Urban and Rural Area Transit Needs Assessment

Presentation
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Texas A&M Transportation Institute
Types of Transit Systems in Texas

9 Transit Authorities & Municipal Transit Departments

6 Metro or Regional Transit Authorities
2 Municipal Transit Depts.*
1 County Transit Authority

State Funded
No dedicated sales tax. Eligible for dedicated state funds.

29 Urban Transit Districts

37 Rural Transit Districts

20 small urban
5 large urban*
4 in DFW Area

* Laredo, a large urban transit district eligible for state funds, is counted as a municipal transit department in this illustration.
Public transit plays an important role:
- Nearly 30 million trips in FY2017*
- Used for medical appointments, shopping errands and work

*Unlinked passenger trips taken at state-funded transit districts. Source: PTN-128.

Source: 2017 Texas Transit Rider Survey
Trip Purposes in Urban and Rural Areas

Source: 2017 Texas Transit Rider Survey, values may not add to 100% due to rounding.
Public Transit in Texas

For transit to continue its vital role:

- Must operate *where* and *when* needed
- Must be funded to meet changing demands and costs
Building on Previous Needs Assessment Work

- Previous Needs Assessment from 2016
  - Sketch-level analysis
  - Assessed four types of need:
    - Span of service
    - Urban and rural gaps
    - Inflation
    - Population growth
  - Span analysis did not account for actual transit service areas
Texas Transit Geospatial Needs Assessment in 2017

- Data-driven, based on actual state-funded service areas and spans

- Goals
  - Where are places in Texas without transit service?
  - What current transit services do not meet a minimum span threshold?
  - How much would it cost to provide a minimum span of service across Texas?
    - Focusing on Texans living outside transit authority boundaries.
Needs Assessment Steps

1. Inventory of State-Funded Transit Services
2. Gap Analysis
3. Cost Estimation
Step 1: Inventory of State Funded Transit Services

- **Where:** Mapped all state-funded transit district service areas and routes
- **When:** Gathered service span data for all transit districts
- Transit districts confirmed accuracy of maps, service areas, and span hours
STEP 2: GAP ANALYSIS

Identified areas without general public transit service and areas without service operating at the span threshold.
Coverage Gaps

Coverage Gap = Places in Texas without general public transit service. Examples include urban gaps, gaps outside transit authorities, and gaps within transit districts.
Coverage Gap Analysis Results

Coverage Gap
Land Area:
13,400 square miles

Coverage Gap
Population:
3.5 M people
Span Gaps – 4 Models

Span Gap = Transit service does not meet span threshold.

<table>
<thead>
<tr>
<th>Model #</th>
<th>Title</th>
<th>Weekday Span Threshold</th>
<th>Saturday Span Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>12-hour weekday service</td>
<td>12 hrs.</td>
<td>0 hrs.</td>
</tr>
<tr>
<td>2</td>
<td>14-hour weekday service</td>
<td>14</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>12-hour weekday, 8-hour Saturday service</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>4</td>
<td>14-hour weekday, 8-hour Saturday service</td>
<td>14</td>
<td>8</td>
</tr>
</tbody>
</table>

Hours of service (span) recommendations can be found in the Transit Capacity and Quality of Service Manual, 3rd ed.
Span Gap Analysis Results

Needed Percent Increase in Service Hours for Each Span Model

<table>
<thead>
<tr>
<th>Span Model</th>
<th>Needed Percent Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>12-hour weekday</td>
<td>4.8%</td>
</tr>
<tr>
<td>14-hour weekday</td>
<td>12.5%</td>
</tr>
<tr>
<td>12-hour weekday, 8-hour Saturday</td>
<td>9.4%</td>
</tr>
<tr>
<td>14-hour weekday, 8-hour Saturday</td>
<td>17.1%</td>
</tr>
</tbody>
</table>
Span Gap Analysis Results: Demand Response

