Identifying State Freight Plan Best Practices

February 2018

Caroline Boris
Research Analyst
American Transportation Research Institute
St. Paul, MN

Dan Murray
Vice President, Research
American Transportation Research Institute
St. Paul, MN
<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Company/Position</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Judy McReynolds</td>
<td>Chairman of the ATRI Board</td>
<td>ArcBest Corporation</td>
<td>Fort Smith, AR</td>
</tr>
<tr>
<td>Andrew Boyle</td>
<td>Co-President</td>
<td>Boyle Transportation</td>
<td>Billerica, MA</td>
</tr>
<tr>
<td>Michael L. Ducker</td>
<td>President and CEO</td>
<td>FedEx Freight</td>
<td>Memphis, TN</td>
</tr>
<tr>
<td>Rich Freeland</td>
<td>President and COO</td>
<td>Cummins Inc.</td>
<td>Columbus, IN</td>
</tr>
<tr>
<td>Darren D. Hawkins</td>
<td>President and COO</td>
<td>YRC Worldwide</td>
<td>Overland Park, KS</td>
</tr>
<tr>
<td>Dave Huneryager</td>
<td>President and CEO</td>
<td>Tennessee Trucking Association</td>
<td>Nashville, TN</td>
</tr>
<tr>
<td>Derek Leathers</td>
<td>President and CEO</td>
<td>Werner Enterprises</td>
<td>Omaha, NE</td>
</tr>
<tr>
<td>Robert E. Low</td>
<td>President and CEO</td>
<td>Prime Inc.</td>
<td>Springfield, MO</td>
</tr>
<tr>
<td>Rich McArdle</td>
<td>President</td>
<td>UPS Freight</td>
<td>Richmond, VA</td>
</tr>
<tr>
<td>Benjamin J. McLean</td>
<td>CEO</td>
<td>Ruan Transportation Management</td>
<td>Des Moines, IA</td>
</tr>
<tr>
<td>Dennis Nash</td>
<td>Executive Chairman of the Board</td>
<td>Kenan Advantage Group</td>
<td>North Canton, OH</td>
</tr>
<tr>
<td>Gregory L. Owen</td>
<td>Head Coach and CEO</td>
<td>Ability/ Tri-Modal Transportation Services</td>
<td>Carson, CA</td>
</tr>
<tr>
<td>James D. Reed</td>
<td>President and CEO</td>
<td>USA Truck</td>
<td>Van Buren, AR</td>
</tr>
<tr>
<td>Annette Sandberg</td>
<td>President and CEO</td>
<td>Transsafe Consulting, LLC</td>
<td>Davenport, WA</td>
</tr>
<tr>
<td>Rebecca M. Brewster</td>
<td>President and COO</td>
<td>American Transportation Research Institute</td>
<td>Atlanta, GA</td>
</tr>
<tr>
<td>Chris Spear</td>
<td>President and CEO</td>
<td>American Trucking Associations</td>
<td>Arlington, VA</td>
</tr>
</tbody>
</table>
ATRI RESEARCH ADVISORY COMMITTEE

Karen Rasmussen, RAC
Chairman
President and CEO
HELP Inc.

Jon Blackham
Policy and Government Affairs
Canadian Trucking Alliance

Amy Boerger
Vice President, Sales
Cummins, Inc.

Bill Brown
Manager of Fleet Telematics
Southeastern Freight Lines

Bob Costello
Senior Vice President and Chief Economist
American Trucking Associations

Tom Cuthbertson
Vice President, Regulatory Compliance
Omnitracs, LLC

Dennis Dellinger
President
Cargo Transporters

Chip Duden
Vice President, Strategic Business Analytics
Werner Enterprises

Paul J. Enos
Chief Executive Officer
Nevada Trucking Association

Thomas Fansler
President
Trimble Transport Mobility

Scott George
Chief Executive Officer
TCW, Inc.

Mike Golias
Director for Research
Intermodal Freight Transportation Institute
University of Memphis

Victor Hart
Director of Safety
DOT Transportation, Inc.

Sanford Hodes
Rider System, Inc.
Senior Vice President and Deputy General Counsel

Ken Howden
Director, 21st Century Truck Partnership
U.S. Department of Energy

Kelly Killingsworth
VP of Inbound Transportation
Wal-mart Stores, Inc.

Victoria King
VP Public Affairs
UPS

Dustin Koehl
Vice President, Sales and Marketing
Total Transportation of Mississippi

Caroline Mays
Director, Freight and International Trade Section
Texas DOT

Lisa Mullings
President and CEO
National Association of Truck Stop Operators

Tom Murtha
Senior Planner
Chicago Metropolitan Agency for Planning

Brenda Neville
President
Iowa Motor Truck Association

Dean Newell
Vice President, Safety
Maverick, Inc.

Steve Raetz
Director of Research and Market Intelligence
C.H. Robinson Worldwide, Inc.

Wellington F. Roemer, III
President and CEO
Wellington F. Roemer Insurance, Inc.

Lee Sarratt
Director of Safety
J.B. Hunt

Mark Savage
Deputy Chief
Colorado State Patrol

Andrea Sequin
Director, Regulatory Services
Schneider National, Inc.

Carl Stebbins
Corporate Director of Admissions and Marketing
New England Tractor Trailer Training School

Harold Sumerford, Jr.
Chief Executive Officer
J&M Tank Lines

James E. Ward
President and CEO
D.M. Bowman

Tom Weakley
Director of Operations
Owner-Operator Independent Drivers Association Foundation
# TABLE OF CONTENTS

## LIST OF TABLES AND FIGURES

<table>
<thead>
<tr>
<th>List of Tables and Figures</th>
<th>p.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

## LIST OF ACRONYMS

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
</table>

## 1.0 INTRODUCTION

## 2.0 BACKGROUND

## 3.0 RESEARCH OBJECTIVE AND METHODOLOGY

- Literature Review: 9
- Stakeholder Identification: 9
- State Freight Contact Outreach: 9
- IAC Development: 11
- Populating the IAC: 11
- Freight Plan Structure: 12
- Freight Data: 13
- Stakeholder Engagement: 15
- Regional and MPO Planning Partners: 15
- Freight Advisory Committees: 16
- Finalizing the IAC: 16
- Review of Nominated Freight Plans: 16
- Freight Plan Feedback: 17

## 5.0 CRITICAL ATTRIBUTES OF TOP STATE FREIGHT PLANS

## 6.0 STATE FREIGHT PLAN RESEARCH FEEDBACK

## 7.0 RECOMMENDATIONS

- Next Steps: Proposed Case Study Plans: 41

## APPENDIX A

<table>
<thead>
<tr>
<th>Appendix</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
</tr>
</tbody>
</table>
LIST OF TABLES AND FIGURES

Figure 1: State Freight Plan Required Elements ................................................................. 8
Figure 2: Top 12 Nominated State Freight Plans ...............................................................10
Table 1: Ranking of State Freight Plans ............................................................................17
Figure 3: Maryland’s Comparison of State and National Freight Related Goals ..........20
Figure 4: Nevada’s Critical Urban Freight Network ..........................................................22
Figure 5: Iowa’s ICE Rating for Primary Roads .................................................................24
Figure 6: Comparison of National Freight Policy to Mississippi Transportation Goals 26
Figure 7: Comparison of Mississippi Freight Goals, Objectives & Performance Measures 27
Figure 8: Comparison of Iowa in Motion Goals to National Freight Policy Goals ........28
Figure 9: Iowa’s Alignment of Freight Strategies and National Freight Goals ...............28
Figure 10: Nevada’s Assessment of Economic Competitiveness Goal ..........................30
Figure 11: Michigan State Freight Project Prioritization ..................................................36
# LIST OF ACRONYMS

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AADT</td>
<td>Annual Average Daily Traffic</td>
</tr>
<tr>
<td>AASHTO</td>
<td>American Association of State Highway and Transportation Officials</td>
</tr>
<tr>
<td>ATRI</td>
<td>American Transportation Research Institute</td>
</tr>
<tr>
<td>CFIRE</td>
<td>National Center for Freight &amp; Infrastructure Research &amp; Education</td>
</tr>
<tr>
<td>CFS</td>
<td>Commodity Flow Survey</td>
</tr>
<tr>
<td>CVISN</td>
<td>Commercial Vehicle Information Systems and Networks</td>
</tr>
<tr>
<td>DOT</td>
<td>Department of Transportation</td>
</tr>
<tr>
<td>FAC</td>
<td>Freight Advisory Committee</td>
</tr>
<tr>
<td>FAF</td>
<td>Freight Analysis Framework</td>
</tr>
<tr>
<td>FAST Act</td>
<td>Fixing America’s Surface Transportation Act</td>
</tr>
<tr>
<td>FDOT</td>
<td>Florida Department of Transportation</td>
</tr>
<tr>
<td>FHWA</td>
<td>Federal Highway Administration</td>
</tr>
<tr>
<td>FMSIB</td>
<td>Freight Mobility Strategic Investment Board</td>
</tr>
<tr>
<td>FPM</td>
<td>Freight Performance Measures</td>
</tr>
<tr>
<td>GAO</td>
<td>General Accounting Office</td>
</tr>
<tr>
<td>GIS</td>
<td>Geographic Information System</td>
</tr>
<tr>
<td>GPS</td>
<td>Global Positioning System</td>
</tr>
<tr>
<td>IAC</td>
<td>Ideal Attributes Checklist</td>
</tr>
<tr>
<td>ICE</td>
<td>Infrastructure Condition Evaluation</td>
</tr>
<tr>
<td>ISTEA</td>
<td>Intermodal Surface Transportation Efficiency Act</td>
</tr>
<tr>
<td>ITS</td>
<td>Intelligent Transportation Systems</td>
</tr>
<tr>
<td>LRTP</td>
<td>Long Range Transportation Plan</td>
</tr>
<tr>
<td>MAP-21</td>
<td>Moving Ahead for Progress in the 21st Century Act</td>
</tr>
<tr>
<td>MDOT</td>
<td>Michigan Department of Transportation</td>
</tr>
<tr>
<td>MPO</td>
<td>Metropolitan Planning Organization</td>
</tr>
<tr>
<td>MULTIPLAN</td>
<td>Mississippi Unified Long-Range Transportation Infrastructure Plan</td>
</tr>
<tr>
<td>NCHRP</td>
<td>National Cooperative Highway Research Program</td>
</tr>
<tr>
<td>NDOT</td>
<td>Nevada Department of Transportation</td>
</tr>
<tr>
<td>PHFS</td>
<td>Primary Highway Freight System</td>
</tr>
<tr>
<td>RAC</td>
<td>Research Advisory Committee</td>
</tr>
<tr>
<td>RFID</td>
<td>Radio Frequency Identification</td>
</tr>
<tr>
<td>SAFETEA-LU</td>
<td>Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users</td>
</tr>
<tr>
<td>SEP</td>
<td>State Enforcement Plan</td>
</tr>
<tr>
<td>STA</td>
<td>State Trucking Association</td>
</tr>
<tr>
<td>TEA-21</td>
<td>Transportation Equity Act for the 21st Century</td>
</tr>
<tr>
<td>TIFIA</td>
<td>Transportation Infrastructure Finance and Innovations Act</td>
</tr>
<tr>
<td>TIGER</td>
<td>Transportation Investment Generating Economic Recovery</td>
</tr>
<tr>
<td>TRB</td>
<td>Transportation Research Board</td>
</tr>
<tr>
<td>TxFAC</td>
<td>Texas Freight Advisory Committee</td>
</tr>
<tr>
<td>U.S. DOT</td>
<td>United State Department of Transportation</td>
</tr>
<tr>
<td>WAFACT</td>
<td>Washington State Freight Advisory Committee</td>
</tr>
<tr>
<td>WSDOT</td>
<td>Washington State Department of Transportation</td>
</tr>
</tbody>
</table>
1.0 INTRODUCTION

The movement of freight across town, across the nation or around the globe, relies on the joint effort of the public and private sectors. The United States transportation system is arguably the largest in the world with assets estimated at more than $8.0 trillion in 2014: “Transportation assets are owned by both the public and private sectors. In total, publicly owned transportation accounted for slightly over one-half of transportation capital stock; public highways and streets accounted for the largest share (41.8 percent) of this stock and much of the growth over the past few years.”

