PSRC and City of Bellevue Multimodal Concurrency Pilot Project

A Special Report to the Joint Transportation Committee

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PSRC AND CITY OF BELLEVUE
MULTIMODAL CONCURRENCY PILOT PROJECT

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I. Executive Summary

Downtown Bellevue, like other regional growth centers in the Puget Sound region, is currently experiencing dramatic growth in both population and employment. As more workers, residents, and shoppers congregate in the same amount of space, maintaining a high level of mobility will be increasingly challenging. Roadways will likely be unable to meet the additional demand placed upon them, underscoring the need to invest in a multimodal network of services and facilities that will facilitate the free movement of people and goods. Such a system will emphasize effective travel choices including transit, as well as biking and walking. Efforts will also need to be made to remove single occupant vehicle trips from the system through Transportation Demand Management (TDM) options, including telecommuting, flexible work schedules, and ridesharing.

In the 2008 session, the Washington State Legislature allocated funding for the Puget Sound Regional Council (PSRC) to conduct a pilot project demonstrating a process for analyzing multimodal concurrency within a designated regional growth center. This report responds to that proviso and documents the work conducted by PSRC in consultation with the City of Bellevue and King County Metro. The pilot project focuses on Downtown Bellevue as a case study with the intent of developing a scalable multimodal concurrency measurement and analysis template that other jurisdictions could employ to manage multimodal travel demand and potentially incorporate into their concurrency management systems.

Regulatory Concurrency => As required by Washington State's Growth Management Act, the short-term process for determining if a proposed development will add trips to the transportation network that will cause a jurisdiction's level-of-service standards to be compromised.

Planning Concurrency => As proposed in this report, a long-range planning exercise that compares forecast population and employment growth to the capacity of a planned multimodal transportation network. If a gap is found in the ability of a planned transportation system to accommodate estimated demand, an action scenario is developed that outlines multimodal improvements necessary to close that gap.

Multimodal Concurrency => A Regulatory or Planning Concurrency process that incorporates considerations for all modes of transportation including, but not limited to transit, automobile, bicycle and pedestrian as well as benefits of transportation demand management efforts.

The focus of this pilot project is on multimodal concurrency within the long-range planning process herein called "Planning Concurrency". In contrast to the existing "Regulatory Concurrency" that typically has a five-to six-year horizon, this longer horizon allows the ability to incorporate multimodal levels of service into local and regional long-range planning efforts. The end result is a process for projecting a multimodal level of service (LOS) that may be used in either Regulatory or Planning Concurrency processes.

This report includes:

- A description of background legislation driving Regulatory Concurrency and the need for a multimodal approach.
- Project context and city of Bellevue background.

- Comparisons of Regulatory Concurrency and Planning Concurrency.
- A generic template that can be used by regional growth centers to forecast a future, multimodal transportation system.
- A summary of the methodology used to conduct the City of Bellevue Multimodal Pilot Project.
- A summary of institutional barriers that inhibit the feasibility of implementing a true multimodal concurrency program. These issues are raised by all would-be parties to multimodal concurrency and require further discussion. This report simply identifies these issues.
- Background land use and transportation policy from the state, regional and local levels.

Key Findings:

- In growth centers, all modes are needed to meet travel demand.
- Citizens and employers care about how the transportation system performs – exempting dense areas from concurrency does not address this.
- What's important is the use of alternative modes, not the just the capacity provided. Performing a market analysis is key to evaluating effective strategies.
- Transit metrics need to include multiple dimensions in order to address all factors that affect transit performance.
- Roadway, transit and land use planning need to be done together and reinforced with investment decisions to ensure that local growth can be supported.
- Long-range planning focus: How can future growth within centers be adequately served by all modes (while recognizing the need to translate the long-term approach into an approach that can be used for Regulatory Concurrency)?
- Suggested process for conducting Regulatory or Planning Concurrency analysis:
    - Step 1) Identify total person trip demand in established horizon year based on projected growth.
    - Step 2) Conduct a Gap Analysis based on current and planning capacity to determine the person-trip "gap" for all modes.
    - Step 3) Conduct an Action Scenario analysis (design/testing of transportation demand management (TDM), transit improvements, transportation system management (TSM), non-motorized investments, pricing, and general purpose roadway capacity expansion) including transit market analysis, to propose the most efficient transit service configuration to meet projected travel demand.

Potential Next Steps:

- "Multimodal Concurrency" is a complex concept. The Legislature has made several changes to the statute which move in the direction of multimodal concurrency, however there has not been a comprehensive rewrite of transportation planning or Regulatory Concurrency requirements which states clear intent as related to how multiple modes of transportation are to be incorporated into concurrency. The Legislature may want to consider such an amendment to clarify their intent.
- Current practice demonstrates that transit agencies and local jurisdictions are working together to coordinate long-range transportation planning efforts. However, no formal framework under the state's Growth Management Act exists that would ensure roadway and transit level-of-service standards in local comprehensive plans are coordinated with transit agency short- and long-range planning. Such a legal framework could help to ensure that growth centers are adequately served by transportation needed to make them work.
- Incorporating a cost/benefit analysis in the planning-level multimodal concurrency analysis would be useful to underscore the efficiencies associated with multimodal transportation investments.
- Establish a multimodal concurrency approach in concert with a regionally coordinated, and locally implemented, set of institutional planning principles that support the context for its implementation. To this end, the Puget Sound Regional Council should pursue resources to support a new element in its Work Program. The focus of this work will be to explore implementation of this pilot methodology in a way to support the Vision 2040 emphasis on mobility within, and access to, centers. This project, in order to be successful, would be done in a collaborative fashion with the legislature, local jurisdictions and transit agencies.
- Further explore how the proposed metrics respond to a range of input. For example, the transit metric output is based on a ridership assumption. Analyzing how this output changes based on different assumptions would give jurisdictions more information on which to base a transit concurrency standard.
- Further explore the potential for additional emerging pedestrian and bicycle metrics to measure useful dimensions of concurrency goals.
- Monitor developments and research in the area of TDM programs with the goal of understanding the potential impacts of specific demand management efforts.

II. Introduction

The focus of this pilot project is on multimodal concurrency within the long-range planning process herein referred to as "Planning Concurrency". In contrast to the existing "Regulatory Concurrency" that typically has six-year horizon, the longer timeframe in the Planning Concurrency process allows the ability to incorporate multimodal levels-of-service into local and regional long-range planning efforts. The end result is a process for projecting a multimodal level-of-service (LOS) that may be used for either Regulatory or Planning Concurrency processes.

This report includes:

- A description of background legislation driving Regulatory Concurrency and the need for a multimodal approach.
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Background

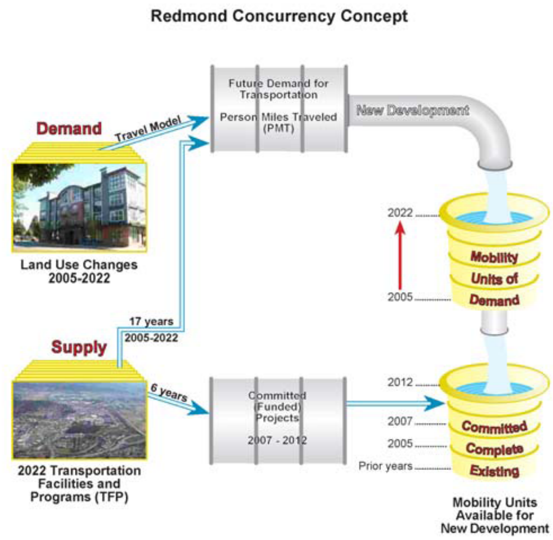
Washington State's Growth Management Act (GMA) contains a provision requiring local jurisdictions to have in place, or to have funded, necessary transportation facilities *concurrent* with new development. Throughout this report, the process of determining if the jurisdiction will meet its concurrency obligation is referred to as Regulatory Concurrency, reflecting the project-oriented nature of the procedure.

The Regulatory Concurrency provision within GMA is intended to provide a link between land use development and transportation investment. However,

GMA Concurrency Requirement

RCW 36.70A.070 (6)(b) After adoption of the comprehensive plan by jurisdictions required to plan or who choose to plan under RCW 36.70A.040, local jurisdictions must adopt and enforce ordinances which prohibit development approval if the development causes the level of service on a locally owned transportation facility to decline below the standards adopted in the transportation element of the comprehensive plan, unless transportation improvements or strategies to accommodate the impacts of development are made concurrent with the development. These strategies may include increased public transportation service, ride sharing programs, demand management, and other transportation systems management strategies. For the purposes of this subsection (6) "concurrent with the development" shall mean that improvements or strategies are in place at the time of development, or that a financial commitment is in place to complete the improvements or strategies within six years.

it has proven to be a controversial topic. Some have expressed concern that the practice tends to favor roadway capacity solutions because simply lowering adopted level of service (LOS) standards can allow development to proceed even if it results in increased traffic congestion. There are also concerns that the system is only required for local street networks which ignores the impact of development on state highways. Further, most cities' concurrency methodology does not support robust multimodal analysis due to the unavailability of reliable measures of alternative mode improvement impacts on area mobility. While some jurisdictions such as the cities of Bellingham and Redmond (see Appendix J) have moved towards implementing a multimodal concurrency system, many cities still have LOS standards based on measuring vehicular capacity at intersections, which does not explicitly measure or recognize the capacity provided by carpools, transit, or non-motorized facilities.



In addition to the short-range Regulatory Concurrency requirement, the GMA also requires local agencies to develop and adopt longer-range comprehensive plans that contain a transportation element (RCW36.70A.070(6)). In that transportation element, the local jurisdiction must identify the land-use assumptions that provide the basis for the transportation plan; adopt level-of-service standards for roadways and transit service; determine long-term growth in population, employment and the ensuing travel demand; identify where infrastructure improvements would be needed to accommodate future growth, and multimodal strategies to address those gaps. The transportation element is also required to have a financial plan. If funding falls short of meeting adopted roadway and transit level-of-service standards the jurisdiction is required to reevaluate its land-use assumptions. This planning requirement is, in essence, a "Planning" Concurrency process that links land-use and transportation planning in an iterative and fundamental way. Land-use development, transportation standards and plans, as well as the ability to finance those transportation improvements have to be in balance, similar to the regulatory concurrency requirement.

> **New 2005 Concurrency Requirement for Regional Transportation Planning Organizations**
>
> RCW 47.80.030 (1) (f) "Sets forth a proposed regional transportation approach, including capital investments, service improvements, programs, and transportation demand management measures to guide the development of the integrated, multimodal regional transportation system. **For regional growth centers, the approach must address transportation concurrency strategies required under RCW 36.70A.070 and include a measurement of vehicle level of service for off-peak periods and total multimodal capacity for peak periods**"

The Washington State Legislature has been reviewing and revising the GMA Concurrency law and requirements contained therein. In 2005, they authorized a study of multimodal concurrency to analyze ways that transit, walking, and other modes could be incorporated into local concurrency systems. Additionally, in 2005 a change was made to the statute governing Regional Transportation Planning Organizations

(RTPOs), such as the PSRC, requiring them to address concurrency in regional growth centers during the development of regional transportation plans. More specifically, RTPO's are required to include measures that are vehicle-oriented during off-peak periods and multimodal for peak periods. Currently, the PSRC is engaged in an update to the central Puget Sound regional transportation plan, *Destination 2030,* which includes 27 designated regional growth centers to which the concurrency requirement applies, including Downtown Bellevue.

RCW36.70A.070(6) ***Growth Management Act Transportation Planning Process:***

A transportation element that implements, and is consistent with, the land use element

(a) The transportation element shall include the following subelements:

- (i) Land use assumptions used in estimating travel;
- (ii) Estimated traffic impacts to state-owned transportation facilities resulting from land use assumptions to assist the department of transportation in monitoring the performance of state facilities, to plan improvements for the facilities, and to assess the impact of land-use decisions on state-owned transportation facilities;
- (iii) Facilities and services needs, including:
  - (A) An inventory of air, water, and ground transportation facilities and services, including transit alignments and general aviation airport facilities, to define existing capital facilities and travel levels as a basis for future planning. This inventory must include state-owned transportation facilities within the city or county's jurisdictional boundaries;
  - (B) Level of service standards for all locally owned arterials and transit routes to serve as a gauge to judge performance of the system. These standards should be regionally coordinated;
  - (C) For state-owned transportation facilities, level of service standards for highways, as prescribed in chapters 47.06 and 47.80 RCW, to gauge the performance of the system. The purposes of reflecting level of service standards for state highways in the local comprehensive plan are to monitor the performance of the system, to evaluate improvement strategies, and to facilitate coordination between the county's or city's six-year street, road, or transit program and the department of transportation's six-year investment program. The concurrency requirements of (b) of this subsection do not apply to transportation facilities and services of statewide significance except for counties consisting of islands whose only connection to the mainland are state highways or ferry routes. In these island counties, state highways and ferry route capacity must be a factor in meeting the concurrency requirements in (b) of this subsection;
  - (D) Specific actions and requirements for bringing into compliance locally owned transportation facilities or services that are below an established level of service standard;
  - (E) Forecasts of traffic for at least ten years based on the adopted land use plan to provide information on the location, timing, and capacity needs of future growth;
  - (F) Identification of state and local system needs to meet current and future demands. Identified needs on state-owned transportation facilities must be consistent with the statewide multimodal transportation plan required under chapter 47.06 RCW;
- (iv) Finance, including:
  - (A) An analysis of funding capability to judge needs against probable funding resources;
  - (B) A multiyear financing plan based on the needs identified in the comprehensive plan, the appropriate parts of which shall serve as the basis for the six-year street, road, or transit program required by RCW 35.77.010 for cities, RCW 36.81.121 for counties, and RCW 35.58.2795 for public transportation systems. The multiyear financing plan should be coordinated with the six-year improvement program developed by the department of transportation as required by **RCW 47.05.030;
  - (C) If probable funding falls short of meeting identified needs, a discussion of how additional funding will be raised, or how land use assumptions will be reassessed to ensure that level of service standards will be met;
- (v) Intergovernmental coordination efforts, including an assessment of the impacts of the transportation plan and land use assumptions on the transportation systems of adjacent jurisdictions;
- (vi) Demand-management strategies;
- (vii) Pedestrian and bicycle component to include collaborative efforts to identify and designate planned improvements for pedestrian and bicycle facilities and corridors that address and encourage enhanced community access and promote healthy lifestyles.

In 2008 the Legislature funded a study of multimodal concurrency to further explore methods of quantifying alternative transportation modes and incorporating them into local concurrency management programs. In response to this legislative proviso PSRC and the City of Bellevue have collaborated with King County Metro to develop multimodal measures that could be utilized for both peak and off-peak periods, concurrency approaches for the Downtown Bellevue regional growth center, and a strategy for integrating all modes (roadways, transit, walk, and bike) into considerations for sustained mobility. Recent changes to the state's Commute Trip Reduction law also emphasize trip reduction in the more dense growth centers, known under the CTR program as Growth and Transportation Efficiency Centers.

Regulatory Concurrency versus Planning Concurrency

As described above, the focus of this pilot project is on multimodal concurrency within the long-range planning process, referred to in this report as Planning Concurrency. In contrast to Regulatory Concurrency that typically has a six-year horizon; the Planning Concurrency process represents a longer time horizon allowing for the ability to incorporate multimodal levels-of-service (LOS) into local and regional long-range planning efforts. This includes the coordination between agencies responsible for land use and transportation planning, such as cities and transit agencies. The end result is a transportation planning process for projecting a multimodal LOS that may be used for either Regulatory or Planning Concurrency processes. Figures 1 and 2 compare and contrast the similarity and differences between each of the planning processes, the steps involved. A detailed comparison of these processes can be found in Appendix B.

