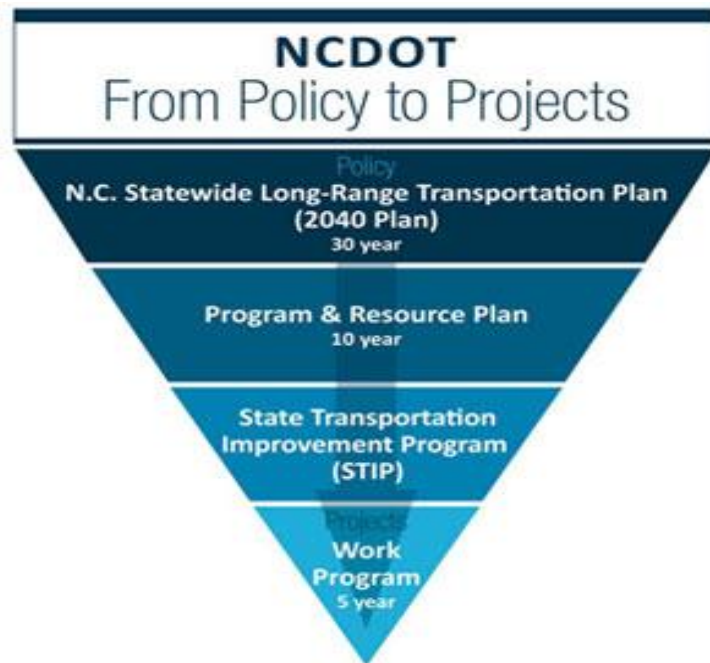
In its 2004 state transportation plan, NCDOT acknowledged that "a state's transportation system consists of all transportation modes and the facilities that link them together" and that "a true 'multimodal' statewide transportation plan must identify and evaluate a full spectrum of future transportation needs and potential solutions by mode and by function" (NCDOT, 2004). In order to broaden its modal coverage NCDOT initiated a new planning framework called the North Carolina Multimodal Investment Network (NCMIN). NCMIN includes transportation facilities of all modes in the state and classifies them into one of three tiers according to their function. These tiers include a Statewide Tier, Regional Tier, and Subregional Tier. The Statewide Tier includes facilities that accommodate large volumes, are used for long-distance travel and are used for mobility. They are typically of greater interest from a statewide perspective. The Subregional Tier includes facilities that serve smaller volumes of localized travel, are used for access, and are of greater importance at the local level. Regional Tier facilities have characteristics of both Statewide and Subregional Tier facilities. They provide both mobility and access functions and are of both statewide and local interest. Figure 5.10 is a graphic representation of the NCMIN classification system (NCDOT, 2012j).



**Figure 5.10: NCMIN Classification Framework (NCDOT, 2012j)**

Policy to Projects Process

In 2009 North Carolina’s Governor issued an executive order to ensure that NCDOT's decision making process focused on "the department's long term goals of safety, mobility, and infrastructure health" (NCDOT, 2012k). As a result, the department



**Figure 5.11: Policy to Projects Conceptual Framework (NCDOT, 2012k)**

has developed a decision making process, called "Policy to Projects," that begins with the Long-Range Plan and ends with the 5-year Work Program. This process is meant to ensure the development of plans with a cohesive vision and the awarding of projects that further the goals laid out in the plans (NCDOT, 2012k). Figure 5.11 depicts the conceptual framework of this "Policy to Projects" process.

#### NC Mobility Fund (2010/2011)

In 2010, the NC Governor was also instrumental in creating the Mobility Fund. This fund is geared towards providing money for transportation projects that are of statewide or regional importance according to the NCMIN classification framework described above. The fund will receive \$45 million in FY 2013 and \$58 million in FY 2014 and onward. Light rail, bus rapid transit and commuter rail projects are eligible. After revisions enacted in 2011, projects selected for funding are judged by the criteria shown in Figure 5.12 (NCDOT, 2012l).

The most important criterion, accounting for 80 percent of the score, is the "Mobility Benefit-Cost" which is measured by the ratio of travel time savings to the cost of the project to the Mobility Fund. The other criterion used is called "Multimodal/Intermodal" and accounts for the remaining 20 percent of the score. This criterion takes into account whether the project contributes to the efficiency of the transportation network by improving more than one mode of transportation. Multimodal/intermodal scoring begins with an eligibility question: does the project provide an improvement to more than one mode of transportation and thereby improve the overall efficiency of the transportation system? If the answer is yes, then the project is

evaluated, with a certain number of points awarded, based on the opportunity a project has to provide seamless transportation efficiency, to enhance travel choice, and to make important connections within the overall system (NCDOT, 2012l). Each project’s final score is then determined by multiplying the number of points assigned to each of the two criteria shown in Figure 5.12 by their respective weights (i.e., by .80 or by .20) and then summing the points, with a higher score producing a higher ranking.

Criterion	Weight
<p><b><u>Mobility Benefit/Cost</u></b> - measured by the estimated travel time savings the project will provide (in vehicle hours) divided by the "cost to the Mobility Fund". Used to compare projects across transportation modes. There is no cap on The scoring for travel time savings. In other words, the greater the savings and/or the lower the cost of the project to the Mobility Fund, the greater the score the project can achieve for this criterion.</p>	<p><b>80%</b></p>
<p><b><u>Multimodal / Intermodal</u></b> - measured by whether the project provides an Improvement to more than one mode of transportation and thereby improves the overall efficiency of the transportation system. This is a Yes / No question. If the project improves more than one mode of travel, a sliding scale of points is assigned to the project score based on the overall resulting impact on the multimodal / intermodal improvement.</p>	<p><b>20%</b></p>

**Figure 5.12: NCDOT’s Project Scoring Criteria (NCDOT, 2012l)**

Other Multimodal Efforts

- *Approach to Transportation Planning* - A recent (NCDOT, 2012m) DRAFT report by NCDOT describes a newly proposed approach to transportation planning in the state, as a replacement of the previous plan development process which focused on highway investment planning. The report lays a multimodal

foundation by defining the characteristics of an ideal multimodal transportation planning process. The report also describes the “Comprehensive Transportation Planning (CTP) Sub-Process” which includes a multi-modal sub-process. The multi-modal sub-process is a 17 step process which begins with establishing multimodal teams and commitments and ends with recommendations for modifying multimodal plans.

- *Freight Transportation* - The state is looking to expand its role in freight, including non-highway freight movements. Currently, the department administers two assistance programs, the Rail Industrial Access Program and the Short Line Infrastructure Assistance Program. In 2009, Governor Purdue created the Governor's Logistics Task Force which is charged with studying the state's future role in freight (NCDOT, 2012n). Though the recommendations have not come into fruition, NCDOT’s first statewide freight and logistics plan, released in May 2008, put forth the creation of a Freight Logistics Authority and a Division for Intermodal Transportation that would include freight logistics (List et al., 2008).
- *Multimodal Projects* - There are notable projects that NCDOT has been involved with. The I-85 Corridor Improvement Project began construction in October 2010 and is expected to be completed in May 2013. It provides upgrades for bridge, highway, and rail infrastructure along a critical link in the state's transportation system (NCDOT, 2012o). Another project, the Southeast High Speed Rail (SEHSR) Corridor, will connect the District of Columbia, Virginia, North Carolina, South Carolina, Georgia and Florida with passenger rail averaging speeds of 85 to 87 miles per hour (SEHSR, 2010).

## **5.3 Oregon Department of Transportation**

### **5.3.1 Brief Overview of ODOT**

In 1913, the Oregon State Highway Department and the Oregon State Highway Commission were created by the Oregon Legislature. Over 50 years later, in 1969, the Oregon Department of Transportation (ODOT) was created (ODOT History Committee, 2009). This creation involved placing the Department of Motor Vehicles, the State Highway Department, the Parks Division, the State Board of Aeronautics, the State Ports Commission, and the newly created Mass Transit Division as divisions within ODOT. Though many aspects of the structure have remained the same, some changes have been seen since then, such as the creation of the Oregon Department of Aviation as a standalone agency. Moreover, since the 1970s, Oregon has shifted from highway planning to a more integrated transportation systems and land use planning approach. As a result, the state's interest and focus on multimodal planning has increased. Currently, ODOT works closely with the Oregon Transportation Commission (former Oregon State Highway Commission), a five member agency appointed by the governor, in managing Oregon's state highways and other transportation projects (ODOT, 2012a).

### **5.3.2 ODOT's Organizational Structure<sup>5</sup>**

ODOT has nine divisions in its structure, whose functions are based on provided services or specific transportation modes. These divisions include: Central Services; Communications; Driver and Motor Vehicle Services; Motor Carrier Transportation;

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<sup>5</sup> Information about ODOT's organizational structure was retrieved from the agency's website: [http://www.oregon.gov/ODOT/Pages/about\\_us.aspx](http://www.oregon.gov/ODOT/Pages/about_us.aspx).

Highway; Public Transit; Rail; Transportation Development; and Transportation Safety. A separate agency, the Oregon Department of Aviation, is responsible for air travel.

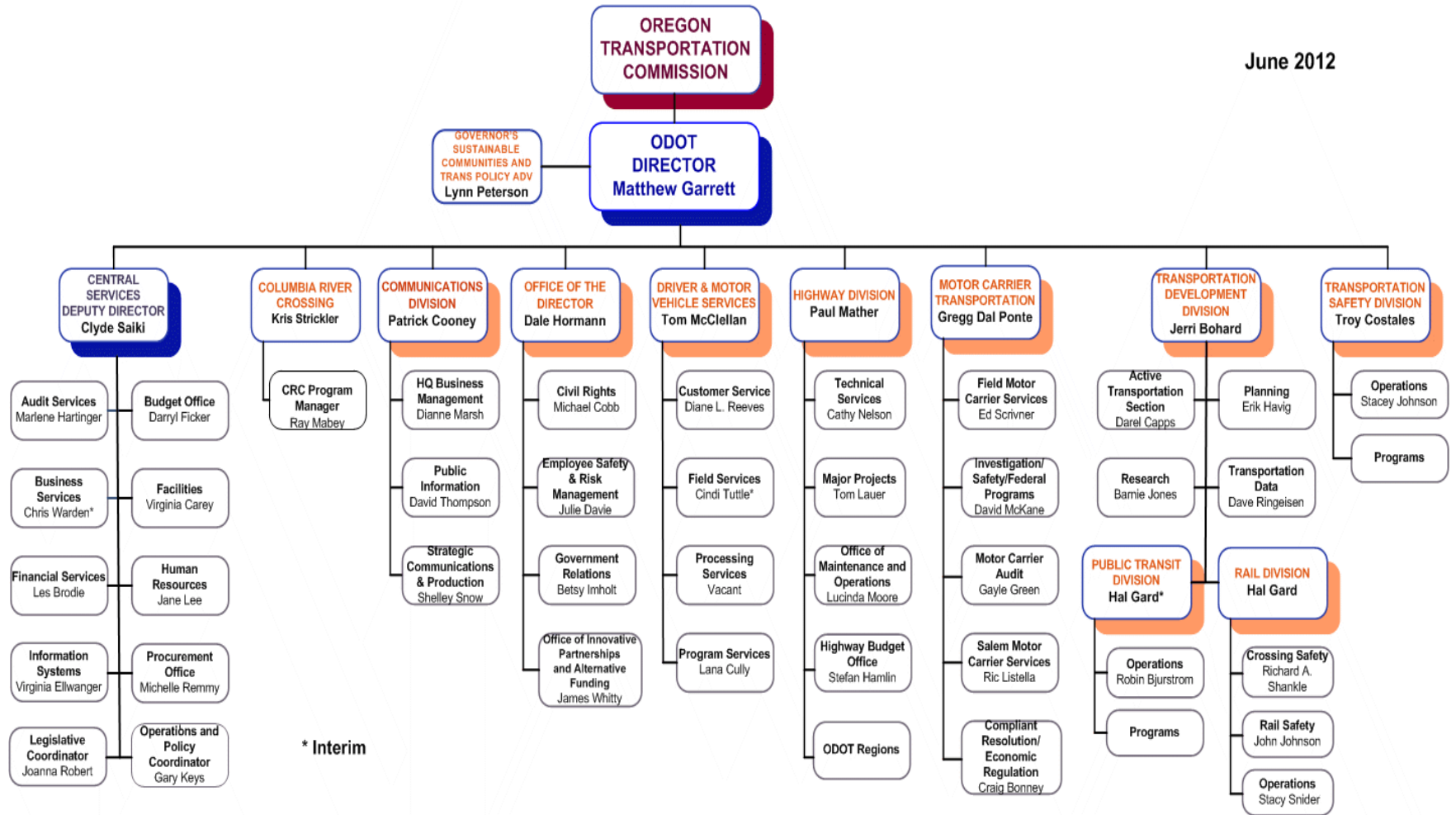
### Modal Divisions

- *Highway Division* – The Highway Division is ODOT’s largest division, with 31 different sections and units, including five Region Technical Centers (ODOT, n.d.(1)). As shown in the organizational chart (Figure 5.13), the other sections and units are broken down into 4 additional areas: Technical Services; Highway Finance; Local Government; Maintenance; and Office of Project Delivery. Overall, the division is responsible for planning, design, engineering, support services, and maintenance of roadways and roadway projects.
- *Motor Carrier Transportation Division* – The Motor Carrier Transportation Division regulates the statewide commercial trucking industry. Main functions of the division include: registering and inspecting trucks; enforcing weight, size and safety regulations; and issuing permits. This division is also responsible for Oregon’s ports and waterways.
- *Transportation Development Division* – The Transportation Development Division has five sections: Research; Planning; Administrative Support Services; Transportation Data; and Active Transportation. These sections work together to provide planning services and analysis for all of the modes that make up the state’s transportation system. Broadly speaking, the Planning Section provides direction to the Department for planning and managing an integrated transportation system. This is done through developing multimodal and mode-



