A.4 Transportation Appendix

Table A.4–1 2015 PM peak period auto travel times

		Urban Centers		
Sector	**Urban Village Used for Analysis**	**Downtown**	**U District**	**Northgate**
Northwest Seattle	Ballard HUV	20	18	20
Northeast Seattle	Northgate UC	16	14	—
Queen Anne/Magnolia	Upper Queen Anne RUV	13	23	24
Downtown/Lake Union	Downtown UC	—	14	16
Capitol Hill/Central District	Capitol Hill UC	11	16	30
West Seattle	West Seattle Junction HUV	15	33	44
Duwamish	South Park RUV	16	31	44
Southeast Seattle	Othello RUV	18	31	44

Note: I-5 travel times include travel on the express lanes whenever possible.

Source: Google Maps, 2014.

Table A.4–2 2015 PM peak period transit travel times

		Urban Centers		
Sector	**Urban Village Used for Analysis**	**Downtown**	**U District**	**Northgate**
Northwest Seattle	Ballard HUV	32	21	30
Northeast Seattle	Northgate UC	18	23	—
Queen Anne/Magnolia	Upper Queen Anne RUV	18	45	54
Downtown/Lake Union	Downtown UC	—	17	18
Capitol Hill/Central District	Capitol Hill UC	15	26	50
West Seattle	West Seattle Junction HUV	21	54	62
Duwamish	South Park RUV	34	79	78
Southeast Seattle	Othello RUV	21	49	59

Source: Sound Transit trip planner, 2014.

Table A.4–3 2015 PM peak period transit travel times

Sector	Intersection Used for Analysis	2015 Households	2015 Retail Employment
Northwest Seattle	NW Market St & 15th Ave NW	7,900	1,500
Northeast Seattle	NE 103rd St & 1st Ave NE	2,700	1,800
Queen Anne/Magnolia	Queen Anne Ave N & W Galer St	9,300	700
Downtown/Lake Union	University St & 3rd Ave	17,900	7,600
Capitol Hill/Central District	Broadway & E John St	20,700	2,000
West Seattle	California Ave SW & SW Alaska St	5,500	700
Duwamish	S Cloverdale St & 8th Ave S	1,100	100
Southeast Seattle	S Othello St & MLK Jr Way S	4,000	100

Source: Fehr & Peers, 2014.

Table A.4–5 2015 PM peak period average trip length in minutes

Sector	Average PM Peak Period Trip Length in Minutes
Northwest Seattle	20
Northeast Seattle	22
Queen Anne/Magnolia	23
Downtown/Lake Union	24
Capitol Hill/Central District	22
West Seattle	21
Duwamish	27
Southeast Seattle	22
City of Seattle	**23**

Source: Project travel demand model, 2014.

Table A.4–6 2015 PM peak period vehicle miles traveled per capita

Sector	PM Peak Period Vehicle Miles Traveled per Capita
Northwest Seattle	4.0
Northeast Seattle	4.5
Queen Anne/Magnolia	4.0
Downtown/Lake Union	2.7
Capitol Hill/Central District	3.2
West Seattle	4.6
Duwamish	5.3
Southeast Seattle	4.7
City of Seattle	**3.3**

Source: Project travel demand model, 2014.

Table A.4–4 2035 auto travel time

	Auto Travel Times in Minutes (Downtown / University District / Northgate)				
Sector (Urban Village)	**2015 Existing**	**2035 Alt. 1**	**2035 Alt. 2**	**2035 Alt. 3**	**2035 Alt. 4**
Northwest Seattle (Ballard)	20 / 18 / 20	25 / 19 / 22	25 / 19 / 22	25 / 19 / 22	24 / 19 / 22
Northeast Seattle (Northgate)	16 / 14 / —	21 / 17 / —	21 / 17 / —	21 / 17 / —	21 / 16 / —
Queen Anne/Magnolia (Upper Queen Anne)	13 / 23 / 24	16 / 25 / 28	16 / 25 / 29	16 / 25 / 29	16 / 25 / 28
Downtown/Lake Union (Downtown)	— / 14 /16	— / 18 / 21	— / 18 / 21	— / 18 / 21	— / 17 / 21
Capitol Hill/Central District (Capitol Hill)	11 / 16 / 30	12 / 20 / 34	12 / 20 / 35	12 / 20 / 35	12 / 20 / 35
West Seattle (West Seattle Junction)	15 / 33 / 44	25 / 38 / 49	25 / 38 / 50	24 / 38 / 49	25 / 38 / 49
Duwamish (South Park)	16 / 31 / 44	27 / 37 / 50	27 / 37 / 51	27 / 37 / 50	27 / 37 / 50
Southeast Seattle (Othello)	18 / 31 / 44	25 / 36 / 48	25 / 36 / 49	25 / 36 / 49	25 / 36 / 49

Source: Fehr & Peers, 2014.

Table A.4–7 2035 transit travel time

	Transit Travel Times in Minutes (Downtown / University District / Northgate)				
Sector (Urban Village)	**2015 Existing**	**2035 Alt. 1**	**2035 Alt. 2**	**2035 Alt. 3**	**2035 Alt. 4**
Northwest Seattle (Ballard)	32 / 21 / 30	14 / 23 / 31	14 / 23 / 31	14 / 22 / 32	14 / 22 / 32
Northeast Seattle (Northgate)	18 / 23 / —	16 / 5 / —	16 / 5 / —	16 / 5 / —	16 / 5 / —
Queen Anne/Magnolia (Upper Queen Anne)	18 / 45 / 54	19 / 30 / 35	19 / 30 / 35	19 / 30 / 35	19 / 30 / 35
Downtown/Lake Union (Downtown)	— / 17 /18	— / 11 / 16	— / 11 / 16	— / 11 / 16	— / 11 / 16
Capitol Hill/Central District (Capitol Hill)	15 / 26 / 50	5 / 6 / 11	5 / 6 / 11	5 / 6 / 11	5 / 6 / 11
West Seattle (West Seattle Junction)	21 / 54 / 62	26 / 37 / 42	26 / 37 / 42	25 / 36 / 41	26 / 36 / 41
Duwamish (South Park)	34 / 79 / 78	40 / 51 / 56	39 / 50 / 55	39 / 50 / 55	39 / 50 / 55
Southeast Seattle (Othello)	21 / 49 / 59	21 / 32 / 37	21 / 32 / 37	21 / 32 / 37	21 / 32 / 37

Source: Fehr & Peers, 2014.

Table A.4–8 2035 households within 20-minute walkshed

Sector (Urban Village)	**2015 Existing**	**2035 Alt. 1**	**2035 Alt. 2**	**2035 Alt. 3**	**2035 Alt. 4**
Northwest Seattle (Ballard)	7,900	10,200	9,000	9,000	10,100
Northeast Seattle (Northgate)	2,700	4,800	7,300	5,800	5,800
Queen Anne/Magnolia (Upper Queen Anne)	9,300	10,700	10,100	10,100	10,000
Downtown/Lake Union (Downtown)	17,900	24,300	27,300	25,000	25,000
Capitol Hill/Central District (Capitol Hill)	20,700	24,200	25,800	24,000	23,900
West Seattle (West Seattle Junction)	5,500	6,800	6,600	6,600	7,900
Duwamish (South Park)	1,100	1,300	1,300	1,300	1,300
Southeast Seattle (Othello)	4,000	4,900	4,400	5,100	5,000

Source: Fehr & Peers, 2014.

Table A.4–9 2035 retail employment within 20-minute walkshed

Sector (Urban Village)	**2015 Existing**	**2035 Alt. 1**	**2035 Alt. 2**	**2035 Alt. 3**	**2035 Alt. 4**
Northwest Seattle (Ballard)	1,500	3,100	2,500	2,500	4,100
Northeast Seattle (Northgate)	1,800	4,900	8,200	6,300	6,300
Queen Anne/Magnolia (Upper Queen Anne)	700	1,100	1,100	1,000	1,000
Downtown/Lake Union (Downtown)	7,600	17,800	19,400	15,900	17,900
Capitol Hill/Central District (Capitol Hill)	2,000	4,200	5,500	4,100	4,300
West Seattle (West Seattle Junction)	700	1,300	1,100	1,300	2,300
Duwamish (South Park)	100	200	300	300	200
Southeast Seattle (Othello)	100	300	200	500	500

Source: Fehr & Peers, 2014.

Table A.4–10 2035 mode share by sector

	Mode Share (%)				
Sector (Urban Village)	**SOV**	**HOV**	**Transit**	**Walk**	**Bike**
Northwest Seattle (Ballard)					
2015 Existing	50	36	7	5	1
2035 Alternative 1	48	35	9	6	2
2035 Alternative 2	48	35	9	5	2
2035 Alternative 3	48	35	9	5	2
2035 Alternative 4	48	35	9	6	2
Northeast Seattle (Northgate)					
2015 Existing	46	36	10	6	2
2035 Alternative 1	44	35	12	6	3
2035 Alternative 2	44	35	12	6	2
2035 Alternative 3	44	35	12	6	3
2035 Alternative 4	44	35	12	6	3
Queen Anne/Magnolia (Upper Queen Anne)					
2015 Existing	45	33	11	9	2
2035 Alternative 1	41	32	14	12	3
2035 Alternative 2	40	32	14	12	3
2035 Alternative 3	41	33	13	11	3
2035 Alternative 4	41	33	13	11	3
Downtown/Lake Union (Downtown)					
2015 Existing	31	24	22	21	2
2035 Alternative 1	22	25	27	23	3
2035 Alternative 2	21	25	26	24	3
2035 Alternative 3	22	25	27	23	3
2035 Alternative 4	21	25	27	23	3
Capitol Hill/Central District (Capitol Hill)					
2015 Existing	35	30	14	19	2
2035 Alternative 1	30	28	18	22	3
2035 Alternative 2	30	28	17	22	3
2035 Alternative 3	30	28	17	21	3
2035 Alternative 4	30	28	18	22	3
West Seattle (West Seattle Junction)					
2015 Existing	45	41	7	5	1
2035 Alternative 1	43	42	8	5	2
2035 Alternative 2	43	42	8	5	2
2035 Alternative 3	44	41	8	5	2
2035 Alternative 4	43	41	8	5	2
Duwamish (South Park)					
2015 Existing	53	32	9	5	1
2035 Alternative 1	50	33	10	5	2
2035 Alternative 2	50	33	10	5	2
2035 Alternative 3	50	33	10	5	2
2035 Alternative 4	50	33	10	5	2
Southeast Seattle (Othello)					
2015 Existing	45	40	9	5	2
2035 Alternative 1	43	39	10	5	3
2035 Alternative 2	42	40	11	5	3
2035 Alternative 3	42	39	11	5	3
2035 Alternative 4	42	39	11	5	3

Source: Project travel demand model, 2014.

