

February 28, 2018

Project #: 22300

James E. Carothers, PE
City of Camas
616 NE 4th Avenue
Camas, WA 98607

RE: Traffic Impact Analysis for Grass Valley Development – Camas, WA

Dear Curleigh,

This letter documents the Traffic Impact Analysis (TIA) prepared for the proposed Grass Valley mixed-use development along the south side of NW 38th Avenue in the City of Camas. The proposed development includes up to 276 apartment units, 100,000 square feet of corporate headquarters, 150,000 square feet of general office, and 20,000 square feet of retail split evenly between restaurant and grocery. Full occupancy of the development is expected by 2021.

Pursuant to City of Camas requirements, this report includes the following:

- Operational assessment of key study intersections under existing traffic conditions
- Review of reported crash data at study intersections
- Assessment of background traffic operations, including traffic associated with approved in-process developments but not the proposed project, under two road network scenarios:
 - Scenario 1: Re-align SE Bybee Road with NW Fisher Creek Drive (identified in City of Camas 6-year Street Priorities)
 - Scenario 2: Connect SE Bybee Road to SW Armstrong Drive (identified as a long-term connection in the *Camas Crossing Development TIA*)
- Trip generation and trip distribution estimate for the proposed development
- Assessment of future traffic conditions at the study intersections and the proposed site accesses after full build-out and occupancy of the proposed development under the two realignment scenarios outlined above
- Queueing, access spacing, sight distance, and on-site circulation review
- Findings and recommendations

This study assumes that activation of the SE 20th Street/NW Fisher Creek Drive intersection has occurred prior to site occupancy based on other approved and pending development. Based on the analysis provided and documented herein, the proposed development can be constructed while complying with City of Camas and City of Vancouver transportation requirements assuming provision of mitigation

measures identified in this report. Site-development related capacity improvement needs were identified at the SE 20th Street/SE 192nd Avenue intersection.

SE 20th Street/SE 192nd Avenue

- In Scenario 1, under 2021 total traffic conditions, the intersection does not satisfy City of Vancouver operating standards during the weekday p.m. peak hour.
 - Recommended mitigation to restore acceptable operations includes provision of a second westbound left-turn lane and traffic signal retiming that allocates additional green time to the primary north-south traffic patterns along NE 192nd Avenue.
- In Scenario 2, under both 2021 background and total traffic conditions, the intersection does not satisfy City of Vancouver operating standards during the weekday a.m. and p.m. peak hours.
 - Recommended mitigation to restore acceptable operations includes provision of a second westbound left-turn lane and a separate westbound right-turn lane as well as corresponding signal retiming that allocates additional green time to the primary north-south traffic patterns along NE 192nd Avenue.

Other Considerations

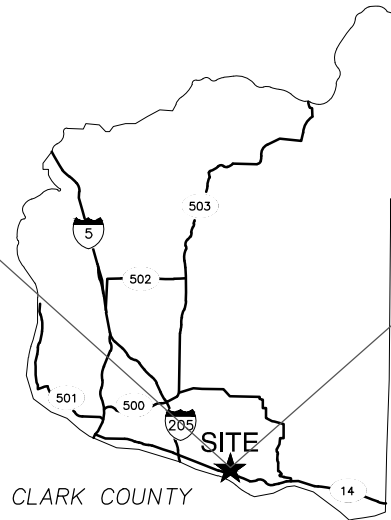
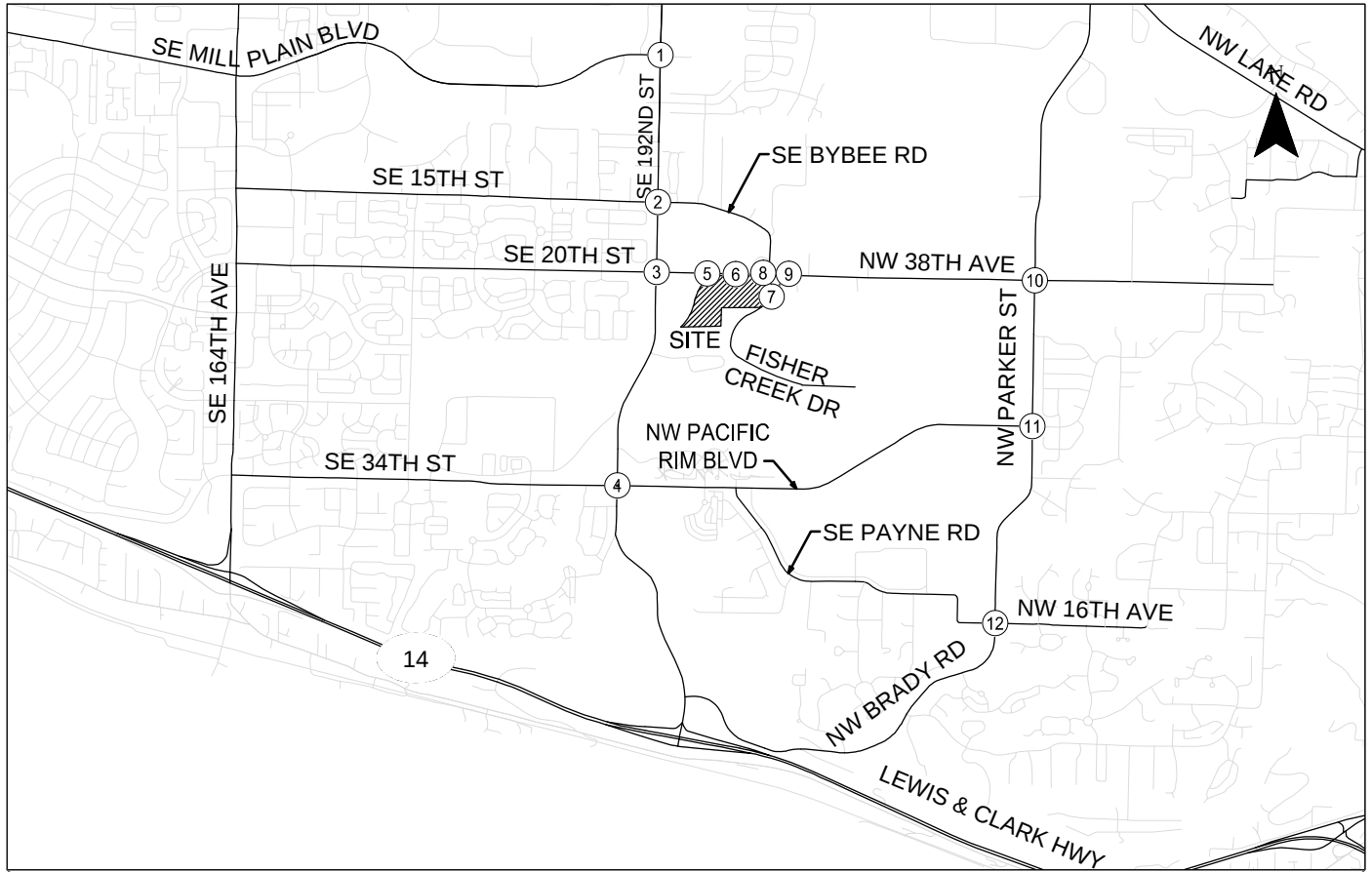
- On-site and off-site landscaping and any above ground utilities at the site driveways and internal roadways should be installed and maintained to ensure that adequate sight distance is provided upon buildout in accordance with City of Camas standards. Further, sight distance availability should be confirmed during the final engineering process.

The methodology of the analysis, findings, and recommendations are documented herein.

INTRODUCTION

Holland Acquisition Co., LLC proposes to construct a mixed-use development on the south side of NW 38th Avenue, west of NW Fisher Creek Drive. Currently, a residential home and a storage building occupy the 36-acre site and are accessible via two driveways on NW 38th Avenue. The site is currently zoned for Regional Commercial (RC) uses. Figure 1 illustrates the site location and Figure 2 shows the site plan.

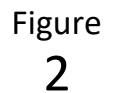
The proposed development will consist of up to 276 apartment units, 100,000 square feet of corporate headquarters, 150,000 square feet of general office, and 20,000 square feet of retail split evenly between restaurant and grocery. Full occupancy of the development is expected to occur by 2021.



- Study Intersections

Site Vicinity Map
Camas, Washington

Figure
1



Access to the development is proposed via:

- two unsignalized full movement public street circulator connections to NW 38th Avenue; and
- two unsignalized connections to NW Fisher Creek Drive south of NW 38th Avenue (and north of the gated entry to the Fisher Investments Campus).

REPORT SCOPE

This analysis determines the transportation-related impacts associated with the proposed mixed-use development. The study intersections and overall study area for this project were determined through a scoping process with City of Camas staff.

Analysis Periods

Weekday a.m. and p.m. peak hour traffic conditions were modeled at the study intersections.

Study Intersections

The following study intersections were included in the analysis as shown in Figure 1.

1. SE 192nd Avenue/Mill Plain Boulevard (operated and maintained by City of Vancouver)
2. SE 192nd Avenue/SE 15th Street (operated and maintained by City of Vancouver)
3. SE 192nd Avenue/SE 20th Street (operated and maintained by City of Vancouver)
4. SE 192nd Avenue/NW Pacific Rim Boulevard (operated and maintained by City of Vancouver)
5. NW 38th Avenue/Proposed Site Driveway 1
6. NW 38th Avenue/Proposed Site Driveway 2
7. Fisher Creek Drive/Proposed Site Driveway 3¹
8. NW 38th Avenue/SE Bybee Road (existing)
9. NW 38th Avenue/NW Fisher Creek Drive (with realigned Bybee Road under Scenario 1)
10. NW 38th Avenue/NW Parker Street
11. NW Pacific Rim Boulevard/NW Parker Street
12. NW 16th Avenue/NW Brady Road

Future Roadway Connectivity Scenarios

A mixed-use development known as the Camas Crossing Development is currently proposed north of the Grass Valley Development and was in the site plan review process at the City of Camas at the time this

¹ The two proposed driveway connections to Fisher Creek Drive were analyzed as a single driveway to be conservative.

study was prepared. City of Camas required that the Grass Valley Development TIA consider the proposed Camas Crossing Development as a vested project that will re-align SE Bybee Road from its current terminus on NW 38th Avenue to the east. Per City of Camas staff, alignment modifications to SE Bybee Road are still being finalized, with the following options being considered:

- Re-align SE Bybee Road with NW Fisher Creek Drive (identified in City of Camas 6-year Street Priorities);
- Connect SE Bybee Road to SE 202nd Avenue (identified as a short-term realignment in the *Camas Crossing Development Transportation Impact Analysis*, TIA); and
- Connect SE Bybee Road to SW Armstrong Drive (identified as a long-term connection in the *Camas Crossing Development TIA*).

Per City of Camas scoping direction, two future realignment scenarios have been considered for purposes of this TIA. The first scenario analyzes impacts with SE Bybee Road aligned at NW Fisher Creek Drive and the second scenario analyzes impacts with the connection occurring at some point further east.

ANALYSIS METHODOLOGY

Intersection Levels-of-Service

Level of service (LOS) analysis described in this report was primarily performed using Synchro 8 software in accordance with the procedures stated in the *2000 Highway Capacity Manual* (HCM, Reference 1). The intersection of NW Pacific Rim Boulevard/NW Parker Street was analyzed using HCS 7 software, which implements 2010 HCM multi-lane all-way stop capacity analysis procedures, due to analysis constraints of the *2000 Highway Capacity Manual* in analyzing four-way stop-controlled intersections with multi-lane approaches.

To evaluate worst-case conditions, the peak 15-minute flow rates of the weekday a.m. and p.m. peak hours were used in the evaluation of all intersection LOS. For this reason, the operations analyses reflect conditions that are likely to occur for the peak 15 minutes out of each weekday a.m. and p.m. peak hour.

Operating Standards

Study intersections within the City of Camas are subject to the following operating standards:

- City of Camas requires a LOS D or better and a volume to capacity ratio of 0.90 or less for all intersections within the city limits of Camas, which includes all study intersections not along SE 192nd Avenue.

Study intersections within the City of Vancouver are subject to the following operating standards, as stated in the City of Vancouver Municipal Code Section 11.80.130.B:

A proposed development that adds at least five net new peak hour trips to an intersection approach operating at an LOS E or lower within the required traffic impact analysis area may be denied based upon any of the following:

- 1. For signalized intersections, when off-site intersection conditions are at a LOS F, or*
- 2. For signalized intersections, when the LOS E and the volume to capacity ratio is greater than 0.95, or*
- 3. For unsignalized intersections, when the volume to capacity ratio for any lane on any approach is greater than 0.95, and*
- 4. When significant traffic hazards would be caused or materially aggravated by the proposed development.*

EXISTING TRAFFIC CONDITIONS

The existing conditions analysis identifies site conditions, surrounding land uses, and the current operational and geometric characteristics of roadways within the study area. The purpose of this section is to create a basis for comparison to future conditions.

Site Conditions and Adjacent Land Uses

The proposed development site is mostly vacant, except for two existing structures. The site is currently zoned for Regional Commercial (RC) uses. Table 1 summarizes the attributes of the key transportation facilities in the site vicinity.

Table 1. Existing Transportation Facilities and Roadway Designations

Roadway	Functional Classification	Cross Section	Posted Speed Limit	Sidewalks?	Bike Lanes?	On-street Parking?
SE 192 nd Avenue	Principal Arterial ¹	4 lanes ²	40 mph	Yes	Yes	No
Mill Plain Boulevard	Principal Arterial ¹	4 lanes ²	30/40 mph ⁴	Yes	Yes	No
SE 15 th Street	Collector Arterial ¹	2 lanes	40 mph	Partial	Yes	No
SE 20 th Street	Minor Arterial ¹	2/3 lanes	40 mph	Yes	Yes	No
SE 34 th Street	Principal Arterial ¹	4 lanes ²	40 mph	Partial	No	No
SE Bybee Road	Collector ³	2 lanes	30 mph	No	Partial	No
NW Fisher Creek Drive	Collector ³	2 lanes	30 mph	Partial	No	No
SE 202 nd Avenue	Local ³	2 lanes	30 mph	No	No	No
NW 38 th Avenue	Arterial ³	3 lanes	35/40 mph ⁵	Yes	Yes	No
NW Pacific Rim Boulevard	Arterial ³	4 lanes ²	35 mph	Yes	No	No
NW Parker Street	Arterial ³	2/4 lanes ²	35 mph	Partial	Partial	No
NW 16 th Avenue	Collector ³	2 lanes	25 mph	Partial	Partial	Partial
NW Brady Road	Collector/Arterial ³	2 lanes	35 mph	Partial	Partial	No

¹City of Vancouver Arterial Street System and Classification Map

²Cross-section includes additional left-turn lanes at major intersections

³City of Camas 2008 Federal Functional Classification Map

⁴Speed limit is 30 mph on eastbound approach at SE 192nd Avenue, 40 mph on westbound approach

⁵Speed limit is 40 mph on eastbound approach at SE 192nd Avenue, 35 mph on westbound approach

Pedestrian Facilities

Continuous sidewalks are provided on both sides of NW 38th Avenue between SE 192nd Avenue and NW Parker Street. A sidewalk is currently provided on the east side of NW Fisher Creek Drive. Sidewalks are currently absent on the west side of NW Fisher Creek Drive along the site frontage and will be constructed in conjunction with the proposed development.

Bicycle Facilities

Bike lanes are provided along both sides NW 38th Avenue in the site vicinity. Bike lanes are present along SE Bybee Road for approximately 100 east of SE 192nd Avenue but are not provided along the remainder of the roadway. Bike lanes are also provided along SE 192nd Avenue, Mill Plain Boulevard, SE 15th Street, SE 20th Street, and NW Parker Street.

Transit Facilities

There is no public fixed-route transit service within Camas. C-TRAN Route 37 operates along SE 192nd Avenue and SE 34th Street. Route 37 connects Fisher's Landing Transit Center and Downtown Vancouver. Service is provided on weekdays from 4:45 a.m. to 12:45 a.m., Saturdays from 7:15 a.m. to 11:30 p.m., and Sundays from 7:30 a.m. to 11 p.m. C-TRAN's "Connector" provides Camas with fully accessible dial-a-ride (reservation-based service) and scheduled stop service (no reservation required) at designated stops at Fisher's Landing Transit Center and Hiddenbrook Drive. Rides are provided on a first-come, first-served basis. Dial-a-ride services are available weekdays from 5:30-9:15 a.m. and 2:00-7:00 p.m.

Traffic Safety Summary

Crash data for the study intersections was obtained from the Washington Department of Transportation (WSDOT) for the three-year period from January 1, 2014 through December 31, 2016 and were reviewed to identify potential intersection safety issues. Table 2 summarizes the crashes reported at the study intersections. *Appendix "A" contains the detailed WSDOT crash data.*

Table 2: Intersection Crash History Summary

Location	Crash Severity			Crash Type						Total Crashes
	Fatal	Injury	PDO ¹	Rear End	Side-swipe	Angle	Turning Movement	Fixed Object	Other	
SE 192 nd Ave / Mill Plain Blvd	0	4	1	2	1	1	1	0	0	5
SE 192 nd Ave / SE 15 th St	0	2	3	4	0	0	1	0	0	5
SE 192 nd Ave / SE 20 th St	0	3	3	4	1	1	0	0	0	6
SE 192 nd Ave / NW Pacific Rim Blvd	0	4	5	1	1	3	4	0	0	9
NW 38 th Ave / SE Bybee Rd	0	0	0	0	0	0	0	0	0	0
NW 38 th Ave / NW Fisher Creek Dr	0	0	0	0	0	0	0	0	0	0
NW 38 th Ave / NW Parker St	0	3	2	0	0	0	2	3	0	5
NW Pacific Rim Blvd / NW Parker St	0	0	3	0	0	1	0	2	0	3
NW 16 th Ave / NW Brady Rd	0	0	4	1	0	1	0	0	2	4

¹PDO – Property damage only

As shown in Table 2, no fatal crashes were reported. No crashes were reported along NW 38th Avenue along or near the site frontage. Based on reviewing the crash data and considering recent urban street improvements made along the NW 38th Avenue corridor, there are no apparent traffic safety hazards that require mitigation in conjunction with site development.