# Oregon Department of Transportation

June 2012



**Figure 5.13: ODOT Organizational Chart (ODOT, 2012a)**

specific plans, coordinating, and providing policy guidance, among many other tasks. The Active Transportation Section provides multimodal solutions specifically for active modes such as walking and biking. The section brings together the Bicycle and Pedestrian Program and the Transportation Enhancement Program. As explained by ODOT Director Matt Garrett, "Our funding structure is overwhelmingly dedicated to highway programs, so we have to be imaginative in how we use discretionary funds and other funding that is directed to non-highway programs" (ODOT, n.d.(2)).

- *Public Transit Division* - The Public Transit Division has a vision to increase access to alternative transportation. The division is overseen by its Administrator and is organized into three main sections that are headed by: 1) an Operations Manager; 2) a Program and Policy Manager; and 3) Regional Transit Coordinators. The division administers programs that support public transit agencies and activities around the state, enhancing urban and rural public transportation options.
- *Rail Division* - The Rail Division includes the Crossing Safety Section and the Rail Safety Section. In addition to safety, the division is responsible for freight and passenger rail planning and operations. The division also coordinates intercity rail and bus operations.
- *Oregon Department of Aviation* - The Oregon Department of Aviation has been an independent state agency since 2000. Oregon has 97 public-use airports and over 350 private airports and airstrips (DOA, 2011). The Department aims to

develop aviation as an integral part of Oregon's transportation network and to support aviation safety and aviation related economic development.

### **5.3.3 Funding for ODOT**

During the 2011-2013 biennium, ODOT's projected revenue is about \$5 billion. About 20 percent comes from the federal government and the remaining 80 percent of this comes from state sources. The majority of the state funds come from gas taxes (\$1.1 billion), weight mile taxes (\$611 million), and Driver and Vehicle Licenses (\$676 million), together accounting for 48 percent of the total revenue. Another \$640 million is generated through Bonds (ODOT, 2011). Like many states, ODOT's motor fuel tax can only fund highway projects and transit capital funds cannot be shifted into operations.

After the funds are distributed to cities, counties, and other agencies, \$3.8 billion remains for ODOT (ODOT, 2011). Figure 5.14 shows a detailed breakdown of the ODOT budget. Given the two-year budget, 66 percent (\$2.5 billion) is appropriated to the Highway Division. Within the Highway Division, the majority will be spent on bridge (\$615 million), maintenance (\$422 million), and modernization (\$390 million). The other highway funds are allocated for local government, preservation, special programs, and operations. The Transportation Program Development Division receives \$238 million, or 6.2 percent. The Motor Carrier Division budget is \$64 million. Rail and transit will receive \$67 million and \$83 million, respectively. Though not under ODOT, it should be noted that the 2009-2011 budget for the Department of Aviation was \$11.5 million (DOA, 2011).

# SOURCES AND USES OF FUNDS

## DEPARTMENT OF TRANSPORTATION

2011-2013 Legislatively Adopted Budget

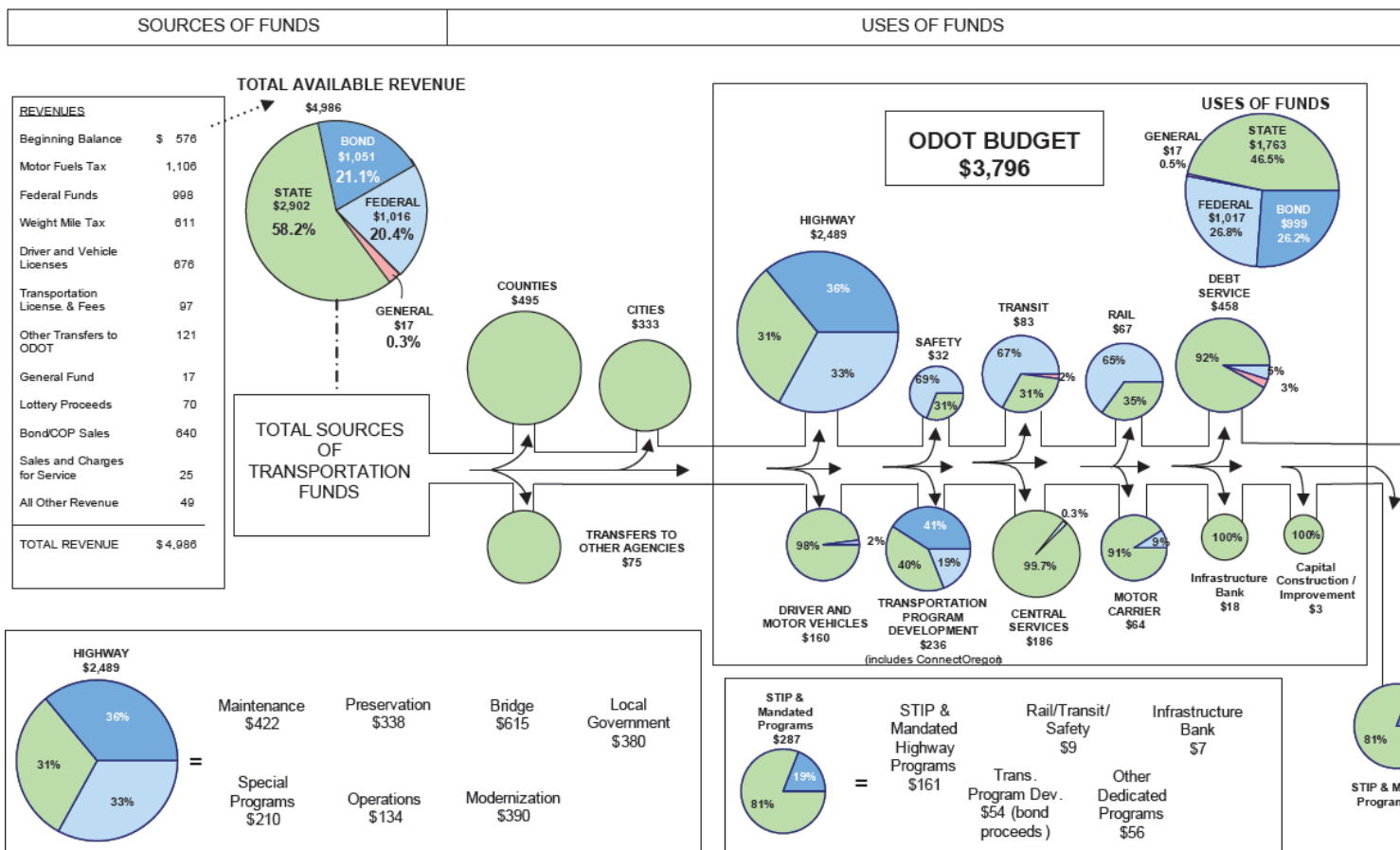
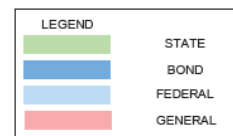
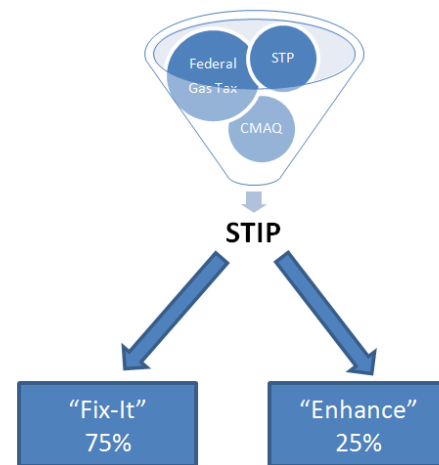


Figure 5.14: ODOT's Budget 2011-2013 (ODOT, 2011)

## STIP Changes

ODOT has recently made changes in funding regarding its Statewide Transportation Improvement Program (STIP). “The STIP will no longer be developed as a collection of programs tied to specific pools of funding dedicated to specific transportation modes or specialty programs” (ODOT, 2012b). Now, 75 percent of the funds are reserved for “Fix-It” projects, which are projects that are intended to maintain and preserve the existing transportation system. The remaining 25 percent goes to “Enhance-It” projects - enhancements and improvements to the system (i.e., added capacity) (see Figure 5.15).



**Definitions:**

- Fix-It:** Activities that fix or preserve the transportation system
- Enhance:** Activities that enhance, expand, or improve the transportation system

**Figure 5.15: 75/25 Funding Split Representation**

The “Enhance-It” funds come from the Surface Transportation Program (STP) and Congestion Mitigation and Air Quality (CMAQ) funds, so they are more flexible in terms of spending restrictions. The annual funds for the “Enhance-It” projects are split into four buckets: Interstate Maintenance, STP, CMAQ, and Bridge. All IM funds have to be used for IM projects. 50 percent of the STP, however, can be flexed. CMAQ funds are reserved for projects that contribute to improvements in air quality and traffic congestion. Bridge funds are used for the replacement, rehabilitation, and maintenance of bridges. Going forward, this will change since the new transportation legislation folds the Bridge program into the STP and the IM Program.

#### Projects First, Then Funding

ODOT has also recently changed its approach to project selection. For the 2015-2018 STIP, ODOT has changed the application process as well as the eligibility criteria and prioritization factors. In short, the old process began by first setting funding levels and then selecting projects within each program area. The new process reverses this approach by first selecting the best projects and then determining which types of funds can be used to deliver those projects. With this change ODOT hopes that greater funding flexibility will lead to improved project selection by maximizing the effectiveness and efficiency of projects and investments and at the same time allowing for the consideration of a wider range of community issues and benefits (ODOT, 2012c).

#### **5.4.4 Multimodal Efforts<sup>6</sup>**

##### Integrated Land Use – Transportation Planning

Since the 1970s, when the Portland-area and state planners decided that transportation decisions could go hand in hand with land use decisions, Oregon has experienced a shift in planning focus from a highway-centric approach to a multimodal one. In 1991 Oregon became a pioneer in managing the so-called transportation-land use connection and it is still one of a few states with a statewide land use department. Planning activities started to demand local Transportation System Plans (TSPs), consideration for all modes, and planning that links transportation to land use policies that favor compact urban form. Likewise, land use planning must take into consideration transportation needs and requirements (OTREC, 2010).

