



King County

Department of Transportation
 Metro Transit
 Service Development
 201 South Jackson Street
 M.S. KSC-TR-0426
 Seattle, WA 98104-3856

June 10, 2013

TO: Resha, John, King County Council Central Staff

FM: Chris O'Claire, Supervisor, Strategic Planning Analysis, Service Development, Metro Transit Division

RE: Updates to the Strategic Plan for Public Transportation 2011-2021 and King County Metro Service Guidelines

Metro has prepared the following analysis in response to questions and concerns that about the service guideline updates transmitted to the King County Council on April 30, 2013.

Summary of Estimated Need with service guideline updates

Compared to the 2012 investment needs under the current guidelines these updates result in an additional 126,200 annual hours of need. The table below shows the difference in need by category.

Comparison of 2012 Investment Needs with and without Service Guideline Updates

Priority	Investment Area	Estimated Annual Hours Needed		
		Current	With Update	Difference
1	Reduce passenger crowding	5,500	5,500	0
2	Improve schedule reliability	19,000	19,000	0
3	Increase service to meet target service levels in All-Day and Peak Network	309,800	436,000	126,200
Total		334,300	460,500	126,200

The table below shows the change in the number of corridors that would be below their target service level with the proposed updates.

Comparison of 2012 Investment Needs for Corridors Below Target Service Levels

	Number of Corridors	Estimated Hours	% of system
2012 without updates	43	310,000	9%
2012 with updates	56	436,000	12%
% Change	30%	41%	

John Resha
June 11, 2013
Page 2

Change in Priority order of Corridors Below Target Service Level

The “Corridors Below Target Service Levels in Priority Order: Spring 2012 Date with Guidelines Update” table on pages 3 and 4 shows all the corridors that are below their target service level for at least one time period and the priority order of that need as identified in the guidelines. To help understand the prioritization, the Geographic Value (GV) scores, Productivity (LU) scores, and Social Equity (SE) scores are all listed.

By way of reminder, the corridors are prioritized by their GV score first, then their LU score and then their SE score. To help track how the updates change the order there is a “Changed Order” column that shows whether the corridor is new, or the priority it changed from and to. The last three columns are included to show which of the three corridor related updates (1. adding student enrollment; 2. adding additional household and job thresholds and making those thresholds constant; and 3. adjusting the step two load factor for service level increase) contributed to the change in priority order. All corridors that changed order due to adding student enrollment are marked with an x in the “Students” column. All corridors that changed order due to the changes in the household and job thresholds are marked with an x in the “Changed Thresholds” column. All corridors that changed order due to the changes in the step two load factor are marked with an x in the “Adjusted Load” column.

John Resha
June 11, 2013
Page 3

Corridors Below Target Service Levels in Priority Order: Spring 2012 Data with Guidelines Updates (1 of 2)

