Transit Station Deficiency Analysis: A Countywide GIS Approach

Public Transit Accessibility and Deficiency Analysis

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Senior Associate

Diana Smith, GISP
GIS Technical Manager
Project Overview

- Project Introduction
- First & Last Mile Strategies
- Public Outreach
- Station Typologies
- Initial Rankings
What the RTA First Mile/Last Mile IS about.
Providing Safe and Connected Access to Transit
What the RTA First Mile/Last Mile IS about.

RTA Service Area First Mile Last Mile Access to Transit
Pedestrian Deficiencies

Typical Problems:
Typical Problems:
Bicycling Deficiencies
Typical Solutions:
Pedestrian Recommendations
Typical Solutions:
Bicycle Recommendations- Phased and Implementable
Outreach Survey

Help us improve access to transit throughout western Riverside County. With your feedback, RTA will create a First Mile-Last Mile Mobility Plan to improve access to transit stops across our service area.

What is First and Last Mile?

Whenever it's a trip to work, shopping, or a trip home, public transportation rarely stops directly in front of a passenger's front door. This is why transit users often rely on other ways to get to and from their bus stop - like sidewalks or3 street furniture. These types of connections are referred to as "first and last mile" methods of travel, although actual distances, of course, are different for every person.

Barriers

This study intends to identify barriers found in the first and last mile of accessing existing bus stops. Some of these barriers include:

- Unavailable pedestrian crossings or nodes
- Unavailable bike facilities
- Lack of vehicle drop-off or parking areas
- Inadequate lighting, seating, or shade
- Lack of real-time transit information
- Lack of different transport options to get to the stop

Tell Us What You Think and You Could Win $100!

Take the short, 5-minute survey today and be automatically entered into a drawing to win $100! This survey will be available through September 30 at: https://www.surveymonkey.com/r/RTAFLM

Who We Are

The Riverside Transit Agency provides public transportation for western Riverside County, operating 38 local fixed routes, eight CommuterLink corsaConnect and Dial-A-Ride service. RTA’s service area spans 1,500 square miles, among the largest in the nation.

Solutions

Solutions to these barriers can be achieved by providing:

- Safe, efficient, and comfortable access to transit stops, such as:
  - Improved pedestrian crossings
  - Improved bike facilities
  - Improved bus stops

- Improved lighting, seating, or shade

- Improved bus stops

- Improved pedestrian crossings

- Improved bike facilities

- Improved bus stops

- Improved lighting, seating, or shade

- Improved transit stops

Please help us by distributing this link:

https://www.surveymonkey.com/r/RTAFLM
What We Heard

Do you experience any problems walking, cycling or accessing transit at a particular location or along a particular route?

- Yes (64%): 894
- No (36%)
Where We Heard it From
**Typology Process**
GIS Analysis - Available Datasets

- Boardings & Alightings
- Land Use Mix
- Commuting Characteristics (Transit to Work, Walk to Work, etc)
- Population and Employment Densities
- Street Network
Typology Process:
Station Access Areas
### Grouping Analysis:
Identified natural clusters in station area data

**Group-Wise Summary**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
<th>R2</th>
</tr>
</thead>
<tbody>
<tr>
<td>POPDENS</td>
<td>3557.6880</td>
<td>1500.2298</td>
<td>0.0000</td>
<td>6612.3613</td>
<td>0.3514</td>
</tr>
<tr>
<td><strong>Group 1:</strong> Count = 350, Std. Distance = 317.4339, SSD = 15.6696</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>POPDENS</td>
<td>3429.3245</td>
<td>317.4339</td>
<td>2908.0778</td>
<td>3981.8637</td>
<td>0.1624</td>
</tr>
<tr>
<td><strong>Group 2:</strong> Count = 324, Std. Distance = 317.4909, SSD = 14.5108</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>POPDENS</td>
<td>2386.4026</td>
<td>317.4909</td>
<td>1805.1739</td>
<td>2901.3702</td>
<td>0.1658</td>
</tr>
<tr>
<td><strong>Group 3:</strong> Count = 239, Std. Distance = 365.8947, SSD = 14.2166</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>POPDENS</td>
<td>5832.9232</td>
<td>365.8947</td>
<td>5194.7145</td>
<td>6612.3613</td>
<td>0.2144</td>
</tr>
</tbody>
</table>
Typology Process

**Figure 1: First Mile Last Mile Station Typologies**

<table>
<thead>
<tr>
<th>Description:</th>
<th>Urban Core</th>
<th>Core District</th>
<th>Suburban</th>
<th>Rural</th>
<th>Commercial District</th>
<th>Industrial and Business Park</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Highest number of activity centers</td>
<td>• Located just outside of urban core</td>
<td>• Moderate to low density single family residential development</td>
<td>• Remote or underdeveloped area outside of the city or town</td>
<td>• Commercial development distributed along a major corridor or concentrated within an area</td>
<td>• Facilities typically utilize large areas of land which limits the diversity of land uses</td>
<td></td>
</tr>
<tr>
<td>• Highest population &amp; employment densities</td>
<td>• Moderate densities</td>
<td>• Non-linear street patterns</td>
<td>• Minimal or non-existent pedestrian facilities</td>
<td>• Includes employment, shopping and community services</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Low auto-centric development patterns</td>
<td>• More auto-centric development connected by high speed arterials/highways</td>
<td>• Disjointed pedestrian facilities</td>
<td>• Low density development patterns</td>
<td>• Destinations surrounded by high quantities of parking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Existing walking facilities</td>
<td>• Grid street network</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Typical Transit Service:**

