APPENDIX A

SAFE Phases

Legend

- SAFE Phase 1
- SAFE Phase 2
- SAFE Phase 3
- Hillside Site
- Ardenwald Elementary

N

1 inch = 0.25 miles

October 9, 2018

APPENDIX B

LISTEN ACOUSTICS™
acoustical and audio/visual systems engineering

Site Noise Study Report

Date: January 7, 2019

Project / Site:
Hillside Master Plan

Prepared for:
SEA Architecture

Summary

This report presents the results of an exterior noise study to investigate existing noise sources and sound levels on the Hillside site. The site noise is variable from moderate to very loud, depending on location on the property and time of day sounds occur.

The primary sources of noise are traffic noise from Highway 224, McLoughlin industrial facilities to the West, and the adjacent rail line, with heavy commercial and Amtrak train traffic.

The sound levels on the loudest (West) side of the site vary within a 52 to 74 dBA range, with an overall hourly average of 54 dBA and a weighted 24-hour average Ldn of 59 dBA. The maximum levels in each hour range from 55 dBA to 87 dBA. The minimum levels are between 50 dBA and 55 dBA.

Further to the East, the sound levels drop off significantly for maximum event noise such as trains, but the ambient overall sound level does not generally reduce below 52 dBA average (Leq).

Acoustics Background Information

Sound waves in air are created by varying pressure levels above and below that of the ambient pressure. Because the range of sound pressure levels significant to people is very large, it is convenient to express them on a logarithmic scale, in units of decibels (dB).

Noise is most often measured as an A-weighted sound level in units of decibels, symbolized as dBA. The A-weighting is a specific weighting filter in a sound level meter that corresponds approximately to the varying sensitivity of human hearing at the measured frequencies.

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Examples of noise levels typical of the urban environment include:

Source	*dBA*
Impact hammer on concrete at 25 feet	90
Outdoor amplified music at 50 feet	80
Noisy Urban Area	80
Freeway at a distance of 100 feet	70
Suburban Commercial Area	65
Social gathering in a small room	60
Normal conversation at 5 feet	50
Quiet Urban Area (average)	55
Quiet suburban neighborhood (average)	40
Rural background noise (no activity)	30

In free field conditions, i.e. far from any reflective surfaces, the sound pressure level from a noise source is expected to be reduced by 6 dB for every doubling of distance; this assumes that the distances are large enough that the noise source is seen as a point source from the receiver positions.

Free field conditions typically do not exist in many practical situations, and environmental factors must also be taken into account when considering outdoor sound propagation, particularly over relatively long distances, which alter the actual distance sound reduction. For instance, traffic and train sources typically reduce only 3-5 dBA per doubling of distance.

Some important measures used in this analysis are as follows:

- Equivalent-Continuous Sound Level, L_{eq}: A continuous (constant) level of sound in dBA over a given time period that has the same energy as a varying sound over the same time period.
- Maximum Sound Level, Lmax: the 1-second maximum level during any given hour.
- Minimum Sound Level, Lmax: the 1-second minimum level during any given hour.
- Day-Night Level, Ldn: the weighted average of the hourly sound levels, with a 10 dB penalty for the nighttime hours.

Exterior Noise

The primary intruding sound sources at the site are:

- Traffic noise from Highway 224
- Industrial facility noise from McLoughlin industrial areas to the West
- Train Noise from the adjacent tracks (Amtrak and commercial rail sources)

Measurements were taken on the site during the period from December 20, 2018 to January 7, 2019. Measurements included a continuous period of sound monitoring at the West property line, and sample measurements throughout the property.

- The measurement devices were a Rion NL-22 Type II sound level meter, and a Bruel and Kjaer Type I precision sound level meter.

- The measured noise levels were recorded on a time weighted-average level analysis using the A scale at slow response with average noise exposure readings recorded throughout 1-hour intervals and calculated averages over the noise study period. Instruments were calibrated before and after each use.

Figure 1: Site Map in Context

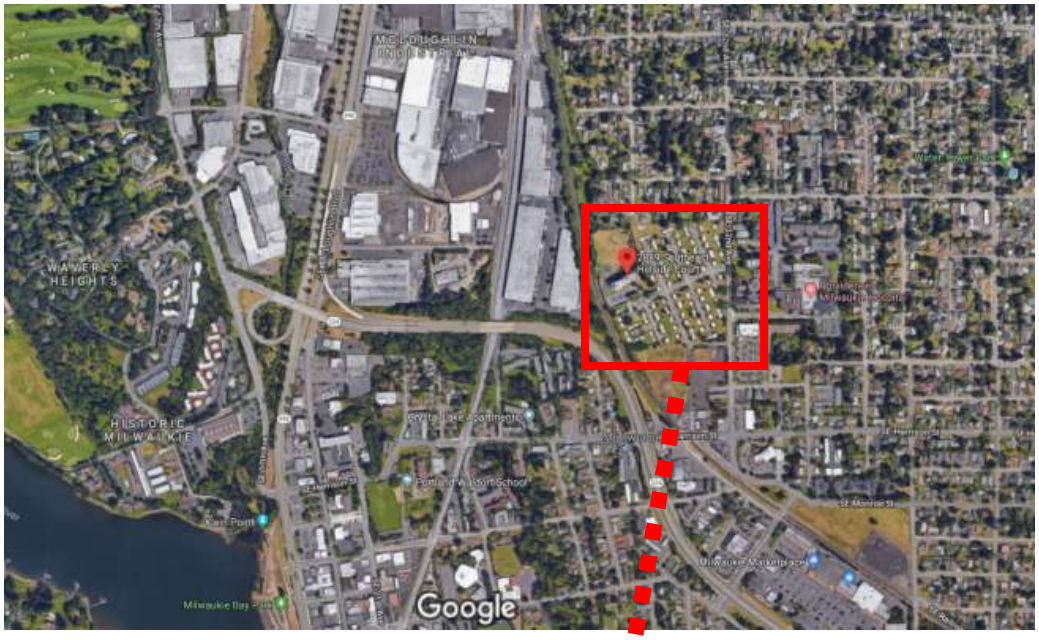


Figure 2: Site Map

(Photos: Google Earth)

Characterization of the Ambient Noise Levels

The site sound levels vary considerably across the property, from West to East. The types of sounds observed include traffic noise, industrial equipment and HVAC noise, and train noise.

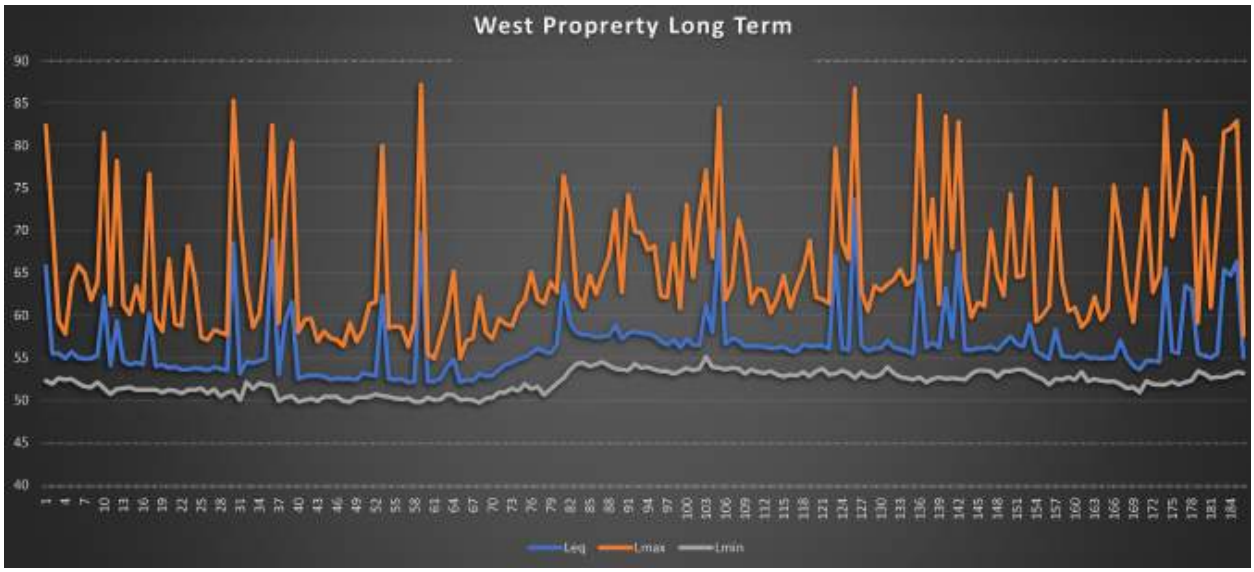
Noise sources are shown below:

Figure 3: Noise Sources

Relative Loudness of the Site

Sound levels were measured near the property line to the West, which is closest to the major noise sources, particularly the train tracks. The following is a graph of the hourly average, maximum, and statistical descriptors L05 and L90 (described below):

Figure 4: Average, Minimum, and Max Noise Levels Continuous Measurement



- Leq is the average sound level during any given hour.
- Lmax is the 1-second maximum level at any time in that hour
- Lmin is the minimum sound level during each period

As can be seen the average sound level varies from 52 dBA to 74 dBA over the course of a 24 hour period. The overall average is 56 dBA, and the weighted average Ldn is 59 dBA.

The maximum levels vary widely due to industrial, train, and traffic sources, from 55 dBA to over 87 dBA. The minimum levels are between 50 dBA and 55 dBA.

Measurements Around the Site:

Sound sample measurements were taken at representative locations throughout the site, to establish the levels at different locations. Since there are a variety of sources of sound, summary descriptions of sound sources are described for each location, as well.

The drop off from the sound at the West property line at each of the measurement locations is shown below as zones for sound reduction. This applies to the louder sources such as train noise only, since overall average levels do not drop below 50 dBA

Figure 5: Loud Noise Sound Reduction from Reference Location

The Ldn around the property was calculated based on the reference long term measurements and sound drop-off over distance as follows:

Location	Ldn
West Property Line	59 dBA
Center of Property	55 dBA (est)
East Property Line	53 dBA (est)

Relative Loudness of the Site

The Department of Housing and Urban Development (HUD) has guidelines for interior noise criteria for proposed residential projects. These HUD criteria may not directly apply to this project, but are useful in determining appropriate goals. In 1980 several federal agencies combined to form the Federal Interagency Committee on Urban Noise (FICUN), and produced a document titled, "Guidelines for Considering Noise in Land Use Planning and Control". These guidelines were produced to develop a consensus among the federal agencies regarding recommended noise levels for various land uses. See the table below for a summary of recommendations from this report.

Exterior Noise Levels (L_{dn})	**Noise Exposure Class**	**HUD/FICUN Noise Standards for Residential Land Use**
0-55 dBA	Minimal	Acceptable
55-65 dBA	Moderate	Normally acceptable with restrictions. The guidelines note that some people may find noise levels in this category objectionable, but considering cost of mitigating measures, these noise levels are generally acceptable for residential use.
65-75 dBA	Significant	Normally unacceptable. Residential use in this environment requires special construction techniques to achieve a minimum Noise Level Reduction (NLR) of 25 dB for exterior noise levels 65-70 dBA and an NLR of 30 dB for noise levels 70-75 dBA. Normal construction can be expected to provide an NLR of 20 dBA, so this environment requires an additional 5-10 dBA of reduction.
75 dBA or above	Severe	Unacceptable

Per these standards, using the appropriate Leq metric, converted to Ldn, the project site is considered to have Moderate noise exposure in the center and East side of the property, and Moderate to Significant noise exposure at the edges, which might require some noise reduction.

Sincerely,
LISTEN ACOUSTICS, INC.

Tobin Cooley, P.E.
Principal

APPENDIX C

Hillside Development

Preliminary Master Plan

Milwaukie, OR

Date:
December 21, 2018

Prepared for:
Chris Olenyik

Prepared by:
Kaitlin Littleford, EI
Brian Davis

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Executive Summary

1. A public housing development of 300 to 500 mid-rise multi-family units is planned for the property located at 2889 SE Hillside Court in Milwaukie, Oregon. A zone change to the property will likely be required.
2. Based on the trip generation calculations, up to 132 trips could be generated by the development in the morning peak hour, and up to 220 could be generated in the evening peak hour.
3. All three of the study intersections are projected to fail to meet jurisdictional operational standards under 2038 planning horizon conditions, with or without the proposed development. Improvements to one of them are planned in the City of Milwaukie's Transportation System Plan. Mitigation at the other intersections will require consideration at the time of a zone change to the property.
4. A detailed examination of the crash history at the study intersections shows no significant safety hazards or trends indicative of design deficiencies.
5. Ample transit options are available to serve the development.
6. Planned improvements to the bicycle infrastructure in the site vicinity will further improve safety and access to transit.

Introduction

A development of 300 to 500 units of public housing is planned for the property located at 2889 SE Hillside Court in Milwaukie, Oregon. The site consists of tax lot 100, and comproses approximately 3.21 acres.

This report addresses the impacts of the proposed conditional use on the nearby street system. The analysis includes capacity and level-of-service analysis for the nearby facilities and intersections, including formal analysis of the intersections of SE 32nd Avenue at SE Johnson Creek Boulevard/SE Tacoma Street, SE 32nd Avenue at SE Harrison Street, and SE 42nd Avenue at SE Harrison Street; a study of the trip generation associated with the proposed development; an analysis of the multimodal safety of the site and surrounding area; discussion of transportation issues and future plans near the site; and discussion of the proposed development as it relates to Oregon's Transportation Planning Rule.

Site Location and Conditions

The site is bordered by a vacant property to the south (the Murphy site), SE 32nd Avenue and Providence Milwaukie Hospital to the east, residential properties to the north, and railroad tracks to the west, as seen in Figure 1 with the site outlined in yellow. The site is located less than a mile south of SE Johnson Creek Boulevard, and is also within a mile of Highway 99E and Highway 224. Development in the area is primarily residential, with industrial development west of the railroad adjacent to the site. The site is currently occupied by 200 units of public housing, 100 of which are located in the nine-story Hillside Manor.[1]

The site is zoned as R-3, a single-family housing zone.[2] Multi-family housing is a conditional use under R-3 zoning.[3] As part of the proposed development, a comprehensive plan change to a multi-family housing zone will likely be required.

[1] milwaukieoregon.gov/sites/default/files/fileattachments/city_council/meeting/85411/rs_6_a_-_presentation_-_hillside.pdf

[2] milwaukie.maps.arcgis.com/apps/webappviewer/index.html?id=48bfb9fc517446f9af954d4d1c4413af

[3] Milwaukie Municipal Code, Title 19: Zoning. http://www.qcode.us/codes/milwaukie/view.php?topic=19-19_300-19_302&frames=off.

Figure 1 – Project Location and Vicinity (Google Maps)

Vicinity Streets

The key vicinity streets that support traffic traveling to and from the project site are:

- SE 32nd Avenue
- SE Johnson Creek Boulevard/SE Tacoma Street
- SE Harrison Street

Characteristics of these roadways are summarized in Table 1.

Table 1 – Characteristics of Study Roadways

Roadway	Jurisdiction	Classification[4,5]	Cross-Section	Speed (mph)	Sidewalks	Bicycle Lanes
SE 32nd Avenue	City of Milwaukie, City of Portland	Collector (CoM) Local Service for all Modes (CoP)	2 lanes	25 posted	Yes	None
SE Johnson Creek Blvd/SE Tacoma Street	City of Portland	Neighborhood Collector	2 lanes	25 posted	Yes	Yes
SE Harrison Street	City of Milwaukie	Arterial	2-3 lanes	25 posted	Yes	None

CoM = City of Milwaukie, CoP = City of Portland

Study Intersections

Three intersections were identified for analysis, with input from the City of Milwaukie:

- SE 32nd Avenue at SE Johnson Creek Boulevard/SE Tacoma Street
- SE 32nd Avenue at SE Harrison Street
- SE 42nd Avenue at SE Harrison Street

Characteristics of these intersections are summarized in Table 2. The site vicinity and intersection configurations are shown in Figure 2 on page 6.

[4] City of Portland *Transportation System Plan*, Chapter 3: Street Classifications, 2018.
[5] *City of Milwaukie Transportation System Plan*, Chapter 8: Street Network Element, 2015. https://www.milwaukieoregon.gov/sites/default/files/fileattachments/planning/page/42751/ch_8_street_network_element.pdf.

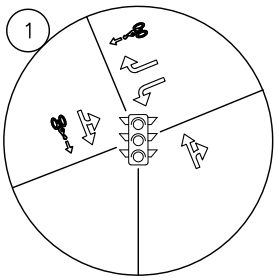
Table 2 – Characteristics of Study Intersections

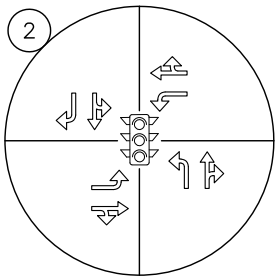
Intersection	Type	Legs	Marked Crosswalks
SE 32nd Avenue at SE Johnson Creek Blvd/SE Tacoma St	Signalized	3	All legs
SE 32nd Avenue at SE Harrison Street	Signalized	4	North, south, and east legs
SE 42nd Avenue at SE Harrison Street	All-Way Stop Control	4	All legs

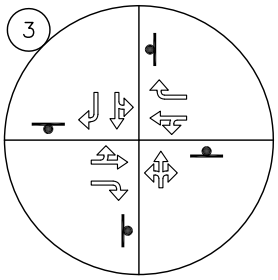
It should be noted that at the intersection of SE 42nd Avenue at SE Harrison Street, most traffic travels via the north and west legs, to and from the intersection of SE 42nd Avenue at SE King Road. West of SE 42nd Avenue, SE Harrison Street is an arterial, and east of SE 42nd Avenue, SE King Road is an arterial.

LEGEND

- STUDY INTERSECTION (EXISTING)
- STOP SIGN
- TRAFFIC SIGNAL
- BIKE LANE
- PROJECT SITE
- ARTERIAL
- COLLECTOR
- NEIGHBORHOOD COLLECTOR
- LOCAL ROADWAY







VICINITY MAP

no scale

FIGURE 2

Site Trips

Trip Generation

To estimate the number of trips that could be generated by the proposed development, trip rates from the *Trip Generation Manual*[6] were used. Data for land use code 221 – *Multi-Family Housing (Mid-Rise)*, were used to calculate the trip generation for the proposed use of the site. Trip rates based on the number of dwelling units were used.

The trip generation calculations show that at the low end of development potential, 300 units, the development will generate a total of 108 trips during the morning peak hour, and 132 trips during the evening peak hour. At the upper end of development potential, 500 units, the development would generate a total of 180 trips during the morning peak hour and 220 trips during the evening peak hour. The trip generation calculation results are summarized in Table 3, and detailed trip generation worksheets are provided in the appendix.

Trip Distribution

The directional distribution of site trips to and from the project site was estimated based on locations of likely trip origins, locations of major transportation facilities in the site vicinity, and existing travel patterns at the study intersections. The following trip distribution was estimated and used for analysis:

- Approximately 35 percent of site trips will travel to and from the west on SE Johnson Creek Boulevard;
- Approximately 25 percent of site trips will travel to and from the east on SE King Road, via an eastbound left turn from SE Harrison Street onto SE 42nd Avenue, followed by a right turn on eastbound SE King Road;
- Approximately 20 percent of site trips will travel to and from the west on SE Harrison Street;
- Approximately 15 percent of site trips will travel to and from the south on SE 32nd Avenue; and
- Approximately 5 percent of site trips will travel to and from the east on SE Johnson Creek Boulevard.

A nominal percentage of site trips is projected to travel to/from the south on SE 42nd Avenue and to/from the east on SE Harrison Street.

[6] Institute of Transportation Engineers (ITE), *Trip Generation Manual*, 9th Edition,

Modal Split

2016 data from the United States Census Bureau's American Community Survey indicates that about 25 percent of workers in Portland travel to work via transit, bicycling, or walking.[7] Based on this value, the fact that fewer transit options serve the subject site than Portland's employment centers, and the site's proximity to the Springwater Corridor, it was estimated that 80 percent of site trips will be vehicle trips. 80 percent of the trip generation calculation results shown in Table 3 were used for analysis in this report.

Trip Assignment

The trip assignment of automotive trips through study intersections and other facilities of interest is shown in Figure 3 on page 9 for a 300-unit development and Figure 4 on page 10 for a 500-unit development.

Table 3 – Trip Generation Summary (Total Trip Generation)

Land Use Code	Units	Morning Peak Hour			Evening Peak Hour			Weekday Total
		In	Out	Total	In	Out	Total	
221 – Multi-Family Housing (Mid-Rise)	300	28	80	108	81	51	132	1,632
221 – Multi-Family Housing (Mid-Rise)	500	47	133	180	134	86	220	2,720

[7] United States Census Bureau: American FactFinder, *Commuting Characteristics by Sex*, 2016. https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk.

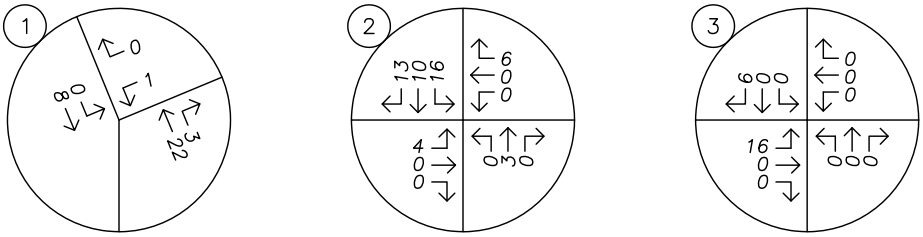
LEGEND

XX% PERCENT OF PROJECT TRIPS*

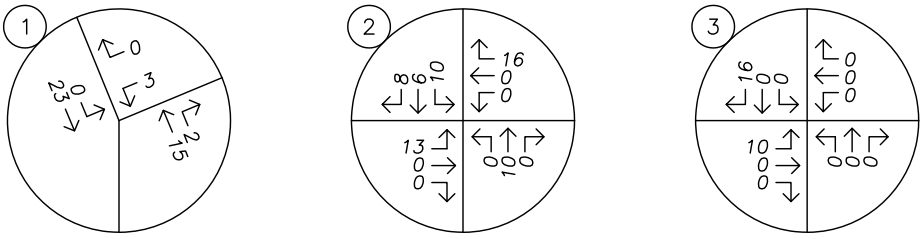
*MODE SPLIT: 80% OF SITE TRIPS ASSUMED TO BE VEHICLE TRIPS

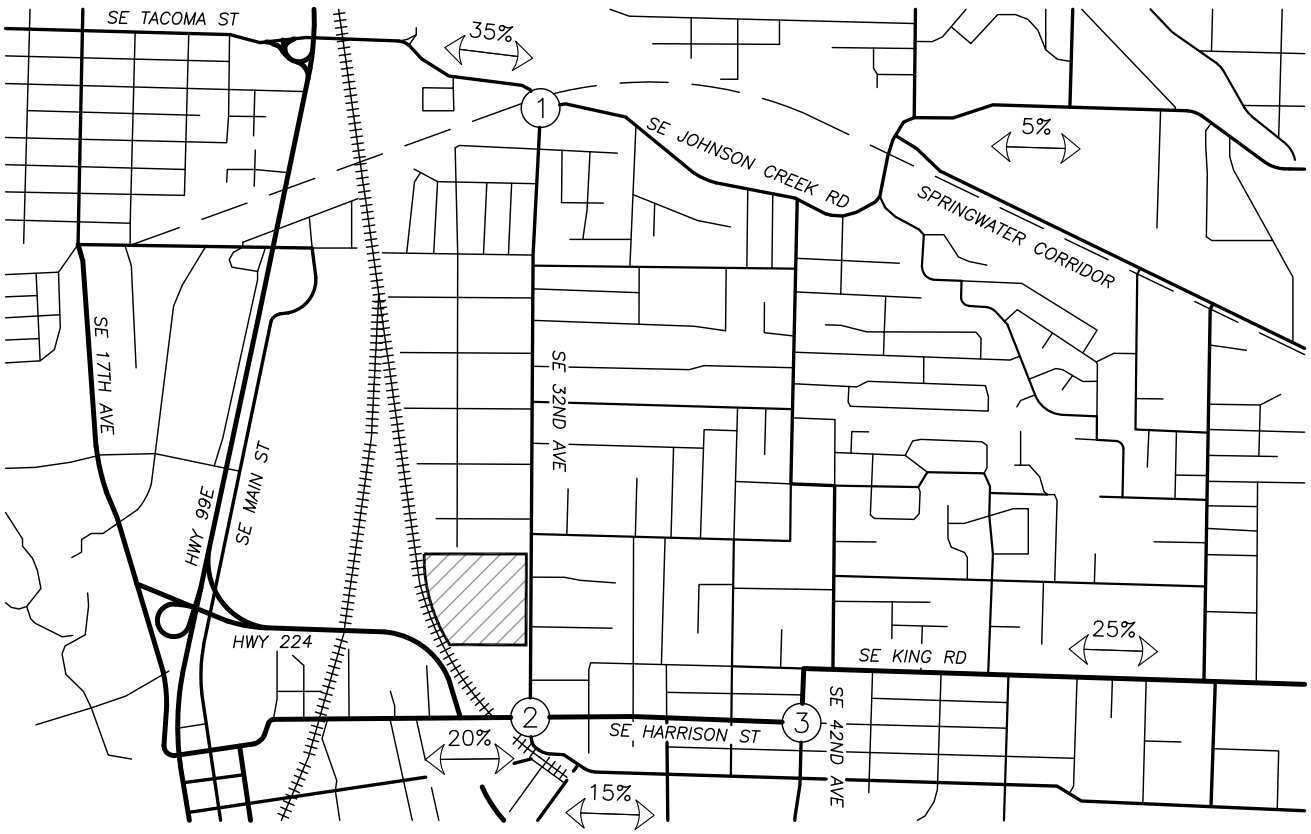
TRIP GENERATION			
	IN	OUT	TOTAL
AM	28	80	108
PM	81	51	132

AM PEAK HOUR



PM PEAK HOUR





SITE TRIP DISTRIBUTION & ASSIGNMENT
Proposed Development – 300 Units
AM & PM Peak Hours

no scale

FIGURE 3

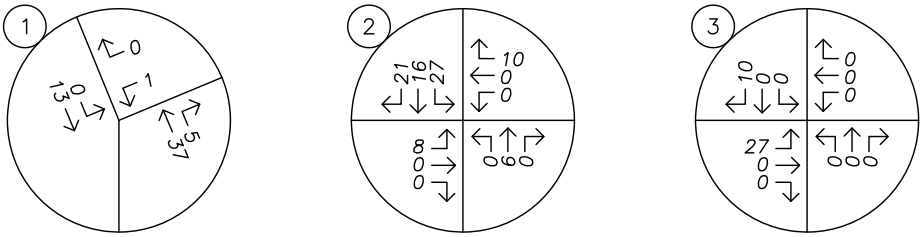
LEGEND

XX% PERCENT OF PROJECT TRIPS*

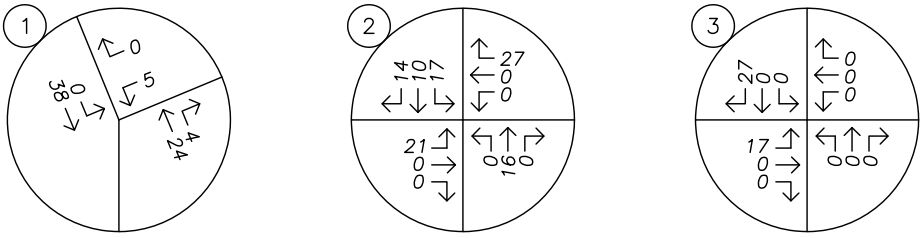
*MODE SPLIT: 80% OF SITE TRIPS ASSUMED TO BE VEHICLE TRIPS

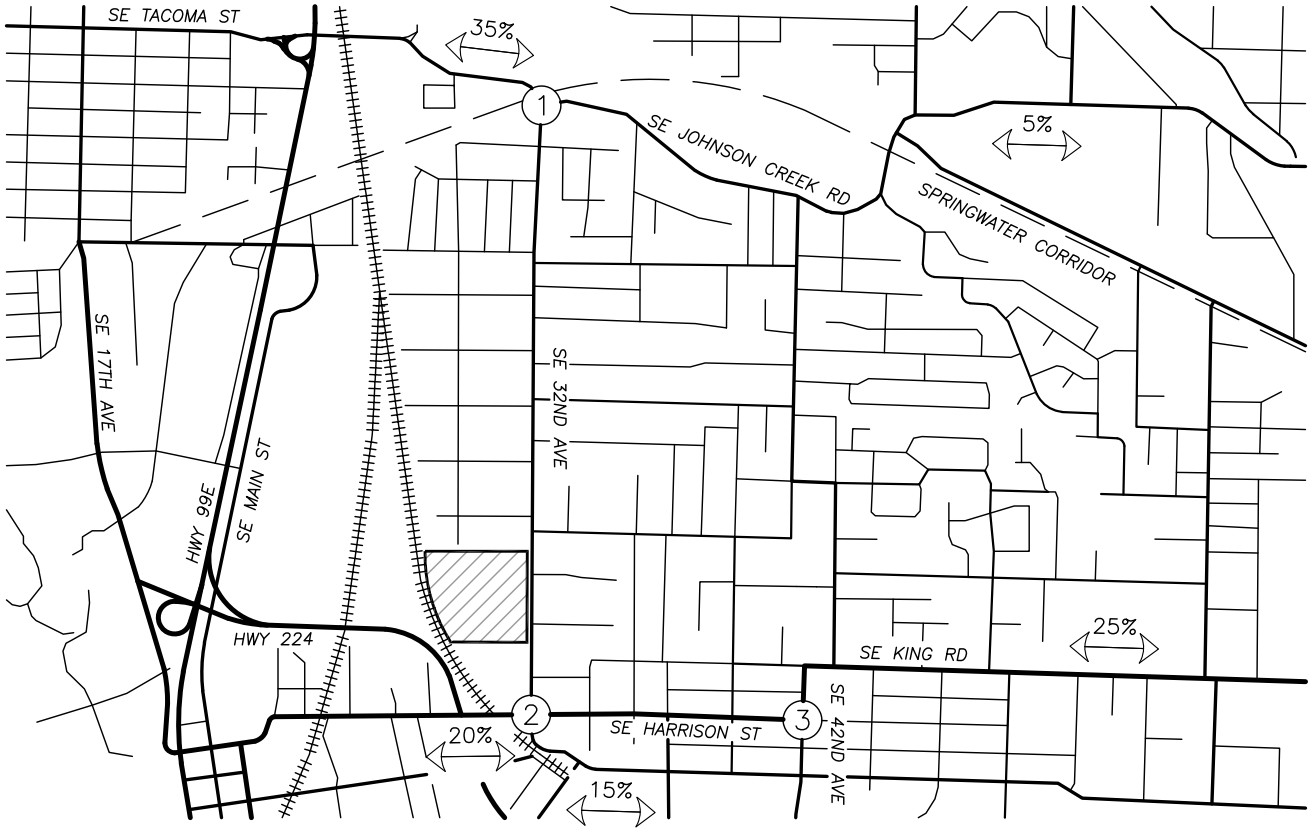
TRIP GENERATION			
	IN	OUT	TOTAL
AM	47	133	180
PM	134	86	220

AM PEAK HOUR



PM PEAK HOUR





SITE TRIP DISTRIBUTION & ASSIGNMENT
Proposed Development – 500 Units
AM & PM Peak Hours

no scale

FIGURE 4

Traffic Volumes

Traffic counts were conducted at the intersection of SE 32nd Avenue at SE Harrison Street on Tuesday, September 18, 2018 from 7:00 a.m. to 9:00 a.m. and 4:00 p.m. to 6:00 p.m. At the intersections of SE 32nd Avenue at SE Johnson Creek Boulevard/SE Tacoma Street and SE 42nd Avenue at SE Harrison Street, traffic counts were conduction on Tuesday, September 25, 2018, from 7:00 a.m. to 9:00 a.m. and 4:00 p.m. to 6:00 p.m.

Figure 5 on page 12 shows existing traffic volumes during the morning and evening peak hours. Detailed count data is provided in the appendix to this report.

Future Traffic Volumes

To provide analysis of the impact of the proposed development on the nearby transportation facilities, an estimate of future traffic volumes is required. The Housing Authority of Clackamas County estimates that at the earliest, construction of the Hillside community would begin in 2021.[8] Therefore, the build-out year was assumed to be 2022. In addition, since a zone change or conditional use permit will likely be required, future volumes were also estimated for the planning horizon year of 2038.

In order to calculate the background future traffic volumes, a compounded growth rate of two percent per year was applied to the measured existing traffic volumes. A typical two percent compound growth rate was used, which is expected to be a conservative estimate.

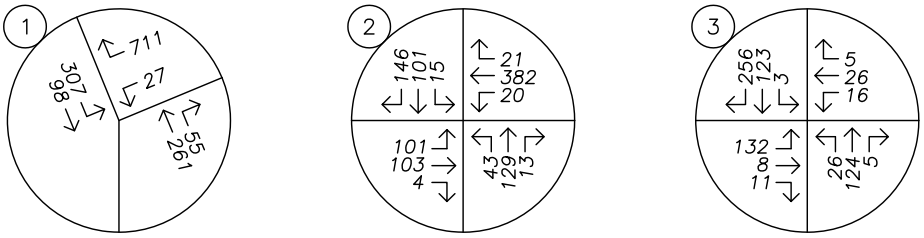
Figure 6 on page 13 and Figure 7 on page 14 respectively show the projected year 2022 and 2038 background traffic volumes at the study intersections during the morning and evening peak hours.

Background Volumes Plus Site Trips

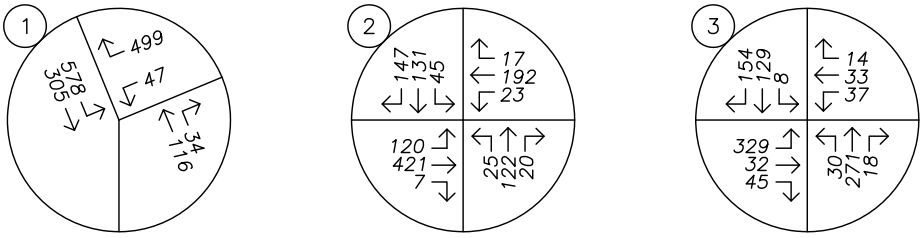
Peak hour trips calculated to be generated by the proposed development, as described in the *Trip Generation* section, were added to the projected year 2022 and 2038 background traffic volumes to obtain the expected 2022 and 2038 background volumes plus site trips. Figure 8 on page 15 and Figure 9 on page 16 respectively show the projected year 2022 background volumes plus site trips for a 300- and 500-unit development for the morning and evening peak hours. Figure 10 on page 17 and Figure 11 on page 18 show the projected year 2038 background volumes plus site trips for a 300- and 500-unit development for the morning and evening peak hours.

[8] Clackamas County Health, Housing, & Human Services. "Hillside Master Plan for Housing Opportunity." September 2018. https://dochub.clackamas.us/documents/drupal/b447fea1-93b4-4faa-b336-799f65ac93d8.

AM PEAK HOUR



PM PEAK HOUR



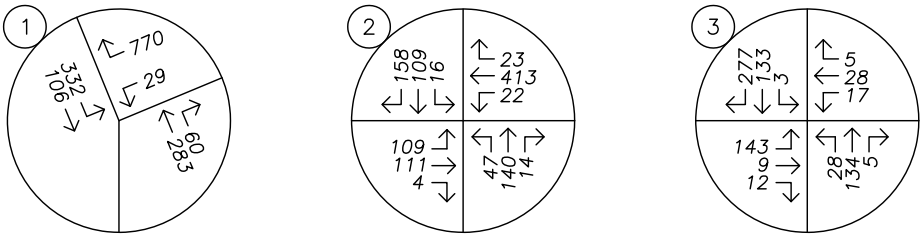
TRAFFIC VOLUMES
Existing Conditions
AM & PM Peak Hours

no scale

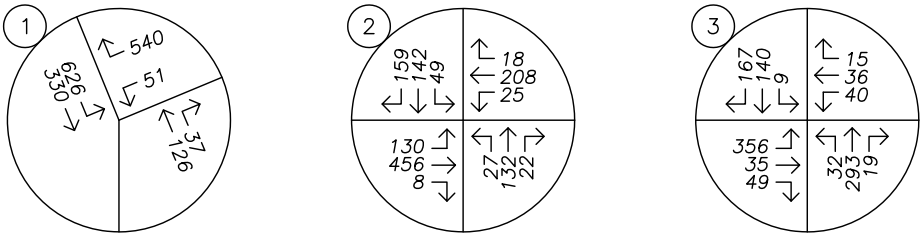
FIGURE 5

GROWTH RATE: 2.0 PERCENT PER YEAR COMPOUNDED

AM PEAK HOUR



PM PEAK HOUR



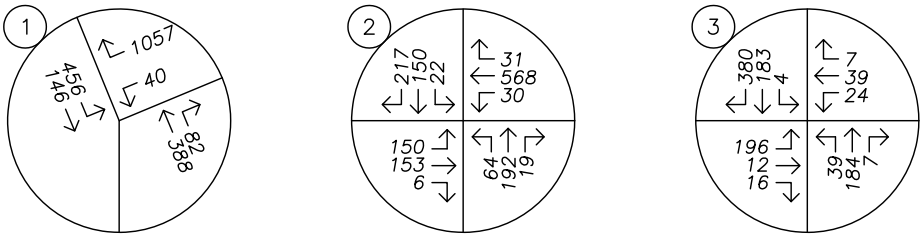
TRAFFIC VOLUMES
2022 Background Conditions
AM & PM Peak Hours

no scale

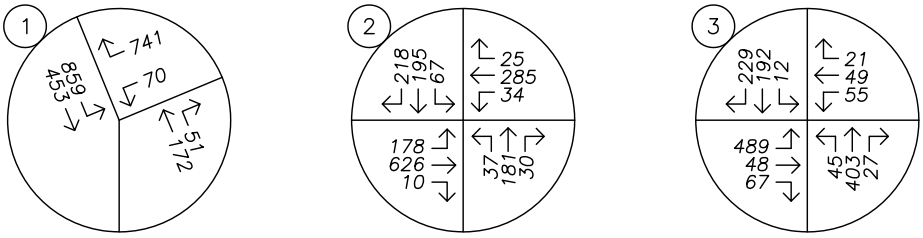
FIGURE 6

GROWTH RATE: 2.0 PERCENT PER YEAR COMPOUNDED

AM PEAK HOUR



PM PEAK HOUR

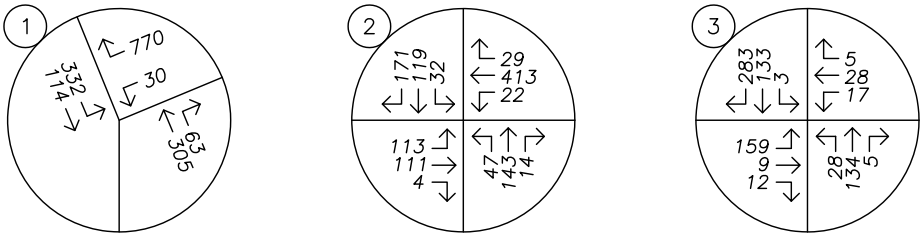


TRAFFIC VOLUMES
2038 Background Conditions
AM & PM Peak Hours

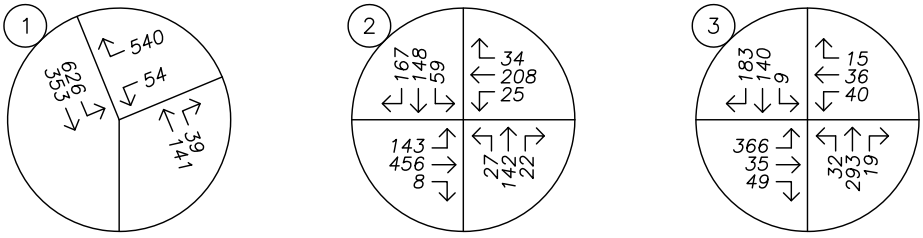
no scale

FIGURE 7

AM PEAK HOUR



PM PEAK HOUR

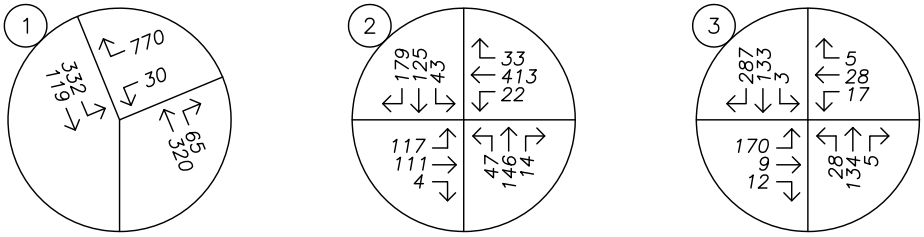


TRAFFIC VOLUMES
2022 Background Plus Site Conditions – 300 Units
AM & PM Peak Hours

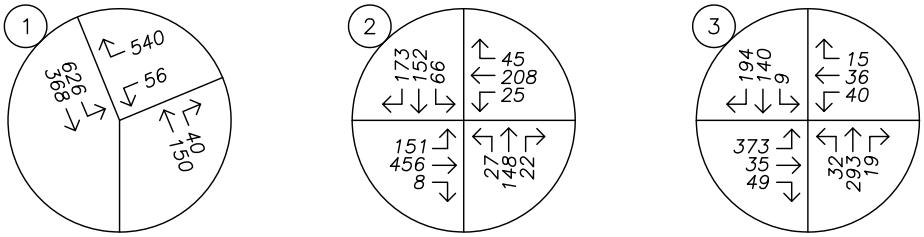
no scale

FIGURE 8

AM PEAK HOUR



PM PEAK HOUR

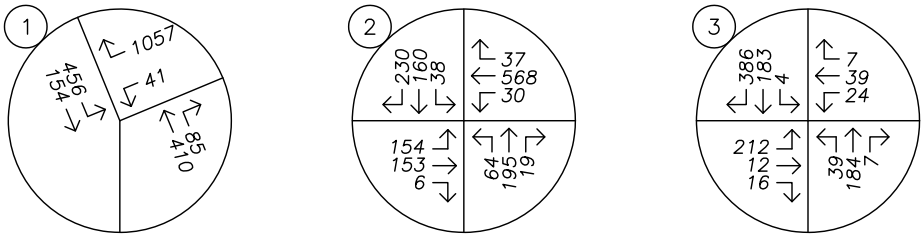


TRAFFIC VOLUMES
2022 Background Plus Site Conditions – 500 Units
AM & PM Peak Hours

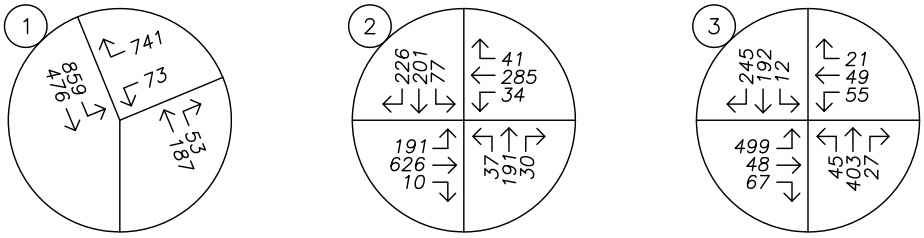
no scale

FIGURE 9

AM PEAK HOUR



PM PEAK HOUR

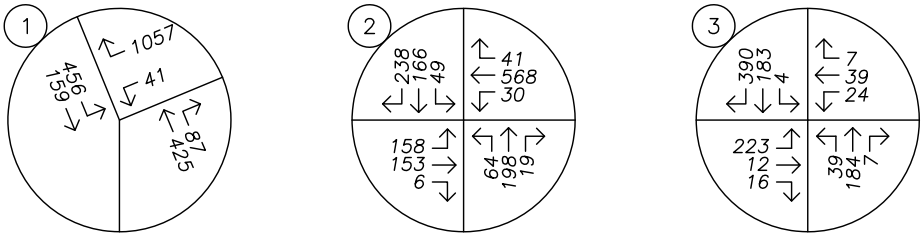


TRAFFIC VOLUMES
2038 Background Plus Site Conditions – 300 Units
AM & PM Peak Hours

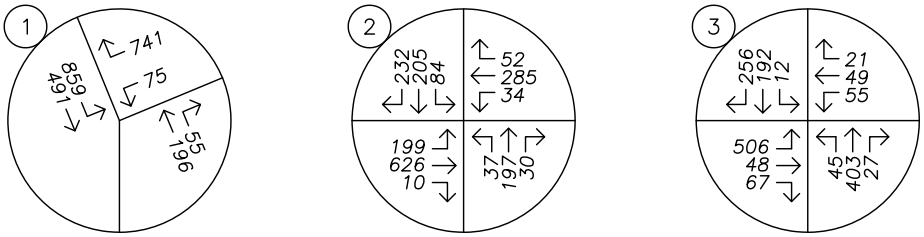
no scale

FIGURE 10

AM PEAK HOUR



PM PEAK HOUR



TRAFFIC VOLUMES
2038 Background Plus Site Conditions – 500 Units
AM & PM Peak Hours

no scale

FIGURE 11

Operational Analysis

A capacity and delay analysis was conducted for each of the study intersections per the unsignalized intersection analysis methodologies in the *HIGHWAY CAPACITY MANUAL* (HCM)[9]. According to the City of Portland, signalized intersections must operate at level of service (LOS) D or better based on vehicle delay for the entire intersection.[10] According to the City of Milwaukie, all intersections must operate at LOS D or better.[11]

The v/c, delay, and LOS results of the capacity analysis are shown in Table 4 for the morning and evening peak hours. Detailed calculations as well as tables showing the relationship between delay and LOS are included in the appendix to this report.

As shown in Table 4, all three of the study intersections are projected to operate acceptably through the year 2022, with or without trips associated with the Hillside development. All three intersections, however, are projected to potentially fail under 2038 background conditions. The following improvements are planned for these intersections and roadways[11]:

- **Harrison Street Capacity Improvements:** widen SE Harrison Street to a three-lane cross-section between SE 32nd Avenue and SE 42nd Avenue. This project is listed as medium-priority and in 2012 had a projected cost of $2.8 million.
- **Harrison Street and King Road Connection:** improve and enhance the connection between these two arterial roadways. This project is listed as medium-priority and in 2012 had a projected cost of $60,000.
- **Intersection Improvements at 42nd Avenue and Harrison Street:** signalize this intersection to facilitate the primary flow of traffic through it. This project is listed as low-priority and in 2012 had a projected cost of $280,000.
- **Intersection Improvements at 42nd Avenue and King Road:** realign this intersection to facilitate traffic movements between SE 42nd Avenue and SE King Road to the east. This project is listed as low-priority and in 2012 had a projected cost of $200,000.

The signal and westbound left-turn lane at the intersection of SE 32nd Avenue at SE Johnson Creek Boulevard/SE Tacoma Street were completed in October 2015. It appears that the City of Portland does not have further improvements planned for this intersection as of October 2018.

Since the projects in the City of Milwaukie's TSP are based on analysis completed in 2012, and improvements at the intersection of SE Johnson Creek Boulevard/SE Tacoma Street were completed relatively recently, it is

[9] Transportation Research Board, *HIGHWAY CAPACITY MANUAL*, 2000.
[10] City of Portland, *TRN-10.27: Traffic Capacity Analysis for Land Use Review Cases*, 2010. https://www.portlandoregon.gov/citycode/article/41049.
[11] *City of Milwaukie Transportation System Plan*, Chapter 8: Street Network Element, 2013. https://www.milwaukieoregon.gov/sites/default/files/fileattachments/planning/page/42751/ch_8_street_network_element.pdf.

possible that the nature, cost, and priority level of planned projects may change before the 2038 planning horizon.

As seen in Table 4, the number of housing units is not projected to significantly impact the projected performance of the study intersections after construction of the development. The difference in projected vehicle delay in scenarios with 300 units versus 500 units was less than 10 seconds in all cases except one. For the 2038 planning horizon scenarios at the intersection of SE 32nd Avenue at SE Harrison Street, projected delay increased by 16 seconds with an increase from 300 to 500 units.

Two ODOT facilities are located near the project site: Highway 99E and Highway 224. Collaboration with ODOT about concerns regarding the operation of these facilities as they relate to the Hillside development are in the early stages. Some offsite mitigation may be necessary to ensure these roadways and any intersections affected by the development adhere to ODOT operational standards. We can assist in determining where improvements may be necessary and their potential costs, should the case arise.

Table 4 – Intersection Capacity Analysis Summary

	Morning Peak Hour		Evening Peak Hour	
	LOS	**Delay (s)**	**LOS**	**Delay (s)**
SE 32nd Avenue at SE Johnson Creek Blvd/SE Tacoma St				
2018 Existing Conditions	C	26	C	20
2022 Background Conditions	C	30	C	24
2022 Background Plus Site Conditions (300 Units)	C	32	C	25
2022 Background Plus Site Conditions (500 Units)	C	34	C	27
2038 Background Conditions	F	>120	F	86
2038 Background Plus Site Conditions (300 Units)	F	>120	F	92
2038 Background Plus Site Conditions (500 Units)	F	>120	F	96
SE 32nd Avenue at SE Harrison Street				
2018 Existing Conditions	B	13	B	19
2022 Background Conditions	B	16	C	20
2022 Background Plus Site Conditions (300 Units)	B	20	C	21
2022 Background Plus Site Conditions (500 Units)	C	27	C	21
2038 Background Conditions	E	70	F	83
2038 Background Plus Site Conditions (300 Units)	E	77	F	96
2038 Background Plus Site Conditions (500 Units)	F	93	F	106
SE 42nd Avenue at SE Harrison Street				
2018 Existing Conditions	B	11	C	21
2022 Background Conditions	B	11	D	26
2022 Background Plus Site Conditions (300 Units)	B	11	D	28
2022 Background Plus Site Conditions (500 Units)	B	12	D	29
2038 Background Conditions	C	15	F	94
2038 Background Plus Site Conditions (300 Units)	C	16	F	99
2038 Background Plus Site Conditions (500 Units)	C	16	F	102

Safety Analysis

In order to assess transportation safety in the site vicinity, a review of crashes occurring at the study intersection was conducted using the most recent five years of available data (January 2012 through December 2016) obtained from the Oregon Department of Transportation's Crash Analysis and Reporting Unit. Detailed crash data are provided in the appendix to this report.

Intersection*	By Severity			By Modes Involved			Total Crashes
	PDO†	Injury	Fatal	Ped	Bike	Car Only	
SE 32nd Avenue at SE Johnson Creek Boulevard/SE Tacoma Street	2	6	0	0	0	8	8
SE 32nd Avenue at SE Harrison Street	5	7	0	0	0	12	12
SE 42nd Avenue at SE Harrison Street	1	1	0	0	0	2	2

*Signalized intersection is set in **bold**; others are unsignalized

† "Property damage only," i.e. a crash in which no injury occurred

Neither the number of crashes nor the detailed crash records reveal any apparent safety deficiencies, and none were noted during the site visits conducted during the analysis. The low number of crashes involving vulnerable road users and the absence of fatal crashes within the study area indicate that the infrastructure is functioning consistent with the City's safety goal. Thus, the area offers the opportunity for safe travel for all modes, and the impacts of the proposed use will not have a significant adverse effect on safety. No problematic safety issues appear to be present, and safe walking routes are available along all of the study roadways.

Transit and Active Modes

Transit

Three bus lines are available near the project site.

- **Bus Line #75, Cesar Chavez/Lombard**, provides service throughout Southeast and Northeast Portland, to the Hollywood Transit Center, Lombard Transit Center, St. Johns, and Milwaukie. Transfer is available to several bus lines and the **MAX Orange Line** at the Milwaukie City Center station, the **MAX Green, Red, and Blue Lines** at the Hollywood Transit Center, and the **MAX Yellow Line** at the N Lombard Transit Center. There are stops near the project site along SE 32nd Avenue, at the intersection with SE Hillside Court. The stops are accessible by sidewalk. This line is

a **Frequent Service Line**, operating with headways of 15 minutes or less every day, most of the day. It runs between 5:00 a.m. and 1:30 a.m.

- **Bus Line #33, McLoughlin/King Road**, provides service between Milwaukie, the Clackamas Town Center Transit Center, the Oregon City Transit Center, and the Clackamas Community College Park and Ride. Transfer is available to multiple other bus lines at each of these transit centers. Transfer is available to the **MAX Green Line** at the Clackamas Town Center Transit Center, **Canby Area Transit** at the Oregon City Transit Center, and the **Molalla Shuttle** at the Clackamas Community College Park and Ride. Stops are available near the project site on SE Harrison Street, at the intersection with SE 32nd Avenue. This line is a **Frequent Service Line**, operating with headways of 15 minutes or less every day, most of the day. It runs between 5:00 a.m. and 2:00 a.m. on weekdays and 5:30 a.m. and 1:00 a.m. on weekends.
- **Bus Line #152, Milwaukie**, provides service between Milwaukie City Center and Clackamas Town Center. Transfer is available to several bus lines at each of these, as well as the **MAX Orange Line** at the Milwaukie City Center station and the **MAX Green Line** at the Clackamas Town Center Transit Center. Stops are available near the project site at the intersection of SE Harrison Street at Highway 224. This line operates on weekdays only, with headways of 30 minutes, between 6:30 a.m. and 6:00 p.m.

The transit service available in the site vicinity appear to be able to reasonably accommodate trips generated by the future Hillside development.

Cycling & Walking Infrastructure

Bicycle lanes are planned for SE Harrison Street between SE McLoughlin Boulevard and SE 42nd Avenue. In addition, a bicycle greenway including traffic calming is planned for SE 29th Avenue. This greenway would connect to SE C Street on the project site. Together, these bicycle infrastructure projects would constitute a significant upgrade in the bicycle facilities available near the project site and in the City as a whole, providing major north-south and east-west routes.

Another greenway is planned for SE Monroe Street, between SE 21st Avenue to the west and the Milwaukie City Limits to the east. As part of this greenway, the City hopes to divert a significant volume of vehicle traffic from SE Monroe Street to SE Harrison Street, reducing the average daily traffic on SE Monroe Street from 8000 vehicles to 1,500 vehicles. The planned housing development is not expected to add significant volumes of traffic to either of these roadways.

Once these improvements are constructed, safe cycling routes will be available between the project site and Milwaukie City Center, where multiple transit options are available.

Transportation Planning Rule

Oregon's Transportation Planning Rule, in Section 660-012-0060 of the Oregon Administrative Rules, is in place to ensure that when an adopted plan or land use regulation is amended, provisions are made to ensure that the transportation system is capable of supporting any potential increase in trip intensity resulting from the amendment.

As shown by the operational analysis, some potential failures are projected at the study intersections. The performance of these intersections and the improvements already proposed would need to be analyzed and addressed in more detail if and when a comprehensive plan amendment is proposed for the Hillside property.

Conclusions

Based on a detailed operational analysis, the study intersections are projected to operate acceptably through the potential 2022 build-out year, with or without the planned Hillside development. The number of units, between 300 and 500, is not expected to significantly change the impact of the development on the nearby transportation system.

Improvements are planned by the City of Milwaukie at the intersection of SE 42nd Avenue at SE Harrison Street, and along SE Harrison Street between SE 32nd Avenue and SE 42nd Avenue.

An examination of the crash history at the study intersections shows no significant safety hazards or trends that are indicative of design deficiencies.

Ample transit options are available to serve the site.

Planned improvements to the bicycle infrastructure near the project site will continue to improve safety and access to transit in the area.

If and when a comprehensive plan amendment is required for construction of the proposed development, Oregon's Transportation Planning Rule and improvements to the intersections projected to perform poorly under 2038 planning horizon conditions will need to be addressed.

