

City of

Bellevue



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DATE: December 5, 2012; Revised for December 13, 2012
TO: Bellevue Transportation Commission
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SUBJECT: Downtown Transportation Plan Update - Traffic

INTRODUCTION

The update to the Downtown Transportation Plan will address mobility issues and challenges and support Downtown growth and urban livability looking out to 2030. On December 13, 2012, modeling staff will review Downtown intersection level of service.

Downtown Intersection Level of Service

Over a number of months staff has built and implemented a traffic operations model – using the program “Dynameq” - for doing dynamic traffic assignment (DTA). To put it into context with the BKR Travel Demand Model and the VISSIM Model that have been used and presented in earlier city studies, DTA is the mid-level version of the three scales of models – macro, meso, and micro.

It is important to note that the BKR model, with the same assumptions, is used as the travel demand forecast base for both DTA and VISSIM modeling. BKR continues to be the foundation of the all of the city’s traffic forecasting.

With this background on the approach used to compare 2030 Baseline with a 2030 “Build” Scenario, three sets of side-by-side comparison graphics will be presented. Each series is represented as the traffic modeled in 5 minute increments between 5-6pm. The first series will show the link volume occupancy in more detail than was shown in the EMME link volume and capacity display. Next are the queue length series of displays. These show the node impedance that is calculated in this mid-level model that we can’t show from the EMME model. The third set is from the intersection delay that can be used for intersection Level of Service comparison.

Since this topic was last reported there were some changes to the project lists which contributed to the amended results in these tables. It was decided to include these two additional projects in both the Baseline and the Build scenarios:

NE 2nd Street: Widen to 5-lanes between Bellevue Way and 112th Avenue NE

I-405: HOT lanes extend from NE 6th to Renton at SR 167; one in each direction

The portion of NE 2nd Street crossing over I-405 from 112th Ave NE to 116th Ave NE was not included at this time. The HOT lane extension is viewed as one of the most worthwhile transportation projects in the region.

What appears to occur is that the level of service decreases as traffic increases from the 2010 base year to the 2030 baseline, aka the “No-Build”. Some measures are shown in Table 1:

Table 1

Downtown	2010 Base Year	2030 No Build	2030 Build
Hourly Volume	82,307	111,865	119,122
Avg Intersection Delay (sec)	27	56	48
LOS	C	E	D
Total Delay Hours in Peak Hour	609	1739	1604

By adding the set of projects listed in the 2030 “Build” scenario there would be some improvement in Downtown traffic level of service, even though most of these projects would be located outside of Downtown. Table 2 has some overall comparisons of the impact of growth on the vehicular traffic system for both the 2030 scenarios:

Table 2

Downtown	Change over 2010	2030 No Build	2030 Build
Hourly Volume	More Served	36%	45%
Avg Intersection Delay (sec)	Average Delay Increase	110%	82%
LOS	Level of Service Change	-2 Grade Levels	-1 Grade Level
Total Delay Hours in Peak Hour	Total Delay Hours Increase	185%	163%

More detail and graphics representing the Dynameq intersection level of service results will be presented at the meeting. *Note: Table 1 & 2 are updated in this version.*

2030 “Build” Scenario Project List

The projects listed below are those that have been advanced, both in terms of design and funding, to the point where they can be realistically added to the transportation network that directly and indirectly supports Downtown Bellevue mobility. These 2030 “Build” scenario projects have evolved through planning efforts outside of the Downtown Transportation Plan Update, for instance the Bel-Red Subarea Plan, Bellevue-Redmond-Overlake Transportation

Study (BROTS), Mobility & Infrastructure Initiative, East Link, and the I-405 Master Plan. The following projects were added for testing to the 2030 baseline:

- **SR 520: New ramps to/from east @ 124th Avenue NE** to complete the interchange
- **SR 520:** Slip ramp eastbound under 148th Avenue NE to connect to 152nd Avenue NE
- **I-405:** Southbound braid from SR 520 to NE 10th Street
- **I-405:** Add one auxiliary lane (collector/distributor lane) each northbound and southbound, between SE 8th Street and SR 520. The portion north of Main St will be accomplished through restriping not additional widening.
- **NE 6th Street:** Extend existing HOV facility across I-405 and connect to 120th Ave NE
- **Bellevue Way SE:** Add one HOV lane southbound from 112th Avenue SE to the South Bellevue Park & Ride to align with the forthcoming SB HOV lane between there and I-90.

Conclusions from Modeling Regarding Downtown Roadway Capacity

Results from travel demand modeling and operational analysis are one component of the measures of effectiveness evaluation for Downtown Bellevue mobility. Overall long-term mobility will involve providing the right facilities that balance the evolving needs of pedestrians, bicyclists, transit riders (who are also pedestrians and bicyclists at some points in their trip) and automobile drivers and passengers (who, as we have seen, walk in significant numbers in Downtown Bellevue). Using a number of different modeling tools and based on assumptions for 2030 land use and the future transportation network, staff can conclude the following regarding roadway capacity:

- 2030 Baseline congestion within Downtown Bellevue is not gridlock
- 2030 “Build” scenario regional and local projects built outside of Downtown Bellevue will improve accessibility to the regional roadway system (I-405) and connectivity to east Bellevue and Bel-Red.
- 2030 “Build” scenario projects will help reduce congestion within Downtown, especially on east-west arterials
- Additional general purpose vehicular capacity beyond the 2030 “Build” scenario projects is not needed within Downtown Bellevue to accommodate 2030 projected growth.
- Certain intersections and links may require additional analysis
- Adaptive signal system technology (ie, SCATS) is optimizing the available capacity in the roadway system
- Many more pedestrians will be present Downtown and will need to be accommodated along and across streets, especially within the core area of Downtown and near transit stops and light rail stations.

