Evaluation of the Operation and Accuracy of Five Available Smart Growth Trip Generation Methodologies - APPENDIX B: Descriptions and Comparisons of Traffic Counts Sites

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Appendix B: Descriptions and comparisons of traffic counts sites

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Introduction

The Smart Growth Trip Generation Project Team (Team) compared available traffic counts from ten sites from the EPA/SANDAG MXD study located in California against estimates from the candidate methodologies in order to determine which methodologies may be the most accurate. In addition to the EPA/SANDAG MXD sites, twelve smart growth sites, from which data were gathered for another project (Caltrans' Trip-Generation Rates for Urban Infill Land Uses in California) were used to test the candidate methodologies. Most of the EPA/SANDAG MXD sites are large-scale developments in more suburban areas, whereas the Infill sites are small-scale developments (in most cases, single buildings) located in urban cores. In this report, all of these sites are compared in light of their smart growth characteristics to better understand each site's potential to reduce vehicle trip generation rates. Smart growth characteristics are determined by examining the variables used to assess each site's trip generation rates, in addition to discussing some of the more qualitative characteristics of each site. Further, the “walkability” of each site is examined using “walkscore.com,” which uses an algorithm to award points based on amenity provisions; however, only the number of commercial and public services within walking distance of a site are quantified. The walk score provides no indication of whether or not it is possible to walk to each amenity, so this portion of the analysis must be interpreted cautiously. Tables comparing the smart growth characteristics of each site are provided at the end of this document.

Review of Smart Growth Characteristics

Ten principles comprise the term “smart growth,” all of which serve to foster a strong sense of place and community, encourage social equity, or reduce the environmental and social impacts of transportation. In particular, four of these principles tend to have a stronger effect on transportation than the rest. These four principles are as follows:

- **Take advantage of compact building design**: This is a synonym for development density, which countless studies over many decades have shown to be positively correlated with transportation modes other than the auto.
- **Mixed land uses**: This smart growth principle is important to take into account when estimating trip generation, because an appropriate diversity of land uses within one site tends to foster internal trips and, depending on site design, reduces overall vehicle trips.
- **Creation of walkable neighborhoods**: This principle is relevant to trip generation because walkable neighborhoods tend to encourage non-motorized travel, thus reducing overall vehicle trips. Density and land use mix play a fundamental role in the creation of walkable environments (by shortening trips and providing nearby destinations), but the presence of sidewalks, footpaths and bikeways providing direct routes between related land uses is also an essential component of walkability.
- **Provision of a variety of transportation choices**: This principle pertains to trip generation in the sense that providing various transportation choices and alternatives to the automobile can encourage reduction in overall vehicle trips. Walkability represents an essential first step toward providing transportation choices, and provision of walkways is a smart growth element that development projects should be expected to provide regardless of their scale.
Assessment of Smart Growth Characteristics of Study Sites in California

Data for the first ten sites were obtained for the EPA/SANDAG MXD study, whereas the data for the latter twelve sites were obtained for Caltrans' infill study. The first ten sites are primarily large, suburban mixed use developments, whereas the latter twelve are primarily small, single-use sites in urban cores. Refer to the tables following these descriptions for side-by-side comparisons of each site.

**EPA/SANDAG MXD Study Sites**

**Gateway Oaks**
Gateway Oaks is a 227-acre multi-use development in Sacramento, consisting of 1,351 multi-family dwelling units, 12,000 square feet of restaurant space, 1,084,000 square feet of office space, and 188 hotel rooms. Its residential density is 6 dwelling units per acre. The development contains 30 intersections, 8 bus stops, and no rail stops. The site has a mix of housing and office space, creating the potential for work trips to remain in the development. The site's walk score is 60 out of 100, indicating that it is “somewhat walkable,” or contains some amenities within walking distance. The intersection density is low, which may affect walkability, but the higher transit station density may make transit a viable travel option within Gateway Oaks. The development is located about 3.5 miles from downtown Sacramento. The office space within the development was constructed from 1989 to 1998. ([http://www.hines.com/property/detail.aspx?id=2101](http://www.hines.com/property/detail.aspx?id=2101))