In realizing this ‘*incremental*’ movement away from purely highway capacity expansion projects, stakeholders like activists, planners, politicians, civic leaders, lobbyists and business activists played a major role at four levels: national, state, metropolitan, and local (OTREC, 2010). Today, Oregon is considered to be a leading example of how to balance and integrate land use and transportation planning initiatives and policies to enhance, and to promote multimodal planning solutions. This balancing act starts from a top-down perspective outside the DOT itself, with regularly scheduled, monthly meetings between the Chairs of the Oregon Transportation Commission, the Oregon Department of Land Conservation and Development (DLCD) Commission, and the Oregon Economic and Community Development Department. Though ODOT has no

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<sup>6</sup> Excerpt taken from Multimodal Needs (2012) with minor modifications

official authority over land use decisions, there are land use consistency requirements throughout the state. This requirement calls for the cities and counties in the state to be consistent with 19 statewide planning goals. These goals are established at the legislative level. In particular, the transportation goal emphasizes land-use and transportation coordination. This goal complements multimodal transportation planning.

#### Area Commissions on Transportation

Local representation within the multimodal planning process is achieved through Oregon's 12 Area Commissions on Transportation (ACTs). These ACTs are made up of local officials that address transportation issues and interests that are particular to their own jurisdiction. A letter from the OTC to ACT chairmen (OTC, 2012) discusses the transition of ACT activities from a highway focused effort towards a broader multimodal focus, noting that "When establishing the voting membership an ACT needs to consider all modes and aspects of the Transportation System". The ACT policy references "elected officials, tribal governments, port officials, transit offices, as well as interested stakeholders such as freight, trucking, bicycle, pedestrian, and public transportation, among other community interests" as potential voting members (OTC, 2012).

In addition to the above mentioned modes, ODOT has placed added emphasis on the promotion and planning for "Active Transportation", such as walking and biking. METRO, the MPO in Portland, plays an important role here in promoting this "Complete Street"-like policy, by emphasizing street connectivity through design. There is also concurrency planning, which requires public facilities, such as transportation corridors, to be in place to serve new land developments. The same April 2012 letter from the Oregon



Transportation Commission to ACT's regional chairs pointed out that the October 2011 creation of an *Active Transportation Section* within the Transportation development Division "helps streamline project selection. Federal and state programs similar in function are now located in one section. Staff working on Transportation Enhancement, Congestion Mitigation, and Air Quality (CMAQ), Bicycle/Pedestrian, Flex Funds, and Safe Routes to Schools programs now sits and works side-by-side." (OTC, 2012)

### Multimodal Freight Inclusive Projects

ODOT maintains mobility for freight. Two issues with freight transportation that have multimodal implications are the lack of redundancy (in freight moving capacity), and the conflict between freight supporting and passenger supporting performance measures. There are three freight-involved initiatives, in particular, that are exemplary of ODOT's multimodal efforts. One is the ConnectOregon program, the second is the Pineville Project, and the third, which involves passenger-freight interactions is the WES Commuter Rail Project:

- *ConnectOregon* – In 2005, 2007, 2009 and 2011 the Oregon Legislature approved the *ConnectOregon* program (ODOT, 2012d). The program is a major funding initiative targeted at multimodal transportation in Oregon. Connect Oregon started as a bottom-up initiative, initiated by stakeholders (mainly the railroads and ports) who presented the idea to the Governor directly and is now a "lottery backed bond initiative focused on improving the connections between the components of a whole transportation system by improving the flow of commerce and easing delays in travel" and functions as a grant/loan program. The first three initiatives

each provided \$100 million for air, rail, marine, and public transit infrastructure and for the fourth initiative (2011-2013 biennium), Legislature authorized \$40 million. With the addition of leveraged funds, programs I through IV represents \$779 million in direct investment in multimodal transportation improvements. Project applications come from public, private and joint organizations and are reviewed by ODOT staff, modal and regional committees, stakeholders, and the 'Final Review Committee'. Applicants for the first three ConnectOregon programs indicated 3,516 construction jobs and 19,953 permanent jobs would be promoted or retained as a result of the state's investments. For the fourth initiative, ODOT initially received 70 applications for funding. After review by all committees, 38 projects totaling \$40,038,333 in Connect Oregon IV funding were recommended. In all, the 38 recommended projects will leverage approximately, \$95 million in non-ConnectOregon funds (ODOT, 2012d). Currently the allocation of the funds is statutory, but efforts are being made to institutionalize the process.

- *City of Prineville Railway* – One of the projects made possible by ConnectOregon is the development of the Prineville Freight Depot (ODOT, 2012e). The \$5.5 million infrastructure investment converted an abandoned mill site into a premier Central Oregon regional trans-load facility. Prineville has “110,000 square feet of covered warehouse space equipped with rail and truck dock doors, a 25-ton overhead crane, drive-through truck loading facilities and in-warehouse rail to facilitate loading of weather sensitive products in all conditions” (ODOT, 2012e).

- *WES (Westside Express Service) Commuter Rail Project* - Created by a partnership between Washington County, ODOT METRO, and the cities of Wilsonville, Tualatin, Tigard and Beaverton, the 27.4 mile WES commuter rail line is managed and funded by TriMet, the Portland metropolitan area's regional transit agency, which also owns and maintains the railcars and stations (TriMet, 2012). In planning since the 1990s, and opened for service in 2009, WES operates over a mostly upgraded freight rail line, while the self-powered diesel railcars are operated by staff from the Portland & Western Class II Freight Railroad. These WES vehicles share the track with freight trains, using a state-of-the-art computerized dispatch and signal system. Free 24-hour parking is provided for riders and carpoolers at numerous Park & Ride Lots, with weekday spaces in many lots donated by churches and businesses. The result is a mixed passenger-freight as well as passenger multimodal travel corridor.

### Oregon Transportation Plan

The Oregon Transportation Plan (OTP) is the “umbrella document” that creates the framework for performance, expectation, and policy. The OTP of 1992 “established a vision of a balanced, multifaceted transportation system leading to expanded investment in non-highway transportation options” (ODOT, 2006) and subsequent plans have built upon this foundation. In addition to the OTP, there are modal and topic specific plans. The different modal plans include Aviation, Bicycle/Pedestrian, Freight, Highway, Public Transportation, and Rail. Moreover, most of the local jurisdictions put together their own TSPs. Integration of these plans is primarily done at the comprehensive plan level, but is

taken into consideration from the highest level out to project delivery. In order to encourage sound decision-making there are five statewide modal advisory committees: Oregon Freight Advisory Committee, Public Transit Advisory Committee, State Aviation Board, Marine Project Review Committee, and Rail Advisory Committee. Having these committees also ensures that the different modes are all represented.

## **5.4 Virginia's Transportation Structure**

### **5.4.1 Brief Overview of Virginia's Transportation Structure**

The Virginia Department of Highways was established in 1927 as a state transportation agency. In 1974, the agency's name was changed to the Virginia Department of Highways and Transportation. Along with this name change, rail and public transportation were added to the agency's areas of responsibility. In 1986, the General Assembly expanded revenue sources for transportation and added a new focus on airports and seaports, and renamed the agency to the Virginia Department of Transportation (VDOT). In 1992, the General Assembly moved the rail and public transportation divisions into their own agency (Department of Rail and Public Transportation (DRPT)), which left VDOT being responsible for "building, maintaining, and operating the state's roads, bridges, and tunnels" (VDOT, 2011a). In addition to VDOT and DRPT, there are a number of other transportation related agencies that are under the Office of the Secretary of Transportation. The Virginia Division of Aeronautics was created in 1928 and was transferred to the Executive Branch of State Government as the Virginia Department of Aviation (DOAV) in 1979 (DOAV, 2006). The Virginia Port

Authority (VPA) was created in 1952 (VPA, 2013). All of these entities, in addition to some others, collectively make up Virginia's Transportation Structure.

#### **5.4.2 Virginia's Transportation Organizational Structure**

Virginia has an established Transportation Secretariat, which includes various transportation agencies, including VDOT, DOAV, DRPT, and VPA. The other agencies include the Department of Motor Vehicles (DMV), the Motor Vehicle Dealer Board, the Office of Transportation Public-Private Partnerships, and Virginia Commercial Space Flight Authority. The Secretariat is governed by the Commonwealth Transportation Board (CTB). The 17-member Board is responsible for creating the transportation policy for the state and allocating funding to projects. The Secretary of Transportation, the Commissioner of VDOT, and the Director of the Department of Rail and Public Transportation are members of the Board. The Board has adopted a statewide multimodal transportation plan, VTrans2035, which provides overall guidance to the state transportation agencies (OIFI, 2012).

#### Modal Transportation Agencies

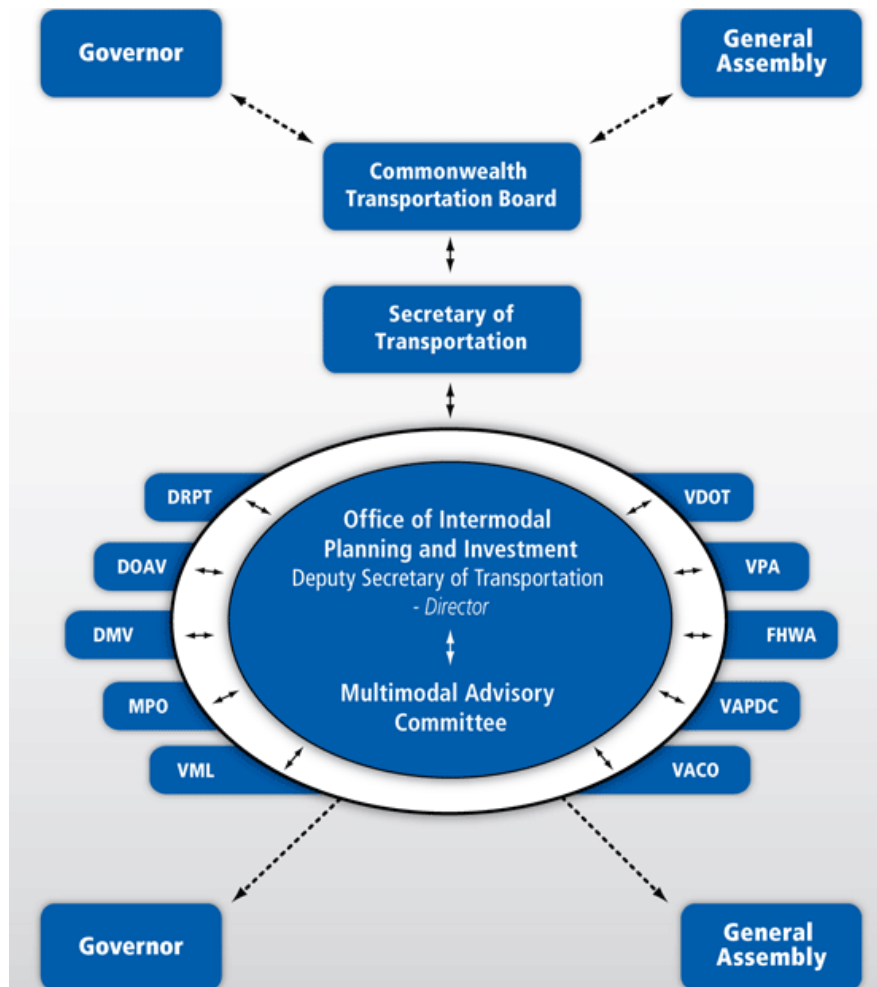
- *Virginia Department of Transportation* – Because of the other modal agencies in Virginia, VDOT's responsibility is narrowed to mainly “building, maintaining, and operating the state's roads, bridges, and tunnels” (VDOT, 2011a). VDOT also has the responsibility for carrying out the state's Bicycle and Pedestrian Program. VDOT's jurisdiction is composed of a total of nine highway districts. These districts are further divided into 29 residency offices and two district satellite offices. Each of these

offices is responsible for between one and four counties. In addition to these offices, there is a central office located in Richmond (VDOT, 2011a).

- *Department of Aviation* - The DOAV is separated into four divisions by function. The Airport Services Division provides technical assistance to airport sponsors and managers for planning, construction, design, and maintenance of airport facilities, administers aviation-related funding programs, and conducts statewide aviation system planning (DOAV, 2006). The Communications and Education Division promotes Virginia's airports and markets aviation. The Flight Operations and Safety Division manages an aviation safety program and maintains the state-owned aircraft. The Finance and Administration Services Division handles the department's budget and manages the procurement and contracting of goods and services.
- *Department of Rail and Public Transportation* - The DRPT is responsible for rail, public transportation, and commuter services. In those three areas, the Department carries out various functions, which include the following: providing assistance to passenger and freight rail through funding, research, and expert advice; supporting public transportation by providing technical assistance and funding for public transportation programs throughout the state; and coordinating with commuter service programs to provide riders with information, business incentives, and ride-matching services. Altogether, the state has over a dozen railroad companies and services and a total of 60 public transportation systems (DRPT, 2011).
- *Virginia Port Authority* – The VPA is in charge of functions related to commerce development and improvement of ports in Virginia. The VPA owns and operates three marine terminals and an inland intermodal facility. The authority also leases and

operates an additional facility. In addition to the operation of these five facilities, the VPA provides assistance to smaller ports in the state (OIPI, 2012).