Freight plans are critical blueprints for how the public sector will develop, manage and maintain public elements of freight networks. These formalized planning documents describe the stakeholders, commodities, trip metrics and geographic operations that utilize a particular freight transportation network. A well-designed freight plan allows a state or region to accurately understand the movement of goods within the larger geographic and economic framework, and speculate on future trends – aiding a government’s ability to make sound decisions in public infrastructure. Freight plans also provide an understanding of how safe, efficient, and productive freight systems benefit local and state economies and help meet local, regional, and national goals for safety and productivity.

Recognizing that seamless, interstate freight movement is critical to the nation’s economy and quality of life, the American Transportation Research Institute’s (ATRI’s) Research Advisory Committee (RAC) identified in 2016 a research objective to improve and standardize freight plans throughout the country. For much of the 20th century, public sector transportation planning focused on passenger movement. Not until 1991, when Congress the passed the Intermodal Surface Transportation Efficiency Act (ISTEA), were public sector agencies encouraged to plan for the movement of freight. However, ISTEA and several subsequent transportation reauthorization bills passed by Congress failed to provide state and local agencies with freight-specific funding. The Fixing America’s Surface Transportation Act (FAST Act) passed in late 2015 established both formula and discretionary grant programs to fund critical transportation projects that benefit freight. For the first time in U.S. history, the FAST Act provided a dedicated source of federal funding for freight projects, including intermodal projects.

While many reports, articles, and case studies have been published discussing the freight planning process, few examples exist in the literature of specific best practices that can be derived from existing freight plans. In order to address this gap in freight planning research, ATRI conducted this research to identify freight plan “best practices” which go beyond compliance with federal mandates to implement innovative and creative strategies for responding to a rapidly changing freight environment. Since the FAST Act requires that freight plans must be updated every five years, this report is intended to provide a baseline for how freight plans are evolving as well as future guidance in freight plan best practices.

---

2 ATRI’s RAC is comprised of industry stakeholders representing motor carriers, trucking industry suppliers, labor and driver groups, law enforcement, federal government and academia. The RAC is charged with annually recommending a research agenda for the Institute.
2.0 BACKGROUND

Freight movement within the U.S. is vital to the continued success of the national economy. According to the Draft National Freight Strategic Plan from the U.S. Department of Transportation (U.S. DOT), the U.S. economy is projected to double in the next 30 years driven largely by a population increase of more than 65 million by 2040. In order to keep up with this growing consumer demand, freight movements are expected to increase by approximately 42 percent. Public sector agencies undertake long-range planning efforts for the purpose of defining goals, identifying problems, evaluating alternatives, and identifying project investments that will prepare the transportation system for the future needs of passengers and freight.

In 1991, as the U.S. was firmly on a path toward a more trade-focused national economy, Congress passed ISTEA which redefined the focus of U.S. transportation policy:

The National Intermodal Transportation System shall consist of all forms of transportation in a unified, interconnected manner, including the transportation systems of the future, to reduce energy consumption and air pollution while promoting economic development and supporting the Nation’s preeminent position in international commerce. (P.L. 102-240, Sec. 2)

In response to this change in focus, transportation and economic development agencies across state and local governments showed new interest in freight planning. However, with no clearly defined goals and no funding sources, few agencies planned with freight investment goals in mind. A 1996 General Accounting Office (GAO) review found, "The total amount of funds obligated for intermodal freight projects through roughly the first 4 of ISTEA’s 6 fiscal years … equals … less than 1 percent of ISTEA funds apportioned to the states during that period …"4

In 1998, Congress passed the Transportation Equity Act for the 21st Century (TEA-21), which added freight shippers to the list of specifically identified stakeholders that must be afforded an opportunity to comment on state and metropolitan planning organization (MPO) plans. The Act also created several broad factors to address freight, either specifically or by default, which states and MPOs were to consider in their planning efforts:

- Support the economic vitality of the U.S., the states, and metropolitan areas, especially by enabling global competitiveness, productivity, and efficiency;
- Increase the accessibility and mobility options available to people and for freight;
- Enhance the integration and connectivity of the transportation system, across and between modes throughout the state, for people and freight.5

While ISTEA and TEA-21 encouraged freight planning from a policy perspective, neither act provided funding. The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), signed into law in 2005, put renewed emphasis on expanding freight capacity through planning at the state and national levels, and created several small freight funding opportunities. These included an expansion in bonding authority to include private

---

activity bonds for surface freight transfer facilities and made freight projects eligible under the Transportation Infrastructure Finance and Innovations Act (TIFIA). SAFETEA-LU also established a freight research program, a Freight Planning and Capacity Building Program, and authorized $25 million over five years to improve truck parking on the National Highway System.

The expanding emphasis on freight has continued with each subsequent transportation reauthorization. Moving Ahead for Progress in the 21st Century Act (MAP-21), passed in 2012, established the first real funding incentive for states to undertake freight-specific planning. In the Act, Congress directed the U.S. DOT to allow a maximum federal share of 95 percent (versus 90 percent) for an Interstate System project, or a maximum federal share of 90 percent for a non-Interstate System project (versus 85 percent) if the project made a demonstrable improvement in the efficiency of freight movement and was identified in a state freight plan. In essence, states that completed a compliant freight plan were provided a slightly higher federal share of funding on freight-related highway projects. Compliant state freight plans must include the elements shown in Figure 1 below.

Additionally, MAP-21 encouraged states undertaking a state freight plan to develop a freight advisory committee (FAC) to act in an advisory role in regards to freight-related priorities, issues, projects, and funding needs. The committees, whose membership was recommended to be comprised of public and private sector stakeholders from ports, shippers, carriers, associations, and state and local transportation agencies, were also encouraged to serve as a forum for freight-related discussions, communicate and coordinate regional priorities with other organizations, promote the sharing of freight information between the private and public sectors, and also participate in the development of the state freight plans.

MAP-21 also established performance and outcome-based goals in order to support investment in surface transportation projects with a freight focus. At the national level, MAP-21 required the U.S. DOT to develop a National Freight Policy, and also mandated the identification of a national Primary Freight Network. Following the passage of MAP-21, the U.S. DOT published draft guidance detailing the implementation of state freight plans (Federal Register, Volume 77, No. 199 / Monday, October 15, 2012).

The U.S. Congress included the first-ever dedicated freight funding program at the federal level in its 2015 highway reauthorization, the Fixing America’s Surface Transportation Act (FAST Act). The FAST Act contains two major freight programs:

- The National Highway Freight Program provides $6.3 billion in formula funds over five years for states to invest in freight projects on the National Highway Freight Network. Up to 10 percent of the funds may be used for intermodal projects.
- A discretionary grant program (originally called FASTLANE Grants, recently renamed INFRA Grants) that provides $4.5 billion over 5 years. Similar to the popular Transportation Investment Generating Economic Recovery (TIGER) grant program, the discretionary grants under the FAST Act are available to states, MPOs, local governments, tribal governments, special purpose districts and public authorities.

To be eligible for the programmatic funds offered by the FAST Act, states were required to complete a freight plan, including a fiscally constrained investment plan element, by December 4, 2017, with the exception that the multimodal component may still be in progress. The FAST Act requires States to update their freight and investment plans at least once every five years.

Compliant freight plans must meet the six criteria established in MAP-21, as well as four additional criteria identified in the FAST Act (Figure 1).

The FAST Act also encourages the development of a state FAC comprised of public and private sector freight stakeholders. According to the FAST Act’s language, the plans should provide a 10-year outlook for projects as well as articulate relevant funding sources for said projects. A FAST Act addition is a focus on innovative technologies and operating strategies that ought to be considered by states as part of their forward-looking planning agendas.7

In 2016, the U.S. DOT published final guidance in the Federal Register (Federal Register, Volume 18, No. 199 / Friday, October 14, 2016). This final guidance provided a template for states to meet the minimum requirements for state freight plans established by the FAST Act, as well as optional recommended elements to include in state freight plans.

---

7 U.S. Department of Transportation, “Draft National Freight Strategic Plan.”
Figure 1: State Freight Plan Required Elements

- When applicable, a listing of –
  - Multimodal critical rural freight facilities/corridors designated under the National Multimodal Freight Network
  - Critical rural and urban freight corridors designated within the state under the National Highway Freight Program
- Consideration of any significant congestion or delay caused by freight movements and any strategies to mitigate that congestion or delay
- A freight investment plan that, subject to 49 U.S.C. 70202(c), includes a list of priority projects and describes how funds made available to carry out 23 U.S.C. 167 would be invested and matched
- Consultation with the State FAC, if applicable

- An identification of significant freight system trends, needs, and issues with respect to the state
- A description of the freight policies, strategies, and performance measures that will guide the freight-related transportation investment decisions of the state
- A description of how the plan will improve the ability of the state to meet the national freight goals established under section 167 of title 23, United States Code
- Evidence of consideration of innovative technologies and operational strategies including intelligent transportation systems, that improve the safety and efficiency of freight movement
- In the case of routes on which travel by heavy vehicles (including mining, agricultural, energy cargo or equipment, and timber vehicles) is projected to substantially deteriorate the condition of roadways, a description of improvements that may be required to reduce or impede the deterioration
- An inventory of facilities with freight mobility issues, such as truck bottlenecks, within the state, and a description of the strategies the state is employing to address those freight mobility issues

---

3.0 RESEARCH OBJECTIVE AND METHODOLOGY

This research seeks to create a compendium of freight planning best practices to guide future updates to state and regional freight plans. As described in more detail below, ATRI’s research team identified and scored state freight plans from around the country against an Ideal Attributes Checklist (IAC) which included those features identified as critical for “model” state freight plans. To develop the IAC and rate the freight plans, ATRI consulted with freight stakeholders at the national, state and local levels.

Literature Review

As a first task, the ATRI research team reviewed the literature on freight planning practices, focusing on information from ISTEA through the FAST Act transportation authorization time periods (1991 – 2017). Additionally, ATRI obtained the most recent, publicly available freight plans for all 50 states. In the absence of a dedicated freight plan, the ATRI research team utilized Long-Range Transportation Plans (LRTPs) when they included a sufficient freight planning component.

Stakeholder Identification

In order to engage those stakeholders in the freight community with the necessary subject matter expertise, ATRI contacted multiple freight-specific organizations across the nation as potential resources. Ultimately, the research team worked with the American Association of State Highway and Transportation Officials (AASHTO) whose membership includes the highway and transportation departments from all 50 states, the District of Columbia and Puerto Rico. ATRI requested and received from AASHTO a working contact list of state Department of Transportation (DOT) freight managers and planners as well as recommended contacts at freight coalition groups.

State Freight Contact Outreach

In order to identify the state freight plans to ultimately be scored and ranked, ATRI first solicited input from the 50+ AASHTO-supplied state freight contacts. These individuals were asked to nominate freight plans – both within their AASHTO region of the country and at the national level – which they viewed as exemplary in terms of planning, assessment, and implementation practices. Stakeholders were allowed to nominate their own state’s freight plan. All nominations were anonymized.

Nominations were solicited by ATRI using an online survey form which allowed each respondent to nominate three state freight plans. The survey, along with language explaining ATRI’s research objectives, was emailed individually to each stakeholder on the outreach list.

The nomination process spanned three weeks. The output of this process fed ATRI’s development of an IAC rubric. The IAC development process is discussed in greater detail below.

ATRI tallied the results and identified the top state freight plans as nominated by the survey respondents. ATRI received 20 state responses representing 55 nominations and 26 unique states. Of the nominated state freight plans, 12 received both the most total nominations as well as the most nominations from outside of the responding state (Figure 2).
IAC Development

Concurrent with the nomination period, the ATRI research team initiated work on a scoring guide by which the nominated freight plans would be rated and ranked. This assessment tool, the IAC, was created by combining the FAST Act compliance criteria with practical examples gleaned from discussions with state DOT representatives, freight planning subject matter experts and through the comprehensive literature review.