**Jamboree Center**
Jamboree Center is a 128-acre multi-use development in Irvine, consisting of 513 multi-family dwelling units, 111,000 square feet of retail space, 3,400 square feet of restaurant space, 12,000 square feet of gas stations, 10,000 square feet of auto repair space, 1,850,000 square feet of office space, 55,000 square feet of industrial space, and 522 hotel rooms. Its residential density is 4 dwelling units per acre. The development contains 22 intersections, 2 bus stops, and no rail stops. This development embodies the smart growth principles of compact building design and mixed land uses. However, 16% of the retail space is devoted to automobile maintenance and some of the land use mix is industrial. Thus, the site may not be especially pedestrian-friendly. The limited number of transit stops also reduces the availability of transit. The development's walk score is 54 out of 100, indicating that, like Gateway Oaks, it is somewhat walkable, with few amenities and services within walking distance. Jamboree Center is located about 3.5 miles from downtown Irvine, and 40 miles from downtown Los Angeles. The hotel and much of the office space were developed between 1985 and 1991, but some of the development at this site has continued into the past decade. ([http://www.allbusiness.com/north-america/united-states-california-metro-areas/4091866-1.html](http://www.allbusiness.com/north-america/united-states-california-metro-areas/4091866-1.html))

**Park Place**
Park Place is a 109-acre multi-use site in Irvine, consisting of 162 high rise condominium units, 60,000 square feet of retail space, 30,000 square feet of restaurant space, and 1,643,000 square
feet of office space. Its residential density is 1.5 dwelling units per acre. The site contains 12 intersections, 2 bus stops, and no rail stops. The site has a mix of land uses, and the high rise condos add to the level of development density. Once again, the low intersection and transit stop densities reduce the level of smart growth compatibility. The site's walk score is 75 out of 100, indicating that there is a fairly large number of services within the area. The development is located about 4 miles from downtown Irvine, and about 40 miles from downtown Los Angeles. The condominium units were completed in 2006, with some of the other development features still underway. (http://www.bosadev.com/residential/project_history.asp)

The Villages

The Villages is a 32-acre multi-use development in Irvine, consisting of 1,132 multi-family dwelling units, 2,070 square feet of retail space, and 2,400 square feet of restaurant space. Its residential density is 35.4 dwelling units per acre. The site contains 7 intersections, 2 bus stops, and no rail stops. The Villages has a mix of housing and commercial land uses, and the intersection and transit stop densities are higher than at most of the other sites examined. Thus, this site demonstrates significant smart growth characteristics. The site's walk score is 68 out of 100, suggesting that there are some services within the area. The development is about 4 miles from downtown Irvine, and 42 miles from downtown Los Angeles. The site was completed as a single development project in 2007. (http://www.mve-architects.com/portfolio/pr/165_The-Village-at-Irvine-Spectrum-Center)

Rio Vista Station Village

Rio Vista Station Village is a 16-acre multi-use development in San Diego, served by light rail and bus, and consisting of 970 multi-family dwelling units, 13,000 square feet of retail space, and 4,000 square feet of restaurant space. Its residential density is 59.3 dwelling units per acre. The site contains 4 intersections and 3 bus stops. This site exhibits a mix of residential and commercial land uses, with high residential density. Its walk score is 68 out of 100, indicating that there is a fair number of services available within walking distance in the area. The development is located about 5.5 miles from downtown San Diego, and was built in 2002. (http://www.promenadeliving.com/homeset.html)

La Mesa Village Plaza

La Mesa Village Plaza is a 6-acre multi-use development in La Mesa, also served by light rail and bus, which consists of 94 multi-family dwelling units, 14,300 square feet of office space, 22,200 square feet of restaurant space, and 8,000 square feet of retail space. Its residential density is 16.4 dwelling units per acre. This site contains 6 intersections and 1 bus stop. In addition to its mix of residential and commercial uses, this site incorporates about half as much office space as it has commercial space, increasing its mix of land uses and thus its smart growth compatibility. This site's walk score is 94 out of 100, indicating that there is a very large number of services available within walking distance in the area. The development is about 11 miles from downtown San Diego, and was completed in 1991. (http://www.uctc.net/papers/343.pdf)