Figure 1 **– Regulatory Concurrency Process**

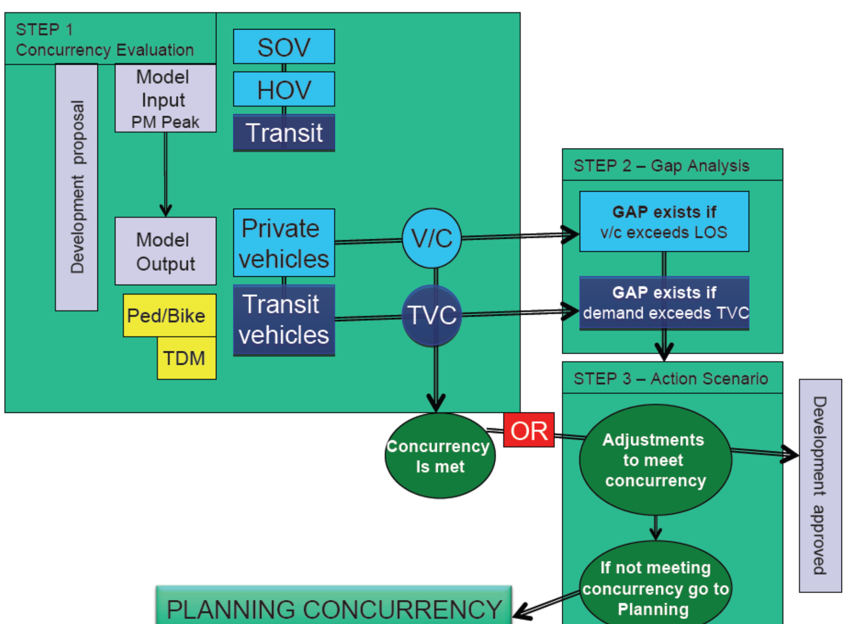
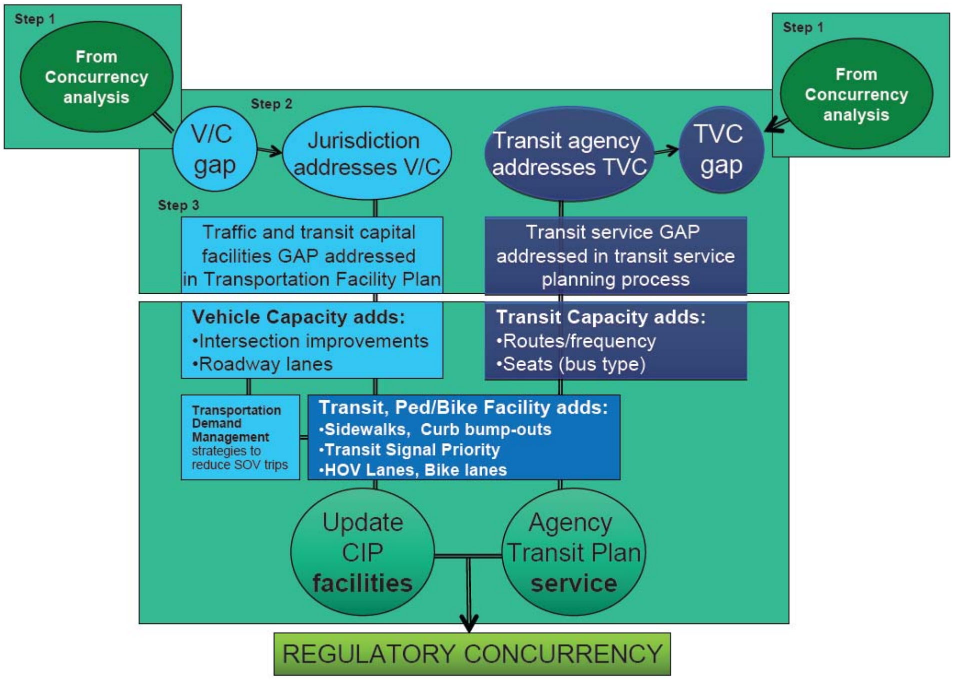


***Figure 2* – Planning Concurrency Process**



City of Bellevue: The Local Planning Context

Bellevue's Downtown Subarea Plan was updated in 2003, after a long community planning process (known as the Downtown Implementation Plan, or DIP). City staff and consultants worked with a large Citizens Advisory Committee to evaluate several transportation alternatives to serve the commercial and residential growth projected in Downtown Bellevue by 2020. Several specific project ideas came out of the DIP process, including the idea of a one-way couplet along 106th and 108th avenues NE, mid-block pedestrian crossings, and a variety of intersection and pedestrian/bicycle improvements. The DIP also called for doubling transit service and quadrupling transit ridership in and to Downtown Bellevue by 2020. The Plan also forecast the need for 40% of commute trips to be on transit by 2020.

Downtown Bellevue is currently experiencing dramatic growth in both employment and housing units. This growth has accelerated in recent years and is expected to continue at a vigorous pace into the foreseeable future. Downtown Bellevue currently has approximately 36,000 workers and 5,000 residents, and is forecasted to have 63,000 employees and 11,000 housing units by 2020. Based on current and projected development activity these forecasts still appear reasonable. The downtown roadway network will have increasing difficulty meeting the new demands. The street grid of "superblocks" poses significant challenges for traffic circulation, signal coordination, and pedestrian movement. As more workers, residents, and shoppers congregate in the same amount of space they will rely more on transportation modes other than the private automobile. This clearly means that the future transportation system needs to become a more multimodal and truly urban system with transit as a particular emphasis, underscoring the utility of Bellevue's regional growth center as the study area for this pilot project.

Like many cities, Bellevue's existing concurrency methodology, developed in 1989 and modified in the 1990s, focuses on measuring the number of vehicles traveling through vehicles at intersections relative to the capacity of those intersections to accommodate vehicles and does not explicitly measure or recognize the capacity provided by other modes. As noted above, in Bellevue's downtown the potential to add vehicular-based roadway capacity is limited. While there is not anticipated to be a short-term concurrency problem, projections in the 2020 - 2030 timeframe show that downtown, as well as other areas of the city, are likely to surpass their current LOS standards, potentially triggering concurrency issues and potential development moratoriums. Since transportation solutions in Downtown Bellevue are likely to be more focused on transit and nomotorized modes, the city is interested in developing a concurrency measure that acknowledges and measures these trips.

While transportation solutions in Downtown Bellevue are likely to be very focused on transit in the longer term, the City has concerns about moving to a more multimodal concurrency system. While the present level-of-service standards, for example, are geared towards intersection and road capacity, these are factors that the City controls through improvements that the City funds and builds (or can have private development build as part of mitigation). Bellevue does not, however, control or allocate transit service; transit service is provided by outside agencies (specifically King County Metro and Sound Transit). The City does control all of the factors and inputs for its existing concurrency system (land use permitting authority, designation of LOS in each zone, and roadway/intersection improvements and signalization). A multimodal concurrency and LOS system that helps drive needed transit service to Downtown Bellevue and other regional growth centers would be a desirable outcome of this effort; conversely, creating a concurrency framework that makes local land-use decisions dependant on transit service that the City does not control would be problematic. From a transit perspective, agencies find the need for a coordinated planning process so that they may understand the roadway conditions on which future transit service will be operating.

III. Proposed Method - Multimodal Concurrency Template

Jurisdictions use Regulatory Concurrency to evaluate the ability of a planned transportation system to accommodate additional travel generated by a proposed development. Such development proceeds to construction only if the jurisdiction determines that the additional trips produced will not violate level-of-service (LOS) standards established through the comprehensive planning process. Many cities still have LOS standards that are based on measuring vehicular capacity at intersections, which does not explicitly measure or recognize the capacity provided by carpools, transit, or non-motorized facilities. The primary purpose of this project is to introduce a new approach to Regulatory Concurrency that addresses these additional modes of travel (bicycle, pedestrian, and transit) that can be replicated by all Washington State Regional Transportation Planning Organizations (RTPOs) and jurisdictions.

While broadening the scope of analysis to satisfy this goal, the project team realized that the resultant approach resembled a comprehensive planning effort that could be useful to jurisdictions in longer time frames than the six-year horizon required under Regulatory Concurrency. The team coined the label “Planning Concurrency” for situations in which a jurisdiction might choose to apply the method to inform longer-range planning decisions.

The Planning Concurrency approach builds off of future land use inputs (population and employment) as well as roadway and transit levels-of-service; all of which are established through a jurisdiction’s comprehensive planning process required under RCW36.70A.070(6). Forecast trips are compared with roadway and transit LOS to determine any gap in the ability of the planned transportation system to accommodate estimated demand in either mode. If a gap is identified, the implementing agency performs a market analysis to determine if and/or where efficiencies and other improvements in the transit network can be achieved. Once an efficient and effective transit network is designed, trips that remain un-served are accommodated by a variety of strategies including transportation demand management (TDM), land use change, bicycle or pedestrian connectivity improvements, and roadway capacity expansion. The prioritization of one strategy type over another remains a local policy decision.

The detailed analytic method proposed below represents a scalable and transferrable multimodal concurrency method that can be used by jurisdictions for either Regulatory or Planning Concurrency, depending upon their needs and resources.

Method Overview

The proposed analysis approach occurs in three broad steps:

Step 1) **Evaluate multimodal concurrency in a chosen future year.** In this step, forecast travel demand is compared with the planned capacity of the transportation system. If the analysis concludes that the transportation system is adequate, a positive concurrency finding, then the proposed development can be constructed and no further work is required.

Step 2) If step one finds that concurrency has not been met, to the analyst must **determine the gap** between the originally proposed future transportation system and a scenario that would meet concurrency. The gap is then translated into units such as person trips, which allows scenario testing to be conducted, step (3).

Step 3) Finally, **strategies are designed and tested to close the gap** and meet concurrency requirements.

The remainder of this chapter describes the proposed method in detail by covering possible evaluation metrics (step 1), gap estimation methods (step 2), and strategy design tools (step 3). The next section demonstrates the method in a long-range, hypothetical Planning Concurrency application in the City of Bellevue.

Implications of Multimodal Concurrency

As previously mentioned, the vast majority of metrics used in concurrency measurement systems focus on vehicle volumes and roadway capacity. This approach, while appropriate for some communities, focuses transportation improvements that are required because of a negative concurrency determination on accommodating additional vehicles as opposed to trips across all modes of transportation. The primary purpose of this project is to introduce a new approach to concurrency that addresses additional modes of travel (bicycle, pedestrian, and transit) and that can be replicated by all Washington state Regional Transportation Planning Organizations (RTPOs) and jurisdictions.

This multimodal approach allows jurisdictions to establish concurrency standards that consider all modes of transportation. In other words, a city could set a policy that would fail a land use proposal in concurrency in a transit or non-motorized dimension even if it meets concurrency in the roadway dimension. While the method described below explains how this would work, it does not propose transit or nonmotorized standards or thresholds, as those specific policy decisions would be the responsibility of local jurisdictions.

Establishing the Base Year Context

While concurrency, by definition, examines the future land use of a city and its transportation system, it is wise to establish a clear understanding of current conditions as context for the analysis of impacts due to various transportation improvements (or lack thereof) over time. When undertaking a long-range Planning Concurrency analysis, the jurisdictions and transit agencies involved should comprehensively document existing multimodal transportation demand and capacity. This includes, but is not limited to, mode share, roadway capacity per LOS standards, transit capacity, and bicycle/pedestrian facility quality of service per the metrics suggested below. Transportation demand management (TDM) strategies implemented in the study area should also be inventoried. Additionally, issues related to land use, demographic change, and economic development should be well documented to provide sufficient context. Having complete documentation of observed, real-world conditions in all of these areas will enable the parties to make well-informed decisions regarding the most appropriate strategies for realizing an efficient and seamless multimodal transportation network.

Information on existing conditions can be found at the local, regional, or state level. Local or regional modeling can provide estimates of mode share and roadway capacity whereas ridership figures and transit service improvements should be collected by the transit agency or agencies serving the study area. Additionally, if available, trips currently not being taken due to transportation demand management (TDM) efforts such as the state's Commute Trip Reduction (CTR) program should be estimated or data obtained. Issues related to land use, demographics, and/or economic development can be assembled from various local and regional sources such as local chambers of commerce or economic development groups.

Method Details

Step 1: Concurrency Evaluation

Determine horizon year. Regulatory Concurrency responds to a Growth Management Act (GMA) stipulation requiring local jurisdictions to provide the infrastructure, programs, and/or services necessary to accommodate additional growth *within six years of a new development being built*. This multimodal method can also be applied in the six-year window most cities choose to satisfy GMA. If jurisdictions wish to take a longer Planning Concurrency approach, the horizon year is best established through consultation between the jurisdiction, local and regional transit agencies and the appropriate regional planning agency. In order to compliment and build-upon existing work, the selected planning horizon should also correspond with, or at least acknowledge, other planning efforts the city may have completed, as well as planning efforts from relevant transit agencies and, if applicable, planning efforts in adjacent jurisdictions or the region at large.

Determine study area. The geographic boundaries of the analysis must be chosen, noting that different boundaries may be appropriate for different steps of the method. For Regional Growth Centers, the main analysis geography is the set of Traffic Analysis Zones (TAZ's) comprising the designated center. Useful variations from this are noted below, most typically using the TAZ's comprising the entire city for certain steps.

Determine future land use. Future growth to be accommodated must be clearly defined, either from specific development requests for Regulatory Concurrency or from an appropriate land use forecast for Planning Concurrency. Potential sources for land use forecasts are the PSRC Small Area Forecasts and the jurisdiction's citywide or regional growth center targets. In any case future land use estimates should include total population and employment within the study area for the horizon year.

Choose evaluation metrics. Include metrics for roadway, transit, and non-motorized modes. The project team performed an assessment of current roadway metrics, and researched potential measures for alternative modes.

Suggested Roadway Metric. Jurisdictions have a choice of metrics in the roadway dimension of the proposed method.

a) Highway Capacity Manual (HCM) intersection-based level-of-service[1]. Several jurisdictions reviewed for this project prefer this method because of its precision; focusing on intersection LOS allows cities to capture system management strategies (such as channelization) directly and therefore better balance potential roadway investments between expensive capital expansion and less costly efficiency measures.

b) Highway Capacity Manual (HCM) roadway segment-based Level of Service.[2] In the absence of specialized modeling or post-processing software used to calculate an intersection level-of-service, jurisdictions could potentially turn to a link (roadway segment) LOS as long as they can conclude that it would not bias the findings.

c) There are other roadway LOS methods in use across the region and within Washington State. To apply the multimodal method outlined in this report, any specific roadway LOS must be an unbiased representation of LOS and have the ability to feed a gap analysis (see below).

Suggested Transit Metric. By consulting transit agencies, local jurisdictions, and national research[3] [4], the project team devised a composite transit LOS criterion including of all the individual metrics identified on the following page.

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[1] For full details see Highway Capacity Manual 2000.
[2] Ibid
[3] HCHRP Report 616.
[4] TCRP Report 88.

Transit Metric	Method
Load Factor	Volume-weighted average ratio of load to capacity (see capacity and load below).
• Capacity (supply)	Seats in time period in study area.
• Load (demand)	Riders in time period in study area.
Speed	Volume-weighted average transit speed on all transit segments within the City boundary.
Headway	Volume-weighted average headways on all routes serving study area.
Reliability	Roadway LOS in study area (as proxy) in time period.
Service Coverage	Percent of transit service area that is accessible where transit service area is defined by the desired type of possible service—e.g. three housing units per acre for hourly bus service. Accessibility would be measured as a ¼ mile network buffer from all active bus stops, ½ mile for rail.

Suggested Bicycle Metric. The project team examined national research, the Washington State Bicycle/Pedestrian plan, and local plans to create a possible composite bicycle quality-of-service criterion. The project team identified the following factors:

a) Presence of off-road bicycle facilities (defined as a facility physically inaccessible to motor vehicles, even if it lies within general roadway right-of-way). The metric is expressed as the ratio of land area in the total of quarter-mile buffers around all off-road, non-motorized facilities to total land area within the study area.

b) Aspects of the on-road bicycle experience where bikes share the general roadway, including amenities such as bike lanes and wide shoulders. The metric is the ratio of centerline miles of roadway with bicycle amenities to centerline miles of roadway without bicycle amenities within the study area.

Other factors could be consulted for additional background information but are difficult to forecast at the necessary level of detail and might not be quantifiable in a given situation.

- Posted vehicle speed limit
- Proportion of heavy vehicles in the roadway traffic volume
- Connectedness of facilities open to bicycle use (including multimodal connections)
- Availability of end-of-trip facilities such as bicycle lockers and showers

Exploring ways in which all of these factors could be combined into a single metric for bicycle facilities is a topic for future work related to establishing and assessing non-motorized levels-of-service. The next generation of analytic tools will be more sensitive to individual improvements to the bicycle network, enabling a more robust analysis of how bicycle mode share responds to a given improvement type, and how growth in mode share may affect established levels-of-service.

Suggested Pedestrian Metric. The project team used the same sources as in the bicycle section above to suggest a composite pedestrian quality-of-service criterion. The identified factors are:

a) Presence of sidewalks. The metric is the ratio of block faces with complete, passable sidewalks to the total number of block faces within the study area.

b) Intersection density expressed as a ratio of walkable intersections per square kilometer to total intersections per square kilometer in the study area

Other factors could be consulted for additional background information but are difficult to forecast at the necessary level of detail and might not be quantifiable in a given situation.

