Assessing the Panama Canal Expansion on Texas Ports and Landside Transportation Infrastructure

Texas Freight Advisory Committee

April 20, 2021
Project Objective

- Document the impact of the three-year operation of the expanded Panama Canal on Texas ports, industries, and the landside transportation infrastructure, including roads, bridges, and other facilities on the Texas multimodal freight network. Identify additional improvements to increase exports and imports through Texas ports.
Assessing the Panama Canal Expansion on Texas Ports and Landside Transportation Infrastructure

Trade with Pacific Rim Countries via Texas Deep Draft Ports Through the Panama Canal

Labeled countries are in the top 25 Texas trading partners
- Panama Canal
- Texas deep draft ports

Assessing the Panama Canal Expansion on Texas Ports and Landside Transportation Infrastructure
March 2021 Suez Canal Blockage

- Ever Given
- 20,000 TEU container ship
- 1,300 foot vessel
- Blocked channel for 6 days
- Sandstorm with high winds and limited visibility

By Contains modified Copernicus Sentinel data [2021], processed by Pierre Markuse - Container Ship #039;Ever Given#039; stuck in the Suez Canal, Egypt - March 24th, 2021, CC BY 2.0, https://commons.wikimedia.org/w/index.php?curid=102400564
Background – TxDOT Panama Canal Stakeholder Working Group (PCSWG)

- TxDOT formed PCSWG in 2012
- Six information-gathering meetings with stakeholders
- Findings, recommendations, and actions to increase exports and imports through Texas ports and expand state’s position as global gateway for nation
- Texas Freight Advisory Committee (TxFAC) established in 2013 with PCSWG members as base
Project Activities

- Conducted interviews with 35 stakeholders
- Reviewed data from the Panama Canal Authority, Department of Energy, ports and other sources
- Reviewed national, state, and regional reports on the impacts of Panama Canal expansion
Individuals Interviewed

- Larry Kelley, Jr., Port of Port Arthur
- Matthew Kaufman, Sabine-Neches Navigation District
- Jordan Frisby and Bruce Mann, Port Houston
- Mike Wilson, Jason Miura, and Jennifer Barrera, Port Freeport
- Sean Strawbridge and Jeff Pollack, Port of Corpus Christi
- Steve Tyndal, Port of Brownsville
- Rodger Rees and Brett Milutin, Galveston Wharves
- Adam Jack, TxDOT Beaumont District
- James Koch, TxDOT Houston District
- Paula Sales Evans, TxDOT Corpus Christi District
- Richard Bartoskewitz, TxDOT Rail Division
- Bob Dickinson, Beaumont-Port Arthur MPO
- Tyson Moeller, Union Pacific Railroad
- Rafael Mercado, Kansas City Southern Railroad
- Megan Shea, Travis Thowe, and Brandon Unterbrink, BNSF Railway
- Judge Ed Emmett, Rice University
- Chad Burke, Economic Alliance (Houston)
- Brant Wilbourn, Texas Farm Bureau
- Steelee Fischbacher, Texas Wheat Producers Association
- Mike Steenhoek, Soy Transportation Coalition
- Jack Todd, Trinity Industries, Inc.
- Len Waterworth, Texas A&M University Galveston
- John Esparza, Texas Trucking Association
- Bill Diehl, Greater Houston Port Bureau
- Will Connell and Don Dovie, Gulf Intermodal Services
- John LaRue, Corpus Christi Chamber of Commerce
- Randy Hillsman, G2 Ocean
Assessing the Panama Canal Expansion on Texas Ports and Landside Transportation Infrastructure
Annual Panama Canal Universal Measurement System (PC/UMS) Tonnage

Thousands


Assessing the Panama Canal Expansion on Texas Ports and Landside Transportation Infrastructure
Transit to and from Gulf Coast Ports

![Bar chart showing transit to and from Gulf Coast Ports from 2012 to 2019. The chart displays data in increments of 500 from 0 to 4000, with years 2012 to 2019 listed on the x-axis. The y-axis shows the number of trips, with bars indicating a steady increase from 2012 to 2019.](image-url)
Texas Benefits from the Expanded Canal

- Examples of increased exports and imports to Pacific Rim countries
  - Liquified Natural Gas (LNG)
  - Liquid Petroleum Gas (LPG)
  - Containers
  - Plastic resins
  - Roll-on/Roll-off (RoRo)
  - Agricultural, processed foods and beverages
Texas LNG Exports

- 2 Operating LNG export terminals in Texas
  - 1 additional terminal in Louisiana

- 3 FERC-approved LNG export terminals in Texas under construction
  - 1 additional terminal in Louisiana