Appendix

TRIP GENERATION CALCULATIONS

Land Use: Multifamily Housing (Mid-Rise)
Land Use Code: 221
Setting/Location General Urban/Suburban
Variable: Dwelling Units
Variable Value: 300

AM PEAK HOUR

Trip Rate: 0.36

	Enter	Exit	Total
Directional Distribution	26%	74%	
Trip Ends	**28**	**80**	**108**

PM PEAK HOUR

Trip Rate: 0.44

	Enter	Exit	Total
Directional Distribution	61%	39%	
Trip Ends	**81**	**51**	**132**

WEEKDAY

Trip Rate: 5.44

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**816**	**816**	**1,632**

SATURDAY

Trip Rate: 4.91

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**737**	**737**	**1,474**

Source: TRIP GENERATION, Tenth Edition

TRIP GENERATION CALCULATIONS

Land Use: Multifamily Housing (Mid-Rise)
Land Use Code: 221
Setting/Location General Urban/Suburban
Variable: Dwelling Units
Variable Value: 500

AM PEAK HOUR

Trip Rate: 0.36

	Enter	Exit	Total
Directional Distribution	26%	74%	
Trip Ends	**47**	**133**	**180**

PM PEAK HOUR

Trip Rate: 0.44

	Enter	Exit	Total
Directional Distribution	61%	39%	
Trip Ends	**134**	**86**	**220**

WEEKDAY

Trip Rate: 5.44

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**1,360**	**1,360**	**2,720**

SATURDAY

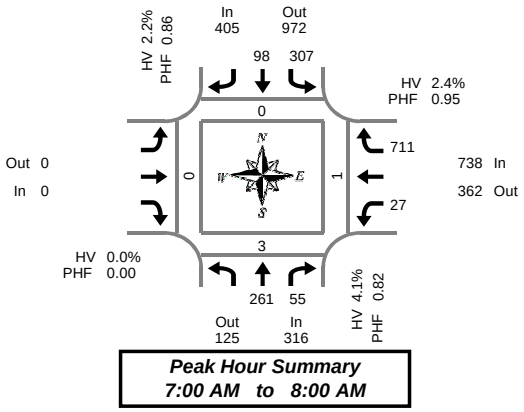
Trip Rate: 4.91

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**1,228**	**1,228**	**2,456**

Source: TRIP GENERATION, Tenth Edition

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



SE 32nd Ave & SE Johnson Creek Blvd

Tuesday, September 25, 2018
7:00 AM to 9:00 AM

Peak Hour Summary
7:00 AM to 8:00 AM

5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE 32nd Ave				Southbound SE 32nd Ave				Eastbound SE Johnson Creek Blvd				Westbound SE Johnson Creek Blvd				Interval Total	Pedestrians Crosswalk			
	T	R	Bikes		L	T		Bikes				Bikes	L		R	Bikes		North	South	East	West
7:00 AM	17	2	0		27	10		0				0	4		57	0	117	0	0	0	0
7:05 AM	30	3	0		18	7		0				0	0		60	2	118	0	0	0	0
7:10 AM	21	3	0		27	8		0				0	0		70	0	129	0	1	0	0
7:15 AM	20	2	3		24	8		0				0	2		58	4	114	0	0	0	0
7:20 AM	24	1	1		23	5		1				0	0		64	2	117	0	2	0	0
7:25 AM	25	2	2		18	6		2				0	2		54	1	107	0	0	1	0
7:30 AM	23	8	1		25	10		1				0	3		62	0	131	0	0	0	0
7:35 AM	20	4	1		32	8		1				0	2		63	1	129	0	0	0	0
7:40 AM	31	10	4		28	8		0				0	0		56	2	133	0	0	0	0
7:45 AM	17	10	2		31	11		0				0	8		45	3	122	0	0	0	0
7:50 AM	20	3	2		32	8		1				0	3		62	0	128	0	0	0	0
7:55 AM	13	7	0		22	9		0				0	3		60	5	114	0	0	0	0
8:00 AM	18	4	0		30	6		1				0	2		55	0	115	0	0	0	0
8:05 AM	18	3	2		17	7		1				0	2		42	1	89	0	0	0	0
8:10 AM	22	2	0		35	11		1				0	2		54	1	126	0	1	0	0
8:15 AM	16	3	1		20	7		0				0	4		44	0	94	0	0	0	0
8:20 AM	14	0	1		32	6		1				0	6		52	2	110	0	0	0	0
8:25 AM	20	1	3		22	8		0				0	4		59	0	114	0	1	2	0
8:30 AM	10	2	1		24	6		0				0	2		52	1	96	0	0	0	0
8:35 AM	10	4	0		38	5		0				0	2		43	2	102	0	1	1	0
8:40 AM	13	6	0		34	4		0				0	1		54	2	112	0	0	0	0
8:45 AM	10	3	0		21	4		1				0	2		35	1	75	3	0	0	0
8:50 AM	13	3	1		25	4		1				0	5		53	1	103	0	0	0	0
8:55 AM	15	6	0		18	10		0				0	3		38	3	90	0	1	0	0
Total Survey	440	92	25		623	176		12				0	62		1,292	34	2,685	3	7	4	0

15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE 32nd Ave				Southbound SE 32nd Ave				Eastbound SE Johnson Creek Blvd				Westbound SE Johnson Creek Blvd				Interval Total	Pedestrians Crosswalk			
	T	R	Bikes		L	T		Bikes				Bikes	L		R	Bikes		North	South	East	West
7:00 AM	68	8	0		72	25		0				0	4		187	2	364	0	1	0	0
7:15 AM	69	5	6		65	19		3				0	4		176	7	338	0	2	1	0
7:30 AM	74	22	6		85	26		2				0	5		181	3	393	0	0	0	0
7:45 AM	50	20	4		85	28		1				0	14		167	8	364	0	0	0	0
8:00 AM	58	9	2		82	24		3				0	6		151	2	330	0	1	0	0
8:15 AM	50	4	5		74	21		1				0	14		155	2	318	0	1	2	0
8:30 AM	33	12	1		96	15		0				0	5		149	5	310	0	1	1	0
8:45 AM	38	12	1		64	18		2				0	10		126	5	268	3	1	0	0
Total Survey	440	92	25		623	176		12				0	62		1,292	34	2,685	3	7	4	0

Peak Hour Summary
7:00 AM to 8:00 AM

By Approach	Northbound SE 32nd Ave				Southbound SE 32nd Ave				Eastbound SE Johnson Creek Blvd				Westbound SE Johnson Creek Blvd				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	316	125	441	16	405	972	1,377	6	0	0	0	0	738	362	1,100	20	1,459	0	3	1	0
%HV	4.1%				2.2%				0.0%				2.4%				2.7%				
PHF	0.82				0.86				0.00				0.95				0.93				

By Movement	Northbound SE 32nd Ave				Southbound SE 32nd Ave				Eastbound SE Johnson Creek Blvd				Westbound SE Johnson Creek Blvd				Total
	T	R	Total		L	T		Total				Total	L		R	Total	
Volume	261	55	316		307	98		405				0	27		711	738	1,459
%HV	NA	1.5%	16.4%	4.1%	2.6%	1.0%	NA	2.2%	NA	NA	NA	0.0%	18.5%	NA	1.8%	2.4%	2.7%
PHF		0.88	0.57	0.82	0.84	0.88		0.86				0.00	0.48		0.93	0.95	0.93

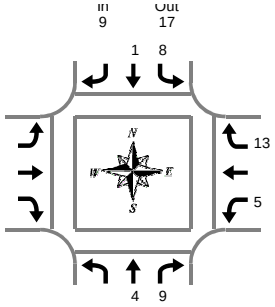
Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE 32nd Ave				Southbound SE 32nd Ave				Eastbound SE Johnson Creek Blvd				Westbound SE Johnson Creek Blvd				Interval Total	Pedestrians Crosswalk			
	T	R	Bikes		L	T		Bikes				Bikes	L		R	Bikes		North	South	East	West
7:00 AM	261	55	16		307	98		6				0	27		711	20	1,459	0	3	1	0
7:15 AM	251	56	18		317	97		9				0	29		675	20	1,425	0	3	1	0
7:30 AM	232	55	17		326	99		7				0	39		654	15	1,405	0	2	2	0
7:45 AM	191	45	12		337	88		5				0	39		622	17	1,322	0	3	3	0
8:00 AM	179	37	9		316	78		6				0	35		581	14	1,226	3	4	3	0

Heavy Vehicle Summary

Clay Carney
(503) 833-2740

Out 0
In 0



SE 32nd Ave & SE Johnson Creek Blvd

Tuesday, September 25, 2018
7:00 AM to 9:00 AM

Peak Hour Summary
7:00 AM to 8:00 AM

Heavy Vehicle 5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE 32nd Ave				Southbound SE 32nd Ave				Eastbound SE Johnson Creek Blvd				Westbound SE Johnson Creek Blvd				Interval Total
	T	R	Total	L	T		Total				Total	L		R	Total	
7:00 AM	0	1	1	0	1		1				0	1		2	3	5
7:05 AM	0	1	1	0	0		0				0	0		0	0	1
7:10 AM	0	0	0	1	0		1				0	0		1	1	2
7:15 AM	0	1	1	2	0		2				0	1		1	2	5
7:20 AM	0	0	0	0	0		0				0	0		2	2	2
7:25 AM	1	1	2	1	0		1				0	0		1	1	4
7:30 AM	0	0	0	0	0		0				0	1		1	2	2
7:35 AM	0	1	1	2	0		2				0	0		1	1	4
7:40 AM	1	0	1	0	0		0				0	0		0	0	1
7:45 AM	0	2	2	1	0		1				0	1		0	1	4
7:50 AM	1	0	1	0	0		0				0	0		2	2	3
7:55 AM	1	2	3	1	0		1				0	1		2	3	7
8:00 AM	0	0	0	0	0		0				0	0		3	3	3
8:05 AM	1	0	1	1	0		1				0	0		0	0	2
8:10 AM	0	0	0	2	0		2				0	2		3	5	7
8:15 AM	0	1	1	2	0		2				0	0		1	1	4
8:20 AM	0	0	0	1	0		1				0	1		0	1	2
8:25 AM	0	0	0	4	0		4				0	0		2	2	6
8:30 AM	0	1	1	1	0		1				0	0		1	1	3
8:35 AM	0	0	0	1	0		1				0	2		2	4	5
8:40 AM	2	0	2	1	0		1				0	0		0	0	3
8:45 AM	0	0	0	1	0		1				0	0		2	2	3
8:50 AM	0	0	0	3	0		3				0	1		5	6	9
8:55 AM	0	1	1	1	1		2				0	1		2	3	6
Total Survey	7	12	19	26	2		28				0	12		34	46	93

Heavy Vehicle 15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE 32nd Ave				Southbound SE 32nd Ave				Eastbound SE Johnson Creek Blvd				Westbound SE Johnson Creek Blvd				Interval Total
	T	R	Total	L	T		Total				Total	L		R	Total	
7:00 AM	0	2	2	1	1		2				0	1		3	4	8
7:15 AM	1	2	3	3	0		3				0	1		4	5	11
7:30 AM	1	1	2	2	0		2				0	1		2	3	7
7:45 AM	2	4	6	2	0		2				0	2		4	6	14
8:00 AM	1	0	1	3	0		3				0	2		6	8	12
8:15 AM	0	1	1	7	0		7				0	1		3	4	12
8:30 AM	2	1	3	3	0		3				0	2		3	5	11
8:45 AM	0	1	1	5	1		6				0	2		9	11	18
Total Survey	7	12	19	26	2		28				0	12		34	46	93

Heavy Vehicle Peak Hour Summary
7:00 AM to 8:00 AM

By Approach	Northbound SE 32nd Ave			Southbound SE 32nd Ave			Eastbound SE Johnson Creek Blvd			Westbound SE Johnson Creek Blvd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	13	6	19	9	17	26	0	0	0	18	17	35	40
PHF	0.54			0.75			0.00			0.75			0.71

By Movement	Northbound SE 32nd Ave				Southbound SE 32nd Ave				Eastbound SE Johnson Creek Blvd				Westbound SE Johnson Creek Blvd				Total
	T	R	Total	L	T		Total				Total	L		R	Total	
Volume	4	9	13	8	1		9				0	5		13	18	40
PHF	0.50	0.56	0.54	0.67	0.25		0.75				0.00	0.63		0.81	0.75	0.71

Heavy Vehicle Rolling Hour Summary
7:00 AM to 9:00 AM

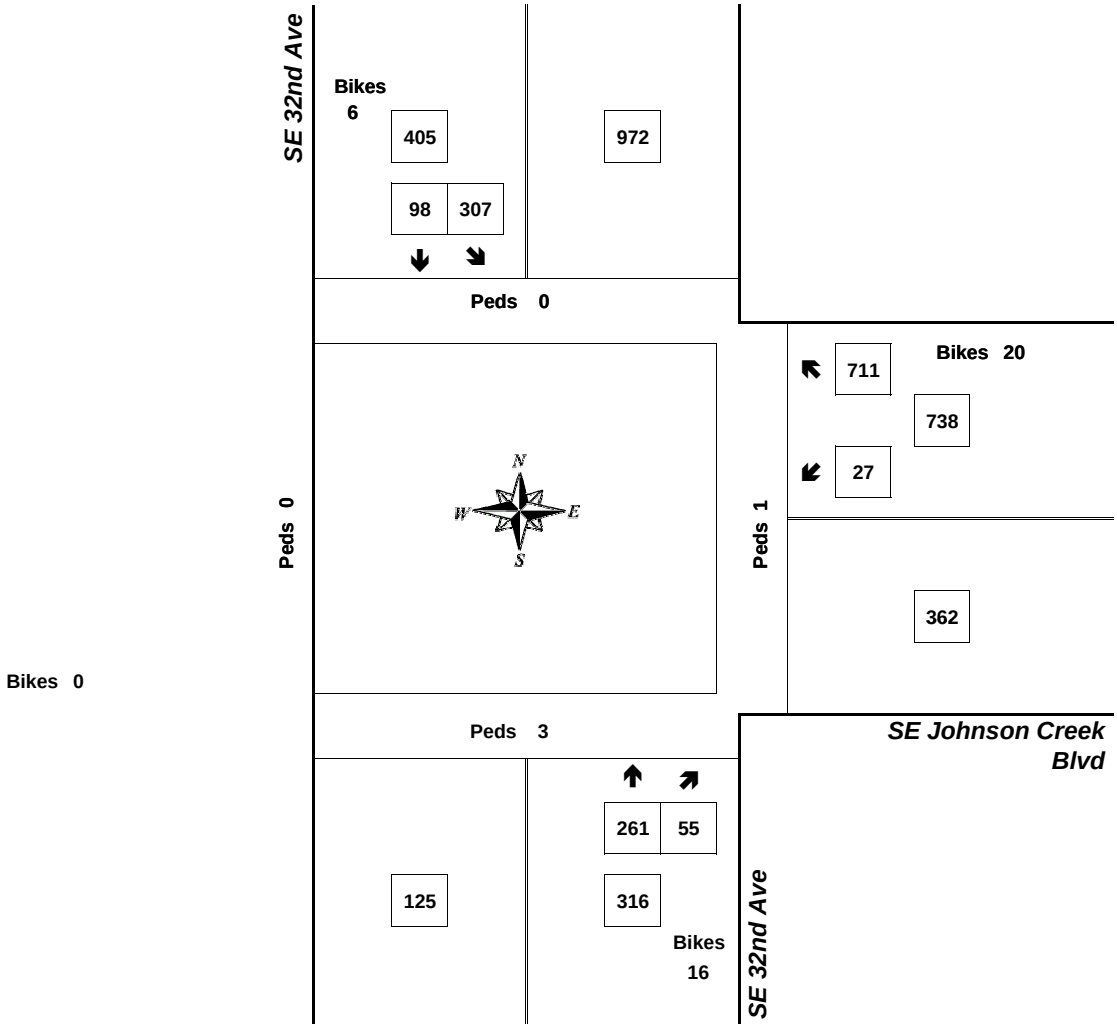
Interval Start Time	Northbound SE 32nd Ave				Southbound SE 32nd Ave				Eastbound SE Johnson Creek Blvd				Westbound SE Johnson Creek Blvd				Interval Total
	T	R	Total	L	T		Total				Total	L		R	Total	
7:00 AM	4	9	13	8	1		9				0	5		13	18	40
7:15 AM	5	7	12	10	0		10				0	6		16	22	44
7:30 AM	4	6	10	14	0		14				0	6		15	21	45
7:45 AM	5	6	11	15	0		15				0	7		16	23	49
8:00 AM	3	3	6	18	1		19				0	7		21	28	53

Peak Hour Summary

Clay Carney
(503) 833-2740

SE 32nd Ave & SE Johnson Creek Blvd

7:00 AM to 8:00 AM
Tuesday, September 25, 2018

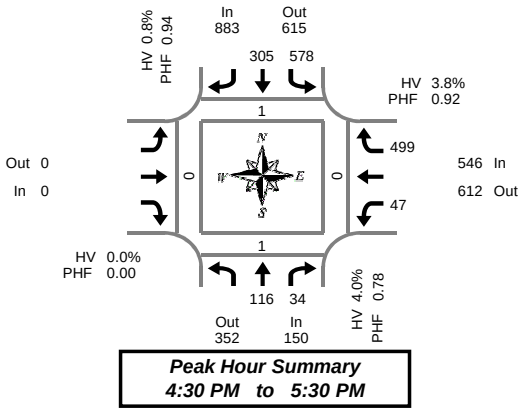


Approach	PHF	HV%	Volume
EB	0.00	0.0%	0
WB	0.95	2.4%	738
NB	0.82	4.1%	316
SB	0.86	2.2%	405
Intersection	0.93	2.7%	1,459

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



SE 32nd Ave & SE Johnson Creek Blvd

Tuesday, September 25, 2018
4:00 PM to 6:00 PM

5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SE 32nd Ave				Southbound SE 32nd Ave				Eastbound SE Johnson Creek Blvd				Westbound SE Johnson Creek Blvd				Interval Total	Pedestrians Crosswalk			
	T	R	Bikes		L	T		Bikes				Bikes	L		R	Bikes		North	South	East	West
4:00 PM	8	4	0		37	27		0				0	8		35	0	119	0	0	0	0
4:05 PM	5	5	0		33	18		1				0	9		34	0	104	0	1	0	0
4:10 PM	12	4	0		60	32		0				0	2		35	0	145	0	0	0	0
4:15 PM	3	2	0		47	26		2				0	4		38	0	120	0	1	0	0
4:20 PM	11	6	0		38	26		1				0	5		36	0	122	0	0	0	0
4:25 PM	9	3	0		40	29		0				0	5		33	2	119	0	0	1	0
4:30 PM	4	2	0		48	28		5				0	3		36	0	121	0	0	0	0
4:35 PM	15	4	0		39	25		0				0	5		33	0	121	0	0	0	0
4:40 PM	7	1	0		49	24		3				0	3		43	0	127	1	0	0	0
4:45 PM	9	1	0		54	26		0				0	2		48	0	140	0	0	0	0
4:50 PM	9	3	0		54	25		4				0	4		40	1	135	0	0	0	0
4:55 PM	10	2	0		49	22		0				0	6		42	3	131	0	0	0	0
5:00 PM	8	3	0		53	25		1				0	5		37	3	131	0	0	0	0
5:05 PM	12	3	0		55	31		1				0	3		40	0	144	0	0	0	0
5:10 PM	7	4	2		47	22		0				0	4		43	3	127	0	0	0	0
5:15 PM	18	4	0		43	31		3				0	2		46	0	144	0	0	0	0
5:20 PM	10	5	0		41	27		3				0	5		41	1	129	0	0	0	0
5:25 PM	7	2	0		46	19		3				0	5		50	1	129	0	1	0	0
5:30 PM	12	1	1		38	20		1				0	2		37	0	110	0	0	0	0
5:35 PM	10	2	0		43	18		3				0	0		38	0	111	1	0	0	0
5:40 PM	13	3	0		32	32		0				0	2		49	3	131	0	0	0	0
5:45 PM	6	3	0		48	21		0				0	4		42	1	124	0	3	0	0
5:50 PM	12	4	0		48	24		5				0	3		44	1	135	0	0	0	0
5:55 PM	8	5	0		40	30		2				0	6		31	0	120	0	0	1	0
Total Survey	225	76	3		1,082	608		38				0	97		951	19	3,039	2	6	2	0

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SE 32nd Ave				Southbound SE 32nd Ave				Eastbound SE Johnson Creek Blvd				Westbound SE Johnson Creek Blvd				Interval Total	Pedestrians Crosswalk			
	T	R	Bikes		L	T		Bikes				Bikes	L		R	Bikes		North	South	East	West
4:00 PM	25	13	0		130	77		1				0	19		104	0	368	0	1	0	0
4:15 PM	23	11	0		125	81		3				0	14		107	2	361	0	1	1	0
4:30 PM	26	7	0		136	77		8				0	11		112	0	369	1	0	0	0
4:45 PM	28	6	0		157	73		4				0	12		130	4	406	0	0	0	0
5:00 PM	27	10	2		155	78		2				0	12		120	6	402	0	0	0	0
5:15 PM	35	11	0		130	77		9				0	12		137	2	402	0	1	0	0
5:30 PM	35	6	1		113	70		4				0	4		124	3	352	1	0	0	0
5:45 PM	26	12	0		136	75		7				0	13		117	2	379	0	3	1	0
Total Survey	225	76	3		1,082	608		38				0	97		951	19	3,039	2	6	2	0

Peak Hour Summary
4:30 PM to 5:30 PM

By Approach	Northbound SE 32nd Ave				Southbound SE 32nd Ave				Eastbound SE Johnson Creek Blvd				Westbound SE Johnson Creek Blvd				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	150	352	502	2	883	615	1,498	23	0	0	0	0	546	612	1,158	12	1,579	1	1	0	0
%HV	4.0%				0.8%				0.0%				3.8%				2.2%				
PHF	0.78				0.94				0.00				0.92				0.95				

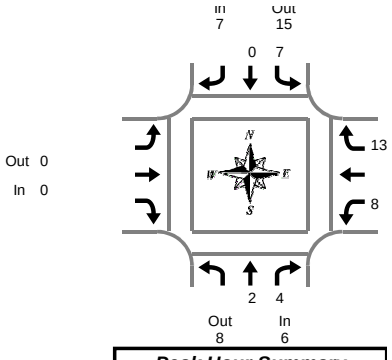
By Movement	Northbound SE 32nd Ave				Southbound SE 32nd Ave				Eastbound SE Johnson Creek Blvd				Westbound SE Johnson Creek Blvd				Total
		T	R	Total	L	T		Total				Total	L		R	Total	
Volume		116	34	150	578	305		883				0	47		499	546	1,579
%HV	NA	1.7%	11.8%	4.0%	1.2%	0.0%	NA	0.8%	NA	NA	NA	0.0%	17.0%	NA	2.6%	3.8%	2.2%
PHF		0.78	0.65	0.78	0.92	0.91		0.94				0.00	0.78		0.91	0.92	0.95

Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SE 32nd Ave				Southbound SE 32nd Ave				Eastbound SE Johnson Creek Blvd				Westbound SE Johnson Creek Blvd				Interval Total	Pedestrians Crosswalk			
	T	R	Bikes		L	T		Bikes				Bikes	L		R	Bikes		North	South	East	West
4:00 PM	102	37	0		548	308		16				0	56		453	6	1,504	1	2	1	0
4:15 PM	104	34	2		573	309		17				0	49		469	12	1,538	1	1	1	0
4:30 PM	116	34	2		578	305		23				0	47		499	12	1,579	1	1	0	0
4:45 PM	125	33	3		555	298		19				0	40		511	15	1,562	1	1	0	0
5:00 PM	123	39	3		534	300		22				0	41		498	13	1,535	1	4	1	0

Heavy Vehicle Summary

Clay Carney
(503) 833-2740



SE 32nd Ave & SE Johnson Creek Blvd

Tuesday, September 25, 2018
4:00 PM to 6:00 PM

Peak Hour Summary
4:30 PM to 5:30 PM

Heavy Vehicle 5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SE 32nd Ave				Southbound SE 32nd Ave				Eastbound SE Johnson Creek Blvd				Westbound SE Johnson Creek Blvd				Interval Total
	T	R	Total		L	T		Total				Total	L		R	Total	
4:00 PM	0	0	0		4	1		5				0	1		1	2	7
4:05 PM	0	1	1		2	0		2				0	1		0	1	4
4:10 PM	0	0	0		0	0		0				0	0		2	2	2
4:15 PM	0	0	0		0	0		0				0	0		0	0	0
4:20 PM	0	1	1		3	0		3				0	1		1	2	6
4:25 PM	0	0	0		0	0		0				0	0		2	2	2
4:30 PM	0	0	0		2	0		2				0	1		1	2	4
4:35 PM	0	1	1		0	0		0				0	1		2	3	4
4:40 PM	0	0	0		0	0		0				0	0		0	0	0
4:45 PM	0	0	0		0	0		0				0	1		3	4	4
4:50 PM	1	1	2		2	0		2				0	0		2	2	6
4:55 PM	0	0	0		1	0		1				0	0		0	0	1
5:00 PM	0	0	0		1	0		1				0	1		1	2	3
5:05 PM	0	0	0		0	0		0				0	2		1	3	3
5:10 PM	0	0	0		1	0		1				0	1		1	2	3
5:15 PM	0	1	1		0	0		0				0	0		0	0	1
5:20 PM	1	1	2		0	0		0				0	0		2	2	4
5:25 PM	0	0	0		0	0		0				0	1		0	1	1
5:30 PM	0	0	0		0	0		0				0	0		1	1	1
5:35 PM	0	1	1		1	0		1				0	0		2	2	4
5:40 PM	0	0	0		0	1		1				0	0		1	1	2
5:45 PM	0	0	0		2	0		2				0	0		1	1	3
5:50 PM	0	1	1		2	0		2				0	1		0	1	4
5:55 PM	0	0	0		0	0		0				0	0		1	1	1
Total Survey	2	8	10		21	2		23				0	12		25	37	70

Heavy Vehicle 15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SE 32nd Ave				Southbound SE 32nd Ave				Eastbound SE Johnson Creek Blvd				Westbound SE Johnson Creek Blvd				Interval Total
	T	R	Total		L	T		Total				Total	L		R	Total	
4:00 PM	0	1	1		6	1		7				0	2		3	5	13
4:15 PM	0	1	1		3	0		3				0	1		3	4	8
4:30 PM	0	1	1		2	0		2				0	2		3	5	8
4:45 PM	1	1	2		3	0		3				0	1		5	6	11
5:00 PM	0	0	0		2	0		2				0	4		3	7	9
5:15 PM	1	2	3		0	0		0				0	1		2	3	6
5:30 PM	0	1	1		1	1		2				0	0		4	4	7
5:45 PM	0	1	1		4	0		4				0	1		2	3	8
Total Survey	2	8	10		21	2		23				0	12		25	37	70

Heavy Vehicle Peak Hour Summary
4:30 PM to 5:30 PM

By Approach	Northbound SE 32nd Ave			Southbound SE 32nd Ave			Eastbound SE Johnson Creek Blvd			Westbound SE Johnson Creek Blvd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	6	8	14	7	15	22	0	0	0	21	11	32	34
PHF	0.50			0.44			0.00			0.75			0.77

By Movement	Northbound SE 32nd Ave				Southbound SE 32nd Ave				Eastbound SE Johnson Creek Blvd				Westbound SE Johnson Creek Blvd				Total
	T	R	Total		L	T		Total				Total	L		R	Total	
Volume	2	4	6		7	0		7				0	8		13	21	34
PHF	0.50	0.50	0.50		0.44	0.00		0.44				0.00	0.50		0.65	0.75	0.77

Heavy Vehicle Rolling Hour Summary
4:00 PM to 6:00 PM

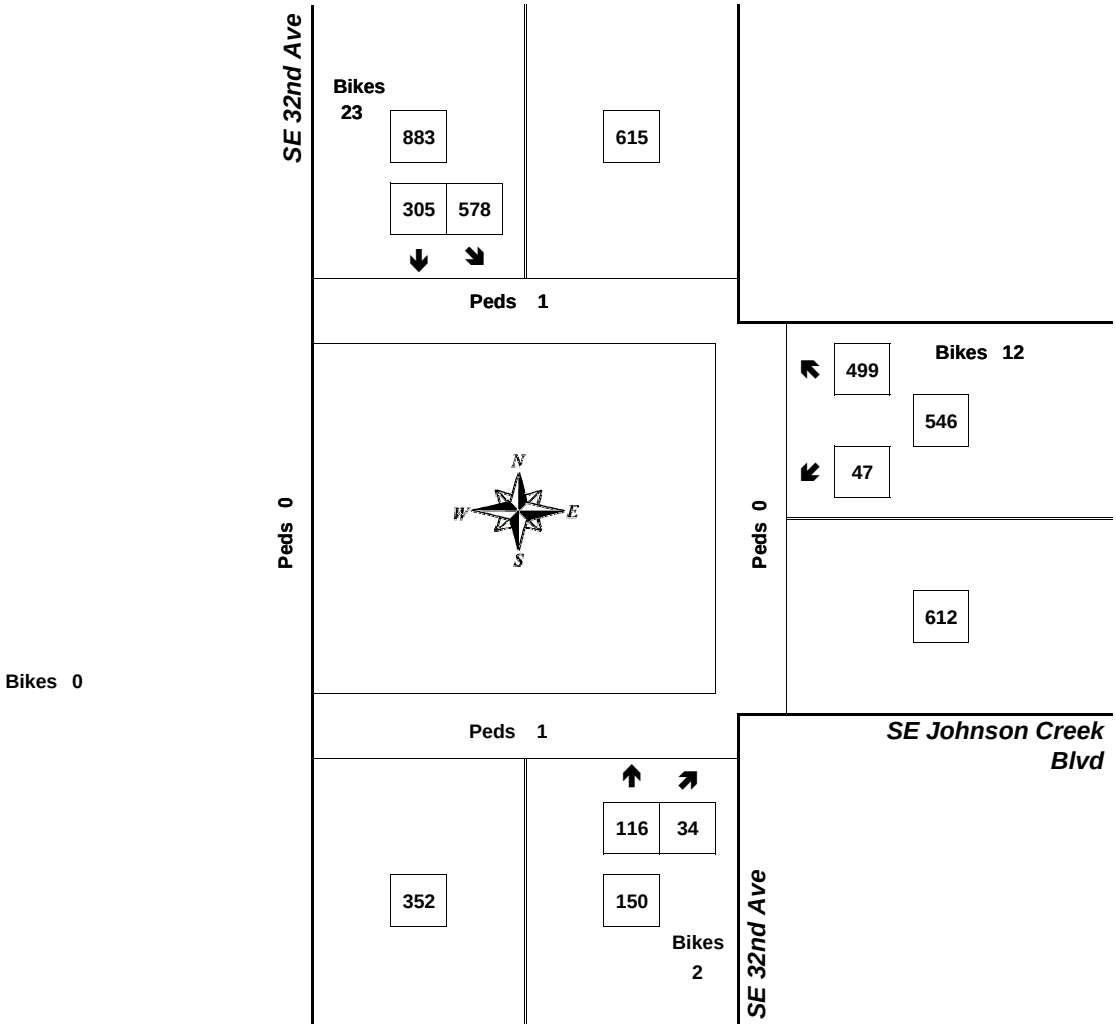
Interval Start Time	Northbound SE 32nd Ave				Southbound SE 32nd Ave				Eastbound SE Johnson Creek Blvd				Westbound SE Johnson Creek Blvd				Interval Total
	T	R	Total		L	T		Total				Total	L		R	Total	
4:00 PM	1	4	5		14	1		15				0	6		14	20	40
4:15 PM	1	3	4		10	0		10				0	8		14	22	36
4:30 PM	2	4	6		7	0		7				0	8		13	21	34
4:45 PM	2	4	6		6	1		7				0	6		14	20	33
5:00 PM	1	4	5		7	1		8				0	6		11	17	30

Peak Hour Summary

Clay Carney
(503) 833-2740

SE 32nd Ave & SE Johnson Creek Blvd

4:30 PM to 5:30 PM
Tuesday, September 25, 2018

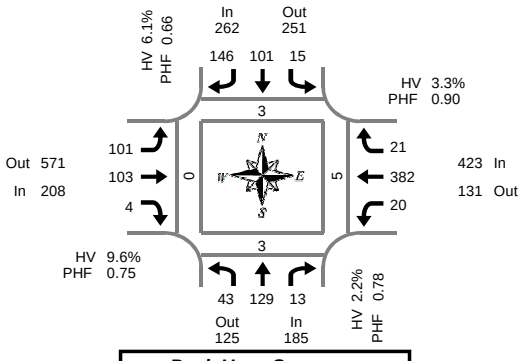


Approach	PHF	HV%	Volume
EB	0.00	0.0%	0
WB	0.92	3.8%	546
NB	0.78	4.0%	150
SB	0.94	0.8%	883
Intersection	0.95	2.2%	1,579

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
7:15 AM to 8:15 AM

SE 32nd Ave & SE Harrison St

Tuesday, September 18, 2018
7:00 AM to 9:00 AM

5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE 32nd Ave				Southbound SE 32nd Ave				Eastbound SE Harrison St				Westbound SE Harrison St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	5	4	0	0	0	3	12	0	4	9	0	0	0	29	0	0	66	1	0	1	0
7:05 AM	3	11	0	0	0	4	6	1	7	7	0	0	1	33	4	0	76	0	0	0	0
7:10 AM	5	9	0	0	0	4	7	0	6	8	1	0	2	28	4	0	74	0	0	0	0
7:15 AM	2	12	0	1	0	5	10	2	5	19	0	0	0	28	3	1	84	0	0	0	0
7:20 AM	7	8	0	0	0	6	12	0	10	6	0	0	2	34	2	0	87	1	0	1	0
7:25 AM	4	9	1	0	3	4	13	0	4	8	0	1	1	44	4	0	95	0	0	0	0
7:30 AM	5	11	0	1	3	14	12	0	6	6	0	0	3	26	0	0	86	0	0	0	0
7:35 AM	2	10	0	0	0	14	19	0	3	11	0	0	0	29	1	0	89	0	0	0	0
7:40 AM	2	14	1	0	0	18	19	0	7	4	1	0	0	34	2	0	102	0	0	0	0
7:45 AM	3	9	3	0	1	6	7	0	11	8	1	0	4	37	0	0	90	0	1	1	0
7:50 AM	5	12	3	0	1	10	13	0	4	4	0	0	3	26	1	0	82	0	0	0	0
7:55 AM	3	19	2	0	4	7	4	0	14	7	0	0	1	33	4	0	98	1	1	1	0
8:00 AM	3	10	2	0	1	10	9	0	15	3	0	0	3	32	3	0	91	0	0	1	0
8:05 AM	2	6	1	0	2	4	16	0	10	16	0	1	2	31	0	0	90	1	1	1	0
8:10 AM	5	9	0	0	0	3	12	0	12	11	2	0	1	28	1	0	84	0	0	0	0
8:15 AM	3	4	1	0	1	7	7	0	12	8	0	0	3	17	0	0	63	0	4	0	2
8:20 AM	3	8	3	0	1	5	12	0	10	9	0	0	0	32	1	0	84	0	0	1	0
8:25 AM	3	8	3	0	2	9	10	0	20	14	0	1	0	23	3	0	95	0	1	0	0
8:30 AM	1	7	1	0	0	4	10	0	14	11	0	0	1	18	0	2	67	0	0	1	0
8:35 AM	3	15	1	0	0	13	8	0	11	12	0	0	2	20	2	0	87	0	0	0	1
8:40 AM	4	8	0	0	1	6	12	0	6	10	1	0	1	28	0	0	77	0	0	0	0
8:45 AM	3	9	2	0	2	3	5	0	11	11	0	1	2	18	5	0	71	0	1	0	0
8:50 AM	0	7	2	0	1	13	14	0	6	9	0	0	3	20	0	0	75	1	1	0	0
8:55 AM	1	2	2	0	1	11	10	0	10	28	0	0	3	22	3	0	93	1	0	1	0
Total Survey	77	221	28	2	24	183	259	3	218	239	6	4	38	670	43	3	2,006	6	10	9	3

15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE 32nd Ave				Southbound SE 32nd Ave				Eastbound SE Harrison St				Westbound SE Harrison St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	13	24	0	0	0	11	25	1	17	24	1	0	3	90	8	0	216	1	0	1	0
7:15 AM	13	29	1	1	3	15	35	2	19	33	0	1	3	106	9	1	266	1	0	1	0
7:30 AM	9	35	1	1	3	46	50	0	16	21	1	0	3	89	3	0	277	0	0	0	0
7:45 AM	11	40	8	0	6	23	24	0	29	19	1	0	8	96	5	0	270	1	2	2	0
8:00 AM	10	25	3	0	3	17	37	0	37	30	2	1	6	91	4	0	265	1	1	2	0
8:15 AM	9	20	7	0	4	21	29	0	42	31	0	1	3	72	4	0	242	0	5	1	2
8:30 AM	8	30	2	0	1	23	30	0	31	33	1	0	4	66	2	2	231	0	0	1	1
8:45 AM	4	18	6	0	4	27	29	0	27	48	0	1	8	60	8	0	239	2	2	1	0
Total Survey	77	221	28	2	24	183	259	3	218	239	6	4	38	670	43	3	2,006	6	10	9	3

Peak Hour Summary
7:15 AM to 8:15 AM

By Approach	Northbound SE 32nd Ave				Southbound SE 32nd Ave				Eastbound SE Harrison St				Westbound SE Harrison St				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	185	125	310	2	262	251	513	2	208	571	779	2	423	131	554	1	1,078	3	3	5	0
%HV	2.2%				6.1%				9.6%				3.3%				5.0%				
PHF	0.78				0.66				0.75				0.90				0.96				

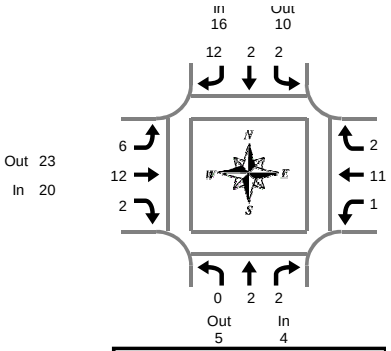
By Movement	Northbound SE 32nd Ave				Southbound SE 32nd Ave				Eastbound SE Harrison St				Westbound SE Harrison St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	43	129	13	185	15	101	146	262	101	103	4	208	20	382	21	423	1,078
%HV	0.0%	1.6%	15.4%	2.2%	13.3%	2.0%	8.2%	6.1%	5.9%	11.7%	50.0%	9.6%	5.0%	2.9%	9.5%	3.3%	5.0%
PHF	0.67	0.79	0.41	0.78	0.54	0.55	0.73	0.66	0.65	0.78	0.50	0.75	0.63	0.90	0.58	0.90	0.96

Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE 32nd Ave				Southbound SE 32nd Ave				Eastbound SE Harrison St				Westbound SE Harrison St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	46	128	10	2	12	95	134	3	81	97	3	1	17	381	25	1	1,029	3	2	4	0
7:15 AM	43	129	13	2	15	101	146	2	101	103	4	2	20	382	21	1	1,078	3	3	5	0
7:30 AM	39	120	19	1	16	107	140	0	124	101	4	2	20	348	16	0	1,054	2	8	5	2
7:45 AM	38	115	20	0	14	84	120	0	139	113	4	2	21	325	15	2	1,008	2	8	6	3
8:00 AM	31	93	18	0	12	88	125	0	137	142	3	3	21	289	18	2	977	3	8	5	3

Heavy Vehicle Summary

Clay Carney
(503) 833-2740



SE 32nd Ave & SE Harrison St

Tuesday, September 18, 2018
7:00 AM to 9:00 AM

Peak Hour Summary
7:15 AM to 8:15 AM

Heavy Vehicle 5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE 32nd Ave				Southbound SE 32nd Ave				Eastbound SE Harrison St				Westbound SE Harrison St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	0	0	0	0	0	0	1	1	0	1	0	1	0	0	0	0	2
7:05 AM	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	2
7:10 AM	0	0	0	0	0	0	0	0	1	3	0	4	0	1	0	1	5
7:15 AM	0	0	0	0	0	1	0	1	1	3	0	4	0	0	1	1	6
7:20 AM	0	0	0	0	0	0	2	2	1	3	0	4	0	1	0	1	7
7:25 AM	0	1	0	1	0	0	0	0	0	2	0	2	0	2	0	2	5
7:30 AM	0	0	0	0	1	0	1	2	0	1	0	1	0	1	0	1	4
7:35 AM	0	0	0	0	0	0	2	2	0	1	0	1	0	1	0	1	4
7:40 AM	0	0	0	0	0	0	0	0	1	0	1	2	0	1	0	1	3
7:45 AM	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0	2	3
7:50 AM	0	0	1	1	0	0	1	1	1	0	0	1	0	2	0	2	5
7:55 AM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	1	2
8:00 AM	0	1	1	2	0	0	2	2	0	0	0	0	0	2	0	2	6
8:05 AM	0	0	0	0	1	1	2	4	0	1	0	1	0	0	0	0	5
8:10 AM	0	0	0	0	0	0	2	2	1	0	1	2	0	0	0	0	4
8:15 AM	0	1	0	1	0	0	0	0	1	0	0	1	0	1	0	1	3
8:20 AM	0	0	1	1	0	0	0	0	0	1	0	1	0	1	1	2	4
8:25 AM	0	0	0	0	0	0	2	2	0	1	0	1	0	1	0	1	4
8:30 AM	0	0	0	0	0	1	1	2	2	1	0	3	0	1	0	1	6
8:35 AM	0	1	0	1	0	0	0	0	0	1	0	1	0	1	0	1	3
8:40 AM	0	1	0	1	0	1	1	2	1	1	0	2	0	0	0	0	5
8:45 AM	0	0	0	0	1	0	0	1	1	1	0	2	0	4	0	4	7
8:50 AM	0	1	0	1	0	1	0	1	1	0	0	1	0	1	0	1	4
8:55 AM	0	0	0	0	0	0	1	1	1	1	0	2	0	0	0	0	3
Total Survey	0	6	3	9	3	5	18	26	15	23	2	40	1	23	3	27	102

Heavy Vehicle 15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE 32nd Ave				Southbound SE 32nd Ave				Eastbound SE Harrison St				Westbound SE Harrison St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	0	0	0	0	0	0	1	1	2	4	0	6	0	2	0	2	9
7:15 AM	0	1	0	1	0	1	2	3	2	8	0	10	0	3	1	4	18
7:30 AM	0	0	0	0	1	0	3	4	1	2	1	4	0	3	0	3	11
7:45 AM	0	0	1	1	0	0	1	1	2	1	0	3	1	3	1	5	10
8:00 AM	0	1	1	2	1	1	6	8	1	1	1	3	0	2	0	2	15
8:15 AM	0	1	1	2	0	0	2	2	1	2	0	3	0	3	1	4	11
8:30 AM	0	2	0	2	0	2	2	4	3	3	0	6	0	2	0	2	14
8:45 AM	0	1	0	1	1	1	1	3	3	2	0	5	0	5	0	5	14
Total Survey	0	6	3	9	3	5	18	26	15	23	2	40	1	23	3	27	102

Heavy Vehicle Peak Hour Summary
7:15 AM to 8:15 AM

By Approach	Northbound SE 32nd Ave			Southbound SE 32nd Ave			Eastbound SE Harrison St			Westbound SE Harrison St			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	4	5	9	16	10	26	20	23	43	14	16	30	54
PHF	0.33			0.50			0.50			0.70			0.75

By Movement	Northbound SE 32nd Ave				Southbound SE 32nd Ave				Eastbound SE Harrison St				Westbound SE Harrison St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	2	2	4	2	2	12	16	6	12	2	20	1	11	2	14	54
PHF	0.00	0.50	0.25	0.33	0.50	0.50	0.50	0.50	0.75	0.38	0.50	0.50	0.25	0.69	0.50	0.70	0.75

Heavy Vehicle Rolling Hour Summary
7:00 AM to 9:00 AM

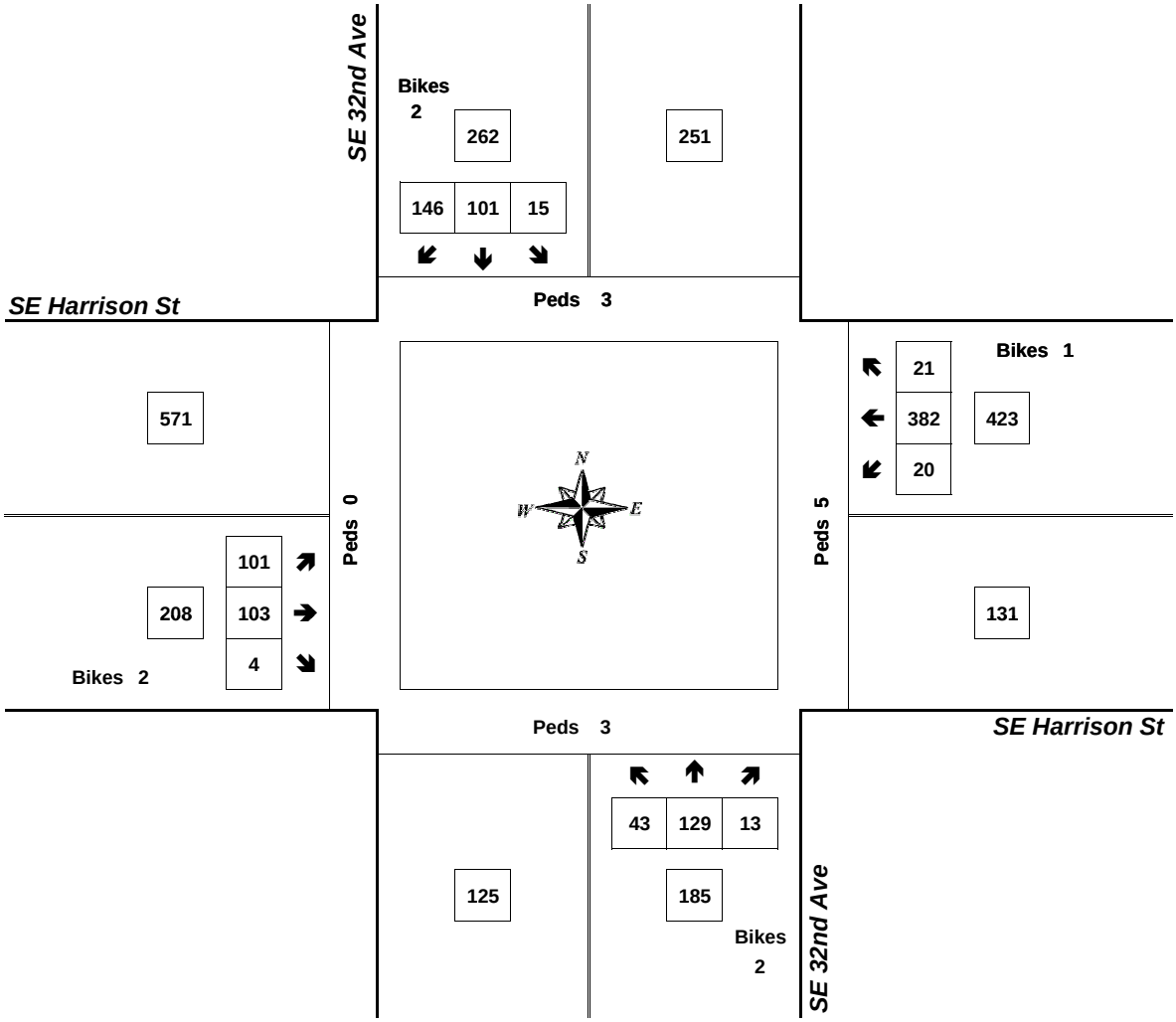
Interval Start Time	Northbound SE 32nd Ave				Southbound SE 32nd Ave				Eastbound SE Harrison St				Westbound SE Harrison St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	0	1	1	2	1	1	7	9	7	15	1	23	1	11	2	14	48
7:15 AM	0	2	2	4	2	2	12	16	6	12	2	20	1	11	2	14	54
7:30 AM	0	2	3	5	2	1	12	15	5	6	2	13	1	11	2	14	47
7:45 AM	0	4	3	7	1	3	11	15	7	7	1	15	1	10	2	13	50
8:00 AM	0	5	2	7	2	4	11	17	8	8	1	17	0	12	1	13	54

Peak Hour Summary

Clay Carney
(503) 833-2740

SE 32nd Ave & SE Harrison St

7:15 AM to 8:15 AM
Tuesday, September 18, 2018

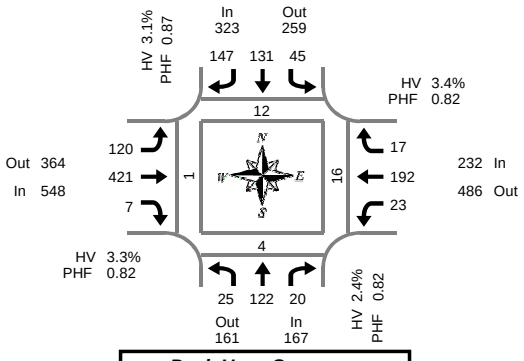


Approach	PHF	HV%	Volume
EB	0.75	9.6%	208
WB	0.90	3.3%	423
NB	0.78	2.2%	185
SB	0.66	6.1%	262
Intersection	0.96	5.0%	1,078

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
4:30 PM to 5:30 PM

SE 32nd Ave & SE Harrison St

Tuesday, September 18, 2018
4:00 PM to 6:00 PM

5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SE 32nd Ave				Southbound SE 32nd Ave				Eastbound SE Harrison St				Westbound SE Harrison St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	1	10	1	0	4	10	12	0	8	34	0	0	2	17	0	0	99	0	0	0	0
4:05 PM	1	11	6	1	1	13	10	0	10	37	0	0	2	17	0	0	108	2	0	3	0
4:10 PM	4	7	3	0	7	11	6	0	10	38	2	2	4	12	0	0	104	1	0	0	0
4:15 PM	1	10	4	0	6	12	9	0	7	30	0	0	2	20	1	0	102	0	0	2	1
4:20 PM	2	11	2	2	6	9	9	0	6	26	2	0	0	18	3	0	94	1	0	1	0
4:25 PM	3	3	1	0	8	10	9	0	6	17	0	0	5	15	3	0	80	0	0	3	0
4:30 PM	4	7	3	1	3	10	13	0	13	34	1	0	3	14	0	0	105	1	0	2	0
4:35 PM	3	11	3	0	3	8	15	0	10	44	0	0	1	19	4	0	121	6	0	4	0
4:40 PM	2	12	0	0	6	5	14	0	19	41	0	0	2	18	2	0	121	1	0	1	0
4:45 PM	1	15	4	0	4	12	15	0	7	32	2	0	1	22	2	0	117	2	1	2	0
4:50 PM	2	10	1	0	4	15	15	0	4	23	1	1	4	20	0	0	99	1	3	1	0
4:55 PM	4	10	0	0	2	12	14	0	10	38	0	0	2	18	1	0	111	0	0	2	0
5:00 PM	1	6	1	0	1	18	11	0	6	27	0	0	1	12	2	0	86	0	0	1	0
5:05 PM	1	7	0	0	4	14	14	1	5	20	0	1	1	12	2	0	80	0	0	0	0
5:10 PM	2	15	3	0	5	9	11	0	11	52	1	0	3	18	2	0	132	1	0	0	1
5:15 PM	3	10	2	1	5	13	9	0	9	36	1	0	1	14	2	0	105	0	0	3	0
5:20 PM	1	11	2	0	4	7	7	1	16	41	0	0	0	12	0	0	101	0	0	0	0
5:25 PM	1	8	1	0	4	8	9	1	10	33	1	1	4	13	0	1	92	0	0	0	0
5:30 PM	1	15	1	0	3	8	7	0	12	33	0	0	2	16	0	0	98	0	0	0	0
5:35 PM	5	8	1	0	6	11	10	0	5	24	1	1	2	14	1	0	88	0	0	0	0
5:40 PM	0	8	1	0	3	17	11	0	7	23	3	0	1	24	1	0	99	0	0	0	0
5:45 PM	0	5	0	0	1	5	13	0	5	26	0	0	1	15	1	0	72	2	1	4	1
5:50 PM	4	6	2	0	2	11	5	1	12	32	0	1	3	18	0	0	95	0	0	1	0
5:55 PM	4	5	0	1	2	13	10	0	8	30	1	0	1	18	2	0	94	3	0	1	0
Total Survey	51	221	42	6	94	261	258	4	216	771	16	7	48	396	29	1	2,403	21	5	31	3

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SE 32nd Ave				Southbound SE 32nd Ave				Eastbound SE Harrison St				Westbound SE Harrison St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	6	28	10	1	12	34	28	0	28	109	2	2	8	46	0	0	311	3	0	3	0
4:15 PM	6	24	7	2	20	31	27	0	19	73	2	0	7	53	7	0	276	1	0	6	1
4:30 PM	9	30	6	1	12	23	42	0	42	119	1	0	6	51	6	0	347	8	0	7	0
4:45 PM	7	35	5	0	10	39	44	0	21	93	3	1	7	60	3	0	327	3	4	5	0
5:00 PM	4	28	4	0	10	41	36	1	22	99	1	1	5	42	6	0	298	1	0	1	1
5:15 PM	5	29	5	1	13	28	25	2	35	110	2	1	5	39	2	1	298	0	0	3	0
5:30 PM	6	31	3	0	12	36	28	0	24	80	4	1	5	54	2	0	285	0	0	0	0
5:45 PM	8	16	2	1	5	29	28	1	25	88	1	1	5	51	3	0	261	5	1	6	1
Total Survey	51	221	42	6	94	261	258	4	216	771	16	7	48	396	29	1	2,403	21	5	31	3

Peak Hour Summary
4:30 PM to 5:30 PM

By Approach	Northbound SE 32nd Ave				Southbound SE 32nd Ave				Eastbound SE Harrison St				Westbound SE Harrison St				Total
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	
Volume	167	161	328	2	323	259	582	3	548	364	912	3	232	486	718	1	1,270
%HV	2.4%				3.1%				3.3%				3.4%				3.1%
PHF	0.82				0.87				0.82				0.82				0.88

Pedestrians Crosswalk			
North	South	East	West
12	4	16	1

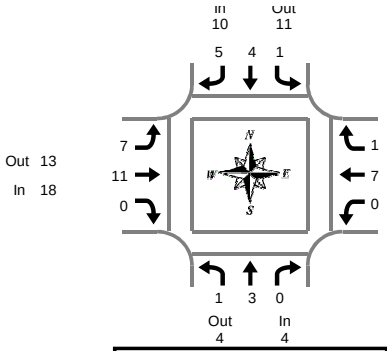
By Movement	Northbound SE 32nd Ave				Southbound SE 32nd Ave				Eastbound SE Harrison St				Westbound SE Harrison St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	25	122	20	167	45	131	147	323	120	421	7	548	23	192	17	232	1,270
%HV	4.0%	2.5%	0.0%	2.4%	2.2%	3.1%	3.4%	3.1%	5.8%	2.6%	0.0%	3.3%	0.0%	3.6%	5.9%	3.4%	3.1%
PHF	0.69	0.80	0.71	0.82	0.80	0.73	0.84	0.87	0.71	0.82	0.58	0.82	0.82	0.80	0.53	0.82	0.88

Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SE 32nd Ave				Southbound SE 32nd Ave				Eastbound SE Harrison St				Westbound SE Harrison St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	28	117	28	4	54	127	141	0	110	394	8	3	28	210	16	0	1,261	15	4	21	1
4:15 PM	26	117	22	3	52	134	149	1	104	384	7	2	25	206	22	0	1,248	13	4	19	2
4:30 PM	25	122	20	2	45	131	147	3	120	421	7	3	23	192	17	1	1,270	12	4	16	1
4:45 PM	22	123	17	1	45	144	133	3	102	382	10	4	22	195	13	1	1,208	4	4	9	1
5:00 PM	23	104	14	2	40	134	117	4	106	377	8	4	20	186	13	1	1,142	6	1	10	2

Heavy Vehicle Summary

Clay Carney
(503) 833-2740



SE 32nd Ave & SE Harrison St

Tuesday, September 18, 2018
4:00 PM to 6:00 PM

Peak Hour Summary
4:30 PM to 5:30 PM

Heavy Vehicle 5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SE 32nd Ave				Southbound SE 32nd Ave				Eastbound SE Harrison St				Westbound SE Harrison St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	0	0	0	0	0	0	0	1	1	0	2	0	2	0	2	4
4:05 PM	0	0	0	0	0	0	1	1	0	1	0	1	0	0	0	0	2
4:10 PM	0	0	0	0	0	0	2	2	0	3	0	3	0	0	0	0	5
4:15 PM	0	0	0	0	0	0	0	0	1	2	0	3	0	0	0	0	3
4:20 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2
4:25 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	3	0	3	0	0	1	1	1	3	0	4	0	1	0	1	9
4:35 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	1	2
4:40 PM	0	0	0	0	0	0	1	1	0	1	0	1	0	1	1	2	4
4:45 PM	0	0	0	0	0	2	0	2	1	3	0	4	0	0	0	0	6
4:50 PM	1	0	0	1	0	0	1	1	0	2	0	2	0	1	0	1	5
4:55 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
5:00 PM	0	0	0	0	0	0	0	0	1	1	0	2	0	1	0	1	3
5:05 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
5:10 PM	0	0	0	0	1	0	1	2	0	0	0	0	0	0	0	0	2
5:15 PM	0	0	0	0	0	0	1	1	1	1	0	2	0	0	0	0	3
5:20 PM	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	2
5:25 PM	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	2
5:30 PM	0	0	0	0	0	0	1	1	1	1	0	2	0	1	0	1	4
5:35 PM	0	0	0	0	0	0	1	1	0	1	0	1	0	0	0	0	2
5:40 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
5:45 PM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1
5:50 PM	0	0	0	0	0	0	1	1	1	0	0	1	0	1	0	1	3
5:55 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	1	3	0	4	1	4	11	16	12	21	0	33	0	13	1	14	67

Heavy Vehicle 15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SE 32nd Ave				Southbound SE 32nd Ave				Eastbound SE Harrison St				Westbound SE Harrison St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	0	0	0	0	0	3	3	1	5	0	6	0	2	0	2	11
4:15 PM	0	0	0	0	0	0	0	0	1	2	0	3	0	2	0	2	5
4:30 PM	0	3	0	3	0	1	2	3	1	4	0	5	0	3	1	4	15
4:45 PM	1	0	0	1	0	3	1	4	1	5	0	6	0	1	0	1	12
5:00 PM	0	0	0	0	1	0	1	2	1	1	0	2	0	2	0	2	6
5:15 PM	0	0	0	0	0	0	1	1	4	1	0	5	0	1	0	1	7
5:30 PM	0	0	0	0	0	0	2	2	1	3	0	4	0	1	0	1	7
5:45 PM	0	0	0	0	0	0	1	1	2	0	0	2	0	1	0	1	4
Total Survey	1	3	0	4	1	4	11	16	12	21	0	33	0	13	1	14	67

Heavy Vehicle Peak Hour Summary
4:30 PM to 5:30 PM

By Approach	Northbound SE 32nd Ave			Southbound SE 32nd Ave			Eastbound SE Harrison St			Westbound SE Harrison St			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	4	4	8	10	11	21	18	13	31	8	12	20	40
PHF	0.33			0.63			0.64			0.50			0.67

By Movement	Northbound SE 32nd Ave				Southbound SE 32nd Ave				Eastbound SE Harrison St				Westbound SE Harrison St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	1	3	0	4	1	4	5	10	7	11	0	18	0	7	1	8	40
PHF	0.25	0.25	0.00	0.33	0.25	0.33	0.63	0.63	0.44	0.46	0.00	0.64	0.00	0.58	0.25	0.50	0.67

Heavy Vehicle Rolling Hour Summary
4:00 PM to 6:00 PM

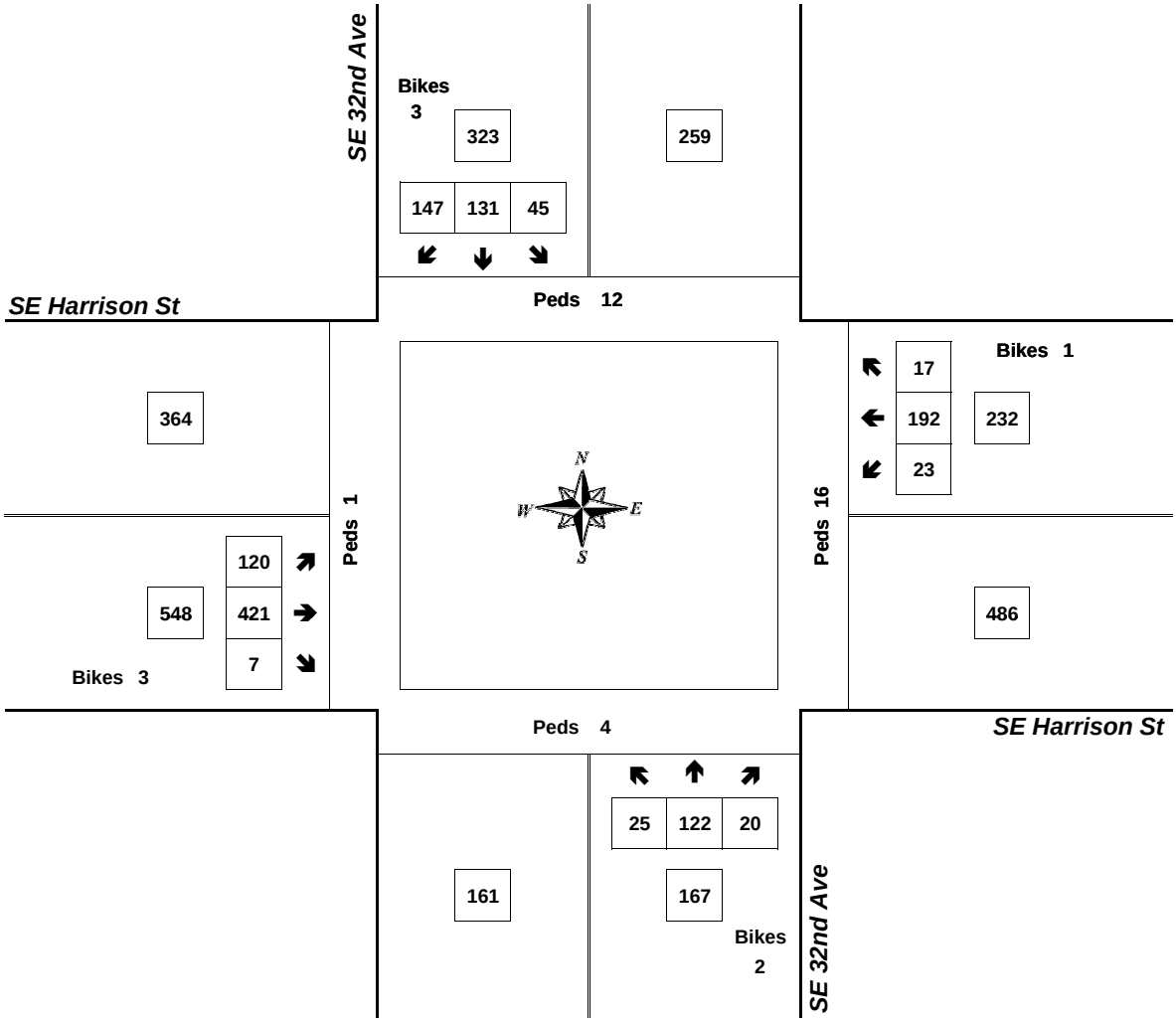
Interval Start Time	Northbound SE 32nd Ave				Southbound SE 32nd Ave				Eastbound SE Harrison St				Westbound SE Harrison St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	1	3	0	4	0	4	6	10	4	16	0	20	0	8	1	9	43
4:15 PM	1	3	0	4	1	4	4	9	4	12	0	16	0	8	1	9	38
4:30 PM	1	3	0	4	1	4	5	10	7	11	0	18	0	7	1	8	40
4:45 PM	1	0	0	1	1	3	5	9	7	10	0	17	0	5	0	5	32
5:00 PM	0	0	0	0	1	0	5	6	8	5	0	13	0	5	0	5	24

Peak Hour Summary

Clay Carney
(503) 833-2740

SE 32nd Ave & SE Harrison St

4:30 PM to 5:30 PM
Tuesday, September 18, 2018

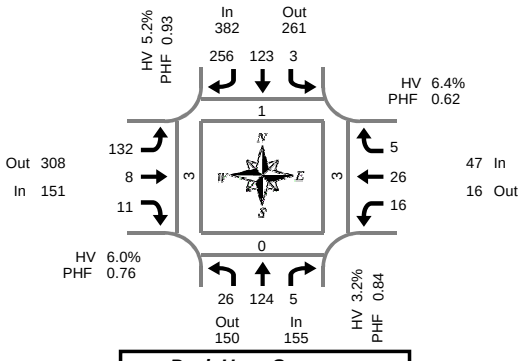


Approach	PHF	HV%	Volume
EB	0.82	3.3%	548
WB	0.82	3.4%	232
NB	0.82	2.4%	167
SB	0.87	3.1%	323
Intersection	0.88	3.1%	1,270