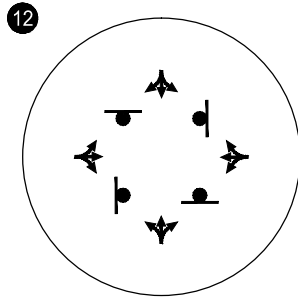
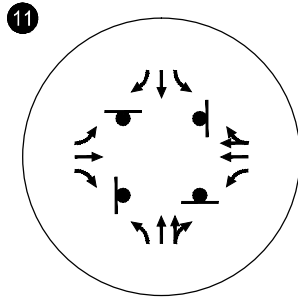
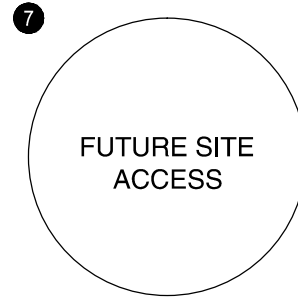
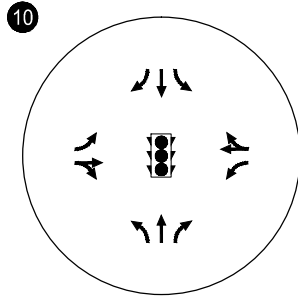
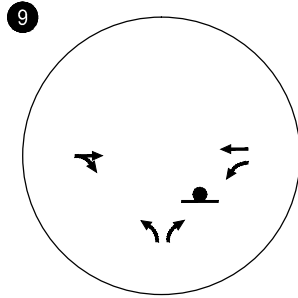
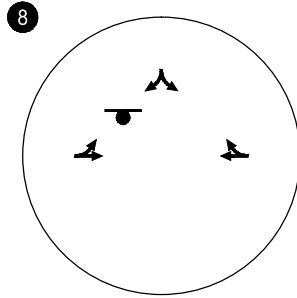
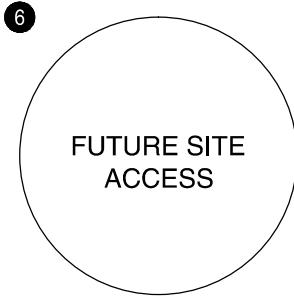
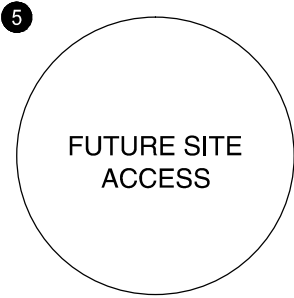
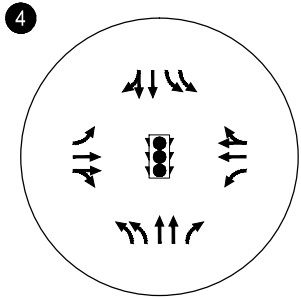
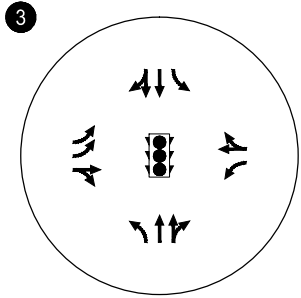
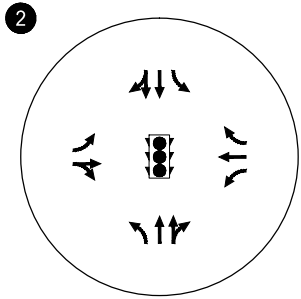
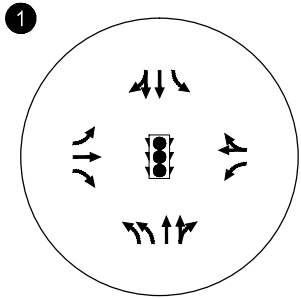
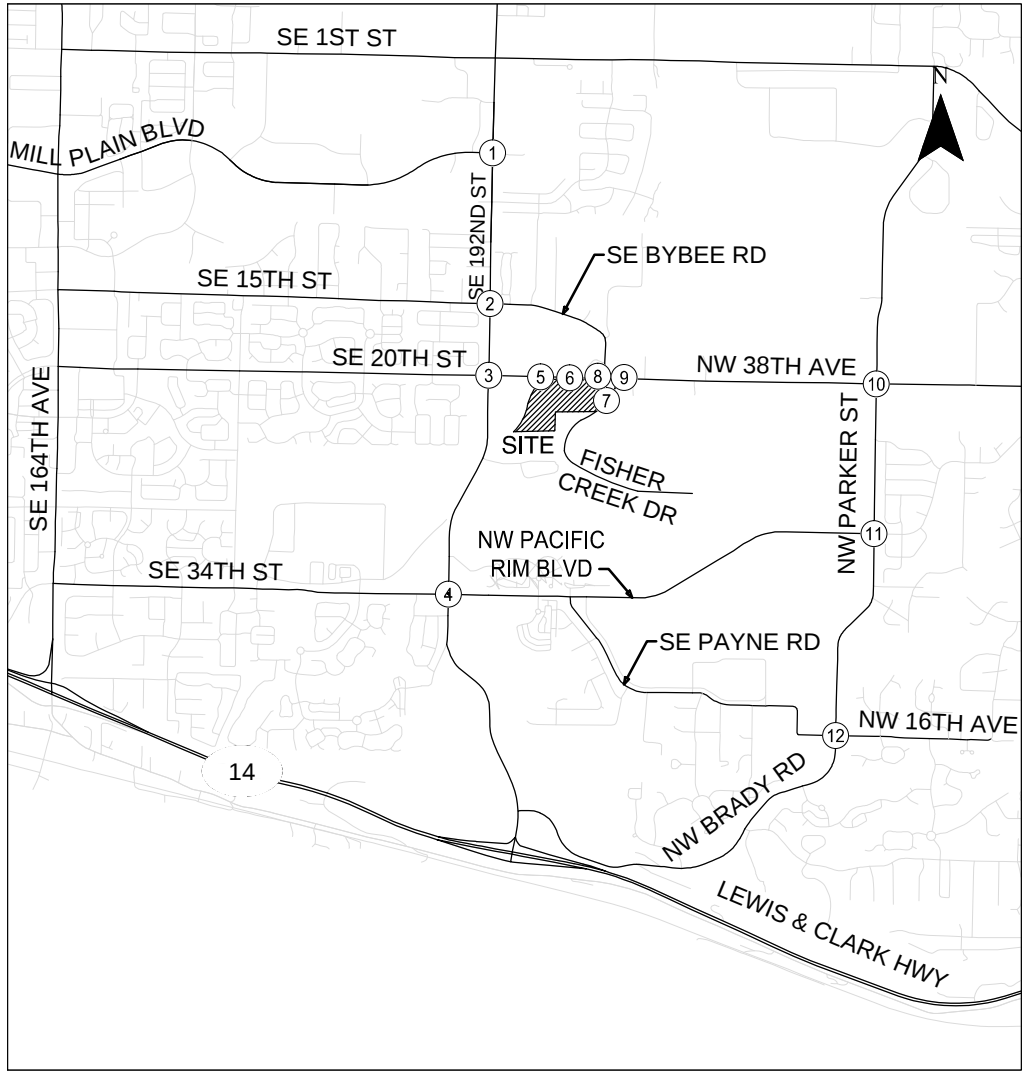
Existing Traffic Operations

Figure 3 illustrates the existing lane configurations and traffic control devices at each of these study intersections.

Turning movement counts were obtained at the study intersections on a midweek day in June 2017. All counts were performed during the morning (7:00 to 9:00 a.m.) and evening (4:00 to 6:00 p.m.) peak periods. Public schools were in session in the cities of Camas and Vancouver on the days the traffic counts were collected. The traffic counts revealed a local system morning peak from 7:30 to 8:30 a.m. and evening peak from 4:35 to 5:35 p.m.

Figures 4 and 5 show the existing traffic volumes and operations at each of the study intersections during weekday a.m. and p.m. peak hours, respectively. As shown in the figures, all study intersections operate acceptably during both peak periods, satisfying the applicable LOS and/or volume to capacity ratio standards. *Appendix “C” includes the traffic count data, and Appendix “D” includes the existing traffic analysis worksheets.*

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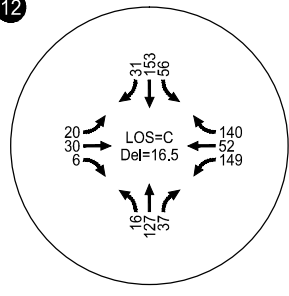
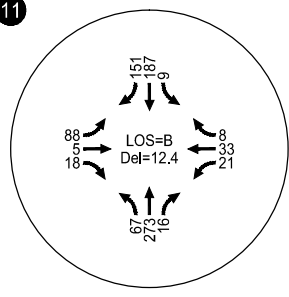
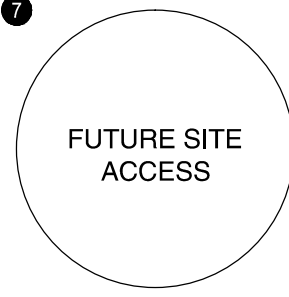
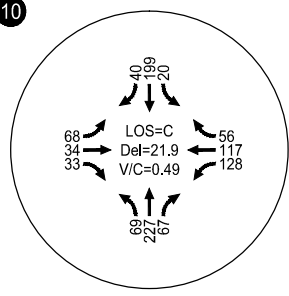
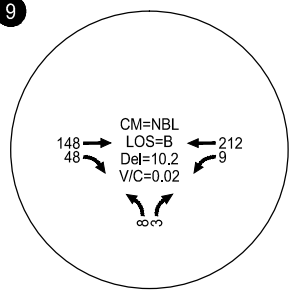
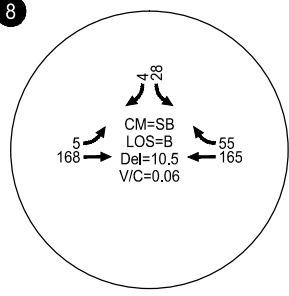
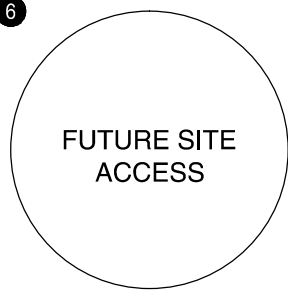
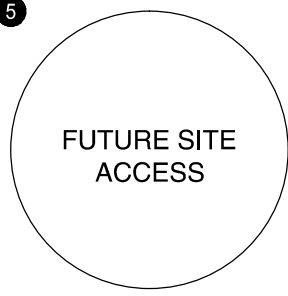
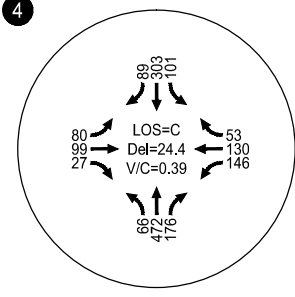
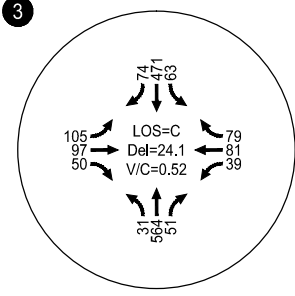
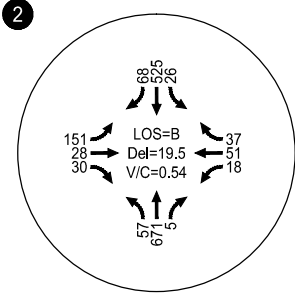
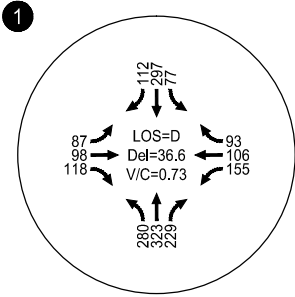
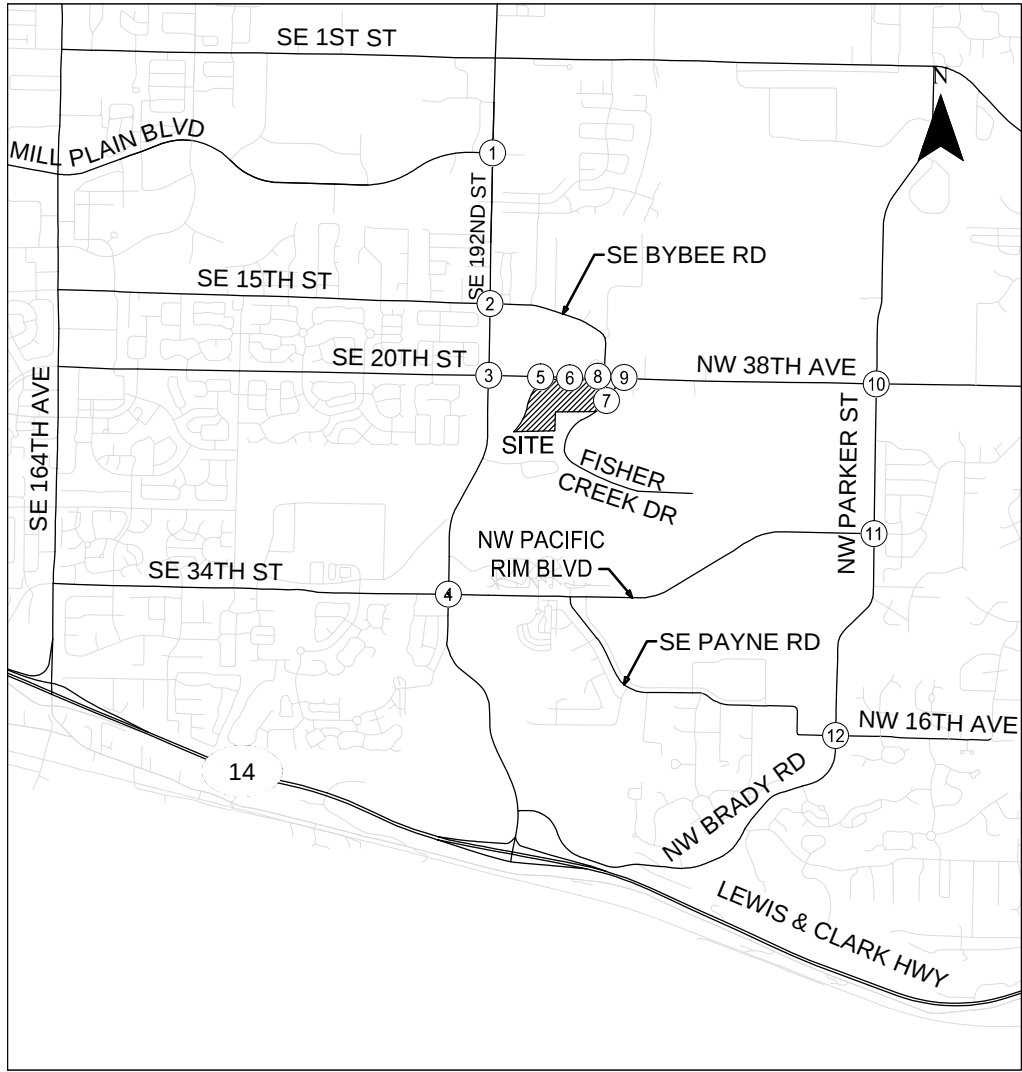


-  - STOP SIGN
-  - TRAFFIC SIGNAL

Existing Lane Configurations and Traffic Control Devices
Camas, Washington

Figure
3

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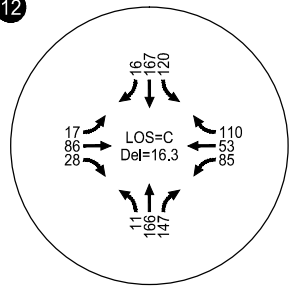
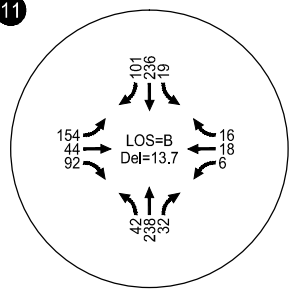
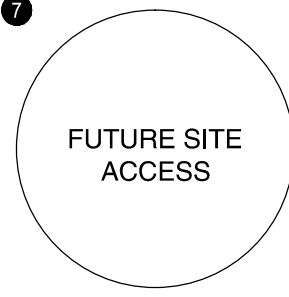
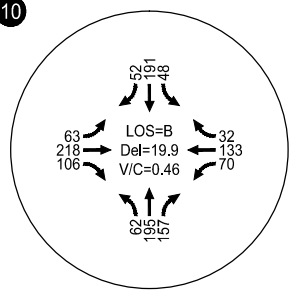
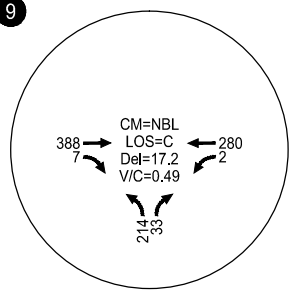
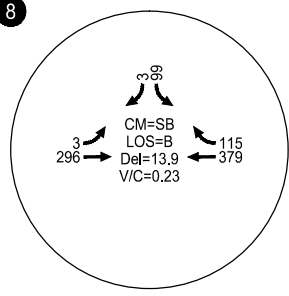
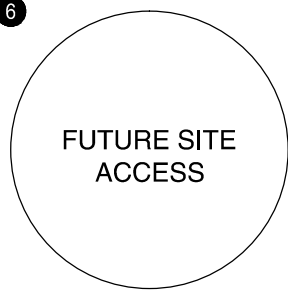
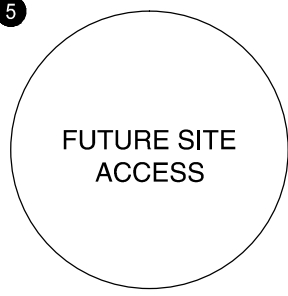
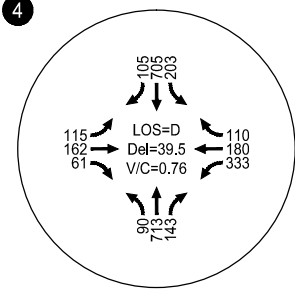
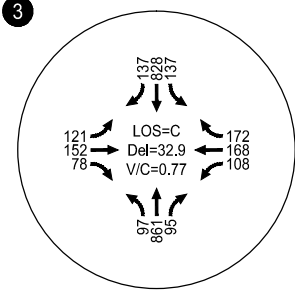
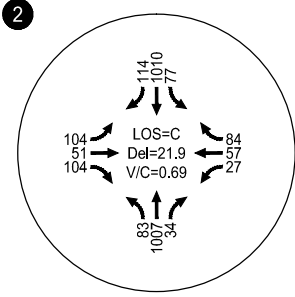
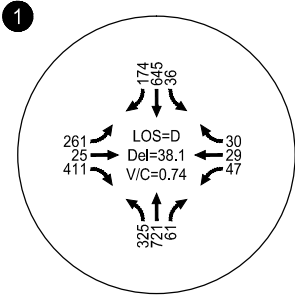
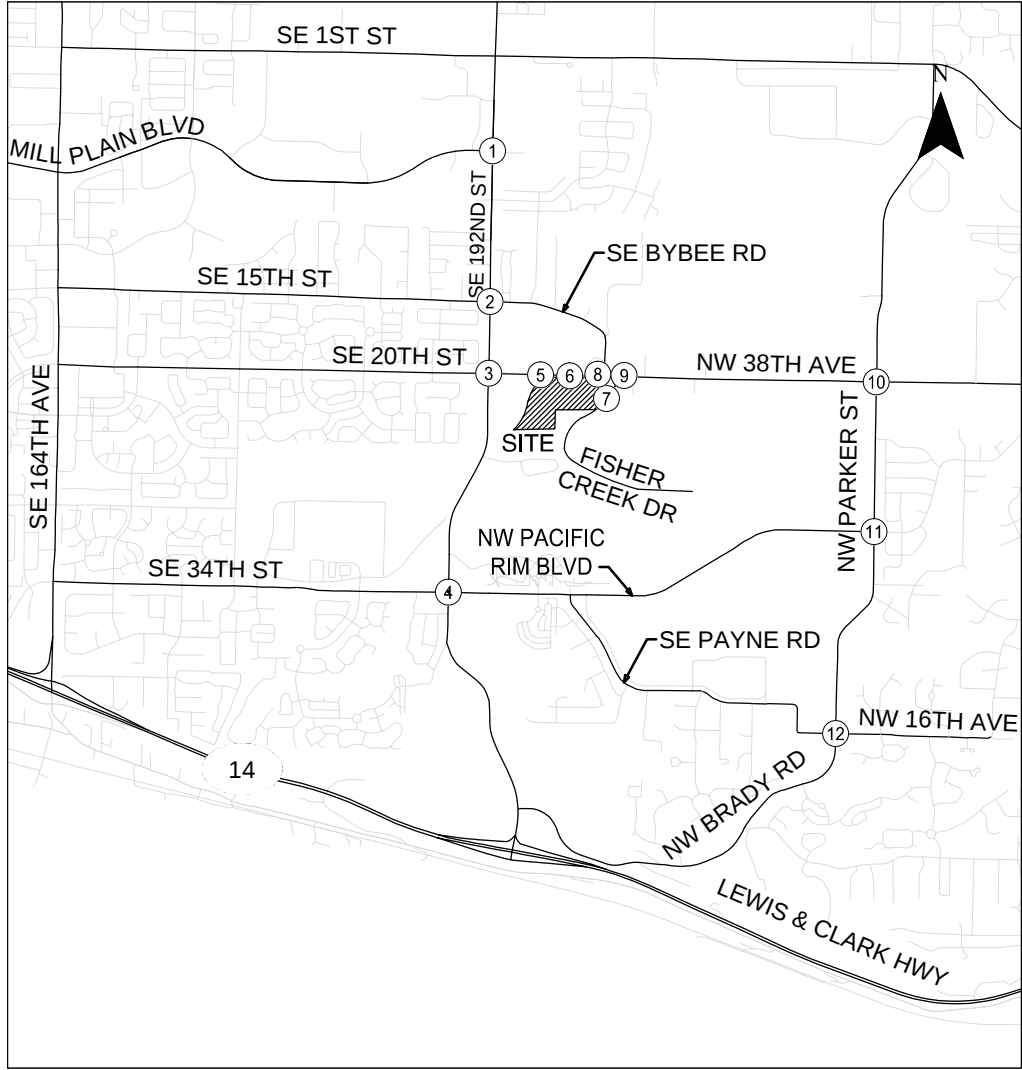


