



DATE: July 3, 2012
TO: Bellevue Transportation Commission
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SUBJECT: Downtown Transportation Plan Update

INTRODUCTION

The update to the Downtown Transportation Plan will address mobility issues and challenges and support Downtown growth looking out to 2030.

On July 12, 2012, in a two-part discussion, staff will provide a review of the subarea-level 2030 travel demand results, and will review preliminary recommendations to address some issues identified by the community related to the pedestrian experience at Downtown intersections.

PART I: BKR TRAVEL DEMAND MODELING RESULTS

At the Commission meeting on June 14, staff reviewed how the 2010 base year transportation model was established, the travel demand modeling assumptions to build the 2030 baseline, the land use assumptions for 2030, and the types of transportation projects that could be “tested” through a measures of effectiveness evaluation. The Commission requested a list of the “reasonably foreseeable” transportation system projects that are embedded in the 2030 baseline – please see Attachment 1. Known transportation projects that are not in the “reasonably foreseeable” transportation system like the NE 6th Street extension, and new projects may be selected for analysis to address capacity issues identified in the modeling.

Select modeling results will begin to tell the story about Downtown mobility in 2030. In this memo and for presentation/discussion on July 12 is some BKR model background and some key observations on trips that have a Downtown destination and originate in defined geographic areas. In the future we will talk about trips that are internal to Downtown. The “measures of effectiveness” will help organize the modeling results as follows:

- Private Vehicle Occupants
 - Percent of vehicle trip ends in Downtown
- Pedestrians
 - Percent of total daily person trip ends
- Transit Riders

- Percent of total daily trip ends
- Sustainability
 - Percent non-SOV daily work trips
 - Percent non-SOV total daily trips

Downtown Land Use Data for BKR Model Application

For the Downtown Transportation Plan Update analysis we will consider daily person trips moving to, from and within downtown. Land use is the source of demand (person trips) in the travel demand model. The 2030 land use forecast for Downtown Bellevue provides for a total employment of 70,300 and residential population of 19,000. Employment and population forecasts for areas outside of downtown are derived from the Puget Sound Regional Council and from Kirkland, Redmond and other jurisdictions.

BKR Model Downtown Trip Patterns Summary

Daily motorized person trips are the modeled result of trip generation and trip distribution, the first two steps in the traditional four-step travel demand model. Step three is mode choice. The chart in Figure 1 has data from these elements.

Specific attention is given to the motorized trips in order to see travel patterns derived from the land use. These travel patterns can be displayed as “desire line” maps which we will present on July 12. This helps show travel demand before modal components are assigned. Not commonly cited, this information is important for planners as well as policy makers to see as we are doing forecasting. Figure 1 displays the total daily person trips produced for each situation.