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
7:25 AM to 8:25 AM

SE 42nd Ave & SE Harrison St

Tuesday, September 25, 2018
7:00 AM to 9:00 AM

5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE 42nd Ave				Southbound SE 42nd Ave				Eastbound SE Harrison St				Westbound SE Harrison St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	4	6	0	0	0	2	19	0	8	0	1	0	0	2	0	0	42	0	0	1	1
7:05 AM	3	5	0	0	0	6	21	0	12	3	1	1	0	1	0	0	52	0	0	0	0
7:10 AM	4	3	0	0	0	10	23	0	5	0	0	0	0	2	0	0	47	0	0	1	0
7:15 AM	3	7	2	0	0	5	23	0	4	1	1	0	0	4	1	0	51	0	0	1	2
7:20 AM	2	6	1	0	0	10	17	0	7	0	1	0	0	1	0	0	45	1	0	0	0
7:25 AM	6	7	0	0	0	10	18	0	9	0	0	0	1	2	0	0	53	0	0	0	0
7:30 AM	2	11	1	0	0	12	29	0	8	0	1	1	0	4	0	0	68	0	0	0	0
7:35 AM	3	12	0	0	0	7	20	0	12	0	1	0	1	0	0	0	56	0	0	1	0
7:40 AM	1	15	1	0	1	7	20	0	9	1	1	0	0	3	0	0	59	0	0	0	0
7:45 AM	1	12	0	0	1	2	23	0	11	1	1	0	5	6	0	0	63	0	0	0	0
7:50 AM	4	12	0	0	0	12	30	0	8	0	0	0	1	3	0	0	70	0	0	0	1
7:55 AM	2	4	2	0	1	9	18	0	10	2	0	0	0	2	2	0	52	0	0	0	0
8:00 AM	4	9	0	0	0	13	14	0	17	0	0	0	1	2	0	0	60	0	0	0	0
8:05 AM	2	11	0	0	0	15	17	0	13	1	3	0	1	1	1	0	65	0	0	0	1
8:10 AM	1	8	1	0	0	12	28	0	14	2	0	0	4	1	1	0	72	1	0	1	1
8:15 AM	0	14	0	0	0	17	14	0	11	1	1	0	1	0	1	0	60	0	0	1	0
8:20 AM	0	9	0	0	0	7	25	0	10	0	3	0	1	2	0	0	57	0	0	0	0
8:25 AM	2	6	0	0	0	3	18	0	8	0	4	0	1	2	0	0	44	0	0	0	0
8:30 AM	3	12	0	0	0	12	14	0	8	2	0	0	0	2	0	0	53	0	1	1	0
8:35 AM	3	11	3	0	0	7	11	0	5	2	0	0	0	2	0	0	44	1	0	1	0
8:40 AM	1	9	0	0	0	11	16	0	7	0	2	0	0	1	0	0	47	0	0	1	0
8:45 AM	2	4	0	0	1	10	9	0	6	0	0	0	1	0	0	0	33	0	0	1	0
8:50 AM	1	17	0	0	0	10	17	0	12	1	0	0	1	1	0	0	60	0	0	3	0
8:55 AM	0	7	1	0	0	11	10	0	12	1	3	0	0	2	0	0	47	0	0	1	0
Total Survey	54	217	12	0	4	220	454	0	226	18	24	2	19	46	6	0	1,300	3	1	14	6

15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE 42nd Ave				Southbound SE 42nd Ave				Eastbound SE Harrison St				Westbound SE Harrison St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	11	14	0	0	0	18	63	0	25	3	2	1	0	5	0	0	141	0	0	2	1
7:15 AM	11	20	3	0	0	25	58	0	20	1	2	0	1	7	1	0	149	1	0	1	2
7:30 AM	6	38	2	0	1	26	69	0	29	1	3	1	1	7	0	0	183	0	0	1	0
7:45 AM	7	28	2	0	2	23	71	0	29	3	1	0	6	11	2	0	185	0	0	0	1
8:00 AM	7	28	1	0	0	40	59	0	44	3	3	0	6	4	2	0	197	1	0	1	2
8:15 AM	2	29	0	0	0	27	57	0	29	1	8	0	3	4	1	0	161	0	0	1	0
8:30 AM	7	32	3	0	0	30	41	0	20	4	2	0	0	5	0	0	144	1	1	3	0
8:45 AM	3	28	1	0	1	31	36	0	30	2	3	0	2	3	0	0	140	0	0	5	0
Total Survey	54	217	12	0	4	220	454	0	226	18	24	2	19	46	6	0	1,300	3	1	14	6

Peak Hour Summary
7:25 AM to 8:25 AM

By Approach	Northbound SE 42nd Ave				Southbound SE 42nd Ave				Eastbound SE Harrison St				Westbound SE Harrison St				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	155	150	305	0	382	261	643	0	151	308	459	1	47	16	63	0	735	1	0	3	3
%HV	3.2%				5.2%				6.0%				6.4%				5.0%				
PHF	0.84				0.93				0.76				0.62				0.93				

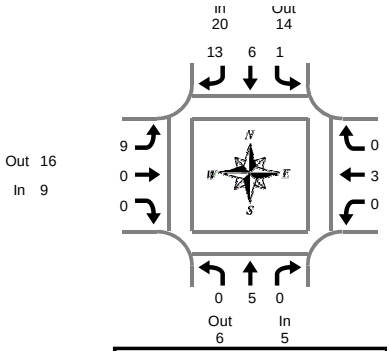
By Movement	Northbound SE 42nd Ave				Southbound SE 42nd Ave				Eastbound SE Harrison St				Westbound SE Harrison St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	26	124	5	155	3	123	256	382	132	8	11	151	16	26	5	47	735
%HV	0.0%	4.0%	0.0%	3.2%	33.3%	4.9%	5.1%	5.2%	6.8%	0.0%	0.0%	6.0%	0.0%	11.5%	0.0%	6.4%	5.0%
PHF	0.59	0.79	0.63	0.84	0.38	0.70	0.88	0.93	0.75	0.50	0.69	0.76	0.67	0.54	0.42	0.62	0.93

Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE 42nd Ave				Southbound SE 42nd Ave				Eastbound SE Harrison St				Westbound SE Harrison St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	35	100	7	0	3	92	261	0	103	8	8	2	8	30	3	0	658	1	0	4	4
7:15 AM	31	114	8	0	3	114	257	0	122	8	9	1	14	29	5	0	714	2	0	3	5
7:30 AM	22	123	5	0	3	116	256	0	131	8	15	1	16	26	5	0	726	1	0	3	3
7:45 AM	23	117	6	0	2	120	228	0	122	11	14	0	15	24	5	0	687	2	1	5	3
8:00 AM	19	117	5	0	1	128	193	0	123	10	16	0	11	16	3	0	642	2	1	10	2

Heavy Vehicle Summary

Clay Carney
(503) 833-2740



SE 42nd Ave & SE Harrison St

Tuesday, September 25, 2018
7:00 AM to 9:00 AM

Peak Hour Summary
7:25 AM to 8:25 AM

Heavy Vehicle 5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE 42nd Ave				Southbound SE 42nd Ave				Eastbound SE Harrison St				Westbound SE Harrison St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	0	0	0	0	0	0	1	1	1	0	0	1	0	0	0	0	2
7:05 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:10 AM	0	0	0	0	0	0	2	2	1	0	0	1	0	0	0	0	3
7:15 AM	0	0	1	1	0	0	1	1	1	0	0	1	0	0	0	0	3
7:20 AM	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1
7:25 AM	0	0	0	0	0	2	2	4	1	0	0	1	0	0	0	0	5
7:30 AM	0	0	0	0	0	0	2	2	1	0	0	1	0	0	0	0	3
7:35 AM	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1
7:40 AM	0	2	0	2	1	0	0	1	2	0	0	2	0	0	0	0	5
7:45 AM	0	0	0	0	0	0	3	3	0	0	0	0	0	2	0	2	5
7:50 AM	0	1	0	1	0	0	1	1	0	0	0	0	0	0	0	0	2
7:55 AM	0	0	0	0	0	1	1	2	0	0	0	0	0	0	0	0	2
8:00 AM	0	2	0	2	0	1	0	1	2	0	0	2	0	0	0	0	5
8:05 AM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1
8:10 AM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1
8:15 AM	0	0	0	0	0	2	1	3	0	0	0	0	0	0	0	0	3
8:20 AM	0	0	0	0	0	0	2	2	1	0	0	1	0	1	0	1	4
8:25 AM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
8:30 AM	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1
8:35 AM	0	1	1	2	0	0	0	0	1	0	0	1	0	0	0	0	3
8:40 AM	0	1	0	1	0	0	0	0	1	0	1	2	0	0	0	0	3
8:45 AM	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1
8:50 AM	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
8:55 AM	0	0	0	0	0	1	2	3	2	0	1	3	0	0	0	0	6
Total Survey	0	10	2	12	1	7	22	30	16	0	2	18	0	3	0	3	63

Heavy Vehicle 15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE 42nd Ave				Southbound SE 42nd Ave				Eastbound SE Harrison St				Westbound SE Harrison St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	0	0	0	0	0	0	3	3	2	0	0	2	0	0	0	0	5
7:15 AM	0	0	1	1	0	2	4	6	2	0	0	2	0	0	0	0	9
7:30 AM	0	2	0	2	1	0	3	4	3	0	0	3	0	0	0	0	9
7:45 AM	0	1	0	1	0	1	5	6	0	0	0	0	0	2	0	2	9
8:00 AM	0	2	0	2	0	1	0	1	4	0	0	4	0	0	0	0	7
8:15 AM	0	1	0	1	0	2	3	5	1	0	0	1	0	1	0	1	8
8:30 AM	0	2	1	3	0	0	1	1	2	0	1	3	0	0	0	0	7
8:45 AM	0	2	0	2	0	1	3	4	2	0	1	3	0	0	0	0	9
Total Survey	0	10	2	12	1	7	22	30	16	0	2	18	0	3	0	3	63

Heavy Vehicle Peak Hour Summary
7:25 AM to 8:25 AM

By Approach	Northbound SE 42nd Ave			Southbound SE 42nd Ave			Eastbound SE Harrison St			Westbound SE Harrison St			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	5	6	11	20	14	34	9	16	25	3	1	4	37
PHF	0.42			0.71			0.56			0.38			0.77

By Movement	Northbound SE 42nd Ave				Southbound SE 42nd Ave				Eastbound SE Harrison St				Westbound SE Harrison St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	5	0	5	1	6	13	20	9	0	0	9	0	3	0	3	37
PHF	0.00	0.42	0.00	0.42	0.25	0.75	0.65	0.71	0.56	0.00	0.00	0.56	0.00	0.38	0.00	0.38	0.77

Heavy Vehicle Rolling Hour Summary
7:00 AM to 9:00 AM

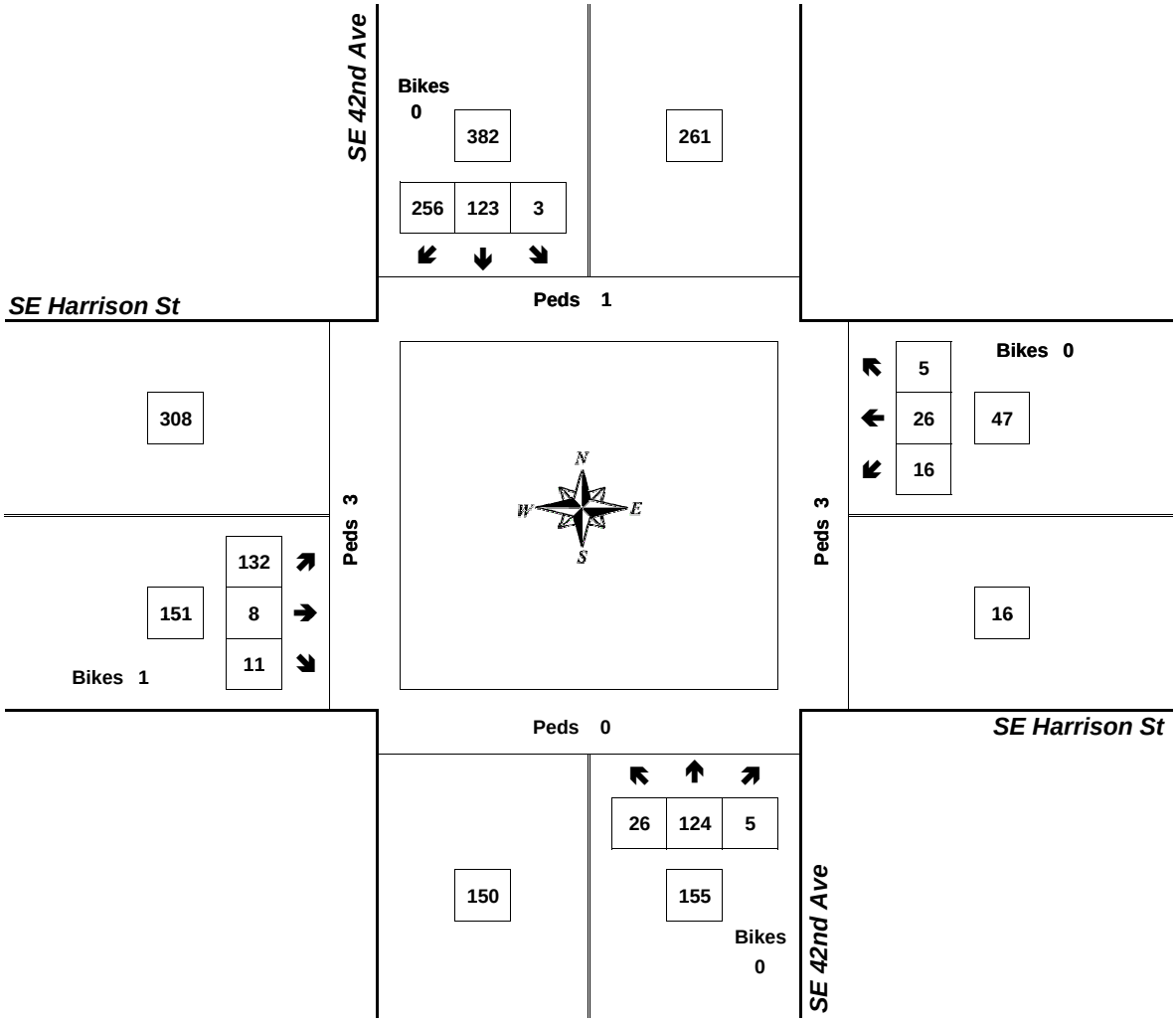
Interval Start Time	Northbound SE 42nd Ave				Southbound SE 42nd Ave				Eastbound SE Harrison St				Westbound SE Harrison St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	0	3	1	4	1	3	15	19	7	0	0	7	0	2	0	2	32
7:15 AM	0	5	1	6	1	4	12	17	9	0	0	9	0	2	0	2	34
7:30 AM	0	6	0	6	1	4	11	16	8	0	0	8	0	3	0	3	33
7:45 AM	0	6	1	7	0	4	9	13	7	0	1	8	0	3	0	3	31
8:00 AM	0	7	1	8	0	4	7	11	9	0	2	11	0	1	0	1	31

Peak Hour Summary

Clay Carney
(503) 833-2740

SE 42nd Ave & SE Harrison St

7:25 AM to 8:25 AM
Tuesday, September 25, 2018

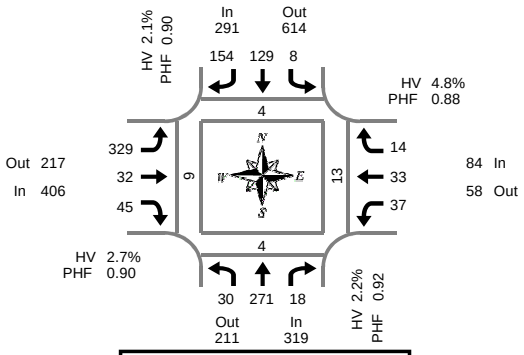


Approach	PHF	HV%	Volume
EB	0.76	6.0%	151
WB	0.62	6.4%	47
NB	0.84	3.2%	155
SB	0.93	5.2%	382
Intersection	0.93	5.0%	735

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



SE 42nd Ave & SE Harrison St

Tuesday, September 25, 2018
4:00 PM to 6:00 PM

Peak Hour Summary
4:50 PM to 5:50 PM

5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SE 42nd Ave				Southbound SE 42nd Ave				Eastbound SE Harrison St				Westbound SE Harrison St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	2	26	0	0	0	8	9	0	21	1	1	0	0	3	2	0	73	0	0	2	3
4:05 PM	3	18	3	0	0	10	14	0	19	1	1	0	3	1	0	0	73	0	0	2	0
4:10 PM	4	28	1	0	0	7	12	0	19	1	3	0	0	6	1	0	82	0	0	1	0
4:15 PM	1	23	2	0	0	13	10	0	24	3	2	0	1	2	1	0	82	0	1	2	0
4:20 PM	2	20	1	0	0	9	5	0	23	3	6	0	3	1	0	0	73	0	0	0	0
4:25 PM	2	28	1	0	0	8	18	0	22	4	9	0	1	0	0	0	93	0	0	0	0
4:30 PM	3	18	1	0	0	8	9	0	21	3	2	0	2	4	1	0	72	1	0	0	0
4:35 PM	1	18	0	0	0	5	17	0	22	4	4	0	4	1	0	0	76	0	0	0	0
4:40 PM	1	24	3	0	0	8	11	0	26	1	3	0	0	2	0	0	79	1	0	0	0
4:45 PM	2	17	2	0	0	10	13	0	30	1	2	0	2	3	1	0	83	1	0	0	0
4:50 PM	1	27	2	0	0	16	11	0	25	3	1	0	1	3	1	0	91	0	0	0	0
4:55 PM	3	17	2	0	0	10	15	1	27	3	2	0	2	4	1	0	86	1	1	0	0
5:00 PM	0	20	3	0	1	13	15	0	30	0	3	0	2	3	3	0	93	0	0	1	3
5:05 PM	2	30	5	0	1	8	13	0	22	2	3	1	1	4	3	0	94	0	1	2	0
5:10 PM	5	20	0	0	0	7	12	0	36	5	6	0	3	4	0	0	98	0	0	0	2
5:15 PM	1	23	1	0	0	10	12	0	16	4	8	0	2	3	1	0	81	0	0	0	0
5:20 PM	5	21	2	0	2	10	13	0	31	1	3	0	7	2	2	0	99	1	1	1	2
5:25 PM	5	25	1	0	0	10	15	0	26	1	1	0	1	0	2	0	87	0	1	2	0
5:30 PM	1	22	0	0	2	11	14	0	30	3	6	0	4	4	0	0	97	0	0	2	2
5:35 PM	3	22	1	0	0	15	10	0	30	2	1	0	7	1	1	0	93	0	0	1	0
5:40 PM	4	20	1	0	0	7	12	0	30	5	6	0	2	4	0	0	91	1	0	2	0
5:45 PM	0	24	0	0	2	12	12	0	26	3	5	0	5	1	0	0	90	1	0	2	0
5:50 PM	4	10	1	0	1	13	17	0	23	5	2	0	4	4	0	0	84	0	0	1	1
5:55 PM	1	14	3	0	1	9	11	0	16	2	4	1	1	3	2	0	67	0	0	0	0
Total Survey	56	515	36	0	10	237	300	1	595	61	84	2	58	63	22	0	2,037	7	5	21	13

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SE 42nd Ave				Southbound SE 42nd Ave				Eastbound SE Harrison St				Westbound SE Harrison St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	9	72	4	0	0	25	35	0	59	3	5	0	3	10	3	0	228	0	0	5	3
4:15 PM	5	71	4	0	0	30	33	0	69	10	17	0	5	3	1	0	248	0	1	2	0
4:30 PM	5	60	4	0	0	21	37	0	69	8	9	0	6	7	1	0	227	2	0	0	0
4:45 PM	6	61	6	0	0	36	39	1	82	7	5	0	5	10	3	0	260	2	1	0	0
5:00 PM	7	70	8	0	2	28	40	0	88	7	12	1	6	11	6	0	285	0	1	3	5
5:15 PM	11	69	4	0	2	30	40	0	73	6	12	0	10	5	5	0	267	1	2	3	2
5:30 PM	8	64	2	0	2	33	36	0	90	10	13	0	13	9	1	0	281	1	0	5	2
5:45 PM	5	48	4	0	4	34	40	0	65	10	11	1	10	8	2	0	241	1	0	3	1
Total Survey	56	515	36	0	10	237	300	1	595	61	84	2	58	63	22	0	2,037	7	5	21	13

Peak Hour Summary
4:50 PM to 5:50 PM

By Approach	Northbound SE 42nd Ave				Southbound SE 42nd Ave				Eastbound SE Harrison St				Westbound SE Harrison St				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	319	211	530	0	291	614	905	1	406	217	623	1	84	58	142	0	1,100	4	4	13	9
%HV	2.2%				2.1%				2.7%				4.8%				2.5%				
PHF	0.92				0.90				0.90				0.88				0.96				

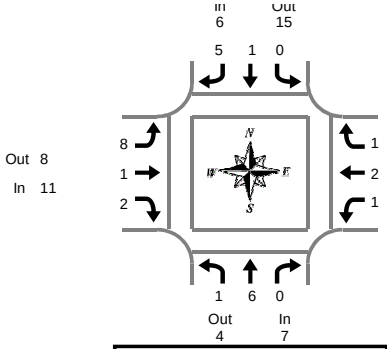
By Movement	Northbound SE 42nd Ave				Southbound SE 42nd Ave				Eastbound SE Harrison St				Westbound SE Harrison St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	30	271	18	319	8	129	154	291	329	32	45	406	37	33	14	84	1,100
%HV	3.3%	2.2%	0.0%	2.2%	0.0%	0.8%	3.2%	2.1%	2.4%	3.1%	4.4%	2.7%	2.7%	6.1%	7.1%	4.8%	2.5%
PHF	0.68	0.93	0.45	0.92	0.50	0.83	0.90	0.90	0.91	0.73	0.66	0.90	0.66	0.75	0.50	0.88	0.96

Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SE 42nd Ave				Southbound SE 42nd Ave				Eastbound SE Harrison St				Westbound SE Harrison St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	25	264	18	0	0	112	144	1	279	28	36	0	19	30	8	0	963	4	2	7	3
4:15 PM	23	262	22	0	2	115	149	1	308	32	43	1	22	31	11	0	1,020	4	3	5	5
4:30 PM	29	260	22	0	4	115	156	1	312	28	38	1	27	33	15	0	1,039	5	4	6	7
4:45 PM	32	264	20	0	6	127	155	1	333	30	42	1	34	35	15	0	1,093	4	4	11	9
5:00 PM	31	251	18	0	10	125	156	0	316	33	48	2	39	33	14	0	1,074	3	3	14	10

Heavy Vehicle Summary

Clay Carney
(503) 833-2740



SE 42nd Ave & SE Harrison St

Tuesday, September 25, 2018
4:00 PM to 6:00 PM

Peak Hour Summary
4:50 PM to 5:50 PM

Heavy Vehicle 5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SE 42nd Ave				Southbound SE 42nd Ave				Eastbound SE Harrison St				Westbound SE Harrison St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	2
4:05 PM	0	1	0	1	0	0	1	1	0	0	0	0	0	0	0	0	2
4:10 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	1	1	3	0	0	3	0	0	0	0	4
4:20 PM	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1
4:25 PM	0	2	0	2	0	0	2	2	0	0	0	0	0	0	0	0	4
4:30 PM	0	1	0	1	0	0	1	1	1	0	0	1	0	0	0	0	3
4:35 PM	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1
4:40 PM	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1
4:45 PM	0	0	0	0	0	0	1	1	1	0	0	1	0	0	0	0	2
4:50 PM	0	1	0	1	0	0	0	0	0	1	0	1	0	1	0	1	3
4:55 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	1	0	1	0	1	1	2	1	0	0	1	0	0	0	0	4
5:05 PM	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	3	4
5:10 PM	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
5:15 PM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1
5:20 PM	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1
5:25 PM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1
5:30 PM	0	0	0	0	0	0	2	2	3	0	0	3	0	0	0	0	5
5:35 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:40 PM	1	0	0	1	0	0	1	1	1	0	1	2	0	0	0	0	4
5:45 PM	0	2	0	2	0	0	0	0	1	0	0	1	0	0	0	0	3
5:50 PM	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	1	2
5:55 PM	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	2
Total Survey	1	10	0	11	0	1	14	15	16	1	2	19	2	4	1	7	52

Heavy Vehicle 15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SE 42nd Ave				Southbound SE 42nd Ave				Eastbound SE Harrison St				Westbound SE Harrison St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	1	0	1	0	0	1	1	1	0	0	1	0	1	0	1	4
4:15 PM	0	2	0	2	0	0	4	4	3	0	0	3	0	0	0	0	9
4:30 PM	0	1	0	1	0	0	3	3	1	0	0	1	0	0	0	0	5
4:45 PM	0	1	0	1	0	0	1	1	1	1	0	2	0	1	0	1	5
5:00 PM	0	3	0	3	0	1	1	2	1	0	1	2	1	1	1	3	10
5:15 PM	0	0	0	0	0	0	1	1	2	0	0	2	0	0	0	0	3
5:30 PM	1	0	0	1	0	0	3	3	4	0	1	5	0	0	0	0	9
5:45 PM	0	2	0	2	0	0	0	0	3	0	0	3	1	1	0	2	7
Total Survey	1	10	0	11	0	1	14	15	16	1	2	19	2	4	1	7	52

Heavy Vehicle Peak Hour Summary
4:50 PM to 5:50 PM

By Approach	Northbound SE 42nd Ave			Southbound SE 42nd Ave			Eastbound SE Harrison St			Westbound SE Harrison St			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	7	4	11	6	15	21	11	8	19	4	1	5	28
PHF	0.58			0.50			0.55			0.33			0.70

By Movement	Northbound SE 42nd Ave				Southbound SE 42nd Ave				Eastbound SE Harrison St				Westbound SE Harrison St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	1	6	0	7	0	1	5	6	8	1	2	11	1	2	1	4	28
PHF	0.25	0.50	0.00	0.58	0.00	0.25	0.42	0.50	0.50	0.25	0.50	0.55	0.25	0.50	0.25	0.33	0.70

Heavy Vehicle Rolling Hour Summary
4:00 PM to 6:00 PM

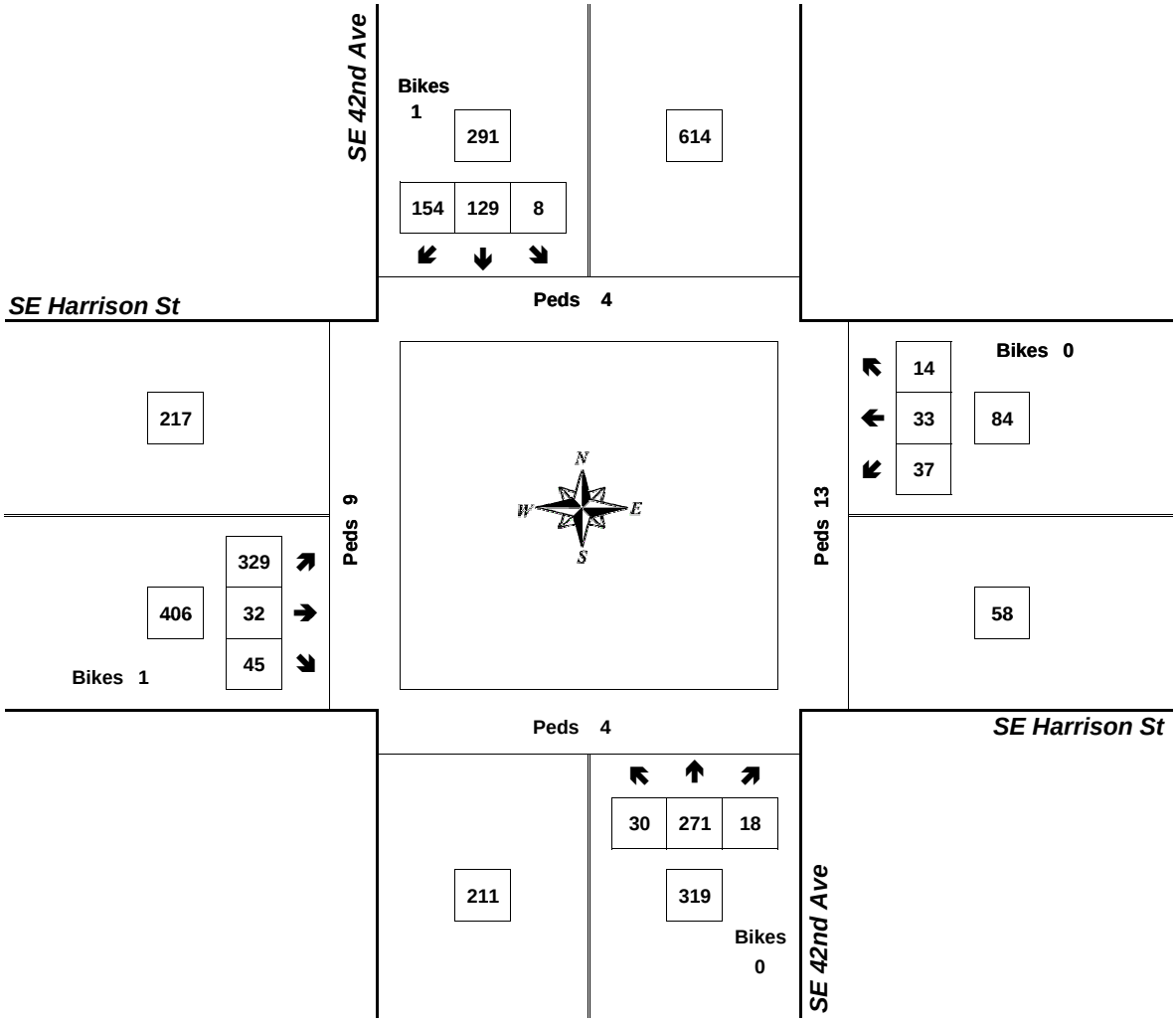
Interval Start Time	Northbound SE 42nd Ave				Southbound SE 42nd Ave				Eastbound SE Harrison St				Westbound SE Harrison St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	5	0	5	0	0	9	9	6	1	0	7	0	2	0	2	23
4:15 PM	0	7	0	7	0	1	9	10	6	1	1	8	1	2	1	4	29
4:30 PM	0	5	0	5	0	1	6	7	5	1	1	7	1	2	1	4	23
4:45 PM	1	4	0	5	0	1	6	7	8	1	2	11	1	2	1	4	27
5:00 PM	1	5	0	6	0	1	5	6	10	0	2	12	2	2	1	5	29

Peak Hour Summary

Clay Carney
(503) 833-2740

SE 42nd Ave & SE Harrison St

4:50 PM to 5:50 PM
Tuesday, September 25, 2018



Approach	PHF	HV%	Volume
EB	0.90	2.7%	406
WB	0.88	4.8%	84
NB	0.92	2.2%	319
SB	0.90	2.1%	291
Intersection	0.96	2.5%	1,100

Count Period: 4:00 PM to 6:00 PM

LEVEL OF SERVICE

Level of service is used to describe the quality of traffic flow. Levels of service A to C are considered good, and rural roads are usually designed for level of service C. Urban streets and signalized intersections are typically designed for level of service D. Level of service E is considered to be the limit of acceptable delay. For unsignalized intersections, level of service E is generally considered acceptable. Here is a more complete description of levels of service:

Level of service A: Very low delay at intersections, with all traffic signal cycles clearing and no vehicles waiting through more than one signal cycle. On highways, low volume and high speeds, with speeds not restricted by other vehicles.

Level of service B: Operating speeds beginning to be affected by other traffic; short traffic delays at intersections. Higher average intersection delay than for level of service A resulting from more vehicles stopping.

Level of service C: Operating speeds and maneuverability closely controlled by other traffic; higher delays at intersections than for level of service B due to a significant number of vehicles stopping. Not all signal cycles clear the waiting vehicles. This is the recommended design standard for rural highways.

Level of service D: Tolerable operating speeds; long traffic delays occur at intersections. The influence of congestion is noticeable. At traffic signals many vehicles stop, and the proportion of vehicles not stopping declines. The number of signal cycle failures, for which vehicles must wait through more than one signal cycle, are noticeable. This is typically the design level for urban signalized intersections.

Level of service E: Restricted speeds, very long traffic delays at traffic signals, and traffic volumes near capacity. Flow is unstable so that any interruption, no matter how minor, will cause queues to form and service to deteriorate to level of service F. Traffic signal cycle failures are frequent occurrences. For unsignalized intersections, level of service E or better is generally considered acceptable.

Level of service F: Extreme delays, resulting in long queues which may interfere with other traffic movements. There may be stoppages of long duration, and speeds may drop to zero. There may be frequent signal cycle failures. Level of service F will typically result when vehicle arrival rates are greater than capacity. It is considered unacceptable by most drivers.

LEVEL OF SERVICE CRITERIA
FOR SIGNALIZED INTERSECTIONS

LEVEL OF SERVICE	CONTROL DELAY PER VEHICLE (Seconds)
A	<10
B	10-20
C	20-35
D	35-55
E	55-80
F	>80

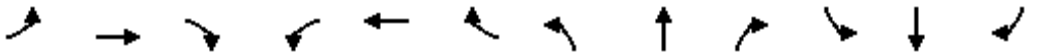
LEVEL OF SERVICE CRITERIA
FOR UNSIGNALIZED INTERSECTIONS

LEVEL OF SERVICE	CONTROL DELAY PER VEHICLE (Seconds)
A	<10
B	10-15
C	15-25
D	25-35
E	35-50
F	>50

Movement	WBL	WBR	NBL	NBR	SEL	SER
Lane Configurations						
Traffic Volume (vph)	27	711	261	55	307	98
Future Volume (vph)	27	711	261	55	307	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	
Lane Util. Factor	1.00	1.00	1.00		1.00	
Frpb, ped/bikes	1.00	0.96	0.99		0.99	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	
Frt	1.00	0.85	0.98		0.97	
Flt Protected	0.95	1.00	0.96		0.96	
Satd. Flow (prot)	1770	1517	1700		1726	
Flt Permitted	0.95	1.00	0.96		1.00	
Satd. Flow (perm)	1770	1517	1700		1792	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	29	765	281	59	330	105
RTOR Reduction (vph)	0	429	10	0	15	0
Lane Group Flow (vph)	29	336	330	0	420	0
Confl. Peds. (#/hr)	3			1	1	
Confl. Bikes (#/hr)		20		16		6
Heavy Vehicles (%)	2%	2%	4%	4%	2%	2%
Turn Type	Prot	Perm	Perm		pm+pt	
Protected Phases	8				1	
Permitted Phases		8	2		6	
Actuated Green, G (s)	26.7	26.7	19.8		42.3	
Effective Green, g (s)	26.7	26.7	19.8		42.3	
Actuated g/C Ratio	0.34	0.34	0.25		0.54	
Clearance Time (s)	4.5	4.5	4.5		4.5	
Lane Grp Cap (vph)	605	519	431		971	
v/s Ratio Prot	0.02				0.10	
v/s Ratio Perm		c0.22	c0.19		c0.14	
v/c Ratio	0.05	0.65	0.77		0.43	
Uniform Delay, d1	17.2	21.7	27.0		10.7	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.1	6.1	12.3		1.4	
Delay (s)	17.3	27.8	39.2		12.1	
Level of Service	B	C	D		B	
Approach Delay (s)	27.4		39.2		12.1	
Approach LOS	C		D		B	

Intersection Summary			
HCM 2000 Control Delay	25.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	78.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	56.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	101	103	4	20	382	21	43	129	13	15	101	146
Future Volume (veh/h)	101	103	4	20	382	21	43	129	13	15	101	146
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	0.99		0.96	0.99		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1856	1856	1856	1870	1870	1870	1811	1811	1811
Adj Flow Rate, veh/h	105	107	4	21	398	22	45	134	14	16	105	152
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	10	10	10	3	3	3	2	2	2	6	6	6
Cap, veh/h	216	560	21	228	581	32	168	264	491	126	308	476
Arrive On Green	0.13	0.33	0.33	0.13	0.33	0.33	0.19	0.19	0.19	0.19	0.19	0.19
Sat Flow, veh/h	1668	1676	63	1767	1739	96	274	1409	1526	111	1642	1478
Grp Volume(v), veh/h	105	0	111	21	0	420	179	0	14	121	0	152
Grp Sat Flow(s),veh/h/ln	1668	0	1739	1767	0	1835	1684	0	1526	1753	0	1478
Q Serve(g_s), s	2.3	0.0	1.8	0.4	0.0	7.6	1.2	0.0	0.2	0.0	0.0	3.0
Cycle Q Clear(g_c), s	2.3	0.0	1.8	0.4	0.0	7.6	3.5	0.0	0.2	2.3	0.0	3.0
Prop In Lane	1.00		0.04	1.00		0.05	0.25		1.00	0.13		1.00
Lane Grp Cap(c), veh/h	216	0	581	228	0	613	432	0	491	434	0	476
V/C Ratio(X)	0.49	0.00	0.19	0.09	0.00	0.68	0.41	0.00	0.03	0.28	0.00	0.32
Avail Cap(c_a), veh/h	798	0	2629	388	0	2301	1351	0	1369	1408	0	1325
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.7	0.0	9.2	14.8	0.0	11.1	14.1	0.0	9.1	13.7	0.0	10.1
Incr Delay (d2), s/veh	1.7	0.0	0.2	0.2	0.0	1.4	0.6	0.0	0.0	0.3	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	0.6	0.2	0.0	2.7	1.3	0.0	0.1	0.8	0.0	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.4	0.0	9.3	15.0	0.0	12.5	14.8	0.0	9.1	14.0	0.0	10.4
LnGrp LOS	B	A	A	B	A	B	B	A	A	B	A	B
Approach Vol, veh/h		216			441			193			273	
Approach Delay, s/veh		13.2			12.6			14.4			12.0	
Approach LOS		B			B			B			B	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		11.8	9.5	17.4		11.8	9.5	17.4				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		29.5	8.5	58.5		29.5	18.5	48.5				
Max Q Clear Time (g_c+I1), s		5.5	2.4	3.8		5.0	4.3	9.6				
Green Ext Time (p_c), s		1.1	0.0	0.7		1.2	0.2	3.1				

Intersection Summary												
HCM 6th Ctrl Delay			12.9									
HCM 6th LOS			B									

Intersection	
Intersection Delay, s/veh	10.5
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	132	8	11	16	26	5	26	124	5	3	123	256
Future Vol, veh/h	132	8	11	16	26	5	26	124	5	3	123	256
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	6	6	6	6	6	6	3	3	3	5	5	5
Mvmt Flow	142	9	12	17	28	5	28	133	5	3	132	275
Number of Lanes	0	1	1	0	1	1	0	1	0	0	1	1

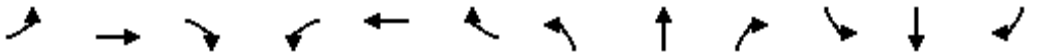
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	2
HCM Control Delay	11.5	9.7	10.9	10
HCM LOS	B	A	B	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	17%	94%	0%	38%	0%	2%	0%
Vol Thru, %	80%	6%	0%	62%	0%	98%	0%
Vol Right, %	3%	0%	100%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	155	140	11	42	5	126	256
LT Vol	26	132	0	16	0	3	0
Through Vol	124	8	0	26	0	123	0
RT Vol	5	0	11	0	5	0	256
Lane Flow Rate	167	151	12	45	5	135	275
Geometry Grp	6	7	7	7	7	7	7
Degree of Util (X)	0.268	0.277	0.018	0.082	0.008	0.205	0.361
Departure Headway (Hd)	5.786	6.616	5.429	6.549	5.644	5.442	4.726
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	625	545	662	549	636	653	751
Service Time	3.786	4.327	3.139	4.265	3.359	3.235	2.518
HCM Lane V/C Ratio	0.267	0.277	0.018	0.082	0.008	0.207	0.366
HCM Control Delay	10.9	11.8	8.2	9.9	8.4	9.7	10.2
HCM Lane LOS	B	B	A	A	A	A	B
HCM 95th-tile Q	1.1	1.1	0.1	0.3	0	0.8	1.6

Movement	WBL	WBR	NBL	NBR	SEL	SER
Lane Configurations						
Traffic Volume (vph)	47	499	116	34	578	305
Future Volume (vph)	47	499	116	34	578	305
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	
Lane Util. Factor	1.00	1.00	1.00		1.00	
Frpb, ped/bikes	1.00	0.96	0.99		0.99	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	
Frt	1.00	0.85	0.97		0.95	
Flt Protected	0.95	1.00	0.96		0.97	
Satd. Flow (prot)	1736	1492	1696		1716	
Flt Permitted	0.95	1.00	0.96		1.00	
Satd. Flow (perm)	1736	1492	1696		1772	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	49	525	122	36	608	321
RTOR Reduction (vph)	0	389	15	0	27	0
Lane Group Flow (vph)	49	136	143	0	902	0
Confl. Peds. (#/hr)	1	1				
Confl. Bikes (#/hr)		12		2		23
Heavy Vehicles (%)	4%	4%	4%	4%	1%	1%
Turn Type	Prot	Perm	Perm		pm+pt	
Protected Phases	8				1	
Permitted Phases		8	2		6	
Actuated Green, G (s)	18.0	18.0	18.3		42.5	
Effective Green, g (s)	18.0	18.0	18.3		42.5	
Actuated g/C Ratio	0.26	0.26	0.26		0.61	
Clearance Time (s)	4.5	4.5	4.5		4.5	
Lane Grp Cap (vph)	449	386	446		1083	
v/s Ratio Prot	0.03				0.24	
v/s Ratio Perm		c0.09	0.08		c0.28	
v/c Ratio	0.11	0.35	0.32		0.83	
Uniform Delay, d1	19.6	21.0	20.6		10.7	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.5	2.5	1.9		7.5	
Delay (s)	20.1	23.5	22.5		18.2	
Level of Service	C	C	C		B	
Approach Delay (s)	23.2		22.5		18.2	
Approach LOS	C		C		B	

Intersection Summary			
HCM 2000 Control Delay	20.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	69.5	Sum of lost time (s)	13.5
Intersection Capacity Utilization	85.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	421	7	23	192	17	25	122	20	45	131	147
Future Volume (veh/h)	120	421	7	23	192	17	25	122	20	45	131	147
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.96	0.99		0.95	0.98		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1870	1870	1870	1856	1856	1856
Adj Flow Rate, veh/h	136	478	8	26	218	19	28	139	23	51	149	167
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	3	3	3	3	3	3	2	2	2	3	3	3
Cap, veh/h	250	682	11	147	531	46	120	503	610	169	442	697
Arrive On Green	0.14	0.38	0.38	0.08	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	1767	1818	30	1767	1676	146	158	1589	1510	295	1397	1497
Grp Volume(v), veh/h	136	0	486	26	0	237	167	0	23	200	0	167
Grp Sat Flow(s),veh/h/ln	1767	0	1849	1767	0	1822	1747	0	1510	1692	0	1497
Q Serve(g_s), s	4.3	0.0	13.4	0.8	0.0	6.1	0.0	0.0	0.6	0.0	0.0	4.1
Cycle Q Clear(g_c), s	4.3	0.0	13.4	0.8	0.0	6.1	4.0	0.0	0.6	5.0	0.0	4.1
Prop In Lane	1.00		0.02	1.00		0.08	0.17		1.00	0.25		1.00
Lane Grp Cap(c), veh/h	250	0	693	147	0	577	623	0	610	611	0	697
V/C Ratio(X)	0.54	0.00	0.70	0.18	0.00	0.41	0.27	0.00	0.04	0.33	0.00	0.24
Avail Cap(c_a), veh/h	250	0	693	147	0	577	623	0	610	611	0	697
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.9	0.0	15.9	25.6	0.0	16.1	15.4	0.0	11.0	15.7	0.0	9.9
Incr Delay (d2), s/veh	8.2	0.0	5.8	2.6	0.0	2.2	1.1	0.0	0.1	1.4	0.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	0.0	6.2	0.4	0.0	2.7	1.8	0.0	0.2	2.2	0.0	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.2	0.0	21.7	28.2	0.0	18.3	16.4	0.0	11.1	17.1	0.0	10.7
LnGrp LOS	C	A	C	C	A	B	B	A	B	B	A	B
Approach Vol, veh/h		622			263			190			367	
Approach Delay, s/veh		24.0			19.2			15.8			14.2	
Approach LOS		C			B			B			B	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		23.5	9.5	27.0		23.5	13.0	23.5				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		19.0	5.0	22.5		19.0	8.5	19.0				
Max Q Clear Time (g_c+I1), s		6.0	2.8	15.4		7.0	6.3	8.1				
Green Ext Time (p_c), s		0.8	0.0	1.8		1.5	0.1	1.0				

Intersection Summary												
HCM 6th Ctrl Delay			19.6									
HCM 6th LOS			B									

Intersection	
Intersection Delay, s/veh	20.5
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	329	32	45	37	33	14	30	271	18	8	129	154
Future Vol, veh/h	329	32	45	37	33	14	30	271	18	8	129	154
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	3	3	3	5	5	5	2	2	2	2	2	2
Mvmt Flow	343	33	47	39	34	15	31	282	19	8	134	160
Number of Lanes	0	1	1	0	1	1	0	1	0	0	1	1

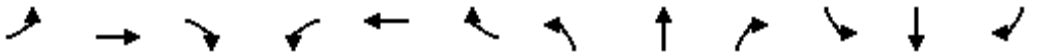
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	2
HCM Control Delay	27.4	11.8	21.6	12.2
HCM LOS	D	B	C	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	9%	91%	0%	53%	0%	6%	0%
Vol Thru, %	85%	9%	0%	47%	0%	94%	0%
Vol Right, %	6%	0%	100%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	319	361	45	70	14	137	154
LT Vol	30	329	0	37	0	8	0
Through Vol	271	32	0	33	0	129	0
RT Vol	18	0	45	0	14	0	154
Lane Flow Rate	332	376	47	73	15	143	160
Geometry Grp	6	7	7	7	7	7	7
Degree of Util (X)	0.64	0.76	0.08	0.161	0.028	0.283	0.285
Departure Headway (Hd)	6.939	7.277	6.132	7.962	6.967	7.138	6.393
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	522	496	588	450	513	504	561
Service Time	4.977	5.013	3.832	5.717	4.721	4.88	4.134
HCM Lane V/C Ratio	0.636	0.758	0.08	0.162	0.029	0.284	0.285
HCM Control Delay	21.6	29.6	9.4	12.2	9.9	12.7	11.7
HCM Lane LOS	C	D	A	B	A	B	B
HCM 95th-tile Q	4.5	6.6	0.3	0.6	0.1	1.2	1.2

Movement	WBL	WBR	NBL	NBR	SEL	SER
Lane Configurations						
Traffic Volume (vph)	29	770	283	60	332	106
Future Volume (vph)	29	770	283	60	332	106
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	
Lane Util. Factor	1.00	1.00	1.00		1.00	
Frpb, ped/bikes	1.00	0.96	0.99		0.99	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	
Frt	1.00	0.85	0.98		0.97	
Flt Protected	0.95	1.00	0.96		0.96	
Satd. Flow (prot)	1770	1517	1699		1726	
Flt Permitted	0.95	1.00	0.96		1.00	
Satd. Flow (perm)	1770	1517	1699		1791	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	31	828	304	65	357	114
RTOR Reduction (vph)	0	421	10	0	15	0
Lane Group Flow (vph)	31	407	359	0	456	0
Confl. Peds. (#/hr)	3			1	1	
Confl. Bikes (#/hr)		20		16		6
Heavy Vehicles (%)	2%	2%	4%	4%	2%	2%
Turn Type	Prot	Perm	Perm		pm+pt	
Protected Phases	8				1	
Permitted Phases		8	2		6	
Actuated Green, G (s)	26.5	26.5	20.0		42.5	
Effective Green, g (s)	26.5	26.5	20.0		42.5	
Actuated g/C Ratio	0.34	0.34	0.26		0.54	
Clearance Time (s)	4.5	4.5	4.5		4.5	
Lane Grp Cap (vph)	601	515	435		975	
v/s Ratio Prot	0.02				0.11	
v/s Ratio Perm		c0.27	c0.21		c0.15	
v/c Ratio	0.05	0.79	0.83		0.47	
Uniform Delay, d1	17.3	23.3	27.4		10.8	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.2	11.8	16.3		1.6	
Delay (s)	17.5	35.0	43.6		12.5	
Level of Service	B	D	D		B	
Approach Delay (s)	34.4		43.6		12.5	
Approach LOS	C		D		B	

Intersection Summary			
HCM 2000 Control Delay	30.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	78.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	59.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	109	111	4	22	413	23	47	140	14	16	109	158
Future Volume (veh/h)	109	111	4	22	413	23	47	140	14	16	109	158
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1856	1856	1856	1870	1870	1870	1811	1811	1811
Adj Flow Rate, veh/h	114	116	4	23	430	24	49	146	15	17	114	165
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	10	10	10	3	3	3	2	2	2	6	6	6
Cap, veh/h	181	561	19	177	566	32	116	273	612	94	398	605
Arrive On Green	0.11	0.33	0.33	0.10	0.33	0.33	0.30	0.30	0.30	0.30	0.30	0.30
Sat Flow, veh/h	1668	1682	58	1767	1738	97	87	926	1536	43	1348	1488
Grp Volume(v), veh/h	114	0	120	23	0	454	195	0	15	131	0	165
Grp Sat Flow(s),veh/h/ln	1668	0	1739	1767	0	1835	1012	0	1536	1392	0	1488
Q Serve(g_s), s	3.3	0.0	2.5	0.6	0.0	11.0	0.9	0.0	0.3	0.3	0.0	3.7
Cycle Q Clear(g_c), s	3.3	0.0	2.5	0.6	0.0	11.0	12.4	0.0	0.3	12.1	0.0	3.7
Prop In Lane	1.00		0.03	1.00		0.05	0.25		1.00	0.13		1.00
Lane Grp Cap(c), veh/h	181	0	581	177	0	598	389	0	612	492	0	605
V/C Ratio(X)	0.63	0.00	0.21	0.13	0.00	0.76	0.50	0.00	0.02	0.27	0.00	0.27
Avail Cap(c_a), veh/h	619	0	2076	266	0	1785	860	0	1068	995	0	1047
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.3	0.0	11.9	20.4	0.0	15.1	14.3	0.0	9.2	13.5	0.0	10.0
Incr Delay (d2), s/veh	3.6	0.0	0.2	0.3	0.0	2.0	1.0	0.0	0.0	0.3	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.0	0.9	0.2	0.0	4.4	1.7	0.0	0.1	1.0	0.0	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.9	0.0	12.1	20.8	0.0	17.1	15.3	0.0	9.2	13.8	0.0	10.2
LnGrp LOS	C	A	B	C	A	B	B	A	A	B	A	B
Approach Vol, veh/h		234			477			210			296	
Approach Delay, s/veh		18.3			17.2			14.8			11.8	
Approach LOS		B			B			B			B	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		19.7	9.5	21.3		19.7	9.9	20.9				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		29.5	7.5	59.5		29.5	18.5	48.5				
Max Q Clear Time (g_c+I1), s		14.4	2.6	4.5		14.1	5.3	13.0				
Green Ext Time (p_c), s		1.0	0.0	0.8		1.2	0.2	3.4				

Intersection Summary												
HCM 6th Ctrl Delay			15.7									
HCM 6th LOS			B									

Intersection	
Intersection Delay, s/veh	11.1
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	143	9	12	17	28	5	28	134	5	3	133	277
Future Vol, veh/h	143	9	12	17	28	5	28	134	5	3	133	277
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	6	6	6	6	6	6	3	3	3	5	5	5
Mvmt Flow	154	10	13	18	30	5	30	144	5	3	143	298
Number of Lanes	0	1	1	0	1	1	0	1	0	0	1	1

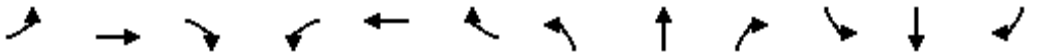
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	2
HCM Control Delay	12.2	10	11.4	10.7
HCM LOS	B	A	B	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	17%	94%	0%	38%	0%	2%	0%
Vol Thru, %	80%	6%	0%	62%	0%	98%	0%
Vol Right, %	3%	0%	100%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	167	152	12	45	5	136	277
LT Vol	28	143	0	17	0	3	0
Through Vol	134	9	0	28	0	133	0
RT Vol	5	0	12	0	5	0	277
Lane Flow Rate	180	163	13	48	5	146	298
Geometry Grp	6	7	7	7	7	7	7
Degree of Util (X)	0.294	0.307	0.02	0.09	0.009	0.229	0.407
Departure Headway (Hd)	5.896	6.753	5.565	6.721	5.815	5.638	4.922
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	611	533	643	533	615	641	736
Service Time	3.926	4.484	3.296	4.458	3.553	3.338	2.622
HCM Lane V/C Ratio	0.295	0.306	0.02	0.09	0.008	0.228	0.405
HCM Control Delay	11.4	12.5	8.4	10.1	8.6	10	11
HCM Lane LOS	B	B	A	B	A	A	B
HCM 95th-tile Q	1.2	1.3	0.1	0.3	0	0.9	2

Movement	WBL	WBR	NBL	NBR	SEL	SER
Lane Configurations						
Traffic Volume (vph)	51	540	126	37	626	330
Future Volume (vph)	51	540	126	37	626	330
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	
Lane Util. Factor	1.00	1.00	1.00		1.00	
Frpb, ped/bikes	1.00	0.96	0.99		0.99	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	
Frt	1.00	0.85	0.97		0.95	
Flt Protected	0.95	1.00	0.96		0.97	
Satd. Flow (prot)	1736	1492	1696		1716	
Flt Permitted	0.95	1.00	0.96		1.00	
Satd. Flow (perm)	1736	1492	1696		1773	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	54	568	133	39	659	347
RTOR Reduction (vph)	0	421	15	0	27	0
Lane Group Flow (vph)	54	147	157	0	979	0
Confl. Peds. (#/hr)	1	1				
Confl. Bikes (#/hr)		12		2		23
Heavy Vehicles (%)	4%	4%	4%	4%	1%	1%
Turn Type	Prot	Perm	Perm		pm+pt	
Protected Phases	8				1	
Permitted Phases		8	2		6	
Actuated Green, G (s)	18.0	18.0	18.5		42.5	
Effective Green, g (s)	18.0	18.0	18.5		42.5	
Actuated g/C Ratio	0.26	0.26	0.27		0.61	
Clearance Time (s)	4.5	4.5	4.5		4.5	
Lane Grp Cap (vph)	449	386	451		1084	
v/s Ratio Prot	0.03				0.25	
v/s Ratio Perm		c0.10	0.09		c0.31	
v/c Ratio	0.12	0.38	0.35		0.90	
Uniform Delay, d1	19.7	21.2	20.6		11.7	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.5	2.8	2.1		12.1	
Delay (s)	20.2	24.0	22.7		23.8	
Level of Service	C	C	C		C	
Approach Delay (s)	23.7		22.7		23.8	
Approach LOS	C		C		C	

Intersection Summary			
HCM 2000 Control Delay	23.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	69.5	Sum of lost time (s)	13.5
Intersection Capacity Utilization	90.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	130	456	8	25	208	18	27	132	22	49	142	159
Future Volume (veh/h)	130	456	8	25	208	18	27	132	22	49	142	159
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.96	0.99		0.95	0.98		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1870	1870	1870	1856	1856	1856
Adj Flow Rate, veh/h	148	518	9	28	236	20	31	150	25	56	161	181
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	3	3	3	3	3	3	2	2	2	3	3	3
Cap, veh/h	250	712	12	147	560	47	118	475	585	163	418	671
Arrive On Green	0.14	0.39	0.39	0.08	0.33	0.33	0.30	0.30	0.30	0.30	0.30	0.30
Sat Flow, veh/h	1767	1817	32	1767	1681	142	158	1583	1508	293	1394	1494
Grp Volume(v), veh/h	148	0	527	28	0	256	181	0	25	217	0	181
Grp Sat Flow(s),veh/h/ln	1767	0	1848	1767	0	1823	1740	0	1508	1687	0	1494
Q Serve(g_s), s	4.7	0.0	14.6	0.9	0.0	6.5	0.0	0.0	0.6	0.2	0.0	4.6
Cycle Q Clear(g_c), s	4.7	0.0	14.6	0.9	0.0	6.5	4.5	0.0	0.6	5.6	0.0	4.6
Prop In Lane	1.00		0.02	1.00		0.08	0.17		1.00	0.26		1.00
Lane Grp Cap(c), veh/h	250	0	724	147	0	608	592	0	585	582	0	671
V/C Ratio(X)	0.59	0.00	0.73	0.19	0.00	0.42	0.31	0.00	0.04	0.37	0.00	0.27
Avail Cap(c_a), veh/h	250	0	724	147	0	608	592	0	585	582	0	671
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.1	0.0	15.5	25.6	0.0	15.5	16.3	0.0	11.6	16.6	0.0	10.6
Incr Delay (d2), s/veh	9.9	0.0	6.3	2.8	0.0	2.1	1.3	0.0	0.1	1.8	0.0	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	0.0	6.8	0.5	0.0	2.9	2.0	0.0	0.2	2.5	0.0	1.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.0	0.0	21.9	28.5	0.0	17.6	17.6	0.0	11.7	18.5	0.0	11.6
LnGrp LOS	C	A	C	C	A	B	B	A	B	B	A	B
Approach Vol, veh/h		675			284			206			398	
Approach Delay, s/veh		24.5			18.7			16.9			15.4	
Approach LOS		C			B			B			B	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		22.5	9.5	28.0		22.5	13.0	24.5				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		18.0	5.0	23.5		18.0	8.5	20.0				
Max Q Clear Time (g_c+I1), s		6.5	2.9	16.6		7.6	6.7	8.5				
Green Ext Time (p_c), s		0.8	0.0	2.0		1.5	0.1	1.1				

Intersection Summary												
HCM 6th Ctrl Delay			20.1									
HCM 6th LOS			C									

Intersection	
Intersection Delay, s/veh	26
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	356	35	49	40	36	15	32	293	19	9	140	167
Future Vol, veh/h	356	35	49	40	36	15	32	293	19	9	140	167
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	3	3	3	5	5	5	2	2	2	2	2	2
Mvmt Flow	371	36	51	42	38	16	33	305	20	9	146	174
Number of Lanes	0	1	1	0	1	1	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	2
HCM Control Delay	37.1	12.7	27	13.3
HCM LOS	E	B	D	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	9%	91%	0%	53%	0%	6%	0%
Vol Thru, %	85%	9%	0%	47%	0%	94%	0%
Vol Right, %	6%	0%	100%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	344	391	49	76	15	149	167
LT Vol	32	356	0	40	0	9	0
Through Vol	293	35	0	36	0	140	0
RT Vol	19	0	49	0	15	0	167
Lane Flow Rate	358	407	51	79	16	155	174
Geometry Grp	6	7	7	7	7	7	7
Degree of Util (X)	0.721	0.853	0.09	0.184	0.032	0.323	0.326
Departure Headway (Hd)	7.243	7.541	6.358	8.379	7.38	7.486	6.737
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	498	481	562	427	483	480	532
Service Time	5.299	5.296	4.111	6.16	5.161	5.248	4.498
HCM Lane V/C Ratio	0.719	0.846	0.091	0.185	0.033	0.323	0.327
HCM Control Delay	27	40.5	9.7	13.1	10.4	13.8	12.8
HCM Lane LOS	D	E	A	B	B	B	B
HCM 95th-tile Q	5.8	8.7	0.3	0.7	0.1	1.4	1.4

Movement	WBL	WBR	NBL	NBR	SEL	SER
Lane Configurations						
Traffic Volume (vph)	30	770	305	63	332	114
Future Volume (vph)	30	770	305	63	332	114
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	
Lane Util. Factor	1.00	1.00	1.00		1.00	
Frpb, ped/bikes	1.00	0.96	0.99		0.99	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	
Frt	1.00	0.85	0.98		0.97	
Flt Protected	0.95	1.00	0.96		0.96	
Satd. Flow (prot)	1770	1516	1701		1723	
Flt Permitted	0.95	1.00	0.96		1.00	
Satd. Flow (perm)	1770	1516	1701		1787	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	32	828	328	68	357	123
RTOR Reduction (vph)	0	418	10	0	16	0
Lane Group Flow (vph)	32	410	387	0	464	0
Confl. Peds. (#/hr)	3			1	1	
Confl. Bikes (#/hr)		20		16		6
Heavy Vehicles (%)	2%	2%	4%	4%	2%	2%
Turn Type	Prot	Perm	Perm		pm+pt	
Protected Phases	8				1	
Permitted Phases		8	2		6	
Actuated Green, G (s)	25.5	25.5	21.0		43.5	
Effective Green, g (s)	25.5	25.5	21.0		43.5	
Actuated g/C Ratio	0.33	0.33	0.27		0.56	
Clearance Time (s)	4.5	4.5	4.5		4.5	
Lane Grp Cap (vph)	578	495	457		996	
v/s Ratio Prot	0.02				0.11	
v/s Ratio Perm		c0.27	c0.23		c0.16	
v/c Ratio	0.06	0.83	0.85		0.47	
Uniform Delay, d1	18.0	24.2	27.0		10.3	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.2	14.7	17.3		1.6	
Delay (s)	18.2	39.0	44.3		11.9	
Level of Service	B	D	D		B	
Approach Delay (s)	38.2		44.3		11.9	
Approach LOS	D		D		B	