CM = CRITICAL MOVEMENT (UNSIGNALIZED)
LOS = CRITICAL MOVEMENT LEVEL OF SERVICE (SIGNALIZED)/CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)
Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED)/CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO

Existing Traffic Conditions
Weekday AM Peak Hour
Camas, Washington

Figure
4

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CM = CRITICAL MOVEMENT (UNSIGNALIZED)
LOS = CRITICAL MOVEMENT LEVEL OF SERVICE (SIGNALIZED)/CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)
Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED)/CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO

Existing Traffic Conditions
Weekday PM Peak Hour
Camas, Washington

Figure
5

TRAFFIC IMPACT ANALYSIS

The future conditions analysis identifies how the study intersections will operate in the proposed development completion year of 2021. The following elements were analyzed to account for the impacts of the proposed development:

- 2021 Scenario 1 Background traffic conditions (SE Bybee Road aligned at NW Fisher Creek Drive **without** the proposed development);
- 2021 Scenario 2 Background traffic conditions (SE Bybee Road aligned to the east **without** the proposed development);
- 2021 Scenario 1 Total Traffic Conditions (SE Bybee Road aligned at NW Fisher Creek drive **with** the proposed development); and
- 2021 Scenario 2 Total Traffic Conditions (SE Bybee Road aligned to the east **with** the proposed development).

Year 2021 Background Conditions

The background traffic analysis identifies how the study intersections will operate in the proposed project build year with traffic growth from in-process developments within the study area, but not including the trips associated with the proposed Grass Valley project. The City of Camas identified the following approved in-process developments in the site vicinity that would potentially add trips to the study intersections:

- | | |
|--|---|
| 1. NW 38 th Dental Office | 8. Lofts at Camas Meadows |
| 2. Belz Place Residential Development ² | 9. Parklands at Camas Meadows |
| 3. CJ Dens Residential Subdivision | 10. The Village at Camas Meadows |
| 4. Columbia Palisades Subdivision | 11. Kate's Woods Apartments |
| 5. Fisher Creek Campus Building 4 | 12. Dawson Ridge Subdivision |
| 6. Green Mountain Estates | 13. Camas Crossing Development |
| 7. Green Mountain Master Plan ³ | 14. Camas School District – Sharp Drive |

Given the traffic volumes from multiple in-process developments and per direction from City of Camas engineering staff, no additional regional background growth rate was applied at City of Camas intersections. A two percent annual growth rate plus the identified in-process trips were applied along the SE 192nd Avenue corridor per the *City of Vancouver Traffic Study Guidelines. Appendix "E" includes the estimated in-process volumes.*

² The Belz Place Development is 50 percent complete. Traffic forecasts have been adjusted accordingly.

³ The Green Mountain Master Plan is five percent complete. Traffic forecasts have been adjusted accordingly.

Future Roadway Network Changes

The capital improvement programs for both the cities of Camas and Vancouver were reviewed to determine if any of the study area roadways or intersections are targeted for capacity enhancements. The SE Bybee Road realignment to the NW Fisher Creek Drive signal is listed on the City's 6-year street plan and Capital Facilities Plan. However, the Camas Crossing development proposes to shift the realignment to SE 202nd Avenue or another point further east through the Master Plan/Development Agreement process as previously described.

As the location of SE Bybee Road's connection with NW 38th Avenue is still being determined, two background scenarios were considered. Minor changes in the in-process trip assignments are expected between Scenario 1 (SE Bybee Road aligned at NW Fisher Creek Drive) and Scenario 2 (SE Bybee Road aligned to the east).

In addition, under both scenarios the NW 16th Avenue/NW Brady Road intersection will be signalized in conjunction with another in-process development. Figures 6 and 7 show the anticipated lane configurations and traffic control devices for Scenarios 1 and 2, respectively.

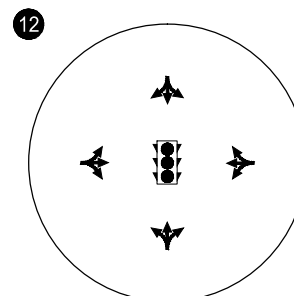
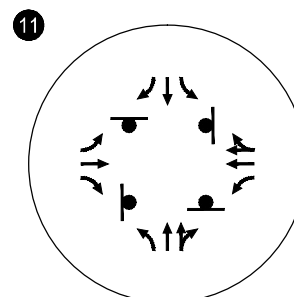
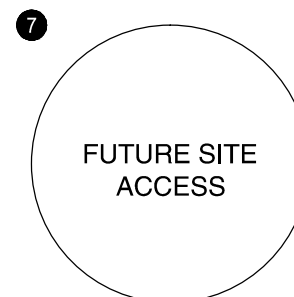
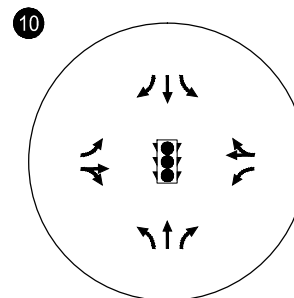
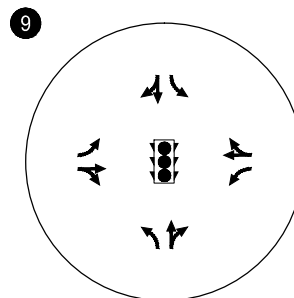
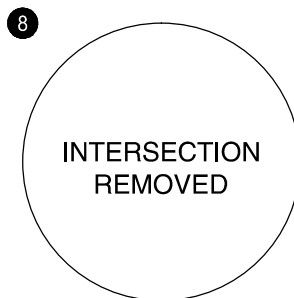
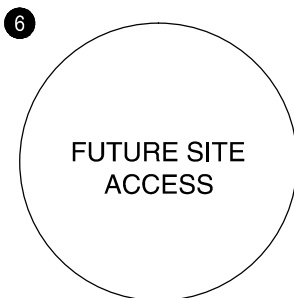
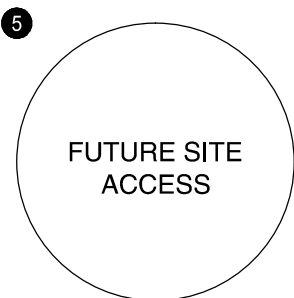
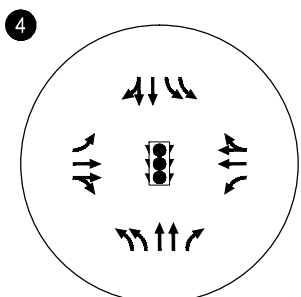
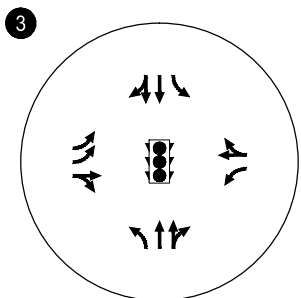
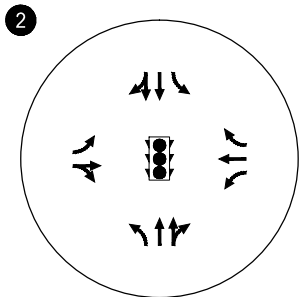
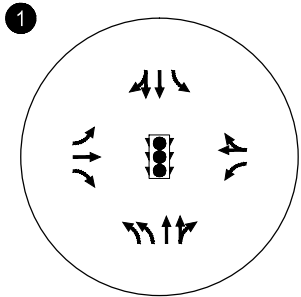
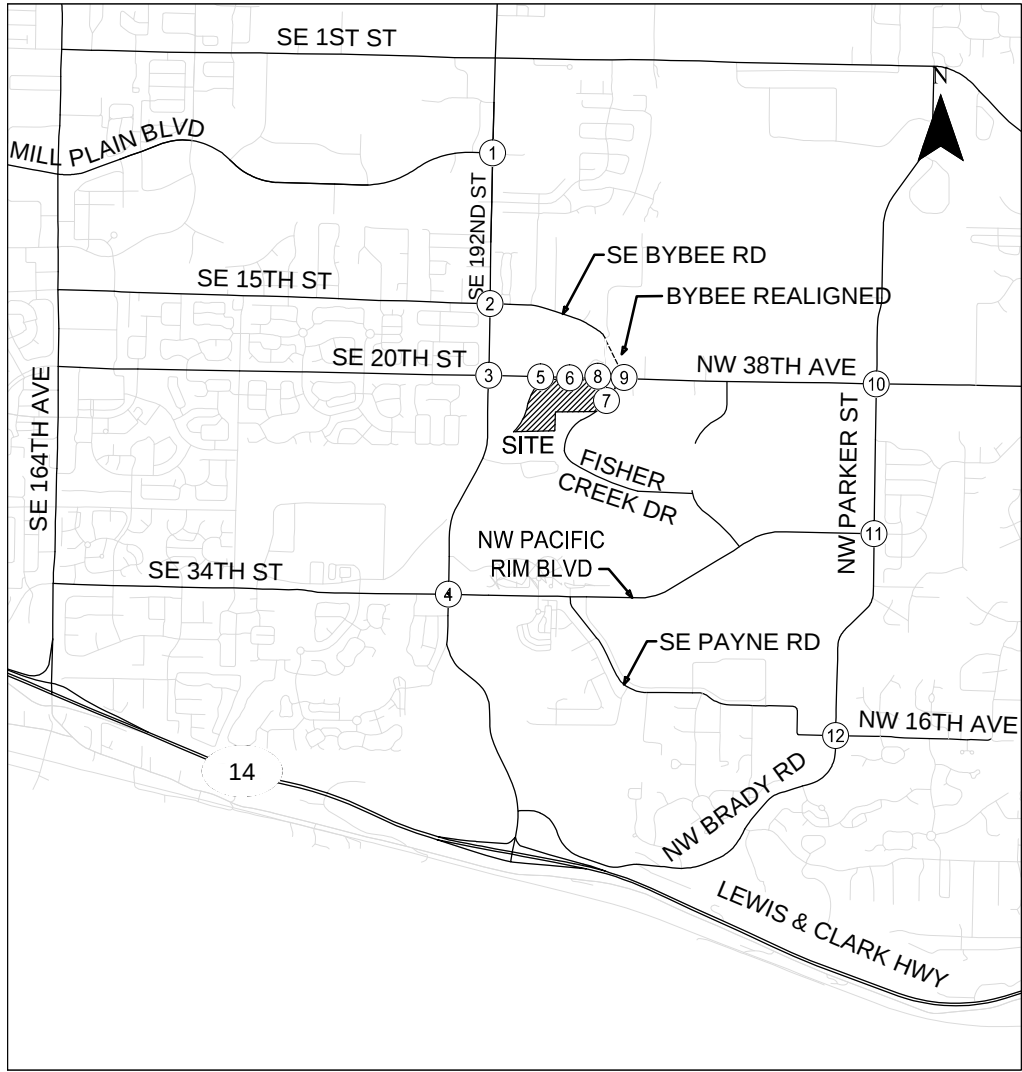
Scenario 1 (SE Bybee Road aligned at NW Fisher Creek Drive) Background Traffic Conditions

Figures 8 and 9 show the projected 2021 background traffic volumes and operations for the study intersections during the weekday a.m. and p.m. peak hours, respectively. As shown in the figures, all intersections are expected to continue operating acceptably and satisfy the jurisdictional standards of the governing agency. *Appendix "F" includes the 2021 background traffic analysis worksheets.*

Scenario 2 (SE Bybee Road aligned to the east) Background Traffic Conditions

Figures 10 and 11 show the projected 2021 background traffic volumes and operations for the study intersections during the weekday a.m. and p.m. peak hours under Scenario 2. As shown in the figures, the SE 20th Street/SE 192nd Avenue intersection is projected to operate over-capacity and at LOS F during the weekday p.m. peak hour, exceeding City of Vancouver standards. All other intersections are projected to continue operating acceptably and satisfy the jurisdictional standards of the governing agency. *Appendix "F" includes the 2021 background traffic analysis worksheets.*

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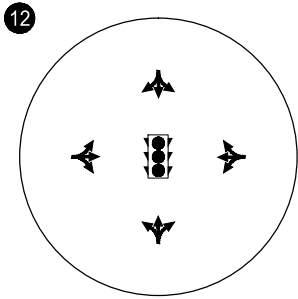
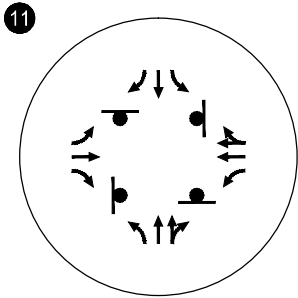
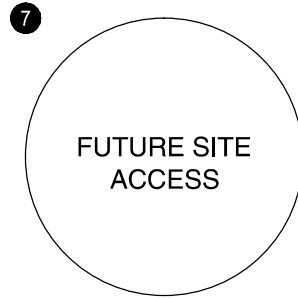
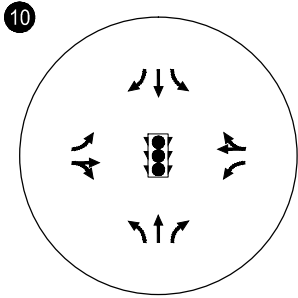
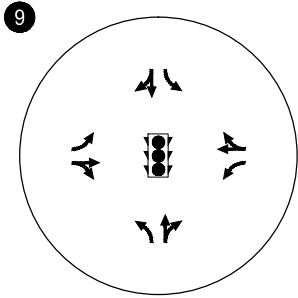
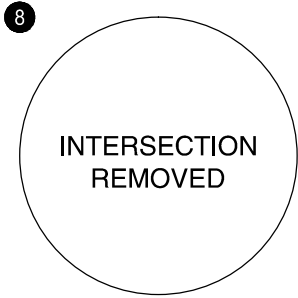
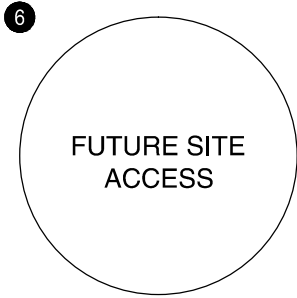
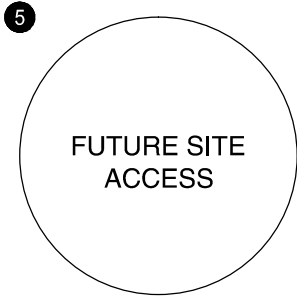
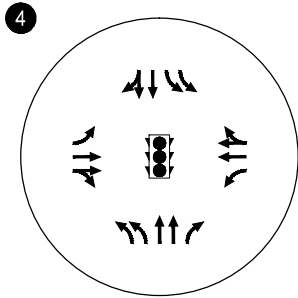
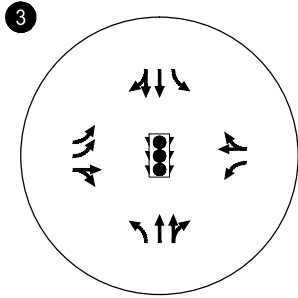
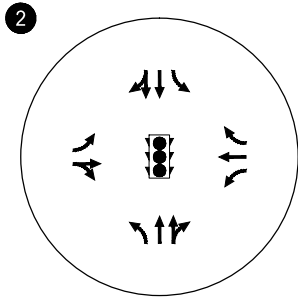
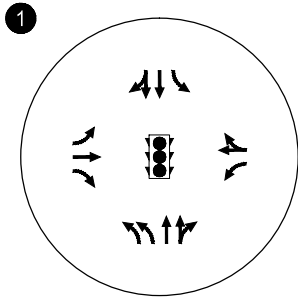
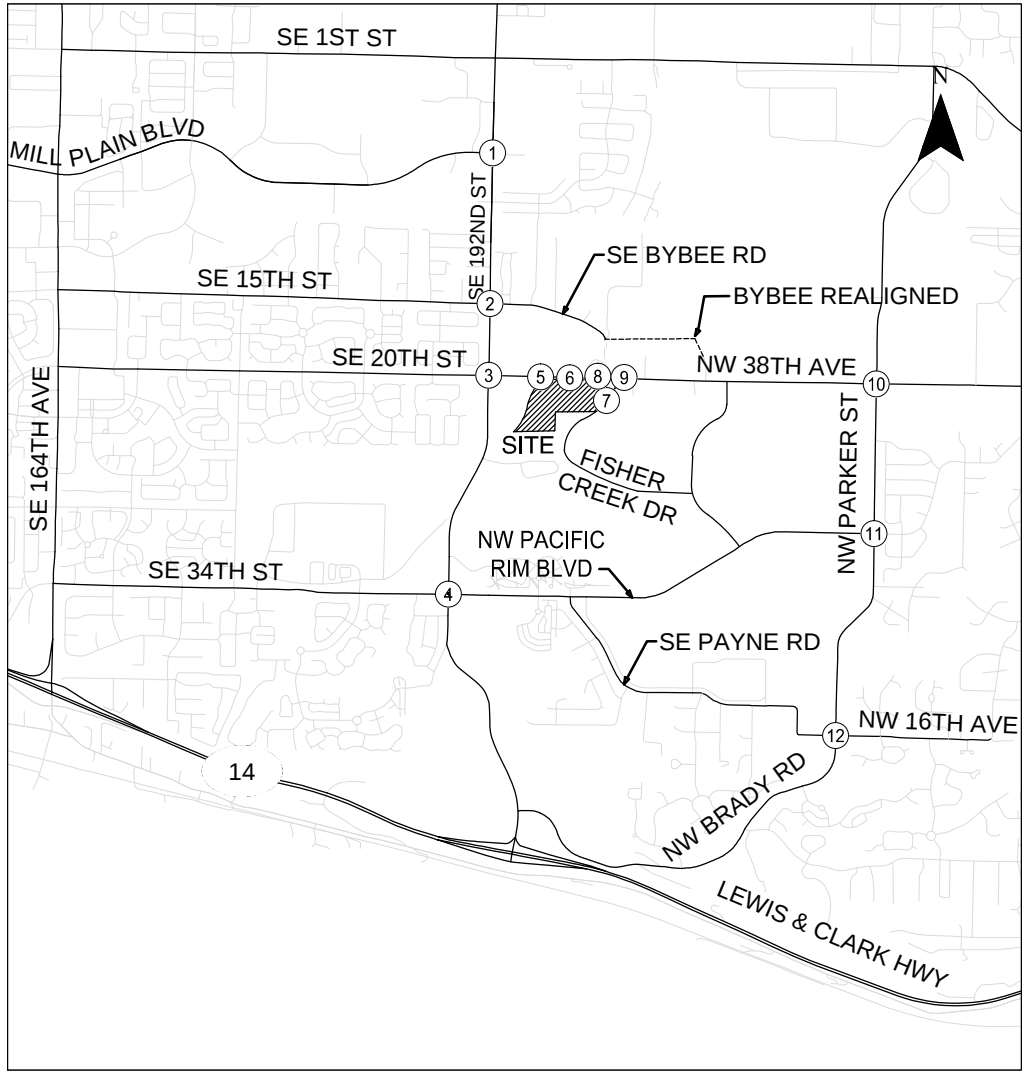


