

Density and Road Width

On Monday 8/15 I reintroduced a topic the Planning Commission got a few weeks ago namely that density only provides the opportunity for fewer car trips, but it requires business and offices inside the upzones before it will limit external car trips. Your task is not a 100 houses in a 100 days initiative but is building the infrastructure for Shoreline 2.0 and remember the EIS create 20 year and long term schedules. The buildings we need for MUR45 are being built in Seattle and those builders shouldn't be expected to have time for Shoreline until the Seattle market cools. "Density at any cost" does have costs for the city and its residents, even for 7,784 extra external auto trips for not having businesses and offices. Lets review a table from both upzones:

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Table 3.3-4 Percentage of Trips by Mode

Action Alternatives	External Walk/Bike Trips	External Transit Trips	Internal Trips	External Auto Trips	Total PM Peak Trips Generated	External PM Auto Trips Generated	Daily Transportation-Related GHG Emissions
Dispersed Land-Use Model w/ Alt. 4—Preferred Alternative Population and Employment totals	4%	4%	25%	66%	20,111	13,312	640
Alternative 4—Preferred Alternative	10%	11%	35%	45%	20,111	8,967	320

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Table 3.3-5 Percentage of Trips by Mode and GHG Emissions

Alternative	External ⁹ Walk/Bike Trips	External Transit Trips	Internal Trips	External Auto Trips	Total PM Peak Trips Generated	External PM Auto Trips Generated	Per Capita GHG (metric tons / 100 households)
Dispersed Land-Use Model with Alternative 3 Population/Job totals	4%	5%	15%	76%	17,894	13,599	7.1
Alternative 4 – Compact Community Hybrid	12%	10%	23%	55%	18,061	10,160	2.6

My first problem is once you are beyond the pedshed of a quarter mile/5 minutes, you no longer have the transit reduction number, because the garage is full and only a few will walk the extra distance, especially when combined with shopping and errands by our more senior population. At 185th the upzone corridor is more than a mile and a quarter and at 145th the west zone is essentially blocked by the elevated pedestrian ramp over the western offramp from I5 so we are depending on buses to get many of the commuters into the station. Editorially only 1 of the 4 "External PM Auto Trips Generated" in the tables above have the actual result of the percentage multiplied by the "Total PM Peak Trips Generated".

While the predicted traffic fits in a road on a diet, its impact at intersections really shows how important it is for residents to have businesses and offices nearby. I have heard city officials talk

about the upzones impacting 3-4 percent of Shoreline. Traffic is where every driver, walker and taxpayer will feel the impact.

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**Table 3.3-5 PM Peak Period Intersection Level of Service
for the Full Build-out of Alternative 4—Preferred Alternative**

Signal Type	Intersection	Existing LOS	Existing Delay (sec. / veh.)	No Action LOS	No Action Delay (sec. / veh.)	Preferred Alternative LOS	Pref. Alt Delay (sec. / veh.)
Signalized	185th St / Meridian Ave	D	54	D	45	F	>120
Signalized	185th St / 1st Ave	A	<10	B	14	F	>120
Unsignalized	185th St / 5 th Ave	B	23	F	>120	F	>120
Unsignalized	185th St / 7 th Ave	B	20	E	36	F	>120
Unsignalized	185th St / 10th Ave	A	11	C	21	F	108
Signalized	15th Ave / Perkins Way	C	21	D	53	E	59
Unsignalized	180th St / 10th Ave	A	<10	C	20	F	>120
Signalized	180th St / 15th Ave	A	<10	C	22	D	38
Signalized	175th St / Meridian Ave	D	51	D	54	F	110
Signalized	175th St / I-5 SB Ramps	C	30	E	79	F	>120
Signalized	175th St / I-5 NB Ramps	D	45	F	>120	F	>120
Signalized	175th St / 5th Ave	C	25	C	26	D	34
Signalized	175th St / 10th Ave	A	<10	B	16	D	48
Signalized	175th St / 15th Ave	D	47	D	53	E	69

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**Table 3.3-8 PM Peak Period Intersection Level of Service
for Alternative 4—Compact Community Hybrid (Full Build-Out)**

