Regional Transportation Concurrency System in Spokane County
A Feasibility Study

TECHNICAL MEMORANDUM # 3

Transportation System Performance Measures for Concurrency Applications

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INTRODUCTION

This memorandum is submitted in fulfillment of Task 4 (Transportation Performance Measures for Concurrency Applications) of the agreement between Ruth L. Steiner, Transportation and Land Use Consulting and Bucher Willis & Ratliff Corporation (BWR), for the Spokane Regional Transportation Council (SRTC). It is part of a comprehensive feasibility study of the implications of a regional transportation concurrency system with respect to legal, economic, land use, and social equity issues. The purpose of this memorandum is to identify and assess the various transportation systems performance measures used in concurrency management. This overview includes traditional quantitative capacity-oriented measures, such as intersection level of service (LOS) and travel time, and nontraditional approaches, such as exception areas, and aggregate area-wide multimodal service standards. After reviewing the performance measures for concurrency application, a matrix will be developed that compares the characteristics or the various measures, their impact on the transportation system, and their advantages and disadvantages. This technical memorandum draws upon the finding of the Literature Review on Various Concurrency Implementation Strategies, which was completed in Task 3 of this contract.

Before reviewing the systems performance measures for concurrency applications, it is useful to review some of the conclusions of the Literature Review. One major finding is that the concurrency system is a complex system that must be considered within the context of the overall growth management system on a region. While at its core, concurrency management systems are designed for consistency between the land use, transportation and capital improvements elements of the comprehensive plan, they assume a financially feasible plan and private-public cooperation, intergovernmental coordination, the overall political, legal and judicial environment and require well-drafted ordinances that provide appropriate LOS standards and details on the timing of growth. This Technical Memorandum will address the performance standards that constitute the appropriate LOS standards. Technical Memorandum #4 addresses the legal issues involved in developing a concurrency management system.

The performance measures used in concurrency applications cannot be separated from the context of the overall goals of the comprehensive plan. The Washington State Growth Management Act (GMA) identifies thirteen core planning goals of equal importance: (1) urban
growth; (2) sprawl, (3) transportation; (4) housing; (5) economic development; (6) property rights; (7) permits; (8) natural resource industries; (9) open space and recreation; (10) environment; (11) citizen participation and coordination; (12) public facilities and services; (13) historic preservation. A fourteenth goal – shoreline management – was later added to the GMA goals. Thus, the goal of providing transportation facilities needs to be considered within the context of the other community goals as defined in the Comprehensive Plan and regional policy documents. Most communities will have goals for local and regional employment growth. These goals, however, likely will not result in an even distribution of development across the region. Some communities may desire to control growth while other areas may desire redevelopment, urban infill, or downtown revitalization. Some areas of the community may desire a more urban environment with a focus on transit-oriented development. Other parts of the community may desire a more conventional suburban form of development with lower densities of development. The challenge is to define performance measures that achieve the development goals of a specific community while balancing the goals with those of its neighbors and the rest of the region.

The development of performance measures for concurrency is a complex task that involves making decisions on a variety of aspects of the measure. As has been documented in the literature review, specific goals can be reached through the use of a variety of methodologies and must be understood within the local, regional and state context in which they are applied. In the next sections, the diversity of performance measures for transportation concurrency will be reviewed. Several major studies will be used to define the approaches to measuring transportation concurrency. Two of these studies – by the Puget Sound Regional Council (PSRC, 2003) and the Washington State Transportation Research Center (TRAC, 2003) were completed in the Puget Sound Region in Western Washington State. The PSRC study documents the variety of approaches taken by local governments in the region (PSRC, 2003) and the TRAC study is a more detailed analysis for the Eastside Transportation Concurrency Project for the cities of Bellevue, Issaquah, Kirkland, and Redmond (Hallenbeck, Carlson and Simmons, 2003). Additional material will be drawn from a memorandum developed by Tim Trohimovich on the variety of alternative approaches to measuring transportation concurrency (Trohimovich, 2001).
Additional approaches to measuring transportation concurrency are provided from practices in Florida and Maryland. The Florida approaches have been developed from two sources – the author of this technical memorandum and the Center for Urban Transportation Research (CUTR) at the University of South Florida. The author’s previous research involves a series of studies for the Florida Department of Transportation (FDOT) as a part of the development of tools for multimodal transportation planning and analysis and an ongoing study for the Florida Department of Community Affairs (FDCA) on the utilization of Transportation Concurrency Exception Areas (TCEAs). The research by CUTR, which is also being conducted for the FDCA, involves the development of Best Practices in transportation concurrency practice in the State of Florida; the findings of this study enhance the approaches identified in Task 3 (Literature Review). Finally, a study by the Delaware Valley Regional Planning Council (DVRPC) will support the discussion.

TRANSPORTATION SYSTEM PERFORMANCE MEASURES

In this section, basic approaches to the measurement of transportation are identified. First, the approaches to traditional quantitatively based capacity-oriented measures, such as volume to capacity ratios and travel delay systems will be discussed. The variety of factors used in these performance measures will be outlined, and the advantages and disadvantages will be identified. Alternative methodologies used in the State of Washington, Florida and Maryland are identified and the advantages and disadvantages discussed. These alternatives include enhanced volume/capacity, use of exceptions and regional systems. Finally, a framework for comparison will be developed and approaches will be compared based on this framework.

Capacity-Oriented Transportation System Performance Measures

Capacity-oriented transportation system performance measures have their basis in the Highway Capacity Manual (TRB, 2000), which is widely used in transportation planning and engineering. The most basic quantitative capacity-oriented performance measure is the volume/capacity ratio. Other capacity-oriented performance measures include travel delay measures, such as travel time and speed.
Volume/Capacity Ratio

At its most basic interpretation, capacity-oriented measures are based on a comparison of the volume of a roadway compared to its capacity (v/c). The “volume” side of the ratio is determined by the number of vehicles that use a roadway during a specified period of the day, usually the busiest hour(s) of the day. The “capacity” portion of the ratio is determined by the operational characteristics of the roadway including their design, functional classification and operational strategy (e.g., signal timing and access management characteristics). A v/c ratio below 1.0 means that the roadway has adequate capacity to serve demand or volume of traffic. A ratio of 1.0 means that the roadway is at capacity and a ratio greater than 1.0 means that the roadway has significant congestion because demand exceeds capacity. The v/c ratio is usually converted to letter grades from “A” to “F” with “A” representing free flow and “F” representing gridlock.