The State of Virginia also has an *Office of Intermodal Planning and Investment* (OIPI) that is directed by the Deputy Secretary of Transportation. The goals of this office are to carry out tasks that “link existing systems, reduce congestion, improve safety, mobility, and accessibility, and provide for greater travel options” (OIPI, 2012). Figure 5.16 shows the organizational structure of OIPI. The office coordinates the multimodal



**Figure 5:16: Office of Intermodal Planning and Investment Organization (OIPI, 2012)**

and intermodal planning for transportation modes in the state. The work of the office is coordinated through a Multimodal Transportation Working Group that includes representatives from various agencies in the Transportation Secretariat (VDOT, DRPT, DOAV, VPA, and DMV). The other agencies include the Virginia Association of Planning District Commissions (VAPDC), the Virginia Municipal League (VML), the Virginia Association of Counties (VACO), and metropolitan planning organizations (MPOs). These entities, along with the Federal Highway Administration, work together to encourage multimodal and intermodal planning within the state.

#### **5.4.3 Funding for Virginia Transportation**

The Commonwealth Trust Fund (CTF) is Virginia's central fund that collects and distributes transportation revenue to the state's transportation agencies and programs. The budget for the FY 2013 CTF comes from various sources, totaling close to \$4.7 billion (VDOT, 2012a). Two of the major revenue sources for the CTF are the Highway Maintenance and Operating Fund (HMOF) and the Transportation Trust Fund (TTF). The HMOF gets its funds from the following state revenue sources: motor vehicles fuels tax, road tax, motor vehicle sales and use tax, international registration plan fees, motor vehicle license fees, recordation tax, and other miscellaneous revenues. The TTF also gets its funds from many of those same taxes and licensing fees in addition to aviation fuels tax and the state general sales and use tax (VDOT, 2012a). Those two funding structures (HMOF and TTF), as well as federal funds, make up nearly three quarters of the total budget. The remainder of the budget comes from the Priority Transportation

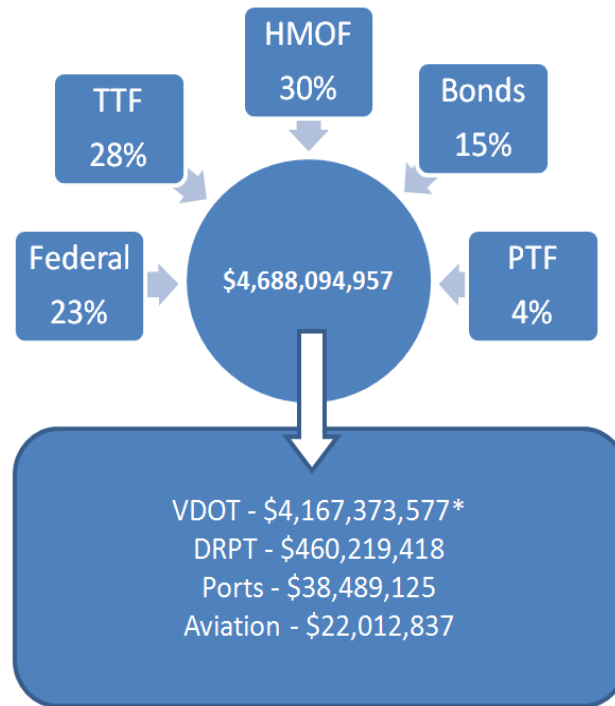


Fund and bonds. Figure 5.17 shows this breakdown of the CTF revenues for FY 2013 (VDOT, 2012a).

The distribution of funds in the CTF is predetermined. Revenues from the HMOF are dedicated to highway maintenance, operations, and administration. The PTF revenues are reserved for debt service on Federal Highway Reimbursement Anticipation Notes and Commonwealth of Virginia Transportation Capital Projects Bonds. Federal funds are used for their designated purposes of supporting transit and constructing and maintaining highways. The TTF funds are distributed by formula, in accordance with the Code of Virginia. Approximately 79 percent of the revenue from the TTF goes to the Construction Fund administered by VDOT, 14.7 percent is directed to the Mass Transit Account directed by the DRPT, 2.4 percent is dedicated for the Airport Fund governed by the DOAV, and 4.2 percent is deposited in the Port Fund overseen by the VPA (VDOT, 2012a). The total distribution of CTF funds by modal agency is shown in Figure 5.17. For FY 2013, VDOT received close to 89 percent of the total budget and DRPT received 9.8 percent. The remainder went to ports and aviation. In some cases, the agencies receive funds in addition from that which comes from the CTF.

A further breakdown of the budgets within each of the modal agencies is below:

- *VDOT* - VDOT's budget for Fiscal Year 2013 is \$4.2 billion. Of the total budget, \$1.83 billion (44 percent) is budgeted for road maintenance and \$1.6 billion (38 percent) is budgeted for construction. Of the remaining funds, \$449.7 million is for administrative support and support to other agencies, tolls, and programs and \$300 million goes to debt service. (VDOT, 2012b)



\*\$4.19B before support to DRPT

**Figure 5.17: FY 2013 CTF Revenue Sources (VDOT, 2012a)**

- DRPT* – Including the CTF, the funding sources and expected expenditures for DRPT total \$509.3 million for FY 2013. The largest expenditures are public transportation programs (\$310.3 million), rail programs (\$109.4 million), and the Dulles Corridor Metrorail Project (\$50 million). The other expenditures include: commuter assistance programs; planning, regulation, and safety programs; human service transportation programs; agency operations; and support to other agencies. (DRPT, 2012)
- VPA* – For FY 2012, VPA’s revenues totaled \$143.7 million. 62 percent of the revenue came from operating revenues from Virginia International Terminals (VIT, a nonprofit corporation that operates the marine terminals owned by VPA) and 25 percent came from the Commonwealth Port Fund allocation. The

remainder came from operating revenues from grants, VPA operating revenue, interest income, capital contributions from VIT, federal government, and other incomes. The expenses for FY 2012 totaled \$164 million. Over 70 percent went to VPA operating expenses. Other expenses include rail relocation expenses, loss on disposals of assets, and interest expenses. (VPA, 2012)

- *DOAV* - For DOAV's total operating budget, \$30,246 comes from the general fund, \$34.4 million comes from the non-general fund, and \$2.87 million is reserved for personnel costs (DPB, n.d.). The majority of the budget goes toward capital improvements while the remaining goes toward facilities, equipment, promotion, aircraft operations, safety, and security.

#### **5.4.4 Multimodal Efforts<sup>7</sup>**

##### Performance Measures

Virginia has a prioritization process that includes performance measures, but this process is not being used currently. Since 2006 they have been publishing statewide performance reports which have been getting more attention recently and Virginia is hoping to apply the performance measures to projects in the future. Currently, the report includes 42 performance measures (but only 12 targets) and the measures are by mode. The reports are prescriptive reports and are published for prior years. Virginia is hoping to change to a more proactive approach using an automated process and ideally include multimodal, rather than single, mode measures.

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<sup>7</sup> Excerpt taken from Multimodal Needs (2012) and slightly modified

## Intermodal Networks

- *I-66 Corridor* – In July 2011, VDOT and DRPT initiated the \$4 million I-66 Multimodal Study to identify and evaluate the most effective multimodal and corridor management solutions for addressing the congestion and transportation needs of the I-66 corridor inside the Capital Beltway (I-495) (Cambridge Systematics, 2011; Office of the Governor, 2010). The study that is expected to be completed in 2012 considers “a wide range of complementary and mutually supportive multimodal improvement options, such as public transportation, transportation demand management, high-occupancy vehicle (HOV) lanes, high-occupancy toll (HOT) lanes, congestion pricing, managed lanes, active traffic management, bicycle and pedestrian corridor access, and highway improvements” (Cambridge Systematics, 2011). VDOT has formed a Participating Agency Representative Committee (PARC) to ensure that the study uses a broad lens to evaluate options. “The PARC meets with VDOT, DRPT, and the project consulting team on a monthly basis to provide input on draft materials and advise the study. Over the course of the project, the PARC will meet at least 10 times to comment on and review progress. In addition, representatives serve as liaisons with their respective agencies and elected officials and help distribute study information to constituents and interested citizens” (Cambridge Systematics, 2011).
- *The Heartland Corridor And Roanoke Region Intermodal Facility* – The Heartland Corridor is a public-private partnership between the Norfolk Southern railroad, the federal government, and the states of Virginia, West Virginia, and

Ohio. The project involved raising vertical clearances along tracks owned by Norfolk Southern to allow double-stacked intermodal container trains to be moved from the Port of Virginia to Chicago, Illinois (Norfolk Southern, 2010)). These improvements are expected to reduce the travel time by up to a day and a half and reduce the travel distance by over 200 miles. The project is expected to take 150,000 trucks off Virginia's highways each year. As a part of this project, DRPT and Norfolk Southern are planning to construct an intermodal facility in Roanoke with close proximity to the Heartland Corridor, the Crescent Corridor, and Interstate 81. This facility will provide connectivity for the entire state of Virginia to these important intermodal rail corridors (Office of the Secretary of Transportation, 2011). The \$169 million project cost is shared between Norfolk Southern and the involved governments. VDOT and DRPT fund \$9.75 million for the Heartland Corridor and \$12.6 million for the Roanoke facility through a Virginia Rail Enhancement Grant (CTB, 2006).

#### Other Multimodal Efforts

- *Survey of Statewide Multimodal Transportation Planning Practices* – As discussed in Chapter 2 of this paper, in 2002 the Virginia Transportation Research Council (a cooperative organization sponsored by VDOT and the University of Virginia) conducted a survey of statewide multimodal transportation planning practices in order to learn from other states and from best practices.
- *Office of Intermodal Planning and Investment* – In 2002, the above discussed Office of Intermodal Planning and Investment was established by Legislature “to

encourage the coordination of multimodal and intermodal planning across the various transportation modes within the commonwealth” (OIPI, 2012). This office developed slowly over the past few years and has only recently been allocated official fulltime staff. Although the office receives funding for planning, it cannot select projects.

- *Multimodal Strategic Plan* – Virginia’s multimodal efforts were further demonstrated when Governor McDonnell released the Multimodal Strategic Plan in 2010. The motivation behind this plan was explained by Virginia Transportation Secretary Connaughton: “Virginia’s multimodal transportation challenges require multimodal transportation solutions. We will strive to make better transportation decisions by looking at every alternative and by focusing on available resources” (Office of the Secretary of Transportation, 2010). All the different agencies were involved in creating this plan in some capacity and met with each other on a monthly basis.

## **5.6 Maryland Department of Transportation**

### **5.6.1 Brief Overview of MDOT**

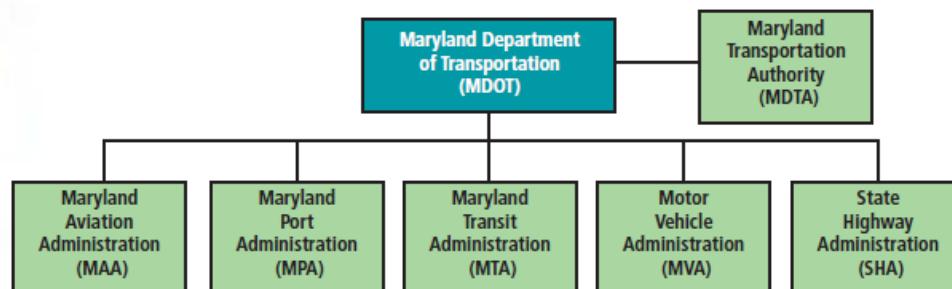
In 1970, the State of Maryland undertook an executive reorganization plan. As part of this plan, “a study was undertaken to establish the requirements, organization, and authority of a state Department of Transportation” (Systems Design Concepts Inc., 1970). In response, the Maryland Department of Transportation (MDOT) was created in 1971 with responsibilities for the State Highway Administration, the Motor Vehicle Administration, the Maryland Aviation Administration, the Maryland Port

Administration, and the Maryland Transit Administration (Maryland State Archives, 2009). Each of these agencies had origins that dated back to the early 1960s and before. The creation of MDOT brought these separate administrations under one institutional umbrella. This arrangement continues to foster a transportation culture that considers various modes of transportation as an integrated system.

