

# **Vehicle Level of Service in Transit Station Areas: A Survey of Current Practice**

**Draft Report**

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# 1. Introduction

Interest in fostering development around rail transit stations has many jurisdictions considering the best ways to plan for multiple modes of transportation in these areas. Efforts to increase the intensity and mix of development around rail station areas are intended to capitalize on the public investment in rail transit, boost ridership, increase rail access to homes and businesses, create environments that support the use of alternative modes, and foster economic development. In many areas, the increased density creates concerns about how to balance the needs of automobile users with pedestrians, cyclists and transit users, particularly as development is phased in over time.

Traditional approaches to evaluating transportation system performance include level of service (LOS) measures, which are detailed in the Highway Capacity Manual (HCM). The most commonly used measure is the vehicle LOS at the intersection level, which is based on levels of delay experienced by motorists. The acceptable performance standards for specific facilities are outlined in comprehensive plans and new development that degrades conditions below these set standards typically must scale back the project or mitigate the future congestion, usually through expansions in capacity, such as adding lanes or turning bays, or through transportation system management solutions, including adjustments to signal timing and phasing.

Requiring sufficient road capacity to maintain a high LOS within transit-oriented development (TOD) can create obstacles to approving more compact, mixed use development, which concentrates trip generators in one place and has the potential to increase the number of trips in the area, including those made by automobile. The supply-side mitigations can also degrade the transportation environment for other modes of travel. For example, widening intersections or increasing the green time on traffic signals can create more difficult conditions for pedestrians. On the other hand, many infill and TOD projects cannot rely on transit and foot traffic alone to be financially viable, particularly in their early stages of development and reasonable access by automobile traffic may be necessary. The challenge for many transportation planners is finding the appropriate balance between transportation modes.

Many communities have advanced the practice of planning for a multi-modal transportation system. They have promoted alternative modes of transportation through various policies, including land use and design approaches, and have subsequently developed methods and standards for evaluating performance or service of the pedestrian, cycling and transit environment. Despite recent efforts to develop multimodal measures of LOS, comprehensive, quantitative approaches that combine these service measures in a planning methodology that permit examination of tradeoffs that incur with different investment decisions are lacking. However, many communities are reevaluating the standards they set for vehicle LOS in areas where alternative mode use is high, such as central business districts, infill areas, special generators, and TOD. The lessons learned from these communities can be helpful in the development of measures and methods to TODs in Fairfax County and the Washington, DC region as a whole.

This report provides an overview of how several communities around the nation have considered automobile congestion within transit station areas, locations designated for transit oriented development or infill projects, or near areas targeted for specific development policies.

## **2. Approach**

The primary aim of this report is to synthesize the state of the practice with respect to planning for automobile congestion within rail transit station areas and to develop recommendations for vehicle LOS standards for TOD areas for Fairfax County, Virginia. To do this, we reviewed the comprehensive plans for many communities with rail transit stations in their jurisdiction and other documents that outline the performance standards for automobile congestion. In addition, we interviewed planners and engineers working for these jurisdictions to understand the rationale for these standards and experiences with them.

Over twenty jurisdictions were identified that have defined a specific LOS threshold within or near transit oriented development or some other similar mixed use, infill, or higher density development. These jurisdictions are largely located within California, in part, due to legislation at the state level (California Environmental Quality Act) that forces local governments to consider the nexus between transportation impacts of land development. This report has drawn heavily upon published documents that include comprehensive plans, overlay zoning codes, and local reports.

## **3. Findings**

Traditional application of vehicle LOS using the HCM have been under scrutiny for their inability to consider all modes of transportation<sup>1</sup>, the bias toward land development projects in less congested areas (leading to a charge that their application leads to sprawl), and the typical responses to congestion that expand automobile capacity when these performance standards are not met. Jurisdictions have dealt with these limitations in a variety of ways and the findings of this report are summarized in Table 1 and the effort is described in more detail below.

The development of multimodal LOS standards or measures based upon person-capacity, not just vehicular capacity, has been discussed as an alternative approach<sup>2</sup>; however, these methods have yet to see widespread adoption. Most locations concerned about this issue have lowered their performance standards for automobile LOS in areas where higher density development is desired or they have exempt development from meeting an

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<sup>1</sup> McLeod, Douglas. 2000. Multimodal Arterial Level of Service , Fourth International Symposium On Highway Capacity, Proceedings, June 27-July 1, 2000, Maui, Hawaii, pp221-233, available online: [http://onlinepubs.trb.org/onlinepubs/circulars/ec018/20\\_14.pdf](http://onlinepubs.trb.org/onlinepubs/circulars/ec018/20_14.pdf)

<sup>2</sup> Phillips, R., Karachepone, J.; and Landis, B. (2001) Multimodal Quality of Service Project Report, Florida Department of Transportation, Project # BC 205.

LOS standard altogether. In others, LOS standards are applied area-wide, rather than focusing on particular intersections. This allows for some congestion at the intersection level but the total throughput of a corridor or area is the most critical measure of interest. In a very few cases, alternative performance measures have been employed, abandoning the LOS concept altogether.

The findings here are organized as follows. First, we discuss how regulation at the state level has impacted consideration of LOS for different development areas. Then, we review the policies for jurisdictions that permit some deviation from their LOS standards for development within TOD or infill areas. Jurisdictions that promote alternatives to LOS or multimodal measures are reviewed. Finally, locations that do not have a specific LOS policy for TOD but do have rail transit present are discussed.

<b>Table 1. Summary of Level of Service Practices</b>				
<b>Jurisdiction, State</b>	<b>Jurisdiction LOS Policy</b>	<b>TOD LOS Policy</b>	<b>Other Infill Area LOS Policy</b>	<b>Transit Type</b>
<b>I. LOS F:</b>				
Livermore, CA	LOS D <sup>1</sup>	No specific TOD LOS policy	LOS F <sup>2</sup>	Bus Transit
Miami-Dade County, FL	LOS D/E	Transit service areas LOS E/F <sup>3</sup>	LOS D/LOS E	Heavy Rail
<b>II. LOS E:</b>				
Redwood City, CA	LOS D <sup>4</sup>	No specific TOD LOS policy	LOS E; Downtown Area <sup>5</sup>	Commuter Rail
Prince Georges County, MD	LOS D/C	No specific TOD LOS policy	LOS E for Centers and Corridors <sup>6</sup>	Heavy Rail; Commuter Rail
Mountain View, CA	LOS D <sup>7</sup>	No specific TOD LOS policy	LOS E; Downtown and San Antonio Center <sup>8</sup>	LRT; Commuter Rail
Walnut Creek, CA	LOS D <sup>9</sup>	No specific TOD LOS policy	LOS E; Delay Index 2.0; 15mph peak hr. speed; Downtown Core Area <sup>10</sup>	Heavy rail
<b>III. LOS D:</b>				
Richardson, TX	LOS D <sup>11</sup>	No specific TOD LOS policy <sup>12</sup>	N/A	LRT
Plano, TX	LOS D <sup>13</sup>	No specific TOD LOS policy <sup>14</sup>	N/A	LRT
Palm Beach County, FL	LOS D <sup>15</sup>	30% below LOS D <sup>16</sup>	N/A	Heavy Rail
San Mateo, CA	LOS D <sup>17</sup>	TDM Mitigations <sup>18</sup>	N/A	Commuter Rail
<b>IV. LOS C:</b>				
Sacramento, CA	LOS C <sup>19</sup>	No specific TOD LOS policy	N/A	LRT; Commuter Rail

Jurisdiction, State	Jurisdiction Policy	LOS	TOD LOS Policy	Other Infill Area LOS Policy	Transit Type
<b>V. Alternative Performance Measures:</b>					
Montgomery County, MD	Critical Lane Volume (CLV); differ by Policy Area.		CLV 1800; Metro Station Policy Area <sup>20</sup>	N/A	Heavy Rail
County of Contra Costa, CA	LOS C-E. <sup>21</sup>		No specific TOD LOS policy	Alternate measures developed for regional facilities	Heavy Rail, Commuter Rail
<b>VI. Multimodal LOS:</b>					
Berkeley, CA	Establishing Multimodal LOS standards <sup>22</sup>		No specific TOD LOS policy <sup>23</sup>	N/A	Heavy Rail;
<b>VII. TOD Infill and Other Policy Areas Exempt from Mitigations:</b>					
San Diego, CA	LOS D <sup>24</sup>		LOS E/F; Exempt from Mitigations <sup>25</sup>	LOS E/F; Exempt from Mitigations	LRT
Santa Rosa, CA	LOS D <sup>26</sup>		No specific TOD LOS policy	Exempt from Mitigations.	Bus
San Jose, CA	LOS D <sup>27</sup>		Exempt from Mitigations <sup>28</sup>	Exempt from Mitigations <sup>29</sup>	LRT; Commuter Rail
<b>VIII. No Policy for TOD:</b>					
Atlanta, GA	No LOS Policy <sup>30</sup>		No specific TOD LOS policy <sup>31</sup>	N/A	Heavy Rail
Minneapolis, MN	LOS C/D <sup>32</sup>		No specific TOD LOS policy <sup>33</sup>	N/A	LRT
Dallas, TX	LOS C <sup>34</sup>		No specific TOD LOS policy <sup>35</sup>	N/A	LRT
Denver, CO	LOS D <sup>36</sup>		No specific TOD LOS policy <sup>37</sup>	N/A	LRT
Hayward, CA	LOS D/E <sup>38</sup>		No specific TOD LOS policy <sup>39</sup>	N/A	Heavy Rail