The foundation of the IAC is the required elements of the FAST Act. Of the elements contained in the legislation, six originated in MAP-21, with the FAST Act adding criteria related to rural and urban critical freight corridor identification. The FAST Act also included strong recommendations for a FAC which MAP-21 before it had also recommended.

Once ATRI identified the core criteria, the next step involved connecting this theoretical framework to practical and innovative applications that could be implemented by freight planners in the field. The IAC functions as a rubric with a range of possible interpretations and implementations of each criterion. In order to function as such, each criterion was assigned a range of possible practices on a sliding scale. These scales would form the basis for the freight plan scoring. Practices and hence plans, were scored on a zero to five-point scale with zero indicating that the freight plan did not address a given criterion at all, one being the lowest possible score for plans that address a criterion, and five being the highest possible score.

In order to weight the type and degree for each IAC inclusion, the research team created a matrix of practices, programs or strategies and then ranked them based on their application / level of use among the nominated plans. The final IAC was then vetted by a combined team of ATRI and external freight planning subject matter experts.

Populating the IAC

In the last 20 years, both the federal and state governments have increasingly highlighted the importance of the freight planning process. Guidebooks, frameworks, and best practice reports have been produced by a variety of sources, but most have focused on quick, easy-to-implement freight planning tasks and solutions. These relatively “canned” strategies may not necessarily generate a real freight benefit to both the public and private sectors.

A constant message of the literature was that there is no “one size fits all” solution to freight planning. While different jurisdictions may face localized challenges such as variable population densities, geographic features and infrastructure funding levels, freight is generally seamless interstate. Still, common themes of the literature review revolve around topics including the organization of the plan itself, the use of freight data, the inclusion of external planning partners such as freight stakeholders and regional freight organizations and use of advisory committees. Consequently, this literature review sought to identify approaches and programs which can be implemented by any entity, and which generate meaningful freight system improvements. In varying forms and degree of inclusion, these then formed the core components of the Checklist.
Freight Plan Structure

In response to ISTEA, the Virginia Transportation Research Council developed *A Methodology for Statewide Intermodal Freight Transportation Planning.*\(^\text{10}\) This plan highlights the core of what would become the MAP-21 and FAST Act freight plan key components: the combination of data-driven analytical metrics with a diverse stakeholder advisory committee to guide the planning process. Although the Research Council’s paper only considers Virginia for its case study, it postulates that an effective freight plan’s structure would map performance goals to concrete metrics (e.g. the freight movement goal of *safe intermodal choices* is directly linked to the *number of crashes, cost of crashes, and number of fatalities*). This outlined structure lays the groundwork for freight planning with an overall goal of accountability. ATRI used this framework as a core component for developing the IAC’s overall ethos and as a rationale for why the highest scoring plans will have detailed and well-documented data practices.

As freight planning became more commonplace among states following TEA-21, different types of freight plans emerged. The contents of these plans varied, as did the objectives of each plan type. Overall, most early freight plans focused on freight-oriented policy goals or opportunities to integrate freight into other long-range planning efforts. While a few states such as Washington and Florida created state-level freight funding programs, the lack of freight funding programs led many state and local agencies to avoid identifying freight projects so as not to create false expectations in the freight community. As a result, many early policy plans were structured around a broad framework of:

- **Supply Analysis**: an inventory of state or regional freight infrastructure assets across all modes.
- **Demand Analysis**: an examination of commodity flows in, out, within and sometimes through a state or region, to examine the volume and value of goods moving across modal assets.
- **Gap Analysis**: based on the data analysis from the supply and demand tasks, along with stakeholder outreach, the Gap Analysis typically provided policy directions for future infrastructure needs without identifying specific projects.

Many of these early policy-oriented freight plans concentrated on linking freight activity to economic or societal goals such as job creation and/or land use planning, or to specific legislative initiatives. Many mode-specific plans took deep dives into the logistics of air, rail, or water-based freight movements, often with a “build it and they will come” approach to creating economic activity through the development of specialized freight infrastructure.

The National Center for Freight & Infrastructure Research & Education (CFIRE) and the Mississippi Valley Freight Coalition examined existing freight planning practices and stakeholder outreach to practitioners in 2009 in an attempt to identify best practices and provide a framework on how to begin freight planning.\(^\text{11}\) Due to varying geographies and the local nature of freight, the guide was not intended to offer step-by-step instructions on how to do freight planning. Instead, it recommends that agencies begin by asking themselves why they are doing a freight plan, as well as how the plan would fit within the agency’s other planning or non-


planning activities. It highlights the idea that getting private sector involvement can be difficult, as well as strategies for overcoming the challenge and establishing credibility with industry.

Another key freight plan component was adequate funding to undertake and complete the freight planning process. Specific information about how the plan was funded is not readily found in most freight plans, but was raised in the National Cooperative Highway Research Program (NCHRP) Synthesis 410 on Freight Transportation Surveys as a vital factor to success. When freight planners were surveyed about their needs during the freight planning process, a repeated theme was the lack of funding available to purchase relevant freight data or hire appropriate consultants.\(^{12}\) If states, MPOs, or other organizations wish to accurately and effectively chart how freight operates within their jurisdiction, planners must be provided with adequate resources to ensure that the highest quality data is used to benchmark and forecast freight movement. In spite of this finding, the IAC does not include any guidance on necessary funding levels. This factor does, however, influence the IAC’s focus on the widespread use of high-quality freight data throughout each freight plan, a feat not easily accomplished without dedicated funding.

**Freight Data**

Since the beginning of public sector freight planning, access to good, reliable data has been a focal point for improving plans. The type and affordability of freight data is a recurring theme throughout freight planning literature. As indicated above, NCHRP Synthesis 410 included survey responses from 46 states that cited “adequacy of funding” as the most pervasive need for freight data collection and analysis programs.\(^{13}\)

As freight planning has evolved, so have the approaches to data and analysis. In a 1998 textbook, *Geography of Transport Systems*, Dr. Jean-Paul Rodrigue introduced a framework for freight data as: 1) Nodes, 2) Networks, and 3) Flows.\(^{14}\) This framework has subsequently been used in many freight plans for organizing data, with nodes and networks supporting supply analysis, and flows supporting the demand analysis.

Conducting an inventory of a state’s freight assets is one of the required freight plan elements in federal legislation. Planners typically begin analyzing freight systems through an “inventory,” or formal listing of freight system assets, traffic statistics and performance metrics. At the state level, it is not surprising that state inventory data on highway systems is plentiful. While information on other modes may not be as current, most states have completed modal plans such as state rail, aviation and where applicable, port/waterway plans. As a result, network data at the local, state and federal level is well-documented and relatively easy to access. Many state plans also inventory significant freight nodes such as ports, rail terminals, truck terminals, distribution centers, major warehouse facilities, large-volume shipper locations and major retail centers. Developing current data about freight nodes often entails a combination of third-party data purchases on business establishments and original data collection through surveys and other stakeholder outreach efforts.


\(^{13}\) Ibid.

\(^{14}\) Rodrigue, J-P et al. (2017) The Geography of Transport Systems, Hofstra University, Department of Global Studies & Geography, [http://people.hofstra.edu/geotrans](http://people.hofstra.edu/geotrans)
Accessing data to support demand elements of a freight plan have been the greater, and typically costlier challenge to freight planning efforts. Demand has typically been analyzed through the use of commodity flow data. Commodity flows are typically presented as an origin/destination data matrix by mode and commodity.

The Commodity Flow Survey (CFS) produced by the U.S. Census Bureau and Bureau of Transportation Statistics was first produced in 1993, and has been conducted every five years since then. The CFS is a very useful dataset, but is limited by highly aggregated geography and several out-of-scope industries including transportation, construction and farming. The creation of the dataset is a highly complex undertaking that typically requires several years for the final dataset to become public. The time lag and limitations of CFS have made it difficult to use at a state or local level to understand commodity movements and markets. For many years, proprietary data sources such as TRANSEARCH® were the only off-the-shelf commodity flow data sources available to fill the void in publicly available freight demand data.

However, as demand for freight activity and related data grew, the Federal Highway Administration (FHWA) responded with the Freight Analysis Framework (FAF). “The FAF provides a comprehensive national picture of freight flows, trends, and a baseline forecast to support policy studies. The FAF informs States and localities about their major trading partners and the volumes and sources of traffic passing through their jurisdictions at the corridor level.”

The first version of FAF was based on the 1997 Economic Census (which includes the CFS), and was released to the public in 2002. FAF-4 (fourth generation), the most recent FAF currently available, is based on the 2012 CFS. FAF shares the CFS limitation for sub-state geographical analysis, but it includes estimates for out-of-scope industries, provides commodity forecasts and includes a user-friendly tool for creating data summaries.

Even though public sector freight data has improved significantly as freight planning has evolved, there is still no “one size fits all” dataset to meet state freight plan needs. The early tome, A Methodology for Statewide Intermodal Freight Transportation Planning, emphasized the critical nature of stakeholder input paired with a technical analysis of available freight data.

Many plans combine freight flow data with population, employment and other economic datasets to establish key industries, understand how supply chains work, and the freight operational trends within a state or region’s economy. This allows freight planners to not only use highly specific geographic information on freight movement, but also provides insight into an unexpected or rapid shift within a state’s economy. Long-standing industries within every region of the U.S. are experiencing disruption due to shifting demographics, new employment patterns, and changing consumer/commodity demands. Freight data deployed early in the planning process provides a clear snapshot of real-world freight activities, rather than modeled or speculative forecasts.

Access to freight data is also crucial for developing appropriate performance metrics for a state’s existing transportation system as well as understanding forecasts of freight trends that will impact a state’s future surface transportation system. This is an area that ATRI has supported through the development of global position system (GPS) data for tracking highway freight flows and related highway performance metrics.

---

Using data to identify critical highway freight corridors within a state or urban area is a new challenge to freight planners created by new requirements in the FAST Act. This often requires real-world data in order to prioritize which routes and facilities take precedence in terms of freight as opposed to simply vehicle counts or delay times. To meet this new challenge, location-specific freight data was viewed as crucial for the identification and inventory of urban and rural freight corridors and freight facilities with mobility concerns.

Given the emphasis on the importance of good freight data found in the literature review conducted for this study, the use of both quantitative and qualitative data in the freight planning process is a key IAC criteria.

Stakeholder Engagement

Each state will have differing and scaled definitions of who makes up the “freight community” within any given region. For those states interested in producing an exemplary freight plan, it is not only a system’s physical infrastructure that must be inventoried, but also the state-specific people, companies, and organizations whose knowledge, work, and input are vital to the feedback necessary for a successful planning process. CFIRE recommends beginning the freight planning process by thinking critically about how stakeholders will be involved. Solicitations for stakeholder input to the freight planning process can come in many forms and no two states will have the same response from freight community in terms of feedback. States have used surveys, one-on-one interviews, public forums, and working groups to bring the public and private sectors together to discuss freight. CFIRE cautions public officials on realistic time frames for project planning when the two sectors interact, as a five-year horizon is a long-term project in many private fields while public departments routinely plan out 30 years.17

Regional and MPO Planning Partners

State DOTs can also look internally to MPOs and externally to other adjoining states for coordination and support. Indeed, multi-jurisdictional planning can yield excellent results when addressing high-level causes of freight movement issues such as bottlenecks or travel times. An example for regional coordination is in weight restrictions for trucks on the National Highway System.18 A truck may be within weight limits in one state, but merely by crossing a state boundary be considered overweight and out of service under a different set of rules in the other state. Coordinating with freight planners and managers across a region could potentially alleviate disparities in regulatory restrictions across states that share critical freight corridors.