Uptown Center

Uptown Center is a 14-acre multi-use development in San Diego, served by a high frequency local bus, consisting of 311 multi-family dwelling units, 137,200 square feet of retail (including a supermarket), and 3,000 square feet of government office space. Its residential density is 22 dwelling units per acre. The site contains 4 intersections and 2 bus stops. The supermarket on site
may serve the needs of the residential community. However, the transit options do not compare to some of the other sites examined in the San Diego region, the light rail does not serve this area. Nonetheless, Uptown Center's walk score, like La Mesa Village Plaza, is 94 out of 100, indicating that there is a very large number of services available within walking distance in the area. The site is about 3 miles from downtown San Diego. It was built on the site of an old department store sometime between 1988 and 1991 (http://www.terrain.org/unsprawl/1/) and has become “...a model for redeveloping low-density, obsolete commercial sites for new housing and community uses” (http://www.gast-hillmer.com/uptown.html).

The Village at Morena Linda Vista

The Village at Morena Linda Vista is a 7-acre multi-use site in San Diego, served by light rail and bus, consisting of 185 multi-family dwelling units, 17,000 square feet of restaurant space, 8,000 square feet of retail space, and a transit station with 165 parking spaces. Its residential density is 28.1 dwelling units per acre. The site contains 6 intersections and 2 bus stops. This site has a good mix of residential and retail. Further, the light rail transit station located within the site provides better access to transit than others without rail transit. This site's walk score is 80 out of 100, indicating that there is a very large number of services available within walking distance in the area. The development is 5.5 miles from downtown San Diego, and was built in 2007. (http://www.villageatmorenavista.com/1)

Hazard Center

Hazard Center is a 16-acre multi-use development in San Diego, served by light rail, consisting of 98,700 square feet of retail space, 20,000 square feet of restaurant space, 284,000 square feet of office space, 300 hotel rooms, and 1,540 theater seats. The site contains no residential space. This site contains 5 intersections and 2 bus stops. It provides good commercial and recreational uses for employees on site and the light rail allows for larger scale access for employees and visitors alike. Further, the site's walk score is 86 out of 100, indicating that there is a very large number of services available within walking distance in the area. This development is located 4.7 miles from downtown San Diego, and was built in 1990. (http://hazardcenter.com/about/)

Heritage Center at Otay Ranch

Heritage Center at Otay Ranch is a 16-acre multi-use site in Chula Vista served by a high frequency local bus, with planned bus rapid transit service. Its residential density is 16.8 dwelling units per acre. The site consists of 271 multi-family dwelling units, 8,000 square feet of gas station space, with a food mart, 67,400 square feet of medical office space, and 38,000 square feet of retail space. It contains 3 intersections. This site provides a limited interaction of uses in comparison with many of the other sites. The retail space is likely of some use to residents, and some of the residents may work at the medical office space. However, transit facilities may be somewhat lacking due to the lack of light rail service. This site's walk score is 40 out of 100, indicating that there are a very few services and amenities available within walking distance in the area. The site is located about 14 miles from downtown San Diego, and was developed in 1999. (http://www.otayranch.com/about/aboutIndex.shtml)
California Infill Study sites

Chain Clothing Store
The chain clothing store is an 11,000 square foot retail development located in Oakland's central business district. The residential density within 0.5 miles of the development is 13.17 dwelling units per acre. The site's walk score is 100 out of 100, indicating that there is a very large number of services available within walking distance in the area.

1388 Sutter Street
Thirteen eighty-eight Sutter Street is an office building located in San Francisco's central business district, with 120,000 square feet of ground floor commercial space. The residential density within 0.5 miles of the building is 49.93 dwelling units per acre. This site has a high level of density, and its walk score is 98 out of 100, indicating that many services are available within walking distance of the area.

Central City Association of Los Angeles
The Central City Association of Los Angeles is an office building located in Los Angeles' central business district, with 138,542 square feet of ground floor commercial. The residential density within 0.5 miles of the site is 9.55 dwelling units per acre. The site's walk score is 98 out of 100, indicating that there is a large number of services within walking distance.

Horizon
Horizon is a high-rise residential complex with 211 dwelling units, located in San Diego's central business district. The residential density within 0.5 miles of the site is 8.86 dwelling units per acre. The site's walk score is 92 out of 100, indicating that many services are available within walking distance.

Atria
Atria is a residential complex with 149 dwelling units, located in San Diego's central business district, with 1250 square feet of ground floor commercial space. The residential density within 0.5 miles of the development is 8.64 dwelling units per acre. The site's walk score is 95 out of 100, indicating that there is a large number of services within walking distance.