### **5.6.2 MDOT's Organizational Structure**

As a “truly multimodal agency” with nearly 9,000 employees, MDOT “strives to achieve...a world-class multimodal transportation system that supports a vibrant economy and an excellent quality of life for all Marylanders” (MDOT, 2009a). As stated by Maryland Secretary of Transportation Beverly Swaim-Staley, “the Maryland Department of Transportation is a multimodal agency. For over 35 years, MDOT’s jurisdiction has encompassed capital investment and operations in the port, airport, highway, transit, and rail modes” (Swaim-Staley, 2010). The agency is responsible for these modes in addition to toll facilities in the state, as well as vehicle registration, titling, driver licensing, and other administrative functions. In order to carry out these responsibilities, MDOT has five modal administrations and one independent transportation authority (Figure 5.18). The five modal administrations existed as separate entities before they were brought under the same agency. Even though most of MDOT’s resources lie in the State Highway Administration (SHA), each administration has a strong degree of independence. They each have planning functions that are specific to their modes and operate in separate locations in or near Baltimore. Yet, the role of state planning is retained by the Secretary’s Office in Baltimore. The Secretary’s Office (TSO)

establishes the Department's transportation policy and oversees the modal administrations. The Secretary of Transportation also serves as Chairman of the Maryland Transportation Authority (MDTA) (MDOT, 2009a). These five modal administrations and the MDTA work together in order to develop a "seamless" transportation system.



**Figure 5.18: MDOT's Organizational Structure (MDOT, 2009a)**

- *Maryland Transportation Authority (MDTA)* – The MDTA is an independent agency that is responsible for constructing, maintaining, and operating the toll facilities within the state. There are a total of eight toll facilities, whose revenues are pooled in a state transportation fund (MDTA, n.d.).
- *Maryland Aviation Administration (MAA)* – The MAA owns and operates Baltimore/Washington International Thurgood Marshall Airport (BWI) and Martin State Airport. Additionally, Maryland's aviation system includes 18 public general aviation airports and 18 private airports (MDOT, 2009a).



- *Maryland Port Administration (MPA)* – Maryland’s main port is the Port of Baltimore (POB), which serves both cargo and cruise vessels. The MPA manages and operates the public marine terminals in the state.
- *Maryland Transit Administration (MTA)* - The transit system, which currently includes the local bus, commuter bus, the Maryland Area Regional Commuter (MARC) Train, light rail, metro subway, and mobility/paratransit services, is one of the largest multi-modal transit systems in the country, serving primarily Baltimore. The MTA also manages the taxi access system and provides financial assistance to locally operated transit systems (LOTS) in all of the counties plus Baltimore City, Ocean City, and Annapolis (MDOT, 2009a).
- *Motor Vehicle Administration (MVA)* – The MVA is responsible for various vehicle and driver services, such as driver licensing and education, vehicle titling and registration. Additional programs include: Vehicle Emissions; Rookie Driver; Motorcycle Safety; Driver Improvement; Alcohol and Drug Education; Organ Donor; and Motor Voter (Motor Vehicle Administration, n.d.).
- *State Highway Administration (SHA)* – The SHA is responsible for maintaining the highway system in Maryland, which includes 17,000 lane-miles and 2,576 bridges (State Highway Administration, 2011). Areas of concern for the administration include highway safety, mobility, congestion relief, system preservation and maintenance, and environmental stewardship.

In addition to these agencies, there are a total of six Metropolitan Planning Organizations (MPOs) in the state: the National Capital Region Transportation Planning

Board (TPB) in Washington, DC; the Baltimore Regional Transportation Board (BRTB) in Baltimore; the Cumberland Area Metropolitan Planning Organization (CAMPO) in Cumberland; the Hagerstown/Eastern Panhandle Metropolitan Organization in Hagerstown; the Salisbury/Wicomico Metropolitan Planning Organization in Salisbury; and the Wilmington Metropolitan Area Planning Coordinating Council (WILMAPCO) in Newark, Delaware. These MPOs work in collaboration with the MDOT administrations, as well as with local officials and the public, in order to develop Maryland's Statewide Transportation Improvement Program (STIP), along with other documents (State Highway Administration, n.d.).

### **5.6.3 Funding for MDOT**

Maryland's multimodal culture is further demonstrated by the flexible funding within the state's transportation program. As noted in the state's transportation plan, "MDOT emphasizes strategic investments in the multimodal transportation system to achieve the Department's goals of a balanced...transportation network" (MDOT, 2009a). The Maryland Transportation Trust Fund (TTF), which was created in 1971, is the state's dedicated revenue source for transportation (MDOT, 2011a). The TTF "assures there are no administrative barriers to combining or flexing State or Federal transportation funds to pay for the needs of a given project, within the constraints of statutory authority" (MDOT, 2011b). In other words, the TTF is a "mode-neutral funding source" and none of the revenue sources are tied to a specific transportation program or project. Furthermore, as of June 2011, MDOT stopped receiving funds from the State's general fund (MDOT, 2011a). This stipulation ensures that MDOT is not in competition with other state

programs for funding. The overall nature of the TTF promotes multimodal transportation planning.

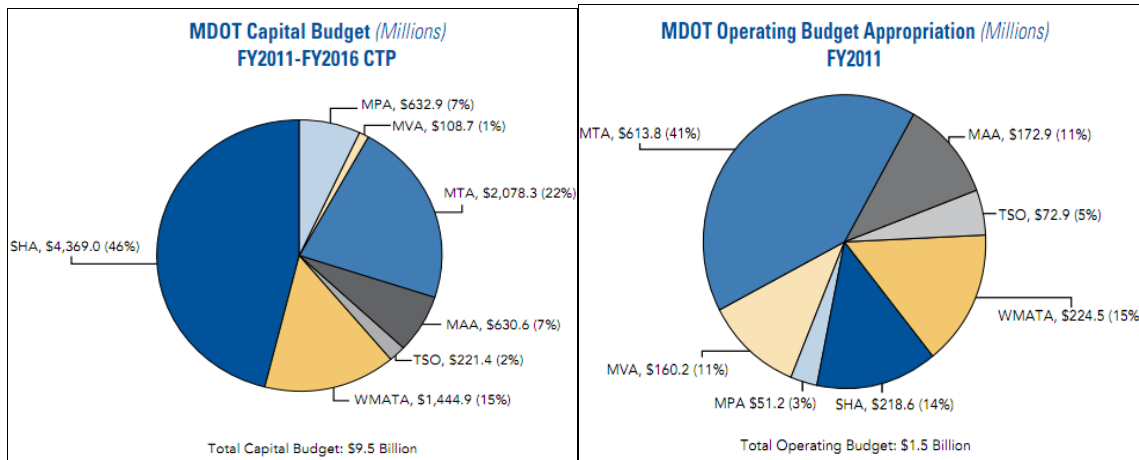
The sources for the TTF include federal aid (19 percent), motor fuel taxes (18 percent), vehicle titling taxes (18 percent), and registrations and MVA fees (15 percent). The remaining funds come from corporate income taxes, operating revenue, bonds, sales and use tax, and other sources (MDOT, 2011c). For fiscal year 2011, the revenues totaled \$2.87 billion in addition to the fund’s starting balance of \$234 million (Department of Legislative Service, 2012). The revenue is used for all MDOT activities, including operation, maintenance, administration, capital projects, and debt service. “The allocation of the funds to projects and programs is made in conjunction with state and local elected officials” (MDOT, 2011a). Table 5.1 shows the allocation of expenditures for fiscal year 2011. Funds that are not expended by the close of the fiscal year remain in the TTF. For fiscal year 2011, the ending fund balance was \$221 million (Department of Legislative Service, 2012). MDTA is independently funded through tolls, concessions, revenue bonds, investment income, and other sources.

**Table 5.1: Allocation of TTF Expenditures for Fiscal Year 2011**

**(Department of Legislative Service, 2012)**

<b>Uses of Funds</b>	<b>Amount (in millions)</b>	<b>Percent</b>
MDOT Operating Expenditures	\$1,546	53.6
MDOT Capital Expenditures	\$621	21.5
MDOT Debt Service	\$156	5.4
Highway User Revenues	\$139	4.8
Other Expenditures	\$423	14.7
<b>Total Expenditures</b>	<b>\$2,885</b>	<b>100</b>

The total capital budget for MDOT between 2011 and 2016 was estimated at \$9.5 billion (Figure 5.19). The largest portion of the capital budget was apportioned for the SHA, followed by MTA and WMATA. The majority of the operating funds appropriated in 2011 also went to MTA, WMATA, and SHA (Figure 5.20). The 2011-2016 capital budget and the 2011 operating budget for the MDTA were \$2.7 billion and \$277.3 million, respectively (MDOT, 2011c). Approximately 70 percent of the MDTA’s capital budget went toward system enhancement and 30 percent went toward system preservation. Operating expenses included the MDTA Division of Operations, administrative and general costs, Maryland state police, and Authority police. The state’s general aviation airports, excluding BWI Marshall and Martin State, received close to \$33.5 million in state funding between 2001 and 2010 (MDOT, 2011c).



**Figures 5.19 and 5.20: MDOT Capital Budget; MDOT Operating Budget (MDOT, 2011c)**

Additional information related to budgeting for MDOT’s planning entities was obtained through phone calls to MDOT’s planning department and to administrations within MDOT. Funding information for MDOT’s Office of Planning and Capital

Programming was of particular interest. For FY 2012, the office had an operating budget of \$1.75 million and a budget of \$650,000 for working on project-related planning. There was a \$100,000 set-aside for the staff for resources outside of salary and a \$1.5 million set-aside for consultant contracts. (MDOT OPCP Staff, 2012).

#### **5.6.4 Multimodal Efforts**

##### 2009 Maryland Transportation Plan

Five goals were outlined in the 2009 Maryland Transportation Plan (MTP). One of these goals was connectivity for daily life. The first stated objective related to this goal was to "provide balanced, seamless, and accessible multimodal transportation options for people and goods" (MDOT, 2009a). This objective was demonstrated through numerous efforts that were noted in the plan. Several of these efforts include improvement of passenger and freight accessibility to BWI Marshall Airport, implementation of the 20-Year Bicycle and Pedestrian Access Master Plan, and addition of numerous park-and-ride facilities. Furthermore, the MTP provided performance measures that corresponded to connectivity for daily life (i.e., average weekday transit ridership for MTA and percent of lane miles with average volumes at or above levels of congestion for SHA).

##### I-270/US 15 Multimodal Corridor Study

A more specific project that demonstrates MDOT's multimodal efforts in planning is the I-270/US 15 Multimodal Corridor Study. The study, which was a collaborative effort between MTA and SHA, was initiated in the mid-1990s in order to find options for reducing congestion, improving safety, and increasing mobility (MDOT,

2009b). Given the two modal administrations that were involved in the study, the main areas of focus were highway capacity improvements and transit expansion. Highway capacity improvements focused on ways to use general-purpose lanes, HOV lanes, express toll lanes, direct access ramps, and collector-distributor lanes as strategies to reduce congestion. Transit expansion projects included bus rapid transit and light rail transit along the Corridor Cities Transitway. The highway capacity improvements and transit expansion project options were combined in order to provide a set of alternatives. The two modal administrations are now carrying out this project on separate, but coordinated tracks. This project reflects other MDOT initiatives to bring planners from separate modal administrations together in order to facilitate multimodal decision-making.