- 6 FERC-approved LNG export terminals in Texas awaiting construction
  - 1 additional terminal in Louisiana

Laden LNG vessels through the Panama Canal neopanamax locks from Texas (Atlantic to Pacific)

<table>
<thead>
<tr>
<th>Year</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td>10</td>
<td>72</td>
<td>142</td>
<td>156</td>
</tr>
</tbody>
</table>

* Federal Energy Regulatory Commission (FERC), March 2020  
** Panama Canal Authority, 2019  
*** Operates through the Sabine Neches Navigation District
Texas LPG Export Facilities
Gulf Ports LPG Exports Through the Panama Canal

Gulf-Origin-to-Pacific Laden LPG Vessels

- 2016: 187
- 2017: 351
- 2018: 397
- 2019: 423
- 2020: 514

Assessing the Panama Canal Expansion on Texas Ports and Landside Transportation Infrastructure
Container Imports and Exports Through the Panama Canal

- **Port Houston**
  - Tradelanes served by Panama Canal major growth engine
  - 80% growth in containers through the Panama Canal 2016-2019
  - Larger vessels in regular rotation

- **Port Freeport**
  - 58% increase in export containers since canal expanded
Plastic Resins — Exports

- Eight new polyethylene plants on the Texas Gulf Coast
- Port Houston — 42% of U.S. resin exports
- Port Houston and Port Freeport — increase in exports and adds balance to imports(exports)
Roll-on/Roll-Off Imports and Exports

Port Freeport

- 97% increase in RoRo vessels
- 305 RoRo vessels first 3 years of expanded canal
- Automotive vehicles, high and heavy equipment, containers and breakbulk cargo
Agricultural Products, Processed Foods, and Beverages

- Houston, Corpus Christi, Galveston, Freeport
- Imports and exports
- Containers and dry bulk
- Wheat, sorghum, soybeans, cotton, and processed foods and beverages
Texas Multimodal Freight Network

- Ports, harbors, and ship channels
- Roadway system
- Railroads
- Pipelines
Texas Ports — Critical Assets

- Deepening and widening projects — Sabine Neches Waterway, Port Freeport Harbor Channel, Corpus Christi Ship Channel, Brazos Island Harbor Channel, Houston Ship Channel, Cedar Bayou Channel, and Matagorda Ship Channel
- Gulf Intracoastal Waterway – Replacing Brazos River Floodgates and Colorado River Locks
- On property expansions and improvements
TxDOT Funds Distributed to Ports for Riders 48, 45, and 38

Port Access Improvement Program

- **Houston** (3 projects) $20,982,686, 21%
- **Galveston** (2 projects) $4,838,471, 5%
- **Palacios** (4 projects) $6,603,166, 7%
- **Victoria** (3 projects) $6,157,981, 6%
- **Corpus Christi** (5 projects) $12,562,421, 13%
- **Port Mansfield** (1 project) $2,919,106, 3%
- **West Calhoun** (1 project) $2,437,450, 3%
- **Calhoun Port** (3 projects) $5,947,837, 6%
- **Harlingen** (2 projects) $13,110,452, 13%
- **Brownsville** (1 project) $1,532,868, 2%
- **Port Arthur** (4 projects) $4,379,890, 4%
- **Beaumont** (3 projects) $7,208,101, 7%
- **Sabine Port Authority** (1 project) $874,177, 1%
Riders 48, 45, and 38 — Port Access Improvement Program

- 2015, 2017, and 2019 Legislative Sessions
- $100 million — projects to improve access to maritime ports
- $41 million — port contributions
- 34 projects
- Maritime division, districts, ports, and local agencies coordinate on project identification
- Port Authority advisory committee reviews and selects projects
- Texas Transportation Commission approves projects
Examples of Rider 48, 45, and 38 Projects

Port Houston
- Jacinto Port Blvd/Peninsula Street Improvements
- Expand Port Road from 4-lanes to 6-lanes
- Sheldon Roadway Improvements

Port Freeport
- Widen SH 36 from 2-lanes to 4-lanes divided roadway from Brazos River Bridge to FM 1495

Port of Galveston
- Improvements and repairs to Old Port Industrial Road, 33rd Street, and 28th Street and Harborside Drive
- Construction of new cruise corridor and three 4-lane access roads from SH 275
Examples of Rider 48, 45, and 38 Projects

Port of Corpus Christi
- Adding access to Joe Fuller International Trade Corridor (JFC)
- Expansion of Rincon Road to extend the JFC

Port of Beaumont
- New lighted truck queuing and staging area

Port of Port Arthur
- Two truck queuing areas
Examples of Unified Transportation Program (UTP) Projects