Intersection Summary			
HCM 2000 Control Delay	32.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	78.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	61.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	113	111	4	22	413	29	47	143	14	32	119	171
Future Volume (veh/h)	113	111	4	22	413	29	47	143	14	32	119	171
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1856	1856	1856	1870	1870	1870	1811	1811	1811
Adj Flow Rate, veh/h	118	116	4	23	430	30	49	149	15	33	124	178
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	10	10	10	3	3	3	2	2	2	6	6	6
Cap, veh/h	168	549	19	142	524	37	83	209	706	78	235	715
Arrive On Green	0.10	0.33	0.33	0.08	0.31	0.31	0.38	0.38	0.38	0.38	0.38	0.38
Sat Flow, veh/h	1668	1681	58	1767	1711	119	29	557	1540	21	626	1491
Grp Volume(v), veh/h	118	0	120	23	0	460	198	0	15	157	0	178
Grp Sat Flow(s),veh/h/ln	1668	0	1739	1767	0	1830	585	0	1540	648	0	1491
Q Serve(g_s), s	4.3	0.0	3.1	0.8	0.0	14.5	1.7	0.0	0.3	1.5	0.0	4.4
Cycle Q Clear(g_c), s	4.3	0.0	3.1	0.8	0.0	14.5	23.4	0.0	0.3	23.4	0.0	4.4
Prop In Lane	1.00		0.03	1.00		0.07	0.25		1.00	0.21		1.00
Lane Grp Cap(c), veh/h	168	0	568	142	0	560	292	0	706	314	0	715
V/C Ratio(X)	0.70	0.00	0.21	0.16	0.00	0.82	0.68	0.00	0.02	0.50	0.00	0.25
Avail Cap(c_a), veh/h	523	0	1665	213	0	1399	449	0	858	474	0	862
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	27.0	0.0	15.1	26.6	0.0	20.0	15.8	0.0	9.3	15.2	0.0	9.7
Incr Delay (d2), s/veh	5.3	0.0	0.2	0.5	0.0	3.1	2.7	0.0	0.0	1.2	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	0.0	1.2	0.3	0.0	6.2	2.0	0.0	0.1	1.5	0.0	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.3	0.0	15.3	27.1	0.0	23.0	18.6	0.0	9.3	16.5	0.0	9.8
LnGrp LOS	C	A	B	C	A	C	B	A	A	B	A	A
Approach Vol, veh/h		238			483			213			335	
Approach Delay, s/veh		23.8			23.2			17.9			12.9	
Approach LOS		C			C			B			B	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		29.2	9.5	25.3		29.2	10.9	24.0				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		29.5	7.5	59.5		29.5	19.5	47.5				
Max Q Clear Time (g_c+I1), s		25.4	2.8	5.1		25.4	6.3	16.5				
Green Ext Time (p_c), s		0.4	0.0	0.8		0.6	0.2	3.4				

Intersection Summary	
HCM 6th Ctrl Delay	19.7
HCM 6th LOS	B

Intersection	
Intersection Delay, s/veh	11.4
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	159	9	12	17	28	5	28	134	5	3	133	283
Future Vol, veh/h	159	9	12	17	28	5	28	134	5	3	133	283
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	6	6	6	6	6	6	3	3	3	5	5	5
Mvmt Flow	171	10	13	18	30	5	30	144	5	3	143	304
Number of Lanes	0	1	1	0	1	1	0	1	0	0	1	1

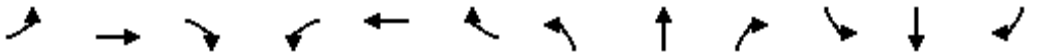
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	2
HCM Control Delay	12.7	10	11.5	10.9
HCM LOS	B	A	B	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	17%	95%	0%	38%	0%	2%	0%
Vol Thru, %	80%	5%	0%	62%	0%	98%	0%
Vol Right, %	3%	0%	100%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	167	168	12	45	5	136	283
LT Vol	28	159	0	17	0	3	0
Through Vol	134	9	0	28	0	133	0
RT Vol	5	0	12	0	5	0	283
Lane Flow Rate	180	181	13	48	5	146	304
Geometry Grp	6	7	7	7	7	7	7
Degree of Util (X)	0.298	0.341	0.02	0.091	0.009	0.232	0.422
Departure Headway (Hd)	5.982	6.788	5.597	6.79	5.884	5.714	4.997
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	602	531	639	527	607	632	724
Service Time	4.015	4.522	3.331	4.534	3.627	3.414	2.697
HCM Lane V/C Ratio	0.299	0.341	0.02	0.091	0.008	0.231	0.42
HCM Control Delay	11.5	13	8.4	10.2	8.7	10.1	11.3
HCM Lane LOS	B	B	A	B	A	B	B
HCM 95th-tile Q	1.2	1.5	0.1	0.3	0	0.9	2.1

Movement	WBL	WBR	NBL	NBR	SEL	SER
Lane Configurations						
Traffic Volume (vph)	54	540	141	39	626	353
Future Volume (vph)	54	540	141	39	626	353
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	
Lane Util. Factor	1.00	1.00	1.00		1.00	
Frpb, ped/bikes	1.00	0.96	1.00		0.99	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	
Frt	1.00	0.85	0.97		0.95	
Flt Protected	0.95	1.00	0.96		0.97	
Satd. Flow (prot)	1736	1492	1698		1713	
Flt Permitted	0.95	1.00	0.96		1.00	
Satd. Flow (perm)	1736	1492	1698		1768	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	57	568	148	41	659	372
RTOR Reduction (vph)	0	421	15	0	29	0
Lane Group Flow (vph)	57	147	174	0	1002	0
Confl. Peds. (#/hr)	1	1				
Confl. Bikes (#/hr)		12		2		23
Heavy Vehicles (%)	4%	4%	4%	4%	1%	1%
Turn Type	Prot	Perm	Perm		pm+pt	
Protected Phases	8				1	
Permitted Phases		8	2		6	
Actuated Green, G (s)	18.0	18.0	18.5		42.5	
Effective Green, g (s)	18.0	18.0	18.5		42.5	
Actuated g/C Ratio	0.26	0.26	0.27		0.61	
Clearance Time (s)	4.5	4.5	4.5		4.5	
Lane Grp Cap (vph)	449	386	451		1081	
v/s Ratio Prot	0.03				0.26	
v/s Ratio Perm		c0.10	0.10		c0.31	
v/c Ratio	0.13	0.38	0.39		0.93	
Uniform Delay, d1	19.7	21.2	20.9		12.1	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.6	2.8	2.5		14.6	
Delay (s)	20.3	24.0	23.4		26.7	
Level of Service	C	C	C		C	
Approach Delay (s)	23.7		23.4		26.7	
Approach LOS	C		C		C	

Intersection Summary			
HCM 2000 Control Delay	25.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	69.5	Sum of lost time (s)	13.5
Intersection Capacity Utilization	92.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	143	456	8	25	208	34	27	142	22	59	148	167
Future Volume (veh/h)	143	456	8	25	208	34	27	142	22	59	148	167
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.96	0.99		0.95	0.98		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1870	1870	1870	1856	1856	1856
Adj Flow Rate, veh/h	162	518	9	28	236	39	31	161	25	67	168	190
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	3	3	3	3	3	3	2	2	2	3	3	3
Cap, veh/h	280	681	12	147	463	76	116	506	610	184	417	723
Arrive On Green	0.16	0.38	0.38	0.08	0.30	0.30	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	1767	1817	32	1767	1542	255	148	1597	1510	338	1318	1497
Grp Volume(v), veh/h	162	0	527	28	0	275	192	0	25	235	0	190
Grp Sat Flow(s),veh/h/ln	1767	0	1848	1767	0	1797	1745	0	1510	1656	0	1497
Q Serve(g_s), s	5.1	0.0	15.0	0.9	0.0	7.6	0.0	0.0	0.6	1.4	0.0	4.6
Cycle Q Clear(g_c), s	5.1	0.0	15.0	0.9	0.0	7.6	4.7	0.0	0.6	6.2	0.0	4.6
Prop In Lane	1.00		0.02	1.00		0.14	0.16		1.00	0.29		1.00
Lane Grp Cap(c), veh/h	280	0	693	147	0	539	622	0	610	602	0	723
V/C Ratio(X)	0.58	0.00	0.76	0.19	0.00	0.51	0.31	0.00	0.04	0.39	0.00	0.26
Avail Cap(c_a), veh/h	280	0	693	147	0	539	622	0	610	602	0	723
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.4	0.0	16.4	25.6	0.0	17.4	15.6	0.0	11.0	16.1	0.0	9.5
Incr Delay (d2), s/veh	8.5	0.0	7.7	2.8	0.0	3.4	1.3	0.0	0.1	1.9	0.0	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	0.0	7.2	0.5	0.0	3.4	2.1	0.0	0.2	2.7	0.0	1.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.9	0.0	24.1	28.5	0.0	20.8	16.9	0.0	11.1	18.0	0.0	10.4
LnGrp LOS	C	A	C	C	A	C	B	A	B	B	A	B
Approach Vol, veh/h		689			303			217			425	
Approach Delay, s/veh		25.9			21.5			16.2			14.6	
Approach LOS		C			C			B			B	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		23.5	9.5	27.0		23.5	14.0	22.5				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		19.0	5.0	22.5		19.0	9.5	18.0				
Max Q Clear Time (g_c+I1), s		6.7	2.9	17.0		8.2	7.1	9.6				
Green Ext Time (p_c), s		0.9	0.0	1.7		1.7	0.1	1.0				

Intersection Summary												
HCM 6th Ctrl Delay			20.9									
HCM 6th LOS			C									

Intersection	
Intersection Delay, s/veh	27.9
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	366	35	49	40	36	15	32	293	19	9	140	183
Future Vol, veh/h	366	35	49	40	36	15	32	293	19	9	140	183
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	3	3	3	5	5	5	2	2	2	2	2	2
Mvmt Flow	381	36	51	42	38	16	33	305	20	9	146	191
Number of Lanes	0	1	1	0	1	1	0	1	0	0	1	1

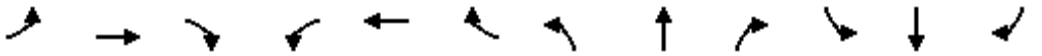
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	2
HCM Control Delay	41.3	12.8	28	13.7
HCM LOS	E	B	D	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	9%	91%	0%	53%	0%	6%	0%
Vol Thru, %	85%	9%	0%	47%	0%	94%	0%
Vol Right, %	6%	0%	100%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	344	401	49	76	15	149	183
LT Vol	32	366	0	40	0	9	0
Through Vol	293	35	0	36	0	140	0
RT Vol	19	0	49	0	15	0	183
Lane Flow Rate	358	418	51	79	16	155	191
Geometry Grp	6	7	7	7	7	7	7
Degree of Util (X)	0.731	0.883	0.091	0.187	0.033	0.326	0.361
Departure Headway (Hd)	7.343	7.609	6.424	8.499	7.499	7.566	6.816
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	491	476	556	420	475	473	526
Service Time	5.405	5.366	4.18	6.285	5.284	5.335	4.585
HCM Lane V/C Ratio	0.729	0.878	0.092	0.188	0.034	0.328	0.363
HCM Control Delay	28	45.2	9.8	13.2	10.5	14	13.4
HCM Lane LOS	D	E	A	B	B	B	B
HCM 95th-tile Q	6	9.5	0.3	0.7	0.1	1.4	1.6

Movement	WBL	WBR	NBL	NBR	SEL	SER
Lane Configurations						
Traffic Volume (vph)	30	770	320	65	332	119
Future Volume (vph)	30	770	320	65	332	119
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	
Lane Util. Factor	1.00	1.00	1.00		1.00	
Frpb, ped/bikes	1.00	0.96	0.99		0.99	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	
Frt	1.00	0.85	0.98		0.96	
Flt Protected	0.95	1.00	0.96		0.96	
Satd. Flow (prot)	1770	1516	1701		1722	
Flt Permitted	0.95	1.00	0.96		1.00	
Satd. Flow (perm)	1770	1516	1701		1785	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	32	828	344	70	357	128
RTOR Reduction (vph)	0	412	10	0	16	0
Lane Group Flow (vph)	32	416	405	0	469	0
Confl. Peds. (#/hr)	3			1	1	
Confl. Bikes (#/hr)		20		16		6
Heavy Vehicles (%)	2%	2%	4%	4%	2%	2%
Turn Type	Prot	Perm	Perm		pm+pt	
Protected Phases	8				1	
Permitted Phases		8	2		6	
Actuated Green, G (s)	25.5	25.5	21.0		43.5	
Effective Green, g (s)	25.5	25.5	21.0		43.5	
Actuated g/C Ratio	0.33	0.33	0.27		0.56	
Clearance Time (s)	4.5	4.5	4.5		4.5	
Lane Grp Cap (vph)	578	495	457		995	
v/s Ratio Prot	0.02				0.11	
v/s Ratio Perm		c0.27	c0.24		c0.16	
v/c Ratio	0.06	0.84	0.89		0.47	
Uniform Delay, d1	18.0	24.4	27.3		10.3	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.2	15.7	21.4		1.6	
Delay (s)	18.2	40.1	48.8		11.9	
Level of Service	B	D	D		B	
Approach Delay (s)	39.3		48.8		11.9	
Approach LOS	D		D		B	

Intersection Summary			
HCM 2000 Control Delay	34.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	78.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	62.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	117	111	4	22	413	33	47	146	14	43	125	179
Future Volume (veh/h)	117	111	4	22	413	33	47	146	14	43	125	179
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1856	1856	1856	1870	1870	1870	1811	1811	1811
Adj Flow Rate, veh/h	122	116	4	23	430	34	49	152	15	45	130	186
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	10	10	10	3	3	3	2	2	2	6	6	6
Cap, veh/h	166	561	19	124	515	41	67	173	738	68	158	760
Arrive On Green	0.10	0.33	0.33	0.07	0.30	0.30	0.41	0.41	0.41	0.41	0.41	0.41
Sat Flow, veh/h	1668	1682	58	1767	1693	134	11	426	1541	11	389	1492
Grp Volume(v), veh/h	122	0	120	23	0	464	201	0	15	175	0	186
Grp Sat Flow(s),veh/h/ln	1668	0	1739	1767	0	1827	437	0	1541	400	0	1492
Q Serve(g_s), s	5.1	0.0	3.5	0.9	0.0	16.9	0.8	0.0	0.4	0.8	0.0	5.0
Cycle Q Clear(g_c), s	5.1	0.0	3.5	0.9	0.0	16.9	29.0	0.0	0.4	29.0	0.0	5.0
Prop In Lane	1.00		0.03	1.00		0.07	0.24		1.00	0.26		1.00
Lane Grp Cap(c), veh/h	166	0	580	124	0	555	241	0	738	226	0	760
V/C Ratio(X)	0.73	0.00	0.21	0.19	0.00	0.84	0.84	0.00	0.02	0.77	0.00	0.24
Avail Cap(c_a), veh/h	456	0	1452	186	0	1218	252	0	749	237	0	771
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	31.2	0.0	17.0	31.2	0.0	23.1	17.7	0.0	9.8	17.6	0.0	9.9
Incr Delay (d2), s/veh	6.1	0.0	0.2	0.7	0.0	3.4	20.4	0.0	0.0	14.0	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	0.0	1.4	0.4	0.0	7.4	3.4	0.0	0.1	2.6	0.0	1.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.3	0.0	17.2	31.9	0.0	26.5	38.1	0.0	9.8	31.7	0.0	10.1
LnGrp LOS	D	A	B	C	A	C	D	A	A	C	A	B
Approach Vol, veh/h		242			487			216			361	
Approach Delay, s/veh		27.3			26.8			36.1			20.6	
Approach LOS		C			C			D			C	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		33.8	9.5	28.7		33.8	11.7	26.5				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		29.5	7.5	59.5		29.5	19.5	47.5				
Max Q Clear Time (g_c+I1), s		31.0	2.9	5.5		31.0	7.1	18.9				
Green Ext Time (p_c), s		0.0	0.0	0.8		0.0	0.2	3.4				

Intersection Summary	
HCM 6th Ctrl Delay	26.7
HCM 6th LOS	C

Intersection	
Intersection Delay, s/veh	11.6
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	170	9	12	17	28	5	28	134	5	3	133	287
Future Vol, veh/h	170	9	12	17	28	5	28	134	5	3	133	287
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	6	6	6	6	6	6	3	3	3	5	5	5
Mvmt Flow	183	10	13	18	30	5	30	144	5	3	143	309
Number of Lanes	0	1	1	0	1	1	0	1	0	0	1	1

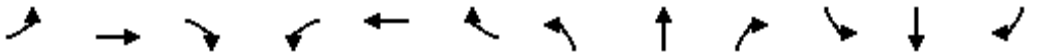
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	2
HCM Control Delay	13.1	10.1	11.7	11.1
HCM LOS	B	B	B	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	17%	95%	0%	38%	0%	2%	0%
Vol Thru, %	80%	5%	0%	62%	0%	98%	0%
Vol Right, %	3%	0%	100%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	167	179	12	45	5	136	287
LT Vol	28	170	0	17	0	3	0
Through Vol	134	9	0	28	0	133	0
RT Vol	5	0	12	0	5	0	287
Lane Flow Rate	180	192	13	48	5	146	309
Geometry Grp	6	7	7	7	7	7	7
Degree of Util (X)	0.301	0.364	0.02	0.092	0.009	0.233	0.43
Departure Headway (Hd)	6.041	6.813	5.62	6.841	5.935	5.738	5.021
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	596	529	637	524	603	626	719
Service Time	4.073	4.544	3.35	4.581	3.674	3.466	2.748
HCM Lane V/C Ratio	0.302	0.363	0.02	0.092	0.008	0.233	0.43
HCM Control Delay	11.7	13.4	8.5	10.3	8.7	10.2	11.5
HCM Lane LOS	B	B	A	B	A	B	B
HCM 95th-tile Q	1.3	1.7	0.1	0.3	0	0.9	2.2

Movement	WBL	WBR	NBL	NBR	SEL	SER
Lane Configurations						
Traffic Volume (vph)	56	540	150	41	626	368
Future Volume (vph)	56	540	150	41	626	368
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	
Lane Util. Factor	1.00	1.00	1.00		1.00	
Frpb, ped/bikes	1.00	0.96	1.00		0.99	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	
Frt	1.00	0.85	0.97		0.95	
Flt Protected	0.95	1.00	0.96		0.97	
Satd. Flow (prot)	1736	1492	1699		1711	
Flt Permitted	0.95	1.00	0.96		1.00	
Satd. Flow (perm)	1736	1492	1699		1765	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	59	568	158	43	659	387
RTOR Reduction (vph)	0	421	14	0	30	0
Lane Group Flow (vph)	59	147	187	0	1016	0
Confl. Peds. (#/hr)	1	1				
Confl. Bikes (#/hr)		12		2		23
Heavy Vehicles (%)	4%	4%	4%	4%	1%	1%
Turn Type	Prot	Perm	Perm		pm+pt	
Protected Phases	8				1	
Permitted Phases		8	2		6	
Actuated Green, G (s)	18.0	18.0	18.5		42.5	
Effective Green, g (s)	18.0	18.0	18.5		42.5	
Actuated g/C Ratio	0.26	0.26	0.27		0.61	
Clearance Time (s)	4.5	4.5	4.5		4.5	
Lane Grp Cap (vph)	449	386	452		1079	
v/s Ratio Prot	0.03				0.26	
v/s Ratio Perm		c0.10	0.11		c0.32	
v/c Ratio	0.13	0.38	0.41		0.94	
Uniform Delay, d1	19.8	21.2	21.0		12.4	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.6	2.8	2.8		16.5	
Delay (s)	20.4	24.0	23.8		28.8	
Level of Service	C	C	C		C	
Approach Delay (s)	23.7		23.8		28.8	
Approach LOS	C		C		C	

Intersection Summary			
HCM 2000 Control Delay	26.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	69.5	Sum of lost time (s)	13.5
Intersection Capacity Utilization	94.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	151	456	8	25	208	45	27	148	22	66	152	173
Future Volume (veh/h)	151	456	8	25	208	45	27	148	22	66	152	173
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.96	0.99		0.95	0.98		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1870	1870	1870	1856	1856	1856
Adj Flow Rate, veh/h	172	518	9	28	236	51	31	168	25	75	173	197
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	3	3	3	3	3	3	2	2	2	3	3	3
Cap, veh/h	280	681	12	147	440	95	114	510	610	190	396	723
Arrive On Green	0.16	0.38	0.38	0.08	0.30	0.30	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	1767	1817	32	1767	1466	317	140	1610	1510	353	1250	1497
Grp Volume(v), veh/h	172	0	527	28	0	287	199	0	25	248	0	197
Grp Sat Flow(s),veh/h/ln	1767	0	1848	1767	0	1783	1749	0	1510	1603	0	1497
Q Serve(g_s), s	5.4	0.0	15.0	0.9	0.0	8.1	0.0	0.0	0.6	2.3	0.0	4.8
Cycle Q Clear(g_c), s	5.4	0.0	15.0	0.9	0.0	8.1	4.9	0.0	0.6	7.2	0.0	4.8
Prop In Lane	1.00		0.02	1.00		0.18	0.16		1.00	0.30		1.00
Lane Grp Cap(c), veh/h	280	0	693	147	0	535	623	0	610	586	0	723
V/C Ratio(X)	0.61	0.00	0.76	0.19	0.00	0.54	0.32	0.00	0.04	0.42	0.00	0.27
Avail Cap(c_a), veh/h	280	0	693	147	0	535	623	0	610	586	0	723
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.5	0.0	16.4	25.6	0.0	17.5	15.7	0.0	11.0	16.3	0.0	9.5
Incr Delay (d2), s/veh	9.7	0.0	7.7	2.8	0.0	3.8	1.3	0.0	0.1	2.2	0.0	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	0.0	7.2	0.5	0.0	3.6	2.2	0.0	0.2	2.9	0.0	1.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.3	0.0	24.1	28.5	0.0	21.3	17.0	0.0	11.1	18.5	0.0	10.5
LnGrp LOS	C	A	C	C	A	C	B	A	B	B	A	B
Approach Vol, veh/h		699			315			224			445	
Approach Delay, s/veh		26.3			22.0			16.4			15.0	
Approach LOS		C			C			B			B	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		23.5	9.5	27.0		23.5	14.0	22.5				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		19.0	5.0	22.5		19.0	9.5	18.0				
Max Q Clear Time (g_c+I1), s		6.9	2.9	17.0		9.2	7.4	10.1				
Green Ext Time (p_c), s		1.0	0.0	1.7		1.7	0.1	1.0				

Intersection Summary												
HCM 6th Ctrl Delay			21.2									
HCM 6th LOS			C									

Intersection	
Intersection Delay, s/veh	29.4
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	373	35	49	40	36	15	32	293	19	9	140	194
Future Vol, veh/h	373	35	49	40	36	15	32	293	19	9	140	194
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	3	3	3	5	5	5	2	2	2	2	2	2
Mvmt Flow	389	36	51	42	38	16	33	305	20	9	146	202
Number of Lanes	0	1	1	0	1	1	0	1	0	0	1	1

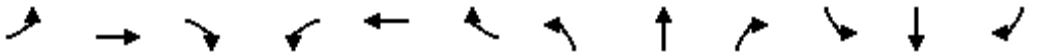
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	2
HCM Control Delay	44.7	12.9	28.7	14
HCM LOS	E	B	D	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	9%	91%	0%	53%	0%	6%	0%
Vol Thru, %	85%	9%	0%	47%	0%	94%	0%
Vol Right, %	6%	0%	100%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	344	408	49	76	15	149	194
LT Vol	32	373	0	40	0	9	0
Through Vol	293	35	0	36	0	140	0
RT Vol	19	0	49	0	15	0	194
Lane Flow Rate	358	425	51	79	16	155	202
Geometry Grp	6	7	7	7	7	7	7
Degree of Util (X)	0.738	0.904	0.092	0.189	0.033	0.329	0.386
Departure Headway (Hd)	7.413	7.654	6.467	8.581	7.58	7.622	6.872
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	487	472	552	416	469	470	521
Service Time	5.479	5.416	4.228	6.375	5.373	5.395	4.644
HCM Lane V/C Ratio	0.735	0.9	0.092	0.19	0.034	0.33	0.388
HCM Control Delay	28.7	48.9	9.9	13.4	10.6	14.1	13.9
HCM Lane LOS	D	E	A	B	B	B	B
HCM 95th-tile Q	6.1	10.1	0.3	0.7	0.1	1.4	1.8

Movement	WBL	WBR	NBL	NBR	SEL	SER
Lane Configurations						
Traffic Volume (vph)	40	1057	388	82	456	146
Future Volume (vph)	40	1057	388	82	456	146
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	
Lane Util. Factor	1.00	1.00	1.00		1.00	
Frpb, ped/bikes	1.00	0.96	0.99		0.99	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	
Frt	1.00	0.85	0.98		0.97	
Flt Protected	0.95	1.00	0.96		0.96	
Satd. Flow (prot)	1770	1516	1700		1726	
Flt Permitted	0.95	1.00	0.96		1.00	
Satd. Flow (perm)	1770	1516	1700		1791	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	43	1137	417	88	490	157
RTOR Reduction (vph)	0	390	10	0	15	0
Lane Group Flow (vph)	43	747	496	0	632	0
Confl. Peds. (#/hr)	3			1	1	
Confl. Bikes (#/hr)		20		16		6
Heavy Vehicles (%)	2%	2%	4%	4%	2%	2%
Turn Type	Prot	Perm	Perm		pm+pt	
Protected Phases	8				1	
Permitted Phases		8	2		6	
Actuated Green, G (s)	25.5	25.5	21.0		43.5	
Effective Green, g (s)	25.5	25.5	21.0		43.5	
Actuated g/C Ratio	0.33	0.33	0.27		0.56	
Clearance Time (s)	4.5	4.5	4.5		4.5	
Lane Grp Cap (vph)	578	495	457		998	
v/s Ratio Prot	0.02				0.15	
v/s Ratio Perm		c0.49	c0.29		c0.21	
v/c Ratio	0.07	1.51	1.08		0.63	
Uniform Delay, d1	18.1	26.2	28.5		11.8	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.3	239.7	66.7		3.1	
Delay (s)	18.4	265.9	95.2		14.9	
Level of Service	B	F	F		B	
Approach Delay (s)	256.9		95.2		14.9	
Approach LOS	F		F		B	

Intersection Summary			
HCM 2000 Control Delay	154.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	78.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	76.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	153	6	30	568	31	64	192	19	22	150	217
Future Volume (veh/h)	150	153	6	30	568	31	64	192	19	22	150	217
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1856	1856	1856	1870	1870	1870	1811	1811	1811
Adj Flow Rate, veh/h	156	159	6	31	592	32	67	200	20	23	156	226
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	10	10	10	3	3	3	2	2	2	6	6	6
Cap, veh/h	194	749	28	100	674	36	51	124	619	46	243	691
Arrive On Green	0.12	0.45	0.45	0.06	0.39	0.39	0.34	0.34	0.34	0.34	0.34	0.34
Sat Flow, veh/h	1668	1675	63	1767	1742	94	0	362	1539	0	707	1490
Grp Volume(v), veh/h	156	0	165	31	0	624	267	0	20	179	0	226
Grp Sat Flow(s),veh/h/ln	1668	0	1739	1767	0	1836	362	0	1539	707	0	1490
Q Serve(g_s), s	8.1	0.0	5.1	1.5	0.0	28.0	0.0	0.0	0.7	0.0	0.0	8.6
Cycle Q Clear(g_c), s	8.1	0.0	5.1	1.5	0.0	28.0	30.5	0.0	0.7	30.5	0.0	8.6
Prop In Lane	1.00		0.04	1.00		0.05	0.25		1.00	0.13		1.00
Lane Grp Cap(c), veh/h	194	0	777	100	0	711	175	0	619	289	0	691
V/C Ratio(X)	0.80	0.00	0.21	0.31	0.00	0.88	1.52	0.00	0.03	0.62	0.00	0.33
Avail Cap(c_a), veh/h	329	0	1171	126	0	1005	175	0	619	289	0	691
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	38.2	0.0	15.0	40.2	0.0	25.2	24.8	0.0	16.1	23.1	0.0	15.2
Incr Delay (d2), s/veh	7.6	0.0	0.1	1.8	0.0	6.6	262.4	0.0	0.0	4.0	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.7	0.0	2.0	0.7	0.0	13.1	15.4	0.0	0.2	3.0	0.0	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.7	0.0	15.1	41.9	0.0	31.8	287.2	0.0	16.2	27.1	0.0	15.5
LnGrp LOS	D	A	B	D	A	C	F	A	B	C	A	B
Approach Vol, veh/h		321			655			287			405	
Approach Delay, s/veh		30.0			32.3			268.3			20.6	
Approach LOS		C			C			F			C	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		35.0	9.5	44.1		35.0	14.8	38.8				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		30.5	6.3	59.7		30.5	17.5	48.5				
Max Q Clear Time (g_c+I1), s		32.5	3.5	7.1		32.5	10.1	30.0				
Green Ext Time (p_c), s		0.0	0.0	1.1		0.0	0.2	4.4				

Intersection Summary	
HCM 6th Ctrl Delay	69.6
HCM 6th LOS	E

Intersection	
Intersection Delay, s/veh	15.2
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	196	12	16	24	39	7	39	184	7	4	183	380
Future Vol, veh/h	196	12	16	24	39	7	39	184	7	4	183	380
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	6	6	6	6	6	6	3	3	3	5	5	5
Mvmt Flow	211	13	17	26	42	8	42	198	8	4	197	409
Number of Lanes	0	1	1	0	1	1	0	1	0	0	1	1

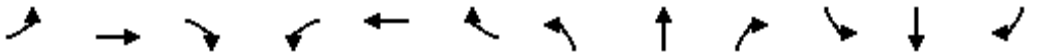
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	2
HCM Control Delay	16.1	11.5	15	15.3
HCM LOS	C	B	B	C

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	17%	94%	0%	38%	0%	2%	0%
Vol Thru, %	80%	6%	0%	62%	0%	98%	0%
Vol Right, %	3%	0%	100%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	230	208	16	63	7	187	380
LT Vol	39	196	0	24	0	4	0
Through Vol	184	12	0	39	0	183	0
RT Vol	7	0	16	0	7	0	380
Lane Flow Rate	247	224	17	68	8	201	409
Geometry Grp	6	7	7	7	7	7	7
Degree of Util (X)	0.451	0.464	0.03	0.144	0.014	0.345	0.62
Departure Headway (Hd)	6.569	7.475	6.277	7.631	6.716	6.18	5.46
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	547	481	567	467	529	579	658
Service Time	4.644	5.249	4.051	5.426	4.51	3.946	3.225
HCM Lane V/C Ratio	0.452	0.466	0.03	0.146	0.015	0.347	0.622
HCM Control Delay	15	16.6	9.2	11.7	9.6	12.2	16.8
HCM Lane LOS	B	C	A	B	A	B	C
HCM 95th-tile Q	2.3	2.4	0.1	0.5	0	1.5	4.3

Movement	WBL	WBR	NBL	NBR	SEL	SER
Lane Configurations						
Traffic Volume (vph)	70	741	172	51	859	453
Future Volume (vph)	70	741	172	51	859	453
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	
Lane Util. Factor	1.00	1.00	1.00		1.00	
Frpb, ped/bikes	1.00	0.96	0.99		0.99	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	
Frt	1.00	0.85	0.97		0.95	
Flt Protected	0.95	1.00	0.96		0.97	
Satd. Flow (prot)	1736	1492	1696		1716	
Flt Permitted	0.95	1.00	0.96		1.00	
Satd. Flow (perm)	1736	1492	1696		1772	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	74	780	181	54	904	477
RTOR Reduction (vph)	0	578	15	0	27	0
Lane Group Flow (vph)	74	202	220	0	1354	0
Confl. Peds. (#/hr)	1	1				
Confl. Bikes (#/hr)		12		2		23
Heavy Vehicles (%)	4%	4%	4%	4%	1%	1%
Turn Type	Prot	Perm	Perm		pm+pt	
Protected Phases	8				1	
Permitted Phases		8	2		6	
Actuated Green, G (s)	18.0	18.0	18.5		42.5	
Effective Green, g (s)	18.0	18.0	18.5		42.5	
Actuated g/C Ratio	0.26	0.26	0.27		0.61	
Clearance Time (s)	4.5	4.5	4.5		4.5	
Lane Grp Cap (vph)	449	386	451		1083	
v/s Ratio Prot	0.04				0.35	
v/s Ratio Perm		c0.14	0.13		c0.42	
v/c Ratio	0.16	0.52	0.49		1.25	
Uniform Delay, d1	19.9	22.1	21.5		13.5	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.8	5.0	3.7		120.3	
Delay (s)	20.7	27.1	25.2		133.8	
Level of Service	C	C	C		F	
Approach Delay (s)	26.5		25.2		133.8	
Approach LOS	C		C		F	

Intersection Summary			
HCM 2000 Control Delay	86.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	69.5	Sum of lost time (s)	13.5
Intersection Capacity Utilization	114.2%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	178	626	10	34	285	25	37	181	30	67	195	218
Future Volume (veh/h)	178	626	10	34	285	25	37	181	30	67	195	218
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.96	0.99		0.95	0.99		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1870	1870	1870	1856	1856	1856
Adj Flow Rate, veh/h	202	711	11	39	324	28	42	206	34	76	222	248
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	3	3	3	3	3	3	2	2	2	3	3	3
Cap, veh/h	161	612	9	161	564	49	77	254	639	82	160	633
Arrive On Green	0.09	0.34	0.34	0.09	0.34	0.34	0.33	0.33	0.33	0.33	0.33	0.33
Sat Flow, veh/h	1767	1821	28	1767	1678	145	0	777	1512	0	489	1498
Grp Volume(v), veh/h	202	0	722	39	0	352	248	0	34	298	0	248
Grp Sat Flow(s),veh/h/ln	1767	0	1849	1767	0	1823	777	0	1512	489	0	1498
Q Serve(g_s), s	5.0	0.0	18.5	1.1	0.0	8.7	0.0	0.0	0.7	0.0	0.0	6.3
Cycle Q Clear(g_c), s	5.0	0.0	18.5	1.1	0.0	8.7	18.0	0.0	0.7	18.0	0.0	6.3
Prop In Lane	1.00		0.02	1.00		0.08	0.17		1.00	0.26		1.00
Lane Grp Cap(c), veh/h	161	0	622	161	0	613	331	0	639	242	0	633
V/C Ratio(X)	1.26	0.00	1.16	0.24	0.00	0.57	0.75	0.00	0.05	1.23	0.00	0.39
Avail Cap(c_a), veh/h	161	0	622	161	0	613	331	0	639	242	0	633
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	25.0	0.0	18.3	23.2	0.0	15.0	15.4	0.0	9.5	17.2	0.0	11.2
Incr Delay (d2), s/veh	156.4	0.0	89.3	3.6	0.0	3.9	14.5	0.0	0.2	134.3	0.0	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.0	0.0	22.4	0.6	0.0	3.9	3.5	0.0	0.2	11.2	0.0	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	181.4	0.0	107.6	26.8	0.0	18.9	29.8	0.0	9.7	151.5	0.0	13.0
LnGrp LOS	F	A	F	C	A	B	C	A	A	F	A	B
Approach Vol, veh/h		924			391			282			546	
Approach Delay, s/veh		123.7			19.7			27.4			88.6	
Approach LOS		F			B			C			F	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		22.5	9.5	23.0		22.5	9.5	23.0				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		18.0	5.0	18.5		18.0	5.0	18.5				
Max Q Clear Time (g_c+I1), s		20.0	3.1	20.5		20.0	7.0	10.7				
Green Ext Time (p_c), s		0.0	0.0	0.0		0.0	0.0	1.3				

Intersection Summary												
HCM 6th Ctrl Delay			83.1									
HCM 6th LOS			F									

Intersection	
Intersection Delay, s/veh	94.2
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	489	48	67	55	49	21	45	403	27	12	192	229
Future Vol, veh/h	489	48	67	55	49	21	45	403	27	12	192	229
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	3	3	3	5	5	5	2	2	2	2	2	2
Mvmt Flow	509	50	70	57	51	22	47	420	28	13	200	239
Number of Lanes	0	1	1	0	1	1	0	1	0	0	1	1

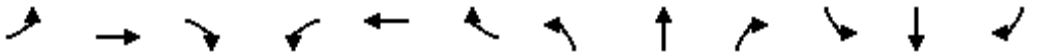
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	2
HCM Control Delay	158.3	16.6	100.6	20.1
HCM LOS	F	C	F	C

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	9%	91%	0%	53%	0%	6%	0%
Vol Thru, %	85%	9%	0%	47%	0%	94%	0%
Vol Right, %	6%	0%	100%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	475	537	67	104	21	204	229
LT Vol	45	489	0	55	0	12	0
Through Vol	403	48	0	49	0	192	0
RT Vol	27	0	67	0	21	0	229
Lane Flow Rate	495	559	70	108	22	212	239
Geometry Grp	6	7	7	7	7	7	7
Degree of Util (X)	1.09	1.298	0.14	0.285	0.052	0.49	0.502
Departure Headway (Hd)	8.764	8.77	7.569	10.515	9.493	9.339	8.577
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	421	420	477	344	380	389	422
Service Time	6.764	6.47	5.269	8.215	7.193	7.039	6.277
HCM Lane V/C Ratio	1.176	1.331	0.147	0.314	0.058	0.545	0.566
HCM Control Delay	100.6	176.6	11.5	17.4	12.7	20.7	19.6
HCM Lane LOS	F	F	B	C	B	C	C
HCM 95th-tile Q	15.5	23.7	0.5	1.2	0.2	2.6	2.7

Movement	WBL	WBR	NBL	NBR	SEL	SER
Lane Configurations						
Traffic Volume (vph)	41	1057	410	85	456	154
Future Volume (vph)	41	1057	410	85	456	154
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	
Lane Util. Factor	1.00	1.00	1.00		1.00	
Frpb, ped/bikes	1.00	0.96	0.99		0.99	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	
Frt	1.00	0.85	0.98		0.97	
Flt Protected	0.95	1.00	0.96		0.96	
Satd. Flow (prot)	1770	1516	1701		1724	
Flt Permitted	0.95	1.00	0.96		1.00	
Satd. Flow (perm)	1770	1516	1701		1788	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	44	1137	441	91	490	166
RTOR Reduction (vph)	0	384	10	0	15	0
Lane Group Flow (vph)	44	753	523	0	641	0
Confl. Peds. (#/hr)	3			1	1	
Confl. Bikes (#/hr)		20		16		6
Heavy Vehicles (%)	2%	2%	4%	4%	2%	2%
Turn Type	Prot	Perm	Perm		pm+pt	
Protected Phases	8				1	
Permitted Phases		8	2		6	
Actuated Green, G (s)	25.5	25.5	21.0		43.5	
Effective Green, g (s)	25.5	25.5	21.0		43.5	
Actuated g/C Ratio	0.33	0.33	0.27		0.56	
Clearance Time (s)	4.5	4.5	4.5		4.5	
Lane Grp Cap (vph)	578	495	457		997	
v/s Ratio Prot	0.02				0.15	
v/s Ratio Perm		c0.50	c0.31		c0.22	
v/c Ratio	0.08	1.52	1.14		0.64	
Uniform Delay, d1	18.1	26.2	28.5		11.9	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.3	245.0	87.6		3.2	
Delay (s)	18.4	271.3	116.1		15.1	
Level of Service	B	F	F		B	
Approach Delay (s)	261.9		116.1		15.1	
Approach LOS	F		F		B	

Intersection Summary			
HCM 2000 Control Delay	160.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.17		
Actuated Cycle Length (s)	78.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	78.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	154	153	6	30	568	37	64	195	19	38	160	230
Future Volume (veh/h)	154	153	6	30	568	37	64	195	19	38	160	230
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1856	1856	1856	1870	1870	1870	1811	1811	1811
Adj Flow Rate, veh/h	160	159	6	31	592	39	67	203	20	40	167	240
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	10	10	10	3	3	3	2	2	2	6	6	6
Cap, veh/h	198	760	29	99	672	44	50	125	612	48	162	688
Arrive On Green	0.12	0.45	0.45	0.06	0.39	0.39	0.34	0.34	0.34	0.34	0.34	0.34
Sat Flow, veh/h	1668	1675	63	1767	1719	113	0	367	1539	0	477	1490
Grp Volume(v), veh/h	160	0	165	31	0	631	270	0	20	207	0	240
Grp Sat Flow(s),veh/h/ln	1668	0	1739	1767	0	1832	367	0	1539	477	0	1490
Q Serve(g_s), s	8.4	0.0	5.1	1.5	0.0	28.7	0.0	0.0	0.7	0.0	0.0	9.3
Cycle Q Clear(g_c), s	8.4	0.0	5.1	1.5	0.0	28.7	30.5	0.0	0.7	30.5	0.0	9.3
Prop In Lane	1.00		0.04	1.00		0.06	0.25		1.00	0.19		1.00
Lane Grp Cap(c), veh/h	198	0	789	99	0	716	175	0	612	210	0	688
V/C Ratio(X)	0.81	0.00	0.21	0.31	0.00	0.88	1.54	0.00	0.03	0.98	0.00	0.35
Avail Cap(c_a), veh/h	326	0	1157	124	0	991	175	0	612	210	0	688
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	38.5	0.0	14.8	40.7	0.0	25.4	25.2	0.0	16.6	26.1	0.0	15.7
Incr Delay (d2), s/veh	7.7	0.0	0.1	1.8	0.0	7.1	271.2	0.0	0.0	57.6	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.8	0.0	2.0	0.7	0.0	13.5	15.8	0.0	0.3	6.7	0.0	3.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.2	0.0	14.9	42.5	0.0	32.5	296.4	0.0	16.6	83.7	0.0	16.0
LnGrp LOS	D	A	B	D	A	C	F	A	B	F	A	B
Approach Vol, veh/h		325			662			290			447	
Approach Delay, s/veh		30.3			32.9			277.1			47.4	
Approach LOS		C			C			F			D	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		35.0	9.5	45.2		35.0	15.1	39.6				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		30.5	6.3	59.7		30.5	17.5	48.5				
Max Q Clear Time (g_c+I1), s		32.5	3.5	7.1		32.5	10.4	30.7				
Green Ext Time (p_c), s		0.0	0.0	1.1		0.0	0.2	4.4				

Intersection Summary												
HCM 6th Ctrl Delay			77.3									
HCM 6th LOS			E									

Intersection	
Intersection Delay, s/veh	15.8
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	212	12	16	24	39	7	39	184	7	4	183	386
Future Vol, veh/h	212	12	16	24	39	7	39	184	7	4	183	386
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	6	6	6	6	6	6	3	3	3	5	5	5
Mvmt Flow	228	13	17	26	42	8	42	198	8	4	197	415
Number of Lanes	0	1	1	0	1	1	0	1	0	0	1	1

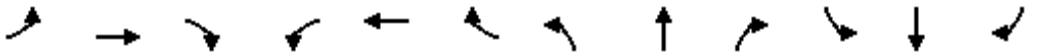
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	2
HCM Control Delay	17.1	11.7	15.3	16
HCM LOS	C	B	C	C

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	17%	95%	0%	38%	0%	2%	0%
Vol Thru, %	80%	5%	0%	62%	0%	98%	0%
Vol Right, %	3%	0%	100%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	230	224	16	63	7	187	386
LT Vol	39	212	0	24	0	4	0
Through Vol	184	12	0	39	0	183	0
RT Vol	7	0	16	0	7	0	386
Lane Flow Rate	247	241	17	68	8	201	415
Geometry Grp	6	7	7	7	7	7	7
Degree of Util (X)	0.458	0.503	0.03	0.147	0.014	0.35	0.639
Departure Headway (Hd)	6.669	7.516	6.316	7.826	6.909	6.267	5.546
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	537	477	563	461	521	571	647
Service Time	4.755	5.296	4.095	5.526	4.609	4.042	3.321
HCM Lane V/C Ratio	0.46	0.505	0.03	0.148	0.015	0.352	0.641
HCM Control Delay	15.3	17.7	9.3	11.9	9.7	12.4	17.7
HCM Lane LOS	C	C	A	B	A	B	C
HCM 95th-tile Q	2.4	2.8	0.1	0.5	0	1.6	4.6

Movement	WBL	WBR	NBL	NBR	SEL	SER
Lane Configurations						
Traffic Volume (vph)	73	741	187	53	859	476
Future Volume (vph)	73	741	187	53	859	476
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	
Lane Util. Factor	1.00	1.00	1.00		1.00	
Frpb, ped/bikes	1.00	0.96	0.99		0.99	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	
Frt	1.00	0.85	0.97		0.95	
Flt Protected	0.95	1.00	0.96		0.97	
Satd. Flow (prot)	1736	1492	1697		1714	
Flt Permitted	0.95	1.00	0.96		1.00	
Satd. Flow (perm)	1736	1492	1697		1769	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	77	780	197	56	904	501
RTOR Reduction (vph)	0	566	15	0	29	0
Lane Group Flow (vph)	77	214	238	0	1376	0
Confl. Peds. (#/hr)	1	1				
Confl. Bikes (#/hr)		12		2		23
Heavy Vehicles (%)	4%	4%	4%	4%	1%	1%
Turn Type	Prot	Perm	Perm		pm+pt	
Protected Phases	8				1	
Permitted Phases		8	2		6	
Actuated Green, G (s)	18.0	18.0	18.5		42.5	
Effective Green, g (s)	18.0	18.0	18.5		42.5	
Actuated g/C Ratio	0.26	0.26	0.27		0.61	
Clearance Time (s)	4.5	4.5	4.5		4.5	
Lane Grp Cap (vph)	449	386	451		1081	
v/s Ratio Prot	0.04				0.36	
v/s Ratio Perm		c0.14	0.14		c0.43	
v/c Ratio	0.17	0.55	0.53		1.27	
Uniform Delay, d1	20.0	22.3	21.8		13.5	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.8	5.6	4.4		130.2	
Delay (s)	20.8	27.9	26.2		143.7	
Level of Service	C	C	C		F	
Approach Delay (s)	27.3		26.2		143.7	
Approach LOS	C		C		F	

Intersection Summary			
HCM 2000 Control Delay	92.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	69.5	Sum of lost time (s)	13.5
Intersection Capacity Utilization	116.5%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	191	626	10	34	285	41	37	191	30	77	201	226
Future Volume (veh/h)	191	626	10	34	285	41	37	191	30	77	201	226
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.96	0.99		0.95	0.99		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1870	1870	1870	1856	1856	1856
Adj Flow Rate, veh/h	217	711	11	39	324	47	42	217	34	88	228	257
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	3	3	3	3	3	3	2	2	2	3	3	3
Cap, veh/h	161	612	9	161	530	77	76	254	639	84	137	633
Arrive On Green	0.09	0.34	0.34	0.09	0.34	0.34	0.33	0.33	0.33	0.33	0.33	0.33
Sat Flow, veh/h	1767	1821	28	1767	1575	228	0	777	1512	0	417	1498
Grp Volume(v), veh/h	217	0	722	39	0	371	259	0	34	316	0	257
Grp Sat Flow(s),veh/h/ln	1767	0	1849	1767	0	1804	777	0	1512	417	0	1498
Q Serve(g_s), s	5.0	0.0	18.5	1.1	0.0	9.5	0.0	0.0	0.7	0.0	0.0	6.6
Cycle Q Clear(g_c), s	5.0	0.0	18.5	1.1	0.0	9.5	18.0	0.0	0.7	18.0	0.0	6.6
Prop In Lane	1.00		0.02	1.00		0.13	0.16		1.00	0.28		1.00
Lane Grp Cap(c), veh/h	161	0	622	161	0	607	330	0	639	220	0	633
V/C Ratio(X)	1.35	0.00	1.16	0.24	0.00	0.61	0.78	0.00	0.05	1.43	0.00	0.41
Avail Cap(c_a), veh/h	161	0	622	161	0	607	330	0	639	220	0	633
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	25.0	0.0	18.3	23.2	0.0	15.2	15.5	0.0	9.5	17.6	0.0	11.2
Incr Delay (d2), s/veh	193.1	0.0	89.3	3.6	0.0	4.6	16.9	0.0	0.2	219.6	0.0	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.6	0.0	22.4	0.6	0.0	4.3	3.8	0.0	0.2	15.3	0.0	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	218.1	0.0	107.6	26.8	0.0	19.8	32.3	0.0	9.7	237.2	0.0	13.2
LnGrp LOS	F	A	F	C	A	B	C	A	A	F	A	B
Approach Vol, veh/h		939			410			293			573	
Approach Delay, s/veh		133.1			20.5			29.7			136.7	
Approach LOS		F			C			C			F	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		22.5	9.5	23.0		22.5	9.5	23.0				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		18.0	5.0	18.5		18.0	5.0	18.5				
Max Q Clear Time (g_c+I1), s		20.0	3.1	20.5		20.0	7.0	11.5				
Green Ext Time (p_c), s		0.0	0.0	0.0		0.0	0.0	1.3				

Intersection Summary												
HCM 6th Ctrl Delay			99.5									
HCM 6th LOS			F									

Intersection	
Intersection Delay, s/veh	98.6
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	499	48	67	55	49	21	45	403	27	12	192	245
Future Vol, veh/h	499	48	67	55	49	21	45	403	27	12	192	245
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	3	3	3	5	5	5	2	2	2	2	2	2
Mvmt Flow	520	50	70	57	51	22	47	420	28	13	200	255
Number of Lanes	0	1	1	0	1	1	0	1	0	0	1	1

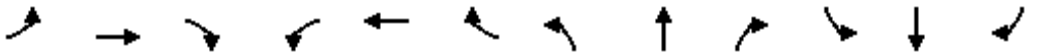
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	2
HCM Control Delay	169.1	16.7	102.4	21
HCM LOS	F	C	F	C

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	9%	91%	0%	53%	0%	6%	0%
Vol Thru, %	85%	9%	0%	47%	0%	94%	0%
Vol Right, %	6%	0%	100%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	475	547	67	104	21	204	245
LT Vol	45	499	0	55	0	12	0
Through Vol	403	48	0	49	0	192	0
RT Vol	27	0	67	0	21	0	245
Lane Flow Rate	495	570	70	108	22	212	255
Geometry Grp	6	7	7	7	7	7	7
Degree of Util (X)	1.094	1.327	0.14	0.286	0.052	0.491	0.538
Departure Headway (Hd)	8.86	8.81	7.608	10.621	9.598	9.414	8.651
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	416	416	474	340	375	385	421
Service Time	6.86	6.51	5.308	8.321	7.298	7.114	6.351
HCM Lane V/C Ratio	1.19	1.37	0.148	0.318	0.059	0.551	0.606
HCM Control Delay	102.4	188.4	11.5	17.5	12.8	20.9	21
HCM Lane LOS	F	F	B	C	B	C	C
HCM 95th-tile Q	15.5	24.9	0.5	1.2	0.2	2.6	3.1

Movement	WBL	WBR	NBL	NBR	SEL	SER
Lane Configurations						
Traffic Volume (vph)	41	1057	425	87	456	159
Future Volume (vph)	41	1057	425	87	456	159
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	
Lane Util. Factor	1.00	1.00	1.00		1.00	
Frpb, ped/bikes	1.00	0.96	0.99		0.99	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	
Frt	1.00	0.85	0.98		0.97	
Flt Protected	0.95	1.00	0.96		0.96	
Satd. Flow (prot)	1770	1514	1701		1723	
Flt Permitted	0.95	1.00	0.96		1.00	
Satd. Flow (perm)	1770	1514	1701		1787	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	44	1137	457	94	490	171
RTOR Reduction (vph)	0	385	9	0	16	0
Lane Group Flow (vph)	44	752	542	0	645	0
Confl. Peds. (#/hr)	3			1	1	
Confl. Bikes (#/hr)		20		16		6
Heavy Vehicles (%)	2%	2%	4%	4%	2%	2%
Turn Type	Prot	Perm	Perm		pm+pt	
Protected Phases	8				1	
Permitted Phases		8	2		6	
Actuated Green, G (s)	24.5	24.5	22.0		44.5	
Effective Green, g (s)	24.5	24.5	22.0		44.5	
Actuated g/C Ratio	0.31	0.31	0.28		0.57	
Clearance Time (s)	4.5	4.5	4.5		4.5	
Lane Grp Cap (vph)	555	475	479		1019	
v/s Ratio Prot	0.02				0.15	
v/s Ratio Perm		c0.50	c0.32		c0.22	
v/c Ratio	0.08	1.58	1.13		0.63	
Uniform Delay, d1	18.8	26.8	28.0		11.3	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.3	272.5	82.2		3.0	
Delay (s)	19.1	299.3	110.2		14.2	
Level of Service	B	F	F		B	
Approach Delay (s)	288.8		110.2		14.2	
Approach LOS	F		F		B	

Intersection Summary			
HCM 2000 Control Delay	171.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	78.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	79.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	158	153	6	30	568	41	64	198	19	49	166	238
Future Volume (veh/h)	158	153	6	30	568	41	64	198	19	49	166	238
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1856	1856	1856	1870	1870	1870	1811	1811	1811
Adj Flow Rate, veh/h	165	159	6	31	592	43	67	206	20	51	173	248
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	10	10	10	3	3	3	2	2	2	6	6	6
Cap, veh/h	201	766	29	96	666	48	49	123	612	48	131	695
Arrive On Green	0.12	0.46	0.46	0.05	0.39	0.39	0.34	0.34	0.34	0.34	0.34	0.34
Sat Flow, veh/h	1668	1675	63	1767	1706	124	0	361	1539	0	383	1490
Grp Volume(v), veh/h	165	0	165	31	0	635	273	0	20	224	0	248
Grp Sat Flow(s),veh/h/ln	1668	0	1739	1767	0	1830	361	0	1539	383	0	1490
Q Serve(g_s), s	8.9	0.0	5.2	1.6	0.0	29.8	0.0	0.0	0.7	0.0	0.0	9.9
Cycle Q Clear(g_c), s	8.9	0.0	5.2	1.6	0.0	29.8	31.5	0.0	0.7	31.5	0.0	9.9
Prop In Lane	1.00		0.04	1.00		0.07	0.25		1.00	0.23		1.00
Lane Grp Cap(c), veh/h	201	0	795	96	0	715	172	0	612	179	0	695
V/C Ratio(X)	0.82	0.00	0.21	0.32	0.00	0.89	1.59	0.00	0.03	1.25	0.00	0.36
Avail Cap(c_a), veh/h	317	0	1108	121	0	944	172	0	612	179	0	695
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	39.5	0.0	15.0	41.9	0.0	26.2	25.6	0.0	17.0	25.6	0.0	15.9
Incr Delay (d2), s/veh	9.0	0.0	0.1	1.9	0.0	8.4	289.7	0.0	0.0	150.4	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	0.0	2.1	0.7	0.0	14.2	16.5	0.0	0.3	10.3	0.0	3.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.6	0.0	15.1	43.8	0.0	34.6	315.3	0.0	17.0	176.0	0.0	16.3
LnGrp LOS	D	A	B	D	A	C	F	A	B	F	A	B
Approach Vol, veh/h		330			666			293			472	
Approach Delay, s/veh		31.8			35.0			295.0			92.0	
Approach LOS		C			C			F			F	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		36.0	9.5	46.6		36.0	15.6	40.5				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		31.5	6.3	58.7		31.5	17.5	47.5				
Max Q Clear Time (g_c+I1), s		33.5	3.6	7.2		33.5	10.9	31.8				
Green Ext Time (p_c), s		0.0	0.0	1.1		0.0	0.2	4.1				

Intersection Summary	
HCM 6th Ctrl Delay	92.9
HCM 6th LOS	F

Intersection	
Intersection Delay, s/veh	16.4
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	223	12	16	24	39	7	39	184	7	4	183	390
Future Vol, veh/h	223	12	16	24	39	7	39	184	7	4	183	390
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	6	6	6	6	6	6	3	3	3	5	5	5
Mvmt Flow	240	13	17	26	42	8	42	198	8	4	197	419
Number of Lanes	0	1	1	0	1	1	0	1	0	0	1	1

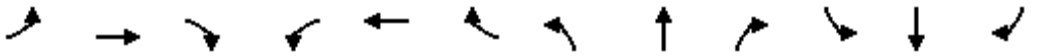
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	2
HCM Control Delay	18	11.8	15.6	16.5
HCM LOS	C	B	C	C

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	17%	95%	0%	38%	0%	2%	0%
Vol Thru, %	80%	5%	0%	62%	0%	98%	0%
Vol Right, %	3%	0%	100%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	230	235	16	63	7	187	390
LT Vol	39	223	0	24	0	4	0
Through Vol	184	12	0	39	0	183	0
RT Vol	7	0	16	0	7	0	390
Lane Flow Rate	247	253	17	68	8	201	419
Geometry Grp	6	7	7	7	7	7	7
Degree of Util (X)	0.463	0.529	0.03	0.149	0.015	0.353	0.653
Departure Headway (Hd)	6.738	7.543	6.342	7.895	6.977	6.326	5.605
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	532	475	560	457	516	565	637
Service Time	4.833	5.33	4.128	5.595	4.677	4.109	3.387
HCM Lane V/C Ratio	0.464	0.533	0.03	0.149	0.016	0.356	0.658
HCM Control Delay	15.6	18.6	9.3	12	9.8	12.6	18.4
HCM Lane LOS	C	C	A	B	A	B	C
HCM 95th-tile Q	2.4	3	0.1	0.5	0	1.6	4.8

Movement	WBL	WBR	NBL	NBR	SEL	SER
Lane Configurations						
Traffic Volume (vph)	75	741	196	55	859	491
Future Volume (vph)	75	741	196	55	859	491
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	
Lane Util. Factor	1.00	1.00	1.00		1.00	
Frpb, ped/bikes	1.00	0.96	0.99		0.99	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	
Frt	1.00	0.85	0.97		0.95	
Flt Protected	0.95	1.00	0.96		0.97	
Satd. Flow (prot)	1736	1492	1698		1712	
Flt Permitted	0.95	1.00	0.96		1.00	
Satd. Flow (perm)	1736	1492	1698		1767	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	79	780	206	58	904	517
RTOR Reduction (vph)	0	559	15	0	30	0
Lane Group Flow (vph)	79	221	249	0	1391	0
Confl. Peds. (#/hr)	1	1				
Confl. Bikes (#/hr)		12		2		23
Heavy Vehicles (%)	4%	4%	4%	4%	1%	1%
Turn Type	Prot	Perm	Perm		pm+pt	
Protected Phases	8				1	
Permitted Phases		8	2		6	
Actuated Green, G (s)	18.0	18.0	18.5		42.5	
Effective Green, g (s)	18.0	18.0	18.5		42.5	
Actuated g/C Ratio	0.26	0.26	0.27		0.61	
Clearance Time (s)	4.5	4.5	4.5		4.5	
Lane Grp Cap (vph)	449	386	451		1080	
v/s Ratio Prot	0.05				0.36	
v/s Ratio Perm		c0.15	0.15		c0.44	
v/c Ratio	0.18	0.57	0.55		1.29	
Uniform Delay, d1	20.0	22.4	21.9		13.5	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.9	6.0	4.8		136.8	
Delay (s)	20.8	28.4	26.8		150.3	
Level of Service	C	C	C		F	
Approach Delay (s)	27.7		26.8		150.3	
Approach LOS	C		C		F	