Corridor	Between	And	Major Route	Hours Needed	GV score	LU Score	SE score	Changed Order	Students	Changed Threshold	Step II Loads
11	Ballard	U. District	44	5,400	10	18	0	2 to 1	X	X	X
25	Cowen Park	Seattle CBD	73	9,600	10	16	10	1 to 2	X		
12	Ballard	Seattle CBD	17	10,600	10	16	0	New	X	X	X
19*	Burien	Seattle CBD	132	18,000	10	12	10	3 to 4	X	X	
55	Lake City	Seattle CBD	41	13,100	10	10	10	4 to 5		X	X
20	Capitol Hill	White Center	60	8,900	10	10	10	5 to 6	X	X	
99	Tukwila	Seattle CBD	124	9,600	10	10	10	6 to 7		X	
84	Renton	Seattle CBD	101	7,100	10	10	5	7 to 8		X	
9	Ballard	Lake City	75	10,000	10	10	0	New	X	X	
51	Kent	Seattle CBD	150	7,400	10	6	10	11 to 10		X	
81	Redmond	Totem Lake	930	10,500	10	6	5	14 to 11		X	
33	Federal Way	Kent	183	10,000	10	4	10	10 to 12		X	
52	Kent	Renton	153	10,000	10	4	10	12 to 13		X	
50	Kent	Renton	169	6,000	10	4	5	New		X	
3	Auburn	Burien	180	21,500	10	2	10	9 to 15		X	
83	Renton	Burien	F Line	8,000	10	2	10	13 to 16		X	
100*	Tukwila	Des Moines	156	12,000	10	2	10	8 to 17		X	
59	Madison Park	Seattle CBD	11	10,200	5	20	5	15 to 18	X		X
38	Greenwood	Seattle CBD	5	2,600	5	20	0	16 to 19		X	
35	Fremont	U. District	30/31	2,000	5	16	5	New	X	X	X
69	Northgate	Seattle CBD	16	8,000	5	16	0	18 to 21	X	X	
5	Aurora Village	Seattle CBD	E Line	7,000	5	14	0	17 to 22		X	X
18*	Burien	Seattle CBD	131	21,000	5	12	10	19 to 23	X	X	
57	Lake City	U. District	65	5,100	5	12	5	23 to 24	X	X	X
86	Renton	Seattle CBD	106	9,100	5	10	10	New		X	
94	Shoreline CC	Northgate	345	8,600	5	10	10	22 to 26	X	X	
45	Kenmore	U. District	372EX	4,000	5	10	5	29 to 27	X	X	
96	Shoreline CC	Greenwood	5	2,600	5	10	5	New	X	X	
95	Shoreline CC	Lake City	330	4,000	5	10	0	24 to 29	X	X	
93	Shoreline	U. District	373EX	21,800	5	8	10	21 to 30	X	X	
16	Bellevue	Renton	240	7,500	5	6	10	New		X	
37	Green River CC	Kent	164	5,800	5	6	10	26 to 32	X	X	
87	Renton	Renton Highlands	105	2,000	5	6	10	20 to 33	X	X	
1	Admiral District	Southcenter	128	8,200	5	4	10	New	X	X	
48*	Kent	Burien	131/ 166	10,800	5	4	10	25 to 35	X	X	

Shaded rows are corridors new to the corridors below their target service level list

*Corridor had significant change since spring 2012

John Resha
June 11, 2013
Page 4

Corridors Below Target Service Levels in Priority Order: Spring 2012 Data with Guidelines Updates (2 of 2)

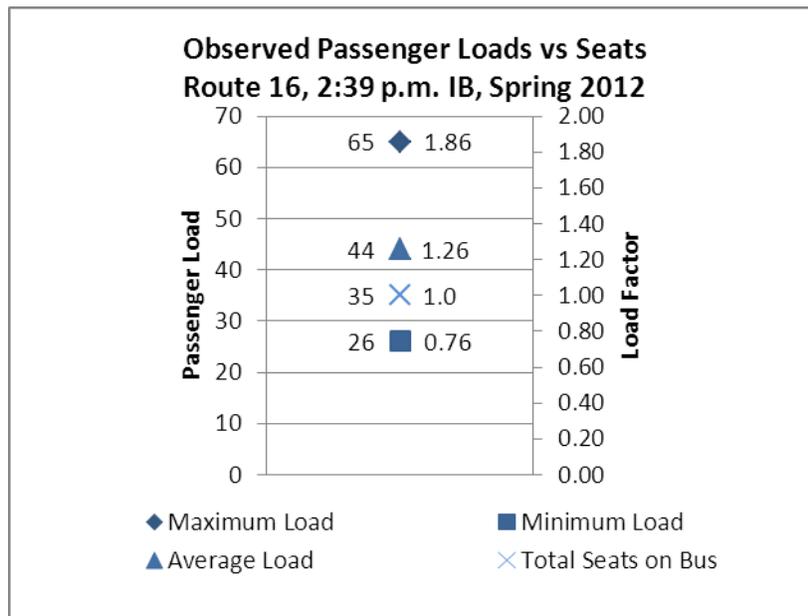
Corridor	Between	And	Major Route	Hours Needed	GV score	LU Score	SE score	Changed Order	Students	Changed Threshold	Step II Loads
49	Kent	Maple Valley	168	7,500	5	4	10	New		X	
41	Issaquah	Overlake	269	11,000	5	4	5	28 to 37		X	
101	Tukwila	Fairwood	155	5,000	5	2	5	30 to 38		X	
30	Enumclaw	Auburn	186/ 915	5,000	5	0	5	27 to 39			
21	Capitol Hill	Seattle CBD	10	3,500	0	20	5	31 to 40	X		
24	Colman Park	Seattle CBD	27	3,000	0	18	5	32 to 41		X	
26*	Discovery Park	Seattle CBD	33	9,000	0	18	0	34 to 42		X	
64	Mount Baker	Seattle CBD	145	9,100	0	16	10	33 to 43		X	
92	Sand Point	U. District	30	3,300	0	16	5	New	X	X	
107	U. District	Seattle CBD	25	8,200	0	16	5	35 to 45	X	X	
113*	White Center	Seattle CBD	23	4,200	0	14	10	36 to 46			
70	Northgate	U. District	68	10,000	0	14	5	40 to 47	X	X	
2*	Alki	Seattle CBD	56	2,500	0	14	0	37 to 48	X	X	
72	Overlake P&R	Bellevue	226	3,500	0	12	10	New		X	
79	Rainier Beach	Capitol Hill	9EX	9,000	0	12	10	39 to 50	X	X	
58	Laurelhurst	U. District	25	3,300	0	12	0	New	X	X	
28	Eastgate	Bellevue	246	5,000	0	8	5	New	X	X	
65	Mountlake Terrace	Northgate	347	6,300	0	6	0	41 to 53		X	
71*	Othello Station	Columbia City	39	2,200	0	4	10	38 to 54			
89	Renton Highlands	Renton	908	4,000	0	4	10	43 to 55		X	
74	Pacific	Auburn	917	4,000	0	0	10	42 to 56			