- I-10 Widening and Improvements – Beaumont
- US69 Widening and Improvements – Beaumont
- US77 – Upgrade Sections to Freeway – Corpus Christi and Pharr
- SH36 – Widening – Houston
- SH146 – Widening – Houston
## Example of Coordinating Project Tracking

### Houston Port Region Freight Improvement Strategic Plan

<table>
<thead>
<tr>
<th>#</th>
<th>Project</th>
<th>Priority</th>
<th>Info &amp; Updates</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Barbours Cut Connectivity to SH-146</td>
<td>H/S</td>
<td>Intersection improvements complete in 2019</td>
</tr>
<tr>
<td>2</td>
<td>SH-146 Widening - Fairmont to Red Bluff Road</td>
<td>H/S</td>
<td>Widen to 6 main lanes, environmentally cleared, Final design underway/anticipated to let in Fall 2022.</td>
</tr>
<tr>
<td>3</td>
<td>SH-225 expansion/improvement (8-East 146)</td>
<td>H/S</td>
<td>TxDOT is working to procure a consultant for the SH 225 PEL. We are hopeful to get started on the project later this year. The study limit will be from IH 610 to SH 146. The SH 225 PEL study is a high-level, early-planning study process that represents an approach to transportation decision making that considers environmental, community and economic goals early in the planning stage and carries them through project development, design and construction. The goal of a PEL study is to gather feedback during planning to inform the environmental review process, including the National Environmental Policy Act (NEPA).</td>
</tr>
<tr>
<td>4</td>
<td>Broadway Double Track Project</td>
<td>H/S</td>
<td>Construction is underway, should complete in 2019</td>
</tr>
<tr>
<td>5</td>
<td>Grand Parkway NE Segments H &amp; I</td>
<td>H/S</td>
<td>Design-Build Project/recently awarded. The total cost of this project is approximately $1.4 Billion. Estimated completion date is February 2022. Construction to being Summer 2018</td>
</tr>
<tr>
<td>6</td>
<td>FM-1942 from Hatcherville Road to SH-146 – road improvement</td>
<td>H/S</td>
<td>submitted in most recent call for projects</td>
</tr>
<tr>
<td>7</td>
<td>Hatcherville Rd from FM-1942 to Liberty/Chambers Co.Line – road widening</td>
<td>H/S</td>
<td>No improvements are currently planned</td>
</tr>
<tr>
<td>8</td>
<td>FM 565 from SH-146 to SH-99 – widening and addition of turning lanes</td>
<td>H/S</td>
<td>MPOID 17113; FY 2024                                                                 Project from FM 1409 to SH 99: Reconstruct and realign roadway is anticipated to let for construction in FY 2018</td>
</tr>
<tr>
<td>9</td>
<td>Peninsula Road Widening and Rail Crossing Improvement</td>
<td>H/S</td>
<td>Notice To Proceed was issued 12/2018, the rail crossing improvements are already underway. Project is in construction. Widen Pensinsula road to 4 lanes (3 inbound and 1 outbound) and make improvements to up to 6 rail crossings</td>
</tr>
<tr>
<td>10</td>
<td>SH-99 and I-45 direct connectors for trucks heading from PH to Dallas and Dallas to PH</td>
<td>H/M</td>
<td>Identified to TxDOT in March 2018</td>
</tr>
<tr>
<td>11</td>
<td>BW-8 Direct Connectors @ SH-225: Westbound on 225 to 8 N, Northbound on 8 to E/W 225, Eastbound on 225 to 8S</td>
<td>H/M</td>
<td>HCTRA and TxDOT agreement to fund first 5 of 8 direct connectors, anticipated letting in 2021, estimate construction cost for entire interchange is $180 Million</td>
</tr>
<tr>
<td>12</td>
<td>SH146 from I10 to Business 146 (Alexander Drive)</td>
<td>H/M</td>
<td>The grade separation/freeway starts at Alexander and continues all the way to Red Bluff. There probably needs to be some work on SH146 North of 110 through Mont Belvieu also</td>
</tr>
</tbody>
</table>
Class One and Shortline Railroads in Texas
Major Crude Oil, HGL, and Natural Gas Pipeline Networks in Texas
Future Influences on Exports and Imports through the Panama Canal

- E-commerce
- Freight distribution centers and patterns
- Completion of port deepening and widening projects
- Global economy
Future Directions

- Maintain focus on trade-related multimodal transportation improvements
- Pursue multimodal and technology initiatives
- Continue support for port improvement programs
- Serve as a resource to Texas ports
Future Directions

Identify ways to increase use of the GIWW

Work with railroads, ports, and other groups to support needed rail capacity

Consider developing and implementing Texas Global Gateway marketing and information program
Questions and Discussion