Intersection Summary			
HCM 2000 Control Delay	96.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.16		
Actuated Cycle Length (s)	69.5	Sum of lost time (s)	13.5
Intersection Capacity Utilization	118.1%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	199	626	10	34	285	52	37	197	30	84	205	232
Future Volume (veh/h)	199	626	10	34	285	52	37	197	30	84	205	232
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.96	0.99		0.95	0.99		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1870	1870	1870	1856	1856	1856
Adj Flow Rate, veh/h	226	711	11	39	324	59	42	224	34	95	233	264
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	3	3	3	3	3	3	2	2	2	3	3	3
Cap, veh/h	177	612	9	161	496	90	76	254	639	84	124	648
Arrive On Green	0.10	0.34	0.34	0.09	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Sat Flow, veh/h	1767	1821	28	1767	1516	276	0	777	1512	0	380	1498
Grp Volume(v), veh/h	226	0	722	39	0	383	266	0	34	328	0	264
Grp Sat Flow(s),veh/h/ln	1767	0	1849	1767	0	1793	777	0	1512	380	0	1498
Q Serve(g_s), s	5.5	0.0	18.5	1.1	0.0	10.1	0.0	0.0	0.7	0.0	0.0	6.7
Cycle Q Clear(g_c), s	5.5	0.0	18.5	1.1	0.0	10.1	18.0	0.0	0.7	18.0	0.0	6.7
Prop In Lane	1.00		0.02	1.00		0.15	0.16		1.00	0.29		1.00
Lane Grp Cap(c), veh/h	177	0	622	161	0	587	330	0	639	209	0	648
V/C Ratio(X)	1.28	0.00	1.16	0.24	0.00	0.65	0.81	0.00	0.05	1.57	0.00	0.41
Avail Cap(c_a), veh/h	177	0	622	161	0	587	330	0	639	209	0	648
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.7	0.0	18.3	23.2	0.0	15.8	15.5	0.0	9.5	17.9	0.0	11.0
Incr Delay (d2), s/veh	161.7	0.0	89.3	3.6	0.0	5.6	18.7	0.0	0.2	278.7	0.0	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.1	0.0	22.4	0.6	0.0	4.6	4.1	0.0	0.2	18.0	0.0	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	186.5	0.0	107.6	26.8	0.0	21.4	34.2	0.0	9.7	296.5	0.0	12.8
LnGrp LOS	F	A	F	C	A	C	C	A	A	F	A	B
Approach Vol, veh/h		948			422			300			592	
Approach Delay, s/veh		126.4			21.9			31.4			170.0	
Approach LOS		F			C			C			F	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		22.5	9.5	23.0		22.5	10.0	22.5				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		18.0	5.0	18.5		18.0	5.5	18.0				
Max Q Clear Time (g_c+I1), s		20.0	3.1	20.5		20.0	7.5	12.1				
Green Ext Time (p_c), s		0.0	0.0	0.0		0.0	0.0	1.2				

Intersection Summary												
HCM 6th Ctrl Delay			105.7									
HCM 6th LOS			F									

Intersection	
Intersection Delay, s/veh	101.8
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	506	48	67	55	49	21	45	403	27	12	192	256
Future Vol, veh/h	506	48	67	55	49	21	45	403	27	12	192	256
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	3	3	3	5	5	5	2	2	2	2	2	2
Mvmt Flow	527	50	70	57	51	22	47	420	28	13	200	267
Number of Lanes	0	1	1	0	1	1	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	2
HCM Control Delay	177	16.8	103.6	21.6
HCM LOS	F	C	F	C

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	9%	91%	0%	53%	0%	6%	0%
Vol Thru, %	85%	9%	0%	47%	0%	94%	0%
Vol Right, %	6%	0%	100%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	475	554	67	104	21	204	256
LT Vol	45	506	0	55	0	12	0
Through Vol	403	48	0	49	0	192	0
RT Vol	27	0	67	0	21	0	256
Lane Flow Rate	495	577	70	108	22	212	267
Geometry Grp	6	7	7	7	7	7	7
Degree of Util (X)	1.097	1.348	0.141	0.287	0.052	0.491	0.562
Departure Headway (Hd)	8.928	8.837	7.634	10.694	9.671	9.468	8.704
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	411	415	472	338	373	383	419
Service Time	6.928	6.537	5.334	8.394	7.371	7.168	6.404
HCM Lane V/C Ratio	1.204	1.39	0.148	0.32	0.059	0.554	0.637
HCM Control Delay	103.6	197	11.6	17.6	12.9	21	22
HCM Lane LOS	F	F	B	C	B	C	C
HCM 95th-tile Q	15.6	25.7	0.5	1.2	0.2	2.6	3.4

ACTION CODE TRANSLATION LIST

ACTION CODE	SHORT DESCRIPTION	LONG DESCRIPTION
000	NONE	NO ACTION OR NON-WARRANTED
001	SKIDDED	SKIDDED
002	ON/OFF V	GETTING ON OR OFF STOPPED OR PARKED VEHICLE
003	LOAD OVR	OVERHANGING LOAD STRUCK ANOTHER VEHICLE, ETC.
006	SLOW DN	SLOWED DOWN
007	AVOIDING	AVOIDING MANEUVER
008	PAR PARK	PARALLEL PARKING
009	ANG PARK	ANGLE PARKING
010	INTERFERE	PASSENGER INTERFERING WITH DRIVER
011	STOPPED	STOPPED IN TRAFFIC NOT WAITING TO MAKE A LEFT TURN
012	STP/L TRN	STOPPED BECAUSE OF LEFT TURN SIGNAL OR WAITING, ETC.
013	STP TURN	STOPPED WHILE EXECUTING A TURN
015	GO A/STOP	PROCEED AFTER STOPPING FOR A STOP SIGN/FLASHING RED.
016	TRN A/RED	TURNED ON RED AFTER STOPPING
017	LOSTCTRL	LOST CONTROL OF VEHICLE
018	EXIT DWY	ENTERING STREET OR HIGHWAY FROM ALLEY OR DRIVEWAY
019	ENTR DWY	ENTERING ALLEY OR DRIVEWAY FROM STREET OR HIGHWAY
020	STR ENTR	BEFORE ENTERING ROADWAY, STRUCK PEDESTRIAN, ETC. ON SIDEWALK OR SHOULDER
021	NO DRVR	CAR RAN AWAY - NO DRIVER
022	PREV COL	STRUCK, OR WAS STRUCK BY, VEHICLE OR PEDESTRIAN IN PRIOR COLLISION BEFORE ACC. STABILIZED
023	STALLED	VEHICLE STALLED
024	DRVR DEAD	DEAD BY UNASSOCIATED CAUSE
025	FATIGUE	FATIGUED, SLEEPY, ASLEEP
026	SUN	DRIVER BLINDED BY SUN
027	HDLGHTS	DRIVER BLINDED BY HEADLIGHTS
028	ILLNESS	PHYSICALLY ILL
029	THRU MED	VEHICLE CROSSED, PLUNGED OVER, OR THROUGH MEDIAN BARRIER
030	PURSUIT	PURSUING OR ATTEMPTING TO STOP ANOTHER VEHICLE
031	PASSING	PASSING SITUATION
032	PRKOFFRD	VEHICLE PARKED BEYOND CURB OR SHOULDER
033	CROS MED	VEHICLE CROSSED EARTH OR GRASS MEDIAN
034	X N/SGNL	CROSSING AT INTERSECTION - NO TRAFFIC SIGNAL PRESENT
035	X W/ SGNL	CROSSING AT INTERSECTION - TRAFFIC SIGNAL PRESENT
036	DIAGONAL	CROSSING AT INTERSECTION - DIAGONALLY
037	BTWN INT	CROSSING BETWEEN INTERSECTIONS
038	DISTRACT	DRIVER'S ATTENTION DISTRACTED
039	W/TRAF-S	WALKING, RUNNING, RIDING, ETC., ON SHOULDER WITH TRAFFIC
040	A/TRAF-S	WALKING, RUNNING, RIDING, ETC., ON SHOULDER FACING TRAFFIC
041	W/TRAF-P	WALKING, RUNNING, RIDING, ETC., ON PAVEMENT WITH TRAFFIC
042	A/TRAF-P	WALKING, RUNNING, RIDING, ETC., ON PAVEMENT FACING TRAFFIC
043	PLAYINRD	PLAYING IN STREET OR ROAD
044	PUSH MV	PUSHING OR WORKING ON VEHICLE IN ROAD OR ON SHOULDER
045	WORK ON	WORKING IN ROADWAY OR ALONG SHOULDER
050	LAY ON RD	STANDING OR LYING IN ROADWAY
051	ENT OFFRD	ENTERING / STARTING IN TRAFFIC LANE FROM OFF-ROAD
088	OTHER	OTHER ACTION
099	UNK	UNKNOWN ACTION

CAUSE CODE TRANSLATION LIST

CAUSE CODE	SHORT DESCRIPTION	LONG DESCRIPTION
00	NO CODE	NO CAUSE ASSOCIATED AT THIS LEVEL
01	TOO-FAST	TOO FAST FOR CONDITIONS (NOT EXCEED POSTED SPEED
02	NO-YIELD	DID NOT YIELD RIGHT-OF-WAY
03	PAS-STOP	PASSED STOP SIGN OR RED FLASHER
04	DIS--RAG	DISREGARDED R-A-G TRAFFIC SIGNAL.
05	LEFT-CTR	DROVE LEFT OF CENTER ON TWO-WAY ROAD
06	IMP-OVER	IMPROPER OVERTAKING
07	TOO-CLOS	FOLLOWED TOO CLOSELY
08	IMP-TURN	MADE IMPROPER TURN
09	DRINKING	ALCOHOL OR DRUG INVOLVED
10	OTHR-IMP	OTHER IMPROPER DRIVING
11	MECH-DEF	MECHANICAL DEFECT
12	OTHER	OTHER (NOT IMPROPER DRIVING)
13	IMP LN C	IMPROPER CHANGE OF TRAFFIC LANES
14	DIS TCD	DISREGARDED OTHER TRAFFIC CONTROL DEVICE
15	WRNG WAY	WRONG WAY ON ONE-WAY ROADWAY
16	FATIGUE	DRIVER DROWSY/FATIGUED/SLEEPY
18	IN RDWY	NON-MOTORIST ILLEGALLY IN ROADWAY
19	NT VISBL	NON-MOTORIST CLOTHING NOT VISIBLE
20	IMP PKNG	VEHICLE IMPROPERLY PARKED
21	DEF STER	DEFECTIVE STEERING MECHANISM
22	DEF BRKE	INADEQUATE OR NO BRAKES
24	LOADSHFT	VEHICLE LOST LOAD OR LOAD SHIFTED
25	TIREFAIL	TIRE FAILURE
26	PHANTOM	PHANTOM / NON-CONTACT VEHICLE
27	INATTENT	INATTENTION
30	SPEED	DRIVING IN EXCESS OF POSTED SPEED
31	RACING	SPEED RACING (PER PAR)
32	CARELESS	CARELESS DRIVING (PER PAR)
33	RECKLESS	RECKLESS DRIVING (PER PAR)
34	AGGRESV	AGGRESSIVE DRIVING (PER PAR)
35	RD RAGE	ROAD RAGE (PER PAR)

COLLISION TYPE CODE TRANSLATION LIST

COLL CODE	SHORT DESCRIPTION	LONG DESCRIPTION
&	OTH	MISCELLANEOUS
-	BACK	BACKING
0	PED	PEDESTRIAN
1	ANGL	ANGLE
2	HEAD	HEAD-ON
3	REAR	REAR-END
4	SS-M	SIDESWIPE - MEETING
5	SS-O	SIDESWIPE - OVERTAKING
6	TURN	TURNING MOVEMENT
7	PARK	PARKING MANEUVER
8	NCOL	NON-COLLISION
9	FIX	FIXED OBJECT OR OTHER OBJECT

CRASH TYPE CODE TRANSLATION LIST

CRASH TYPE	SHORT DESCRIPTION	LONG DESCRIPTION
&	OVERTURN	OVERTURNED
0	NON-COLL	OTHER NON-COLLISION
1	OTH RDWY	MOTOR VEHICLE ON OTHER ROADWAY
2	PRKD MV	PARKED MOTOR VEHICLE
3	PED	PEDESTRIAN
4	TRAIN	RAILWAY TRAIN
6	BIKE	PEDALCYCLIST
7	ANIMAL	ANIMAL
8	FIX OBJ	FIXED OBJECT
9	OTH OBJ	OTHER OBJECT
A	ANGL-STP	ENTERING AT ANGLE - ONE VEHICLE STOPPED
B	ANGL-OTH	ENTERING AT ANGLE - ALL OTHERS
C	S-STRGHT	FROM SAME DIRECTION - BOTH GOING STRAIGHT
D	S-1TURN	FROM SAME DIRECTION - ONE TURN, ONE STRAIGHT
E	S-1STOP	FROM SAME DIRECTION - ONE STOPPED
F	S-OTHER	FROM SAME DIRECTION-ALL OTHERS, INCLUDING PARKING
G	O-STRGHT	FROM OPPOSITE DIRECTION - BOTH GOING STRAIGHT
H	O-1TURN	FROM OPPOSITE DIRECTION - ONE TURN, ONE STRAIGHT
I	O-1STOP	FROM OPPOSITE DIRECTION - ONE STOPPED
J	O-OTHER	FROM OPPOSITE DIRECTION-ALL OTHERS INCL. PARKING

DRIVER LICENSE CODE TRANSLATION LIST

LIC CODE	SHORT DESC	LONG DESCRIPTION
0	NONE	NOT LICENSED (HAD NEVER BEEN LICENSED)
1	OR-Y	VALID OREGON LICENSE
2	OTH-Y	VALID LICENSE, OTHER STATE OR COUNTRY
3	SUSP	SUSPENDED/REVOKED

DRIVER RESIDENCE CODE TRANSLATION LIST

RES CODE	SHORT DESC	LONG DESCRIPTION
1	OR<25	OREGON RESIDENT WITHIN 25 MILE OF HOME
2	OR>25	OREGON RESIDENT 25 OR MORE MILES FROM HOME
3	OR-?	OREGON RESIDENT - UNKNOWN DISTANCE FROM HOME
4	N-RES	NON-RESIDENT
9	UNK	UNKNOWN IF OREGON RESIDENT

ERROR CODE TRANSLATION LIST

ERROR CODE	SHORT DESCRIPTION	FULL DESCRIPTION
000	NONE	NO ERROR
001	WIDE TRN	WIDE TURN
002	CUT CORN	CUT CORNER ON TURN
003	FAIL TRN	FAILED TO OBEY MANDATORY TRAFFIC TURN SIGNAL, SIGN OR LANE MARKINGS
004	L IN TRF	LEFT TURN IN FRONT OF ONCOMING TRAFFIC
005	L PROHIB	LEFT TURN WHERE PROHIBITED
006	FRM WRNG	TURNED FROM WRONG LANE
007	TO WRONG	TURNED INTO WRONG LANE
008	ILLEG U	U-TURNED ILLEGALLY
009	IMP STOP	IMPROPERLY STOPPED IN TRAFFIC LANE
010	IMP SIG	IMPROPER SIGNAL OR FAILURE TO SIGNAL
011	IMP BACK	BACKING IMPROPERLY (NOT PARKING)
012	IMP PARK	IMPROPERLY PARKED
013	UNPARK	IMPROPER START LEAVING PARKED POSITION
014	IMP STRT	IMPROPER START FROM STOPPED POSITION
015	IMP LGHT	IMPROPER OR NO LIGHTS (VEHICLE IN TRAFFIC)
016	INATTENT	FAILED TO DIM LIGHTS (UNTIL 4/1/97) / INATTENTION (AFTER 4/1/97)
017	UNSF VEH	DRIVING UNSAFE VEHICLE (NO OTHER ERROR APPARENT)
018	OTH PARK	ENTERING/EXITING PARKED POSITION W/ INSUFFICIENT CLEARANCE; OTHER IMPROPER PARKING MANEUVER
019	DIS DRIV	DISREGARDED OTHER DRIVER'S SIGNAL
020	DIS SGNL	DISREGARDED TRAFFIC SIGNAL
021	RAN STOP	DISREGARDED STOP SIGN OR FLASHING RED
022	DIS SIGN	DISREGARDED WARNING SIGN, FLARES OR FLASHING AMBER
023	DIS OFCR	DISREGARDED POLICE OFFICER OR FLAGMAN
024	DIS EMER	DISREGARDED SIREN OR WARNING OF EMERGENCY VEHICLE
025	DIS RR	DISREGARDED RR SIGNAL, RR SIGN, OR RR FLAGMAN
026	REAR-END	FAILED TO AVOID STOPPED OR PARKED VEHICLE AHEAD OTHER THAN SCHOOL BUS
027	BIKE ROW	DID NOT HAVE RIGHT-OF-WAY OVER PEDALCYCLIST
028	NO ROW	DID NOT HAVE RIGHT-OF-WAY
029	PED ROW	FAILED TO YIELD RIGHT-OF-WAY TO PEDESTRIAN
030	PAS CURV	PASSING ON A CURVE
031	PAS WRNG	PASSING ON THE WRONG SIDE
032	PAS TANG	PASSING ON STRAIGHT ROAD UNDER UNSAFE CONDITIONS
033	PAS X-WK	PASSED VEHICLE STOPPED AT CROSSWALK FOR PEDESTRIAN
034	PAS INTR	PASSING AT INTERSECTION
035	PAS HILL	PASSING ON CREST OF HILL
036	N/PAS ZN	PASSING IN "NO PASSING" ZONE
037	PAS TRAF	PASSING IN FRONT OF ONCOMING TRAFFIC
038	CUT-IN	CUTTING IN (TWO LANES - TWO WAY ONLY)
039	WRNGSIDE	DRIVING ON WRONG SIDE OF THE ROAD
040	THRU MED	DRIVING THROUGH SAFETY ZONE OR OVER ISLAND
041	F/ST BUS	FAILED TO STOP FOR SCHOOL BUS

ERROR CODE TRANSLATION LIST

ERROR CODE	SHORT DESCRIPTION	FULL DESCRIPTION
042	F/SLO MV	FAILED TO DECREASE SPEED FOR SLOWER MOVING VEHICLE
043	TO CLOSE	FOLLOWING TOO CLOSELY (MUST BE ON OFFICER'S REPORT)
044	STRDL LN	STRADDLING OR DRIVING ON WRONG LANES
045	IMP CHG	IMPROPER CHANGE OF TRAFFIC LANES
046	WRNG WAY	WRONG WAY ON ONE-WAY ROADWAY (DELIBERATELY TRAVELING ON WRONG SIDE)
047	BASCRULE	DRIVING TOO FAST FOR CONDITIONS (NOT EXCEEDING POSTED SPEED)
048	OPN DOOR	OPENED DOOR INTO ADJACENT TRAFFIC LANE
049	IMPEDING	IMPEDING TRAFFIC
050	SPEED	DRIVING IN EXCESS OF POSTED SPEED
051	RECKLESS	RECKLESS DRIVING (PER PAR)
052	CARELESS	CARELESS DRIVING (PER PAR)
053	RACING	SPEED RACING (PER PAR)
054	X N/SGNL	CROSSING AT INTERSECTION, NO TRAFFIC SIGNAL PRESENT
055	X W/SGNL	CROSSING AT INTERSECTION, TRAFFIC SIGNAL PRESENT
056	DIAGONAL	CROSSING AT INTERSECTION - DIAGONALLY
057	BTWN INT	CROSSING BETWEEN INTERSECTIONS
059	W/TRAF-S	WALKING, RUNNING, RIDING, ETC., ON SHOULDER WITH TRAFFIC
060	A/TRAF-S	WALKING, RUNNING, RIDING, ETC., ON SHOULDER FACING TRAFFIC
061	W/TRAF-P	WALKING, RUNNING, RIDING, ETC., ON PAVEMENT WITH TRAFFIC
062	A/TRAF-P	WALKING, RUNNING, RIDING, ETC., ON PAVEMENT FACING TRAFFIC
063	PLAYINRD	PLAYING IN STREET OR ROAD
064	PUSH MV	PUSHING OR WORKING ON VEHICLE IN ROAD OR ON SHOULDER
065	WK IN RD	WORKING IN ROADWAY OR ALONG SHOULDER
070	LAYON RD	STANDING OR LYING IN ROADWAY
073	ELUDING	ELUDING
080	FAIL LN	FAILED TO MAINTAIN LANE
081	OFF RD	RAN OFF ROAD
082	NO CLEAR	DRIVER MISJUDGED CLEARANCE
083	OVRSTEER	OVERCORRECTING
084	NOT USED	CODE NOT IN USE
085	OVRLOAD	OVERLOADING OR IMPROPER LOADING OF VEHICLE WITH CARGO OR PASSENGERS
097	UNA DIS TC	UNABLE TO DETERMINE WHICH DRIVER DISREGARDED TRAFFIC CONTROL DEVICE

EVENT CODE TRANSLATION LIST

EVENT CODE	SHORT DESCRIPTION	LONG DESCRIPTION
001	FEL/JUMP	OCCUPANT FELL, JUMPED OR WAS EJECTED FROM MOVING VEHICLE
002	INTERFER	PASSENGER INTERFERED WITH DRIVER
003	BUG INTF	ANIMAL OR INSECT IN VEHICLE INTERFERED WITH DRIVER
004	PED INV	PEDESTRIAN INVOLVED (NON-PEDESTRIAN ACCIDENT)
005	SUB-PED	"SUB-PED": PEDESTRIAN INJURED SUBSEQUENT TO COLLISION, ETC.
006	BIKE INV	TRICYCLE-BICYCLE INVOLVED
007	HITCHIKR	HITCHHIKER (SOLICITING A RIDE)
008	PSNGR TOW	PASSENGER BEING TOWED OR PUSHED ON CONVEYANCE
009	ON/OFF V	GETTING ON OR OFF STOPPED OR PARKED VEHICLE (OCCUPANTS ONLY)
010	SUB OTRN	OVERTURNED AFTER FIRST HARMFUL EVENT
011	MV PUSHD	VEHICLE BEING PUSHED
012	MV TOWED	VEHICLE TOWED OR HAD BEEN TOWING ANOTHER VEHICLE
013	FORCED	VEHICLE FORCED BY IMPACT INTO ANOTHER VEHICLE, PEDALCYCLIST OR PEDESTRIAN
014	SET MOTN	VEHICLE SET IN MOTION BY NON-DRIVER (CHILD RELEASED BRAKES, ETC.)
015	RR ROW	AT OR ON RAILROAD RIGHT-OF-WAY (NOT LIGHT RAIL)
016	LT RL ROW	AT OR ON LIGHT-RAIL RIGHT-OF-WAY
017	RR HIT V	TRAIN STRUCK VEHICLE
018	V HIT RR	VEHICLE STRUCK TRAIN
019	HIT RR CAR	VEHICLE STRUCK RAILROAD CAR ON ROADWAY
020	JACKNIFE	JACKKNIFE; TRAILER OR TOWED VEHICLE STRUCK TOWING VEHICLE
021	TRL OTRN	TRAILER OR TOWED VEHICLE OVERTURNED
022	CN BROKE	TRAILER CONNECTION BROKE
023	DETACH TRL	DETACHED TRAILING OBJECT STRUCK OTHER VEHICLE, NON-MOTORIST, OR OBJECT
024	V DOOR OPN	VEHICLE DOOR OPENED INTO ADJACENT TRAFFIC LANE
025	WHEELOFF	WHEEL CAME OFF
026	HOOD UP	HOOD FLEW UP
028	LOAD SHIFT	LOST LOAD, LOAD MOVED OR SHIFTED
029	TIREFAIL	TIRE FAILURE
030	PET	PET: CAT, DOG AND SIMILAR
031	LVSTOCK	STOCK: COW, CALF, BULL, STEER, SHEEP, ETC.
032	HORSE	HORSE, MULE, OR DONKEY
033	HRSE&RID	HORSE AND RIDER
034	GAME	WILD ANIMAL, GAME (INCLUDES BIRDS; NOT DEER OR ELK)
035	DEER ELK	DEER OR ELK, WAPITI
036	ANML VEH	ANIMAL-DRAWN VEHICLE
037	CULVERT	CULVERT, OPEN LOW OR HIGH MANHOLE
038	ATENUATN	IMPACT ATTENUATOR
039	PK METER	PARKING METER
040	CURB	CURB (ALSO NARROW SIDEWALKS ON BRIDGES)
041	JIGGLE	JIGGLE BARS OR TRAFFIC SNAKE FOR CHANNELIZATION
042	GDRL END	LEADING EDGE OF GUARDRAIL
043	GARDRAIL	GUARD RAIL (NOT METAL MEDIAN BARRIER)
044	BARRIER	MEDIAN BARRIER (RAISED OR METAL)
045	WALL	RETAINING WALL OR TUNNEL WALL
046	BR RAIL	BRIDGE RAILING (ON BRIDGE AND APPROACH)
047	BR ABUT	BRIDGE ABUTMENT (APPROACH ENDS)
048	BR COLMN	BRIDGE PILLAR OR COLUMN (EVEN THOUGH STRUCK PROTECTIVE GUARD RAIL FIRST)
049	BR GIRDR	BRIDGE GIRDER (HORIZONTAL STRUCTURE OVERHEAD)
050	ISLAND	TRAFFIC RAISED ISLAND
051	GORE	GORE
052	POLE UNK	POLE - TYPE UNKNOWN
053	POLE UTL	POLE - POWER OR TELEPHONE
054	ST LIGHT	POLE - STREET LIGHT ONLY
055	TRF SGNL	POLE - TRAFFIC SIGNAL AND PED SIGNAL ONLY
056	SGN BRDG	POLE - SIGN BRIDGE
057	STOPSIGN	STOP OR YIELD SIGN
058	OTH SIGN	OTHER SIGN, INCLUDING STREET SIGNS
059	HYDRANT	HYDRANT

EVENT CODE TRANSLATION LIST

EVENT CODE	SHORT DESCRIPTION	LONG DESCRIPTION
060	MARKER	DELINEATOR OR MARKER (REFLECTOR POSTS)
061	MAILBOX	MAILBOX
062	TREE	TREE, STUMP OR SHRUBS
063	VEG OHED	TREE BRANCH OR OTHER VEGETATION OVERHEAD, ETC.
064	WIRE/CBL	WIRE OR CABLE ACROSS OR OVER THE ROAD
065	TEMP SGN	TEMPORARY SIGN OR BARRICADE IN ROAD, ETC.
066	PERM SGN	PERMANENT SIGN OR BARRICADE IN/OFF ROAD
067	SLIDE	SLIDES, ROCKS OFF OR ON ROAD, FALLING ROCKS
068	FRGN OBJ	FOREIGN OBSTRUCTION/DEBRIS IN ROAD (NOT GRAVEL)
069	EQP WORK	EQUIPMENT WORKING IN/OFF ROAD
070	OTH EQP	OTHER EQUIPMENT IN OR OFF ROAD (INCLUDES PARKED TRAILER, BOAT)
071	MAIN EQP	WRECKER, STREET SWEEPER, SNOW PLOW OR SANDING EQUIPMENT
072	OTHER WALL	ROCK, BRICK OR OTHER SOLID WALL
073	IRRGL PVMT	SPEED BUMP, OTHER BUMP, POTHOLE OR PAVEMENT IRREGULARITY (PER PAR)
075	CAVE IN	BRIDGE OR ROAD CAVE IN
076	HI WATER	HIGH WATER
077	SNO BANK	SNOW BANK
078	HOLE	CHUCKHOLE IN ROAD, LOW OR HIGH SHOULDER AT PAVEMENT EDGE
079	DITCH	CUT SLOPE OR DITCH EMBANKMENT
080	OBJ F MV	STRUCK BY ROCK OR OTHER OBJECT SET IN MOTION BY OTHER VEHICLE (INCL. LOST LOADS)
081	FLY-OBJ	STRUCK BY OTHER MOVING OR FLYING OBJECT
082	VEH HID	VEHICLE OBSCURED VIEW
083	VEG HID	VEGETATION OBSCURED VIEW
084	BLDG HID	VIEW OBSCURED BY FENCE, SIGN, PHONE BOOTH, ETC.
085	WIND GUST	WIND GUST
086	IMMERSED	VEHICLE IMMERSED IN BODY OF WATER
087	FIRE/EXP	FIRE OR EXPLOSION
088	FENC/BLD	FENCE OR BUILDING, ETC.
089	OTH ACDT	ACCIDENT RELATED TO ANOTHER SEPARATE ACCIDENT
090	TO 1 SIDE	TWO-WAY TRAFFIC ON DIVIDED ROADWAY ALL ROUTED TO ONE SIDE
092	PHANTOM	OTHER (PHANTOM) NON-CONTACT VEHICLE (ON PAR OR REPORT)
093	CELL-POL	CELL PHONE (ON PAR OR DRIVER IN USE)
094	VIOL GDL	TEENAGE DRIVER IN VIOLATION OF GRADUATED LICENSE PGM
095	GUY WIRE	GUY WIRE
096	BERM	BERM (EARTHEN OR GRAVEL MOUND)
097	GRAVEL	GRAVEL IN ROADWAY
098	ABR EDGE	ABRUPT EDGE
099	CELL-WTN	CELL PHONE USE WITNESSED BY OTHER PARTICIPANT
100	UNK FIXD	UNKNOWN TYPE OF FIXED OBJECT
101	OTHER OBJ	OTHER OR UNKNOWN OBJECT, NOT FIXED
104	OUTSIDE V	PASSENGER RIDING ON VEHICLE EXTERIOR
105	PEDAL PSGR	PASSENGER RIDING ON PEDALCYCLE
106	MAN WHLCHR	PEDESTRIAN IN NON-MOTORIZED WHEELCHAIR
107	MTR WHLCHR	PEDESTRIAN IN MOTORIZED WHEELCHAIR
110	N-MTR	NON-MOTORIST STRUCK VEHICLE
111	S CAR VS V	STREET CAR/TROLLEY (ON RAILS AND/OR OVERHEAD WIRE SYSTEM) STRUCK VEHICLE
112	V VS S CAR	VEHICLE STRUCK STREET CAR/TROLLEY (ON RAILS AND/OR OVERHEAD WIRE SYSTEM)
113	S CAR ROW	AT OR ON STREET CAR/TROLLEY RIGHT-OF-WAY
114	RR EQUIP	VEHICLE STRUCK RAILROAD EQUIPMENT (NOT TRAIN) ON TRACKS
120	WIRE BAR	WIRE OR CABLE MEDIAN BARRIER
124	SLIPPERY	SLIDING OR SWERVING DUE TO WET, ICY, SLIPPERY OR LOOSE SURFACE
125	SHLDR	SHOULDER GAVE WAY

FUNCTIONAL CLASSIFICATION TRANSLATION LIST

FUNC CLASS	DESCRIPTION
01	RURAL PRINCIPAL ARTERIAL - INTERSTATE
02	RURAL PRINCIPAL ARTERIAL - OTHER
06	RURAL MINOR ARTERIAL
07	RURAL MAJOR COLLECTOR
08	RURAL MINOR COLLECTOR
09	RURAL LOCAL
11	URBAN PRINCIPAL ARTERIAL - INTERSTATE
12	URBAN PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXP
14	URBAN PRINCIPAL ARTERIAL - OTHER
16	URBAN MINOR ARTERIAL
17	URBAN COLLECTOR
19	URBAN LOCAL
78	UNKNOWN RURAL SYSTEM
79	UNKNOWN RURAL NON-SYSTEM
98	UNKNOWN URBAN SYSTEM
99	UNKNOWN URBAN NON-SYSTEM

HIGHWAY COMPONENT TRANSLATION LIST

CODE	DESCRIPTION
0	MAINLINE STATE HIGHWAY
1	COUPLET
3	FRONTAGE ROAD
6	CONNECTION
8	HIGHWAY - OTHER

INJURY SEVERITY CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
1	KILL	FATAL INJURY
2	INJA	INCAPACITATING INJURY - BLEEDING, BROKEN BONES
3	INJB	NON-INCAPACITATING INJURY
4	INJC	POSSIBLE INJURY - COMPLAINT OF PAIN
5	PRI	DIED PRIOR TO CRASH
7	NO<5	NO INJURY - 0 TO 4 YEARS OF AGE

LIGHT CONDITION CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	UNK	UNKNOWN
1	DAY	DAYLIGHT
2	DLIT	DARKNESS - WITH STREET LIGHTS
3	DARK	DARKNESS - NO STREET LIGHTS
4	DAWN	DAWN (TWILIGHT)
5	DUSK	DUSK (TWILIGHT)

MEDIAN TYPE CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	NONE	NO MEDIAN
1	RSDMD	SOLID MEDIAN BARRIER
2	DIVMD	EARTH, GRASS OR PAVED MEDIAN

MILEAGE TYPE CODE TRANSLATION LIST

CODE	LONG DESCRIPTION
0	REGULAR MILEAGE
T	TEMPORARY
Y	SPUR
Z	OVERLAPPING

MOVEMENT TYPE CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	UNK	UNKNOWN
1	STRGHT	STRAIGHT AHEAD
2	TURN-R	TURNING RIGHT
3	TURN-L	TURNING LEFT
4	U-TURN	MAKING A U-TURN
5	BACK	BACKING
6	STOP	STOPPED IN TRAFFIC
7	PRKD-P	PARKED - PROPERLY
8	PRKD-I	PARKED - IMPROPERLY

PEDESTRIAN LOCATION CODE TRANSLATION LIST

CODE	LONG DESCRIPTION
00	AT INTERSECTION - NOT IN ROADWAY
01	AT INTERSECTION - INSIDE CROSSWALK
02	AT INTERSECTION - IN ROADWAY, OUTSIDE CROSSWALK
03	AT INTERSECTION - IN ROADWAY, XWALK AVAIL UNKNWN
04	NOT AT INTERSECTION - IN ROADWAY
05	NOT AT INTERSECTION - ON SHOULDER
06	NOT AT INTERSECTION - ON MEDIAN
07	NOT AT INTERSECTION - WITHIN TRAFFIC RIGHT-OF-WAY
08	NOT AT INTERSECTION - IN BIKE PATH
09	NOT-AT INTERSECTION - ON SIDEWALK
10	OUTSIDE TRAFFICWAY BOUNDARIES
15	NOT AT INTERSECTION - INSIDE MID-BLOCK CROSSWALK
18	OTHER, NOT IN ROADWAY
99	UNKNOWN LOCATION

ROAD CHARACTER CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	UNK	UNKNOWN
1	INTER	INTERSECTION
2	ALLEY	DRIVEWAY OR ALLEY
3	STRGHT	STRAIGHT ROADWAY
4	TRANS	TRANSITION
5	CURVE	CURVE (HORIZONTAL CURVE)
6	OPENAC	OPEN ACCESS OR TURNOUT
7	GRADE	GRADE (VERTICAL CURVE)
8	BRIDGE	BRIDGE STRUCTURE
9	TUNNEL	TUNNEL

PARTICIPANT TYPE CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	OCC	UNKNOWN OCCUPANT TYPE
1	DRVR	DRIVER
2	PSNG	PASSENGER
3	PED	PEDESTRIAN
4	CONV	PEDESTRIAN USING A PEDESTRIAN CONVEYA
5	PTOW	PEDESTRIAN TOWING OR TRAILERING AN OB
6	BIKE	PEDALCYCLIST
7	BTOW	PEDALCYCLIST TOWING OR TRAILERING AN
8	PRKD	OCCUPANT OF A PARKED MOTOR VEHICLE
9	UNK	UNKNOWN TYPE OF NON-MOTORIST

TRAFFIC CONTROL DEVICE CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
000	NONE	NO CONTROL
001	TRF SIGNAL	TRAFFIC SIGNALS
002	FLASHBCN-R	FLASHING BEACON - RED (STOP)
003	FLASHBCN-A	FLASHING BEACON - AMBER (SLOW)
004	STOP SIGN	STOP SIGN
005	SLOW SIGN	SLOW SIGN
006	REG-SIGN	REGULATORY SIGN
007	YIELD	YIELD SIGN
008	WARNING	WARNING SIGN
009	CURVE	CURVE SIGN
010	SCHL X-ING	SCHOOL CROSSING SIGN OR SPECIAL SIGNAL
011	OFCR/FLAG	POLICE OFFICER, FLAGMAN - SCHOOL PATROL
012	BRDG-GATE	BRIDGE GATE - BARRIER
013	TEMP-BARR	TEMPORARY BARRIER
014	NO-PASS-ZN	NO PASSING ZONE
015	ONE-WAY	ONE-WAY STREET
016	CHANNEL	CHANNELIZATION
017	MEDIAN BAR	MEDIAN BARRIER
018	PILOT CAR	PILOT CAR
019	SP PED SIG	SPECIAL PEDESTRIAN SIGNAL
020	X-BUCK	CROSSBUCK
021	THR-GN-SIG	THROUGH GREEN ARROW OR SIGNAL
022	L-GRN-SIG	LEFT TURN GREEN ARROW, LANE MARKINGS, OR SIGNAL
023	R-GRN-SIG	RIGHT TURN GREEN ARROW, LANE MARKINGS, OR SIGNAL
024	WIGWAG	WIGWAG OR FLASHING LIGHTS W/O DROP-ARM GATE
025	X-BUCK WRN	CROSSBUCK AND ADVANCE WARNING
026	WW W/ GATE	FLASHING LIGHTS WITH DROP-ARM GATES
027	OVRHD SGNL	SUPPLEMENTAL OVERHEAD SIGNAL (RR XING ONLY)
028	SP RR STOP	SPECIAL RR STOP SIGN
029	ILUM GRD X	ILLUMINATED GRADE CROSSING
037	RAMP METER	METERED RAMPS
038	RUMBLE STR	RUMBLE STRIP
090	L-TURN REF	LEFT TURN REFUGE (WHEN REFUGE IS INVOLVED)
091	R-TURN ALL	RIGHT TURN AT ALL TIMES SIGN, ETC.
092	EMR SGN/FL	EMERGENCY SIGNS OR FLARES
093	ACCEL LANE	ACCELERATION OR DECELERATION LANES
094	R-TURN PRO	RIGHT TURN PROHIBITED ON RED AFTER STOPPING

095	BUS STPSGN	BUS STOP SIGN AND RED LIGHTS
099	UNKNOWN	UNKNOWN OR NOT DEFINITE

VEHICLE TYPE CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
01	PSNGR CAR	PASSENGER CAR, PICKUP, ETC.
02	BOBTAIL	TRUCK TRACTOR WITH NO TRAILERS (BOBTAIL)
03	FARM TRCTR	FARM TRACTOR OR SELF-PROPELLED FARM EQUIPMENT
04	SEMI TOW	TRUCK TRACTOR WITH TRAILER/MOBILE HOME IN TOW
05	TRUCK	TRUCK WITH NON-DETACHABLE BED, PANEL, ETC.
06	MOPED	MOPED, MINIBIKE, MOTOR SCOOTER, OR MOTOR BICYCLE
07	SCHL BUS	SCHOOL BUS (INCLUDES VAN)
08	OTH BUS	OTHER BUS
09	MTRCYCLE	MOTORCYCLE
10	OTHER	OTHER: FORKLIFT, BACKHOE, ETC.
11	MOTRHOME	MOTORHOME
12	TROLLEY	MOTORIZED STREET CAR/TROLLEY (NO RAILS/WIRES)
13	ATV	ATV
14	MTRSCTR	MOTORIZED SCOOTER
15	SNOWMOBILE	SNOWMOBILE
99	UNKNOWN	UNKNOWN VEHICLE TYPE

WEATHER CONDITION CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	UNK	UNKNOWN
1	CLR	CLEAR
2	CLD	CLOUDY
3	RAIN	RAIN
4	SLT	SLEET
5	FOG	FOG
6	SNOW	SNOW
7	DUST	DUST
8	SMOK	SMOKE
9	ASH	ASH

CITY OF PORTLAND SE, MULTNOMAH COUNTY

JOHNSON CREEK BLVD at 32ND AVE, City of Portland SE, Multnomah County, 01/01/2012 to 12/31/2016

1 - 4 of 8 Crash records shown.

SER# / INVEST / RD DPT / UNLOC?	S P E D	A L C	R S L	S U G	W C H	O R K	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACT	EVENT	CAUSE
13913	N	N	N				12/09/2015	16	SE JOHNSON CREEK BLVD	INTER	3-LEG	N	N	CLR	S-1STOP	01	NONE 0	STRGHT											29
NO RPT							WE	0	SE 32ND AVE	N		TRF SIGNAL	N	WET	REAR		PRVTE	N -S									000		00
N							12P			06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	49	M	OR-Y		026	000		29
N							45 27 45.18	-122 37 47.45																OR<25					
																02	NONE 0	STOP											
																	PRVTE	N -S									011		00
																	PSNGR CAR		01	DRVR	INJC	37	F	OTH-Y		000	000		00
																								OR<25					
08305	N	N	N				07/18/2016	16	SE JOHNSON CREEK BLVD	INTER	3-LEG	N	N	CLR	S-STRGHT	01	NONE 0	STRGHT											29
NONE							MO	0	SE 32ND AVE	N		STOP SIGN	N	DRY	REAR		PRVTE	N -S									000		00
N							4P			06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	17	M	OR-Y		026	000		29
N							45 27 45.18	-122 37 47.45																OR<25					
																02	NONE 0	STRGHT											
																	PRVTE	N -S									015		00
																	PSNGR CAR		01	DRVR	INJC	26	F	OTH-Y		000	000		00
																								OR<25					
00998	N	N	N	N	N		01/12/2015	16	SE JOHNSON CREEK BLVD	INTER	3-LEG	N	N	CLR	S-1STOP	01	UNKN 9	STRGHT											07
CITY							MO	0	SE 32ND AVE	E		STOP SIGN	N	DRY	REAR		UNKN	E -W									000		00
N							6A			06	0		N	DLIT	INJ		UNKNOWN		01	DRVR	NONE	00	Unk	UNK		026	000		07
N							45 27 45.18	-122 37 47.45																UNK					
																02	NONE 0	STOP											
																	PRVTE	E -W									011		00
																	PSNGR CAR		01	DRVR	INJC	29	M	OR-Y		000	000		00
																								OR<25					
82647	N	N	N				06/12/2016	17	SE JOHNSON CREEK BLVD	INTER	3-LEG	N	N	CLR	S-1STOP	01	NONE 0	STRGHT											29
NONE							SU	0	SE 32ND AVE	S		TRF SIGNAL	N	DRY	REAR		PRVTE	S -N									000		00
N							3P			06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	38	F	OR-Y		026	000		29
N							45 27 45.18	-122 37 47.45																OR<25					
																02	NONE 0	STOP											
																	PRVTE	S -N									011		00
																	PSNGR CAR		01	DRVR	INJC	44	F	OR-Y		000	000		00
																								OR<25					
																02	NONE 0	STOP											
																	PRVTE	S -N									011		00
																	PSNGR CAR		02	PSNG	INJC	46	M			000	000		00
85236	N	N	N				11/10/2016	16	SE JOHNSON CREEK BLVD	INTER	3-LEG	N	N	CLR	S-1STOP	01	NONE 9	STRGHT											27
NONE							TH	0	SE 32ND AVE	S		STOP SIGN	N	DRY	REAR		N/A	N -S									000		00
N							4P			05	0		N	DUSK	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00
N							45 27 45.18	-122 37 47.45																UNK					

CITY OF PORTLAND SE, MULTNOMAH COUNTY

JOHNSON CREEK BLVD at 32ND AVE, City of Portland SE, Multnomah County, 01/01/2012 to 12/31/2016

5 - 8 of 8 Crash records shown.

SER# / INVEST / RD DPT / UNLOC?	S P E D	A L C	R U S	S C G	W O H	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACT	EVENT	CAUSE
															02	NONE 9	STOP										
																N/A	N -S									011	00
																PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000	00
																							UNK				
09601	N	N	N			09/04/2012	16	SE JOHNSON CREEK BLVD	INTER	3-LEG	N	N	CLR	O-1 L-TURN	01	NONE 0	STRGHT										02
NO RPT						TU	0	SE 32ND AVE	CN		FLASHBCN-R	N	DRY	TURN		UNKN	S -N									000	00
N						7A			04	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	M	UNK		000	000	00
N						45 27 45.1804225	-122 37 47.4484927																UNK				
															02	NONE 0	TURN-L										
																PRVTE	N -E									000	00
																PSNGR CAR		01	DRVR	NONE	22	F	OR-Y		028,004	000	02
																							OR<25				
															02	NONE 0	TURN-L										
																PRVTE	N -E									000	00
																PSNGR CAR		02	PSNG	NO<5	01	F			000	000	00
11460	N	N	N	N	N	10/25/2013	16	SE JOHNSON CREEK BLVD	INTER	3-LEG	N	N	CLR	S-1STOP	01	NONE 0	STRGHT										07
CITY						FR	0	SE 32ND AVE	CN		STOP SIGN	N	DRY	REAR		PRVTE	S -N									000	00
N						3P			04	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	51	M	OR-Y		043	000	07
N						45 27 45.180396	-122 37 47.4484799																OR<25				
															02	NONE 0	STOP										
																PRVTE	S -N									013	00
																PSNGR CAR		01	DRVR	INJB	54	M	OR-Y		000	000	00
																							OR<25				
07532	N	N	N	N	N	06/29/2016	16	SE JOHNSON CREEK BLVD	INTER	3-LEG	N	Y	CLD	FIX OBJ	01	NONE 0	TURN-R									055	17,08
CITY						WE	0	SE 32ND AVE	CN		TRF SIGNAL	N	DRY	FIX		PRVTE	E -N								000	055	00
N						8A			01	0		N	DAY	INJ		PSNGR CAR		01	DRVR	INJC	71	M	OR-Y		001	028	17,08
N						45 27 45.18	-122 37 47.45																OR<25				

CITY OF MILWAUKIE, CLACKAMAS COUNTY

HARRISON ST at 32ND AVE, City of Milwaukie, Clackamas County, 01/01/2012 to 12/31/2016

1 - 5 of 12 Crash records shown.

SER# / INVEST / RD DPT / UNLOC?	S P E D E A L C	R S U G H S	W C O R K	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACT	EVENT	CAUSE
02423	N	N N N	N	06/19/2015	16	HARRISON ST	INTER	CROSS	N	N	CLD	O-1 L-TURN	01	NONE 0	TURN-L											02
CITY				FR	0	32ND AVE	NE		TRF SIGNAL	N	DRY	TURN		PRVTE	N -E									000		00
N				10P			06	0		N	DLIT	PDO		PSNGR CAR		01	DRVR	NONE	34	M	OTH-Y		028	000		02
N				45 26 47.73	-122 37 46.89																N-RES					
													02	NONE 0	STRGHT											
														PRVTE	S -N									000		00
														PSNGR CAR		01	DRVR	NONE	18	M	OR-Y		000	000		00
																					OR<25					
01651	N	N N N	N	05/13/2013	16	HARRISON ST	INTER	CROSS	N	Y	CLR	FIX OBJ	01	NONE 0	TURN-R										055	08
NONE				MO	0	32ND AVE	W		TRF SIGNAL	N	DRY	FIX		PRVTE	W -S									000	055	00
N				5P			06	0		N	DAY	PDO		MOTRHOME		01	DRVR	NONE	54	M	OR-Y		002	000		08
N				45 26 47.7304439	-122 37 46.890228																OR<25					
02153	N	N N		06/05/2014	16	HARRISON ST	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT											29
NONE				TH	0	32ND AVE	W		TRF SIGNAL	N	DRY	REAR		PRVTE	W -E									000		00
N				2P			06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	60	M	OR-Y		026	000		29
N				45 26 47.73	-122 37 46.89																OR<25					
													02	NONE 0	STOP											
														PRVTE	W -E									011		00
														PSNGR CAR		01	DRVR	INJC	34	M	OR-Y		000	000		00
																					OR<25					
00904	N	N N		03/10/2012	17	HARRISON ST	INTER	CROSS	N	N	UNK	S-OTHER	01	NONE 0	TURN-R											08
NONE				SA	0	32ND AVE	CN		L-GRN-SIG	N	WET	TURN		UNKN	N -W									000		00
N				5P			01	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	F	UNK		006	000		08
N				45 26 47.7304521	-122 37 46.890241																UNK					
													02	NONE 0	TURN-R											
														PRVTE	N -W									000		00
														PSNGR CAR		01	DRVR	NONE	55	F	OR-Y		000	000		00
																					OR<25					
													02	NONE 0	TURN-R											
														PRVTE	N -W									000		00
														PSNGR CAR		02	PSNG	NO<5	02	F			000	000		00
00692	N	N N		02/27/2013	16	HARRISON ST	INTER	CROSS	N	N	CLR	O-1 L-TURN	01	NONE 0	STRGHT											02
NONE				WE	0	32ND AVE	CN		TRF SIGNAL	N	DRY	TURN		PRVTE	S -N									000		00
N				3P			04	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	63	F	OR-Y		000	000		00
N				45 26 47.7304439	-122 37 46.890228																OR<25					
													02	NONE 0	TURN-L											
														PRVTE	N -E									000		00
														PSNGR CAR		01	DRVR	NONE	17	F	OR-Y		028,004	000		02
																					OR<25					

CITY OF MILWAUKIE, CLACKAMAS COUNTY

HARRISON ST at 32ND AVE, City of Milwaukie, Clackamas County, 01/01/2012 to 12/31/2016

6 - 8 of 12 Crash records shown.

SER# / INVEST / RD DPT / UNLOC?	S P E D	A L C	R U G S	S C H L	W O R K	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACT	EVENT	CAUSE
01512	N	N	N	N	N	05/02/2013	16	HARRISON ST	INTER	CROSS	N	N	CLR	O-1 L-TURN	01	NONE 0	STRGHT											02,05
CITY						TH	0	32ND AVE	CN		TRF SIGNAL	N	DRY	TURN		PRVTE	N -S									000		00
N						6P			03	0		N	DAY	INJ		PSNGR CAR		01	DRVR	INJC	48	F	OR-Y		000	000		00
N						45 26 47.7304439	-122 37 46.890228																OR<25					
															01	NONE 0	STRGHT											
																PRVTE	N -S									000		00
																PSNGR CAR		02	PSNG	INJB	49	M			000	000		00
															02	NONE 0	TURN-L											
																PRVTE	S -W									000		00
																PSNGR CAR		01	DRVR	INJB	46	F	OR-Y		028,004	000		02
																							OR<25					
01294	N	N	N	N	N	04/03/2014	16	HARRISON ST	INTER	CROSS	N	N	RAIN	O-1 L-TURN	01	NONE 0	TURN-L											04
CITY						TH	0	32ND AVE	CN		TRF SIGNAL	N	WET	TURN		PRVTE	E -S									000		00
N						7P			03	0		N	DLIT	INJ		PSNGR CAR		01	DRVR	INJC	22	M	OR-Y		000	000		00
N						45 26 47.7304439	-122 37 46.890228																OR<25					
															02	NONE 0	STRGHT											
																PRVTE	W -E									000		00
																PSNGR CAR		01	DRVR	NONE	40	F	OR-Y		020	000		04
																							OR<25					
04096	N	N	N			10/05/2015	16	HARRISON ST	INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 0	TURN-R											02
NONE						MO	0	32ND AVE	CN		TRF SIGNAL	N	DRY	TURN		PRVTE	E -N									000		00
N						10A			02	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	61	F	OR-Y		028	000		02
N						45 26 47.73	-122 37 46.89																OR<25					
															02	NONE 0	STRGHT											
																PRVTE	S -N									000		00
																PSNGR CAR		01	DRVR	NONE	41	F	OR-Y		000	000		00
																							OR<25					
00702	N	N	N	N	N	02/12/2016	16	HARRISON ST	INTER	CROSS	N	N	CLD	ANGL-OTH	01	NONE 0	STRGHT											04
CITY						FR	0	32ND AVE	CN		TRF SIGNAL	N	WET	ANGL		PRVTE	N -S									000		00
N						5P			01	0		N	DUSK	INJ		PSNGR CAR		01	DRVR	INJC	28	F	OR-Y		000	000		00
N						45 26 47.73	-122 37 46.89																OR<25					
															02	NONE 0	STRGHT											
																PRVTE	E -W									000		00
																PSNGR CAR		01	DRVR	INJC	37	M	OR-Y		020	000		04
																							OR<25					
															02	NONE 0	STRGHT											
																PRVTE	E -W									000		00
																PSNGR CAR		02	PSNG	INJB	29	F			000	000		00

SER# / INVEST / RD DPT / UNLOC?	S P E D	A L C	R U G S	S C H	W O R K	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACT EVENT	CAUSE
															02	NONE 0 PRVTE PSNGR CAR	STRGHT E -W									000 000	00 00
01812	N	N	N	N	N	04/20/2016 12P 45 26 47.73	16 -122 37 46.89	HARRISON ST WE 32ND AVE	INTER 0 CN	CROSS 0 02	N TRF SIGNAL 0	N N N	CLR DRY DAY	O-1 L-TURN TURN INJ	01	NONE 0 PRVTE PSNGR CAR	TURN-L W -N	01	DRVR	INJC	17	F	OR-Y OR<25		028	000 000	02 00 02
															02	NONE 0 PRVTE PSNGR CAR	STRGHT E -W	01	DRVR	NONE	30	F	OR-Y OR<25		000	000 000	00 00
03255	N	N	N	N	N	07/19/2016 1P 45 26 47.73	16 -122 37 46.89	HARRISON ST TU 32ND AVE	INTER 0 CN	CROSS 0 04	N TRF SIGNAL 0	N N N	CLR DRY DAY	ANGL-OTH ANGL INJ	01	NONE 0 PRVTE PSNGR CAR	STRGHT S -N	01	DRVR	NONE	34	F	OR-Y OR<25		020	000 000	04 00 04
															02	NONE 0 PRVTE PSNGR CAR	STRGHT W -E	01	DRVR	INJC	88	M	OR-Y OR<25		000	000 000	00 00
05321	Y	N	N	N	N	11/16/2016 10A 45 26 47.73	16 -122 37 46.89	HARRISON ST WE 32ND AVE	INTER 0 CN	CROSS 0 04	N TRF SIGNAL 0	N N N	CLD WET DAY	O-1 L-TURN TURN INJ	01	NONE 0 PRVTE PSNGR CAR	STRGHT S -N	01	DRVR	NONE	60	F	OR-Y OR<25		000	000 000	02,01,08 00 00
															02	NONE 0 PRVTE PSNGR CAR	TURN-L N -E	01	DRVR	INJC	52	F	OR-Y OR<25		028,047,004	000 000	02,01,08 00 02,01,08

OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANAYLYSIS AND REPORTING UNIT
URBAN NON-SYSTEM CRASH LISTING

CITY OF MILWAUKIE, CLACKAMAS COUNTY

HARRISON ST at 42ND AVE, City of Milwaukie, Clackamas County, 01/01/2012 to 12/31/2016

1 - 2 of 2 Crash records shown.

SER# / INVEST / RD DPT / UNLOC?	S P E D	A L C	R U G S	S C H L	W O R K	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACT EVENT	CAUSE
04094	N	N	N	N	N	10/31/2012	16	HARRISON ST	INTER	CROSS	N	N	RAIN	ANGL-OTH	01	NONE 0	STRGHT										27,03
CITY						WE	0	42ND AVE	CN		STOP SIGN	N	WET	TURN		PRVTE	W -E									000	00
N						8A			03	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	83	M	OR-Y		016,021	038	27,03
N						45 26 47.833883	-122 37 10.3295459																OR<25				
															02	NONE 0	STRGHT										
																PRVTE	N -S									015	00
																PSNGR CAR		01	DRVR	INJC	70	F	OR-Y		000	000	00
																							OR<25				
02412	N	N	N			01/11/2016	16	HARRISON ST	INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 9	STRGHT										02
NONE						MO	0	42ND AVE	CN		STOP SIGN	N	DRY	ANGL		N/A	S -N									015	00
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CITY OF MILWAUKIE, CLACKAMAS COUNTY

42ND AVE at KING RD, City of Milwaukie, Clackamas County, 01/01/2012 to 12/31/2016

1 - 3 of 3 Crash records shown.

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APPENDIX D

Hillside Master Plan for Housing Opportunity – Demographic Analysis for Engagement Planning
DRAFT – 8/15/2018

Overview

EnviroIssues completed a demographic analysis of the Hillside community, Ardenwald-Johnson Creek neighborhood and City of Milwaukie to inform the development of equitable engagement strategies for the Hillside Master Plan project. The data presented in this summary are derived from the following sources:

- Housing Authority of Clackamas County
- U.S. Census – American Community Survey (2012-2016), compiled using:
    - U.S. Census American Factfinder
    - PolicyMap.com, a third-party website used to map demographic data by census tract and other geographic units
    - Community/Attributes' online mapping tool
- North Clackamas School District
- City of Milwaukie

Outreach considerations and recommendations informed by demographic analysis

Outreach tactics and messaging must be sensitive to the lived experiences and challenges faced by Hillside residents

- Many Hillside residents are managing disabilities, earn little or no income and have experienced significant instability in their lives. All outreach efforts must be sensitive to the diverse range of experiences, backgrounds and circumstances represented in the Hillside community.
- Many residents have lived at Hillside for a long period of time; anxieties around relocation and change should be expected and respected

The following accommodations should be made whenever possible to increase accessibility:

- Translation of materials into Russian and Spanish
- Provision of childcare for residents and community members with children
- Accommodations for individuals with vision, hearing and mobility challenges
- Provision of food at in person events (when possible, consider stipends for regular or in-depth participation in engagement activities)

Project materials must be accessibly written, avoiding jargon and technical language

- Languages spoken at home and educational levels vary across Hillside residents and the surrounding neighborhood. Limiting complex language will reduce barriers to participation.

A range of engagement approaches and tools will be needed to appeal to different age groups and learning styles

- The average age of Hillside residents is much higher than the surrounding community. A multi-faceted engagement strategy that allows people to plug-in in several ways will help the project team reach individuals across the age spectrum.

Hillside resident demographics

Population, household size and waiting list

Currently, 295 people live at Hillside. Hillside Park is home to 97 households, including 181 people, 35 of whom are children. Hillside Manor is home to 97 households, including 114 people and two children.

Two-thirds of Hillside households are single-person households, while a quarter have two people and about 10 percent have three or more residents (Table 1). Hillside Manor is home to many more single-person households; almost all families with children live in Hillside Park (Table 2). Overall, 10 children under age six live in the Hillside community.

Table 1: Household size - Hillside

	Hillside Park		Hillside Manor		Total Hillside Community	
People in household	Number of households	Percentage of households	Number of households	Percentage of households	Number of households	Percentage of households
1	41	42%	84	87%	125	64%
2	37	38%	11	11%	48	25%
3	12	12%	0	0%	12	6%
4	5	5%	2	2%	7	4%
5	2	2%	0	0%	2	1%

Table 2: Number of children - Hillside

	Hillside Park		Hillside Manor		Total Hillside Community	
Number of children	Number of households	Percentage of households	Number of households	Percentage of households	Number of households	Percentage of households
0	77	79%	95	98%	172	89%
1	10	10%	2	2%	12	6%
2	6	6%	0	0%	6	3%
3	3	3%	0	0%	3	2%
4	1	1%	0	0%	1	1%

Table 3: Number of children under age six - Hillside

	Hillside Park	Hillside Manor	Total Hillside Community
Children under 6	9	1	10

Length of residence

More than half (53 percent) of Hillside residents have lived there for 5 or more years (table 4). On average, the median length of residence is 6 years. Hillside Park residents are more likely to have lived in the community for 5 or more years than Hillside Manor residents.

Table 4: Length of residence - Hillside

	Hillside Park		Hillside Manor		Total Hillside Community	
Median length of residence	7 years		5 years		6 years	
	Number of households	% of households	Number of households	% of households	Number of households	% of households
Less than 2 years	17	18%	20	21%	37	19%
2 – 5 years	22	23%	31	32%	53	27%
5 – 10 years	29	30%	20	21%	49	25%
More than 10 years	29	30%	26	27%	55	28%

Housing size and monthly rent

Housing stock at Hillside is split between one and two-bedroom units. In Hillside Manor, almost all units are one-bedroom, while three-quarters of the units in Hillside Park are two-bedroom units (table 5).

Table 5: Unit size - Hillside

	Hillside Park		Hillside Manor		Total Hillside Community	
	Number of households	% of households	Number of households	% of households	Number of households	% of households
1 bedroom	24	25%	93	96%	117	60%
2 bedrooms	73	75%	4	4%	77	40%

Most Hillside residents pay less than $400 a month on rent, with about a quarter (23 percent) paying less than $100 (table 6).

Table 6: Monthly rent - Hillside

	Hillside Park		Hillside Manor		Total Hillside Community	
	Number of households	% of households	Number of households	% of households	Number of households	% of households
$0 or less	7	7%	3	3%	10	5%
$1 - $100	29	30%	6	6%	35	18%
$101 - $400	43	44%	73	75%	116	60%
$401 - $800	13	13%	14	14%	27	14%
More than $800	5	5%	1	1%	6	3%

Age

The average age of Hillside residents is 60 years old, however there is broad age distribution throughout the community (table 7). Around a third of all residents are over 65, while about a fifth are between 30-44.

