Agenda

1. Corridor Overview
2. Project Goals
3. Key Challenges
4. Four (4) Preliminary BRT Concepts
5. Assessment of Preferred BRT Concepts
6. Key Findings
7. Next Steps
December 2013 – Completed Los Angeles County Bus Rapid Transit Study (CBRT)
- Recommended nine potential corridors for BRT including Vermont:
  - Vermont yielded highest net 20-year benefits
July/October 2014 – Board directed staff to begin advanced technical work on Vermont
July 2015 – Contract awarded and study officially kicked off
  - Phase I anticipated to be completed by March 2017
  - Phase II to be launched soon after
Passage of Measure M, which identifies conversion of BRT to Rail on Vermont Ave. (not included in original study scope)
> 12.4 mile corridor from Hollywood Blvd. to 120th Street
> Served by Metro Rapid Line 754 and Metro Local Line 204
> ROW as narrow as 80ft. in some segments – widens to 200ft. south of Gage Avenue (includes sidewalks/medians)
> ROW is narrowest in segments with highest boarding activity
> Sparse bus stop environments
Why Improve Transit on Vermont Corridor?

> Second busiest bus corridor in Metro system
  • 45,000 daily boardings

> Heavy traffic congestion and/or recurring bottlenecks resulting in:
  • Slow bus speeds
  • Poor on-time performance
  • Uneven headways
  • Overcrowding

> Connects to:
  • Several rail and bus lines
  • Key activity centers
Project Goals for Improving Bus Service

> **Improve service performance**
  - Create a cost-effective long-term transit solution
  - Faster average bus speeds
  - Increase ridership

> **Enhance the customer experience**
  - Reduce passenger travel times
  - Improve service reliability

> **Increase person throughput for the corridor**
There are Five (5) Key Project Challenges

> Slow bus speeds caused by traffic
> Intersection delays and service reliability concerns due to congestion
> Excessive dwell times at busy bus stops
> Absence of customer-friendly amenities at stop locations
> Poor pedestrian access between bus stops and Metro Rail stations

Each of these key challenge areas must be addressed in order to provide faster, more reliable and convenient service
Common BRT Elements

- Running Ways
- Stations & Stops
- Vehicles

- Fare Collection
- Signal Priority/Other Signal Improvements
- Branding & Image
What We’ve Heard

> Support improving transit service on the corridor
> Desire to maintain on-street parking
> Concerned with potential impacts to traffic
> Want improved passenger amenities (e.g. shelters, lighting) for enhanced convenience and safety
Four (4) Preliminary BRT Concepts Were Identified

> **Concept 1:** End-to-End Side Running BRT

> **Concept 2:** Combination Side and Center Running BRT

> **Concept 3:** Curbside Running BRT

> **Concept 4:** Peak Period Curbside Running BRT
Concept 1: End-to-End Side Running BRT

- Side running BRT for entire 12.4 mile corridor
- Converts traffic lanes next to parking to dedicated bus lanes
- Total parking loss: 446 all-day spaces (22% of all on-street parking)
Concept 2: Combo Side / Center Running BRT

> 8.2 miles of side running BRT; 4.2 miles of center running BRT

> North of Gage, converts traffic lanes next to parking to bus lanes

> In wider segment south of Gage, creates center running bus lanes by converting two center traffic lanes
  • Faster travel times
  • Reduced friction with other vehicles

> Total parking loss: 464 all-day spaces (23% of all on-street parking)
Concept 3: Curbside Running BRT

- 7.3 miles of curbside dedicated bus lanes; 5.1 miles in mixed-flow (due to ROW constraints)
- Converts existing on-street parking, where wide enough, to bus lanes
- Total parking loss: 1,100 all-day spaces (55% of all on-street parking)
- Right-turning cars would interfere with bus lanes at intersections
> Bus lanes would exist during peak hours only (7-9 AM and 4-7 PM); BRT would operate in mixed-flow all other times

> 2.7 miles of curbside peak hour dedicated bus lanes; 9.7 miles in mixed-flow (due to lack of existing restricted peak period parking and ROW constraints)

> Total parking loss: 83 all-day spaces (4% of capacity)

> Right-turning cars would interfere with bus lanes at intersections
Performance Assessment of BRT Concepts

Performance Measures

> Passenger Travel Time Savings
> Average Bus Speeds
> Ridership
> Estimated Project Costs
> Person Throughput
> Impacts to Existing Facilities
Passenger Travel Time Savings

<table>
<thead>
<tr>
<th>Concept</th>
<th>Savings Over Existing Rapid Service (minutes)</th>
<th>% Change Over Existing Rapid Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concept 1</td>
<td>Midday 13</td>
<td>20%</td>
</tr>
<tr>
<td></td>
<td>PM Peak 19</td>
<td>27%</td>
</tr>
<tr>
<td>Concept 2</td>
<td>Midday 13</td>
<td>21%</td>
</tr>
<tr>
<td></td>
<td>PM Peak 20</td>
<td>28%</td>
</tr>
<tr>
<td>Concept 3</td>
<td>Midday 7</td>
<td>11%</td>
</tr>
<tr>
<td></td>
<td>PM Peak 8</td>
<td>12%</td>
</tr>
<tr>
<td>Concept 4</td>
<td>Midday 0</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>PM Peak 6</td>
<td>9%</td>
</tr>
</tbody>
</table>

Concepts 1 and 2 achieve the greatest time savings by implementing dedicated bus lanes along entire length of corridor.
Concepts 1 and 2 provide the greatest improvements to average bus speeds due to reduced conflicts with traffic.
## Ridership (Daily Boardings)

