

SRTC AND STAKEHOLDER WORKSHOP

Presented to



June 14, 2006

Presented by



In association with

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Technical Memorandum # 3

Transportation Performance Measures

CONCURRENCY PERFORMANCE MEASURES

❖ Capacity-Oriented

- Volume/Capacity Ratio
- Travel Delay Systems
- Enhanced Volume/Capacity
- Regional Concurrency Systems
- Exception Areas/Multimodal Transportation Districts

CAPACITY-ORIENTED SYSTEM PERFORMANCE MEASURES

❖ Volume/Capacity Ratio

- Volume – number of vehicles using a roadway during a specified period of the day
- Capacity – determined by operational characteristics of the roadway
 - Design
 - Functional Classification
 - Operational Strategy (e.g., signal timing, access management characteristics)

CAPACITY-ORIENTED SYSTEM PERFORMANCE MEASURES

❖ Volume/Capacity Ratio

- Ratio of 1.0 – roadway is at capacity
- Ratio > 1.0 – roadway has significant congestion
- Ratio < 1.0 – roadway has available capacity
- Ratio is converted to a letter grade from “A” (free flow) to “F” (gridlock)

CAPACITY-ORIENTED SYSTEM PERFORMANCE MEASURES

❖ Volume/Capacity Ratio

➤ Simple Relationship but Involves Variety of Decisions to Implement

- Time period used (peak hour, peak two hours, daily)
- Methodology (Circular 212, Highway Capacity Manual, segments)
- Intersection vs. zonal standards
- Use of Other Performance Measures (e.g., Maximum v/c for intersection, Number/Percentage of Intersections at LOS "D")

❖ Volume/Capacity Ratio

➤ Advantages

- Wide Acceptance and Comprehensibility Among Transportation Professionals and Development Community
- Flexibility to Adjust LOS to Desired Planning Outcome (e.g., high in residential neighborhoods, low in commercial areas or areas planned for redevelopment)

❖ Volume/Capacity Ratio

➤ Disadvantages

- In general practice it is auto-focused, and does not encourage alternative transportation use or capacity
- Resultant mitigations are limited to roadway solutions (e.g., roadway widenings, new road construction, intersection and traffic signal changes to enhance capacity)
- Roadways widenings/new road construction may conflict with other community goals

❖ Volume/Capacity Ratio

➤ Disadvantages

- False Precision In Analysis Because Analysis Is Conducted On An All-or-nothing Basis
 - If Development Generates Too Many Trips, It Will Not Be Permitted
 - Level Of Variability In Number Of Trips By Day Of Week, Month Of Year
 - Estimates Should Be Seen As "Reasonable Estimates"
- Irrespective Of Approach – Zonal Or Intersection – Used, The Statistic May Not Reflect Actual Conditions On Roadway

CAPACITY-ORIENTED SYSTEM PERFORMANCE MEASURES

❖ Travel Delay Systems

- Travel Time
- Travel Speed
- Intersection Delay
- Corridor vs. Key Center
 - Corridor – between point “A” and “B” (e.g., downtown to regional shopping mall)
 - Key Center – distance one can travel from a fixed point in a specific amount of time

❖ Travel Delay Systems – Advantages

➤ Understood by the Public

- Travel Time Between Two Points or Along a Specific Corridor
- Intersection Delay
- Travel Distance in Specific Time

CAPACITY-ORIENTED SYSTEM PERFORMANCE MEASURES

❖ Travel Delay Systems – Disadvantages

- Complexity in Calculation
- May Require Use of Transportation Models
 - Travel Time, Intersection Delay, Vehicle Operating Speed, Travel Distance
 - Can Be Expensive for Small Communities
- Lots of Data Required to Establish Baseline
 - If Baseline is Not Well-Established, Could Lead to Overinvestment or Congestion

CAPACITY-ORIENTED SYSTEM PERFORMANCE MEASURES

❖ Travel Delay Systems – Disadvantages

- Clarity May Translate into Public Demand for Roadway Capacity
- Single or Small Number of Intersections May Adversely Affect The Delay
- Key Center Approach May Not Work in Larger Communities with Multiple Centers