Regional partnering for coordinated freight planning at the state level could also enhance things such as system reliability and seamlessness, as well as environmental concerns – a more holistic process for interstate freight users.19 MPOs, regardless of size, can provide critical input into the state freight planning process. MPO officials’ proximity to county and city-level freight trends and issues can be integrated into the planning process as a source of continuous

19 Dan Seedah and Robert Harrison, “Megaregion Freight Movements: A Case Study of the Texas Triangle” (Southwest Region University Transportation Center, Center for Transportation Research, University of Texas at Austin, 2011), https://pdfs.semanticscholar.org/d583/9670f2445babbcde68fd0b54394092302e10.pdf.
feedback, letting state officials see if their efforts are yielding tangible results at the local level.\textsuperscript{20} Partnering on this scale would require an agile and responsive freight planning group, and it is unsurprising that a major recommendation from the \textit{Guidebook for Freight Policy, Planning, and Programming in Small- and Medium-Sized Metropolitan Areas} is that freight planning efforts be concentrated in a single department or organization within the DOT. Doing so reduces planning delays and centralizes subject-matter experts and freight personnel in one office.\textsuperscript{21} A concern about this level of integration and partnership, however, is that these conversations will add additional time (e.g. arranging disparate personnel schedules) and potential delays to an already time-sensitive planning process.\textsuperscript{22} ATRI’s IAC therefore identifies freight planning partnerships as an element of best practice for planners.

Freight Advisory Committees

As the vast majority of nominated freight plans utilize private or commercial data in order to achieve the specificity required for an in-depth analysis, FACs have moved from helpful guides to key “data interpreters” in the freight planning process. Successful freight plans depend on private sector input and that input often includes specific, detailed and potentially confidential or proprietary information.\textsuperscript{23} With this in mind, the freight plans with the highest IAC ratings for FACs were identified based on leveraging committee members’ expertise in innovative technologies and operational strategies, strategies for addressing freight congestion and delay in a cost efficient and safe manner, and the identification of freight mobility issues. This private sector feedback allows FACs to address freight issues within the public sector by applying methods that have been vetted and well-established as part of private industry.

Finalizing the IAC

Once the model approaches were finalized, the ATRI research team conducted a series of discussions with its subject matter expert research partners. The research partners attributed real-world examples from their experiences as freight planners or as part of state freight planning committees. In particular, the partners highlighted innovative practices and trends in the freight planning field over the last five years. These observations were synthesized with the FAST Act plan criteria and assigned point values as part of the IAC rubric. The IAC was then reviewed and edited by a joint ATRI-partner team to clarify language as appropriate. The final IAC rubric used to assess state freight plans is contained in Appendix A.

Review of Nominated Freight Plans

Once the IAC was finalized, the ATRI research team assessed the nominated state freight plans. The process consisted of two parts: individual team member assessments and two collaborative vetting discussions.

Prior to the ranking process, ATRI reconfirmed that the most recent version of each state freight plan was available for review. The research team used the IAC to rate each freight plan on the identified ten criteria. The team then totaled the points for each freight plan and ranked the plans accordingly. These initial rankings were created in isolation, without discussion between


\textsuperscript{21} Ibid.

\textsuperscript{22} Seedah and Harrison, “Megaregion Freight Movements.”

\textsuperscript{23} Ibid.
team members. Once completed, the team members reconvened to compare rankings and discuss discrepancies. Despite minimal variation in freight plan rankings, these discussions allowed research team members to compare their observations and comments on each plan's overall organization, level of detail and any innovative practices worthy of highlighting. In the event of minor differences between criteria ratings, the plans were re-examined until all team members were satisfied by the final point value. Once the scores had been finalized, the plans were ranked by the collaborative ratings.

This ranking of the nominated freight plans is displayed in Table 1. As discussed above, each plan was reviewed and rated against the ten criteria required by the FAST Act to be a compliant state freight plan. Each criteria was rated on a scale from 1 to 5, for a possible high score of 50. Following the plan review, the highest rated plan scored a total of 43 points, while the lowest rated plan scored 20 points.

<table>
<thead>
<tr>
<th>State</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Texas</td>
<td>1</td>
</tr>
<tr>
<td>Georgia</td>
<td>2</td>
</tr>
<tr>
<td>California</td>
<td>3 (T)</td>
</tr>
<tr>
<td>Mississippi</td>
<td>3 (T)</td>
</tr>
<tr>
<td>Iowa</td>
<td>4 (T)</td>
</tr>
<tr>
<td>Florida</td>
<td>4 (T)</td>
</tr>
<tr>
<td>Washington</td>
<td>5 (T)</td>
</tr>
<tr>
<td>Michigan</td>
<td>5 (T)</td>
</tr>
<tr>
<td>Ohio</td>
<td>5 (T)</td>
</tr>
<tr>
<td>Nevada</td>
<td>6</td>
</tr>
<tr>
<td>Maryland</td>
<td>7</td>
</tr>
<tr>
<td>Alabama</td>
<td>8</td>
</tr>
</tbody>
</table>

(T) indicates a tie in the scoring and rank

Freight Plan Feedback

Finally, as additional vetting of the freight plan review and ranking, ATRI surveyed the 50 state trucking associations (STAs) for feedback on their state freight plans and the related planning process. Results of this survey are described in Section 6.0 – State Freight Plan Research Feedback.
5.0 CRITICAL ATTRIBUTES OF TOP STATE FREIGHT PLANS

The following section describes in more detail each of the IAC criteria, and how the criteria were incorporated into one or more of the top 12 nominated state freight plans.

Criteria 1: “An identification of significant freight system trends, needs, and issues with respect to the State.”

This is perhaps the most flexible criterion of the FAST Act’s requirements, as no two states will have identical freight system needs, or likely be impacted in the exact same manner by external trends and issues. The state plans reviewed exhibited a certain amount of creative license in how they address this element. Based on the scoring guide, ideal freight plans undertake a broad view when examining trends and issues that may impact freight movement in their states. Unlike commuter travel, freight routinely crosses over geo-political boundaries, routinely moves between modal networks and is far more subject to politics, environment and global conflict. So, in rating this criterion, the research team identified best practices as those states that looked beyond historic trends, looked at sectors beyond transportation to identify issues that may affect freight, and looked beyond their own borders. To accomplish this type of 360 degree review, best practice states appear to utilize a combination of data and analysis in concert with expert opinion, often from their assembled freight advisory group. It was also recognized that a common theme is to link state freight planning to broader economic development goals by examining trends in growth industries or industries targeted by the state for future development. The rating of plans did not identify a “best” format for presenting trends, needs and issues, but several of the best practice plans were organized around a framework first presented in a 2008 report prepared for the Transportation Research Board for setting a future agenda of transportation research.24

Best practices for this criterion include:

a) Analyses and predictions using secondary data relating to demographic and social-economic shifts, regulatory trends and generational spending differences;
b) Combining data analysis with expert opinions through forums, future freight flow scenario planning, and/or facilitated discussions with a state’s freight advisory group;
c) Trend analyses for core freight activities such as tonnage, vehicle miles traveled and modal trends

Trend Analyses

Trend analyses are vital to the overall long-term understanding of a freight system. Since freight is often referred to as a demand-driven activity, best practice states also examined broader demographic and societal trends likely to impact freight volumes and supply chains in their states. For example, income growth in many third world countries has spurred export demand for more value-added agriculture products such as meat, poultry and processed foods in many agriculture states. An in-depth and nuanced analysis of factors such as commodity, tonnage and modal trends allows planners to look critically at the needs of a system in the larger economic context of regional, national and international commerce.

The review of plans saw a common theme in the use of secondary data sources to support trends analysis, often related to another criterion for Economic Context. Commonly used secondary data sources included the U.S. Census Bureau, the Bureau of Labor Statistics, and

---

the Bureau of Economic Analysis. These secondary data sources were typically used to
determine employment by industry, population growth, and industry value data.

For instance, the Mississippi Statewide Freight Plan used a variety of secondary data in its
approach to framing its identification of trends and issues, beginning with a high-level overview
of its freight network before providing more detailed socio-economic impact information.
Mississippi’s annual tonnage flows were tracked by regional origin and destination within the
U.S., connecting Mississippi’s freight performance directly to the economic prosperity of the
nation as a whole. The Mississippi plan appears to have relied heavily on data analysis to
connect the performance of its freight network to specific industries and the larger economic
context of the U.S; however the plan document also credits the state FAC for providing
meaningful input in identifying freight trends, needs, and issues.

The Ohio freight plan used the previous referenced framework for strategic issues that drive
transportation as its starting point for the discussion of trends, needs and issues. Overall, the
Ohio approach appears more qualitative, based on a narrative that frames the analyses around
the “Ohio Freight Story.” While no less data-supported, Ohio includes additional discussions of
how freight impacts the quality of life for its citizens, explicitly mentioning that delays on Ohio’s
highway system translate to an inability to stock grocery stores or deliver a consumer’s
package. Freight investment in Ohio’s overall infrastructure is framed as an investment in
prosperity and quality of life for Ohio residents with direct parallels drawn between a robust
freight network attracting job-supplying businesses and an increase in Ohio residents’
disposable income from 2003 to 2013. This, in addition to actionable project recommendations,
gives another, more human dimension to Ohio’s approach to communicating its freight goals.

**Combining Quantitative Analysis with Expert Opinion**

Texas offers another example of combining data analysis with qualitative input. The Texas
Freight Mobility Plan places the trends and issues analysis within the same strategic framework
of driving forces used by Ohio. After developing a white paper about a wide range of trends and
issues affecting freight transportation in Texas, the Texas FAC (TxFAC) reviewed the paper
along with a survey questionnaire asking TxFAC members to rank the most important issues
affecting the state. The highest rated issues were re-examined, and many lowly rated issues
were dropped.

In general, most of the freight plans reviewed relied on a combination of quantitative data and
analysis and qualitative feedback in order to identify relevant trends for individual states.

**Criteria 2: “A description of the freight policies, strategies, and performance measures
that will guide the freight-related transportation investment decisions of the state.”**

This criterion, also a required factor in federal legislation for a compliant freight plan, explores
the overall integration of freight into the broader context of a state’s overall transportation
planning and investment program. The policies, strategies, and performance measures form a
blueprint of the freight plan and provide continuity and consistency in program delivery.
Performance measures can be used to benchmark the effects of policy changes over time and
the impact of investments/improvements brought about by the planning process. Ideal plans
were considered to be those that have clear guidance about how freight investments were
assessed, demonstrated how the investment process was consistent with or differed from non-
freight investment decisions, and were supported with quantitative and qualitative analysis.
Best practices for this criterion include:

a) Connecting existing state freight plan goals to broader state transportation planning goals;

b) Investment decisions relating directly to the performance measures established in this part of the freight plan;

c) Investment assessment techniques that distinguish, when necessary, between non-freight and freight investment choices.

**Connecting State and Federal Freight Planning Goals**

Maryland’s 2015 Strategic Goods Movement Plan uses a flow chart, seen in Figure 3, to visually highlight its freight policies and show the connection to goals in the state’s Strategic Goods Movement Plan and 2035 Maryland Transportation Plan. The graphic distills the key themes from all three documents. Strategies to achieve these goals are listed by issue and include a defined “desired outcome” with an action-oriented strategy for each issue.

**Figure 3: Maryland’s Comparison of State and National Freight Related Goals**

![Figure 3: Maryland’s Comparison of State and National Freight Related Goals](image)

Maryland’s plan goes on to identify performance metrics by mode with each mode being assessed by tonnage and value in order to provide a system-wide assessment for both those measures. The performance measures come from Maryland’s Freight System Performance Annual Report and most goals have more than one measure associated with them.

Ohio provides another example of a plan that ties the state’s guiding policies for freight to existing goals in Access Ohio 2040, Ohio’s LRTP. Ohio acknowledges that the selected
performance measures, primarily FHWA highway metrics, were chosen based on their availability given Ohio’s high percentage of privately-owned freight infrastructure.

**Investment Decision Process**

Florida’s Freight Mobility and Trade Plan was produced in two volumes: 1) Policy Element; and 2) Investment Element. The Investment Element builds on the policy document and is intended to:

- Identify freight needs;
- Identify criteria for state investments in freight;
- Prioritize freight investments across modes;
- Meet requirements of MAP-21.

Florida’s freight plan makes a concerted effort to use freight-focused performance measures to discuss the plan’s outlined policies. Every policy objective in the freight plan is explicitly freight-related as opposed to more generalized transportation policy goals common among the other plans reviewed. Florida’s Investment Element also provides historical context on the formation of the state’s goals starting with legislative language in House Bill 599 to: “enhance the integration and connectivity of the transportation system across and between transportation modes throughout the state.”