Shaded rows are corridors new to the corridors below their target service level list

*Corridor had significant change since spring 2012

Use of Average Load Thresholds

Passenger load thresholds are based on the average load at the most crowded point along a route. Ridership is based on a sample of trips throughout a service change period. The chart below illustrates an example of how the average load factors relate to the individual observations of a given trip that was identified as overcrowded in Spring 2012. A trip that meets the threshold for overcrowding will have some trips that had more or less crowding than average. In this example, the maximum load observed on this trip was 65 and the minimum was 26 while the average was 44.



Loads and Low-Floor Buses

The chart below lists the load factors for weekday trips using the scheduled fleet in spring 2012, and the load factors if the fleet had been 100% low floor during the same time period. This reduces the seating to 35 seats for trips that were scheduled in 40-foot, high-floor buses and reduces seating to 56 seats for trips scheduled in 60-foot, high-floor buses. This also does not take into account places where Metro has made changes since spring 2012 such as assigning larger vehicles, and adding or deleting service.

Trips with Load Factors within various ranges

	Weekday Trips	All	Load Factor Range			
			<1	1-1.25	1.25-1.5	>1.5
Spring 2012 current fleet	# Trips	11,197	10,761	375	48	13
	% of Trips	100%	96.1%	3.3%	0.4%	0.1%
Spring 2012 100% Low Floor	# Trips	11,197	10,479	564	109	45
	% of Trips	100%	93.6%	5.0%	1.0%	0.4%
Difference	# Trips	0	-282	189	61	32

John Resha
 June 11, 2013
 Page 6

The chart below shows the change in trips with load factors above 1.25 and 1.5 with an all low-floor fleet.

Trips with Load Factors above 1.25 by Route

Route	Spring 2012 Current fleet		Spring 2012 100% Low-Floor	
	1.25-1.5	>1.5	1.25-1.5	>1.5
1			3	
2N Ex			1	
2N			2	
2S			2	
3N	1		4	1
3S	6	3	11	9
4N	1		2	1
4S	4		7	4
7	1		1	
10	2		5	2
12			2	
13			2	
14N	1		5	1
14S	3	3	3	6
16	1		1	
17	1		2	1
30	1		1	
36	12	5	18	17
44	4	2	4	2
60	1		1	
65			3	
66			2	
68	2		3	
70			7	
71	1		1	
74	1		1	
128	1		1	
193	1		1	
250			1	
271	1		3	1
301	1		1	
306			1	
309			1	
358	1		2	
372			4	
TOTAL	48	13	109	45
Difference			61	32

John Resha
 June 11, 2013
 Page 7

Based on the table on page 6 there would have been 93 more total trips identified with load factors above 1.25 if the fleet was entirely low-floor in spring 2012. This only gives a very rough sense of the level of change that could occur over a period of years as Metro moves to a low-floor fleet; not all of these trips would be identified to receive investment. There have been substantial changes to many routes since spring 2012 as well as major changes to how fleets are distributed among Metro bases. In addition, Metro has changed fleet assignments on some routes since spring 2012, which would affect the level of crowding identified. Ridership has changed since that time as well. Metro will be re-evaluating overcrowding using information from spring 2013 as part of our updated guidelines report to be published this fall.