CAPACITY-ORIENTED SYSTEM PERFORMANCE MEASURES

❖ Enhanced Volume/Capacity Ratio

- Uses Traditional V/C Ratio with Tiers based Upon Whether Roadways Accommodate Alternative Modes

LOS (V/C)	Mitigation
0.7	Concurrent
>0.7 – 0.8	Concurrent if developer joins Transportation Management Association (TMA)
> 0.8 – 0.9	Concurrent if developer joins TMA and establish Transportation Demand Management (TDM) Programs
>0.9 – 1.0	Concurrent if developer joins TMA, establish TDM programs and development-specific transportation improvements
> 1.0	Concurrent if developer makes specific mitigations to lower v/c below 1.0

CAPACITY-ORIENTED SYSTEM PERFORMANCE MEASURES

❖ Enhanced Volume/Capacity Ratio Approaches

- Zonal LOS Approach
- Intersection Approach
- Location-Constrained Approach

CAPACITY-ORIENTED SYSTEM PERFORMANCE MEASURES

❖ Enhanced Volume/Capacity Ratio Approaches

➤ Zonal LOS Approach

- Sets an Enhanced Standard if Certain Intersections Are Eligible for Transit Adjustment
- If the Baseline LOS is 0.9 and transit standard is 1.0, it increases the opportunity for development because it moves the standard to include transit availability

CAPACITY-ORIENTED SYSTEM PERFORMANCE MEASURES

❖ Enhanced Volume/Capacity Ratio Approaches – Zonal LOS Approach

➤ Advantages

- Allows Development Beyond Existing Standard
- Uses V/C Ratio, Which is Widely Accepted Practice

➤ Disadvantages

- Application is Limited to Boundaries of Zone
- May Permit Congestion Where Transit is NOT Available

CAPACITY-ORIENTED SYSTEM PERFORMANCE MEASURES

❖ Enhanced Volume/Capacity Ratio Approaches – Intersection

- Overcomes Disadvantage of Zonal Approach
- Applies Only to Intersections that Have Transit
 - With Baseline LOS of 0.9, only Intersections with 5 or more Buses per Hour Would Be Adjusted
 - The Zone's LOS Standard is Adjusted Using a Performance Standard (e.g., "No more than x locations (or percentage of locations) in a zone can exceed a given LOS")

CAPACITY-ORIENTED SYSTEM PERFORMANCE MEASURES

❖ Enhanced Volume/Capacity Ratio Approaches

– Intersection

➤ Advantages

- Allows Development Beyond Existing Standard
- Adjusts to the Availability of Transit Service in Zone
- Could Encourage Transit Investment

➤ Disadvantages

- If Zone is Not Well Served, Standard May be Difficult to Meet
- Complexity

CAPACITY-ORIENTED SYSTEM PERFORMANCE MEASURES

- ❖ **Enhanced Volume/Capacity Ratio Approaches**
 - **Location-Constrained**
 - **Overcomes Disadvantage of Zonal and Intersection Approaches**
 - **New Development are Eligible if**
 - **Within Convenient Walking Distance of Transit**
 - **Defined Urban Center where Transit is Concentrated**
 - **Within Walking Distance and with “Transit-Friendly” Design**

CAPACITY-ORIENTED SYSTEM PERFORMANCE MEASURES

- ❖ **Enhanced Volume/Capacity Ratio Approaches**
 - **Location-Constrained**
 - **Would Not Prohibit Certain Development But Would Ensure Where Roadways are Constrained, Development Would Take Advantage of Transit**
 - **All Other Development Would Be Held to Auto-Oriented LOS Standards**

CAPACITY-ORIENTED SYSTEM PERFORMANCE MEASURES

❖ Enhanced Volume/Capacity Ratio Approaches

– Location-Constrained

➤ Advantages

- Would Require a Clear Vision of Land Use-Transportation System
- Provides Developers with Clear Incentive to Develop at High Intensity Where Transit is Available
- Reinforces Land Use-Transportation Connection

➤ Disadvantages

- If People Don't Use Transit, Congestion Will Increase

CAPACITY-ORIENTED SYSTEM PERFORMANCE MEASURES

❖ Enhanced Volume/Capacity Ratio Approaches

➤ Advantages

- Enhance Capacity at Low Costs
- May Represent a More Efficient Use of Transportation Capacity
- Matches Community Goals – Set by Policy, not by Measurement