- Posted vehicle speed limit
- Presence of a buffer between pedestrian space and vehicle lanes
- Street width
- Presence of mid-block crossings
- Presence of crosswalks and pedestrian amenities including wayfinding
- Topographical challenges

Exploring ways in which these factors could be combined into a single metric for pedestrian facilities is a topic for future work related to establishing and assessing non-motorized levels-of-service. The next generation of analytic tools will be more sensitive to individual improvements to the pedestrian network, enabling a more robust analysis of how pedestrian mode share responds to a given improvement type, and how growth in mode share may affect established levels-of-service.

Establish Concurrency Standards. As previously mentioned it is up to each jurisdiction to set policy specified standards (also called thresholds) for each of the metrics defined above which, if met, would allow a growth proposal to meet concurrency. In response to the unique nature of each community, this method allows jurisdictions to set standards differently across the different modes to be more relevant to their particular situation or goals.

Establish Time Period for Analysis. The time(s) of day to use in determining concurrency must also be chosen. While one jurisdiction may want to focus on peak-period work trips, others may be more concerned with non-work activity dispersed throughout the day. The methodology for Planning Concurrency can be applied in any time period throughout the day; however, the project team suggests that the AM peak period is a minimum requirement, given its typical congestion and the fact that it tends to see the highest transit use for work trip purposes.

Establish the baseline state of the future transportation system. The horizon year baseline system must include all funded transportation investments for all modes within a jurisdiction. It should also include all funded investments regionwide that could affect the local transportation system. For Planning Concurrency it *may* also be appropriate to add future but currently unfunded investments to the baseline when jurisdictions can make a compelling case that investments are certain (if, for example, there are significant resources programmed in the regional TIP, however these funds are not yet available). Types of investments to consider include, at minimum:

- Roadway capacity projects
- Transit service and facility investments or changes
- Ferry system investments (if applicable)
- Bicycle and pedestrian projects and programs
- Freight-related investments (grade separations, etc.)
- Transportation system management (Intelligent Transportation Systems (ITS) projects and programs
- Transportation Demand Management (TDM) programs

Sources of funded investments include, but are not limited to, the following:

- The city's own six-year Capital Improvement Program (CIP)
- Relevant transit agency six-year Transit Development Programs (TDP's)
- The regional TIP as maintained by the RTPO
- CIP's of neighboring jurisdictions

Sources of other future investments include:

- Various departments of the local jurisdiction (public works, planning, etc.)
- Corridor planning efforts (e.g., route development plans)

- County departments of transportation
- Washington State Department of Transportation
- Appropriate local improvement districts
- Transit agencies
- Neighborhood or activist groups
- Private providers of transportation services
- Local businesses

Forecast horizon year travel demand and apply evaluation metrics. Ultimately, concurrency evaluation is complete when the jurisdiction runs a travel demand forecast model for the future year baseline, computes all evaluation metrics listed above, and compares the baseline metric results to the policy-set threshold requirements. Should any of the metrics fail, analysis proceeds to the relevant parts of the next major step: problem identification.

Step 2: Gap/Problem Identification

The general approach to problem identification is to build upon the Concurrency Evaluation in step 1 by performing additional analysis to convert the evaluation findings into a gap expressed in person-trips or other quantifiable terms. The general concept is that problems in the system arise either because too many people are trying to use a mode (a person-trip gap) or a given portion of the system is simply inadequate to support many trips at all (a quality-of-service gap). While the horizon year baseline forecast modeling and the base year observed data provide much of the necessary information for this step, it is also possible that other planning and policy work at the city has already identified problems or made policy decisions establishing certain goals. Such additional information should be added to the discussion of findings from the gap analysis method outlined below.

Determine roadway gap or issues. The roadway gap calculation builds upon the adopted roadway LOS standard and the traffic volume information it produces to derive a person-trip gap, on average, across the intersections or links cities use in their concurrency methodology. The increment of vehicle trips above the adopted LOS standard at all locations chosen for analysis would be used in a volume-weighted average calculation to produce the total "roadway person-trip gap" that this method's strategy design step must address. Averaging is necessary to ensure that trips in the study area aren't double-counted; weighting is necessary to ensure that individual intersections or segments that are particularly congested influence the strategy design sufficiently.

Determine transit gap or issues. Transit presents a more complex problem identification challenge than the roadway side, since bus transit depends on roadway performance as well as the provision of service. The proposed transit problem identification step is therefore multi-dimensional:

a) ***Identify specific capacity issues*** using the Concurrency Evaluation load factor metric (see section 1.d.ii above) on a route-by-route basis for all routes serving the study. While this can be expressed as a person-trip gap it is quicker to move directly to potential changes to existing baseline service frequency (the result being a list of headway changes on the existing routes that would close the person-trip gap sufficiently to meet a load factor of 1.2 (120% of seats).

b) ***Identify service coverage issues*** using the Concurrency Evaluation coverage metric in the study area. This addresses a quality-of-service gap issue by identifying portions of the study area un- or under-served by baseline transit and is expressed as a map of those portions of the study area failing to meet the city's chosen coverage threshold.

c) ***Identify service attractiveness issues*** by extending the Concurrency Evaluation speed and headway metrics to the route level for all service to and from the study area. The results are a table by time period for speed and headway by route for the portions of each lying within the city boundary regardless of the size of the actual study area or center. The reason to use a different geography in this case is to capture the full area over which the city could consider strategies under its own control that would enhance transit attractiveness.

Determine bicycle issues. The Concurrency Evaluation metric for bicycles produces a statement of problems or issues.

Determine pedestrian issues. The Concurrency Evaluation metric for pedestrians produces a statement of problems or issues.

Synthesize a picture of the overall problem from individual issues. There are many possible combinations of findings and issues that the problem identification method outlined in this section might produce. Any given application of this method will thus need to include a step where the analytic team documents and synthesizes the identified problems. Problems tend to be interrelated; for example, a roadway LOS failure may occur because a location is not maximizing its transit opportunities. Due to the use of professional judgment in this step, synthesizing of the overall problem statement will most likely blend into the next step: strategy design.

Step 3: Strategy Design and Testing

The design of a set of future transportation investments to meet concurrency across all dimensions should integrate all individual modal efforts into one comprehensive picture (which this proposal labels the "action strategy"). This requires some iteration to allow the analysis team to explore the interrelations between different strategies in different modes. However, given the fact that bus transit is so dependent upon roadway performance, the project team recommends that the strategy design step address transit as early as possible in the process.

Design transit strategies. The metrics from the gap/problem identification step inherently suggest some potential transit remedies but they do not provide the complete picture. For example, a roadway problem by itself would suggest the potential for additional transit even if the transit metrics all met established thresholds. For this reason the project team proposes that the multimodal concurrency method incorporate a transit market analysis any time concurrency fails in any dimension. The Puget Sound Regional Council has recently developed two tools to aid in transit service analysis and design. Where these, or similar, tools are not available, planners should use traditional sources to conduct the transit market analysis. There are two parts to the proposed transit strategy design:

a) ***Transit market analysis.*** The Transit Competitiveness Index (TCI) tool uses 2006 demographic and market survey data to allow the analysis of transit's relative competitiveness of getting to and from selected portions of the region. This method proposes a TCI analysis of both transit attractiveness from key areas of the region to the study area and transit attractiveness from the study area to other parts of the region. The analyst can be guided in which areas to focus TCI attention by examining the trip-making characteristics of the horizon year baseline travel demand forecast. The two products of this step are (1) a table and related map showing total trip flows to and from the study area from the model "districts" (larger-scale geographies used in the regional or local model software) and (2) a series of tables and maps from the TCI tool showing the potential for transit to carry trips from the districts to the study area and vice versa.

b) ***Transit service design/sketch analysis.*** The analyst would next design modified and/or additional transit service for the study area based on a comparison of ridership and trip flows from the baseline horizon year to areas in the region that the TCI has identified as having the greatest potential for transit use to and from the study area. Services with low existing or baseline forecast ridership compared to TCI-identified transit potential are the transit corridors on which to concentrate the most design effort.

   With potentially productive service improvements identified, the analyst would use the Service Planning Tool (SPT), professional judgment, and other analyses suggested by the situation to create and test service modifications

(The SPT examines a given corridor. In response to service changes entered, and reports a resulting change in transit ridership).

c) ***A list of proposed transit strategies*** for the action scenario is the product of the transit design step which shows expected person-trips served by each individual strategy.

Design transportation demand management strategies. Working from observed TDM efforts in the study area, the analyst should create a list of potential efforts that would shift trips to less congested modes or reduce trip making to the study area (such as telecommuting). While quantitative analysis of TDM efforts is not yet mature, the analyst should make every effort to attach realistic trip-making changes to proposed demand management strategies based on observed local data where feasible. Where local data is insufficient or not available, alternative sources such as the Victoria Transport Policy Institute (VTPI) contain a wealth of information related to the impacts of various TDM strategies, generally expressed as ranges of SOV trip reductions, increases in alternative mode share, or as elasticities. The product of this step is an inventory of TDM programs in the action scenario, with numbers of expected trip reductions or shifts, in total, or preferably by individual strategy.

Design bicycle strategies. The proposed bicycle Concurrency Evaluation metrics produce some direct suggestions of action steps, but the analyst would need to supplement these with suggestions from any planning efforts the city may have and through consultation with stakeholders. Although, like TDM, the ability to quantitatively analyze the trip impacts of bicycle investments is not yet mature, the analyst should make an informed suggestion of trip-making changes likely to be caused by such investments. The product of this step is an inventory of bicycle investments in the action scenario with numbers of expected trip shifts, in total, or preferably by individual strategy.

Design pedestrian strategies. Similar to the bicycle mode, the proposed pedestrian Concurrency Evaluation metrics produce some direct suggestions of action steps but the analyst would need to supplement these with suggestions from any planning efforts the city may have and through consultation with stakeholders. Walking is in a similar analytic state as cycling. The current generation of tools does not yet forecast specific reactions to specific investments. Nonetheless, the product of this step is an inventory of pedestrian investments in the action scenario with numbers of expected trip shifts, preferably by individual strategy, but at least in total.

Design roadway strategies. This method proposes to examine roadway strategies last because of their fundamental nature in providing the “backbone” for many other modes, including bus, sidewalks and bike lanes. Work in those other areas may suggest some particular use of existing roadway right-of-way such as a business-access/transit lane, sidewalk, or bike lane. The roadways may also need attention in their own right either through specific management strategies such as signal coordination and retiming, different intersection channelization or through capacity strategies such as adding capacity for general purpose or managed lanes. The analyst should examine the gap analysis findings and all other modal suggestions to create a series of roadway strategies that integrate the action scenario into its final form. The product is a list of roadway strategies with either their model-able characteristics or a qualitative discussion of the expected effect on the Concurrency Evaluation metrics.

Test the "action scenario" comprised of all strategies together. In the final phase of the overall analysis, the project team would code and run in the travel demand forecast model the full set of strategies comprising the action scenario. The product of this step is a summary of trip making into and out of the study area by mode and by trip purpose. Since the current generation of regional modeling tools is not fully sensitive to the range of strategies that jurisdictions and transit agencies might employ to meet concurrency the team will need to augment the trip-making response forecast by the model with qualitative trip-making changes asserted by certain components of the various strategies outlined above to reach a final judgment of whether the action scenario meets concurrency standards.

The results of this analysis can be iteratively adjusted to reflect a desired state and policy direction received from decision-makers.

IV. Example - Downtown Bellevue

PSRC staff collaborated with staff from Bellevue and King County Metro to apply the template from the previous chapter in a hypothetical exercise to the Downtown Bellevue Regional Growth Center (RGC, also referred to below as "the study area"). This chapter documents the example.

Step 1: Concurrency Evaluation

This section outlines the evaluation metrics chosen, their application to the Bellevue example, and assumptions it was necessary to make given the hypothetical nature of the exercise.

Determine horizon year. Due to the collaborative nature of this project it was necessary to establish a planning horizon that aligned with future year information available and compatible with both the PSRC regional travel demand mode and the Bellevue-Kirkland-Redmond (BKR) travel demand model. The project team chose 2020 to allow use of information in the city's Downtown Subarea Plan adopted in 2003.

Determine study area. The study area is the Downtown Bellevue designated Regional Growth Center. The center is represented by four TAZ's in the PSRC model (TAZ numbers 293, 294, 295, and 296).

Determine future land use. The future population and employment for year 2020 were taken from the PSRC 2006 Small Area Forecasts:

a) Total population in the Downtown Bellevue RGC in 2020 = 13,528.

b) Total employment in the Downtown Bellevue RGC in 2020 = 62,999.

Select evaluation metrics and standards.

Roadway Metric: HCM intersection LOS. Standard: City of Bellevue adopted roadway LOS of .95 volume-to-capacity ratio at select intersections; equates to intersection near capacity.

Transit Metrics: Proposed composite transit metrics from this report (see Chapter III. Standard: see below.

Bicycle Metrics: Proposed metrics from this report (see Chapter III). Standard: see below.

Pedestrian Metrics: Proposed metrics from this report (see Chapter III). Standard: see below.

Standards/Thresholds: Since the new transit, bicycle, and pedestrian metrics have no adopted standards, this report compares results for the base case vs.

the action scenario. The project team suggests that the range of results from this pilot be used to inform future discussions of what standards would be appropriate for these metrics should jurisdictions choose to use them.

Select time period. The team chose the AM peak period (6 a.m. to 9 a.m. on a typical weekday) as the time period for analysis given the congestion typically experienced in that period and its high volume of transit for trips to work.

Baseline state of the study area transportation system. Bellevue staff provided analysis and data describing the year 2006-2007 behavior of the local transportation system.

Table 1 **- BKR Model Results for 2007 Travel Demand**

Daily Person Trips - **2007 Estimate**

Worktrips to Downtown Bellevue	42,075
Transit mode share from all areas	11%
Worktrips from Downtown Bellevue	5,391
Transit mode share to all areas	7%
Internal work trips	846
Transit mode share internal	17%
Total daily person trips	46,620

Source: Bellevue-Kirkland-Redmond Travel Demand Model Version: MP0R9

Figure 3 **- Existing Transit Service to Downtown Bellevue**

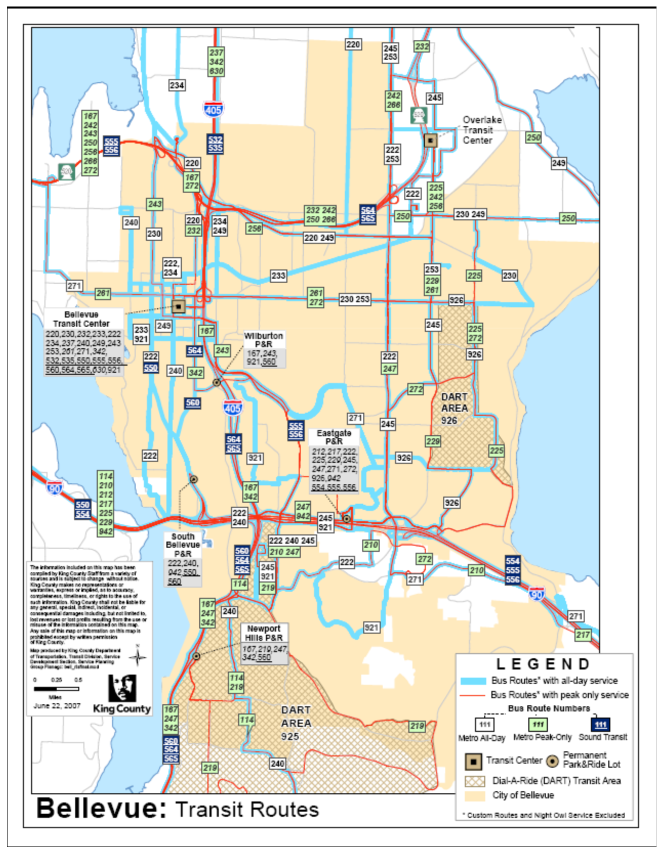
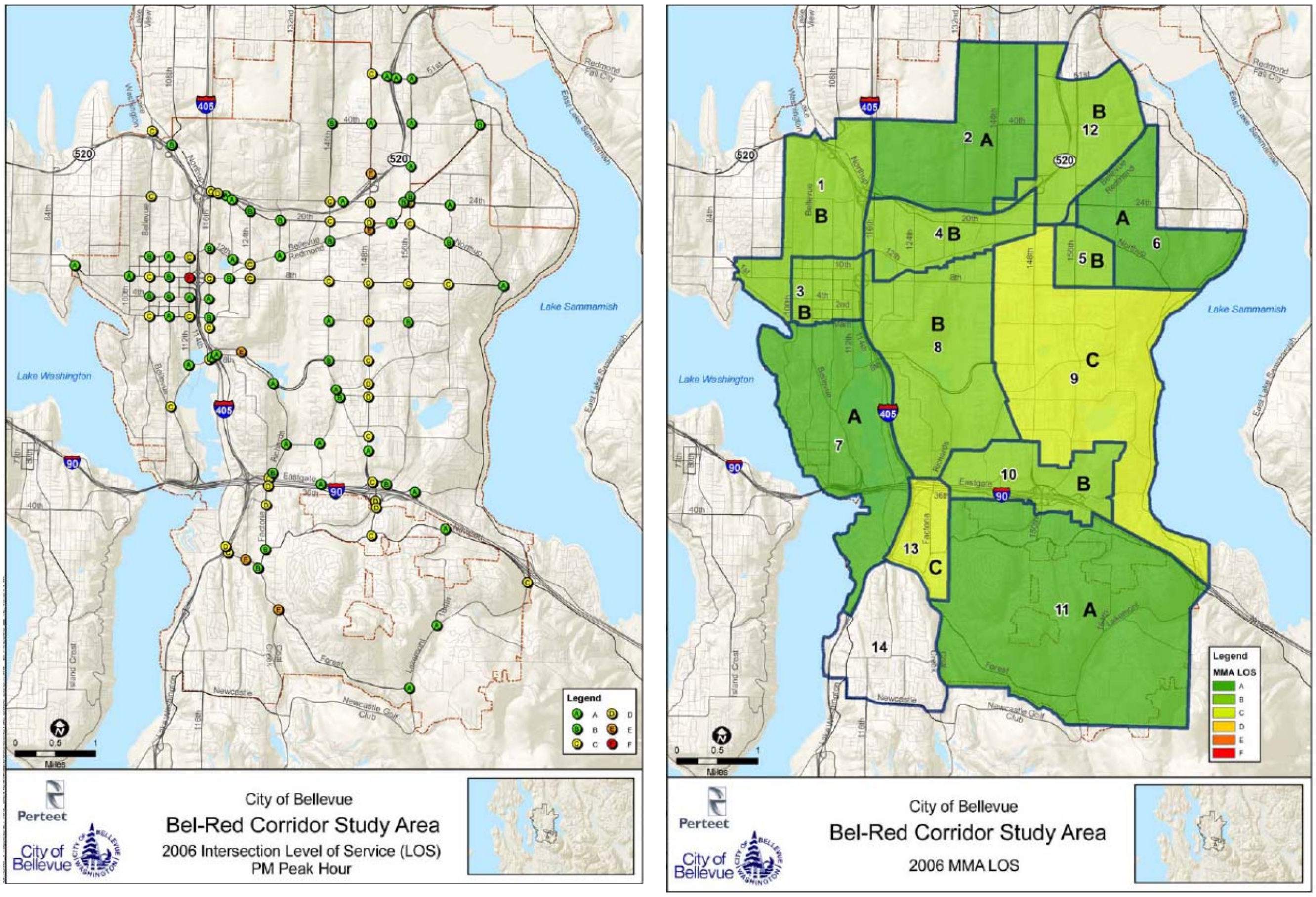