<table>
<thead>
<tr>
<th>Urban Core</th>
<th>Core District</th>
<th>Suburban</th>
<th>Rural</th>
<th>Commercial District</th>
<th>Industrial and Business Park</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metrolink/Sub-regional, Community, CommuterLink</td>
<td>Metrolink/Sub-regional, Community, CommuterLink</td>
<td>Sub-regional, Community</td>
<td>Sub-regional, Community</td>
<td>Sub-regional, Community</td>
<td>Regional, Community</td>
</tr>
</tbody>
</table>

**Number of Stations:**

<table>
<thead>
<tr>
<th>Urban Core</th>
<th>Core District</th>
<th>Suburban</th>
<th>Rural</th>
<th>Commercial District</th>
<th>Industrial and Business Park</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>201</td>
<td>882</td>
<td>87</td>
<td>229</td>
<td>158</td>
</tr>
</tbody>
</table>
## Typology Process

### Figure 2: Characteristics Found - First Mile Last Mile Station Typologies

<table>
<thead>
<tr>
<th>General Characteristics</th>
<th>Urban Core</th>
<th>Core District</th>
<th>Suburban</th>
<th>Rural</th>
<th>Commercial District</th>
<th>Industrial and Business Park</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency of Transit:</td>
<td>10-30 min</td>
<td>30-45 min</td>
<td>30-45 min</td>
<td>45-120 min</td>
<td>30-45 min</td>
<td>30-45 min</td>
</tr>
<tr>
<td>Boarding / Alighting Levels:</td>
<td>Very High</td>
<td>High</td>
<td>Moderate</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Land Use Mix. Number of transit supportive land uses within 3-mile network. Can include Mixed-use, Multi-Family, Office, Commercial, Schools, Institutional or Industrial</td>
<td>High (5+)</td>
<td>Moderate (3-4)</td>
<td>Low (1-2)</td>
<td>Low (1-2)</td>
<td>Low (1-2)</td>
<td>Moderate (3-4)</td>
</tr>
</tbody>
</table>

### Commuting Characteristics

<table>
<thead>
<tr>
<th>Lack of Vehicle Ownership:</th>
<th>High</th>
<th>High</th>
<th>Moderate</th>
<th>Low</th>
<th>Moderate</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Motorized Commuter Trips: Walking and bicycling to work</td>
<td>High to Moderate</td>
<td>High to Moderate</td>
<td>Moderate</td>
<td>Low</td>
<td>Low</td>
<td>Moderate</td>
</tr>
<tr>
<td>Public Transit to Work:</td>
<td>Moderate (&gt;2%)</td>
<td>Moderate (&gt;2%)</td>
<td>Low (1-2%)</td>
<td>Low (1-2%)</td>
<td>Low (1-2%)</td>
<td>Moderate (&gt;2%)</td>
</tr>
<tr>
<td>Percentage of Students: (High School &amp; College)</td>
<td>High</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Moderate</td>
<td>High</td>
</tr>
</tbody>
</table>

### Population Characteristics

<table>
<thead>
<tr>
<th>Employment and Population Densities:</th>
<th>Very High</th>
<th>High</th>
<th>Low to Moderate</th>
<th>Low</th>
<th>Moderate</th>
<th>Moderate to High</th>
</tr>
</thead>
</table>

### Street Network Characteristics (Averages)

<table>
<thead>
<tr>
<th>Block Length (Feet):</th>
<th>Short</th>
<th>Short</th>
<th>Moderate</th>
<th>Long</th>
<th>Moderate</th>
<th>Moderate</th>
</tr>
</thead>
</table>

### Average Station Characteristics

<table>
<thead>
<tr>
<th>Sample Stations:</th>
<th>Downtown Riverside, Perris Transit Station, Florida Corridor (Hemet), Riverside</th>
<th>Downtown Corona, Beaumont, Banning, Hemet, San Jacinto, Menifee, Sun City, Wildomar, Perris, Corona, Eastvale, Jurupa Valley</th>
<th>Mead Valley, North Beaumont, Gilman Springs Road, Perris (South)</th>
<th>Moreno Valley Mall, Hemet Valley Mall, Temecula Town Center, Old Town Temecula</th>
<th>March JPA, Temecula City Office &amp; Business Park, Perris Blvd (Perris/Moreno Valley), Arlington Ave Riverside Airport, Hunter Park Riverside</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Stations:</td>
<td>14</td>
<td>201</td>
<td>882</td>
<td>87</td>
<td>229</td>
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</tbody>
</table>
Typology Results
RTA staff will work with Hemet and San Jacinto directly with these cities on their specific plan projects to include a First Mile Last Mile element.
Final Pilot Study Stations

**Urban Core**

**Station:** East University Avenue and Lemon Street  
**Location:** City of Riverside  
**Transitshed Coverage:** City of Riverside, Jurupa Valley  
**Status:** Highest ranking Urban Core station
Final Pilot Study Stations

**Rural**

**Station:** Winchester Road and Simpson Road  
**Location:** Riverside County  
**Transitshed Coverage:** Riverside County - Winchester, Hemet  
**Status:** High ranking rural station, low density residential, less stops and isolated, and typical of rural development patterns. Covers eastern edge of RTA’s service area.
Questions?

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