Assessing the Panama Canal Expansion on Texas Ports and Landside Transportation Infrastructure
The Economic Role of Freight in Texas

Final Report and Outreach Materials

April 20, 2021
<table>
<thead>
<tr>
<th>The Study Includes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic Impact of Freight – State, District, Texas Triangle and Corridor</td>
</tr>
<tr>
<td>Economic Impact of Modes – Rail, Ports and Waterways, Trucking, Air Cargo, Pipelines, Warehousing and Distribution</td>
</tr>
<tr>
<td>Economic Impact of Freight Congestion – Current and Future</td>
</tr>
<tr>
<td>Economic Impact of Freight Investments</td>
</tr>
<tr>
<td>Economic Impact of E-commerce in Texas Triangle</td>
</tr>
<tr>
<td>Economic Impact of Cross Border Trade</td>
</tr>
</tbody>
</table>
Key Statewide Findings
Summary Approach

PRODUCER INDUSTRIES → FREIGHT TRANSPORTATION → CONSUMER INDUSTRIES

USER IMPACTS
- Direct

ENTERPRISE IMPACTS
- Direct
- Indirect
- Induced

NON-MARKET IMPACTS
- Safety
- Emissions
- Pavement
- Congestion

USER IMPACTS
- Direct

Key Data
- TRANSEACH, Texas Labor Market Information (LMI), U.S. Bureau of Economic Analysis

Key Tools
- TREDIS, IMPLAN, TxDOT Statewide Analysis Model
Statewide Total Annual Economic Impact of Freight

- 4 million jobs
- $302 billion in income
- $499 billion in Gross State Product
- $102 billion in Federal, state, and local tax revenue
Economic Costs of Freight Congestion

- **2018**
  - 33,800 fewer jobs worth nearly $2 billion in personal income.
  - Reduction in GSP of $2.6 billion annually.
  - $418 million in lost tax revenue.

- **by 2050**
  - 284,000 fewer jobs worth nearly $17.9 billion in personal income.
  - Reduction in GSP of $25.3 billion annually.
  - $4.1 billion in lost tax revenue.

- **31 million hours of delay**
- **62 million gallons of fuel wasted**
- **$2 billion in congestion costs**

- **517 million hours of delay**
- **930 million gallons of fuel wasted**
- **$32.4 billion in congestion costs**
The high-priority projects in the unconstrained Freight Investment Plan will provide average annual direct benefits through 2050 of:

- 405 million hours of travel time saved, worth $11.2 billion
- 4,000 crashes avoided, worth nearly $500 million
- Technology reducing congestion on key corridors in metropolitan areas, worth $1.3 billion
- $13 billion, in total annually, to TFHN users
Outreach Materials
One Page Fact Sheets

- Statewide, 25 Districts, Texas Triangle
- 10 corridors
- Modes
- Special topics
  - Doing nothing, FIP, E-commerce, Cross-border trade
Executive Summary

- 16-page brochure highlighting key findings
- Why is freight important
- Statewide and district level findings
- Texas Multimodal Freight Networks
  - Modes
  - Corridors
- Cross-border flow and e-commerce
- Cost of congestion and return on investment
Texas in Global Commerce
- Why freight matters
- Texas in the global economy
- Overview of study
- Statewide economic role of freight

Economic Role of Freight Across the State
- District level analysis for all 25 districts
- Texas triangle analysis
- Selected freight corridor findings

To Invest or Not Invest
- Impact of congestion, current and future
- Return on investment of FIP

Moving Goods in Texas Means Business
- Freight modes
- Cross-border analysis at district level
- E-commerce in Texas Triangle

Texas Freight Advisory Committee
April 20, 2021
Thank you!

Contact us for more information about the Economic Role of Freight in Texas

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Freight Infrastructure Design Considerations

Highlights of Project and Final Report
Project Overview

Freight Infrastructure Design Considerations
Study Motivation

Purpose

Address roadway functional design and operational issues related to the movement of freight in Texas

Goals

- Recommend design considerations for incorporation into freight network design
- Develop freight factors for use in update of TxDOT Roadway Design Manual
- Enhance safety, address congestion, increase efficiency and improve multimodal access on the Texas Multimodal Freight Network
- Identify freight infrastructure design issues on the Texas Multimodal Freight Network
Project Process Overview