Table 7: Age - Hillside

	Hillside Park		Hillside Manor		Total Hillside Community	
Median age	60 years old		58 years old		60 years old	
	Number of households	% of households	Number of households	% of households	Number of households	% of households
Younger than 30	3	3%	2	2%	5	3%
30 – 44	22	23%	14	14%	36	19%
45 – 54	11	11%	24	25%	35	18%
55 – 64	26	27%	27	28%	53	27%
65+	35	36%	30	31%	65	34%

Gender

The majority of Hillside heads of households are women (70 percent) (Table 8).

Table 8: Gender - Hillside

	Hillside Park		Hillside Manor		Total Hillside Community	
	Number of households	% of households	Number of households	% of households	Number of households	% of households
Female head of households	77	79%	58	60%	135	70%
Male head of households	20	21%	39	40%	59	30%

Ethnicity/Cultural background

Around 91 percent of Hillside residents identify as white (table 9). This is likely to change overtime, however, as more individuals on HACC's waitlist move in: of the 8,000 people to apply during the waitlist opening in 2016, 25 percent identified as African American and 10 percent identified as Latino/a/x.

Table 9: Race/ethnicity - Hillside

	Hillside Park		Hillside Manor		Total Hillside Community	
	Number of households	% of households	Number of households	% of households	Number of households	% of households
White	89	92%	88	91%	177	91%
Black	6	6%	7	7%	13	7%
Indian	2	2%	3	3%	5	3%
Hispanic	6	6%	3	3%	9	5%
Other	0	0%	2	2%	2	1%

Languages spoken at home

According to the Housing Authority, 6 percent of Hillside residents are not proficient in English, their primary language being Ukrainian, Russian or Spanish.

Health

A majority of Hillside residents are managing a disability, and over three-quarters of all households include someone with a disability (table 10).

Table 10: Households and individuals with a disability - Hillside

	Hillside Park		Hillside Manor		Total Hillside Community	
	Number	Percent	Number	Percent	Number	Percent
Households	68	70%	79	81%	147	76%
Individuals	74	41%	82	72%	156	53%

According to the HACC: "New residents, especially at move-in, often can use assistance accessing resources to meet basic needs: food, clothing, furniture and other household goods. Assistance accessing health insurance benefits, health and mental health services, recovery support groups and addiction treatment programs are also essential…Residents often come into housing with little in terms of a social support system making community building activities that promote socialization and provide opportunities for resident leadership also essential."

Income and employment

Approximately 84 percent of people living at Hillside Manor and 63 percent living at Hillside Park earn income. Most Hillside residents earn less than $20,000 a year, with 51 percent earning less than $10,000 (table 11).

Table 11: Household income - Hillside

	Hillside Park		Hillside Manor		Total Hillside Community	
	Number of households	% of households	Number of households	% of households	Number of households	% of households
$0-$9,999	48	49%	50	52%	98	51%
$10,000-$19,999	26	27%	37	38%	63	32%
$20,000-$29,999	12	12%	9	9%	21	11%
$30,000-$39,999	6	6%	1	1%	7	4%
$40,000-$49,999	2	2%	0	0%	2	1%
$50,000-$59,999	2	2%	0	0%	2	1%
$60,000-$69,999	1	1%	0	0%	1	1%

According to HACC: "A typical resident in our housing program is on a fixed income from SSI/SSI benefits of $900/month, well below the Federal Poverty Line and 30% AMI. Three of the residents have no income beyond their SNAP benefits."

Surrounding community demographics

Ardenwald-Johnson Creek Neighborhood

Hillside is located in the Ardenwald-Johnson Creek neighborhood in Milwaukie. Census tract 41005020900 was used as an approximation for the boundaries of Ardenwald-Johnson Creek (see figure 1).

Figure 1: Approximate boundary of Ardenwald-Johnson Creek neighborhood used for data analysis

Table 12 summarizes key demographic information for the Ardenwald-Johnson Creek neighborhood.

Table 12: Ardenwald-Johnson Creek – Demographic Overview

Age		**Housing Tenure**		**Race/Ethnicity**	
Under 18	18%	Owner-occupied	55%	White (non-Hispanic)	92%
Working age (18-64)	67%	Renter-occupied	45%	Hispanic/Latino	10%
		Rental vacancy rate	3.5%	Two or more races	3%
Age 65+	15%			Black/African-American	2%
Median age	41	**Disability Status**		Asian	2%
		Any disability	18%	Other	1%
Number of households	1,650	Ambulatory	10%	Native Hawaiian and Other Pacific Islander	0%
		Cognitive	8%		
Total population	3,958	Hearing	6%	American Indian and Alaska Native alone	0%
		Vision	5%		
		Region of Origin (% of foreign born population)			
Foreign-Born Population				**Languages Spoken At home**	
7% born outside the U.S.		Eastern Europe	25%	English only	87%
		Latin America	21%	Spanish	6%
		Western Asia	14%	Russian, Polish or Slavic languages	5%
Limited English Population					
5%		Western Europe	11%	Chinese	1%
		Eastern Asia	6%	French	.3%
Annual Household Income		**Unemployment Rate**		**Highest Educational Attainment**	
Less than $25,000	26%	4.2%		Less than high school	8%
$25,000-$49,999	18%			Graduated high school	26%
$50,000-$99,999	42%	**Poverty Rate**		College grad	33%
$100,000 plus	14%	12.8%			
Median household income	$55,110				

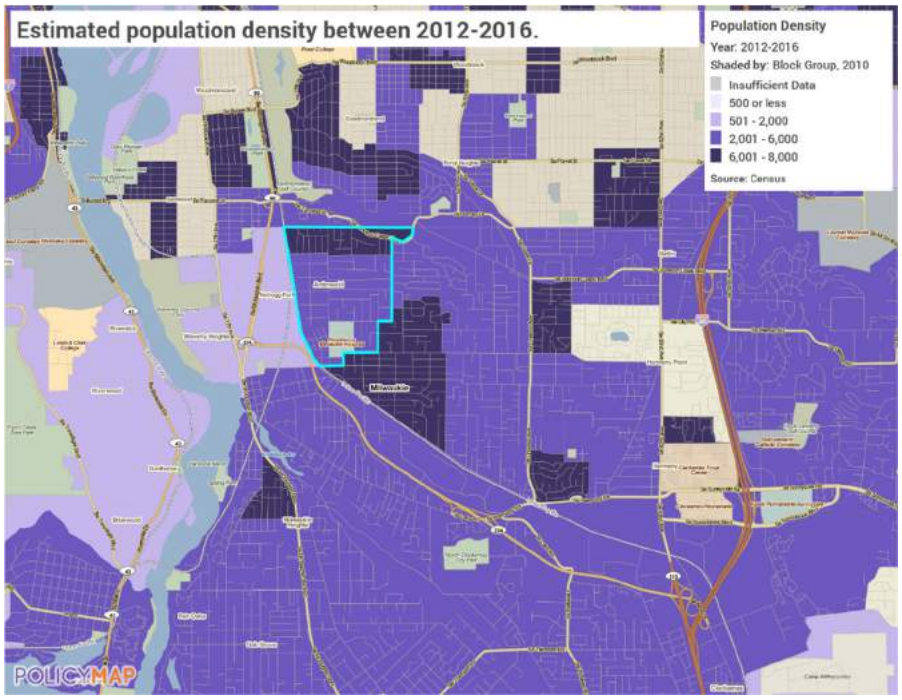
Data collected from the U.S. Census American Community Survey (2012-2016) using American FactFinder, PolicyMap.com, and CAIMaps.Info.

City of Milwaukie

A full demographic overview of the City of Milwaukie is appended to this analysis. The following heatmaps show distribution of key demographic indicators across the City, with the approximate boundaries of the Ardenwald-Johnson Creek neighborhood highlighted in blue.

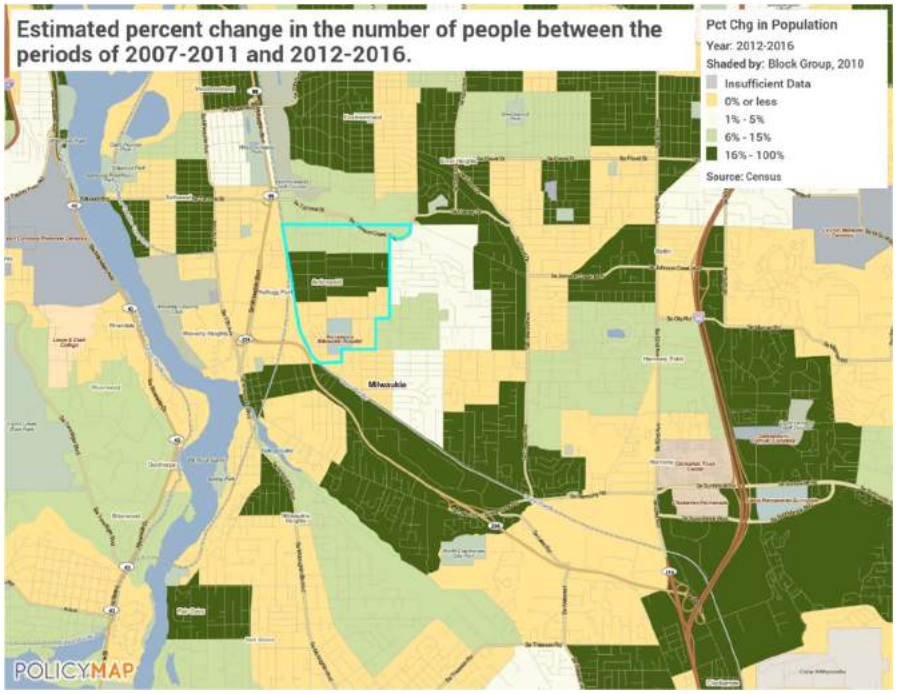
Population density:

The northern section of Ardenwald-Johnson Creek is denser than the portion that includes Hillside. To the south, the area around downtown Milwaukie is also denser.



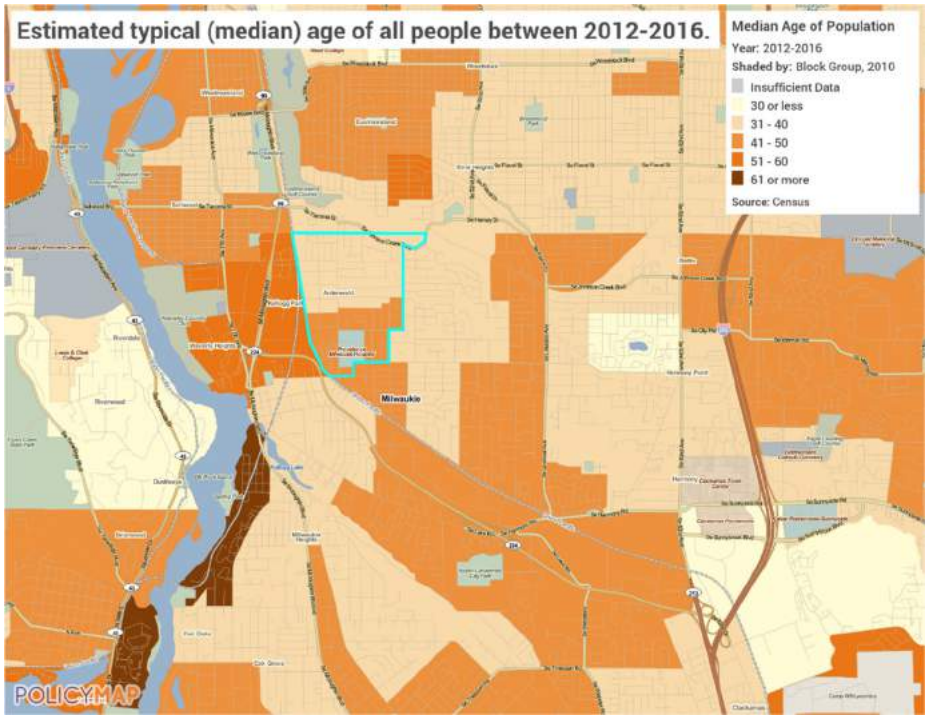
Population change:

The population grew by more than 16% in the past five years in the portion of Ardenwald just north of Hillside, while the population around Hillside and Providence Hospital remained stagnant or decreased slightly.



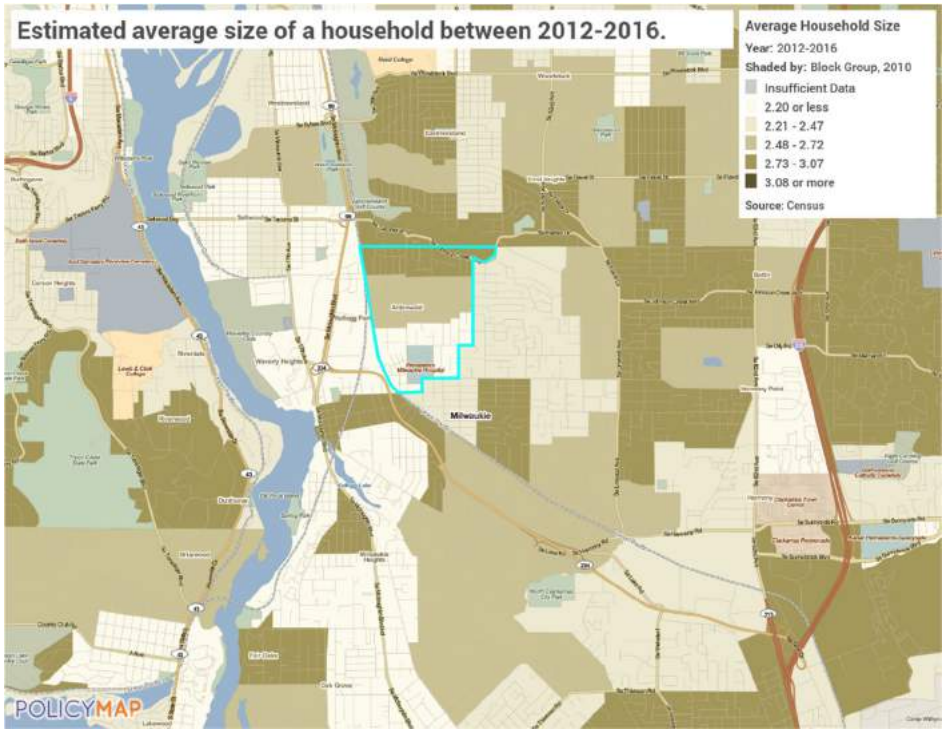
Age

The median age in Ardenwald is slightly lower in the northern portion of the neighborhood and older around Hillside and Providence Hospital.



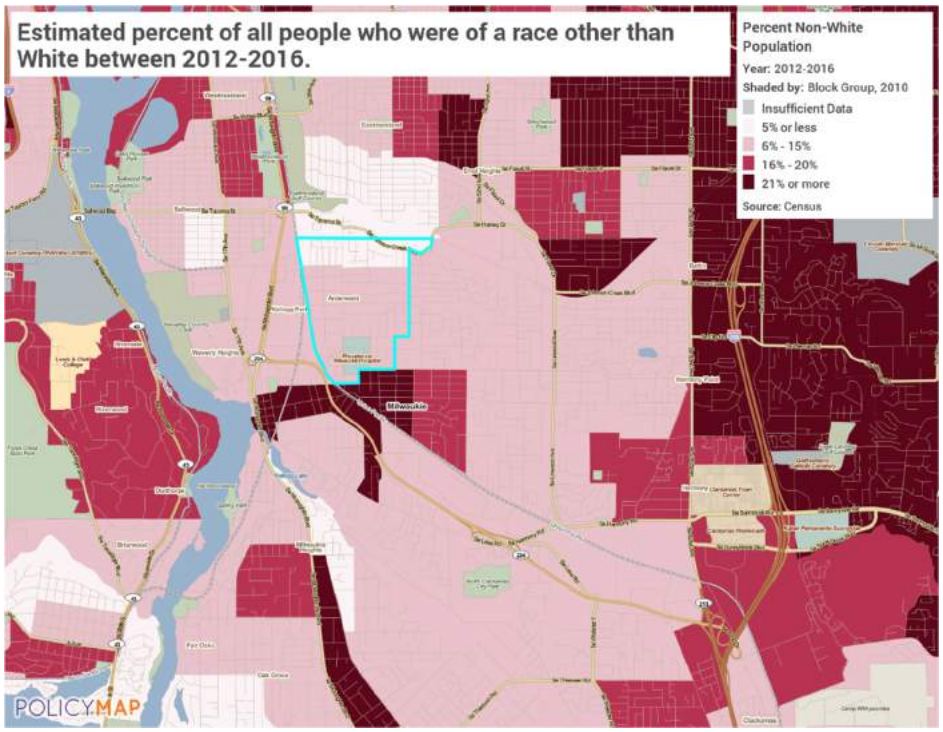
Household size

Households in the southern section of the Ardenwald neighborhood tend to be smaller than those to the north and south.



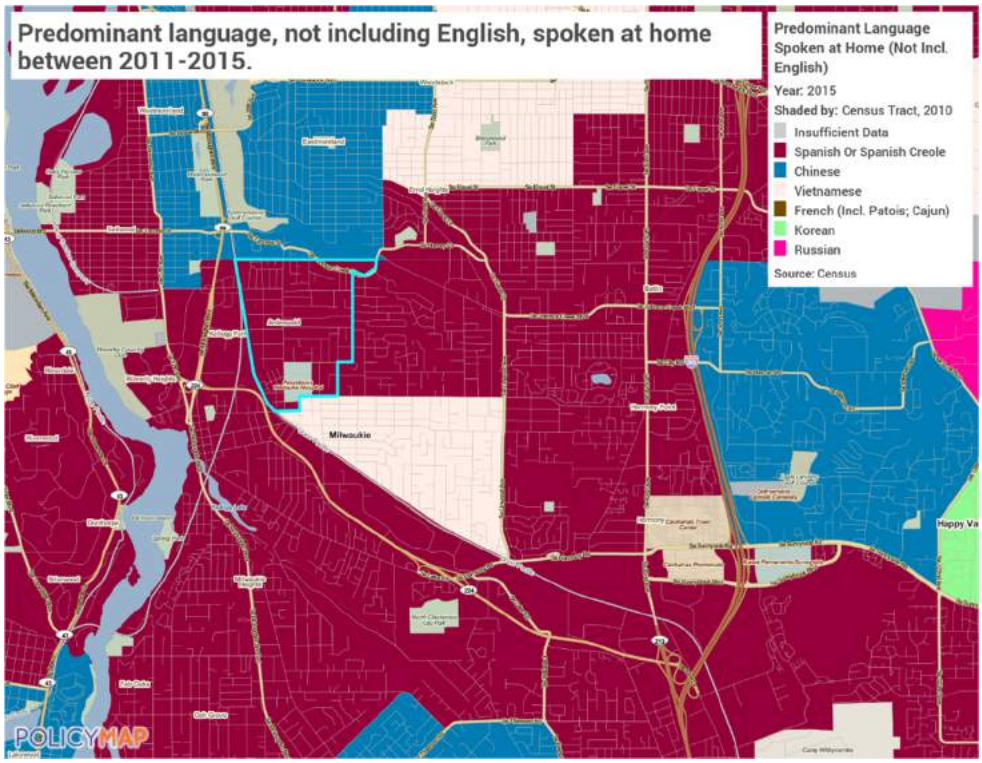
Non-white population

The northern section of Ardenwald is less diverse than the southern section. The population of the Historic Milwaukie area—which borders Ardenwald to the south—is more than 20% non-white.



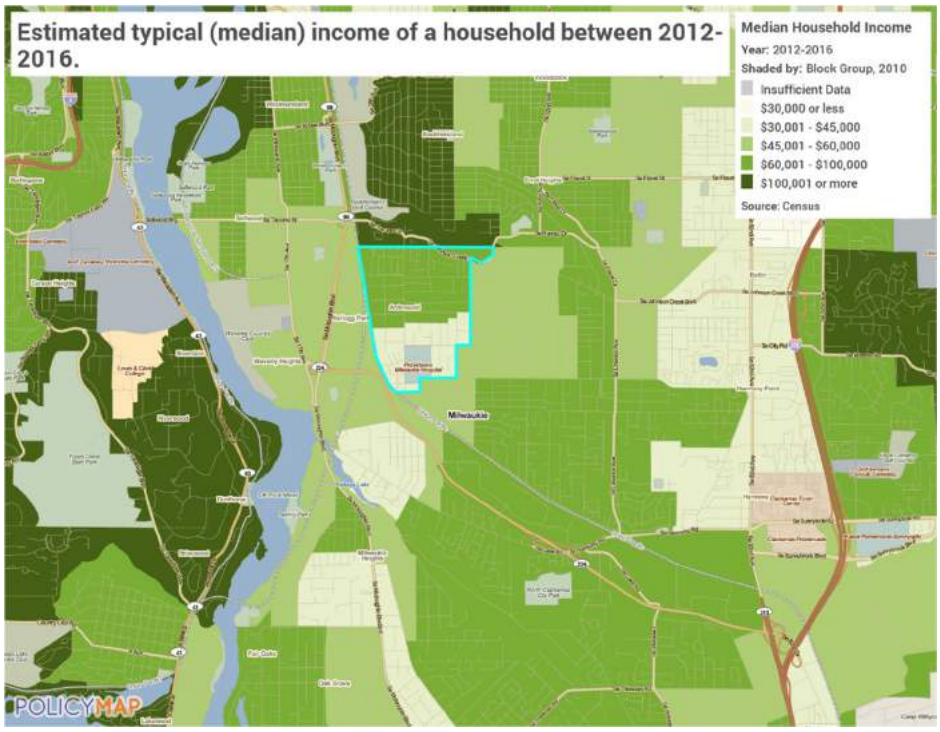
Languages spoken at home other than English

In Ardenwald as a whole, Spanish is the most commonly spoken language other than English at home. Vietnamese is the most widely non-English language spoken in the Hector-Campbell area to the southeast.



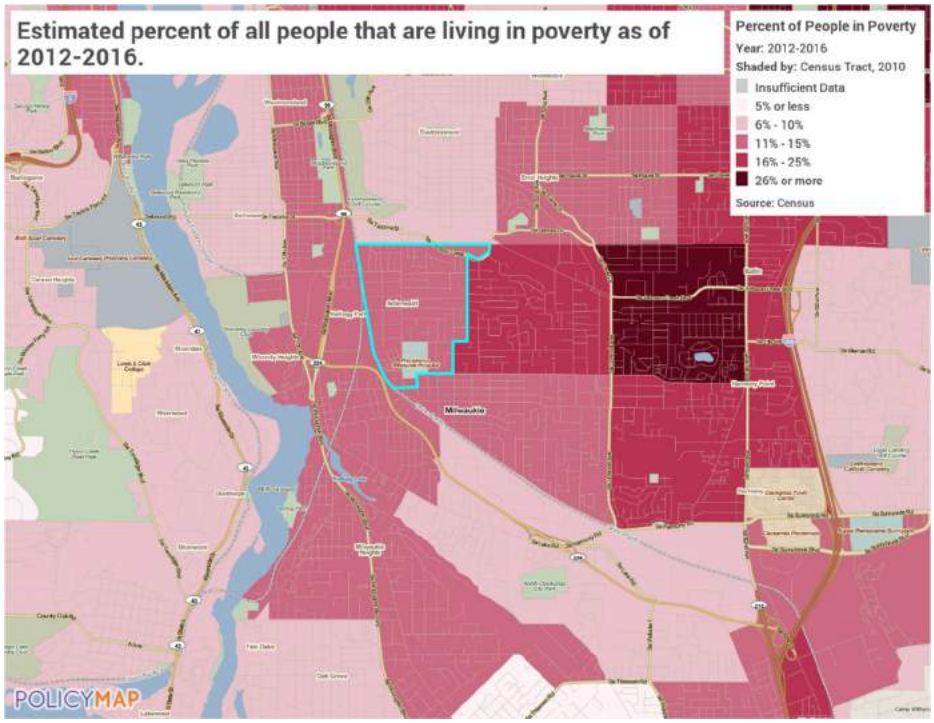
Income

Median household incomes in the southern portion of Ardenwald—including Hillside—are lower than the northern portion. Incomes increase on the other side of Johnson Creek Boulevard in southeast Portland.



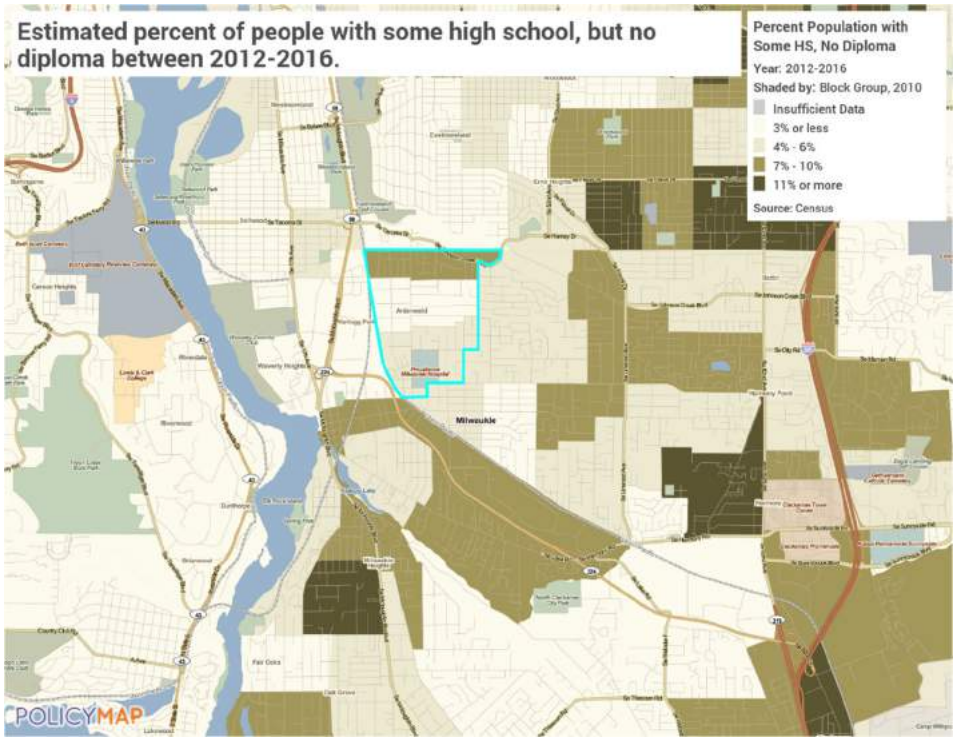
Poverty

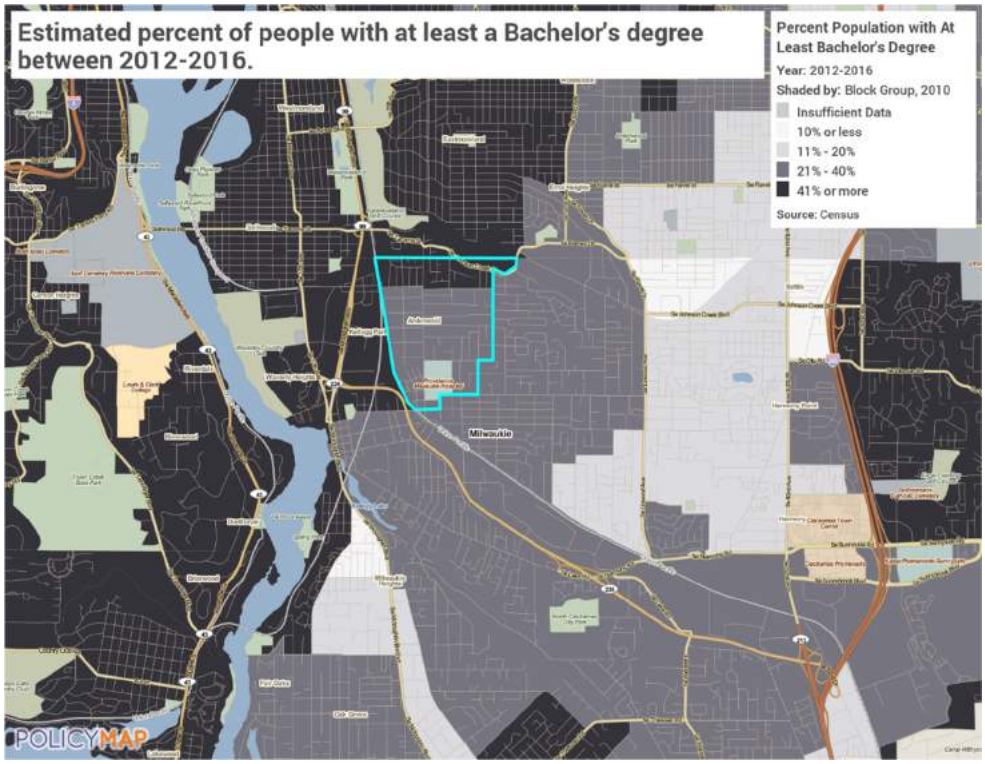
Between 11-15 percent of people who live in the Ardenwald area are experiencing poverty. To the east in the Lewelling neighborhood, this is higher (between 16-25 percent).



Educational attainment

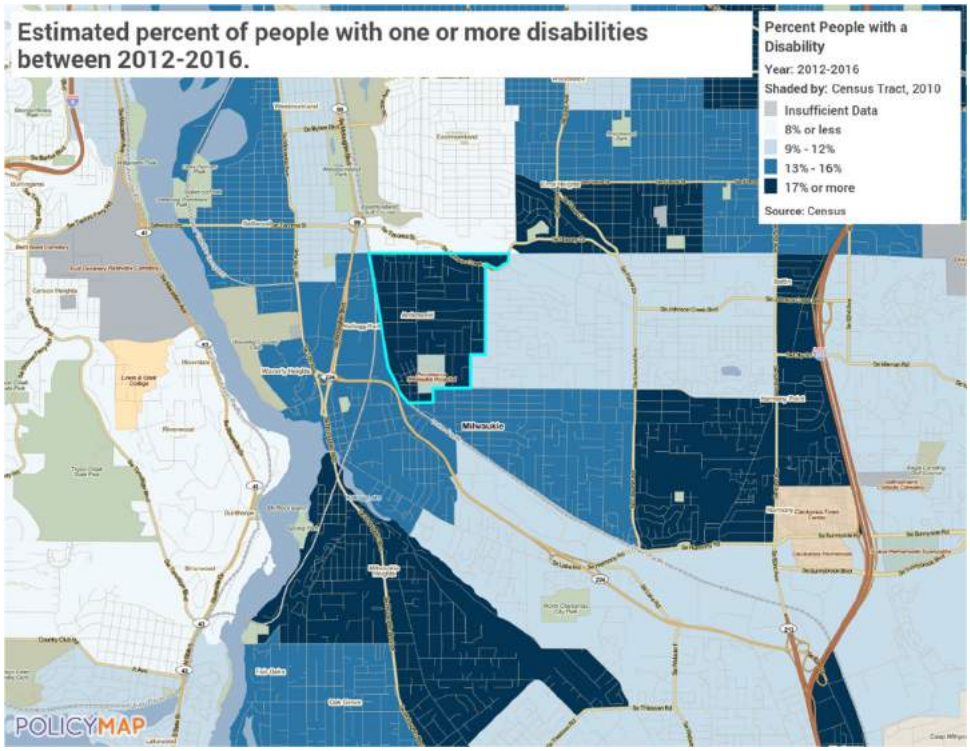
The northern area of Ardenwald has a greater proportion of people who have not obtained a high school diploma. However, this area also has a higher proportion of college graduates.





Disabilities

Compared to much of the rest of Milwaukie, the Ardenwald area has a high proportion of people living with a disability (17 percent or more).



Appendix A: City of Milwaukie demographic profile

The City of Milwaukie covers an area of 4.85 square miles and is located 6.8 miles south of downtown Portland in the northwest corner of Clackamas County. Approximately 20,643 people lived in the City of Milwaukie in 2016.1 Estimates suggest around 12,000 people come into the city each day for work and 7,000 commute out of Milwaukie for employment. Between 2012-2016, 18 percent of the city's population was under 18 years old, while 17 percent were older than 65.

Race and ethnicity

According to the latest census data, around 89 percent of Milwaukie residents identify as white, while 3 percent identify as Asian or two or more races respectively, 2 percent identify as African American, and 1 percent or fewer identify as American Indian or Alaskan Native, Native Hawaiian, other Pacific Islander or as "other." Census figures show Hispanic or Latino residents make up 8 percent of Milwaukie's population.

Data from North Clackamas School District #12 about the race and ethnicity of students in schools in the Milwaukie Feeder System differ from census information. Overall, 30 percent of Milwaukie students identify as Hispanic and 7 percent identify as multi-racial, more than census figures would suggest.[2]

Race/Ethnicity	Milwaukie (2012-2016 US Census American Community Survey)	Students in Milwaukie feeder school system	Oregon
White	89%	56%	85%
African American	2%	3%	2%
Asian	3%	2%	4%
Native Hawaiian and other Pacific Islander	0.1%	1%	0.4%
American Indian or Alaskan Native	1%	1%	1%
Other race	1%	--	3%
Two or more races	3%	7%	4%
Hispanic or Latino (any race)	8%	30%	12%

Languages spoken at home

Census data indicates that the majority of Milwaukie residents speak only English at home (90 percent), while 10 percent speak a language other than English. The most commonly spoken languages other than English in the city include Spanish (5 percent), Russian (1 percent), Chinese (1 percent) and Vietnamese (1 percent).3 School district data, however, suggests much higher proportions of non-native English speakers. Around 73 percent of Milwaukie students speak English as a first language, while 21 percent

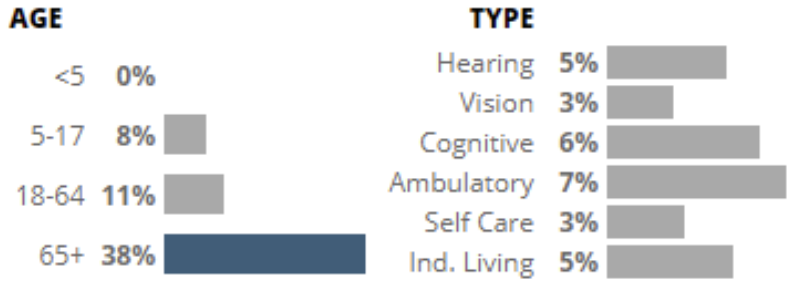
[1] U.S. Census. 2012-2016 American Community Survey (5-year estimate).
[2] Data provided by North Clackamas School District #12 (2018).
[3] U.S. Census. 2011-2015 American Community Survey (5-year estimate). 2016 data not yet available at individual language level

speak Spanish at home, 2 percent speak Russian or Ukrainian and 1 percent speak Chuukese.4 The other most commonly spoken languages among students include (in this order) Vietnamese, Amharic, Chinese and Tagalog/Filipino. Coordinating outreach with organizations that serve these communities will be important for engaging non-Native English speakers.

Community members with disabilities

According to American Community Survey data, 14 percent of Milwaukie residents have a disability. Around a third (38 percent) of seniors (65 years +) have a disability. Ambulatory, cognitive, hearing and independent living disabilities are the most common types in the city. Project staff will consider accessibility needs of community members with disabilities when planning public events.

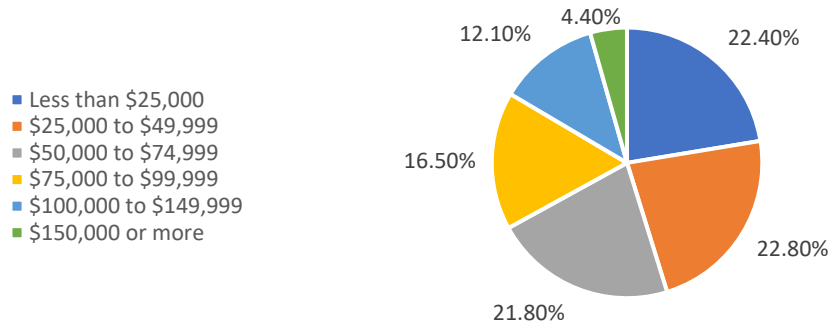
Disability demographics (2011-2015 American Community Survey)



Income and employment

In 2016, the median household income in Milwaukie was $55,880, which is lower than the County average ($68,915). Almost half of Milwaukie households (45 percent) earn less than $50,000. Figure 3 shows the distribution of median incomes in the community. School district data indicate 56 percent of Milwaukie students experience poverty.

Median income (2012-2016 American Community Survey)



The most common industries Milwaukie residents work in include educational services, health care and social assistance (22 percent); manufacturing (13 percent); retail (12 percent); arts, entertainment, recreation, accommodation and food services (11 percent); and professional, scientific, administrative and waste management services (11 percent).

[4] Data provided by North Clackamas School District #12 (2018).

APPENDIX E

ECONorthwest
ECONOMICS • FINANCE • PLANNING

DATE: October 5, 2018
TO: Chris Olenyik, Scott Edwards Architecture
FROM: Erik Rundell, Lorelei Juntunen, and Ryan Knapp
SUBJECT: Hillside Park Master Plan: Demand Analysis

1 Introduction

The Housing Authority of Clackamas County (HACC) is in the process of developing a master plan for the Hillside Park public housing community in Milwaukie, Oregon. Built in the 1940s, Hillside Park totals 100 homes and duplexes, on the 16-acre site. Three-quarters of the units are two-bedroom units; the remaining are one-bedroom. The master plan will describe a mixed-use, mixed-income community that replaces the 100 affordable housing units and builds additional affordable and potentially market-rate housing. In addition, the master planning process is considering the potential for commercial and community uses on the site.

1.1 Purpose

This Demand Analysis informs the master planning process with data and analysis of current real estate market conditions and implications for the development of a mixed-use, mixed-income community. The demand analysis has two main objectives:

- First, the analysis evaluates the types of units needed to replace the existing affordable housing units. Specifically, the analysis will consider the unit sizes and affordability levels needed for the replacement units.
- Second, the analysis assesses the potential for market-rate development (particularly multifamily housing, mixed-use, and medical office uses) at the site. This evaluation would include determining what uses and product types are the most viable and what rents or sales price product types could realize.

1.2 Report Organization

The remainder of the Demand Analysis is organized into three main sections.

- **Replacement Units Analysis** summarizes the housing needs of current Hillside Park residents and those on the waitlist for public housing units.
- **Market Analysis** assesses the potential for the most likely market rate building types and their scale at the Hillside site. This section then summarizes the likely need for public housing units and the type, form, and phasing issues related to the development of market-rate housing units and other commercial uses.
- **Considerations** discuss the implication of the replacement unit analysis and market analysis findings for the redevelopment of the site and creation of the Master Plan.

2 Replacement Unit Analysis

The replacement unit analysis evaluates key characteristics of households currently living the Hillside Park units and those on the waitlist for units to understand the type of units needed to replace the existing one- and two-bedroom houses and duplexes on the site. Specific characteristics evaluated include family size, income, and current unit size.

2.1 Household Characteristics of Hillside Park Residents

The large majority of current Hillside Park residents live in two-bedroom units

The largest share of existing units (75 percent) in Hillside Park is two-bedroom units. A total of 181 people live in the 97 occupied units. Twenty percent of residents are children (under 18 years of age), all who live in two-bedroom units. Thirty percent of residents are seniors over 62 years of age, the majority of whom also live in a two-bedroom unit.

Exhibit 1. Hillside Park, Residents by Bedrooms in Unit, 2018

	Units	Residents	Childern	Resident Over 62
1 Bedroom	24	29	0	18
2 Bedroom	73	152	35	37
Total	**97**	**181**	**35**	**55**
Percent		100.0%	19.3%	30.4%

Source: Housing Authority of Clackamas County

Hillside Park households are relatively small in size

The average household size in Hillside Park is 1.9 people per household. Forty-two percent of Hillside Park households consist of one person, and 38 percent consist of two people. However, 22 one-person households live in a two-bedroom unit. This indicates there is a need for more one-bedroom units or even studios.

Exhibit 2. Hillside Park Residents, Family Size by Bedrooms in Unit, 2018

	Family Size						
	1	2	3	4	5	**Total**	Percent
1 Bedroom	19	5	0	0	0	**24**	24.7%
2 Bedroom	22	32	12	5	2	**73**	75.3%
Total	**41**	**37**	**12**	**5**	**2**	**97**	100.0%
Percent	42.3%	38.1%	12.4%	5.2%	2.1%	100.0%	

Source: Housing Authority of Clackamas County

Hillside Park households have very low incomes

Almost half of Hillside Park households earn less than $10,000 annually. The current average household income per person is $8,012. Affordable housing costs for a household earning $10,000 a year is just $250 per month, assuming 30 percent of gross income goes to housing-related costs.

Exhibit 3. Hillside Park Residents, Family Size by Annual Income, 2018

Annual Income	Monthly Affordable Housing Costs	Family Size 1	2	3	4	5	Total	Percent
< $ 10,000	<$250	26	15	3	2	2	48	49.5%
$ 10,000-19,999	$250-$500	10	10	4	2	0	26	26.8%
$ 20,000-29,999	$500-$750	4	6	2	0	0	12	12.4%
$30,000-40,000	$750-$1,000	1	6	3	1	0	11	11.3%
Total		**41**	**37**	**12**	**5**	**2**	**97**	**100.0%**
Percent		42.3%	38.1%	12.4%	5.2%	2.1%	100.0%	

Source: Housing Authority of Clackamas County

2.2 Characteristics of Waitlist Households

This section summarizes the characteristics of households on the waitlist for units at Hillside Park as well as Hillside Manor, the HCAA's adjacent tower that will be maintained and whose units do not need to be replaced. The demographic and household characteristics of these households indicate whether the demand for public housing units at the site are different or similar to the characteristics of existing residents. There are 255 households on the waitlist for Hillside Park and 806 households on the waitlist for Hillside Manor.

The largest share of people on the waitlist currently live in a one-bedroom unit

A combined 1,640 people are on the waitlist for a unit at either Hillside Park or Hillside Manor. Forty-six percent of these people currently live in a one-bedroom unit. Almost 30 percent of people on the waitlist are children, which is higher than the share of current Hillside Park residents (19 percent). A smaller share of people on the waitlist are seniors over the age of 62 (10 percent) compared to Hillside Park residents (30 percent).

Exhibit 4. Waitlist Households, Number of People by Current Unit Type, 2018

Current Unit Type	Households	People	Children	Over 62 years
1 Bedroom	696	754	24	142
2 Bedrooms	292	633	299	19
3 Bedrooms	60	197	130	3
4 Bedrooms	13	56	34	0
Total	**1,061**	**1,640**	**487**	**164**
Percent		100.0%	29.7%	10.0%

Source: Housing Authority of Clackamas County

Households on the waitlist are also relatively small

The average size of a household on the waitlist is 1.5 people per unit, which is smaller than that of current Hillside Park households. Over 60 percent of households on the waitlist are one-person households. All most all of these households currently live in a one-bedroom unit. Two-

person households are 28 percent of households on the waitlist. Just 49 (or 16 percent) of two-person households currently live in a one-bedroom unit.

Exhibit 5. Waitlist Households, Family Size by Current Unit Type, 2018

Current Unit Type	Family Size 1	2	3	4	5	6	**Total**	Percent
1 Bedroom	642	49	5	0	0	0	**696**	65.6%
2 Bedrooms	1	247	38	6	0	0	**292**	27.5%
3 Bedrooms	0	3	41	14	0	2	**60**	5.7%
4 Bedrooms	0	0	0	9	4	0	**13**	1.2%
Total	**643**	**299**	**84**	**29**	**4**	**2**	**1,061**	100.0%
Percent	60.6%	28.2%	7.9%	2.7%	0.4%	0.2%	100.0%	

Source: Housing Authority of Clackamas County

Households on the waitlist also have very low incomes

The average annual income for a household on the waitlist for Hillside Park is $11,600 a year; the average person is just $4,700 per year. Sixty-one percent of households on the waitlist earn less than $10,000 a year, and 91 percent earn less than $20,000 per year.

Exhibit 6. Waitlist Households, Family Size by Annual Income, 2018

Annual Income	**Monthly Affordable Housing Costs**	Family Size 1	2	3	4	5	6	**Total**	Percent
< $10,000	<$250	418	170	43	10	1	2	**644**	60.7%
$ 10,000-19,999	$250-$500	188	94	18	17	3	0	**320**	30.2%
$ 20,000-29,999	$500-$750	34	31	17	1	0	0	**83**	7.8%
$30,000-40,000	$750-$1,000	3	4	6	1	0	0	**14**	1.3%
Total		**643**	**299**	**84**	**29**	**4**	**2**	**1,061**	100.0%
Percent		60.6%	28.2%	7.9%	2.7%	0.4%	0.2%	100.0%	

Source: Housing Authority of Clackamas County

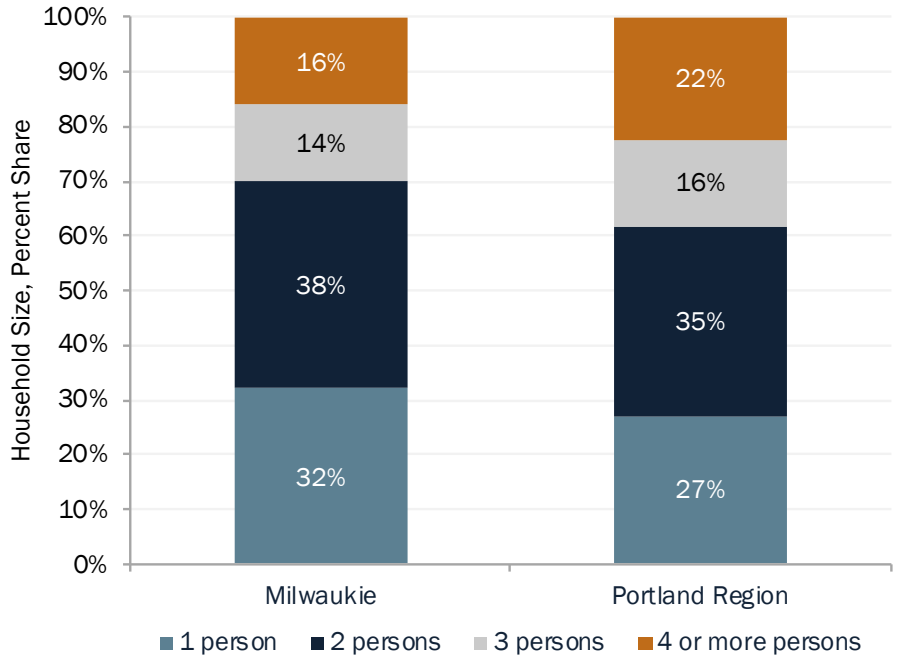
2.3 Demographic Comparison to City of Milwaukie

For further insight into unit mix for the redeveloped site, this section summarizes household size and tenure, age distribution, household and income distribution in Milwaukie and the broader Portland region (the Portland Metropolitan Statistical Area).

Milwaukie has smaller households compared to the region

Over the 2012-2016 period, the average household size was 2.3 people per household compared to 2.6 for the Portland region. One- and two-person households are 70 percent of all households in Milwaukie relative to 62 percent of for the Portland region.

Exhibit 7. Household Size, Milwaukie and Portland MSA, 2012-2016

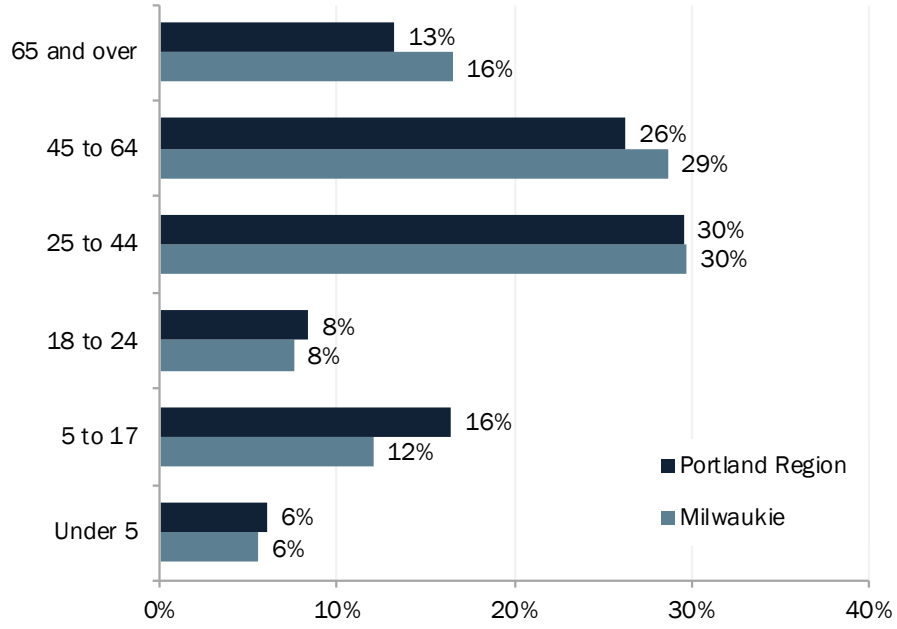


Source: U.S. Census Bureau, SF1 2010 Census Summary; American Community Survey 5-Year Estimates, 2012-2016

Milwaukie also has an older population compared to the region

Milwaukie has a median age of 41.6 compared to 37.6 in the Portland region. Milwaukie has a larger population of residents aged 45 to 64 and 65 years and older relative to the Portland Region. Milwaukie also has a lower share of children than the region. Just 18 percent of Milwaukie's population includes those aged 17 or less. Notably, the share of the population in prime renting age, those between the ages of 25 and 44, is the same in Milwaukee and the region.

Exhibit 8. Age Distribution, Milwaukie and Portland MSA, 2012-2016

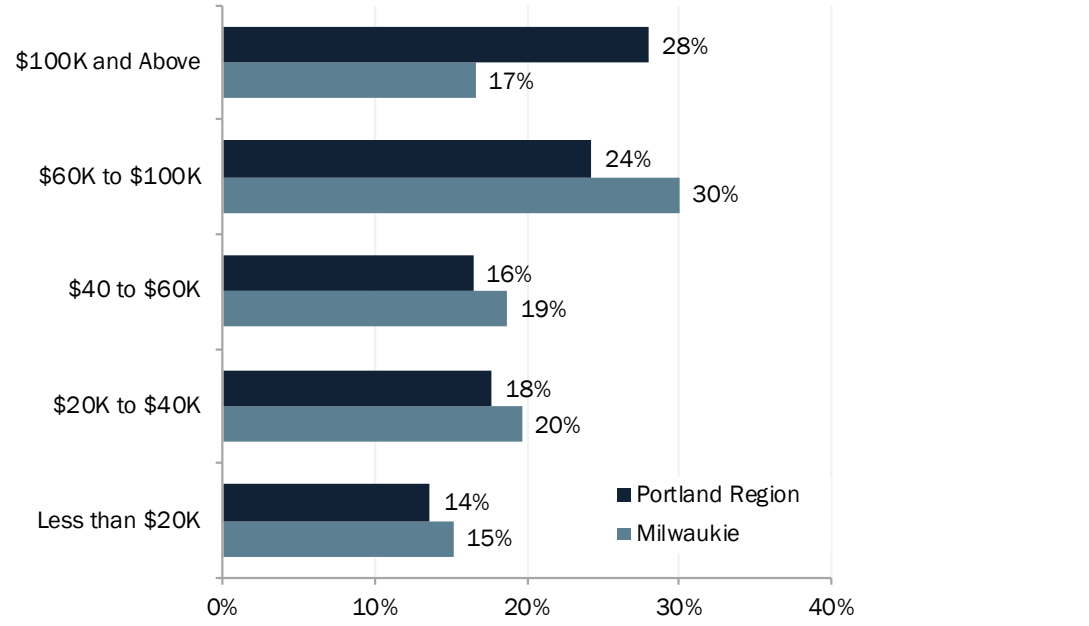


Source: U.S. Census Bureau, 2010 Census; American Community Survey 5-Year Estimates, 2012-2016

Milwaukie also has a higher share of lower-income households

Milwaukie's median household income over the 2012-2016 period was $55,880. In comparison, the Portland region's median household income was $62,772, 12 percent higher than Milwaukie's. Exhibit 9 shows that over one-third of households in Milwaukie earned less than $40,000 a year. Conversely, households in the Portland region have a higher share of households earning over $100,000 of income (28 percent) compared to Milwaukie (17 percent).

Exhibit 9. Household Income Distribution, Milwaukie and Portland MSA, 2012-2016



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates, 2006-2010 and 2012-2016, Table B01001

2.4 Affordable Housing Needs

HACC has the goal of at least replacing all 100 affordable housing units as part of any redevelopment of the Hillside Park site and adding, at minimum, an additional 100 affordable units on site. Currently, one-quarter of units are one-bedroom units, and the remaining three-quarters of units are two-bedroom units. Based on the analysis in the sections above, any public housing units replacing the existing 100 units on the site will likely need a broader range of unit types, particularly for smaller units.

For example, if every household currently at Hillside Park lived in a unit that had bedrooms to accommodate its members (with couples sharing a room and no more than two children per bedroom), there would be 71 studios or one-bedroom units, 22 2-bedroom units, and four 3-bedroom units. Exhibit 10 shows the estimated unit type needed for current Hillside Park residents.

Exhibit 10. Estimated Replacement Unit Needs by Type

	Studio or 1-Bed	2-Bed	3-Bed or more	Total
Total	71	22	4	97
Percent	73%	23%	4%	100%

Source: ECONorthwest, Housing Authority of Clackamas County

Housing units to meet the needs of those currently on the waitlist at Hillside Park and Hillside Manor would also need to have a high share of studios and/or one-bedrooms and a smaller share of two- or three-bedroom units. Exhibit 11 shows the estimated unit type for households on the waitlist.

Exhibit 11. Estimated Wait List Unit Needs by Type

	Studio or 1-Bed	2-Bed	3-Bed or more	Total
Hillside Park	38	194	23	255
Hillside Manor	695	107	4	806
Total	733	301	27	1,061
Percent	69%	28%	3%	100%

Source: ECONorthwest, Housing Authority of Clackamas County

As a result, the affordable housing needed on the site will need to have a much higher share of studios and/or one-bedroom units. Larger units will likely be a smaller share, but will need to include two-, three-, and potentially four-bedroom units. The estimated share unit types for new affordable housing on the Hillside site is outlined below.

- **Studios can potentially be 40 to 60 percent of units.** The largest share of current and waitlist households are one-person households. Forty percent of current households and 60 percent of waitlist households consist of one person.

- **One-bedroom units can potentially be a similar share (25 to 30 percent) as the number of one-bedroom units currently on the site.** One- and two-person households (especially without children) are the most likely to need a one-bedroom unit. Two-person households were the second largest share of households.
- **Two or more bedroom units can potentially be 20 percent or less of future units.** Households with three or more people represent about 20 percent of current residents and 11 percent of waitlist households. In addition, only seven of the 37 two-person households currently living in Hillside Park have children. Lastly, three-bedroom units may need to be at around three to five percent of all units to meet the needs of larger households (those with more than three persons).
- **Units will still need to be affordable for very low-income households.** Of those currently living in Hillside Park, about half have income below $10,000 a year. An even higher share (60 percent) of those on the waitlist had annual incomes below $10,000.

3 Market Analysis

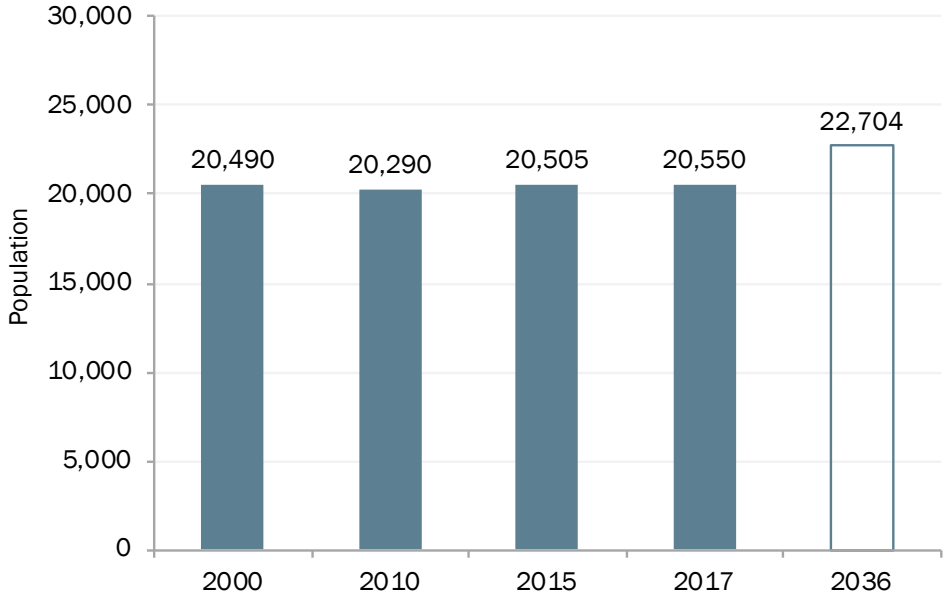
The market analysis section evaluates the market trends and identifies comparable developments for a range of market-rate uses that could potentially be developed at the Hillside site. The analysis focuses on the current real estate market fundamentals (absorption, prices, and vacancies) for multifamily housing (rental and for-sale) and commercial uses (local-serving retail and medical office uses). The section then identifies recent development projects in the local area (Milwaukie and the surrounding area) and other suburban regional locations close light-rail stations to evaluate the potentially achievable rents or sales prices from market rate development.

3.1 Real Estate Market Conditions and Trends

Milwaukie has been growing slowly for the last 15 years

The City of Milwaukie's population has been relatively unchanged since 2000, growing by less than 100 people. The 2016 Housing and Residential Land Needs Assessment projects the city will add 2,150 people by 2036.

Exhibit 12. Population Estimates and 2036 Population Forecast

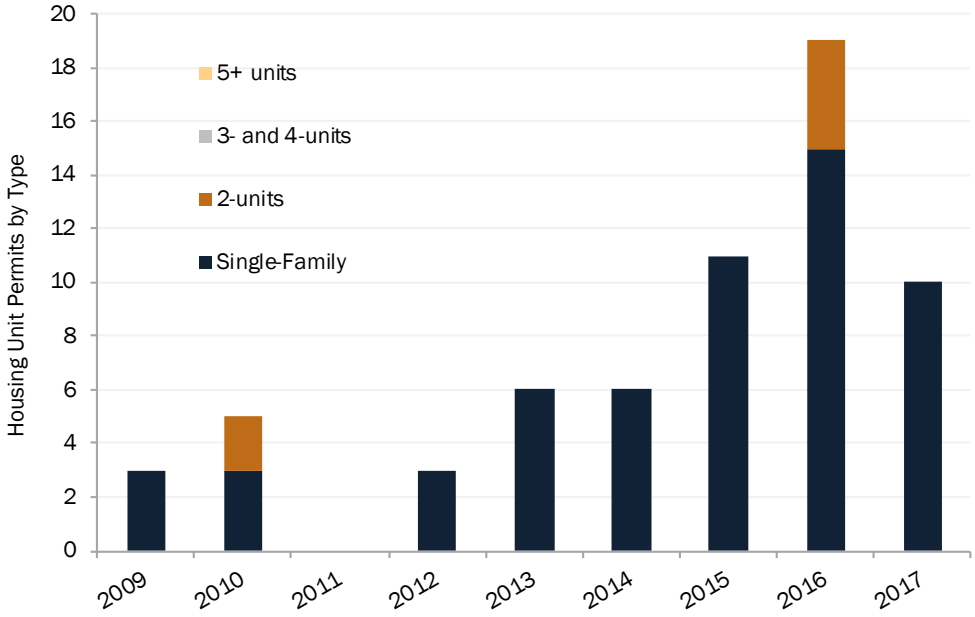


Source: Portland State University, Population Research Center, City of Milwaukie Housing and Residential Land Needs Assessment

Limited Residential Development

Very few housing units have been permitted in Milwaukie since 2009. According to the U.S. Census, only 63 units total were permitted. All of the residential building permits that have been permitted are single-family homes or duplexes. Exhibit 13 shows the units permitted in Milwaukie by type.

