MEMORANDUM

Date: January 21, 2011 Project #: 11049.0

To: Ellen Vanderslice

City of Portland 1120 SW 5th Avenue Portland, OR 97204

From: Mike Coleman and Jessica Horning
Project: Portland Bikeway Project Development

Subject: Lloyd District/NE Holladay Street Existing Conditions

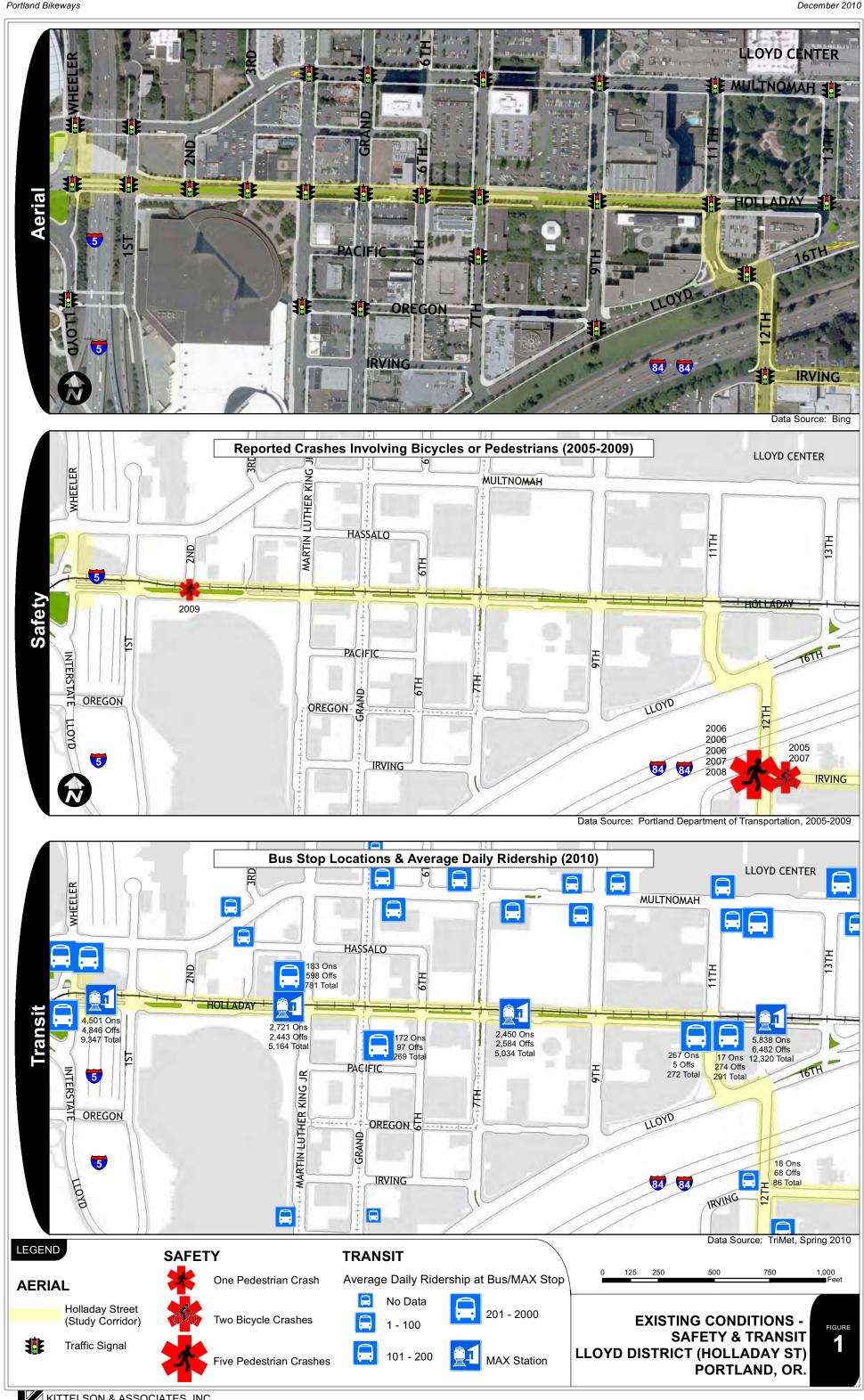
This technical memorandum describes the existing transportation conditions on the NE Holladay Street corridor between 1st and 13th Avenue in the Lloyd District as well as on NE 12th Avenue in the vicinities of NE Lloyd Boulevard and NE Irving Street (herein referred to collectively as the NE Holladay corridor). The assessment of existing conditions is based on a compilation of parking, transit, and transportation data obtained from available sources and is intended to inform future alternatives analyses. The details of the existing conditions analysis are documented herein.