Figure 3 - **2006 Baseline Roadway Concurrency Evaluation.**



Source: BKR model.

Forecast horizon year travel demand and application of evaluation metrics. Bellevue and PSRC, with consultation from Metro staff, shared the tasks of base case future forecasts. Bellevue analysis informed the roadway concurrency evaluation while PSRC analysis addressed the other evaluation metrics and strategy design/testing.

a) ***Roadway Concurrency Evaluation:*** Bellevue forecast analysis determined that in the BKR model in year 2020 the study area would meet concurrency standards (see Figure 4).

b) ***Transit, Bicycle, and Pedestrian Concurrency Evaluations***: see the results of the action scenario analysis beginning on page 43.

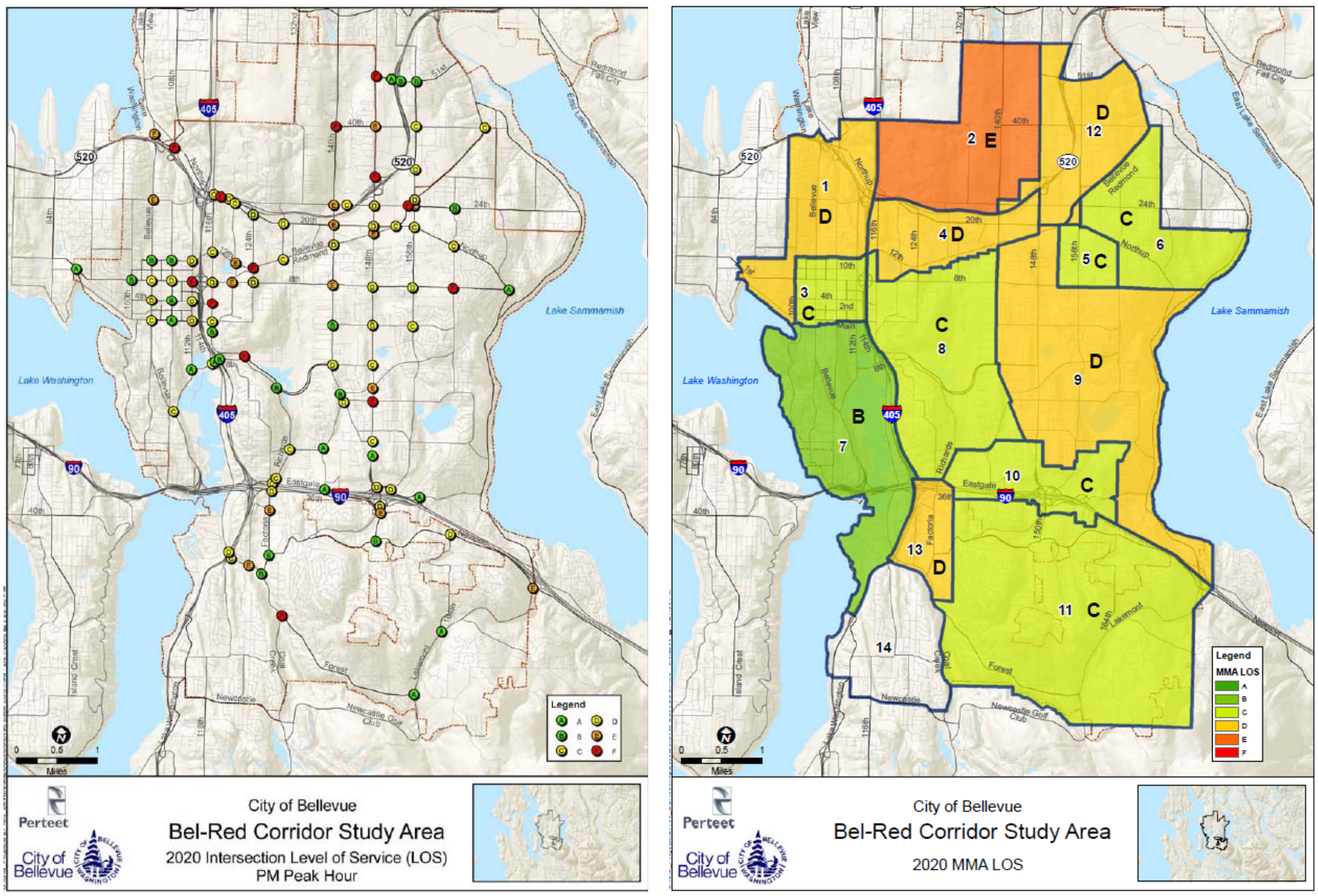
Table 2 - Baseline 2020 travel demand data

2020 Daily Person Trips:

Worktrips to Downtown Bellevue	61,452
Transit mode share from all areas	24%
Worktrips from Downtown Bellevue	12,548
Transit mode share to all areas	29%
Internal work trips	2,413
Transit mode share internal	60%
Total Daily Person Trips	71,587

Source: Bellevue-Kirkland-Redmond Travel Demand Model

Figure 4 - 2020 Base Case Roadway Concurrency Evaluation.



Source: BKR model.

Step 2: Gap/Problem Identification

Since the Bellevue analysis forecasts that the roadway portion of the study area's transportation system will meet concurrency standards in 2020 and since the other metrics have as yet no adopted standards, the project team made the assumption for this pilot exercise that the study area roadway system failed to meet concurrency. The gap and problem identification step of the analysis was carried out as follows:

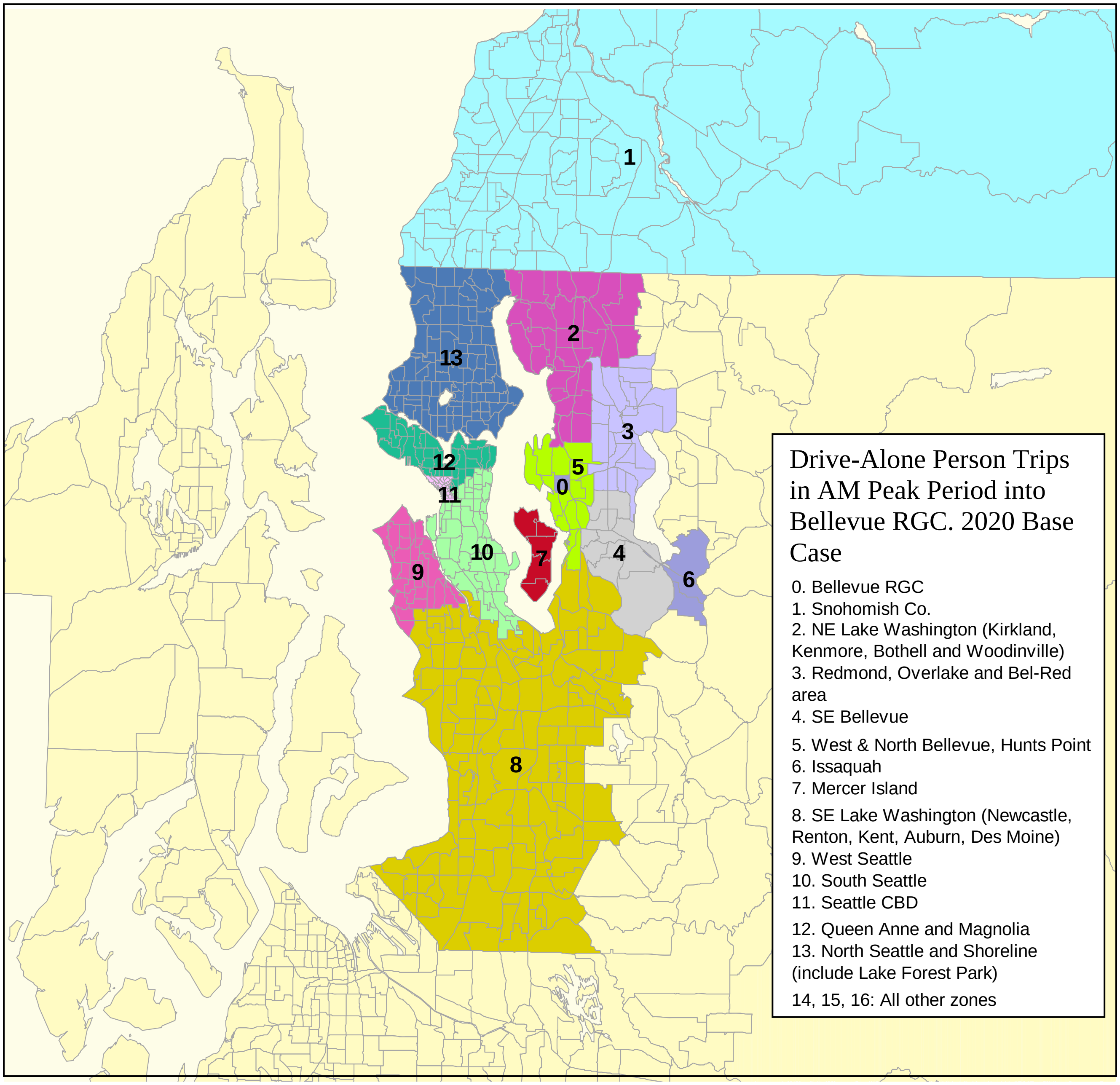
> ***Roadway gap/issues.*** In 2007, the City of Bellevue produced the Downtown Bellevue Growth and Transportation Efficiency Center (GTEC) Plan[5], which identified that a 10% reduction in Single Occupancy Vehicle (SOV) trips applied to their downtown worker population amounts to approximately 5,000 additional persons not driving alone by 2011. In addition, the GTEC plan identified that system-wide the number of peak-hour round trip transit seats available for new commuters to Downtown Bellevue in 2011 would be approximately 2,300. The team used the analysis from Bellevue's GTEC plan as a starting point for deriving a hypothetical roadway person-trip gap for this exercise since the GTEC plan considers the same study area as the Regional Growth Center and treats similar issues. Extrapolating the 5,000 drive-alone work trips figure to 2020 proportional to expected population and employment growth in the study area results in an assumed roadway concurrency person trip gap of 7,000 drive alone trips that should be shifted to other modes in the AM peak period.
>
> ***Transit, bicycle, and pedestrian gap/issues.*** As mentioned in Chapter III the team chose to report these metrics for both the base case and action scenario to illustrate a range of change in the measures. The intent of this choice is to demonstrate a range of measure results across two distinct states of an example transportation system, allowing the reader to make their own judgment as to what concurrency standard would be appropriate for their jurisdiction were they to use these new metrics.
>
> ***Synthesis of gaps and issues.*** Table 3 on the following page shows forecasted trip making into and out of the study area in year 2020 from the PSRC travel model. It illustrates the challenge faced in the strategy design step: the AM period forecast predicts over 63,000 person trips to and from the study area, of which over 30,000 (48%) are drive-alone. To shift 7,000 person trips from drive-alone into other choices, the action scenario must affect 28% of all drive-alone trips and 11% of all person-trips in the AM period.

5 Downtown Bellevue Growth and Transportation Efficiency Center Plan, See Appendix G of this report

Table 3 - PSRC Base Case Modeling Results, AM Peak Period Year 2020

		2020 Baseline - Bellevue MMC AM trip tables by subarea											
Origin subarea	Destination subarea	Drive Alone Vehicles	Car Pool 2 Vehicles	Car Pool 3+ Vehicles	Vanpool Vehicles	Light Trk Vehicles	Med Trk Vehicles	Hvy Trk Vehicles	Transit Persons	Bike Persons	Walk Persons	**TOTAL VEHICLES**	**TOTAL PERSONS**
Bel CBD	Bel CBD	4,348	677	287	0	114	15	13	0	641	3,512	5,454	11,002
Bel CBD	1	172	25	8	0	146	39	8	11	0	2	398	456
Bel CBD	2	828	96	38	0	109	20	13	185	22	70	1,104	1,570
Bel CBD	3	1,463	156	61	0	155	25	17	402	42	110	1,877	2,738
Bel CBD	4	635	65	25	0	56	9	7	188	17	45	798	1,176
Bel CBD	5	2,361	302	133	0	92	13	11	181	189	897	2,912	4,813
Bel CBD	6	130	15	6	0	17	3	2	16	1	7	173	226
Bel CBD	7	198	20	8	0	11	2	1	23	4	10	240	316
Bel CBD	8	420	56	19	0	138	39	10	91	2	2	683	882
Bel CBD	9	53	6	2	0	13	4	2	7	0	0	80	99
Bel CBD	10	302	34	11	0	65	16	11	93	1	3	438	597
Bel CBD	11	186	19	5	0	71	17	5	281	0	0	303	616
Bel CBD	12	260	32	11	0	57	14	5	97	1	9	379	547
Bel CBD	13	340	40	14	0	71	17	5	173	1	7	487	742
Bel CBD	14	210	32	11	0	273	81	12	5	1	6	620	691
Bel CBD	15	9	2	0	0	0	0	8	0	0	0	18	21
Bel CBD	16	206	0	0	0	0	0	0	1	0	0	206	207
Bel CBD	**All Zones**	**12,121**	**1,577**	**640**	**0**	**1,388**	**314**	**130**	**1,753**	**922**	**4,677**	**16,170**	**26,700**
	occupancy	1.0	2.0	3.5	8.0	1.0	1.0	1.0	1.0	1.0	1.0		
	persons	12121	3153	2241	0	1388	314	130	1753	922	4677		26,700
person-trip share		**45.4%**	**11.8%**	**8.4%**	**0.0%**	**5.2%**	**1.2%**	**0.5%**	**6.6%**	**3.5%**	**17.5%**		
Bel CBD	Bel CBD	4,348	677	287	0	114	15	13	0	641	3,512	5,454	11,002
1	Bel CBD	1,737	338	100	2	146	39	8	344	0	0	2,370	3,320
2	Bel CBD	2,480	287	94	1	109	20	13	865	62	41	3,004	4,500
3	Bel CBD	2,467	274	96	0	155	25	17	1,257	107	85	3,034	4,996
4	Bel CBD	1,433	197	71	0	56	9	7	498	59	52	1,773	2,755
5	Bel CBD	3,055	459	182	0	92	13	11	689	392	972	3,812	6,779
6	Bel CBD	257	31	11	0	17	3	2	44	0	1	321	425
7	Bel CBD	528	78	29	0	11	2	1	156	15	13	648	981
8	Bel CBD	1,714	303	92	10	138	39	10	797	14	15	2,305	3,729
9	Bel CBD	243	25	6	1	13	4	2	84	0	0	294	427
10	Bel CBD	455	55	17	0	65	16	11	238	1	2	618	956
11	Bel CBD	46	7	3	0	71	17	5	41	0	0	149	204
12	Bel CBD	347	35	10	2	57	14	5	180	0	1	471	730
13	Bel CBD	1,111	104	24	1	71	17	5	534	0	0	1,334	2,037
14	Bel CBD	2,110	410	123	8	273	81	12	162	1	2	3,018	3,954
15	Bel CBD	156	32	7	0	0	0	9	0	0	0	204	253
16	Bel CBD	0	0	0	0	0	0	0	447	0	0	0	447
All Zones	**Bel CBD**	**22,487**	**3,312**	**1,150**	**25**	**1,388**	**314**	**131**	**6,336**	**1,293**	**4,696**	**28,808**	**47,493**
	occupancy	1.0	2.0	3.5	8.0	1.0	1.0	1.0	1.0	1.0	1.0		
	persons	22487	6625	4027	196	1388	314	131	6336	1293	4696		47,493
person-trip share		**47.3%**	**13.9%**	**8.5%**	**0.4%**	**2.9%**	**0.7%**	**0.3%**	**13.3%**	**2.7%**	**9.9%**		
Total person-trips		**30,261**	**8,423**	**5,262**	**196**	**2,663**	**613**	**248**	**8,089**	**1,574**	**5,861**		**63,190**
person-trip share		**48%**	**13%**	**8%**	**0%**	**4%**	**1%**	**0%**	**13%**	**2%**	**9%**		

Figure 5 **- Trip Origin and Destination Subareas Used for Gap and Strategy Development Steps**



Step 3: Strategy Design and Testing

The project team judged that this example analysis would best demonstrate the full range of tools and techniques if it examined the full range of strategies available to jurisdictions for addressing transportation concurrency issues. It was therefore decided to include strategies from all possible program areas to address the assumed roadway AM period gap of 7,000 person trips.