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- <sup>1</sup>Livermore, CA General Plan (2004). p 5-8. Retrieved from [http://www.ci.livermore.ca.us/general\\_plan/general\\_plan.html](http://www.ci.livermore.ca.us/general_plan/general_plan.html)
- <sup>2</sup>Turnbull, Jenny. Associate Planner. City of Livermore, CA. Personal Interview. 12 July 2007.
- <sup>3</sup>Miami-Dade County, FL Transportation Element (2005). P. II-9. Retrieved from <http://www.miamidade.gov/planzone/cdmp.asp>
- <sup>4</sup>Passanisi, Tom. Principal Planner. Redwood City, CA. Personal Interview. 12 July 2007.
- <sup>5</sup>Passanisi, Tom. Principal Planner. Redwood City, CA. Personal Interview. 12 July 2007.
- <sup>6</sup>Approved Sector Plan and SMA for the Morgan Boulevard and Largo Town Center Metro Areas (2002). p 35. Retrieved from <http://www.mncppc.org/cpd/generalplanmain.htm>
- <sup>7</sup>Mountain View, CA General Plan (1992). p 54. Retrieved from [http://www.ci.mtnview.ca.us/city\\_hall/community\\_development/planning/plans\\_regulations\\_and\\_guidelines/general\\_plan.asp](http://www.ci.mtnview.ca.us/city_hall/community_development/planning/plans_regulations_and_guidelines/general_plan.asp)
- <sup>8</sup>Mountain View, CA General Plan (1992). p 56. Retrieved from [http://www.ci.mtnview.ca.us/city\\_hall/community\\_development/planning/plans\\_regulations\\_and\\_guidelines/general\\_plan.asp](http://www.ci.mtnview.ca.us/city_hall/community_development/planning/plans_regulations_and_guidelines/general_plan.asp)
- <sup>9</sup>Walnut Creek, CA General Plan 2025 (2005). p 101. Retrieved from <http://www.ci.walnut-creek.ca.us/header.asp?genericId=2&catId=10&subCatId=1247>
- <sup>10</sup>Walnut Creek, CA General Plan 2025 (2005). p 101. Retrieved from <http://www.ci.walnut-creek.ca.us/header.asp?genericId=2&catId=10&subCatId=1247>
- <sup>11</sup>Serna, Arturo. Traffic Management Engineer. City of Richardson, TX. Personal Interview. 11 July 2007.
- <sup>12</sup>Serna, Arturo. Traffic Management Engineer. City of Richardson, TX. Personal Interview. 11 July 2007.
- <sup>13</sup>Sims, Steve. Senior Planner. City of Plano, TX. Personal Interview. 11 July 2007.
- <sup>14</sup>Sims, Steve. Senior Planner. City of Plano, TX. Personal Interview. 11 July 2007.
- <sup>15</sup>City of Delray Beach, FL Comprehensive Plan (1989). p TR-19. Retrieved from <http://www.mydelraybeach.com/Delray/Departments/Planning+and+Zoning/Quick+Links/Comprehensive+Plan.htm>
- <sup>16</sup>Palm Beach County, FL Transit Oriented Development Text Amendment (2006). p 2. Retrieved from <http://www.pbcgov.com/pzb/planning/comprehensiveplan/tableofcontent.htm>
- <sup>17</sup>San Mateo, CA Corridor Plan and Bay Meadows Specific Plan Amendment EIR (2005) p 4.3-12.
- <sup>18</sup>Ring, Lisa. Senior Planner. City of San Mateo, CA. Personal Interview. 17 July 2007.
- <sup>19</sup>City of Sacramento, CA Central City Two-Way Conversion Study (2006). p 12.
- <sup>20</sup>M-NCPPC Local Area Transportation Review Guidelines (2004). p 19. [http://www.mc-mncppc.org/Transportation/latr\\_guidelines/LATR\\_index.shtm](http://www.mc-mncppc.org/Transportation/latr_guidelines/LATR_index.shtm)
- <sup>21</sup>Performance measures to improve transportation systems and agency operations. Transportation Research Board Conference Proceedings 26 (2001). p 162.
- <sup>22</sup>Berkeley, CA General Plan (2001). p 17. Retrieved from <http://www.ci.berkeley.ca.us/planning/landuse/plans/generalPlan/Intro.html>
- <sup>23</sup>Nicols, Matt. Senior Planner. Berkeley, CA. Email Correspondance. 13 July 2007.
- <sup>24</sup>City of San Diego, CA Traffic Impact Study Manual (1998). p 17. Retrieved from <http://www.sandiego.gov/development-services/industry/transportation.shtml>
- <sup>25</sup>Hajjiri, Samir. Senior Traffic Engineer. Personal Interview. 13 July 2007.
- <sup>26</sup>Santa Rosa, CA Transit-Oriented Redevelopment Project EIR (2003). p 3.1-9. Retrieved from <http://ci.santa-rosa.ca.us>,
- <sup>27</sup>San Jose, CA General Plan (2007). p 88. Retrieved from <http://www.sanjoseca.gov/planning/gp/gptext.asp>
- <sup>28</sup>Pineda, Manuel. Transportation Planner. City of San Jose, CA. Personal Interview. 12 July 2007.
- <sup>29</sup>Pineda, Manuel. Transportation Planner. City of San Jose, CA. Personal Interview. 12 July 2007.
- <sup>30</sup>Williams, Jeff. Planner. City of Atlanta, GA. Personal Interview. 12 July 2007.
- <sup>31</sup>Williams, Jeff. Planner. City of Atlanta, GA. Personal Interview. 12 July 2007.
- <sup>32</sup>Elliot, Beth. Community Planner. Minneapolis, MN. Personal Interview. 12 July 2007.
- <sup>33</sup>Elliot, Beth. Community Planner. Minneapolis, MN. Personal Interview. 12 July 2007.
- <sup>34</sup>Manoy, Keith. Transportation Planner. Dallas, TX. Personal Interview. 12 July 2007.
- <sup>35</sup>Manoy, Keith. Transportation Planner. Dallas, TX. Personal Interview. 12 July 2007.
- <sup>36</sup>Ittelson, Ellen. Senior City Planner. Email Correspondence. 9 July 2007.

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<sup>37</sup> Ittelson, Ellen. Senior City Planner. Email Correspondence. 9 July 2007.

<sup>38</sup> City of Hayward, CA General Plan (2002). p 27. Retrieved from [www.ci.hayward.ca.us/about/generalplan/Cover-Table\\_of\\_Contents\\_Preface.pdf](http://www.ci.hayward.ca.us/about/generalplan/Cover-Table_of_Contents_Preface.pdf)

<sup>39</sup> Carmichael-Hart, Roxy. Acting Transportation/Development Manager. City of Hayward, CA. Email Correspondence. 9 July 2007.

### **3.1 State Legislation Affecting LOS in TOD**

Several states have enacted legislation that attempts to mitigate the negative impacts of new development by setting congestion standards. These concurrency requirements tie land development to the condition of adequate transportation and other infrastructure capacity. Concurrency regulations tie the issuance of development permits, such as rezonings, planned unit development approvals, subdivision plats, site plans, and building permits, to vehicle LOS standards identified in a comprehensive plan<sup>3</sup>. Measures of transit capacity are not used in these concurrency requirements.

The result has not always been favorable with respect to transit oriented development and infill projects, since the higher densities can make it difficult to meet strict LOS standards. Subsequent legislation in several states permit local governments to grant exceptions from these standards in areas designated for infill or TOD projects.

Finding that concurrency may sometimes discourage urban infill development and redevelopment, Florida authorizes exemptions from LOS standards under transportation concurrency if a project is otherwise consistent with the comprehensive plan, and the project either promotes public transportation or is located within a designated urban infill development, urban redevelopment, or downtown revitalization area in the comprehensive plan<sup>4,5</sup>. Florida has created a useful framework for implementing TOD by authorizing realistic, two tiered LOS standards and transportation concurrency management areas (TCMAs). Local governments may adopt a long-term transportation concurrency management system (LTTCMS) with a planning period of up to 10 years in specially designated districts or in areas where infrastructure provision lags significantly behind desired growth patterns. An interim LOS may be used for certain facilities but development permits must be issued contingent upon the local government's 10-year Capital Improvement Plan. The LTTCMS must be designed to correct existing deficiencies and to set priorities to address backlogged facilities<sup>6</sup>. The area must be in compliance with concurrency standards after the 10 year period.

California's Congestion Management Act of 1989 requires that congestion be mitigated by supply-side improvements that tend to expand capacity, which often have adverse impacts on pedestrian environments. In 2002, the Act was modified (SB 1636) to exempt streets and highways from meeting LOS in areas that city or county governments designate as "infill opportunity zones". An "infill opportunity zone" must be within 1/3 mile of a transit stop, with transit service having a maximum headway of 15 minutes.

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<sup>3</sup>White, S. Mark (1996) Using Adequate Public Facilities Ordinances For Traffic Management 17-21 (American Planning Association, Planning Advisory Service Report No 465, August 1996).

<sup>4</sup>White, S. Mark (1996) Using Adequate Public Facilities Ordinances For Traffic Management 17-21 (American Planning Association, Planning Advisory Service Report No 465, August 1996).

<sup>5</sup>Ewing, R. 1997. Transportation and Land Use Innovations. Chicago: Planners Press

<sup>6</sup>Florida Department of Transportation.2006. Working with Transportation Concurrency Management Systems, Florida Department of Transportation, p5. Available online at: <http://www.dot.state.fl.us/planning/gm/CMS.pdf>

Additionally, the mitigation methods for traffic congestion within these infill opportunity zones can be in the form of pedestrian or transit improvements<sup>7</sup>.

In the State of Washington's growth management regulations, concurrency can be utilized as a means to encourage TOD through the use of nontraditional LOS standards such as those measured at the district, area-wide, or corridor level. These LOS standards must include, at a minimum, arterials and transit routes<sup>8</sup>.

While legislation at the state level provides exceptions for transit and infill areas, the degree to which local governments take advantage of this flexibility and plan for transit supporting land uses varies. Additionally, developers may not be aware of these exceptions when proposing projects in transit areas.<sup>9</sup>

### **3.2 LOS F Standard for TOD, Infill and Other Policy Areas**

Two communities have set the LOS standard to F in areas designated for certain types of development. This standard allows the intersections to operate at failing conditions but a traffic impact analysis is still required to document the impacts. The City of Livermore permits an LOS F for new infill development within their downtown areas. Miami-Dade County permits LOS F in areas with exceptional transit service and LOS E in areas with transit service with headways of 20 minutes or less. The context for these policies is outlined below.