Signal Type	Intersection	Existing LOS	Existing Delay (sec. / veh.)	No Action LOS	No Action Delay (sec. / veh.)	Compact Community Hybrid LOS	Compact Community Hybrid Delay (sec. / veh.)
Signalized	145th St / Meridian Ave	B	16	D	55	F	940
Signalized	145th St / 1st Ave	B	18	E	57	F	>1000
Signalized	145th St / SB I-5	D	46	E	66	F	223
Signalized	145th St / 5 th Ave	D	42	F	81	F	570
Signalized	5th Ave / I-5 NB On-ramp	A	<10	A	<10	D	39
Signalized	145th St / 15th Ave	E	60	F	94	F	310
Signalized	150th St / 15th Ave	B	16	C	21	E	69
Signalized	155th St / 15th Ave	C	30	D	37	F	940
Signalized	155th St / 5th Ave	B	10	B	17	F	>1000
Unsignalized	155th St / 1st Ave	C	21	E	49	F	223
Signalized	155th / Meridian	B	14	C	27	F	570

Notes: Large delay values (over 240 seconds) rounded to the nearest ten; Level of Service results do not incorporate improvements identified in the 145th Street Multimodal Corridor Study

Notice the footnote about not incorporating improvements identified in the 145th Corridor Study. There is a limit to delaying north/south traffic to benefit run times from Lake City to the station or Aurora to the station. Queue jumps may advance a bus 3-8 vehicles per stop light. Limited left turns should not impact the values in this table. I can summarize the affects this has on Bus Rapid Transit with a simple saying “This is not my Shoreline”. I’m talking about 185th for CT Swift and Metro Rapid Ride and about 145th for the North Shore Tri-cities buses. Adding lanes will not greatly reduce the intersection delays.

**Table 3.3-6 Average Daily Traffic Volumes and PM Peak Period Congestion
for the Full Build-out of Alternative 4—Preferred Alternative**

Street	Segment	Existing ADT	No Action ADT	Preferred Alt. ADT	Pref. Alt. PM Peak Hour Volume ¹⁰	Preferred Alt. V/C
East-West Corridors						
175th Street	West of I-5	30,770	39,490	52,820	2,115	>1.0
175th Street	East of I-5	18,010	21,180	28,590	1,186	0.76
185th Street	West of I-5	9,700	17,180	34,620	1,831	>1.0
185th Street	East of I-5	7,130	11,360	17,080	937	.94
North-South Corridors						
5th Avenue NE	South of N 185 th Street	3,360	5,700	8,770	399	0.57
15th Avenue NE	North of N 175 th Street	15,040	20,340	21,610	1,470	0.79
Meridian Avenue N	North of N 175 th Street	12,070	15,140	26,100	1,602	>1.0

**Table 3.3-9 Average Daily Traffic Volumes and PM Peak Period Congestion
for Alternative 4—Compact Community Hybrid (Full Build-Out)**

Street	Segment	Existing ADT	No Action ADT	Compact Community Hybrid ADT	No Action PM Peak Hour Volume ¹²	Compact Community Hybrid PM Peak Hour Volume ¹¹	Compact Community Hybrid V/C Ratio
East-West Corridors							
N/NE 145th Street*	West of I-5	25,240	30,430	55,250	1,650	2,920	1.77
NE 145th Street*	East of I-5	31,790	37,650	65,670	1,630	2,760	1.67
N 155th Street	West of I-5	11,640	14,920	40,000	700	1,860	1.95
NE 155th Street	East of I-5	9,900	12,380	20,030	610	940	0.98
North-South Corridors							
5th Avenue NE*	I-5 NB on-ramp to 155th Street	7,170	9,230	15,700	670	1,280	1.83
15th Avenue NE	145th to 150th Street	16,130	20,060	36,760	1,290	2,150	1.07
15th Avenue NE**	150th to 155th Street	14,240	18,640	26,340	1,150	1,540	1.28
Meridian Avenue N	145th to 155th Street	6,220	9,310	23,070	650	1,320	1.58

Don't ignore the Compact Community Hybrid V/C ratio just because the significant violations are outside the city limits. Restricted left turns should help the ratio, while longer signal lights should worsen the ratio. Look at the Compact Community Hybrid Average Daily Trips for 145th averaging about 60,000 trips/day, similar to what Aurora has with 2 fewer lanes. We are going to offer consistent bus times for Sound Transit BRT in trade for funding our 145th project in ST3?