While the v/c ratio is generally seen as a simple relationship, in practice local governments make a variety of decisions about how to use this ratio as a part of a concurrency management system. Hallenbeck et al. (2003) reviewed the concurrency procedure of four Eastside cities – Redmond, Kirkland, Issaquah and Bellevue – and concluded that, while each community uses a v/c ratio, the approaches vary according to decisions on such factors as the time period used (peak hour vs. peak two hours), the methodology (Circular 212 vs. HCM vs. segments), the use of intersection vs. zonal standard, the v/c ratios used in zonal analysis and other performance standards (e.g., maximum intersection v/c and the use of different standards for different zones) (Hallenbeck, Carlson, and Simmons, 2003: D-3).

The advantage of the v/c ratio is its wide acceptance and comprehensibility among transportation planners and engineers. Developers and their consultants are familiar with the use of the v/c ratio as a part of traffic impact studies and in the planning process. Local governments can use a range of LOS standards to reflect their preferences for congestion within specific zones of the community. For example, in commercial areas a city could allow congestion by setting an LOS standard of “E” or “F’ and thus encourage additional development and the use of other transportation choices. In residential neighborhoods, a more stringent standard could be adopted to discourage congestion. The disadvantage of the v/c ratio as used in practice is that it is auto-focused and does not encourage alternative transportation use or capacity. The focus on vehicle LOS leads to concurrency mitigation that is limited to roadway
widening, new road construction, and intersection and traffic signal changes to increase vehicle capacity (Hallenbeck, Carlson, and Simmons, 2003; CUTR, 2006). The undue emphasis given to achieving high levels of vehicle mobility “likely impedes the attainment of more important goals for community design, which promote compact urban growth, urban infill and redevelopment (TLUSC, 1999: 18).” The use of v/c ratios creates a false precision in the analysis. Depending upon the number of trips generated, the analysis is conducted on an all or nothing basis. If the number of trips exceeds the available capacity, the development would be turned down. Given the variability in the number of trips from one day to the next and the variability of trips generated by new development, the estimates of roadway and capacity are “reasonable estimates” and should not be considered as exact or precise (Hallenbeck Carlson and Simmons, 2003). Irrespective of whether the concurrency management system uses a zonal or an intersection approach, the statistic chosen may not reflect the actual conditions of the roadway.

**Travel Delay Systems**

Rather than measuring congestion, travel delay systems provide an alternative LOS measure (Hallenbeck, Carlson, and Simmons, 2003; Trohimovich, 2001). Travel delay systems can measure the travel time, travel speed or intersection delay. Travel delay systems can use one of two approaches – corridor or key center. The corridor approach measures how long it takes to go from point A to point B in the community. For example, the LOS standard might say that “the travel time between the center of the city and the regional shopping mall should not exceed 20 minutes” or “the driver should be able to travel at an average speed of 35 miles per hour between downtown and the regional shopping mall.” The travel time or speed would be measured along the arterials and different classes of arterials would have different standards. A travel delay system could also incorporate performance standards that limit the delay at intersections along the corridor, or limit the number or percentage of intersections operating under the average delay (Trohimovich, 2001). The City of Vancouver and Clark County, Washington have adopted corridor travel time and intersection delay systems. (Trohimovich, 2001). This system includes the travel time along selected arterial streets (links). Different classes of arterials have different standards and intersection delay is measured on selected arterial streets. The number or percentage of intersections operating under the standard would be limited; this so-called measure is called a “mobility index.”
The key center approach measures the distance one can travel from a fixed point in a specific amount of time. Renton's multimodal travel distance standard is based on a weighted average sum of p.m. peak travel distances one can travel from the city, averaged in all directions using single-occupant vehicles (SOV), high-occupant vehicles (HOV) and transit. The weighted sum creates an index that is compared against a baseline distance that shifts future index components from a 1990 baseline distances with SOV at 18 miles, HOV at 21 miles and transit at 10 miles. The policy is to maintain the average distances across modes but to shift modes to SOV at 14 miles, HOV at 21 miles and Transit at 14. This means that projects need to meet multimodal goals and not simply focus on SOVs (PSRC, 2003).

Travel delay systems have significant advantages due to their comprehensibility among the public, however they have disadvantages that result from a change in accepted practice. The advantages of travel delay systems are that the public understands them. They understand travel time between two important places in the community or along main corridors (Trohimovich, 2001). They also understand intersection delay and travel distance within a specified time. Most people use either travel time, travel distance or speed as a measure of the performance of the transportation system. In contrast to transportation professionals, who use v/c ratios, the public and elected officials can understand measure of travel delay and, as such, they may be more likely to carry more credibility.

However, clarity may involve additional complexity in calculation; proposed new development may require the use of a transportation model to calculate the travel time, intersection delay, vehicle operating speed, or travel distance. The establishment of the original standard would require lots of data to establish baseline conditions. If the standard is not set properly, the result may be a mismatch between the standard and public acceptance of delay. This will either mean that some unneeded transportation improvements may be indicated or excess delay is endured by residents. To determine compliance, the municipality needs to use transportation models; this can be a complex system (Trohimovich, 2001). Clarity may also translate into additional pressure for expansion of roadway capacity because the public may not be willing to take longer to go a specific distance, travel at a slower speed, or encounter excess delay (Hallenbeck, Carlson, and Simmons, 2003). Travel delay systems include the travel over a larger area rather than the specific intersections of the v/c measurement. One or more problematic intersections could negatively impact the overall travel time. An additional
disadvantage of the key center approach is that it does not account for development and its resulting congestion in areas away from the key center. While the approach may work in small communities where the key center is the center of activity and congestion, it may not work in larger cities where development takes place away from the key center (PSRC, 2003).