DATA COLLECTION
- LITERATURE REVIEW
- PEER STATE PRACTICE
- TXDOT PRACTICE
- COMPARISON MATRIX

EXISTING CONDITIONS
- FUNCTIONAL CLASSES
- EXISTING GUIDELINES
- CRITICAL ATTRIBUTES FOR FREIGHT

COORDINATION & OUTREACH

FREIGHT DESIGN NEEDS
- MINIMUM, OPTIMUM DESIGN FEATURES
- THFN SYSTEMWIDE NEEDS
- NEEDS ON KEY THFN CORRIDORS

FREIGHT DESIGN CONSIDERATIONS
- CONDITIONS VS MINIMUM, OPTIMUM
- DEFICIENCY IMPACTS
- PRIORITY DESIGN NEEDS

DOCUMENTATION

DRAFT FINAL REPORT

FINAL REPORT & EXECUTIVE SUMMARY
Coordination and Outreach

- TxDOT Design Division
  - Update of Roadway Design Manual (RDM) underway
- TxDOT District Operations
- Regional Forums
- Industry Needs Survey
  - 453 responses
- Truck Driver Design Attributes Survey
  - 72 responses
Highlights of Freight Infrastructure Design Considerations
Roadway Design

- Turning radii too narrow, curbs too high (intersections notably)
- More/wider shoulders (esp. on alternative routing)
- Merge/weaving areas too short; avoid roundabouts
- Maintenance: on-road (paint); off-road (maintain sight distance)
- Low bridges/overpasses
- Lanes too narrow
- Pavement maintenance (rutting, bumpy, potholes, falling apart)
## Truck Driver Top 10 Design Attributes

<table>
<thead>
<tr>
<th>Rank</th>
<th>Attribute</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sight Distance (Passing, turning and stopping)</td>
</tr>
<tr>
<td>2 (tie)</td>
<td>Intersection Turning Radius</td>
</tr>
<tr>
<td>2 (tie)</td>
<td>Signage and Pavement Markings</td>
</tr>
<tr>
<td>4</td>
<td>Traffic Signal Timing</td>
</tr>
<tr>
<td>5</td>
<td>Bridge Vertical Clearance</td>
</tr>
<tr>
<td>6</td>
<td>Pavement Quality/Strength</td>
</tr>
<tr>
<td>7</td>
<td>Acceleration/Deceleration Lanes</td>
</tr>
<tr>
<td>8 (tie)</td>
<td>Lane Width</td>
</tr>
<tr>
<td>8 (tie)</td>
<td>Shoulder Width</td>
</tr>
<tr>
<td>8 (tie)</td>
<td>Work Zone Design</td>
</tr>
</tbody>
</table>

### Effect on Freight Operations:
- Safety
- Congestion
- Speed, reliability, cost
- Route selection
- “Truck friendliness” and driver retention
## Roadway Freight Design Attributes: Key Geometrics

<table>
<thead>
<tr>
<th>KEY ATTRIBUTE</th>
<th>CATEGORY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GEOMETRICS</strong></td>
<td></td>
</tr>
<tr>
<td>Design Vehicle</td>
<td>Design Standards</td>
</tr>
<tr>
<td>Design Speed</td>
<td></td>
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<tr>
<td>Passing Sight Distance &amp; Passing/No-Passing Zones</td>
<td>Sight Distances</td>
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<tr>
<td>Railroad-Highway Grade Crossing Sight Distance</td>
<td>Vertical Profile</td>
</tr>
<tr>
<td>Vertical Grade</td>
<td></td>
</tr>
<tr>
<td>Critical Length of Grade</td>
<td></td>
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<tr>
<td>Acceleration Lane</td>
<td>Speed Change Lanes</td>
</tr>
<tr>
<td>Deceleration Lane</td>
<td></td>
</tr>
<tr>
<td>Ramp Length</td>
<td></td>
</tr>
<tr>
<td>Climbing Lane</td>
<td></td>
</tr>
<tr>
<td>Lane Width</td>
<td>Cross Sectional Elements</td>
</tr>
<tr>
<td>Shoulder Width</td>
<td></td>
</tr>
</tbody>
</table>

### Priority Factors:
- Mobility
- Safety
- Cost Effectiveness

### Additional Issue:
- Data Availability
## Roadway Design Attributes: Intersections, Bridges, Pavement

<table>
<thead>
<tr>
<th>KEY ATTRIBUTE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INTERSECTION &amp; INTERCHANGE</strong></td>
</tr>
<tr>
<td>Intersection Sight Distance</td>
</tr>
<tr>
<td>Turning radius</td>
</tr>
<tr>
<td>Channelization</td>
</tr>
<tr>
<td><strong>BRIDGE &amp; STRUCTURE</strong></td>
</tr>
<tr>
<td>Bridge Vertical Clearance</td>
</tr>
<tr>
<td>Railroad-Highway Underpass Bridge Vertical Clearance</td>
</tr>
<tr>
<td>Railroad-Highway Overpass Bridge Vertical Clearance</td>
</tr>
<tr>
<td><strong>PAVEMENT</strong></td>
</tr>
<tr>
<td>Pavement Strength/Design Strategy</td>
</tr>
</tbody>
</table>
### Key Attribute