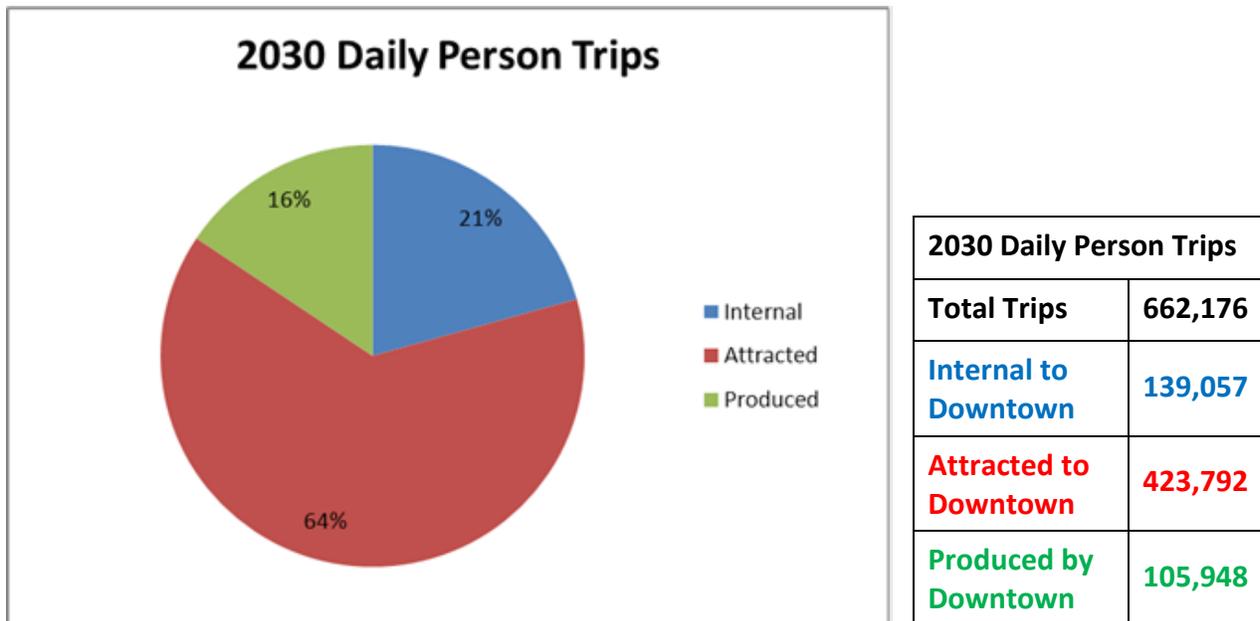


Figure 1

Figure 1 shows all trips related to Downtown. It is clear that the biggest portion of travel demand is trips attracted to Downtown. These trips are made by people who do not live Downtown but come Downtown for work, shopping, recreation, etc. About 425,000 of these trips will be made every day in 2030. The components of these trips attracted to Downtown are:

- Work trips made to Downtown from home
- Trips made from work or other stops to the Downtown for any purpose
- Trips from homes outside the Downtown to the Downtown for any purpose other than work.

The most frequent trip pattern is the home-to-work trip. It may not be the same route or mode everyday but has the potential in many cases to be repeated up to 10 times a week for about 50 weeks, accounting for about 500 trips a year. Next would be school trips which occur 10 times per week for roughly 360 trips per year. Non-home based trips and home based other trips are more varied as seen in the travel surveys.

This first phase of travel demand analysis informs the measures of effectiveness for the 2030 Baseline and provides a comparison with the 2010 Base Year. Additional analysis is being done on trips internal to Downtown and we will report on those trips in a subsequent meeting.

PART II: PEDESTRIAN MOBILITY

As a component of Downtown Bellevue mobility, walking will be an increasingly significant portion of the number of daily trips internal to Downtown, and also a key element of economic vitality and Downtown livability.

Measures of Effectiveness – Pedestrian Mobility

The approved Measures of Effectiveness for pedestrian mobility include both quantitative and qualitative measures. Much of the focus of this memo is on the components of the “Intersection Crosswalk Rating” and the quality of the pedestrian experience.

Modeling of Pedestrian Activity

Pedestrian trips are anticipated to substantially grow and will account for an increasing percentage of the total daily internal trips in Downtown Bellevue – especially non-home based trips. The sheer quantity of walking coupled with the wide range of walking abilities requires our attention in terms of the capacity and the quality of the pedestrian infrastructure. Other factors related to the experience of walking in Downtown Bellevue are related to the type of land use along the sidewalk – land use factors will be addressed separately through the Downtown Livability Initiative.

Economic Vitality

In mixed use urban centers such as Downtown Bellevue, the pedestrian is a significant contributor to the economy. Economic vitality and vibrancy are enhanced through pedestrian-oriented land uses and generous and safe pedestrian facilities that encourage walking. Whether the pedestrian arrives Downtown in a car, on transit, on a bicycle, or if the pedestrian lives downtown, the pace of their walk and the flexibility walking affords allows for enjoyable and often spontaneous shopping, dining and socializing.

Livability

The Downtown Subarea Plan contains a number of policies and projects that address the interface between livability and walkability. The following policies provide guidance for consideration in developing project ideas to enhance the pedestrian environment:

- **Policy S-DT-1.** Emphasis shall be placed on Downtown livability, with provisions made for the needs, activities, and interests of Downtown residents, employees, shoppers, and visitors.
- **Policy S-DT-35.** Create a pedestrian environment with a sense of activity, enclosure, and protection.
- **Policy S-DT-47.** Reinforce the importance of the pedestrian in Downtown Bellevue with the use of a series of signalized midblock crossings. Consideration should be given to the design of adjacent superblocks, consideration of traffic flow, and the quality of the pedestrian environment when implementing mid-block crossings.
- **Policy S-DT-54.** Provide incentives to reinforce unique characteristics of Downtown Districts to create pedestrian-scaled, diverse, and unique urban lifestyle experiences and options.
- **Policy S-DT-107.** Create connections along public sidewalks and mid-block connections that link key parks and open spaces and include dispersed recreation opportunities and urban plazas where appropriate.
- **Policy S-DT-159.** Enhance the mobility of pedestrians and bicyclists Downtown by improving signals and crosswalks at intersections and mid-block locations.
- **Policy S-DT-162.** Provide pedestrian linkages through superblocks that help create a finer-grained pedestrian network.
- **Project #601.** Improve pedestrian facilities by completing a network of sidewalks in Downtown where they are missing, providing connections from surrounding neighborhoods, enhancing pedestrian signals and crosswalks, and removing obstacles on sidewalks. The interim sidewalk width where they are currently missing should be at least 8 feet.

Community Comments

Through community outreach for the Downtown Transportation Plan Update, staff learned about a number of issues related to pedestrian mobility. From all of the information gathered, including input from two “walking audits” conducted and documented by Feet First, staff identified four distinct components of pedestrian mobility that the Downtown Transportation Plan Update will address: intersections; mid-block crossings, sidewalks; and through-block connections. This memo will focus on intersections.

The “Transportation Issues Scoping Report”, January 2012, documents the community input provided through the various outreach activities conducted in the Summer and Fall of 2011. A supplement to the report is a summary of the two walking audits held in December.

Comments Related to Intersections

Key issues and comments regarding the Downtown pedestrian environment at intersections are as follows – not all of which are long-range transportation planning issues but may represent some opportunities for early implementation:

- Crosswalk bars are worn off in many places
- Crosswalk width is too narrow at some intersections to accommodate the number of pedestrians who are crossing
- Vehicles encroach into the crosswalk
- Drivers making right turns sometimes don’t pay not enough attention to pedestrians in the crosswalk
- Crossing time seems too short to some people- especially across wide arterials
- Wait time for pedestrians at the corner seems too long
- Pedestrian push buttons are needed to actuate the “walk” signal rather than the signal providing an automatic walk

Project Ideas for Intersections

From a long-range planning and policy perspective, the issue of the quality of the pedestrian experience is fundamental to creating a more walkable and vibrant Downtown Bellevue. To simply “accommodate” the anticipated number of pedestrians is requisite. Staff recommends that some pedestrian facilities do more than accommodate pedestrians – rather they should provide them with an exceptional environment. A “measures of effectiveness” evaluation will help staff and the Commission weigh the trade-offs as specific project ideas are further developed.

Project ideas for intersections are grouped into three main categories; signalization and timing; crosswalk typology; and intersection geometry.

Intersection Signalization and Timing

Typically in Downtown Bellevue, a pedestrian must push a walk button to get the traffic signal to recognize that someone wants to cross the street. This signal “actuation” is similar to the embedded pavement loop that detects the presence of a car and sends a message to the signal that a motorist wants to proceed through an intersection. With the implementation of the SCATS signal technology at all Downtown intersections, the signals are responsive to both pedestrians and motorists. When no pedestrians are present, the signal responds to the vehicle demand; with pedestrians in the mix, the signal allocates time to them.

Still, pedestrians express frustration when they push the button and have to wait with the “don’t walk” while cars proceed in the same direction of travel with a green light. The question arises as to why a pedestrian can’t cross along with the cars. The answer has to do with walk time and crossing distance – the crosswalk must be clear of pedestrians before opposing traffic is allowed to proceed. SCATS allows for a “walk” signal to appear when the button is pushed if sufficient time is left in the signal cycle for a pedestrian to cross– otherwise the pedestrian will have to wait until the next cycle. For safety and operational purposes, pedestrian push-buttons are likely to remain at most Downtown Bellevue intersections.

We have heard from some pedestrians that the wider Downtown streets seem to take forever to cross. The “walk” cycle is set assuming a standard walk speed of 3.5 feet per second, which is based on guidance from the Manual for Uniform Traffic Control Devices (MUTCD).

Countdown signals help the average pedestrian adjust their pace when crossing the street. But for some, the standard crossing time is not adequate and the street may become a barrier to mobility. These same wide streets are important for auto, transit and freight mobility, so the comprehensive solution may not be as simple as extending the walk time by employing a slower walk speed.