Enhanced Volume/Capacity

The enhanced volume/capacity (v/c) ratio uses the traditional v/c measurement process but provides tiered LOS standards based on whether or not the roadways have alternative transportation modes, such as transit. Jurisdictions that use the enhanced v/c method make a policy determination to tolerate a higher level of congestion or a lower LOS standard. The most important step in enhanced v/c measurement is setting the LOS standard so that it encourages the specific transportation system and services desired by a community. Enhanced v/c could be implemented using a tiered LOS standard with a gradually increasing system of mitigation measures designed to support alternative modes of transportation. Thus, a new development that is located in an area with a v/c of 0.7 is concurrent. With a v/c ratio over 0.7 and including 0.8, the development is concurrent if the proponent joins a transportation management association (TMA). When the v/c ratio is over 0.8 up to and including 0.9, the developer would be required to both join a TMA and establish transportation demand management (TDM) programs. When a proposed development would push the roadway to an LOS over 0.9 up to and including 1.0, the developer would be required to make negotiated development-specific transportation improvements in addition to participation in a TMA and TDM programs. For development that pushes the LOS over 1.0, the development would not be found concurrent unless and until the developer undertakes specific concurrency mitigation determined through negotiated agreement to lower the v/c ratio below 1.0 (Hallenbeck, Carlson, and Simmons 2003).

The measurement of enhanced v/c ratio would depend upon the approach taken to the basic v/c. The most common performance measures include: (1) a zonal LOS approach; (2) an intersection approach; and (3) a location-constrained approach (Hallenbeck, Carlson, and Simmons, 2003; Trohimovich, 2001). The zonal approach involves setting one “enhanced” standard depending upon whether a certain number of intersections are eligible for a transit LOS adjustment. Thus, for example, if the baseline LOS is 0.9 and the transit standard is 1.0,
the zonal approach increases the development possibilities throughout the zone considerably because it moves it from being near the LOS standard to below the standard. The advantage of this approach is that it allows development beyond the existing standard. It uses the v/c ratio, which is widely used among transportation professionals. Its application, however, will be limited by the boundaries delimiting the zones as it will allow congestion throughout the zone and may permit additional congestion in places in the zone where transit service is not available. Broward County, Florida, uses a variation of the enhanced v/c through the use of two types of concurrency districts: transit-oriented concurrency districts and standard concurrency districts. The transit-oriented districts are defined as a “compact geographic area with an existing network of roads where multiple alternative travel paths or modes are available for common trips.” Standard concurrency districts are defined as “an area where roadway improvements are anticipated to be the dominant form of transportation enhancement.” (CUTR, 2006)

The intersection approach attempts to overcome a disadvantage of the enhanced v/c zonal approach – additional development may occur in areas not served by transit. The intersection approach applies only to intersections that have transit service. Again, the baseline roadway LOS would be 0.9 and the transit LOS would be 1.0 at each intersection with 5 or more buses per hour. The zone’s LOS standard is based on the average of intersection v/c ratios but is adjusted using a performance standard for the individual ratios themselves. The standard would be stated such that “no more than x location (or percentage of locations) in a zone can exceed a given LOS.” Thus the intersection with good transit service would have a LOS of 1.0. If transit service is limited to a small number of intersections in the zone and congestion occurs at even a few of the intersections, the concurrency may not be met. However, this method could encourage developers to support additional transit service. This offers the third option in addition to funding roadway projects or scaling back the development (Hallenbeck, Carlson, and Simmons, 2003: 20).

The location-constrained approach attempts to address the concern that the zonal and intersection approaches to concurrency analysis allow all new development benefits whether or not the development is near or far from the transit service and regardless of whether the

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1 It should be noted that this definition is consistent with a part of the definition of transportation concurrency management areas (TCMA). See discussion of exception areas.
development will generate transit users. New development would be eligible for enhanced LOS standards if it incorporated a number of factors including: (1) it must be within convenient walking distance of a transit corridor; (2) it must be in a defined “urban center” where there is a concentration of transit services; or (3) it must be within walking distance and have “transit-friendly design.” Transit-friendly considerations may include whether the site design allows easy access to transit or if the retail is likely to serve transit-oriented or pedestrian patrons. Transit-friendly design would also include sidewalks, maximum setbacks and limited surface parking. The location-constrained approach would not prohibit certain kinds of development but it would ensure that where roadways are nearing baseline LOS standards, development that only takes advantage of the available transit will be permitted. All other developments would be held to the LOS standards for auto-oriented development. Thus, similar developments would be treated differently depending upon whether their design is transit-friendly and whether it is located within walking distance of transit. The location-centered approach would require a clear vision of the desired land uses-transportation systems. Without this clear vision, performance standards and LOS standards cannot be appropriately designed. It would provide developers with an incentive to develop at a higher intensity at locations that are well-served by transit. It would reinforce the linkage between the transportation and land use elements of the comprehensive plan (Hallenbeck, Carlson, and Simmons, 2003).

Enhanced v/c systems are those that enhance capacity for growth at low costs and may represent a more efficient use of the transportation capacity. For communities using an LOS intersection system, the enhanced v/c system can be easily adapted. The enhanced v/c would establish standards that are set by policy and not by the measurement; as such, the system may more closely match the intention of the growth management policies. On the other hand, none of the changes produce real increases in capacity. They just add more development with the same transportation facilities. The increased level of monitoring and the use of multiple layers of performance measures are likely to take an already complex system and make it even more complex. Such a system may require modeling to determine compliance (Trohimovich, 2001).