The Florida plan also provides a chart showing how each policy objective connects to freight-specific goals for state and federal freight policy goals, as well as goals in previous plans by the Florida Department of Economic Opportunity and the Florida Chamber of Commerce.

**Investment Assessment Technique**

Ohio’s plan provides specific investment recommendations, complete with goal-supported rationales, for how to advance Ohio’s identified goals both within and outside of surface transportation. New initiatives include a maritime study, the deployment of a truck parking information management system, and a statewide management and operations plan aimed at improvements outside of major investment projects. Ohio’s plan also discusses ongoing multimodal projects and current policies that are advancing freight goals in the state. These supplemental sections help address Ohio freight policies and goals in a multimodal environment despite using performance metrics pulled primarily from surface transportation.

**Criteria 3: “When applicable, a listing of multimodal critical rural freight facilities; and critical rural and urban freight corridors designated within the State.”**

This criterion was established by the FAST Act to strategically direct resources to improve public roads that provide access to the Primary Highway Freight System (PHFS), ports and/or intermodal freight facilities. State freight plans can designate a total of 150 miles of rural highways or 20 percent of the state’s PHFS mileage, whichever is greater and 75 miles of urban highway or 10 percent of the state’s PHFS mileage, whichever is greater. When reviewing plans for this element, those that scored well identified a state’s key multimodal corridors based upon the evaluation of the highest volume and/or value flows. Ideal plans integrated economic data with traffic data through geographic information system (GIS) mapping and bottleneck analysis.
Best practices for this criterion include:

a) Transparency in their identification criteria for a “critical” corridor using evaluations of freight volume, freight value flows, or both;

b) A combination of data including economic and traffic data, ideally using GIS mapping and bottleneck analyses.

**Transparency**

In Nevada’s plan, critical rural freight corridors and critical urban freight corridors are examined separately. Nevada identified critical rural and urban freight corridors using a simple-to-understand and easy-to-read matrix of priorities shown in Figure 4, allowing readers to follow how a single project can address multiple freight priorities at once. These priorities include access to freight-generating employment centers, number of intermodal facilities, and 2014 average annual daily traffic (AADT) data broken down by corridor segment.

**Figure 4: Nevada’s Critical Urban Freight Network**

<table>
<thead>
<tr>
<th>Corridor No.</th>
<th>Corridor Name &amp; Extents</th>
<th>Region</th>
<th>Corridor Type</th>
<th>County</th>
<th>Corridor Length</th>
<th>MODA Value</th>
<th>2014 AADT</th>
<th>Access to Intermodal</th>
<th>Access to Emp Centers</th>
<th>Advances I-11</th>
</tr>
</thead>
<tbody>
<tr>
<td>38</td>
<td>US395 (I-80 to Lemmon Dr)</td>
<td>RTCWC</td>
<td>State</td>
<td>WA</td>
<td>6.4</td>
<td>50.6</td>
<td>3151</td>
<td>3</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>16</td>
<td>CC215 (US95 to I-15N)</td>
<td>RTCSNV</td>
<td>State</td>
<td>CL</td>
<td>12.9</td>
<td>48.6</td>
<td>4092</td>
<td>2</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>85</td>
<td>US95 (CC215 to SR157/Kyle Canyon Rd)</td>
<td>RTCSNV</td>
<td>State</td>
<td>CL</td>
<td>4.3</td>
<td>43.7</td>
<td>1708</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>141</td>
<td>CC215 (I-215 to Rainbow)</td>
<td>RTCSNV</td>
<td>Local</td>
<td>CL</td>
<td>2.975</td>
<td>42.7</td>
<td>4379</td>
<td>0</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>39</td>
<td>US395 (Lemmon Dr to Red Rock Rd)</td>
<td>RTCWC</td>
<td>State</td>
<td>WA</td>
<td>3.6</td>
<td>39.2</td>
<td>1425</td>
<td>0</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>134</td>
<td>SR573/Craig (Loose to Las Vegas Blvd)</td>
<td>RTCSNV</td>
<td>State</td>
<td>CL</td>
<td>3.5</td>
<td>33.0</td>
<td>630</td>
<td>5</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>45</td>
<td>Greg St (I-80 to Mill St)</td>
<td>RTCWC</td>
<td>Local</td>
<td>WA</td>
<td>4.5</td>
<td>32.3</td>
<td>0</td>
<td>5</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>33</td>
<td>Koval (E Reno Ave to Sands)</td>
<td>RTCSNV</td>
<td>Local</td>
<td>CL</td>
<td>1.8</td>
<td>32.3</td>
<td>865</td>
<td>2</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>101</td>
<td>US50 (I-580 (Carson City) to SR341)</td>
<td>CAMPO</td>
<td>State</td>
<td>CC/LY</td>
<td>6.2</td>
<td>30.0</td>
<td>724</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>36</td>
<td>SR612/Nellis (Washington to Las Vegas Blvd)</td>
<td>RTCSNV</td>
<td>Local</td>
<td>CL</td>
<td>3.8</td>
<td>27.0</td>
<td>792</td>
<td>3</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>43</td>
<td>SR468/Glendale Ave/2nd St (Keystone to SR659/McCarran Blvd)</td>
<td>RTCWC</td>
<td>State</td>
<td>WA</td>
<td>4.6</td>
<td>26.8</td>
<td>602</td>
<td>3</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>19</td>
<td>SR593/Tropicana (I-15 to I-515)</td>
<td>RTCSNV</td>
<td>State</td>
<td>CL</td>
<td>5.7</td>
<td>26.7</td>
<td>531</td>
<td>3</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>48</td>
<td>SR610/Lamb Blvd (Las Vegas Blvd to I-15)</td>
<td>RTCSNV</td>
<td>State</td>
<td>CL</td>
<td>2.37</td>
<td>26.6</td>
<td>489</td>
<td>3</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

Source: Nevada DOT, Nevada State Freight Plan

Nevada also includes a full discussion of how each corridor was assessed along with associated performance metrics. These discussions include a rationale for the corridor’s inclusion in addition to baseline measurements. For example on page D-2 of Appendix 1, access to employment centers was defined by:

*Providing adequate access to existing and planned commercial and industrial developments that serve or have the potential to attract freight-dependent/intensive businesses will be essential to Nevada’s economic diversification efforts and continued economic growth.*

Access to employment centers was scored on a scale of 0 to 3, with 3 being access to existing or planned high density freight-dependent employment clusters. This is a good example of the
blending of quantitative and qualitative assessment standards, allowing a corridor to be analyzed beyond traditional metrics such as pavement quality or average travel time.

**Combined Data**

Iowa provides another example showing an excellent multimodal network analysis in its plan. Iowa identifies “priority corridors” for in-depth study using an in-house developed Infrastructure Condition Evaluation (ICE) tool. The ICE tool produces a composite rating using seven different criteria that includes metrics such as AADT, combination truck counts, congestion index value and pavement condition rating. Figure 5 displays the ICE rating for Iowa corridors. Additional information is also provided for Iowa’s Interstate Highways in a separate document, the “Iowa Interstate Corridor Plan.” Ideally, each corridor type is separated out with the intention of targeting different funding mechanisms and grants available for either rural or urban projects.
Out of the 12 plans reviewed, only Texas scored the full five points available in this category. The Texas plan stood out among others in this criterion because of its use of detailed commodity data to identify key corridors. Texas used TRANSEARCH commodity data and analysis using the Statewide Analysis Model to identify urban and rural industry-specific freight flows for the energy, mining, timber, and agricultural industries by both truck and rail modes. These industries, identified through MAP-21’s emphasis on heavy truck road usage, allowed Texas not only to benchmark current corridor usage by freight volume, but also to predict growth by projected tonnage to 2040. This connects directly to Texas’ prioritization process by identifying locations of potential freight growth as opposed to only addressing current high-usage areas.

Criteria 4: “A description of how the plan will improve the ability of the State to meet the national multimodal freight policy goals described in section 70101(b) of this title and the national highway freight program goals described in section 167 of title 23.”

This element is closely related to the second criterion requiring plans to list policies, strategies, and performance measures influencing investment choices. In reviewing plans for this element, “best of class” plans should at a minimum discuss the National Freight Policy and other goals specific to the state, with an emphasis on the symbiotic relationship between freight and the economy. Policies for investment should be based on sound financial analysis and should view safety from a multimodal standpoint. Finally, the state should include a discussion of the impact of the plan on key policy goals such as supporting exports, safety initiatives and maintaining infrastructure.
Best practices for this criterion include:
   a) The ability to support both national multimodal and highway policy goals such as making cost-effective infrastructure investments, supporting economic growth, and improving safety measures;
   b) Linking appropriate performance metrics to each goal for accountability.

**Supporting Policy Goals**

Much like the approach of using tables and matrices to compare state and national freight goals, Mississippi’s plan used the tables shown in Figures 6 and 7 to compare the state’s Freight Focus Areas with national freight policy goals.

Figure 6 shows the correlation between the National Freight Policy Goals and the general long-range transportation goals for Mississippi identified in the state’s long range plan (MULTIPLAN). Some goals meet more than one national criterion, and all are linked with at least one quantitative performance metric.

Figure 7 shows how the proposed freight goals for the Mississippi Statewide Freight Plan sought to be responsive to previous state plans: Mississippi Goods Movement and Trade Study, Mississippi State Rail Plan, and MULTIPLAN 2035. For example, the state freight plan goal of “protecting the safety and security of freight infrastructure” is tied to the MULTIPLAN 2035 goal of “ensuring high standards of safety in the transportation system,” both of which are connected to the national goal of “improving safety, security, and resilience.” Progress on these goals is measured through annual statewide crash statistics for heavy trucks and highway-rail crashes.

---

### Table 2.1 - Comparison of National Freight Policy Goals and Mississippi Transportation Goals

<table>
<thead>
<tr>
<th>Freight Focus Area</th>
<th>National Freight Policy Goal</th>
<th>Mississippi Transportation Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freight movement &amp; economic vitality</td>
<td>Enhancing economic efficiency, productivity, and competitiveness</td>
<td></td>
</tr>
<tr>
<td>Congestion reduction</td>
<td>Reducing congestion</td>
<td>X</td>
</tr>
<tr>
<td>Safety</td>
<td>Improving safety, security, and resilience</td>
<td>X</td>
</tr>
<tr>
<td>Infrastructure condition</td>
<td>Improving State of Good Repair</td>
<td>X</td>
</tr>
<tr>
<td>System reliability</td>
<td>Using advanced technology, performance management, innovation, competition, and accountability in operating and maintaining the freight network</td>
<td>X</td>
</tr>
<tr>
<td>Environmental sustainability</td>
<td>Reducing adverse environmental and community impacts</td>
<td>X</td>
</tr>
</tbody>
</table>

**Source:** Mississippi Department of Transportation (MDOT), Mississippi Statewide Freight Plan
Likewise in Iowa’s freight plan, links between national and state goals are clearly articulated. Iowa’s plan compares MAP-21 goals with goals identified in *Iowa in Motion – Planning Ahead 2040*, the state’s long range plan, as shown in Figure 8. Iowa also highlights how its proposed freight strategies, which influence prioritization and project selection, connect to national freight goals (Figure 9). This allows the freight plan to make a stronger case for each individual funding project by including multiple rationales from both the state and federal guidelines. All of Iowa’s proposed freight strategies meet multiple national goals. For example, Iowa’s freight strategy to, “Right-size the highway system and apply cost-effective solutions to locations with existing and anticipated issues,” includes the combination of significant investments in stewardship, focused capacity expansion, and even contraction in parts of the system. This strategy meets multiple national goals contributing to the efficiency of the freight system including the reduction of congestion and adverse environmental impacts while improving safety, the state of good repair, and accountability in operations and maintenance.