INTRODUCTION

The Portland Bicycle Plan for 2030 sets a new direction for bikeway design and network completion in Portland. The plan emphasizes creating conditions to make bicycling more attractive than driving for short trips, and on completing a bikeway network that attracts new riders. A new generation of bikeway designs is envisioned to make riders feel safer and more comfortable than they would in standard bike lanes. To achieve these objectives, the City aims to pilot and implement a variety of separated in-roadway designs, including cycle tracks, buffered bike lanes, contra-flow bike lanes, and wide bike lanes. NE Holladay Street and NE 12th Avenue have been identified as a potential pilot project location.

EXISTING CONDITIONS

To provide information on opportunities and constraints on potential pedestrian and bicycle design treatments, the existing conditions analysis identifies traffic volumes and operations, parking supply and demand, public transportation supply and demand, and bicycle/pedestrian safety issues along the NE Holladay corridor in the Lloyd District. Figure 1 shows existing conditions and traffic controls in the Lloyd District.



Traffic Operations

The NE Holladay corridor extends between the Rose Garden and Oregon Convention Center near I-5, to the Regal Cinema, Holladay Park, and Lloyd Center Mall at NE 13th Ave. Benson High School, a magnet school drawing students from throughout the City of Portland, is located just south of the corridor at the intersection of NE 12th/Irving. In addition to the major entertainment/retail and Convention venues, the other predominant land uses in the corridor are office, hotels, and some convenience retail.

The southern half of NE Holladay Street is a one-lane, one-way eastbound street with intermittent metered on-street parking. The northern half accommodates the light rail line and is separated from the vehicular traffic by a landscaped median. The light rail line is used by the TriMet Red, Blue, and Green MAX rail lines. All intersections along the NE Holladay corridor are signalized.