**Regional Concurrency System**

A regional approach replaces a facility performance calculation with a measure of how well a region or subregion is achieving selected overall transportation goals. A regional
concurrency system could be maintained by a regional organization, such as, a Regional Planning Council, Metropolitan Transportation Organization, Rural Transportation Organization, county, or consortium of cities. The regional organization could maintain a concurrency model and conduct the concurrency analysis (Trohimovich, 2001). A more specific regional approach could specify a regional mode-split goal. A regional mode-split approach replaces a facility performance calculation with a measure of how well a region (or subregion) achieves a transportation policy target of reducing vehicle miles traveled (VMT) (Hallenbeck, Evans, and Simmons, 2003). Thus, if the regional LOS target is to increase the share of non-single occupancy vehicle (SOV) trips during the evening peak by 3 percent within five years, and the share of non-SOV trips increase from 8 percent to 11 percent, the region would remain concurrent. After five years, the region would establish another goal.

A regional approach recognizes the reality that traffic is a regional problem and many of its solutions are also regional. It provides the development community with a uniform regional approach that recognizes the regional nature of traffic. Depending upon its design, a regional system may provide technical capacity that is not easily available in smaller communities. For smaller communities, a regional approach may make additional resources available for complex tasks such as data collection and transportation modeling. Communities can pool their resources for administration of the concurrency system. A regional approach could ensure that regional traffic is accommodated in the modeling and monitoring of the transportation system. A regional system would do a better job than the existing systems because the regional agency would review and monitor all developments within the region and consider them in a single concurrency system. The concurrency system could allow mitigations to be located in an entirely different part of the region. For example, this would provide the flexibility to fund transit as the most cost-effective investment that would have the greatest potential to reduce SOV trips. Transit funding could be made in places that support transit-friendly development rather than in locations with less dense and intense patterns of development. The most optimistic outcome would be the creation of a market for transportation improvements and land use designs that encourage shifts in mode split.

The implementation of a regional approach to transportation concurrency or regional mode split would require cooperation among communities with diverse visions for the community’s future. Local governments would have less control over their transportation and
land use system. This is especially the case if the goals of a local government differ from the regional goals. The diversity of goals would likely create a complex concurrency system that would require the use of the four-step models. The accuracy of the estimates is questionable depending upon the scale, characteristics and nature of the development project. A regional concurrency system would require a region-wide commitment to the goal of trip reduction and would require a strong monitoring system that imposes sanctions for not meeting the trip reduction goals. Finally, a system of “mode shift” credits may develop but the price of the credits may be difficult to establish. Depending upon how a regional concurrency system is organized, it may require new legislation (Hallenbeck, Carlson, and Simmons, 2003).

**Exception Areas and Multimodal Transportation Districts (MMTDs)**

One additional approach to concurrency that the State of Florida has taken is to use a variety of project and areawide exceptions. Before explaining the use of exceptions in Florida’s concurrency system, it is useful to identify some of the key differences in the growth management laws of the two states. This differences include: (1) All Florida cities and counties, irrespective of their size and growth rate are required to participate in growth management activities; (2) the modification of the Highway Capacity Manual to provide specific guidance for communities in the state; (3) the absence of a State Environmental Policy Act (SEPA) that requires environmental review of most projects; and (4) the requirement that local governments maintain the LOS for facilities on Florida’s Strategic Intermodal System (SIS) and its highway component, the Florida Intrastate Highway System (FIHS).

A major difference between Florida and Washington State is that in Florida all communities, irrespective of their size, are required to participate in the Growth Management program and incorporate a concurrency management system into the Local Comprehensive Plan. Many communities lack technical and fiscal capacity to implement a complex concurrency management system. The FDOT has adapted the capacity calculations to the Florida context in a series of steps that have taken the national standards and adjusted them based upon changes in the nature of the transportation system in the state. This adaptation provides a series of tools that range from the most basic practice based upon the use of generalized tables to monitor the capacity of the road to more complex computerized systems that incorporate intersection delay into the calculation of roadway capacity.
Over the last 15 years, practice has shifted from an emphasis on highway capacity along freeways, rural and suburban highways and major urban arterials (TRB, 2000) to a wider range of transportation facilities (e.g., two lane highways, ramps, transit, bicycle and pedestrian) and to include areawide analysis (TRB, 2000). The FDOT has changed the name from the 1998 LOS Handbook (FDOT, 1998) to the 2002 Quality/Level of Service Handbook (FDOT, 2002) to recognize that various users value different aspects of travel. While speed, throughput, and travel time may be important to automobile users, pedestrians may prefer a leisurely walk and bicyclists may prefer facilities with fewer trucks and lower speeds. The 2002 QLOS Handbook provides “the first successful multimodal approach unifying the nation’s leading automobile, bicycle, pedestrian and bus Q/LOS evaluation techniques into common transportation analysis” (FDOT, 2002: i). The handbook is the culmination of a series of research projects that have developed the MMTDs, LOS measures for bus (Kittleson Associates, 2001), bicycles (Landis et al., 2000) and pedestrians (Landis et al., 2000), measurement of LOS across modes (Winters et al., 2001) and methods of analysis of the level of service at the point (e.g., signalized intersection or bus stop), segment (signalized intersection to signalized intersection or transit stop to transit stop), facility (a group of segments typically 1-5 miles in length), corridor (a group of parallel facilities sharing a common origin and destination) and area (all highway facilities or transit coverage in a designated area) (see, e.g., Guttenplan et al., 2001).

Florida does not have a state environmental policy that is comparable to Washington State’s system. A practical result of the difference in laws is that the use of regional transportation models is not required as a routine part of transportation practice during development review. The one exception to this is for Developments of Regional Impact (DRI). Developers of large scale projects are required to complete a site impact assessment (see FDOT, 1998). As part of the process, the applicant is required to complete the four-step modeling process to determine the area of impact and influence of their projects. This difference results in two major distinctions between practices in the two states: the modeling capacity; and the focus in Florida on trip generation and roadway capacity. Additionally, the state uses a single model structure that supports a single statewide model. Thus, regional models do not include significant customization based upon specific conditions in the region. The requirement that local governments protect the LOS of roads on the state highway system means that, in many communities, local governments have not been able to ignore transportation concurrency. When transportation concurrency was first required, many of the
more urban counties realized that it would be extremely difficult to provide additional capacity in already urbanized areas. This inherent conflict between the desire to have communities provide infrastructure concurrent with the impact of development and the existing congestion in areas that could not expand roadways has strongly influenced aspects of the transportation concurrency systems.

