

Prepared for:



Traffic Impact Analysis of Perimeter Road Closure and UPS BFI Gateway Development

October 2019



Prepared By:

KPG

Interdisciplinary Design

3131 Elliott Avenue, Suite 400

Seattle, WA 98121

www.kpg.com

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Prepared for:

**United Parcel Service
7300 Perimeter Road
Seattle, WA 98108**

Prepared by:

**KPG
3131 Elliott Avenue, Suite 400
Seattle, WA 98121**

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Introduction

This study examines the traffic and transportation impacts related to the planned closure of Perimeter Road and the traffic impacts from the development of the UPS BFI Gateway Expansion Project. The analysis reviews existing and future traffic conditions to determine impacts to the transportation system and the need for mitigation measures. The analysis looks at peak hour traffic conditions during the morning and evening commute.

Organization of the Transportation Study

The study follows the standard practice for a Traffic Impact Analysis (TIA). The report is divided into five major sections:

- *Project Description* describes the project site, its location and a summary of the proposed actions and developments.
- *Existing Conditions* reviews the existing traffic, non-motorized, transit, and freight conditions.
- *Background Conditions* is a forecast of 2021 traffic conditions **without** construction of the proposed development. This section takes into consideration such elements as growth in area traffic volumes and assumes the closure of Perimeter Road S to the north of Portland Street.
- *Project Conditions* examines 2021 traffic conditions **with** the project completed. This section identifies the impacts of the project and proposes actions to mitigate those impacts.

Figures, tables, and text are used to illustrate and describe the results of the study for each section. Detailed analysis information is found in the appendices of this document.

Key Findings

- The closure of Perimeter Way S will divert approximately 45 morning peak hour and 30 evening peak hour trips to the Portland Street/Airport Way S intersection, resulting in LOS D operations and higher delays.
- The Portland Street/Airport Way S intersection does not meet any of the MUTCD signal warrants without or with the Perimeter Way S closure. Therefore, a signal is not recommended.
- There is an existing sight distance issue at the Portland Street/Airport Way S intersection. As part of the site plan design, the project will move landscaping and fencing to meet minimum sight distance requirements to the north.
- The UPS project does not create any significant impacts to intersections that require mitigation.

Project Description

The UPS BFI Gateway site is owned by the King County Airport. The proposed project is for UPS to improve facilities within its leased site to improve package handling and efficiency. The site is located between the Perimeter Road/S Portland Street and Perimeter Road/S Orchard Street intersections, just south of the King County Airport in Seattle. The primary access to the site is on Airport Way S, which runs along the east of the site and is paralleled by the Burlington Northern Santa Fe (BNSF) railroad tracks and Interstate 5 (I-5) to the east. The King County International Airport/Boeing Field runways are located to the west. **Figure 1** is a study area map that shows the location of the site in the context of the adjacent street system and land uses.

The proposed project consists of two events that are interrelated and required for the development of the site. The first event closes Perimeter Road to through traffic in order to combine the five parcels that will make up the UPS BFI Gateway leasehold. The second event constructs the on-site improvements that will allow UPS to modernize its cargo operations and facilities. **Table 1** compares the existing and proposed land uses at the site. In 2013, the on-site hangar used by UPS as a support facility was demolished by King County, requiring UPS to spread out its operations to various nearby buildings.

Table 1. Proposed Development

Land Use	Existing	Proposed
Airplane Parking	5 gates	5 gates
Admin/Office	21,600 gsf	52,370 gsf
Package Handling	26 loading doors	
Maintenance	Off-site	13,140 gsf
Security	Off-site	1,255 gsf
On-site Employee Parking	202 spaces	153 spaces
Off-site Parking	43 spaces	43 spaces

Source: UPS

Figure 2 is the proposed site plan (as of October 2019) used in the analysis. The site plan shows the main features of the development including the location of buildings, parking areas, and access control points to the UPS Site.

Figure 1. Study Area Map

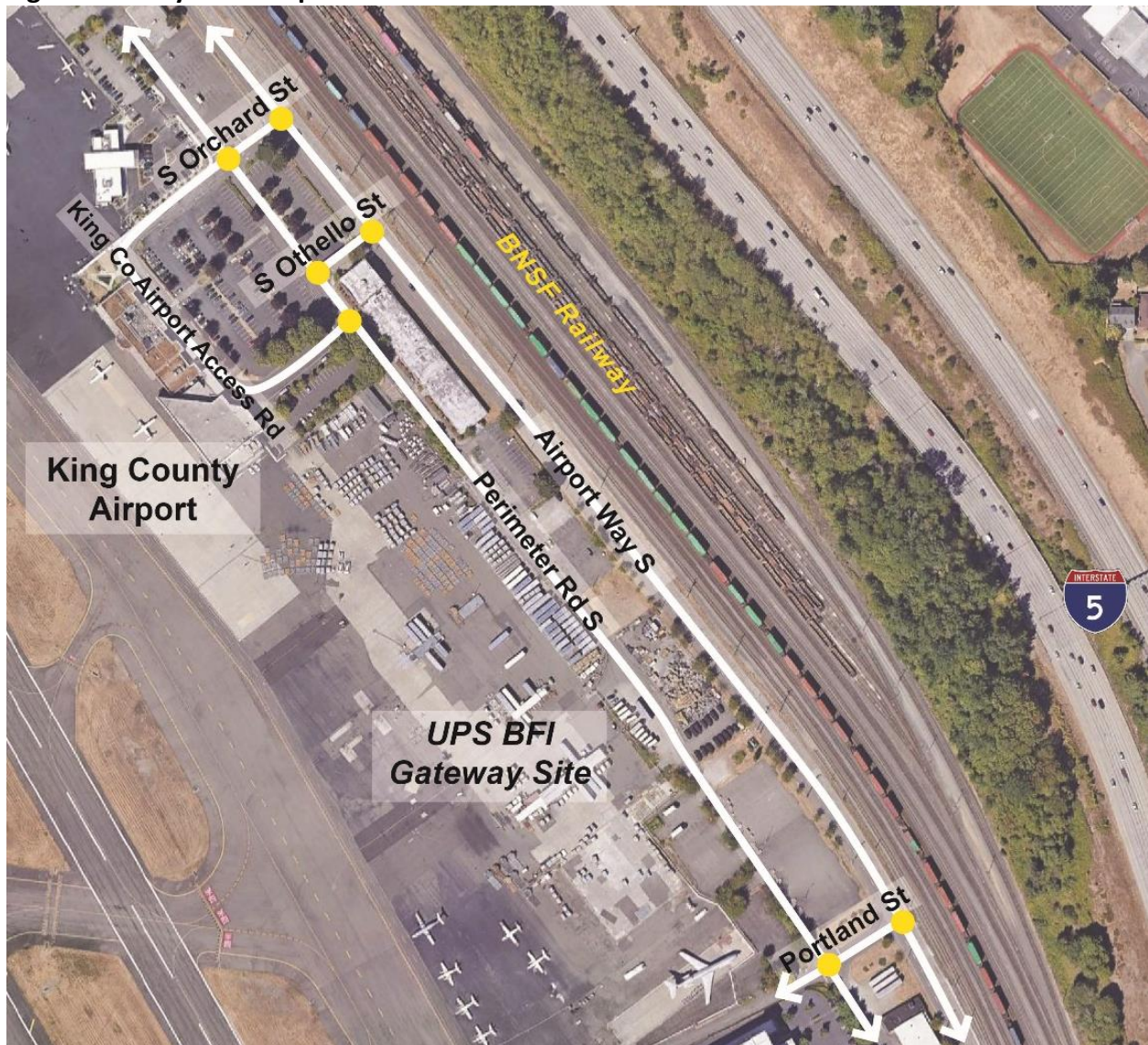
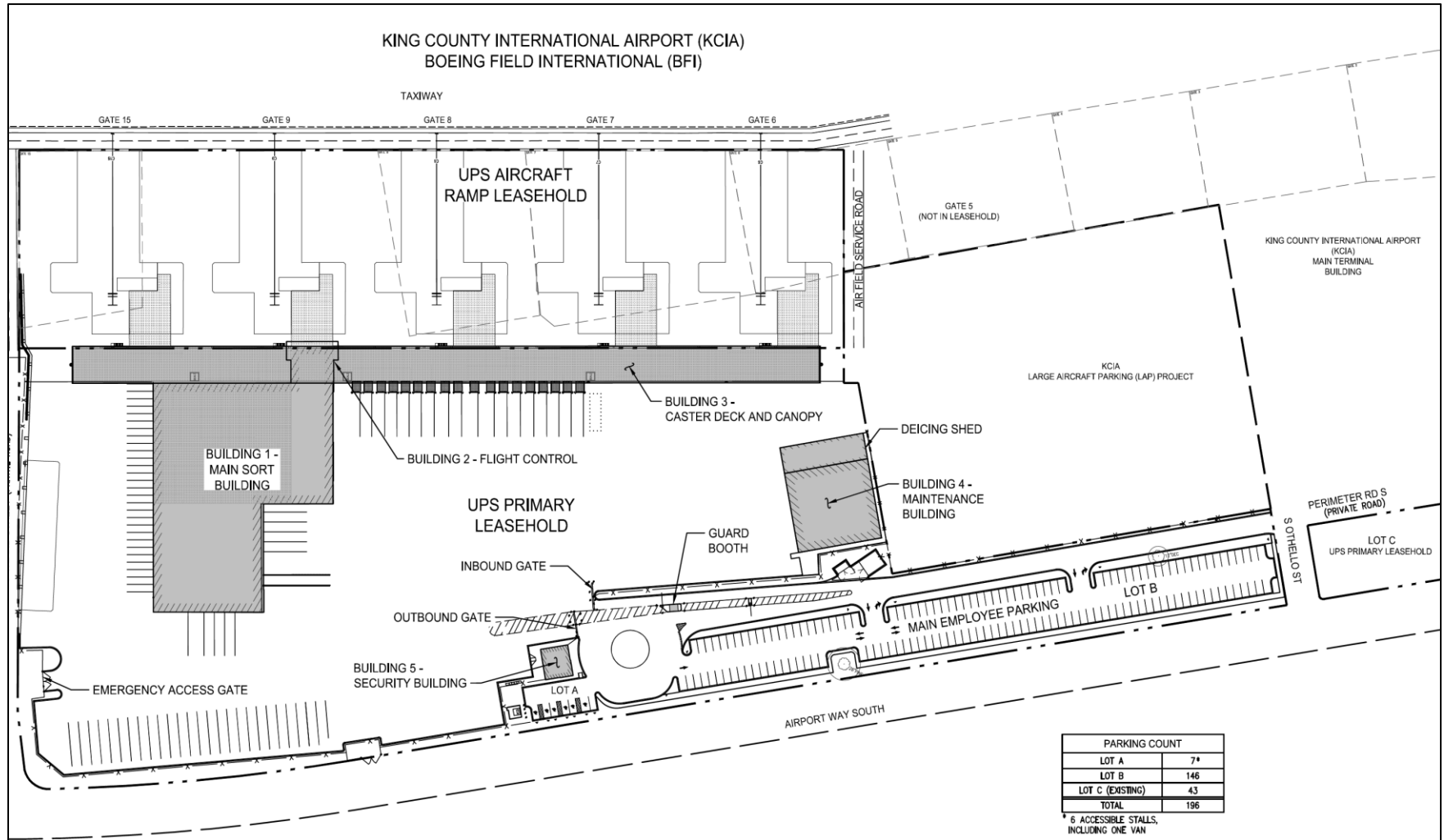


Figure 2. Proposed Site Plan



Existing Conditions

The existing conditions analysis documents the transportation facilities and operations within the study area. This includes analysis of traffic volumes, intersection operations, collision history, non-motorized facilities, transit, and freight.

The roadways serving the project are described below.

Perimeter Road – A 1.9 mile two-lane road that provides access to properties on the east side of the airport. The road has a 20 mile per hour (mph) posted speed limit and frequent access to adjacent parking areas. Sidewalk construction has occurred as part of frontage improvements for other new developments, but sidewalks frequently are not continuous.

S Orchard Street – A two-lane westbound one-way street that is the entrance to the King County Airport. There are no sidewalks between Perimeter Road and Airport Way S.

S Othello Street – A two-lane eastbound one-way street that serves as the exit of the King County Airport. There is a traffic signal at the Airport Way S/S Othello Street intersection. There is a segment of sidewalk on the south side of S Othello Street, connecting sidewalks along Perimeter Road to the entrance to the 7300 Building.

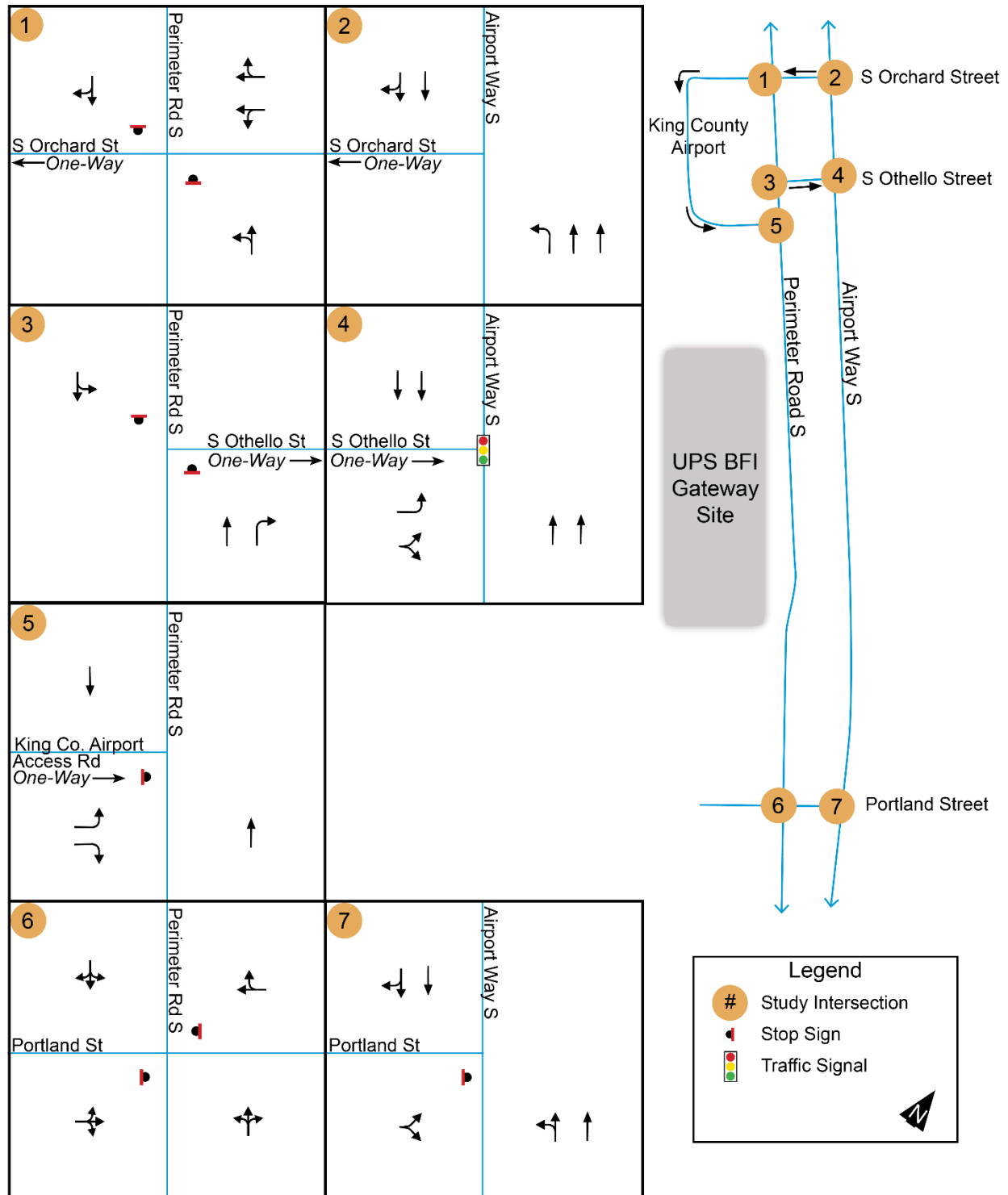
Portland Street – A two-lane street that connects between Perimeter Road and Airport Way S, to the south of the UPS BFI Gateway site. There are no sidewalks on Portland Street.

Airport Way S – A four-lane primary arterial with a 45 mph speed limit. The west side of Airport Road has a 4-foot asphalt pathway that is separated from traffic by a street trees within a 5-foot planted buffer. A 200-foot section of sidewalk is missing to the south of S Othello Street and there are no sidewalks south of Portland Street.

The intersections of these five roadways make up the seven study intersections in this analysis. Except for the signal at Airport Way S/S Othello Street intersection, all other intersections are unsignalized, with stop controls on the minor street approaches.

Figure 3 shows the existing traffic control and channelization at the study intersections.

Figure 3. Existing Intersection Control and Channelization

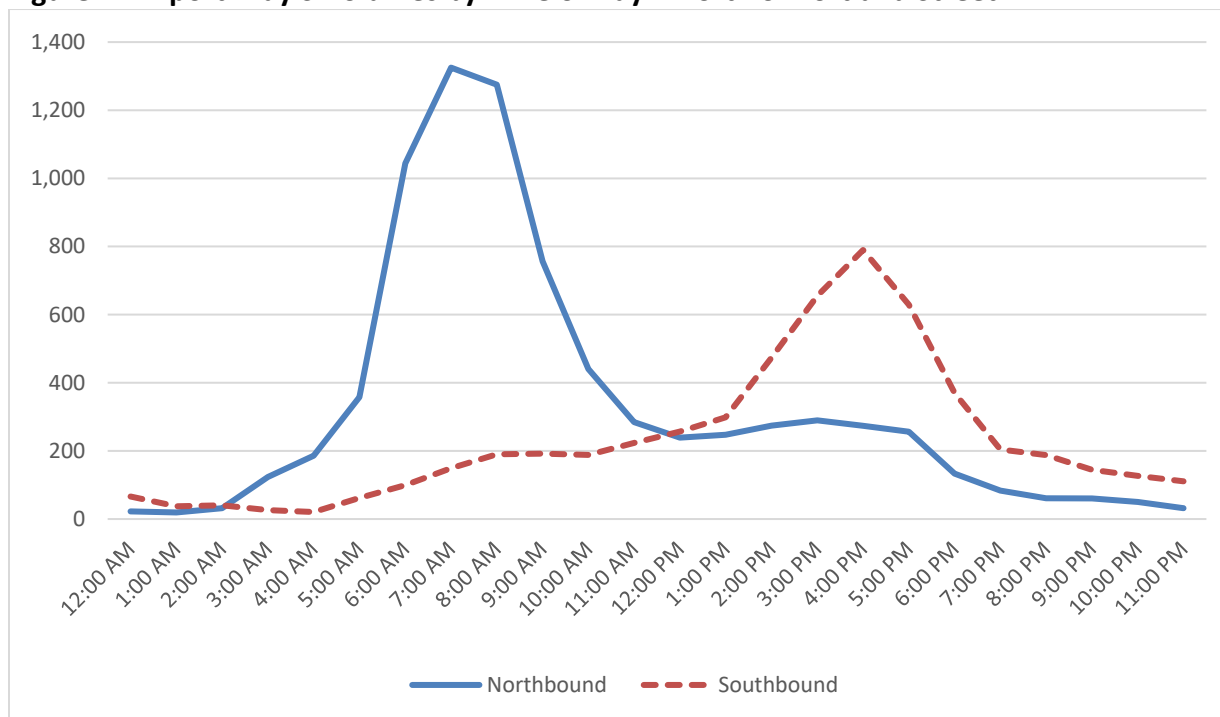


Traffic Volumes

Six intersection (turning movement) and four roadway (tube) counts were conducted for use in the analysis of traffic conditions. **Table 2** indicates the locations and date of the traffic counts used in this analysis. Copies of the traffic counts are found in Appendix A.

Volumes by time of day are directional with higher northbound traffic volumes in the morning and higher southbound traffic volumes in the evening. The northbound AM peak hour traffic volumes are 68 percent higher than the southbound PM peak hour traffic volumes, indicating that northbound regional traffic is frequently using Airport Way S during the morning commute and using other southbound routes in the evening. **Figure 4** shows the volumes on Airport Way S, north of Portland Street, by time of day.

Figure 4. Airport Way S Volumes by Time of Day – North of Portland Street



Two-hour intersection turning movement counts were collected between 7:00 AM - 9:00 AM and 4:00 PM - 6:00 PM to identify the peak hour of the morning commute and evening commute.

The AM peak hour occurred between 7:30 AM - 8:30 AM and the PM peak hour occurred between 4:15 PM - 5:15 PM. Pedestrian and bicycle activity at the study intersections is very light. Heavy vehicles make up between 3 and 4 percent of the traffic volumes for intersections on Airport Way S and as much as 14 percent (at S Othello Street) for intersections on Perimeter Road S.

Table 2. Traffic Count Data

Location	Count Type	Date Collected
S Orchard St/ Airport Way S	Turning Movement Count	May 7, 2019
S Orchard St/Perimeter Rd	Turning Movement Count	May 7, 2019
S Othello St/Airport Way S	Turning Movement Count	May 7, 2019
S Othello St/Perimeter Rd	Turning Movement Count	May 7, 2019
Portland St/Airport Way S	Turning Movement Count	May 7, 2019
Portland St/Perimeter Rd	Turning Movement Count	May 7, 2019
Airport Way, N of Portland St	3-day 24-hour Count	May 7-9, 2019
Airport Way, S of Portland St	3-day 24-hour Count	May 7-9, 2019 May 14-15, 2019
Perimeter Rd, N of Portland St	3-day 24-hour Count	May 7-9, 2019
Portland St between Perimeter Rd and Airport Way S	3-day 24-hour Count	May 7-9, 2019

Figure 5 shows the existing AM and PM peak hour traffic volumes at study area intersections, respectively.

Level of Service

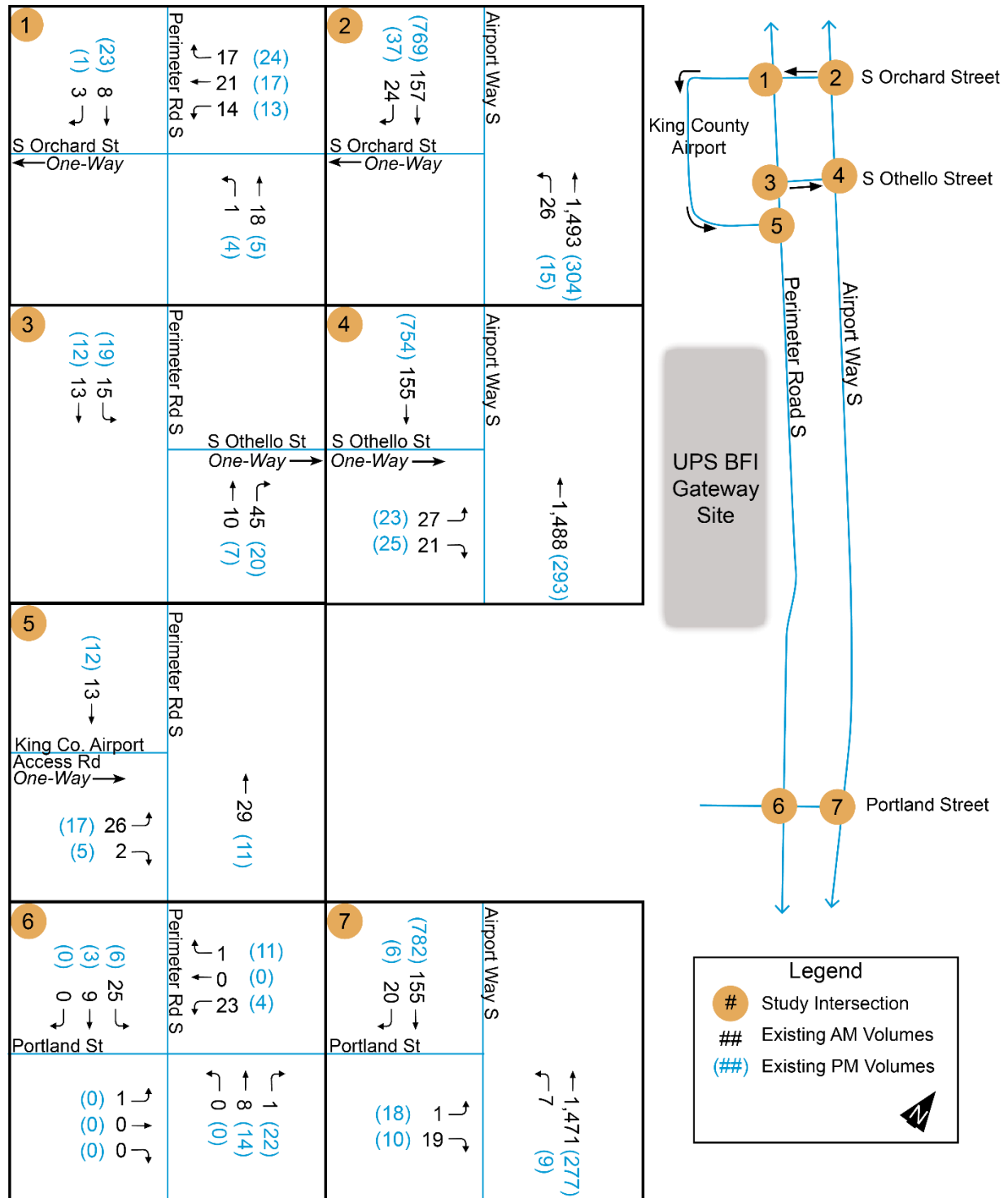
Level of Service (LOS) is a qualitative assessment of intersection operations based on the average delay (measured in seconds) incurred by vehicles. The Highway Capacity Manual, 6th Edition (Transportation Research Board) sets the methodology for calculating LOS at intersections. For signalized and all-way stop-controlled intersections, the overall intersection LOS is reported. At unsignalized intersections where only the minor movements are stop-controlled (two-way stop-controlled intersections), the LOS for the worst performing approach is reported. **Table 3** lists the LOS criteria for signalized and unsignalized intersections. Generally, up to LOS E is considered acceptable in an urban environment, with LOS F considered to require mitigation.

Table 3. Level of Service Criteria

Level of Service	Signalized Average Delay per Vehicle (seconds)	Unsignalized Average Delay per Vehicle (seconds)
A	0 to 10	0 to 10
B	10 to 20	10 to 15
C	20 to 35	15 to 25
D	35 to 55	25 to 35
E	55 to 80	35 to 50
F	> 80	> 50

Highway Capacity Manual, 6th Edition.

Figure 5. 2019 AM and PM Peak Hour Traffic Volumes – Existing Conditions



Intersection Operations

Table 4 shows the LOS for existing conditions during the AM and PM peak hours at each of the study intersections. All intersections operate at LOS C or better during both the AM and PM peak hours. The HCM intersection LOS results are found in Appendix B.

Table 4. Existing Peak Hour LOS and Delay (Seconds)

Intersection	Intersection Control	AM Peak Hour LOS (delay)	PM Peak Hour LOS (delay)
S Orchard St/ Airport Way S	None ^[1]	A (8)	A (10)
S Orchard St/Perimeter Rd	Northbound/Southbound Stop Control ^[2]	A (10)	A (10)
S Othello St/Airport Way S	Signal ^[3]	A (4)	A (4)
S Othello St/Perimeter Rd	Northbound/Southbound Stop Control ^[2]	A (7)	A (8)
King County Airport Access Exit/ Perimeter Rd	Eastbound Stop Control ^[2]	A (9)	A (9)
Portland St/Airport Way S	Eastbound Stop Control ^[2]	B (10)	C (18)
Portland St/Perimeter Rd	Eastbound/Westbound Stop Control ^[2]	A (9)	A (9)

[1] LOS and delay reported for worst movement of the intersection.

[2] LOS and delay reported for worst-operating approach at 2-way stop-controlled intersections.

[3] LOS and delay reported for intersection.

Travel Speeds

Vehicles travel along Airport Way S in excess of the 45 mph posted speed limit. The three-day traffic counts on Airport Way (north of Portland Street) show an 85th-percentile speed of 52 mph for northbound vehicles and 53 mph for southbound vehicles. **Table 5** summarizes the results of the 5/7/2019 to 5/9/2019 count. Travel speed data sheets are found in Appendix A.

Table 5. Vehicle Speed Summary (5/7/2019 to 5/9/2019)

Direction/Percentile	Results
Northbound	
50th Percentile (median)	47.0 mph
85th Percentile	51.5 mph
Southbound	
50th Percentile (median)	47.2mph
85th Percentile	53.3 mph

Source: Vehicle Speed Report Summary, Airport Way S, South of Portland Street 5/7/2019 to 5/9/2019.

Collision Data

Five years (2014-2018) of collision data from roadways and intersections within the study area was compiled and provided by WSDOT. A total of 10 collisions occurred, with four collisions occurring at intersections and six along roadways. Seven of the collisions were related to a single vehicle running into a fixed object, such as a utility pole, street light, or building. Five collisions involved driver inattention, two were exceeding a safe speed, and one was under the influence of alcohol. **Table 6** summarizes the results of the traffic data.

Table 6. 2013-2017 Collision Data

Intersection/Segment	Rear-End	Left Turn	Fixed Object	Other	Total
S Orchard Street/Airport Way S			1		1
Portland Street/Airport Way S	1		2		3
Airport Way S, north of S Orchard St			2		2
Airport Way S, SE of S Othello St				1	1
Perimeter Rd S, NW of Orchard St			1		1
Perimeter Rd S, SE of Airport Access Rd		1			1

Source: WSDOT (1/1/2014 to 12/31/2018).

Sight Distance

A detailed sight distance analysis was conducted for the Portland Street/Airport Way S intersection by KPFF Consultants in 2013. The intersection is located along a curve on Airport Way S and the horizontal curvature of the street, along with trees, power poles, buildings, equipment, and parked vehicles block or limit the visibility to the north and south from the side street. According to the analysis, the available sight distance at Portland Street looking north onto Airport Way S is 510 feet and looking south onto Airport Way S is 485 feet. A copy of this study is included in Appendix C.

In *A Policy on Geometric Design of Highways and Streets* (2018), AASHTO recommends providing passenger vehicles a sight distance of 590 feet for vehicles turning left and 480 feet for vehicles turning right. Based on the sight distance measurements for a 50 mph design speed, the Portland Street/Airport Way S intersection has inadequate sight distance to the north and the south for left-turning vehicles. Sight distance is adequate for right-turning passenger vehicles. Stopping sight distance, the minimum distance for an approaching vehicle to recognize and stop for a condition in its travel path, is adequate for approaching vehicles on Airport Way S. **Table 7** lists the required and measured sight distances for passenger vehicles at the Portland Street/Airport Way S intersection. Additional sight distance would be required if a heavy vehicle (truck) is used as the design vehicle.