- STOP SIGN
- TRAFFIC SIGNAL

Scenario 1
Future Lane Configurations & Traffic Control Devices
Camas, Washington

Figure
6

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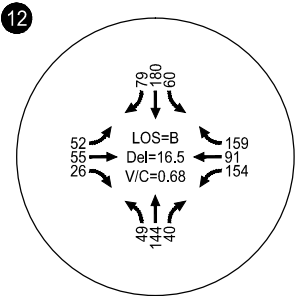
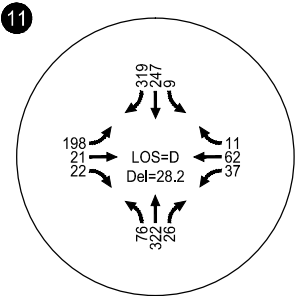
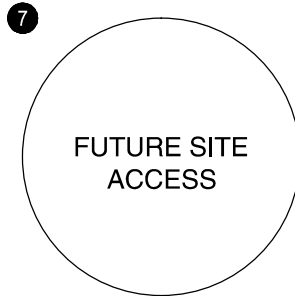
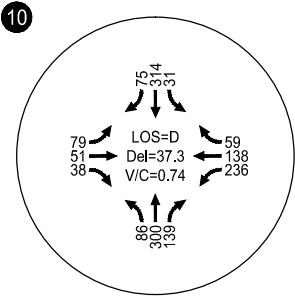
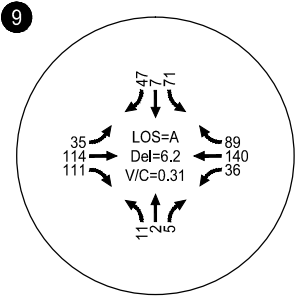
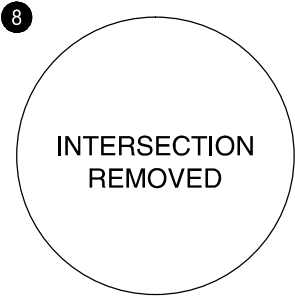
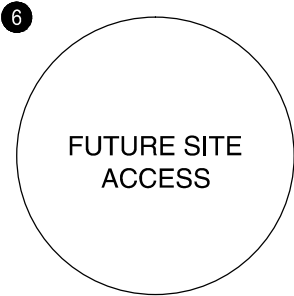
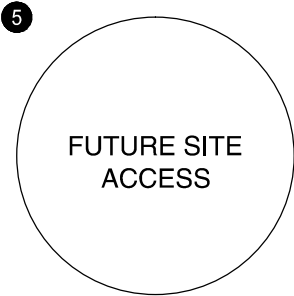
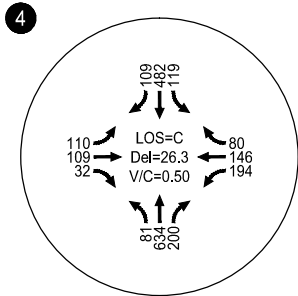
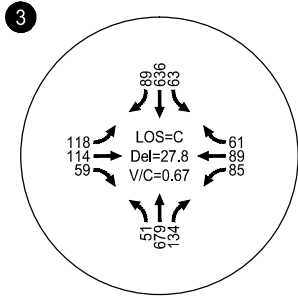
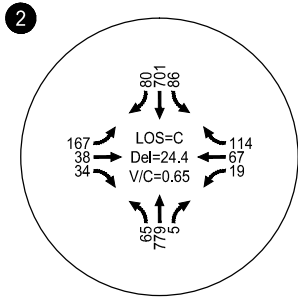
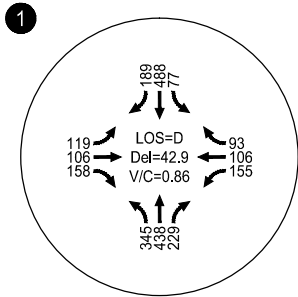
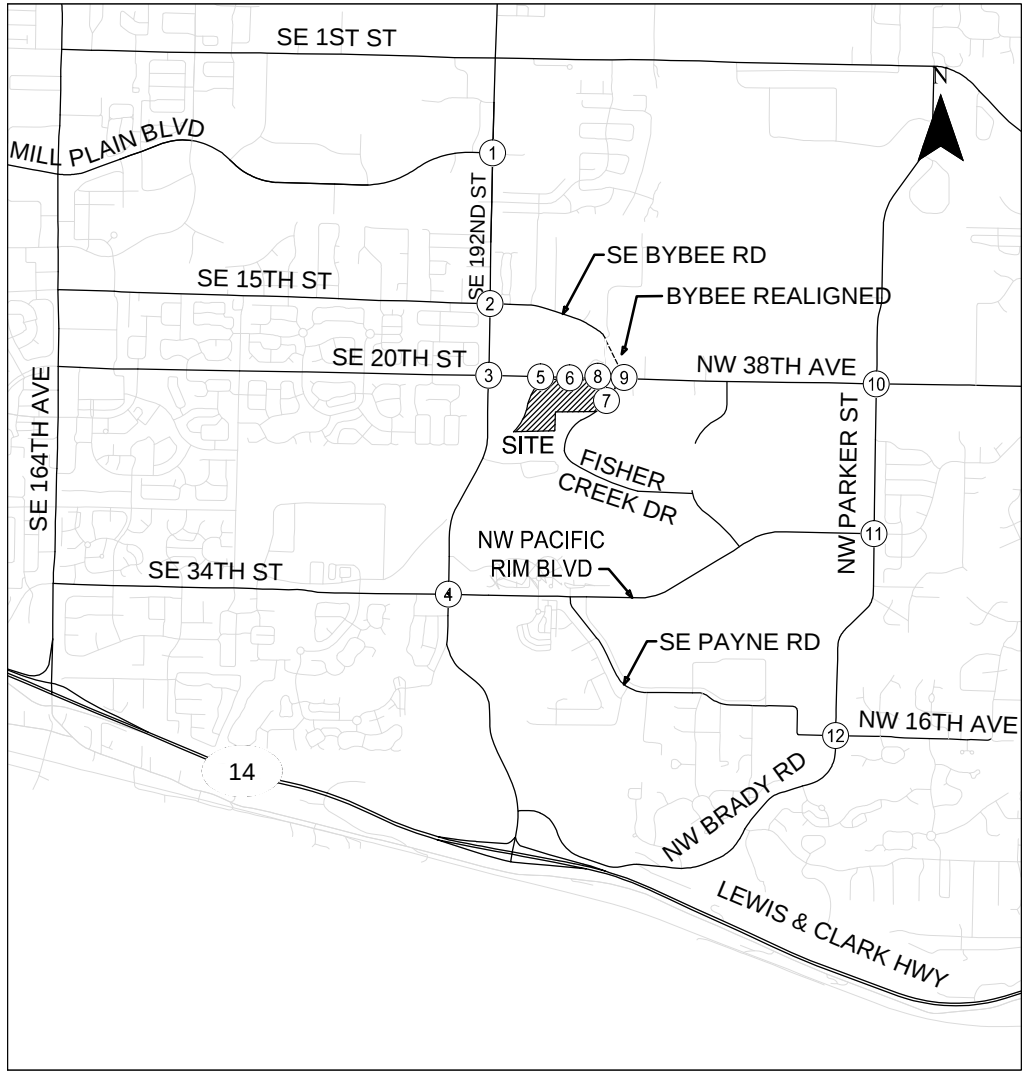


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Scenario 2
Future Lane Configurations & Traffic Control Devices
Camas, Washington

Figure
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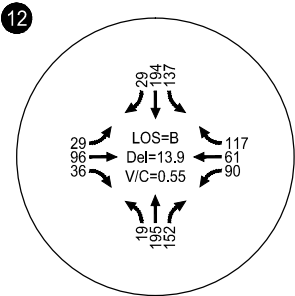
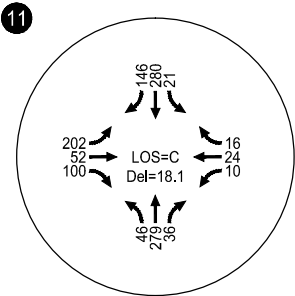
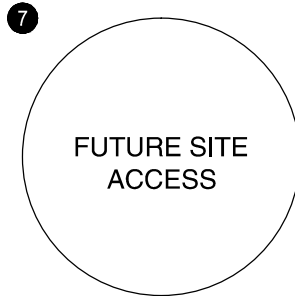
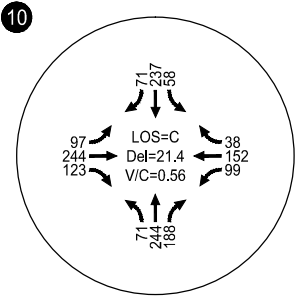
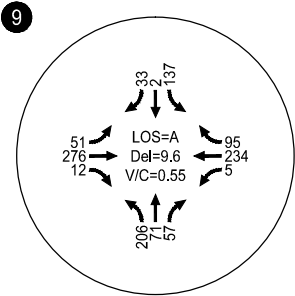
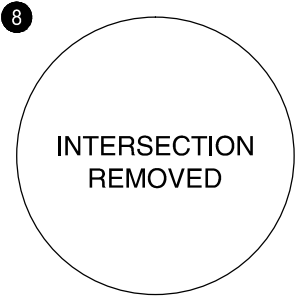
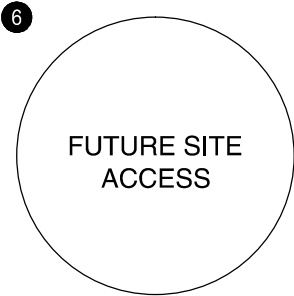
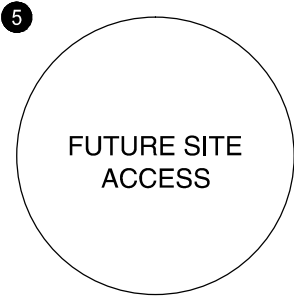
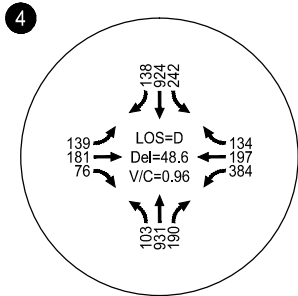
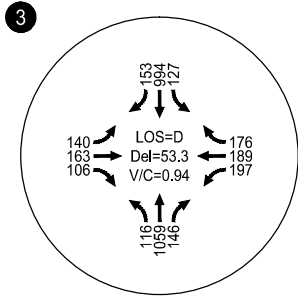
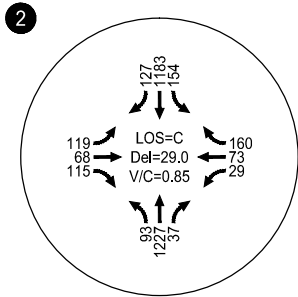
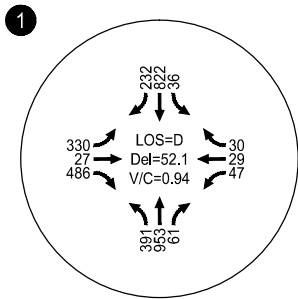
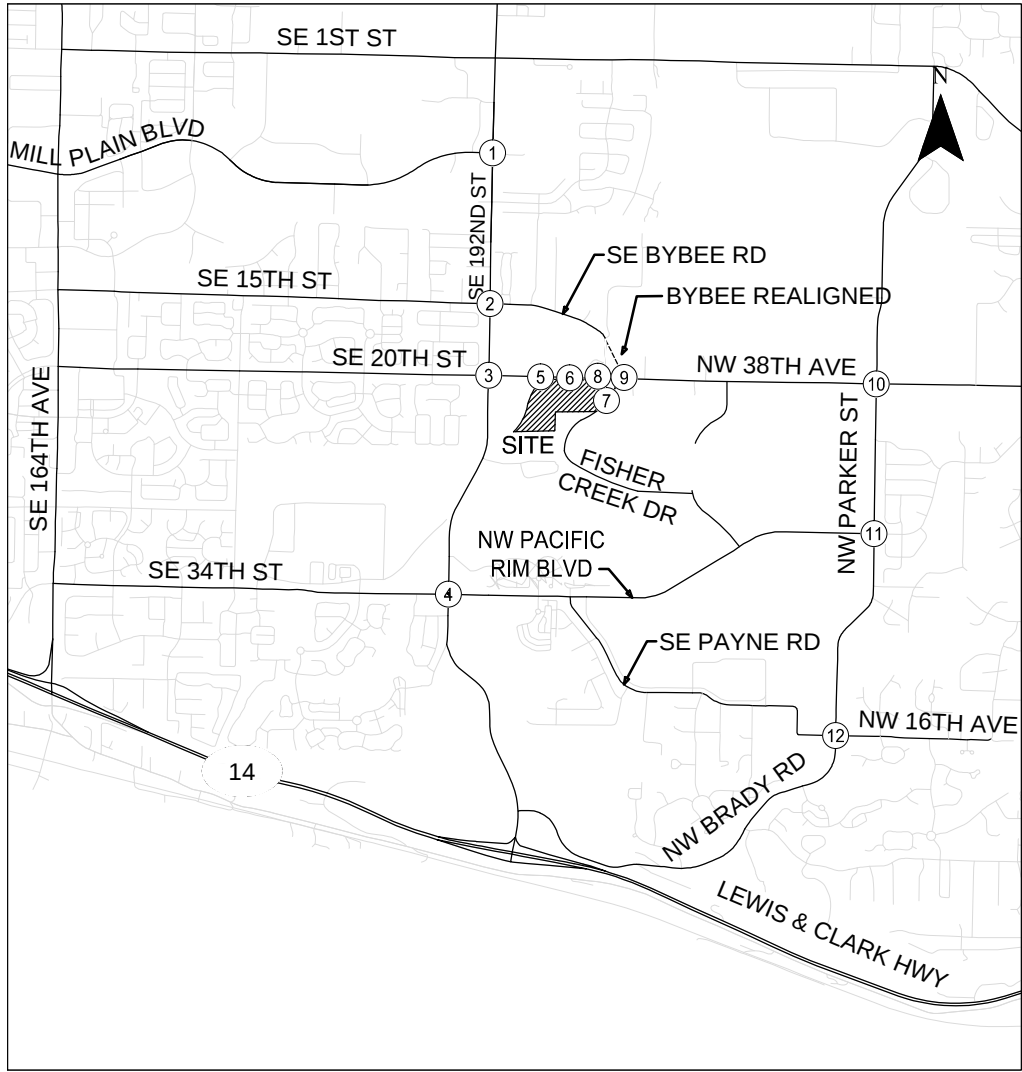


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Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED)/CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO

Scenario 1 2021 Background Traffic Conditions
Weekday AM Peak Hour
Camas, Washington

Figure
8

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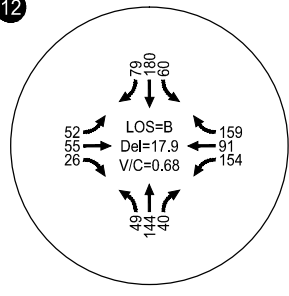
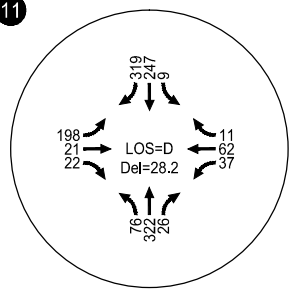
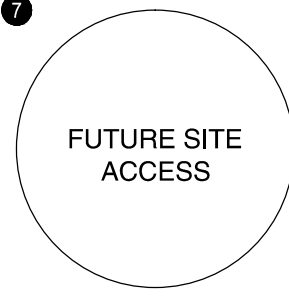
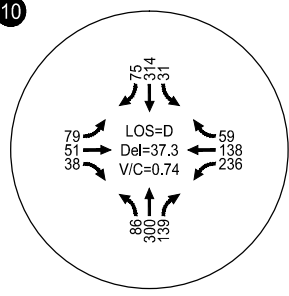
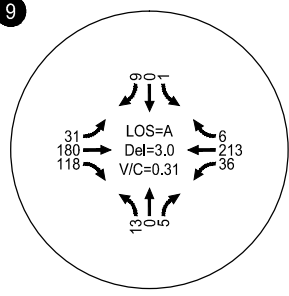
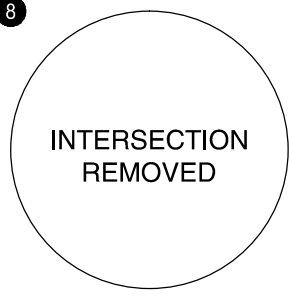
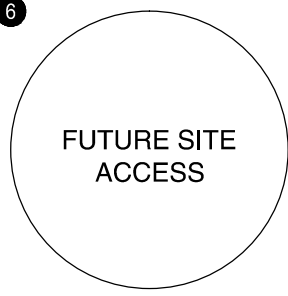
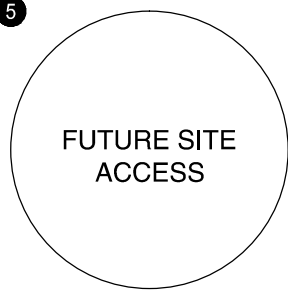
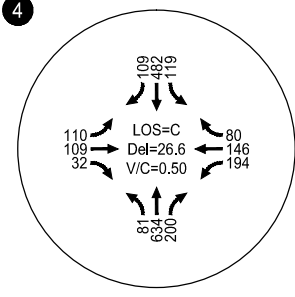
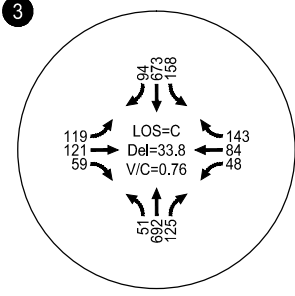
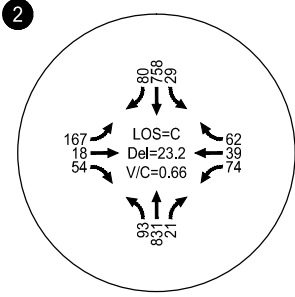
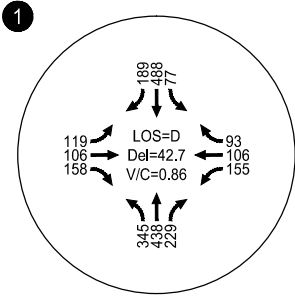
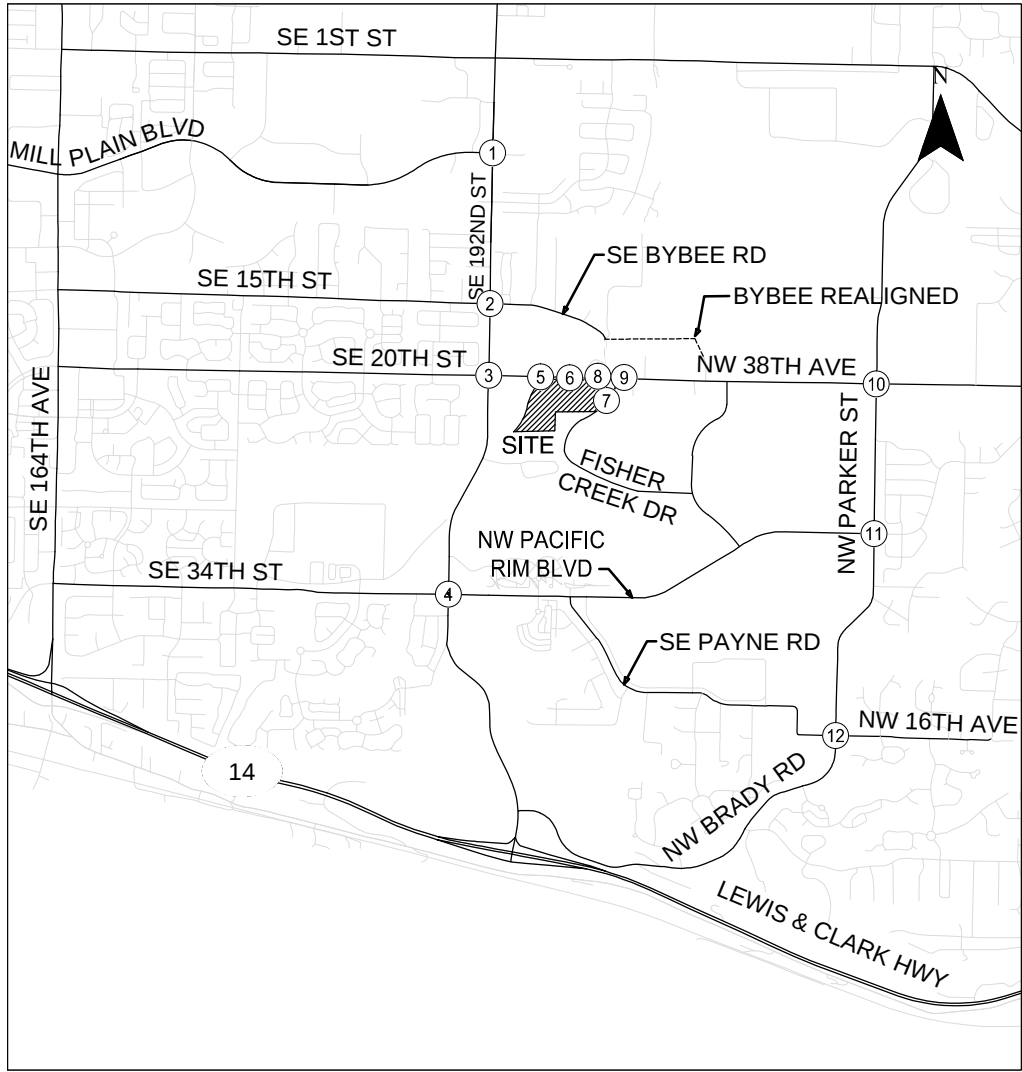