Motor Vehicles

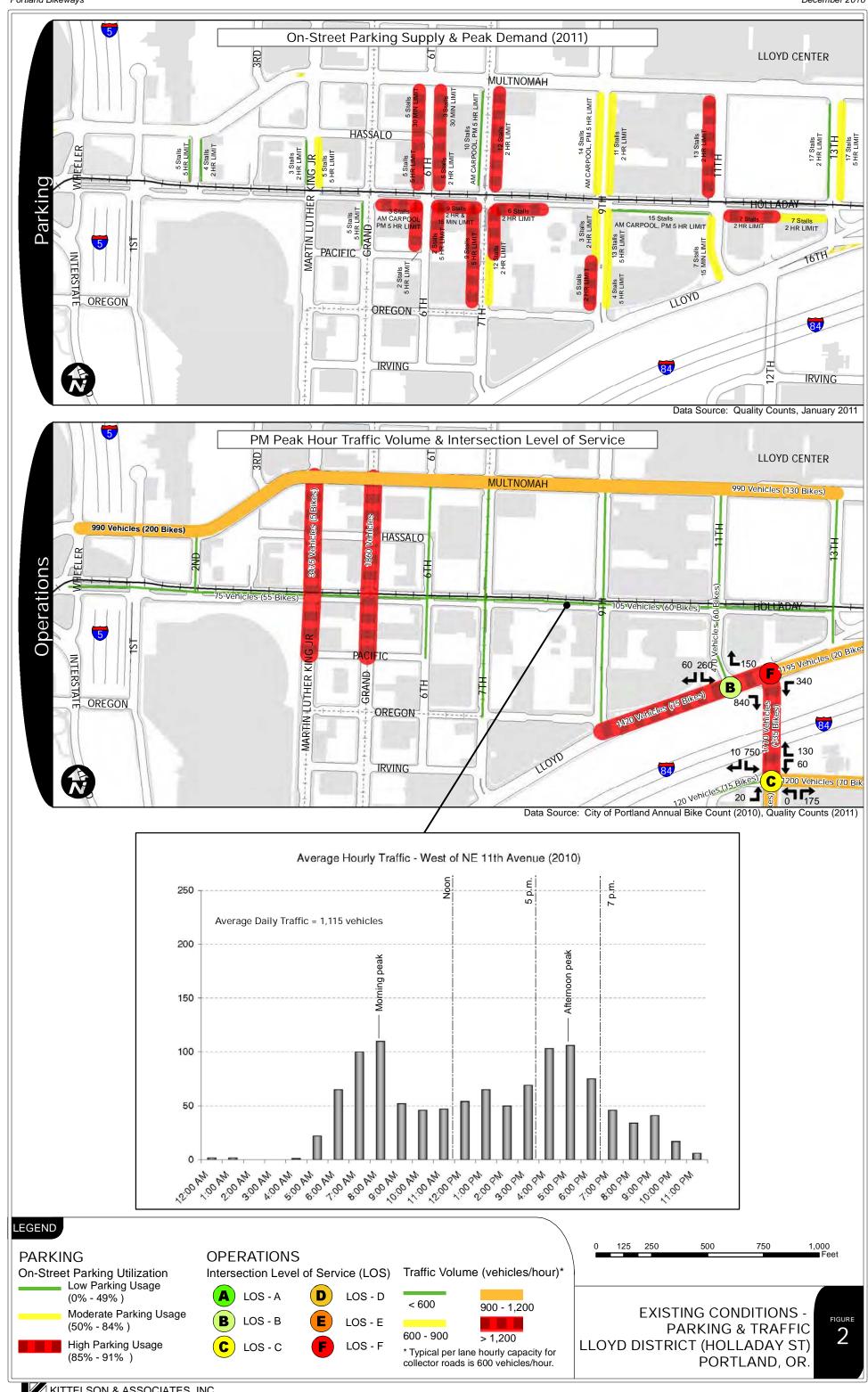
Figure 2 identifies existing traffic volumes and operations on the NE Holladay corridor. P.M. peak hour traffic volumes are significantly lower on NE Holladay (75 to 105 motor vehicles/hour) compared to other east/west corridors in the Lloyd District – NE Multnomah Street (990 motor vehicles/hour) and NE Lloyd Boulevard (1,195 to 1,420 motor vehicles/hour). The Lloyd Center, Rose Garden/Convention Center and related hotel/conference and adjacent offices appear to be the highest generator of transportation activity along the corridor.

NE 12th Avenue is the only I-84 crossing between NE Grand and NE 21st Avenue and is centered approximately ¼ mile between two eastbound on-ramps to I-84. A westbound off-ramp also terminates in the vicinity of NE 12th Avenue. As a result, this segment serves a high volume of motor vehicles (1,770 motor vehicles/hour during the p.m. peak) as well as bicyclists and pedestrians.

NE Holladay intersections between NE 1st Avenue and 11th Avenue currently yield acceptable operations, based on low traffic volumes and field observations. A formal operations analysis was conducted for the Lloyd/11th, Lloyd/12th, and Irving/12th intersections due to higher volumes and observed conflicts at these intersections. All of the locations analyzed currently meet City of Portland level-of-service standards ("D" or better) during the a.m. peak period. The Lloyd/12th intersection is operating close to capacity; as traffic volumes increase, it is likely that operations for southbound turning movements from Lloyd to 12th will fail.

During the p.m. peak period, the Lloyd/11th and 12th/Irving intersections currently meet City of Portland standards. The Lloyd/12th intersection is currently at capacity and operates at level of service "F" due to the high volume of turning movements. Although the 12th/Irving intersection operates at level of service "C" during the p.m. peak, the intersection is nearing capacity, and traffic entering from the east often experiences long delays and queues. As traffic volumes increase, this intersection will likely exceed City standards as well.

