Streetcar Ridership and Livability: Is there a Connection?
Presentation Outline

• Time for a ridership revolution!
• Who are transit riders?
• Why are people riding transit?
• What is happening out there?
Time for a ridership revolution!
Conventional Ridership Modeling

Screen for Travelers
Conventional Ridership Modeling

Screen for Transit Travelers
Conventional Ridership Modeling

Screen for TT by Mode and Station
Conventional Ridership Modeling

Screen for Access Mode to Station
Conventional Ridership Modeling
3.3 Travel Forecasting for Small Starts

For some Small Starts projects such as downtown circulators or other proposed fixed guideway or corridor-based bus improvements that serve markets which are not typically well captured by regional travel demand models, the application of alternative tools and methods for estimating transportation benefits may be desirable. In addition, where enhanced bus service is proposed in corridors already served by transit, and where good data exists on existing ridership patterns and travel speeds in those corridors, “elasticity” or “pivot-point” analysis may be sufficient to estimate the transportation benefits of such projects. FTA is open to alternative travel forecasting approaches for Small Starts projects and invites sponsors to discuss such techniques with technical staff from the FTA Office of Planning and Environment.
1. Conduct Detailed Counting of Existing Riders in the Project Corridor

2. Estimate the Number of Existing Riders That Will Benefit from the Very Small Starts Project

3. Submit Documentation of the Data Collection and Estimation to FTA.
Exhibit 1
Route 12
Estimation of Benefiting Riders

**Inbound**
- Riders Onboard at 16th Street 1,143
- Boarding Riders between 16th Street and Terminal 129
**Total Inbound Benefiting Riders** 1,272

**Outbound**
- Riders Onboard at Terminal (Transfer Riders) 126
- Boarding Riders between Terminal and 16th Street 1,156
**Total Outbound Benefiting Riders** 1,282

**Total Benefiting Riders** 2,554

---

Exhibit 3
Route 53
Estimation of Benefiting Riders

**Inbound**
- Riders Onboard at 16th Street 965
- Boarding Riders between 16th Street and Terminal 98
**Total Inbound Potential Benefiting Riders** 1,063

**Outbound**
- Riders Onboard at Terminal (Transfer Riders) 89
- Boarding Riders between Terminal and 16th Street 952
**Total Outbound Potential Benefiting Riders** 1,041

**Total Potential Benefiting Riders** 2,104

**Parallel Adjustment Factor** 0.750

**Total Adjusted Benefiting Riders** 1,578
"… ridership projections for New Starts are often highly inaccurate in terms of both total ridership and the characteristics of the markets that are actually served."

Courtesy FTA’s Office of Planning and Environment (TPE) from July 2006 New Starts Forecasting Workshop
Table 5. Program Results

<table>
<thead>
<tr>
<th>Housing Units</th>
<th>Completed or under construction</th>
<th>Approved projects</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Affordable - 30%</td>
<td>0</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Affordable - 60%</td>
<td>316</td>
<td>43</td>
<td>359</td>
</tr>
<tr>
<td>Market Rate Affordable - 80%</td>
<td>758</td>
<td>-</td>
<td>758</td>
</tr>
<tr>
<td>Market Rate</td>
<td>719</td>
<td>663</td>
<td>1,382</td>
</tr>
<tr>
<td>Total</td>
<td>1,793</td>
<td>721</td>
<td>2,514</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Commercial</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Office SF</td>
<td>560,537</td>
<td>223,200</td>
<td>783,737</td>
</tr>
<tr>
<td>Retail SF</td>
<td>193,700</td>
<td>244,736</td>
<td>438,436</td>
</tr>
<tr>
<td>Total</td>
<td>754,237</td>
<td>467,936</td>
<td>1,222,173</td>
</tr>
</tbody>
</table>

| Induced Riders Per Day             | 2,317                           | 822               | 3,139  |
ALBUQUERQUE STREETCAR EVALUATION

Summary Report

Prepared for:
The City of Albuquerque

Prepared by:
Leland Consulting Group
Fehr & Peers

1 August 2008

PORTLAND STREETCAR SYSTEM CONCEPT PLAN

Public Review
DRAFT
July 1, 2009

This study is partially funded by the US Department of Transportation, Federal Transit Administration
City of Portland, Bureau of Transportation

iForecasting.....
Seattle Streetcar Network and Feasibility Analysis

Prepared for:
Seattle Department of Transportation

Prepared by:
Parsons Brinckerhoff
in association with
Nelson Nygaard Consulting Associates
& URS Corporation

June 30, 2004

Spokane Streetcar Feasibility Study

March 2006
Prepared by
URS Corporation
David Evans & Associates
Nelson Nygaard
LTK Engineering
David Newlands & Co.

iForecasting
Streetcar Introduction

The Milwaukee Connector Study

The Milwaukee Connector study is evaluating transit improvements for Milwaukee County. Bus Rapid Transit (BRT) and Streetcar technologies are being considered. This meeting will focus on the Streetcar component, which is intended to circulate people around downtown and to adjacent neighborhoods.