Exhibit 13. Residential Building Permits, Unit Permitted in Milwaukie, 2009-2017

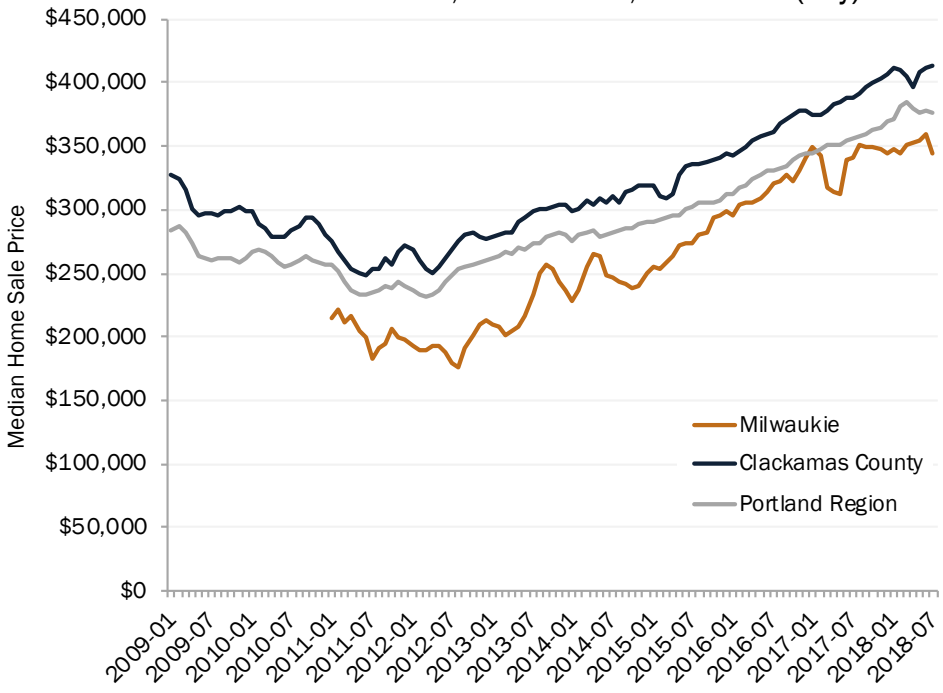


Source: U.S. Census, SOCDS Building Permit Database

Home Sales Prices Have Increased

Sale prices in Milwaukie and the region have increased steadily by almost 80 percent since 2012. As of 2018 (July), the median home sale price in Milwaukie was $359,000. In comparison, the median home sale price in the Portland Region was $385,000, slightly above home sales in Milwaukie. Exhibit 14 shows the trends in home sales prices from 2009 through July 2018.

Exhibit 14. Home Sales Price Trends, 2018 Dollars, 2009-2018 (July)

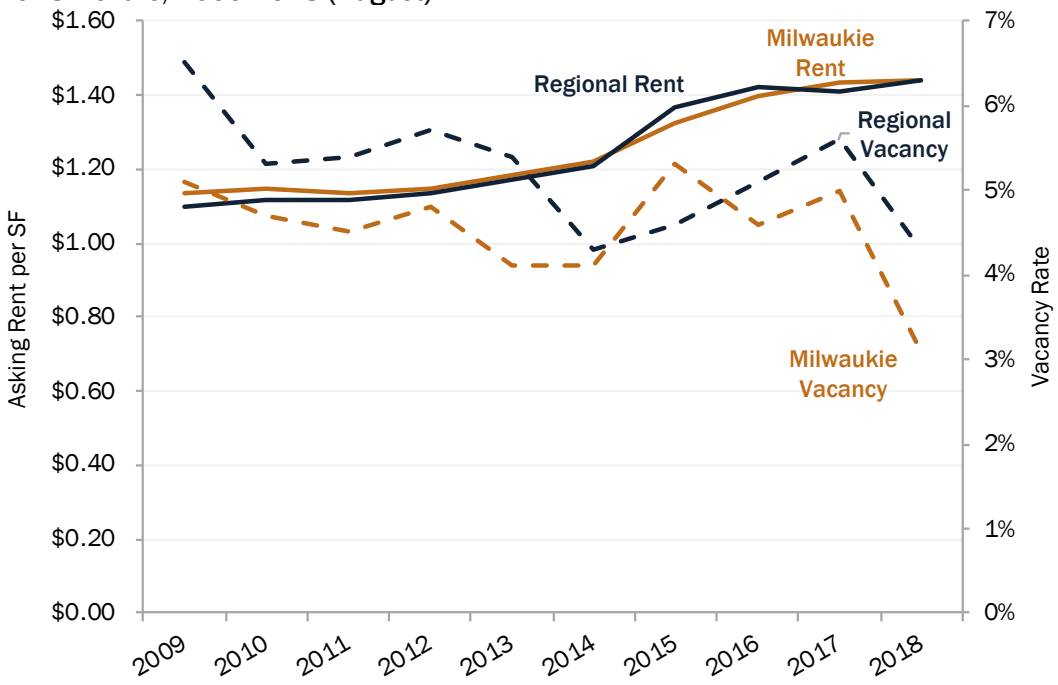


Source: Zillow

Increasing Apartment Rents and Declining Vacancies

The market fundamentals for apartments indicate a tightening market as vacancies have declined and average rents have increased. Currently, the vacancy rates in Milwaukie are almost three percent, the lowest in the last 18 years. At the same time, rents have increased; average rents have increased the last 10 years, with a sharp increase in 2014. In Milwaukie, the average asking rent per square foot (psf) a month has increased from $1.13 psf in 2009 to $1.44 in 2018, adjusted for inflation. This represents a 2.7 percent average annual increase in average rents in the last 10 years. Current average rents in Milwaukie are the same as average rents for the region overall (the Portland MSA).

Exhibit 15. Average Annual Multifamily Asking Rent (per square foot per month) and Vacancy Rate, 2018 Dollars, 2009-2018 (August)



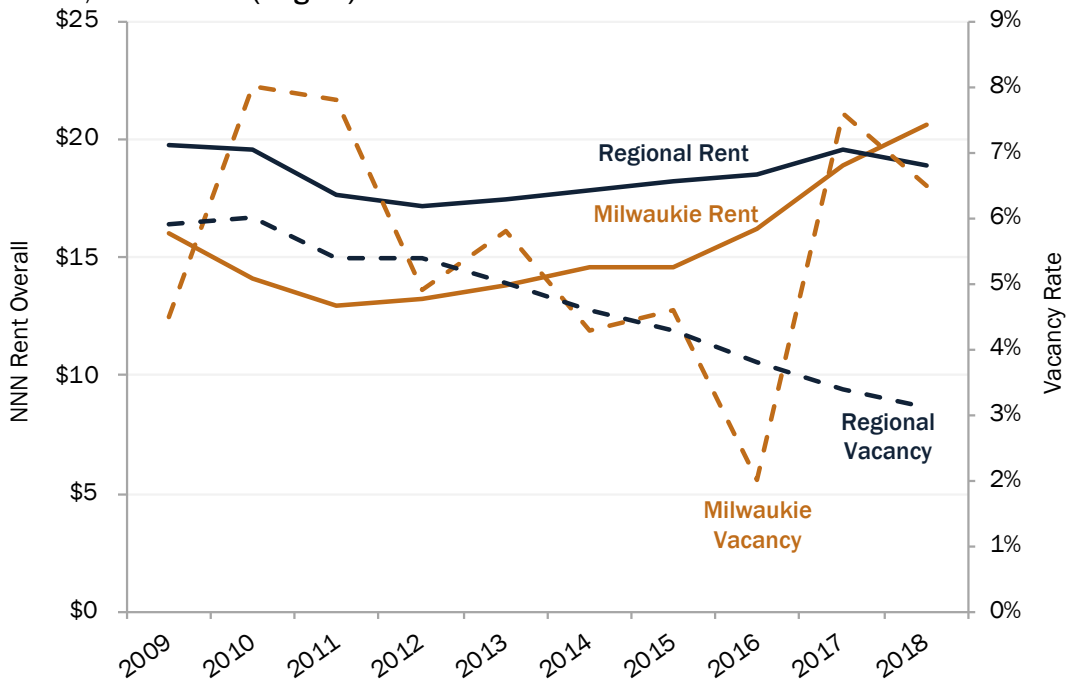
Source: CoStar

More Mixed Retail Market

Market fundamentals for retail uses reflect local retail market that has performed well, but regionally, is seeing declining rental rates despite lower vacancies. In Milwaukie, the vacancies declined from eight percent in 2010 to just two percent in 2016. Over the same period, average retail rents increased 46 percent to over $20.00 per square foot per year (triple net). However, in 2017 total vacancy increased sharply with over 50,000 net square feet vacated in Milwaukie.

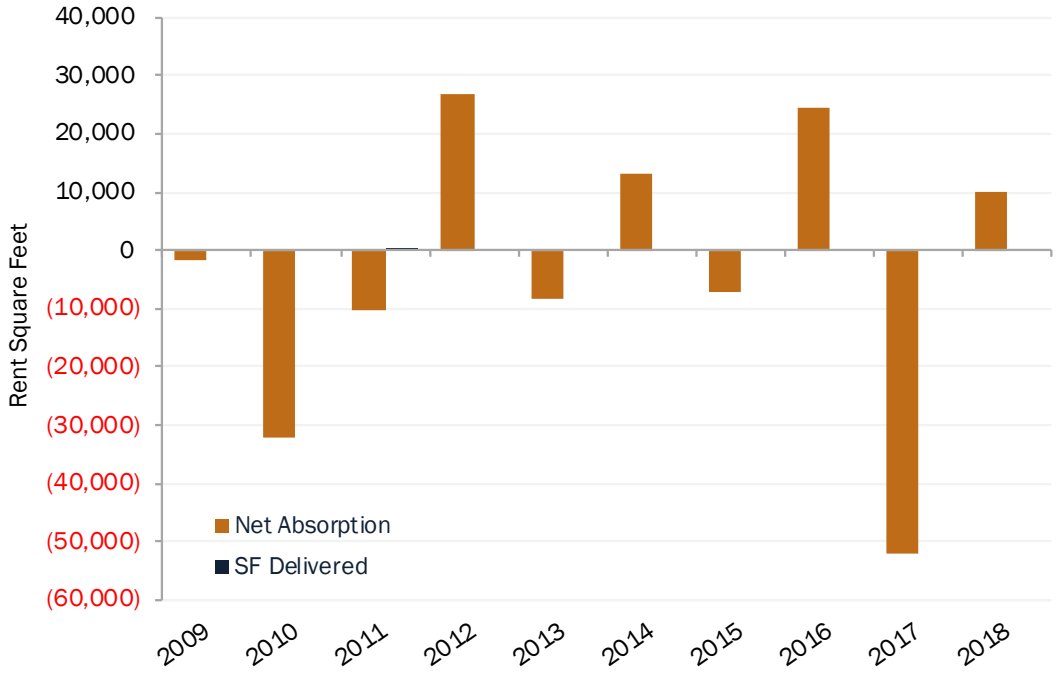
In the last ten years, just 300 square feet of retail space was built within Milwaukie that is in CoStar's survey of buildings. Over the same period, the net retail space leased (referred to as net absorption) has been up and down year-to-year. The large vacation of retail space in 2017 (negative absorption) is reflected in the increase in the vacancy rate that year.

Exhibit 16. Average Annual Retail Rent (per square foot, Triple-Net) and Retail Vacancy, 2018 Dollars, 2009-2018 (August)



Source: CoStar

Exhibit 17. Retail Space Leased and Built in Milwaukie, 2009-2018 (August)

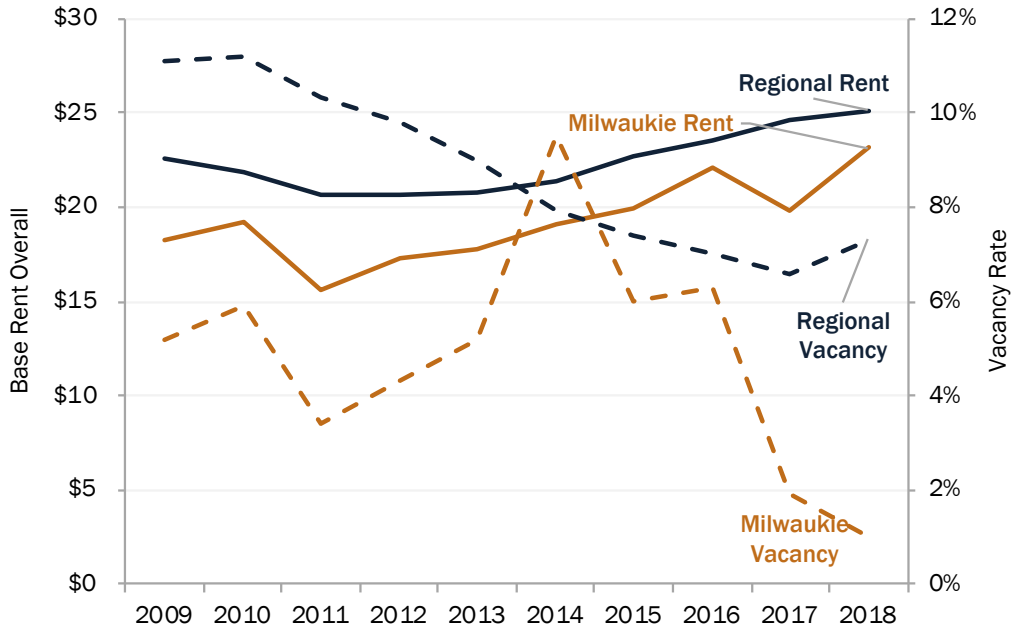


Source: CoStar

Improving fundamentals for office space

Demand for office space is increasing regionally and in Milwaukie. Vacancies are low and rents have been increasing. Average office rents in Milwaukie ($23.13 psf) are lower than the region's ($25.09 psf), indicating Milwaukie is a less valued location for office uses in the region. The vacancy rate of office uses is very low in Milwaukie at just one percent.

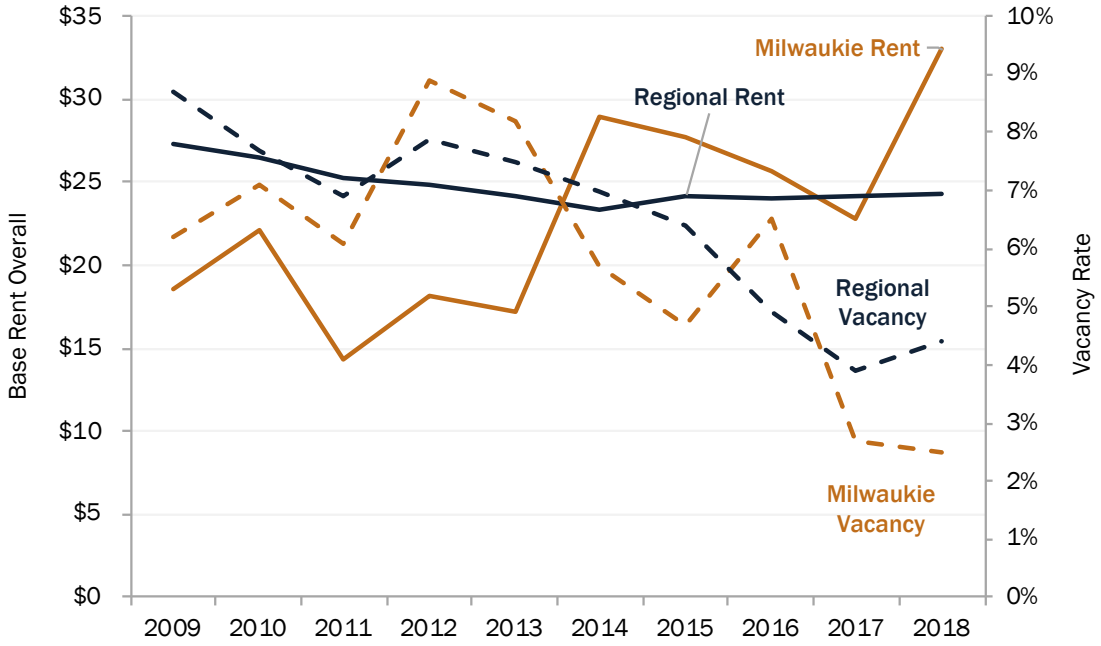
Exhibit 18. Average Annual Office Rent (base rent per square foot per year) and Vacancy, 2018 Dollars, 2009-2018 (August)



Source: CoStar

Medical office submarket fundamentals also improving. In 2018, average rents in Milwaukie have increased to reach $33.00 psf per year. Vacancies in Milwaukie and regionally have declined over the last ten years to less than three percent and five percent, respectively. However, net absorption in Milwaukie has been modest. The city averaged just 400 net square feet a year over the last ten years.

Exhibit 19. Average Annual Medical Office Rent (base rent per square foot per year) and Vacancy, 2018 Dollars, 2009-2018 (August)



Source: CoStar

3.2 Area Comparable Developments

Recent development projects provide a benchmark about the scale and intensity of buildings the current market can support based on the achievable rental rates. Below are examples of multifamily and medical office projects recently built in the Portland region. No market-rate apartments projects have been built in Milwaukie recently. Thus, the analysis considered nearby project in the broader area (Southeast Portland) and projects in suburban locations near light-rail stations. In addition, few medical office projects have been built in the broader area recently, and the analysis considered older, nearby projects.

Multifamily

- Rent levels for the comparable project range from $1.41psf for a relatively basic, small-scale building in east Portland to $2.40 psf for a higher-end, mixed-use building in the Brooklyn neighborhood.
- Achievable rents for a new market-rate apartment project at the Hillside site will likely be lower than those in Sellwood ($2.00-2.30 psf), which is closer to downtown Portland. However, achievable rents will likely be at least as high as those in Happy Valley ($1.81 psf), if not higher.

Medical Office

- Only two medical office buildings have been built nearby since 2000. One of those buildings is the Healing Place building across from the Hillside site.
- Rental rates for the two example medical office projects are approximately $30 psf. Newer buildings would likely receive a premium above those rates.

Milwaukie Area Multifamily Projects

Brooklyn Yard

4780 SE Milwaukie Ave, Portland (Brooklyn)

Year Built: 2016
Units: 46
Stories: 4
Rent: $2.38 psf/month
Unit Mix: 4% (Studio)
87% (1-Bed)
9% (2-Bed)
Vacancy (2018, YTD): 4.4%

Commercial/Retail Space: 2,000 sf (leased)

Parking: Podium/ground-level

The Morgan

1650 SE Tacoma St., Portland (Sellwood)

Year Built: 2017
Units: 44
Stories: 5
Rent: $2.28 psf/month
Unit Mix: 27% (Studio)
64% (1-Bed)
9% (2-Bed)
Vacancy (2018, YTD): 25%

Commercial/Retail Space: 1,200 sf (vacant)

Parking: Podium and underground

Moreland Crossing

8150 SE 23rd Ave, Portland (Sellwood)

Year Built: 2014
Units: 68
Stories: 4
Rent: $1.96 psf/month
Unit Mix: 34% (Studio)
28% (1-Bed)
38% (2-Bed)
Vacancy (2018, YTD): 5.9%

Parking: Surface and tuck-under

Stevens Creek Apartments

11430 SE Stevens Rd., Happy Valley

Year Built: 2018
Units: 140
Stories: 4
Rent: $1.81 psf/month
Unit Mix: 17% (Studio)
21% (1-Bed)
64% (2-Bed)
Vacancy (2018, YTD): 54%

Parking: Surface and ground level

Regional Multifamily Projects Near Light-Rail Stations

The Alexis Apartments
15075 SE Stark St., Portland

Year Built: 2018
Units: 40
Stories: 3
Parking: 20 surface spaces
Rent: $1.41 psf/month
Unit Mix: 8% (Studio)
8% (1-Bed)
70% (2-Bed)
15% (3-Bed)
Vacancy (2018, YTD): 30.0%

Parking: Surface

Vector Apartments
967 NE Orenco Station Loop

Year Built: 2016
Units: 223
Stories:4 | Retail bottom floor (3.1%)
Parking: Covered, in building
Rent: $2.01 psf/month
Unit Mix: 27% (Studio)
55% (1-Bed)
18% (2-Bed)
Vacancy (2018, YTD): 4.5%

Commercial/Retail: 6,420 sf

Parking: Podium

Milwaukie Area Medical Office Projects

Providence Milwaukie Healing Place

10330 SE 32nd Ave, Milwaukie

Year Built: 2001
Total Floor Space: 42,000 SF
Stories: 3
Rent: $24-30 psf Full Service Gross (estimated)
Tenants:

- Providence Medical Group
- Pacific Foot & Ankle Clinic
- Northwest Ent & Allergy
- Advanced Healing Inc.

Mt. Scott Professional Center II

9300 SE 91st Ave, Happy Valley

Year Built: 2008
Total Floor Space: 78,640 SF
Stories: 4
Rent: $32 psf Full Service Gross
Tenants:

- Kaiser Dental
- Metropolitan Pediatrics
- Mt. Scott Surgery Center, LLC

3.3 Market Demand Outlook

While the broader Portland region has grown substantially over the last 10 years, Milwaukie has not realized much new development. Recent trends do not indicate future performance. As the Portland region continues to grow and land values increase, locations with close proximity to major urban centers and good transit service, such as Milwaukie, are increasingly attractive places for development.

The real estate market trends in Milwaukie and comparable development projects also point to a city that does have growing demand for all types of development. In particular, housing (both rental and for-sale) have realized increasing prices and low inventory. A continuation of these growth trends and low vacancies indicate there will likely be demand for more housing (single-family and multifamily) in the future. The resulting increase in population will also drive the demand for additional commercial space to provides goods and services, including retail and medical services.

Demand Outlook by Use

- **Single-family Housing Outlook.** Demand for single-family homes in Milwaukie is likely to continue. Over the last five years sales prices in the city have increased, but there has been little new single-family housing built in response. As the region continues to grow and home prices increase, the site would be a desirable location for new single-family homes. However, the lower densities that come with single-family homes may run counter to the goal of providing as many units as possible, unless they are explicitly offered as opportunities for affordable homeownership product and/or mixed with multifamily units. Townhomes may be a denser, more affordable approach for building single-family housing on the site.
- **Multifamily Outlook.** There is demand for apartments in Milwaukie as well. Vacancies are almost three percent and rents have been increasing. Recently built multifamily developments in the area (Sellwood and Happy Valley) are three- to four-story wood frame construction. As land values in the region increase, denser apartment or mixed-use buildings may become more viable in Milwaukie.

  The regional apartment market may be near the end of the current development cycle, though. A large number of apartment units have been built or are in the construction pipeline, particularly in Portland. Future regional demand for multifamily (rental or for-sale) and the attractiveness of the Hillside Park site compared to other development sites will determine how many and how quickly multifamily units can be absorbed.
- **Retail Outlook.** There is not likely additional demand for a sizable amount of retail space at the site. The retail market in Milwaukie has also shown improving fundamentals, but little new retail space has been developed. The lack of new retail development is likely due to a lack of demand from a small increase in population in the local area and a changing retail market broadly with the rise of online shopping. In addition, the local area already has a supply of retail space nearby to meet local demand. The Milwaukie Marketplace plaza is a half mile from the site, and a shopping center

anchored by a Safeway store (King Road and 42nd Avenue) is less than one mile from the site.

Any future retail development at the Hillside Site would likely cater to local (neighborhood) retail demand. As a result, retail uses that could be supported at the site are likely small-scale, local-serving businesses, which typically need spaces less than 2,000 square feet in size.

- **General Office.** There is not likely additional demand for a sizable amount of general office space at the site, either. The office market in Milwaukie is very tight. However, the site is not adjacent to major roadways and transit stops, which make it less desirable for potential office tenants in the regional marketplace. Smaller, local office users (such as an insurance or tax services) would be the most likely to lease office space at the site. These users also typically need spaces less than 2,000 square feet in size.
- **Medical Office.** Medical office uses are a potential opportunity at the site. Market fundamentals indicate a tightening market medical office space as vacancies are quite low. The proximity to Providence Milwaukie Hospital makes the site an attractive location for future medical office uses, and the aging population and growth regionally will generate demand for new medical office space.

Overall, **multifamily housing is most likely to be the predominant market-rate use viable at the site.** Future market conditions will dictate if rental or for-sale products are the most viable. In addition, the future land values and achievable rents will dictate the building type (including parking) that can be built at the site.

Market-rate, mixed use development may be viable if rents or sale prices for the residential unit are high enough to justify the more costly building form. Ground floor commercial uses (retail or office) would be accessory uses. Given the low vacancy rate for retail and office uses in Milwaukie, there would likely be demand for small commercial spaces. However, potential local tenants for the commercial space may not be able to pay the market-rate rents developers are seeking.

Medical office buildings are also potentially viable uses at the site. Total demand may be limited. Absorption of medical office space has been modest in Milwaukie and the surrounding area and the population has not increased over the last decade. As a result, the scale of a future medical office building may be fairly small to meet the modest amount of demand.

Redevelopment Considerations

Large-scale redevelopment of public housing communities into mixed-income communities is not new. Many of these projects have dealt with the challenges above. New Columbia in North Portland is a regional example. The creation of the Master Plan can help guide the redevelopment Hillside Park and through these and other challenges. Specific considerations for the Hillside Park site include:

- The size of the area available for market-rate development (including parking needs) at the site,
- Infrastructure development needs and costs,
- Phasing of affordable housing units and market-rate development, and
- The relocation of existing residents during construction.

APPENDIX F

Hillside Master Plan for Housing Opportunity

Community Engagement Strategy

10/1/2018

Overview

This document describes the strategy for engaging residents, neighbors and the broader community in the Hillside Master Plan process. It includes the following sections:

- Community engagement goals and objectives
- Key messages
- Stakeholder interests and needs
- Engagement tools and tactics
- Evaluation and metrics

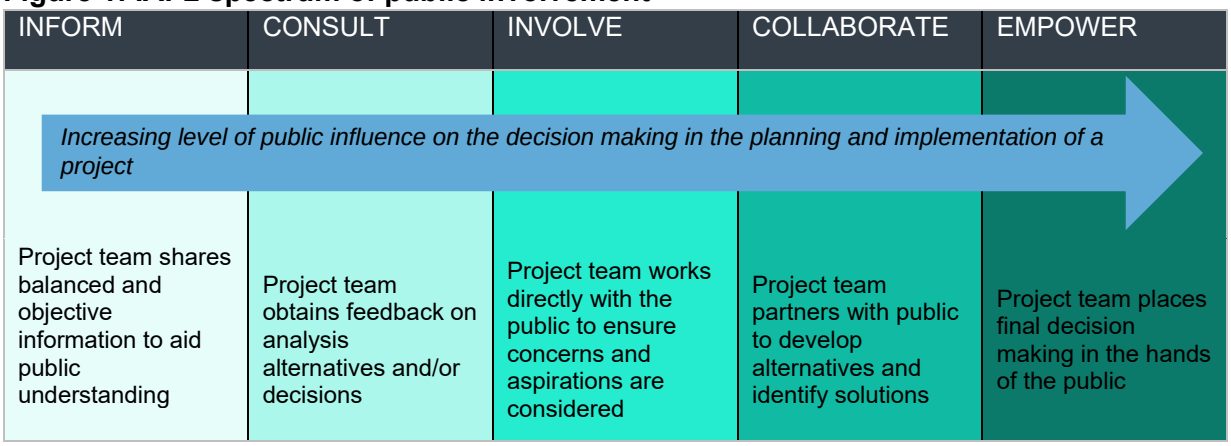
A schedule of community engagement activities and milestones for the entire project is presented in Appendix A. This plan is a living document and this schedule is subject to change. The strategy will be revisited and refined throughout the project as needed.

This community engagement plan was informed by the following (full summaries are available in the appendices):

- Demographic analysis of the Hillside site and broader City of Milwaukie (Appendix B)
- Interviews with seven key stakeholder groups conducted in August 2018 (Appendix C)
- A resident listening session held on September 5, 2018, attended by just over 40 people (Appendix D)

To ensure the Hillside Master Plan project employs community engagement best practices, this strategy has been prepared in alignment with the principles and values of the International Association for Public Participation (IAP2). The IAP2 spectrum of public participation classifies the level of public influence on decision making in the planning and implementation of a project (adapted spectrum shown in Figure 1; full IAP2 spectrum presented in Appendix E). At various points in this process and when dealing with different stakeholder groups, public engagement will occur at the **inform, consult, involve** and **collaborate** levels. At the far right-hand side of the spectrum, “empower” refers to having the public make the final decision on the project. While the project team will collaborate with stakeholders to help develop and identify solutions, final decision-making authority lies with the County.

Figure 1: IAP2 spectrum of public involvement



Throughout this plan, these terms will be used to indicate which level of the spectrum is applicable.

Community engagement goals and objectives

The community engagement goals of the Hillside Master Plan project are as follows:

- **Raise awareness and understanding:** Clearly communicate project purpose, process and objectives to ensure the public can participate in an informed, educated way.
- **Conduct an accessible, inclusive engagement process:** Employ tactics and tools that engage all identified stakeholder groups throughout the project and reduce barriers to participation.
- **Build trust, credibility and relationships**: Use the master planning process to bring people together and create a foundation for future engagement at Hillside.
- **Authentically and transparently incorporate community feedback into design**: Develop a master plan that is responsive to the feedback we receive.
- **Close the feedback loop:** Explain to the community how their input was used throughout the planning process and how public feedback informed the overall vision.

Project goals:

- Comprehensive public engagement
- Procurement of highly qualified development and design team
- Creation of physically and financially viable master plan
- Land use approval and alignment with City of Milwaukie Comprehensive Plan
- Successful funding awards

These community engagement goals compliment the overall goals of the master plan project (see sidebar).

Key messages

The following key and supporting messages should be used by all members of the project team when engaging with the public to ensure consistent tone and characterization of the project. These messages may be expanded upon or added to in certain circumstances and as new

information arises. Audience should always be considered when selecting exact word choice and language.

In addition to these key messages, a specific set of frequently asked questions (FAQs) has been developed for Hillside Residents (Appendix F). These FAQs will be updated throughout the project as needed.

Project vision and scope: **The Hillside Master Plan will set the vision for a vibrant mixed-use, mixed-income community that preserves and rebuilds existing affordable housing at the site, while creating opportunities for expanded housing choice and type.**

- The master plan will include up to 400 new affordable housing units, community gathering space, enhanced outdoor recreation areas and greenspace, and other amenities that will serve both Hillside residents and neighbors.
- Mixed-use refers to a combination of housing and businesses, retail, office space or other services.
- The master plan will improve public spaces at Hillside and provide a range of recreational and greenspaces for residents and neighbors to enjoy.
- The project will complement County-wide goals for affordable housing.
- Hillside Manor, the nine-story tower in the Hillside community, will remain in place as part of this master plan, but the area around the Manor (called Hillside Park) will be reimagined. Improvements to Hillside Manor will happen as a separate project.
- Current Hillside residents will be centered throughout the engagement process and highly involved in the development of the master plan. All current Hillside residents will be guaranteed a right to return to the community once the new homes are completed.

Why Hillside? **There is significant opportunity to add housing and amenities for current and future residents at the 16-acre Hillside site.**

- The homes at Hillside Park were built in 1942 to serve as temporary housing for the local workforce. Over the years, the homes have been maintained but they are now in need of major repair. There is an opportunity to redevelop Hillside Park to provide more housing onsite and help meet housing demand.
- The City of Milwaukie and the County have also seen many changes during this time, including more people living in this area and higher housing costs. There is a need to build more housing to meet the needs of our current and future community members.
- Hillside's proximity to essential services, transit connections, downtown Milwaukie and Southeast Portland make it the ideal location for expanding housing options.
- The City of Milwaukie and Clackamas County are actively developing strategies to plan for growth, address rapidly increasing housing costs, and improve quality of life for current and future residents. The Hillside Master Plan is an important part of this community-wide conversation.

Human-centered, resident driven approach: **A robust community engagement strategy will involve Hillside residents, neighbors and stakeholders in creating a vision for the site.**

- Engagement efforts will center on Hillside residents to ensure the master plan reflects their needs and values.
- Public involvement opportunities will be transparent and accessible.

- Community members can provide feedback at any time via the project website or by contacting Mary-Rain O'Meara, Housing Development Coordinator, at 503-650-3140 or momeara@clackamas.us

Support for current residents: **The Housing Authority of Clackamas County (HACC) is committed to supporting its residents through any transition related to the redevelopment of this site.**

- It is likely that residents at Hillside Park will need to be temporarily relocated to new accommodation to allow for homes to be demolished and rebuilt.
- To ensure a smooth move, a relocation counselor and professional movers will be available to each resident, who will help make a plan for each household. All expenses related to relocation, including replacement housing payments and moving services will be paid by HACC.
- It is HACC's goal to minimize disruption to the current Hillside residents during the redevelopment. To achieve this, a phased development approach will be explored that could allow for most residents to remain at the community while the new homes are being built.
- All current Hillside residents will be guaranteed a right to return to the community once the new homes are completed.

Project timeline: **The Housing Authority of Clackamas County (HACC) seeks to adopt a comprehensive master plan by summer 2019.**

- There will be opportunities for community engagement and input between September 2018 and May 2019.
- After the Hillside Master Plan is completed, the HACC will apply for funding to move forward with development, which could take up to an additional year, due to the design, permitting and funding timelines. The earliest construction would begin is 2021.

Stakeholder interests and needs

This strategy recognizes the multi-faceted "public" involved in this process. To develop a vision through this master plan that is truly human-centered, this strategy must consider the unique needs and circumstances of those who might be affected or have a stake in the eventual redevelopment of Hillside.

The Hillside Master Plan will most directly impact the current residents and the agencies who serve them; followed by immediate neighbors and the broader Milwaukie community (including government, services and businesses); and finally regional actors and agencies that oversee services or amenities near the area. The orbit diagram below (Figure 2) shows these varying levels of impact, which effects the tools, tactics and strategies selected to engage these populations.

Figure 2: Orbits of participation on the Hillside Master Plan project

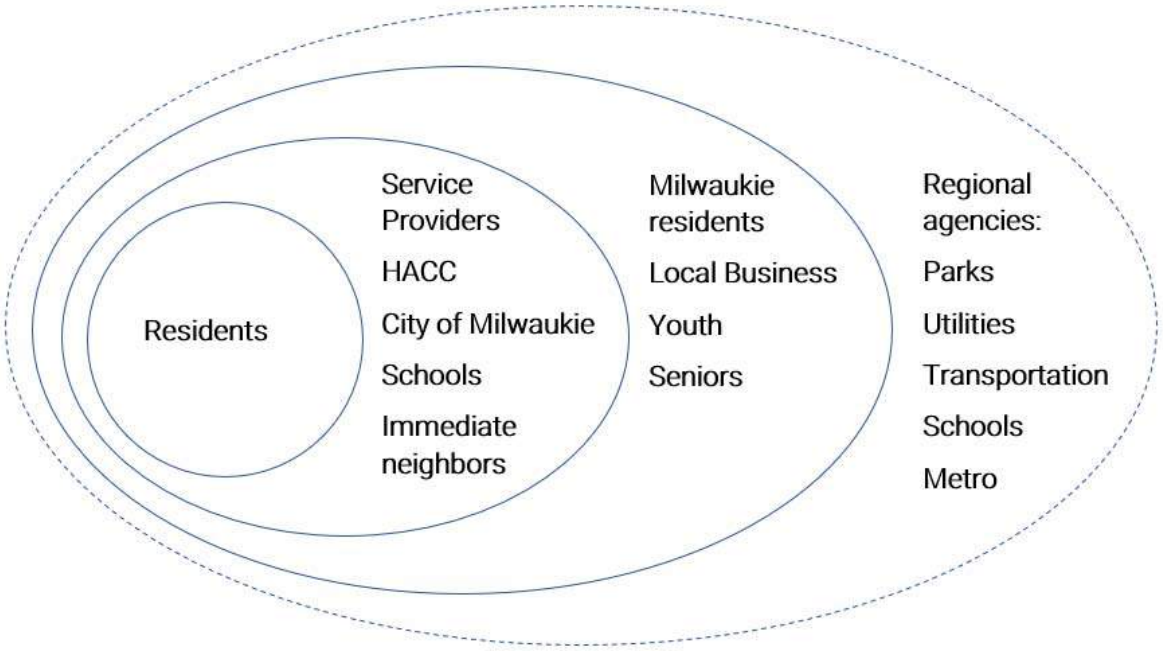


Table 1 summarizes the current list of stakeholder interests identified for engagement as part of this process, including key organizations and contacts and things to consider when engaging these groups.

Table 1: Stakeholder interests, contacts and considerations

Stakeholder interests	Key organizations and contacts	Engagement considerations
Residents	• Hillside Manor Residents Association • Residents on the stakeholder advisory committee	• Mobility needs • Vision accessibility • Time and location of events • Russian and Spanish language needs
Property management staff	• Hillside property managers	• Need timely updates as or before residents receive information so they can answer questions
City of Milwaukie	• Community Development Department • City Manager's Office • City committees (PSAC, ArtMOB, Tree Board, CPAC) • Ledding Library	• Align engagement process with Comprehensive Plan and other City public involvement efforts • Ensure consistency with City policies and goals
Clackamas County	• HACC • Behavioral Health Division • Public and Governmental Affairs • Board of County Commissioners' office	• Ensure consistency with County policies and goals
Service Providers	• HACC (Jemila Hart) • Oregon Food Bank • Public Health Division	• Time and availability (consider focused outreach)
Ardenwald neighborhood	• Ardenwald Neighborhood District Association • Ardenwald Elementary PTO	• Desire frequent, transparent updates and information

		• Legacy of previous engagement processes
Seniors	• AARP • Milwaukie Center	• Mobility and accessibility needs • Technological barriers
Youth	• North Clackamas Youth Advisory Council • Ardenwald Elementary students • Milwaukie High School students • El Puente (bi-lingual school) students	• Accessibility of information • Activities need to be engaging and relevant
Milwaukie Russian/Ukrainian community	• Hillside residents • Eben-Ezer Russian Gospel Church	• Translation and interpretation needs • Work with trusted organizations and liaisons to spread the word
Milwaukie Latino/a/x community	• Wichita Center, Ready, Set, Go! Program • GracePointe church • Latino Network	• Translation and interpretation needs • Work with trusted organizations and liaisons to spread the word
Milwaukie Vietnamese community	• Vietnamese community of Oregon (VNCO.org)	• Translation and interpretation needs • Work with trusted organizations and liaisons to spread the word
Neighboring landowners	• Murphy site owner and rep • Providence Milwaukie	• Time and availability (consider focused outreach)
Local business and economic development	• Milwaukie Café and Bottle Shop • 32nd Street Market • North Clackamas Chamber of Commerce • City of Milwaukie Community Development	• Time and availability (consider focused outreach)
Public safety	• Milwaukie Police Department • Milwaukie Fire Department	• Time and availability (consider focused outreach)
Metro	• Metro contract manager	• Ensure alignment with grant goals
Health	• Providence Milwaukie • Clackamas County Public Health	• Time and availability (consider focused outreach)
Food access	• Oregon Food Bank • Milwaukie farmer's market	• Time and availability (consider focused outreach)
School leadership and staff	• Ardenwald Elementary staff • North Clackamas School District • El Puente staff • Portland Waldorf School	• Time and availability (consider focused outreach)
Transportation	• TriMet	• Time and availability (consider focused outreach)
Parks and recreation	• North Clackamas Parks and Recreation	• Time and availability (consider focused outreach)
Utilities	• PGE • Northwest Natural • Railroad	• Time and availability (consider focused outreach)

Engagement tactics and tools

The following tactics and tools will be utilized as part of the engagement strategy. The tables below describe each tactic, its purpose in this project, and roles and responsibilities associated with that tool. A matrix showing which tools will be used to engage which audiences is included in Appendix F.

Table 2: Tools and tactics to *inform* the public

Inform 	• Tactics and tools used to ***inform*** stakeholders that provides clear and accurate information to detail the what, why, where, when, how of project milestones and decisions. • These methods should also detail where further information can be found and who may be contacted to assist community members and stakeholders in their understanding of the information being shared.	
Tool/tactic	***Purpose***	***Roles/responsibilities***
Project fact sheet	• Provide an overview of the project goals, process, timeline, and key contact information • To be used at events and online as a general informational resource	• EnviroIssues develops and keeps fact sheet updated
Resident folio	• Provide resident-specific overview information and answers to FAQs	• EnviroIssues develops and keeps folio updated
Briefings at key milestones	• Provide in-person updates to community groups and organizations at key project milestones • Build relationships and trust	• HACC staff to provide briefings to agency staff, community groups, City and County committees, etc.
Event notification flyers	• Notify residents and community members of upcoming engagement opportunities • To be posted on resident doors, near laundry facilities, in Manor lobby and at key community locations as appropriate (e.g. Ledding Library, businesses at corner of Harrison and 32nd Ave, City buildings)	• EnviroIssues to draft content • Clackamas County PGA to create layout and coordinate translation
Mailed postcards /letters/ newsletters	• Inform residents and community members of decisions, project updates and upcoming engagement opportunities at key milestones • To be mailed to residents and, as appropriate and budget allows, to Ardenwald residents	• EnviroIssues to draft content • Clackamas County PGA to create layout and coordinate translation
City and County social media channels (Facebook and Twitter)	• Notify Milwaukie and Clackamas County residents of engagement opportunities that are open to the public (e.g. charrettes, open houses and online open house) • Draw traffic to online resources (e.g. website and online open house) •	• EnviroIssues to draft content • City of Milwaukie to post on Milwaukie accounts • Clackamas County PGA to post on County accounts
Email updates	• Inform those who have expressed interest in the project by attending an event or signing up online of project updates and upcoming engagement opportunities • Inform organizations who have not engaged in the project and provide an opportunity to become more involved or opt-out of updates	• HACC to provide existing email contact list • EnviroIssues to augment list by identifying contacts for all key stakeholder interests identified in this plan • EnviroIssues to maintain contact database from event and web sign ups • EnviroIssues to draft content for e-newsletters • HACC to program and send emails to list provided by EnviroIssues
***Milwaukie Pilot* newsletter**	• The Milwaukie Pilot is the City of Milwaukie's community newsletter that is published monthly and delivered to mailboxes across the city. • Notify Milwaukie residents of engagement opportunities that are open to the public (e.g. charrettes, open houses and online open house)	• EnviroIssues to draft content • City of Milwaukie to publish in Pilot
County website	• Provide an overview of the project goals, process, timeline, and key contact information	• EnviroIssues to draft content • PGA to manage site and publish content

	• Serve as central repository for public project documents and background information	
Direct outreach for information sharing	• Meet people where they are and notify people of upcoming engagement opportunities • Specific tactics could include: o Providing "resident representatives" with notification materials and asking them to distribute to their neighbors o Door-to-door flyering	• HACC to arrange flyering volunteers • Residents on the Stakeholder Advisory Committee to assist in identifying "resident representatives"

Table 3: Tools and tactics to *consult* the public

Consult 	• These tools/tactics aim to ***consult*** community and stakeholders to gather feedback to help improve future decisions being made. • The project team will develop **detailed plans** for the in-person and online open house at least a month prior to the event date, which will include objectives, audiences, notification tools and timeline, materials and supplies and a workback plan.	
Tool/tactic	***Purpose***	***Roles/responsibilities***
Online comment form and Mary-Rain's email	• Provide a place for the public to submit comments and questions throughout the project	• EnviroIssues to monitor comment form and send incoming comments to project team • HACC to inform project team of project comments and questions she receives in summary form • HACC staff to manage responses as needed
In-person open house	• Provide an opportunity for the public to learn about the project process, review design concepts and provide feedback for refining these concepts	• Scott | Edwards lead • County and other consultant staff support • EnviroIssues to draft notification content; PGA to distribute
Online open house and online outreach survey	• Provide an online opportunity for the public to learn about the project process, review a set of design concepts and provide feedback for refining these concepts • Parallels the in-person open house opportunity	• EnviroIssues to lead content development and programming • PGA to link to online open house from County website
HACC Office Hours at Hillside	• Every Wednesday morning from 9-11AM starting September 19th through June 2019, HACC Development staff will be onsite for drop in meetings with Hillside Residents • Clackamas County Public Health staff may attend office hours to collect feedback for the Health Impact Assessment as needed; these drop-in opportunities should be publicized using "inform" tactics above	• HACC to lead • Clackamas County Public Health to participate in office hours as needed
Direct outreach for consultation	• Meet people where they are to collect feedback on survey-style questions (e.g. on iPads or via paper surveys) • Specific door-to-door direct consultation opportunities could include: o When the online open house is live o At key moments in the Health Impact Assessment process	• HACC to arrange staff and volunteers to conduct door-to-door consultation

Table 4: Tools and tactics to *involve* and *collaborate* with the public

Involve & collaborate 	• These tactics aim to help the project team ***involve*** and ***collaborate*** with stakeholders, bringing people together to discuss issues, needs, concerns, opportunities and ideas while actively playing a role in developing outcomes. • The project team will develop **detailed event plans** a month prior to the event date, which will include event objectives, audiences, notification tools and timeline, materials and supplies and a workback plan.	
Tool/tactic	***Purpose***	***Roles/responsibilities***
Listening session	• Hear preliminary feedback from residents on concerns, opportunities, and engagement preferences to inform the outreach strategy	• EnviroIssues lead • County and other consultant staff support
Visioning workshops (3) • Residents & neighbors (day) • Residents & neighbors (evening) • Service providers and agency staff	• Engage residents, neighbors, service providers and key agencies in visioning discussions to identify key desires, needs and values	• Scott | Edwards lead • County and other consultant staff support • EnviroIssues to draft notification content; PGA to distribute
Design charrettes • Project team charrette • Community charrette	• Review feedback and input gathered to date • Discuss site constraints and opportunities and gain feedback on initial design elements	• Scott | Edwards lead • County and other consultant staff support • EnviroIssues to draft notification content; PGA to distribute
Stakeholder Advisory Committee	• Multi-sector committee representing all key stakeholder interests • Meets five times during the project, prior to key milestones, to: o Provide feedback on outreach strategy o Provide feedback on preliminary drafts of public materials o Represent stakeholder interests and inform design discussions	• Scott | Edwards facilitates • County attends • Other consultant staff attend on an as-needed basis

Evaluation and metrics

Table 5 will be used to evaluate and track progress toward meeting our engagement objectives throughout the project.

Table 5: Engagement objectives and metrics for success

Objective	*Metrics for Success*	*How/When to Measure?*
Raise awareness and understanding: Clearly communicate project purpose, process and objectives to ensure the public can participate in an informed, educated way.	• Comments received are well informed and on-topic • Reduced spread of misinformation	• As part of each event summary (event lead) • Bi-monthly review of comments received (EnviroIssues) • Bi-monthly conversations with Jemila and project management staff to

		determine what residents are asking about (HACC)
Conduct an accessible, inclusive engagement process: Employ tactics and tools that engage all identified stakeholder groups throughout the project and reduce barriers to participation.	• Every event plan contains a notification strategy with steps to contact all relevant stakeholder groups • Every event plan includes accessibility considerations (mobility, language, vision, etc.) • Events are well-attended (30+ people) and represent a diverse cross-section of stakeholders	• As part of each event summary (event lead) • Bi-monthly review of email list to ensure it reflects full stakeholder matrix (EnviroIssues)
Build trust, credibility and relationships: Use the master planning process to bring people together and create a foundation for future engagement at Hillside.	• Conduct at least 10 in-person briefings to community groups and organizations at key project milestones (exact organizations will be determined by HACC and the project team based on requests and project needs) • High levels of satisfaction with engagement process • Outreach efforts are taken to engage all stakeholder interests on the matrix in this plan at each engagement milestone (see schedule in Appendix A)	• Conduct interim online engagement evaluation survey in February/March (HACC) • Conduct final evaluation survey in May (HACC)
Authentically and transparently incorporate community feedback into design: Develop a master plan that is responsive to the feedback we receive.	• Community members either support or accept design because they trust and respect the process • All events and engagement opportunities are summarized, and the material is made available to the public on the County's project website • All concerns or complaints are responded to within three business days	• Conduct interim online engagement evaluation survey in February/March (HACC) • Conduct final evaluation survey in May (HACC)
Close the feedback loop: Explain to the community how their input was used throughout the planning process.	• At each design milestone, project team presents how feedback has been incorporated	• Conduct interim online engagement evaluation survey in February/March (HACC) • Conduct final evaluation survey in May (HACC)

Appendix A: Engagement schedule

Key public milestones presented in blue

Tactic Type	Timing	Event/Activity	Lead
	Complete	**Demographic analysis**	EnviroIssues
	*Complete*	**Stakeholder interviews**	EnviroIssues
	*Complete*	**Listening session**	EnviroIssues
	*Complete*	**Quarterly update to Milwaukie City Council (1)** • Provide council with project updates	HACC
	Sept. 15	**Pilot blurb (for October, due month prior)**	EnviroIssues
	Between Sept. 24 and Oct. 5	**Stakeholder Advisory Committee – meeting #1** • Introduce the project • Review and gain feedback on draft public involvement plan • Gain feedback on Visioning Workshop planning	Scott | Edwards
	Distribute by Oct. 5	**Project update blast #1 – Project introduction, listening session results, comment form online, visioning workshop invitation** • Resident letter/flyer • E-newsletter • Social media posts • Web update • Direct outreach	EnviroIssues/HACC
	Mid-October	**Visioning workshops (3)** • Residents & neighbors (day) • Residents & neighbors (evening) • Service providers and agency staff	Scott | Edwards
	Between Oct. 22 and Nov. 9	**Stakeholder Advisory Committee – meeting #2** • Review feedback from the visioning workshops • Discuss information and materials to be workshopped at upcoming design charrettes	Scott | Edwards
	November	**Community group briefings – In-person presentations to community groups and organizations on the results from the visioning process, looking ahead to design charrettes (exact organizations TBD by HACC based on requests received and project needs)**	HACC
	Mid-November	**Project update blast #2 – Results from visioning process, design charrette notification** • Resident letter/flyer • E-newsletter • Social media posts • Web update	EnviroIssues/HACC

		• Pilot blurb (for December) • Direct outreach	
	December	**Community design charrette** • Possibly to be held in conjunction with Hillside holiday celebration to boost participation	Scott | Edwards
	December	**Quarterly update to Milwaukie City Council (2)** • Provide council with project updates	HACC
	Mid-December	**Stakeholder Advisory Committee – meeting #3** • Review feedback from design charrette • Provide focused feedback to project team to inform initial concepts	Scott | Edwards
	February	**Community group briefings – Initial design concepts, looking ahead to open house/online open house (exact organizations TBD by HACC based on requests received and project needs)**	HACC
	Mid-late February	**Project update blast #3 – Update on design process, notification for in-person and online open-houses** • Resident letter/flyer • E-newsletter • Social media posts • Web update • Pilot blurb (for March) • Direct outreach	EnviroIssues/HACC
	February/March	**Conduct short engagement evaluation survey**	EnviroIssues/HACC
	March 6	**Stakeholder Advisory Committee – meeting #4** • Review three design concepts • Gather focused feedback from SAC	Scott | Edwards
	Mid-March	**Design concepts in-person open house**	Scott | Edwards
	Mid-March	**Design concepts online open house**	EnviroIssues
	Late March	**Quarterly update to Milwaukie City Council (3)** • Provide council with project updates	HACC
	Mid-May	**Stakeholder Advisory Committee – meeting #5** • Review feedback from spring engagement • Presentation of refined concept • Gather feedback on concept	Scott | Edwards

 	Mid-May	**Project update blast #4 – Revised design update, opportunity for final comment (?)** • Resident letter/flyer • E-newsletter • Social media posts • Web update • Pilot blurb (for June) • Direct outreach	EnviroIssues/HACC
	May	**Community group briefings – Revised design, looking ahead to adoption (exact organizations TBD by HACC based on requests received and project needs)**	HACC
	June	**Presentation of final concept (exact format of event TBD)**	Scott | Edwards
	June	**Quarterly update to Milwaukie City Council (4)** • Provide council with project updates	HACC
	June/July	**Final plan adoption**	HACC
	July	**Project update blast #5 – Final plan adopted, next steps** • Resident letter/flyer • E-newsletter • Social media posts • Web update • Pilot blurb (for August) • Direct outreach	EnviroIssues/HACC
	July	**Conduct short engagement evaluation survey**	EnviroIssues/HACC

Appendices under other cover:

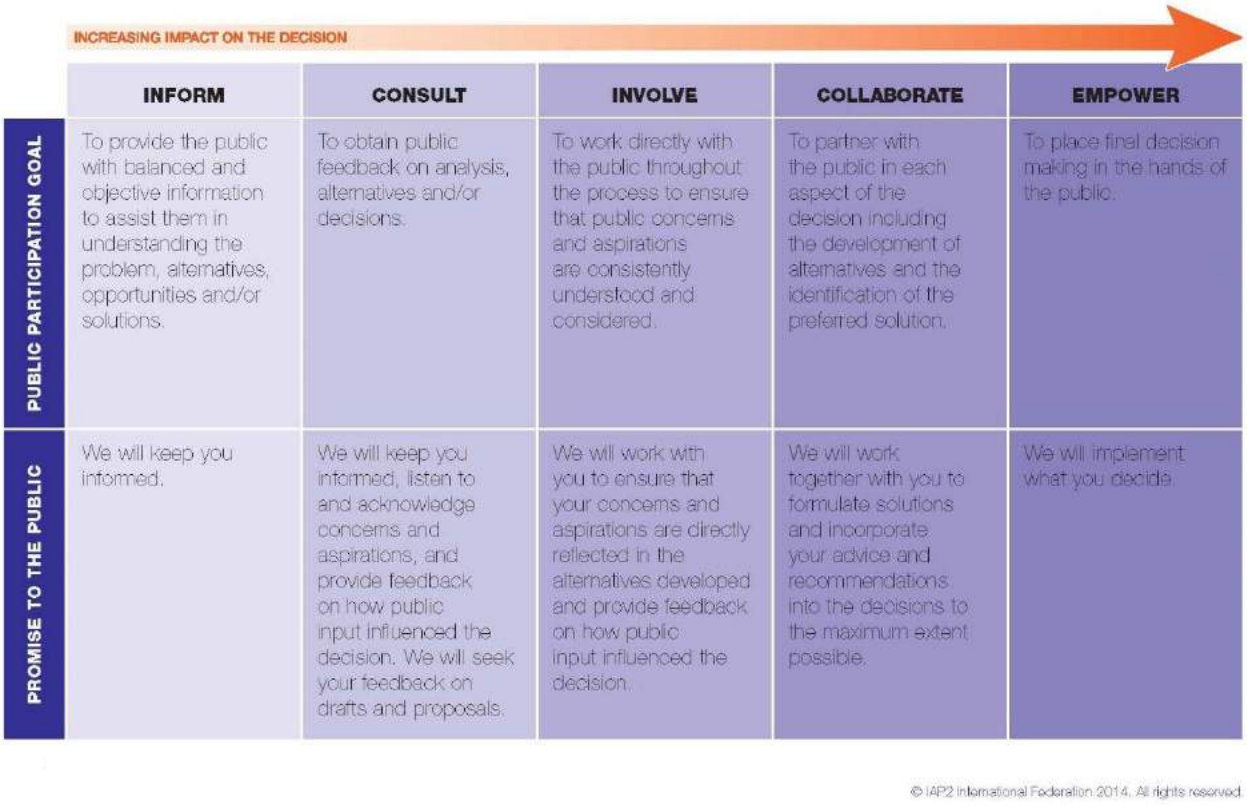
Appendix B: Demographic analysis

Appendix C: Stakeholder interview summary

Appendix D: Listening session summary

Appendix F: Resident folio and FAQs

Appendix E: IAP2 Spectrum of Public Involvement



INCREASING IMPACT ON THE DECISION

	INFORM	CONSULT	INVOLVE	COLLABORATE	EMPOWER
PUBLIC PARTICIPATION GOAL	To provide the public with balanced and objective information to assist them in understanding the problem, alternatives, opportunities and/or solutions.	To obtain public feedback on analysis, alternatives and/or decisions.	To work directly with the public throughout the process to ensure that public concerns and aspirations are consistently understood and considered.	To partner with the public in each aspect of the decision including the development of alternatives and the identification of the preferred solution.	To place final decision making in the hands of the public.
PROMISE TO THE PUBLIC	We will keep you informed.	We will keep you informed, listen to and acknowledge concerns and aspirations, and provide feedback on how public input influenced the decision. We will seek your feedback on drafts and proposals.	We will work with you to ensure that your concerns and aspirations are directly reflected in the alternatives developed and provide feedback on how public input influenced the decision.	We will work together with you to formulate solutions and incorporate your advice and recommendations into the decisions to the maximum extent possible.	We will implement what you decide.

TACTICS KEY	***STAKEHOLDER INTERESTS***														
Inform Consult Involve/ Collaborate	**Hillside Residents**	**Ardenwald neighborhood**	**City of Milwaukie**	**Clackamas County**	**Public safety**	**Health service providers (e.g. Providence, County behavioral health)**	**Food access service providers (e.g. Oregon Food Bank)**	**Schools**	**Russian/ Ukrainian community**	**Latino/a/x community**	**Vietnamese community**	**Neighboring landowners (e.g. Murphy Site, Providence)**	**Regional agencies (transportation, parks, utilities)**	**Seniors**	**Youth**
Project fact sheet (translated into Russian and Spanish)	X	X							X	X				X	
Resident folio and FAQ (translated into Russian and Spanish)	X														
Briefings at key milestones		X	X	X		X						X			
Flyers notifying public of events (available in public places and posted on doors/residences ; translated into Russian, Spanish and Vietnamese)	X	X	X					X	X	X	X			X	X
Mailed postcards/letters/ newsletters	X	X													
City and County social media channels (Facebook and Twitter)	X	X	X	X											X
Email newsletters	X	X	X	X	X	X	X	X				X		X	
Milwaukie Pilot newsletter	X	X	X											X	

County website and online comment form	X	X							X	X	X			X	X
Direct outreach	X														
Online open house and online outreach survey	X	X	X	X	X	X	X	X	X	X	X	X	X		X
Visioning workshops	X	X	X	X	X	X	X	X	X	X		X		X	X
Listening session	X														
Design charrettes	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

In-person open houses	X	X	X	X	X				X	X	X	X		X	X
Stakeholder Advisory Committee	X	X	X	X	X	X	X	X	X			X	X	X	X

APPENDIX G

Hillside Master Plan for Housing Opportunity

Resident Listening Session Event Summary

Overview

On September 5, 2018, residents of Hillside Manor and Park were invited to a listening session in the Hillside Fellowship room as part of the Hillside Master Plan for Housing Opportunity. The purpose of the event was to raise awareness of the master plan project; build trust and encourage continued participation among Hillside residents; and gather feedback to inform the project community engagement plan.

Approximately 42 people attended the two-hour event, which was held between 5 and 7 p.m. A majority of those attending live in Hillside Manor, while fewer than ten said they live in Hillside Park. Food, childcare and simultaneous translation in Russian and Spanish were provided. Two Russian-speaking community members participated in the listening session; no Spanish speakers attended.

Attendees received a brief introduction to the master plan project and the concurrent Health Impact Assessment (HIA) effort from project staff before engaging in small group discussions for the majority of the program. Each small group was guided by a staff discussion leader, and all tables discussed the following questions:

Part 1: How do you want to be involved?

- How much do you know about the master plan project? How have you been informed so far?
- How do you want to stay up to date on this project?
- In what ways do you want to participate in this project?
- What kinds of events would you like to attend?

Photo: EnviroIssues

Part 2: What are your goals for this process?

- What do you like about living at Hillside and what would make it better?
- What is your vision for the Hillside community and site?
- What questions or concerns do you have about this project?
- Anything else we should know?

At the conclusion of the event, each table group reported their top takeaways from Part 1 and Part 2 to the wider group. Residents also had the opportunity to provide written feedback on comment forms and to complete a voluntary HIA questionnaire (the results of these questionnaires will be summarized separately).

This document summarizes the key themes and ideas raised through the small group discussions at the listening session. Key takeaways shared during the report out portion of the

event are listed first in each section. The summary concludes with a review of key recommendations for future outreach and engagement planning.

Part 1: Resident involvement and engagement preferences

Awareness of the master planning effort

- Many attendees were aware of the master plan effort, but some said they had not heard about the project before.
- Many attendees confused the Hillside Master Plan for Housing Opportunity and the Hillside Manor renovation project. Several were aware that funding has not been secured for the Manor renovation work and believed this impacted the master planning process.
- Several said they have heard that buildings will be demolished and residents will need to be relocated. There was confusion around which residents would be relocated (Manor, Park or both) and when. This was related to the confusion between the two planning processes.
- Some said they were aware denser forms of housing may be possible on site (e.g. four-plexes and apartments).
- A few said they were aware relocation counselors and moving assistance would be provided, and some were aware that relocated residents would have the right to return. In general, awareness of the specifics around relocation plans was low.