The table below shows the number of trips exceeding the 1.25 and 1.5 thresholds based on 2012 loads and fleet mix. The list is ordered based on the highest number of trips exceeding the highest load threshold. In other words, the route with the most number of trips exceeding the 1.5 threshold is listed first followed by the route with the second highest number on trips exceeding the 1.5 threshold etc. As with the previous table, not all of these trips would be identified to receive investment.

Routes ranked by number of trips with load factors exceeding thresholds (1 of 6)

Route	# Trips with Load Factor				Avg. Seats
	<1	1-1.25	1.25-1.5	>1.5	
36	220	23	12	5	44
3S	129	16	6	3	42
14S	80	5	3	3	42
916	8	1	3	3	15
44	153	13	4	2	56
4S	75	10	4	0	42
68	43	10	2	0	44
10	158	7	2	0	42
16	96	7	1	0	43
71E	46	7	1	0	58
14N	79	6	1	0	42
60	86	6	1	0	35
193E	7	6	1	0	52
128	61	5	1	0	35
3N	71	4	1	0	42
7	229	4	1	0	56
17	68	4	1	0	45
30	69	4	1	0	35
74E	12	4	1	0	58
271	147	4	1	0	42
4N	84	3	1	0	42
301E	21	3	1	0	58
358E	158	3	1	0	64
914	11	3	1	0	15
41	143	25	0	0	58
73E	66	9	0	0	58
5	126	8	0	0	57
11	96	8	0	0	40
9E	50	7	0	0	51

Routes ranked by number of trips with load factors exceeding thresholds (2 of 6)

Route	# Trips with Load Factor				Avg. Seats
	<1	1-1.25	1.25-1.5	>1.5	
70	113	7	0	0	42
1	98	6	0	0	42
101	87	6	0	0	56
120	138	6	0	0	58
218	23	6	0	0	56
28	78	5	0	0	54
33	54	5	0	0	45
111	11	5	0	0	55
372E	72	5	0	0	62
28E	13	4	0	0	58
65	81	4	0	0	51
102	9	4	0	0	56
143E	6	4	0	0	54
179	11	4	0	0	38
212	51	4	0	0	58
2S	133	3	0	0	42
8	134	3	0	0	58
12	147	3	0	0	42
13	93	3	0	0	42
15E	17	3	0	0	59
49	148	3	0	0	56
54	146	3	0	0	57
66E	70	3	0	0	51
76	13	3	0	0	58
164	59	3	0	0	35
180	80	3	0	0	36
316	11	3	0	0	58
671	181	3	0	0	48
2N	86	2	0	0	42
55	87	2	0	0	54
71	24	2	0	0	58
72E	50	2	0	0	58
77E	15	2	0	0	58
121	36	2	0	0	50
190	9	2	0	0	41
240	77	2	0	0	35
255	151	2	0	0	56
303E	20	2	0	0	62
2NE	20	1	0	0	59
15	109	1	0	0	59
17E	10	1	0	0	56
18E	14	1	0	0	61
23	71	1	0	0	54
24	76	1	0	0	47
26	83	1	0	0	60
31	52	1	0	0	43

Routes ranked by number of trips with load factors exceeding thresholds (3 of 6)

Route	# Trips with Load Factor				Avg. Seats
	<1	1-1.25	1.25-1.5	>1.5	
43	168	1	0	0	56
54E	13	1	0	0	54
64E	13	1	0	0	55
75	111	1	0	0	57
106	96	1	0	0	56
107	82	1	0	0	30
113	10	1	0	0	39
118	42	1	0	0	34
119	16	1	0	0	34
122	11	1	0	0	50
159	8	1	0	0	54
161	9	1	0	0	37
162	4	1	0	0	43
177	30	1	0	0	49
181	66	1	0	0	35
214	20	1	0	0	54
216	11	1	0	0	57
250	11	1	0	0	42
252	14	1	0	0	57
306E	10	1	0	0	61
309E	8	1	0	0	62
312E	33	1	0	0	60
823	1	1	0	0	49
913	27	1	0	0	15
5E	14	0	0	0	59
7E	8	0	0	0	54
18	103	0	0	0	60
19	9	0	0	0	40
21E	22	0	0	0	61
21	77	0	0	0	59
22	52	0	0	0	60
25	33	0	0	0	35
26E	13	0	0	0	59
27	63	0	0	0	44
34E	6	0	0	0	43
35	4	0	0	0	52
37E	8	0	0	0	35
37	7	0	0	0	35
38	40	0	0	0	30
39	55	0	0	0	45
42	16	0	0	0	42
45E	6	0	0	0	35
46	21	0	0	0	35
48NE	6	0	0	0	58
48N	162	0	0	0	58
48S	163	0	0	0	58