In carrying out the strategy design and testing the team iterated through a series of model runs that successively layered in different strategies suggested to the team by their examination of the base case model results, the Bellevue GTEC plan, the Bellevue Bicycle/Pedestrian plan, and the base year transit service for the study area. A similar iterative approach would be useful in future applications of this method. For brevity's sake full details of all the iterations have been omitted from this report. The reader should note, however, that the particular order of any iteration is unique to the situation at hand. The example iterations proceeded in this order (see following sections for additional details):

1. Applying parking management, first round transit service strategies, and roadway management strategies.
2. Applying increased vanpooling as a demand management strategy second round transit service strategies.

Since the PSRC travel model, like other common regional models, is not sensitive to the full array of strategies jurisdictions might apply in small areas, the team supplemented the modeling analysis with qualitative analysis of additional strategy areas, including:

- Additional, "non-modelable" transit strategies.
- Transportation Demand Management strategies other than vanpooling.
- Bicycle strategies.
- Pedestrian strategies.

The following sections document the detailed analysis used to address each strategy area.

Design transit strategies. The project team examined base year bus service provisions, the Sound Transit Phase 2 Program, and the Bellevue GTEC plan as background to designing transit strategies for the example analysis. It then conducted market analysis to suggest the type and location of the most potentially productive transit strategies, created a list of strategies, and refined those strategies using a combination of the concurrency evaluation metrics, sketch analysis, and regional travel model analysis.

Transit market analysis. Analysts used the Transit Competiveness Index tool (TCI; see Appendix E for details) to conduct the market analysis which found that Downtown Bellevue has among the highest levels of transit competitiveness with scores of 280 – 466 for all trips from the region. These scores increase significantly to the highest TCI levels of over 2000 when examining more specific Bellevue-related travel corridors. This elevates Downtown Bellevue to among the highest priority transit service locations in the region.

The market analysis found that Downtown Bellevue has significantly higher transit-friendly market segments than is typical regionally. This gives a larger potential transit market share of 71% of the total travel market for Downtown Bellevue versus the 58% of the regional travel market willing to take transit "in the right circumstances".

Since the 13 subareas were formed based on the highest TCI scores for a given travel shed, or corridor with existing bus service each of the 13 has some areas of high transit competitiveness. In addition, all of the 13 Subareas already have some service to Downtown Bellevue, although a transit trip may require one or more transfers.

Table 4 shows all 13 subareas ranked by size of potential transit market as identified by the TCI analysis. The top 6 subareas are all on the eastside immediately adjacent or in City of Bellevue except for North Seattle/Shoreline. These are the "low hanging fruit" for transit service improvements that the TCI analysis indicates would result in significant ridership increases. The remaining 7 subareas have lower overall potential transit markets and may be better served by selective park and rides in the few transit competitive areas.

Table 4 **- 2006 Potential Transit Trip Market Identified by TCI Analysis**

Zone Area	Work Trips	Other Trips	All Trips
Redmond/Overlake/Bel-Red	3,100	20,400	23,500
SE Lake - Newcastle/Renton/Auburn/Des Moines	3,800	12,000	15,800
NE Lake - Kirkland/Kenmore/Bothell/Woodinville	3,100	13,500	16,600
SE Bellevue	2,000	14,900	16,800
West Bellevue/Hunts Pt	1,200	10,000	11,100
North Seattle/Shoreline	2,500	5,000	7,500
Snohomish Co.	1,200	2,200	3,400
Mercer Island	500	3,000	3,500
South Seattle	800	2,600	3,300
Issaquah	600	2,000	2,600
West Seattle	1,000	1,200	2,100
Seattle CBD	100	1,800	1,900
Queen Anne and Magnolia	500	700	1,200
Potential Transit Trips – 13 zones groups	20,100	89,100	109,200

Using the market analysis, the team identified these opportunities for transit strategies:

a) ***Downtown Circulator.*** A strong opportunity for transit to affect mode share is to add a downtown circulator. In other communities, a downtown or regional center circulator has supported development goals while providing transit service for the short (<1/2 mile) trips within the regional center. The potential for a Downtown Bellevue circulator ranges from 1,000 to 6,000 trips a day taken on transit within the 4 TAZs rather than by auto[6]. A local circulator within the downtown and adjacent high density residential areas has potential to increase the local walk mode share in addition to the streetcar/circulator ridership[7].

b) ***East Bellevue to Overlake/Redmond.*** The Bel-Red to Overlake segment along Bel-Red Road and SR 520 to Redmond ranks highest for potential ridership with up to 9% of the trips to Bellevue and 11% of the trips from Bellevue to this zone group attracted to transit[8]. The existing strong work-trip corridor to Downtown Bellevue could be strengthened by increased frequency of mid-day service to capture more of the non-work other trips, and enhancing the existing core service. As East Link LRT service is established and grows incrementally to Redmond, more of the non-work trips may be attracted to the LRT, thereby reducing the need for additional buses operating through Downtown Bellevue from increased off-peak service in this corridor.

c) ***SE Bellevue.*** From the TCI analysis, a gap in service area was identified in SE Bellevue, between Eastgate and Lake Washington near I-90. This area has the greatest opportunity for new local transit service (community connector).

d) ***North Bellevue and West Bellevue/Meydenbauer Bay, South and East Bellevue.*** Additional local service (community connector) to residential neighborhoods between downtown and adjacent freeways to pick up short other (non-work) trips, such as shopping, medical, and especially recreational to Downtown Bellevue. These zone areas had high TCI's in all trip type evaluations. The potential exists to

6 APTA's Public Transportation Ridership Statistics, APTA Ridership Report: Fourth Quarter 2008: King Co. Dept of Transportation (South Lake Union Streetcar) 1,300 daily riders; Sound Transit (Tacoma Link) 3,200; Memphis Area Transit (Riverfront and Main St Trolleys) 2,800 daily riders; Portland Streetcar daily_ridership_graph.pdf (Initial segment loop through Pearl District to Portland State University) 6,000 weekday riders in 2004.

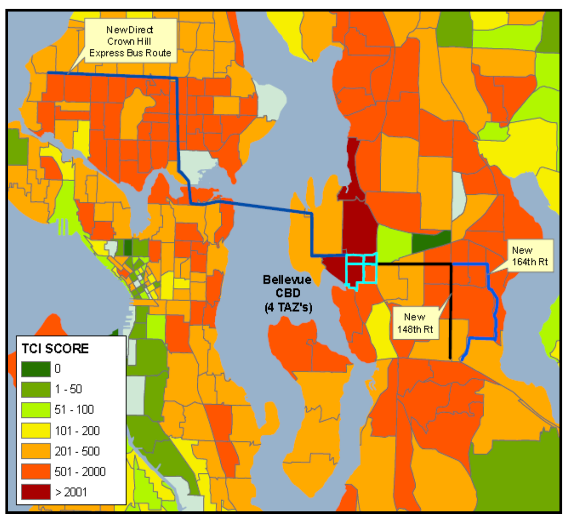
7 Portland Streetcar – The Portland Experience, Development Oriented Streetcars, 2009 APTA/TRB LRT Conference presentation
8 TCI Analysis: % of Total Trips Ranked tab in TCI's of All 6 O-D pairs.xls

reroute some regional/local routes to spread through the neighborhoods to add service off peak.

e) ***North I-405 (Kirkland/Kenmore/Bothell) and South I-405/167(Newcastle/Renton/Kent).*** The areas with the greatest potential for transit ridership outside of Bellevue are immediately adjacent to Downtown Bellevue: and the first few cities immediately north and south of Bellevue along I-405. The highest TCI score outside of Bellevue was the Zone area immediately along Lake Washington in SW Kirkland. This potential exists to add additional service through this area, particularly in the off-peak mid-day to enhance the connection to Downtown Bellevue from downtown Kirkland.

f) ***North Seattle.*** New peak hour express service from Ballard and Crown Hill through Greenlake and the U-District to Downtown Bellevue would serve the growing population who live in North Seattle but work in Downtown Bellevue. For other trips, North Seattle had low TCI scores suggesting low transit competitiveness as a result of low transit demand for other or non-work trips to and from Bellevue, with the exception of the University District which is a strong attractor for work trips from Bellevue and originator of other trips to Bellevue.

Figure 6 **- New bus service suggested by market analysis**



g) ***Work Trips to Bellevue.*** Other locations, such as West Seattle, Queen Anne/Magnolia, South Seattle, Mercer Island had fairly high TCI's (350 – 477) only for the work trips to Bellevue but low volumes of total trips. Currently, West Seattle and Queen Anne/Magnolia suffer from significant transfer penalties because of wait time at transfer points; this may contribute to the small transit demand market for these areas.

h) ***Other findings that did not lead to strategy suggestions.*** Snohomish Co. had moderately high TCI scores (136) for the work trips to Bellevue, but they were spread out in islands of high TCI surrounded by pools of low TCI (below 100), suggesting park and ride express service rather than direct transit service from home to work. For all other trips (other to Bellevue, work and other trips from Bellevue), these locations showed low TCI scores, suggesting low transit competitiveness for non-work trips. The only exception was the Beacon Hill Zone area in South Seattle which showed moderate transit competitiveness for other trips to and from Bellevue, which supports the justification of an East Link LRT freeway stop on Rainier Ave as it heads towards Bellevue.

Transit service design/sketch analysis. The results of the Transit Sketch Planning tool analysis identified the transit service improvements summarized in Table 5. In general, most of the corridors analyzed by the SPT indicated that existing transit service was reasonably quick and direct, that is, transit in-vehicle time was acceptable compared to auto in-vehicle time, and the number of transfers was low. The exceptions were: (1) from North Seattle to Bellevue where the SPT identified a high transfer rate suggesting new direct (no transfer) service which resulted in the addition of route MK801; and 2) East Bellevue to Downtown Bellevue, which the SPT identified long transit in-vehicle time relative to auto travel time. This indicated existing transit in this area is very circuitous, so routes MK253x and MK253y were added to provide a more direct path from East Bellevue to Downtown Bellevue.

In all other corridors, reducing headways to reduce waiting time for transit was identified as the most effecting way to increase ridership. The proposed new headways were calculated by the project team in a manner that illustrates many of the steps that would be used in the transit concurrency evaluation capacity metric:

1. As a starting point the team assumed that half of the drive-alone person-trip gap would be addressed by transit strategies.
2. Staff moved the assumed trips from the drive-alone trip tables to the transit trip tables in the travel demand forecast model and re-ran only the transit assignment module.
3. The result was a transit assignment the assumed number of shifted trips on transit rather than in drive-alone vehicles.

4. Staff then created a table of the bus routes serving the study area from the transit-only assignment to show ridership, vehicle capacity, and headways.
5. Headways of the bus routes were adjusted so that each route met the target load factor of 1.2 and used as inputs to the final regional model analysis.

Service improvements for All Day (Core) Service:

1. The downtown circulator was not analyzed due to the fact that the regional travel demand model underestimates short transit trips that occur in a circulator due to the few number of transportation analysis zones (TAZ) that represent Downtown Bellevue.
2. New service from SE Bellevue, Factoria and east to Lake Washington was added due to the long transit in-vehicle time identified by the SPT due to circuitous bus routes that served the area. New routes, MK253x and MK253y providing more direct service for this area were added. Also the headway on MK921 was reduced.
3. The Bel-Red Corridor to Overlake and Redmond Town Center was identified by the SPT as having good transit service and that the most productive service change would be to reduce headways on existing routes such as the MK220, MK222, MK233, MK249,and MK253.
4. The Northwest Bellevue and Kirkland to Bellevue corridor was identified as having good existing transit service so headways were reduced on routes MK230, MK234, MK237, and ST535.
5. The West Bellevue/Meydenbauer Bay circulator was judged to be too small a service area to be evaluated by the SPT or to be modeled in the regional travel demand model.
6. The SW Bellevue/Beaux Arts circulator represents a service that is smaller than the resolution of the SPT and regional travel demand model and was not analyzed.
7. The University of Washington Transit Center is served by the new MK801 route and by the existing route MK271 that had a headway reduction.
8. The downtown Seattle/Rainier Ave area is served by the Light Rail system in Sound Transit Phase 2.
9. The Factoria/Newcastle area was identified as having good transit service so a shorter headway on route MK240 was assigned to reduce wait time.

Peak Hours Service for Work Trips

1. The Kent to Bellevue transit service on surface routes was identified as having good existing transit service so wait time was reduced with shorter headways on routes ST564, ST565, and modifying route MK167 to stop at the Bellevue Transit Center.
2. New service from Ballard to Bellevue was viewed to be accommodated by existing bus service feeding the light rail service.
3. New direct service was added from Crown Hill to Bellevue, because the SPT identified this corridor as having a high transfer rate, this resulted in route MK801 added.
4. Transit service from West Seattle to Bellevue is accommodated by existing bus routes connecting to light rail service (SPT not used).
5. The Bothell area to Bellevue corridor was identified by the SPT as having good service. Headway was reduced on route MK230 which uses local streets, not I-405.
6. The Kenmore/Juanita to Bellevue area was identified by the SPT as having good bus service, wait times reduces by reducing the headway of route MK234.