Table 7. Sight Distance Analysis of the Portland Street/Airport Way S Intersection

Maneuver and Position	Direction	Sight Distance Requirement (feet)	Sight Distance Measured (feet)	Adequate Sight Distance?
Left turn from Portland Street	Looking Right	590	485	No
Left turn from Portland Street	Looking Left	590	510	No
Right Turn from Portland Street	Looking Left	480	510	Yes
Stopping Sight Distance for Vehicles on Airport Way S	Northbound	425	850	Yes
Stopping Sight Distance for Vehicles on Airport Way S	Southbound	425	1,100	Yes

AASHTO, *A Policy on Geometric Design of Highways and Streets* (2018). KPFF

Signal Warrants

The 2009 Manual on Uniform Traffic Control Devices (MUTCD) provides warrants to determine if a signal is justified at a particular location. There are nine warrants that can be applied, based on vehicle volumes, pedestrian volumes, crash experience and other factors. The satisfaction of one or more warrants does not require the installation of a signal, but rather establishes that a signal could be considered. Traffic count data was collected on all three approaches of the Portland Street/Airport Way intersection to establish if warrants are met under existing conditions. The data show that none of the warrants are satisfied under existing conditions and a signal is not an appropriate treatment at the intersection. **Table 8** summarizes the signal warrants analysis for existing conditions. Results are included in Appendix D.

Table 8. Signal Warrants Analysis for the Portland Street/Airport Way Intersection - Existing Conditions

Warrant	Hours Met	Hours Required	Warrant Status
1. Eight-Hour Vehicle Volume	0	8	Not Met
2. Four-Hour Vehicle Volume	0	4	Not Met
3. Peak-Hour Vehicle Volume	0	1	Not Met
4. Pedestrian Volume	0	4	Not Met
5. School Crossing	N/A	N/A	Not Met
6. Coordinated Signal System	N/A	N/A	Not Met
7. Crash Experience	0	8	Not Met
8. Roadway Network	N/A	N/A	Not Met
9. Near Grade Crossing	N/A	N/A	Not Met

MUTCD 2009.

Pedestrian Facilities

Segments of pedestrian facilities are located along west side Airport Way S and frequently are non-continuous. For the length of Boeing Field, there are no sidewalks on the east side of Airport Way S, which is Burlington Northern Santa Fe (BNSF) railroad property. There are no marked crosswalks on Airport Way S within the vicinity of the project site. Most of Perimeter Road S does not have sidewalks, except for a few stretches near the King County Airport. Along the UPS/BFI Gateway site, there is an asphalt sidewalk along Airport Way S for most of the existing property frontage, except for a 200' missing segment at the northern end of the site, just south of the S Othello Street intersection. The UPS/BFI Gateway Project will construct continuous sidewalk facilities along the property frontage.

Bicycle Facilities

There are no bicycle facilities along Airport Way S. The 2014 *Seattle Bicycle Master Plan* recommends the construction of protected bicycle lanes along Airport Way S between Downtown Seattle and the southern city limits, including the study segment. This type of facility would most likely require reducing the number of lanes on Airport Way S and construction of the bicycle facilities within the existing paved width of the roadway. This project has not been prioritized in the City's 2017 or draft 2019 implementation plans. As part of the UPS/BFI Gateway Project, a bike rack for 12 bicycles will be provided on site.

Transit Service

Currently, King County Metro does not provide transit service along Airport Way S (<https://tripplanner.kingcounty.gov/>). The nearest stops are approximately 1 mile north of the Airport near S Albro Place in the Georgetown neighborhood of Seattle.

Freight

Airport Way S is an important freight connection that provides intermodal connections between air cargo and truck freight. The 2016 *City of Seattle Freight Master Plan* identifies Airport Way S as a Major Freight corridor and the King County Airport as a designated Manufacturing/Industrial Center.

Background Conditions

Background conditions provide a forecast of future operating conditions without the project. This allows the project conditions to be compared with no-build conditions for the same future year. The project year for this study is 2021, the expected completion date for the UPS BFI Gateway Project.

Planned Transportation Improvements

The City of Seattle (<https://capitalprojects.seattle.gov/projects>) currently does not identify any new capital projects in the vicinity of the study area that may affect traffic operations.

Growth Rate Estimate

A 1.5% annual growth rate was applied to the 2019 traffic count volumes to provide an estimate of the 2021 traffic conditions in the area. The 1.5% rate represents a conservative (or high growth) estimate of peak hour growth. Comparison of 2013 and 2019 daily counts found that overall growth on Airport Way S has been less than 1 percent per year.

Closure of Perimeter Road

King County Airport plans to close the Perimeter Road to the north of the Portland Street. Northbound Perimeter Road traffic will be required to turn right on Portland Way, turn left on Airport Way S, and turn left on S Orchard Street to reconnect with northbound Perimeter Road. Southbound traffic on Perimeter Road will need to turn left on Othello Street, turn right on Airport Way and turn right on Portland Street to return to southbound Perimeter Road.

This closure will divert approximately 45 trips onto Airport Way S during the AM peak hour and 35 trips during the PM peak hour. Left turn volumes from Portland Street onto Airport Way S are expected to increase from 2 to 10 trips during the AM peak hour and from 18 to 32 trips during the PM peak hour. Other movements at the Portland Street/Airport Way S intersection are expected to be lower with the closure, such as eastbound right turns and northbound left turns, resulting in approximately the same total volume at the intersection.

Other Factors Affecting Traffic Growth

King County's Airport Properties and Business Development Division was contacted to determine whether there are specific projects in the vicinity of the site that might affect traffic volumes. Of the projects identified by the County, most were the replacement of old buildings with upgraded facilities, such as hangars for aircraft storage or improvements to aircraft parking. These projects are not expected to increase in vehicle volumes or delays at study intersections.

The County identified two projects that are noteworthy to the UPS/BFI Gateway analysis:

JetSuiteX airlines began passenger service at the King County International Airport on July 1, 2019. This operator will use the Main Terminal and will operate 30-passenger aircraft with 3 flights per day initially. This new service is expected to increase traffic volumes at the terminal and on Airport Way S at the S Othello Street and S Orchard Street intersections. A conservative estimate of this new service is estimated to add approximately 65 new vehicle trips during the AM peak hour and 65 new trips during the PM peak hour based on one arriving and one departing flight during both the morning and evening peak hours and a 90% single-person arrival and a 70%/30% split between those who drive and park at the airport and passengers who are dropped-off (taxi, rideshare, friend).

King County's Large Aircraft Parking (LAP) project will demolish the old King County Airport arrivals building and will use the space as long-term aircraft parking. The existing building is underutilized and the 10 airport staff who work in this building will be relocated to the main building. The other building tenant will be relocated to a nearby office building.

Background Traffic Volumes

The 2021 AM and PM peak hour traffic volumes were estimated based on the growth in background travel volumes, the closure of Perimeter Road and the addition of new passenger service at the King County Airport. **Figure 6** summarizes the 2021 AM and PM peak hour traffic volumes at the study intersections. The 2021 Background PM peak hour volumes are 15 percent higher than existing volumes at the Othello Street/Airport Way S intersection, and 11 percent higher at the Portland Street/Airport Way S intersection.

Intersection Operations

Table 9 reports the intersection LOS and seconds of delay for 2021 background conditions during the AM and PM peak hour. Most intersections experience additional delays. Compared with existing traffic operations, the Portland Street/Airport Way S intersection declines from LOS B to LOS D during the AM peak hour and from LOS C to LOS D during the PM peak hour. This decrease is related to higher delays from increased left turns from Portland Street onto Airport Way S as a result of the Perimeter Road S closure.

Table 9. 2021 Background Conditions - Peak Hour LOS and Delay (Seconds)

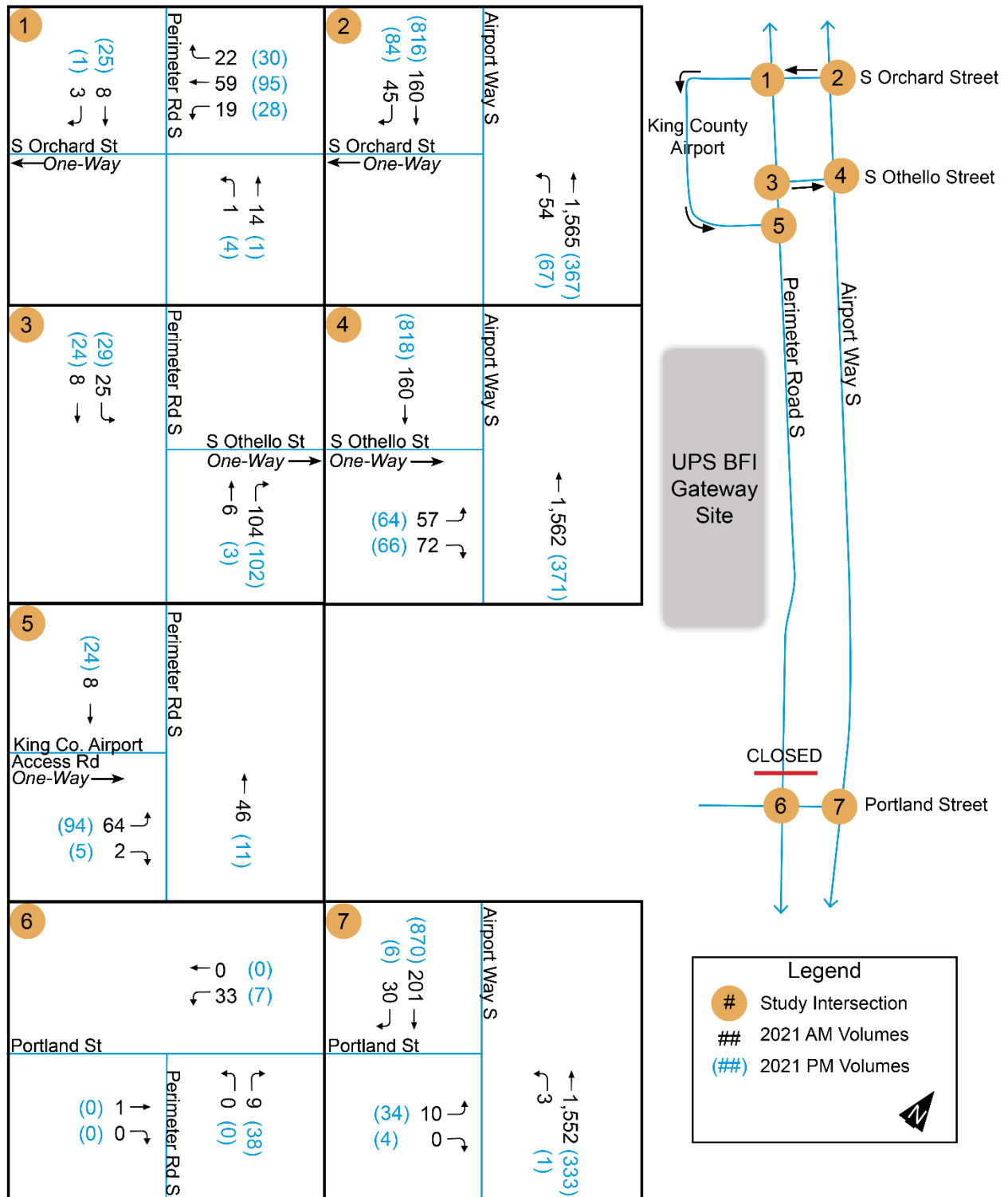
Intersection	Background Intersection Control	Existing		2021 Background	
		AM Peak Hour LOS (delay)	PM Peak Hour LOS (delay)	AM Peak Hour LOS (delay)	PM Peak Hour LOS (delay)
S Orchard St/ Airport Way S	None ^[1]	A (8)	A (10)	A (8)	B (11)
S Orchard St/ Perimeter Rd	Northbound/ Southbound Stop Control ^[2]	A (10)	A (10)	A (10)	B (11)
S Othello St/ Airport Way S	Signal ^[3]	A (4)	A (4)	A (7)	A (8)
S Othello St/ Perimeter Rd	Northbound/Southbound Stop Control ^[2]	A (7)	A (8)	A (7)	A (7)
Airport Exit/ Perimeter Rd	Eastbound Stop Control ^[2]	A (9)	A (9)	A (9)	A (9)
Portland St/ Airport Way S	Eastbound Stop Control ^[2]	B (10)	C (18)	D (30)	D (25)
Portland St/ Perimeter Rd	Eastbound/Westbound Stop Control ^[2]	A (9)	A (9)	A (9)	A (9)

[1] LOS and delay reported for worst movement of the intersection.

[2] LOS and delay reported for worst-operating approach at 2-way stop-controlled intersections.

[3] LOS and delay reported for intersection.

Figure 6. 2021 AM and PM Peak Hour Traffic Volumes – Background Conditions



Project Conditions

The UPS BFI Gateway Project will improve the package handling capabilities and consolidate operations into a single new building. The primary objective of the project is to improve efficiency, security and logistics. The expected number of aircraft served will not change.

The proposed project consolidates the package sorting and administration and flight control functions into a single building of a single 52,370 square foot building. In addition, there is a 13,400 square foot maintenance building and a 1,255 square foot security building. The project also constructs a caster deck for the loading and unloading of aircraft.

UPS identifies that there are 331 existing employees (2015) with a maximum peak requirement of 194 employees. While UPS does not anticipate the number of employees to increase, the project provides for the capacity to accommodate up to 45 additional employees by 2025. The project includes 153 employee parking spaces within the leasehold, a reduction from 202 spaces provided today. UPS leases also 43 employee parking spaces off-site and plans to continue to use these spaces in the future.

Trip Generation

The project provides the capacity to add up to 45 employees over the life of the project. To be conservative, the analysis uses this capacity increase to calculate the number of additional trips added to area roadways.

ITE Trip Generation Manual (10th Edition) was used to provide a conservative analysis of the traffic impacts at nearby intersections. Using the warehousing land use category and the total projected increase in employee capacity (45), approximately 28 new AM peak hour trips and 29 new PM peak hour trips are estimated. **Table 10** summarizes the results of the trip generation analysis. Appendix E provides the trip generation reports for the AM peak and PM peak hours.

Table 10. Trip Generation (Net New Trips)

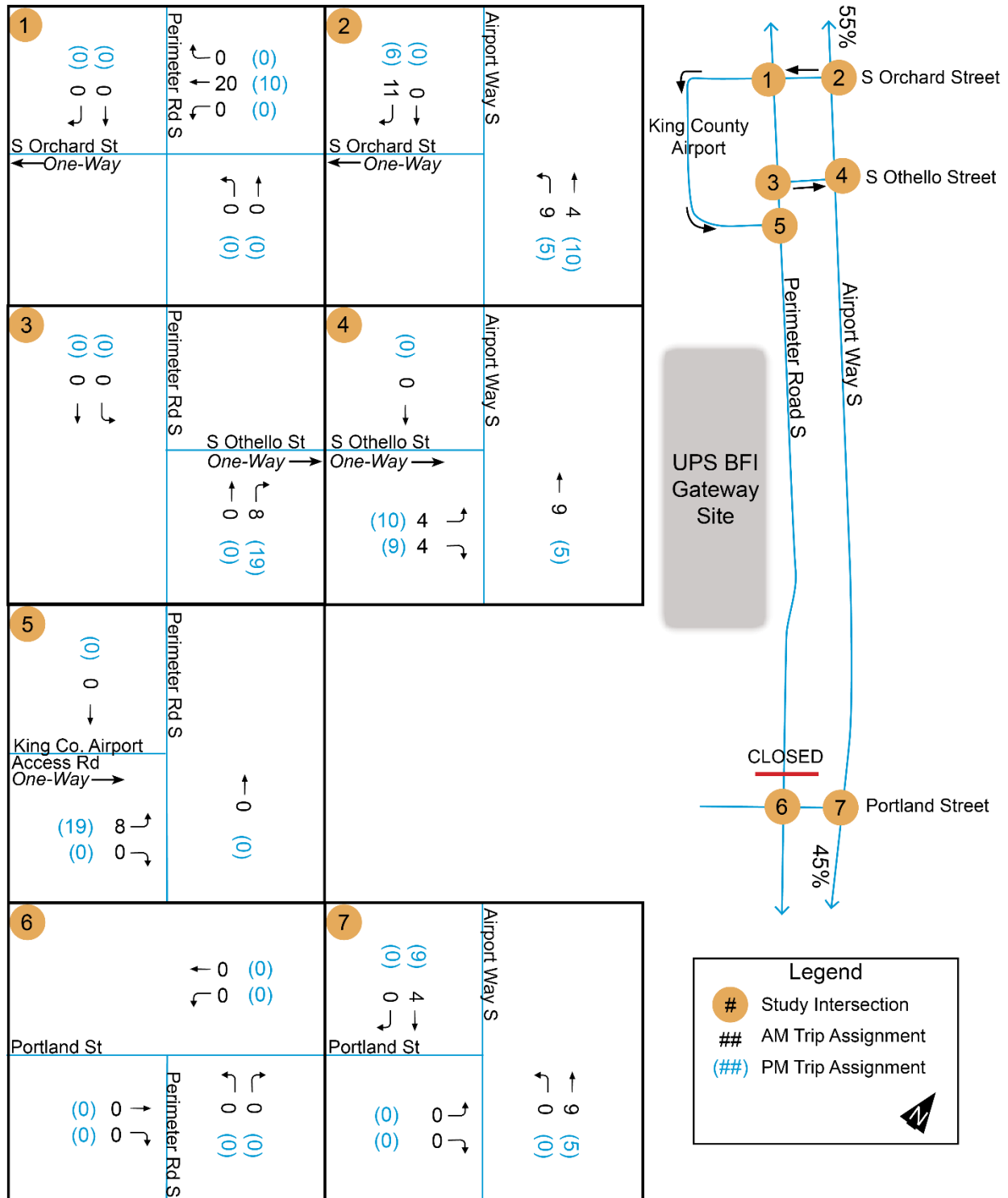
Land Use	Daily Trips	AM Peak Hour Trips			PM Peak Hour Trips		
		Total	Entering	Exiting	Total	Entering	Exiting
Warehousing (#150)	233	28	20	8	29	10	19

ITE Trip Generation 10th Edition - Land Use 150 Warehousing.

Trip Distribution and Assignment

The trip distribution is based on the existing traffic volumes at the study intersections. Approximately 55 percent of trips travel to and from the north and 44 percent travel to and from the south. The entering and exiting trips generated from the site are multiplied by the trip distribution to obtain the expected trip assignment. **Figure 7** shows the calculated trip distribution and assignment for the new trips associated with the UPS BFI Gateway site.

Figure 7. Trip Distribution and Assignment



Traffic Volumes with Project

The 2021 AM and PM peak hour traffic volumes were estimated based on the background volumes and the new trips assigned to the roadway due to the estimated employee growth at UPS. **Figure 8** summarizes the 2021 AM and PM peak hour traffic volumes at the study intersections. Compared to existing volumes, the 2021 PM peak hour volumes with the project are 24 percent higher at the Othello Street/Airport Way S intersection, while the Portland Street/Airport Way S intersection increased by 15 percent.

Traffic Operations

Table 11 reports the intersection LOS and seconds of delay for 2021 background conditions during the AM and PM peak hour. Most intersections experienced higher delays with the Portland Street/Airport Way S intersection declining to LOS D for the AM and PM peak hours.

Table 11. Project Conditions - Peak Hour LOS and Delay (Seconds)

Intersection	Intersection Control	AM Peak Hour LOS (delay)	PM Peak Hour LOS (delay)
S Orchard St/ Airport Way S	None ^[1]	A (8)	B (11)
S Orchard St/Perimeter Rd	Northbound/ Southbound Stop Control ^[2]	B (10)	B (11)
S Othello St/Airport Way S	Signal ^[3]	A (7)	A (9)
S Othello St/Perimeter Rd	Northbound/Southbound Stop Control ^[2]	A (8)	A (8)
Airport Exit/Perimeter Rd	Eastbound Stop Control ^[2]	A (9)	A (10)
Portland St/Airport Way S	Eastbound Stop Control ^[2]	D (30)	D (26)
Portland St/Perimeter Rd	Eastbound/Westbound Stop Control ^[2]	A (9)	A (9)

[1] LOS and delay reported for worst movement of the intersection.

[2] LOS and delay reported for worst-operating approach at 2-way stop-controlled intersections.

[3] LOS and delay reported for intersection.

Warrants Analysis

A signal warrants analysis was conducted for the Portland Street/Airport Way S intersection to reflect conditions with the closure of Perimeter Road S and with the Project. The results in **Table 12** show that none of the signal warrants were met. While volumes on Airport Way S will continue to be high, the expected volumes on Portland Street are insufficient to justify a signal. Results of the analysis are included in Appendix D.

Figure 8. 2021 AM and PM Peak Hour Traffic Volumes – Project Conditions

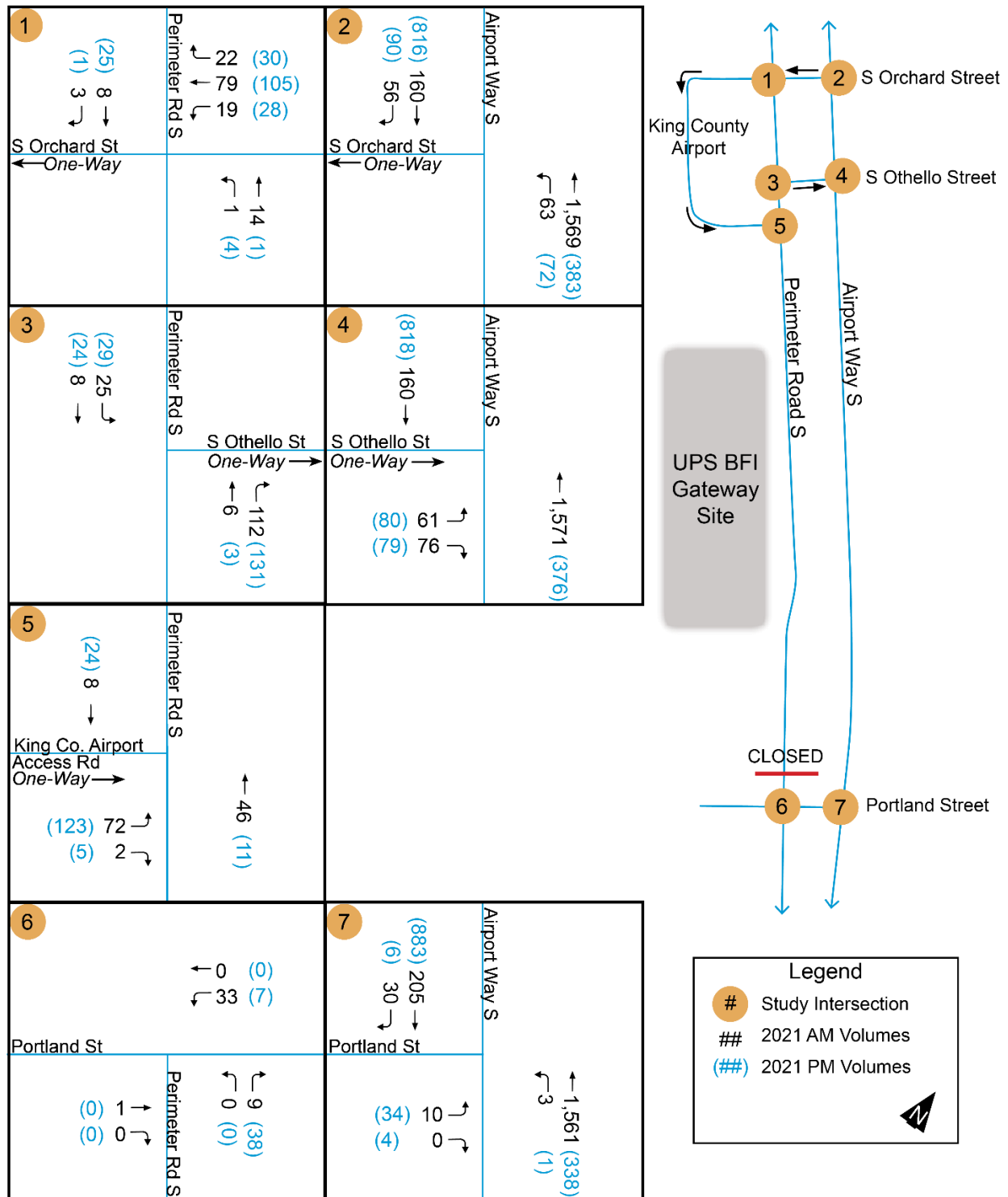


Table 12. Signal Warrant Analysis for the Portland Street/Airport Way Intersection – Project Conditions

Warrant	Hours Met	Hours Required	Warrant Status
1. Eight-Hour Vehicle Volume	0	8	Not Met
2. Four-Hour Vehicle Volume	0	4	Not Met
3. Peak-Hour Vehicle Volume	0	1	Not Met
4. Pedestrian Volume	0	4	Not Met
5. School Crossing	N/A	N/A	Not Met
6. Coordinated Signal System	N/A	N/A	Not Met
7. Crash Experience	0	8	Not Met
8. Roadway Network	N/A	N/A	Not Met
9. Near Grade Crossing	N/A	N/A	Not Met

MUTCD 2009.

Summary of Impacts

The closure of Perimeter Road S will change the traffic flows in the area, requiring vehicles to travel around the UPS site on Airport Way S. For vehicles traveling southbound on Perimeter Road S, the maneuver requires a left turn onto S Othello Street, and then a right turn at Airport Way S and a right turn onto Portland Street. For northbound traffic from Perimeter Road S, this requires a right turn at Portland Street and two left turn movements at Airport Way S and at S Orchard Street. Because of the existing sight distance limitations at the Portland Street/Airport Way S intersection, the increase to the left turn movement volumes is considered an impact.

There are no other impacts related to the improvements proposed at the UPS BFI Gateway site. Traffic operations at all study intersection remain acceptable.

Recommended Mitigation

As part of the development of the UPS BFI Gateway site, frontage improvements will be constructed along Airport Way S. This will include new sidewalk along the west side of Airport Way S, connecting S Othello Street and Portland Street. The frontage improvements will also establish an intersection “clear zone” to meet minimum intersection sight distance for vehicles looking to the north from Portland Street.

To address the sight distance issue at the Portland Street/Airport Way S intersection looking to the south, the following course of action is being pursued by the architectural design team:

1. Remove or modify the building at 7696 Perimeter Road to obtain minimum sight distance requirements looking south from Portland Street. This modification will require coordination with the King County Airport, which owns the building and property.

2. Trimming/removal of street trees and planted bushes within intersection sight triangle looking south.

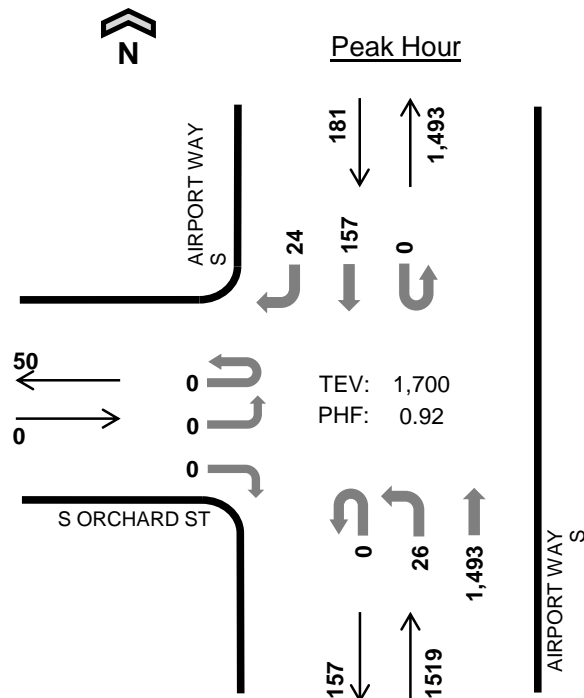
With these improvements, sight distances can be improved to acceptable levels. Other improvements include provision of a bike rack that can hold 12 bicycles.

Other Considerations

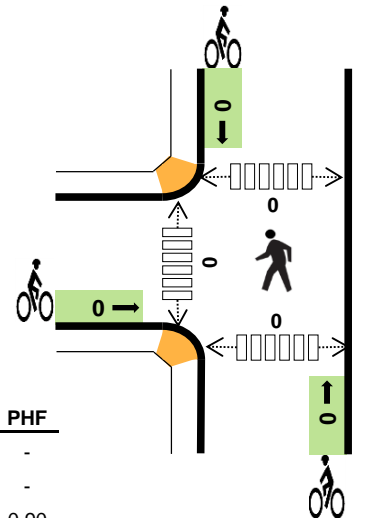
With the planned closure to the north of Portland Street, northbound travel on Perimeter Road S will become more difficult. Drivers that can currently travel north on Perimeter Road S will be diverted to the Portland Street/Airport Way S intersection, where they will need to make a left turn onto Airport Way S. Adding a center median refuge lane on Airport Way S would facilitate left turn movements to and from the Portland Street/Airport Way S intersection, allowing drivers making left turns from Portland Street to use a two-step maneuver where they only need to cross one direction of traffic at a time. Modifying Airport Way S to include a center refuge lane could be accomplished either by widening the street to 5 lanes or through a 4-lane to 3-lane conversion (road diet). A five-lane section would require additional right of way. The 4-lane to 3-lane conversion would provide an opportunity to add bicycle facilities to the corridor which are identified in the City's Bicycle Master Plan, and would also improve sight distance because vehicles would be moved farther away from the curb. We recommend that King County work with the City of Seattle to explore options for providing a center median refuge lane along this segment of Airport Way S.