## **5.5 Massachusetts Department of Transportation**

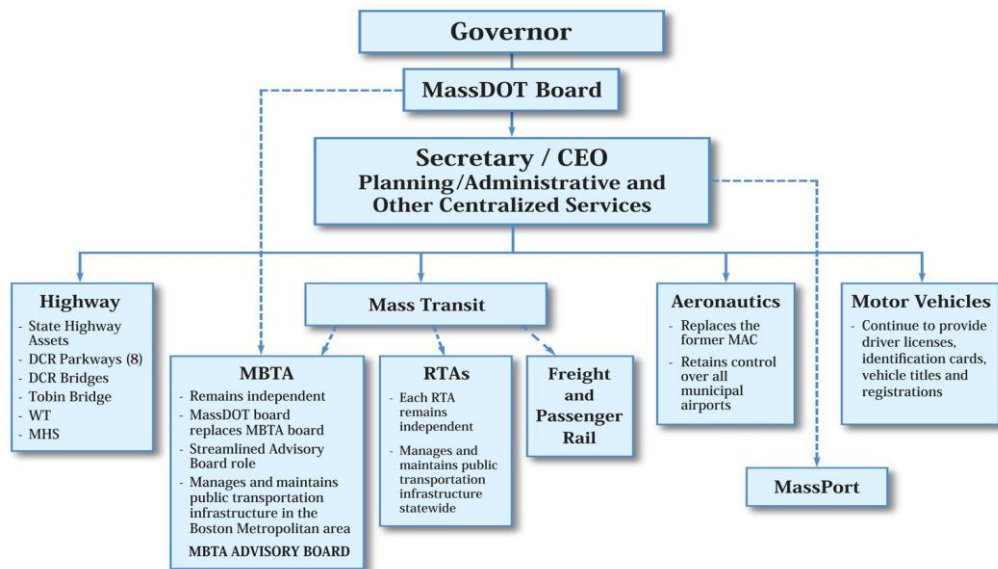
### **5.5.1 Brief Overview of MassDOT**

The Massachusetts Department of Transportation (MassDOT), newly established in 2009 (as a result of the Transportation Reform Act), is a “merger of the (then) current Executive Office of Transportation and Public Works (EOT) with the Massachusetts Turnpike Authority (MTA), the Massachusetts Highway Department (MHD), the Registry of Motor Vehicles (RMV), the Massachusetts Aeronautics Commission (MAC), and the Tobin Bridge, currently owned and operated by the Massachusetts Port Authority (MPA)” (MassDOT, 2012a). This merger was done for the purpose of creating a centralized transportation agency that can carry out its tasks more efficiently and effectively. In addition to the responsibilities associated with these former independent

agencies, MassDOT also oversees the Regional Transit Authorities (RTAs) in the state, including the Massachusetts Bay Transportation Authority (MBTA), the largest RTA in Boston.

### 5.5.2 MassDOT’s Organizational Structure<sup>8</sup>

MassDOT is led by the Secretary of Transportation, which includes oversight of four separate divisions within the agency: the Highway Division, the Rail and Transit Division, the Registry of Motor Vehicles Division, and the Aeronautics Division (see Figure 5.21).



**Figure 5.21: MassDOT Organizational Structure, FY 2011 Transportation Budget (Mullan, 2010)**

<sup>8</sup> Information about MassDOT’s organizational structure was obtained from the agency’s website: <http://www.massdot.state.ma.us/AboutUs.aspx>

- *Highway Division* – The Highway Division is responsible for designing, constructing, and maintaining the state’s highways and bridges. These facilities include 9,517 lane-miles of roadway, 65 lane-miles of tunnels, and 5,098 bridges (MassDOT, 2010). The division also plays a leading role in ensuring highway safety throughout the state.
- *Rail and Transit Division* – The Rail and Transit Division oversees all transit projects and other transit initiatives throughout Massachusetts. The division also provides oversight for the Massachusetts Bay Transportation Authority as well as all Regional Transit Authorities.
- *Registry of Motor Vehicles Division* – The Registry of Motor Vehicles Division is responsible for the licensing of drivers and for the registration of vehicles and aircraft. The division also carries out the state’s vehicle inspection program.
- *Aeronautics Division* – The Aeronautics Division has authority over public use airports, private use landing areas, and seaplane bases in the state. The division is responsible for tasks such as airport development, airport improvement, aviation safety, aircraft accident investigation, and aviation planning. It also “certifies airports and heliports, licenses airport managers, conducts annual airport inspections, and enforces safety and security regulations” (MassDOT, 2012a).

In addition to these four divisions, MassDOT has an Office of Transportation Planning (OTP). This office is responsible for implementing both state and federal transportation planning requirements, engaging the public in order to identify transportation issues and possible strategies to solve them, and ensuring that



transportation plans are in line with the Governor's sustainable development principles. Other areas of focus include transportation research, transit planning and programming, statewide freight planning, and intelligent transportation systems (ITS) planning. Even though this office is dedicated to multimodal planning, planning still occurs in all of the modal divisions. The responsibility and the scale of planning varies depending on the scope of the project; *“small infrastructure specific projects like an intersection upgrade would be done in our Highway Division while a large effort to go to automated tolling across our entire tolled highway system is done in the Office of Transportation Planning”* (MassDOT OTP Staff, 2013). OTP is also responsible for other large scale projects, programmatic level plans, and policy-related tasks, except for those of the Aeronautics Division since the division is very small. OTP reports to the CEO and the Secretary of MassDOT to coordinate the large scale planning efforts on behalf of the capital divisions: Transit, Highway, and Aeronautics. *“OTP's position in the organizational structure allows us to easily build partnerships and relationships with our capital divisions and coordinate planning efforts”* (MassDOT OTP Staff, 2013). Planning for the Regional Transit Authorities (RTA) and the Massachusetts Bay Transportation Authority (MBTA) is carried out by MassDOT's planning office in conjunction with regional planning agencies.

In addition to the offices within the Department, there are external organizations in the state that contribute to and complement MassDOT's role in carrying out multimodal transportation planning. There are 13 Metropolitan Planning Organizations (MPOs) in the state accounting for 351 municipalities in Massachusetts. These MPOs have a major role in transportation planning alongside MassDOT in the state's

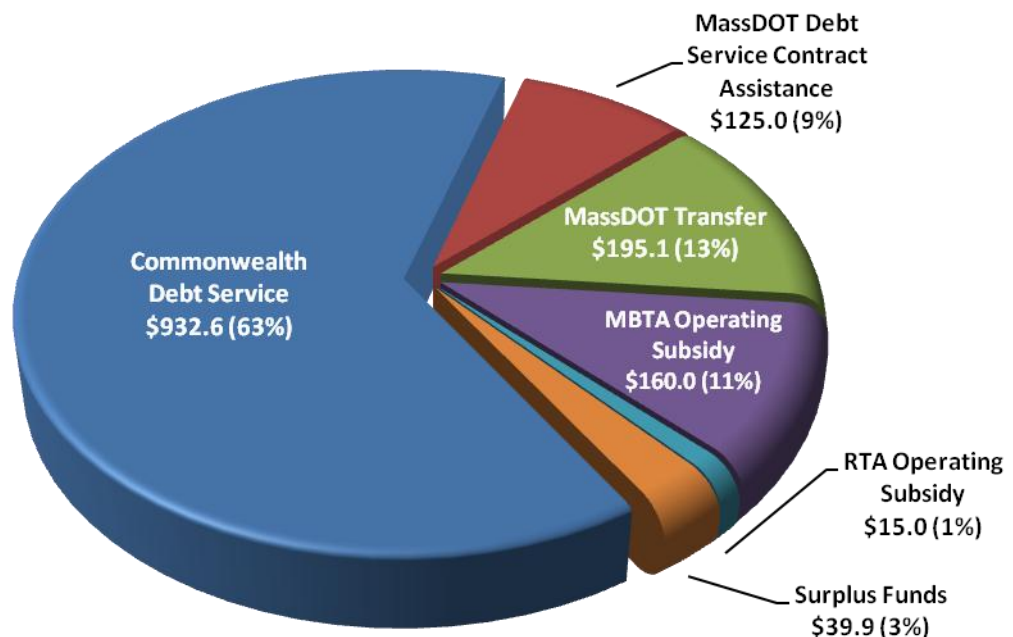
metropolitan areas, namely through the preparation of various mandated transportation planning documents. The most important planning documents include the Statewide Strategic Plan, the Regional Transportation Plan (RTP), the Transportation Improvement Program (TIP), the State Transportation Improvement Program (STIP), and the Unified Planning Work Program (UPWP). The Statewide Strategic Plan is developed and approved by MassDOT. The STIP is developed by MassDOT and approved by the USDOT. The RTP, the TIP, and the UPWP are all developed and approved by the MPOs (MassDOT, 2013a).

### **5.5.3 Funding For MassDOT**

Funding decisions for MassDOT are made through a collaborative process that includes the Governor, the Legislature, MassDOT, MassDOT Board of Directors, RTAs, and MPOs. These individuals and organizations participate in the decisions for both the operating and the capital budgets. “The operating budget enables the day-to-day functioning of MassDOT by paying for recurring expenditures for programs and services, employee salaries, rents, utilities, supplies, insurance and equipment repairs. The capital budget funds construction and maintenance of roads, bridges, airports, durable goods such as trucks, vehicles and major repairs to buildings and other facilities” (Mullan, 2010).

MassDOT’s funding sources and structures include capital projects funds, fiduciary funds (Trust Funds or Agency Funds), the Commonwealth Transportation Fund (CTF), the Massachusetts Transportation Trust Fund (MTTF), the Motor Vehicle Safety Inspection Trust Fund (MSVI), the Transportation Infrastructure Fund (TIF), and the

Central Artery Tunnel Project Repair and Maintenance Fund. The CTF, which was established under the Transportation Reform Act of 2009, “accounts for road and highway use revenues, including the gas tax, aviation gas taxes, registry fees, and 0.385 percent of the sales tax” (Mullan, 2010). In fiscal year 2011, the CTF revenues totaled \$1.4 billion (Mullan, 2010); 21 percent came from sales tax, 34 percent came from RMV fees, and 45 percent came from gas tax (Mullan, 2010). Figure 5.22 shows how this revenue was spent. Funds from the CTF go toward debt service related to maintenance and construction projects. The remaining funds are appropriated to MassDOT by the Legislature. These funds go to the MTTF. The MTTF, which is the main governmental funding structure for MassDOT, was established under the Transportation Reform Act of 2009 as well. Sources of funding for the MTTF include an annual appropriation from the CTF, toll revenue, permits and fees for the use of state transportation facilities, and rents and land proceeds for the use of land owned by MassDOT. The funds from the MTTF are



**Figure 5.22: CTF - Where the \$1.4B Goes, FY11 (in millions) (Mullan, 2010)**

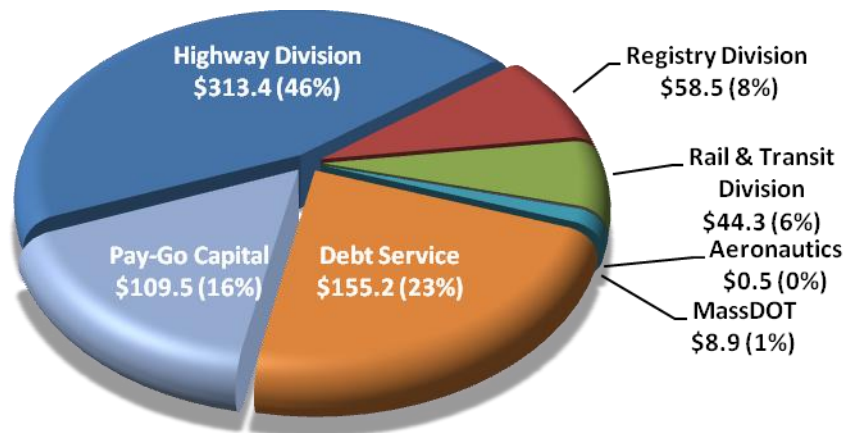
used for MassDOT operation. Toll revenues are used to fund highways operation and maintenance projects. The permits and fees and rents and land proceeds are unrestricted, meaning they are able to be used by all modal divisions within MassDOT.

Table 5.2 shows the various sources of revenue for MassDOT's FY 2011 operating budget, both restricted and non-restricted. Collectively, these sources netted MassDOT \$690 million. The restricted funds limit how the revenue can be used by certain modal divisions. 70 percent of the revenues received by MassDOT must be used for tolled roads and bridges. The other 30 percent can be used for the non-tolled roads, the Registry of Motor Vehicles Division, the Aeronautics Division, and MassDOT's Office of Planning and Programs.