10351 Santa Monica Boulevard
This is an office building located in Los Angeles' central business district, with 101,495 square feet of ground floor commercial space. The residential density within 0.5 miles of the development is 8.08 dwelling units per acre. The site's walk score is 92 out of 100, indicating that many services are within walking distance.

Wilshire Pacific Plaza
Wilshire Pacific Plaza is an office building located in Los Angeles' central business district, with 105,977 square feet of ground floor commercial space. The residential density within 0.5 miles of the development is 14.60 dwelling units per acre. The site's walk score is 80 out of 100, indicating that there is a large number of services within walking distance.
Archstone Santa Monica

Archstone Santa Monica is a residential complex with 133 dwelling units located 1 mile from Santa Monica's central business district and 16 miles from Los Angeles' central business district. The residential density within 0.5 miles of the development is 10.24 dwelling units per acre. The site's walk score is 80 out of 100, indicating that many services are within walking distance.

Archstone Pasadena

Archstone Pasadena is a residential complex with 120 dwelling units and 1800 square feet of ground floor commercial, located in Pasadena's central business district. The residential density within 0.5 miles of the development is 10.13 dwelling units per acre. The site's walk score is 92 out of 100, indicating that there is a very large number of services within walking distance.

Archstone Fox Plaza

Archstone Fox Plaza is a high-rise residential complex with 443 dwelling units located in San Francisco's central business district. The residential density within 0.5 miles of the building is 24.35 dwelling units per acre. The site has a high level of density, and its walk score is 97 out of 100, indicating that many services are within walking distance.

Pazzia Caffe and Trattoria

Pazzia Caffe and Trattoria is a 3,000 square foot restaurant located in San Francisco's central business district. The residential density within 0.5 miles of the restaurant is 9.85 dwelling units per acre. The site's walk score is 95 out of 100 indicating that there is a very large number of services within walking distance.

Bong Su

Bong Su is a 6,000 square foot restaurant located in San Francisco's central business district. The residential density within 0.5 miles of the development is 9.9 dwelling units per acre. The site's walk score is 95 out of 100 indicating that there is a very large number of services within walking distance.

Conclusions

Based on walk score, mix of land uses, density, and transit provision, each of the sites demonstrates smart growth characteristics to some extent. Four of the EPA/SANDAG MXD sites are served by light rail, and the rest are served by some kind of bus transit, most achieved reasonable walk scores, and all demonstrate a significant mix of land uses. When compared with the infill sites, the EPA/SANDAG MXD sites tended to achieve lower walk scores, but the residential densities of these developments were higher than those of the infill sites, on average. The fact that none of the EPA/SANDAG MXD sites are located in the central business district may contribute to the lower walk scores, whereas the infill sites tended to get higher walk scores due to their urban locations. Overall, despite the fact that only a few of the EPA/SANDAG MXD sites demonstrate significant smart growth characteristics, most are improvements over isolated, low-density, suburban areas such as those used to derive the ITE trip generation rates. Further, the infill sites were in very dense urban areas, with many diverse land uses, making them exemplary smart growth developments.
<table>
<thead>
<tr>
<th><strong>EPA/SANDAG MXD Sites:</strong></th>
<th>Intersections/Acre</th>
<th>Dwelling Units/Acre</th>
<th>Distance to CBD (Miles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gateway Oaks, Sacramento</td>
<td>0.13</td>
<td>6.0</td>
<td>3.5</td>
</tr>
<tr>
<td>Jamboree Center, Irvine</td>
<td>0.17</td>
<td>4.0</td>
<td>3.5 (Irvine), 40 (L.A.)</td>
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<tr>
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<td>11</td>
</tr>
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<td>Uptown Center, San Diego</td>
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<td>3</td>
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<td>28.1</td>
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<td>0.0</td>
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<td>16.8</td>
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<td>19</td>
<td>5.9</td>
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<tr>
<th><strong>Infill Study Sites:</strong></th>
<th>Intersections/Acre</th>
<th>Dwelling Units/Acre (Within 0.5 miles)</th>
<th>Distance to CBD (Miles)</th>
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<td>Within</td>
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<td>50</td>
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<td>Within</td>
</tr>
<tr>
<td>Horizon, San Diego</td>
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<td>8.9</td>
<td>Within</td>
</tr>
<tr>
<td>Atria, San Diego</td>
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<td>8.6</td>
<td>Within</td>
</tr>
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<td>Within</td>
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<td>Wilshire Pacific Plaza, L.A.</td>
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<td>9.9</td>
<td>Within</td>
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<td>Bong Su, San Francisco</td>
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<td>Within</td>
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<td>Infill Study Site Average</td>
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<td>Residential Space (Dwelling Units)</td>
<td>Commercial Space (Square Feet)</td>
<td>Office Space (Square Feet)</td>
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<td>271</td>
<td>46000</td>
<td>674000</td>
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Table 3: Smart Growth Principle: *Creation of Walkable Neighborhoods*