Routes ranked by number of trips with load factors exceeding thresholds (4 of 6)

Route	# Trips with Load Factor				Avg. Seats
	<1	1-1.25	1.25-1.5	>1.5	
51	50	0	0	0	30
53	16	0	0	0	35
56E	19	0	0	0	59
56	56	0	0	0	59
57	12	0	0	0	62
67	68	0	0	0	53
72	20	0	0	0	58
73	18	0	0	0	58
79E	7	0	0	0	42
81	4	0	0	0	42
82	4	0	0	0	58
83	4	0	0	0	50
84	4	0	0	0	58
85	4	0	0	0	42
99	59	0	0	0	35
105	71	0	0	0	35
110	20	0	0	0	30
114	9	0	0	0	49
116E	15	0	0	0	41
118E	4	0	0	0	34
119E	2	0	0	0	34
123E	9	0	0	0	45
124	98	0	0	0	59
125	91	0	0	0	40
129	16	0	0	0	30
131	37	0	0	0	46
132	53	0	0	0	47
133	8	0	0	0	52
134	9	0	0	0	40
139	60	0	0	0	30
140	115	0	0	0	35
143	1	0	0	0	56
148	57	0	0	0	30
150	130	0	0	0	56
152	10	0	0	0	35
153	25	0	0	0	31
154	8	0	0	0	30
155	26	0	0	0	30
156	61	0	0	0	30
157	7	0	0	0	35
158	11	0	0	0	52
166	70	0	0	0	35
167	9	0	0	0	56
168	66	0	0	0	35
169	73	0	0	0	35
173	4	0	0	0	35

Routes ranked by number of trips with load factors exceeding thresholds (5 of 6)

Route	# Trips with Load Factor				Avg. Seats
	<1	1-1.25	1.25-1.5	>1.5	
175	8	0	0	0	35
182	42	0	0	0	31
183	34	0	0	0	31
186	19	0	0	0	35
187	50	0	0	0	31
192	8	0	0	0	38
196	13	0	0	0	41
197	16	0	0	0	55
200	49	0	0	0	30
201	3	0	0	0	30
202	16	0	0	0	47
203	36	0	0	0	30
204	29	0	0	0	30
205E	8	0	0	0	44
209	28	0	0	0	30
210	8	0	0	0	45
211E	14	0	0	0	42
213	12	0	0	0	30
215	10	0	0	0	57
217	6	0	0	0	56
219	9	0	0	0	30
221	67	0	0	0	42
224	13	0	0	0	30
226	64	0	0	0	42
232	18	0	0	0	42
234	61	0	0	0	42
235	74	0	0	0	42
236	58	0	0	0	30
237	5	0	0	0	42
238	60	0	0	0	30
241	63	0	0	0	42
242	12	0	0	0	50
243	5	0	0	0	42
244E	10	0	0	0	42
245	120	0	0	0	42
246	40	0	0	0	31
248	72	0	0	0	42
249	53	0	0	0	32
257	12	0	0	0	55
260	6	0	0	0	42
265	18	0	0	0	42
268	9	0	0	0	52
269	31	0	0	0	42
277	12	0	0	0	42
280	4	0	0	0	42
301	11	0	0	0	58

Routes ranked by number of trips with load factors exceeding thresholds (6 of 6)