Meeting Purpose

The purpose of the meeting is to:

- Update the public on progress of the Streetcar component for the Milwaukee Connector study.
- Present alternatives for a Streetcar starter line in downtown Milwaukee.
- Review preliminary analysis for each Streetcar route alternative.
- Obtain public feedback to assist with Streetcar route selection.
Are we really all Portland?
Are we really all Portland?
"Communities around the US have been enthusiastic partners, looking for opportunities to advance good projects that have solid **ridership expectations**, that create opportunities for economic development, that have demonstrable **environmental benefits**, and that increase access for transit-dependent people."

- July 07, 2010
GUIDE TO SUSTAINABLE TRANSPORTATION PERFORMANCE MEASURES

EPA 231-K-10-004
August 2011
www.epa.gov/smartgrowth

The Role of FHWA Programs in Livability:
State of the Practice Summary

Requested by
U.S. Department of Transportation
Federal Highway Administration

March 21, 2011

Leveraging the Partnership:
DOT, HUD, and EPA Programs for Sustainable Communities

In June 2009, the Partnership for Sustainable Communities was formed by the U.S. Departments of Housing and Urban Development (HUD), the U.S. Department of Transportation (DOT), and the Environmental Protection Agency (EPA). These three departments have pledged to ensure that housing and transportation policies are coordinated so as to promote environmentally sound development and infrastructure that reduces greenhouse gas emissions and supports other sustainability goals.

In March 2011, the Partnership for Sustainable Communities published Leveraging the Partnership: DOT, HUD, and EPA Programs for Sustainable Communities. This guide to federal programs is intended to help communities identify resources available to support their efforts to promote livable and sustainable communities.
Who are transit riders?
Who’s riding transit?

- FTA Transit Dependent (those without transportation)
Who’s riding transit?

- FTA Transit Dependent (Youth under 18 years of age)
Who’s riding transit?

- FTA Transit Dependent (Seniors +65)
Who’s riding transit?

- FTA Transit Dependent (Persons on fixed incomes)
Who’s riding transit?

• Tourists
Who’s riding transit?

• “Choice” Riders
Who's riding transit?

• College Students
Who's riding transit?

• “Creative Class”
Transit Planning 101

Who's riding transit?

• "Choice" Riders

Why are people riding transit?

Why are people riding transit?
Where are people riding to?

- Work
Where are people riding to?

• The “Game”
Where are people riding to?

- Shopping
Where are people riding to?

- Shopping
- Dining
Where are people riding to?

• The “Game”

Where are people riding to?

• Airports
Where are people riding to?
• Urban Centers
Where are people riding to?

- Suburban Centers
NHB?
HBO?
HBW?

Courtesy FTA's Office of Planning and Environment (TPE) from July 2006 New Starts Forecasting Workshop
What Psychographic Group Are You In?

<table>
<thead>
<tr>
<th>Customer Type</th>
<th>Time Sensitivity</th>
<th>Transit Tolerance</th>
<th>Price Sensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transit Trippers</td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>Mellow Movers</td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>LINKs &amp; MINKs</td>
<td>Low</td>
<td>Low</td>
<td>Medium</td>
</tr>
<tr>
<td>Boomers &amp; Blazers</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Young &amp; Restless</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Movers &amp; Shakers</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
</tbody>
</table>

LINKs = Low Income No Kids
MINKs = Middle Income No Kids

Courtesy Valley Transportation Authority & CambridgeSystematics
• Transit Tripper
  – “Transit Dependent”
  – Low income, in households without vehicles
  – Often unemployed

Methods courtesy of Valley Transportation Authority & CambridgeSystematics
• Mellow Movers
  • Low income
    – less then $25K
  – Often multi-child households
    • less than 1 vehicle per driver in HH
  – High school education
• Boomers & Blazers
  – Retired
    • +65 years
  – Often in single person household
• Young & Restless
  – Student
  – Low-middle income job
  – No children
• Movers & Shakers
  – Higher income
    • more than $75K
  – Employed full time
  – College educated
<table>
<thead>
<tr>
<th>Time Sensitivity</th>
<th>Transit Tolerance</th>
<th>Price Sensitivity</th>
<th>Travel Flexibility</th>
<th>Stress Sensitivity</th>
<th>Social Sensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Bus" /></td>
<td><img src="image" alt="High" /></td>
<td><img src="image" alt="High" /></td>
<td><img src="image" alt="Medium" /></td>
<td><img src="image" alt="Medium" /></td>
<td><img src="image" alt="Low" /></td>
</tr>
<tr>
<td><img src="image" alt="Family" /></td>
<td><img src="image" alt="Medium" /></td>
<td><img src="image" alt="High" /></td>
<td><img src="image" alt="Medium" /></td>
<td><img src="image" alt="Medium" /></td>
<td><img src="image" alt="Low" /></td>
</tr>
<tr>
<td><img src="image" alt="Boomers &amp; Blazers" /></td>
<td><img src="image" alt="Medium" /></td>
<td><img src="image" alt="Low" /></td>
<td><img src="image" alt="Medium" /></td>
<td><img src="image" alt="Medium" /></td>
<td><img src="image" alt="Low" /></td>
</tr>
<tr>
<td><img src="image" alt="Young &amp; Restless" /></td>
<td><img src="image" alt="High" /></td>
<td><img src="image" alt="Low" /></td>
<td><img src="image" alt="Low" /></td>
<td><img src="image" alt="Medium" /></td>
<td><img src="image" alt="Low" /></td>
</tr>
<tr>
<td><img src="image" alt="Movers &amp; Shakers" /></td>
<td><img src="image" alt="High" /></td>
<td><img src="image" alt="Low" /></td>
<td><img src="image" alt="Low" /></td>
<td><img src="image" alt="Low" /></td>
<td><img src="image" alt="Low" /></td>
</tr>
</tbody>
</table>