Assuming a 12-hour weekday, 8-hour Saturday span threshold

State-Funded Demand Response Service
Span Threshold: 12-Hour Weekday, 8-Hour Saturday
- or - No Demand Response Service
- or - No State-Funded Transit District
- or - Does Not Meet the Span Threshold
- or - Partially Meets the Span Threshold
- or - Meets the Span Threshold
Span Gap Analysis Results: Demand Response

Assuming a **14-hour weekday span threshold**

State-Funded Demand Response Service Span Threshold: 14-Hour Weekday
- or Gray: No Demand Response Service
- or Orange: No State-Funded Transit District
- or Gray: Does Not Meet the Span Threshold
- or Green: Partially Meets the Span Threshold
- or Green: Meets the Span Threshold
Span Gap Analysis Results: Demand Response Services

Percent of Demand-Response Services Needing More Span Hours to Reach the Span Threshold

<table>
<thead>
<tr>
<th>Span Requirement</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 or less hours</td>
<td>4%</td>
</tr>
<tr>
<td>5 to 10 hours</td>
<td>16%</td>
</tr>
<tr>
<td>10 to 15 hours</td>
<td>6%</td>
</tr>
<tr>
<td>15 to 20 hours</td>
<td>6%</td>
</tr>
<tr>
<td>More than 20 hours</td>
<td>21%</td>
</tr>
</tbody>
</table>

Assuming a 12-hour weekday, 8-hour Saturday span threshold.
Span Gap Analysis Results: Fixed/Flexible-Route Local Bus Services

Percent of Local Bus Services Needing More Span Hours to Reach the Span Threshold

- No Hours Needed [PERCENTAGE]: 7%
- 5 to 10 hours: 20%
- 10 to 15 hours: 10%
- 15 to 20 hours: 8%
- More than 20 hours: 5%

Assuming a 12-hour weekday, 8-hour Saturday span threshold.
Estimated the costs of providing all Texans* with a standard span of service.

**STEP 3: COST ESTIMATION**

*All Texans living outside of transit-authorities’ service areas or excluded coverage gaps.*
Cost Estimation Procedure

- Estimate annual operating costs to fill span gaps using operating data from FY2016
- Estimate one-time and annual costs to fill coverage gaps with full span general-public demand-responsive service; include
  - Operating costs based on a regional conditions
  - Capital costs for vehicle purchases and replacement
<table>
<thead>
<tr>
<th>Span Model</th>
<th>Current FY2016 Operating Cost</th>
<th>Additional Annual Operating Cost</th>
<th>Total Annual Operating Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>12-hour weekday</td>
<td>$208.5</td>
<td>$13.6</td>
<td>$222.1</td>
</tr>
<tr>
<td>14-hour weekday</td>
<td>$208.5</td>
<td>$31.1</td>
<td>$239.6</td>
</tr>
<tr>
<td>12-hour weekday, 8-hour Saturday</td>
<td>$208.5</td>
<td>$25.5</td>
<td>$234</td>
</tr>
<tr>
<td>14-hour weekday, 8-hour Saturday</td>
<td>$208.5</td>
<td>$43.0</td>
<td>$251.5</td>
</tr>
</tbody>
</table>

Additional costs reflect the estimated new FY2016 operating expenses if transit services were operated at the given span thresholds instead of current service levels. These costs would be ongoing.
# Coverage Gap Cost Estimates ($ in millions)