### Table 2.2 - Comparison of Mississippi Freight Goals, Objectives, and Performance Measures

<table>
<thead>
<tr>
<th>MULTIPLAN 2035 Goals (1)</th>
<th>MSFP Freight Goals</th>
<th>Freight Objectives</th>
<th>Freight Network Performance Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic Development: Provide a transportation system that encourages and supports Mississippi’s economic development</td>
<td>Improve economic benefits of the statewide freight network.</td>
<td>Increase public investment to facilitate freight system improvements that generate jobs and enhance MS’s competitive position.</td>
<td>Statewide annual funds invested by MDOT for freight-related projects through its Multi-Modal Transportation Improvement Program.</td>
</tr>
<tr>
<td>Accessibility and Mobility: Improve accessibility and mobility for Mississippi’s people, commerce and industry</td>
<td>Improve reliability and reduce congestion on the priority freight corridors.</td>
<td>Provide reliable and predictable travel times along identified freight corridors by reducing time delays.</td>
<td>Annual hours of truck delay (AHTD(2)) on the MFN Tier I and Tier II highway corridors. (3) For each corridor segment, AHTD = daily truck delay x 300, where daily delay =</td>
</tr>
<tr>
<td>Safety: Ensure high standards of safety in the transportation system</td>
<td>Protect the safety and security of freight infrastructure.</td>
<td>Reduce the number and rate of freight-movements related fatalities and injuries.</td>
<td>Statewide annual crashes, injuries, and fatalities involving heavy trucks. (4)</td>
</tr>
<tr>
<td>Maintenance and Preservation: Maintain and preserve Mississippi’s transportation system</td>
<td>Maintain the MS freight network infrastructure in a state of good repair.</td>
<td>Continuously improve infrastructure conditions that affect freight bottlenecks and reliability issues.</td>
<td>Percentage of the MFN highway pavement in good condition based on the International Roughness Index (IRI).</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Number of posted weight-restricted highway bridges on the MS Freight Network.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Statewide percent of rail network supporting 286k weight limits. (4) (5)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Channel depth for MS coastal ports (maintain authorized depth) and river ports (response time to recover to 12’ minimum depth after a drought or flood). (5)</td>
</tr>
</tbody>
</table>

*Source: MDOT, Mississippi Statewide Freight Plan*
### Figure 8: Comparison of Iowa in Motion Goals to National Freight Policy Goals

<table>
<thead>
<tr>
<th>National freight goals</th>
<th>Safety</th>
<th>Efficiency</th>
<th>Quality of life</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improve economic efficiency, productivity, and competitiveness</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Reduce congestion</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Improve safety, security, and resiliency</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Improve state of good repair</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Use advanced technology, innovation, and competition</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Use performance management and accountability</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Reduce adverse environmental and community impacts</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Source: Iowa DOT, Iowa in Motion – State Freight Plan*

### Figure 9: Iowa’s Alignment of Freight Strategies and National Freight Goals

<table>
<thead>
<tr>
<th>Contribution of freight system</th>
<th>Reduce congestion</th>
<th>Safety and security</th>
<th>Repair system</th>
<th>Innovative technology</th>
<th>Performance management</th>
<th>Reduce impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximize the advantages inherent to Iowa’s geographic proximity</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Explore/Create other funding sources to increase investment in the freight transportation system</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Target investment to address mobility issues that impact freight movements</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Emphasize the Multi modal Freight Network and utilize designs that are compatible with significant freight movements</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Target investment on the interstate system at a level that reflects the importance of this system for moving freight</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

*Source: Iowa DOT, Iowa in Motion – State Freight Plan*
Accountability

Nevada embraced data-driven goal setting in its freight plan and included a wide range of non-highway performance measures to reflect its multimodal freight goals. In order to align with national freight goals, the Nevada Department of Transportation (NDOT) cites the National Freight Policy and collects freight goals from existing state documentation including: *Moving Nevada Forward: A Plan for Excellence in Economic Development*, *Envisioning Nevada’s Future*, and NDOT’s *Connecting Nevada*, the state’s LRTP. The state’s FAC agreed on eight strategic goals to be included in the final freight plan with the intention to act as guidance for freight planning efforts. Goals included mobility and reliability, safety, advanced innovative technology, and infrastructure preservation. Each goal was subjected to a rigorous analysis with a quantitative baseline assessment made using appropriate performance measures. The scoring for each goal was adapted based on the complexity of the topic. For example, Nevada’s goal of economic competitiveness was assigned a composite score as seen in Figure 10. In this goal’s case, indicating factors included bridge conditions, bottlenecks on major truck routes, vehicular emissions, and highway safety ratings. A target of “progress on 45 percent of critical factor objectives trending positive” was established as an accountability measure. This goal is linked to multiple national goals in the category description.
Figure 10: Nevada’s Assessment of Economic Competitiveness Goal

 Criteria 5: “A description of how innovative technologies and operational strategies, including freight intelligent transportation systems (ITS), that improve the safety and efficiency of freight movement, were considered.”

Ideal plans for this category discuss both operational strategies and innovative technologies that are specifically connected to tangible, data-driven performance metrics.

The optimal best practice for this criterion includes an immediate future window of three to five years to be analyzed with a discussion of available private sector technologies.

**Innovative Technology Review**

Most of the freight plans reviewed for this study did not substantively address the implementation of current ITS technologies related to freight or investigate emerging technological trends in either the public or private sectors. Many states tended to consolidate this criterion’s required elements into a single state-level goal such as safety or environmental responsibility. ITS, when properly applied, can improve multiple categories for a freight system, and state freight plans that identified more than one area of potential improvement were rated higher than plans who considered ITS in a more narrow context. For example, one of the success stories of applied technology affecting both the public and private sectors has been the Commercial Vehicle Information Systems and Networks (CVISN) program. Created in 1991 by ISTEA, today the program continues to engage technology to reduce administrative burdens on
the trucking industry, improve public safety, and create more efficient enforcement operations. However, few of the plans reviewed acknowledge technology use in state enforcement operations.

Michigan does discuss ITS as both a safety and productivity strategy within its freight plan. Michigan prioritized advanced weight enforcement strategies through wireless weigh-in-motion monitoring, the statewide Truck Weight Information System, and by upgrading existing weigh stations to reduce surface system deterioration and decrease delays through improved regulatory compliance. The plan also identifies three transportation management centers across the state which focus on incident management activities with a particular emphasis on improving safety and mobility through advanced warnings of travel delays to shippers, and alternate routes to drivers during times of congestion. At the time of the plan’s publication, Michigan had secured a grant to develop a real-time truck parking information system, providing alerts and messages regarding available parking to improve trucking productivity and minimize driver time spent searching for available parking.

Nevada’s state freight plan proposes full integration of ITS into its freight plan, with one of the strategic goals of the plan specifically addressing “Advanced Innovative Technology.” As part of Nevada’s baseline performance assessment, the plan identifies an NDOT research goal as the identification of innovations in transportation with a target of two or more strategies to be researched per year. In the area of innovation, the Nevada plan does not limit itself to conventional devices or systems. Nevada took the unique step of considering true emergent technologies such as Hyperloop Tech for high-speed cargo delivery to reduce freight travel times and drone delivery to address freight congestion. These very forward-looking technologies were assigned performance metrics and considered as part of the overall approach to integrating new technologies into the existing freight system.

California aggressively acted on MAP-21’s recommendation to integrate ITS technology into the existing freight network, as demonstrated by the Freight Mobility Plan. California places particular emphasis on environmental responsibility in its freight planning, and relates many of the identified and implemented ITS tools back to sustainability metrics. This emphasis comes from freight stakeholders at the city, regional, and state level with MPOs and regional planning associations providing feedback on potential areas of technological improvement. In the freight plan, California predicts that nearly every one of its freight funding programs will have an ITS or advanced technology component as the state moves forward. California acknowledges that the availability of a trained labor force is essential to the state meeting this goal, and cites 2002’s International Longshore and Warehouse Union’s agreement with the Pacific Maritime Association as a predictor of a massive shift in the accessibility of advanced technology systems training. The plan names several freight-specific ITS elements including the use of radio frequency identification (RFID) tags on vehicles and facility gates, California’s participation in PrePass to improve weight and tolling enforcement, and smart truck parking to reduce idling emissions and improve productivity.

Criteria 6: “In the case of roadways on which heavy truck travel (including mining, agricultural, energy cargo or equipment, and timber vehicles) is projected to substantially deteriorate the condition of the roadways, include descriptions of improvements that may be required to reduce or impede the deterioration.”

The vast majority of the nominated freight plans did not address the truck weight criterion in any detail. It must be pointed out that this is a conditional factor based on state-specific industries (i.e. mining, agriculture, energy and timber). In its guidance on this factor, the U.S. DOT mostly
discusses the recent “energy boom” as a catalyst for accelerated deterioration of roads and bridges in some states. U.S. DOT guidance cites Texas DOT as an example of information developed by its Energy Sector Impacts Task Force and other sources to inform its State Freight Plan.

Similar to the previous criterion discussion about describing the use of technology, none of the freight plans reviewed discussed the role of size and weight enforcement operations in the state, even though every state is required to submit an annual state enforcement plan (SEP) and certify to the U.S. DOT annually that they are executing the strategies in the SEP in order to reduce bridge and pavement deterioration and receive federal highway funding.

In rating this criterion an ideal freight plan was viewed as one that discusses the effect of heavy vehicle traffic in a context appropriate to the state’s own industries, state-adopted weight regulation/policy, and steps the state is taking to address infrastructure deterioration attributed to trucks. Accountability plans should be clearly outlined and should address deterioration as tied to identified performance metrics.

Best practices for this criterion include:

a) Using both federal and state data to support its analysis of industrial impacts on bridges and roadways, with data targeted to the county or sub-county level in order to provide exact locations of deterioration;

b) Performance metrics associated with each road/segment to give the clearest picture possible of how heavy vehicles are moving within the system, connecting identified metrics to any relevant external documents such as the state’s truck weight enforcement plan.

California substantively discusses the identification of deterioration by industry as well as strategies for dealing with affected heavy truck routes. In particular, the plan highlights the poor pavement on its local roads due to the fact they are not constructed to accommodate heavy loads. California acknowledges the seasonality of many high-traffic heavy truck routes as part of the agricultural calendar. Routes connecting rural agricultural regions within the state are identified for increased support despite lower than average AADT counts throughout the year.

The plan also makes a distinction between intrastate corridors with high-value heavy freight and interstate corridors which belong to the National Freight Network, arguing that even rural corridors not identified as critical to freight movement are essential to freight flow during the agricultural season. California also tied industries to specific corridors and roads (e.g. the Eastern Sierra/Owens Valley and US-395 are tied to farm products, general freight, and food/kindred products) with freight flows identified for each corridor. While California does not link to the state’s external weight enforcement plan, it is by far the best example of identifying heavy truck deterioration by industry, linking to performance metrics, and proposing potential solutions to mitigate damage.

The Texas State Freight Plan highlights the additional stress from oil and gas exploration and production activities placed upon roads not originally designed to handle heavy truck traffic, and in particular the challenges rural areas face in order to keep pace with needed infrastructure improvements. In 2012, TxDOT created the Energy Sector Task Force, to address the estimated $4 billion per year in needed roadway repairs due to the heavy truck traffic. TxDOT’s freight plan makes a number of policy, program, and project recommendations related to the freight network supporting the oil and gas industry, and it calls for “a comprehensive process for the private-sector and industries to contribute to necessary improvements” when the movements directly impact the Texas freight network.
Criteria 7: “An inventory of facilities with freight mobility issues, such as bottlenecks, within the State, and for those facilities that are state-owned or operated, a description of the strategies the state is employing to address the freight mobility issues.”

This criterion concentrates on identifying and cataloging public infrastructure locations with freight flow problems in the state. The FAST Act language provides bottlenecks as an example, but states may list any freight mobility impediments or problems present within their system. Bottlenecks that are included in the assembled inventory should be freight-specific.

Best practices for this criterion include:

a) Leveraging available data, such as GPS data combined with stakeholder interviews or other stakeholder involvement efforts to identify problem areas of freight flow;

b) Clearly outlined strategies to improve bottlenecks and other mobility issues that are appropriate to the mode in which the bottleneck occurs.