**1. Public transportation in Livermore, CA** is currently limited to bus transit, although residents have access to the nearby Dublin/Pleasanton BART station in Pleasanton. Nonetheless, their experience is relevant because they have lowered their congestion standards in response to new infill development. The City has set the LOS standard lower in the downtown area (LOS F) and near intersections near freeways (LOS E) than in other areas of the City (LOS D).<sup>10,11</sup>

Recognizing that intersections located in the downtown would fail the LOS D standards with the addition of about 2000 new houses slated for development, the City has adopted LOS F standard for development in this area.<sup>12</sup> The downtown streets are used as a thoroughfare during the morning and evening commutes and the addition of new

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<sup>7</sup> Cervero, Robert, Ferrell, Murphy, Steven, Christopher, et al. (2002), Transit-Oriented Development in the United States: Experiences, Challenges, and Prospects, TCRP Report 102, Transportation Research Board, National Research Council, Washington D.C.

<sup>8</sup> White, S. Mark (1996) Using Adequate Public Facilities Ordinances For Traffic Management 17-21 (American Planning Association, Planning Advisory Service Report No 465, August 1996)

<sup>9</sup> Cervero, Robert, Ferrell, Murphy, Steven, Christopher, et al. (2002), Transit-Oriented Development in the United States: Experiences, Challenges, and Prospects, TCRP Report 102, Transportation Research Board, National Research Council, Washington, D.C.

<sup>10</sup> City of Livermore, CA General Plan (2004). p 5-23. Retrieved from [http://www.ci.livermore.ca.us/general\\_plan/general\\_plan.html](http://www.ci.livermore.ca.us/general_plan/general_plan.html)

<sup>11</sup> City of Livermore, CA General Plan (2004). p 5-24. Retrieved from [http://www.ci.livermore.ca.us/general\\_plan/general\\_plan.html](http://www.ci.livermore.ca.us/general_plan/general_plan.html)

<sup>12</sup> City of Livermore, CA General Plan (2004). p 5-8. Retrieved from [http://www.ci.livermore.ca.us/general\\_plan/general\\_plan.html](http://www.ci.livermore.ca.us/general_plan/general_plan.html)

residential development would compromise a higher LOS standard. In response, the City lowered the LOS standard to F for this downtown area while simultaneously improving the pedestrian environment. This included increasing sidewalk size and narrowing some roads.

The City's experience overall with lowering the LOS has been positive as it has allowed them to improve the downtown environment and make it more pedestrian friendly. Complaints have typically come from individuals who in the past used these routes as thoroughfares.<sup>13</sup>

**2. Miami-Dade County** has bus and rail transit options available, including 100-plus Metrobus routes, the 22-mile Metrorail heavy rail system; Metromover, a downtown people mover system, and the commuter system Tri-Rail. Although there is no specific policy with respect to TOD development, there are LOS policies that affect TOD development due to the station locations within their growth management area, referred to as an Urban Development Boundary or UDB.

Miami-Dade County is encouraging growth to occur within their UDB. Inside the UDB boundaries, the County created an urban infill area (UIA), which supports and encourages higher density development. The city of Miami, including its entire heavy rail network, is located in the UIA. In Miami-Dade County, most other municipalities are located within the UIA. There is less than 10% vacant land in the rest of the County.

The LOS policies reflect these differences in development approach through the application of tiered standards. Between the Urban Infill Area and the Urban Development Boundary, roadway operating conditions are set at LOS D (90 percent of their capacity). An exception is that State Urban Minor Arterials (SUMAs) may operate at LOS E (100 percent of their capacity). Where public mass transit service exists having headways of 20 minutes or less within 1/2-mile distance, the LOS standard for roadways is LOS E. Where exceptional transit service such as commuter rail or express bus service exists, parallel roadways within 1/2 mile may operate up to 120 percent of roadway capacity or LOS F.<sup>14</sup> The minimum acceptable peak period operating LOS for all State and County roads in Miami-Dade County outside of the Urban Development Boundary (UDB) identified in the Land Use Element shall be LOS D on State minor arterials and LOS C on all other State roads and on all County roads.<sup>15</sup> This tiered approach allows for the most stringent LOS requirements in areas where development is less desirable. Conversely, in areas in which the county would like to encourage intense infill development LOS policies are less stringent.

The City of Miami has adopted a person-trip-based LOS standard. They consider the person trip capacity within the different corridors within the city, for both automobile and

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<sup>13</sup>Turnbull, Jenny. Associate Planner. City of Livermore, CA. Personal Interview. 12 July 2007.

<sup>14</sup>Miami-Dade County, FL Transportation Element (2005). p II-9. Retrieved from <http://www.miamidade.gov/planzone/cdmp.asp>

<sup>15</sup>Miami-Dade County Transportation Element (2005). p II-8. Retrieved from <http://www.miamidade.gov/planzone/cdmp.asp>

transit. Many Miami corridors are currently operating at LOS F and the City has no plans to adjust their policies in response.<sup>16</sup>

### **3.3 LOS E Standard for TOD, Infill and Other Policy Areas**

The vast majority of jurisdictions that have lowered their LOS standards for specific development considerations, including but not limited to TOD, have set them at LOS E. They are discussed in more depth below.

**1. The City of Redwood City, CA** has a Downtown revitalization program aims to encourage pedestrian friendly development and promote alternative travel modes. The Downtown is the “Transit Hub” of the City, containing the Redwood City Caltrain Station, which provides access to transportation service between San Francisco and Gilroy and connections to local and regional bus transportation, making the area an appropriate location for more compact, higher intensity development.

There are plans to develop around the Cal Trains station, located in the downtown area. At this time there is not any appreciable development directly surrounding this area. However, there are several redevelopment projects within the downtown area.<sup>17</sup>

The City of Redwood sets a citywide LOS D standard for signalized and unsignalized intersections.<sup>18</sup> Within the downtown area, this standard has been lowered in order to foster alternative transportation options. The City recognizes an LOS E as an acceptable standard at intersections within the Downtown Area where roadway improvements may potentially degrade the pedestrian environment. The LOS policy allowing this lower level of LOS applies specifically to those areas identified for mixed-use, higher density development.<sup>19</sup>

As a consequence of the policy to lower the LOS requirement to E and improvements to the pedestrian environment, the downtown area in the City of Redwood is experiencing more congestion. However, in the downtown, the City is more concerned with preserving the pedestrian environment than accommodating the automobile and no specific capacity expansions are planned as a result of these congestion levels.<sup>20</sup> The Draft Downtown Precise Plan specifically states, “in the event of a conflict between the needs of motor vehicles and pedestrians, it is City policy that pedestrian comfort, safety, convenience, and enjoyment have priority.”<sup>21</sup> The roads on the periphery of the downtown area are also

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<sup>16</sup> Woerner, Mark. Interim Assistant Director Planning. Miami Dade County, FL. Personal Interview. 13 July 2007.

<sup>17</sup> Passanisi, Tom. Principal Planner. Redwood City, CA. Personal Interview. 12 July 2007.

<sup>18</sup> Redwood City, CA Downtown Precise Plan DEIR (2006). p 9-4. Retrieved from [http://www.redwoodcity.org/cds/planning/precise/draft\\_eir.html](http://www.redwoodcity.org/cds/planning/precise/draft_eir.html)

<sup>19</sup> Passanisi, Tom. Principal Planner. Redwood City, CA. Personal Interview. 12 July 2007.

<sup>20</sup> Passanisi, Tom. Principal Planner. Redwood City, CA. Personal Interview. 12 July 2007.

<sup>21</sup> Redwood City, CA Downtown Precise Plan DEIR (2006). p 9-2. Retrieved from [http://www.redwoodcity.org/cds/planning/precise/draft\\_eir.html](http://www.redwoodcity.org/cds/planning/precise/draft_eir.html)

more congested and failing to meet the LOS D policy. This congestion will likely be addressed with some traditional mitigation measures.<sup>22</sup>

**2. The City of Mountain View, CA** is well served by rail transit for a city of its size. It has five light rail transit stops spread throughout the City and two CalTrain commuter rail stops, located downtown and near the San Antonio Shopping Center. To capitalize on these resources, Mountain View has adopted policies to encourage mixed-use developments and higher-density development near rail stations.<sup>23</sup>

The City has set the peak hour LOS at D for new or reconstructed streets, intersections, and traffic-control devices on arterials.<sup>24</sup> Recognizing that this may not always be appropriate for an area's overall transportation system goals, the City of Mountain View lowers the automobile LOS requirements in the Downtown area, primarily served by the Downtown Station, and San Antonio Center, primarily served by the San Antonio Caltrain Station. The City has adopted LOS E, "significant delays," for these areas where "vitality, activity, and transit use" are primary goals.<sup>25</sup>

**3. The City of Walnut Creek, CA** has two Bay Area Rapid Transit stations in the Walnut Creek area: The Walnut Creek station at Ygnacio Valley Road and Interstate 680, and the Pleasant Hill station at Treat Boulevard and Oak Road. In 2004, Walnut Creek completed a station area plan for the Walnut Creek BART station, which is situated on the edge of downtown<sup>26</sup>. The plan incorporates more mixed-use development adjacent to the station and proposes greater residential and employment density in the downtown area.

Walnut Creek established a Downtown Core Area that is subject to lower LOS standards than in the rest of the City. This policy was adopted, in part, due to the constraint on widening downtown roads to provide additional capacity. Rather, any improvements would "consider operations and management for improve efficiency of the existing roadway system as well as opportunities to improve the pedestrian-oriented nature of the Core Area. The LOS standards for the Core area are LOS low E (v/c: 0.90 to 0.94)."<sup>27</sup> In the case of regional routes, measures of delay (delay index of 2.0) and peak hour average

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<sup>22</sup> Passanisi, Tom. Principal Planner. Redwood City, CA. Personal Interview. 12 July 2007.