Thus, the transportation concurrency systems of most communities in Florida use the volume to capacity ratio requirements and in a limited number of communities, areawide and project exceptions are used. The following project-specific exceptions are allowed under Florida’s concurrency system: (1) urban redevelopment projects [FSA 163.3180 (8)]; (2) de minimus projects [FSA 163.3180 (6)]; (3) projects that promote public transportation [FSA 163.3180 (5) (b) and 9J-5.0057 (7)]; (4) part-time projects [FSA 163.3180 (5) (c)]; and (5) projects for which private contributions are made [FSA 163.3180 (11) (c)]. Urban redevelopment projects are not subject to the concurrency requirement for up to 110% of the roadway impacts generated by prior development [FSA 163.3180 (8)]. De minimus projects are those whose impacts do not significantly degrade the existing LOS and for which no concurrency review would be required. Local governments may exempt projects promoting public transportation, such as office building that incorporate transit terminals and fixed rail stations, by setting standards for granting this exception in the local comprehensive plan [FSA Sec. 163.3180 (5) (b) and FAC 9J-5-055 (7)]. Projects, such as stadiums, performing arts centers, racetracks and fairgrounds, that are located within urban infill, urban redevelopment, existing urban service areas, or downtown revitalization areas and pose only special part-time demands on the roads may be exempt from concurrency [FSA Sec 163.3180 (5) (c)]. Local governments must allow developers to proceed with the development of land notwithstanding a failure of the development to meet concurrency, and avoid a claim of a temporary taking, if the developer is willing to pay their “proportionate share” of the cost of providing the transportation facility necessary to serve the proposed development [FSA Sec 163.3180 (11)].

In the Growth Management Reform Act (GMRA) of 2005, the use of proportionate share was reinforced by the inclusion of a requirement that all local governments include “proportionate share” provisions in their Comprehensive Plan. The GMRA will also require that local governments update their capital improvements plan (CIP) on an annual basis or risk losing the right to gain approval for the allowed two annual comprehensive plan updates. A proportionate share methodology has been developed but local governments are still incorporating this language into their comprehensive plans.
Local governments in Florida have the option of using four different types of areawide exceptions: (1) transportation concurrency management areas (TCMAs); (2) long-term transportation concurrency management systems (LTCMSs) [FSA Sec.163.3180 (9) (b)]; (3) transportation concurrency exception areas (TCEAs) [FSA Sec. 163.3180 (5) (b)] and (4) multimodal transportation districts (MMTDs). When used as intended, these exception areas can be seen as a part of a special area plan.

The purpose of a TCMA is to “promote infill development or redevelopment within selected portions of urban areas in a manner that supports the provision of more efficient mobility alternatives, including public transit [FAC 9J-5.50055].” The TCMA may be established in “a compact geographic area with an existing network of roads where multiple, viable alternative travel paths or modes are available for common trips [FSA Sec. 163.3180 (7)].” In a TCMA, an areawide LOS may be established for facilities with similar functions serving common origins and destinations [FSA Sec. 163.3180 (7)].

LTCMSs were developed to eliminate the backlog of transportation projects. This is accomplished through the development of a comprehensive plan that identifies the improvements to be made over a ten-year period, or in exceptional circumstances, over a fifteen-year period. The comprehensive plan must: (1) designate specific areas where the deficiency exists; (2) provide a financially feasible means to ensure that existing deficiencies will be corrected within the ten-year period, and (3) demonstrate how development will be accommodated and the facilities (including roads and public transit) to correct the existing deficiency [FAC 9J-5.0055 (4)].

The purpose of a TCEA is to “reduce the adverse impact transportation concurrency may have on urban infill and redevelopment and the achievement of other goals and policies of the state comprehensive plan, such as promoting the development of public transportation [FAC 9J-5.0055 (7) and FSA Sec. 163.3180 (5) (b)].” It can be established to meet three purposes: (1) promotion of urban infill development; (2) urban redevelopment; (3) promotion of downtown revitalization; and (4) urban redevelopment and infill. In a TCEA that is designed to promote urban infill, no more than ten percent of the land can be developable vacant land [FAC 9J-5.0055 (6) (a) 1. a.]. Specific development density and intensity thresholds must also be met [FAC 9J-5.0055 (6) (a) 1. b]. In the 2005 GMRA, the standards for the establishment and evaluation of TCEAs was enhanced to require that they show that the TCEA will fund and
support mobility. With the introduction of (Florida) Senate Bill 360, TCEAs and MMTDs are now more similar. Both focus on ensuring that mobility is provided through an integration of all modes of transportation. They are designed to offer concurrency incentives to direct growth to existing urban service areas to counter the trend of sprawl development. The significant difference between TCEAs and MMTDs is one of measurement — in TCEAs, level-of-service standards and concurrency requirements do not apply, while in MMTDs level-of-service standards are designed to include all modes of transportation into the concurrency management process.

The goal of an MMTD is to facilitate the use of multiple modes of transportation, leading to a reduction in automobile use and vehicle miles traveled. MMTDs may be established in two situations: (1) development in existing areas, such as a central core of a municipality, where the focus is on the enhancement of existing elements and qualities, and guiding redevelopment and infill opportunities; and (2) new proposed development located outside of the traditional municipal area (Guttenplan et al., 2003). Community design features that provide an adequate level of multimodal mobility and accessibility within the district should support an MMTD. An MMTD should contain the following community design elements:

- Complementary mix of land uses, including residential, educational, recreational, and cultural uses;
- An interconnected network of streets designed to encourage walking and bicycling with traffic calming, where desirable;
- Appropriate densities and intensities of land uses within walking distance of transit stops;
- Daily activities within walking distance of residences;
- Public infrastructure that is safe, comfortable, and attractive for pedestrians;
- Adjoining buildings open to the street;
- Parking facilities structured to avoid conflicts with pedestrians, transit, automobile, and truck travel; and
- Transit service within the designated area, or definitive commitment to the provision of transit. (FDOT, 2003, p. 12).
Areas with the most multimodal potential should have a wide variety of land uses including a solid residential base. The types of areas that are suitable for MMTDs include: urban centers, regional centers and traditional town or village (FDOT, 2003). These uses were adapted from *Planning for Transit Friendly Land Use, New Jersey Transit, 1994* (New Jersey Transit, 1994). In addition to the appropriate scale and mix of land use, the multimodal transportation district should have the urban form, or pattern of land uses that promotes transit, bicycle and pedestrian travel, including good intermodal connections.