**GPS Data**

In Washington’s freight plan, the state used GPS data is used to identify freight bottlenecks on surface transportation. The Washington State Department of Transportation (WSDOT) uses that data to identify locations with freight mobility issues. The Washington plan goes beyond simply identifying truck bottlenecks, it also places bottlenecks into several categories driven by performance metrics: slow speed, reliability, resiliency, restricted access for legal loads, and clearance restrictions for over-height loads. Special attention is paid to urban freight bottlenecks as the plan cites faster pavement deterioration given higher percentages of truck deliveries and a generally higher level of congestion. Multimodal and intermodal bottlenecks are briefly discussed as part of the system inventory.

**Bottleneck Strategies**

The Florida Department of Transportation (FDOT) identified bottlenecks by first reviewing previous transportation-oriented freight documents such as the 2060 Florida Transportation Plan and cross-referencing issues raised in mode-specific system documents. After modal bottlenecks were identified, Florida conducted interviews with FDOT modal managers to verify the bottlenecks. Then interviews were conducted with location-based local partners and agency personnel in order to pinpoint the particular issue creating the impediment as well as adding any previously unindexed mobility problems. By using a combination of quantitative and qualitative data, Florida’s freight plan is able to discuss both hyper-local freight flow problems, but also use stakeholder input to find ongoing modal impediment themes for addressing the bottlenecks present in the system.

Criteria 8: “Consideration of any significant congestion or delay caused by freight movements and any strategies to mitigate that congestion or delay.”

Similar to the seventh criterion requiring an inventory of locations with freight mobility issues, the eighth criterion asks for the consideration of significant congestion or delays caused by freight movements. Plans are required to discuss strategies to mitigate any recognized delays. U.S. DOT guidance suggests that states make quantitative and qualitative assessments of locations where freight contributes to delay, and then consider network effects of mitigation strategies. There is no requirement that specific Freight Plan mitigation strategies must be implemented.
Best practices for this criterion include:
   a) The use of dynamic data, such as GPS or Freight Performance Measures (FPM) data, to identify the specific delay locations;
   b) The strategic use of feedback or suggestions from stakeholders which may or may not include the FAC;
   c) Addressing congestion and delay across all modes of transportation.

**Dynamic Data**

California’s freight plan makes the distinction between freight delay and more general traffic congestion on highways while also assessing multimodal congestion as part of the plan’s freight system condition and performance analysis. FHWA freight bottlenecks on the Primary Freight Network were ranked by severity. Other congested areas in-state are identified with local plans via multiple performance metrics including delay time and volume flows. California clearly lists remedies for congestion, although most of these lack associated performance metrics. These strategies include ultimately measureable techniques such as improving pavement quality, adding truck-only lanes, and methods to increase capacity such as adding passing lanes and improving intersection infrastructure. Multimodal congestion strategies include making short-line rail connections available for heavy-load trucks and investing in marine highways to free up rail capacity and ultimately reduce truck traffic on California highways.

**Feedback**

Early in the development of the *Texas Freight Mobility Plan*, a white paper examining trends and issues likely to impact Texas freight movement now and in the future was developed. The white paper was distributed to the TxFAC and a presentation on the white paper was made at a TxFAC meeting. TxFAC members were asked:

1. To identify the *most* important trends/issues impacting Texas freight movements in the next 10 to 20 years;
2. To identify the *least* important trends/issues impacting Texas freight movements in the next 10 to 20 years;
3. If important trends or issues not discussed in the white paper, and what should be added.

The results of the TxFAC survey were compiled and the issues/trends determined to be most important by TxFAC members were ultimately incorporated into the final *Texas Freight Mobility Plan*.

**Multimodal Congestion and Delay**

Texas provides a ranking of its top 10 congested freight locations by urban area, truck-person hours of delay by mile and total annual cost of truck congestion. Highway bottlenecks are all assigned a “total freight congestion value” based on average commercial truck speeds in a given area. The Texas Department of Transportation identified these locations with a combination of INRIX data and state traffic volume information. The plan notes that as all 10 locations are in urban areas, the intermodal connectors driving freight flows are in direct competition with passenger movements for system capacity. ATRI’s FPM data was used to identify primary and secondary freight corridor segments that suffer from congestion. The report also noted that Texas had seven of the top 25 truck bottlenecks in the nation. Multimodal mobility delays are considered across the system including air, rail and ports. Mitigation strategies are mode-specific with strategies for reducing highway crash rates, supporting
integrated cargo security strategies to allow faster inspections at border crossings, and fostering rail freight as a modal alternative for congested highway freight routes.

Georgia used ATRI’s FPM data to identify both corridor-level bottleneck segments as well as site-specific freight bottlenecks. In Georgia’s Freight Improvement Project Recommendations, highway freight bottlenecks are paired with completed or proposed projects that could significantly improve the conditions at these locations. For example, a later analysis of national freight bottlenecks showed that the addition of a taper lane at the truck bottleneck at northbound I-75 and I-675 that average truck speeds increased, reducing freight congestion at that bottleneck location.

Criteria 9: “A freight investment plan that includes a list of priority projects and describes how funds made available to carry out section 167 of title 23 would be invested and matched.”

The cornerstone of the FAST Act requirements includes synthesizing the data collected and assessed in the previous criteria into a list of prioritized freight projects for the state. Projects should be directly connected to relevant funding or investment information.

Best practices for this criterion include:
  a) Standardizing how benefit-cost, return-on-investment or performance measure improvements will be calculated;
  b) Industry techniques such as standard accounting practices or optimization through supply chain modeling should be used whenever possible;
  c) A discussion of the state’s FAC’s role in the prioritization process used to identify priority projects

Reporting Standards

Michigan uses three sources of guidance in prioritizing its state’s freight projects: MDOT base criteria identified in the Michigan Freight Plan; MAP-21 eligible project types; and federal freight priorities (Figure 11). Highway projects were divided into three tiers: Tier 1 projects satisfy MDOT base criteria, are a MAP-21 eligible project type, and are identified as a federal priority for freight; Tier 2 projects satisfy the MDOT base criteria and are a MAP-21 eligible project type; and Tier 3 projects are a MAP-21 eligible project types, but do not satisfy the MDOT base criteria.
Both highway and non-highway freight projects are assessed by a defined set of performance measures including unique metrics like remaining service life, projects with local matching funds, and projects containing locations considered to have “excess commercial vehicle crashes.” While all projects have estimated costs, funding opportunities are not identified across the board. Michigan also provides a step-by-step protocol for replicating its project list development data analysis, allowing others interested in replicating the quantitative analysis to move from the initial data extraction all the way to exporting tier-sorted projects.

**Industry Techniques**

Georgia’s freight investment plan includes a clear mode-by-mode analysis of how projects were prioritized by category. Each category has a tailored prioritization process based on stakeholder input from the FAC and mode-specific outreach to the freight community in addition to previous reports and demand models. Each project has a total project cost associated with it as well as an individual benefit-cost assessment. Georgia goes beyond the criterion requirement by also including recommended implementation timelines for near term and out to 2050, and when combined with the cost-benefit analysis, allows Georgia’s Statewide Freight and Logistics Plan to project the return-on-investment for each project through the lens of overall value to the freight industry.
When considering all the nominated freight plans, Florida’s plan rose to the top in terms of project prioritization. The plan analyzes more than 700 projects totaling $32 billion throughout the state. Assessed projects are classified as freight-focused, freight-related, or freight-impacted. These projects are divided into major freight modes with both federal and state financing programs identified, including links to external materials on the funding programs. Individualized benefit-cost analyses or return-on-investment calculations were part of the prioritization process for each project as part of the submission process. The Florida freight community was surveyed about the nominated projects through an online survey in which they could review existing projects gleaned from current Florida freight-related plans and add new projects for consideration. These projects were then reviewed and discussed in state-sponsored business forums with local government, private industry, and professional agencies. Florida’s prioritization process, project analyses, and finance descriptions were released as a separate Phase 2 document that complements Florida’s Freight Plan Policy Element (Phase 1) and is extremely detailed. With that in mind, Florida’s depth of research is unparalleled and by far, the best in class of the nominated freight plans for Criteria 9.

Criteria 10: “Consultation with the state FAC, if applicable.”

While not a true requirement, the ideal attributes checklist does screen for state freight plans that utilize FACs. All 12 of the nominated plans included an advisory group and it is the belief of the research team that a well-developed and empowered freight committee is indispensable to the planning process.

Best practices for this criterion include:
   a) A balanced membership drawing on experience and expertise from both the public and private sector;
   b) Regular and on-going meeting schedules to ensure consistent contact, key to developing trust and respect between committee members;
   c) Acting in an education and outreach capacity;
   d) Decision making authority.

Balanced Membership

California’s FAC is chaired by the California Department of Transportation and includes 62 member organizations comprising a range of fields such as environmental (Coalition for Clean Air), tribal (Native American Advisory Committee), modal (port representatives, California Airports Council) and private industry partners. The committee’s duties include refining the freight system designation “tiers” and prioritizing the state’s identified freight projects according to the state freight plan-identified goals. California was one of the few plans to acknowledge and solicit input from Native American nations and tribes as part of the planning process, resulting in an independent chapter of the plan dedicated to connectivity needs between the Native American Tribal Trust Lands and the National and State Freight Systems. The California FAC is a permanent body and meets four times a year in various locations around the state.

Washington’s freight plan cites the state’s Freight Mobility Strategic Investment Board (FMSIB) as the lead agency for the Washington State FAC (WAFAC). As noted earlier, in 1998 Washington was one of the few states that created a state-funded freight investment program, and FMSIB is the 12-member, Governor-appointed board that oversees the program. WAFAC is a sixteen-member committee, of which six members are also appointees of the FMSIB.
Cities, counties, tribal government, labor, major freight modes and WSDOT are represented in WAFAC. WAFAC does not have members from the state’s major industries or trade associations. WAFAC was used to identify trends arising from interviews with private businesses and industry partners conducted by WSDOT’s Freight System Division. WSDOT’s Freight Mobility Plan highlights FMSIB’s role in describing short and long-term freight trends within the existing system, serving as a forum for transportation decision-making discussions and coordinating regional priorities with outside organizations. WAFAC is a standing committee which meets quarterly.

Outreach and Education

The Texas freight plan calls for its advisory committee to do more than simply submit project ideas or help prioritize freight goals. The TxFAC also acts as an educational and outreach resource across the state, communicating the freight plan’s priorities to outside organizations and sharing freight information across the public-private sector divide. Established as a permanent committee, TxFAC meets quarterly with each meeting themed around a particular aspect of the freight system (e.g. freight technology, Texas’ freight network designation process) allowing committee members to provide input while developing a holistic view of freight within the state. TxFAC was tasked with reviewing the draft freight plan and providing feedback on the identified recommendations and project selection, allowing members to find common themes such as the vital role of a multimodal strategy to address the projected gap between Texas’ highway system freight capacity and forecasted freight demand.

Decision Making Authority

Perhaps the most unique element of ATRI’s Ideal Attributes Checklist is contained within this criterion. After reviewing industry trends and existing literature, researchers posited that ideal advisory committees will possess some amount of decision making authority. As evidenced by the name, FACs can provide advice to a state’s DOT regarding freight matters as well as weigh in on the prioritization process. However, no committee in the nominated plans has decision making authority regarding project selection or funding considerations. Washington’s FMSIB comes closest in this regard, but FMSIB is a statutorily defined, Governor-appointed board. WAFAC is a separate group with cross-over membership, but no statutorily defined responsibilities like FMSIB. As this element was one of the attributes for the highest rating in this category, no plan received the full five points.
6.0 STATE FREIGHT PLAN RESEARCH FEEDBACK

As described in Section 3.0 Research Objective and Methodology, ATRI conducted a survey of the 50 State Trucking Associations (STAs) to provide additional feedback on the state freight plan review and ranking criteria. Slightly less than half of all STAs responded to the survey. Of those respondents, only four indicated that they had not reviewed their state’s freight plan. ATRI synthesized and incorporated insights from the state association surveys on the pros and cons of freight plans and the related planning process.