Table A.4–11 2035 average trip length in minutes

Sector	2015 Existing	2035 Alt. 1	2035 Alt. 2	2035 Alt. 3	2035 Alt. 4
Northwest Seattle	20	22	22	22	22
Northeast Seattle	22	23	23	23	23
Queen Anne/Magnolia	23	25	25	25	25
Downtown/Lake Union	24	26	26	26	26
Capitol Hill/Central District	22	23	23	23	23
West Seattle	21	25	24	24	24
Duwamish	27	31	31	30	31
Southeast Seattle	22	25	25	24	24
Seattle	**23**	**25**	**25**	**25**	**25**

Source: Project travel demand model, 2014.

Table A.4–12 2035 vehicle miles traveled per capita

Sector	2015 Existing	2035 Alt. 1	2035 Alt. 2	2035 Alt. 3	2035 Alt. 4
Northwest Seattle	4.0	3.6	3.7	3.7	3.7
Northeast Seattle	4.5	4.1	4.1	4.1	4.1
Queen Anne/Magnolia	4.0	3.6	3.6	3.6	3.6
Downtown/Lake Union	2.7	2.2	2.1	2.1	2.1
Capitol Hill/Central District	3.2	2.6	2.7	2.7	2.7
West Seattle	4.6	4.4	4.5	4.5	4.4
Duwamish	5.3	5.1	5.2	5.2	5.2
Southeast Seattle	4.7	4.4	4.4	4.2	4.2
Seattle	**3.3**	**2.9**	**2.9**	**2.9**	**2.9**

Source: Project travel demand model, 2014.

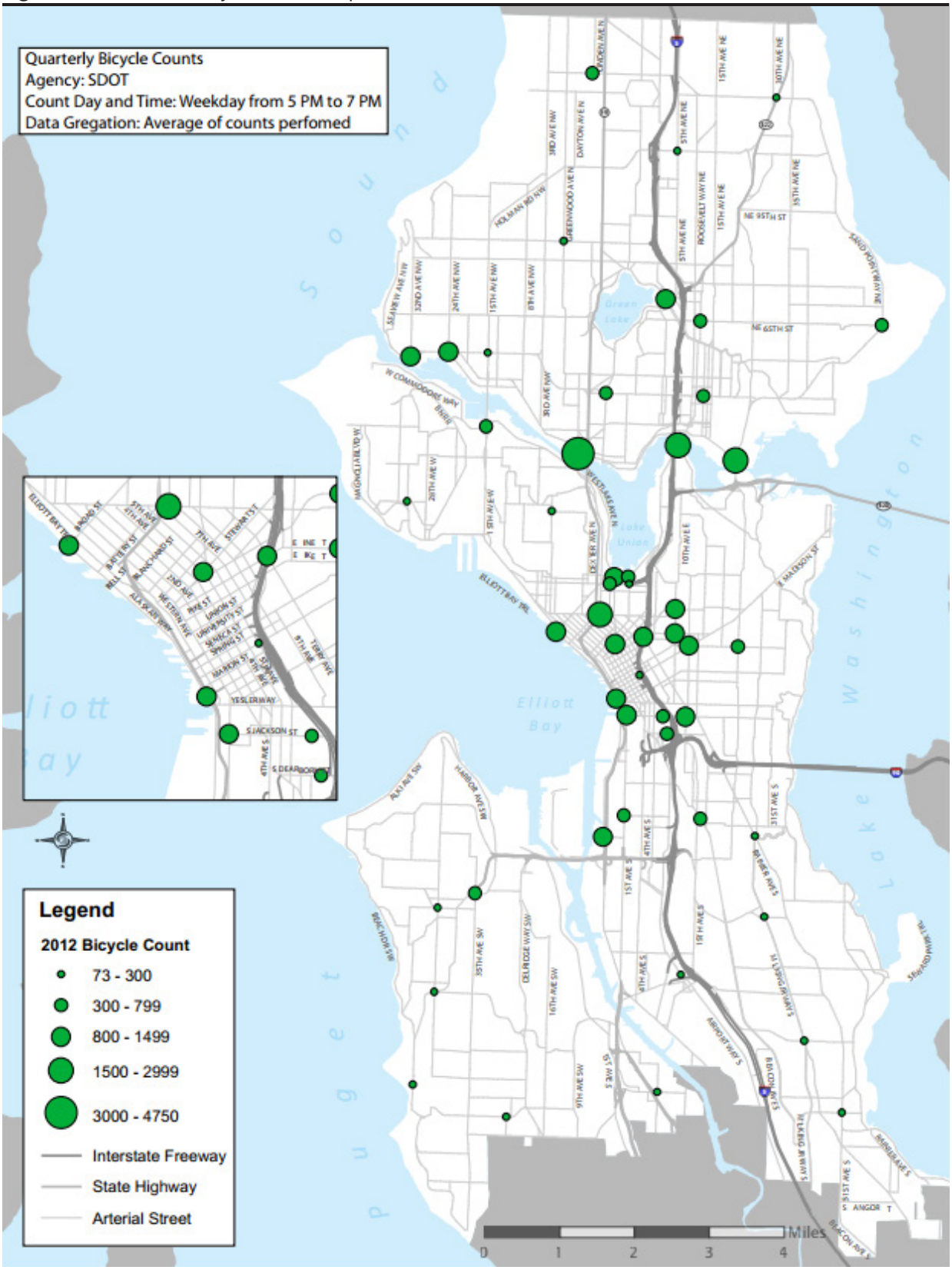
Existing Conditions Data

Two additional maps are included here as reference. The maps on the following two pages summarize high bicycle count locations (Figure A.4–1) and the frequent transit network (Figure A.4–2).

Travel Demand Model

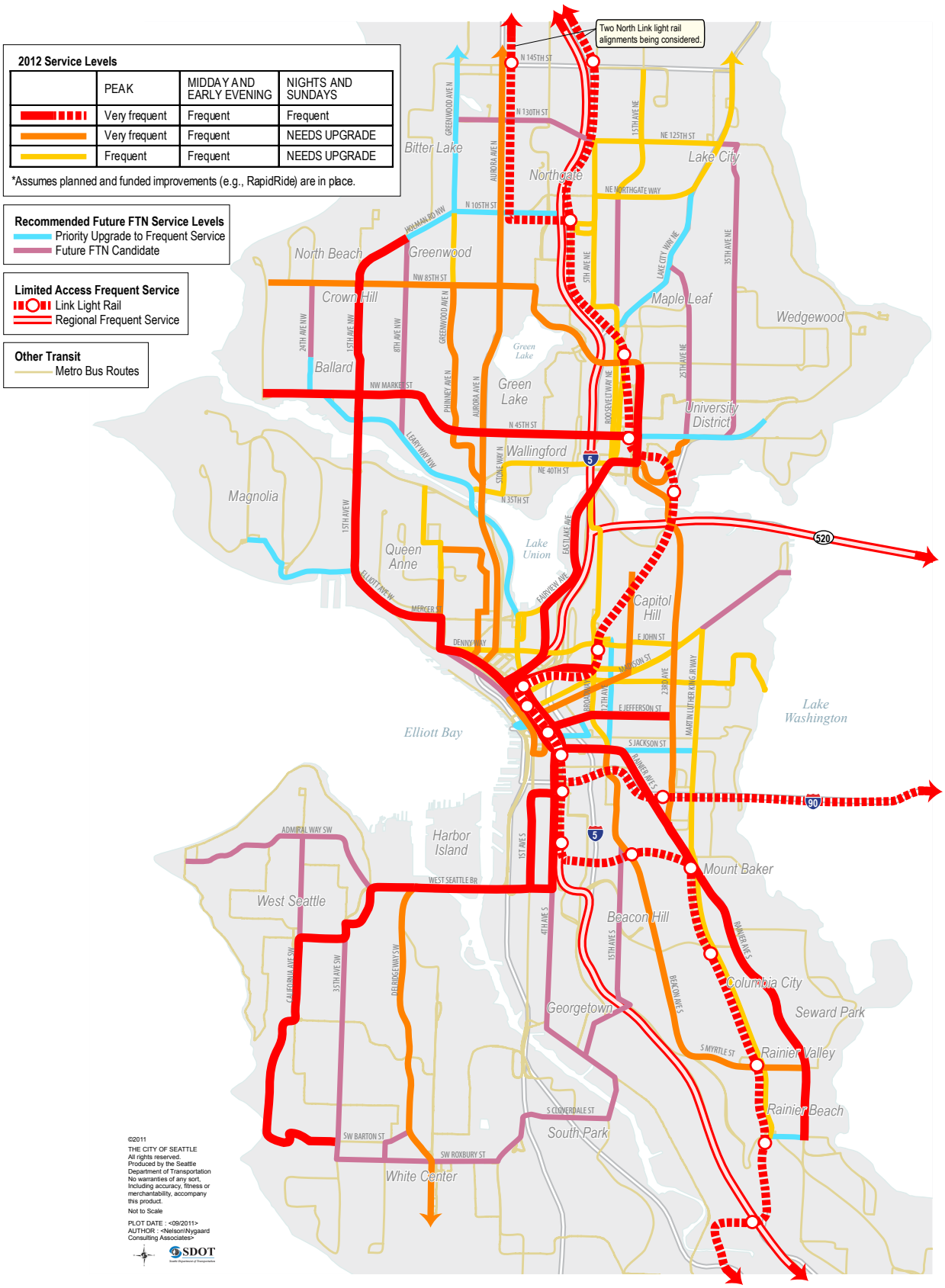
The City of Seattle updated its travel demand model in 2007 to be reflective of the Puget Sound Regional Council's (PSRC) Regional Travel Demand Model, Version 1.00b. The PSRC model has a relatively coarse TAZ structure since the model is regional in nature and is focused on generating travel forecasts across all of Snohomish, King, Pierce and Kitsap Counties. To provide more refined travel forecasts in Seattle, the PSRC zones were split as part of the citywide model development (Seattle went from 218 zones to 517 zones). The finer TAZ structure allows for traffic forecasts to be generated on a denser roadway network, improves the estimates of non-auto trips and provides the ability to extract turning movement forecasts at key intersections.

Figure A.4–1 2012 bicycle counts map



Source: SDOT. Quarterly Bicycle Counts. 2012. Average of Weekday Counts from 5PM to 7PM.