Appendix A: Traffic Count Data

AIRPORT WAY S S ORCHARD ST



Date: Tue, May 07, 2019
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:30 AM to 8:30 AM



	HV %:	PHF
EB	-	-
WB	-	-
NB	3.8%	0.90
SB	8.8%	0.82
TOTAL	4.3%	0.92

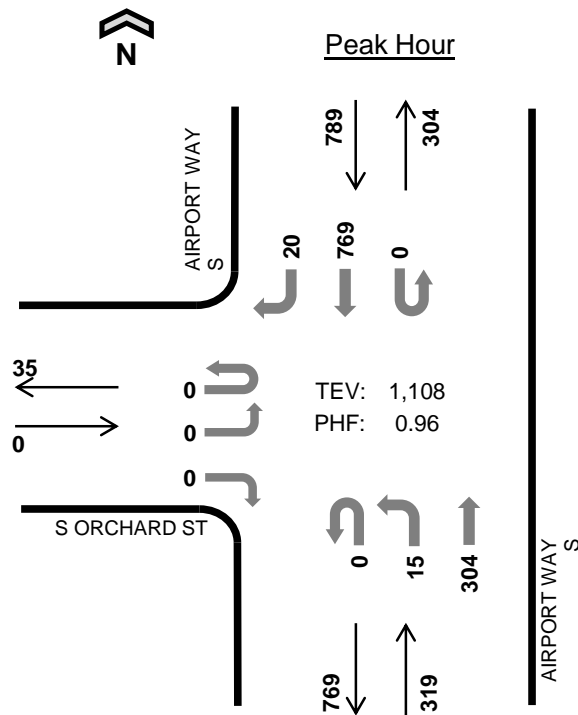
Two-Hour Count Summaries

Interval Start	S ORCHARD ST				0				AIRPORT WAY S				AIRPORT WAY S				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	0	0	3	338	0	0	0	31	3	375	0
7:15 AM	0	0	0	0	0	0	0	0	0	6	333	0	0	0	17	4	360	0
7:30 AM	0	0	0	0	0	0	0	0	0	6	380	0	0	0	32	8	426	0
7:45 AM	0	0	0	0	0	0	0	0	0	7	379	0	0	0	40	5	431	1,592
8:00 AM	0	0	0	0	0	0	0	0	0	6	414	0	0	0	35	6	461	1,678
8:15 AM	0	0	0	0	0	0	0	0	0	7	320	0	0	0	50	5	382	1,700
8:30 AM	0	0	0	0	0	0	0	0	0	3	324	0	0	0	45	5	377	1,651
8:45 AM	0	0	0	0	0	0	0	0	0	10	285	0	0	0	46	6	347	1,567
Count Total	0	0	0	0	0	0	0	0	0	48	2,773	0	0	0	296	42	3,159	0
Peak Hour	0	0	0	0	0	0	0	0	0	26	1,493	0	0	0	157	24	1,700	0

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

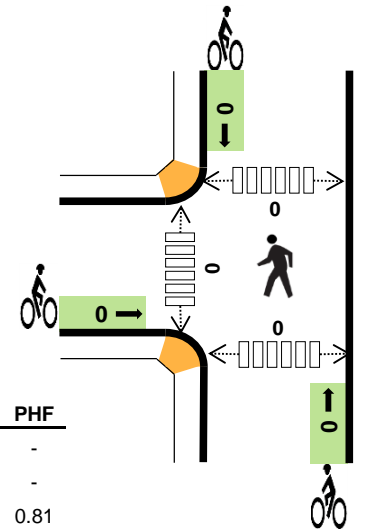
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	0	0	16	2	18	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	9	1	10	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	10	3	13	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	9	6	15	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	19	2	21	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	19	5	24	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	9	3	12	0	0	0	0	0	0	2	0	0	2
8:45 AM	0	0	19	4	23	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	110	26	136	0	0	0	0	0	0	2	0	0	2
Peak Hr	0	0	57	16	73	0	0	0	0	0	0	0	0	0	0

AIRPORT WAY S S ORCHARD ST



Date: Tue, May 07, 2019
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:15 PM to 5:15 PM

	HV %:	PHF
EB	-	-
WB	-	-
NB	6.3%	0.81
SB	2.7%	0.94
TOTAL	3.7%	0.96



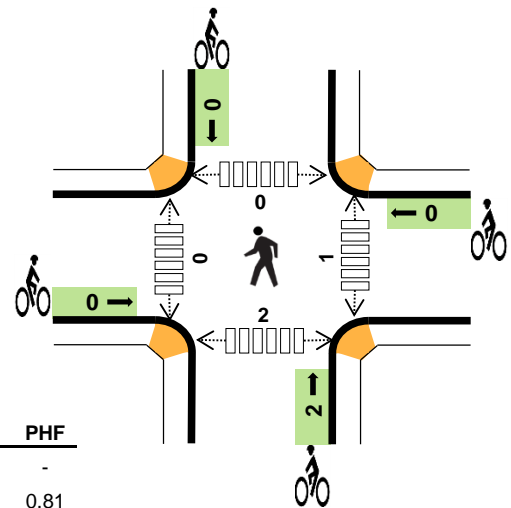
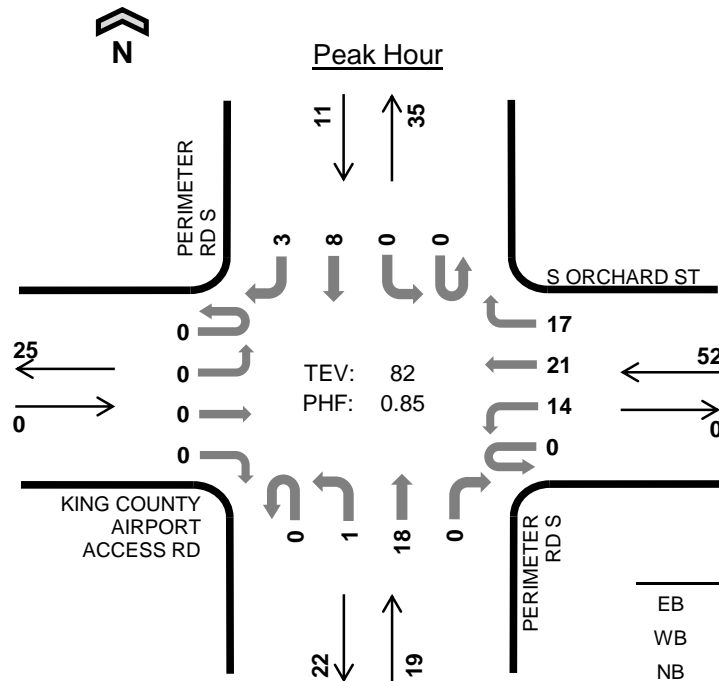
Two-Hour Count Summaries

Interval Start	S ORCHARD ST				0				AIRPORT WAY S				AIRPORT WAY S				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	0	0	0	0	0	0	0	1	52	0	0	0	201	4	258	0
4:15 PM	0	0	0	0	0	0	0	0	0	4	69	0	0	0	203	6	282	0
4:30 PM	0	0	0	0	0	0	0	0	0	7	91	0	0	0	184	4	286	0
4:45 PM	0	0	0	0	0	0	0	0	0	3	63	0	0	0	181	5	252	1,078
5:00 PM	0	0	0	0	0	0	0	0	0	1	81	0	0	0	201	5	288	1,108
5:15 PM	0	0	0	0	0	0	0	0	0	5	77	0	0	0	175	9	266	1,092
5:30 PM	0	0	0	0	0	0	0	0	0	5	57	0	0	0	163	9	234	1,040
5:45 PM	0	1	0	0	0	0	0	0	0	7	47	0	0	0	153	14	222	1,010
Count Total	0	1	0	0	0	0	0	0	0	33	537	0	0	0	1,461	56	2,088	0
Peak Hour	0	0	0	0	0	0	0	0	0	15	304	0	0	0	769	20	1,108	0

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	0	0	2	3	5	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	5	9	14	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	8	6	14	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	2	4	6	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	5	2	7	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	3	3	6	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	4	0	4	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	3	5	8	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	32	32	64	0	0	0	0	0	0	0	0	0	0
Peak Hr	0	0	20	21	41	0	0	0	0	0	0	0	0	0	0

PERIMETER RD S S ORCHARD ST



	HV %:	PHF
EB	-	-
WB	7.7%	0.81
NB	0.0%	0.68
SB	18.2%	0.55
TOTAL	7.3%	0.85

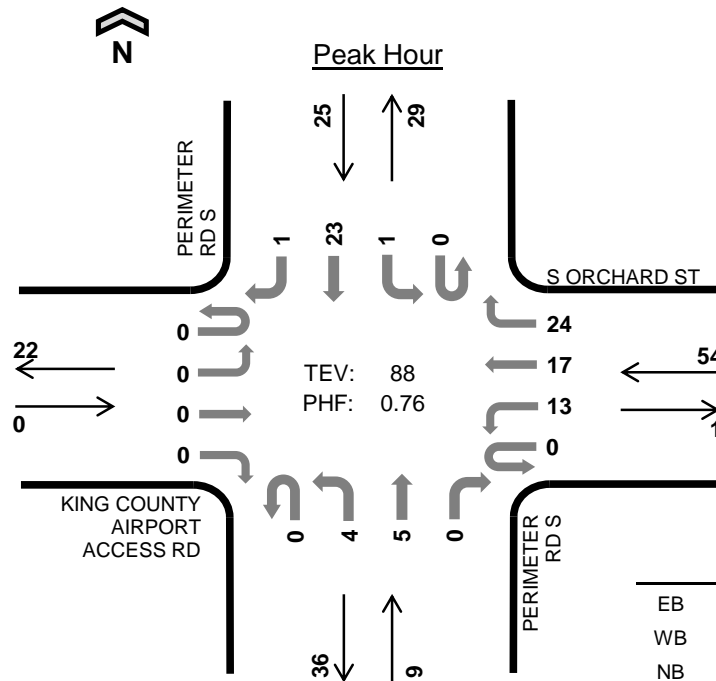
Two-Hour Count Summaries

Interval Start	KING COUNTY AIRPORT ACCESS RD				S ORCHARD ST				PERIMETER RD S				PERIMETER RD S				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	0	0	0	2	0	4	0	0	2	0	0	0	2	0	10	0
7:15 AM	0	0	0	0	0	0	3	5	0	0	5	0	0	0	4	0	17	0
7:30 AM	0	0	0	0	0	8	5	3	0	0	2	0	0	0	0	2	20	0
7:45 AM	0	0	0	0	0	3	4	5	0	0	3	0	0	0	4	0	19	66
8:00 AM	0	0	0	0	0	2	7	3	0	1	6	0	0	0	0	0	19	75
8:15 AM	0	0	0	0	0	1	5	6	0	0	7	0	0	0	4	1	24	82
8:30 AM	0	0	0	0	0	2	2	4	0	0	1	0	0	0	3	0	12	74
8:45 AM	0	0	0	0	0	1	6	9	0	0	3	0	0	0	4	1	24	79
Count Total	0	0	0	0	0	19	32	39	0	1	29	0	0	0	21	4	145	0
Peak Hour	0	0	0	0	0	14	21	17	0	1	18	0	0	0	8	3	82	0

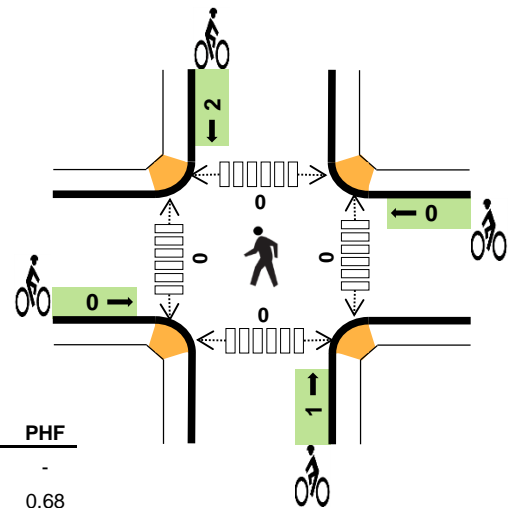
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	0	1	0	0	1	0	0	0	1	1	0	1	0	0	1
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	2	3
7:45 AM	0	2	0	1	3	0	0	1	0	1	0	0	0	0	0
8:00 AM	0	1	0	0	1	0	0	1	0	1	0	0	0	0	0
8:15 AM	0	1	0	1	2	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	2	2	0	0	1	0	1	0	0	0	0	0
Count Total	0	5	0	4	9	0	0	3	1	4	1	1	0	2	4
Peak Hour	0	4	0	2	6	0	0	2	0	2	1	0	0	2	3

PERIMETER RD S S ORCHARD ST



Date: Tue, May 07, 2019
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 5:00 PM to 6:00 PM



	HV %:	PHF
EB	-	-
WB	5.6%	0.68
NB	0.0%	0.56
SB	0.0%	0.78
TOTAL	3.4%	0.76

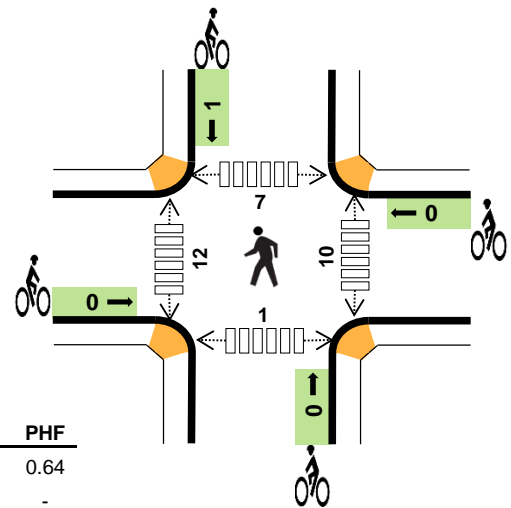
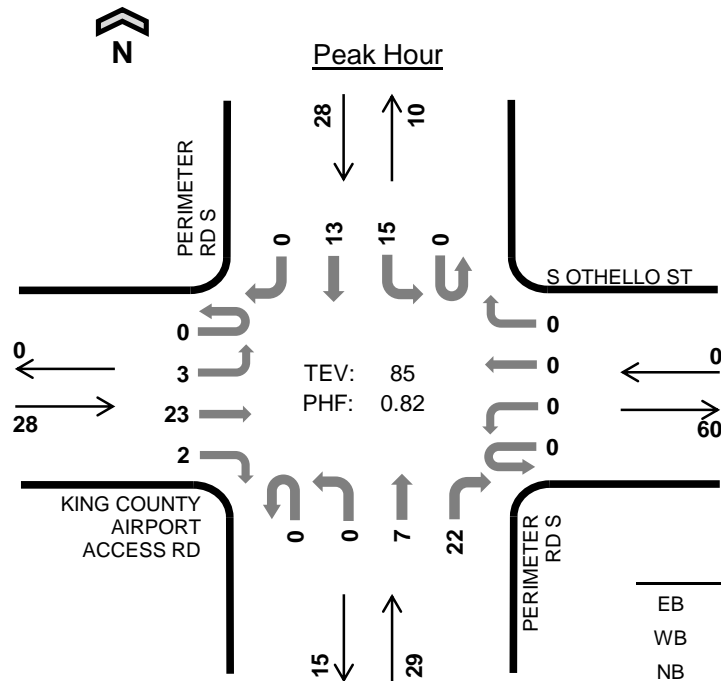
Two-Hour Count Summaries

Interval Start	KING COUNTY AIRPORT ACCESS RD				S ORCHARD ST				PERIMETER RD S				PERIMETER RD S				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	0	0	0	2	3	0	0	0	4	0	0	0	2	0	11	0
4:15 PM	0	0	0	0	0	3	6	1	0	0	4	0	0	0	7	0	21	0
4:30 PM	0	0	0	0	0	2	5	4	0	0	1	0	0	0	9	1	22	0
4:45 PM	0	0	0	0	0	2	2	4	0	0	2	0	0	0	5	1	16	70
5:00 PM	0	0	0	0	0	1	2	3	0	1	3	0	0	0	6	0	16	75
5:15 PM	0	0	0	0	0	3	8	3	0	1	1	0	0	0	4	1	21	75
5:30 PM	0	0	0	0	0	3	3	8	0	1	1	0	0	1	5	0	22	75
5:45 PM	0	0	0	0	0	6	4	10	0	1	0	0	0	0	8	0	29	88
Count Total	0	0	0	0	0	22	33	33	0	4	16	0	0	1	46	3	158	0
Peak Hour	0	0	0	0	0	13	17	24	0	4	5	0	0	1	23	1	88	0

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
4:15 PM	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
4:45 PM	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0
5:45 PM	0	3	0	0	3	0	0	1	0	1	0	0	0	0	0
Count Total	0	3	0	0	3	0	0	2	3	5	2	0	0	0	2
Peak Hour	0	3	0	0	3	0	0	1	2	3	0	0	0	0	0

PERIMETER RD S S OTHELLO ST



	HV %:	PHF
EB	3.6%	0.64
WB	-	-
NB	31.0%	0.81
SB	7.1%	0.88
TOTAL	14.1%	0.82

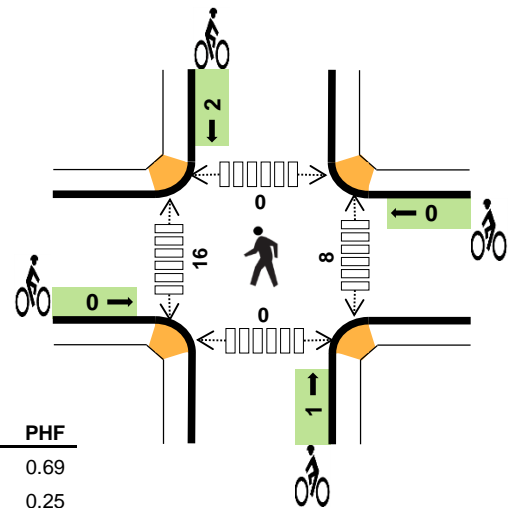
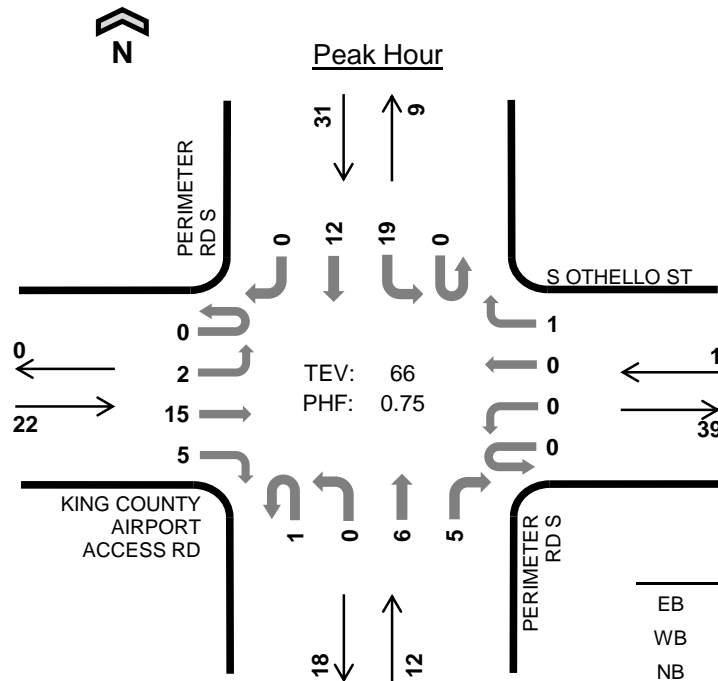
Two-Hour Count Summaries

Interval Start	KING COUNTY AIRPORT ACCESS RD				S OTHELLO ST				PERIMETER RD S				PERIMETER RD S				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	5	0	0	0	0	0	0	0	1	8	0	5	3	0	22	0
7:15 AM	0	2	3	1	0	0	0	0	0	0	3	4	0	4	1	0	18	
7:30 AM	0	0	11	0	0	0	0	0	0	0	1	6	0	2	6	0	26	
7:45 AM	0	1	4	1	0	0	0	0	0	0	2	4	0	4	3	0	19	
8:00 AM	0	2	4	0	0	0	0	0	0	0	4	3	0	1	1	0	15	78
8:15 AM	0	0	3	1	0	0	0	0	0	0	5	0	0	6	3	0	18	78
8:30 AM	0	0	6	3	0	0	0	0	0	0	1	3	0	3	3	0	19	71
8:45 AM	0	1	1	1	0	0	0	0	0	0	1	6	0	3	3	0	16	68
Count Total	0	6	37	7	0	0	0	0	0	0	18	34	0	28	23	0	153	0
Peak Hour	0	3	23	2	0	0	0	0	0	0	7	22	0	15	13	0	85	0

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	1	0	3	1	5	0	0	0	1	1	1	2	0	0	3
7:15 AM	0	0	0	0	0	0	0	0	0	0	2	2	0	0	4
7:30 AM	0	0	5	0	5	0	0	0	0	0	5	7	7	1	20
7:45 AM	0	0	1	1	2	0	0	0	0	0	2	1	0	0	3
8:00 AM	0	0	0	0	0	0	0	2	0	2	7	1	2	0	10
8:15 AM	0	0	0	1	1	0	0	0	0	0	4	0	0	0	4
8:30 AM	0	0	0	0	0	0	0	0	0	0	3	4	0	0	7
8:45 AM	1	0	2	1	4	0	0	1	0	1	1	0	0	0	1
Count Total	2	0	11	4	17	0	0	3	1	4	25	17	9	1	52
Peak Hour	1	0	9	2	12	0	0	0	1	1	10	12	7	1	30

PERIMETER RD S S OTHELLO ST



	HV %:	PHF
EB	0.0%	0.69
WB	0.0%	0.25
NB	16.7%	0.60
SB	9.7%	0.60
TOTAL	7.6%	0.75

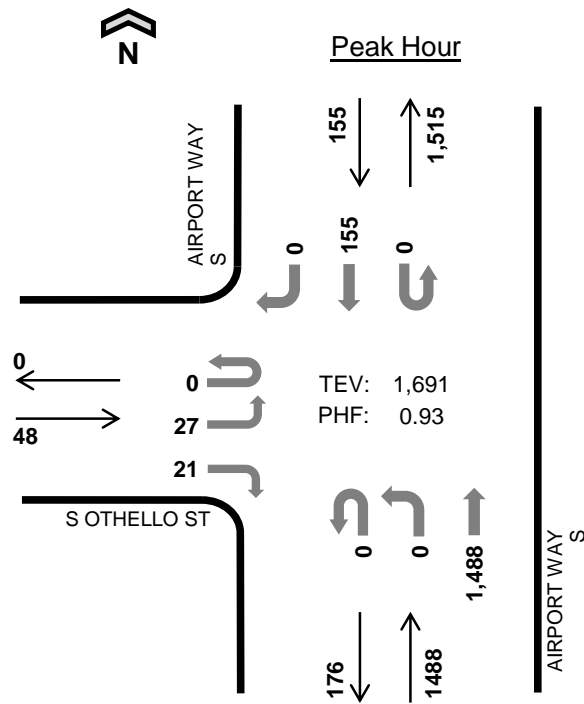
Two-Hour Count Summaries

Interval Start	KING COUNTY AIRPORT ACCESS RD				S OTHELLO ST				PERIMETER RD S				PERIMETER RD S				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	3	5	1	0	0	0	0	0	0	1	3	0	2	1	0	16	0
4:15 PM	0	1	2	0	0	0	0	0	0	0	2	3	0	6	0	0	14	0
4:30 PM	0	0	3	0	0	0	0	0	0	0	1	6	0	10	1	0	21	0
4:45 PM	0	1	4	1	0	0	0	0	0	0	1	1	0	3	3	0	14	65
5:00 PM	0	0	3	1	0	0	0	0	0	0	4	1	0	5	0	0	14	63
5:15 PM	0	1	5	1	0	0	0	0	0	0	1	0	0	5	1	0	14	63
5:30 PM	0	0	2	1	0	0	0	1	1	0	1	3	0	2	5	0	16	58
5:45 PM	0	1	5	2	0	0	0	0	0	0	0	1	0	7	6	0	22	66
Count Total	0	7	29	7	0	0	0	1	1	0	11	18	0	40	17	0	131	0
Peak Hour	0	2	15	5	0	0	0	1	1	0	6	5	0	19	12	0	66	0

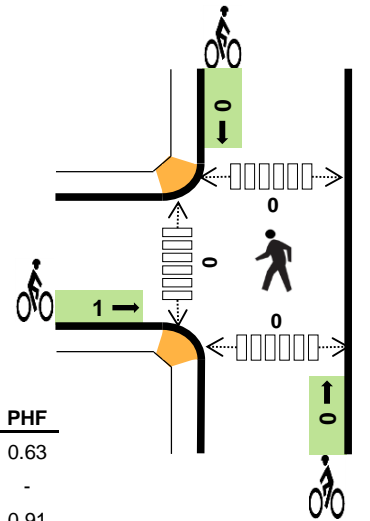
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	0	0	1	0	1	0	0	0	0	0	4	0	0	0	4
4:15 PM	0	0	1	0	1	0	0	0	1	1	5	0	1	0	6
4:30 PM	0	0	2	0	2	0	0	0	0	0	2	2	0	0	4
4:45 PM	0	0	0	0	0	0	0	1	0	1	2	1	0	0	3
5:00 PM	0	0	0	0	0	0	0	0	1	1	0	3	0	0	3
5:15 PM	0	0	0	0	0	0	0	0	0	0	4	2	0	0	6
5:30 PM	0	0	1	0	1	0	0	0	1	1	3	9	0	0	12
5:45 PM	0	0	1	3	4	0	0	1	0	1	1	2	0	0	3
Count Total	0	0	6	3	9	0	0	2	3	5	21	19	1	0	41
Peak Hour	0	0	2	3	5	0	0	1	2	3	8	16	0	0	24

AIRPORT WAY S S OTHELLO ST



Date: Tue, May 07, 2019
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:30 AM to 8:30 AM



	HV %:	PHF
EB	12.5%	0.63
WB	-	-
NB	3.5%	0.91
SB	9.0%	0.76
TOTAL	4.3%	0.93

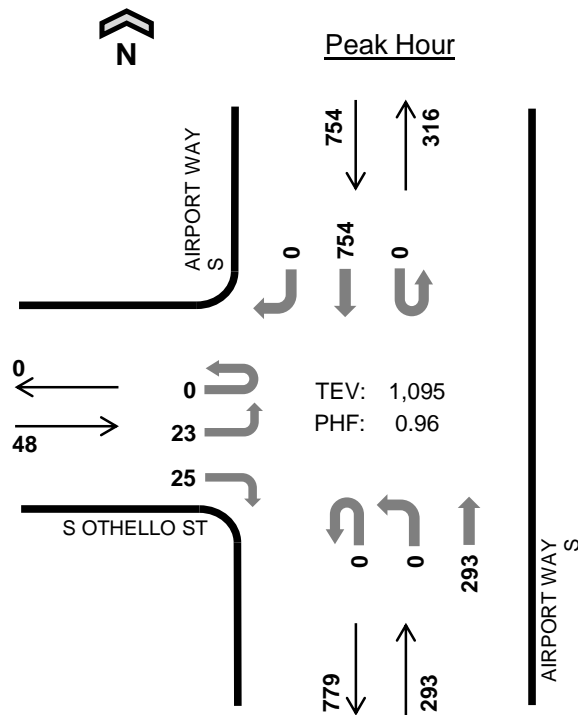
Two-Hour Count Summaries

Interval Start	S OTHELLO ST				0				AIRPORT WAY S				AIRPORT WAY S				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	11	0	6	0	0	0	0	0	0	329	0	0	0	31	0	377	0
7:15 AM	0	10	0	2	0	0	0	0	0	0	323	0	0	0	17	0	352	0
7:30 AM	0	10	0	9	0	0	0	0	0	0	379	0	0	0	29	0	427	0
7:45 AM	0	9	0	3	0	0	0	0	0	0	376	0	0	0	39	0	427	1,583
8:00 AM	0	6	0	2	0	0	0	0	0	0	410	0	0	0	36	0	454	1,660
8:15 AM	0	2	0	7	0	0	0	0	0	0	323	0	0	0	51	0	383	1,691
8:30 AM	0	11	0	1	0	0	0	0	0	0	312	0	0	0	46	0	370	1,634
8:45 AM	0	7	0	3	0	0	0	0	0	0	291	0	0	0	44	0	345	1,552
Count Total	0	66	0	33	0	0	0	0	0	0	2,743	0	0	0	293	0	3,135	0
Peak Hour	0	27	0	21	0	0	0	0	0	0	1,488	0	0	0	155	0	1,691	0

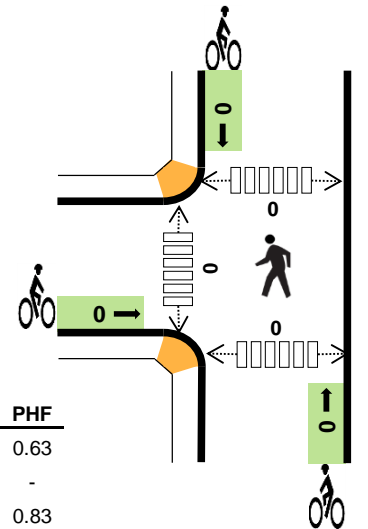
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	4	0	12	1	17	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	8	1	9	0	0	1	0	1	0	0	0	0	0
7:30 AM	5	0	7	2	14	0	0	0	0	0	0	0	0	0	0
7:45 AM	1	0	7	6	14	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	18	1	19	1	0	0	0	1	0	0	0	0	0
8:15 AM	0	0	20	5	25	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	8	3	11	0	0	0	0	0	0	0	0	0	0
8:45 AM	3	0	16	4	23	0	0	0	0	0	0	0	0	0	0
Count Total	13	0	96	23	132	1	0	1	0	2	0	0	0	0	0
Peak Hr	6	0	52	14	72	1	0	0	0	1	0	0	0	0	0

AIRPORT WAY S S OTHELLO ST



Date: Tue, May 07, 2019
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:15 PM to 5:15 PM



	HV %:	PHF
EB	6.3%	0.63
WB	-	-
NB	6.1%	0.83
SB	2.8%	0.96
TOTAL	3.8%	0.96

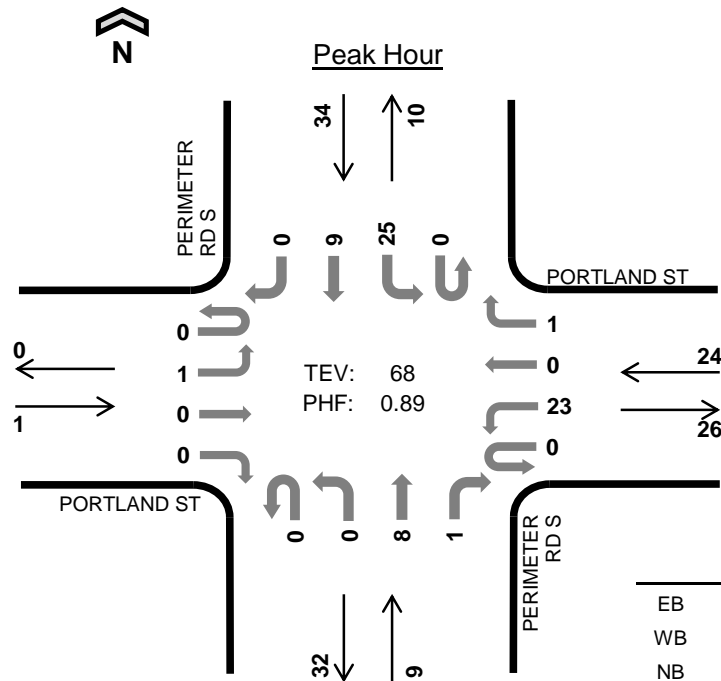
Two-Hour Count Summaries

Interval Start	S OTHELLO ST				0				AIRPORT WAY S				AIRPORT WAY S				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	9	0	1	0	0	0	0	0	0	44	0	0	0	201	0	255	0
4:15 PM	0	5	0	7	0	0	0	0	0	0	67	0	0	0	197	0	276	0
4:30 PM	0	9	0	10	0	0	0	0	0	0	88	0	0	0	179	0	286	0
4:45 PM	0	4	0	3	0	0	0	0	0	0	62	0	0	0	182	0	251	1,068
5:00 PM	0	5	0	5	0	0	0	0	0	0	76	0	0	0	196	0	282	1,095
5:15 PM	0	3	0	7	0	0	0	0	0	0	74	0	0	0	175	0	259	1,078
5:30 PM	0	4	0	2	0	0	0	0	0	0	61	0	0	0	157	1	225	1,017
5:45 PM	0	7	0	6	0	0	0	0	0	0	45	0	0	0	157	0	215	981
Count Total	0	46	0	41	0	0	0	0	0	0	517	0	0	0	1,444	1	2,049	0
Peak Hour	0	23	0	25	0	0	0	0	0	0	293	0	0	0	754	0	1,095	0