Table 5 - Bus Service Modifications and Additions from the Transit Sketch Planning Analysis

Bus Route	Description	Base Headway	2020 Headway	Service Area	Inbound/ Outbound
MK220a	220 REDM-BELLEVUE WB	32	7.5	Redmond	I
MK220b	220 REDM-BELLEVUE EB	40	7.5	Redmond	O
MK222a	222 OVRL-EGT-BELV WB	26	7.5	Overlake	I
MK222b	222 OVRL-EGT-BELV EB	2	15	Overlake	O
MK230a	230 KNGSG-BTC-RED SB	23	20	Wood/Kirk	I
MK230b	230 KIRKLN-BEL TC SB	32	20	Wood/Kirk	I
MK230c	230 KNGSG-BTC-RED NB	26	15	Wood/Kirk	O
MK230d	230 KIRKLN-BEL TC NB	32	15	Wood/Kirk	O
MK233a	233 AVNDL-OVLK-BL SB	26	20	Redmond	I
MK233b	233 AVNDL-OVLK-BL NB	32	20	Redmond	O
MK234a	234 KENMR-KRK-BEL SB	26	15	Wood/Kirkland	I
MK234b	234 KENMR-KRK-BEL NB	26	7.5	Wood/Kirkland	O
MK237	237 WDNV-405-BELV SB	53	30	Kirkland	I
MK240a	240 BEL-NEWC-RENT SB	26	13	Renton	O
MK240b	240 BEL-NEWC-RENT NB	26	15	Renton	I
MK240c	240 BEL TC-NEWCST NB	88	20	Newcastle	I
MK243	243 JC PK-LKC-BEL EB	53	7.5	NE Seattle	I
MK249a	249 BEL-OVRLK-RDM SB	32	7	Redmond	I
MK249b	249 BEL-OVRLK-RDM NB	32	7.5	Redmond	O
MK253a	253 RED-OVRLK-BEL SB	26	20	Redmond	I
MK253b	253 RED-OVRLK-BEL NB	26	18	Redmond	O
MK261	261 OVLK-BTC-SCBD WB	40	15	Overlake/SeattleCBD	I
MK271a	271 ISSQH-BELV-UW WB	26	20	Isasquah/UW	I
MK271b	271 EGATE-BELV-UW WB	40	20	Eastgate/UW	I
MK271c	271 ISSQH-BELV-UW EB	32	20	Issaquah/UW	I
MK271d	271 EGATE-BELV-UW EB	53	30	Eastgate/UW	I
MK342	342 SHRL-BELV-RNT SB	53	7.5	Shoreline/Renton	I
MK921a	921 BELV-SOMERSET SB	53	30	Eastgate/Somerset	O
MK921b	921 BELV-SOMERSET NB	32	20	Eastgate/Somerset	I
ST532a	532 BELVUE-EVERTT SB	15	10	Everett	I
ST535a	535 BELV-LYNNWOOD NB	36	30	Wood/Kirk Lynnwood	O
ST535b	535 BELV-LYNNWOOD SB	36	30	Wood/Kirk Lynnwood	I
ST555	555 ISSAQ-BTC-NGT EB	36	20	Issaquah/Ngate	I
ST556	556 ISSAQ-BTC-NGT WB	36	30	NE Seattle	I
ST560a	560 BEL-STAC-WSEA EB	30	30	W Seattle/Setac	I
ST560b	560 BEL-STAC-WSEA WB	30	30	W Seattle/Setac	O
ST564a	564 S HL-AUB-OVLK NB	45	30	Kent/Auburn	I
ST565a	565 FED-REN-OVRLK NB	30	20	Kent/FedWay/Auburn	I
ST565b	565 FED-REN-OVRLK SB	45	30	Kent/FedWay/Auburn	O
MK630a	630 KNSGT-405-BEL SB	30	20	Kingsgate	I
MK630b	630 KNSGT-405-BEL NB	30	20	Kingsgate	O
MK253x	NEW 164th TO BEL WB	N/A	10	East Bellevue 164th	I
MK253y	NEW 148th TO BEL WB	N/A	10	East Bellevue 148th	I
MK167a	167 AU-KNT-405-UW NB	40	20	Auburn/Kent/UW	I
MK801e	NEW CRHILL-BelRD EB	N/A	15	N Seattle	I
MK801f	NEW CRHILL-BelRD WB	N/A	15	N Seattle	O

Transportation demand management (TDM) strategy design. Drawing upon work from the Bellevue GTEC plan and Transportation 2040 alternatives development, the project team identified the strategies described below as the most likely to produce the desired trip-making effects.

Pricing. PSRC and the City of Bellevue agreed that the most appropriate form of pricing to be tested in the pilot project was parking charges in the Downtown Bellevue study area. Table 6 shows base case parking charges in 2020 as well as the proposed action scenario pricing scheme. According to one iteration of the PSRC travel demand model an average increase in hourly parking costs of nearly 40% and an increase in daily parking fees of 11% across the study area had a relatively small impact on trips to Downtown Bellevue; reducing projected AM inbound SOV demand by 329 trips (-1.5%) while increasing demand for alternative modes.

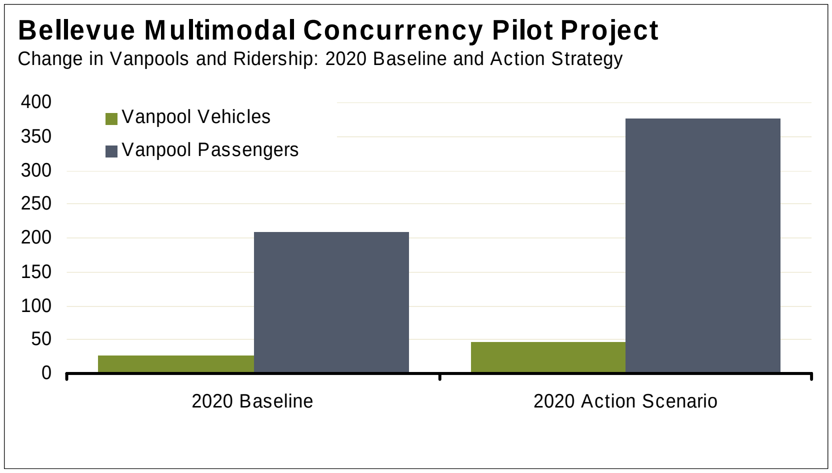
***Table 6* - 2020 Daily and Hourly Parking Rates in Downtown Bellevue TAZ's for the Base Case and Action Scenario**

TAZ ID	Base Daily Rate	Action Scenario Daily Rate	% Increase	Base Hourly Rate	Action Scenario Hourly Rate	% Increase
293	$ 16.49	$ 18.64	13.1%	$ 5.72	$ 7.67	34.2%
294	$ 15.34	$ 16.69	8.8%	$ 5.16	$ 7.01	35.8%
295	$ 12.06	$ 13.47	11.7%	$ 4.04	$ 5.92	46.4%
296	$ 14.56	$ 16.08	10.4%	$ 4.53	$ 6.81	50.4%
Avg.	**$ 14.61**	**$ 16.22**	**11.00%**	**$ 4.86**	**$ 6.85**	**41.68%**

Vanpools. The project team identified significant growth in vanpooling as an essential strategy for meeting trip reduction goals established for the pilot. Baseline estimates indicate that 26 vanpools' destination was within the study area in 2020; translating to approximately 208 daily peak period trips∗. Utilizing regional vanpool growth established for the Transportation 2040 alternatives, the project team determined that an additional 22 vanpools could potentially serve Downtown Bellevue. Based on applying an 8 person load factor, vanpools would meet the mobility needs of 376 peak period commuters in 2020.

∗ PSRC's travel demand model includes and 8 person load factor for all vanpool vehicles.

***Figure 7 -* Change in Vanpool Vehicles and Ridership: 2020 Baseline – 2020 Action Strategy**



Other transportation demand management strategies. In 2006, the City of Bellevue, through a partnership with King County Metro and TransManage, developed the Downtown Bellevue Growth and Transportation Efficiency Center Plan. The plan documents the existing land-use and transportation context as well as inventories planned multimodal transportation improvements. The partnership established an SOV trip reduction goal of removing 5,000 daily peak period trips by 2011 and a menu of transportation demand management strategies that are tailored to the unique mobility options and travel needs of Downtown Bellevue employees and residents. The following tables and descriptions summarize investments in TDM outlined in the Downtown Bellevue GTEC Plan. To view the full Downtown Bellevue GTEC Plan please refer to Appendix G.

Product Subsidies and Discounts. This category contains basic products that support trip reduction efforts to be made available with discounts subsidized by the GTEC. The FlexPass product, in particular, is a key element of the GTEC. The FlexPass is a product available to employers for their employees that provides unlimited rides on Metro bus and Sound Transit. Employers pay based on estimated number of rides taken by their employees. The FlexPass has been shown to increase transit ridership and is offered through the GTEC to employers at a discount level as a cornerstone tool for reducing employees' drive-alone trips. The Home Free Guarantee product is also important for providing assurance to employees that they have a way to travel in case of emergency.

Table 7 **- Product Subsidies and Discounts**

Strategy	Roles/Stakeholders
****FlexPass Discount Incentive (for employers)***: Offer a special price on a FlexPass with a greater-than-normal discount for new or all Area FlexPass customers. Provide a discount in both the first and second years. This will result in a more gradual increase in the cost to the employer over the first three years. *Note: The FlexPass may be replaced with a comparable product following implementation of the Smart Card fare payment system.*	Source of funds: Initially, WSDOT mitigation funds; once this funding stream ends, the cost would be backfilled with GTEC funds. County and TransManage: Administer
Home Free Guarantee: Provide free taxi ride in case of emergency for downtown employees through King County Metro's existing program (pooling the risk). Perhaps have employers contribute a match; assumption is 25%.	County to administer through existing program

*Note: Shaded strategies will be heavily promoted to small employers and/or their employees as a portfolio of options under a brand name.

Services and Education. This category comprises activities the city and its partners will offer in order to assist employers, employees, and property managers navigate the world of non-drive-alone commuting. The 2006 Market Analysis showed that small employer awareness of products, and even of commuting habits of their own employees, was fairly low. Therefore, these strategies are key to raising awareness and assisting the various audiences with services in setting up their programs. In particular, carpool ridematching services (and, secondarily, vanpool) are a cornerstone of the GTEC strategy, which is to promote these modes based on their advantages and room to grow in this market and the limits to how many new riders the transit system can absorb.

Table 8 **- Services and Education**

Strategy	Roles/Stakeholders
****Rideshare Programs and Services:*** Focus on implementing RideshareOnline.com ridematching tool for carpool, commuter van, and custom bus services as a daily mode and as a complement to other modes. In addition, for carpools, utilize the County's Carpool Management Program to register carpoolers, track participation, and interact with users, and promote the program through marketing and outreach.	County: Design and manage Carpool Management Program. Staff for outreach events, program material inventory, signage, and reporting City: Partner advocate TransManage: Local leadership and liaison into employment sites (existing and in development)
****Employer Commute Consulting Services:*** Provide free commute consulting services for downtown employers with 99 or fewer employees. Tie in with branded portfolio of small employer programs in how the offer is presented. Steps include mailing a letter/ brochure, following up with phone calls, offering to meet, and helping to develop program.	City: Program design, with TransManage input; mailing TransManage: Remainder
****TransManage Storefront/Individualized Commute Planning Services:*** Set up a storefront at a downtown location near the Transit Center, such as the Rider Services Building. Activities would include pass sales and free personal assistance in commute planning, covering all non-SOV modes, geared toward individual needs.	Promotion and implementation to be done by TransManage.

***Table 8* - Services and Education (cont.)**

Strategy	Roles/Stakeholders
Employer/Employee Newsletter: Create and distribute a periodic (such as quarterly) newsletter, electronically and in hard copy, with stories to personalize commute experiences, interviews, promotion information, ridesharing/Flexcar partners sought, etc. Distribute to small employers and their employees downtown.	TransManage to produce; other agencies give input as appropriate.
Workshops – How to start a commute benefit program: Offer annual free workshop for employers on how to start an employee commute benefit program, timed with annual Employer Commute Consulting Services outreach (described above).	City: Mailing/web/email notices Trans-Manage to conduct workshop
Workshops – How to get more out of your existing FlexPass: Offer free annual workshop for employers on how to get more out of your existing FlexPass, and what to expect for your renewal.	City: Mailing/web/email notices Trans-Manage to conduct workshop
Zip Code Workshops/Events: Conduct zip code workshops/events on a quarterly basis, inviting residents of several different zip codes per month. Events would be open to all downtown employees and promoted especially to employees of small employers. Staff will present and explain the various travel options, and individuals can meet others in their zip code in order to find carpooling and vanpooling partners. Could be tied into the small employer portfolio brand.	TransManage to design workshops, with input from County and City. TransManage to conduct workshops.
Enhanced Flexcar Services: Set up a special "employer matchmaking" program so that employers can get together and pool their resources to pay up-front guarantee required to initiate a Flexcar, thus lowering the cost for each participating employer. Include production of a map showing where within Bellevue Flexcars are located; assess Flexcar locations and work with Flexcar to locate optimally.	Promotion: Ongoing, all agencies, embedded in other promotions List development and maintenance: TransManage Matching Services: Trans-Manage
Voluntary CTR Site Designation: Allow certain worksites to become voluntary CTR sites. Voluntary CTR employers would become listed with the State as part of the city's CTR site count. They would take part in surveys, submit program reports and have them reviewed, and be eligible to receive assistance and feedback with planning their commute programs.	Funding: State CTR funds allocated for voluntary sites, backfilled with state GTEC implementation funds as needed. Provide Services: County or TransManage
Transportation Management Program (TMP) Education: Work with property managers of TMP buildings on an ongoing basis to make them more aware of their TMP activities and the services that the BDA is providing. Communications should include activities they are currently doing, what is required, and what they need to do that they are not doing. The existence of a legal obligation to perform certain activities can help to make them happen, once they are informed. The strategy to update the TMP code will require further interaction to ensure they are meeting their obligations.	TransManage to do hands-on ongoing communication; paid for building with TMP revenues. City to conduct update of TMP code and perform associated communications with property managers.
Telework Assistance: Use recognition as a Bellevue Leaders Telework category to encourage promotion of this option. Webinar orientation and toolkit development.	City: Integrate into brand/ web efforts. County: Mail letters and CTR employer follow-up. TransManage: Non-CTR employer follow-up.
Welcome Activities: Educate residents, employees, and employers about travel options as they move into Bellevue through toolkits and events and materials such as a walking map.	County: Staffing for events, transit and ridesharing collateral, funding City: Contribute collateral, map development, funding TransManage/Bell. Econ. Partnership: Organize and staff events, contribute TransManage event collateral, delivery of packets, fare media sales

*Note: Shaded strategies will be heavily promoted to small employers and/or their employees as a portfolio of options under a brand name.

Incentives and Rewards. Financial incentives and other rewards are key to making it both economical and enticing for employers and individuals to try something new. There is some overlap with the FlexPass product listed in Table 7.

***Table 9* - Incentives and Rewards**

Strategy	Roles/Stakeholders
***FlexPass Discount Incentive**: See Table 4-1.	
***Incentives**: Offer financial incentives for carpools to support the County's demonstration project to help achieve planned trip reductions on I-405. Additional carpool incentives or encouragement to employers anticipated to continue following I-405 program.	County lead and funding contribution for initial County I-405 program. State - Initial funding to County via I-405 mitigation program. City – Input on program design to supplement I-405 program.
Commute Club: Create an online commuter club open to all Downtown residents and employees who state that they currently drive alone. Members log non-SOV commute trips, and when they reach a certain threshold they are eligible to receive a modest prize such as a $50 gift card. Consider annual re-eligibility.	Promotion & signups: TransManage and City Monitoring of calendars & award distribution: City or County, depending on which agency hosts the commute calendar.
Individual Parking Cash-Out: Offer parking cash-out to individuals. This strategy would be feasible where tenants pay only for the actual parking spaces they use each month. Employers would be required to enroll in the program prior to their employees being eligible. The program would subsidize a three-month trial period during which an individual would give up their space in return for a transit subsidy and additional cash or gift card incentive. Following the three-month trial period, the employee could choose to permanently give up their parking space in return for a transit pass provided by the employer.	TransManage to promote and sign up individuals. City to handle financial administration.
Recognition: Provide employer recognition for outstanding trip reduction efforts; potential venue would be to regularly designate an "Employer of the Quarter" in the employer newsletter. Include a small article that tells the employer's story – what they do, how, and why.	Setup of evaluation criteria: All agencies Implementation: TransManage
In Motion, Phase II: Resident-based trip reduction program offering travel option information and incentives. For Phase II, target new residential units coming on board in 2008-09 and "near-in" residents to downtown	County lead & funding contribution City funding contribution

*Note: Shaded strategies will be heavily promoted to small employers and/or their employees as a portfolio of options under a brand name.

Marketing and Promotions. In order to raise awareness as called for by the Market Analysis, as well as to increase utilization of products and services offered, the following marketing and promotional activities are included in the GTEC.