<sup>23</sup> Mountain View, CA General Plan (1992). p 53. Retrieved from [http://www.ci.mtnview.ca.us/city\\_hall/community\\_development/planning/plans\\_regulations\\_and\\_guidelines/general\\_plan.asp](http://www.ci.mtnview.ca.us/city_hall/community_development/planning/plans_regulations_and_guidelines/general_plan.asp)

<sup>24</sup> Mountain View, CA General Plan (1992). p 55. Retrieved from [http://www.ci.mtnview.ca.us/city\\_hall/community\\_development/planning/plans\\_regulations\\_and\\_guidelines/general\\_plan.asp](http://www.ci.mtnview.ca.us/city_hall/community_development/planning/plans_regulations_and_guidelines/general_plan.asp)

<sup>25</sup> Mountain View, CA General Plan (1992). p 56. Retrieved from [http://www.ci.mtnview.ca.us/city\\_hall/community\\_development/planning/plans\\_regulations\\_and\\_guidelines/general\\_plan.asp](http://www.ci.mtnview.ca.us/city_hall/community_development/planning/plans_regulations_and_guidelines/general_plan.asp)

<sup>26</sup> Walnut Creek, CA Comprehensive Station Plan (2004). Retrieved from <http://www.ci.walnut-creek.ca.us/pdf/planning/wcbart/AWCCSPToC2Ack.pdf>

<sup>27</sup> Walnut Creek, CA General Plan 2025 (2005). p 101. Retrieved from <http://www.ci.walnut-creek.ca.us/header.asp?genericId=2&catId=10&subCatId=1247>

speed (15 mph) are used as the performance standard (see F. Alternative LOS Measures, 5/ Contra Costa County for use of alternative measures).<sup>28</sup>

**4. Prince Georges County, MD** has three Metrorail lines that stop at fifteen metro stations and eight regional rail stations located along two rail lines (MARC). Because of the numerous stops and the availability of developable land, there is great potential for TOD. To capitalize on this resource, Maryland National Capital Parks and Planning Commission developed a strategic framework for TOD in Prince Georges County.<sup>29</sup> The strategic framework highlights the potential for TOD, presents a case study transit village concept for the West Hyattsville Metro Station, and outlines a planning strategy for future development. The issue of automobile congestion around transit stations targeted for development was not addressed in this document; however, the County has addressed LOS in their general plan, which has implications for these TOD areas.

The Prince George's County General Plan establishes three growth policy areas in the county: Developed, Developing and Rural Tiers.<sup>30</sup> Each of these tiers has different LOS standards for road facilities within them.<sup>31</sup> The General Plan also established Centers and Corridors where future development is targeted. Largo Town Center Metro Station, West Hyattsville Metro Station, Cheverly Metro Station and New Carrollton Metro Station are designated as Centers. Development and redevelopment in these locations can capitalize on existing infrastructure by locating homes, jobs and shopping closer to transit services.

The Developed Tier is located along the border with the District of Columbia encompassing an 83-square mile area and generally within the Capital Beltway. The Developed Tier's land development policies encourage increasing density and infill development along with the provision of transit and pedestrian facilities and services. The highest priority for expenditure of public funds is reserved for the Developed Tier.<sup>32</sup>

The Developing Tier includes the middle section of the county and covers approximately 231 square miles. Land development policies in the Developing Tier permit low to moderate density that can support transit- and pedestrian-oriented development; and encourage multimodal transportation choices as possible for new development; and the planning and provision of public facilities to support the planned development pattern.<sup>33</sup>

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<sup>28</sup> Walnut Creek, CA General Plan 2025 (2005). p 101. Retrieved from <http://www.ci.walnut-creek.ca.us/header.asp?genericId=2&catId=10&subCatId=1247>

<sup>29</sup> MNCPPC Strategic Framework for Transit Oriented Development in Prince Georges County, MD (2003). Retrieved from <http://www.mncppc.org/cpd/SFTOD.htm>

<sup>30</sup> Prince George's County, MD General Plan (2002). Retrieved from <http://www.mncppc.org/cpd/generalplanmain.htm>

<sup>31</sup> Prince Georges County, MD General Plan (2002). p 5. Retrieved from <http://www.mncppc.org/cpd/generalplanmain.htm>

<sup>32</sup> Approved Sector Plan and SMA for the Morgan Boulevard and Largo Town Center Metro Areas (2002). p 5. Retrieved from <http://www.mncppc.org/cpd/generalplanmain.htm>

<sup>33</sup> Approved Sector Plan and SMA for the Morgan Boulevard and Largo Town Center Metro Areas (2002). p 5. Retrieved from <http://www.mncppc.org/cpd/generalplanmain.htm>

The 2002 General Plan tolerates a lower LOS standard within the Developed Tier and Centers within the Developing Tier.<sup>34</sup> The LOS standard is set at E for these areas compared to LOS D for other areas in the Developing Tier and LOS C in the Rural Tier.

### **3.4 LOS D Standard for TOD, Infill and Other Policy Areas**

Four locations examined in this report have a LOS standard of D for areas that include rail station. Each of these areas is giving TODs increasing consideration in their future plans. In the case of Palm Beach County, FL, the local government is permitted to set local LOS standards for new development under the state concurrency requirements. In the case of San Mateo, CA, the mitigation measures required by developers in areas with TOD differ from those required elsewhere.

**1. The City of Plano, TX** has two light rail stations on the Dallas Area Rapid Transit red line. Construction began on the red line expansion in 1999 and was completed by December of 2002. Plano began planning for its, Eastside Village TOD in the 1990's, when DART indicated an expansion of its light rail network with a planned stop in Plano. As Plano is the second to last stop on the DART north central line it has attempted to make Eastside Village a destination place.<sup>35</sup>

The City of Plano used the Dallas area Mockingbird Station and the Addison Circle TOD projects as examples to guides their development process for the Eastside Transit Village TOD. This TOD has been influential in the revitalization of Downtown Plano.<sup>36</sup> Almost 500 apartments are now located in this development along with new office areas, personal business services, art galleries, restaurants and performing arts theaters.

The City of Plano has one LOS standard, LOS D, for all areas in the city including the Eastside Village TOD area. There are no plans to change this LOS standard for TODs. The reduction of lanes through the Eastside Village on K Avenue was done purposefully to slow traffic and encourages people to stop.<sup>37</sup>

**2. The City of Richardson, TX** is a northern suburb of Dallas. It is served by four light rail stations on Dallas' Red Line. The City has only recently started construction on their TOD as the city ran into opposition to the "idea of building multifamily housing, especially at the densities proposed."<sup>38</sup> Because Plano has had more experience with TOD and less opposition from the public, the City of Richardson has been looking to them as a model for the development of their station areas.

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<sup>34</sup> Approved Sector Plan and SMA for the Morgan Boulevard and Largo Town Center Metro Areas (2002).

p 35. Retrieved from <http://www.mncppc.org/cpd/generalplanmain.htm>

<sup>35</sup> Sims, Steve. Senior Planner. City of Plano, TX. Personal Interview. 11 July 2007.

<sup>36</sup> Sims, Steve. Senior Planner. City of Plano, TX. Personal Interview. 11 July 2007.

<sup>37</sup> Sims, Steve. Senior Planner. City of Plano, TX. Personal Interview. 11 July 2007.

<sup>38</sup> Dittmar, H. & Ohland, G. The New Transit Town: Best Practices in Transit Oriented Development (2004). p 158.

LOS D is the standard for the city with no exception for TOD. At this time congestion is somewhat of an issue for the City but as in the case of Plano, this is due to the auto-oriented nature of development.<sup>39</sup>

**3. Palm Beach County, FL** is served by six stations of the Tri-Rail commuter rail line. The Tri-Rail line is operated by the South Florida Regional Transit Authority with service from Miami to Palm Beach County. The system has stations located at six municipalities (Mangonia Park, West Palm Beach, Lake Worth, Boynton Beach, Delray Beach and Boca Raton) spread north to south along the eastern half of the county. The County has identified these six potential stations for future TOD.<sup>40</sup> The regional planning council has completed a planning study for land use and zoning districts around these stations.

Palm Beach County has a LOS D Policy for all critical intersections in the county.<sup>41</sup> However, the County has proposed an amendment to their General Plan to permit roadways inside Transit Oriented Development areas to operate at 30% below LOS D.<sup>42</sup> This standard was based upon their experience with planning for schools and hospitals, where the community need for these facilities in certain developed locations outweighed the concerns about their contribution increased traffic congestion. At the time of this writing, the amendment was awaiting approval from the State of Florida.

Palm Beach County has set the proposed performance standard for TOD areas at 30% below LOS D based upon previous traffic studies for schools and hospitals being built in the county. These types of structures can be approved for plan amendments or development approvals even if they are found to reduce the LOS up to 30% lower than the acceptable standard.

Florida's concurrency requirements can potentially affect LOS standards in TODs. In the City of West Palm Beach, the train station is located in a Transportation Concurrency Exception Area (TCEA), which permits deviation from Florida's LOS standards mandated in the concurrency legislation. This station area is not fully developed at this time so the County has not had any experience with TODs inside a TCEA. The other five stations are also underdeveloped and will likely not conflict with concurrency traffic requirements for several years.

One interesting station area to watch is in the City of Boca Raton. The City is currently in the process of developing a multimodal transportation district to deal with transportation concurrency requirements. This would create a citywide multimodal service standard used in lieu of an automobile LOS standard.<sup>43</sup>

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<sup>39</sup> Serna, Arturo. Traffic Management Engineer. City of Richardson, TX. Personal Interview. 11 July 2007.

<sup>40</sup> Perez, Jorge. AICP. Palm Beach County, FL. Personal Interview. 17 July 2007.

<sup>41</sup> City of Delray Beach, FL Comprehensive Plan (1989). p TR-19. Retrieved from <http://www.mydelraybeach.com/Delray/Departments/Planning+and+Zoning/Quick+Links/Comprehensive+Plan.htm>

<sup>42</sup> Palm Beach County, FL Transit Oriented Development Text Amendment (2006). p 2. Retrieved from <http://www.pbcgov.com/pzb/planning/comprehensiveplan/tableofcontent.htm>

<sup>43</sup> Perez, Jorge. AICP. Palm Beach County, FL. Personal Interview. 17 July 2007.