Figure A.4–2 Frequent transit network (reproduced from TMP Figure 4-1)



The City's model was initially used for the Seattle Surface and Transit Project and the Alaskan Way Viaduct Replacement Project. During the course of those projects, a team of consultants updated key aspects of the model to improve its performance, including:

- Arterial speeds
- Development of a parking cost model
- Modifications to the trip distribution and mode choice models to better reflect active transportation modes

Since that time, Fehr & Peers has used the model on subsequent City of Seattle projects including Elliott Bay Seawall Project, South Lake Union Height and Density Rezone EIS, University District Urban Design EIS and now the Seattle Comprehensive Plan EIS. With each of these projects, the model roadway, transit and non-motorized networks were revised to correct errors carried over from the PSRC model and to reflect updated conditions (e.g., road diet projects, revised transit routing, etc.) as appropriate. Future year assumptions have also been reviewed with City staff throughout the course of each project to incorporate the latest knowledge of upcoming transportation projects, such as the SR 99 Tunnel, the City's modal master plans and major regional projects.

Trip generation rates and mode split output in 12 sample locations throughout the City were examined by evaluating TAZ-level trip generation by mode and by land use category. The results of the trip generation/mode split analysis followed expected trends based on research and travel behavior theory. For example, urban centers have lower vehicle trip generation and higher bike/pedestrian/transit trip generation when compared to less dense areas of the City. Based on the analysis, one change was made to apply the Central Business District mode choice factors to the Lower Queen Anne area. This adjustment increased non-auto mode share to a level that is closer to observed conditions. Trip generation rates and mode choice in areas that have had recent subarea plans such as South Lake Union and the U District were also reviewed and found to be appropriate for this citywide analysis.

Modeling Assumptions

The assumptions for the 2015 and 2035 travel demand models were determined in conjunction with City staff using the best knowledge available at the time. Table A.4–13 summarizes key projects and their inclusion in the 2015 and/or 2035 models.

SR 99 TOLLING

The 2035 travel demand model includes tolling on the SR 99 tunnel. Since the actual toll has not yet been set, the most recent recommendations of the Advisory Committee on Tolling and Traffic Management (ACTT) were consulted. A toll was added on the SR 99 tunnel to match the PM diversion rates published for the recommended Scenario 7 identified in ACTT's "Advisory Recommendations for Tolling the SR 99 Tunnel" (March 2014). The PM diversion for Scenario 7 is 19 percent, while the travel demand models showed a 21 percent diversion. Tolls were also added to other time periods such that the relative scale of the tolls over the course of the day matched those used in the ACTT's Scenario 7.

Table A.4–13 Travel demand model network assumptions

Project	2015	2030
SR 99 tunnel (with tolls)		x
Mercer Corridor Project (east/west)	x	x
SR 520 HOV lanes to Montlake	x	x
Second Montlake Bascule Bridge		
SR 520 Tolling	x	x
I-90 HOV lanes	x	x
I-405 Widening (SR 167 to SR 527)		x
Buses in DT Seattle 3rd Avenue Tunnel	x	
Passenger-only Ferries (Kingston, Southworth, Juanita)		
South Lander Street Overpass		x
Montlake Blvd NE HOV Lane and ITS Improvements		x

TRANSIT

Transit routing assumptions were made to align with the Transit Master Plan (TMP). Table A.4–14 and Table A.4–15 outlines the changes made to routes in each transit priority corridor and the center city corridors. Per the TMP, all transit priority corridors should have transit service frequency of 15 minutes or better all day.

Table A.4–14 2035 transit priority corridors

Corridor	Name	Route Modification
1	West Seattle–Downtown	Head west on Columbia to Alaskan Way.
2	Burien–White Center–Delridge–Downtown	NA
3	Othello–U District	Rt 36 extended to Rainier Ave on Myrtle.
4	Mount Baker–Downtown via Rainier and 23rd	NA
5	Rainier Valley–U District–via Rainier and 23rd	Rt 7 re-routed to Rainier Beach LRT stop.
6	Central Area–First Hill–Downtown	Add BRT on Madison—5 min headways. Rt 11 and 12 truncated at Madison BRT. Re-channelization from I-5 to 23rd Ave for transit lanes.
7	Queen Anne–S Lake Union–Capitol Hill	NA
8	SLU–Eastlake–U District–Roosevelt	Add BRT from Westlake to NE 65th via Eastlake, headway=5min. Rt 70/66 eliminated. Rt 67 headway changed to every 15 min.
9	Aurora Village–Downtown via Aurora Ave	NA
10	Northgate–Ballard–Downtown via Northgate Way	NA
11	Ballard–Downtown rail	Add rail following Corridor D (NW Market St to DT Seattle via tunnel). No other changes to KCM routes were assumed to provide local service.
12	Lake City–Northgate–U District	Rt 41 extended north on Lake City Way to NE 145th St.
13	Ballard–U District–Laurelhurst	NA
14	Crown Hill–Greenlake–U District	NA
15	Phinney Ridge–Greenwood–Broadview	NA

Table A.4–15 Center city priority bus corridors

Corridor	Modification
Pike/Pine	NA
Jefferson/Yesler	Rt 3, 4 re-routed west of 9th Ave to Yesler and 3rd Ave Transit Mall
Seattle Center East	All-day transit-only restrictions on the 3rd Ave Transit Mall extended north to Denny Way
Jackson	Added BAT lanes on Jackson St

THE DIFFERENCE METHOD

To reduce model error, a technique known as the difference method was applied for traffic volumes and travel times. Rather than take the direct output from the 2035 model, the difference method calculates the growth between the base year and 2035 models, and adds that growth to an existing count or travel time. For example, assume a road has an existing travel time of 20.5 minutes. If the base year model showed a travel time of 22.5 minutes and the future year model showed a travel time of 28.0 minutes, 5.5 minutes would be added to the existing travel time for a future expected travel time of 26.0 minutes.

Screenline Analysis

EXISTING SCREENLINE VOLUME-TO-CAPACITY (V/C) RESULTS

The PM peak hour volume for each arterial crossing each screenline is listed below in Table A.4–16. For locations without recent traffic counts, older counts were factored to reflect the expected growth to the base year by comparing the growth of nearby comparable arterials. The PM capacity by direction was developed to reflect current (2015) conditions using a methodology based on nationally accepted standards. Details of the methodology may be found in the Seattle Screenline Capacity Methodology technical memorandum at the end of this appendix. These updated capacities are anticipated to be adopted into a DPD Director's Rule to supersede Director's Rule 5-2009 which is based on the 2008 transportation system.

Table A.4–16 Existing PM screenline results

LOS Screen Line #	Location	Arterial Crossing Screenline	2015 Capacity		PM Peak Volume	
			EB/NB	WB/SB	EB/NB	WB/SB
	North City Limit - 3rd Ave NW to Aurora Ave N	3rd Ave NW, s/o NW 145th St	770	770	470	380
		Greenwood Ave N, s/o N 145th St	1940	1940	1220	840
		Aurora Ave N, s/o N 145th St	2100	2000	1680	1220
1.11	Screenline V/C Ratio		4810	4710	0.70	0.52
	North City Limit - Meridian Ave N to 15th Ave NE	Meridian Ave N, s/o NE 145th ST	770	770	310	160
		1st Ave NE, s/o 145th St	770	770	230	390
		5th Ave NE, s/o I-5 145th St offramp	770	770	370	200
		15th Ave NE, s/o 145th St	2040	2040	890	640
1.12	Screenline V/C Ratio		4350	4350	0.41	0.32
	North City Limit - 30th Ave NE to Lake City Way NE	30th Ave NE, s/o 145th St	770	770	430	370
		Lake City Way NE, s/o NE 145th St	2150	2040	1700	1390
1.13	Screenline V/C Ratio		2920	2810	0.73	0.63
	Magnolia	Magnolia Br, w/o Garfield St offramp	770	1540	450	870
		W Dravus St, e/o 20th Ave W	1540	1540	760	920
		W Emerson Pl, se/o 21st Ave W	1540	1540	820	760
2	Screenline V/C Ratio		3850	4620	0.53	0.55
	Duwamish River - W Seattle Fwy and Spokane St	SW Spokane Br, w/o SW Spokane E st	770	770	480	680
		EB West Seattle Bridge, w/o Alaskan Way Viaduct NB on ramp	6380		3860	NA
		WB West Seattle Br., w/o Alaskan Way Viaduct NB on ramp		5380	NA	4680
3.11	Screenline V/C Ratio		7150	6150	0.61	0.87
	Duwamish River - 1st Ave S and 16th Ave S	1st Ave S Br, S/O Point A	8220	8220	2930	4320
		16th Ave S, N/O 16th Ave S BR	1540	1540	480	730
3.12	Screenline V/C Ratio		9760	9760	0.35	0.52
	South City Limit - M L King Jr Wy to Rainier Ave S	Martin Luther King Jr Way S, s/o Norfolk	2040	2040	1080	1300
		51st Ave S, s/o Bangor St	770	770	220	350
		Renton Ave S, se/o Bangor St	770	770	390	570
		Rainier Ave S, se/o 75th Ave SE	1460	1460	660	970
4.11	Screenline V/C Ratio		5040	5040	0.47	0.63
	South City Limit - Marine Dr SW to Meyers Wy S	Marine View Drive SW, N/O 46th Ave SW	770	770	190	190
		35th Ave SW, N/O SW Roxbury St	1940	1940	660	750
		26th Ave SW, N/O SW Roxbury St	770	770	340	400
		Delridge Wy, NW/o SW cambridge st	770	770	490	340
		16th Ave SW, n/o SW cambridge st	770	770	220	290
		8th Ave SW, N/O SW Roxbury St	770	770	310	280
		Olson Pl SW, SW/o 1st Ave S	2040	2040	1070	1440
		Myers Way S, S/O Olson Pl SW	1540	1540	190	260
4.12	Screenline V/C Ratio		9370	9370	0.37	0.42

Table A.7–20 Existing PM screenline results (cont.)