Portland Bikeways



Bicycles

Bicycles make up approximately 40 percent of total vehicle traffic on NE Holladay. However, NE Holladay currently serves a relatively small number of bicyclists compared to other east/west corridors through the Lloyd District (e.g. Broadway/Weidler, Multnomah, Lloyd). This may be due in part to the fact that NE Holladay is a one-way eastbound street, does not have dedicated bicycle lanes or facilities, and does not provide direct bicycle-friendly connections to destinations west of NE 2nd Avenue or east of NE 13th Avenue. In contrast, the Broadway/Weidler couplet, Multnomah Street, and Lloyd Boulevard all provide bicycle facilities and direct routes from downtown to east Portland through the Lloyd District.

Figure 3 compares daily bicycle volumes observed at Inner NE Portland intersections, as obtained from the City's bicycle program. Of the 25 "Inner NE" intersections that were observed in 2010, the NE 12th/Irving intersection had the 2nd highest bicycle traffic volume (nearly 1,750 daily bicycle trips). NE 12th Avenue provides a key link for bicyclists traveling to and from SE Portland and/or connecting to bike lanes on NE Irving Street and NE Lloyd Boulevard. In addition to bicycles, this link serves a large number of pedestrians, many of which are Benson High School students. During the a.m. peak hour, approximately 250 pedestrians cross the eastern leg of the NE Lloyd/12th intersection and 400 pedestrians cross the eastern leg of the NE 12th/Irving intersection. During the p.m. peak hour, approximately 150 pedestrian crossings occur at the same two crosswalks.

Daily Bicycle Traffic: Inner NE Portland 2010 Counts Compared to Previous Years Daily Bicycle Trips 4,000 3,750 3,500 3,250 3,000 2,750 2,500 2,250 2,000 1,750 1,500 1,250 1,000 750 500 250 ME GENT PLA 33rd ME Davis & A1st HE COM & OTH prior to 2000 2000 2001 2003 2004 2005 Location 2006 2007 2008 2009 2010 Extrapolated from 2-hour peak counts

Figure 3 Daily Bicycle Traffic at Select Inner Northeast Portland Intersections

Source: Portland Bicycle Count Report 2010

On-Street Parking

Figure 2 shows existing on-street parking supply and peak daily demand on the NE Holladay corridor and cross streets. In January 2011, a field observation of on-street parking along the NE Holladay corridor was conducted. Parking regulations (e.g. carpool only, 2 hour limit), the number of on-street parking spaces available, and the number of spaces in use was inventoried during the late morning and early afternoon mid-week hours. In addition, SmartMeter revenue data was collected for the three pay stations located on NE Holladay.¹ This information was used to estimate maximum daily on-street parking usage. Appendix A shows the results of the parking supply and demand estimates for the study area.

¹ In addition to the SmartMeter pay stations, there are three single space meters on NE Holladay between Grand and 6th Avenue; however, revenue data for these meters are not available. These spaces are limited to permitted carpools only from 6:00 to 10:00 a.m.; as a result, revenue from these spaces is expected to be minimal.

Based on this inventory, there are 234 on-street parking spaces in the study area (47 spaces on the south side of NE Holladay Street and 187 spaces on cross streets one block north or south of Holladay). Fourty-two spaces in the study area (18 on NE Holladay and 24 on cross streets) are reserved for registered carpools from 6:00 to 10:00 a.m. All of the on-street parking spaces in the study area are metered between 8:00 a.m. and 6:00 p.m. at a rate of \$1.00 per hour, with some spaces near the convention center metered until 10:00 p.m.

Overall, parking spaces in the study area are well-utilized. Between July and December 2010, SmartMeter revenue data indicates that metered spaces on NE Holladay were occupied for two to four hours of the 10-hour day and generated revenues per space per day at or above the city average of \$2.24. Areas where on-street parking is generally under-utilized during the day (less than 50% utilization) include:

- NE 2nd Avenue, NE Martin Luther King Jr. Boulevard, and NE Grand Avenue (near the Oregon Convention Center and several hotels);
- NE Holladay, between 9th and 11th (near Bonneville Power Administration); and
- NE 13th Avenue north of Holladay (near Holladay Park and a parking structure).