**4. The City of San Mateo** is served by two Caltrans Stations: Hayward Park and Hillsdale. The City completed the San Mateo Rail Corridor Transit Oriented Development Plan for the area around these stations.<sup>44</sup> The Corridor Plan, as proposed by the City of San Mateo, is broadly intended to create a new, more compact infill development pattern oriented around the Hayward Park and Hillsdale Caltrans stations.<sup>45</sup>

In the City of San Mateo, the acceptable LOS standard is D.<sup>46</sup> The City does not lower its LOS standard for TOD areas such as those stations in the San Mateo Rail Corridor. Instead, the city requires that projects developed within the corridor area have transportation demand measures incorporated. These measures need to reduce traffic levels by 25%. Developers can accomplish this through the design of the project, parking standards and/or subsidizing transit passes. Because it is a relatively new plan, only two projects have moved forward under this policy since the plan was approved in 2005. The city has had good experiences with its legislation as one of the projects has been able to achieve the goals of reducing traffic demand by 25%. There are no plans to change this requirement at this time.<sup>47</sup>

### **3.5 LOS C Standard for TOD, Infill and Other Policy Areas**

The City of Sacramento is the only community in this study that applies the LOS C standard uniformly to all development. The city is revising its General Plan to address some of the consequences of using this inflexible standard.

**1. The City of Sacramento, CA** has several available transit options including bus and rail. The city is served by both Sacramento Regional Transit Light rail and Amtrak. The City has over 35 miles of light rail track with 44 stations. Amtrak has three stops located in the city that allow connections to locations throughout the state.<sup>48</sup>

Sacramento currently has a standard of LOS C for all collectors and arterials.<sup>49</sup> The standard does not currently allow the City to balance land use decisions with traffic flow considerations.<sup>50</sup> As such, the City is currently rewriting their General Plan. Some of the objectives for their transportation element are to revise the LOS standards with the goal of “allowing acceptable levels of congestion and desirable mitigation measures Citywide, near light rail stations and in the Central Business District.”<sup>51</sup> However, the standards and

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<sup>44</sup> City of San Mateo, CA Rail Corridor Transit Oriented Development Plan (2005). Retrieved from [http://www.cityofsanmateo.org/dept/planning/bay\\_meadows/corridor.html](http://www.cityofsanmateo.org/dept/planning/bay_meadows/corridor.html)

<sup>45</sup> San Mateo, CA Corridor Plan and Bay Meadows Specific Plan EIR (2005). p 3-1.

<sup>46</sup> San Mateo, CA Corridor Plan and Bay Meadows Specific Plan EIR (2005). p 4.3-12.

<sup>47</sup> Ring, Lisa. Senior Planner. City of San Mateo, CA. Personal Interview. 17 July 2007.

<sup>48</sup> City of Sacramento, CA. Retrieved August 5, 2007 from [http://www.cityofsacramento.org/visiting\\_sac.htm](http://www.cityofsacramento.org/visiting_sac.htm)

<sup>49</sup> City of Sacramento, CA Central City Two-Way Conversion Study (2006). p 12.

<sup>50</sup> EIP Associates & Mintier. Sacramento General Plan Update (2005). p 7.

<sup>51</sup> Planning Dynamics Group & DKS Associates & Jones and Stokes Associates. City of Sacramento, CA FEIR Central City Two-Way Conversion Study (2006). p 15.

their implementation have not been determined. The City would like to encourage more infill development with higher densities around their light rail stations.

### **3.6 Alternative Performance Measures**

Two communities have adopted alternative performance measures in lieu of the traditional LOS standards outlined in the Highway Capacity Manual.

**1. Montgomery County, MD** is well served by transit with one Metrorail line (Red Line) serving 12 Metro stations and 10 MARC regional rail stations along the Brunswick Line. To encourage development around these stations and foster a multimodal transportation environment, Montgomery County has designated certain areas where they will allow both lower and alternative performance standards for automobile traffic.

Montgomery County has divided the area into different policy areas based upon the characteristics of existing and planned development. The Critical Lane Volume (CLV) is the measure used to evaluate the performance of intersections and roadway segments. The standards vary across these policy areas based upon the development characteristics in the areas within the county.

Some areas surrounding Metro stations have been designated as Metro Station Policy Areas in the most-recently adopted Annual Growth Plan (AGP), including: Bethesda CBD, Friendship Heights CBD, Glenmont, Grosvenor, Shady Grove, Silver Spring CBD, Twinbrook, Wheaton CBD, and White Flint. In these areas, the congestion performance standard is set at CLV of 1800.<sup>52</sup> This standard was adopted by the Montgomery County Planning Board and enacted by the County Council. These standards are not the same as state requirements, as the state requirements are more stringent. The Policy is intended to encourage alternative transportation usage in these areas, which have metro and bus access.<sup>53</sup>

According to Local Area Transportation Review (LATR) guidelines, just because the vehicular CLV exceeds 1800 does not mean that the intersection is failing as far as the planning board is concerned.<sup>54</sup> “If the Critical Lane Volume (CLV) is over 1,800, a queuing analysis shall be performed. Existing queues shall be measured by the applicant and total traffic (i.e., existing, background and site) and planned roadway and circulation changes shall be taken into account. The signal timing assumed for this analysis must be consistent with the crossing time required for pedestrians in paragraph B.2.b. of this section. If adequate conditions cannot be achieved, and no mitigating measures are programmed that would result in an acceptable CLV, the transportation system in the CBD or Metro Station Policy Area may not be deemed adequate to support the development.”<sup>55</sup>

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<sup>52</sup> M-NCPPC Local Area Transportation Review Guidelines (2004). p 19.

<sup>53</sup> Paine, David. Transportation Planning. Montgomery County, MD. Personal Interview. 9 July 2007.

<sup>54</sup> Paine, David. Transportation Planning. Montgomery County, MD. Personal Interview. 9 July 2007.

<sup>55</sup> M-NCPPC Local Area Transportation Review Guidelines (2004). p 19.

In the past ten years, Metro policy areas have only exceeded a CLV of 1800 a few times. At this time some Metro Policy Station Areas intersections are approaching or are around 1800 CLV. However, the County assumes a certain amount of congestion to be acceptable and therefore expects to approve development in areas with congestion problems. Residents have complained but the planning board has told them this is done by design.<sup>56</sup>

Montgomery County instituted the current CLV standards as it created each Policy Area. The Glenmont Station was deemed a Metro Station Policy Area in 1998. The County has had other measures. At one time, Montgomery County used a Policy Area Transportation Review (PATR), which tested a larger geographic area (more than an intersection). However, the County could then only put a moratorium on development if the area exceeded capacity.

In response to this shortfall, the County has been developing a new test. This test retains the broad Policy area, as opposed to individual intersections, but the county would now have the ability to allow a development that will cause more congestion, in exchange for requiring more from the developers. The new requirement tests not only the automobile capacity but the capacity of the transit system as well (multimodal in nature). This test is not based on observed use, like the LATR, but instead relies upon a model. This policy has not yet been adopted.

Montgomery County is interested in multimodal standards and has been looking to other states and municipalities for guidance. They has also been in contact with planners in Florida in regards to the Transportation Concurrency Exception Areas (TCEA) and how that might be implemented in Montgomery County.<sup>57</sup>

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<sup>56</sup> Paine, David. Transportation Planning. Montgomery County, MD. Personal Interview. 9 July 2007.

<sup>57</sup> Paine, David. Transportation Planning. Montgomery County, MD. Personal Interview. 9 July 2007.

**Table 2 Local Area Transportation Review Congestion Standards by Policy Area** <sup>58</sup>  
*adopted by the Montgomery County Council October 28, 2003*

<b>Policy Area</b>	<b>Critical Lane Volume Standard</b>
Rural Areas	1400
Clarksburg Damascus Germantown East Germantown Town Center Germantown West Montgomery Village/Airpark	1450
Cloverly Derwood North Potomac Olney Potomac R & D Village	1475
Aspen Hill Fairland/White Oak	1500
North Bethesda	1550
Bethesda/Chevy Chase Kensington/Wheaton Silver Spring/Takoma Park	1600
Bethesda CBD Friendship Heights Glenmont Grosvenor Shady Grove Silver Spring CBD Twinbrook Wheaton CBD White Flint	1800

**Notes**  
*Rural areas are: Darnestown/Travilah, Goshen, Patuxent, Poolesville, and Rock Creek.  
 Potomac, Friendship Heights, and Silver Spring CBD have special LATR rules identified  
 in their master plans or in the Annual Growth Policy.*

<sup>58</sup> Montgomery County, MD Annual Growth Policy (2003). p 18.

2. The **County of Contra Costa, CA**, located in the east of San Francisco Bay, has several rail and bus transit lines serving the area. Amtrak has stations in Antioch-Pittsburg, Richmond and Martinez. The Bay Area Rapid Transit system has stops throughout the County. In addition, local and regional bus transit serves the county and the municipalities in it.

The County does not have LOS standards specific to TODs but they do employ both fixed and flexible performance standards. The County sets fixed LOS standards for local, non-regional routes and are tied to adjoining land uses.<sup>59</sup>,<sup>60</sup> Local governments decide which of these standards apply to their road facilities. These standards are listed below.

- Rural LOS low C [V/C (volume-to-capacity) ratio of 70 – 74]
- Semirural LOS high C (V/C ratio of 75 – 79)
- Suburban LOS low D (V/C ratio of 80 – 84)
- Urban LOS high D (V/C ratio of 85 – 89)
- Central business district LOS low E (V/C ratio of 90 – 94)

The County uses more flexible Transportation Service Objectives (TSOs) as the performance standard on routes of regional significance. TSOs, established by regional committees are quantitative measures of effectiveness, such as vehicle occupancy or hours of congestion. TSO must be measurable and it is not tied to any specific measure of effectiveness. Regional committees have used LOS, delay index, transit ridership, and average vehicle occupancy as TSOs. The rationale behind regional committees choosing the standard is that no one jurisdiction should have the responsibility for planning regional routes.<sup>61</sup>

### 3.7 Multimodal LOS Standards

One community in this study, Berkeley, CA is in the process of developing multimodal performance standards that attempt to incorporate all system users and link conditions across modes. However, the community does not have any experience to date applying the measures under development.