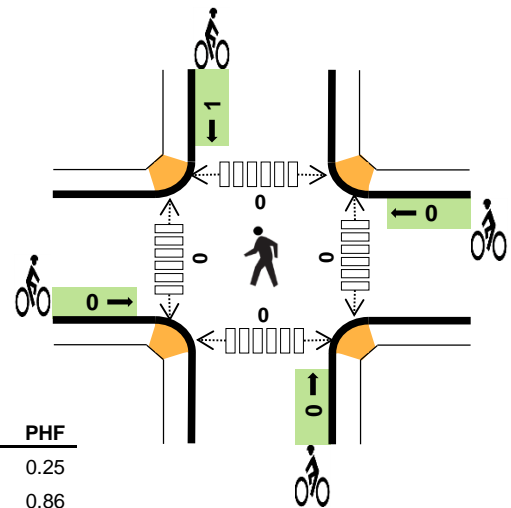
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	1	0	1	3	5	0	0	0	0	0	0	0	0	0	0
4:15 PM	1	0	4	9	14	0	0	0	0	0	0	0	0	0	0
4:30 PM	2	0	7	6	15	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	2	4	6	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	5	2	7	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	3	3	6	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	4	0	4	0	0	0	0	0	0	0	0	0	0
5:45 PM	1	0	3	2	6	0	0	0	0	0	0	0	0	0	0
Count Total	5	0	29	29	63	0	0	0	0	0	0	0	0	0	0
Peak Hr	3	0	18	21	42	0	0	0	0	0	0	0	0	0	0

PERIMETER RD S PORTLAND ST



Date: Tue, May 07, 2019
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:00 AM to 8:00 AM



	HV %:	PHF
EB	0.0%	0.25
WB	0.0%	0.86
NB	0.0%	0.75
SB	29.4%	0.77
TOTAL	14.7%	0.89

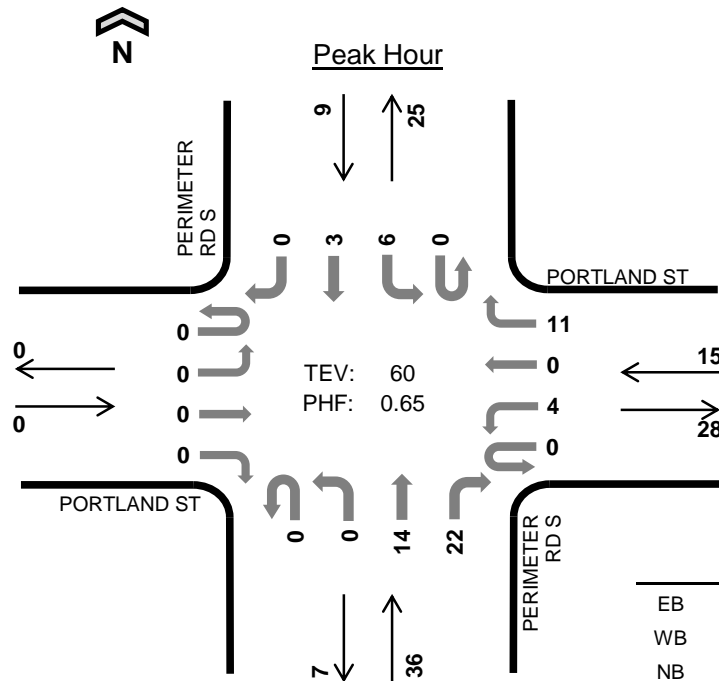
Two-Hour Count Summaries

Interval Start	PORTLAND ST Eastbound				PORTLAND ST Westbound				PERIMETER RD S Northbound				PERIMETER RD S Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	1	0	0	0	7	0	0	0	0	2	1	0	5	3	0	19	0
7:15 AM	0	0	0	0	0	7	0	0	0	0	3	0	0	7	2	0	19	0
7:30 AM	0	0	0	0	0	2	0	1	0	0	1	0	0	9	2	0	15	0
7:45 AM	0	0	0	0	0	7	0	0	0	0	2	0	0	4	2	0	15	68
8:00 AM	0	1	0	0	0	6	1	2	0	0	5	1	0	3	0	0	19	68
8:15 AM	0	0	0	0	0	7	0	1	0	0	2	1	0	2	1	0	14	63
8:30 AM	0	0	0	0	0	5	0	2	0	0	2	0	0	5	3	0	17	65
8:45 AM	0	0	0	0	0	2	0	3	0	0	2	0	0	5	3	0	15	65
Count Total	0	2	0	0	0	43	1	9	0	0	19	3	0	40	16	0	133	0
Peak Hour	0	1	0	0	0	23	0	1	0	0	8	1	0	25	9	0	68	0

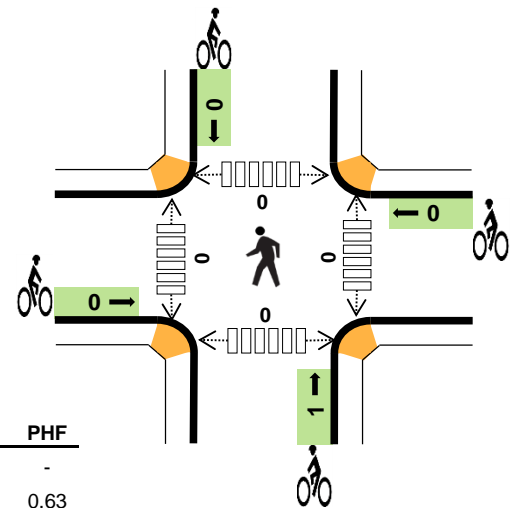
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	0	0	0	2	2	0	0	0	1	1	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	8	8	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	2	1	0	3	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	2	1	10	13	0	0	0	1	1	0	0	0	0	0
Peak Hour	0	0	0	10	10	0	0	0	1	1	0	0	0	0	0

PERIMETER RD S PORTLAND ST



Date: Tue, May 07, 2019
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:15 PM to 5:15 PM



	HV %:	PHF
EB	-	-
WB	6.7%	0.63
NB	2.8%	0.64
SB	0.0%	0.75
TOTAL	3.3%	0.65

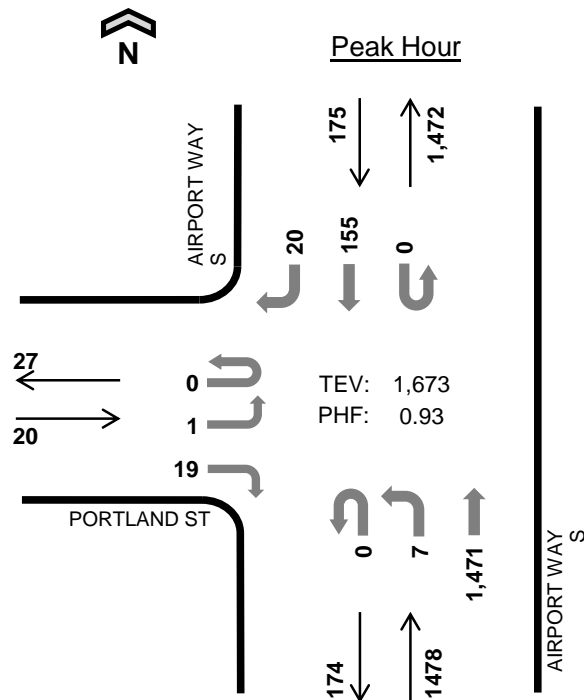
Two-Hour Count Summaries

Interval Start	PORTLAND ST Eastbound				PORTLAND ST Westbound				PERIMETER RD S Northbound				PERIMETER RD S Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	0	0	0	2	0	2	0	0	3	0	0	1	0	0	8	0
4:15 PM	0	0	0	0	0	0	0	2	0	0	4	8	0	2	0	0	16	0
4:30 PM	0	0	0	0	0	1	0	2	0	0	2	5	0	1	1	0	12	0
4:45 PM	0	0	0	0	0	3	0	1	0	0	2	1	0	0	2	0	9	45
5:00 PM	0	0	0	0	0	0	0	6	0	0	6	8	0	3	0	0	23	60
5:15 PM	0	0	0	0	0	0	0	6	0	0	1	3	0	1	2	0	13	57
5:30 PM	0	0	0	0	0	2	0	6	0	0	2	0	0	1	3	0	14	59
5:45 PM	0	0	0	0	0	2	0	2	0	0	0	2	0	0	1	0	7	57
Count Total	0	0	0	0	0	10	0	27	0	0	20	27	0	9	9	0	102	0
Peak Hour	0	0	0	0	0	4	0	11	0	0	14	22	0	6	3	0	60	0

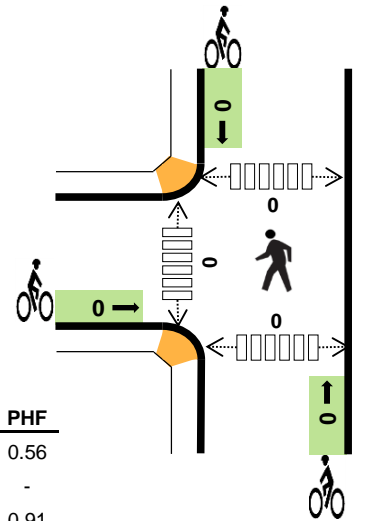
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
5:00 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0
5:30 PM	0	3	1	0	4	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	2	0	0	2	0	0	1	0	1	0	0	0	0	0
Count Total	0	7	2	0	9	0	0	2	1	3	0	0	0	0	0
Peak Hour	0	1	1	0	2	0	0	1	0	1	0	0	0	0	0

AIRPORT WAY S PORTLAND ST



Date: Tue, May 07, 2019
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:30 AM to 8:30 AM



	HV %:	PHF
EB	40.0%	0.56
WB	-	-
NB	3.4%	0.91
SB	7.4%	0.78
TOTAL	4.2%	0.93

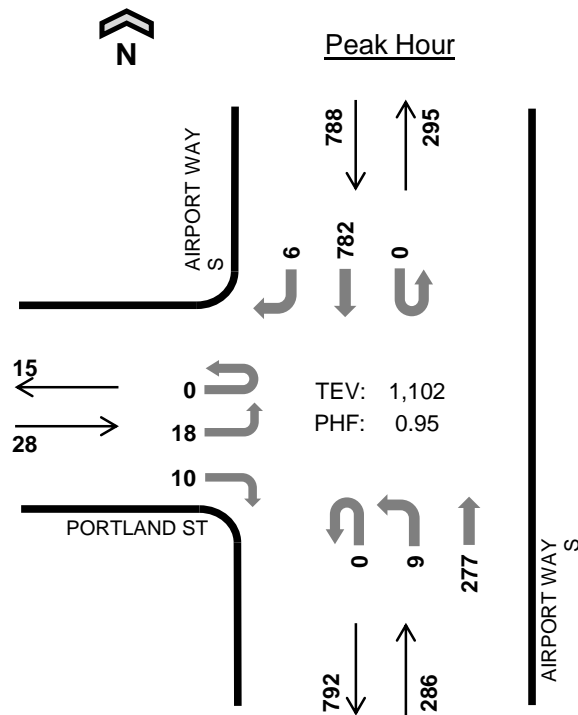
Two-Hour Count Summaries

Interval Start	PORTLAND ST				0				AIRPORT WAY S				AIRPORT WAY S				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	1	0	5	0	0	0	0	0	3	319	0	0	0	32	4	364	0
7:15 AM	0	1	0	6	0	0	0	0	0	3	345	0	0	0	15	4	374	0
7:30 AM	0	0	0	9	0	0	0	0	0	1	362	0	0	0	35	2	409	0
7:45 AM	0	0	0	4	0	0	0	0	0	1	383	0	0	0	37	6	431	1,578
8:00 AM	0	1	0	3	0	0	0	0	0	3	402	0	0	0	33	6	448	1,662
8:15 AM	0	0	0	3	0	0	0	0	0	2	324	0	0	0	50	6	385	1,673
8:30 AM	0	0	0	5	0	0	0	0	0	0	314	0	0	0	40	7	366	1,630
8:45 AM	0	0	0	5	0	0	0	0	0	0	291	0	0	0	44	5	345	1,544
Count Total	0	3	0	40	0	0	0	0	0	13	2,740	0	0	0	286	40	3,122	0
Peak Hour	0	1	0	19	0	0	0	0	0	7	1,471	0	0	0	155	20	1,673	0

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

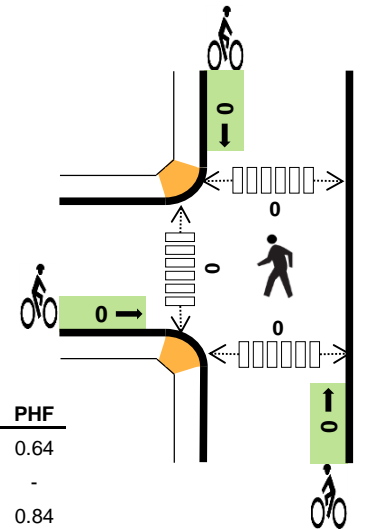
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	2	0	12	1	15	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	9	1	10	0	0	1	0	1	0	0	0	0	0
7:30 AM	8	0	6	2	16	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	7	6	13	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	16	1	17	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	21	4	25	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	9	4	13	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	15	5	20	0	0	0	0	0	0	0	0	0	0
Count Total	10	0	95	24	129	0	0	1	0	1	0	0	0	0	0
Peak Hr	8	0	50	13	71	0	0	0	0	0	0	0	0	0	0

AIRPORT WAY S PORTLAND ST



Date: Tue, May 07, 2019
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:15 PM to 5:15 PM

	HV %:	PHF
EB	3.6%	0.64
WB	-	-
NB	6.3%	0.84
SB	2.9%	0.97
TOTAL	3.8%	0.95



Two-Hour Count Summaries

Interval Start	PORTLAND ST				0				AIRPORT WAY S				AIRPORT WAY S				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	0	1	0	0	0	0	0	2	46	0	0	0	200	2	251	0
4:15 PM	0	5	0	5	0	0	0	0	0	1	63	0	0	0	203	1	278	0
4:30 PM	0	4	0	1	0	0	0	0	0	2	83	0	0	0	192	1	283	0
4:45 PM	0	2	0	0	0	0	0	0	0	1	58	0	0	0	187	3	251	1,063
5:00 PM	0	7	0	4	0	0	0	0	0	5	73	0	0	0	200	1	290	1,102
5:15 PM	0	3	0	1	0	0	0	0	0	5	74	0	0	0	186	1	270	1,094
5:30 PM	0	0	0	1	0	0	0	0	0	6	56	0	0	0	162	1	226	1,037
5:45 PM	0	2	0	0	0	0	0	0	0	2	45	0	0	0	160	2	211	997
Count Total	0	23	0	13	0	0	0	0	0	24	498	0	0	0	1,490	12	2,060	0
Peak Hour	0	18	0	10	0	0	0	0	0	9	277	0	0	0	782	6	1,102	0

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	0	0	2	2	4	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	4	10	14	0	0	0	0	0	0	0	0	0	0
4:30 PM	1	0	6	7	14	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	2	4	6	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	6	2	8	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	3	3	6	1	0	0	0	1	0	0	0	0	0
5:30 PM	0	0	6	0	6	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	5	3	8	0	0	0	0	0	0	0	0	0	0
Count Total	1	0	34	31	66	1	0	0	0	1	0	0	0	0	0
Peak Hr	1	0	18	23	42	0	0	0	0	0	0	0	0	0	0

Location: AIRPORT WY S S/O PORTLAND ST
Date Range: 5/7/2019 - 5/13/2019
Site Code: 04

Time	Tuesday			Wednesday			Thursday			Friday			Saturday			Sunday			Monday			Mid-Week Average		
	5/7/2019			5/8/2019			5/9/2019			5/10/2019			5/11/2019			5/12/2019			5/13/2019					
	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total
12:00 AM	21	69	90	36	71	107	21	64	85	-	-	-	-	-	-	-	-	-	-	-	-	26	68	94
1:00 AM	18	38	56	34	52	86	23	34	57	-	-	-	-	-	-	-	-	-	-	-	-	25	41	66
2:00 AM	50	59	109	78	44	122	55	25	80	-	-	-	-	-	-	-	-	-	-	-	-	61	43	104
3:00 AM	119	25	144	166	21	187	182	24	206	-	-	-	-	-	-	-	-	-	-	-	-	156	23	179
4:00 AM	135	19	154	324	22	346	225	18	243	-	-	-	-	-	-	-	-	-	-	-	-	228	20	248
5:00 AM	350	50	400	521	55	576	383	60	443	-	-	-	-	-	-	-	-	-	-	-	-	418	55	473
6:00 AM	1,338	105	1,443	1,363	114	1,477	1,049	99	1,148	-	-	-	-	-	-	-	-	-	-	-	-	1,250	106	1,356
7:00 AM	1,638	145	1,783	1,673	174	1,847	1,412	151	1,563	-	-	-	-	-	-	-	-	-	-	-	-	1,574	157	1,731
8:00 AM	1,646	182	1,828	1,565	183	1,748	1,356	197	1,553	-	-	-	-	-	-	-	-	-	-	-	-	1,522	187	1,710
9:00 AM	944	170	1,114	0	0	0	910	186	1,096	-	-	-	-	-	-	-	-	-	-	-	-	618	119	737
10:00 AM	470	180	650	0	0	0	649	193	842	-	-	-	-	-	-	-	-	-	-	-	-	373	124	497
11:00 AM	290	209	499	0	0	0	320	230	550	-	-	-	-	-	-	-	-	-	-	-	-	203	146	350
12:00 PM	342	224	566	0	0	0	249	276	525	-	-	-	-	-	-	-	-	-	-	-	-	197	167	364
1:00 PM	315	281	596	261	296	557	255	288	543	-	-	-	-	-	-	-	-	-	-	-	-	277	288	565
2:00 PM	326	439	765	264	463	727	300	492	792	-	-	-	-	-	-	-	-	-	-	-	-	297	465	761
3:00 PM	325	671	996	282	649	931	331	663	994	-	-	-	-	-	-	-	-	-	-	-	-	313	661	974
4:00 PM	311	744	1,055	271	789	1,060	290	819	1,109	-	-	-	-	-	-	-	-	-	-	-	-	291	784	1,075
5:00 PM	344	699	1,043	249	399	648	264	785	1,049	-	-	-	-	-	-	-	-	-	-	-	-	286	628	913
6:00 PM	188	406	594	133	283	416	148	449	597	-	-	-	-	-	-	-	-	-	-	-	-	156	379	536
7:00 PM	91	200	291	87	144	231	88	306	394	-	-	-	-	-	-	-	-	-	-	-	-	89	217	305
8:00 PM	70	293	363	64	145	209	77	207	284	-	-	-	-	-	-	-	-	-	-	-	-	70	215	285
9:00 PM	78	231	309	72	74	146	62	142	204	-	-	-	-	-	-	-	-	-	-	-	-	71	149	220
10:00 PM	61	173	234	50	106	156	43	111	154	-	-	-	-	-	-	-	-	-	-	-	-	51	130	181
11:00 PM	36	122	158	29	97	126	32	111	143	-	-	-	-	-	-	-	-	-	-	-	-	32	110	142
Total	9,506	5,734	15,240	7,522	4,181	11,703	8,724	5,930	14,654	-	-	-	-	-	-	-	-	-	-	-	-	8,584	5,282	13,866
Percent	62%	38%	-	64%	36%	-	60%	40%	-	-	-	-	-	-	-	-	-	-	-	-	-	62%	38%	-

1. Mid-week average includes data between Tuesday and Thursday.

Vehicle Speed Report Summary

Location: AIRPORT WY S S/O PORTLAND ST

Count Direction: Northbound / Southbound

Date Range: 5/7/2019 to 5/9/2019

Site Code: 04

	Speed Range (mph)																	Total
	0 - 10	10 - 15	15 - 20	20 - 25	25 - 30	30 - 35	35 - 40	40 - 45	45 - 50	50 - 55	55 - 60	60 - 65	65 - 70	70 - 75	75 - 80	80 - 85	85 +	Volume
Study Total																		
Northbound	0	3	6	5	64	271	1,323	6,400	11,547	4,851	1,045	188	35	8	5	1	0	25,752
Percent	0.0%	0.0%	0.0%	0.0%	0.2%	1.1%	5.1%	24.9%	44.8%	18.8%	4.1%	0.7%	0.1%	0.0%	0.0%	0.0%	0.0%	100%
Southbound	0	1	9	26	146	363	1,200	3,727	5,464	3,376	1,154	296	57	13	8	3	2	15,845
Percent	0.0%	0.0%	0.1%	0.2%	0.9%	2.3%	7.6%	23.5%	34.5%	21.3%	7.3%	1.9%	0.4%	0.1%	0.1%	0.0%	0.0%	100%
Total	0	4	15	31	210	634	2,523	10,127	17,011	8,227	2,199	484	92	21	13	4	2	41,597
Percent	0.0%	0.0%	0.0%	0.1%	0.5%	1.5%	6.1%	24.3%	40.9%	19.8%	5.3%	1.2%	0.2%	0.1%	0.0%	0.0%	0.0%	100%

Total Study Percentile Speed Summary			Total Study Speed Statistics		
Northbound			Northbound		
50th Percentile (Median)	47.0	mph	Mean (Average) Speed	47.0	mph
85th Percentile	51.5	mph	10 mph Pace	41.8 - 51.8	mph
95th Percentile	55.0	mph	Percent in Pace	74.8	%
Southbound			Southbound		
50th Percentile (Median)	47.2	mph	Mean (Average) Speed	47.2	mph
85th Percentile	53.3	mph	10 mph Pace	41.7 - 51.7	mph
95th Percentile	57.4	mph	Percent in Pace	61.8	%

Vehicle Classification Report Summary



Location: AIRPORT WY S S/O PORTLAND ST

Count Direction: Northbound / Southbound

Date Range: 5/7/2019 to 5/9/2019

Site Code: 04

	FHWA Vehicle Classification													Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	Volume
Study Total														
Northbound	191	20,995	2,738	21	987	118	0	342	153	97	6	9	95	25,752
Percent	0.7%	81.5%	10.6%	0.1%	3.8%	0.5%	0.0%	1.3%	0.6%	0.4%	0.0%	0.0%	0.4%	100%
Southbound	195	11,847	2,428	30	990	90	0	98	82	42	1	3	39	15,845
Percent	1.2%	74.8%	15.3%	0.2%	6.2%	0.6%	0.0%	0.6%	0.5%	0.3%	0.0%	0.0%	0.2%	100%
Total	386	32,842	5,166	51	1,977	208	0	440	235	139	7	12	134	41,597
Percent	0.9%	79.0%	12.4%	0.1%	4.8%	0.5%	0.0%	1.1%	0.6%	0.3%	0.0%	0.0%	0.3%	100%

FHWA Vehicle Classification

Class 1 - Motorcycles	Class 8 - Four or Fewer Axle Single-Trailer Trucks
Class 2 - Passenger Cars	Class 9 - Five-Axle Single-Trailer Trucks
Class 3 - Other Two-Axle, Four-Tire Single Unit Vehicles	Class 10 - Six or More Axle Single-Trailer Trucks
Class 4 - Buses	Class 11 - Five or fewer Axle Multi-Trailer Trucks
Class 5 - Two-Axle, Six-Tire, Single-Unit Trucks	Class 12 - Six-Axle Multi-Trailer Trucks
Class 6 - Three-Axle Single-Unit Trucks	Class 13 - Seven or More Axle Multi-Trailer Trucks
Class 7 - Four or More Axle Single-Unit Trucks	

Location: **PORTLAND ST BTWN PERIMETER RD & AIRPORT WY S**
 Date Range: **5/7/2019 - 5/13/2019**
 Site Code: **03**

Time	Tuesday			Wednesday			Thursday			Friday			Saturday			Sunday			Monday			Mid-Week Average		
	5/7/2019			5/8/2019			5/9/2019			5/10/2019			5/11/2019			5/12/2019			5/13/2019					
	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total
12:00 AM	5	4	9	7	5	12	3	1	4	-	-	-	-	-	-	-	-	-	-	-	-	5	3	8
1:00 AM	2	3	5	9	7	16	10	9	19	-	-	-	-	-	-	-	-	-	-	-	-	7	6	13
2:00 AM	8	28	36	1	27	28	6	31	37	-	-	-	-	-	-	-	-	-	-	-	-	5	29	34
3:00 AM	3	23	26	5	28	33	11	32	43	-	-	-	-	-	-	-	-	-	-	-	-	6	28	34
4:00 AM	5	15	20	5	15	20	2	22	24	-	-	-	-	-	-	-	-	-	-	-	-	4	17	21
5:00 AM	13	29	42	5	23	28	10	19	29	-	-	-	-	-	-	-	-	-	-	-	-	9	24	33
6:00 AM	21	25	46	23	27	50	21	25	46	-	-	-	-	-	-	-	-	-	-	-	-	22	26	47
7:00 AM	29	24	53	30	20	50	20	27	47	-	-	-	-	-	-	-	-	-	-	-	-	26	24	50
8:00 AM	17	30	47	21	24	45	27	26	53	-	-	-	-	-	-	-	-	-	-	-	-	22	27	48
9:00 AM	12	27	39	12	27	39	20	25	45	-	-	-	-	-	-	-	-	-	-	-	-	15	26	41
10:00 AM	13	15	28	18	15	33	16	21	37	-	-	-	-	-	-	-	-	-	-	-	-	16	17	33
11:00 AM	24	21	45	20	19	39	12	18	30	-	-	-	-	-	-	-	-	-	-	-	-	19	19	38
12:00 PM	21	41	62	20	42	62	26	40	66	-	-	-	-	-	-	-	-	-	-	-	-	22	41	63
1:00 PM	22	25	47	20	37	57	11	29	40	-	-	-	-	-	-	-	-	-	-	-	-	18	30	48
2:00 PM	24	37	61	19	31	50	23	27	50	-	-	-	-	-	-	-	-	-	-	-	-	22	32	54
3:00 PM	25	20	45	32	45	77	23	24	47	-	-	-	-	-	-	-	-	-	-	-	-	27	30	56
4:00 PM	19	15	34	26	18	44	16	16	32	-	-	-	-	-	-	-	-	-	-	-	-	20	16	37
5:00 PM	19	27	46	14	18	32	23	24	47	-	-	-	-	-	-	-	-	-	-	-	-	19	23	42
6:00 PM	17	25	42	20	34	54	32	32	64	-	-	-	-	-	-	-	-	-	-	-	-	23	30	53
7:00 PM	28	14	42	29	12	41	27	19	46	-	-	-	-	-	-	-	-	-	-	-	-	28	15	43
8:00 PM	31	13	44	39	12	51	38	15	53	-	-	-	-	-	-	-	-	-	-	-	-	36	13	49
9:00 PM	23	17	40	13	11	24	12	12	24	-	-	-	-	-	-	-	-	-	-	-	-	16	13	29
10:00 PM	7	4	11	14	9	23	19	8	27	-	-	-	-	-	-	-	-	-	-	-	-	13	7	20
11:00 PM	4	8	12	4	2	6	14	5	19	-	-	-	-	-	-	-	-	-	-	-	-	7	5	12
Total	392	490	882	406	508	914	422	507	929	-	-	-	-	-	-	-	-	-	-	-	-	407	502	908
Percent	44%	56%	-	44%	56%	-	45%	55%	-	-	-	-	-	-	-	-	-	-	-	-	-	45%	55%	-

1. Mid-week average includes data between Tuesday and Thursday.

Vehicle Speed Report Summary

Location: PORTLAND ST BTWN PERIMETER RD & AIRPORT WY S

Count Direction: Eastbound / Westbound

Date Range: 5/7/2019 to 5/9/2019

Site Code: 03

	Speed Range (mph)																	Total
	0 - 10	10 - 15	15 - 20	20 - 25	25 - 30	30 - 35	35 - 40	40 - 45	45 - 50	50 - 55	55 - 60	60 - 65	65 - 70	70 - 75	75 - 80	80 - 85	85 +	Volume
Study Total																		
Eastbound	148	830	236	6	0	0	0	0	0	0	0	0	0	0	0	0	0	1,220
Percent	12.1%	68.0%	19.3%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100%
Westbound	272	1,029	200	2	2	0	0	0	0	0	0	0	0	0	0	0	0	1,505
Percent	18.1%	68.4%	13.3%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100%
Total	420	1,859	436	8	2	0	0	0	0	0	0	0	0	0	0	0	0	2,725
Percent	15.4%	68.2%	16.0%	0.3%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100%

Total Study Percentile Speed Summary				Total Study Speed Statistics			
Eastbound				Eastbound			
50th Percentile (Median)	13.1	mph		Mean (Average) Speed	13.0	mph	
85th Percentile	15.4	mph		10 mph Pace	8.0 - 18.0	mph	
95th Percentile	17.1	mph		Percent in Pace	95.1	%	
Westbound				Westbound			
50th Percentile (Median)	12.7	mph		Mean (Average) Speed	12.5	mph	
85th Percentile	14.9	mph		10 mph Pace	6.6 - 16.6	mph	
95th Percentile	16.5	mph		Percent in Pace	94.6	%	

Vehicle Classification Report Summary



Location: PORTLAND ST BTWN PERIMETER RD & AIRPORT WY S

Count Direction: Eastbound / Westbound

Date Range: 5/7/2019 to 5/9/2019

Site Code: 03

	FHWA Vehicle Classification													Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	Volume
Study Total														
Eastbound	31	756	193	15	130	94	0	0	0	1	0	0	0	1,220
Percent	2.5%	62.0%	15.8%	1.2%	10.7%	7.7%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	100%
Westbound	87	898	278	2	150	88	0	0	0	2	0	0	0	1,505
Percent	5.8%	59.7%	18.5%	0.1%	10.0%	5.8%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	100%
Total	118	1,654	471	17	280	182	0	0	0	3	0	0	0	2,725
Percent	4.3%	60.7%	17.3%	0.6%	10.3%	6.7%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	100%