Areas where virtually all on-street parking is utilized during the day (greater than 85% usage) include:

- NE Holladay Street, between Grand and 9th (near multiple office buildings);
- NE 6th Avenue, between Pacific and Multnomah (near multiple office buildings, parking structures, a condo development, and restaurant);
- NE 7th Avenue, between Oregon and Multnomah (near multiple office buildings);
- NE 11th, north of Holladay (near a hotel and multiple office buildings); and
- NE Holladay Street between 11th and 13th (near a coffee shop and café).

High on-street parking utilization may limit the feasibility of on-street bicycle facilities on NE Holladay Street; however, multiple parking structures in the study area may provide alternatives to on-street parking.

Safety

Figure 1 shows the locations of reported bicycle and pedestrian crashes between January 1, 2005 and December 31, 2009 on the NE Holladay corridor. Over this period, two bicycle crashes and six pedestrian crashes were reported. Appendix B includes a detailed summary of reported bicycle and pedestrian crashes in the study area between 2005 and 2009.

Between 2005 and 2009, 13 crashes occurred at the Lloyd/12th intersection and 29 crashes occurred at the Irving/12th intersection. Two crashes at the Irving/12th intersection involved bicycles and five involved pedestrians. Both bicycle-related crashes involved cyclists traveling south on 12th who were struck by turning motor vehicles. Motor vehicles making left turns and stopped motor

vehicles (rear end crashes) were involved in five of the seven bicycle- and pedestrian-related crashes at this intersection.

This concentration of crashes is likely due to:

- High numbers of pedestrian crossings related to Benson High School,
- High volumes of motor vehicles making southbound left turns to access Irving Street and I-84,
- Motor vehicles stopped travel lanes waiting to turn and/or waiting for pedestrians, and
- Poor visibility/awareness of cyclists in shared travel lanes.

Public Transportation

Figure 1 shows the locations of existing Lloyd District MAX and bus stops and average daily ridership at stops along NE Hollady. TriMet Route 70 is the only bus that runs on NE Holladay Street. This route provides school bus service for Benson High School students and provides service between the Rose Quarter Transit Center and the Milwaukie Transit Center on weekdays with 20 minute headways.

The MAX Red, Blue, and Green lines also serve four stations on NE Holladay Street:

- The Blue line provides service between Gresham, Gateway, Rose Quarter, Pioneer Square, Beaverton, and Hillsboro;
- The Red line provides service between Portland International Airport, Gateway, Rose Quarter, Pioneer Square, and Beaverton; and
- The Green line provides service between Gateway, the Rose Quarter, Pioneer Square, and Portland State University.

Planned future streetcar lines will cross NE Holladay at Grand and 7th Avenues.

Appendix C shows a summary of daily MAX and bus stop usage for the NE Holladay corridor. The MAX stop between 11th and 13th Avenue serves the largest number of riders each day, followed by the Rose Garden Transit Center stop, located near 1st Avenue. These stops have an average daily ridership (ons and offs) of 12,320 and 9,350 riders, respectively. The MAX stops at MLK Boulevard and 7th Avenue each serve over 5,000 riders each day. The two bus stops at NE Holladay and 11th each have average daily ridership (ons and offs) of over 250 passengers.

Between 2005 and 2009, there were no crashes involving bicycles or pedestrians and TriMet buses or MAX cars in the study area. However, potential conflicts between bicyclists and large numbers of transit riders at/near stops and potential safety issues related to cyclists crossing rail tracks should be considered when evaluating potential future improvements to this corridor.