1. The **City of Berkeley** has access to heavy rail service, offered by BART, and bus lines run by AC Transit. In Berkeley there are three BART Stations, Ashby Station, Downtown Berkeley and North Berkeley.

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<sup>59</sup> Performance measures to improve transportation systems and agency operations. Transportation Research Board Conference Proceedings 26 (2000). p 162. Retrieved from [http://onlinepubs.trb.org/onlinepubs/conf/reports/cp\\_26.pdf](http://onlinepubs.trb.org/onlinepubs/conf/reports/cp_26.pdf).

<sup>60</sup> Performance measures to improve transportation systems and agency operations. Transportation Research Board Conference Proceedings 26 (2000). p 162. Retrieved from [http://onlinepubs.trb.org/onlinepubs/conf/reports/cp\\_26.pdf](http://onlinepubs.trb.org/onlinepubs/conf/reports/cp_26.pdf)

<sup>61</sup> Performance measures to improve transportation systems and agency operations, Transportation Research Board Conference Proceedings 26 (2000). p 164. Retrieved from [http://onlinepubs.trb.org/onlinepubs/conf/reports/cp\\_26.pdf](http://onlinepubs.trb.org/onlinepubs/conf/reports/cp_26.pdf)

Berkeley is in the process of developing citywide multimodal LOS standards.<sup>62</sup> These standards will consider all modes of transportation, including transit, bicycles, and pedestrians in addition to automobiles.<sup>63</sup> The City does not have a specific LOS policy for TOD areas. “In cases where a major street is identified as a Transit Route on the Transit Network map, mitigations should emphasize the movement of public transit vehicles first and private automobiles second. In cases where major streets enter the Downtown, improvements should emphasize the pedestrian first, transit second, and the automobile third.”<sup>64</sup>

### **3.8 TOD, Infill and Other Policy Areas Exempt from Mitigations**

Three communities in this study, all in California, exempt development that exceeds LOS thresholds from undergoing mitigations to offset this additional traffic. This policy is often done in recognition of the conflicts that these mitigations will have in areas targeted for multimodal improvements, including TOD.

**1. The City of Santa Rosa, CA** operates a City Bus with seventeen regular routes. They currently do not have rail service.

Although the City does not have specific LOS standards for TODs or other development areas, they do have a policy exempting development in its downtown area from the mitigations necessary to satisfy its citywide LOS standard of D.<sup>65</sup>,<sup>66</sup> Development affecting intersections that are exempted must still conduct traffic impact studies as part of the state of California’s environmental review requirements for new development projects (California Environmental Quality Act or CEQA). However, the traffic analysis performed under the State’s environmental review process often results in the identification of measures such as roadway widening, intersection improvements and/or signalization to reduce (mitigate) the traffic impacts of a project. The City of Santa Rosa established the exemption policy so that they do not have to employ such measures in their downtown area in order to maintain their pedestrian environment.<sup>67</sup> The consequences of attainment of LOS standards would “entail the loss of the area’s unique character.”<sup>68</sup>

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<sup>62</sup> Nichols, Matt. Senior Planner. Berkeley, CA. Personal Interview. 13 July 2007.

<sup>63</sup> Berkeley, CA General Plan (2001). p 17. Retrieved from <http://www.ci.berkeley.ca.us/planning/landuse/plans/generalPlan/Intro.html>

<sup>64</sup> Berkeley, CA General Plan (2001). p 30. Retrieved from <http://www.ci.berkeley.ca.us/planning/landuse/plans/generalPlan/Intro.html>

<sup>65</sup> McNab, Ken. Transportation Planner. City of Santa Rosa, CA. Email Correspondence. 9 July 2007.

<sup>66</sup> Santa Rosa, CA Transit-Oriented Redevelopment Project EIR (2003). p 3.1-9. Retrieved from <http://ci.santa-rosa.ca.us/default.aspx?PageId=1332>

<sup>67</sup> McNab, Ken. Transportation Planner. City of Santa Rosa, CA. Email Correspondence. 9 July 2007.

<sup>68</sup> Santa Rosa, CA Downtown Station Area Specific Plan (2003). p 20. Retrieved from <http://ci.santa-rosa.ca.us/default.aspx?PageId=1332>

**2. The City of San Diego, CA** is served by the regional Amtrak lines as well as a local light-rail/Trolley service. They opened their light rail system in 1981 and currently three light rail lines connect downtown San Diego to Santee, El Cajon and San Ysidro. In 1992 the City became a leader in TOD development by adopting “Transit Oriented Development Design Guidelines.”<sup>69</sup> In subsequent years, San Diego has developed nearly a third of its station areas and there are now 15 TOD projects and plans in place.

This increase in development has been in part due to the local and regional support for TOD. At the local level, the San Diego Transit Agency – the Metropolitan Transit Development Board has been very supportive of TOD development. They have a dedicated land use planner to work full time on TOD projects. Meanwhile at the regional level, the San Diego Association of Governments approved a “Regional Growth Management Strategy.”<sup>70</sup> This Growth Strategy supported “increased development in transit focus areas.”<sup>71</sup>

According to the Transit Oriented Development Guidelines for the City of San Diego, TOD in the city of San Diego must be located at “light rail or express bus stops on a segment of the Trunk Line Network, along High Frequency Bus Corridors, or on a segment of the Feeder Bus line network within 10 minutes transit travel time from the Trunk Line network or bus corridors.”<sup>72</sup> The trunk line network represents the San Diego region’s express transit system. It consists of either light rail “trolley lines or high speed limited stop bus service, with at least 15 minute frequency of service.”<sup>73</sup>

The Transit Guidelines also elaborate upon the types of TOD that can exist. According to the document two types of Transit oriented developments may be developed in San Diego: Urban and Neighborhood TODs. “Urban TODs are located on the Trunk Line Network at light rail stops or at express bus stops. Neighborhood TODs are located on the feeder bus line network within 10 minutes transit travel time (no more than 3 miles) from a light rail stop or express bus stop, or along high frequency bus lines that pass through residential neighborhoods.”<sup>74</sup>

The City of San Diego has set a citywide LOS D standard. To determine if a new development project contributes enough traffic to the transportation facilities to consider mitigation measures, the City uses a level of significance threshold.<sup>75</sup> “If the project causes a change greater than the level shown, the developer is considered to be responsible for all or part of the improvements required to mitigate the site traffic to the level previously held on the facility prior to the project’s traffic impacts.”<sup>76</sup>

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<sup>69</sup> Transportation Research Circular E-C058: 9th National Light Rail Transit Conference (2003). p 197.

<sup>70</sup> Transportation Research Circular E-C058: 9th National Light Rail Transit Conference (2003). p 197.

<sup>71</sup> Transportation Research Circular E-C058: 9th National Light Rail Transit Conference (2003). p 197.

<sup>72</sup> City of San Diego, CA Transit Oriented Development Design Guidelines. p 11.

<sup>73</sup> City of San Diego, CA Transit Oriented Development Design Guidelines. p 11.

<sup>74</sup> City of San Diego, CA Transit Oriented Development Design Guidelines. p 11.

<sup>75</sup> City of San Diego, CA Traffic Impact Study Manual (1998). p 17. Retrieved from <http://www.sandiego.gov/development-services/industry/transportation.shtml>

<sup>76</sup> City of San Diego, CA Traffic Impact Study Manual (1998). p 17. Retrieved from <http://www.sandiego.gov/development-services/industry/transportation.shtml>

The City has faced challenges with applying its LOS standards. The LOS standards are not adapted to individual policy areas but rather they apply the same LOS standards to suburban and urban areas. This would appear to limit infill development in areas already built out. However, the City has been able to adapt to their LOS policy as it continues to allow development in TODs through the discretion of its traffic engineers. In areas such as the urban core or within designated TODs, traffic engineers have the ability to allow LOS E or F or to exempt the developer from making system improvements because mitigation may not be possible or in the best interest of the overall development goals.<sup>77</sup>

In order to provide more consistent standards, the City is moving towards multimodal LOS standards. The standards will be adopted from the National Cooperative Highway Research Project (NCHRP) 3-70, which aims to develop multimodal LOS measures and make suggestions for improving the Highway Capacity Manual. The findings from the NCHRP report will then be integrated into the 2010-11 California Highway Capacity Manual.<sup>78</sup> Pending final approval of NCHRP 3-70 the City will “revisit its current LOS standards to adopt multimodal LOS standards that address traffic analysis in urban infill areas.”<sup>79</sup>

3. Rail Service to the **City of San Jose, CA** is provided by the Altamont Commuter Express Train (ACE), CalTrain, Amtrak and a local light-rail network. ACE provides service to Pleasanton and Stockton through its one San Jose Station. CalTrain provides commuter rail service between San Francisco and Gilroy with stations in San Jose. A local light-rail system connects downtown San Jose to the surrounding municipalities of Milpitas, Campbell, Almaden Valley and Mountain View. There are plans for BART service to be extended to San Jose over the long term.<sup>80</sup>

The City of San Jose has experience with Transit Oriented Development. The Ohlone-Chynoweth Station on the Guadalupe Light Rail line in San Jose includes housing and community facilities developed on the site of a former light rail park-and-ride lot.<sup>81</sup> The City has revised its general plan to encourage more high-density development around transit stations. “The Housing Initiative Program and Intensification Corridors Special Strategy targets station areas for high and very high-density housing.”<sup>82</sup>

The citywide minimum LOS for the City of San Jose is LOS D. Once E or F is reached, all new developments are required to mitigate their impact.<sup>83</sup> The City allows exemptions to its LOS D Policy for certain street intersections “if they are located within transit oriented development corridors, transit station areas, planned communities, and neighborhood business districts.” This means that development is exempt from the mitigation requirement to restore intersections to the citywide LOS standard. The exempt

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<sup>77</sup> Hajjiri, Samir. Senior Traffic Engineer. Personal Interview. 13 July 2007.