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(SIGNALIZED)/CRITICAL MOVEMENT CONTROL
DELAY (UNSIGNALIZED)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO

Scenario 1 2021 Background Traffic Conditions
Weekday PM Peak Hour
Camas, Washington

Figure
9

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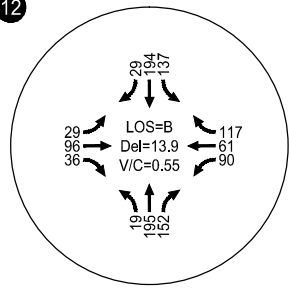
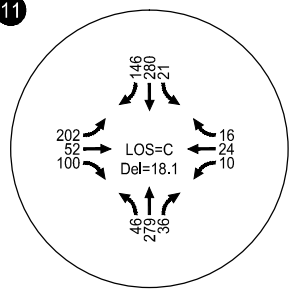
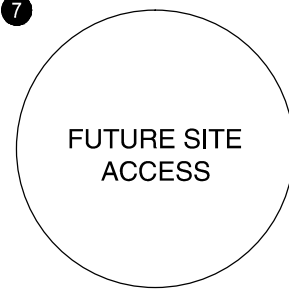
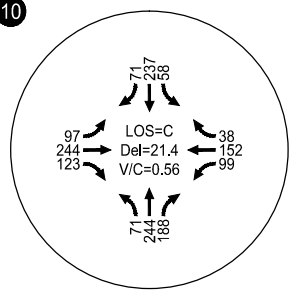
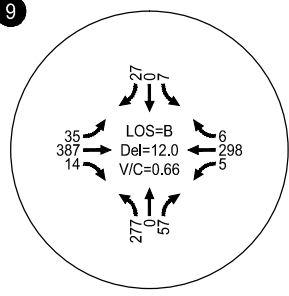
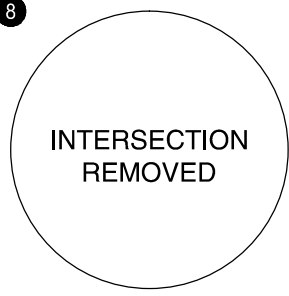
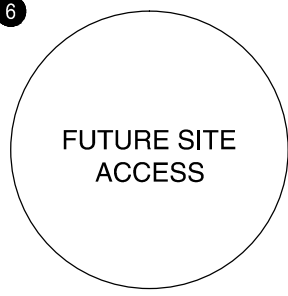
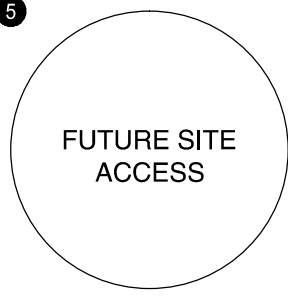
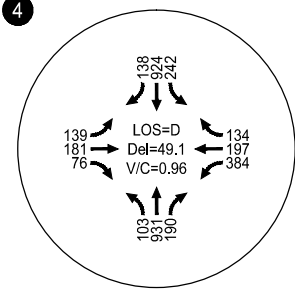
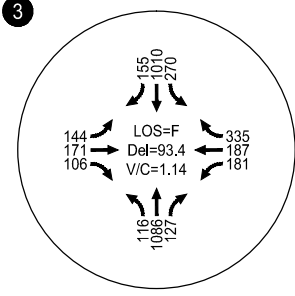
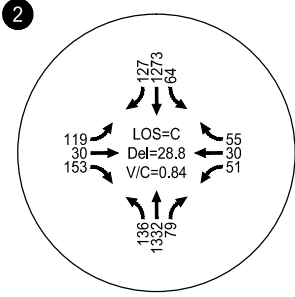
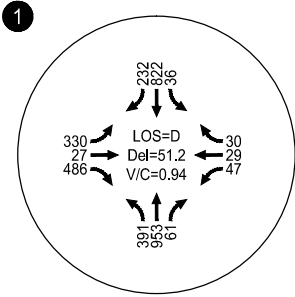
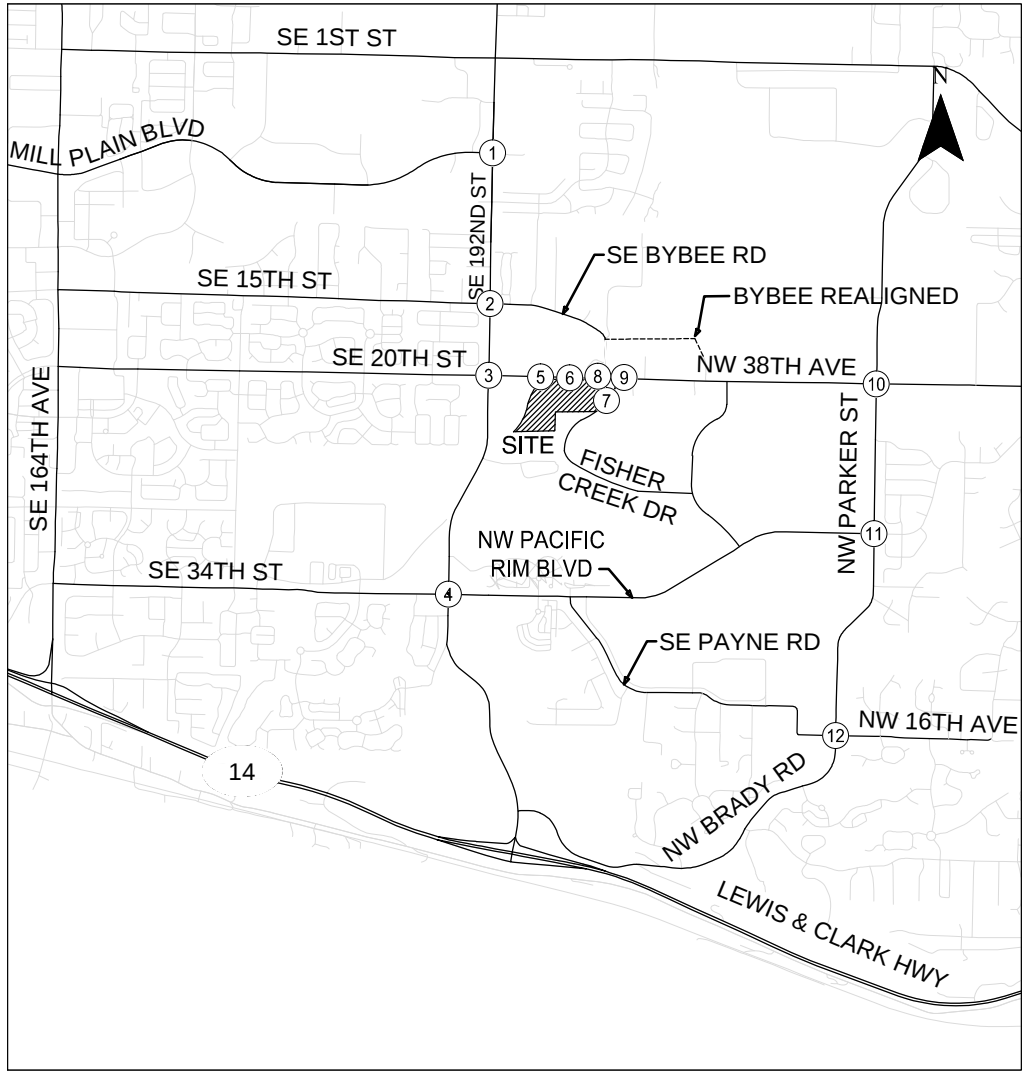


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V/C = CRITICAL VOLUME-TO-CAPACITY RATIO

Scenario 2 2021 Background Traffic Conditions
Weekday AM Peak Hour
Camas, Washington

Figure
10

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LOS = CRITICAL MOVEMENT LEVEL OF SERVICE (SIGNALIZED)/CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)
Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED)/CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO

Scenario 2 2021 Background Traffic Conditions
Weekday PM Peak Hour
Camas, Washington

Figure
11

Proposed Development Plan

The applicant proposes to construct a mixed-use development consisting of up to 276 apartment units, 100,000 square feet of corporate headquarters, 150,000 square feet of general office, and 20,000 square feet of retail split evenly between restaurant and grocery. Access to the development is proposed via two unsignalized driveways on NW 38th Avenue and two unsignalized driveways on NW Fisher Creek Drive south of NW 38th Avenue (and north of the gated entry to the Fisher Investments Campus). The location of the western driveway on NW 38th Avenue is being coordinated with the neighboring Camas Crossing development to align the site driveways.

Other planned transportation improvements associated with the proposed development include a sidewalk along the site frontage on the west side of NW Fisher Creek Drive and a southbound right turn lane into the site at the unsignalized driveway on NW Fisher Creek Drive. Full occupancy of the development is expected to occur by 2021.

Trip Generation

Estimates of average weekday a.m. and p.m. peak hour vehicle trip ends were obtained from the standard reference manual, *Trip Generation, 9th Edition*, published by the Institute of Transportation Engineers (Reference 2). Pass-by rates were developed based on guidance in *Trip Generation Handbook, 3rd Edition* (Reference 3), and trip internalization rates between uses were developed based on guidance in *Trip Generation Handbook, 2nd Edition* (Reference 4) for daily trips, and NCHRP Report 684 (Reference 5) for peak hour trips. *Appendix "G" includes the OTISS Traffic software trip internalization calculations.* Table 3 summarizes the trip generation for the proposed development.

Table 3: Site Trip Generation Estimate

Land Use Category	ITE Code	Size	Units	Total Daily Trips	Weekday AM Peak Hour			Weekday PM Peak Hour		
					Total	In	Out	Total	In	Out
Residential Apartments	220	276	DU	1,835	141	28	113	171	111	60
Less Internal Trips				-254	-17	-2	-15	-38	-23	-15
Corporate Headquarters Building	714	100,000	Sq. Ft.	798	152	141	11	141	14	127
General Office Building	710	150,000	Sq. Ft.	1,654	234	206	28	224	38	186
Less Internal Trips				-124	-40	-21	-19	-12	-2	-10
High-Turnover (Sit-Down) Restaurant	932	10,000	Sq. Ft.	1,272	108	59	49	99	59	40
Less Internal Trips				-455	-45	-27	-18	-47	-24	-23
Less Pass-By Trips (21% Daily and AM peak, 43% PM peak)				-172	-12	-6	-6	-22	-11	-11
Supermarket	850	10,000	Sq. Ft.	1,022	34	21	13	95	48	47
Less Internal Trips				-433	-16	-9	-7	-51	-25	-26
Less Pass-By Trips (18% Daily and AM peak, 36% PM peak)				-106	-4	-2	-2	-38	-19	-19
Total Trips				6,581	669	455	214	730	270	460
Less Internal Trips				-1,266	-118	-59	-59	-148	-74	-74
Less Pass-by Trips				-278	-16	-8	-8	-60	-30	-30
Net New Primary Trips				5,037	535	388	147	522	166	356

Trip Distribution

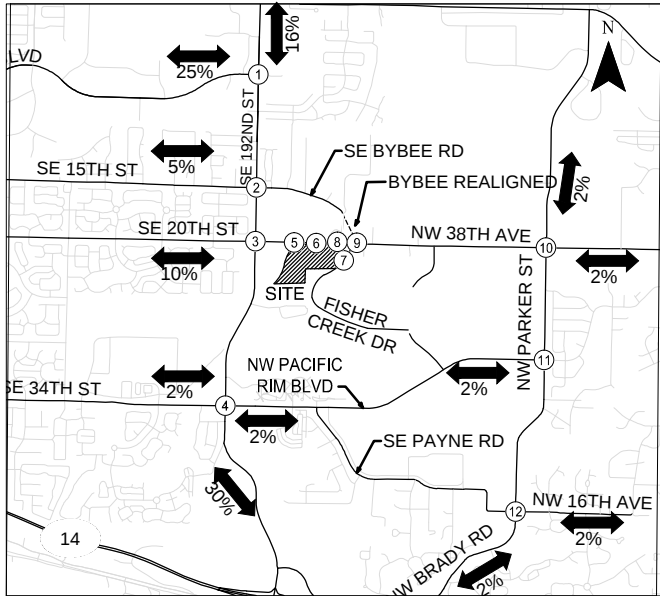
The distribution of site-generated trips onto the study area roadway system was estimated based on a review of surrounding roadway characteristics, existing uses, the 2035 travel demand model maintained by the Southwest Washington Regional Transportation Council (RTC) (select zone analysis of TAZ #651), and other trip distribution patterns used for similar projects in the area.

Three distinct distribution patterns were employed in the analysis (one each for residential, office, and retail uses) recognizing trips associated with each of the land uses will have different travel patterns. For example, some retail trips are likely to be made from employees of existing businesses and homes in the immediate site vicinity given the project location whereas residential trips are likely to travel further to and from the site. Further, the market area for retail uses will be limited to the west where there are multiple competing uses while there is little retail service provided east of the site. Figures 12 and 13 illustrate the three estimated trip distribution patterns.

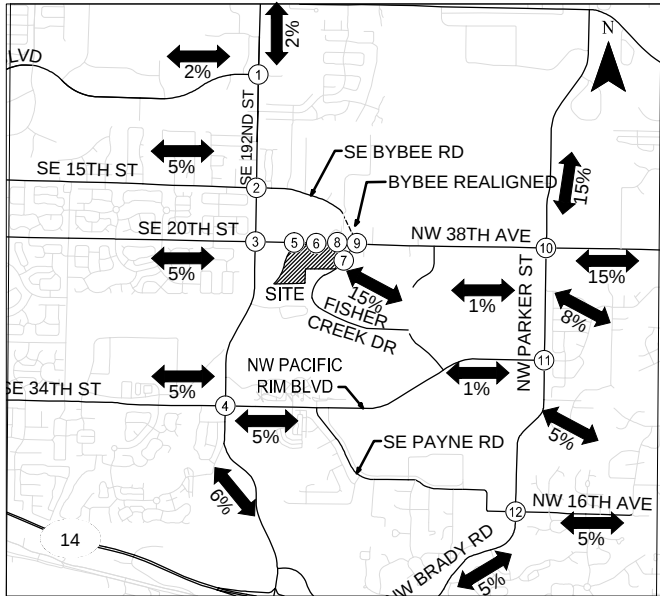
Trip Assignment

The weekday a.m. and p.m. peak hour site trips shown in Table 3 were assigned to the roadway network based on the trip distribution patterns shown in Figures 12 and 13. Figures 12 and 13 also show the a.m. and p.m. peak hour primary trip assignments for site development under Scenario 1. Figures 14 and 15 show the a.m. and p.m. peak hour pass-by trip assignments. New trip assignments under Scenario 2 are shown on Figures 16 and 17 (site pass-by trip assignment remains the same under Scenarios 1 and 2).