LOS Screen Line #	Location	Arterial Crossing Screenline	2015 Capacity		PM Peak Volume	
			EB/NB	WB/SB	EB/NB	WB/SB
	South City Limit - SR 99 to Airport Wy S	SR 99 (W Marginal Way S, NB - SE/O Cloverdale St onramp; SB - SE/O Kenyon onramp)	2000	2000	1840	1700
		8th Ave S, s/o Director St	770	770	100	90
		East Marginal Way S, SE/O S 81st	2040	2040	700	700
		14th Ave S, n/o Director St	1540	1540	390	500
		Airport Way S, N/O S Norfolk St	2000	2000	360	760
4.13	Screenline V/C Ratio		8350	8350	0.41	0.45
	Ship Canal Ballard Bridge	Ballard Bridge	2870	3410	2850	1760
5.11	Screenline V/C Ratio		2870	3410	0.99	0.52
	Ship Canal Fremont Bridge	Fremont Bridge	2210	2210	1570	1200
5.12	Screenline V/C Ratio		2210	2210	0.71	0.54
	Ship Canal Aurora Ave N	Aurora Bridge	5380	5380	4360	3330
5.13	Screenline V/C Ratio		5380	5380	0.81	0.62
	Ship Canal University and Montlake Bridges	University Bridge, SW/O Point A	2210	2210	1320	1720
		Montlake Bridge, S/O Point A	2210	2210	2220	2130
5.16	Screenline V/C Ratio		4420	4420	0.80	0.87
	South of NW 80th St - Seaview Ave NW to 15th Ave NW	Seaview Ave NW, N/O NW 67th St	1010	1010	250	130
		32nd Ave NW, S/O NW 80th St	770	770	90	350
		24th Ave NW, S/O NW 80th St	1010	1010	630	440
		15th Ave NW, S/O NW 80th St	3070	2040	1640	1140
6.11	Screenline V/C Ratio		5860	4830	0.45	0.43
	South of NW 80th St - 8th Ave NW to Greenwood Ave N	8th Ave NW, S/O NW 80th St	1010	1010	700	440
		3rd Ave NW, S/O NW 80th St	770	770	520	430
		Greenwood Ave N, S/O N 80th St	1010	1010	610	500
6.12	Screenline V/C Ratio		2790	2790	0.66	0.49
	South of NE 80th St - Linden Ave N to 1st Ave NE	Linden Ave N, S/O N 80th St	770	770	210	160
		Aurora Ave N, S/O N 80th St	2150	2150	1710	790
		Green Lake Drive N, SE/O N 80th St	1010	1010	250	170
		Wallingford Ave N, S/O N 80th St	770	770	260	260
		Stroud Ave N, SW/O N 80th St	770	770	220	150
		1st Ave NE, S/O NE 80th St	770	770	70	160
6.13	Screenline V/C Ratio		6240	6240	0.44	0.27
	South of NE 80th St - 5th Ave NE to 15th Ave NE	5th Ave NE, S/O NE 78th St	770	770	430	290
		Roosevelt Way NE (one-way), N/O NE 73rd St		1840	NA	1180
		Lake City Way NE, SW/O NE 80th St	2040	2040	1820	930
		15th Ave NE, S/O NE 75th St	1540	770	590	470
6.14	Screenline V/C Ratio		4350	5420	0.65	0.53
	South of NE 80th St - 20th Ave NE to Sand Point Way NE	20th Ave NE, S/O NE 75th St	770	770	150	150
		25th Ave NE, S/O NE 75th St	1540	770	760	440
		35th Ave NE, S/O NE 75th St	1540	770	790	620
		40th Ave NE, S/O NE 75th St	770	770	400	270
		Sand Point Way NE, S/O NE 74th St	1540	1540	910	670
6.15	Screenline V/C Ratio		6160	4620	0.49	0.47

Table A.7–20 Existing PM screenline results (cont.)

LOS Screen Line #	Location	Arterial Crossing Screenline	2015 Capacity		PM Peak Volume	
			EB/NB	WB/SB	EB/NB	WB/SB
	West of Aurora Ave - Fremont Pl N to N 65th St	Fremont Pl N, NW/O Fremont Ave N	1940	1940	690	930
		N 39th St, W/O Fremont Ave N	770	770	570	680
		N 46th St, W/O Phinney Ave N.	1540	1540	890	850
		N 50th St, W/O Fremont Ave N	770	770	420	650
		N 65th St, W/O Linden Ave N	770	770	230	250
7.11	Screenline V/C Ratio		5790	5790	0.48	0.58
	West of Aurora Ave - N 80th St to N 145th St	N 80th St, W/O Linden Ave N	960	960	650	700
		N 85th St, W/O Linden Ave N	1540	1540	790	1000
		N 105th St w/o Evanston	1540	1540	760	930
		N 125th St, W/O Aurora Ave N	1010	1010	440	360
		N 130th St, W/O Linden Ave N	960	960	570	630
		N 145th St, W/O Linden Ave	1540	1540	530	650
7.12	Screenline V/C Ratio		7550	7550	0.50	0.57
	South of Lake Union	Valley St, W/O Fairview Ave N	770	770	270	2020
		Mercer St, EB -w/o Fairview Ave N; WB-e/o Boren Ave N	3070	3070	3460	1680
		Republican St, w/o Eastlake Ave	770	770	40	290
		Denny Way, E/O Minor Ave	1540	1540	1020	780
8	Screenline V/C Ratio		6150	6150	0.78	0.78
	South of Spokane St - Beach Dr SW to W Marginal Way SW	Beach Dr SW, SE/O 61st Ave SW	770	770	190	220
		55th Ave SW, S/O SW Charlestown St	770	770	110	80
		California Ave SW, S/O SW Charlestown St	1010	1010	590	850
		Fauntleroy Wy SW (NB - West Seattle Br, NE/O Fauntleroy Wy; SB - NE/O 35th Ave SW)	3590	3590	2580	2730
		SW Avalon Wy, N/O 30th Ave SW	1010	1010	480	770
		Delridge Wy, S/O SW Andover St	1010	1010	640	880
		W Marginal Way SW	2000	2000	640	330
9.11	Screenline V/C Ratio		10160	10160	0.51	0.58
	South of Spokane St - E Marginal Way S to Airport Way S	E Marginal Way SW, N/O Alaskan Wy Vi SB	1150	1150	480	970
		Alaskan Wy, N/O East Marginal Way S	3590	3590	1950	1830
		1st Ave S, S/O S Spokane SR St	2040	2040	630	1010
		4th Ave S, S/O S Spokane SR St	2040	2040	1440	1340
		6th Ave S, S/O S Forest St	1540	1940	750	760
		Airport Way S (NB - S/O S Spokane St, SB - N/O S Spokane St)	2040	2040	600	740
9.12	Screenline V/C Ratio		12400	12800	0.47	0.52
	South of Spokane St - 15th Ave S to Rainier Ave S	15th Ave S, S/O S Bradford St	2920	1540	1220	690
		Beacon Ave S, S/O S Spokane St	1010	1010	530	630
		Martin Luther King Jr Way S, N/O S Andover St	2040	2040	770	1020
		Rainier Ave S, SE/O M LK	2040	2040	1120	1490
9.13	Screenline V/C Ratio		8010	6630	0.45	0.58

Table A.7–20 Existing PM screenline results (cont.)

LOS Screen Line #	Location	Arterial Crossing Screenline	2015 Capacity		PM Peak Volume	
			EB/NB	WB/SB	EB/NB	WB/SB
	South of S Jackson St - Alaskan Way S to 4th Ave S	Alaskan Wy S, N of S King St	1540	1540	430	680
		SR 99 – Alaskan Way Viaduct	6080	6080	5190	5440
		1st Ave S, N/O S King St	2040	2040	400	630
		2nd Ave S, N/O S King St	1540	1540	480	270
		4th Ave S, S/O 2nd Ave ET S	2920	1940	1350	1470
10.11	Screenline V/C Ratio		14120	13140	0.56	0.65
	South of S Jackson St - 12th Ave S to Lakeside Ave S	12th Ave S, S/O S Weller St	1540	1540	980	1030
		Rainier Ave S, SE/O Boren Ave S	2040	2040	1180	1130
		23rd Ave S, S/O S Jackson St	1540	1540	610	870
		Martin Luther King Jr Way S, S/O S Jackson St	1010	1010	610	790
		31st Ave S, S/O S Jackson St	960	960	180	300
		Lakeside Ave S	770	770	250	440
10.12	Screenline V/C Ratio		7860	7860	0.48	0.58
	East of CBD	S Jackson St, E/O 5th Ave S	1010	1010	760	450
		Yesler Way, W/O 6th Ave	770	770	180	310
		James St, NE/O 6th Ave	2040	2040	630	1690
		Cherry St, NE/O 6th Ave	1150		710	NA
		Madison St, SW/O 7th Ave	1540	1630	180	1630
		Spring St, SW/O 6th Ave	2760		1350	NA
		Seneca St, NE/O 6th Ave		2760	NA	870
		University, sw/o 6th	2330		700	NA
		Union St, NE of 7th Ave		3500	NA	710
		Pike St, SW/O Terry Ave	1540	1540	790	200
		Pine St, NE/O 9th Ave	770	960	110	520
		Olive Way, NE/0 9th Ave	3500		1030	NA
		Howell St, ne/o 9th ave	3940		940	NA
12.12	Screenline V/C Ratio		21350	14210	0.35	0.45
	East of I-5 NE Northgate Way to NE 145th St	NE Northgate Way, E/O 5th Ave NE	2040	2040	1260	980
		NE 125th St (Roosevelt Way NE, SE/O NE 130th St N)	1010	1010	620	810
		NE 145th St, E/O 5th Ave NE	1540	1540	1390	930
13.11	Screenline V/C Ratio		4590	4590	0.71	0.59
	East of I-5 NE 65th St to NE 80th St	NE 80th St, E/O 5th Ave NE	770	770	590	310
		NE 75th St, W/O Roosevelt Way NE	2040	2040	800	850
		NE 70th St, W/O Roosevelt Way NE	770	770	320	300
		NE 65th St, W/O Roosevelt Way NE	1540	1540	540	650
13.12	Screenline V/C Ratio		5120	5120	0.44	0.41
	East of I-5 NE Pacific St to NE Ravenna Blvd	NE Pacific St, NW/O NE Boat St	1010	1010	1020	750
		NE 40th St, E/O 7th Ave NE	770	770	510	290
		NE 42nd St, E/O 7th Ave NE	770	770	330	190
		NE 45th St W/O Roosevelt Way NE	2040	2040	1210	1210
		NE 50th St W/O Roosevelt Way NE	1540	1540	470	1010
		NE Ravenna Blvd, W/O Roosevelt Way	1010	1010	390	400
13.13	Screenline V/C Ratio		7140	7140	0.55	0.54

2035 SCREENLINE V/C RATIO RESULTS

The arterial volumes for each of the future year alternatives were calculated using the difference method. The capacities of some screenlines are different from the base year due to the completion of future roadway projects that add or remove capacity (e.g. new lanes, road diets). Capacity changes were based on the roadway capacities set in the travel model. Based on the Bicycle Master Plan's planned cycle track and bicycle lane locations, road diets were assumed on the following roadways:

- 15th Ave NE (NE 117th St–NE 145th St, Pacific Place)
- Pinehurst Way (Roosevelt Way NE–15th Ave NE)
- Sand Point Way NE (NE 65th St–NE 75th St)
- N 130th St (Linden Ave N–5th Ave NE)
- Harvard Ave E (E Roanoke St–E Shelby St)
- Westlake Ave N (Valley St–south of Aurora Ave N)
- Fairview Ave N (Valley St–Eastlake Ave E)
- Eastlake Ave (Stewart St–Fairview Ave)
- 1st Ave (Roy St–Broad St)
- Broad St (Alaskan Way–2nd Ave)
- Dexter Ave (Mercer St–Denny Way)
- 5th Ave N (Roy St–Denny Way, Seneca St–S Jackson St)
- S Jackson St (20th Ave S–ML King Jr Way S)
- S Dearborn St (7th Ave S to Rainier Ave S)
- 12th Ave S (S Dearborn St–E Yesler Way)
- 15th Ave S (S Oregon St–S Spokane St)
- Rainier Ave S (12th Ave S–S Massachusetts St, S McClellan St–ML King Jr Way S)
- ML King Jr Way S (Rainier Ave S–S Norfolk St)
- Airport Way S (4th Ave–S Norfolk St)
- East Marginal Way (1st Ave–S 81st Pl)
- SW Admiral Way (Fairmount Ave SW–Harbor Ave SW)
- Fauntleroy Way SW (SW Alaska St–36th Ave SW)
- 16th Ave SW (SW Roxbury St–SW Avalon Way)
- Delridge Way SW (SW Andover St–Chelan Ave SW)
- Olson Pl SW (SW Roxbury St–S Cloverdale St)

Table A.4–17 2035 screenline V/C ratio results

LOS Screen Line #	Location	Arterial Crossing Screenline	2035 Capacity		2035 Alt 1 Model		2035 Alt 2 Model		2035 Alt 3 Model		2035 Alt 4 Model	
			EB/NB	WB/SB	EB/NB	WB/SB	EB/NB	WB/SB	EB/NB	WB/SB	EB/NB	WB/SB
	North City Limit - 3rd Ave NW to Aurora Ave N	3rd Ave NW, s/o NW 145th St	770	770	780	650	800	650	770	650	790	660
		Greenwood Ave N, s/o N 145th St	1940	1940	1740	1220	1760	1210	1740	1210	1750	1210
		Aurora Ave N, s/o N 145th St	2100	2000	2430	1880	2420	1850	2400	1830	2440	1870
1.11	Screenline V/C Ratio		4810	4710	1.03	0.80	1.04	0.79	1.02	0.78	1.04	0.79
	North City Limit - Meridian Ave N to 15th Ave NE	Meridian Ave N, s/o NE 145th ST	770	770	580	370	580	380	590	410	590	410
		1st Ave NE, s/o 145th St	770	770	490	590	500	570	500	580	520	590
		5th Ave NE, s/o I-5 145th St offramp	770	770	550	340	560	360	550	350	550	360
		15th Ave NE, s/o 145th St	1010	1010	890	730	890	700	890	720	890	710
1.12	Screenline V/C Ratio		3320	3320	0.76	0.61	0.76	0.61	0.76	0.62	0.77	0.62
	North City Limit - 30th Ave NE to Lake City Way NE	30th Ave NE, s/o 145th St	770	770	590	550	600	550	620	540	590	540
		Lake City Way NE, s/o NE 145th St	2150	2040	2220	1790	2260	1770	2180	1790	2230	1790
1.13	Screenline V/C Ratio		2920	2810	0.96	0.83	0.98	0.83	0.96	0.83	0.97	0.83
	Magnolia	Magnolia Br, w/o Garfield St offramp	770	1540	460	920	450	900	450	890	450	870
		W Dravus St, e/o 20th Ave W	1540	1540	840	940	830	920	850	930	830	920
		W Emerson Pl, se/o 21st Ave W	1540	1540	860	750	850	760	860	760	860	760
2	Screenline V/C Ratio		3850	4620	0.56	0.56	0.55	0.56	0.56	0.56	0.56	0.55
	Duwamish River - W Seattle Fwy and Spokane St	SW Spokane Br, w/o SW Spokane E St	770	770	730	1000	720	1000	750	1010	760	1000
		EB West Seattle Bridge, w/o Alaskan Way Viaduct NB on ramp	6380		4180	NA	4150	NA	4230	NA	4240	NA
		WB West Seattle Bridge, w/o Alaskan Way Viaduct NB on ramp		5380	NA	6050	NA	6050	NA	6000	NA	6050
3.11	Screenline V/C Ratio		7150	6150	0.69	1.15	0.68	1.15	0.70	1.14	0.70	1.15
	Duwamish River - 1st Ave S and 16th Ave S	1st Ave S Br, S/O Point A	8220	8220	2930	4320	2930	4320	2930	4320	2930	4320
		16th Ave S, N/O 16th Ave S BR	1540	1540	800	1060	810	1020	850	1020	820	1020
3.12	Screenline V/C Ratio		9760	9760	0.38	0.55	0.38	0.55	0.39	0.55	0.38	0.55

Table A.7–21 2035 screenline V/C ratio results (cont.)

LOS Screen Line #	Location	Arterial Crossing Screenline	2035 Capacity		2035 Alt 1 Model		2035 Alt 2 Model		2035 Alt 3 Model		2035 Alt 4 Model	
			EB/NB	WB/SB	EB/NB	WB/SB	EB/NB	WB/SB	EB/NB	WB/SB	EB/NB	WB/SB
	South City Limit - M L King Jr Wy to Rainier Ave S	Martin Luther King Jr Way S, s/o Norfolk	2040	2040	1080	1890	1080	1640	1080	1710	1080	1650
		51st Ave S, s/o Bangor St	770	770	310	700	260	700	280	690	280	680
		Renton Ave S, se/o Bangor St	770	770	500	950	490	930	520	940	500	930
		Rainier Ave S, se/o 75th Ave SE	1460	1460	990	1420	990	1400	1020	1400	1010	1410
4.11	Screenline V/C Ratio		5040	5040	0.57	0.98	0.56	0.93	0.58	0.94	0.57	0.93
	South City Limit - Marine Dr SW to Meyers Wy S	Marine View Drive SW, N/O 46th Ave SW	770	770	390	240	380	220	380	240	380	240
		35th Ave SW, N/O SW Roxbury St	1010	1010	810	920	780	920	800	920	790	940
		26th Ave SW, N/O SW Roxbury St	770	770	370	520	380	530	380	530	380	520
		Delridge Wy, NW/o SW Cambridge St	770	770	680	410	670	390	690	410	680	410
		16th Ave SW, n/o SW Cambridge St	770	770	250	520	250	540	250	560	250	570
		8th Ave SW, N/O SW Roxbury St	770	770	350	580	340	580	340	580	360	590
		Olson Pl SW, SW/o 1st Ave S	1010	1010	1070	1440	1070	1440	1070	1440	1070	1440
		Myers Way S, S/O Olson Pl SW	1540	1540	230	670	210	680	220	660	210	670
4.12	Screenline V/C Ratio		7410	7410	0.56	0.72	0.55	0.72	0.56	0.72	0.56	0.73
	South City Limit - SR 99 to Airport Wy S	SR 99 (W Marginal Way S, NB - SE/O Cloverdale St onramp; SB - SE/O Kenyon onramp)	2000	2000	1980	2220	1970	2270	1980	2320	1960	2300
		8th Ave S, s/o Director St	770	770	100	220	100	250	100	250	100	240
		East Marginal Way S, SE/O S 81st	2040	2040	780	990	760	1040	780	1040	770	1020
		14th Ave S, n/o Director St	1540	1540	580	850	590	840	610	820	600	830
		Airport Way S, N/O S Norfolk St	1000	1000	820	1120	800	1150	840	1130	820	1150
4.13	Screenline V/C Ratio		7350	7350	0.58	0.73	0.57	0.76	0.59	0.76	0.58	0.75
	Ship Canal Ballard Bridge	Ballard Bridge	2870	3410	3410	2450	3310	2370	3340	2380	3350	2490
5.11	Screenline V/C Ratio		2870	3410	1.19	0.72	1.15	0.70	1.16	0.70	1.17	0.73
	Ship Canal Fremont Bridge	Fremont Bridge	2210	2210	1750	1560	1720	1540	1720	1540	1710	1560

Table A.7–21 2035 screenline V/C ratio results (cont.)

LOS Screen Line #	Location	Arterial Crossing Screenline	2035 Capacity		2035 Alt 1 Model		2035 Alt 2 Model		2035 Alt 3 Model		2035 Alt 4 Model	
			EB/NB	WB/SB	EB/NB	WB/SB	EB/NB	WB/SB	EB/NB	WB/SB	EB/NB	WB/SB
5.12	Screenline V/C Ratio		2210	2210	0.79	0.71	0.78	0.70	0.78	0.70	0.77	0.71
	Ship Canal Aurora Ave N	Aurora Bridge	5380	5380	5040	4420	4950	4420	4910	4410	4880	4460
5.13	Screenline V/C Ratio		5380	5380	0.94	0.82	0.92	0.82	0.91	0.82	0.91	0.83
	Ship Canal University and Montlake Bridges	University Bridge, SW/O Point A	2210	2210	1630	2150	1620	2140	1590	2130	1580	2140
		Montlake Bridge, S/O Point A	2210	2210	2630	2540	2610	2530	2590	2500	2580	2520
5.16	Screenline V/C Ratio		4420	4420	0.96	1.06	0.96	1.06	0.95	1.05	0.94	1.05
	South of NW 80th St - Seaview Ave NW to 15th Ave NW	Seaview Ave NW, N/O NW 67th St	1010	1010	280	130	270	130	270	130	290	130
		32nd Ave NW, S/O NW 80th St	770	770	100	370	100	350	100	360	100	360
		24th Ave NW, S/O NW 80th St	1010	1010	690	500	680	470	680	480	700	520
		15th Ave NW, S/O NW 80th St	3070	2040	1990	1390	1920	1340	1950	1360	1990	1390
6.11	Screenline V/C Ratio		5860	4830	0.52	0.49	0.51	0.47	0.51	0.48	0.53	0.50
	South of NW 80th St - 8th Ave NW to Greenwood Ave N	8th Ave NW, S/O NW 80th St	1010	1010	1060	870	1020	810	1030	840	1050	890
		3rd Ave NW, S/O NW 80th St	770	770	660	570	650	560	650	570	660	580
		Greenwood Ave N, S/O N 80th St	1010	1010	720	710	710	710	710	710	710	710
6.12	Screenline V/C Ratio		2790	2790	0.87	0.77	0.85	0.75	0.86	0.76	0.87	0.78
	South of NE 80th St - Linden Ave N to 1st Ave NE	Linden Ave N, S/O N 80th St	770	770	350	290	340	250	330	270	340	280
		Aurora Ave N, S/O N 80th St	2150	2150	1930	1270	1910	1300	1890	1280	1880	1310
		Green Lake Drive N, SE/O N 80th St	1010	1010	330	170	320	170	310	170	300	170
		Wallingford Ave N, S/O N 80th St	770	770	340	340	340	340	320	350	320	350
		Stroud Ave N, SW/O N 80th St	770	770	280	190	280	200	280	180	300	200
		1st Ave NE, S/O NE 80th St	770	770	230	280	210	290	200	280	200	290
6.13	Screenline V/C Ratio		6240	6240	0.55	0.41	0.54	0.41	0.53	0.41	0.53	0.42
	South of NE 80th St - 5th Ave NE to 15th Ave NE	5th Ave NE, S/O NE 78th St	770	770	570	490	550	480	550	500	540	480
		Roosevelt Way NE (one-way), N/O NE 73rd St		1840	NA	1360	NA	1370	NA	1390	NA	1380
		Lake City Way NE, SW/O NE 80th St	2040	2040	2050	1160	2030	1090	2010	1160	1990	1150
		15th Ave NE, S/O NE 75th St	1540	770	670	600	650	600	650	610	650	610
6.14	Screenline V/C Ratio		4350	5420	0.76	0.67	0.74	0.65	0.74	0.68	0.73	0.67