<sup>78</sup> Hajjiri, Samir. Senior Traffic Engineer. Personal Interview. 13 July 2007.

<sup>79</sup> Hajjiri, Samir. Senior Traffic Engineer. Personal Interview. 13 July 2007.

<sup>80</sup> City of San Jose, CA Website. Retrieved August 5, 2007 from <http://www.sanjoseca.gov/trans.html>

<sup>81</sup> Transportation Research Circular E-C058: 9th National Light Rail Transit Conference (2003).

<sup>82</sup> GB Arrington. TOD in the United States: The Experience with Light Rail. p 15.

<sup>83</sup> San Jose General Plan (2007). p 88. Retrieved from <http://www.sanjoseca.gov/planning/gp/gptext.asp>

intersections have been identified and defined as “Protected Intersections”. They consist of “locations that have been built to their planned maximum capacity and where expansion of the intersection would have an adverse effect upon other transportation facilities (such as pedestrian, bicycle, and transit systems).”<sup>84</sup> If a development project has “significant traffic impacts at a designated Protected Intersection, the project may be approved if offsetting Transportation System Improvements are provided that enhance pedestrian, bicycle and transit facilities for the community near the Protected Intersection.”<sup>85</sup>

Areas inside the Downtown Core Area Boundaries are exempted from traffic mitigation requirements. Intersections on the boundary of this area are also exempt from the LOS D performance requirement, including the North San Jose Policy area - a light rail corridor. In this area, twelve intersections are functioning below the city LOS D standard and the city is willing to permit this to occur and waive mitigation requirements for new development that exceeds LOS standard. Within the Downtown and North San Jose Special policy areas there are several light rail stations.

### **3.9 No LOS Policy for TOD**

**1. The City of Atlanta** is served by a heavy rail network as well as a local bus system. The MARTA Bus system has over 125 routes and shuttle service. The MARTA Train System has two lines, north-south and east-west with 38 metro stations.

Atlanta is in the process of updating their comprehensive plan. In that effort, they will be determining the LOS standards for all major streets in the city. The city has in the past relied on area plans in lieu of developing a comprehensive citywide plan. In this next planning effort, the city is attempting to address this shortfall by developing a comprehensive plan. This includes the establishment of a citywide LOS standard. The city intends it to balance traditional LOS standards with some measure of connectivity as well as a land use measure.

Atlanta has limited experience with TOD, Lindbergh Station being their famous example. The City of Atlanta does not have specific LOS Policies for their TOD areas. Nor does the city have specific policies for the development of TODs. The City encourages this development through zoning districts. The City has a planned development zoning classification, mixed use zoning, as well as area plans for business districts.<sup>86</sup>

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<sup>84</sup> City of San Jose, CA Revised Transportation Impact Policy (2005). p 1. Available on line: <http://www.sanjoseca.gov/planning/Hearings/2005/PC/reports/6-2-05/PC%206-02-05%20Trans%20Policy%20memo.pdf>

<sup>85</sup> City of San Jose, CA Revised Transportation Impact Policy (2005). p 1. Available on line: <http://www.sanjoseca.gov/planning/Hearings/2005/PC/reports/6-2-05/PC%206-02-05%20Trans%20Policy%20memo.pdf>

<sup>86</sup> Williams, Jeff. Planner. City of Atlanta, GA. Personal Interview. 12 July 2007.

**2. The City of Minneapolis, MN** has bus service and a light rail system to help residents get around. The Hiawatha Light Rail line has 17 stations, connecting downtown Minneapolis to the Mall of America in Bloomington. To better plan for these transit resources, they have established Transit Station Areas. Transit Station Areas (TSA) are a land use policy feature arising from regional investment in dedicated, fixed-route transit lines (e.g., LRT, commuter rail, and busway). The purpose of identifying TSAs as a land use feature in the Minneapolis Plan is to emphasize that station areas represent unique opportunities and challenges that require special policy consideration. As such, TSAs call for tools that maximize potential community development benefits of transit while also strengthening and protecting the surrounding neighborhoods.<sup>87</sup>

The City seeks to maintain a LOS C or D but there is no official LOS standard. The City does not have a citywide policy for transit station areas nor does the City does have a specific LOS standard for Transit Station Areas.<sup>88</sup>

**3. The State of New Jersey** implemented a Transit Village Area Program in 1999. This program is a cooperative effort of NJ Transit and several state agencies. To date, the program has provided technical assistance to five communities to facilitate transit station redevelopment efforts. Participation in the program also entitles communities prioritized consideration for allocation of grant monies from existing state programs.

The Transit Villages are generally based around rail stations; however, it can be based around light rail, buses and ferries as well. The projects have resulted in infill development progressing. The communities thus far have tended to be economically depressed in need of redevelopment.

LOS standards are not reduced for these Transit Village Areas. While NJ Transit is concerned with development around stations, they and the various communities participating in this program have not generated policies to address the question of traffic congestion in these areas. There is a general assumption that if a train station or park and ride are built these will bring more traffic into a smaller area but this has not been specifically addressed in policy.

**4. Dallas, TX** area is served by DART, Dallas Area Rapid Transit. DART operates a bus and light rail network. The light rail network comprises of over 45 miles of track and 43 stations with plans for future expansion. Currently, the City does not have a citywide LOS standard. The City would like its transportation infrastructure to operate at LOS C or better. However, during the evening peak hour, LOS D and E are acceptable. It should be noted this is not an official policy. In and around TOD development, there are not any specific polices regarding LOS standards nor is it always the case that the pedestrian environment will be protected.

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<sup>87</sup> Minneapolis, MN Comprehensive Plan (2000). p 1.4.14. Retrieved from <http://www.ci.minneapolis.mn.us/planning/mplsplan.asp>

<sup>88</sup> Elliot, Beth. Community Planner. Minneapolis, MN. Personal Interview. 12 July 2007.

**5. The City of Hayward, CA** has two BART lines (Fremont-Richmond and Fremont-Daly City/Colma) which pass through the city while a third line (Dublin/Pleasanton-Daly City/Colma) is in close proximity. The Amtrak Capitol Corridor line runs through Hayward with a stop at B Street and Meekland Avenue, “which enhances the role of the Downtown Hayward BART Station as a significant intermodal transfer station.”<sup>89</sup>

The City, in an effort to promote the pedestrian environment over that of the automobile has enacted an LOS policy that seeks a minimum “LOS D at intersections during the peak commute periods except when a LOS E may be acceptable due to costs of mitigation or when there would be other unacceptable impacts”<sup>90</sup>, such as failing to balance the needs of pedestrian and bicycle movements with that of vehicles.”<sup>91</sup>

The City of Hayward does not have any separate LOS standards for Transit Oriented Development Areas at this time. However, the city is working with the Alameda County Congestion Management Agency to review and analyze potential LOS standards inside “infill opportunity zones” as is permitted by State of California law. These are being handled on a case by case basis to ensure that there would be no negative impact to the Countywide Congestion Management System. Under California State law, the CMA is responsible for monitoring and reviewing developments for their impacts to the Congestion Management System.<sup>92</sup>

**6. RTD, Regional Transportation District, provides bus and light rail service to Denver, CO** residents. RTD has 15.8 miles of track with 23 stations with a significant expansion of routes currently underway. The City and Regional Transportation District (RTD) of Denver have become leaders in the development of Transit Oriented Development. RTD has raised the visibility of TOD through its appointment of a full time TOD employee. “The City and RTD have also recently collaborated with the Denver Urban Renewal Authority to provide TOD incentives to further its use throughout their light rail network.”<sup>93</sup>

The region has several TOD projects including its first, the Englewood Town Center which is a mixed use TOD created on the site of a failed mall. This site is adjacent to Denver’s Southwest Corridor light rail. TOD planning has continued to move forward with RTD pursuing TOD at the 13 stations along the Southwest light rail corridor.<sup>94</sup>

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<sup>89</sup> City of Hayward, CA General Plan (2002). p 2. Retrieved from [www.ci.hayward.ca.us/about/generalplan/Cover-Table\\_of\\_Contents\\_Preface.pdf](http://www.ci.hayward.ca.us/about/generalplan/Cover-Table_of_Contents_Preface.pdf)

<sup>90</sup> City of Hayward, CA General Plan (2002). p 26. Retrieved from [www.ci.hayward.ca.us/about/generalplan/Cover-Table\\_of\\_Contents\\_Preface.pdf](http://www.ci.hayward.ca.us/about/generalplan/Cover-Table_of_Contents_Preface.pdf)

<sup>91</sup> City of Hayward, CA General Plan (2002). p 27. Retrieved from [www.ci.hayward.ca.us/about/generalplan/Cover-Table\\_of\\_Contents\\_Preface.pdf](http://www.ci.hayward.ca.us/about/generalplan/Cover-Table_of_Contents_Preface.pdf)

<sup>92</sup> Carmichael-Hart, Roxy. Acting Transportation/Development Manager. City of Hayward, CA. Email Correspondence. 9 July 2007.

<sup>93</sup> Transportation Research Circular E-C058: 9th National Light Rail Transit Conference (2003). p 201.

<sup>94</sup> Transportation Research Circular E-C058: 9th National Light Rail Transit Conference (2003). p 201.

LOS D represents the minimal desirable operating conditions for the City and County of Denver.<sup>95</sup>The City of Denver has not addressed lowering its LOS requirements in Transit Oriented Developments. According to Ellen Ittelson with the City of Denver Planning Office, “this topic is still under discussion among city agencies with no direction at this time.”<sup>96</sup>

## 4. Summary of Findings

The majority of communities examined in this study have no specific policy in place with respect to LOS within TOD areas, even though communities such as San Diego and Dallas have implemented TOD development. Of those that do consider a lower standard, LOS D and E are the most common standards. Most have lowered the LOS requirements for specific development areas such as central business districts or infill areas where transit stations are often located. The rationale for this policy was not specifically designed to promote or foster TODs. These policies were intended to remove barriers to higher density development, support alternative modes of travel, and relax the standards for mitigation of traffic congestion caused by failure to meet LOS standards. Yet as a consequence of the location of many rail transit stops within these designated redevelopment areas, development near transit stations would be impacted by these lowered standards.