Route	# Trips with Load Factor				Avg. Seats
	<1	1-1.25	1.25-1.5	>1.5	
304	9	0	0	0	64
308	7	0	0	0	48
311	23	0	0	0	56
330	23	0	0	0	51
331	60	0	0	0	30
342	9	0	0	0	49
345	58	0	0	0	30
346	64	0	0	0	35
347	63	0	0	0	35
348	62	0	0	0	30
355E	18	0	0	0	52
373E	19	0	0	0	64
600E	10	0	0	0	37
661	8	0	0	0	59
672	172	0	0	0	48
821	2	0	0	0	58
822	2	0	0	0	56
824	2	0	0	0	49
885	2	0	0	0	57
886	2	0	0	0	56
888	2	0	0	0	56
889	2	0	0	0	49
890	2	0	0	0	57
891	2	0	0	0	49
892	2	0	0	0	56
893	2	0	0	0	42
901	60	0	0	0	15
903	60	0	0	0	15
907	14	0	0	0	15
908	20	0	0	0	15
909	28	0	0	0	15
910	18	0	0	0	15
912	6	0	0	0	34
915	10	0	0	0	15
917	28	0	0	0	15
919	17	0	0	0	15
925	1	0	0	0	15
927	21	0	0	0	15
930	20	0	0	0	15
931	40	0	0	0	15
935	40	0	0	0	15
952E	8	0	0	0	56
TOTAL	10,761	375	48	13	N/A

John Resha
 June 11, 2013
 Page 13

Metro Fleet and Fleet Assignments

The table below shows Metro's fleet and distribution by base as of Spring 2013.

Metro Fleet and Distribution: MAY 2013

FLEET TYPE	##	AB	CB	RB	EB	BB	NB	SB	Total
30' Diesel Gillig	1100					24	13	23	60
60' Diesel New Flyer	2300			88			88		176
60' Hybrid New Flyer LF	2600	37	96		28		51		212
60' Diesel New Flyer LF	2800			30					30
35' Diesel Gillig	3100		9						9
40' Diesel Gillig	3200		23			119			142
35' Diesel Gillig (Center Parc)	3300		2						2
40' Diesel New Flyer LF	3600			53			47		100
40' Trolley Gillig	4100	100							100
60' Trolley Breda	4200	58							58
60' RapidRide BRT New Flyer LF	6000	36			17			17	70
60' Hybrid New Flyer LF	6800			25	63			100	188
40' Hybrid Daimler LF	7000		29	27	13			130	199
40' Diesel Sound Transit	9000				22				22
40' Hybrid Sound Transit LF	9200				1				1
60' Diesel Sound Transit LF	9500				37				37
60' Hybrid Sound Transit LF	9600				52				52
Low Floor Coaches		73	125	135	211	0	98	247	889
Percent Low Floor Coaches		32%	79%	61%	91%	0%	49%	91%	61%
TOTAL COACHES		231	159	223	233	143	199	270	1458
Low Floor fleets are highlighted below and indicated with an "LF" Base Abbreviations: AB = Atlantic Base (Downtown Seattle); CB = Central Base (Downtown Seattle); RB = Ryerson Base (Downtown Seattle); EB = East Base (Bellevue); BB = Bellevue Base (Bellevue); NB = North Base (Shoreline); SB = South Base (Tukwila)									

Metro assigns fleet to routes based on several factors, including: ridership and loads; availability of different fleets at each base; unique fleets such as trolley buses or RapidRide buses; operating conditions on a route such as tight turns that limit bus size; and operation in the Downtown Seattle Transit Tunnel. Fleets are assigned to different bases changes over time as Metro procures and puts new fleets into service. The number and type of buses at each base is impacted by factors such as maintenance bay capacity, parking capacity, and parts storage.

John Resha
 June 11, 2013
 Page 14

University and Colleges to be included in Fall 2013 Service Guidelines Report

Green River Community College will have enrollment data available by June 14, 2013. Once we receive all the university enrollment data, we will update the corridor analysis.

University or College	Available Enrollment
Art Institute of Seattle	2,261
Bastyr University	1,018
Bellevue College	20,000
Cascadia Community College	5,250
City University-Bellevue	160
City University-Downtown Seattle	500
City University - Renton	125
Cornish College of the Arts	776
Digipen Institute of Technology	1,100
Green River Community College	8,262
Green River CC Enumclaw Campus	287
Green River CC Kent Campus	1,179
Highline Community College	7,181
Lake Washington Institute of Technology - Kirkland	5,560
Lake Washington institute of Technology -Redmond	350
North Seattle Community College	8,465
Northwest University	1,383
Renton Technical College	11,667
Seattle Central Community College	9,606
Seattle Pacific University	4,167
Seattle University	7,755
Shoreline Community College	13,247
South Seattle Community College	5,081
University of Washington	37,777
University of Washington-Bothell	3,245