Understanding Transit-Oriented Development (TOD) and Transit-Adjacent Development (TAD)

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• Background
5Ds of Compact Development

- Density
- Design
- Diversity
- Distance to Transit
- Destination Accessibility

Mobility
Accessibility
Livability
Absent Hard Numbers

✓ Officials usually assume that TODs require the same number of parking spaces as conventional development and that transit stations require the same number of park-and-ride spaces as non-TOD stations.
Not Applicable to TODs

- “Data were primarily at suburban locations having little or no transit services, nearby pedestrian amenities, or travel demand management (TDM) programs” ITE Trip Generation Manual

- “Primarily isolated, suburban sites” ITE Parking Generation
The average trip generation rate in areas with TOD is well below the trip generation rate from the ITE report (Arrington & Cervero 2008; Cervero & Arrington 2008; Cervero et al. 2004).

There are a few studies of vehicle trip generation at multifamily developments near transit (Arrington & Cervero, 2008; Cervero & Arrington, 2008; Zamir et al. 2014). There is only one study of vehicle trip generation at TODs (defined as mixed-use developments – Handy et al. 2013). The question of how much vehicle trip reduction occurs with TOD is largely unexplored in the literature.

By comparing parking generation rates for housing projects near rail stops with parking supplies and with ITE’s parking generation rates (Cervero et al. 2010), found there is an oversupply of parking at TODs, sometimes by as much as 25-30 percent.
How much of the travel demand is captured internally or satisfied by alternate modes?

- Vehicle trips
- Transit trips
- Walk trips
- Internal trips
TODs are widely defined as **compact, mixed-use developments with high-quality walking environments near transit facilities**

*(ITE 2004, pp. 5-7; Jacobson & Forsyth 2008; Renne 2009)*

For our purposes, TODs are developed by a single developer under a master development plan, and can also include a clustering of development projects near transit facilities that are developed by one or more developers pursuant to a master development plan.
Trip and parking generation at transit-oriented developments: a case study of Redmond TOD, Seattle region

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Abstract The decision on how best to allocate land around transit stations is a debated topic, with transit officials often opting for park-and-ride lots over active uses such as multifamily housing, office, and retail organized into transit-oriented developments (TODs). In this study, we identify the ten best self-contained TODs in ten regions across the United States based on seven criteria: dense, mixed-use, pedestrian-friendly, adjacent to transit, built after transit, fully developed, and with self-contained parking. We measure trip and parking generation at one of these TODs, the Redmond TOD in the Seattle region, as a pilot study, using an onsite count and intercept survey. The results show that the Redmond TOD has 1.7 times more trips made by walking and 3 times more trips made by transit than Seattle’s regional average. The actual vehicle trips we observed are only 37% of the Institute of Transportation Engineers’ (ITE) expected value. The actual residential peak period parking demand is only 65% of the ITE’s peak demand, and the actual commercial peak period parking demand is only 27% of the ITE’s peak demand. Additionally, the peak period of transit parking was daytime, while the peak periods of commercial and residential were evening and nighttime. There is a real opportunity for sharing parking spaces among these different uses, something which is not realized at present.

Keywords Transit oriented development · TOD · Trip generation · Parking generation

Research Paper
Trip and parking generation at transit-oriented developments: Five US case studies
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Highlights
- Parking demand at the five TODs is generally less than half the ITE guideline.
- Trip generation at the five TODs is generally less than half the ITE guideline.
- Automobile mode shares at the five US TODs are as low as one quarter of all trips.
- Results suggest the potential for significant savings in TOD developments.
- Guidelines are provided for using study results in TOD planning.

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Guidelines for trip and parking generation in the United States come mainly from the Institute of Transportation Engineers (ITE). However, their trip and parking manuals focus on suburban locations with limited transit and pedestrian access. This study aims to determine how many fewer vehicle trips are generated at transit-oriented developments (TODs), and how much less parking is required at TODs, than ITE guidelines would suggest.