FHWA Vehicle Classification

Class 1 - Motorcycles	Class 8 - Four or Fewer Axle Single-Trailer Trucks
Class 2 - Passenger Cars	Class 9 - Five-Axle Single-Trailer Trucks
Class 3 - Other Two-Axle, Four-Tire Single Unit Vehicles	Class 10 - Six or More Axle Single-Trailer Trucks
Class 4 - Buses	Class 11 - Five or fewer Axle Multi-Trailer Trucks
Class 5 - Two-Axle, Six-Tire, Single-Unit Trucks	Class 12 - Six-Axle Multi-Trailer Trucks
Class 6 - Three-Axle Single-Unit Trucks	Class 13 - Seven or More Axle Multi-Trailer Trucks
Class 7 - Four or More Axle Single-Unit Trucks	

Location: PERIMETER RD S N/O PORTLAND ST
Date Range: 5/7/2019 - 5/13/2019
Site Code: 02



Time	Tuesday			Wednesday			Thursday			Friday			Saturday			Sunday			Monday			Mid-Week Average		
	5/7/2019			5/8/2019			5/9/2019			5/10/2019			5/11/2019			5/12/2019			5/13/2019					
	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total
12:00 AM	3	6	9	1	4	5	0	4	4	-	-	-	-	-	-	-	-	-	-	-	-	1	5	6
1:00 AM	5	2	7	6	7	13	8	11	19	-	-	-	-	-	-	-	-	-	-	-	-	6	7	13
2:00 AM	27	5	32	27	3	30	30	7	37	-	-	-	-	-	-	-	-	-	-	-	-	28	5	33
3:00 AM	24	4	28	25	2	27	30	4	34	-	-	-	-	-	-	-	-	-	-	-	-	26	3	30
4:00 AM	16	6	22	16	5	21	16	5	21	-	-	-	-	-	-	-	-	-	-	-	-	16	5	21
5:00 AM	19	9	28	14	7	21	12	10	22	-	-	-	-	-	-	-	-	-	-	-	-	15	9	24
6:00 AM	13	25	38	15	22	37	22	22	44	-	-	-	-	-	-	-	-	-	-	-	-	17	23	40
7:00 AM	9	35	44	4	31	35	15	28	43	-	-	-	-	-	-	-	-	-	-	-	-	9	31	41
8:00 AM	21	23	44	15	24	39	15	28	43	-	-	-	-	-	-	-	-	-	-	-	-	17	25	42
9:00 AM	21	25	46	18	24	42	22	40	62	-	-	-	-	-	-	-	-	-	-	-	-	20	30	50
10:00 AM	21	13	34	15	28	43	21	12	33	-	-	-	-	-	-	-	-	-	-	-	-	19	18	37
11:00 AM	23	18	41	21	27	48	17	14	31	-	-	-	-	-	-	-	-	-	-	-	-	20	20	40
12:00 PM	33	14	47	31	25	56	39	18	57	-	-	-	-	-	-	-	-	-	-	-	-	34	19	53
1:00 PM	18	18	36	31	19	50	23	15	38	-	-	-	-	-	-	-	-	-	-	-	-	24	17	41
2:00 PM	30	17	47	32	11	43	20	12	32	-	-	-	-	-	-	-	-	-	-	-	-	27	13	41
3:00 PM	27	26	53	22	17	39	19	21	40	-	-	-	-	-	-	-	-	-	-	-	-	23	21	44
4:00 PM	19	9	28	22	12	34	21	8	29	-	-	-	-	-	-	-	-	-	-	-	-	21	10	30
5:00 PM	30	15	45	16	7	23	18	8	26	-	-	-	-	-	-	-	-	-	-	-	-	21	10	31
6:00 PM	25	17	42	24	14	38	28	10	38	-	-	-	-	-	-	-	-	-	-	-	-	26	14	39
7:00 PM	9	27	36	14	25	39	15	28	43	-	-	-	-	-	-	-	-	-	-	-	-	13	27	39
8:00 PM	13	32	45	10	39	49	12	36	48	-	-	-	-	-	-	-	-	-	-	-	-	12	36	47
9:00 PM	19	18	37	12	9	21	11	10	21	-	-	-	-	-	-	-	-	-	-	-	-	14	12	26
10:00 PM	3	3	6	8	10	18	5	4	9	-	-	-	-	-	-	-	-	-	-	-	-	5	6	11
11:00 PM	4	1	5	1	4	5	4	5	9	-	-	-	-	-	-	-	-	-	-	-	-	3	3	6
Total	432	368	800	400	376	776	423	360	783	-	-	-	-	-	-	-	-	-	-	-	-	418	368	786
Percent	54%	46%	-	52%	48%	-	54%	46%	-	-	-	-	-	-	-	-	-	-	-	-	-	53%	47%	-

1. Mid-week average includes data between Tuesday and Thursday.

Vehicle Speed Report Summary

Location: PERIMETER RD S N/O PORTLAND ST

Count Direction: Northbound / Southbound

Date Range: 5/7/2019 to 5/9/2019

Site Code: 02

	Speed Range (mph)																	Total
	0 - 10	10 - 15	15 - 20	20 - 25	25 - 30	30 - 35	35 - 40	40 - 45	45 - 50	50 - 55	55 - 60	60 - 65	65 - 70	70 - 75	75 - 80	80 - 85	85 +	Volume
Study Total																		
Northbound	26	254	442	368	130	28	7	0	0	0	0	0	0	0	0	0	0	1,255
Percent	2.1%	20.2%	35.2%	29.3%	10.4%	2.2%	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100%
Southbound	29	98	330	382	221	35	8	1	0	0	0	0	0	0	0	0	0	1,104
Percent	2.6%	8.9%	29.9%	34.6%	20.0%	3.2%	0.7%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100%
Total	55	352	772	750	351	63	15	1	0	0	0	0	0	0	0	0	0	2,359
Percent	2.3%	14.9%	32.7%	31.8%	14.9%	2.7%	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100%

Total Study Percentile Speed Summary			Total Study Speed Statistics		
Northbound			Northbound		
50th Percentile (Median)	19.0	mph	Mean (Average) Speed	19.2	mph
85th Percentile	24.6	mph	10 mph Pace	12.9 - 22.9	mph
95th Percentile	28.3	mph	Percent in Pace	67.9	%
Southbound			Southbound		
50th Percentile (Median)	21.1	mph	Mean (Average) Speed	21.1	mph
85th Percentile	26.5	mph	10 mph Pace	16.8 - 26.8	mph
95th Percentile	29.5	mph	Percent in Pace	67.8	%

Vehicle Classification Report Summary



Location: PERIMETER RD S N/O PORTLAND ST

Count Direction: Northbound / Southbound

Date Range: 5/7/2019 to 5/9/2019

Site Code: 02

	FHWA Vehicle Classification													Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	Volume
Study Total														
Northbound	92	587	178	3	235	87	0	41	32	0	0	0	0	1,255
Percent	7.3%	46.8%	14.2%	0.2%	18.7%	6.9%	0.0%	3.3%	2.5%	0.0%	0.0%	0.0%	0.0%	100%
Southbound	60	545	183	7	225	54	0	15	14	1	0	0	0	1,104
Percent	5.4%	49.4%	16.6%	0.6%	20.4%	4.9%	0.0%	1.4%	1.3%	0.1%	0.0%	0.0%	0.0%	100%
Total	152	1,132	361	10	460	141	0	56	46	1	0	0	0	2,359
Percent	6.4%	48.0%	15.3%	0.4%	19.5%	6.0%	0.0%	2.4%	1.9%	0.0%	0.0%	0.0%	0.0%	100%

FHWA Vehicle Classification

Class 1 - Motorcycles	Class 8 - Four or Fewer Axle Single-Trailer Trucks
Class 2 - Passenger Cars	Class 9 - Five-Axle Single-Trailer Trucks
Class 3 - Other Two-Axle, Four-Tire Single Unit Vehicles	Class 10 - Six or More Axle Single-Trailer Trucks
Class 4 - Buses	Class 11 - Five or fewer Axle Multi-Trailer Trucks
Class 5 - Two-Axle, Six-Tire, Single-Unit Trucks	Class 12 - Six-Axle Multi-Trailer Trucks
Class 6 - Three-Axle Single-Unit Trucks	Class 13 - Seven or More Axle Multi-Trailer Trucks
Class 7 - Four or More Axle Single-Unit Trucks	

Location: AIRPORT WY S BTWN S OTHELLO ST & PORTLAND ST
 Date Range: 5/7/2019 - 5/13/2019
 Site Code: 01

Time	Tuesday			Wednesday			Thursday			Friday			Saturday			Sunday			Monday			Mid-Week Average		
	5/7/2019			5/8/2019			5/9/2019			5/10/2019			5/11/2019			5/12/2019			5/13/2019					
	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total
12:00 AM	19	65	84	25	70	95	23	63	86	-	-	-	-	-	-	-	-	-	-	-	-	22	66	88
1:00 AM	15	37	52	24	47	71	19	28	47	-	-	-	-	-	-	-	-	-	-	-	-	19	37	57
2:00 AM	24	52	76	40	44	84	31	25	56	-	-	-	-	-	-	-	-	-	-	-	-	32	40	72
3:00 AM	102	29	131	104	23	127	164	26	190	-	-	-	-	-	-	-	-	-	-	-	-	123	26	149
4:00 AM	124	19	143	220	22	242	213	21	234	-	-	-	-	-	-	-	-	-	-	-	-	186	21	206
5:00 AM	336	57	393	371	65	436	367	64	431	-	-	-	-	-	-	-	-	-	-	-	-	358	62	420
6:00 AM	1,056	96	1,152	1,045	111	1,156	1,031	91	1,122	-	-	-	-	-	-	-	-	-	-	-	-	1,044	99	1,143
7:00 AM	1,295	134	1,429	1,279	162	1,441	1,401	152	1,553	-	-	-	-	-	-	-	-	-	-	-	-	1,325	149	1,474
8:00 AM	1,266	189	1,455	1,199	185	1,384	1,360	197	1,557	-	-	-	-	-	-	-	-	-	-	-	-	1,275	190	1,465
9:00 AM	725	181	906	630	206	836	914	189	1,103	-	-	-	-	-	-	-	-	-	-	-	-	756	192	948
10:00 AM	343	182	525	332	179	511	646	203	849	-	-	-	-	-	-	-	-	-	-	-	-	440	188	628
11:00 AM	256	212	468	291	229	520	307	230	537	-	-	-	-	-	-	-	-	-	-	-	-	285	224	508
12:00 PM	248	233	481	231	258	489	238	280	518	-	-	-	-	-	-	-	-	-	-	-	-	239	257	496
1:00 PM	240	290	530	254	305	559	248	301	549	-	-	-	-	-	-	-	-	-	-	-	-	247	299	546
2:00 PM	269	461	730	259	462	721	294	499	793	-	-	-	-	-	-	-	-	-	-	-	-	274	474	748
3:00 PM	257	656	913	286	651	937	326	658	984	-	-	-	-	-	-	-	-	-	-	-	-	290	655	945
4:00 PM	259	769	1,028	276	781	1,057	286	819	1,105	-	-	-	-	-	-	-	-	-	-	-	-	274	790	1,063
5:00 PM	256	693	949	245	397	642	268	797	1,065	-	-	-	-	-	-	-	-	-	-	-	-	256	629	885
6:00 PM	135	396	531	119	273	392	146	441	587	-	-	-	-	-	-	-	-	-	-	-	-	133	370	503
7:00 PM	69	189	258	86	126	212	95	298	393	-	-	-	-	-	-	-	-	-	-	-	-	83	204	288
8:00 PM	48	268	316	64	117	181	71	178	249	-	-	-	-	-	-	-	-	-	-	-	-	61	188	249
9:00 PM	58	225	283	68	71	139	55	138	193	-	-	-	-	-	-	-	-	-	-	-	-	60	145	205
10:00 PM	47	174	221	50	98	148	54	108	162	-	-	-	-	-	-	-	-	-	-	-	-	50	127	177
11:00 PM	28	125	153	28	97	125	39	110	149	-	-	-	-	-	-	-	-	-	-	-	-	32	111	142
Total	7,475	5,732	13,207	7,526	4,979	12,505	8,596	5,916	14,512	-	-	-	-	-	-	-	-	-	-	-	-	7,866	5,542	13,408
Percent	57%	43%	-	60%	40%	-	59%	41%	-	-	-	-	-	-	-	-	-	-	-	-	-	59%	41%	-

1. Mid-week average includes data between Tuesday and Thursday.

Vehicle Speed Report Summary

Location: AIRPORT WY S BTWN S OTHELLO ST & PORTLAND ST

Count Direction: Northbound / Southbound

Date Range: 5/7/2019 to 5/9/2019

Site Code: 01

	Speed Range (mph)																	Total
	0 - 10	10 - 15	15 - 20	20 - 25	25 - 30	30 - 35	35 - 40	40 - 45	45 - 50	50 - 55	55 - 60	60 - 65	65 - 70	70 - 75	75 - 80	80 - 85	85 +	Volume
Study Total																		
Northbound	0	3	11	5	52	272	1,686	6,449	9,238	4,450	1,133	234	40	16	6	1	1	23,597
Percent	0.0%	0.0%	0.0%	0.0%	0.2%	1.2%	7.1%	27.3%	39.1%	18.9%	4.8%	1.0%	0.2%	0.1%	0.0%	0.0%	0.0%	100%
Southbound	1	1	6	4	32	213	1,264	4,039	5,756	3,627	1,215	343	84	25	9	3	5	16,627
Percent	0.0%	0.0%	0.0%	0.0%	0.2%	1.3%	7.6%	24.3%	34.6%	21.8%	7.3%	2.1%	0.5%	0.2%	0.1%	0.0%	0.0%	100%
Total	1	4	17	9	84	485	2,950	10,488	14,994	8,077	2,348	577	124	41	15	4	6	40,224
Percent	0.0%	0.0%	0.0%	0.0%	0.2%	1.2%	7.3%	26.1%	37.3%	20.1%	5.8%	1.4%	0.3%	0.1%	0.0%	0.0%	0.0%	100%

Total Study Percentile Speed Summary			Total Study Speed Statistics		
Northbound			Northbound		
50th Percentile (Median)	46.8	mph	Mean (Average) Speed	46.8	mph
85th Percentile	52.0	mph	10 mph Pace	41.3 - 51.3	mph
95th Percentile	55.6	mph	Percent in Pace	69.6	%
Southbound			Southbound		
50th Percentile (Median)	47.4	mph	Mean (Average) Speed	47.6	mph
85th Percentile	53.4	mph	10 mph Pace	41.5 - 51.5	mph
95th Percentile	57.8	mph	Percent in Pace	62.3	%

Vehicle Classification Report Summary



Location: AIRPORT WY S BTWN S OTHELLO ST & PORTLAND ST

Count Direction: Northbound / Southbound

Date Range: 5/7/2019 to 5/9/2019

Site Code: 01

	FHWA Vehicle Classification													Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	Volume
Study Total														
Northbound	195	17,600	3,770	28	1,290	138	0	140	184	95	8	13	136	23,597
Percent	0.8%	74.6%	16.0%	0.1%	5.5%	0.6%	0.0%	0.6%	0.8%	0.4%	0.0%	0.1%	0.6%	100%
Southbound	197	12,129	2,738	28	1,137	78	0	128	96	46	2	3	45	16,627
Percent	1.2%	72.9%	16.5%	0.2%	6.8%	0.5%	0.0%	0.8%	0.6%	0.3%	0.0%	0.0%	0.3%	100%
Total	392	29,729	6,508	56	2,427	216	0	268	280	141	10	16	181	40,224
Percent	1.0%	73.9%	16.2%	0.1%	6.0%	0.5%	0.0%	0.7%	0.7%	0.4%	0.0%	0.0%	0.4%	100%

FHWA Vehicle Classification

Class 1 - Motorcycles	Class 8 - Four or Fewer Axle Single-Trailer Trucks
Class 2 - Passenger Cars	Class 9 - Five-Axle Single-Trailer Trucks
Class 3 - Other Two-Axle, Four-Tire Single Unit Vehicles	Class 10 - Six or More Axle Single-Trailer Trucks
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Class 6 - Three-Axle Single-Unit Trucks	Class 13 - Seven or More Axle Multi-Trailer Trucks
Class 7 - Four or More Axle Single-Unit Trucks	










Appendix B: HCM Intersection Analysis Results

HCM Unsignalized Intersection Capacity Analysis

1: Airport Way S & S Orchard St

Existing AM Peak Hour

10/15/2019

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	28	1493	157	24
Future Volume (Veh/h)	0	0	28	1493	157	24
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	30	1623	171	26
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				248		
pX, platoon unblocked	0.88					
vC, conflicting volume	1056	98	197			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	803	98	197			
tC, single (s)	6.8	6.9	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	98			
cM capacity (veh/h)	278	938	1359			
Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2	
Volume Total	30	812	812	114	83	
Volume Left	30	0	0	0	0	
Volume Right	0	0	0	0	26	
cSH	1359	1700	1700	1700	1700	
Volume to Capacity	0.02	0.48	0.48	0.07	0.05	
Queue Length 95th (ft)	2	0	0	0	0	
Control Delay (s)	7.7	0.0	0.0	0.0	0.0	
Lane LOS	A					
Approach Delay (s)	0.1			0.0		
Approach LOS						
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			52.8%	ICU Level of Service		A
Analysis Period (min)			15			

Intersection												
Int Delay, s/veh	3.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔			↔			↔	
Traffic Vol, veh/h	0	0	0	14	21	17	1	18	0	0	8	3
Future Vol, veh/h	0	0	0	14	21	17	1	18	0	0	8	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	2	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	8	8	8	0	0	0	18	18	18
Mvmt Flow	0	0	0	16	25	20	1	21	0	0	9	4

Major/Minor	Major2			Minor1			Minor2		
Conflicting Flow All	0	0	0	49	77	-	-	67	23
Stage 1	-	-	-	0	0	-	-	67	-
Stage 2	-	-	-	49	77	-	-	0	-
Critical Hdwy	4.26	-	-	7.5	6.5	-	-	6.86	7.26
Critical Hdwy Stg 1	-	-	-	-	-	-	-	5.86	-
Critical Hdwy Stg 2	-	-	-	6.5	5.5	-	-	-	-
Follow-up Hdwy	2.28	-	-	3.5	4	-	-	4.18	3.48
Pot Cap-1 Maneuver	-	-	-	951	817	0	0	788	999
Stage 1	-	-	-	-	-	0	0	803	-
Stage 2	-	-	-	964	835	0	0	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	939	817	-	-	788	999
Mov Cap-2 Maneuver	-	-	-	939	817	-	-	788	-
Stage 1	-	-	-	-	-	-	-	803	-
Stage 2	-	-	-	949	835	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s		9.5	9.4
HCM LOS		A	A

Minor Lane/Major Mvmt	NBLn1	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	823	-	-	-	836
HCM Lane V/C Ratio	0.027	-	-	-	0.015
HCM Control Delay (s)	9.5	-	-	-	9.4
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0

HCM 6th Signalized Intersection Summary

3: Airport Way S & S Othello St

Existing AM Peak Hour

10/15/2019



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	🚗🚗			🚗🚗	🚗🚗	
Traffic Volume (veh/h)	27	21	0	1488	155	0
Future Volume (veh/h)	27	21	0	1488	155	0
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1707	1900	0	1841	1767	0
Adj Flow Rate, veh/h	26	26	0	1600	167	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	13	0	0	4	9	0
Cap, veh/h	56	55	0	3115	2990	0
Arrive On Green	0.03	0.03	0.00	0.89	0.89	0.00
Sat Flow, veh/h	1626	1610	0	3681	3533	0
Grp Volume(v), veh/h	26	26	0	1600	167	0
Grp Sat Flow(s),veh/h/ln	1626	1610	0	1749	1678	0
Q Serve(g_s), s	1.9	1.9	0.0	11.1	0.7	0.0
Cycle Q Clear(g_c), s	1.9	1.9	0.0	11.1	0.7	0.0
Prop In Lane	1.00	1.00	0.00			0.00
Lane Grp Cap(c), veh/h	56	55	0	3115	2990	0
V/C Ratio(X)	0.47	0.47	0.00	0.51	0.06	0.00
Avail Cap(c_a), veh/h	251	248	0	3115	2990	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	56.9	56.9	0.0	1.3	0.8	0.0
Incr Delay (d2), s/veh	5.9	6.1	0.0	0.6	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.9	0.0	0.4	0.0	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	62.8	63.0	0.0	1.9	0.8	0.0
LnGrp LOS	E	E	A	A	A	A
Approach Vol, veh/h	52			1600	167	
Approach Delay, s/veh	62.9			1.9	0.8	
Approach LOS	E			A	A	
Timer - Assigned Phs	2			4		6
Phs Duration (G+Y+Rc), s	111.4			8.6		111.4
Change Period (Y+Rc), s	4.5			4.5		4.5
Max Green Setting (Gmax), s	92.5			18.5		92.5
Max Q Clear Time (g_c+I1), s	13.1			3.9		2.7
Green Ext Time (p_c), s	19.1			0.1		1.0
Intersection Summary						
HCM 6th Ctrl Delay			3.6			
HCM 6th LOS			A			










Notes

User approved volume balancing among the lanes for turning movement.

HCM Unsignalized Intersection Capacity Analysis 4: Perimeter Road & S Othello St











Existing AM Peak Hour

10/15/2019





						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	0	0	10	45	15	13
Future Volume (vph)	0	0	10	45	15	13
Peak Hour Factor	0.82	0.82	0.82	0.82	0.93	0.93
Hourly flow rate (vph)	0	0	12	55	16	14
Direction, Lane #	NB 1	NB 2	SB 1			
Volume Total (vph)	12	55	30			
Volume Left (vph)	0	0	16			
Volume Right (vph)	0	55	0			
Hadj (s)	0.53	-0.17	0.23			
Departure Headway (s)	5.0	4.3	4.3			
Degree Utilization, x	0.02	0.07	0.04			
Capacity (veh/h)	702	816	833			
Control Delay (s)	6.9	6.5	7.4			
Approach Delay (s)	6.5		7.4			
Approach LOS	A		A			
Intersection Summary						
Delay			6.8			
Level of Service			A			
Intersection Capacity Utilization			13.3%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 5: Perimeter Road & Airport Exit

Existing AM Peak Hour
10/15/2019

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	26	2	0	29	13	0
Future Volume (Veh/h)	26	2	0	29	13	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	28	2	0	31	14	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	45	14	14			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	45	14	14			
tC, single (s)	6.4	6.2	4.4			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.5			
p0 queue free %	97	100	100			
cM capacity (veh/h)	960	1060	1434			
Direction, Lane #	EB 1	EB 2	NB 1	SB 1		
Volume Total	28	2	31	14		
Volume Left	28	0	0	0		
Volume Right	0	2	0	0		
cSH	960	1060	1700	1700		
Volume to Capacity	0.03	0.00	0.02	0.01		
Queue Length 95th (ft)	2	0	0	0		
Control Delay (s)	8.9	8.4	0.0	0.0		
Lane LOS	A	A				
Approach Delay (s)	8.8		0.0	0.0		
Approach LOS	A					
Intersection Summary						
Average Delay			3.5			
Intersection Capacity Utilization			13.3%	ICU Level of Service		A
Analysis Period (min)			15			










Intersection						
Int Delay, s/veh	0.3					
Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations		↕↕	↕↕		↕↕	
Traffic Vol, veh/h	7	1471	155	20	1	19
Future Vol, veh/h	7	1471	155	20	1	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	3	3	7	7	40	40
Mvmt Flow	8	1582	167	22	1	20
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	189	0	-	0	985	95
Stage 1	-	-	-	-	178	-
Stage 2	-	-	-	-	807	-
Critical Hdwy	4.16	-	-	-	7.6	7.7
Critical Hdwy Stg 1	-	-	-	-	6.6	-
Critical Hdwy Stg 2	-	-	-	-	6.6	-
Follow-up Hdwy	2.23	-	-	-	3.9	3.7
Pot Cap-1 Maneuver	1375	-	-	-	188	833
Stage 1	-	-	-	-	732	-
Stage 2	-	-	-	-	315	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1375	-	-	-	179	833
Mov Cap-2 Maneuver	-	-	-	-	179	-
Stage 1	-	-	-	-	697	-
Stage 2	-	-	-	-	315	-
Approach	NB	SB		NE		
HCM Control Delay, s	0.2	0		10.3		
HCM LOS	B					
Minor Lane/Major Mvmt	NELn1	NBL	NBT	SBT	SBR	
Capacity (veh/h)	704	1375	-	-	-	
HCM Lane V/C Ratio	0.031	0.005	-	-	-	
HCM Control Delay (s)	10.3	7.6	0.2	-	-	
HCM Lane LOS	B	A	A	-	-	
HCM 95th %tile Q(veh)	0.1	0	-	-	-	

Intersection										
Int Delay, s/veh	5.8									
Movement	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR
Lane Configurations										
Traffic Vol, veh/h	0	0	0	8	1	25	9	0	23	0
Future Vol, veh/h	0	0	0	8	1	25	9	0	23	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	-	None	-	-	None	-	-
Storage Length	0	-	-	-	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	-	-	0	-	0	-
Grade, %	0	-	-	0	-	-	0	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	0	0	0	0	0	29	29	29	0	0
Mvmt Flow	0	0	0	9	1	28	10	0	26	0
Major/Minor	Minor2		Major1		Major2		Minor1			
Conflicting Flow All	76	10	10	0	0	10	0	0	76	10
Stage 1	66	-	-	-	-	-	-	-	10	-
Stage 2	10	-	-	-	-	-	-	-	66	-
Critical Hdwy	7.1	6.2	4.1	-	-	4.39	-	-	7.1	6.2
Critical Hdwy Stg 1	6.1	-	-	-	-	-	-	-	6.1	-
Critical Hdwy Stg 2	6.1	-	-	-	-	-	-	-	6.1	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	2.461	-	-	3.5	3.3
Pot Cap-1 Maneuver	919	1077	1623	-	-	1450	-	-	919	1077
Stage 1	950	-	-	-	-	-	-	-	1016	-
Stage 2	1016	-	-	-	-	-	-	-	950	-
Platoon blocked, %				-	-		-	-		
Mov Cap-1 Maneuver	904	1077	1623	-	-	1450	-	-	906	1077
Mov Cap-2 Maneuver	904	-	-	-	-	-	-	-	906	-
Stage 1	950	-	-	-	-	-	-	-	1016	-
Stage 2	1015	-	-	-	-	-	-	-	932	-
Approach	EB		NB		SB		SW			
HCM Control Delay, s	9		0		5.5		8.3			
HCM LOS	A						A			
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR	SWLn1		
Capacity (veh/h)	1623	-	-	904	1450	-	-	1077		
HCM Lane V/C Ratio	-	-	-	0.001	0.019	-	-	0.001		
HCM Control Delay (s)	0	-	-	9	7.5	0	-	8.3		
HCM Lane LOS	A	-	-	A	A	A	-	A		
HCM 95th %tile Q(veh)	0	-	-	0	0.1	-	-	0		

HCM Unsignalized Intersection Capacity Analysis

1: Airport Way S & S Orchard St

Existing PM Peak Hour
10/15/2019

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	15	304	769	37
Future Volume (Veh/h)	0	0	15	304	769	37
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	0	16	317	801	39
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				248		
pX, platoon unblocked	1.00					
vC, conflicting volume	1011	420	840			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1009	420	840			
tC, single (s)	6.8	6.9	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	100	100	98			
cM capacity (veh/h)	231	582	766			
Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2	
Volume Total	16	158	158	534	306	
Volume Left	16	0	0	0	0	
Volume Right	0	0	0	0	39	
cSH	766	1700	1700	1700	1700	
Volume to Capacity	0.02	0.09	0.09	0.31	0.18	
Queue Length 95th (ft)	2	0	0	0	0	
Control Delay (s)	9.8	0.0	0.0	0.0	0.0	
Lane LOS	A					
Approach Delay (s)	0.5			0.0		
Approach LOS						
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			32.5%	ICU Level of Service		A
Analysis Period (min)			15			

Intersection												
Int Delay, s/veh	3.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔			↔			↔	
Traffic Vol, veh/h	0	0	0	13	17	24	4	5	0	0	23	1
Future Vol, veh/h	0	0	0	13	17	24	4	5	0	0	23	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	2	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	76	76	76	76	76	76	76	76	76	76	76	76
Heavy Vehicles, %	2	2	2	6	6	6	0	0	0	0	0	0
Mvmt Flow	0	0	0	17	22	32	5	7	0	0	30	1

Major/Minor	Major2			Minor1			Minor2		
Conflicting Flow All	0	0	0	60	88	-	-	72	27
Stage 1	-	-	-	0	0	-	-	72	-
Stage 2	-	-	-	60	88	-	-	0	-
Critical Hdwy	4.22	-	-	7.5	6.5	-	-	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	6.5	5.5	-	-	-	-
Follow-up Hdwy	2.26	-	-	3.5	4	-	-	4	3.3
Pot Cap-1 Maneuver	-	-	-	934	806	0	0	822	1049
Stage 1	-	-	-	-	-	0	0	839	-
Stage 2	-	-	-	950	826	0	0	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	907	806	-	-	822	1049
Mov Cap-2 Maneuver	-	-	-	907	806	-	-	822	-
Stage 1	-	-	-	-	-	-	-	839	-
Stage 2	-	-	-	915	826	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s		9.3	9.5
HCM LOS		A	A

Minor Lane/Major Mvmt	NBLn1	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	848	-	-	-	829
HCM Lane V/C Ratio	0.014	-	-	-	0.038
HCM Control Delay (s)	9.3	-	-	-	9.5
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

HCM 6th Signalized Intersection Summary

3: Airport Way S & S Othello St

Existing PM Peak Hour

10/15/2019












Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	🚗🚗			🚗🚗	🚗🚗	
Traffic Volume (veh/h)	23	25	0	293	754	0
Future Volume (veh/h)	23	25	0	293	754	0
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1811	1900	0	1811	1856	0
Adj Flow Rate, veh/h	24	26	0	305	785	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	6	0	0	6	3	0
Cap, veh/h	58	54	0	3067	3142	0
Arrive On Green	0.03	0.03	0.00	0.89	0.89	0.00
Sat Flow, veh/h	1725	1610	0	3622	3711	0
Grp Volume(v), veh/h	24	26	0	305	785	0
Grp Sat Flow(s),veh/h/ln	1725	1610	0	1721	1763	0
Q Serve(g_s), s	1.6	1.9	0.0	1.3	3.7	0.0
Cycle Q Clear(g_c), s	1.6	1.9	0.0	1.3	3.7	0.0
Prop In Lane	1.00	1.00	0.00			0.00
Lane Grp Cap(c), veh/h	58	54	0	3067	3142	0
V/C Ratio(X)	0.41	0.48	0.00	0.10	0.25	0.00
Avail Cap(c_a), veh/h	266	248	0	3067	3142	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	56.8	56.9	0.0	0.8	0.9	0.0
Incr Delay (d2), s/veh	4.6	6.4	0.0	0.1	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.9	0.0	0.0	0.1	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	61.4	63.3	0.0	0.8	1.1	0.0
LnGrp LOS	E	E	A	A	A	A
Approach Vol, veh/h	50			305	785	
Approach Delay, s/veh	62.4			0.8	1.1	
Approach LOS	E			A	A	
Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		111.4		8.6		111.4
Change Period (Y+Rc), s		4.5		4.5		4.5
Max Green Setting (Gmax), s		92.5		18.5		92.5
Max Q Clear Time (g_c+l1), s		3.3		3.9		5.7
Green Ext Time (p_c), s		1.9		0.1		5.8
Intersection Summary						
HCM 6th Ctrl Delay			3.7			
HCM 6th LOS			A			





Notes

User approved volume balancing among the lanes for turning movement.