<table>
<thead>
<tr>
<th>EPA/SANDAG MXD Sites:</th>
<th>Walk Score (Out of 100)</th>
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<tr>
<td>Gateway Oaks, Sacramento</td>
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<th>Infill Study Sites:</th>
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<td>Pazzia Cafe and Trattoria, San Francisco</td>
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<td>Infill Study Site Average</td>
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<td>Table 4: Smart Growth Principle: Provision of a Variety of Transportation Choices</td>
<td>Bus</td>
</tr>
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<td>-------------------------------------------------</td>
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<td>Gateway Oaks, Sacramento</td>
<td>√ (8 Stops)</td>
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<tr>
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<tr>
<td>La Mesa Village Plaza, La Mesa</td>
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<tr>
<td>Uptown Center, San Diego</td>
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<tr>
<td>The Village at Morena Linda Vista, San Diego</td>
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</tbody>
</table>
Maps of Site Locations (unless noted otherwise, all images taken from Google Maps)

Gateway Oaks, Sacramento:

Jamboree Center, Irvine:
Park Place, Irvine:

The Villages, Irvine:
Rio Vista Station Village, San Diego:

Image taken from SANDAG's *Trip Generation for Smart Growth*
La Mesa Village Plaza, La Mesa:

Image taken from SANDAG's Trip Generation for Smart Growth
Uptown Center, San Diego:
Morenda Linda Vista Station, San Diego:

Image taken from SANDAG’s Trip Generation for Smart Growth
Hazard Center, San Diego:

Image taken from SANDAG's *Trip Generation for Smart Growth*
Heritage Center at Otay Ranch, Chula Vista:

Image taken from SANDAG's *Trip Generation for Smart Growth*
Infill study's San Francisco Bay Area sites:
Infill study's Los Angeles Area sites:
Infill study's San Diego Area sites:
Site Addresses

Gateway Oaks
2150 River Plaza Drive
Sacramento, CA 95833

Jamboree Center
1 Park Plaza
Irvine, CA 92614

Park Place
Michelson Drive
Irvine, CA 92612

The Villages
8105 Irvine Center Dr
Irvine, CA 92618

Rio Vista Station Village
2185 Station Village Way
San Diego, California 92108

La Mesa Village Plaza
7914 La Mesa Blvd
La Mesa, CA 91942

Uptown Center
1270 Cleveland Avenue
San Diego, California 92103

The Village at Morena Linda Vista
5395 Napa Street
San Diego, CA 92110

Hazard Center
7676 Hazard Center Drive
San Diego, CA 92108

Heritage Center at Otay Ranch
1580 La Media Road
Chula Vista, CA 91913

Chain Clothing Store
1333 Broadway
Oakland, CA 94612
1388 Sutter Street
San Francisco, CA 94109

Central City Association of Los Angeles
626 Wilshire Boulevard
Los Angeles, CA 90017

Horizon
505 Front Street
San Diego, CA 92101

Atria
101 Market Street
San Diego, CA 92101

10351 Santa Monica Boulevard
Los Angeles, CA 90025

Wilshire Pacific Plaza
12301 Wilshire Boulevard
Los Angeles, CA 90025

Archstone Santa Monica on Main
2000 Main Street
Santa Monica, California 90405

Archstone Pasadena
25 South Oak Knoll Avenue
Pasadena, CA 91101

Archstone Fox Plaza
1390 Market St.
San Francisco, CA 94102

Pazzia Caffe and Trattoria
337 3rd Street
San Francisco, California 94107

Bong Su
311 3rd Street
San Francisco, California 94107