Table A.7–21 2035 screenline V/C ratio results (cont.)

LOS Screen Line #	Location	Arterial Crossing Screenline	2035 Capacity		2035 Alt 1 Model		2035 Alt 2 Model		2035 Alt 3 Model		2035 Alt 4 Model	
			EB/NB	WB/SB	EB/NB	WB/SB	EB/NB	WB/SB	EB/NB	WB/SB	EB/NB	WB/SB
	South of NE 80th St - 20th Ave NE to Sand Point Way NE	20th Ave NE, S/O NE 75th St	770	770	460	190	440	180	430	210	410	210
		25th Ave NE, S/O NE 75th St	1540	770	980	610	970	610	930	610	930	610
		35th Ave NE, S/O NE 75th St	1540	770	870	740	860	740	860	740	860	740
		40th Ave NE, S/O NE 75th St	770	770	500	290	490	280	490	290	490	290
		Sand Point Way NE, S/O NE 74th St	1540	1540	1160	840	1150	830	1110	840	1100	830
6.15	Screenline V/C Ratio		6160	4620	0.64	0.58	0.63	0.57	0.62	0.58	0.62	0.58
	West of Aurora Ave - Fremont Pl N to N 65th St	Fremont Pl N, NW/O Fremont Ave N	1940	1940	830	1060	810	1030	830	1030	870	1040
		N 39th St, W/O Fremont Ave N	770	770	600	740	580	730	590	730	620	730
		N 46th St, W/O Phinney Ave N.	1540	1540	930	1010	890	970	920	970	950	970
		N 50th St, W/O Fremont Ave N	770	770	600	750	580	730	590	720	620	730
		N 65th St, W/O Linden Ave N	770	770	230	270	230	260	230	250	230	270
7.11	Screenline V/C Ratio		5790	5790	0.55	0.66	0.53	0.64	0.55	0.64	0.57	0.65
	West of Aurora Ave - N 80th St to N 145th St	N 80th St, W/O Linden Ave N	960	960	750	780	710	750	730	750	750	770
		N 85th St, W/O Linden Ave N	1540	1540	860	1120	810	1090	850	1100	880	1120
		N 105th St w/o Evanston	1540	1540	760	1040	760	1060	760	1040	760	1060
		N 125th St, W/O Aurora Ave N	1010	1010	470	400	440	380	470	400	470	410
		N 130th St, W/O Linden Ave N	960	960	680	820	670	820	720	830	680	810
		N 145th St, W/O Linden Ave	1540	1540	700	820	730	820	710	810	690	810
7.12	Screenline V/C Ratio		7550	7550	0.56	0.66	0.55	0.65	0.56	0.65	0.56	0.66
	South of Lake Union	Valley St, W/O Fairview Ave N Mercer St, EB -w/o Fairview Ave N; WB- e/o Boren Ave N Republican St, w/o Eastlake Ave Denny Way, E/O Minor Ave	6150	6150	5660	5090	5620	4800	5650	4840	5470	4780
8	Screenline V/C Ratio		6150	6150	0.92	0.83	0.91	0.78	0.92	0.79	0.89	0.78
	South of Spokane St - Beach Dr SW to W Marginal	Beach Dr SW, SE/O 61st Ave SW	770	770	190	250	190	240	190	240	190	260
		55th Ave SW, S/O SW Charlestown St	770	770	170	80	160	80	170	80	170	80

Table A.7–21 2035 screenline V/C ratio results (cont.)

LOS Screen Line #	Location	Arterial Crossing Screenline	2035 Capacity		2035 Alt 1 Model		2035 Alt 2 Model		2035 Alt 3 Model		2035 Alt 4 Model	
			EB/NB	WB/SB	EB/NB	WB/SB	EB/NB	WB/SB	EB/NB	WB/SB	EB/NB	WB/SB
	Way SW	California Ave SW, S/O SW Charlestown St	1010	1010	630	960	630	950	640	960	670	980
		Fauntleroy Wy SW (NB - West Seattle Br, NE/O Fauntleroy Wy; SB - NE/O 35th Ave SW)	3590	3590	2780	3230	2750	3230	2790	3180	2820	3260
		SW Avalon Wy, N/O 30th Ave SW	1010	1010	600	950	560	920	590	950	630	960
		Delridge Wy, S/O SW Andover St	1010	1010	730	950	710	930	730	930	730	930
		W Marginal Way SW	2000	2000	850	820	830	820	860	860	840	850
9.11	Screenline V/C Ratio		10160	10160	0.59	0.71	0.57	0.71	0.59	0.71	0.60	0.72
	South of Spokane St - E Marginal Way S to Airport Way S	E Marginal Way SW, N/O Alaskan Wy Vi SB	1150	1150	520	1110	500	1100	520	1100	510	1130
		Alaskan Wy, N/O East Marginal Way S	3590	3590	2360	2540	2360	2580	2380	2520	2360	2550
		1st Ave S, S/O S Spokane SR St	2040	2040	1070	1460	1040	1470	1090	1460	1080	1450
		4th Ave S, S/O S Spokane SR St	2040	2040	1920	2070	1900	2080	1960	2090	1920	2080
		6th Ave S, S/O S Forest St	1540	1940	870	1130	910	1120	900	1120	900	1130
		Airport Way S (NB - S/O S Spokane St, SB - N/O S Spokane St)	2040	2040	680	740	670	740	680	740	670	740
9.12	Screenline V/C Ratio		12400	12800	0.60	0.71	0.60	0.71	0.61	0.71	0.60	0.71
	South of Spokane St - 15th Ave S to Rainier Ave S	15th Ave S, S/O S Bradford St	2920	1540	1220	800	1220	790	1220	810	1220	820
		Beacon Ave S, S/O S Spokane St	1010	1010	1030	1040	980	1040	1040	1050	1030	1050
		Martin Luther King Jr Way S, N/O S Andover St	1010	1010	770	1020	770	1020	770	1020	770	1020
		Rainier Ave S, SE/O M LK	2040	2040	1630	2150	1540	2150	1670	2190	1660	2190
9.13	Screenline V/C Ratio		6980	5600	0.67	0.89	0.65	0.89	0.67	0.91	0.67	0.91
	South of S Jackson St - Alaskan Way S to 4th Ave S	Alaskan Wy S, N of S King St	2140	2040	720	1740	730	1750	730	1690	730	1740
		SR 99 Tunnel	3940	3940	3960	3960	3960	3960	3960	3960	3960	3960
		1st Ave S, N/O S King St	2040	2040	1230	1690	1240	1730	1240	1670	1240	1700
		2nd Ave S, N/O S King St	1540	1540	820	530	830	520	830	510	820	510
		4th Ave S, S/O 2nd Ave ET S	2920	1940	1350	1770	1350	1790	1350	1760	1350	1800

Table A.7–21 2035 screenline V/C ratio results (cont.)

LOS Screen Line #	Location	Arterial Crossing Screenline	2035 Capacity		2035 Alt 1 Model		2035 Alt 2 Model		2035 Alt 3 Model		2035 Alt 4 Model	
			EB/NB	WB/SB	EB/NB	WB/SB	EB/NB	WB/SB	EB/NB	WB/SB	EB/NB	WB/SB
10.11	Screenline V/C Ratio		12580	11500	0.64	0.84	0.64	0.85	0.64	0.83	0.64	0.84
	South of S Jackson St - 12th Ave S to Lakeside Ave S	12th Ave S, S/O S Weller St	1010	1010	1160	1310	1150	1320	1190	1310	1180	1320
		Rainier Ave S, SE/O Boren Ave S	1010	1010	1300	1240	1330	1270	1300	1240	1310	1250
		23rd Ave S, S/O S Jackson St	1540	1540	670	870	670	870	710	870	700	870
		Martin Luther King Jr Way S, S/O S Jackson St	1010	1010	960	1090	940	1110	990	1090	980	1100
		31st Ave S, S/O S Jackson St	960	960	300	570	290	580	320	580	320	590
		Lakeside Ave S	770	770	270	630	260	640	270	630	270	630
10.12	Screenline V/C Ratio		6300	6300	0.74	0.91	0.74	0.92	0.76	0.91	0.76	0.91
	East of CBD	S Jackson St, E/O 5th Ave S	1010	1010	950	580	950	580	960	580	950	600
		Yesler Way, W/O 6th Ave	770	770	180	350	180	350	180	360	180	360
		James St, NE/O 6th Ave	2040	2040	630	1940	630	1940	630	1930	630	1940
		Cherry St, NE/O 6th Ave	1150		710	NA	720	NA	710	NA	730	NA
		Madison St, SW/O 7th Ave	1540	1630	180	1840	180	1860	180	1840	180	1850
		Spring St, SW/O 6th Ave	2760		1450	NA	1410	NA	1400	NA	1410	NA
		Seneca St, NE/O 6th Ave		2760	NA	980	NA	1000	NA	970	NA	990
		University, sw/o 6th	2330		830	NA	830	NA	810	NA	810	NA
		Union St, NE of 7th Ave		3500	NA	710	NA	710	NA	710	NA	710
		Pike St, SW/O Terry Ave	1540	1540	1010	340	1010	360	970	330	980	340
		Pine St, NE/O 9th Ave	770	960	200	630	190	660	180	620	180	630
		Olive Way, NE/0 9th Ave	3500		1310	NA	1300	NA	1250	NA	1260	NA
		Howell St, ne/o 9th ave	3940		950	NA	960	NA	940	NA	940	NA
12.12	Screenline V/C Ratio		21350	14210	0.39	0.52	0.39	0.52	0.38	0.52	0.39	0.52
	East of I-5 NE Northgate Way to NE 145th St	NE Northgate Way, E/O 5th Ave NE	2040	2040	1530	1220	1750	1360	1600	1260	1580	1250
		NE 125th St (Roosevelt Way NE, SE/O NE 130th St N)	1010	1010	730	1120	670	1070	720	1090	720	1100
		NE 145th St, E/O 5th Ave NE	1540	1540	1600	1250	1620	1220	1560	1260	1560	1250
13.11	Screenline V/C Ratio		4590	4590	0.84	0.78	0.88	0.80	0.85	0.79	0.84	0.78