Project Ideas:

- Install countdown pedestrian signal heads, audible pedestrian signals, and standardize the location of pedestrian push-buttons at all Downtown intersections
- Consider the effectiveness of implementing an automatic “walk” phase on certain legs of intersections of high pedestrian demand and where an exceptional pedestrian environment is intended
- Consider an “all walk” signal phase at certain intersections where pedestrian demand warrants and adverse effect on traffic operations is not significant
- Use the measures of effectiveness to evaluate the trade-offs of factoring in a slower walk speed - focusing on certain intersections where demand exists and where an exceptional pedestrian experience is desired

- Consider providing a leading pedestrian interval at additional high-demand intersections (currently at 102nd Ave NE/NE 8th St, and 110th Ave NE/NE 12th St) - that would allow pedestrians to proceed before the cars

Intersection Crosswalk Typology

Standard intersection crosswalks in Downtown Bellevue measure 10 feet between the outside of two parallel white bars. An advance stop bar for through traffic is typically not provided. Comments from pedestrians indicate that there is an interest in exploring alternatives to the standard, both in terms of width and typology. Crosswalk types can vary in style, location, width, and materials to serve the needs of the pedestrian in the context of the intersection. When proper design is employed, crosswalk types that are different than the standard can increase pedestrian and driver awareness. However, too many different variations can be confusing.

At some intersections at times of heavy pedestrian demand, the standard crosswalks do not accommodate all of the pedestrians within the white bars. Where there is a long signal cycle pedestrians gather at the corner waiting to cross, and when they do cross they may move in a cluster that expands beyond the parallel white bars. Cars that approach closely or encroach into the crosswalk may cause pedestrians to go around the front or the back of the car outside of the crosswalk.

Project Ideas:

- Employ crosswalk design components that will help to create an exceptional pedestrian experience at key intersections
- Provide wider crosswalks at locations of high pedestrian demand
- Consider installing a stop bar in advance of the crosswalk to help reduce automobile encroachment into the crosswalk

Intersection Geometry

Certain geometric components of the intersection affect the pedestrian experience in ways that are not included in the discussion of signalization and crosswalks. Project ideas related to crossing distance and direction, plus space for queuing are included below.

Project Ideas:

- Decrease pedestrian crossing distance using curb bulb outs at intersections where on-street parking or other curbside use can be transformed into pedestrian space
- Provide adequate space on the corners for pedestrians to gather as they wait for the opportunity to cross

NEXT STEPS

At the next scheduled Commission meeting on September 12, 2012 we will continue review of the BKR modeling results and of preliminary pedestrian project ideas.