Table 1 compares the characteristics of the four types of concurrency areawide exceptions. This comparison suggests that each of the areawide exceptions has a defined niche in concurrency planning. Among the objectives of a concurrency management system, they collectively address all of the objectives except the need to accommodate development at the established LOS standards; this result is logical because each is used when an area is not meeting the LOS standards. The LTCMS most directly addresses the need to coordinate land development with additional roadway capacity; the statutes and administrative rules contain no discussion of efficient land use development patterns, discouraging sprawl, or promoting redevelopment, infill or downtown revitalization.

The MMTD can be seen as a second generation of the TCMA and the TCEA. The MMTD includes a more comprehensive planning tool than either the TCMA or the TCEA. It can be used in a variety of development contexts from infill and redevelopment to new development outside the municipal boundary; it incorporates areawide and multimodal LOS measures, and incorporates a mix of land uses that are likely to lead to internal capture of trips onto an interconnected multimodal network. To understand the distinctions between these types of areawide exceptions it is helpful to consider their implementation throughout the state of Florida. See Table 1 for a comparison of the characteristics of the four types of exceptions allowed under Florida’s concurrency management system.
## Table 1. Comparison of Multimodal Characteristics of Concurrency Areawide Tools

<table>
<thead>
<tr>
<th>Objective or Characteristic</th>
<th>LTCMS</th>
<th>TCMA</th>
<th>TCEA</th>
<th>MMTD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controls type of development</td>
<td>X</td>
<td>--</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Considers land use mix</td>
<td>--</td>
<td>--(3)</td>
<td>X(6)</td>
<td>X</td>
</tr>
<tr>
<td>Addresses connectivity</td>
<td>--</td>
<td>X(2)</td>
<td>X(6)</td>
<td>X</td>
</tr>
<tr>
<td>Controls amount of development</td>
<td>X</td>
<td>--</td>
<td>--</td>
<td>--(3)</td>
</tr>
<tr>
<td>Controls location of development</td>
<td>X</td>
<td>--</td>
<td>--</td>
<td>--(3)</td>
</tr>
<tr>
<td>Promotes redevelopment</td>
<td>--</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Promotes infill development</td>
<td>--</td>
<td>X</td>
<td>X</td>
<td>--(1)</td>
</tr>
<tr>
<td>Promotes downtown revitalization</td>
<td>--</td>
<td>--</td>
<td>X</td>
<td>--</td>
</tr>
<tr>
<td>Controls density of development</td>
<td>--</td>
<td>--</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Controls rate of development</td>
<td>X</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Controls timing of new development</td>
<td>X</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Accommodates development at established LOS standards</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>X</td>
</tr>
<tr>
<td>Coordinates facility and service capacity</td>
<td>X</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Discourages sprawl development</td>
<td>--</td>
<td>X</td>
<td>--</td>
<td>X(4)</td>
</tr>
<tr>
<td>Encourages efficient development pattern</td>
<td>--</td>
<td>X</td>
<td>--</td>
<td>X</td>
</tr>
<tr>
<td>Does not cause reduction in automobile LOS</td>
<td>X</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Establishes minimum size of area</td>
<td>--</td>
<td>X(2)</td>
<td>--</td>
<td>--(3)</td>
</tr>
<tr>
<td>Promotes public transit</td>
<td>--</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Promotes bicycle and walking</td>
<td>--</td>
<td>--</td>
<td>X(6)</td>
<td>X</td>
</tr>
<tr>
<td>Utilizes Areawide LOS</td>
<td>--</td>
<td>X</td>
<td>--</td>
<td>X</td>
</tr>
<tr>
<td>Utilizes Multimodal LOS</td>
<td>--</td>
<td>--</td>
<td>--(3)</td>
<td>X</td>
</tr>
</tbody>
</table>

(1) MMTDs can be used in redevelopment and infill areas and for proposed development outside of the traditional municipal area.

(2) The TCMA may be established in “a compact geographic area with an existing network of roads where multiple, viable alternative travel paths or modes are available for common trips.” [163.3180 (7) FSA]

(3) These elements are discussed in the statutes, but no measure is provided.

(4) These elements are not discussed in statutes, but are in implementation guidelines.

(5) Applicable to both infill, redevelopment and new development

(6) These elements were added in Growth Management Reform Act (GMRA) of 2005

Source: Adopted from Steiner et. al., 2006
The TCEA has been the most widely used of the areawide exceptions with over 28 applications statewide. The scale of these TCEAs varies from 128,000 acres in Miami Dade County to 98 acres in Pompano Beach (FDCA, 2006). Four of the TCEAs – Hallendale, Miami Springs, Ocala, and Pensacola – are of the scale that was initially proposed for the minimum size of an MMTDs, between 2 and 4 square miles. In addition, Miami-Dade County incorporates large areas of the unincorporated counties; while the cities of Tampa, Orlando, and Gainesville incorporate large areas of their respective cities. Broward County recently converted its TCEA into the two areas discussed above: the transit-oriented concurrency district and the standard concurrency district. An MMTD could be developed for these larger TCEAs. The remaining TCEAs are less than 2 square miles. Only one LTCMS system is currently in use in the Ulmerton Avenue area of Pinellas County. There is currently no inventory of the TCMAs in communities in Florida. They appear to be used in a variety of contexts. They were recently implemented in two communities in Miami-Dade County - Hialeah and Miami Beach (Miami Beach, 2000; Hialeah, 2004) - that are located within the county’s TCEA. As has already been mentioned, the transit-oriented concurrency district is defined in similar terms as the TCMA. In these two applications, the consultant developed an areawide LOS measure based upon excess capacity on minor roadways in the city (Corradino, 2004).³