Our sample of TODs is small, which limits our ability to generalize. However, the five cases selected for this study are more or less exemplary of the D variables, at least in comparison with US norms. They are characterized by land-use diversity and pedestrian-friendly designs. They minimize distance to transit, literally shutting transit stations. They have varying measures of destination accessibility to the rest of the region via transit. Three have progressive parking policies, which fall under the heading of demand management. Two have high residential densities, and one has a high density of commercial development.

Simply put, our case study TODs create significantly less demand for parking and driving than do conventional suburban developments. With one exception, peak parking demand in these TODs is less than one half of the parking supply guideline in the ITE Parking Generations manual. Also, with one exception, vehicle trip generation rates are about half or less of what is predicted in the ITE Trip Generation Manual. Automobile mode shares are as low as one quarter of all trips, with the remainder being mostly transit and walk trips.

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Keun Park

• Comparative Case Studies
Comparative Case Studies:
Trip and Parking Generation at TOD vs. TAD

Orenco Station TOD, Portland Region
Station Park TAD, Salt Lake City Region
✓ What distinguishes Orenco Station from the first five TODs is its **scale**.

✓ What makes Station Park so interesting is its status as the **only TAD** in our sample. Station Park is prototypically mixed-use. “park once, and walk.”

<table>
<thead>
<tr>
<th>TOD</th>
<th>Region</th>
<th>Gross Area (acres)</th>
<th>Gross Residential Density (units per gross acre)</th>
<th>Net Residential Area (acres)</th>
<th>Net Residential Density (units per net acre)</th>
<th>Gross Commercial FAR (for retail and office uses)</th>
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<td>Redmond TOD</td>
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<td>San Francisco</td>
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<td>3.4</td>
<td>14</td>
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<td>15</td>
<td>10.7</td>
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<td>Wilshire/Vermont</td>
<td>Los Angeles</td>
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<td>140</td>
<td>0.27</td>
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<td>Orenco Station (study area)</td>
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<td>32.4</td>
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<td>Station Park (study area)</td>
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<td>4.1</td>
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Early Development

- Parks
- Live-work units
- Orengo Station
- Cottage homes on 4,500 sf lots
- Retail and office
- Short main street (apartments and offices over shops)
- 1/2 mile
- Condos
- 5-lane divided arterial
- Apartments
- Community shopping center
- Row houses
- Light rail station
- Park-and-ride lot
- 200+ acre site in suburban setting
- Rezoned to higher density residential mixed-use to accommodate light rail ridership
- 1834 Minimum Residential Dwellings
- 500,000 S.F. Commercial
- 30,000 S.F. Main Street Retail
More Recent Development

(a) Main Street Looking South Toward Cornell

(b) Platform 14 on Orenco Station Parkway

(c) Completed Hub 9 Viewed from Platform

(d) Vector on Former Park-and-Ride Lot
(e) LRT with Rowlock in Background

(f) Public Plaza at Edge of Station Platform

(f) Outdoor Dining at Edge of Plaza
Transit Connection

- Orenco Station is served by TriMet’s light rail and a bus route
- 14th stop westbound on the Blue Line from Downtown Portland
- The Blue Line generally runs every 10 minutes between 5 am and 1 am
Station Park Parking Lots

Big Box Store Turning its Back on the Commuter Rail Station
Early History

- Farmington and the original owner’s design was based on a TOD template from UTA

- After the recession and under pressure from tenants, the site plan subsequently morphed into what it is today, the eastern portion consisting of a big-box power center
More Recent Development

• Station Park was anchored by a Harmons grocery store and a Cinemark movie theater

• Park Lane Village Apartments (324 units) was completed in 2012

• In August 2016, a 108-room Hyatt Place hotel opened with a 35,000 sq. ft. of commercial space

(a) Village Core with Hotel in Background

(b) Fountain Square with Theater in Background

(c) Park-and-Ride with Station in Background

(d) Bus Transfer Area from Rail Overpass
• In October 2016, University of Utah Farmington Health Center opened on the far west side of the development (136,000 sq. ft. facility/ 60 providers & 150 staff)

• Most recently, an apartment development, Avanti at Farmington Station, went up nearly adjacent to Station Park.
Future Development

“Everyone’s paradigm is shifting.”