**Table 5.2: Sources of Revenue and Projected Amounts for FY 2011 (Mullan, 2010)**

<b>Funds</b>	<b>Source of Revenue</b>	<b>Amount (in millions)</b>
Restricted	Turnpike & Tobin Bridge Toll Revenues	\$313
	Commonwealth Debt Service and Operations Contract Assistance	\$125
	Turnpike & Tobin Bridge Non-Toll Revenues	\$47
Non-Restricted	Commonwealth Transportation Fund Appropriation	\$195
	Permits, Rents, and Other Department Revenue	\$10

Figure 5.23 shows how the \$690M in revenue was allocated among the divisions within the agency (Mullan, 2010). The largest amount of money was allocated for highways, followed by debt service. The least amount of money was allocated for aeronautics, which received \$0.5M from MassDOT in fiscal year 2011.



**Figure 5.23: Operating Budget by Division**

**(MassDOT – Where the \$690M Goes, FY 2011 (in millions)) (Mullan, 2010)**

At the start of 2013, total funds available for planning were over \$93 million (MassDOT, 2011). Based on planning needs for 2013, which totaled \$18.4 million, there is an expected surplus at the end of the year.

### **5.5.4 Multimodal Efforts**

#### Long-Range Transportation Plan (2006)

In 2004, Chapter 196 of the Acts of 2004: An Act Restructuring the Transportation System of the Commonwealth was signed into law. “This legislation strengthened the Executive Office of Transportation, simplified the management and integration of transportation agencies, and increased the institutional emphasis on multimodalism and coordination” (MassDOT, 2006). The changes that were made as a result of the Act were reflected in Massachusetts’ 2006 Long-Range Transportation Plan (LRTP), in which MassDOT identified the need to broaden transportation choices in

order to reduce congestion. One identified way to do this was to create a more balanced transportation system. The LRTP stated that “some of the principal modes that can help to improve mobility through travel demand management and transportation choice include walking, bicycling, transit, and ridesharing” (MassDOT, 2006). Various initiatives included in the plan were the implementation of pedestrian and bicycle projects and the consideration of pedestrian and bicycle accessibility, mobility, and safety in all roadway projects. Other programs in the plan included Safe Routes to School, Access to Transit, Transit-Oriented Development, and a Housing Support Program.

#### Central Artery/Tunnel Project

One project that demonstrates MassDOT’s commitment to a multimodal transportation system is the Central Artery/Tunnel Project (CA/T). The purpose of the CA/T project, whose construction began in 1991 and was substantially completed by 2006, was to reduce congestion and increase mobility in Boston. The CA/T project, which is recognized as the “largest, most complex, and technologically challenging highway project in the history of the United States...replaced Boston’s deteriorating six-lane elevated Central Artery (I-93) with an eight-to-ten lane state-of-the-art underground highway, two new bridges over the Charles River, extended I-90 to Boston’s Logan International Airport, and Route 1A, created more than 300 acres of open land and reconnected downtown Boston to the waterfront” (MassDOT, 2012b). Though primarily highway-oriented, the project had many implications for other modes of transportation. As stated in the 2006 LRTP, “an important aspect of the CA/T project is its multimodal character” (MassDOT, 2006). This claim is supported by the approximately 1,200

commitments in addition to the main highway elements (MassDOT, 2006). “Prominent among these were the transit commitments, a list of public transit projects that the Commonwealth of Massachusetts pledged to complete in order to preserve Boston’s balanced, multimodal transportation system, and to prevent the project’s increased highway capacity from resulting in growth exclusively in automobile travel” (MassDOT, 2006). Some of these projects include the Blue Line Modernization Project, the Silver Line bus rapid transit project, the Old Colony Commuter Rail Restoration Project, and over 20,000 additional parking spaces for transit riders. In addition, a series of parks were constructed along the path of the previous Central Artery. Along this stretch there are several miles of new and refurbished sidewalks and 600 street lights (MassDOT, 2012b). This provided accommodations for both pedestrians and bicyclists. Moreover, the various environmental initiatives of the project, such as improved air quality, encouraged a well-balanced selection of transportation projects.

#### Efforts of the Office of Transportation Planning

Further information regarding MassDOT's multimodal nature was obtained over a phone interview with a transportation planner in MassDOT's Office of Transportation Planning. MassDOT does consider itself a multimodal transportation agency. During the interview, MassDOT's multimodal culture was traced back to its creation as a result of the 2009 reform, in which the five separate modal administrations were combined to form MassDOT. "The modal divisions [at MassDOT] are more closely knit than other DOTs in terms of how we operate" (MassDOT OTP Staff, 2012). Furthermore, MassDOT has a "shared service" such that the modal divisions are clients of the Office of Transportation

Planning. The Office of Transportation Planning works for these divisions and is responsible for planning for each division.

During the phone interview, information about weMove Massachusetts was also obtained. weMove Massachusetts is a strategic multimodal long range plan. It is essentially a priority tool for all projects. The plan has three parts. The first part is to determine how much funding is allocated to each modal division and if this amount of funding is appropriate for each mode. The second part is to determine the priorities within each mode. The third part is to develop specific projects related to these priorities. This plan, which is being developed by a consulting team led by Cambridge Systematics, is nearing completion. In addition to the plan, the GreenDOT policy was noted. The GreenDOT policy is an initiative to reduce GHG emissions in Massachusetts by 25 percent by 2020 (MassDOT OTP Staff, 2012). This initiative encourages multimodalism and “pushes the envelope on how we use our transportation system” (MassDOT OTP Staff, 2012).

#### Passenger Multimodal Transportation System

In addition to the various plans and policy initiatives, MassDOT already has an extensive passenger multimodal transportation system. The system includes a bus network, a passenger rail network, MBTA lots, and park-and-ride lots (MassDOT, 2013b). The MBTA lots serve as transfer points between automobile and rail while the park-and-ride lots serve as transfer points between automobile and bus. MassDOT’s freight multimodal transportation system includes the highway, railroad lines and yards, airports, seaports, and ferry routes.



## **CHAPTER 6**

### **CONCLUSIONS, LIMITATIONS, & FUTURE RESEARCH**

#### **6.1 Conclusions**

The purpose of this project was to analyze the characteristics and the evolution of state DOTs in order to see how these agencies have fared in responding to the responsibility of statewide multimodal transportation planning. Primarily, the characteristics that were analyzed were organizational structures and funding. Other factors, including organizational culture and coordination with other transportation related organizations, were also considered. Analyses in those areas led to various overall findings as well as findings specific to certain aspects of the planning process. Overall, this research verified the notion that highway is still the dominant mode in statewide transportation planning in most state DOTs. However, this research also supports the idea that this situation is changing, though more rapidly in some states than in others.

In terms of departmental organization, state DOTs generally integrate multiple modes of transportation into their organizational structures in three different ways: 1) a multimodal division; 2) separate modal divisions; or 3) both. The majority of state DOTs have multimodal divisions as well as separate modal divisions. However, having these entities in the organizational structure is not necessarily indicative of a state DOT that is more successful than others. The same can be said about the location of planning divisions within the state DOT in relation to the multimodal or separate modal divisions. Accordingly, through the organizational structure analysis, the statewide multimodal survey, and the case studies, it was shown that there is not necessarily a certain

organizational structure that is better or worse than others. Rather, the results of this project support the idea that states often use the reorganization of departmental structures as a way to make their agency more effective and efficient in carrying out its tasks. For the states that were selected for the case studies, all different modes of transportation are typically situated together within the organizational chart or they are on the same level within the structure. Three of the states had multimodal entities and the other three had strong separate modal divisions/administrations.

With respect to funding, it is clear that increased funding flexibility encourages and supports a multimodal approach to transportation planning. Moreover, this increased funding flexibility is seen more often in states that have transportation trust funds or the equivalent, or dedicated funding programs for specific transportation modes other than highway. States that have funding structures that support multimodal transportation or alternative transportation options tend to have paralleled aspects in their organizational structure (i.e., multimodal division or same-level separate modal divisions). With the exception of Oregon, all of the states that were selected for the case studies have transportation trust funds. Oregon does have programs and other funding structures that ensure funding flexibility. Furthermore, Oregon broadens the discussion on how funding is used by linking the interactions of ODOT with the decisions of the state legislature and other state agencies. This approach has many implications for successful multimodal transportation planning since funding decisions are not exclusively made at the state DOT level.

Altogether, these states are not as dependent on the federal government to fund nearly all of their needs, as is the case with some other states. These states have strong

state revenue sources (usually in the form of taxes) and tend to invest in their own transportation systems. Taking the aforementioned into consideration, the amount of available funds, how they are able to be used, and the related funding mechanisms are at the basis of successful multimodal planning.

## **6.2 Limitations**

One of the inherent limitations of this project was defining what it means for a state DOT to be successful at carrying out statewide multimodal planning. The characteristics of states (e.g., population, density, rural vs. urban, lane-miles, etc.) differ significantly. Accordingly, the needs of a transportation system vary from state to state and the approaches to transportation planning are different. That is to say that the success is relative and that the extent of multimodal planning is significant within the context of the needs of the transportation system of a given state. In order to have a meaningful project and to fairly compare state DOTs among each other, this “success” was standardized to some extent. For the organizational structures and the statewide multimodal survey, analysis was kept at a high level instead of considering factors and characteristics that were too specific and detailed. More detailed information was provided through the case studies.

For this project, there were three parts of the analysis. The scope of the organizational structure analysis included all 50 state DOTs. However, that was not the case for the statewide multimodal survey, which only considered the 35 states that responded to the survey. The other 15 states were not accounted for. Even for the states that did respond, however, the responses from those 35 state DOTs only represented one

perspective. It is likely that if multiple people from the same state DOT responded to the survey, the responses to the questions would differ to some extent. Even further, case studies were only carried out for six state DOTs. Taking those things into consideration, this project was limited in the sense that the available information was not inclusive of all 50 state DOTs and some of the information was partly subjective.

The scope was also limited in the sense that state DOTs were the primary focus. The research isolated state DOTs and focused on factors within DOTs that may influence multimodal planning. Though a very significant piece, the success of these departments in statewide multimodal transportation planning is linked to what other transportation related state agencies are doing. Such agencies such as MPOs and local governments were mentioned throughout the paper. Moreover, the larger project from which this project stems includes a regional analysis that looks at the Atlanta Regional Commission (Atlanta's MPO), the Georgia Regional Transportation Authority, and the role that such entities have in statewide multimodal planning in Georgia (see Southworth et al., 2012). Pertaining to this project however, exploring the characteristics and factors associated with these other agencies was not done in-depth because of limited time and resources.

### **6.3 Future Research**

Going forward, there are many aspects of statewide multimodal planning that still need to be investigated further. Given the above data limitations, it would be beneficial to carry out research that evaluates statewide multimodal planning from a broader perspective. This would consider an in-depth look at all of the stakeholders in the transportation industry (e.g., transit agencies, MPOs, local governments, the traveling

public, freight companies, etc.) and what implications the coordination and interaction between these various entities has on statewide multimodal planning as well as how these relationships have evolved over time. Along these same lines, research that analyzes the parties that were involved and the sequence of events that transpired in order for changes regarding funding structures and organizational structures to occur would offer more insight into the factors and characteristics that contribute to successful statewide multimodal planning.

Another area of potential future research focuses on the tools that are necessary for state DOTs to be successful in carrying out multimodal transportation planning. Such research would ask the following question: “Once state DOTs have in place the organizational structures, funding structures, and organizational culture, among other factors, that are conducive to multimodal planning, what tools are needed for the staff members to effectively carry out multimodal transportation planning?” As mentioned in Chapter 2 of this document, transportation planning tools are evolving in order to take alternative modes of transportation into consideration. This is demonstrated through tools such as Florida’s Strategic Investment Tool and North Carolina’s Multimodal Investment Network tool. However, typical transportation models and tools still focus primarily on highway travel while “different approaches like multi-modal transportation planning and transportation demand management, that encourage alternatives to roadway expansion are newer and are less developed in terms of analysis tools” (Litman, 2011). In developing these tools, further research should be carried out in order to analyze current tools and the gap between the information they provide and the information that is needed to more effectively consider alternative modes as well as other factors such as

environmental impacts and land use and development implications. An emerging and challenging research topic here is that of multimodal trade-off analysis (Cambridge Systematics, 2004; Spence and Tischer, 2008).