**Importance:**
- Low
- Medium
- High

Methods courtesy of Valley Transportation Authority & CambridgeSystematics
Based on Metro Denver Economic Development 2009 Demographics from a Demographic Detail Comparison Report run by Debra Baskett

Methods courtesy of Valley Transportation Authority & CambridgeSystematics
What is happening out there?
Corridor Level Data
- Memphis Riverfront Line
- Tampa Streetcar System

Station Level Data
- Portland Streetcar System
- Seattle South Lake Union Line
- Tacoma Streetcar System

Corridor Level Data
- Memphis Riverfront Line
- Tampa Streetcar System
Line Configuration Data
- Start of Line
- Stops to Line Terminus
- Distance to Closest Stop

Stop Area Characteristics
- Household Density
- Employment Density
- Retail Employment Density
- Urban Density
- Retail Mix
- Jobs Housing Balance
- Intersections

Line Characteristics
- Free/Paid
- Peak Headway
- Span of Service

Connections to Regional Rail
- Feeder Buses
- Feeder Rail
42 Stations (independent directions)
- Census Block Level Jobs/Housing
- Stop Level Daily Ridership
- Stop Level Interconnect Schedule & GIS Analysis
12 Stations (independent directions)
- Census Block Level Jobs/Housing
- Stop Level Daily Ridership
- Stop Level Interconnect Schedule & GIS Analysis
5 Stations

- Census Block Level Jobs/Housing
- Stop Level Daily Ridership
- Stop Level Interconnect Schedule & GIS Analysis
Complexity of allocating land use to station give close spacing
Regression Model Results

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start of Line (0/1)</td>
<td>404</td>
</tr>
<tr>
<td>Stops to Line Terminus</td>
<td>12.2</td>
</tr>
<tr>
<td>Free / Paid (0/1)</td>
<td>90.8</td>
</tr>
<tr>
<td>Distance to Closest Stop (ft)</td>
<td>0.095</td>
</tr>
<tr>
<td>Transfer to Rail (0/1)</td>
<td>121</td>
</tr>
<tr>
<td>Retail Employment</td>
<td>0.018</td>
</tr>
</tbody>
</table>

Dependent Variable: Directional Boardings per Stop

\[ R^2 = 0.61 \]
**LA Streetcar**

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start of Line (0/1)</td>
<td>308</td>
</tr>
<tr>
<td>Free / Paid (0/1)</td>
<td>110</td>
</tr>
<tr>
<td>Center Size</td>
<td>0.597</td>
</tr>
<tr>
<td>Urban Density</td>
<td>0.018</td>
</tr>
<tr>
<td>Daily Feeder Trains</td>
<td>0.424</td>
</tr>
</tbody>
</table>

R² = 0.56

Can perform sensitivity analysis on free versus paid stops.

Higher boardings at stations near a center (LA Live).

- Measures magnitude of feeder trains per day.
- R² is lower because stops to line terminus was removed.

**Daily Boardings per Station for Alternative 1**
### Sugar House Streetcar

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start of Line (0/1)</td>
<td>421</td>
</tr>
<tr>
<td>Stops to Line Terminus</td>
<td>11.2</td>
</tr>
<tr>
<td>College (0/1)</td>
<td>207</td>
</tr>
<tr>
<td>Transfer to Rail (0/1)</td>
<td>112</td>
</tr>
<tr>
<td>Distance to Closest Stop</td>
<td>0.081</td>
</tr>
<tr>
<td>Urban Density</td>
<td>0.007</td>
</tr>
</tbody>
</table>

$R^2 = 0.73$

Stops with larger spacings have a higher catchment area.

More boardings at the first stop.

More boardings at stops near a college.

Urban density includes both housing and retail employment.
Current Projects with FTA

- LA Streetcar
- Sugar House Streetcar (Salt Lake City)
- Sacramento Streetcar

Issues Encountered:

- Loop Systems vs. Bi-Directional Lines
- Special Generators
  - Museums, Conference Centers, Performing Arts Centers
  - Hotels
  - Colleges
Updating Seattle Data

Creating New Variables

- Centers (0/1)
- Center Size (square footage of center)
- Hotel (0/1)
- College (0/1)

Removing Stops to Line Terminus variable for loop systems

Creating Project Specific Models