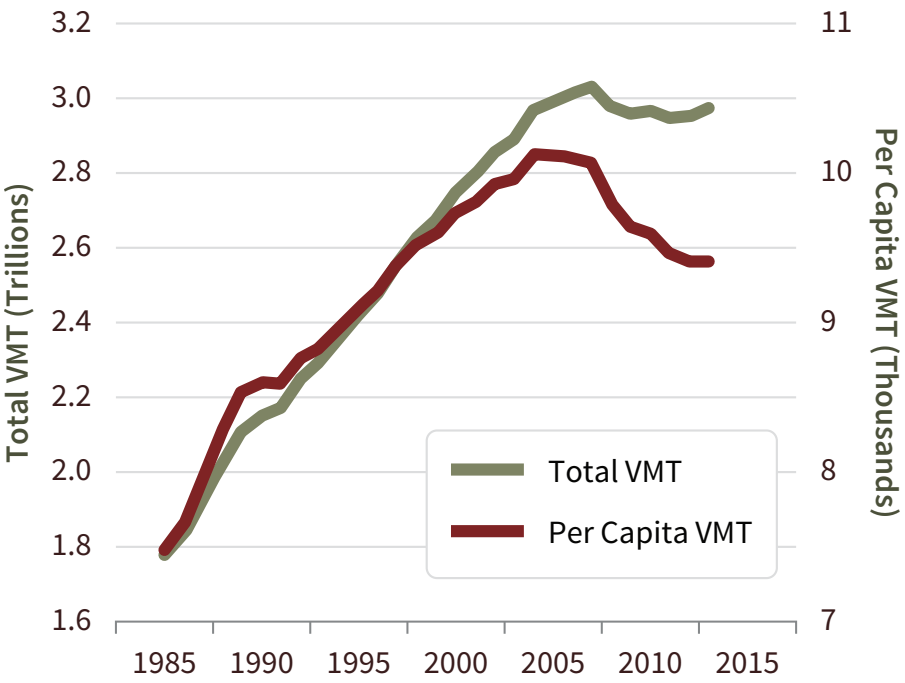
Table A.7–21 2035 screenline V/C ratio results (cont.)

LOS Screen Line #	Location	Arterial Crossing Screenline	2035 Capacity		2035 Alt 1 Model		2035 Alt 2 Model		2035 Alt 3 Model		2035 Alt 4 Model	
			EB/NB	WB/SB	EB/NB	WB/SB	EB/NB	WB/SB	EB/NB	WB/SB	EB/NB	WB/SB
	East of I-5 NE 65th St to NE 80th St	NE 80th St, E/O 5th Ave NE	770	770	680	470	700	460	700	480	710	470
		NE 75th St, W/O Roosevelt Way NE	2040	2040	810	1080	800	1040	820	1090	800	1070
		NE 70th St, W/O Roosevelt Way NE	770	770	520	450	530	440	460	410	460	430
		NE 65th St, W/O Roosevelt Way NE	1540	1540	540	710	540	690	560	780	560	780
13.12	Screenline V/C Ratio		5120	5120	0.5	0.53	0.50	0.51	0.50	0.54	0.49	0.54
	East of I-5 NE Pacific St to NE Ravenna Blvd	NE Pacific St, NW/O NE Boat St	1010	1010	1180	1070	1180	1050	1180	1020	1180	1020
		NE 40th St, E/O 7th Ave NE	770	770	640	420	630	420	640	400	650	400
		NE 42nd St, E/O 7th Ave NE	770	770	330	220	330	210	330	200	330	210
		NE 45th St W/O Roosevelt Way NE	2040	2040	1300	1390	1300	1400	1310	1370	1300	1360
		NE 50th St W/O Roosevelt Way NE	1540	1540	520	1170	520	1160	550	1140	550	1140
		NE Ravenna Blvd, W/O Roosevelt Way	1010	1010	490	520	480	520	480	500	480	500
13.13	Screenline V/C Ratio		7140	7140	0.62	0.67	0.62	0.67	0.63	0.65	0.63	0.65

Potential Changes to VMT per Capita

After 50 years of steady growth, nationwide vehicle miles traveled (VMT) per capita leveled off in 2004 and declined by eight percent between 2004 and 2012. Whether travel will return to growth rates of past decades, remain static or continue to decline is of critical importance to decision-makers in government at all levels. VMT growth affects many areas of transportation ranging from fuel tax revenues, to modal investment decisions, to environmental impacts, which is the focus of this document.

Figure A.4–3 VMT trends for the United States through 2013[1]



Source: FHWA; U.S. Census Bureau.

For this study, VMT is estimated using a travel demand model based on the PSRC's regional model. The model's estimate of VMT generation is based on a range of factors including trip generation rates, auto operating costs, household size and income and traffic congestion levels. With the exception of traffic congestion levels, PSRC does not project major changes in the factors listed above, which translates into a relatively static level of VMT per capita from the travel model.

To explore how variables beyond those considered in the travel demand model may affect VMT per capita in Seattle over the next 30 years, Fehr & Peers used its TrendLab+ tool.

1 McCahill, Chris. 2014. Per capita VMT drops for ninth straight year; DOTs taking notice. Accessed September 18, 2014: http://www.ssti.us/2014/02/vmt-drops-ninth-year-dots-taking-notice/.

TrendLab+ estimates 2040 VMT per capita based on predictions about future demographic and economic shifts. For this effort, the estimate was created with Seattle's local trends and characteristics in mind. In particular, the following trends were assumed:

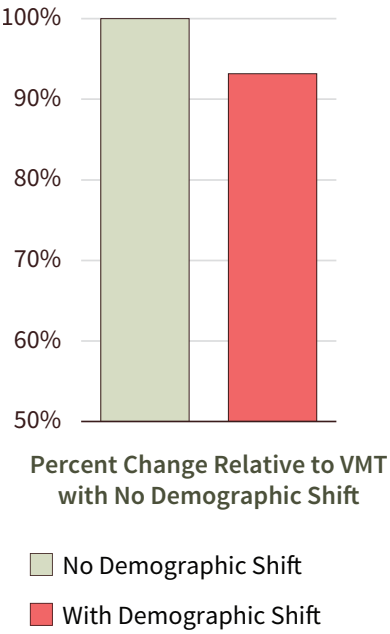
- Decrease in vehicle ownership—current trends indicate millennials are more focused on urban living and are foregoing car ownership in greater numbers or are buying fewer cars as they form families.
- Increase in gasoline prices—while gasoline prices tend to fluctuate substantially, general prices are projected to remain at the high levels that helped produce the VMT slowdown in the early 2000's.
- Increase in non-auto mode options—the expansion of light rail, pedestrian and bicycle options over the next 20 years is expected to increase the non-auto mode options available to Seattle's residents and workers. While the travel model is sensitive to increased transit levels, it does not have the detail related to the pedestrian or bicycle network.
- Increase in social networking—the sharing economy and web connectivity will continue to change human interaction potentially reducing solo travel and recreational driving.
- Increase in internet shopping—with the increase of internet shopping and same-day delivery, consumer VMT would decrease; this increase would be offset to some extent by the increase in VMT generated for goods delivery, but commercial delivery is generally more efficient than individuals driving to stores.

This scenario translates to an estimated VMT per capita decrease of nearly seven percent from 2015 to 2035. This estimate would bring the travel model's projection of 2.9 PM peak period VMT per capita down to 2.7 (compared to 3.3 PM peak period VMT per capita in 2015). On an aggregate basis, this reduction in VMT is roughly 300 million annual vehicle-miles and translates into several important outcomes:

- GHG emissions from transportation roughly track VMT generation and a seven percent decrease in VMT would translate into a seven percent decrease in transportation-related GHG emissions.
- Based on the predicted 2035 mode splits, the VMT reduction would translate into more than 30 million additional transit passenger miles traveled. This will increase demands on the transit system and strengthens the need for the improvements identified in the TMP.

Overall, trends are pointing to the continued decrease in VMT generation per capita, although at a slower pace than has been observed over the past several years. The overall evaluation prepared for this EIS is consistent with other environmental documents prepared in the region, since it is based on the regionally adopted (PSRC) model. However, based on the output from TrendLab+, the PSRC-based models may have a slight bias toward increased VMT generation that may be seen over the coming years. The TrendLab+ output supports the City's broad vision to better balance multimodal travel needs across Seattle.

Figure A.4–4
2035 VMT per capita



FEHR & PEERS

MEMORANDUM

Date: January 9, 2015

To: Gordon Clowers and Kristian Kofoed, City of Seattle DPD

From: Chris Breiland and Ariel Davis, Fehr & Peers

Subject: Seattle Screenline Capacity Methodology

SE14-0337

At the outset of the Seattle Comprehensive Plan update, DPD Director's Rule 5-2009 was used to provide total capacities at each of the City's designated screenlines. These capacities were developed to represent the transportation system in 2008. Over the course of analysis, it became clear that the capacities at various screenlines needed to be re-examined to reflect current (2015) conditions. Fehr & Peers, building from a foundation of nationally accepted standards, developed a methodology to estimate capacity across Seattle's screenlines. This memorandum describes that methodology.