Photo: EnviroIssues

Existing information sources

- Several attendees noted news travels fast among neighbors, but information can often turn into rumors and be misconstrued. Much of the misinformation or rumors circulated thus far concern the timeline of the project (i.e. when construction and relocation could begin) and which structures and areas will be affected (i.e. impact on the Manor; whether additional towers will be built; the future of the park space behind the Manor). A few said property management staff are seen as “fact checkers” and key sources of information.
- Several mentioned learning about the project at previous resident meetings hosted by the Housing Authority of Clackamas County (HACC).
- Several mentioned hearing about this listening session in a recent resident letter. Some said mailed and written correspondence can be confusing if it is not clear who the invitation is for (Manor residents, Park residents, or both) and if information is buried within other updates. A few said they were confused about the style of this event and whether it was a “drop-in” format.

Preferred information sharing methods

- The most frequently endorsed information-sharing method was informative flyers advertising events either attached to resident doors or mailed to residents.
    - Flyers should be clear, easy to understand, and communicate who the information is intended for.
    - Some attendees suggested a consistent paper color be used for these pieces of communication.
    - Russian-speaking participants noted Google translate is not sufficient for these kinds of materials because Google translate can make information more confusing.
- Several also suggested regular updates be presented in the resident "catch all" newsletter, though a few stated this may be too slow to circulate timely information.
- Some suggested identifying key people per street or area who receive updates and can share them with neighbors to reduce the spread of rumors and misinformation.
- Attendees advocated for a mix of traditional and digital information sharing tools to engage residents of different ages and technological comfort levels. Suggestions included:
    - *Traditional methods:* Flyers, mail, meetings, information posted on bulletin boards in laundry rooms, newsletters, presentations or updates at resident events and committee meetings, phone call reminders
    - *Digital/electronic methods:* Project website, email, text message updates; while this option was important to some residents, others said online tools like email are not easily accessible to them
- Attendees provided mixed feedback on the preferred frequency of communication. Some advocated for frequent updates (monthly or more), while others felt quarterly would be more appropriate to reduce stress. There was general agreement that the latest information should be easily accessible to those who want it (e.g. online, with the property manager, on a bulletin board, etc.).
- Attendees said it is important to communicate how previous input was used to help residents feel heard, better understand the process and encourage continued involvement. Some residents feel they give the same input at each meeting and don't understand a sense of progress on the master plan process.

Engagement preferences and future events

- Attendees were very interested in attending future resident events at key project milestones, particularly to discuss design in more detail.
- Some noted they liked having events with both Manor and Park residents and would also like to invite residents of neighboring areas to hear what they have to say.
- Several noted the relatively low turn-out among Park residents at the event and said this should be addressed for future workshops.
    - Several said more direct door-to-door outreach will be needed to engage these residents, as well as more reminders prior to the event.
    - Several said it needs to be clearer which residents are invited to which events.

    - Some Park residents mentioned feeling unwelcome in the Manor. This is a barrier that must be addressed if future events are held in the Hillside Fellowship Room.
- Some said they liked the small group discussion format, though some said more space was needed to be able to spread out and hear other participants.
- Many said it is important to emphasize the importance of attending these events in notification materials. Some said they value being asked for their perspective and ideas, while others said they are worried their comments will not be considered. Many said it is important to explain how feedback will be used and what the next steps in the process are.
- Accessibility of events was a key theme. At future events, the project team must consider cross-cultural barriers, wheelchair access and mobility, accommodations for vision impaired residents and ways to make all residents feel comfortable sharing opinions. A few said materials should emphasize that interpreters are available to increase attendance of non-English speaking residents.
- Some suggested holding events or providing information in conjunction with existing resident programs, such as food basket day or the Christmas party.
- A few said events should be held at multiple times (i.e. during the day and in the evening) to accommodate people's work schedules.

Photo: EnviroIssues

Part 2: Vision for Hillside

What residents value about Hillside

When asked what they like about living at Hillside, attendees mentioned the following features:

- Neighborhood feel – green space, gardens, flowers, individual structures plus dense tower
- The people – neighbors, activities for residents

- Affordability – low cost of housing (30% of income and below), utilities paid for
- Greenery – trees, gardens, open space, walking area and berry patches behind the Manor
- Feeling of independence – ability to have a garden, access transit, and live independently
- Programming – existing activities, market on Sunday
- The food basket program provided by the Oregon Food Bank
- Bus access
- Access to Providence across the street

Vision for the future: What residents would like to see

Comments about desired improvements and potential future amenities, services and design covered the following themes:

Photo: EnviroIssues

- **Increased safety:** Several attendees discussed feeling unsafe at times and advocated for improved security cameras, addressing trespassing concerns along the railroad line, residents letting unattended guests into the Manor, improved rule enforcement by management, potential increased police presence and ways to reduce instances of crime and illegal substance use. Some noted parts of the site have better fire access than others. A few said the lighting should be improved to increase safety.
- **Increased accessibility of key services:** Several attendees said they would like to see more social services (e.g. physical, behavioral and mental health support, economic assistance and job training, support for recently homeless, etc.) located on-site.
- **Improved access to food:** Many attendees discussed a desire for better access to fresh and healthy food in closer proximity to Hillside (e.g. by increasing the food basket program, adding a grocery on site, etc.)
- **Continued affordability and meeting housing need:** Several said it is important to maintain or increase the ability of this site to provide low-cost housing, particularly as more people are experiencing homelessness.
- **Preserving neighborhood feel while feeling less isolated:** Several said they want to preserve the "neighborhood feel" of Hillside by preserving open space, keeping gardens and having some lower-density homes while improving connectivity and aesthetics so the site feels less isolated. Some said they'd like it to feel more "cheery." A few noted they need to live in detached housing for health reasons.
- **Varied density:** Related to desires for preserving neighborhood feel, several said they would like to see a mixture of density, including the preservation of some less dense areas. Several said they do not want to see other towers.

- **Different housing types:** Some said they would like to see a mixture of small and larger (3+ bedroom) housing types as well as senior housing to encourage a more diverse community of ages and family sizes.
- **Mixed-use integration with housing:** Some said they like the idea of mixing commercial, retail and residential, particularly if it increases accessibility to key services. While some liked the idea of some housing above retail, there was concern about whether this type of housing would work for people with mobility challenges.
- **Improved health:** Several mentioned a desire to improve health conditions at Hillside, including reducing smoking and drug use, encouraging exercise and healthy eating, and making access to health services easier for residents.
- **Improved mobility access:** Several expressed a vision for enhanced wheelchair and mobility access to units and common spaces. Some connected bathroom amenities to mobility and said residents should be able to choose units with walk-in showers.
- **Gathering spaces:** Some said they would like to see spaces for community events and social gathering, such as libraries and coffee shops. Others said a computer lab and increase access to technology would be useful.
- **Improved laundry facilities:** Several said they felt the current laundry facilities are inadequate and said they would like to see more laundry or in-unit laundry in future designs.
- **Improved cleanliness and resources to discourage dumping:** Several noted concerns about the cleanliness of communal spaces, cigarette smoke, bed bugs in units, and issues with illegal dumping. Some suggested a re-use center or donation station could help encourage people to re-use discarded materials and clean up common areas.
- **Enhanced recreation opportunities:** Several said the playground should be improved and different recreation areas should be developed for different age groups. A few said there may be an opportunity for non-profits like the Boys and Girls Club to provide programming for youth onsite. Others mentioned a desire for space for yoga, Tai Chi and other activities.
- **Diversity and culturally-responsive support:** Some advocated for community diversity training and increased support and inclusion of residents who speak other languages or come from other cultures.
- **Sustainability and energy efficiency:** Some mentioned a desire for more sustainable structures and better insulation.
- **Improved parking facilities:** A few noted parking challenges on site for residents and caregivers and said they would like to see improvements to the parking options.
- **Pet amenities:** A few said a veterinarian office, dog park, and other pet facilities would be beneficial for pet owners in the community.

Questions and concerns about the master planning process

Attendees raised the following concerns and questions about the master planning process:

- **Anxiety around instability:** Several mentioned many things feel out of their control, which causes stress and anxiety.
- **Mobility issues:** Several expressed concern about whether new designs would accommodate people with mobility challenges and enhance their experiences.

- **Impact of increased density:** Some mentioned concerns about the impacts of more people at Hillside on traffic, parking and quality of life.
- **Confusion around project timescale:** Several stated they had heard conflicting messages around when construction could begin and how this project is related to other planning efforts at Hillside.
- **Impact on rent:** Some asked questions about how relocation and redevelopment at Hillside could impact their rent in the future, specifically if the development is converted into Section 8 housing. A few asked about the impact on renter's insurance.
- **Displacement and confusion about the relocation process:** Several asked questions and expressed concerns over whether they would have to relocate, when this might occur, what types of housing they might be moved into, and whether they would be able to stay near key services and amenities.
- **Getting Park residents to participate:** Some expressed concern about the underrepresentation of Park residents at this listening session and noted the importance of concerted outreach to these residents going forward.

Management questions, concerns and feedback

In addition to providing feedback on the discussion questions, several attendees shared comments about management issues at Hillside. These comments touched on the following themes (specific comments have been passed on the HACC management team).

Photo: EnviroIssues

- Consistent enforcement of rules at Hillside and notification when rules change
- Cleanliness
- Trust
- Safety concerns
- Trespassing
- Comments about watering garden areas
- Maintenance and responsiveness to maintenance needs

Conclusions

The feedback provided at the listening session will be used in the following ways:

- To develop key messages and answers to frequently asked questions for the project.
- To select information sharing tactics, feedback mechanisms and engagement events for the community engagement plan.
- To inform the project schedule.

Key conclusions from the event include the following:

- Direct, focused outreach to Park residents is needed to boost their participation.
- A range of traditional and electronic information sharing tactics should be used to spread the word to residents.

- Consistent, relevant information should be readily accessible via the property management office and project website; resident-wide communication should be frequent enough to reduce confusion and keep people informed, but not too frequent to cause anxiety.
- Accessibility should be thoroughly considered for all future engagement opportunities (e.g. vision, mobility and language needs).
- Steps should be taken to make Hillside events inclusive and ensure everyone feels welcome.
- Residents look forward to future opportunities to share their perspective and ideas.
- The project team should develop materials and resources to address key questions and concerns related to project timescale, scope, relocation and rent impacts.

HOUSING AUTHORITY OF CLACKAMAS COUNTY

HILLSIDE MASTER PLAN

SUSTAINABILITY CHARRETTE REPORT

BRIGHTWORKS SUSTAINABILITY


TARGET
TARGET
TARGET
TARGET
ASPIRATIONAL
ASPIRATIONAL
ASPIRATIONAL

CHARRETTE PURPOSE

Members of the Hillside Master Plan project team participated in a sustainability charrette on November 7, 2018. The primary purpose of the charrette was to identify, evaluate and prioritize sustainability strategies for the design, construction and operations of the redeveloped Hillside neighborhood.

Interdisciplinary project team representatives participated in interactive sessions, spending most of the meeting in focused working groups to brainstorm and vet sustainability strategies. Participants identified sustainability strategies for Hillside Master Plan to pursue or to explore further.

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Paul Wroblewski

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Mitch Dec

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Shilpa Surana

STEPPING INTO THE FUTURE TO DEFINE SUCCESS

Sustainability efforts must be developed through the lens of the project's priorities, leveraging the strengths and opportunities unique to the organizations inhabiting and operating the buildings.

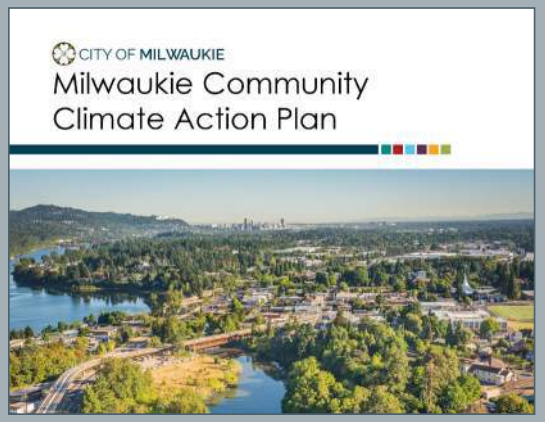
To kick off the charrette, participants considered the question, "It's 2023. Construction of Hillside is completed. Returning and new residents of Hillside have moved in. Later that week, you're reading The Sunday Oregonian, and you are thrilled and proud to read an in-depth story about Hillside. What is the story headline?"

Team members' responses were varied, but some recurring themes included:

- Net Zero Energy/Emissions neighborhood
- Connection and integration with the broader Milwaukie community
- Residents are thriving
- A new model for sustainable and affordable housing
- Ample funding from public-private partnerships

"Hillside is the ultimate opportunity to prove the model of a community that is really livable, desirable, net zero and affordable."

Mark Gamba,
Mayor, City of Milwaukie



Goals for the Hillside Master Plan include providing:

- Up to 400 new affordable housing units
- Community gathering space
- Enhanced outdoor recreation areas
- Other amenities that will serve both Hillside residents and neighbors
- A mixed-use community with potential new retail and office space

"In 2040, Milwaukie is a flourishing city that is entirely equitable, delightfully livable, and completely sustainable. It is a safe and welcoming community whose residents enjoy secure and meaningful work, a comprehensive educational system, and affordable housing. A complete network of sidewalks, bike lanes, and paths along with well-maintained streets and a robust transit system connect our neighborhood centers. Art and creativity are woven into the fabric of the city."

Milwaukie Community Vision
and Action Plan(September 5, 2017)

ASSESSING SUSTAINABILITY STRATEGIES

ENERGY

HEALTH + WELLNESS

PLACE + GREEN INFRASTRUCTURE

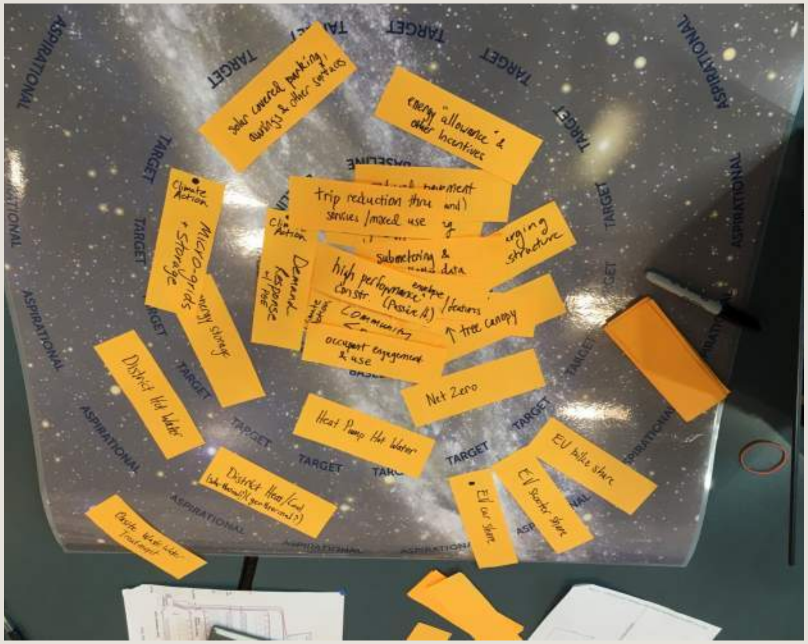
Charrette participants engaged in an interactive exercise intended to identify which sustainability strategies are central to supporting Hillside's priorities, why they are important, and next steps to turn the most important items from ideas into reality.

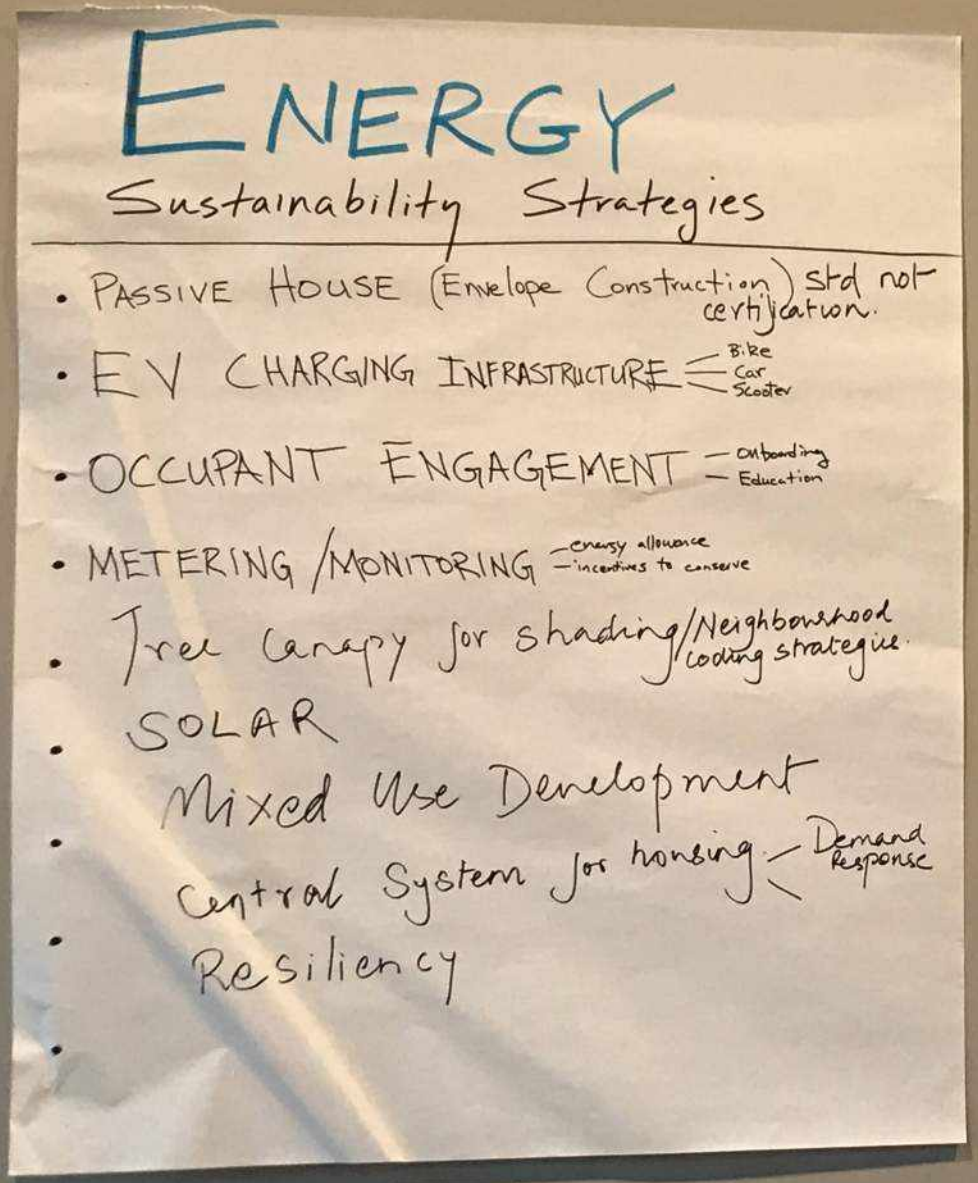
Small-table working groups each focused on a sustainability category: Energy, Health & Wellness, and Sense of Place/Green Infrastructure. The working groups were tasked with identifying the Top Ten Best Strategies for their category, and to plot each strategy as "Baseline," "Targeted," or "Aspirational."

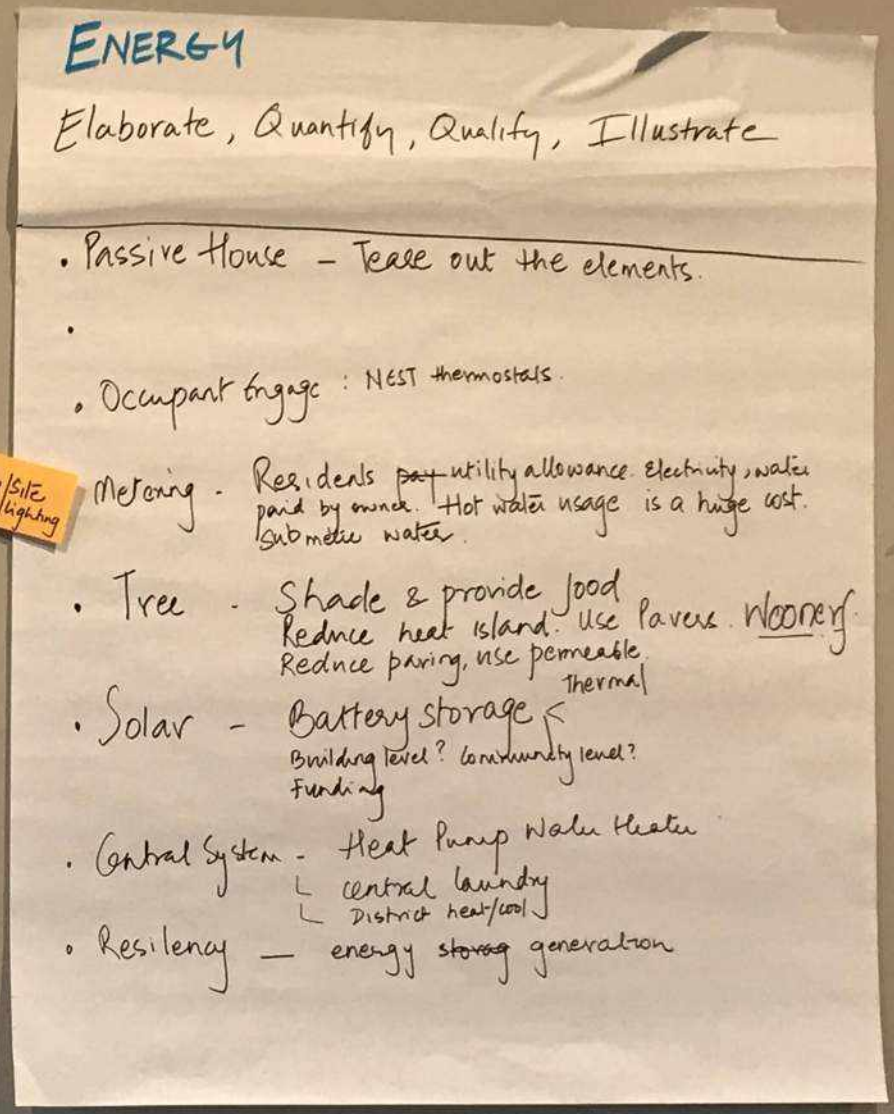
- "Best Strategies" = the most meaningful, most impactful, and in line with the project's goals
- "Baseline" = deemed as meaningful, impactful and feasible to be included in the project
- "Targeted" = deemed as meaningful and impactful, but with some challenges to overcome
- "Aspirational" = deemed as meaningful and impactful, but with some significant challenges to overcome

After each working group completed the two-step exercise, everyone came together for a round-robin report-out by a chosen speaker from each group to share and discuss their recommendations.

ENERGY

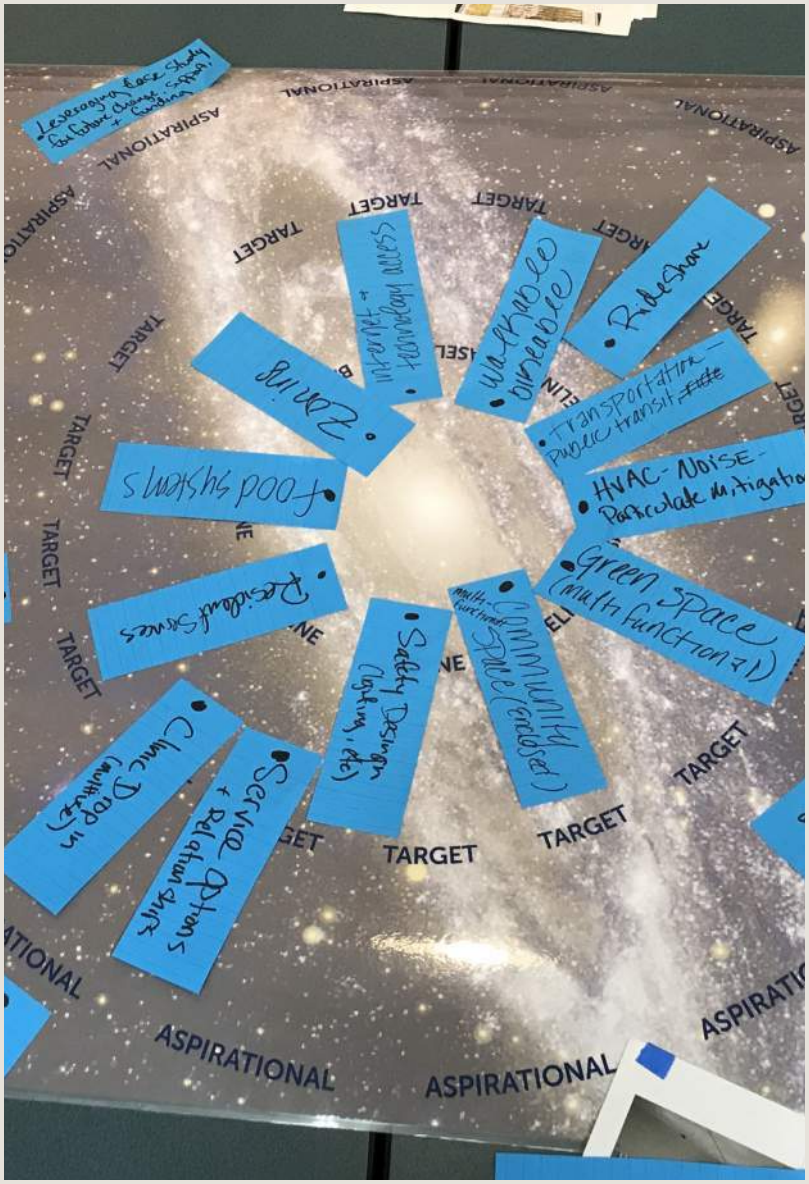

TARGET
ASPIRATIONAL
Net Zero
Heat Pump Hot Water
District Hot Water
EV bike share
EV car share
EV Scooter share
occupant engagement
& use
trip reduction thru
tree canopy
Demand response
Climate Action

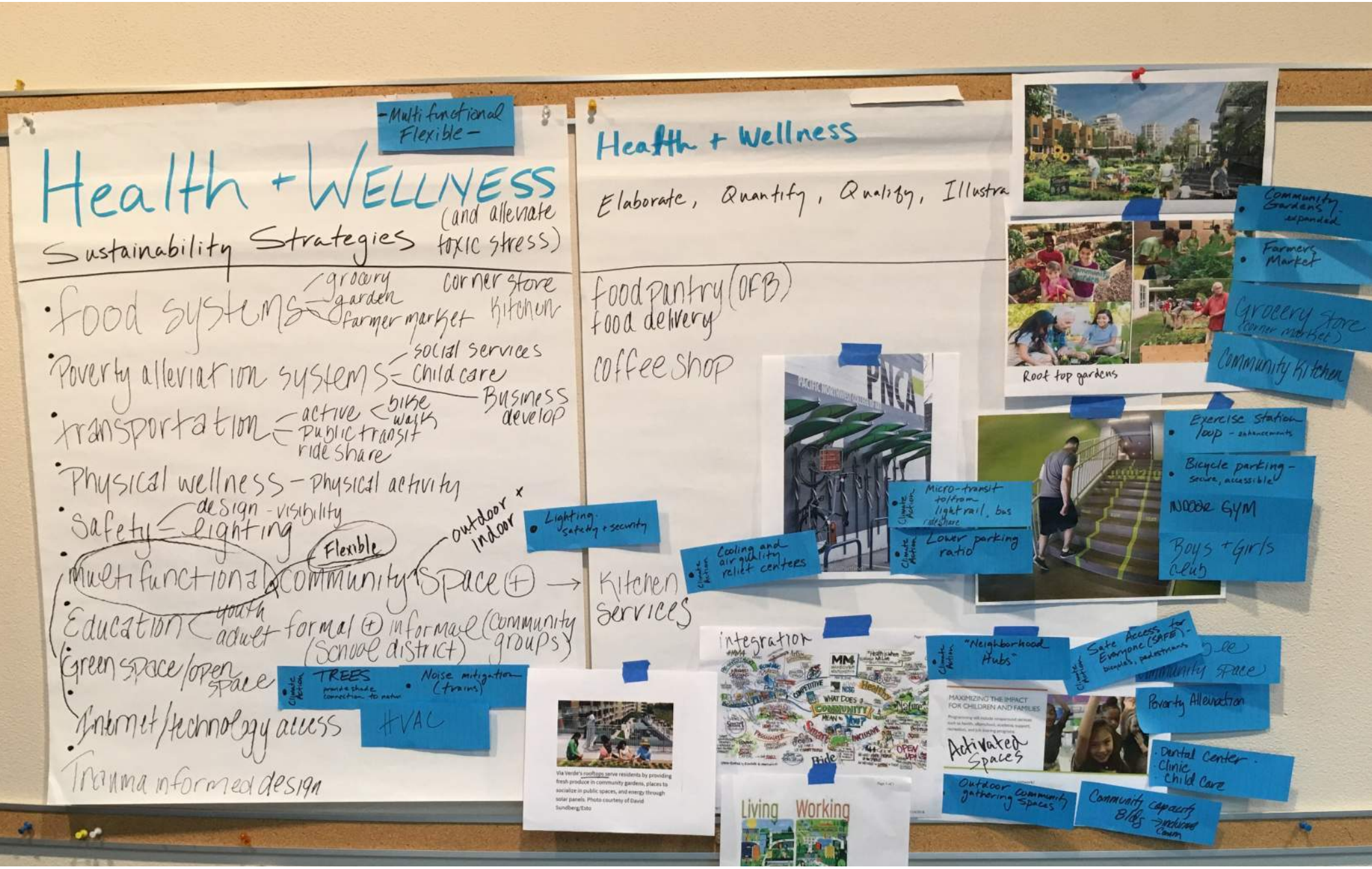




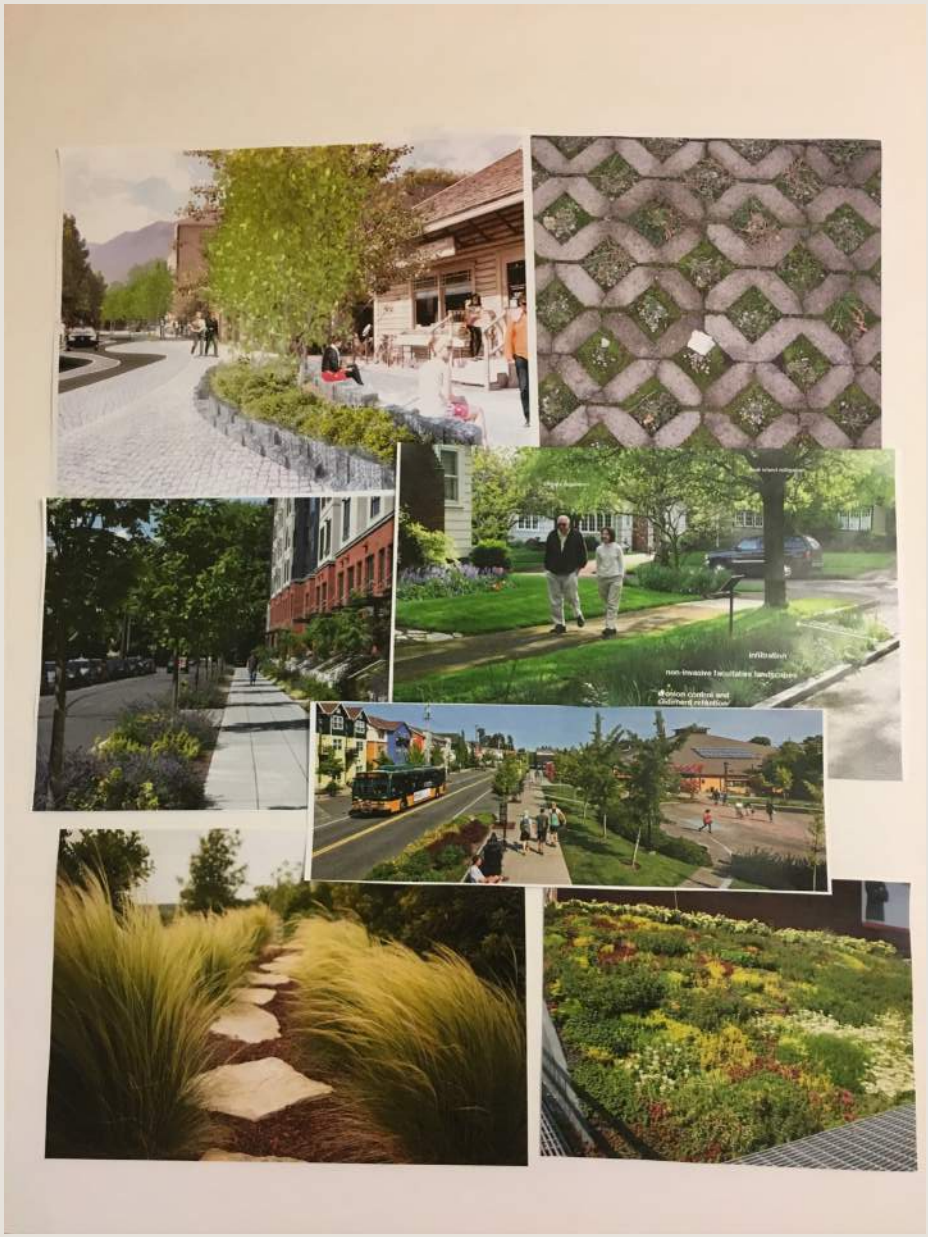
Street lighting/Site lighting

HEALTH + WELLNESS




Health + WELLNESS
Sustainability Strategies (and alleviate toxic stress)
-Multifunctional Flexible-
food systems
grocery
garden
farmer market
corner store
kitchen
Poverty alleviation systems
social services
Child care
Business develop
transportation
active
bike
walk
public transit
ride share
Physical wellness - Physical activity
Safety
design - visibility
lighting
multifunctional
Flexible
community space
outdoor
indoor
Education
youth
adult
formal
informal (community groups)
(School district)
Green space/open space
Internet/technology access
Trauma informed design
Health + Wellness
Elaborate, Quantify, Qualify, Illustra
food pantry (OFB)
food delivery
coffee shop
Kitchen services
Lighting. Safety + security
Cooling and air quality relief centers
Micro-transit to/from light rail, bus rideshare
Lower parking ratio
Root top gardens
Community Gardens - expanded
Farmers Market
Grocery store (corner market)
Community Kitchen
Exercise station loop - enhancements
Bicycle parking - secure, accessible
NOOBE GYM
Boys + Girls Club
TREES
provide shade
connection to nature
Noise mitigation (trains)
HVAC
integration
"Neighborhood Hubs"
Safe Access for Everyone (SAFE) - bicycle, pedestrians
Poverty Alleviation
Dental Center - Clinic Child Care
Activated Spaces
Outdoor community gathering spaces
Community capacity Bldg
Via Verde's rooftops serve residents by providing fresh produce in community gardens, places to socialize in public spaces, and energy through solar panels. Photo courtesy of David Sundberg/Esto
Living
Working

PLACE + GREEN INFRASTRUCTURE



GREEN INFRASTRUCTURE / SENSE OF PLACE

Sustainability Strategies

- ACCESSABLE + EQUITABLE
- SEAMLESS INTEGRATION OF GREEN INFRASTRUCTURE
- MULTIMODAL TRANSPORTATION PROMOTION
- RESILIENT TRANSPORTATION SYSTEM
- PRIORITIZATION OF RESILIENT GREENSPACES w/ ENGAGEMENT OPPORTUNITIES
- PROMOTE GREEN PAVEMENT ALTERNATIVES TO REDUCE URBAN HEAT ISLAND.
- HABITAT CREATION FOR LOCAL NATIVE WILDLIFE + POLLINATORS
- SAFE LIGHTING MINIMIZING LIGHT POLLUTION
- ON-SITE WATER RECLAMATION

Green Infrastructure / Sense of Place

Elaborate, Quantify, Qualify, Illustrate

↳ Indoor + OUTDOOR SPACES (+SOCIAL SPACES)
DISPERSED, FREQUENT, REPEATING
INDIVIDUAL 'FEEL' IN COMMUNITY SPACE (OWN THEIR HOME)

↳ BIKES, CARS, STORMWATER MGMT HABIT
NO HARD BORDERS, ON SITE COMPOSTING
CARS OUTER
BIKES/WALK/SHARED
INTERIOR

↳ ENOUGH RESOURCES TO RELY ON
SAFE BIKE STREET OPTIONS
SHARED RIDE SERVICES
ELECTRIC SCOOTERS
RAISED BIKELANES

↳ CONNECTED, AFFORDABLE, FLEXIBLE

↳ 50% CAP+ TREE CANOPY IN HILLSIDE
WILDLIFE + PLANT HABITAT (COLLABORATION w/ ORGANIZATIONS)

↳ POROUS CONCRETE, NO ASPHALT
GREEN ROOFS,

↳ PNW Feel,

↳ DEFINES PLACE, SAFETY PRIORITY, SMART LED

↳ 90th Percentile storm water event treated on-site

NEAR-TERM NEXT STEPS

The recommendations from the sustainability charrette will be revisited periodically as the Hillside Master Plan process progresses. Additional vetting of the many sustainability strategies identified is needed to understand tradeoffs and to refine priorities. The essence of the "baseline," "targeted," and "aspirational" strategies and goals will be captured for future reference in the Hillside Master Plan.

	ENERGY	HEALTH & WELLNESS	PLACE / GREEN INFRASTRUCTURE
BASELINE Deemed as meaningful, impactful and feasible to be included in the project	- Tree canopy area enhancements - Pavement use limited to reduce heat island effect - EV charging infrastructure - Vehicular trip reduction due to mixed-use - Community Solar - Demand Response program with PGE - Green certification for future buildings - High-performance building envelopes (strive to meet Passive House principles) - Water fixtures & features – high-performance and water efficient - Energy sub-metering & monitoring systems - Occupant education and engagement - Street lighting with adaptive LEDs	- Multifunctional outdoor green spaces - Multifunctional indoor/outdoor community spaces - Food systems – gardens, markets, community kitchens, rooftop and balcony gardens - Public transit with easy access - Active transportation – walkable, bikable - On-site resident services (child care, social services, microenterprise support) - Good relations and partnerships with law enforcement - Noise mitigation through high performance building envelopes - Building HVAC supply air filtration for healthy indoor air quality - Technology and internet access - Sense of safe community – lighting, visibility	- Landscaping with native/adapted/drought-tolerant - Neighborhood hubs - Vibrant, integrated, coherent neighborhood - Play/Educational indoor/outdoor spaces for youth and teens - Community gardens near dwellings and throughout - Lyft-Uber shared pick-up areas - Less impactful pavement alternatives - Limited vehicle parking - Safe networks for pedestrians - Safe networks for bicyclists - Bicycle storage and repair stations - Equitable access for disabled - Education and celebration of cultural and natural resources - Active composting system - Wetlands for on-site stormwater management - Sense of safe community
TARGETED Deemed as meaningful and impactful, but with some challenges to overcome	- Net-Zero Energy - Solar-covered parking, awnings & other surfaces - Micro-grids of on-site renewables & storage - Heat pump hot water systems - Energy “allowances” & incentives for residents	- RideShare programs - Drop-in clinic services - Service options & relationships	- People-centric (not car-centric) streets -- woonerfs - Limited vehicle access to neighborhood core - Recreational spaces for elders - Food Forest - Tree canopy 40% - Porous concrete - On-site stormwater management for 98th percentile of events - Comprehensive recycling-reuse programs - Full participation in food waste/green waste collection, composting - Community Tool-Equipment share programs
ASPIRATIONAL Deemed as meaningful and impactful, but with some significant challenges to overcome	- District hot water system - District Heat/Cool (solar thermal, geothermal) - EV bicycle share - EV scooter share - EV car share - On-site blackwater treatment system	- Connection to downtown - Pedestrian overpass to-from downtown - Food delivery services	- Tree canopy 50% - No black asphalt - EV-Ready infrastructure for 100% solar EV - On-site blackwater treatment system

BRIGHTWORKS
SUSTAINABILITY

APPENDIX I

Hillside Master Plan for Housing Opportunity

Visioning Session Event Summary

Overview

On October 24th and 25th, 2018, residents of Hillside, the community and local service providers were invited to participate in a visioning session in the Mother Gamelin room at Providence Milwaukie as part of the Hillside Master Plan for Housing Opportunity. The purpose of the event was to begin the discussion of what the community and residents envision for the redevelopment of the Hillside site; and to gather feedback to help inform the upcoming community work sessions.

A total of three sessions were held over the course of the two days. Two sessions were held on the 24th (9:30-11:00 and 5:00 – 7:30) and were focused on gathering input from the community and the existing Hillside residents. While the last session on the 25th (3:30 -5:00) solicited feedback from local service providers. The sessions on the 24th had a total of 50 participants (20 and 30 respectively). While the 25th had ten individuals in attendance.

All three sessions were similarly arranged and formatted. Upon arrival attendants were given a comment form and color-coded stickers (red, yellow and green). After a short project introduction and explanation, the attendees were encouraged to move throughout the room to visit four stations addressing the following categories;

- Housing Density and Style
- Neighborhood Character
- Healthy Community
- Open Space

Each station had 18 images for participants to “vote” on by applying stickers to the image. A green sticker represented what the individual liked, a yellow sticker represented they were unsure, while the red sticker indicated a dislike.

After participants had a chance to visit all four stations the group reconvened to

review summarize the group's likes and dislikes. People were then asked to comment on why they felt strongly in favor for or against an image. All the comments were recorded by the design team to be incorporated into the final report.

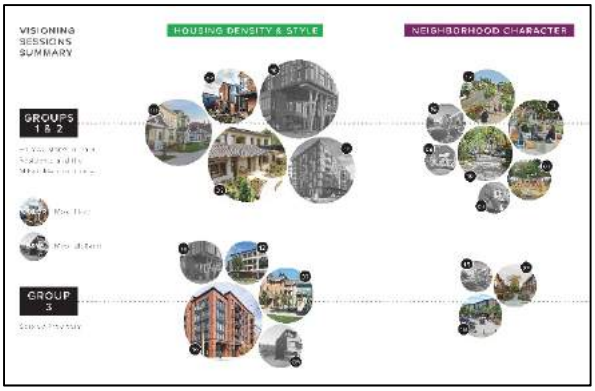
The following graphs summarize each session's votes and display which images received the most likes and dislikes. The first graph summarizes the vote tallies from all three meetings combined, while the second graph breaks down the tallies per session. The legend indicates which tallies belong to each group.

Graph 1

Graph 2

For each category, the third graph summarizes the comment forms collected from all sessions. Comments from all sessions were compiled and assigned a value like the vote tallies—like, unsure, or dislike. The images are scaled to the percentage of comments that fall under each value. The fourth graph summarizes the previous graphs to display what participants liked or disliked the most. The graph is split between the Hillside Manor and Park residents and the Milwaukie community (Groups 1 and 2), and the service providers (Group 3). Complete visioning sessions results are attached below.

Graph 3



Graph 4

VISIONING SESSIONS SUMMARY

GROUPS 1 & 2

Hillside Manor & Park Residents and the Milwaukie community

COLOR Most liked

B&W Most disliked

GROUP 3

Service Providers

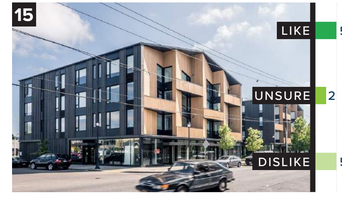
HOUSING DENSITY & STYLE

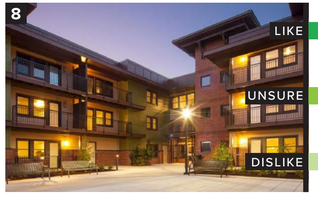
NEIGHBORHOOD CHARACTER

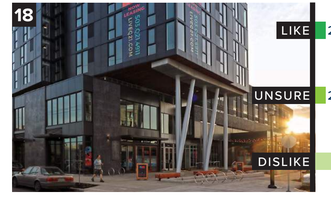
HEALTHY COMMUNITY

OPEN SPACE

HOUSING DENSITY & STYLE | STICKER RESULTS | ALL GROUPS

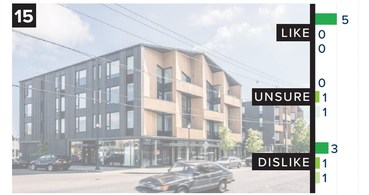


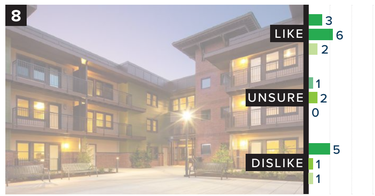


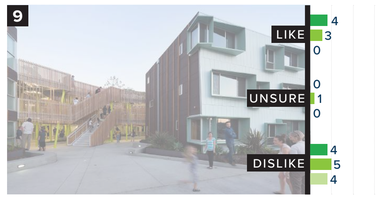


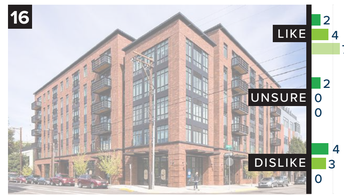
HOUSING DENSITY & STYLE | STICKER RESULTS | GROUP BREAKDOWN

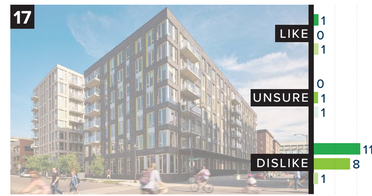
Group 1 (20 people) Group 2 (30 people) Group 3 (10 people)

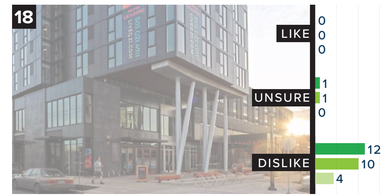






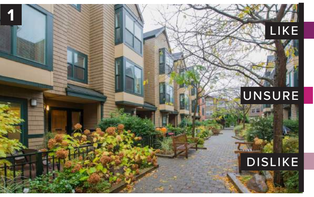


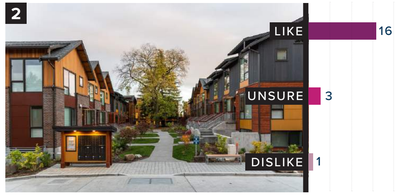


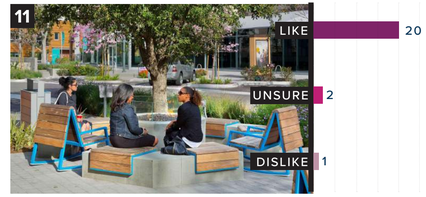


HOUSING DENSITY & STYLE - COMMENT FORMS RESULTS - ALL GROUPS

NEIGHBORHOOD CHARACTER | STICKER RESULTS | ALL GROUPS

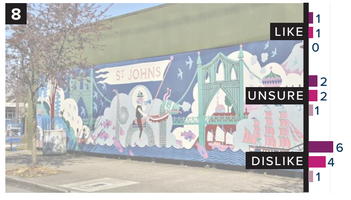




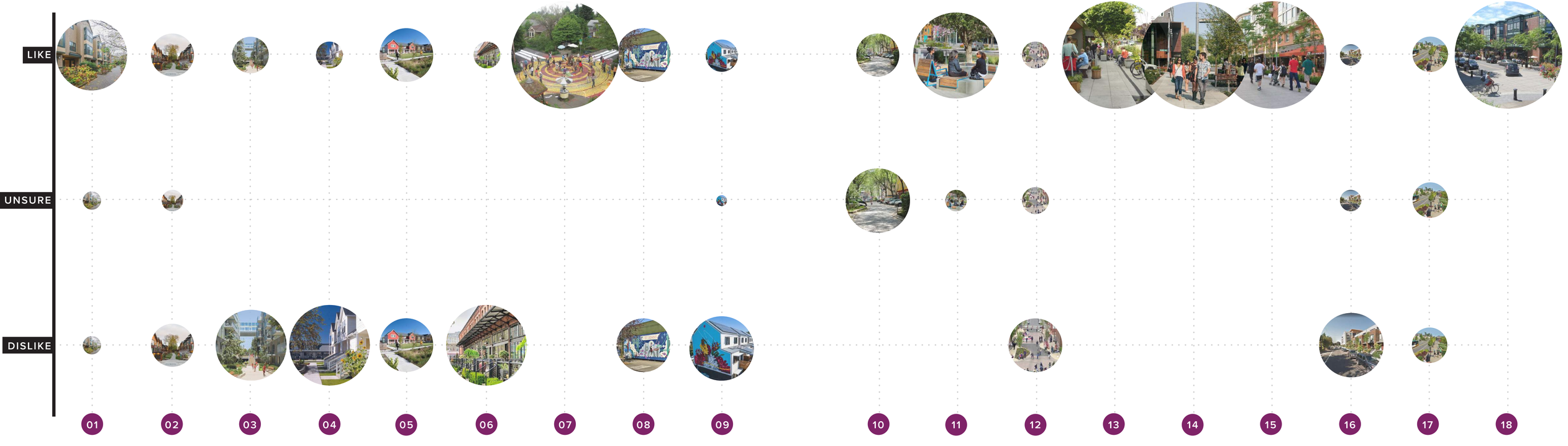


NEIGHBORHOOD CHARACTER - STICKER RESULTS - GROUP BREAKDOWN

Group 1 (20 people) Group 2 (30 people) Group 3 (10 people)



NEIGHBORHOOD CHARACTER - COMMENT FORMS RESULTS - ALL GROUPS



HEALTHY COMMUNITY - STICKER RESULTS - ALL GROUPS

HEALTHY COMMUNITY - STICKER RESULTS - GROUP BREAKDOWN

Group 1 (20 people) Group 2 (30 people) Group 3 (10 people)

1

	Group 1	Group 2	Group 3
LIKE	14	10	5
UNSURE	0	2	1
DISLIKE	0	1	0

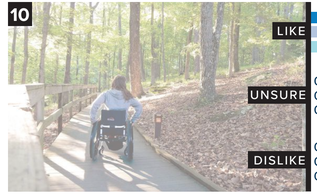
2

	Group 1	Group 2	Group 3
LIKE	10	8	6
UNSURE	1	0	0
DISLIKE	0	0	0

3

	Group 1	Group 2	Group 3
LIKE	2	2	2
UNSURE	0	0	0
DISLIKE	3	0	0

10



	Group 1	Group 2	Group 3
LIKE	7	8	5
UNSURE	0	0	0
DISLIKE	0	0	0

11

	Group 1	Group 2	Group 3
LIKE	8	7	0
UNSURE	0	0	0
DISLIKE	1	1	1

12

	Group 1	Group 2	Group 3
LIKE	6	7	0
UNSURE	1	1	2
DISLIKE	1	0	0

4

	Group 1	Group 2	Group 3
LIKE	10	4	0
UNSURE	0	0	2
DISLIKE	0	0	0

5

	Group 1	Group 2	Group 3
LIKE	1	2	4
UNSURE	2	2	0
DISLIKE	1	0	0

6

	Group 1	Group 2	Group 3
LIKE	5	5	1
UNSURE	1	1	1
DISLIKE	0	2	1

13

	Group 1	Group 2	Group 3
LIKE	4	1	2
UNSURE	2	1	0
DISLIKE	2	0	0

14

	Group 1	Group 2	Group 3
LIKE	8	1	3
UNSURE	0	1	0
DISLIKE	0	0	0

15

	Group 1	Group 2	Group 3
LIKE	5	1	4
UNSURE	0	3	0
DISLIKE	0	1	0

7

	Group 1	Group 2	Group 3
LIKE	6	7	2
UNSURE	1	0	0
DISLIKE	1	0	1

8

	Group 1	Group 2	Group 3
LIKE	2	2	0
UNSURE	4	2	2
DISLIKE	0	0	0

9

	Group 1	Group 2	Group 3
LIKE	3	2	0
UNSURE	0	3	0
DISLIKE	7	0	4

16

	Group 1	Group 2	Group 3
LIKE	3	8	2
UNSURE	3	0	0
DISLIKE	3	0	0

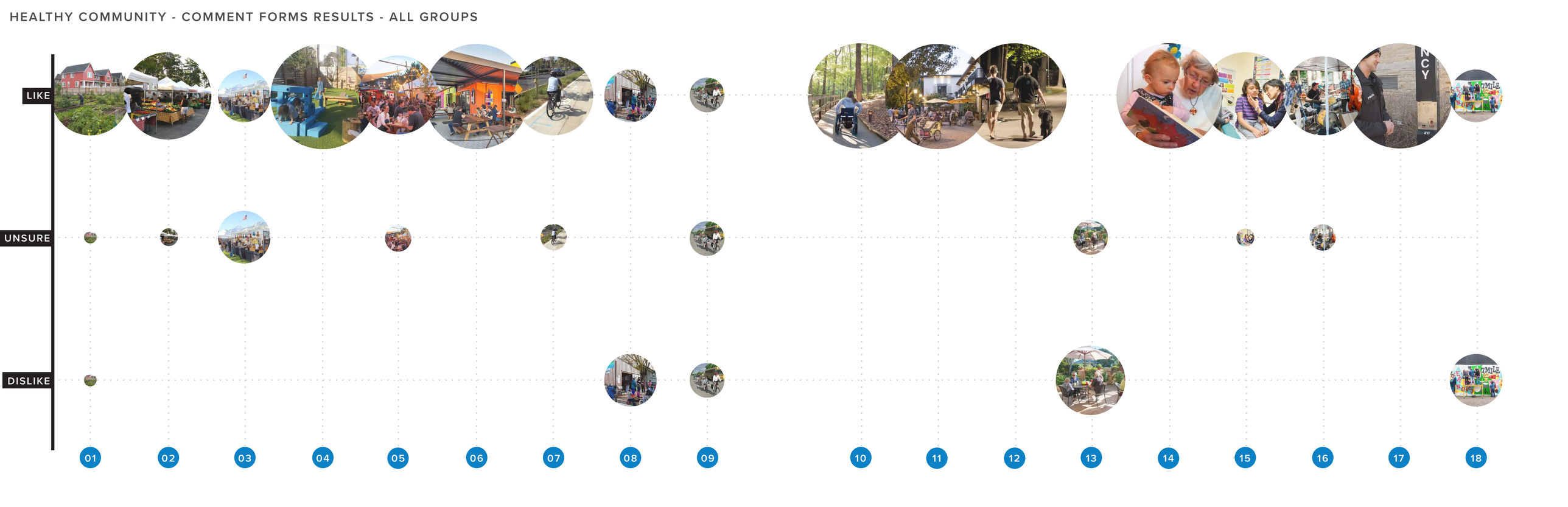
17

	Group 1	Group 2	Group 3
LIKE	5	1	3
UNSURE	0	1	0
DISLIKE	0	1	0

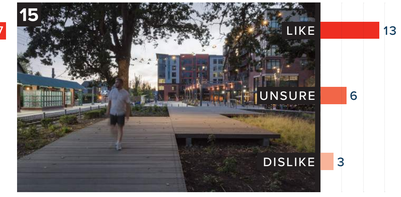
18

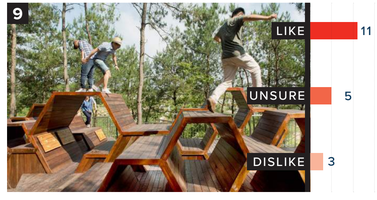
	Group 1	Group 2	Group 3
LIKE	4	1	0
UNSURE	1	1	2
DISLIKE	5	5	1

HEALTHY COMMUNITY - COMMENT FORMS RESULTS - ALL GROUPS



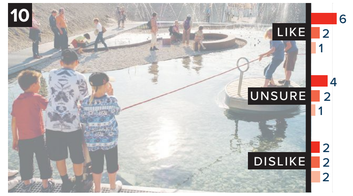
OPEN SPACE - STICKER RESULTS - ALL GROUPS

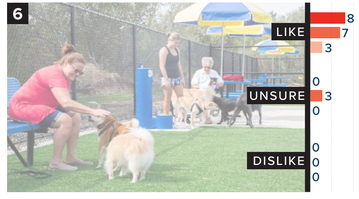


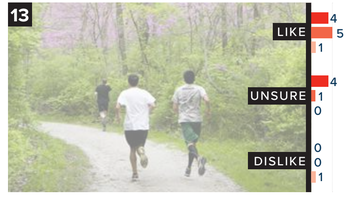


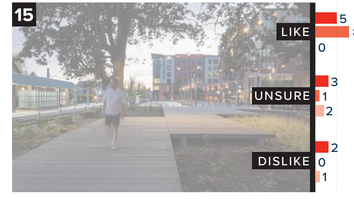
OPEN SPACE - STICKER RESULTS - GROUP BREAKDOWN

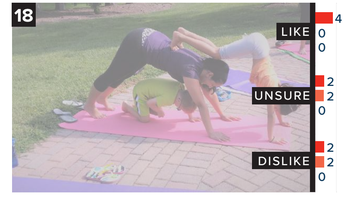
Group 1 (20 people) Group 2 (30 people) Group 3 (10 people)



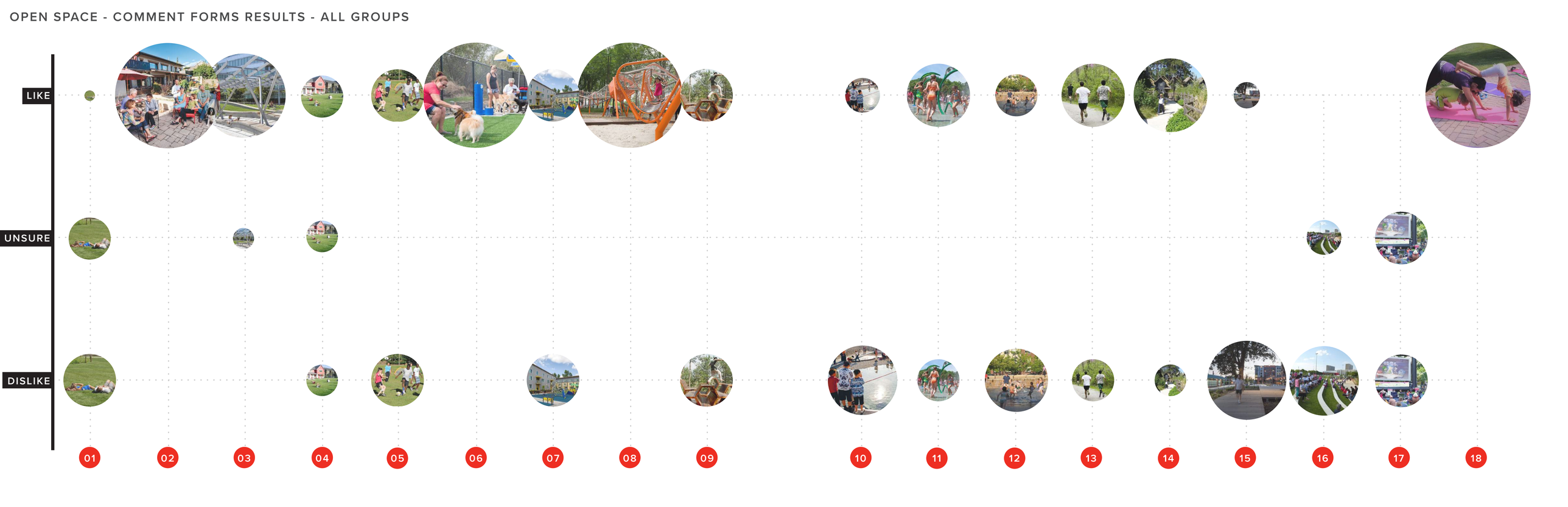




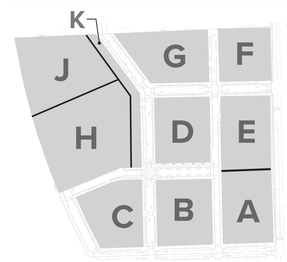




OPEN SPACE - COMMENT FORMS RESULTS - ALL GROUPS



KEY PLAN



LEGEND

parking ratio
.5 3/1 — # of stories (res.) / over commerical
E1 50 — # of units
Building

TABULATIONS

Lot A	= 1.34 ac	**75 du/ac**
Lot B	= 1.38 ac	**78 du/ac**
Lot C	= 1.29 ac	**50 du/ac**
Lot D	= 1.39 ac	**39 du/ac**
Lot E	= 1.39 ac	**67 du/ac**
Lot F	= 0.99 ac	**40 du/ac**
Lot G	= 1.52 ac	**18 du/ac**
Lot H	= 2.45 ac	**37 du/ac**
Lot J	= 1.79 ac	**0 du/ac**
Lot K	= 1.06 ac	**11 du/ac**
Total	= **14.61 ac**	

Hillside Manor (existing)	= 100 units
Hillside Park (replacement units)	= 100 units
Net New Units (to be developed)	= 400 units
Grand Total	= **600 units**

Off-street parking*	= 352 stalls
On-street parking	= 137 stalls
Total	= **489 stalls**

MASTER PLAN