In regard to the continuing evolution of statewide transportation, the most recent transportation legislation (MAP-21) will have significant implications for transportation planning. It will be worth carrying out research that investigates how and to what extent MAP-21 will influence planning and change the requirements of state DOTs and other transportation agencies. MAP-21 made many significant changes; those of great significance include changes regarding program funding, and increased federal emphasis on performance measurement. The new legislation restructures many of the programs that were in SAFETEA-LU. Activities that were once carried out under the National Highway System, Interstate Maintenance, Highway Bridge, and Appalachian Development Highway System Programs, are now incorporated into the new core formula program structure which is comprised of six programs (FHWA OPGA, 2012). Additionally, MAP-21 creates two new formula programs. One of these programs is the Transportation Alternatives Program which consolidates the Transportation Enhancement (TE), Safe Routes to School (SRTS), and Recreational Trails Programs (RTP) into one. Furthermore, the Act eliminates most of the other discretionary programs, accommodating them through other programs. These changes in programs have further implications for funding. For example, the Transportation Alternatives Program is allocated \$808 million in 2013, while the three programs (TE, SRTS, and RTP) combined were allocated \$1.2 billion in 2011 (America Bikes, 2012). State DOTs will need to be

prepared to continue to accommodate multiple transportation modes despite reduced resources.

In regard to performance-based programming, “under MAP-21, U.S. DOT will establish performance measures and state DOTs will develop performance targets in consultation with metropolitan planning organizations (MPOs) and others” (CMAP, 2012). Even though, under MAP-21, there are neither financial penalties nor funding decisions that are linked to a state’s progress toward the performance goals, it is expected that investments that states make will work toward the performance targets and that MPOs will incorporate them into their TIPs and LRTPs. Generally, research on this topic should include an analysis of how states have adapted to new legislation historically and how to use the lessons learned from those experiences to better prepare DOTs to deal with present and forthcoming changes. Though MAP-21 only goes through 2014, it will likely either be extended or used as the basis for future legislation. Preparing for these changes will be of great benefit for the transportation industry.

## APPENDIX A

### STATEWIDE MULTIMODAL SURVEY INSTRUMENT



The Georgia Department of Transportation has entered into a study with the Georgia Institute of Technology that is examining multimodal transportation planning and multimodal transportation agencies. This survey is a very important part of this research and we ask that you or someone knowledgeable about such concepts for your agency fill it out. We think the survey will take approximately 15 minutes to complete.

The answers for your state or from you will not be quoted in any report or presentation without your permission. Please help us in this very important study by completing the survey.



# State Multimodal Survey



1. In what state are you located?

2. Do you work for the state DOT?

yes

no

3. If not, what agency do you work for?

5

6

# State Multimodal Survey

4. If you work in a state DOT, which of the following modes of transportation does your state DOT have some responsibility for? Please indicate who is responsible for each mode so indicated. (Note all that apply)

	Planning	Intermodal Bureau or Division	Mode-Specific Bureau or Division	Special Unit within Secretary's/Director's office	Other
Transit (Operator of some transit services)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Transit (Funder or provides subsidies)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Port (Operator)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Port (Dredging)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ferry (Operator of some ferry services)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ferry (Funder or provides subsidies)		<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Inland water/river (Funder or provides subsidies)		<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shortline Rail (Operator of some shortline services)		<input type="checkbox"/>			
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shortline Rail (Funder)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Airports (Operator of some state airports)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Airports (Funder or provides subsidies)		<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aviation Services (Funder or provides subsidies)		<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ridesharing Services (Operator)		<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ridesharing Services (Funder or provides subsidies)		<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Intercity Bus Services (Funder or provides subsidies)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pedestrian/Bicycle (Operator of some ped/bike facilities)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pedestrian/Bicycle (Funder or provides subsidies)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If other is selected for a mode, please identify who is responsible for the mode. Also, if there is a mode your DOT is responsible for that is not listed above, please identify the mode as well as who is responsible for it.

## State Multimodal Survey

5. Does your agency develop mode-specific plans and/or a multimodal plan?

Mode specific plans

Multimodal Plans

Both

What efforts exist to integrate the various plans?



6. In your opinion, to what extent does your agency conduct multimodal transportation planning that examines different modal strategies among the state-responsible modes indicated in #4 above?

1 (very little)

2

3 (moderate amount)

4

5 (to a great extent)

not applicable

7. To what extent are different modal options compared to one another in the planning/programming process to determine the most cost effective investment for the state?

1 (very little)

2

3 (moderate amount)

4

5 (to a great extent)

not applicable

8. If different modal options are compared to one another, are there specific evaluation criteria that are used to conduct such a comparison?

yes

no

don't know

not applicable

## State Multimodal Survey

9. In your opinion, over the past 10 years, to what extent has your agency been incorporating a more multimodal approach into transportation planning and programming?

- 1 (very little)
- 2
- 3 (moderate amount)
- 4
- 5 (to a great extent)
- not applicable

10. Does your state have a transportation trust fund whose funds can be used for any mode of transportation?

- yes
- no
- don't know

11. Does your state have separate funding programs for non-highway modes, such as a freight rail investment program, ports program, airport improvements, etc? (Note: this includes funding programs outside of your agency, but still using state funds, such as a freight facility investment program)

- yes
- no
- don't know

Please identify such programs.

## State Multimodal Survey

12. If your answer to #11 is yes, which of the following modes are funded with state funds? Indicate which types of funding can be used for each mode that is funded.

	Dedicated transportation funds to this mode	General state funds	Bond funding	Motor fuel taxes	Other motor vehicle taxes	Other
Transit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Port	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ferry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Inland water/river	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shortline rail	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Airports	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aviation services	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ridesharing services	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Intercity bus services	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pedestrian/bicycle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If the type of funding for a mode is "Other", please identify the type of funding. Also, if your state funds other modes not listed above, please identify the modes and the type of funding they receive.

13. Given your experience with multimodal transportation planning, identify three of the most important reasons that can explain why such planning has not been undertaken more fully in your agency.

- Modal funding categories focus our attention on mode-specific plans/programs
- State government and agency leadership is not emphasizing multimodal plans
- We are not organized to conduct multimodal planning
- Agency history and culture are not conducive to multimodal planning
- Agency standard operating procedures and processes are mode-specific
- Very few analysis tools/models exist to conduct multimodal planning
- Staff capabilities and background are not conducive to multimodal planning
- Agency constituency groups and lobbyists do not support multimodal planning
- Other agencies (e.g., MPOs, transit, ports) already do multimodal planning

Other (please specify)

## State Multimodal Survey

14. If you are an employee of a state DOT, please indicate the number of full time employees in the state DOT.

15. If you are an employee of a state DOT, estimate the number of employees in the state DOT that deal primarily with the planning for the following modes. (Note: Do not double count. If one employee is equally responsible for port and inland water, count each as 0.5 employees). Round your final number to the nearest whole number

Transit

Port

Ferry

Inland water/river

Shortline rail

Airports

Aviation services

Ridesharing services

Intercity bus services

Pedestrian/bicycle

Other

16. What do you think are the most critical issues relating to statewide multimodal transportation planning in your state?

17. What are the characteristics that are necessary in a state DOT to be considered a multimodal agency?

18. In your opinion, are there examples of multimodal planning in your state that could be pointed to as good examples of such planning? If so, please describe below.

## APPENDIX B

### LIST OF SOURCES FOR ORGANIZATIONAL STRUCTURES

**Alabama DOT** - <http://www.dot.state.al.us/adweb/Organization.html>  
**Alaska DOT & PF** - <http://www.dot.state.ak.us/inside.shtml>  
**Arizona DOT** - [http://www.azdot.gov/Inside\\_ADOT/index.asp](http://www.azdot.gov/Inside_ADOT/index.asp)  
**Arkansas State HTD** - [http://www.arkansashighways.com/about/about\\_ahtd.aspx](http://www.arkansashighways.com/about/about_ahtd.aspx)  
**California DOT** - <http://www.dot.ca.gov/aboutcaltrans.htm>  
**Colorado DOT** - <http://www.coloradodot.info/about>  
**Connecticut DOT** - <http://www.ct.gov/dot/cwp/view.asp?a=1380&Q=302028>  
**Delaware DOT** - <http://www.deldot.gov/home/about/>  
**Florida DOT** - <http://www.dot.state.fl.us/personnel/OfficeOrg.shtml>  
**Georgia DOT** - <http://www.dot.ga.gov/aboutGeorgiaDot/Pages/default.aspx>  
**Hawaii DOT** - <http://hidot.hawaii.gov/administration/about/>  
**Idaho TD** - <http://itd.idaho.gov/AboutITD/About.htm>  
**Illinois DOT** - <http://www.dot.state.il.us/org.html>  
**Indiana DOT** - <http://www.in.gov/indot/2339.htm>  
**Iowa DOT** - <http://www.iowadot.gov/about/index.html>  
**Kansas DOT** - <http://www.ksdot.org/about.asp>  
**Kentucky TC** - <http://transportation.ky.gov/Pages/AboutUsInfo.aspx>  
**Louisiana DOTD** - <http://www.dotd.la.gov/>  
**Maine DOT** - <http://www.maine.gov/mdot/about/>  
**Maryland DOT** - <http://www.mdot.maryland.gov/>  
**Massachusetts DOT** - <http://www.massdot.state.ma.us/AboutUs.aspx>  
**Michigan DOT** - <https://www.michigan.gov/mdot/0,4616,7-151-9623---,00.html>  
**Minnesota DOT** - <http://www.dot.state.mn.us/about/index.html>  
**Mississippi DOT** - [http://www.gomdot.com/portal/mdot\\_org.aspx](http://www.gomdot.com/portal/mdot_org.aspx)  
**Missouri DOT** - <http://www.modot.org/about/index.htm>  
**Montana DOT** - <http://www.mdt.mt.gov/#>  
**Nebraska DOR** - <http://www.transportation.nebraska.gov/>  
**Nevada DOT** - <http://www.nevadadot.com/about/>  
**New Hampshire DOT** - <http://www.nh.gov/dot/org/index.htm>  
**New Jersey DOT** - <http://www.state.nj.us/transportation/about/>  
**New Mexico DOT** - <http://dot.state.nm.us/en.html>  
**New York State DOT** - <https://www.dot.ny.gov/about-dot>  
**North Carolina DOT** - <http://www.ncdot.gov/about/structure/>  
**North Dakota DOT** - <http://www.dot.nd.gov/public/div-distr.htm>  
**Ohio DOT** - <http://www.dot.state.oh.us/Divisions/Pages/default.aspx>  
**Oklahoma DOT** - <http://www.okladot.state.ok.us/>  
**Oregon DOT** - [http://www.oregon.gov/ODOT/Pages/about\\_us.aspx](http://www.oregon.gov/ODOT/Pages/about_us.aspx)  
**Pennsylvania DOT** - <http://www.dot.state.pa.us/>  
**Rhode Island DOT** - <http://www.dot.state.ri.us/divisions/chart/index.asp>  
**South Carolina DOT** - <http://www.scdot.org/inside/inside.aspx>  
**South Dakota DOT** - <http://www.sddot.com/dot/Default.aspx>  
**Tennessee DOT** - <http://www.tdot.state.tn.us/orgstructure.htm>

**Texas DOT** - <http://www.txdot.gov/>  
**Utah DOT** - [http://www.udot.utah.gov/main/f?p=100:pg:0:::1:T,V:4,](http://www.udot.utah.gov/main/f?p=100:pg:0:::1:T,V:4)  
**Vermont AOT** - <http://www.aot.state.vt.us/Inside.htm>  
**Virginia Transportation Secretariat** - <http://www.transportation.virginia.gov/>  
**Washington State DOT** - <http://www.wsdot.wa.gov/about/>  
**West Virginia DOT** - <http://www.transportation.wv.gov/Pages/default.aspx>  
**Wisconsin DOT** - <http://www.dot.wisconsin.gov/about/index.htm>  
**Wyoming DOT** - <http://www.dot.state.wy.us/wydot/administration>



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