

Eastside Transportation Association

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How People Really Choose to Travel Today

A comparison of travel data on I-5 and Sound Transit's Central Link
Downtown Seattle to the City of SeaTac

The James W. Maclsaac Research Committee – July, 2015

Current discussions comparing the efficiency of freeway lanes to light rail trains promote several myths.

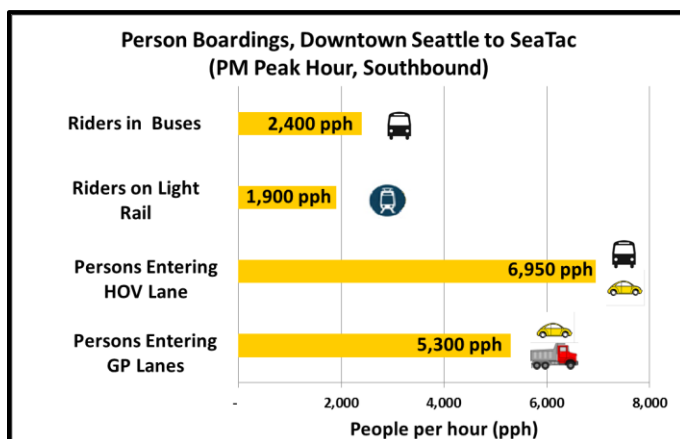
One of the myths that Sound Transit (ST) aggressively promotes is that people in the Puget Sound Region would prefer to ride light rail if only it went where they want to go. The reality here in the Puget Sound Region is more people are making the choice to ride a bus than ride light rail in the one corridor where busses, freeways and light rail are all available. In addition, more people are choosing to travel in a carpool than light rail in the same corridor.

Five years after the beginning of ST's Central Link Light Rail revenue operations, the buses in the southbound HOV lane on I-5 carry more people than the light rail line in the PM peak. Including buses, vanpools and 2+ carpools the SB HOV lane carries over three times as many people as the light rail. In addition, each southbound general purpose lane on I-5 carries more than double the people than the southbound light rail trains in the same corridor. On a daily basis, the two I-5 HOV lanes carry three times more people than Central Link. The ten lane I-5 freeway carries 20 times more people than Central Link on a daily basis in the same corridor of metropolitan Seattle.

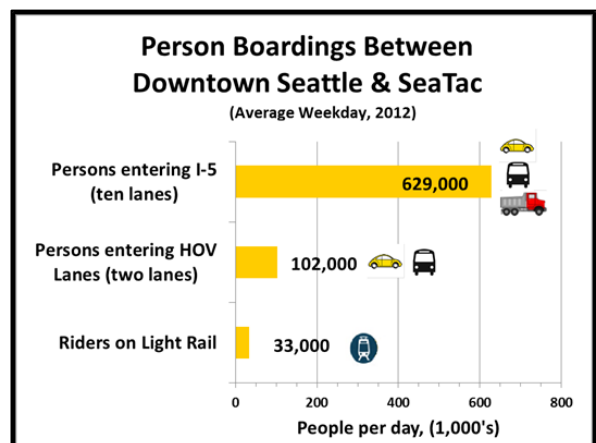
Highlights

- ✚ The 62 buses in I-5's SB HOV lane carry more people than Central Link in the peak hour
- ✚ The I-5 Freeway lanes out-perform Central Link's trains
- ✚ The SB I-5 HOV lane carries 3.6 times more people than Light Rail in the peak hour
- ✚ The I-5 HOV lanes carry three times more people than Light Rail every day
- ✚ I-5 carries twenty times more people than Central Link daily

Peak Hour



Daily



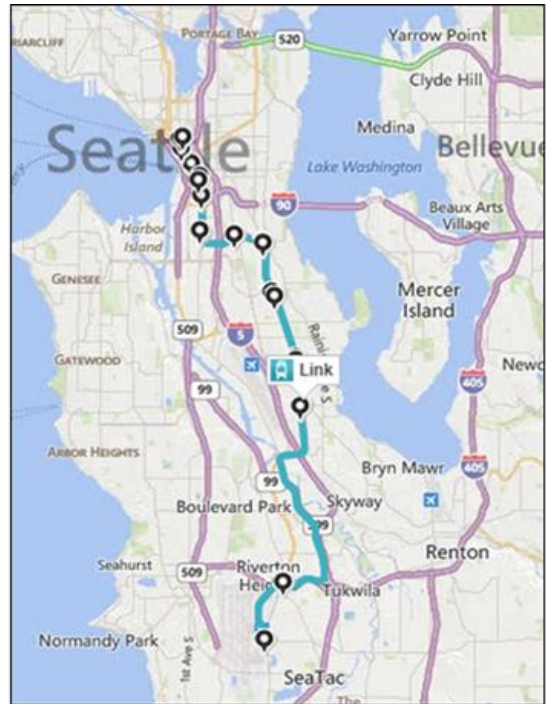
How People Really Choose to Travel Today (Backup Material)

Peak Hour Ridership (Table 1)

Sound Transit started ridership operations on Central Link Light Rail in 2009 between Downtown Seattle and the City of SeaTac along the I-5 Freeway corridor. Central Link has five underground stations in Downtown Seattle and serves Rainier Valley and the rest of the corridor with eight stations.

I-5 is a ten lane Interstate Highway in the same corridor with 13 interchanges between Downtown Seattle and S. 188th St. in SeaTac. The freeway is operated with one HOV lane and four general purpose lanes in each direction.

ST operates six Regional Express Bus (REX) routes and King County Metro operates eleven bus routes on the I-5 corridor in this segment. Other bus routes serve the area but do not use I-5 and were not included in this analysis. In the PM peak hour 62 buses leave Seattle and travel southbound on at least a portion of I-5.