**Traffic Operation**
- Traffic Signal Phasing/Corridor Operation
- Sign & Pavement Marking

**Work Zone**
- WZ Lane Width
- WZ Shoulder Width
- WZ Strategy
- WZ Bridge Vertical Clearance
THFN Systemwide Lane Width: Match to Minimum & Optimum Design Features

Match to Minimum

Match to Optimum

Existing Roadway Design and Minimum Design Considerations Comparison

Lane Widths on the THFN (2020)

Source: TxDOT Roadway Inventory, 2020

Released by Cambridge Systematics
Data for planning purposes only
February 22, 2021

Existing Roadway Design and Optimal Design Considerations Comparison

Lane Widths on the THFN (2020)

Source: TxDOT Roadway Inventory, 2020

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Selected THFN Corridors: Multi-Attribute Minimum & Optimum Features

Key Corridors:
- I-10
- I-35
- I-69
- US 287
- US 290

Match to Features:
Freight Design Attribute Treatment Example: Acceleration Lane Length

**Definition**
- Dedicated distance for vehicles entering highways to accelerate to and merge into mainline traffic

**Function**
- Reduce differences in speed between mainline and ramp traffic, improving safety especially for larger vehicles that need more time to accelerate

**Existing RDM Guidelines**
- Minimum acceleration lane length varies with design speeds:
  - Highway 65 mph, entrance ramp 45 mph: 600 feet minimum
  - Highway 70 mph, entrance ramp 50 mph: 580 feet minimum
Recommendation: Acceleration Lane Length

**Recommendation**
- Retain existing RDM minimums
- On roadways with average daily volume of 5,000+ trucks:
  - Add optimum length of **1,200 feet** plus taper
- Source: AASHTO Green Book

**Benefits**
- **Safety** improved: Heavy trucks take longer to reach speed, causing other vehicles to move around them
  - Studies show accidents increase when speed differential between cars and trucks >10 mph
- **Congestion** improved: slower moving trucks cause other traffic to back up
Key Corridors: Match to Minimum/Optimum Acceleration Lane Length

Key Corridors Summary

- Of 289 entrance ramps examined:
  - 52% below Minimum (151)
  - 33% above Optimum (94)
  - 15% between Minimum and Optimum (44)

- Schematic Illustration:

Match to Features

- Below Minimum: 52%
- Between 15%
- Above Optimum: 33%

Meets Minimum

Risk if Below Minimum
Acceleration Lane Length: Below Minimum Example

**Location:**
SB I-35 Entrance Ramp in Laredo - North of W Mann Road/I-35 Intersection

**Situation:**
Mainline speed limit: 65 mph □ Ramp speed limit: 45 mph

**Minimum:**
600 feet

**Actual:**
54 feet plus 360 foot taper
**Location:**
NB US 287 Entrance Ramp in Ft. Worth - South of E Maddox Ave/US 287 Intersection

**Situation:**
Mainline speed limit: 60 mph  Ramp speed limit: 45 mph

**Minimum:**
420 feet

**Actual:**
420 feet
Acceleration Lane Length: Match to Optimum Example

**Location:**
SB I-45 Entrance Ramp in Rice - North of Calhoun St/I-45 Intersection

**Situation:**
- Mainline speed limit: 75 mph
- Ramp speed limit: 45 mph

**Optimum:**
1,200 feet

**Actual:**
1,200 feet
Organization of Final Report

- Executive Summary
- Introduction
- Project Approach Summary
- Corridor Needs Assessment of Key Freight Design Attributes
- Design Needs Prioritization
- Conclusion
- Appendices
  - Existing Conditions Report
  - Comparison Matrix
  - Freight Design Needs Analysis of THFN
Questions and Discussion
Thank you!

Contact us for more information about Freight Infrastructure Design Considerations

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Topics in State Freight Planning, 2021
Presentation to the Texas Freight Advisory Committee

April 20, 2021
Overview

- State Freight Plan Update and Implementation Toolkit
- Freight Formula Funding and Discretionary Grant Programs
- Freight Mobility Trends Dashboard
- Freight Bottlenecks and Congested Corridors
- Truck Parking Information
- Truck Size and Weight
A new State Freight Plan Toolkit defines the fundamental elements of State freight plan updates.

States with plans that need to be updated in 2022 will pilot the strategies developed in the interim Toolkit.

The Toolkit will include case studies describing effective State freight plan practices. A second edition will be developed for States with plan updates due in late 2022 or 2023.