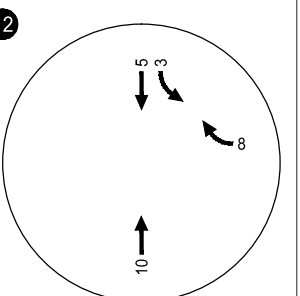
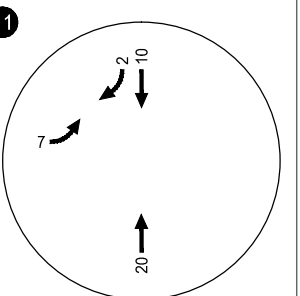
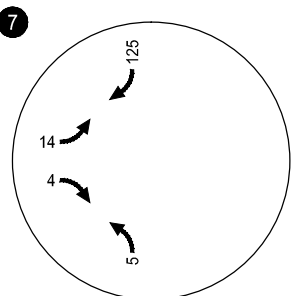
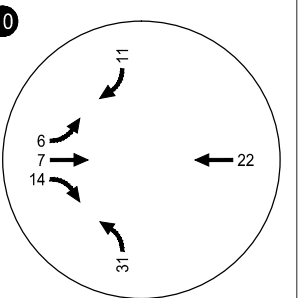
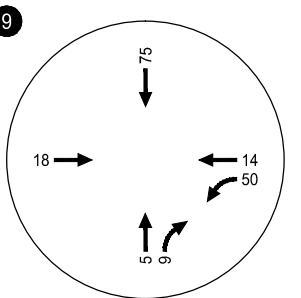
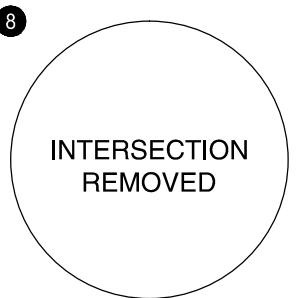
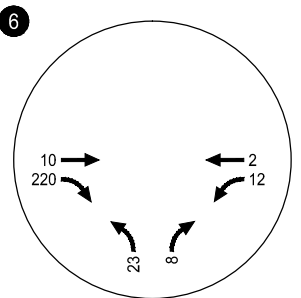
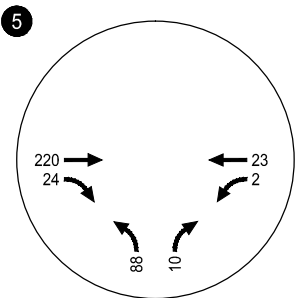
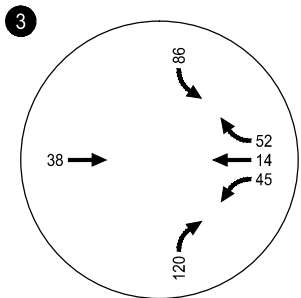
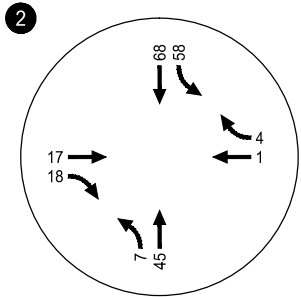
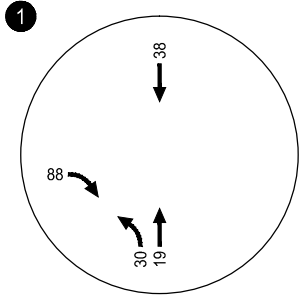
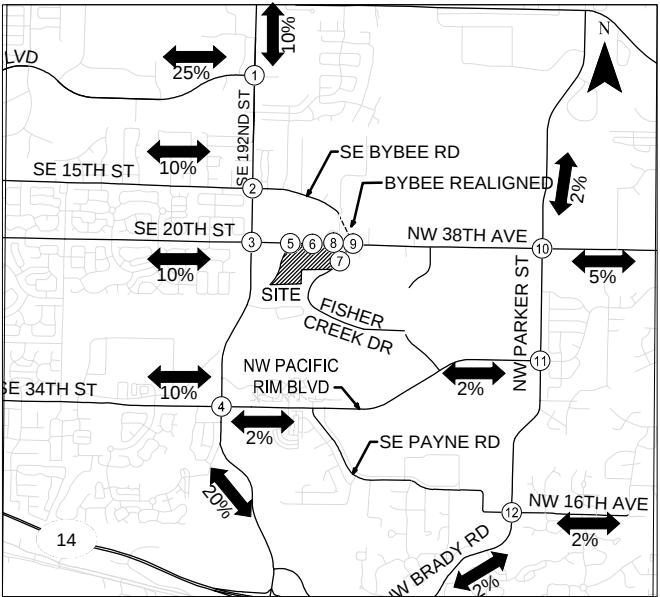
Residential Distribution



Retail Distribution



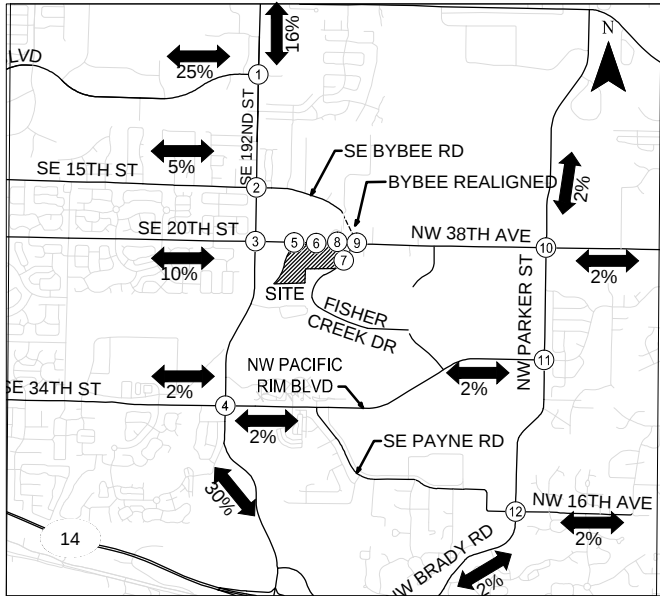
Office Distribution



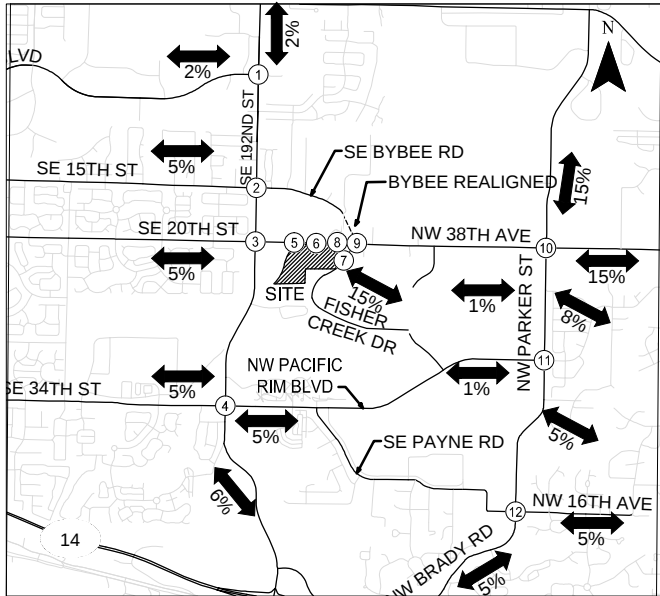
Scenario 1 Trip Distribution & Assignment
Weekday AM Peak Hour
Camas, Washington

Figure
12

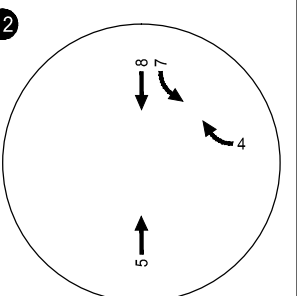
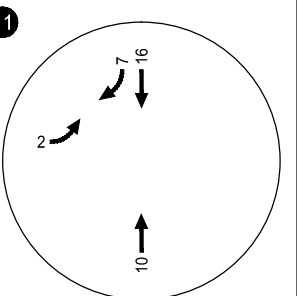
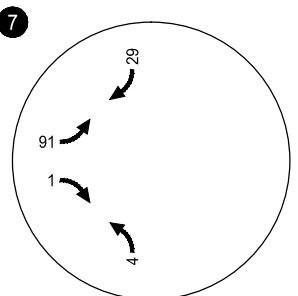
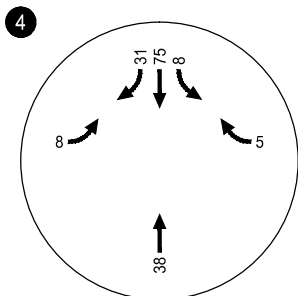
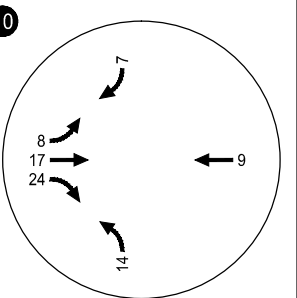
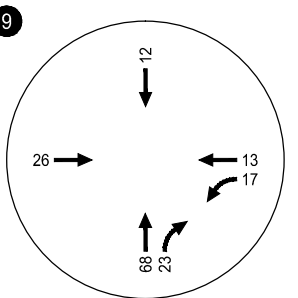
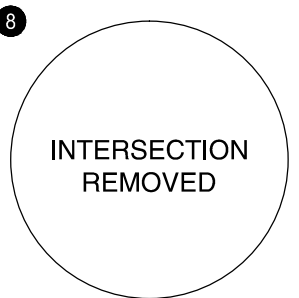
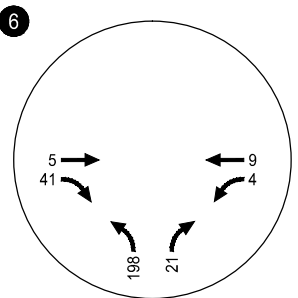
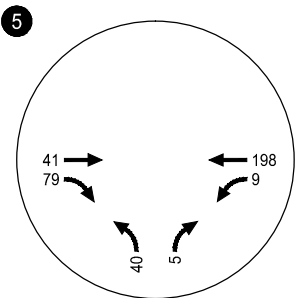
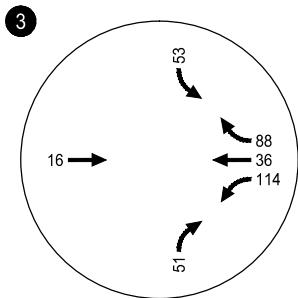
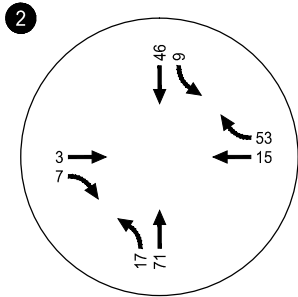
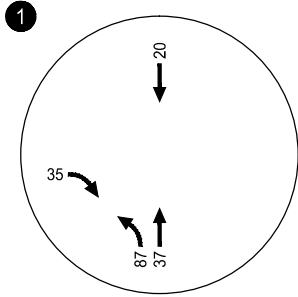
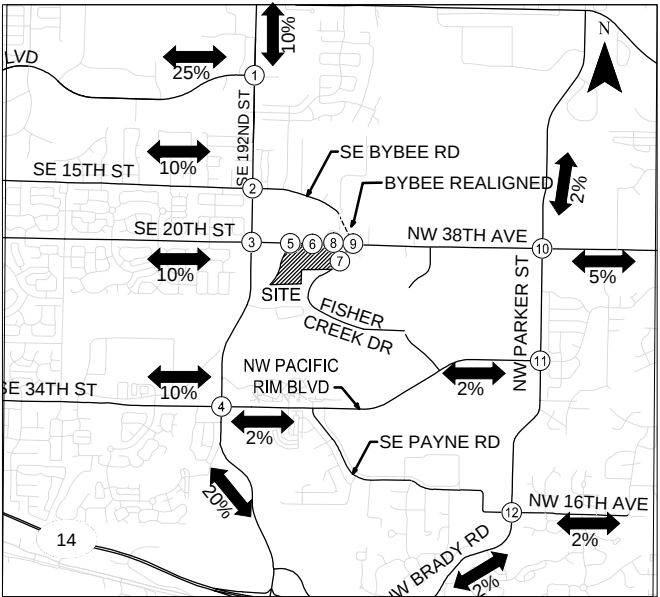
Residential Distribution



Retail Distribution



Office Distribution



Scenario 1 Trip Distribution & Assignment
Weekday PM Peak Hour
Camas, Washington

Figure
13

The map shows the proposed site (shaded area) located near the intersection of SE 20th St and NW 38th Ave. Major roads and traffic volumes are indicated:

- SE 192nd St: 16% (northbound), 25% (southbound)
- SE 15th St: 5% (eastbound)
- SE 20th St: 10% (westbound)
- SE 34th St: 2% (westbound)
- NW 38th Ave: 2% (eastbound)
- NW Parker St: 2% (westbound)
- NW Pacific Rim Blvd: 2% (westbound)
- SE Payne Rd: 2% (westbound)
- NW 16th Ave: 2% (westbound)
- NW Brady Rd: 2% (westbound)
- NW 14th St: 30% (northbound)

Other roads shown include SE Bybee Rd, Fisher Creek Dr, and NW 14th St. A north arrow is located in the top right corner.

The map shows the proposed site (shaded area) located near the intersection of SE 20th St and NW Pacific Rim Blvd. Major roads and traffic volumes are as follows:

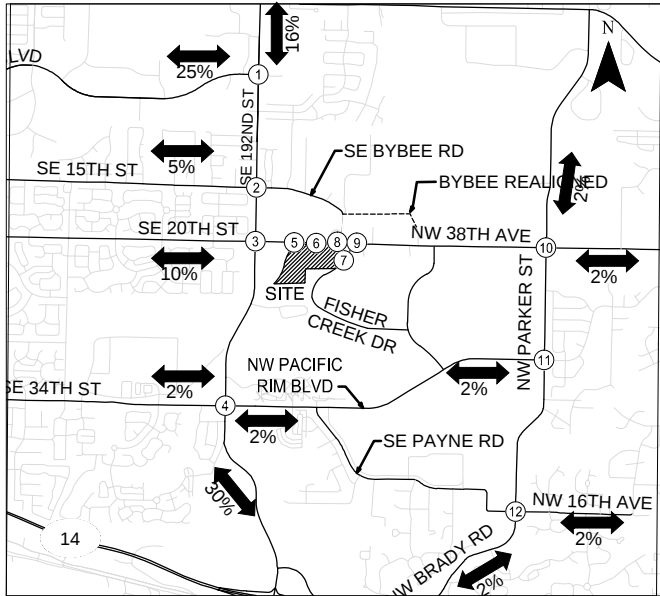
- SE 15th St: 2% (left), 2% (right)
- SE 20th St: 5% (left), 5% (right)
- SE 34th St: 5% (left), 6% (right)
- NW Pacific Rim Blvd: 5% (left), 15% (right)
- NW 38th Ave: 1% (left), 1% (right)
- NW 16th Ave: 5% (left), 5% (right)
- NW Parker St: 8% (left), 15% (right)
- NW Brady Rd: 5% (left)
- SE Bybee Rd: 1% (left)
- SE Payne Rd: 1% (left)
- SE Fisher Creek Dr: 1% (left)

A north arrow is located in the upper right corner of the map.

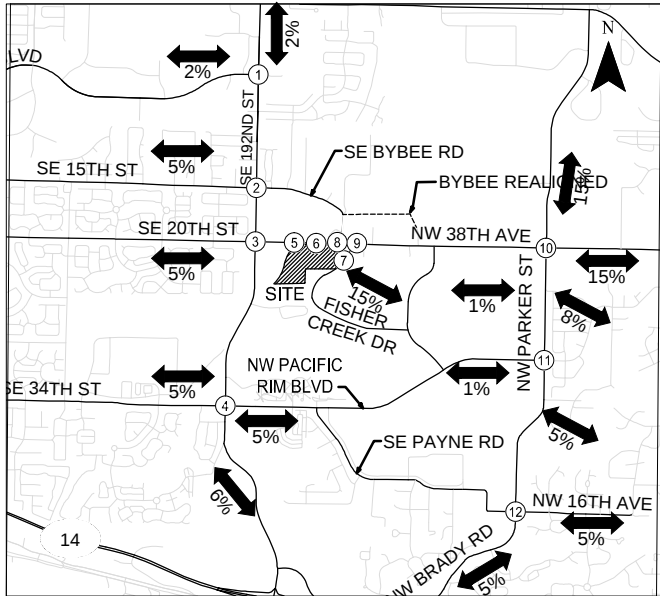
Figure
14

Figure
15

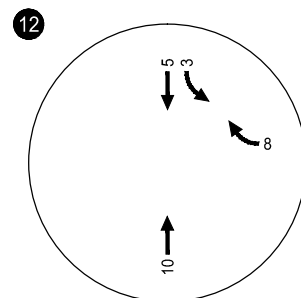
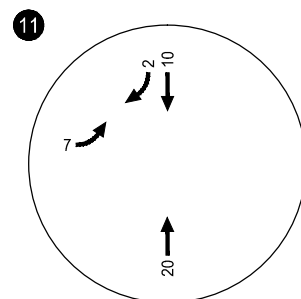
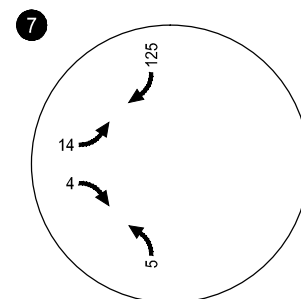
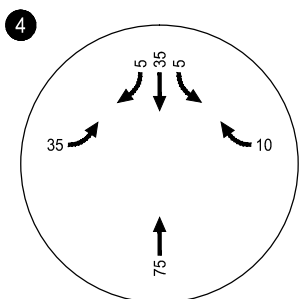
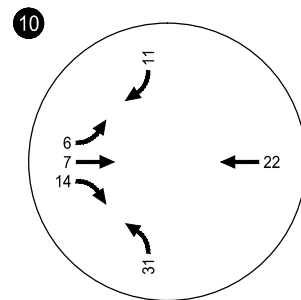
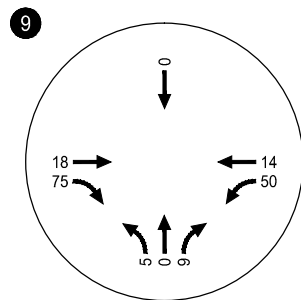
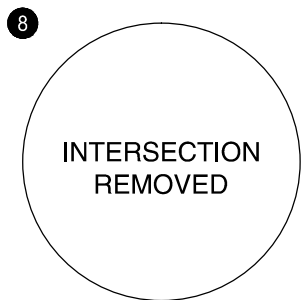
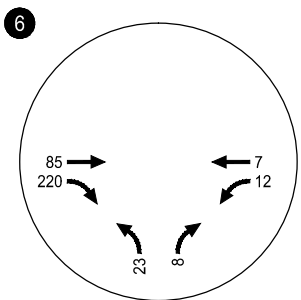
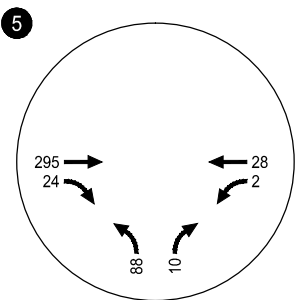
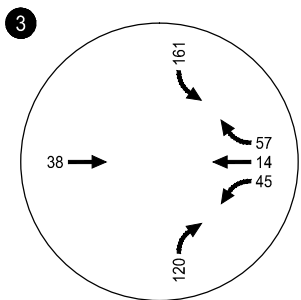
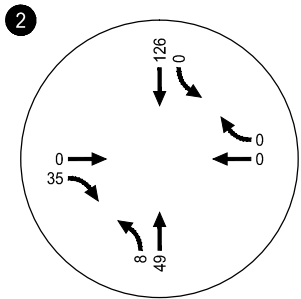
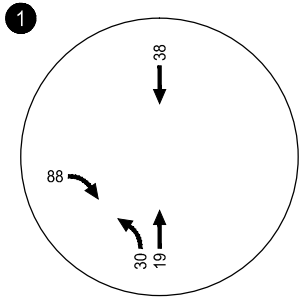
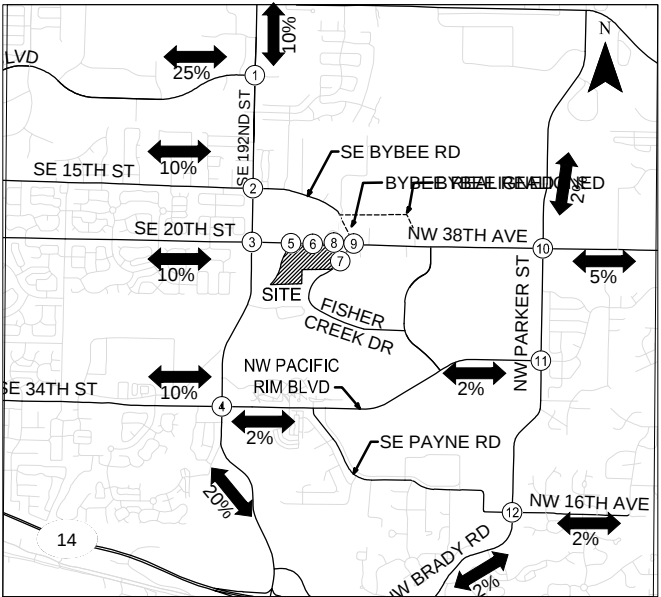
Residential Distribution