Currently, Palm Beach County has a proposal for a review of the application of an exception area along a highly congested corridor. The Okeechobee Boulevard CRALLS Point system is being proposed that would provide a means for approving new land development/redevelopment projects that will have significant traffic impacts on Okeechobee Boulevard but provide acceptable mitigation for those impacts. Mitigation of impacts can be accomplished in the following ways: (1) reduction of single-occupant vehicle trips by encouraging ride sharing, diversion to alternative modes, and telecommuting; (2) reduction of peak hour vehicle trips by shifting these trips to other time periods; (3) reduction of land use intensity and density for proposed development/redevelopment; and (4) increase land use densities and intensities for proposed development/redevelopment only in cases where land use mix maximizes internal trip capture and promotes feasibility of mass transit options (Hymowitz, 2006).

³ In one of these communities, it is reported that elected officials chose to implement a TCMA because they did not want to create a TCEA; they did not want to exempt developers from providing infrastructure. The term called “transportation concurrency management area” was more politically acceptable.
Guidance on areawide LOS is provided in the *Multimodal Transportation Districts and Areawide Level Of Service Handbook* (FDOT, 2003). The guidelines for MMTDs were completed in November 2003. As part of the development of these tools, analyses were conducted in two cities – Gainesville and Orlando – that currently used TCEA. Further analysis was conducted in DeLand and that city currently has an MMTD under review. Destin, which is located on the Panhandle of Florida is the only city that currently has an MMTD in place; several other cities are considering such an approach.

Since the MMTDs are in the early stages of implementation, questions remain about their acceptability and their relationship with the other areawide exception area. For example, can a developer make a takings claim if a local government converts a TCEA or TCMA to an MMTD?

Overall the use of areawide exceptions by less than 50 jurisdictions is relatively minor when one considers that all of the counties and over 460 cities and 67 counties in the state are required to have a transportation concurrency management system. Yet, the variety of approaches to the establishment of exception areas provides flexibility to local governments to match the community’s vision for redevelopment, downtown revitalization or infill with its land use and transportation configuration in a TCEA, a TCMA or an MMTD. Local governments that want to gradually address a backlog of projects can continue to develop in anticipation of the completion of a long-term plan for transportation infrastructure under a LTCMS. The structure of the MMTD and TCEA encourage the mixing of land uses, development of alternative means of mobility in an urban environment, and the establishment of a connected grid for both local and regional trips. This would allow the community to continue to develop where the community wants to develop in areas such as downtown or in redevelopment and infill areas. The use of multimodal LOS and Quality of Service in the exception areas has created methodology that encourages planning for alternative modes of transportation whether within an exception area or as a part of an enhanced v/c system.

The flexibility of the exception areas may mean that they are simply used to ignore the implementation of concurrency and allow development to continue despite constrained roadway capacity. Similarly, if sufficient transportation alternatives are not available, congestion could get very bad. These systems may be unpopular with people who want to drive anywhere anytime. The systems can be quite complex to implement because the community needs to
monitor the progress towards achieving the goals of the exception area. Given the lack of strong transportation modeling among Florida communities, this task is difficult. Additionally, regional trips and background traffic is not accommodated in the concurrency system. About a third of the communities that have adopted TCEAs have not taken the steps to implement the intent of the exception area (Steiner, Wheelock Russin Macedo Boles Betancourt and Collins, forthcoming). In Miami-Dade County, the TCEA has been broadly implemented and is only applied in four of the twenty-eight cities that are located within the TCEA; two other cities have adopted TCMAs as a part of their concurrency management system. Another issue associated with exception areas is the question of how to establish their boundaries and create a transition to and from them. Because of requirements for density, intensity and percentage of vacant land in TCEAs that are being used for infill, adjacent communities may not be eligible for an exception area even if they have significant traffic impacts. Finally, it is not clear if exception areas are authorized under Washington’s state concurrency law. However, they may be allowed if they are expressed as a LOS (Trohimovich, 2001).

COMPARISON OF TRANSPORTATION SYSTEM PERFORMANCE MEASURES

The measurement of concurrency must be considered within the overall context of a community’s vision and its transportation concurrency management program. As this paper has documented there are multiple performance measures that can be used as a part of a concurrency management system. Each of those performance measures have advantages and disadvantages in their use for addressing concurrency within a region. Beyond the performance measures, communities also make decisions about other elements of the concurrency system that interact with the chosen performance measure and with each other. Examples of these decisions include: (1) treatment of de minimus impacts; (2) the geographic scale and impact area included in the concurrency assessment; (3) the use of exceptions for areas or specific projects; (4) consideration of capacity on significant state and regional highways; (5) approaches to access management; (6) scope of application (e.g., area-wide vs. corridor vs. intersection); (7) timing of systems performance review. The performance review can be completed through periodic review of roadway performance or through a “new trips allowed” process in which concurrency is implemented on a development by development review. It is not settled whether the State of Washington allows the use of concurrency exceptions on either a project by project or area wide basis. PSRC (2003) studies reveal that most communities in
that region are using exemptions to allow public services to be sited even if they are located in an area with constrained roadway capacity. For example, Bellevue exempts child care, transit facilities, park facilities, not-for-profit schools, affordable housing, libraries, public schools, hospitals and some neighborhood shopping center developments. Kirkland exempts a few unique permit types, such as accessory dwelling units, and outdoor cafes. And, King County exempts subdivisions inside the urban growth area; single-family structures; residential structures with eight dwelling units or less; minor office/commercial or recreational facilities; and, new public elementary, middle or junior high schools, and high schools located in the urban growth area, or elsewhere with a Transportation Demand Management (TDM) plan.