ATTACHMENT

1. "Reasonably Foreseeable" 2030 transportation system projects

ATTACHMENT 1

2030 Baseline Transportation Network

BKR Travel Demand Model

Downtown Transportation Update

King County Interstate and State Routes

Facility	Title	Location	Detail
I-405	SR 520 to SR 522 (Bellevue to Lynnwood Improvement Project)	SR 520 to NE 85th St	Add one lane SB from SR 520 to NE 85th St resulting in 5 lanes (1 HOV & 4 GP or 2 HOV & 3 GP) in this section.
		NE 85th St to NE 70th St	Add one lane NB between NE 70th and NE 85th Streets resulting in 5 lanes (1 HOV & 4 GP or 2 HOV & 3 GP) in this section.
		NE 124th St to SR 522	Add one lane NB and SB from NE 124th St. to SR 522 resulting in 5 lanes (1 HOV & 4 GP or 2 HOV & 3 GP) in each direction. Includes Managed Lanes buffer. Managed Lanes: Should the decisions be made to implement Managed Lanes they could be incorporated
		NE 132nd St Interchange	Rebuild the structures over NE 132nd St. Construct a new half interchange to and from the north at NE 132nd St in Kirkland.
	I-90 to SR 520	I-90 to SR 520	Add one lane NB and SB between I-90 and SR 520 resulting in 7 lanes NB (1 HOV, 5 GP & 1 Aux. or 2 HOV, 4 GP & 1 Aux.) and SB (1 HOV, 4 GP, 1 Aux & 1HOV outside) or (2 HOV, 3 GP, 1 Aux. & 1 HOV outside).
		Main St Bridge	Reconstruct the Main Street bridge.
		SE 8th St Interchange	Construct NB and SB braided crossings for the on and off ramps on the north legs of the SE 8th St Interchange.
	SR 169 to I-90	SR 169 to I-90	Add lanes NB and SB and rebuild the existing roadway from SR 169 to I-90, including the 4 ft. HOV buffer, resulting in 6 lanes (1 HOV & 4 GP & 1 Aux or 2 HOV & 3 GP & 1 Aux) in both directions.
		N 3rd St Interchange	Modify or rebuild N 3rd St. I/C (to accommodate future direct ramp to SR 169).
		SR 900 Interchange	Modify or rebuild SR 900 I/C.
		NE 30th Interchange	Modify or rebuild NE 30th I/C.
		NE 44th Interchange	Modify or rebuild NE 44th I/C (to accommodate future HOV Direct Access).
		112th St Interchange	Modify or rebuild 112th St I/C (to accommodate future flyer stop and park & ride expansion).
		Coal Creek Parkway Interchange	Modify or rebuild Coal Ck Pkwy I/C; add lanes NB and SB and rebuild the existing roadway half way to the 112th St interchanges in the south and all the way to I-90 in the north.
		SR 169	Construct SB I-405 to SB SR 169 direct connection ramp.
		Sunset Blvd	Realign and reconstruct undercrossing at Sunset Blvd.
		SR 900 to NE 30th	Construct NB auxiliary lane between SR 900 and NE 30th.
	I-90 Interchange and Braided Ramps	Add NB I-405 to EB I-90 and EB I-90 to SB I-405 braided ramps between Coal Ck Pkwy. and I-90.	
	I-405 Hot Lanes	I-405	Hot Lanes Implemented on I-405
	I-90	Two-way Transit and HOV Operations Stage 3	Rainier Ave S. to 80th Ave SE
SR 520	I-5 to SR 202 (SR 520 Bridge Replacement)	I-5 to Montlake Blvd	Construct new six lane connection between I-5 and Montlake Blvd. This includes reconstruction of the Portage Bay Bridge. Construct a westbound to southbound freeway-to-freeway Core HOV Connection at the I-5/SR520 interchange.
		SR-520 Bridge	Construct new six lane bridge and approaches from the west end of the floating bridge to Evergreen Point Road on the east side.
		Evergreen Point Road to 108th Ave NE	Add HOV lanes eastbound between Evergreen Point Road and 108th Ave. Move existing HOV lanes and upgrade to full standard lanes to the inside and add a direct HOV access at 108th Avenue.
		108th Ave NE to SR 202	Restripe existing eastbound and westbound HOV lanes from the outside to the inside lane.
SR 509	SR 509 Extension to I-5	SR 509 to I-5	Construct a four lane divided freeway on a new alignment, construct new I-5 interchange and add general purpose lanes on I-5 from 320th St. S to the new SR 509 alignment. Specifically, in SB direction; add 3 lanes to SR 516, 2 lanes to 272nd St. and 1 lane to 320th. In NB direction, adding 1 lane from 272nd to SR 516, and 3 lanes from SR 516 to the new SR 509/I-5 interchange).
SR 99	SR 99 Viaduct Replacement	SR 99/S Holgate St to S King St - Viaduct Replacement	Remove and replace the seismically vulnerable viaduct by adding new SR 99 on and off ramps, constructing a new undercrossing at S. Atlantic St, constructing new bicycle/pedestrian paths, signing, illumination, utilities, and drainage.
		SR 99/Central Waterfront Viaduct Replacement	Construct a bored tunnel to replace the viaduct with a total of 2 lanes in each direction.
		SR 99/Viaduct Surface Restoration & Construction Transit Center	Demolish the existing Alaskan Way Viaduct structure on Seattle's central waterfront and construct facilities that mitigate the impacts to traffic and parking resulting from the demolition. Included is widening and improvements of the Alaskan Way surface street so that it can accommodate increased daily trips.

Pierce County Interstate and State Routes

Facility	Project Title	Location	Detail
SR 161	36th to Jovita Widening	36th to 24th St E 24th St E to Jovita	Widen to 5 lanes (creating 5 lane roadway with center two-way left turn). Add Lanes is programmed for completion in 2011, but majority of work likely to be done by 2010.