***Table 10 -* Marketing and Promotions**

Strategy	Roles/Stakeholders
Building-Centered Options: Engage property managers in outreach efforts designed to improve non-drive-alone mode share in their buildings by going above and beyond Transportation Management Program requirements. Tailor incentives according to unique needs of building. Develop relationships with property managers that allow information to be distributed, both electronically and in hard copy, and that allow access/presence in buildings—this program utilizes the property manager as a conduit for communicating with individual tenants and employees in a building.	City-County funding agreement to share costs (30% city, 70% county pass-through federal grant). City agreement with Trans-Manage. TransManage to develop relationships with property managers, communicate with tenants and employees, and enter buildings to perform in-person outreach on an ongoing basis.
FlexPass Mailing/Promotion: Promote Area FlexPass program in Downtown and Greater Bellevue to increase sales and transit/HOV ridership through quarterly mailings, promotion at existing events, and city web integration. (See crossover opportunities with I-405 mitigation incentive programs and small employer workshops.)	City: Contracts County: Staff at events, materials TransManage: Lead for outreach (labor)
Transit Promotion: Increase transit ridership on particular routes using a variety of strategies such as: • Identifying routes with good ridership potential • Mailing materials to surrounding ridership sheds • Providing incentives such as free ride tickets • Promoting service through employers and other networks • Improving signage along a corridor • Developing maps and/or interactive online tools showing route destinations	City lead County and TransManage: Program development support
Communications: Ongoing communication of city's new transportation demand management brand identity and website, developed in 2007. This is a city-wide activity being leveraged as a GTEC tool.	TransManage to perform work under contract with city.
Social Marketing: Use social marketing as a methodology in all efforts and develop distinct campaigns as strategies to target audience segments. This is an ongoing concept that is incorporated into other strategies such as the In Motion residential trip reduction program. In addition, this strategy includes the Partners in Transit program, which is a partnership with a member-based organization to launch a member-based drive-less campaign.	City: Integrate into brand/ web efforts County: Lead for Partners in Transit
I-405 Mitigation: Promotion of TDM programs to mitigate impact of I-405 construction through Bellevue. Specific activities are **Downtown Area FlexPass campaign** (listed above as separate GTEC strategy) and **outreach to workers in the hospitality industry**. Other activities: **vanpool relocation** and **neighborhood In Motion** (residential trip reduction program).	County lead

Market Research. Market research is included in the GTEC in order to ensure that products are suited to the audiences and that strategies continue to reach the appropriate market in an effective way.

***Table 11* - Market Research**

Strategy	Roles/Stakeholders
Expansion of Mode Share Survey: Expand the Mode Share Survey to collect more information from employees of small employers. The online version of the state survey instrument can now be customized. Expand questions in order to better identify levels of awareness, deterrents to non-drive-alone travel, and what would motivate employees of small employers to switch from driving alone.	City-hired consultant to conduct survey
Small Employer Focus Groups: Use employer focus groups to test potential product adjustments and messages; monitor success of small employer program.	City lead, consultant City and County assist in design TransManage: advisory, outreach to participants

Bicycle and pedestrian strategy design. Bellevue recently completed a Bicycle and Pedestrian plan from which the project team took non-motorized strategies for this example analysis. Table 12 summarizes these investments citywide.

***Table 12* - Bellevue Bicycle and Pedestrian Strategies Citywide**

Strategy Type	Description	Existing Mileage	Proposed Additional Mileage
Pedestrian Sidewalk - Residential Street	5 foot-wide sidewalk; should only be built if space does not exist for a buffer such as a planting strip	Data not available	27.1 miles
Pedestrian Sidewalk - Collector Arterial Street	6 foot-wide sidewalk and 4 foot wide planter strip	Data not available	52.9 miles
Pedestrian Sidewalk - Major/Minor Arterial Street	8 foot-wide sidewalk and 4 foot-wide planter strip; width of sidewalks should be increased to 8 feet, in order to accommodate higher pedestrian volumes and encourage walking	Data not available	5.9 miles
Pedestrian Sidewalk - Downtown Principal Connection	12 foot-wide sidewalk and 4 foot-wide planter strip	Data not available	3.16 miles
Bicycle Lane	5 feet wide: striped area running parallel to street corridors, solely designated for the use of one-way bicycle traffic	33.2 miles	80.4 miles
Bicycle Shoulder with Fog Line	14 foot-wide travel lanes; vary in width and has no bicycle stenciling	26.1 miles	20.9 miles
Shared Shoulder with Fog Line	14 foot-wide travel lanes; fog line is essentially a bike shoulder, also used by parked vehicles and/or pedestrians. This type of facility should only be recommended for areas where traffic and speed levels are very low.	43 miles	20.9 miles
Shared Wide Outside Lane	variable travel lane widths; This type of bicycle facility is the same as the wide outside lane facility, differing only in that on-street parking might be present, and no sidewalks. This type of facility should only be recommended for areas where traffic and speed levels are very low.	23.2 miles	1.12 miles

Table 12 - **Bellevue Bicycle and Pedestrian Strategies Citywide (cont'd)**

Strategy Type	Description	Existing Mileage	Proposed Additional Mileage
Off Street Paths	10-14 feet wide	11.5 miles	37.9 miles
Pedestrian Walking Trail	2-6 foot-wide trail; soft surface walking trail	Data not available	12.5 miles
Multiple Use Gravel Trail	8-12 foot-wide trail	Data not available	4.4 miles
Boardwalk	6-10 foot-wide trail; typically built in wet areas to facilitate access, drainage and wildlife passage year round	Data not available	4.3 miles

Roadway strategy design. Roadway strategies include both capacity and system management efforts and were taken from the City of Bellevue and regional long-range transportation plans. They consist of:

Projects within the Study Area from the Regional TIP Complete by year 2010
NE 2nd St. Roadway Enhancement, Bellevue Way to 112th Ave NE add center left turn lane (widen to 5 lanes) One Way Couplet - 106th & 108th Ave NE, NE 12th St. to Main St. [convert to one-way couplet] - 106th Ave NE (three general purpose lanes northbound) - 108th Ave NE (three general purpose lanes southbound plus northbound transit only contraflow lane between 4th & 8th)
Project within the Study Area from the Regional Plan Complete by year 2010
<MTP-3666> NE 8th St., 106th Ave NE to 108th Ave NE (add one WB general purpose lane)
Project within the Study Area from the Regional TIP Complete by year 2020
124th Ave NE, NE 4th St. (8th) to Northup Way: add center left turn lane (widen to 5 lanes), change to principal arterial)
Project within the Study Area from the Regional Plan Complete by year 2020
<MTP-3477> Bellevue Way HOV Lanes & Transit Priority, I-90 to S Bellevue P&R

Results of "action scenario" strategies and their effect on trip-making in the study area. The project team conducted analysis of the proposed strategies in the PSRC regional travel demand model and supplemented the quantitative model results with qualitative assessments of strategies to which the model is not sensitive. The following sections report the modeling and qualitative analysis culminating in an integrated set of findings.

Action Scenario Travel Demand Modeling. The modeling results (see Table 13) show a net reduction of about 1,200 drive-alone person trips with a corresponding increase in vanpool person trips of over 180 and transit person trips by over 1,800.

Table 13 **- PSRC Action Scenario Modeling Results, AM Peak Period Year 2020**

Origin subarea	Destination subarea	Drive Alone Vehicles	Car Pool 2 Vehicles	Car Pool 3+ Vehicles	Vanpool Vehicles	Light Trk Vehicles	Med Trk Vehicles	Hvy Trk Vehicles	Transit Persons	Bike Persons	Walk Persons	TOTAL VEHICLES	TOTAL PERSONS
Bel CBD	**All Zones**	11,745	1,570	645	0	1,388	314	130	2,077	925	4,726	**15,792**	**26,701**
All Zones	**Bel CBD**	21,547	3,267	1,159	47	1,388	314	131	8,012	1,307	4,744	**27,854**	**48,414**
All Bellevue Trips		**29,052**	**4,149**	**1,508**	**47**	**2,662**	**613**	**248**	**9,914**	**1,582**	**5,886**	**38,279**	**63,911**
	occupancy	1.0	2.0	3.5	8.0	1.0	1.0	1.0	1.0	1.0	1.0		
	persons	29052	8298	5278	378	2662	613	248	9914	1582	5886		63,911
	person-trip share	**45.5%**	**13.0%**	**8.3%**	**0.6%**	**4.2%**	**1.0%**	**0.4%**	**15.5%**	**2.5%**	**9.2%**		
difference from base		-1209	-125	16	182	0	0	0	1825	7	24		

Additional Transit Analysis. In addition to the actual travel model analysis the project team concluded that there was enough basis in the literature and observed transit performance from actual implementations to justify additional trip-making responses to: (a) the strategies that were actually modeled and (b) additional strategies to which the model is not sensitive. The rationale and proposed trip effects include:

Factoring the forecast transit person trip share up based on the market research informing the TCI. This involved factoring the forecast 1,800 trips up by 22% to reflect the 71% of the travel demand market that is willing to take transit for trips accessing Bellevue versus the regional average of 58% of the travel demand market willing to take transit "in the right circumstances". This market share adjustment results in a total of 2,200 AM peak hour transit riders in 2020 to Bellevue. The rationale for this adjustment is that the TCI incorporates knowledge about the preferences of users to which the travel model is insensitive.

Accounting for the effects of the proposed downtown circulator bus. With high TCI scores of 200 – 500 within the 4 downtown TAZs, a strong opportunity for transit to affect mode share would be to add a Downtown circulator to connect the shopping areas with the office and residential areas. The City of Bellevue has already developed a proposal with King County Metro for a circulator bus to start tentatively in 2010 with forecast ridership of 550 daily riders (770 riders in 2020).

Accounting for the effects of the proposed transit ride free zone in the downtown area. Offering free transit service within a specified zone is a successful trip reduction strategy that has been used in other locations.. In Portland, TriMet added the all day Fareless Square in 1975 and expanded it in 2001. In Seattle, King County Metro established their 6 am to 7 pm Ride Free Area which included the Downtown Transit Tunnel when it opened in 1992. Based on the KCM 20% figure and a downtown Bellevue ridership base case of 8,100 in 2020 from the PSRC TDM model, 1,600 new riders would be attracted to transit solely because of the Ride Free Zone in 2020.[9]

Examining range of results in the transit concurrency evaluation metrics. Table 14 reports the results of the proposed transit metrics in the Base Case versus the Action Scenario. Recalling that the pilot project has assumed a concurrency issue caused by roadway congestion and therefore a desire to shift trips to transit, the results show that the metrics are sensitive to potential changes to the transit system. The weighted average load factor decreases significantly and average frequency was increased (as shown below the headways are cut in half, on average). The slight average speed decline shown was found, upon examination of the modeling results, to be caused by the additional transit riders in the Action Scenario using the slower of the available routes.

Table 14 **- Transit Metrics Results**

Metric	2020 Base Case	2020 Action Scenario
Weighted Average Load Factor	0.67	0.44
Weighted Average Speed	15.1	14.5
Weighted Average Headway	31.2	14.9
Reliability	Not Examined (roadway LOS is proxy)	
Service Coverage	97%	97%
Bus Service Hours	4,790	10,408

Accounting for potential effects of TDM strategies beyond the parking charges and vanpool increases incorporated in the modeling.

Quantitative analytic tools are not yet sensitive to the impacts of TDM strategies on the transportation system. Typically, when discussing these impacts the analyst draws upon empirical data and evidence of behavioral change from a comparable program that has been implemented in a similar setting in another part of the country or world. The *potential* impacts are often represented as ranges or as elasticities measuring the change in behavior due to the implementation of a given strategy, highlighting the inexact nature of these analyses. There are a variety of sources for this information including implementing agencies that have experience with the TDM strategy in question, or clearinghouse organizations such as the Victoria Transport Policy Institute

9 The PSRC's Regional Travel Demand Model does not capture incentives for short transit trips. Therefore the project team looked to the experiences of other transit agencies. From Sound Transit's Ride Free Area Analysis (February 2009), they found that 23% of the forecast Central Link LRT ridership in the Downtown Transit Tunnel consists of trips beginning and ending in the Ride Free Area. Sound Transit also found that charging a fare at tunnel stations results in a loss of 43.4% of all tunnel riders or approximately 9.1% of all LRT riders. In that analysis, they cite that King County Metro has found that 85% of the downtown Ride Free Area ridership would not use transit if they had to pay, even a nominal sum of $ 0.80. In addition, for Fall 2008, KCM averaged 20% of all its Downtown Seattle Ridership (trips ending, beginning or within Downtown) was solely within the Ride Free Area during fare free hours.

(VTPI) or the Center for Urban Transportation Research (CUTR) that provide access to data and qualitative analyses of numerous TDM programs.

While methods of estimating the impacts of TDM are less precise than a quantitative approach, proposed strategies are generally developed through a process of assessing the available transportation infrastructure and using professional judgment to design the most appropriate program or service. Policy guidance may also dictate an end result which may have a direct affect on the strategies selected. In the case of the Bellevue GTEC, strategies were crafted in response to extensive market research and tailored to the unique mobility options available to employees and residents in Downtown Bellevue.

Accounting for potential effects of bicycle strategies. While no methods exist to estimate of bicycle ridership specifically in response to bicycle infrastructure or program investments, full build out of Bellevue's Pedestrian and Bicycle Transportation Plan shows promise in terms of the provision of facilities necessary to induce bicycle use. As shown in Table 15, under the full build out scenario, nearly all of the study area will be accessible to bicycles through off road trail facilities while the presence of both off-road and on-road facilities increases significantly. Current literature suggests that there is a large potential trip response to this large additional supply of bike facilities. In addition both metrics are clearly sensitive to the supply of bicycle facilities in the transportation system and therefore potentially useful in future applications of this method. However, as mentioned in Chapter IV, the topic of non-motorized performance is evolving rapidly and other factors should be considered as the development of other potential metrics matures.

Table 15 **- Bicycle Metric Results**

Metric	Definition	Base Case (Study Area)	Base Case (City Wide)	Action Scenario (Study Area)	Action Scenario (City Wide)
Off-road Facility Presence	Ratio of area of quarter-mile buffer around all off-road non-motorized facilities to total land area within the study area	26%	20%	98%	53%
On-Road Facility Presence	Ratio of centerline miles of roadway with bicycle amenities to centerline miles of roadway (including local roads) without bicycle amenities	4%	13%	35%	25%

Accounting for potential effects of pedestrian strategies. Similar to the question of bicycle issues no trip-making estimation methods that capture the effects of pedestrian-related facility improvements are in common use. However, as shown in Table 16. the study area is already positively positioned to attract walking as a potential mode with nearly the entire area accessible with adequate sidewalks and over half of the area having pedestrian friendly intersections. While this shows less potential affect of pedestrian investments on trip-making within the study area the metrics agree with anecdotal evidence of the extent of the study area's existing pedestrian infrastructure, indicating that the metrics are sensitive to pedestrian facility supply. As with bicycling, national discussions of pedestrian performance metrics are evolving rapidly. While this proposal appears to provide metrics sensitive to strategy choices, other factors should be considered in any future application of this method.

Table 16 **- Pedestrian Metric Results**

Facility Type	Metric Definition	Base Case (Study Area)	Base Case (City Wide)	Action Scenario (Study Area)	Action Scenario (City Wide)
sidewalk presence	Ratio of block faces with complete, passable sidewalks to the total number of block faces within the study area	88%	28%	84%	37%
Intersection density	Number of walkable intersections (including crosswalks) per square kilometer in the study area compared to total roadway intersections per square kilometer	54 int/km^2 walkable; 62 int/km^2 total	data not available	54 int/km^2 walkable; 62 int/km^2 total	data not available

Analysis Findings Summary. Table 17 on the following page summarizes the AM period trip-making effects of all the Action Scenario strategies and assumptions taken together.