Retail Distribution



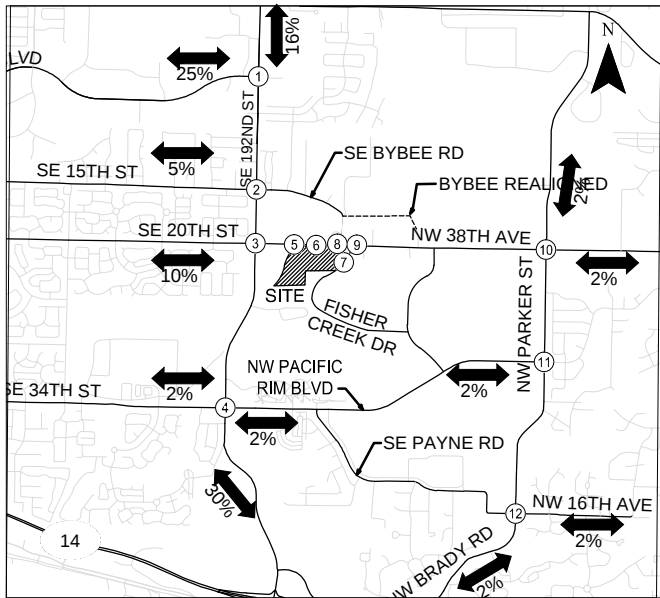
Office Distribution



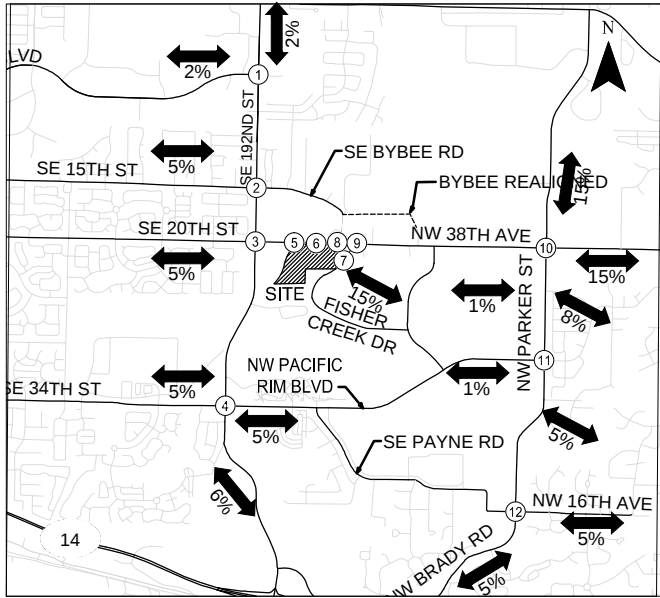
Scenario 2 Trip Distribution & Assignment
Weekday AM Peak Hour
Camas, Washington

Figure
16

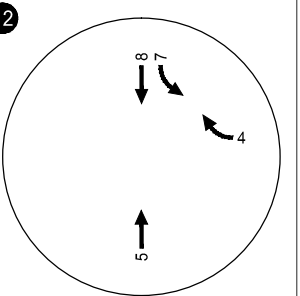
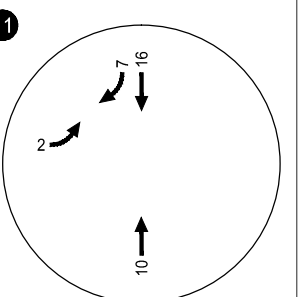
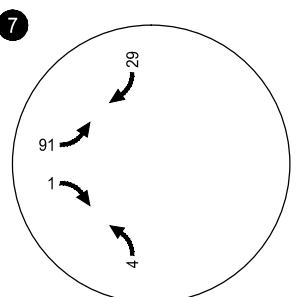
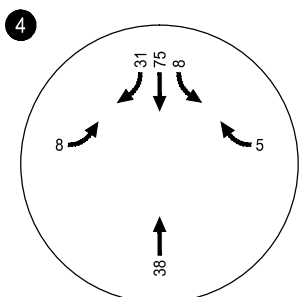
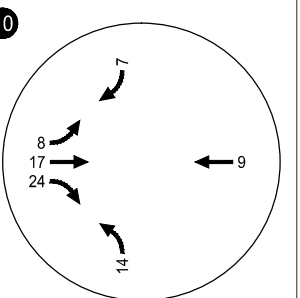
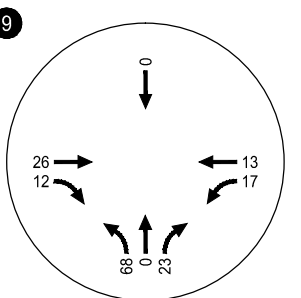
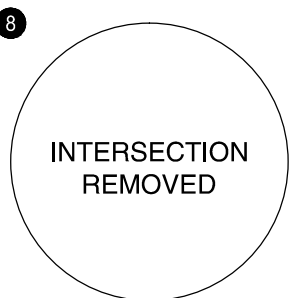
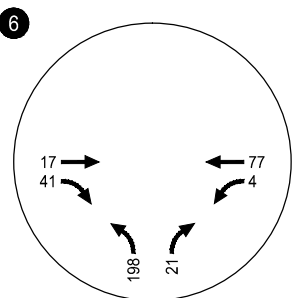
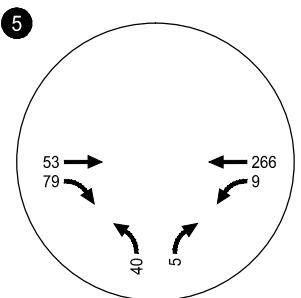
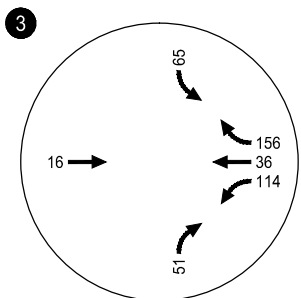
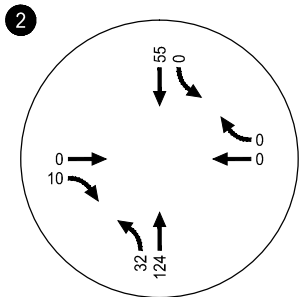
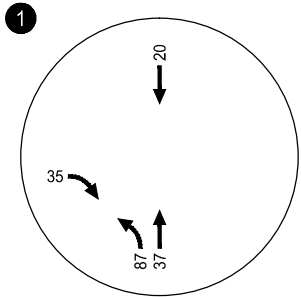
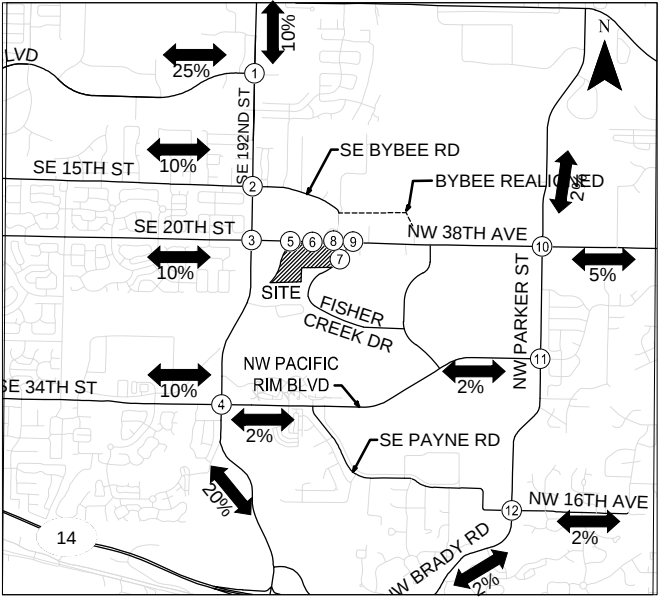
Residential Distribution



Retail Distribution



Office Distribution



Scenario 2 Trip Distribution & Assignment
Weekday PM Peak Hour
Camas, Washington

Figure
17

Year 2021 Total Traffic Conditions

The total traffic conditions analysis forecasts how the study intersections will operate with the inclusion of site-generated traffic. These future conditions were evaluated for both roadway network scenarios as described below.

Scenario 1 (SE Bybee Road aligned at NW Fisher Creek Drive) Total Traffic Conditions

The total traffic volumes at the study intersections include the 2021 background traffic volumes (Figures 8 and 9), primary site-generated trips (Figures 12 and 13) and pass-by site-generated trips (Figures 14 and 15). Figures 18 and 19 show the 2021 total traffic volumes and operations during the weekday a.m. and p.m. peak hours for Scenario 1.

As shown in Figure 19, the SE 20th Street/SE 192nd Avenue intersection is projected to operate at an unacceptable LOS “F” during the weekday p.m. peak hour. *Appendix “H” includes the year 2021 total traffic analysis worksheets.* All other study intersections are predicted to continue to operate acceptably and satisfy the applicable mobility standards.

SE 20th Street/SE 192nd Avenue Intersection Mitigation

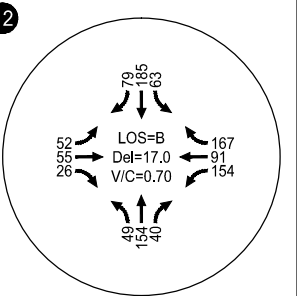
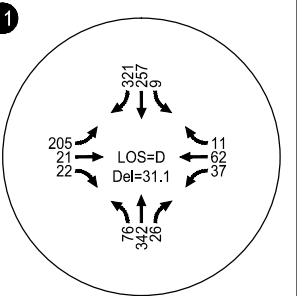
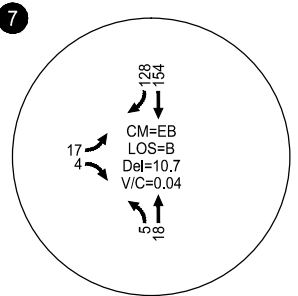
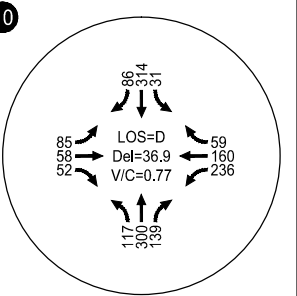
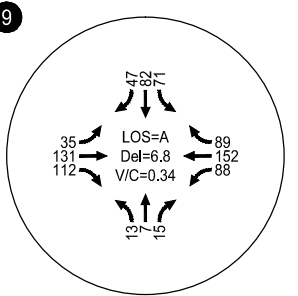
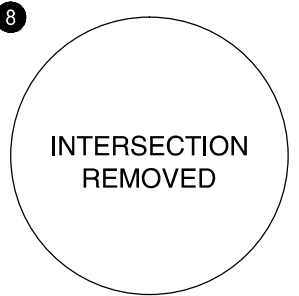
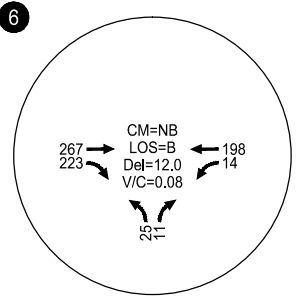
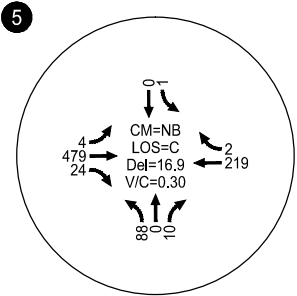
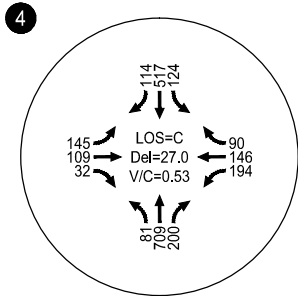
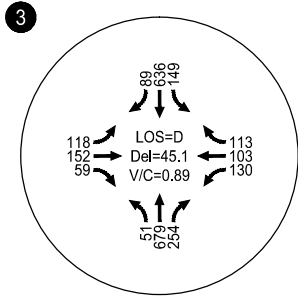
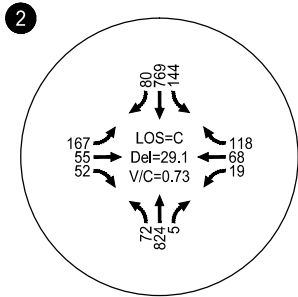
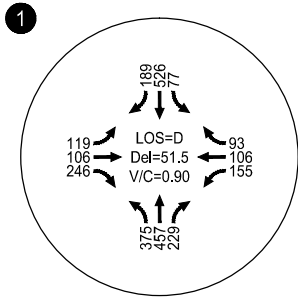
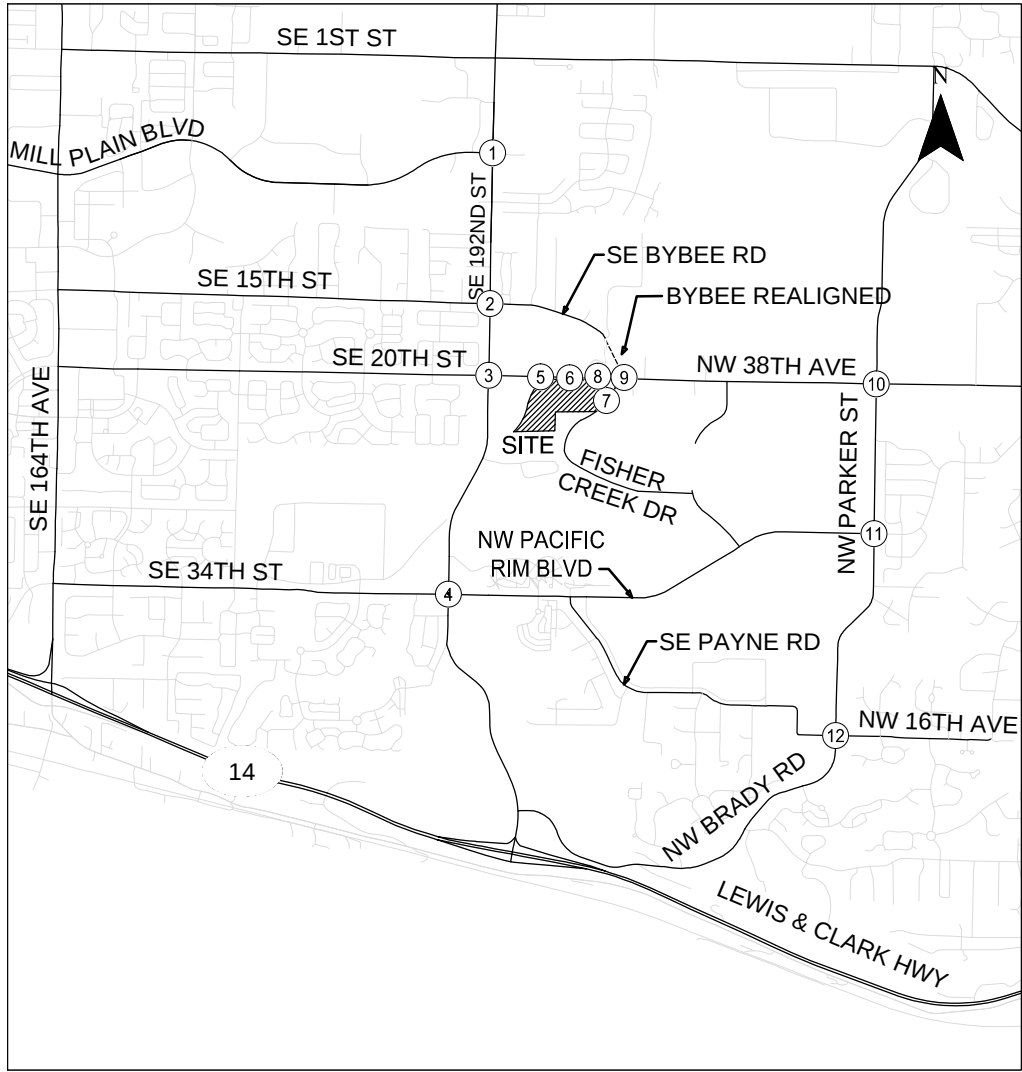
Operations of the SE 20th Street/SE 192nd Avenue intersection could be mitigated to comply with City of Vancouver standards through the addition of a second westbound left-turn lane on SE 20th Street. The additional left-turn lane would add westbound left-turn capacity and allow for traffic signal retiming that allocates additional green time to the primary north-south traffic patterns along SE 192nd Avenue. With this mitigation in place, the intersection is projected to operate at LOS D and a volume to capacity ratio of 1.02 during the weekday p.m. peak hour. *Mitigated operations analysis assuming the additional turn lane and signal retiming for p.m. peak hour conditions is provided at the end of Appendix “H”.*

Scenario 2 (SE Bybee Road aligned to the east) Total Traffic Conditions

The Scenario 2 total traffic volumes at the study intersections reflect summation of the 2021 background traffic volumes (Figures 10 and 11), primary site-generated trips (Figures 16 and 17) and pass-by site-generated trips (Figures 14 and 15). Figures 20 and 21 show the 2021 total traffic volumes and operations during the weekday a.m. and p.m. peak hours for Scenario 2.