Common themes among STAs that reported successful involvement in their respective state freight planning process and FAC include:

- A recognition by public sector planning staff of the importance of trucking to the state;
- Regular newsletters containing reports relevant to the state’s freight planning process and objectives;
- Strategic site visits intended as learning opportunities for FAC members to understand the multimodal nature of freight within a state’s system.

One theme that emerged from the collected state association feedback relates directly to one of the research findings from the freight plan analysis. Survey participants communicated that it was critical for FAC members to have a formal role in the identification of priorities and by extension, project selection, as a key indicator of engagement and overall commitment from committee members. Simply providing feedback that did not result in actionable or noticeable changes to the overall FAC process or policies resulted in members feeling disconnected and discontent with the planning process as a whole as well as justifying their own participation.

Among the STAs who indicated dissatisfaction with their state’s freight plan, key areas of dissatisfaction included modal favoritism (e.g. state-supported websites to encourage use of one freight mode over another) and boilerplate language promulgated by the consultants developing the plans which did not recognize the unique freight issues and opportunities in each state.
7.0 RECOMMENDATIONS

Based on ATRI’s comprehensive review of state freight planning literature, current state freight plans, and how those plans are operationalized in the states, a series of recurrent themes emerged, including:

1. All of the nominated plans used some form of externally generated, real-world data to justify their prioritization process and project selection. The research team observed, however, that state freight plans that used more than one source of data were able to make more targeted and detailed project identification, justification and investment rationalization. Plans that used only FAF as a data resource for justifying a critical corridor for example, tended to have project recommendations at a broad level as opposed to more granular location-specific actions. Plans that used location-dependent freight data such as GPS information made stronger cases for bottleneck identification and thus the criticality of investment and funding. As state planners consider how to allocate funding for freight plans going forward, using funds to acquire and analyze detailed data allows for planners to reap multiple benefits.

2. All the plans reviewed for this study were nominated by a national group of freight peers. Despite this endorsement, there were gaps common to almost every plan that should be more fully addressed by future planning efforts. It must be recognized that the field of freight planning is rapidly evolving, as Congress just recently began directing federal highway funds to new freight programs. Following the passage of MAP-21, the U.S. DOT released “Interim Guidance on State Freight Plans and State Freight Advisory Committees” in October of 2012. The final guidance was not published until October 2016. As a result, some states proceeded under the interim guidance, while others waited until after the FAST Act, which changed some of the state plan mandates, and added a significant mandate for investment plans. As a result, it appears that while state freight planning has been energized, the process remains at times ambiguous. As an example, the highest rated plan from this research, the Texas Freight Mobility Plan – 2016, was largely redone in 2017 for the purpose of adding an investment plan element.

As another example of the quickly changing nature of state freight plans, only a few of the plans reviewed had designated critical urban and critical rural freight corridors. However, the requirement for establishing the National Highway Freight Network, was not created until late 2015, and U.S. DOT guidance for designating critical freight corridors was not released until April 2016. A number of the plans reviewed for this effort had already been completed by the spring of 2016, or were in final draft stages.

3. Every nominated freight plan was guided by a state-sponsored FAC in some form, confirming that exemplary plans will not only incorporate community and stakeholder feedback, but formally bring outside partners into the planning process. One element identified as a best practice, however, was missing from all of the FACs reviewed in this research. While many FACs provided guidance and support to the project prioritization process, no FAC had any direct decision authority in the project selection process. It appears that in most cases FACs exert some influence over the project selection process, but none of the freight plans referenced an ability for FACs to veto or add projects or priorities once the prioritization process has yielded a list of projects. This ability would alter the nature of the committee, moving away from an advisory capacity and toward a more formal partnership model like Washington State’s FMSIB.
The December 4, 2017 deadline for state freight plans has passed and proactive planners may already be considering how to update, and in some cases alter, the format and contents of their state’s freight plan. Through this study, ATRI hopes to assist states and other entities in better standardizing best practices and model language in the freight plan updates for the end benefit of improving the seamless flow of goods throughout the U.S. By examining and assessing state freight plans nominated by the freight community, ATRI produced this report to act as a guide and resource for those looking to benchmark actionable, practical best practices for freight planning at the state level.

Next Steps: Proposed Case Study Plans

As part of ATRI’s research objective for this project, the highest scoring freight plans reviewed were researched further as future case study subjects. Based on the point distribution of the rated plans, four states qualified as potential case studies. The highest scoring plans were Texas, Georgia, California, and Mississippi. California and Mississippi tied for third place.

While in-depth case studies are not part of this report’s research scope, a more in-depth analysis of the top three Freight Plans would yield important guidance for entities involved in state freight plan development. Ideally the case studies would include a longitudinal assessment that would follow-up on the investment plans and their ultimate impact on freight flow productivity. The proposed state-based case studies could involve interviews with freight planners, infrastructure engineers and private sector stakeholders – particularly those on the FACs – to develop greater insights about “what works” and what could be improved in the selected state’s freight planning process.

An important outcome of the case studies would be a more in-depth documentation of the logistics of the planning process including timelines for stakeholder engagement, assessment of data used in the plan, a discussion of the state’s prioritization process and criteria, and suggested implementation practices for freight planners at the state level. These case studies would serve as detailed examinations of the behind-the-scenes process of putting together the many disparate pieces of a freight plan.
APPENDIX A

IDEAL ATTRIBUTES CHECKLIST

1. Criteria 1: “An identification of significant freight system trends, needs, and issues with respect to the State”
   a. Level 5
      i. Global, national, regional, and local economic, industry, technology, demographic and regulatory trends; and how they impact current and future freight flows/key supply chains of the state
   b. Level 3
      i. National/Regional focus of trends with a focus on impacts to state highway systems, with an emphasis on linking trends back to stated planning and programing goals of the state
   c. Level 1
      i. Selective identification of trends impacting the state with no systemic approach or underlying connection to freight movements or trade.
   d. Level 0
      i. Criteria Not Addressed

2. Criteria 2: “A description of the freight policies, strategies, and performance measures that will guide the freight-related transportation investment decisions of the State”
   a. Level 5
      i. Policies that guide investments are clearly state and based on both quantitative (ROI or BCA) and qualitative factors. The investment approach should discuss assessment techniques (e.g. FPM, GPS data, state specific data); and show consistency or explain differences with non-freight investment decisions.
   b. Level 3
      i. Presents either quantitative or qualitative approaches / factors but not both.
   c. Level 1
      i. Investment decision process is highly qualitative, (lacks ROI or BCA) and approaches are not consistent with other investment decision processes
   d. Level 0
      i. Criteria Not Addressed

3. Criteria 3: “When applicable, a listing of multimodal critical rural freight facilities; and critical rural and urban freight corridors designated within the State”
   a. Level 5
      i. The identification of key corridors is multimodal in nature based on an evaluation of highest volume and/or value flows. Plans integrate economic data with traffic data through GIS mapping and bottleneck analysis
   b. Level 3
      i. Use of non-GPS mapping; focus on one or two modes instead of holistic view of system; industries identified and described but lacks commodity assessment
   c. Level 1
i. Limited mapping of corridors, cursory listing of industries in state/region without reference to freight facilities  
d. Level 0  
i. Criteria Not Addressed

4. Criteria 4: “A description of how the plan will improve the ability of the State to meet the national multimodal freight policy goals described in section 70101(b) of this title and the national highway freight program goals described in section 167 of title 23”
   a. Level 5  
i. Presents a multimodal policy/goal framework that incorporates key elements of Federal Freight Policy, such as making cost effective infrastructure investments, supporting economic growth and improving safety; and, provides performance measures to monitor progress towards goals.
   b. Level 3  
i. Identifies goals unrelated to federal freight policy and presents performance measures with no plan for monitoring or implementation strategy. Limited in scope/modes.
   c. Level 1  
i. References back to national goals without specifics or metrics  
d. Level 0  
i. Criteria Not Addressed

5. Criteria 5: “A description of how innovative technologies and operational strategies, including freight ITS, that improve the safety and efficiency of freight movement, were considered”
   a. Level 5  
i. Operational strategies and innovative technologies are described along with data metrics; 3-5 year future window is discussed; includes discussion of private sector technology available; input from community stakeholders gathered and assessed
   b. Level 3  
i. Operational strategies and innovative technologies are addressed with limited discussion of metrics or data used; involves 18 month to 3 year future window; limited discussion of emerging technology
   c. Level 1  
i. Operational strategies are addressed without discussion of technologies related to safety or efficiency  
d. Level 0  
i. Criteria Not Addressed

6. Criteria 6: “In the case of roadways on which travel by heavy vehicles (including mining, agricultural, energy cargo or equipment, and timber vehicles) is projected to substantially deteriorate the condition of the roadways, a description of improvements that may be required to reduce or impede the deterioration.”
   a. Level 5  
i. Includes federal and state data down to country or sub-county level supporting analysis of relevant industries within the state; State Enforcement Plan for weight limits and other metrics tied to freight plan; performance metrics tied to specific roads/corridors; accountability plans for addressing deterioration clearly outlined
b. Level 3
   i. References federal and state data regarding relevant industries, but not both; performance metrics identified but no specific plans articulated for addressing deterioration; projects identified but not clearly articulated

c. Level 1
   i. References federal or state data regarding relevant industries, but not both; performance metrics mentioned but not clearly identified at state level; no projects identified for addressing deterioration

d. Level 0
   i. Criteria Not Addressed

7. Criteria 7: “An inventory of facilities with freight mobility issues, such as bottlenecks, within the State, and for those facilities that are State owned or operated, a description of the strategies the State is employing to address the freight mobility issues”
   a. Level 5
      i. Use of combined GPS data and interviews with stakeholders; strategies to address bottlenecks across modes clearly defined; bottleneck defined as freight-specific
   b. Level 3
      i. Use of GPS data or interviews with stakeholders, but not both; strategies to address bottlenecks addressed but without specific plans/projects; bottlenecks not freight-specific
   c. Level 1
      i. Limited or no use of data to identify bottlenecks; strategies outlined or poorly defined; bottlenecks addressed as concept, but not with specific examples
   d. Level 0
      i. Criteria Not Addressed

8. Criteria 8: “Consideration of any significant congestion or delay caused by freight movements and any strategies to mitigate that congestion or delay”
   a. Level 5
      i. Use of quantitative measures (e.g. GPS/FPM data for highways) to identify delays; considers the multimodal delays across the freight system; strategies involve input from stakeholders
   b. Level 3
      i. Use of qualitative information (e.g. stakeholder opinions) to identify congestion or uses quantitative data for only a single mode; limited input from stakeholders on solutions/strategies
   c. Level 1
      i. No state-specific data; modes not specifically identified; solutions not state or system specific
   d. Level 0
      i. Criteria Not Addressed

9. Criteria 9: “A freight investment plan that includes a list of priority projects and describes how funds made available to carry out section 167 of title 23 would be invested and matched”
   a. Level 5
      i. Projects listed with associated funding/investment information; use of largely quantitative analysis to arrive at project prioritization, which is then
presented to the FAC for review and refinement. Quantitative approaches use benefit-cost analysis, or return on investment (ROI) based on industry standards such as standard accounting practices or supply chain modeling such as optimization.

b. Level 3
   i. List of projects with funding information; prioritization process based on a combination of quantitative and qualitative processes that is presented to an FAC for review and refinement.

c. Level 1
   i. List of projects based primarily or solely on qualitative process for deriving prioritization. Not presented for review or refinement to the FAC.

d. Level 0
   i. Criteria Not Addressed

10. Criteria 10: "Consultation with the State FAC, if applicable"
   a. Level 5
      i. Diverse/balanced input from public/private stakeholders; articulated means of engagement (e.g. meetings, focus groups, etc.); Ongoing basis for meetings; advisory group has decision making abilities
   b. Level 3
      i. Input from public or private sector, but skewing heavily toward either stakeholder type; ad-hoc planning group without ongoing engagement; advisory ability but no decision making capabilities
   c. Level 1
      i. No discussion of advisory committee make-up; intermittent or disbanded meeting structure; or committee structure is primarily public sector partners and a few associations.
   d. Level 0
      i. Criteria Not Addressed