“Total PM Peak Trips Generated” numbers in both upzone EIS’s came from a mixed use reduction to higher traditional Peak PM hour trip numbers calculated using the MXD technique. It should be noted it calculates the trips generated, not the distance travelled and most adults have practiced trip reductions. It doesn't make any sense to come back home after each leg of your errands. The problem with the residential upzones is there are very few destinations to

chain together and a lack of road width for local buses to pick up people and drop them off. Internet online resources keep people home but mean delivery vans stopping at the front door. It's the same linear relationship as car trips, the more you shop the more traffic you generate. A lot of my concerns are caused by the pace of activity, if we had 3-5 MUR45 (not townhomes, but 1 commercial and 3-6 residential floors) under construction, I wouldn't be saying so adamantly that we have a problem. The lack of construction in Shoreline while Seattle booms is a timing problem. The expected setbacks on 185th are targeted for sidewalk and bike expansion; there can be no widening of the street or additional lanes without property purchases (which become more expensive as new buildings are constructed closer to the arterial and secondary roads using the city's ownership and recommended setbacks). Given the similarities between 145th and 185th streets, we can predict using the concepts of the 145th Street corridor study that 185th will get a couple of more traffic lights, restricted left turns and bus bulbs in the 185th Street Corridor. This will not be sufficient to handle the increased traffic in the upzone with Aurora BRT trying to maintain their schedules.

With the average household making an average of 4-6 trips a day, the use of Peak PM hour doesn't tell the whole story. It doesn't take into account that Saturday total trips are higher than weekday total trips, and it doesn't emphasize the importance of business and offices on the other sides from residential on a 3 legged stool.

According to <https://www.bozeman.net/Smarty/files/85/8598c759-766c-4186-bd78-1a38947e42be.pdf> the land-use types and adjustments embodied in the lookup tables are now limited to the three uses: residential, retail, and offices. The traffic impacts of other mixed uses cannot be assessed. Their analysis included statistical equations derived from the data revealing that the primary factors affecting this reduction in automobile travel are:

1. The total and the relative amounts of population and employment on the site;
2. The site size and activity density;
3. The size of households and their auto ownership;
4. The amount of employment within walking distance of the site;
5. The block size on the site; and
6. The access to employment within a 30 min transit ride of the site.

In Table A I have included matching numbers from 3 other TOD sites around the US. The estimates for Shoreline used a per unit number for the sq ft of office and retail from the other sites multiplied by the units expected in Shoreline. The Georgia site was an old industrial park completely scalped and needing all the infrastructure. The Oregon site was an add-on to downtown Portland and only required an incremental addition to infrastructure.

Table A TOD sites across the US			
Location	Units	Office (sq ft)	Retail (sq ft)
Atlantic Station, GA	798	550,600	434,500
Baystreet Station, NJ	381	N/A	382,000
RiverPlace, OR	700	40,000	26,500
185 th Shoreline (est)	23,000	1.3 to 15 Million	0.8 to 12 Million
145 th Shoreline (est)	13,486	0.8 to 9.3 Million	0.5 to 7.3 Million

A note for Puget Sound that very few employers meet the 30 minute ride either in terms of walking when you leave transit or connector buses. I am also concerned that 185th is an arterial and also used as a local street in the upzone. To fit the definition, 185th street would be the arterial out to Aurora and the other local streets would be used for errands and internal zone traffic. In short, by the time the station is operational we will be well under the vibrant community requirements to justify the car trip estimates used in the EIS. Especially with density is job one expressed by the Planning Commission at their last meeting.

We should check that we have 60 foot right of ways for all the side streets in the upzones. For residential locations more than a quarter mile pedshed from the station and business centers we should allocate more parking in those buildings and space for bus stops and delivery vehicles in the street width. Internal building parking for businesses needs to be increased and minimum square footage and lot size for both MUR70 and MUR45. Zoning on 5th Ave and 185th needs the same building on the major street back to the street behind it for garage access.

The short answer is double left turns and more traffic lanes are the wrong answer. We solve the traffic with more businesses and offices and a city designed around business centers and not transit stations. Density has its place around arterials and honestly Shoreline should work on a road matrix for commuting/arterial, parking and secondary roads. We started with bikeways and walkways.

Dave Lange

Shoreline