HCM Unsignalized Intersection Capacity Analysis 4: Perimeter Road & S Othello St

Existing PM Peak Hour
10/15/2019




						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	0	0	7	20	19	12
Future Volume (vph)	0	0	7	20	19	12
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	0	0	9	27	25	16
Direction, Lane #	NB 1	NB 2	SB 1			
Volume Total (vph)	9	27	41			
Volume Left (vph)	0	0	25			
Volume Right (vph)	0	27	0			
Hadj (s)	0.29	-0.41	0.29			
Departure Headway (s)	4.8	4.1	4.3			
Degree Utilization, x	0.01	0.03	0.05			
Capacity (veh/h)	736	861	827			
Control Delay (s)	6.7	6.0	7.5			
Approach Delay (s)	6.2		7.5			
Approach LOS	A		A			
Intersection Summary						
Delay			6.9			
Level of Service			A			
Intersection Capacity Utilization			15.7%	ICU Level of Service		A
Analysis Period (min)			15			

Intersection						
Int Delay, s/veh	4.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	17	5	0	11	12	0
Future Vol, veh/h	17	5	0	11	12	0
Conflicting Peds, #/hr	16	16	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	75	75	75	75	75
Heavy Vehicles, %	0	0	17	17	10	10
Mvmt Flow	23	7	0	15	16	0

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	47	32	-	0	-	0
Stage 1	16	-	-	-	-	-
Stage 2	31	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	-	-
Pot Cap-1 Maneuver	968	1048	0	-	-	0
Stage 1	1012	-	0	-	-	0
Stage 2	997	-	0	-	-	0
Platoon blocked, %				-	-	
Mov Cap-1 Maneuver	968	1032	-	-	-	-
Mov Cap-2 Maneuver	968	-	-	-	-	-
Stage 1	1012	-	-	-	-	-
Stage 2	997	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.7	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	EBLn1	EBLn2	SBT
Capacity (veh/h)	-	968	1032	-
HCM Lane V/C Ratio	-	0.023	0.006	-
HCM Control Delay (s)	-	8.8	8.5	-
HCM Lane LOS	-	A	A	-
HCM 95th %tile Q(veh)	-	0.1	0	-

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	18	10	9	277	782	6
Future Vol, veh/h	18	10	9	277	782	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	4	4	6	6	3	3
Mvmt Flow	19	11	9	292	823	6
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	990	415	829	0	-	0
Stage 1	826	-	-	-	-	-
Stage 2	164	-	-	-	-	-
Critical Hdwy	6.88	6.98	4.22	-	-	-
Critical Hdwy Stg 1	5.88	-	-	-	-	-
Critical Hdwy Stg 2	5.88	-	-	-	-	-
Follow-up Hdwy	3.54	3.34	2.26	-	-	-
Pot Cap-1 Maneuver	240	581	773	-	-	-
Stage 1	385	-	-	-	-	-
Stage 2	842	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	237	581	773	-	-	-
Mov Cap-2 Maneuver	237	-	-	-	-	-
Stage 1	380	-	-	-	-	-
Stage 2	842	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	18.3	0.4		0		
HCM LOS	C					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	773	-	301	-	-	
HCM Lane V/C Ratio	0.012	-	0.098	-	-	
HCM Control Delay (s)	9.7	0.1	18.3	-	-	
HCM Lane LOS	A	A	C	-	-	
HCM 95th %tile Q(veh)	0	-	0.3	-	-	

Intersection												
Int Delay, s/veh	2.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	0	0	4	0	11	0	14	22	6	3	0
Future Vol, veh/h	0	0	0	4	0	11	0	14	22	6	3	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	65	65	65	65	65	65	65	65	65	65	65	65
Heavy Vehicles, %	0	0	0	7	7	7	3	3	3	0	0	0
Mvmt Flow	0	0	0	6	0	17	0	22	34	9	5	0

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	71	79	5	62	62	39	5	0	0	56	0	0
Stage 1	23	23	-	39	39	-	-	-	-	-	-	-
Stage 2	48	56	-	23	23	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.17	6.57	6.27	4.13	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.17	5.57	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.17	5.57	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.563	4.063	3.363	2.227	-	-	2.2	-	-
Pot Cap-1 Maneuver	925	815	1084	921	819	1019	1610	-	-	1562	-	-
Stage 1	1000	880	-	963	853	-	-	-	-	-	-	-
Stage 2	971	852	-	982	866	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	906	810	1084	916	814	1019	1610	-	-	1562	-	-
Mov Cap-2 Maneuver	906	810	-	916	814	-	-	-	-	-	-	-
Stage 1	1000	875	-	963	853	-	-	-	-	-	-	-
Stage 2	955	852	-	976	861	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	8.7	0	4.9
HCM LOS	A	A		










Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1610	-	-	-	989	1562	-
HCM Lane V/C Ratio	-	-	-	-	0.023	0.006	-
HCM Control Delay (s)	0	-	-	0	8.7	7.3	0
HCM Lane LOS	A	-	-	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	-	0.1	0	-

HCM Unsignalized Intersection Capacity Analysis

1: Airport Way S & S Orchard St

2021 AM Peak Hour Background

10/15/2019

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	54	1565	160	45
Future Volume (Veh/h)	0	0	54	1565	160	45
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	59	1701	174	49
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				248		
pX, platoon unblocked	0.86					
vC, conflicting volume	1167	112	223			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	864	112	223			
tC, single (s)	6.8	6.9	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	96			
cM capacity (veh/h)	241	920	1329			
Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2	
Volume Total	59	850	850	116	107	
Volume Left	59	0	0	0	0	
Volume Right	0	0	0	0	49	
cSH	1329	1700	1700	1700	1700	
Volume to Capacity	0.04	0.50	0.50	0.07	0.06	
Queue Length 95th (ft)	3	0	0	0	0	
Control Delay (s)	7.8	0.0	0.0	0.0	0.0	
Lane LOS	A					
Approach Delay (s)	0.3			0.0		
Approach LOS						
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			54.8%	ICU Level of Service		A
Analysis Period (min)			15			

Intersection												
Int Delay, s/veh	2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔			↔			↔	
Traffic Vol, veh/h	0	0	0	19	59	22	1	14	0	0	8	3
Future Vol, veh/h	0	0	0	19	59	22	1	14	0	0	8	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	2	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	8	8	8	0	0	0	18	18	18
Mvmt Flow	0	0	0	22	69	26	1	16	0	0	9	4

Major/Minor	Major2			Minor1			Minor2		
Conflicting Flow All	0	0	0	83	139	-	-	126	48
Stage 1	-	-	-	0	0	-	-	126	-
Stage 2	-	-	-	83	139	-	-	0	-
Critical Hdwy	4.26	-	-	7.5	6.5	-	-	6.86	7.26
Critical Hdwy Stg 1	-	-	-	-	-	-	-	5.86	-
Critical Hdwy Stg 2	-	-	-	6.5	5.5	-	-	-	-
Follow-up Hdwy	2.28	-	-	3.5	4	-	-	4.18	3.48
Pot Cap-1 Maneuver	-	-	-	901	756	0	0	728	961
Stage 1	-	-	-	-	-	0	0	754	-
Stage 2	-	-	-	922	785	0	0	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	889	756	-	-	728	961
Mov Cap-2 Maneuver	-	-	-	889	756	-	-	728	-
Stage 1	-	-	-	-	-	-	-	754	-
Stage 2	-	-	-	907	785	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s		9.8	9.7
HCM LOS		A	A

Minor Lane/Major Mvmt	NBLn1	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	764	-	-	-	780
HCM Lane V/C Ratio	0.023	-	-	-	0.017
HCM Control Delay (s)	9.8	-	-	-	9.7
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1

HCM 6th Signalized Intersection Summary

3: Airport Way S & S Othello St

2021 AM Peak Hour Background
10/15/2019












Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	🚗🚗			🚗🚗	🚗🚗	
Traffic Volume (veh/h)	57	72	0	1562	160	0
Future Volume (veh/h)	57	72	0	1562	160	0
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1707	1900	0	1841	1767	0
Adj Flow Rate, veh/h	61	77	0	1680	172	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	13	0	0	4	9	0
Cap, veh/h	106	105	0	3007	2886	0
Arrive On Green	0.07	0.07	0.00	0.86	0.86	0.00
Sat Flow, veh/h	1626	1610	0	3681	3533	0
Grp Volume(v), veh/h	61	77	0	1680	172	0
Grp Sat Flow(s),veh/h/ln	1626	1610	0	1749	1678	0
Q Serve(g_s), s	4.4	5.6	0.0	15.5	0.9	0.0
Cycle Q Clear(g_c), s	4.4	5.6	0.0	15.5	0.9	0.0
Prop In Lane	1.00	1.00	0.00			0.00
Lane Grp Cap(c), veh/h	106	105	0	3007	2886	0
V/C Ratio(X)	0.58	0.73	0.00	0.56	0.06	0.00
Avail Cap(c_a), veh/h	251	248	0	3007	2886	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	54.5	55.1	0.0	2.3	1.2	0.0
Incr Delay (d2), s/veh	4.9	9.5	0.0	0.8	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	2.6	0.0	2.1	0.1	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	59.3	64.5	0.0	3.0	1.3	0.0
LnGrp LOS	E	E	A	A	A	A
Approach Vol, veh/h	138			1680	172	
Approach Delay, s/veh	62.2			3.0	1.3	
Approach LOS	E			A	A	
Timer - Assigned Phs	2			4		6
Phs Duration (G+Y+Rc), s	107.7			12.3		107.7
Change Period (Y+Rc), s	4.5			4.5		4.5
Max Green Setting (Gmax), s	92.5			18.5		92.5
Max Q Clear Time (g_c+I1), s	17.5			7.6		2.9
Green Ext Time (p_c), s	21.0			0.3		1.1
Intersection Summary						
HCM 6th Ctrl Delay			7.0			
HCM 6th LOS			A			





Notes

User approved volume balancing among the lanes for turning movement.

HCM Unsignalized Intersection Capacity Analysis 4: Perimeter Road & S Othello St

2021 AM Peak Hour Background
10/17/2019




						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	0	0	6	104	25	8
Future Volume (vph)	0	0	6	104	25	8
Peak Hour Factor	0.82	0.82	0.82	0.82	0.93	0.93
Hourly flow rate (vph)	0	0	7	127	27	9
Direction, Lane #	NB 1	NB 2	SB 1			
Volume Total (vph)	7	127	36			
Volume Left (vph)	0	0	27			
Volume Right (vph)	0	127	0			
Hadj (s)	0.53	-0.17	0.27			
Departure Headway (s)	5.1	4.3	4.4			
Degree Utilization, x	0.01	0.15	0.04			
Capacity (veh/h)	701	816	812			
Control Delay (s)	6.9	6.9	7.6			
Approach Delay (s)	6.9		7.6			
Approach LOS	A		A			
Intersection Summary						
Delay			7.1			
Level of Service			A			
Intersection Capacity Utilization			16.4%	ICU Level of Service		A
Analysis Period (min)			15			

Intersection						
Int Delay, s/veh	5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	64	2	0	46	8	0
Future Vol, veh/h	64	2	0	46	8	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	4	4	31	31	7	7
Mvmt Flow	69	2	0	49	9	0

Major/Minor	Minor2	Major1	Major2		
Conflicting Flow All	58	9	-	0	-
Stage 1	9	-	-	-	-
Stage 2	49	-	-	-	-
Critical Hdwy	6.44	6.24	-	-	-
Critical Hdwy Stg 1	5.44	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-
Follow-up Hdwy	3.536	3.336	-	-	-
Pot Cap-1 Maneuver	944	1067	0	-	-
Stage 1	1009	-	0	-	-
Stage 2	968	-	0	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	944	1067	-	-	-
Mov Cap-2 Maneuver	944	-	-	-	-
Stage 1	1009	-	-	-	-
Stage 2	968	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.1	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	EBLn1	EBLn2	SBT
Capacity (veh/h)	-	944	1067	-
HCM Lane V/C Ratio	-	0.073	0.002	-
HCM Control Delay (s)	-	9.1	8.4	-
HCM Lane LOS	-	A	A	-
HCM 95th %tile Q(veh)	-	0.2	0	-

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	10	0	3	1552	201	30
Future Vol, veh/h	10	0	3	1552	201	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	40	40	3	3	7	7
Mvmt Flow	11	0	3	1669	216	32











Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	1073	124	248
Stage 1	232	-	-
Stage 2	841	-	-
Critical Hdwy	7.6	7.7	4.16
Critical Hdwy Stg 1	6.6	-	-
Critical Hdwy Stg 2	6.6	-	-
Follow-up Hdwy	3.9	3.7	2.23
Pot Cap-1 Maneuver	162	795	1308
Stage 1	682	-	-
Stage 2	301	-	-
Platoon blocked, %			
Mov Cap-1 Maneuver	157	795	1308
Mov Cap-2 Maneuver	157	-	-
Stage 1	661	-	-
Stage 2	301	-	-

Approach	EB	NB	SB
HCM Control Delay, s	29.6	0.1	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1308	-	157	-	-
HCM Lane V/C Ratio	0.002	-	0.068	-	-
HCM Control Delay (s)	7.8	0.1	29.6	-	-
HCM Lane LOS	A	A	D	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

HCM Unsignalized Intersection Capacity Analysis 7: Perimeter Road & S Portland St

2021 AM Peak Hour Background
10/15/2019










						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1	0	33	0	0	9
Future Volume (Veh/h)	1	0	33	0	0	9
Sign Control	Stop			Stop	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	1	0	37	0	0	10
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	10	0	6	5	0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	10	0	6	5	0	
tC, single (s)	6.5	6.2	7.1	6.5	4.1	
tC, 2 stage (s)						
tF (s)	4.0	3.3	3.5	4.0	2.2	
p0 queue free %	100	100	96	100	100	
cM capacity (veh/h)	889	1091	1019	894	1636	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	1	37	10			
Volume Left	0	37	0			
Volume Right	0	0	10			
cSH	889	1019	1636			
Volume to Capacity	0.00	0.04	0.00			
Queue Length 95th (ft)	0	3	0			
Control Delay (s)	9.1	8.7	0.0			
Lane LOS	A	A				
Approach Delay (s)	9.1	8.7	0.0			
Approach LOS	A	A				
Intersection Summary						
Average Delay			6.9			
Intersection Capacity Utilization			18.5%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

1: Airport Way S & S Orchard St

2021 Background PM Peak Hour

10/15/2019

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	67	367	816	84
Future Volume (Veh/h)	0	0	67	367	816	84
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	0	70	382	850	88
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				248		
pX, platoon unblocked	0.99					
vC, conflicting volume	1225	469	938			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1215	469	938			
tC, single (s)	6.8	6.9	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	100	100	90			
cM capacity (veh/h)	156	541	702			
Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2	
Volume Total	70	191	191	567	371	
Volume Left	70	0	0	0	0	
Volume Right	0	0	0	0	88	
cSH	702	1700	1700	1700	1700	
Volume to Capacity	0.10	0.11	0.11	0.33	0.22	
Queue Length 95th (ft)	8	0	0	0	0	
Control Delay (s)	10.7	0.0	0.0	0.0	0.0	
Lane LOS	B					
Approach Delay (s)	1.7			0.0		
Approach LOS						
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			35.6%	ICU Level of Service		A
Analysis Period (min)			15			

Intersection												
Int Delay, s/veh	1.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔↔			↔			↔	
Traffic Vol, veh/h	0	0	0	28	95	30	4	1	0	0	25	1
Future Vol, veh/h	0	0	0	28	95	30	4	1	0	0	25	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	2	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	76	76	76	76	76	76	76	76	76	76	76	76
Heavy Vehicles, %	2	2	2	6	6	6	0	0	0	0	0	0
Mvmt Flow	0	0	0	37	125	39	5	1	0	0	33	1

Major/Minor	Major2			Minor1			Minor2		
Conflicting Flow All	0	0	0	153	238	-	-	219	82
Stage 1	-	-	-	0	0	-	-	219	-
Stage 2	-	-	-	153	238	-	-	0	-
Critical Hdwy	4.22	-	-	7.5	6.5	-	-	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	6.5	5.5	-	-	-	-
Follow-up Hdwy	2.26	-	-	3.5	4	-	-	4	3.3
Pot Cap-1 Maneuver	-	-	-	805	666	0	0	683	968
Stage 1	-	-	-	-	-	0	0	726	-
Stage 2	-	-	-	840	712	0	0	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	774	666	-	-	683	968
Mov Cap-2 Maneuver	-	-	-	774	666	-	-	683	-
Stage 1	-	-	-	-	-	-	-	726	-
Stage 2	-	-	-	801	712	-	-	-	-










Approach	WB	NB	SB
HCM Control Delay, s		9.8	10.5
HCM LOS		A	B

Minor Lane/Major Mvmt	NBLn1	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	750	-	-	-	691
HCM Lane V/C Ratio	0.009	-	-	-	0.05
HCM Control Delay (s)	9.8	-	-	-	10.5
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.2

HCM 6th Signalized Intersection Summary 3: Airport Way S & S Othello St

2021 Background PM Peak Hour

10/15/2019

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	64	66	0	371	818	0
Future Volume (veh/h)	64	66	0	371	818	0
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1811	1900	0	1811	1856	0
Adj Flow Rate, veh/h	67	69	0	386	852	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	6	0	0	6	3	0
Cap, veh/h	104	97	0	2976	3049	0
Arrive On Green	0.06	0.06	0.00	0.86	0.86	0.00
Sat Flow, veh/h	1725	1610	0	3622	3711	0
Grp Volume(v), veh/h	67	69	0	386	852	0
Grp Sat Flow(s),veh/h/ln	1725	1610	0	1721	1763	0
Q Serve(g_s), s	4.6	5.0	0.0	2.1	5.2	0.0
Cycle Q Clear(g_c), s	4.6	5.0	0.0	2.1	5.2	0.0
Prop In Lane	1.00	1.00	0.00			0.00
Lane Grp Cap(c), veh/h	104	97	0	2976	3049	0
V/C Ratio(X)	0.64	0.71	0.00	0.13	0.28	0.00
Avail Cap(c_a), veh/h	266	248	0	2976	3049	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	55.1	55.4	0.0	1.2	1.4	0.0
Incr Delay (d2), s/veh	6.5	9.2	0.0	0.1	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	2.3	0.0	0.2	0.6	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	61.6	64.6	0.0	1.3	1.7	0.0
LnGrp LOS	E	E	A	A	A	A
Approach Vol, veh/h	136			386	852	
Approach Delay, s/veh	63.1			1.3	1.7	
Approach LOS	E			A	A	
Timer - Assigned Phs	2			4		6
Phs Duration (G+Y+Rc), s	108.3			11.7		108.3
Change Period (Y+Rc), s	4.5			4.5		4.5
Max Green Setting (Gmax), s	92.5			18.5		92.5
Max Q Clear Time (g_c+I1), s	4.1			7.0		7.2
Green Ext Time (p_c), s	2.5			0.3		6.5
Intersection Summary						
HCM 6th Ctrl Delay			7.7			
HCM 6th LOS			A			










Notes





User approved volume balancing among the lanes for turning movement.




HCM Unsignalized Intersection Capacity Analysis 4: Perimeter Road & S Othello St

2021 Background PM Peak Hour

10/15/2019

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	0	0	3	102	29	24
Future Volume (vph)	0	0	3	102	29	24
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	0	0	4	136	39	32
Direction, Lane #	NB 1	NB 2	SB 1			
Volume Total (vph)	4	136	71			
Volume Left (vph)	0	0	39			
Volume Right (vph)	0	136	0			
Hadj (s)	0.29	-0.41	0.28			
Departure Headway (s)	4.8	4.1	4.4			
Degree Utilization, x	0.01	0.16	0.09			
Capacity (veh/h)	732	858	810			
Control Delay (s)	6.7	6.7	7.8			
Approach Delay (s)	6.7		7.8			
Approach LOS	A		A			
Intersection Summary						
Delay			7.1			
Level of Service			A			
Intersection Capacity Utilization			18.6%	ICU Level of Service	A	
Analysis Period (min)			15			










Intersection						
Int Delay, s/veh	6.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	94	5	0	11	24	0
Future Vol, veh/h	94	5	0	11	24	0
Conflicting Peds, #/hr	16	16	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	75	75	75	75	75
Heavy Vehicles, %	0	0	17	17	10	10
Mvmt Flow	125	7	0	15	32	0
Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	63	48	-	0	-	0
Stage 1	32	-	-	-	-	-
Stage 2	31	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	-	-
Pot Cap-1 Maneuver	948	1027	0	-	-	0
Stage 1	996	-	0	-	-	0
Stage 2	997	-	0	-	-	0
Platoon blocked, %				-	-	
Mov Cap-1 Maneuver	948	1011	-	-	-	-
Mov Cap-2 Maneuver	948	-	-	-	-	-
Stage 1	996	-	-	-	-	-
Stage 2	997	-	-	-	-	-
Approach	EB	NB	SB			
HCM Control Delay, s	9.4	0	0			
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	EBLn1	EBLn2	SBT		
Capacity (veh/h)	-	948	1011	-		
HCM Lane V/C Ratio	-	0.132	0.007	-		
HCM Control Delay (s)	-	9.4	8.6	-		
HCM Lane LOS	-	A	A	-		
HCM 95th %tile Q(veh)	-	0.5	0	-		

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	34	4	1	333	870	6
Future Vol, veh/h	34	4	1	333	870	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	4	4	6	6	3	3
Mvmt Flow	36	4	1	351	916	6
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	1097	461	922	0	-	0
Stage 1	919	-	-	-	-	-
Stage 2	178	-	-	-	-	-
Critical Hdwy	6.88	6.98	4.22	-	-	-
Critical Hdwy Stg 1	5.88	-	-	-	-	-
Critical Hdwy Stg 2	5.88	-	-	-	-	-
Follow-up Hdwy	3.54	3.34	2.26	-	-	-
Pot Cap-1 Maneuver	204	542	712	-	-	-
Stage 1	344	-	-	-	-	-
Stage 2	829	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	204	542	712	-	-	-
Mov Cap-2 Maneuver	204	-	-	-	-	-
Stage 1	343	-	-	-	-	-
Stage 2	829	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	25.2	0		0		
HCM LOS	D					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	712	-	218	-	-	
HCM Lane V/C Ratio	0.001	-	0.183	-	-	
HCM Control Delay (s)	10.1	0	25.2	-	-	
HCM Lane LOS	B	A	D	-	-	
HCM 95th %tile Q(veh)	0	-	0.7	-	-	

HCM Unsignalized Intersection Capacity Analysis 7: Perimeter Road & S Portland St

2021 Background PM Peak Hour










10/15/2019

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	7	0	0	38
Future Volume (Veh/h)	0	0	7	0	0	38
Sign Control	Stop			Stop	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.65	0.65	0.65	0.65	0.65	0.65
Hourly flow rate (vph)	0	0	11	0	0	58
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	58	0	29	29	0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	58	0	29	29	0	
tC, single (s)	6.5	6.2	7.2	6.6	4.1	
tC, 2 stage (s)						
tF (s)	4.0	3.3	3.6	4.1	2.2	
p0 queue free %	100	100	99	100	100	
cM capacity (veh/h)	837	1091	967	854	1617	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	0	11	58			
Volume Left	0	11	0			
Volume Right	0	0	58			
cSH	1700	967	1617			
Volume to Capacity	0.00	0.01	0.00			
Queue Length 95th (ft)	0	1	0			
Control Delay (s)	0.0	8.8	0.0			
Lane LOS	A	A				
Approach Delay (s)	0.0	8.8	0.0			
Approach LOS	A	A				
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization			13.3%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

1: Airport Way S & S Orchard St

2021 AM Peak Hour - Project
10/16/2019

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	63	1569	160	56
Future Volume (Veh/h)	0	0	63	1569	160	56
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	68	1705	174	61
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				248		
pX, platoon unblocked	0.86					
vC, conflicting volume	1193	118	235			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	889	118	235			
tC, single (s)	6.8	6.9	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	95			
cM capacity (veh/h)	229	912	1315			
Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2	
Volume Total	68	852	852	116	119	
Volume Left	68	0	0	0	0	
Volume Right	0	0	0	0	61	
cSH	1315	1700	1700	1700	1700	
Volume to Capacity	0.05	0.50	0.50	0.07	0.07	
Queue Length 95th (ft)	4	0	0	0	0	
Control Delay (s)	7.9	0.0	0.0	0.0	0.0	
Lane LOS	A					
Approach Delay (s)	0.3			0.0		
Approach LOS						
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			55.1%	ICU Level of Service		B
Analysis Period (min)			15			

Intersection												
Int Delay, s/veh	1.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔			↔			↔	
Traffic Vol, veh/h	0	0	0	19	79	22	1	14	0	0	8	3
Future Vol, veh/h	0	0	0	19	79	22	1	14	0	0	8	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	2	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	8	8	8	0	0	0	18	18	18
Mvmt Flow	0	0	0	22	93	26	1	16	0	0	9	4

Major/Minor	Major2	Minor1	Minor2
Conflicting Flow All	0	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.26	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.28	-	-
Pot Cap-1 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s		10	9.8
HCM LOS		B	A

Minor Lane/Major Mvmt	NBLn1	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	741	-	-	-	757
HCM Lane V/C Ratio	0.024	-	-	-	0.017
HCM Control Delay (s)	10	-	-	-	9.8
HCM Lane LOS	B	-	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1

HCM 6th Signalized Intersection Summary

3: Airport Way S & S Othello St

2021 AM Peak Hour - Project
10/16/2019












Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	🚗🚗			🚗🚗	🚗🚗	
Traffic Volume (veh/h)	61	76	0	1571	160	0
Future Volume (veh/h)	61	76	0	1571	160	0
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1707	1900	0	1841	1767	0
Adj Flow Rate, veh/h	66	82	0	1689	172	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	13	0	0	4	9	0
Cap, veh/h	111	110	0	2995	2875	0
Arrive On Green	0.07	0.07	0.00	0.86	0.86	0.00
Sat Flow, veh/h	1626	1610	0	3681	3533	0
Grp Volume(v), veh/h	66	82	0	1689	172	0
Grp Sat Flow(s),veh/h/ln	1626	1610	0	1749	1678	0
Q Serve(g_s), s	4.7	6.0	0.0	16.1	0.9	0.0
Cycle Q Clear(g_c), s	4.7	6.0	0.0	16.1	0.9	0.0
Prop In Lane	1.00	1.00	0.00			0.00
Lane Grp Cap(c), veh/h	111	110	0	2995	2875	0
V/C Ratio(X)	0.59	0.74	0.00	0.56	0.06	0.00
Avail Cap(c_a), veh/h	251	248	0	2995	2875	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	54.3	54.9	0.0	2.4	1.3	0.0
Incr Delay (d2), s/veh	4.9	9.4	0.0	0.8	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	2.7	0.0	2.4	0.1	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	59.2	64.3	0.0	3.2	1.3	0.0
LnGrp LOS	E	E	A	A	A	A
Approach Vol, veh/h	148			1689	172	
Approach Delay, s/veh	62.0			3.2	1.3	
Approach LOS	E			A	A	
Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		107.3		12.7		107.3
Change Period (Y+Rc), s		4.5		4.5		4.5
Max Green Setting (Gmax), s		92.5		18.5		92.5
Max Q Clear Time (g_c+I1), s		18.1		8.0		2.9
Green Ext Time (p_c), s		21.2		0.3		1.1
Intersection Summary						
HCM 6th Ctrl Delay			7.3			
HCM 6th LOS			A			





Notes

User approved volume balancing among the lanes for turning movement.