CONCLUSIONS

In summary, the existing conditions analysis reveals that the NE Holladay corridor west of NE 11th Avenue currently meets City of Portland operations standards, serves a low volume of motor vehicles (less than 100 motor vehicles/hour during the p.m. peak), and has capacity to serve a larger number of bicyclists. Although motor vehicles, buses, rail, cyclists, and large numbers of pedestrians share the corridor, only one crash involving a pedestrian occurred on NE Holladay west of 11th Avenue between 2005 and 2009. NE Holladay currently serves approximately 60 bicyclists/hour during peak periods; however; bicycle volumes on NE Holladay are relatively low compared to other east/west corridors through the Lloyd District (e.g. Broadway/Weidler, Multnomah, Lloyd) in part due to its one-way eastbound flow and the absence of direct, bicycle-friendly connections from Holladay to destinations west of NE 2nd Avenue and east of NE 13th Avenue.

Innovative bicycle facilities on NE Holladay with clear connections to the surrounding bicycle/pedestrian network and destinations may attract additional cyclists to this corridor. However, high on-street parking utilization may impact the feasibility of developing on-street bicycle facilities. On-street parking utilization is generally high (greater than 85% peak utilization) on segments of NE Holladay and cross streets where parking is allowed. Local stakeholders should be engaged to determine:

- Potential impacts of removing on-street parking on NE Holladay,
- Whether multiple parking structures in the study area provide feasible alternatives to onstreet parking, and
- Feasibility of relocating carpool parking to nearby cross streets with current low (less than 50% peak) parking utilization.

Though not specifically observed in this analysis, special events at the Rose Quarter may also influence parking demand at the western end of the corridor.

In contrast to the western portion of the corridor, multiple existing operations and safety-related issues were identified on the eastern end of the corridor on NE 12th Avenue between NE Lloyd Boulevard and NE Irving Street. This segment provides the only crossing of I-84 between Grand Avenue and 21st Avenue and currently serves high volumes of motor vehicles accessing/egressing I-84, cyclists, and pedestrians (predominantly Benson High School students). The NE Lloyd/12th intersection currently operates at capacity and level of service "F" during the p.m. peak. Given the high volume of left turns occurring at the NE Irving/12th intersection and that the intersection is currently operating near capacity during the p.m. peak, it is likely that operations at this intersection will also fail in the future as a result of growth in traffic volumes.

The NE Irving/12th intersection was also the location of seven crashes involving bicycles or pedestrians between 2005 and 2009. The majority of these crashes were rear end or turning movement collisions. Bicycle and pedestrian improvements should be considered to help address safety concerns at this intersection. Existing trends may indicate a need for:

- Additional signage and/or pavement markings to alert drivers to the presence of large numbers of children, pedestrians, and cyclists at the intersection,
- Countdown crossing lights or other crossing improvements to promote safe pedestrian crossings, and/or
- Changes to signal timing or implementation of turning restrictions to improve flow of vehicles through the intersection and minimize conflicts between turning motor vehicles, bicycles, and pedestrians.

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Appendix A: Parking Summary

Table 1 NE Holladay Street SmartMeter Revenue Data (July 1 to December 31, 2010):

LOCATION	METER ID	# SPACES	# TRANS	\$ AMT	Rev/Space/Day		
6th-7th	L100610	8	5250	\$4,787.60	\$3.96		
7th-9th	L100710	7	2879	\$3,606.80	\$3.41		
11th-13th	L101110	8	2186	\$2,627.40	\$2.18		

Table 2 NE Holladay Street On-Street Parking Summary: Supply & Demand

	South Side							
Block	Туре	Adjacent Land Use	Supply	AM Demand	PM Demand			
HOLLADAY STREET								
NE 1st Ave to NE 2nd Ave	Bus only	Oregon Convention Ctr	0	0	0			
NE 2nd Ave to NE MLK Jr Blvd	Bus only	Oregon Convention Ctr	0	0	0			
NE MLK Jr Blvd to NE Grand Ave	None	Hotel	0	0	0			
NE Grand Ave to NE 6th Ave	5 hrs, carpool only 6-10	Hotel	3	3	2			
NE 6th Ave to NE 7th Ave	2 hrs	Office highrise	7	7	7			
NE 6th Ave to NE 7th Ave	15 minute	Office highrise	2	0	0			
NE 7th Ave to NE 9th Ave	2 hrs	Offices	6	6	6			
NE 9th Ave to NE 11th Ave	5 hrs, carpool only 6-10	Bonneville Power Admin.	15	3	7			
NE 11th Ave to NE 13th Ave	2 hrs	Café, Coffee shop, offices	14	12	12			
Total			47	31	34			