- UTA’s growing interest in residential development on its 11-acre, 900-stall parking lot next to the station
- Proposed mixed-use development on vacant land to the northwest of Station Park

Everyone’s paradigm is shifting.
Transit Connection

• The site is served by UTA’s commuter rail, FrontRunner, and four bus routes. The station has a free park-and-ride lot with about 840 parking spaces available.

• A bus rapid transit (BRT) line is proposed from the suburban community of Bountiful to downtown Farmington and ultimately to Station Park.
Data Collection

✓ A count of all persons entering and exiting the buildings – 7:30am to 9:00pm on a weekday in May 2017

✓ Parking Occupancy Counts – bi-hourly, total of 10 collections

✓ A brief intercept survey of a sample of individuals entering and exiting the building
  • “How did you get here?” (e.g., by what mode of travel?), and
  • What is the purpose of your trip?
  • How many destinations are you visiting within the Development?
Interviews with agencies

- City planners (City of Hillsboro, City of Farmington)
- Transit agencies
- Property managers
Guang Tian

• Results and Conclusions
Results

Mode share

- **Redmond**: 19% walk, 13% transit
- **Rhode Island Row**: 17% walk, 37% transit
- **Fruitvale**: 28% walk, 41% transit
- **Englewood**: 19% walk, 17% transit
- **Wilshire/Vermont**: 27% walk, 41% transit
- **Orenco Station**: 46% walk, 20% transit
- **Station Park**: 4% walk, 6% transit
Vehicle Trips as % of ITE Trip Generation

- Redmond: 37%
- Rhode Island Row: 35%
- Fruitvale: 52%
- Englewood: 70%
- Wilshire/Vermont: 43%
- Orenco Station: 59%
- Station Park: 75%
Residential Parking Supplies and Demands

- Redmond
- Rhode Island Row
- Fruitvale
- Englewood
- Wilshire/Vermont
- Orenco Station
- Station Park

Legend:
- ITE supply (spaces per unit)
- TOD supply (spaces per unit)
- TOD peak demand (spaces per unit)
Peak Parking Demand as % of ITE Guideline

- Redmond: 42%
- Rhode Island Row: 33%
- Fruitvale: 19%
- Englewood: 46%
- Wilshire/Vermont: 33%
- Orenco Station: 42%
- Station Park: 36%
Parking Policies

• Lowest Parking Demand at Fruitvale Village, Rhode Island Row, and Wilshire/Vermont
  1. Shared Parking
  2. Unbundled Residential Parking
  3. Paid Commercial Parking
Structured Parking Costs

• **Shoup’s estimate** - $22k per space back in 2005
  (Don Shoup, High Cost of Free Parking, 2005)

• **San Francisco study** - $45k to $75k per space

• **A consultant’s estimate** - $18,599 per space
  (Carl Walker, 2016, Mean Construction Costs, Carl Walker Consulting (www.carlwalker.com))
Cost of Parking at Redmond TOD

- $8.0 million as built
- $2.0 million unused
- $14 million if built to ITE standards
- $8 million unused
Parking Space Occupancy Rate for Different Uses at Orenco Station TOD
Parking Space Occupancy Rate for Different Uses at Station Park TAD

Graph showing the parking space occupancy rate over the period of the day for Residential, Commercial, and Park-and-ride categories.
Conclusion

Orenco Station TOD

• Orenco Station creates significantly less demand for parking and driving than do conventional suburban developments

• The peak parking demand is less than one half the ITE parking supply guideline

• Vehicle trip generation rates are about half what is suggested in the ITE guideline

• The non-automobile mode share is 69 percent of all trips
Station Park TAD

- Does not have as deep discounts of vehicle trip and parking generation as the other TODs
- Vehicle trip generation rates are about three-quarters what is predicted in the ITE guidelines, due to the mixed-use nature of Station Park
- The results show that 40 percent of visitors to Station Park have more than one destination within the development; the average number of stops is 1.95, or almost two
Even a TAD can provide some transportation benefits

- Park once, and walk

A Free Concert in Fountain Square
Next Case

City Creek Center
Thank you!