HCM Unsignalized Intersection Capacity Analysis 4: Perimeter Road & S Othello St

2021 AM Peak Hour - Project
10/16/2019




						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	0	0	6	112	25	8
Future Volume (vph)	0	0	6	112	25	8
Peak Hour Factor	0.82	0.82	0.82	0.82	0.93	0.93
Hourly flow rate (vph)	0	0	7	137	27	9
Direction, Lane #	NB 1	NB 2	SB 1			
Volume Total (vph)	7	137	36			
Volume Left (vph)	0	0	27			
Volume Right (vph)	0	137	0			
Hadj (s)	0.53	-0.17	0.27			
Departure Headway (s)	5.1	4.4	4.4			
Degree Utilization, x	0.01	0.17	0.04			
Capacity (veh/h)	701	816	810			
Control Delay (s)	6.9	7.0	7.6			
Approach Delay (s)	7.0		7.6			
Approach LOS	A		A			
Intersection Summary						
Delay			7.1			
Level of Service			A			
Intersection Capacity Utilization			16.9%	ICU Level of Service	A	
Analysis Period (min)			15			

Intersection						
Int Delay, s/veh	5.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	72	2	0	46	8	0
Future Vol, veh/h	72	2	0	46	8	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	4	4	31	31	7	7
Mvmt Flow	77	2	0	49	9	0

Major/Minor	Minor2	Major1	Major2		
Conflicting Flow All	58	9	-	0	-
Stage 1	9	-	-	-	-
Stage 2	49	-	-	-	-
Critical Hdwy	6.44	6.24	-	-	-
Critical Hdwy Stg 1	5.44	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-
Follow-up Hdwy	3.536	3.336	-	-	-
Pot Cap-1 Maneuver	944	1067	0	-	-
Stage 1	1009	-	0	-	-
Stage 2	968	-	0	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	944	1067	-	-	-
Mov Cap-2 Maneuver	944	-	-	-	-
Stage 1	1009	-	-	-	-
Stage 2	968	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.2	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	EBLn1	EBLn2	SBT
Capacity (veh/h)	-	944	1067	-
HCM Lane V/C Ratio	-	0.082	0.002	-
HCM Control Delay (s)	-	9.2	8.4	-
HCM Lane LOS	-	A	A	-
HCM 95th %tile Q(veh)	-	0.3	0	-

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	10	0	3	1561	205	30
Future Vol, veh/h	10	0	3	1561	205	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	40	40	3	3	7	7
Mvmt Flow	11	0	3	1678	220	32
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	1081	126	252	0	-	0
Stage 1	236	-	-	-	-	-
Stage 2	845	-	-	-	-	-
Critical Hdwy	7.6	7.7	4.16	-	-	-
Critical Hdwy Stg 1	6.6	-	-	-	-	-
Critical Hdwy Stg 2	6.6	-	-	-	-	-
Follow-up Hdwy	3.9	3.7	2.23	-	-	-
Pot Cap-1 Maneuver	160	792	1303	-	-	-
Stage 1	679	-	-	-	-	-
Stage 2	299	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	155	792	1303	-	-	-
Mov Cap-2 Maneuver	155	-	-	-	-	-
Stage 1	656	-	-	-	-	-
Stage 2	299	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	30	0.1		0		
HCM LOS	D					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1303	-	155	-	-	
HCM Lane V/C Ratio	0.002	-	0.069	-	-	
HCM Control Delay (s)	7.8	0.1	30	-	-	
HCM Lane LOS	A	A	D	-	-	
HCM 95th %tile Q(veh)	0	-	0.2	-	-	

HCM Unsignalized Intersection Capacity Analysis

7: Perimeter Road & S Portland St

2021 AM Peak Hour - Project
10/16/2019

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗			↖	↗	↘
Traffic Volume (veh/h)	1	0	33	0	0	9
Future Volume (Veh/h)	1	0	33	0	0	9
Sign Control	Stop			Stop	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	1	0	37	0	0	10
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	10	0	6	5	0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	10	0	6	5	0	
tC, single (s)	6.5	6.2	7.1	6.5	4.1	
tC, 2 stage (s)						
tF (s)	4.0	3.3	3.5	4.0	2.2	
p0 queue free %	100	100	96	100	100	
cM capacity (veh/h)	889	1091	1019	894	1636	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	1	37	10			
Volume Left	0	37	0			
Volume Right	0	0	10			
cSH	889	1019	1636			
Volume to Capacity	0.00	0.04	0.00			
Queue Length 95th (ft)	0	3	0			
Control Delay (s)	9.1	8.7	0.0			
Lane LOS	A	A				
Approach Delay (s)	9.1	8.7	0.0			
Approach LOS	A	A				
Intersection Summary						
Average Delay			6.9			
Intersection Capacity Utilization			18.5%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

1: Airport Way S & S Orchard St

2021 PM Peak Hour - Project
10/16/2019

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations			↰	↗↗	↗↗	↰
Traffic Volume (veh/h)	0	0	72	383	816	90
Future Volume (Veh/h)	0	0	72	383	816	90
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	0	75	399	850	94
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				248		
pX, platoon unblocked	0.99					
vC, conflicting volume	1246	472	944			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1234	472	944			
tC, single (s)	6.8	6.9	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	100	100	89			
cM capacity (veh/h)	150	538	698			
Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2	
Volume Total	75	200	200	567	377	
Volume Left	75	0	0	0	0	
Volume Right	0	0	0	0	94	
cSH	698	1700	1700	1700	1700	
Volume to Capacity	0.11	0.12	0.12	0.33	0.22	
Queue Length 95th (ft)	9	0	0	0	0	
Control Delay (s)	10.8	0.0	0.0	0.0	0.0	
Lane LOS	B					
Approach Delay (s)	1.7			0.0		
Approach LOS						
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			36.1%	ICU Level of Service		A
Analysis Period (min)			15			

Intersection												
Int Delay, s/veh	1.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔↔			↔			↔	
Traffic Vol, veh/h	0	0	0	28	105	30	4	1	0	0	25	1
Future Vol, veh/h	0	0	0	28	105	30	4	1	0	0	25	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	2	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	76	76	76	76	76	76	76	76	76	76	76	76
Heavy Vehicles, %	2	2	2	6	6	6	0	0	0	0	0	0
Mvmt Flow	0	0	0	37	138	39	5	1	0	0	33	1

Major/Minor	Major2		Minor1		Minor2	
Conflicting Flow All	0	0	0	160	251	-
Stage 1	-	-	-	0	0	-
Stage 2	-	-	-	160	251	-
Critical Hdwy	4.22	-	-	7.5	6.5	-
Critical Hdwy Stg 1	-	-	-	-	-	5.5
Critical Hdwy Stg 2	-	-	-	6.5	5.5	-
Follow-up Hdwy	2.26	-	-	3.5	4	-
Pot Cap-1 Maneuver	-	-	-	796	656	0
Stage 1	-	-	-	-	0	0
Stage 2	-	-	-	832	703	0
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	765	656	-
Mov Cap-2 Maneuver	-	-	-	765	656	-
Stage 1	-	-	-	-	-	716
Stage 2	-	-	-	793	703	-

Approach	WB	NB	SB
HCM Control Delay, s		9.9	10.6
HCM LOS		A	B

Minor Lane/Major Mvmt	NBLn1	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	740	-	-	-	680
HCM Lane V/C Ratio	0.009	-	-	-	0.05
HCM Control Delay (s)	9.9	-	-	-	10.6
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.2

HCM 6th Signalized Intersection Summary

3: Airport Way S & S Othello St

2021 PM Peak Hour - Project
10/16/2019












Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	🚗🚗🚗			🚗🚗	🚗🚗	
Traffic Volume (veh/h)	80	79	0	376	818	0
Future Volume (veh/h)	80	79	0	376	818	0
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1811	1900	0	1811	1856	0
Adj Flow Rate, veh/h	82	83	0	392	852	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	6	0	0	6	3	0
Cap, veh/h	120	112	0	2943	3016	0
Arrive On Green	0.07	0.07	0.00	0.86	0.86	0.00
Sat Flow, veh/h	1725	1610	0	3622	3711	0
Grp Volume(v), veh/h	82	83	0	392	852	0
Grp Sat Flow(s),veh/h/ln	1725	1610	0	1721	1763	0
Q Serve(g_s), s	5.6	6.1	0.0	2.2	5.5	0.0
Cycle Q Clear(g_c), s	5.6	6.1	0.0	2.2	5.5	0.0
Prop In Lane	1.00	1.00	0.00			0.00
Lane Grp Cap(c), veh/h	120	112	0	2943	3016	0
V/C Ratio(X)	0.68	0.74	0.00	0.13	0.28	0.00
Avail Cap(c_a), veh/h	266	248	0	2943	3016	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	54.5	54.8	0.0	1.4	1.7	0.0
Incr Delay (d2), s/veh	6.7	9.2	0.0	0.1	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	2.8	0.0	0.3	0.8	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	61.2	63.9	0.0	1.5	1.9	0.0
LnGrp LOS	E	E	A	A	A	A
Approach Vol, veh/h	165			392	852	
Approach Delay, s/veh	62.6			1.5	1.9	
Approach LOS	E			A	A	
Timer - Assigned Phs	2			4		6
Phs Duration (G+Y+Rc), s	107.1			12.9		107.1
Change Period (Y+Rc), s	4.5			4.5		4.5
Max Green Setting (Gmax), s	92.5			18.5		92.5
Max Q Clear Time (g_c+I1), s	4.2			8.1		7.5
Green Ext Time (p_c), s	2.6			0.3		6.5
Intersection Summary						
HCM 6th Ctrl Delay			8.9			
HCM 6th LOS			A			





Notes

User approved volume balancing among the lanes for turning movement.

HCM Unsignalized Intersection Capacity Analysis 4: Perimeter Road & S Othello St

2021 PM Peak Hour - Project
10/16/2019




						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	0	0	3	131	29	24
Future Volume (vph)	0	0	3	131	29	24
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	0	0	4	175	39	32
Direction, Lane #	NB 1	NB 2	SB 1			
Volume Total (vph)	4	175	71			
Volume Left (vph)	0	0	39			
Volume Right (vph)	0	175	0			
Hadj (s)	0.29	-0.41	0.28			
Departure Headway (s)	4.8	4.1	4.4			
Degree Utilization, x	0.01	0.20	0.09			
Capacity (veh/h)	732	859	803			
Control Delay (s)	6.7	7.0	7.9			
Approach Delay (s)	7.0		7.9			
Approach LOS	A		A			
Intersection Summary						
Delay			7.2			
Level of Service			A			
Intersection Capacity Utilization			20.0%	ICU Level of Service	A	
Analysis Period (min)			15			

Intersection						
Int Delay, s/veh	7.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	123	5	0	11	24	0
Future Vol, veh/h	123	5	0	11	24	0
Conflicting Peds, #/hr	16	16	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	75	75	75	75	75
Heavy Vehicles, %	0	0	17	17	10	10
Mvmt Flow	164	7	0	15	32	0

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	63	48	-	0	-	0
Stage 1	32	-	-	-	-	-
Stage 2	31	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	-	-
Pot Cap-1 Maneuver	948	1027	0	-	-	0
Stage 1	996	-	0	-	-	0
Stage 2	997	-	0	-	-	0
Platoon blocked, %				-	-	
Mov Cap-1 Maneuver	948	1011	-	-	-	-
Mov Cap-2 Maneuver	948	-	-	-	-	-
Stage 1	996	-	-	-	-	-
Stage 2	997	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.6	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	EBLn1	EBLn2	SBT
Capacity (veh/h)	-	948	1011	-
HCM Lane V/C Ratio	-	0.173	0.007	-
HCM Control Delay (s)	-	9.6	8.6	-
HCM Lane LOS	-	A	A	-
HCM 95th %tile Q(veh)	-	0.6	0	-

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	34	4	1	338	883	6
Future Vol, veh/h	34	4	1	338	883	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	4	4	6	6	3	3
Mvmt Flow	36	4	1	356	929	6

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1112	468	935	0	-	0
Stage 1	932	-	-	-	-	-
Stage 2	180	-	-	-	-	-
Critical Hdwy	6.88	6.98	4.22	-	-	-
Critical Hdwy Stg 1	5.88	-	-	-	-	-
Critical Hdwy Stg 2	5.88	-	-	-	-	-
Follow-up Hdwy	3.54	3.34	2.26	-	-	-
Pot Cap-1 Maneuver	200	536	704	-	-	-
Stage 1	339	-	-	-	-	-
Stage 2	827	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	200	536	704	-	-	-
Mov Cap-2 Maneuver	200	-	-	-	-	-
Stage 1	338	-	-	-	-	-
Stage 2	827	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	25.7	0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	704	-	214	-	-
HCM Lane V/C Ratio	0.001	-	0.187	-	-
HCM Control Delay (s)	10.1	0	25.7	-	-
HCM Lane LOS	B	A	D	-	-
HCM 95th %tile Q(veh)	0	-	0.7	-	-

HCM Unsignalized Intersection Capacity Analysis

7: Perimeter Road & S Portland St

2021 PM Peak Hour - Project
10/16/2019

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	↰	
Traffic Volume (veh/h)	0	0	7	0	0	38
Future Volume (Veh/h)	0	0	7	0	0	38
Sign Control	Stop			Stop	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.65	0.65	0.65	0.65	0.65	0.65
Hourly flow rate (vph)	0	0	11	0	0	58
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	58	0	29	29	0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	58	0	29	29	0	
tC, single (s)	6.5	6.2	7.2	6.6	4.1	
tC, 2 stage (s)						
tF (s)	4.0	3.3	3.6	4.1	2.2	
p0 queue free %	100	100	99	100	100	
cM capacity (veh/h)	837	1091	967	854	1617	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	0	11	58			
Volume Left	0	11	0			
Volume Right	0	0	58			
cSH	1700	967	1617			
Volume to Capacity	0.00	0.01	0.00			
Queue Length 95th (ft)	0	1	0			
Control Delay (s)	0.0	8.8	0.0			
Lane LOS	A	A				
Approach Delay (s)	0.0	8.8	0.0			
Approach LOS	A	A				
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization			13.3%	ICU Level of Service	A	
Analysis Period (min)			15			

Appendix C: Sight Distance Analysis



September 10, 2013

Attn: Jennifer Everett
KPFF
101 Stewart Street, Suite 400
Seattle, WA 98101

Re: The Intersection of S. Portland St. and Airport Way S. Entering/Stopping Sight Distances

Dear Jennifer:

Wednesday August 14, 2013 the KPFF design Team measured the existing entering sight distances at the intersection of South Portland Street and Airport Way South and measured stopping sight distances associated with left turns from Airport Way South onto South Portland Street during a follow up visit September 06, 2013. The following is a general summary of findings:

Intersection geometry

South Portland Street is a two-way, east west street with stop sign control. The roadway is 31 feet wide from face of curb to face of curb and consists of two 15.5 foot lanes delineated with a yellow centerline.

Airport Way is an undivided, north-south, four lane roadway resembling an un-divided urban highway. The roadway section north of the intersection with South Portland Street consists of a sidewalk, grass and tree planter area, curb and gutter, two 10 foot wide southbound travel lanes, and gravel shoulder against the railroad right-of-way. Both streets are crowned equally and do not have any significant vertical profile or longitudinal slope gradient.

The eastern shoulder contains power poles against the railroad right of way but do not obstruct the view. On the west side of the road, power poles and trees are located in the shoulder or planter strip and provide some sight obstruction. It is possible to see vehicles through the trees, but the sight is not completely unobstructed.

South Portland Street is slightly lower in elevation than the adjacent north parking lot. When the northern parking lot is full of cars against Airport Way South, the view of southbound on-coming traffic is obstructed when vehicles are stopped at the stop bar/stop sign. A building, utility boxes, and trees south of the intersection likewise obstruct vision for on-coming northbound traffic when a vehicle is at the designated stop location. This causes all drivers to stop and creep forward until sight can be obtained.

Entering Sight Distance Location

According to the American Association of State Highway and Transportation Officials Geometric Design of Highways and Streets (AASHTO 2004), vehicles will stop and creep forward at an intersection. The distance a driver might creep forward is a function of visibility, the feeling of safety a driver might have regarding on-coming traffic, and weather conditions. AASHTO 2004 (pg 657) recommends a range of distance between 14.5 feet up to 18.0 feet behind the edge of travelled way (fog line) as values which can be used to evaluate entering sight distances. After reviewing the vehicle movements at the intersection, the sight location was established at 14.5 feet behind the edge of travelled way in the center of the eastbound lane on South Portland Street where vehicles turn left or right. The location is further into the intersection than the stop bar and offers significantly more sight distance than at the stop bar location.

Drivers Eye to Target

The entering driver's eye location and elevation was established with a survey rod and set at 3.5 feet above existing grade in the middle of the entering lane on South Portland Street (See Exhibit 1).

A sight target 2 feet high (AASHTO 2004, pg 113) was placed in the middle of the closest on-coming lanes when looking north and southbound from the driver's eye location. The furthest unobstructed visible distance of travel within the lane to the street intersection was measured and reported (see Exhibit 1) as the existing stopping sight distance.

A Truck driver's eye height of 7.6 feet above the existing ground (AASHTO, 2004, pg 127) was considered and sight distance increased slightly. The slightly larger value was not reported.

Obstructed View

Looking north and south along Airport Way South from South Portland Street is not a clear field of vision. Trees, power poles, buildings, utility boxes, and the parking lots obstruct or block the field of vision. However, openings between the objects do not completely block the field of vision and objects (vehicles or bicycles) can be detected through the obstructions. Because there are few bicycles and the shoulder is not wide enough for bicycle use, the longest field of view between the trees was reported as the existing stopping sight distance. Looking south along Airport Way South, tree and bush pruning is critical to obtain the reported existing sight distance. Without tree trimming, a much shorter distance will exist and has been noted in Exhibit 1.

Existing "Reported" Entering Sight Distances

Looking north onto Airport Way South = 510 feet.

Looking south onto Airport Way South = 485 feet. (395 feet without tree trimming).

Existing Stopping Sight Distances Required

Looking north on Airport Way South toward the intersection with South Portland Street = 875 feet.

Looking south on Airport Way toward the intersection with South Portland Street = 1,100 feet

Stopping sight distances were evaluated considering the 85th percentile traffic speeds, braking distance, decision, and avoidance time for cars and trucks. As one might imagine, trucks need more time and greater distances to react than cars. The following table summarizes the required entering sight distances, required turning sight distances, and required stopping sight distances and compares them with the existing sight distance and existing stopping sight distance.

Table 1. Entering, Turning, and Stopping Sight Distances

	Passenger Car	Single Unit Truck	Combination Truck	AASHTO Analysis	Comments
ENTERING					
Left Turn from S. Portland St. Required Entering Sight Distance (Looking Left at Oncoming Southbound Traffic) (ft)	588	750	897	Case B1	Calculated
Left Turn from S. Portland St. Existing Entering Sight Distance (Looking Left toward Oncoming Southbound Traffic) (ft)	510	510	510	Case B1	Measured
<i>Deficient (ft)</i>	78	240	387	Case B1	
Left Turn from S. Portland St. Required Entering Sight Distance (Looking Right toward Oncoming Northbound Traffic) (ft)	635	810	968	Case B1	Calculated
Left Turn from S. Portland St. Existing Entering Sight Distance (Looking Right toward Oncoming Northbound Traffic) (ft)	485	485	485	Case B1	Measured
<i>Deficient (ft)</i>	150	325	483	Case B1	Not Sufficient
Right Turn from S. Portland St. Required Entering Sight Distance (Looking Left at Oncoming Southbound Traffic) (ft)	478	625	772	Case B2	Calculated
Right Turn from S. Portland St. Existing Entering Sight Distance (Looking Left toward Oncoming Southbound Traffic) (ft)	510	510	510	Case B2	Measured
<i>Deficient (ft)</i>	PASSES	115	262	Case B2	
TURNING					
Left Turn from Airport Way S. Required Turning Sight Distance (ft) (Looking Northbound Toward Oncoming Southbound Traffic)	441	529	603	Case F1	Calculated at (50 mph)

Left Turn from Airport Way onto S. Portland St. Existing Turning Sight Distance (Looking Northbound Toward Oncoming Southbound Traffic) (ft)	1,100	1,100	1,100	Case F1	Measured
<i>Deficient (ft)</i>	PASSES	PASSES	PASSES	Case F1	
Required Northbound Traffic Stopping Sight Distance (ft) Looking Toward a Vehicle Turning Left onto S. Portland St.	1,002	1,002	1,002	Case F1	Calculated (using 54 mph)
Existing Stopping Sight Distance Available (for Approaching Northbound Traffic) (ft)	875	875	875	Case F1	Measured
<i>Deficient (ft)</i>	127	127	127	Case F1	-
STOPPING SIGHT DISTANCE					
Required Southbound Stopping Sight Distance (Looking Northbound Toward Oncoming Traffic) (ft)	909	909	909		Calculated at (50 mph)
Existing Stopping Sight Distance (ft)	1,100	1,100	1,100		Measured
<i>Deficient (ft)</i>	PASSES	PASSES	PASSES		
Required Northbound Traffic Stopping Sight Distance (ft) Looking Toward a Vehicle Turning Left onto S. Portland St.	1,002	1,002	1,002	-	Calculated (using 54 mph)
Existing Stopping Sight Distance Available (for Approaching Northbound Traffic) (ft)	875	875	875	-	Measured
<i>Deficient (ft)</i>	127	127	127	-	-

kpff Consulting Engineers 101 Stewart Street, Suite 400 Seattle, Washington 98101 p (206) 382-0600 f (206) 382-0500	Project:	King County Airport	Date:	2-Aug-13
	Location:	Portland Ave. and Airport Way	Sheet #	1
	Client:	King County Airport	Job #	113065
	By:	JGR		

INTERSECTION of PORTLAND AVE. and AIRPORT WAY

The following calculations are based on methods and information in the Policy On Geometric Design of Highways and Streets 2004 and/or WSDOT Highway Design Manual M22-01, 2009.

APPROACH SIGHT TRIANGLES

CASE B) ENTERING/DEPARTURE SIGHT TRIANGLES

B.1)	Horizontal Requirements		
	CASE B - Intersections with stop control on minor road		(pg 654)
	Case B1 - Left Turn From Minor Road	(Looking Left)	
	ISD = $1.47 V_{\text{major}} t_g$		(pg 659)
	Decision Point Distance =	14.5 ft min.	(pg 657)
	Decision Point Distance =	18.0 ft max.	(pg 657)
	Posted Speed =	45 mph	CH 1130.02 WSDOT
	Design Speed (V_{major}) =	50 mph	M22-01 (2009)
	Adjustment for Grade =	N/A	
	Passenger Car t_g =	8 seconds	(pg 660)
	Single Unit Truck t_g =	10.2 seconds	(pg 660)
	Combination Truck t_g =	12.2 seconds	(pg 660)
	ESD Passenger Car =	588 ft	
	ESD Single Unit Truck =	750 ft	
	ESD Combination Truck =	897 ft	
	ESD Existing =	510 ft	<u>Not OK for Cars</u> <u>Not OK for Trucks</u>

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	Location:	Portland Ave. and Airport Way	Sheet #	2
	Client:	King County Airport	Job #	113065
	By:	JGR		

INTERSECTION of PORTLAND AVE. and AIRPORT WAY

The following calculations are based on methods and information in the Policy On Geometric Design of Highways and Streets 2004 and/or WSDOT Highway Design Manual M22-01, 2009.

APPROACH SIGHT TRIANGLES

CASE B) ENTERING/DEPARTURE SIGHT TRIANGLES

B.1)	Horizontal Requirements		
	CASE B - Intersections with stop control on minor road		(pg 654)
	Case B1 - Left Turn From Minor Road	(Looking Right)	
	ISD = $1.47 V_{\text{major}} t_g$		(pg 659)
	Decision Point Distance =	14.5 ft min.	(pg 657)
	Decision Point Distance =	18.0 ft max.	(pg 657)
	Posted Speed =	45 mph	CH 1130.02 WSDOT
	Design Speed (V_{major}) =	54 mph	M22-01 (2009)
	Adjustment for Grade =	N/A	
	Passenger Car t_g =	8 seconds	(pg 660)
	Single Unit Truck t_g =	10.2 seconds	(pg 660)
	Combination Truck t_g =	12.2 seconds	(pg 660)
	ESD Passenger Car =	635 ft	
	ESD Single Unit Truck =	810 ft	
	ESD Combination Truck =	968 ft	
	ESD Existing =	485 ft	<u>Too short for All</u>

kpff Consulting Engineers 101 Stewart Street, Suite 400 Seattle, Washington 98101 p (206) 382-0600 f (206) 382-0500	Project:	King County Airport	Date:	2-Aug-13
	Location:	Portland Ave. and Airport Way	Sheet #	3
	Client:	King County Airport	Job #	113065
	By:	JGR		

INTERSECTION of S. PORTLAND ST. and AIRPORT WAY S.

The following calculations are based on methods and information in the Policy On Geometric Design of Highways and Streets 2004 and/or WSDOT Highway Design Manual M22-01, 2009.

APPROACH SIGHT TRIANGLES

CASE B) ENTERING/DEPARTURE SIGHT TRIANGLES

B.2)	Horizontal Requirements		
	CASE B - Intersections with stop control on minor road		(pg 654)
	<i>Case B2 - Right Turn From Minor Road</i>		
	$ISD = 1.47 V_{major} t_g$		(pg 659)
	Decision Point Distance =	14.5 ft min.	(pg 657)
	Decision Point Distance =	18.0 ft max.	(pg 657)
	Posted Speed =	45 mph	CH 1130.02 WSDOT
	Design Speed (V_{major}) =	50 mph	M22-01 (2009)
	Adjustment for Grade =	N/A	
	Passenger Car t_g =	6.5 seconds	(pg 664)
	Single Unit Truck t_g =	8.5 seconds	(pg 664)
	Combination Truck t_g =	10.5 seconds	(pg 664)
	ESD Passenger Car =	478 ft	
	ESD Single Unit Truck =	625 ft	
	ESD Combination Truck =	772 ft	
	ESD Existing =	510 ft	<u>OK for Cars</u> <u>Not OK for Trucks</u>

kpff Consulting Engineers 101 Stewart Street, Suite 400 Seattle, Washington 98101 p (206) 382-0600 f (206) 382-0500	Project:	King County Airport	Date:	2-Aug-13
	Location:	Portland Ave. and Airport Way	Sheet #	4
	Client:	King County Airport	Job #	113065
	By:	JGR		

INTERSECTION of S. PORTLAND ST. and AIRPORT WAY S.

The following calculations are based on methods and information in the Policy On Geometric Design of Highways and Streets 2004
and/or WSDOT Highway Design Manual M22-01, 2009.

APPROACH SIGHT TRIANGLES

CASE F) ENTERING/DEPARTURE SIGHT TRIANGLES

F.1)	Horizontal Requirements		
	CASE F - Intersections with stop control on minor road		(pg 654)
	<i>Case F2 - Left Turn From Major Road</i>		
	ISD = 1.47 V_{major} t_g		(pg 659)
	Decision Point Distance =	14.5 ft min.	(pg 657)
	Decision Point Distance =	18.0 ft max.	(pg 657)
	Posted Speed =	45 mph	CH 1130.02 WSDOT
	Design Speed (V _{major}) =	50 mph	M22-01 (2009)
	Adjustment for Grade =	N/A	
	Passenger Car t _g =	6 seconds	(pg 674)
	Single Unit Truck t _g =	7.2 seconds	(pg 674)
	Combination Truck t _g =	8.2 seconds	(pg 674)
	ESD_{Passenger Car} =	441 ft	
	ESD_{Single Unit Truck} =	529 ft	
	ESD_{Combination Truck} =	603 ft	
	ESD_{Existing} =	1,100 ft	<u>OK for all vehicles</u>

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	Location:	Portland Ave. and Airport Way	Sheet #	5
	Client:	King County Airport	Job #	113065
	By:	JGR		

INTERSECTION of S. PORTLAND ST. and AIRPORT WAY S.

The following calculations are based on methods and information in the Policy On Geometric Design of Highways and Streets 2004 and/or WSDOT Highway Design Manual M22-01, 2009.

A) SOUTHBOUND STOPPING SIGHT DISTANCE

- 1) Airport Way is flat in both directions of the intersection and a vertical stopping sight distance (SSD) is not the controlling factor.
- 2) Braking and decision sight distances are more critical than the non-existent vertical curve evaluation.

B) BRAKING DISTANCE

$$d = 1.075 V^2 / a$$

V =	50 mph	(design speed)	(pg 111)
a =	11.2 ft/s ²	(deceleration rate)	(pg 111)
d =	240 ft	(braking distance)	(pg 111)

C) BRAKE REACTION TIME/DECISION SIGHT DISTANCE (Stop on Urban Road)

$$d = 1.47 V t$$

V =	50 mph	(design speed)	(pg 111)
t =	9.1 sec		(pg 111)
a =	11.2 ft/s ²	(deceleration rate)	(pg 111)
d =	669 ft		

D) TOTAL STOPPING SIGHT DISTANCE

$$d = 1.47 V t + 1.075 V^2 / a$$

$$d = 909 \text{ ft}$$

$$SSD_{\text{Existing}} = 1,100 \text{ ft} \quad \text{OK}$$

735 ft to first obstruction (tree) but visibility beyond was available.
After 1,100 feet, all visibility was gone.

kpff Consulting Engineers 101 Stewart Street, Suite 400 Seattle, Washington 98101 p (206) 382-0600 f (206) 382-0500	Project:	King County Airport	Date:	2-Aug-13
	Location:	Portland Ave. and Airport Way	Sheet #	6
	Client:	King County Airport	Job #	113065
	By:	JGR		

INTERSECTION of S. PORTLAND ST. and AIRPORT WAY S.

The following calculations are based on methods and information in the Policy On Geometric Design of Highways and Streets 2004 and/or WSDOT Highway Design Manual M22-01, 2009.

A) NORTHBOUND STOPPING SIGHT DISTANCE

- 1) Airport Way is flat in both directions of the intersection and a vertical stopping sight distance (SSD) is not the controlling factor.
- 2) Braking and decision sight distances are more critical than the non-existent vertical curve evaluation.

B) BRAKING DISTANCE

$$d = 1.075 V^2 / a \quad (\text{pg 111})$$

V =	54 mph	(design speed)	
a =	11.2 ft/s ²	(deceleration rate)	(pg 113)
d =	280 ft	(braking distance)	

C) DECISION SIGHT DISTANCE FOR PREMANEUVER (Stop On Urban Road)

$$d = 1.47 V t \quad (\text{pg 117})$$

V =	54 mph	(design speed)	
t =	9.1 sec		(pg 117)
a =	11.2 ft/s ²	(deceleration rate)	(pg 113)
d =	722 ft		

D) TOTAL STOPPING SIGHT DISTANCE (With PRE/Avoidance Maneuver)

$$d = 1.47 V t + 1.075 V^2 / a \quad (\text{pg 113})$$

$$d = 1002 \text{ ft}$$

$$\text{SSD}_{\text{Existing}} = 875 \text{ ft} \quad \text{Not OK}$$

Project:	King County Airport	Date:	2-Aug-13
Location:	Portland Ave. and Airport Way	Sheet #	7
Client:	King County Airport	Job #	113065
By:	JGR		

Truck Driver's Eye Height = 7.6 ft (pg 127)
 Driver's Eye Height = 3.5 ft (pg 117)
 Object Target Height = 2.0 ft (pg 117)
 (Target height was not a control due to flat grades)

EXISTING AVAILABLE ENTERING SIGHT DISTANCE

LEFT ESD Existing = 510 ft
 RIGHT ESD Existing = 485 ft*

** Right hand sight distance could be as short as 395 feet without brush and tree trimming. Existing utility enclosures are poorly located and add to the obstructed sight distance.*

Measured sight distance was performed 14.5 feet behind the edge of travelled way.