- Texas DOT provided input to the case studies
Freight Formula Funding and Discretionary Grant Programs

- The FAST Act established the National Highway Freight Program (NHFP), which provides approximately $1.2 billion annually for freight transportation improvements:
  - Between FY 2016-2020, nearly $17 Billion of NHFP and other funding sources were identified for projects in State freight plans.

- The Notice of Funding Opportunity (NOFO) for the current round of the Rebuilding American Infrastructure with Sustainability and Equity (RAISE) Grant Program [formerly the Better Utilizing Investments to Leverage Development (BUILD) program] was released on April 13, 2021. Congress provided $1 billion for the program in 2021. Applications are due July 12, 2021.

- The NOFO for the 2021 round of the Infrastructure for Rebuilding America (INFRA) round was published on February 17, 2021. Approximately $889 million will be available for INFRA grants in 2021. Grant awards are planned to be announced in June, 2021.
Freight Mobility Trends Dashboard

- Total delay
- Delay per mile
- Travel Time Index
- Planning Time Index
- Buffer Index
- Travel Reliability Index
- Congestion Cost
Freight Bottlenecks and Congested Corridors

Source: FHWA 2019 NPMRDS
National Performance Management Research Data Set (NPMRDS) and Other Sources of Information

Sources:
National Performance Management Research Data Set, (NPMRDS), University of Maryland (UMD) Center for Advanced Transportation Technology Laboratory (CATT Lab)

Source: NPMRDS, UMD CATT Lab

Source: Texas Department of Transportation
Texas A&M Transportation Institute
2019 Major Highway Freight Bottlenecks and Congested Corridors 2019

<table>
<thead>
<tr>
<th>Rank</th>
<th>Road</th>
<th>Urban Area</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>I-95/I-295</td>
<td>New York, NY/NJ</td>
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<td>Los Angeles, CA</td>
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<td>25</td>
<td>I-495</td>
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## South-Central Texas Major Interstate Freight Bottlenecks

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<th>Rank</th>
<th>Road</th>
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<tr>
<td>4</td>
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<tr>
<td>5</td>
<td>I-610</td>
<td>Houston, TX</td>
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<td>14</td>
<td>I-45</td>
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<td>I-10</td>
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<td>Baton Rouge, LA</td>
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<td>Little Rock, AR</td>
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<td>35</td>
<td>I-10</td>
<td>Houston, TX</td>
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<tr>
<td>53</td>
<td>I-35</td>
<td>San Antonio, TX</td>
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<td>I-35E</td>
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<td>68</td>
<td>I-30</td>
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<tr>
<td>82</td>
<td>I-35W</td>
<td>Dallas-Fort Worth, TX</td>
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</tbody>
</table>

### Map

- **2019 Major Highway Freight Bottlenecks**
  - Truck Hours of Delay per Mile
  - Data Source: 2019 NPMRDS
Truck Parking Information

• Truck parking shortages are a major problem in every State and region.
• Major freight corridors and large metro areas have the most acute shortages.
• Truck Parking Information and Management Systems to inform drivers:
  – Florida (Statewide)
  – Texas I-10 corridor
  – Virginia I-95 corridor
• Challenges in funding truck parking facilities.
• Local government involvement needed.

Number of Truck Parking Spaces per 100K Daily Truck Vehicle Miles Traveled (TVMT), 2019
Truck Size and Weight (TSW): Laws and Regulations

• Federal weight laws apply to the Interstate and within reasonable access only.
  o Reasonable access = minimum of 1 road mile from the Interstate; more if extended by State statute, regulation or policy.
  o State laws govern weight restrictions off the Interstate.

• Federal size (width and length) laws apply to the National Network (NN) for trucks.
  o State laws govern size restrictions off the NN.

• No Federal height restrictions.
  o Height restrictions are set by the States
National Network for Conventional Combination Trucks

NOTES: This map should not be interpreted as the official National Network and should not be used for truck size and weight enforcement purposes. "Other NHS" refers to NHS mileage that is not included on the National Network. Conventional combination trucks are tractors with one semitrailer up to 48 feet in length or with one 28-foot semitrailer and one 28-foot trailer. Conventional combination trucks can be up to 102 inches wide.