➤ Disadvantages

- Adds Development without Increasing Roadway Capacity
- Increase in Complexity Due to Layers of Performance Measures

Regional Concurrency Systems

- ❖ **Replaces Facility Capacity Performance with Measure of Regional Performance**
 - **Could be Maintained by a Regional Planning Agency**
 - **Regional Mode Split Approach – How Well a Region (or Subregion) Achieves a Reduction in Vehicle Miles of Travel (VMT)**
 - **3 percent reduction would be met with increase from 8 to 11 percent of non-Single Occupant Vehicle (SOV) Trips**

Regional Concurrency Systems

- ❖ **Recognizes That Traffic is a Regional Problem**
- ❖ **Regional Agency Would Review and Monitor All Development in the Region**
- ❖ **Could Allow Mitigations in Other Parts of Region**
 - **Provide Transit Funding in Places that Support Transit-Friendly Development**

Regional Concurrency Systems

❖ Advantages

- Pools Community Resources
- Could Provide Technical Expertise to Small Communities
- Accommodates and Models Regional Trips
- Targets Transit and Automobile Investments
- Creates Market for Transportation Improvements that Encourage Mode Split

Regional Concurrency Systems

❖ Disadvantages

- Requires Cooperation of Communities with Diverse Visions
- Local Governments Have Less Control Over Local Land Use Decisions
- Accuracy of Estimates Depends Upon Scale, Characteristics and Nature of Development Projects
- Diversity of Goals Creates Complex System

Regional Concurrency Systems

❖ Disadvantages

- Requires Region-wide Commitment to Goal of Trip Reduction – Strong Monitoring With Sanctions for Non-Compliance
- System of “Mode Shift” Credits May Develop but the Price May be Difficult to Establish
- May Require Legislation

Exception Areas and Multimodal Transportation Districts

- ❖ **Project-Specific (Florida - statutory)**
 - **Urban Redevelopment Projects**
 - ***De Minimus* Projects**
 - **Projects that Promote Public Transit**
 - **Projects that Pose Part-Time Demand (arenas, performing arts centers, racetracks located in existing urbanized areas)**
 - **Pay-and-Go Provisions**

Exception Areas and Multimodal Transportation Districts

❖ Project-Specific (Washington)

- Child Care, Transit Facilities, Parks, Not-for-Profit Schools, Affordable Housing, Libraries, Hospitals, Neighborhood Shopping Developments (Bellevue)
- Accessory Dwellings, Outdoor Cafes (Kirkland)
- Subdivisions Inside Growth Area, Single-family Structures, Residential Dwellings with Less Than 8 or Less Units, Minor Office/Commercial or Recreational Facilities, Schools in Urban Growth Area or in a Transportation Demand Management (TDM) Plan (King County)

Exception Areas and Multimodal Transportation Districts

❖ Areawide (Florida – Statutory)

- Transportation Concurrency Exception Areas (TCEAs)
- Transportation Concurrency Management Areas (TCMA)
- Long-Term Concurrency Management System (LTCMS)
- Multi-modal Transportation District (MMTDs)

Exception Areas and Multimodal Transportation Districts

❖ Advantages

- Provide Flexibility to Implement Plans (Redevelopment, Infill, Downtown Revitalization)
- Allows to Gradually Address Backlog of Projects
- Encourage the Mixing of Land Use, Development of Alternative Modes and Development of Regional and Local Transportation Network
- Develop Techniques for Analysis of Alternative Modes of Transportation

Exception Areas and Multimodal Transportation Districts

❖ Disadvantages

- Used to Ignore Concurrency Requirement and Continue to Allow Development?
- Increases Congestion if Alternatives are Not Available or Not Used
- Can Be Complex to Implement and Monitor – Without Good Modeling
- Can Be Difficult to Establish Boundary
- Applicability to Washington is Not Clear

COMPARISON OF ALTERNATIVE APPROACHES TO CONCURRENCY

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

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 other practices in the rest of the community.

Source: Adapted from Hallenbeck Carlson and Simmons, 2003