<table>
<thead>
<tr>
<th>Span Model</th>
<th>One-Time Cost</th>
<th>Annual Ongoing Costs</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of</td>
<td>2016 Vehicle Cost</td>
<td>Additional Annual Vehicle Replacement Cost</td>
<td>Additional Annual Operating Cost</td>
<td>Total Additional Annual Cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vehicles</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12-hour weekday</td>
<td>234</td>
<td>$18.3</td>
<td>$3.0</td>
<td>$6.0</td>
<td>$9.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14-hour weekday</td>
<td>234</td>
<td>$18.3</td>
<td>$3.0</td>
<td>$7.0</td>
<td>$10.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12-hour weekday, 8-hour Saturday</td>
<td>234</td>
<td>$18.3</td>
<td>$3.0</td>
<td>$6.8</td>
<td>$9.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14-hour weekday, 8-hour Saturday</td>
<td>234</td>
<td>$18.3</td>
<td>$3.0</td>
<td>$7.7</td>
<td>$10.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The one-time cost is the vehicle purchase expense for 234 vehicles, totaling $18.3 million. However, these vehicles eventually will have to be replaced, so one-sixth of the vehicle purchase cost ($3 million) is included as an annual ongoing cost in addition to the annual operating cost in FY2016 dollars.

Annual operating costs are estimated FY2016 operating expenses for general public demand-responsive service operated in all gaps at the given span thresholds.
Estimated Total Annual Costs to Fill All Gaps ($ \textit{in millions})

Current FY2016 Operating Cost = $208.5 million.

<table>
<thead>
<tr>
<th>Schedule</th>
<th>Span Gap Operating Cost</th>
<th>Coverage Gap Operating Cost</th>
<th>Coverage Gap Vehicle Replacement Cost*</th>
</tr>
</thead>
<tbody>
<tr>
<td>12-hour weekday</td>
<td>$14</td>
<td>$6</td>
<td>$3</td>
</tr>
<tr>
<td>14-hour weekday</td>
<td>$31</td>
<td>$7</td>
<td>$3</td>
</tr>
<tr>
<td>12-hour weekday, 8-hour Saturday</td>
<td>$26</td>
<td>$7</td>
<td>$3</td>
</tr>
<tr>
<td>14-hour weekday, 8-hour Saturday</td>
<td>$43</td>
<td>$8</td>
<td>$3</td>
</tr>
</tbody>
</table>

*The vehicle replacement cost does not include the initial cost of $18.3 million to purchase 234 vehicles, but reflects the ongoing financial commitment to replace 234 vehicles at the end of their useful life.
ADDITIONAL CONSIDERATIONS: TRANSIT COST INFLATION
Transit Cost Inflation Overview

- Cost of running and providing transit increases over time

- Consumer Price Index not adequate measure of transit’s “market basket”

- TTI developed a Transit Cost Index (TCI) to forecast increased operating costs of transit in future years
Transit Cost Index Methodology

- Collected and cleaned National Transit Database (NTD) service and operating expense data for Texas transit agencies from 2005 to 2015
- Calculated operating cost per revenue mile for each mode and year
- Forecasted operating cost per revenue mile using simple linear trend through 2025
- Transformed cost per revenue mile into an inflation index with 2016 as baseline year
Transit Cost Index for Rural Transit Agencies

- Same as Small Urban, with exceptions:
  - Data source for service data and operating expenses: PTN-128* reporting system from 2007 to 2016.
  - Cost per revenue mile and TCI not broken down by mode.

*PTN-128 is a web-based data collection and reporting system that all Texas transit agencies must report into.
Transit Cost Index (TCI) Results

Motor Bus: 1.13
Demand Response: 1.10
Commuter Bus: 1.04
Rural: 1.10

Fiscal Year

TCI Index (Based on Cost / Rev. Mile)
## Transit Cost Index (TCI) Results

<table>
<thead>
<tr>
<th>Mode</th>
<th>Cost per Revenue Mile</th>
<th>Percent Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2016</td>
<td>2021</td>
</tr>
<tr>
<td>Bus</td>
<td>$8.67</td>
<td>$9.78</td>
</tr>
<tr>
<td>Small Urban</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commuter Bus</td>
<td>$6.40</td>
<td>$6.68</td>
</tr>
<tr>
<td>Small Urban</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demand Response</td>
<td>$4.21</td>
<td>$4.61</td>
</tr>
<tr>
<td>Small Urban</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>$3.19</td>
<td>$3.50</td>
</tr>
</tbody>
</table>

Values are approximate due to rounding.
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