The foundation of the capacity methodology is Florida Department of Transportation's (FDOT) generalized service volume tables which are based on the 2010 Highway Capacity Manual's capacity methodology. These tables use "typical" default values to determine the capacity of a roadway based on characteristics such as its number of lanes, presence of turn lanes, presence of medians, signal density etc. The typical process is described below. For each arterial crossing a screenline, the following information was collected for each direction of travel:

- Number of through lanes;
- Speed Limit – 40 mph or higher is categorized as a Class I roadway and 35 mph or slower is categorized as a Class II roadway, based on FDOT's definitions;
- Presence of median – this includes a physical barrier or a two-way left turn lane, either of which results in no obstructions of through lanes by left-turning vehicles;
- Presence of exclusive left turn lane or left turn pocket at major intersections;

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- Presence of exclusive right turn lane at major intersections – only applied if there was sufficient storage to accommodate all right turning vehicles such that the through lanes are not blocked, for example roadways with BAT lanes or right turn only lanes; and
- One-way or two-way operations.

This data was entered into a spreadsheet that calculates the capacity based on the "signalized arterials" section of FDOT's Generalized Service Volume Table 7, included as an attachment to this memotemp. Table 7 provides directional peak hour capacities for urbanized areas such as Seattle. As shown in Table 7, a base capacity is assigned depending on the number of lanes and speed limit, and standardized adjustments are applied based on the remaining characteristics: presence of median, presence of turn lanes, and directionality.

The vast majority of Seattle's arterials fall into the Class II signalized roadway category (roadways with a speed limit of 35 mph or less). However, for many of those roadways, we found that FDOT's typical capacities were below the observed counts collected by the Seattle Department of Transportation (SDOT) on Seattle arterials, indicating that SDOT's management of key arterial roadways (for instance, signal timing) results in higher capacities than predicted by FDOT's typical characteristics.

To calibrate to local conditions, we used Highway Capacity Software to adjust the parameters of the "typical" analysis such that most of the City's busiest arterials were operating below, but very near, capacity. This calibration was completed by adjusting the default "g/C ratio." The g/C ratio reflects the percentage of "green time" that is allocated to the arterial at intersections. This ratio was adjusted upward to reflect that SDOT allocates green traffic signal time to maximize vehicle throughput on key arterials during the PM peak hour. After testing a variety of values, the g/C ratio was adjusted from 0.44 to 0.52, which results in a 20 percent increase over FDOT's base capacities. Application of this factor more closely reflects local observed conditions (i.e. observed flow does not consistently exceed capacity). This "Typical Seattle g/C Factor" was applied to Class II roadways only.

There remained a small number of Class II arterials for which the modified FDOT methodology described above is not well suited, such as the Ship Canal bridges which have substantially higher observed flows than most other roads in the City. For those locations, parameters were further calibrated to observed conditions to obtain a "High Capacity g/C Factor" that results in a 30

percent increase in the typical FDOT capacities, reflecting a g/C ratio of 0.56. This adjustment was applied at three locations: the Fremont Bridge, University Bridge, and Montlake Bridge.[1]

Capacities for high-speed arterials categorized as Class I roadways, freeways, or uninterrupted flow highways were calculated using FDOT's Table 7, with no further modifications. Those instances are described in the following table.

TABLE 1. HIGH SPEED ROADWAY CAPACITIES[2]

Screenline	Arterial	Methodology
1.11	Aurora Avenue N south of N 145th Street	Class I divided roadway with two through lanes in each direction and an exclusive right turn lane (BAT lane) in the northbound direction
3.11	West Seattle Bridge west of the Alaskan Way Viaduct on-ramp	Uninterrupted flow highway with three through lanes in each direction and an auxiliary lane (bus lane) in the eastbound direction
3.12	First Avenue S Bridge	Freeway with four lanes in each direction
4.11	Rainier Avenue S southeast of 75th Avenue SE	Due to its unusual characteristics (unsignalized arterial for over two miles), this location was analyzed within Highway Capacity Software to obtain an individualized capacity. The basic characteristics are one through lane in each direction with a two way left turn lane acting as both a median and exclusive left turn lane.
4.13	SR 99 southeast of Cloverdale Street on-ramp	Class I divided roadway with two through lanes in each direction
4.13	Airport Way S north of S Norfolk Street	Class I divided roadway with two through lanes in each direction
5.11	Ballard Bridge	Uninterrupted flow two-lane roadway in the southbound direction; the 5 percent reduction for an undivided roadway was applied rather than the 25 percent reduction since no left turns are permitted. Class I three-lane roadway with exclusive left turn lane in the northbound direction (approaching Market Street)
5.13	Aurora Bridge	Uninterrupted flow divided highway with three through lanes (a median was assumed since that is the prevailing condition along the segment beyond the bridge)

[1] The High Capacity g/C Factor was applied in the place of, not in addition to, the Typical Seattle g/C Factor.
[2] These include Class I roadways, freeways, and uninterrupted flow highways.

City of Seattle
January 9, 2015
Page 4 of 4

TABLE 1. HIGH SPEED ROADWAY CAPACITIES[2]

Screenline	Arterial	Methodology
9.11	Fauntleroy Way SW west of the Seattle Bridge	Uninterrupted flow divided highway with two through lanes in each direction
9.11	W Marginal Way SW south of Spokane Street	Class I divided roadway with two through lanes in each direction
9.12	Alaskan Way north of East Marginal Way	Uninterrupted flow divided highway with two through lanes in each direction
10.11	Alaskan Way Viaduct northwest of First Avenue ramp	Freeway with three through lanes (the condition at the time the count was taken)

Source: Fehr & Peers, 2015.

The same methodology was applied for the 2035 analysis. The vast majority of locations were assumed to retain the same capacity as existing conditions. Exceptions include roadways with planned cycletracks that may require road diets, and reasonably foreseeable projects such as the replacement of the Alaskan Way Viaduct, which results in changes to the capacity of Alaskan Way and SR 99.

The methodology was also applied for the twelve urban center screenlines with the prefix "A." Since these locations are located in urban centers that tend to have lower throughput, often due to congestion on I-5, the Typical Seattle g/C Factor of 20 percent was not universally applied, consistent with the lower traffic counts observed on these streets. However, there were two arterials where the Typical Seattle g/C Factor was applied since they have relatively high g/C ratios and little cross-street traffic: Montlake Blvd NE north of NE Pacific Place (Screenline A9) and Elliott Avenue W east of W Mercer Place (Screenline A4).

TABLE 7

Generalized **Peak Hour Directional** Volumes for Florida's **Urbanized Areas**[1]

12/18/12

INTERRUPTED FLOW FACILITIES

STATE SIGNALIZED ARTERIALS

Class I (40 mph or higher posted speed limit)

Lanes	Median	B	C	D	E
1	Undivided	*	830	880	**
2	Divided	*	1,910	2,000	**
3	Divided	*	2,940	3,020	**
4	Divided	*	3,970	4,040	**

Class II (35 mph or slower posted speed limit)

Lanes	Median	B	C	D	E
1	Undivided	*	370	750	800
2	Divided	*	730	1,630	1,700
3	Divided	*	1,170	2,520	2,560
4	Divided	*	1,610	3,390	3,420

Non-State Signalized Roadway Adjustments
(Alter corresponding state volumes by the indicated percent.)
Non-State Signalized Roadways - 10%

Median & Turn Lane Adjustments

Lanes	Median	Exclusive Left Lanes	Exclusive Right Lanes	Adjustment Factors
1	Divided	Yes	No	+5%
1	Undivided	No	No	-20%
Multi	Undivided	Yes	No	-5%
Multi	Undivided	No	No	-25%
–	–	–	Yes	+ 5%

One-Way Facility Adjustment
Multiply the corresponding directional volumes in this table by 1.2

BICYCLE MODE[2]

(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Paved Shoulder/Bicycle Lane Coverage	B	C	D	E
0-49%	*	150	390	1,000
50-84%	110	340	1,000	>1,000
85-100%	470	1,000	>1,000	**

PEDESTRIAN MODE[2]

(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Sidewalk Coverage	B	C	D	E
0-49%	*	*	140	480
50-84%	*	80	440	800
85-100%	200	540	880	>1,000

BUS MODE (Scheduled Fixed Route)[3]

(Buses in peak hour in peak direction)

Sidewalk Coverage	B	C	D	E
0-84%	> 5	≥ 4	≥ 3	≥ 2
85-100%	> 4	≥ 3	≥ 2	≥ 1

UNINTERRUPTED FLOW FACILITIES

FREEWAYS

Lanes	B	C	D	E
2	2,260	3,020	3,660	3,940
3	3,360	4,580	5,500	6,080
4	4,500	6,080	7,320	8,220
5	5,660	7,680	9,220	10,360
6	7,900	10,320	12,060	12,500

Freeway Adjustments

Auxiliary Lane	Ramp Metering
+ 1,000	+ 5%

UNINTERRUPTED FLOW HIGHWAYS

Lanes	Median	B	C	D	E
1	Undivided	420	840	1,190	1,640
2	Divided	1,810	2,560	3,240	3,590
3	Divided	2,720	3,840	4,860	5,380

Uninterrupted Flow Highway Adjustments

Lanes	Median	Exclusive left lanes	Adjustment factors
1	Divided	Yes	+5%
Multi	Undivided	Yes	-5%
Multi	Undivided	No	-25%

[1]Values shown are presented as peak hour directional volumes for levels of service and are for the automobile/truck modes unless specifically stated. This table does not constitute a standard and should be used only for general planning applications. The computer models from which this table is derived should be used for more specific planning applications. The table and deriving computer models should not be used for corridor or intersection design, where more refined techniques exist. Calculations are based on planning applications of the Highway Capacity Manual and the Transit Capacity and Quality of Service Manual.

[2] Level of service for the bicycle and pedestrian modes in this table is based on number of motorized vehicles, not number of bicyclists or pedestrians using the facility.

[3] Buses per hour shown are only for the peak hour in the single direction of the higher traffic flow.

* Cannot be achieved using table input value defaults.

** Not applicable for that level of service letter grade. For the automobile mode, volumes greater than level of service D become F because intersection capacities have been reached. For the bicycle mode, the level of service letter grade (including F) is not achievable because there is no maximum vehicle volume threshold using table input value defaults.

Source:
Florida Department of Transportation
Systems Planning Office
www.dot.state.fl.us/planning/systems/sm/los/default.shtm

2012 FDOT QUALITY/LEVEL OF SERVICE HANDBOOK TABLES

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