Table 3 Cross Street On-Street Parking Summary: Supply & Demand

	West Side					East Side					Total		
	AM PM			PM	AM PM				AM PM				
Block	Туре	Adjacent Land Use	Supply	Demand	Demand	Туре	Adjacent Land Use	Supply	Demand	Demand	Supply	Demand	Demand
NE 2nd Ave													
NE Holladay St to NE Multnomah St	5 hrs	Construction	5	1	1	2 hrs	Offices	4	0	0	9	1	1
Total			5	1	1			4	0	0	9	1	1
NE MLK Jr Blvd													
NE Holladay St to NE Hassalo St	2 hrs	Coffee shop	3	1	1	5 hrs	Hotel	5	1	3	8	2	4
NE Holladay St to NE Pacific St	None	Oregon Convention Ctr	0	0	0	None	Hotel	0	0	0	0	0	0
Total			3	1	1			5	1	3	8	2	4
NE Grand Ave													
NE Holladay St to NE Hassalo St	None	Hotel	0	0	0	None	Empty lot	0	0	0	0	0	0
NE Holladay St to NE Pacific St	5 hrs	Hotel	5	0	1	None	Hotel	0	0	0	5	0	1
Total			5	0	1			0	0	0	5	0	1
NE 6th Ave													
NE Halladay St to NE Hassala St		Restaurant, highrise											
NE Holladay St to NE Hassalo St	5 hrs	condos	5	5	4	2 hrs	Parking structure	5	5	6	10	10	10
NE Hassalo St to NE Multnomah St						30 min Kaiser							
NE Hassalo St to NE Multhoman St	30 min Kaiser only	Office highrise	5	5	3	only	Parking structure	3	3	1	8	8	4
NE Holladay St to NE Pacific St	5 hrs	Parking lot	2	2	2	5 hrs	Office highrise	2	2	2	4	4	4
Total			12	12	9			10	10	9	22	22	18
NE 7th Ave													
NE Holladay St to NE Multnomah St	5 hrs, carpool only 6-10	Parking structure	10	3	3	2 hrs	Office highrise	12	11	10	22	14	13
NE Holladay St to NE Pacific St	5 hrs	Office highrise	1	1	0	2 hrs	Offices	2	2	2	3	3	2
NE Pacific St to NE Oregon St	5 hrs	Office highrise	8	8	7	2 hrs	Offices	10	7	8	18	15	15
Total			19	12	10			24	20	20	43	32	30
NE 9th Ave													
NE Holladay St to NE Multnomah St	5 hrs, carpool only 6-10	Office highrise	14	7	8	2 hrs	Hotel	11	8	7	25	15	15
NE Halladay China NE Davidia Ch						5 hrs, 2 are ADA							
NE Holladay St to NE Pacific St	2 hrs	Offices	3	2	2	spots	Bonneville Power Admin.	9	6	7	12	8	9
NE Pacific St to NE Oregon St	2 hrs	Offices	5	4	5	5 hrs	Bonneville Power Admin.	4	3	2	9	7	7
Total			22	13	15			24	17	16	46	30	31
NE 11th Ave													
NE Holladay St to NE Multnomah St	2 hrs, 2 add'l taxi spots	Hotel	13	11	13	None	Park	0	0	0	13	11	13
NE Halladay Chha NE Hayad Blood	15 min, 3 are ADA												
NE Holladay St to NE Lloyd Blvd	spots	Offices	7	5	4	None	Parking structure	0	0	0	7	5	4
Total			20	16	17			0	0	0	20	16	17
NE 13th Ave													
NE Holladay St to NE Multnomah St	2 hrs	Park	17	3	2	5 hrs	Parking lot	17	12	11	34	15	13
NE Holladay St to NE Lloyd Blvd	Loading zone only	Offices	0	1	0	None	Fwy off ramp	0	0	0	0	1	0
Total	·		17	4	2			17	12	11	34	16	13
Total			103	59	56			84	60	59	187	119	115