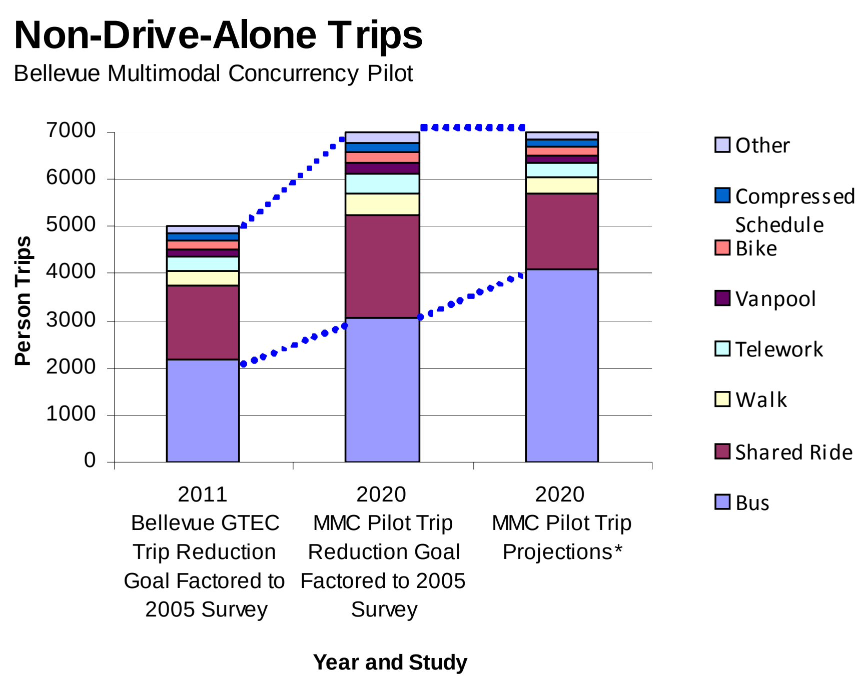
***Table 17 -* 2020 Drive-Alone Trip Reduction Expected from Action Scenario Strategies**

Trip reduction goal extrapolated from Bellevue GTEC plan		7,000
Model-able strategies, including: • transit frequency increases (headway decreases) • new bus routes • vanpool program expansion • roadway efficiency and capacity investments		1,800
Additional increment of ridership expected from the modeled transit investments but to which the model is insensitive		400
Downtown circulator bus		300
Ride-Free zone		1,600
Travel Demand Management programs, including: • Product Subsidies and Discounts • Services and Education • Incentives and Rewards • Marketing and Promotions • Market Research		Unknown
Bicycle strategies		Unknown
Bicycle Lane	5 feet wide: striped area running parallel to street corridors, solely designated for the use of one-way bicycle traffic	
Bicycle Shoulder with Fog Line	14 foot-wide travel lanes; vary in width and has no bicycle stenciling	
Shared Shoulder with Fog Line	14 foot-wide travel lanes; fog line is essentially a bike shoulder, also used by parked vehicles and/or pedestrians. This type of facility should only be recommended for areas where traffic and speed levels are very low.	
Shared Wide Outside Lane	variable travel lane widths; This type of bicycle facility is the same as the wide outside lane facility, differing only in that on-street parking might be present, and no sidewalks. This type of facility should only be recommended for areas where traffic and speed levels are very low.	
Multiple Use Gravel Trail	8-12 foot-wide trail	
Pedestrian strategies		Unknown
Off Street Paths	10-14 feet wide	
Pedestrian Sidewalk - Residential Street	5 foot-wide sidewalk; should only be built if space does not exist for a buffer such as a planting strip	
Pedestrian Sidewalk - Collector Arterial Street	6 foot-wide sidewalk and 4 foot wide planter strip	
Pedestrian Sidewalk - Major/Minor Arterial Street	8 foot-wide sidewalk and 4 foot-wide planter strip; width of sidewalks should be increased to 8 feet, in order to accommodate higher pedestrian volumes and encourage walking	
Pedestrian Sidewalk - Downtown Principal Connection	12 foot-wide sidewalk and 4 foot-wide planter strip	
Pedestrian Walking Trail	2-6 foot-wide trail; soft surface walking trail	
Boardwalk	6-10 foot-wide trail; typically built in wet areas to facilitate access, drainage and wildlife passage year round	

Since the analytic tools do not yet exist (although there is hope for the future) to forecast trip response from all potential strategies in jurisdictions' toolkits, this analysis could not show a quantitative finding that the assumed trip reduction goal would be conclusively reached in the Action Scenario. However, the findings that the quantifiable trip response from transit is large (4,100 of the 7,000 goal) and that the proposed alternative mode concurrency evaluation metrics are sensitive to specific changes in the transportation system are encouraging.

For comparison purposes Figure 8 charts and Table 18 tabulates the trip-making findings. The 2011 GTEC trip reduction goal (5,000 trips) factored to the 2005 Bellevue Downtown Mode Share Survey appear first for reference; the factored GTEC goal extrapolated to 2020 appear next; last appear the transit trip changes forecast or asserted by the Action Strategy analysis. The non-transit trip-making numbers shown for the Action Scenario are shown for illustrative purposes. They are again proportional to the shares observed in the 2005 survey that would be necessary to achieve the 7,000 drive-alone trip reduction assumption used in this pilot study after deducting the quantified transit response.

Figure 8 **- Non-Drive-Alone Trips – Comparison of GTEC Plan and MMC Study Assumptions and Results**



* Transit project as quantified in subsection (f); other modes factored from 2005 study

Table 18 **- Non-Drive-Alone Trips – Comparison of GTEC Plan and MMC Study Assumptions and Results**

	Non-SOV trip target	Bus	Shared Ride	Walk	Tele-work	Vanpool	Bike	Compressed Schedule	Other
2005 Bellevue Survey (share)	100%	44%	31%	6%	6%	3%	3%	3%	3%
2011 Bellevue GTEC Trip Reduction Goal Factored to 2005 Survey	5,000	2,188	1,563	313	313	156	156	156	156
2020 MMC Pilot Trip Reduction Goal Factored to 2005 Survey	7,000	3,063	2,188	438	438	219	219	219	219
2020 MMC Pilot Trip Projection*	7,000	4100	1,611	322	322	161	161	161	161
2020 MMC Pilot Trip Projection (Share)*	100%	59%	23.0%	4.6%	4.6%	2.3%	2.3%	2.3%	2.3%

* Transit project as quantified in subsection (f); other modes factored from 2005 study

In conclusion, the application of the proposed multimodal concurrency method demonstrates that it could be meaningfully applied to a real case where the jurisdictions involved have access to the necessary tools and data.

V. Institutional Issues

While state, regional, local and transit policy guidance supports multimodal planning, multiple institutional issues are obstacles to implementation. The City of Bellevue, King County Metro and PSRC developed the following list of institutional issues with additional comments provided by the city of Seattle. This list is broken into three sections:

- Organizational Responsibilities,
- Technical Approach, and
- Regional issues

Organizational Responsibilities

In recent years there has been progress in the coordination between transit agencies and local jurisdictions with regards to land use and transportation planning. However, a challenge remains in that no single agency has ultimate responsibility for both land use and transit planning decisions.

- ***Strengthened legislation.*** Even though the Growth Management Act does allow for alternative transportation mitigation measures to satisfy concurrency level-of-service (LOS) standards, jurisdictions have been reluctant to impose them. They fear of being unable to demonstrate the nexus between a development's impact and infrastructure constructed elsewhere in the subarea. Multimodal concurrency measures will need to overcome this hurdle as well. As the necessary analytic tools are not yet mature, a legislative approach (declaring the validity of non-motorized and transit infrastructure, as well as transportation demand management strategies to mitigate development) would be worth considering.
- ***Long-term, dependable mobility partners.*** For example, Downtown Bellevue and other activity centers in the region rely increasingly on transit service to meet mobility goals. Jurisdictions will have confidence to approve development in a multimodal regulatory concurrency scenario only if they have assurance that transit will be a long-term, dependable mobility partner.
- ***Secure funding sources.*** Secure funding resources are essential to ensure that transit agencies are able to be long-term, dependable partners in concurrency with jurisdictions.
- ***Effective performance measurement.*** The City of Seattle's transit plan has an ongoing monitoring component for several transit service performance measures. While the city would be reluctant to have these included in a concurrency measure due to a lack of local control, these measures will continue to play a role in identifying where service investments are desired.

- ***Coordinate land use and transportation planning.*** When a coordinated land use and transportation planning approach is pursued, infrastructure and service responsibilities should be explicitly defined between cities and transit agencies. Transit agencies would likely be responsible for transit service (seat capacity, routes and frequency). Cities would likely be responsible for assessing and mitigating roadway concurrency, as well as providing potential capacity improvements to support transit. Each partner would be jointly responsible for coordinating and implementing transit-supportive infrastructure such as transit signal priority (TSP), or HOV and queue jump lanes.
- ***Jurisdiction investment in transit supportive capital improvements.*** Because local jurisdictions do not control transit service provision, multimodal concurrency should consider transit elements local jurisdictions can control as a means of satisfying concurrency transit levels of service. Examples include providing capital improvements in the right of way (curb bulbs, queue jumps, business access and transit [BAT] lanes, etc.) and operational improvements (e.g., signal timing) to satisfy concurrency level-of-service requirements.
- ***Recognize private transit services.*** Transit planning will also need to recognize and anticipate that employers may create private transit service as a TDM measure (e.g., Microsoft Connector or the University of Washington Health Sciences Express).

Technical Approach

- By identifying the gap, the analyst can propose to make strategic investments that will enhance transit's role in the mobility of people to and within the study area. Capacity and frequency are measures that have been suggested as ways to quantify multimodal concurrency. Though each measure is helpful, there are also the following limitations:
    - Capacity: A focus on capacity is concerned only with relieving overcrowded transit service at specific times of the day, particularly during the peak period. This may not facilitate the ultimate goal of providing maximum transit mobility to and within a community.
    - Frequency: Additions to an already congested roadway network will only marginally improve the competitiveness of transit.
    - Speed and reliability: Because multimodal concurrency is meant to provide additional mobility as the roadway becomes too congested to accommodate an acceptable vehicle level of service, a measure that identifies a transit speed or reliability deficiency will guide municipalities toward transit priority treatments that they can control, that are within the institutional framework of vehicular concurrency, and that will add significantly to the relative competitiveness of transit. San Francisco employs a transit impact fee approach that considers not only new transit trip generation by development, but also considers impacts on transit speed and reliability caused by new auto trip congestion. Impact fees

collected may be used for additional transit service or transit-supportive capital investments. Similarly, a multimodal concurrency approach could allow speed and reliability or passenger amenity (shelter, real time information, etc.) investments by local jurisdictions or developers to mitigate impacts necessary to meet transit concurrency LOS.

- ***Coordinate transit level-of-service with roadway level of service.*** Establish a level of service (LOS) metric for transit service that is consistent with and compatible with measures of LOS for general purpose capacity used by cities *(NOTE: Not all cities use volume/capacity ratios, or intersections, as their level of service measure. Some (like Renton) use travel time, for example)*. Consider two components for transit LOS:
  - Transit vehicle capacity (120% of seating).
  - Transit service frequency (no less than 30-minute peak hour headway).
- ***Establish non-motorized levels-of-service.*** Better quantifying the non-motorized component of the commute would allow the inclusion of these modes into Regulatory Concurrency assessments. Planning Concurrency sets up the potential for a greater non-motorized mode share with land use patterns, bicycle facilities and sidewalks. However, in Regulatory Concurrency non-motorized modes are not accounted for in approving development because non-motorized levels-of-service do not exist and the current generation of analytic tools is not sensitive to the capacity and implications of non-motorized improvements.
  - Other multimodal assessment tools (including the soon-to-be released Multimodal Level of Service tool in the 2009 Highway Capacity Manual) have limitations. The new Highway Capacity Manual method does a much better job of addressing the user experience when assigning an LOS standard, but the method does not balance the issues across modes very effectively. The data needed to support these methods can also be difficult and expensive to collect. The City of Seattle has used a number of other tools and approaches, including implementing a Complete Streets ordinance and developing a voluntary mitigation payment system for development based on subarea plans.
- ***Consider modifications to parking regulations and code.*** Availability and costs for convenient parking are key determinants in travel mode choice. Rather than measuring intersection LOS for autos, a multimodal concurrency approach for an individual project could factor in parking provisions (amount of spaces and fees) that are at levels compatible with sustainable transportation system development.

- ***Consider how to measure person delay.*** Developing a reliable tool to measure person delay would be an excellent outcome of this work. We also recommend sharing the findings of this pilot with the Institute of Transportation Engineers for consideration when they next update their trip generation tables.

- Impact fees and local control of municipal roadways may be better tools for managing right-of-way than mandating additional transit service. If, as with vehicular concurrency, multimodal concurrency began with assessing the infrastructure needs of a specific community for transit, this would encourage the development of specific transit pathways through that community. It would do so by elevating, at the municipal level, the discussion of:
    - Transit signal priority treatments
    - Stop placement
    - Bus bulbs
    - Passenger amenities
    - Repurposing of existing right of way
    - Transit lanes
    - On-street parking
    - Transit speed
    - Improvement of vehicular and transit conflicts
- ***Do not limit a multimodal concurrency approach to peak travel periods.*** The current concept of multimodal concurrency is to limit the multimodal measures to the peak period. A multimodal concurrency approach that does not consider midday concurrency is inconsistent with the policy direction of Metro and will undervalue the transit benefits within a given community. Many of the types of medium-or high-capacity transit services that could fill the necessary peak period mobility needs (i.e., light rail or bus rapid transit) are intended to be all-day transit services. These transportation assets should receive credit for the mobility they provide regardless of when they provide it.

  Transit will not become the mobility resource it could be if it is limited to peak period service. Metro's experience has shown that the productivity of midday services can be competitive with peak period services. To the extent that there is any need for midday concurrency, it should include a multimodal component.

- ***Alternative technical approaches.*** Currently, San Francisco is investigating an auto trips generated (ATG) measure. It assumes all auto trips have negative impacts (congestion, emissions, safety, etc.). Because impact fees would be collected on every vehicle trip, developers would be motivated to build types of development that minimize auto trips, by proximity to transit and/or by investing in other modal infrastructure and TDM. Efforts are underway to establish a nexus between development and these types of investments and strategies, as well as to evaluate how impact fee charges might be established. The Puget Sound region should follow San Francisco's activities, as an ATG approach could obviate the need for multimodal concurrency.

Regional Coordination

- ***Synchronize planning horizons.*** Jurisdictions and transit agencies currently have different long-range planning horizons. For both regulatory concurrency and planning concurrency, these would have to be synched up and integrated to ensure that transit service, transit-supportive infrastructure, and roadway improvements are available concurrent with new development.

- ***Transit serves multiple jurisdictions and activity centers.*** Long transit routes serving regional growth centers may traverse one or more other jurisdictions. Improvements made to transit-supportive infrastructure within centers may be rendered less effective if there are transit bottlenecks in another portion of the route that are not addressed.
    - Capacity constraints are dynamic. There may be choke points in the transit network where capacity is critical but other parts or directions of the route that are not. How transit capacity and demand are aggregated is important.
- ***Focus mobility improvements where they are needed***. Based on projected land use assumptions, some regional growth centers will require more mobility improvements than others. If an automated system is considered in the future, a tiered system of ranking the centers based on forecast residential and employee density per acre might be a starting point.
- ***Focus on the big picture, not just service investments.*** A multimodal concurrency process that only focuses on service investments could result in transit plans that are not well integrated with the region at large and create unnecessary tension between transit providers and local jurisdictions.

VI. Key Findings and Potential Next Steps

Key Findings

- In growth centers, all modes are needed to meet travel demand.
- Citizens and employers care about how the transportation system performs – exempting dense areas from concurrency does not address this.
- What's important is the use of alternative modes, not the just the capacity provided. Market analysis is key to evaluating strategies that work.
- Transit metrics need to include multiple dimensions in order to address all factors that affect transit performance.
- Roadway, transit and land use planning need to be done together and reinforced with investment decisions to ensure that local growth can be supported.
- Long-range planning focus: How can future growth within centers be adequately served by all modes (while recognizing the need to translate the long-term approach into an approach that can be used for Regulatory Concurrency)?
- Suggested process for conducting Regulatory or Planning Concurrency analysis:

  Step 4) Identify total person trip demand in established horizon year based on projected growth.

  Step 5) Conduct a Gap Analysis based on current and planning capacity to determine the person-trip "gap" for all modes.

  Step 6) Conduct an Action Scenario analysis (design/testing of transportation demand management (TDM), transit improvements, transportation system management (TSM), non-motorized investments, pricing, and general purpose roadway capacity expansion) including transit market analysis, to propose the most efficient transit service configuration to meet projected travel demand.

Potential Next Steps

- "Multimodal Concurrency" is a complex concept. The Legislature has made several changes to the statute which move in the direction of multimodal concurrency, however there has not been a comprehensive rewrite of transportation planning or Regulatory Concurrency requirements which states clear intent as related to how multiple modes of transportation are to be incorporated into concurrency. The Legislature may want to consider such an amendment to clarify their intent.

- Current practice demonstrates that transit agencies and local jurisdictions are working together to coordinate long-range transportation planning efforts. However, no formal framework under the state's Growth Management Act exists that would ensure roadway and transit level-of-service standards in local comprehensive plans are coordinated with transit agency short- and long-range planning. Such a legal framework could help to ensure that growth centers are adequately served by transportation needed to make them work.
- Incorporating a cost/benefit analysis in the planning-level multimodal concurrency analysis would be useful to underscore the efficiencies associated with multimodal transportation investments.
- Establish a multimodal concurrency approach in concert with a regionally coordinated, and locally implemented, set of institutional planning principles that support the context for its implementation. To this end, the Puget Sound Regional Council should pursue resources to support a new element in its Work Program. The focus of this work will be to explore implementation of this pilot methodology in a way to support the Vision 2040 emphasis on mobility within, and access to, centers. This project, in order to be successful, would be done in a collaborative fashion with the legislature, local jurisdictions and transit agencies.
- Further explore how the proposed metrics respond to a range of input. For example, the transit metric output is based on a ridership assumption. Analyzing how this output changes based on different assumptions would give jurisdictions more information on which to base a transit concurrency standard.
- Further explore the potential for additional emerging pedestrian and bicycle metrics to measure useful dimensions of concurrency goals.
- Monitor developments and research in the area of TDM programs with the goal of understanding the potential impacts of specific demand management efforts.