2030 Baseline Transportation Network

BKR Travel Demand Model
Downtown Transportation Update

Bellevue Arterials

Project Title	Location	Detail
Northrup Way Corridor Improvements	NE 24th St to 108th Ave NE	This project will construct bike lane and sidewalk improvements on Northrup Way between NE 24th Street and 108th Avenue NE, and may also include a center turn lane and planting strips.
130th Ave NE Center Turn Lane	Bel-Red Rd to NE 16th St	Add two-way left-turn lane, resulting in 3-lanes.
148th/150th Ave NE Widening	WB I-90 on ramp to south of Eastgate Way at I-90 off ramp	Widen by extending the third SB lane on 148th Avenue SE from the on-ramp to WB I-90 to south of Eastgate Way at the I-90 WB off ramp.
NE 4th St Extension	116th Ave to 120th Ave NE	Extend NE 4th St to 120th Ave NE with 4 vehicle lanes, bike lanes, sidewalks and grade separation for BNSF RR crossings.
Bel-Red Road	NE 20th St to NE 24th St	Ultimate cross section will be 5 lanes with two lanes each direction, a center turn lane, and bicycle lanes each direction.
110th Ave NE	NE 6th St to NE 8th	Widen 110th Ave NE to 5 lanes with sidewalks.
120th Ave NE Improvements	Phase 1: 300 - 700 Block	Widen the existing roadway to five lanes, two lanes in each direction with center-turn lanes pockets, from the 300 block to the 700 block. Bike lanes and sidewalks will be included.
	Phase 2: NE 8th St to NE 12th St	Extend, realign and widen 120th Avenue NE from south of NE 8th Street thru NE 12th Street to accommodate a five lane roadway with 5-foot wide bike lanes, 5-foot wide landscaping and 5-foot wide sidewalk on both sides of the street (Phase 2). Phase 2 includes all intersection improvements at NE 8th Street and Old Bel-Red Road.
	Phase 3: NE 12th St to Northrup Way	Continue the five lane section with bike lanes from Phase 2 from NE 12th St to NE 18th Street. Improvement north of NE 18th Street will accommodate a four lane roadway with a multi-purpose path on the west side of 120th Avenue NE. Improvements at NE 15th Street will be coordinated with the proposed alignment of Sound Transit's East Link light rail line.
110th Ave NE	NE 12th St to 1600 block	Widen to five lanes north of existing intersection to Children's Hospital driveway.
NE 8th St Realignment	108th Ave NE to 106th Ave NE	Realign the roadway to the south to better utilize the new westbound travel lane (between 108th and 106th Avenues NE; funded in CIP) and preserve the existing large sequoia tree.
NE 15th/16th St Extension	Zone 1: 116th Ave NE to 120th Ave NE	4-lane roadway (2 EB and 2 WB) and multi-purpose path (north side). Connects with MPP west of 116th Ave NE crossing at NE 12th St.
	Zone 2: 120th Ave NE to 124th Ave NE	4-lane roadway (2 EB and 2 WB) with north side short term on-street parking and drop-off/pick-up zone at plaza.
	Zone 4: 130th Ave NE to 136th PI NE	1-lane EB and WB. Adjacent to both sides of light rail station. Bike lanes and sidewalks are included on each side.
	Zone 5: 136th PI NE	1-lane EB and WB. Adjacent to both sides of light rail station. Bike lanes and sidewalks are included on each side. No on-street parking.
129th Ave SE Extension	SE 38th St to Newport Way	Extend 129th Ave SE from SE 38th St to Newport Way
148th Ave NE Master Plan (Phase 1)	NE 22nd St to SR 520 EB on-ramp	Convert right turn lane to through lane from NE 22nd St to SR 520 EB on-ramp. Widen 148th Ave NE to accommodate new right turn lane between NE 22nd St and NE 24th St.
	SR 520 EB on-ramp	Modify SR 520 EB on-ramp to allow for an HOV by-pass from the NB through lane
	NE 20th St and NE 24th St	Add second EB and WB left turn lanes at NE 24th St and NE 20th St. Extend the NE 24th St WB right turn lane approximately 500' east of 148th Ave NE