**I-5 and Sound Transit's Central Link,
Downtown Seattle to the City of SeaTac**

I-5 Boardings

WSDOT's Ramp & Roadway¹ data provides vehicle volume on the mainline of I-5 and each on- and off-ramp for the PM peak hour and an average weekday for general purpose (GP) lanes and HOV lanes separately.

Tables 1 and 2 summarize the data. The total 'boardings' of vehicles entering I-5 southbound in the PM peak hour between Downtown Seattle and S. 188th St. were **2150 vph entering the HOV lane** and 18,540 entering the 4 general purpose (GP) lanes on an average weekday². **Sixty two PM peak hour buses** in the HOV lane were included, operated by King County Metro and Sound Transit. Carpools (2+) and vanpools were distributed between the HOV lane and the GP lanes with the single occupant vehicles (SOV), trucks and other commercial vehicles in the GP lanes.

King County Metro and Sound Transit provided PM peak hour ridership data on the bus routes that use I-5 southbound in the PM peak hour. WSDOT collaborated with the University of Washington's Washington State Transportation Center (TRAC-UW) in 2011 to determine average vehicle occupancy (AVO) factors for vehicles on the regional corridors, including I-5. Separate AVO factors were determined for HOV lanes, GP lanes, buses and vanpools. These data result in **6,953 people entering the HOV lane** and 21,093 people entering the four GP lanes on southbound I-5 in the PM peak hour in 2012. This translates to **5,273 people per lane per hour entering each of the I-5 GP lanes** and 6,953 people entering the HOV lane southbound in the PM peak hour on an average weekday.

¹ The Washington State Department of Transportation (WSDOT) publishes the Ramp & Roadway Traffic Volume Report every two years with the most recent report for 2012, including I-5 from Denny Way near the Washington State Convention Center in Downtown Seattle to S. 188th St. in SeaTac.

² A boarding of the freeway means the vehicle was on the mainline at the beginning point or got on the freeway at one of the on-ramps in the direction of flow. The vehicles were on the freeway for various lengths of trip depending on where they entered and exited the I-5 corridor. This method of counting vehicles and converting to people allow apples to apples comparisons to the transit industries' 'ridership' data.

How People Really Choose to Travel Today (Backup Material)

Central Link Boardings

Central Link has 8 two-car southbound trains leaving Downtown Seattle at 7.5 minute headways in the PM peak hour. Sound Transit provided 2013-14 station boarding data for Central Link. The average PM peak hour ridership from Seattle to SeaTac was **1,900 riders per hour³**.

Thus, in real life in 2012-14, the 62 King County Metro and ST REX buses that operate on I-5 in the HOV lane southbound in the PM peak hour carry more passengers than Central Link. The I-5 southbound HOV lane carried 3.6 times the number of people in the PM peak hour as did Central Link. A single I-5 freeway GP lane carried over twice as many people in one lane in one direction as Central Link carried in the PM peak hour, or 2 times more efficient.

These results are for light rail operations in Seattle five years after the Initial Segment of Central Link was put into service.

Daily Ridership (Table 2)

WSDOT, Metro and Sound Transit data is also available on an average weekday basis. In this case, both directions are used as a combined daily ridership.

The total “boardings” of vehicles entering I-5 in the corridor between S. 188th St. and Downtown Seattle were 531,876 vpd on an average weekday. These vehicles included 694 daily buses operated by King County Metro and Sound Transit plus SOV’s, carpools, vanpools, trucks and other commercial vehicles.

Applying the transit agency’s bus ridership and TRAC’s average vehicle occupancy data to the vehicle boardings entering I-5 results in **629,000 people using I-5 daily in 2012** (all 10 lanes).

The total boardings of vehicles in the I-5 HOV lanes (one each direction at 2+) is 36,000 on a daily basis, and **102,000 people entering the HOV lanes**, including 27,000 in buses.

Sound Transit reports that Central Link between October 2013 and September 2014 carried **33,000 riders per day** (total, both directions).

Thus, in real life in 2012-14, the 10 lane I-5 Freeway carried nearly 20 times as many people per day as Central Link light rail between Downtown Seattle and the City of SeaTac. The I-5 HOV lanes carry 3 times as many people per day as the light rail trains of Central Link.

Table 1.

I-5 Boardings, 2012-2013, PM Peak Hour, Southbound (Downtown Seattle to S. 188th St.)			Person Boardings		
Vehicle Boardings			Person Boardings		
Vehicle Types	HOV Lane	GP lanes	Vehicle Types	HOV Lane	GP lanes
Cars & Trucks	2,052	18,497	Cars & Trucks	4,324	20,852
Buses	62		Buses	2,413	
Vanpools	36	41	Vanpools	211	239
Total	2,150	18,538	Total	6,948	21,091
Total, per lane	2,150	4,600	Total, per lane	6,950	5,300

Table 2.

I-5 Boardings, 2012-2013, Average Weekday, Both Directions (Between Downtown Seattle & S. 188th St.)						
Vehicle Boardings				Person Boardings		
Vehicle Types	HOV Lane(s)	GP lanes	HOV+GP	Vehicle Types	HOV Lane(s)	GP lanes
Cars & Trucks	34,954	495,457	530,411	Cars & Trucks	72,704	525,185
Buses	694	-	694	Buses	27,039	-
Vanpools	362	409	771	Vanpools	2,114	2,387
Total	36,010	495,866	531,876	Total	101,857	527,572
Boardings per lane/direction	18,000	62,000	53,200	Boardings per lane/direction	50,900	65,900

³ Average weekday Southbound PM peak hour boardings, Sept. 26, 2013 to Sept. 28, 2014