Source: 2017 Bureau of Transportation Statistic
Vehicles Weighed in Texas for Enforcement

Data Source: FHWA - 2019 State Truck Size and Weight Certification
Vehicles Cited in Texas for TS&W Violations

Data Source: FHWA - 2019 State Truck Size and Weight Certification
Other Resources

• 23rd Edition of the Highway Freight Conditions and Performance Report, published in 2018:

• National Freight Strategic Plan (NFSP), published in September 2020:
  – https://www.transportation.gov/freight/NFSP

• Networks and Data Brochure to be released in 2021
For additional information on freight programs, contact:

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Office of Operations
Director of Office of Freight Management and Operations
Caitlin.Hughes@dot.gov
202-493-0457
Texas Freight Mobility Plan
TxFAC Input on Scope and Desired Outcomes
2018 TFMP

Overview
TFMP update kick-off 02/01/2017

Draft Plan submitted to TxFAC 09/20/2017

TxFAC approves Plan 11/02/2017

Transportation Commission adopts Plan on 11/16/2017

FHWA approves Plan on 03/07/2018
### 2018 TFMP Addresses Many Topics

<table>
<thead>
<tr>
<th>Establish Strategic Goals and Policies</th>
<th>Understand Economic Importance of Freight</th>
<th>Identify Trends, Issues, and Needs</th>
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</thead>
<tbody>
<tr>
<td>Designate Texas Multimodal Freight Network</td>
<td>Measure Performance of Freight Assets and their Condition</td>
<td>Forecast Future Freight Demand</td>
</tr>
<tr>
<td>Identify Strengths and Weaknesses of Freight Network</td>
<td>Identify and Prioritize Freight Needs and Recommendations</td>
<td>Develop Freight Investment Plan</td>
</tr>
</tbody>
</table>
2018 TFMP Coordination and Outreach

- TxFAC
  - Bi-monthly and monthly meetings
- Stakeholder meeting
  - 2 rounds of 12 meetings
- TxDOT District and MPO outreach
  - 5 webinars
- Private sector stakeholders
  - Interviews
  - Surveys
- Coordinating calls with neighboring states
2018 TFMP Organization

- Chapter 1: Introduction
  - Overview, purpose, and organization of the Freight Plan
- Chapter 2: Strategic Goals
  - Texas’ strategic freight goals to guide investments
- Chapter 3: The Economic Importance of Freight Transportation
  - Importance of freight to the economy
- Chapter 4: Overview of Trends, Issues and Needs
  - Current trends impacting freight transportation
- Chapter 5: Freight Policies, Programs and Institutions
  - Inventory of Texas freight policies and strategies
- Chapter 6: The Designation of the Texas Multimodal Freight Network
  - Process and results
- Chapter 7: Conditions and Performance of the Texas Multimodal Freight Network
  - Tied back to goal areas
2018 TFMP Organization

- Chapter 8: Freight Demand, Forecast and Scenarios
  - Base and future year commodity flows
- Chapter 9: Strengths and Weaknesses of the Freight Transportation System
  - Needs assessment
- Chapter 10: Freight Project Identification and Prioritization
  - Identifies and prioritizes projects
- Chapter 11: Freight Policy and Programming Recommendations
  - Freight policies and programs
- Chapter 12: State’s Unconstrained Freight Investment Plan
  - Inventory of projects on TMFN
- Chapter 13: 5-Year Fiscally Constrained Freight Investment Plan
  - 5-Year FIP
- Chapter 14: Freight Transportation Implementation Plan
  - Short, medium, and long-term actions to advance the TFMP
Implementation of 2018 TFMP
TFMP Implementation Efforts

Truck Parking Study (April 2020)
Permian Basin Freight and Energy Sector Transportation Plan (November 2020)
Rio Grande Valley Freight and Trade Transportation Plan (December 2020)
Presidio Freight and Trade Transportation Plan (September 2020)
Freight Network Technology and Operations Plan (December 2020)
Weigh in Motion / Vehicle Classification Strategic Plan (Summer 2021)
TFMP Implementation Efforts

The Texas-Mexico Border Transportation Master Plan (BTMP) (December 2020)

Economic Role of Freight in Texas (April 2021)

Freight Infrastructure Design Considerations (April 2021)

Freight Planning and Programming Training (April 2021)

Texas Freight Optimization Tools (FreightOpts)

Oversize / Overweight Report (Summer 2021)
2023 TFMP
2023 TFMP Potential Schedule

- **Refine scope and complete contracting**: 06/01/2021
- **Kick-off Plan**: 06/15/2021
- **Draft TFMP to TxFAC**: 09/2022
- **TxFAC approves Plan/TTC discussion**: 10/2022
- **Transportation Commission adopts Plan**: 12/2022
- **FHWA approves Plan**: 1/2023

**FAST Act Reauthorization Expires December 2021**
2022 TFMP - Potential New Topics

- Scenario planning
- Freight Network Resiliency
- Equity
  - Social and economic
  - Modal
  - Geographic
- Strategic / Critical supply chains
- Emphasis on multimodal corridors and gateways
- Freight operations and technology
- Climate change / trend awareness

Any other topics?