The second most common policy exception to LOS standards is to exempt those developments near transit or infill areas that fail the set LOS standards from the required mitigations. This approach requires developers to evaluate the impacts of their development and compare them against the planning performance standards set for the facilities nearby but does not impose intersection improvement mitigations that might compromise the pedestrian- or transit-oriented nature of the area.

Very few communities use alternate performance measures for the development review process. Almost all of the locations in this study use LOS as their performance standard as outlined by the Highway Capacity Manual (2000). Many of the planners interviewed in this study discussed the need for alternative or multimodal performance measures but communities are reluctant to break from the established LOS measures. Traditional LOS measures do offer some advantages, such as professional acceptance, standard methods that allow prioritization of investment decisions, and a history of experience and use. However, these measures can create barriers to higher densities and infill development as it favors lower density areas with more capacity. It also does not provide for a quantitative methodology to positively evaluate the impacts provided by improvements in alternative modes. Some communities are in the process of developing comprehensive multimodal standards that meet their needs but none in this study have experience in their application or could elaborate on what form the measure(s) would ultimately take.

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<sup>95</sup> Denver Union Station Master Plan (2004). p 76. Retrieved from [http://www.denverunionstation.org/master\\_plan/mp\\_document.aspx](http://www.denverunionstation.org/master_plan/mp_document.aspx)

<sup>96</sup> Ittelson, Ellen. Senior City Planner. Email Correspondence. 9 July 2007.

State regulations in California, Florida, and Washington have prompted many communities to re-evaluate their vehicle LOS standards. Concurrency legislation or adequate public facilities ordinances can have the unintended consequence of impeding higher density development. In response, some states permit relaxation of automobile performance standards in areas where TODs, infill and higher densities are desired. However, the majority of local governments have not capitalized on the flexibility permitted by states in lowering LOS standards within these areas.

Finally, those jurisdictions that have a lower LOS standard for TOD areas have little experience in applying these standards to new development. Perhaps this is because the policies have not been in place for very long and infill and TOD development has been relatively slow. Nonetheless, it will be important to watch these communities as their experience will inform future efforts elsewhere.

## **5. Recommendations for Fairfax County, VA**

Fairfax County, VA, like many other communities, desires to make the most of the public's investments by encouraging higher density, mixed use TOD development around current and future rail stations. At the same time, the automobile currently is and will remain an important mode, particularly in the early stages of TOD development. The challenge for these communities is to balance the needs of all system users, mindful that the dominant mode of travel in a station area will likely change over time.

The lessons learned from this study offer some suggestions for how Fairfax County may approach the vehicle performance standards in their development policy for these station areas. None of the cases presented here provides an ideal policy that can be transferred directly to the Fairfax County context. However, each approach explored here does provide useful information that can help inform the development of LOS standards in transit station areas.

Fairfax County is currently served by three Metrorail lines in the Washington, DC system (Orange, Blue and Yellow lines) with numerous stations. These stations currently are oriented toward automobile access and target commuters with park and ride lots. There are three stops along the Orange Line (Vienna-Fairfax-GMU; Dunn Loring-Merrifield; West Falls Church), all located near major freeways and with ample parking for commuters. On the Blue Line, there are two stops (Van Dorn and Franconia-Springfield). The Franconia-Springfield station is connected to the Franconia VRE station, and like the stations on the Orange Line, is located on major thoroughfares and has over 5,000 parking spaces. The Van Dorn station is similarly situated on major routes and surrounded by auto-oriented businesses. On the Yellow Line, Huntington Station has residential areas nearby but the station is surrounded by large commuter lots. These stops have the potential for residential and commercial redevelopment and reorientation toward pedestrian access but, given their relative locations near freeways and major automobile routes, it is unlikely that the character will change dramatically without major investment and loss of some parking capacity.

More promising locations for TOD development are along the planned 23 mile expansion of the Orange Line along the Dulles corridor. Under this plan, Fairfax County will receive eight new rail stations with TOD development anticipated for the station areas. A prime location for redevelopment is in the Tysons Corner area, which possesses a concentration of jobs and retail outlets but they are not integrated with housing opportunities. The area is oriented to the automobile and conditions for pedestrians are not favorable. The Tysons Corner area is slated for four new transit stations in Phase 1 of this expansion plan. Also anticipated in Phase 1 is the Wiehle Avenue station. Three more stations in Fairfax County are planned for Phase 2 of this project: Reston Parkway, Herndon-Monroe and Route 28.

One potential barrier to more concentrated development is the "Non-degradation" policy, which requires that arterials serving a TOD area and areas immediately adjacent to a TOD area perform no worse after the project is developed than it would otherwise. This approach is the traditional performance-based approach, which requires applicants to provide improvements or other guarantees in order to maintain the set performance standard, usually measured as vehicle LOS. These levels would be measured by levels of service or other performance measures as deemed appropriate by the Office of Transportation.<sup>97</sup> The policy does have a contingency that does allow for off-setting mitigation measures aimed at reducing vehicle trips (in lieu of additional capacity) in the event that this non-degradation policy cannot be met. This contingency is a critical in that it provides a path for development to occur when vehicle performance standards cannot be maintained. How this exception is applied in practice will be important determinant of the transportation and traffic conditions within future TODs and should not be treated lightly.

For example, the LOS standard for the Tysons Corner area is currently LOS E, although a LOS D standard is set for some adjacent boundary streets and a revised planning effort is currently underway.<sup>98</sup> Based on the cases provided in this study, LOS E is one of the most common performance standards for infill and TOD and could be an appropriate standard here. Since many of the intersections in this area are already performing at or below this standard at peak hours of the generators, any new development could easily fail to meet this standard. Given this, an LOS standard of E could potentially compromise the ability for higher density development to occur if the non-degradation policy is determined applicable or if proper mitigations are not made, could compromise the integrity of the pedestrian and transit oriented designs planned for the area.

Fairfax County should consider modifying the language of the non-degradation policy to allow for exceptions from this strict and somewhat inflexible standard. Either the standards should be lowered to LOS F with the condition that improvements to transit, bicycle, and pedestrian modes and/or TDM policies may be required for certain locations near priority development that meets the goals of supporting alternative modes or desired development patterns or the types of mitigations deemed acceptable should be expanded to include those that contribute to the overall transportation goals.

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<sup>97</sup> Fairfax County Comprehensive Plan; Tysons Corner Urban Center Area. p 22.

<sup>98</sup> Fairfax County Comprehensive Plan; Tysons Corner Urban Center Area. p 21.

A few cases presented in this study opted to waive mitigations for projects that fail to meet the performance standards in infill and TOD areas. The basis of this policy is to give priority to pedestrian and transit users over the automobile in given areas. However, the context of these locations is different from most areas in Fairfax County under consideration for TOD. In this study, areas exempt from mitigations already have some concentration of development, such as downtowns, and are already attracting some pedestrian travel, although perhaps not to their full potential. In Fairfax County, many of the potential TOD areas are generally auto-oriented with large parking lots and not well integrated into the surrounding neighborhoods. Opportunities to exact some mitigation measures would be lost if development was exempt from meeting set standards altogether. A better approach would be to exempt certain capacity expansions and instead focus on those measures that enhance the overall transportation environment.

The current TOD policy in place in Fairfax County (March 2007) requires maintenance of a high level of service for transit service, pedestrians and cyclists and encourages transportation demand management measures; however the policy does not explicitly define what this standard should be or how they might be used in the planning process<sup>99</sup>. Given that this new TOD development in Fairfax County is intended to support transit use and access to area destinations on foot, new development could over time offset some of the anticipated automobile traffic by increases in the use of alternative modes. One way to progress this is to explicitly define the types of mitigations that developers must perform when their development fails to meet defined LOS standards for each mode. Instead of expansions to automobile capacity through provision of road infrastructure or signalization efforts, mitigations could include improvements to alternative transportation. Credits could be provided for significant changes that promote shifts away from the automobile by increasing pedestrian and bike infrastructure, connectivity, and transit service and access. Clearly defined transportation demand management goals could be imposed for the area, similar to the approach adopted by San Mateo, CA. Although this will likely not change traffic performance in the short term, it furthers the goals of the TOD and over the long term supports mode shifts.

A more comprehensive and systematic way to evaluate these mitigations would be to develop multimodal LOS standards that could capture tradeoffs between modes. One way for this to occur would be to change the types of mitigations required, prioritize modes at certain intersections, and focus on the total person-capacity of an area. To date, multimodal standards are under consideration in only a few locations. Given the lack of a clear methodology to achieve these multimodal goals, it is prudent for Fairfax County to move toward the development and application of multimodal methods over the long term.

Alternative measures used elsewhere include critical lane volume, delay indices and average peak hour speeds. These are all potential alternative measures for Fairfax County; however, care must be taken to set the appropriate measures to the appropriate facility. While none of the cases in this study used area-wide averages, this seems to be a

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<sup>99</sup> Amendment to the Policy Plan, Amendment No. 2003 P-09, Fairfax County Comprehensive Plan, Fairfax County, VA Adopted March 12, 2007

promising approach, particularly in locations where the travel conditions are likely to vary from intersection to intersection. Under this scenario, congestion and queues would be allowed to occur at certain intersections but as long as the area-wide average delays, throughput, or LOS maintains desired standards, development would be allowed to occur.

Fairfax County should be commended for thinking about these issues in the early stages of planning. The decisions made now will likely impact the urban form and transportation context for many years into the future. Promoting environments where users have a choice between several viable modes of transportation contributes to the likelihood of success of the public investments made in public and private transportation, private investments in development, and ultimately the health and vitality of the region.