This memorandum discussed the performance measures for concurrency that can be used in combination with a wide variety of provisions that support, or contradict the purposes of the concurrency system and the underlying vision of the community. Hallenbeck et al. (2003: 51) identify eight criteria for evaluating transportation concurrency performance measures. These eight questions are as follows:

1. Is the alternative multimodal? Does it support funding for non-roadway transportation improvements?

2. Does the alternative enhance the link between land use and transportation?

3. Does the alternative address regional traffic and interjurisdictional transportation issues?

4. Is the alternative less resource-intensive than current practice?

5. Is the alternative easy to understand and is it credible?

6. Can the alternatives adapt to land-use and transportation changes?

7. Are the concurrency results of the alternative predictable for developers?

8. Will concurrency violations be exceptions, not rule, if this approach is adopted?

An additional question identified in Hallenbeck et al. (2003), is whether the concurrency measurement system is designed to handle the diversity of planning situations identified
in the community. This ninth question (consisting of a series of questions) can be phrased as follows:

9. Does the transportation concurrency performance measure reinforce the broader vision of the community plan? Does it implement policies in the comprehensive plan? Does it stimulate development in designated areas, provide for infill, and discourage sprawl? Can the alternatives be adopted to support the widely varying goals of the communities in the region?

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Enhanced v/c: zonal and Intersection</th>
<th>Enhanced v/c: location-constrained</th>
<th>Travel delay: key center</th>
<th>Travel Delay: Corridors</th>
<th>Regional Approaches</th>
<th>Exception Areas</th>
<th>Current Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multimodal</td>
<td>3-4</td>
<td>4-5</td>
<td>1-3</td>
<td>1-4</td>
<td>5</td>
<td>3-5</td>
<td>1</td>
</tr>
<tr>
<td>Enhance land use-transportation link</td>
<td>3</td>
<td>5</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>1-5</td>
<td>3</td>
</tr>
<tr>
<td>Address regional and interjurisdictional issues</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Less resource intensive</td>
<td>1.5</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1-4</td>
<td>1-3</td>
<td>2</td>
</tr>
<tr>
<td>Easier to understand and more credible</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>1-4</td>
<td>2</td>
</tr>
<tr>
<td>Adaptive to land use changes</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Predictable for Developers</td>
<td>2-4</td>
<td>2-4</td>
<td>2-4</td>
<td>2-4</td>
<td>1-5</td>
<td>2-5</td>
<td>2-4</td>
</tr>
<tr>
<td>Concurrency violations are the exception?</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>5</td>
<td>n/a</td>
</tr>
<tr>
<td>Reinforces the broader community vision</td>
<td>3</td>
<td>3-4</td>
<td>2-4</td>
<td>3-4</td>
<td>2-4</td>
<td>1-5</td>
<td>1</td>
</tr>
</tbody>
</table>

Notes: Rated 1 to 5 where 1 = very poor and 5 = very good * - Exception areas will be evaluated based upon their use in combination with current practice in the rest of the community. Source: Adapted from Hallenbeck, Carlson, and Simmons, 2003

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As discussed above, the other provisions of the concurrency management system may also influence this factor irrespective of the concurrency performance measure.
As Table 2 shows, current practice does not address many of the evaluation criteria. Because this system is familiar to everyone, it makes development more predictable. The introduction of any other system would create uncertainty in the review process but this uncertainty would be balanced with the achievement of other goals for the transportation system. The enhanced v/c ratio using a zonal or intersection approach will have the advantage of enhancing the transportation-land use link and planning for and funding all modes of transportation. Similarly, the enhanced v/c ratio using a location-constrained system would have even greater advantages in these two areas because it would focus on areas of major congestion. The time delay systems will have major advantages in that they are more easily understood by the public, but they will require major resources, and depending upon how they are structured, may or may not address the link between transportation and land use and planning for a multimodal environment. The regional approaches, especially those focused on the measurement of mode split, will have the obvious advantage of addressing the regional needs and interjurisdictional issues, but they may not address the diverse visions of communities within the region. The use of exception areas will ensure greater predictability within the exception areas, but will not ensure that predictability in non-exception areas. The exception areas will need to be combined with other approaches in those areas to ensure that the broader community goals are achieved throughout the region. Additionally, they may create spillover effects that cannot be easily addressed in areas adjacent to the exception area. While it is unclear whether cities and counties in Washington can use exception areas, the use of artificially low LOS standards in any other concurrency measurement system will create a de facto exception area.

SUMMARY AND CONCLUSIONS

The purpose of this memorandum has been to identify the approaches that can be taken to measure transportation concurrency. At its core, transportation concurrency needs to be a part of the broader approach to growth management in the community, which must also address the connection between land use and transportation. Five broad alternatives were identified and compared: (1) current practice – volume to capacity (v/c) ratio; (2) enhanced v/c using a zonal, intersection or location-constrained approach; (3) travel delay systems that measure travel time, travel speed, or intersection delay using a key center or corridor approach; (4) regional approaches including regional mode split; and (5) the use of exception areas. All of
these options may be viable for the Spokane Region, except the use of exception areas which may not be allowed in the State of Washington; if such an approach were to be used, it would need to be carefully crafted to meet the requirements of state laws.

No matter what system is adopted it will need to address the diverse needs of communities throughout the region. The current system does not generally accommodate all modes of transportation nor does it address the diversity of community goals throughout a region. The current system can be enhanced to address its weaknesses through enhanced v/c ratios but the incomprehensibility of the system to the general public is not easily addressed. Travel delay systems may be more easily understood by the public, like both basic and enhanced v/c systems, they do not address regional and interjurisdictional issues. Regional systems can more carefully match the need of the community but they will require an ongoing commitment from each community in the region to ensure their success. The choice of regional approaches will require consideration by a variety of public and private officials who understand the tradeoffs in the use of specific transportation concurrency measures. This memorandum provides a framework to begin this discussion.
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