Appendix B: Bicycle/Pedestrian Crash Summary

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Date	Time	Collision	Crash Type	Cross Street	Vehicle Type	Movement	From/To
2009	UNKNOWN	UNKNOWN	PED	NE HOLLADAY/2ND	UNKNOWN	UNKNOWN	UNKNOWN
7/18/2005	12P	ANGLE	BIKE	NE 12th/IRVING	PSNGR CAR	TURN-R	N to E
8/28/2007	11A	TURN	BIKE	NE 12th/IRVING	PSNGR CAR	TURN-L	W to N
1/7/2006	7P	TURN	PED	NE 12th/IRVING	PSNGR CAR	STOP/L TURN	N to S
4/24/2006	9P	REAR	PED	NE 12th/IRVING	PSNGR CAR	STOP/STRGHT	W to E
6/6/2006	2P	PED	PED	NE 12th/IRVING	PSNGR CAR	TURN-L	N to E
1/25/2007	11A	REAR	PED	NE 12th/IRVING	PSNGR CAR	STOP/STRGHT	S to N
10/30/2008	9P	PED	PED	NE 12th/IRVING	PSNGR CAR	STRGHT	E to W

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Appendix C: Transit Summary

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Table 5 TriMet MAX and Bus Stop Usage

Route #	Stop Location	Direction	Ons	Offs	Total	Monthly Lifts	
100	Rose Quarter TC MAX Station	E	1,037	1,055	2,092	0	
100	Rose Quarter TC MAX Station	W	920	1,344	2,264	0	
200	Rose Quarter TC MAX Station	E	681	299	980	0	
200	Rose Quarter TC MAX Station	W	365	763	1,128	0	
90	Rose Quarter TC MAX Station	Е	1,042	681	1,723	0	
90	Rose Quarter TC MAX Station	W	440	664	1,104	0	
190	Rose Quarter TC MAX Station	W	16	0	16	0	
190	Rose Quarter TC MAX Station	E	0	40	40	0	
85	Rose Quarter TC & Holladay	N	156	3	159	3	
85	Rose Quarter TC & Holladay	N	1	125	126	3	
6	NE M L King & Holladay	S	183	598	781	135	
100	Convention Center MAX Station	E	392	692	1,084	0	
100	Convention Center MAX Station	W	746	457	1,203	0	
200	Convention Center MAX Station	E	266	210	476	0	
200	Convention Center MAX Station	W	376	251	627	0	
90	Convention Center MAX Station	E	420	539	959	0	
90	Convention Center MAX Station	W	521	294	815	0	
100	NE 7th Ave MAX Station	E	400	744	1,144	0	
100	NE 7th Ave MAX Station	W	723	508	1,231	0	
200	NE 7th Ave MAX Station	E	303	270	573	0	
200	NE 7th Ave MAX Station	W	331	287	618	0	
90	NE 7th Ave MAX Station	E	298	541	839	0	
90	NE 7th Ave MAX Station	W	395	234	629	0	
100	Lloyd Center/NE 11th Ave MAX Station	E	965	1,767	2,732	0	
100	Lloyd Center/NE 11th Ave MAX Station	W	1,531	1,248	2,779	0	
200	Lloyd Center/NE 11th Ave MAX Station	E	628	797	1,425	0	
200	Lloyd Center/NE 11th Ave MAX Station	W	942	626	1,568	0	
90	Lloyd Center/NE 11th Ave MAX Station	E	668	1,498	2,166	0	
90	Lloyd Center/NE 11th Ave MAX Station	W	1,104	546	1,650	0	
70	NE 11th & Holladay	N	17	274	291	61	
70	NE Holladay & 11th	E	267	5	272	59	
70	NE 12th & Irving	N	108	44	152	4	
70	NE 12th & Irving	S	18	68	86	1	
	TOTAL		16,260	17,472	33,732	266	