2030 Travel Times in Downtown Bellevue under No Build and Build Scenarios

Avg Travel Time in PM Peak Hour	Option	Minutes
112th Ave NE NB 112th Ave NE NB	2030 No Build	4.2
	2030 Build	5.1
112th Ave NE SB 112th Ave NE SB	2030 No Build	9.5
	2030 Build	6.6
NE 4th St EB NE 4th St EB	2030 No Build	10.9
	2030 Build	6.6
NE 4th St WB NE 4th St WB	2030 No Build	3.3
	2030 Build	3.7
NE 8th St EB NE 8th St EB	2030 No Build	8.4
	2030 Build	5.4
NE 8th St WB NE 8th St WB	2030 No Build	2.8
	2030 Build	3.5
Bellevue Way NB Bellevue Way NB	2030 No Build	4.9
	2030 Build	3.7
Bellevue Way SB Bellevue Way SB	2030 No Build	3.4
	2030 Build	3.6
Main St EB Main St EB	2030 No Build	7.0
	2030 Build	6.9
Main St WB Main St WB	2030 No Build	2.5
	2030 Build	2.7

	Node ID	2012 Existing				2030 No Build 120812				2030 Build 120712			
		Hourly Volume	Avg Intersection Delay (sec)	LOS	Total Delay Hours in Peak Hour	Hourly Volume	Avg Intersection Delay (sec)	LOS	Total Delay Hours in Peak Hour	Hourly Volume	Avg Intersection Delay (sec)	LOS	Total Delay Hours in Peak Hour
Bellevue Way/Main Street	1736	1774	21.7	C	11	2761	38	D	29	2860	45	D	36
Bellevue Way/2nd Street	5019	1419	21.0	C	8	2993	22	C	19	3097	24	C	21
Bellevue Way/4th Street	2640	2313	37.3	D	24	3425	38	D	36	3359	37	D	35
Bellevue Way/6th Street	5018	851	3.3	A	1	1882	4	A	2	2027	4	A	2
Bellevue Way/8th Street	1738	2492	39.1	D	27	3743	52	D	54	4209	52	D	60
Bellevue Way/10th Street	5017	2226	15.6	B	10	3035	35	D	30	3532	25	C	25
Bellevue Way/12th Street	1750	1900	17.8	B	9	2996	64	E	53	3388	31	C	29
106th Avenue/Main Street	1735	1662	9.1	A	4	2213	44	D	27	2301	26	C	17
106th Avenue/2nd Street	5025	1532	12.8	B	5	2770	26	C	20	2807	22	C	17
106th Avenue/4th Street	5022	1619	23.1	C	10	3451	47	D	45	3515	45	D	44
106th Avenue/6th Street	5024	967	18.6	B	5	1902	14	B	7	2092	14	B	8
106th Avenue/8th Street	5021	2670	27.4	C	20	3878	61	E	66	4309	67	E	80
106th Avenue/10th Street	5023	2517	15.8	B	11	3042	24	C	20	3196	49	D	44
106th Avenue/12th Street	5020	1136	8.6	A	3	2430	86	F	58	2542	27	C	19
108th Avenue/Main Street	1734	2737	13.3	B	10	2783	42	D	33	2653	33	C	25
108th Avenue/2nd Street	5027	1644	13.5	B	6	1734	33	C	16	1675	31	C	14
108th Avenue/4th Street	2641	2013	29.4	C	16	2896	23	C	18	2919	25	C	20
108th Avenue/6th Street	5026	1083	25.8	C	8	959	36	D	10	1088	21	C	6
108th Avenue/8th Street	1739	3494	37.9	D	37	4265	74	E	88	4956	49	D	67
108th Avenue/10th Street	6200	3146	13.8	B	12	2909	32	C	26	3141	46	D	40
108th Avenue/12th Street	1749	1678	12.8	B	6	3248	89	F	80	3496	48	D	47
110th Avenue/Main Street	5028	2239	4.9	A	3	2598	50	D	36	2377	74	E	49
110th Avenue/2nd Street	5029	1513	29.7	C	12	2271	78	E	49	2241	100	F	62
110th Avenue/4th Street	5641	3149	62.7	E	55	3646	99	F	100	3570	52	D	51
110th Avenue/6th Street	5030	1004	26.1	C	7	1793	34	C	17	1841	33	C	17
110th Avenue/8th Street	5031	2921	21.7	C	18	4794	71	E	94	5750	59	E	95
110th Avenue/10th Street	6201	3095	20.9	C	18	2771	52	D	40	3093	52	D	45
110th Avenue/12th Street	5401	2113	12.9	B	8	3550	44	D	43	3638	35	D	36
112th Avenue/Main Street	1733	3675	50.5	D	52	4803	71	E	95	5071	76	E	107
112th Avenue/2nd Street	5032	1993	38.9	D	22	2932	46	D	38	3457	55	D	53
112th Avenue/4th Street	2642	4045	51.9	D	58	4560	87	F	110	4492	74	E	92
112th Avenue/6th Street	5033	2634	44.4	D	32	3642	56	E	57	3515	55	E	54
112th Avenue/8th Street	1740	5290	30.8	C	45	6535	104	F	188	7564	68	E	144
112th Avenue/10th Street	5393	4721	9.5	A	12	3649	59	E	59	4410	53	D	66
112th Avenue/12th Street	1748	3042	26.6	C	23	5006	54	D	75	4941	57	E	78
Network Wide	---	82307	26.6	C	609	111865	56.0	E	1739	119122	48.5	D	1604