EXISTING STOPPING SIGHT DISTANCE

Left SSD Existing = 1,100 ft
 Right SSD Existing = 875 ft

Appendix D: MUTCD Warrants Analysis

Intersection Information

	Major Street	Minor Street
Street Name	Airport Way S	S Portland St
Direction	NB/SB	EB
Number of Lanes	2	1
Approach Speed	45	25

Warrant	Met?	Notes
Warrant 1, Eight-Hour Vehicular Volume		
	No	
Condition A or B Met?	No	0 Hours met (8 required)
Condition A and B Met?	No	0 Hours met (8 required)
Warrant 2, Four-Hour Vehicular Volume		
	No	0 Hours met (4 required)
Warrant 3, Peak Hour		
	No	
Condition A Met?	No	0 Hours met (1 required)
Condition B Met?	No	0 Hours met (1 required)
Warrant 4, Pedestrian Volume		
	No	
Condition A Met?	No	0 Hours met (4 required)
Condition B Met?	No	0 Hours met (1 required)
Warrant 5, School Crossing		
	No	

Warrant 6, Coordinated Signal System**No****Warrant 7, Crash Experience****No**Traffic Volume Condition **No** 0 Hours met (8 required)Ped Condition? **No** 0 Hours met (8 required)**Warrant 8, Roadway Network****No****Warrant 9, Intersection Near a Grade Crossing****No****AWSC Warrant, Multiway Stop Application****No**Condition A Met? **No**Condition B Met? **No**Condition C Met? **No**

Warrant 1: Eight-hour Vehicular Volume

6: Airport Way S & S Portland St

Existing Conditions

Intersection Information

Major Street Name: Airport Way S

Major Street Direction: NB/SB

Minor Street Direction: EB

WARRANT 1 MET? **No**

Details:

Condition A Met? **No** 0 Hours met (8 required)

Condition B Met? **No** 0 Hours met (8 required)

Hour	Major Street Vehicles (Total of Both Approaches)	High Volume Minor Approach Vehicles	70% Standard Met? Cond. A OR Cond. B		56% Standard Met? Cond. A AND Cond. B	
			Condition A 70% Column	Condition B 70% Column	Condition A 56% Column	Condition B 56% Column
00:00 to 01:00	98	5	No	No	No	No
Condition A	Volume >= 70% column (420)?	No	Volume >= 70% column (630)?	No		
	Volume >= 56% column (336)?	No	Volume >= 56% column (504)?	No		
Condition B	Volume >= 70% column (630)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (504)?	No	Volume >= 56% column (42)?	No		
00:15 to 01:15	81	4	No	No	No	No
Condition A	Volume >= 70% column (420)?	No	Volume >= 70% column (630)?	No		
	Volume >= 56% column (336)?	No	Volume >= 56% column (504)?	No		
Condition B	Volume >= 70% column (630)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (504)?	No	Volume >= 56% column (42)?	No		
00:30 to 01:30	63	0	No	No	No	No
Condition A	Volume >= 70% column (420)?	No	Volume >= 70% column (630)?	No		
	Volume >= 56% column (336)?	No	Volume >= 56% column (504)?	No		
Condition B	Volume >= 70% column (630)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (504)?	No	Volume >= 56% column (42)?	No		

Interval data removed (19 pages)

Warrant 2: Four-hour Vehicular Volume

Existing Conditions

6: Airport Way S & S Portland St

Intersection Information

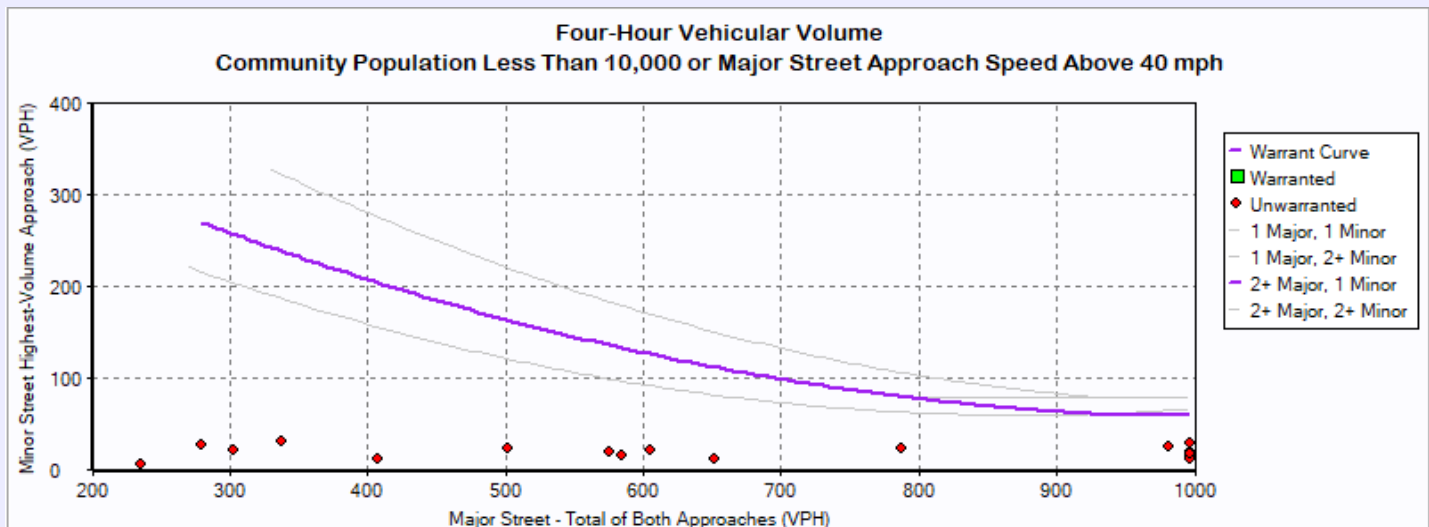
	Major Street	Minor Street
Street Name	Airport Way S	S Portland St
Direction	NB/SB	EB
Number of Lane	2	1
Approach Speed	45	25

Warrant 2 Met? **No**

Details:

Notes 0 Hours met (4 required)

Low population **No**



Warrant 2: Four-hour Vehicular Volume

6: Airport Way S & S Portland St

Hourly Volumes

Hour	Major Street Total All Approaches (vph)	Minor Street Highest Volume Approach (vph)
00:00:00 - 01:00:00	98	5
01:00:00 - 02:00:00	55	2
02:00:00 - 03:00:00	102	8
03:00:00 - 04:00:00	148	3
04:00:00 - 05:00:00	154	5
05:00:00 - 06:00:00	407	13
06:00:00 - 07:00:00	1,434	21
07:00:00 - 08:00:00	1,772	29
08:00:00 - 09:00:00	1,835	17
09:00:00 - 10:00:00	1,125	12
10:00:00 - 11:00:00	652	13
11:00:00 - 12:00:00	502	24
12:00:00 - 13:00:00	575	21
13:00:00 - 14:00:00	605	22
14:00:00 - 15:00:00	787	24
15:00:00 - 16:00:00	981	25
16:00:00 - 17:00:00	1,080	19
17:00:00 - 18:00:00	1,037	19
18:00:00 - 19:00:00	584	17
19:00:00 - 20:00:00	280	28
20:00:00 - 21:00:00	338	31
21:00:00 - 22:00:00	303	23
22:00:00 - 23:00:00	235	7

Warrant 2: Four-hour Vehicular Volume

6: Airport Way S & S Portland St

	23:00:00 - 00:00:00	161	4							
<div>Warranted Hours</div> <table><tr><th>Hour</th><th>Major Street Total All Approaches (vph)</th><th>Minor Street Highest Volume Approach (vph)</th></tr><tr><td colspan="3"></td></tr></table> <div>Note: Only data of hours warranted is represented in the above table.</div>					Hour	Major Street Total All Approaches (vph)	Minor Street Highest Volume Approach (vph)			
Hour	Major Street Total All Approaches (vph)	Minor Street Highest Volume Approach (vph)								

Warrant 3: Peak Hour

6: Airport Way S & S Portland St

Existing Conditions

Intersection Information

	Major Street	Minor Street
Street Name	Airport Way S	S Portland St
Direction	NB/SB	EB
Number of Lane:	2	1
Approach Speed	45	25

Warrant 3 Met? **No**

Details

Low Population? **No**

Condition A Met? **No**

Condition B Met? **No**

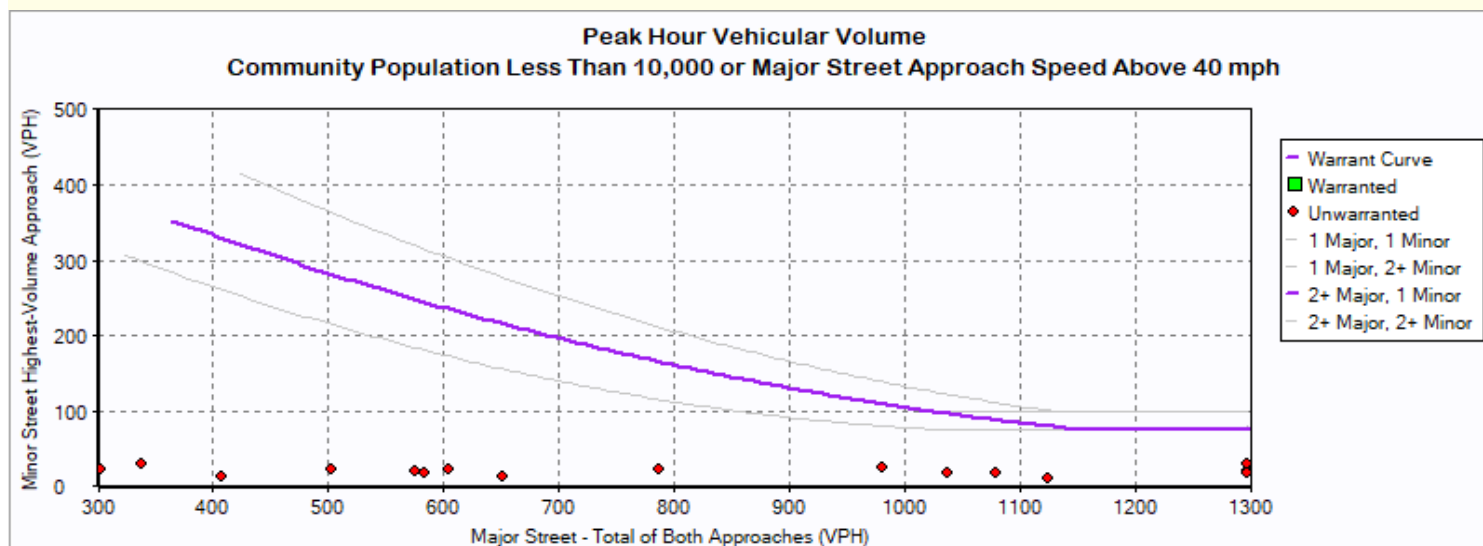
Notes 0 Hours met (1 required)

Notes 0 Hours met (1 required)

Minor Approach Time Delay Condition Met? **Not Met**

Minor Approach Volume Condition Met? **Not Met**

Total Entering Intersection Volume Condition Met? **Not Met**



Warrant 3: Peak Hour

6: Airport Way S & S Portland St

Hour	Major Street Total All Approaches (vph)	Minor Street Highest Volume Approach (vph)
0:00	98	5
1:00	55	2
2:00	102	8
3:00	148	3
4:00	154	5
5:00	407	13
6:00	1,434	21
7:00	1,772	29
8:00	1,835	17
9:00	1,125	12
10:00	652	13
11:00	502	24
12:00	575	21
13:00	605	22
14:00	787	24
15:00	981	25
16:00	1,080	19
17:00	1,037	19
18:00	584	17
19:00	280	28
20:00	338	31
21:00	303	23
22:00	235	7
23:00	161	4

Warrants Summary Report

6: Airport Way S & S Portland St

2021 Project Conditions

Intersection Information

	Major Street	Minor Street
Street Name	Airport Way S	S Portland St
Direction	NB/SB	EB
Number of Lane	2	1
Approach Speed	45	30

Warrant	Met?	Notes
Warrant 1, Eight-Hour Vehicular Volume		
	No	
Condition A or B Met?	No	1 Hours met (8 required)
Condition A and B Met?	No	0 Hours met (8 required)
Warrant 2, Four-Hour Vehicular Volume		
	No	0 Hours met (4 required)
Warrant 3, Peak Hour		
	No	
Condition A Met?	No	0 Hours met (1 required)
Condition B Met?	No	0 Hours met (1 required)
Warrant 4, Pedestrian Volume		
	No	
Condition A Met?	No	0 Hours met (4 required)
Condition B Met?	No	0 Hours met (1 required)
Warrant 5, School Crossing		
	No	

Warrants Summary Report

6: Airport Way S & S Portland St

Warrant 6, Coordinated Signal System

No

Warrant 7, Crash Experience

No

Traffic Volume Condi **No** 3 Hours met (8 required)

Ped Condition? **No** 0 Hours met (8 required)

Warrant 8, Roadway Network

No

Warrant 9, Intersection Near a Grade Crossing

No

AWSC Warrant, Multiway Stop Application

No

Condition A Met? **No**

Condition B Met? **No**

Condition C Met? **No**

Warrant 1: Eight-hour Vehicular Volume

6: Airport Way S & S Portland St

2021 Project Conditions

Intersection Information

Major Street Name: Airport Way S

Major Street Direction: NB/SB

Minor Street Direction: EB

WARRANT 1 MET? **No**

Details:

Condition A Met? **No** 1 Hours met (8 required)

Condition B Met? **No** 0 Hours met (8 required)

Hour	Major Street Vehicles (Total of Both Approaches)	High Volume Minor Approach Vehicles	70% Standard Met? Cond. A OR Cond. B		56% Standard Met? Cond. A AND Cond. B	
			Condition A 70% Column	Condition B 70% Column	Condition A 56% Column	Condition B 56% Column
00:00 to 01:00	90	1	No	No	No	No
Condition A	Volume >= 70% column (420)?	No	Volume >= 70% column (630)?	No		
	Volume >= 56% column (336)?	No	Volume >= 56% column (504)?	No		
Condition B	Volume >= 70% column (630)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (504)?	No	Volume >= 56% column (42)?	No		
00:15 to 01:15	76	2	No	No	No	No
Condition A	Volume >= 70% column (420)?	No	Volume >= 70% column (630)?	No		
	Volume >= 56% column (336)?	No	Volume >= 56% column (504)?	No		
Condition B	Volume >= 70% column (630)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (504)?	No	Volume >= 56% column (42)?	No		
00:30 to 01:30	61	3	No	No	No	No
Condition A	Volume >= 70% column (420)?	No	Volume >= 70% column (630)?	No		
	Volume >= 56% column (336)?	No	Volume >= 56% column (504)?	No		
Condition B	Volume >= 70% column (630)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (504)?	No	Volume >= 56% column (42)?	No		

Interval data removed - 19 pages

Warrant 2: Four-hour Vehicular Volume

6: Airport Way S & S Portland St

2021 Project Conditions

Intersection Information

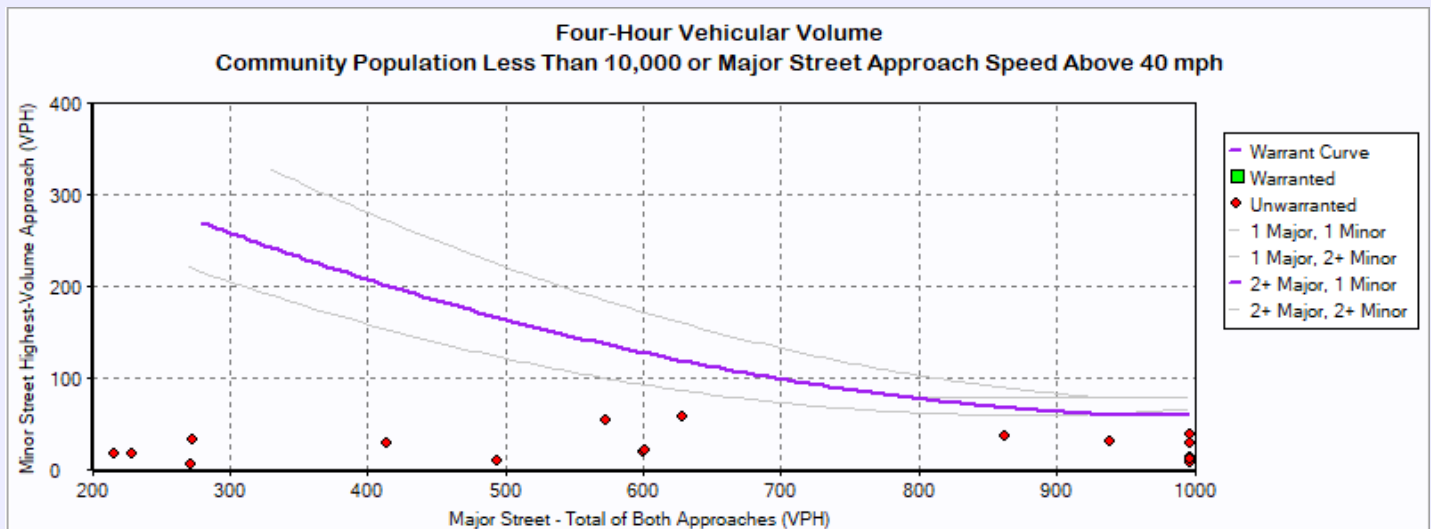
	Major Street	Minor Street
Street Name	Airport Way S	S Portland St
Direction	NB/SB	EB
Number of Lane	2	1
Approach Speed	45	30

Warrant 2 Met? **No**

Details:

Notes 0 Hours met (4 required)

Low population **No**



Warrant 2: Four-hour Vehicular Volume

6: Airport Way S & S Portland St

Hourly Volumes

Hour	Major Street Total All Approaches (vph)	Minor Street Highest Volume Approach (vph)
00:00:00 - 01:00:00	90	1
01:00:00 - 02:00:00	54	6
02:00:00 - 03:00:00	86	14
03:00:00 - 04:00:00	229	18
04:00:00 - 05:00:00	272	6
05:00:00 - 06:00:00	494	10
06:00:00 - 07:00:00	1,265	15
07:00:00 - 08:00:00	1,734	9
08:00:00 - 09:00:00	1,718	15
09:00:00 - 10:00:00	1,213	13
10:00:00 - 11:00:00	939	31
11:00:00 - 12:00:00	600	20
12:00:00 - 13:00:00	573	54
13:00:00 - 14:00:00	601	22
14:00:00 - 15:00:00	862	38
15:00:00 - 16:00:00	1,064	30
16:00:00 - 17:00:00	1,187	30
17:00:00 - 18:00:00	1,136	39
18:00:00 - 19:00:00	629	58
19:00:00 - 20:00:00	414	29
20:00:00 - 21:00:00	273	33
21:00:00 - 22:00:00	216	18
22:00:00 - 23:00:00	162	23

Warrant 2: Four-hour Vehicular Volume

6: Airport Way S & S Portland St

	23:00:00 - 00:00:00	152	16							
<div>Warranted Hours</div> <table><tr><th>Hour</th><th>Major Street Total All Approaches (vph)</th><th>Minor Street Highest Volume Approach (vph)</th></tr><tr><td colspan="3"></td></tr></table> <div>Note: Only data of hours warranted is represented in the above table.</div>					Hour	Major Street Total All Approaches (vph)	Minor Street Highest Volume Approach (vph)			
Hour	Major Street Total All Approaches (vph)	Minor Street Highest Volume Approach (vph)								

Warrant 3: Peak Hour

6: Airport Way S & S Portland St

2021 Project Conditions

Intersection Information

	Major Street	Minor Street
Street Name	Airport Way S	S Portland St
Direction	NB/SB	EB
Number of Lane:	2	1
Approach Speed	45	30

Warrant 3 Met? **No**

Details

Low Population? **No**

Condition A Met? **No**

Condition B Met? **No**

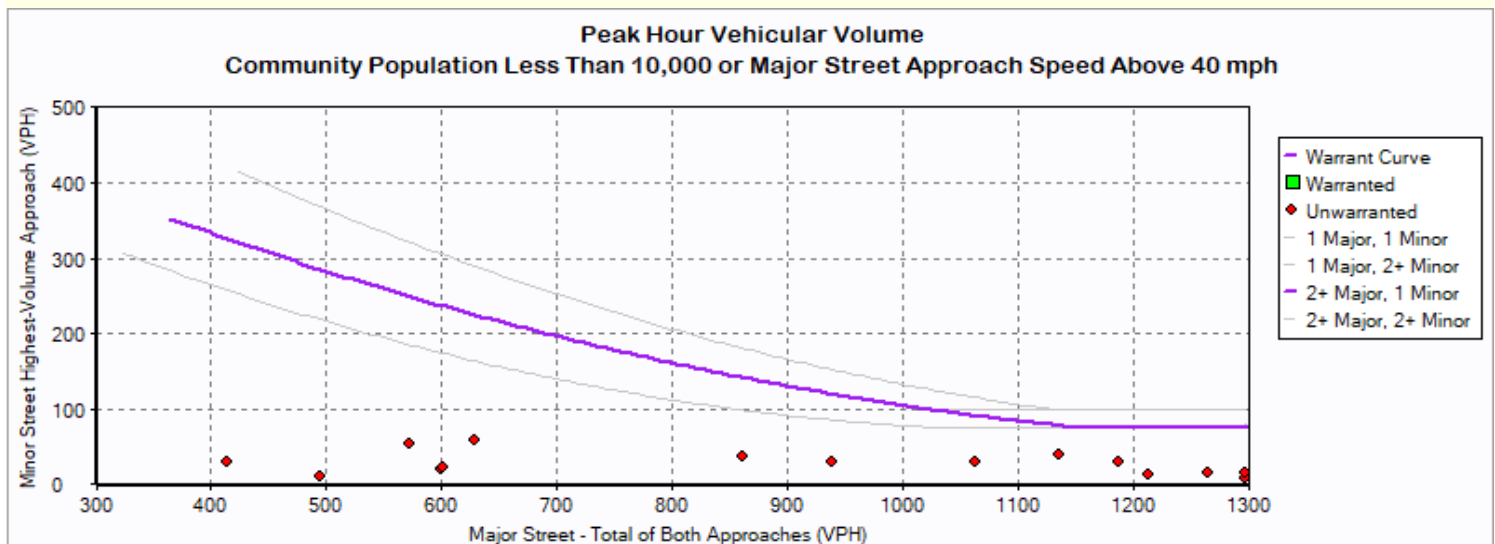
Notes 0 Hours met (1 required)

Notes 0 Hours met (1 required)

Minor Approach Time Delay Condition Met? **Not Met**

Minor Approach Volume Condition Met? **Not Met**

Total Entering Intersection Volume Condition Met? **Not Met**



Warrant 3: Peak Hour

6: Airport Way S & S Portland St

Hour	Major Street Total All Approaches (vph)	Minor Street Highest Volume Approach (vph)
0:00	90	1
1:00	54	6
2:00	86	14
3:00	229	18
4:00	272	6
5:00	494	10
6:00	1,265	15
7:00	1,734	9
8:00	1,718	15
9:00	1,213	13
10:00	939	31
11:00	600	20
12:00	573	54
13:00	601	22
14:00	862	38
15:00	1,064	30
16:00	1,187	30
17:00	1,136	39
18:00	629	58
19:00	414	29
20:00	273	33
21:00	216	18
22:00	162	23
23:00	152	16

Appendix E: Trip Generation

Warehousing (150)

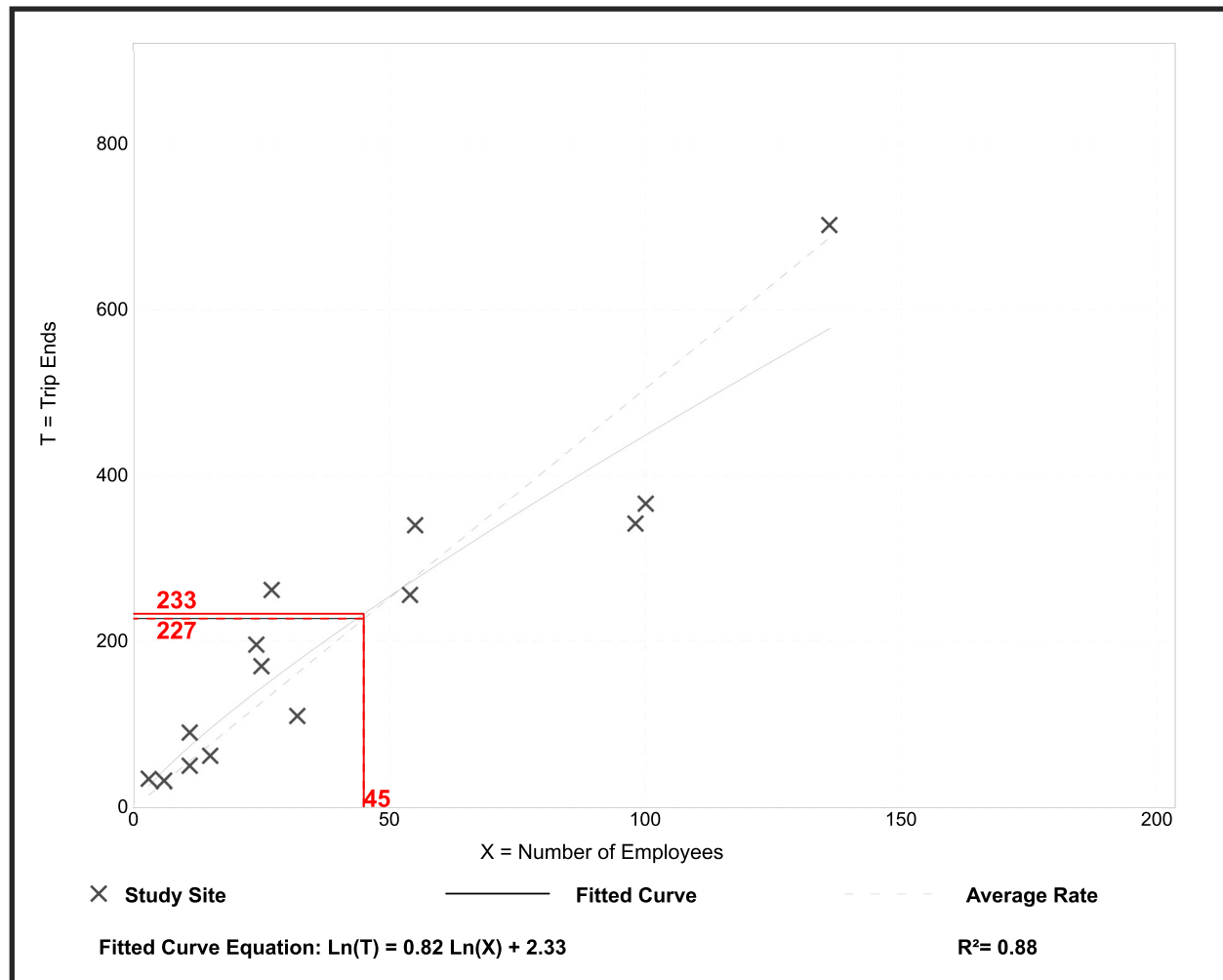
Vehicle Trip Ends vs: Employees
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 14
Avg. Num. of Employees: 43
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
5.05	3.44 - 11.33	1.77

Data Plot and Equation



Warehousing (150)

Vehicle Trip Ends vs: Employees

On a: Weekday,

Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban

Number of Studies: 14

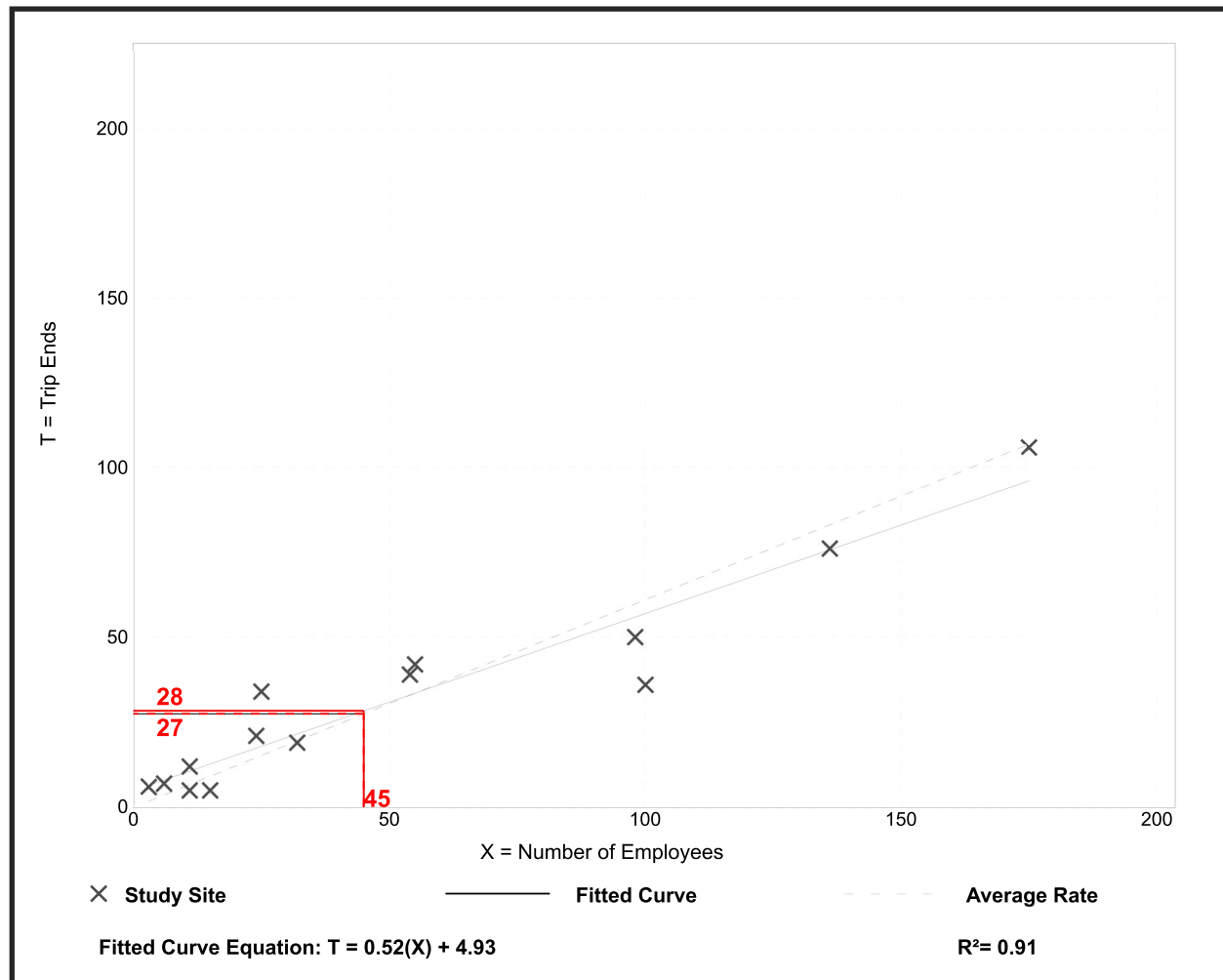
Avg. Num. of Employees: 53

Directional Distribution: 72% entering, 28% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.61	0.33 - 2.00	0.23

Data Plot and Equation



Trip Generation Manual, 10th Edition • Institute of Transportation Engineers

Warehousing (150)

Vehicle Trip Ends vs: Employees

On a: Weekday,

Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 15

Avg. Num. of Employees: 51

Directional Distribution: 36% entering, 64% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.66	0.17 - 2.22	0.40

Data Plot and Equation