<table>
<thead>
<tr>
<th></th>
<th>Total Corridor Ridership Forecast (2035)</th>
<th>% Change from No Build Forecast (2035)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Build</td>
<td>54,600</td>
<td>--</td>
</tr>
<tr>
<td>Concept 1</td>
<td>74,050</td>
<td>36%</td>
</tr>
<tr>
<td>Concept 2</td>
<td>74,380</td>
<td>36%</td>
</tr>
<tr>
<td>Concept 3</td>
<td>66,480</td>
<td>22%</td>
</tr>
<tr>
<td>Concept 4</td>
<td>63,850</td>
<td>17%</td>
</tr>
</tbody>
</table>

Concepts 1 and 2 have the largest projected ridership increases due to faster travel times and improved service levels.
## Estimated Project Costs

<table>
<thead>
<tr>
<th>Concept</th>
<th>Capital Cost ($ Millions) (2016)</th>
<th>Annual O&amp;M Cost ($ Millions) (2016)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concept 1</td>
<td>$321.7</td>
<td>$12.7</td>
</tr>
<tr>
<td>Concept 2</td>
<td>$331.8</td>
<td>$12.7</td>
</tr>
<tr>
<td>Concept 3</td>
<td>$234.8</td>
<td>$13.1</td>
</tr>
<tr>
<td>Concept 4</td>
<td>$144.5</td>
<td>$13.4</td>
</tr>
</tbody>
</table>

Dedicated bus lanes for the entire corridor (Concepts 1 and 2) result in a higher upfront Capital Cost but lower annual Operating & Maintenance Costs.
Dedicated bus lanes increase the throughput capacity over existing mixed-flow lanes

> Existing mixed-flow lanes can carry about 900 people (685 vehicles) per hour per mixed-flow lane

> A dedicated bus lane can carry between 1,400 – 1,600 people per lane per hour
  • 18 - 20 articulated buses per lane per peak hour (based on average of up to 80 people per bus)

Dedicated bus lanes can move a lot more people than existing mixed-flow lanes
Traffic on the corridor with project is forecasted to perform no better than today.

Concepts 1 and 2 assume traffic diversion onto parallel streets, which can absorb additional vehicles except southbound during the PM peak.

Concepts 1 and 2 would result in the greatest reduction of VMT, up to 34,000 miles, due to people shifting to transit.

All four concepts would reduce VMT on the corridor.
## Impacts to Existing On-Street Parking

<table>
<thead>
<tr>
<th>Concept</th>
<th>Removed On-street parking spaces (all-day)</th>
<th>% Reduction Corridor-wide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concept 1</td>
<td>446</td>
<td>22%</td>
</tr>
<tr>
<td>Concept 2</td>
<td>464</td>
<td>23%</td>
</tr>
<tr>
<td>Concept 3</td>
<td>1,100</td>
<td>55%</td>
</tr>
<tr>
<td>Concept 4</td>
<td>83</td>
<td>4%</td>
</tr>
</tbody>
</table>

Current average on-street parking occupancy along Vermont Avenue is 55%

Concept 3 would result in the greatest loss of parking by converting it to an all-day bus lane.
### Summary of Performance

<table>
<thead>
<tr>
<th>Concepts</th>
<th>Average Travel Time (PM Peak, SB, in Minutes)</th>
<th>Average Bus Speed</th>
<th>Total Corridor Ridership (weekday)</th>
<th>Capital Cost ($ in Millions)</th>
<th>Increase in Annual O&amp;M Cost ($ in Millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Current Metro Rapid Line 754 (2015)</td>
<td>Post Project (2035)</td>
<td>% Change</td>
<td>% Change from current Metro Rapid Line 754</td>
<td>No Build (2035)</td>
</tr>
<tr>
<td>Concept 1</td>
<td>70</td>
<td>51</td>
<td><strong>27%</strong></td>
<td>37%</td>
<td>74,050</td>
</tr>
<tr>
<td>Concept 2</td>
<td>50</td>
<td><strong>28%</strong></td>
<td>39%</td>
<td>74,380</td>
<td><strong>36%</strong></td>
</tr>
<tr>
<td>Concept 3</td>
<td>62</td>
<td>12%</td>
<td>13%</td>
<td>66,480</td>
<td>21%</td>
</tr>
<tr>
<td>Concept 4</td>
<td>64</td>
<td>9%</td>
<td>9%</td>
<td>63,850</td>
<td>17%</td>
</tr>
</tbody>
</table>

Concepts 1 and 2 offer the greatest improvements in travel time, bus speed, and ridership.
## Summary of Impacts

<table>
<thead>
<tr>
<th>Concepts</th>
<th>Travel Lane Impacts (by direction)</th>
<th>Person Throughput (per lane)</th>
<th>Parking Impacts (reduction)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concept 2</td>
<td>2-3</td>
<td>900</td>
<td>1,400-1,600</td>
</tr>
<tr>
<td>Concept 3</td>
<td>2-3</td>
<td>1,100</td>
<td>1,400-1,600</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2,005</td>
</tr>
</tbody>
</table>

Concept 3 has the largest on-street parking loss
Key Findings

Concepts 1 and 2 stand out as the most promising options for improving bus service on Vermont for several reasons:

- Yield largest improvement in operational performance
- Result in highest ridership increase
- Best improve the customer experience
- Minimize impact on parking

Concept 1

Concept 2
Next Steps

> Vermont BRT is a Measure M Project
  • Ground breaking date 2024
  • Opening date 2028
  • Funding for potential rail conversion after FY 2067

> Phase II of the study will look at how the BRT could be converted to rail in the future
Thank You