As shown in the figures, the SE 20th Street/SE 192nd Avenue continues to operate at an unacceptable level based on the City of Vancouver standards during the weekday p.m. peak hour. Compared to Scenario 1, the intersection experiences higher traffic volumes and delay. The other study intersections are projected to continue to operate acceptably and satisfy the applicable mobility standards. *Appendix “H” includes the year 2021 total traffic analysis worksheets.*

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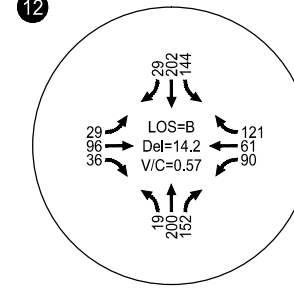
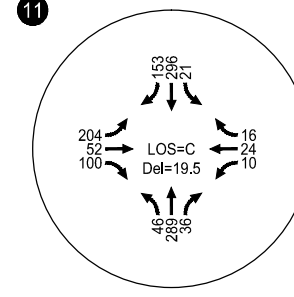
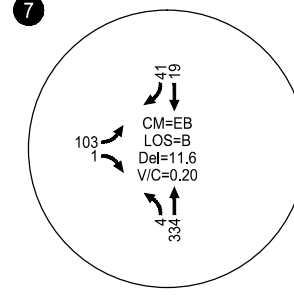
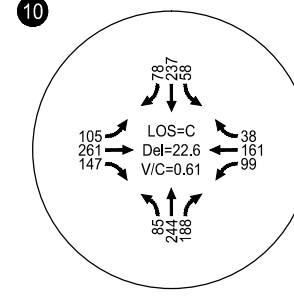
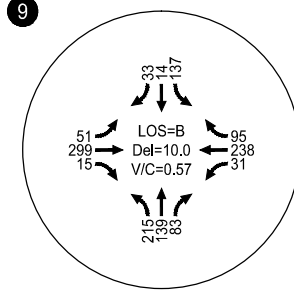
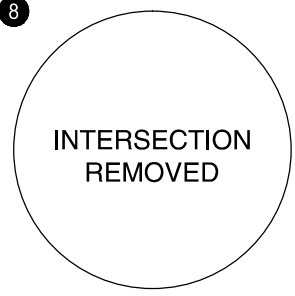
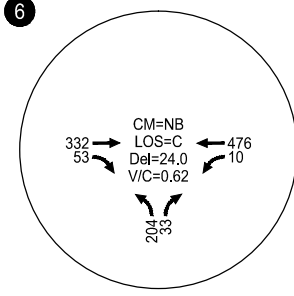
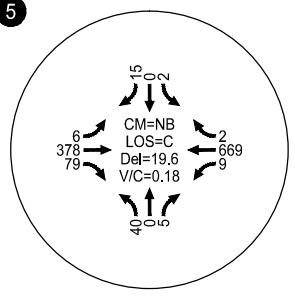
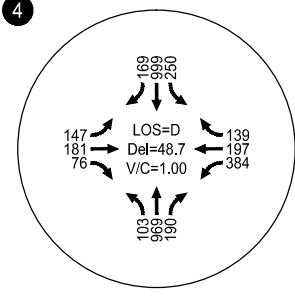
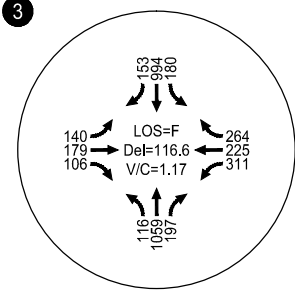
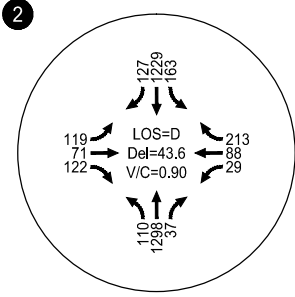
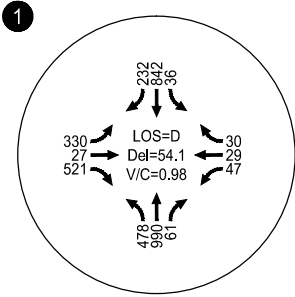
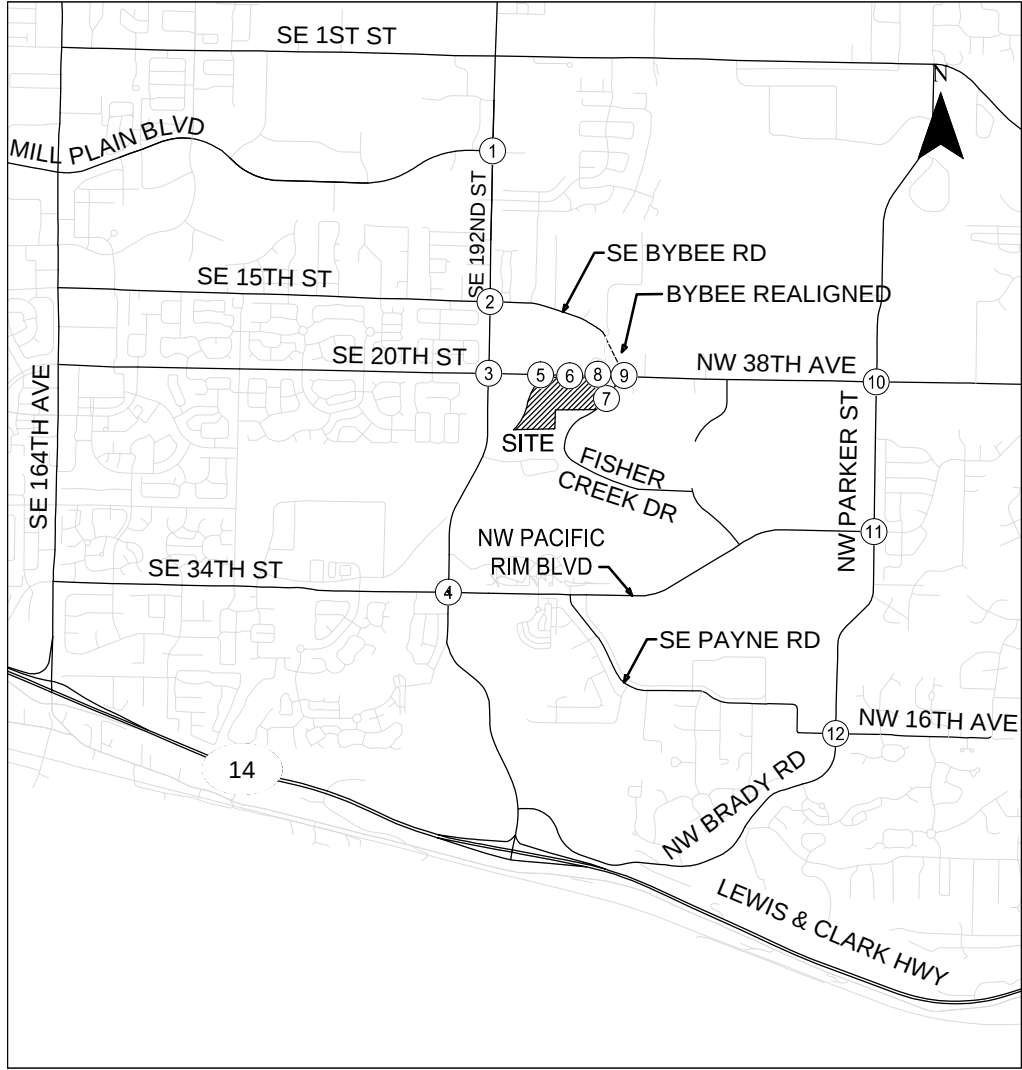


CM = CRITICAL MOVEMENT (UNSIGNALIZED)
LOS = CRITICAL MOVEMENT LEVEL OF SERVICE (SIGNALIZED)/CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)
Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED)/CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO

Scenario 1 2021 Total Traffic Conditions
Weekday AM Peak Hour
Camas, Washington

Figure
18

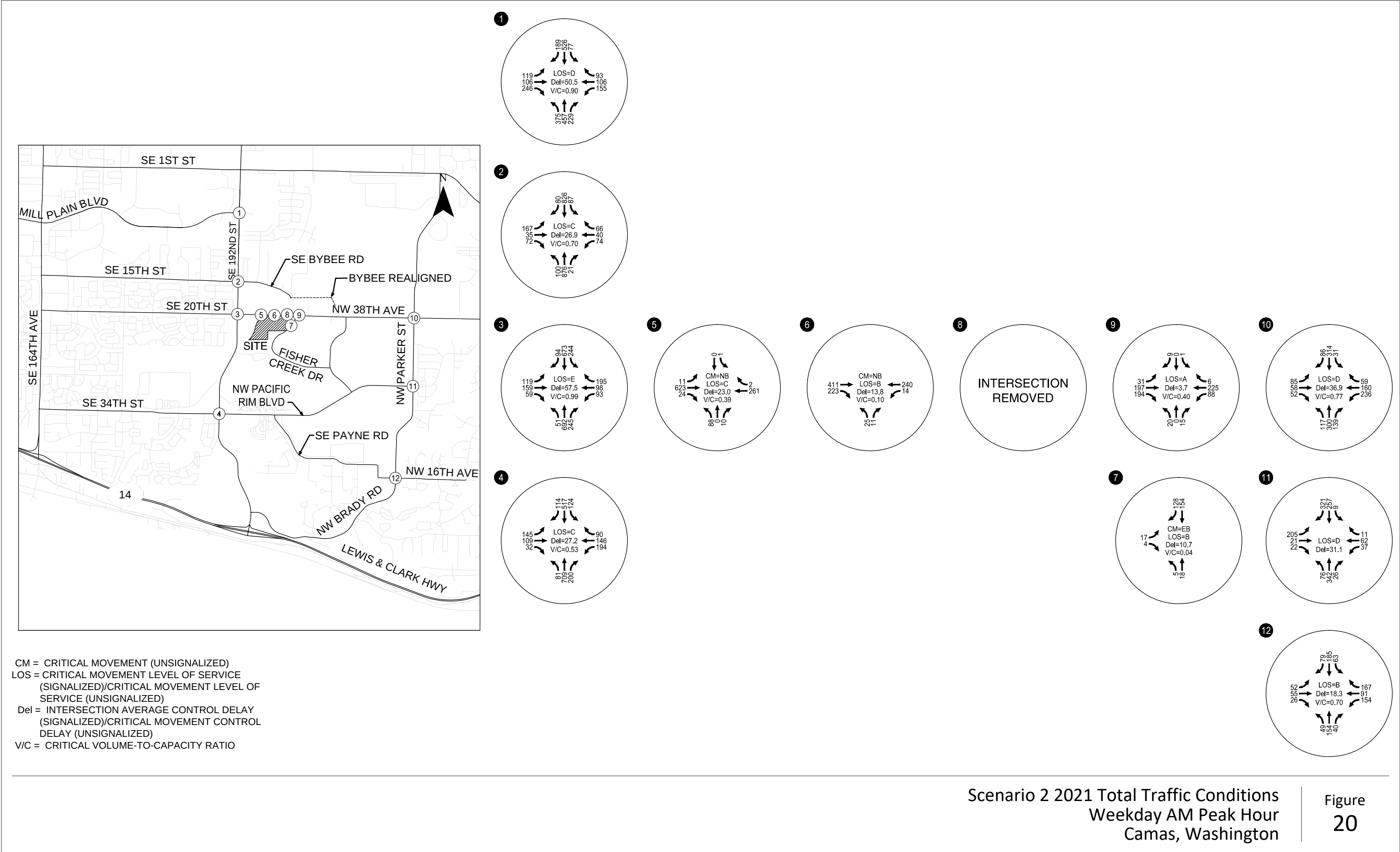
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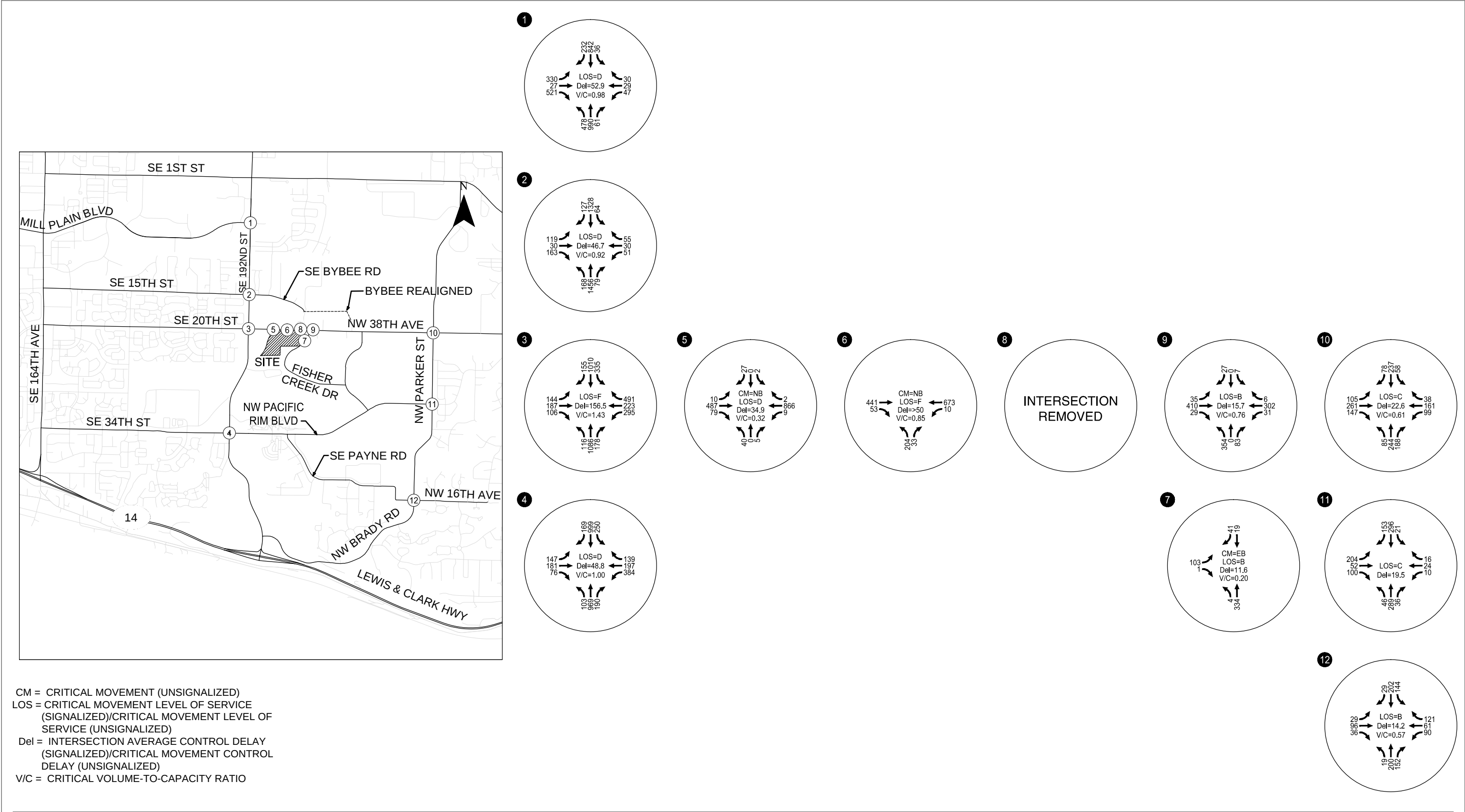


CM = CRITICAL MOVEMENT (UNSIGNALIZED)
LOS = CRITICAL MOVEMENT LEVEL OF SERVICE
(SIGNALIZED)/CRITICAL MOVEMENT LEVEL OF
SERVICE (UNSIGNALIZED)
Del = INTERSECTION AVERAGE CONTROL DELAY
(SIGNALIZED)/CRITICAL MOVEMENT CONTROL
DELAY (UNSIGNALIZED)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO

Scenario 1 2021 Total Traffic Conditions
Weekday PM Peak Hour
Camas, Washington

Figure
19





Scenario 2 2021 Total Traffic Conditions
Weekday PM Peak Hour
Camas, Washington

Figure
21

SE 20th Street/SE 192nd Avenue Intersection Mitigation

Mitigation of the SE 20th Street/SE 192nd Avenue intersection under Scenario 2 requires the addition of a second westbound left-turn lane as well as a separate westbound right-turn lane. Similar to Scenario 1, the additional westbound approach capacity would allow for traffic signal retiming that allocates additional green time to the primary north-south traffic patterns along SE 192nd Avenue. These mitigations would restore intersection operations to a level in compliance with City of Vancouver standards. *Mitigated intersection operations analysis for Scenario 2 is provided at the end of Appendix "H".*

While not required to mitigate the traffic impacts of the proposed development, intersection operations could be further enhanced through provision of a westbound right-turn traffic signal overlap phase for the new westbound right-turn lane.

Queueing Analysis

Site Driveways

A 95th-percentile queuing analysis was performed for the three proposed site access points along NW 38th Avenue and Fisher Creek Driver under 2021 peak hour total traffic conditions. Table 5 summarizes the 95th-percentile queue estimates for the stop controlled approaches, rounded up to the nearest single vehicle length (estimated at 25 feet).

Table 5: 95th-Percentile Queue Analysis Findings (2021 Total Traffic Conditions)

Intersection	Movement	Available Storage (feet)	Scenario 1		Scenario 2	
			AM Peak Hour Queue (feet)	PM Peak Hour Queue (feet)	AM Peak Hour Queue (feet)	PM Peak Hour Queue (feet)
5 NW 38 th Avenue/ Proposed Site Driveway 1	Westbound Left		0	25	0	25
	Northbound		50	25	50	50
6 NW 38 th Avenue/ Proposed Site Driveway 2	Westbound Left		25	25	25	25
	Northbound		25	125	25	200
7 Fisher Creek Drive/ Proposed Site Driveway 3	Eastbound		25	25	25	25

Site driveway queues are projected to be longer under Roadway network Scenario 2, reflecting the projected increase in east-west traffic volumes on NW 38th Avenue along the site frontage as compared to Scenario 1.

As Table 5 indicates, the 95th-percentile queue for the northbound approach at the NW 38th Avenue/Proposed Site Driveway 2 intersection is expected to reach five car lengths under Scenario 1 and eight car lengths under Scenario 2. While the queuing condition will occur on-site and not impact the public roadway approaches, the on-site queuing could be reduced through provision of a shared through/left-turn lane and a separate right-turn lane northbound at the eastern site driveway on NW

38th Avenue. As the site plan is finalized, it is recommended that the site plan provide adequate storage for each of the stop controlled approaches.

SE 192nd Avenue/SE 20th Street Intersection

Table 6 summarized projected queues at the signalized SE 192nd Avenue/SE 20th Street intersection for both Scenarios 1 and 2 assuming provision of the previously recommended mitigation measures. *A more detailed summary of the queue results is provided within the LOS worksheets for this intersection in Appendix "H".*

Table 6: SE 192nd Avenue/SE 20th Street Intersection 95th-Percentile Queue Analysis Results (2021 Total Traffic Conditions)

Approach	Movement	Storage ¹	Scenario 1		Scenario 2	
			AM Peak Hour Queue (ft)	PM Peak Hour Queue (ft)	AM Peak Hour Queue (ft)	PM Peak Hour Queue (ft)
Eastbound	Left	100'	68	104	68	96
	Through-Right	230'/825'	191	296	199	372
Westbound	Left	100'	174	166	113	188
	Through	325'/2,110'	172	517	222	227
	Right	200'				386
Northbound	Left	325'	65	137	65	125
	Through-Right	190'/1,285'	440	584	444	590
Southbound	Left	400'	235	154	408	253
	Through-Right	1080'	235	312	265	284

¹When two storage lengths are shown, the first measurement represents distance to nearest driveway intersection and the second measurement represents distance to nearest street intersection.

Driveway Sight Distance Considerations

Access to the development is proposed via two full-access, stop-controlled driveways on NW 38th Avenue and two full-access stop-controlled driveways on NW Fisher Creek Drive. As site civil engineering plans are finalized, landscaping, above ground utilities, and signing should be located and maintained along the site frontage and throughout the site in a manner that preserves adequate intersection sight distance in accordance with City of Camas standards. Sight distance availability should be confirmed during the final engineering process.

FINDINGS AND RECOMMENDATIONS

Based on the results of the transportation impact analysis, the proposed development can be constructed while maintaining acceptable levels of service and safety on the surrounding transportation system given assuming the provision of the recommended mitigation measures. The primary findings and recommendations of this study are summarized below.

Findings

- The proposed mixed-use development is estimated to generate 5,037 net new weekday trips, including 535 during the a.m. peak hour (388 in, 147 out) and 522 during the p.m. peak hour (166 in, 356 out).
- Under Scenario 1 year 2021 total traffic conditions, the SE 20th Street/SE 192nd Street intersection requires mitigation to comply with City of Vancouver operating standards during the weekday p.m. peak hour.
 - Mitigation to restore acceptable operations includes provision of a second westbound left-turn lane and traffic signal retiming that allocates additional green time to the primary north-south traffic patterns along NE 192nd Avenue.
- Under Scenario 2, both year 2021 background and total traffic conditions require mitigation at the SE 20th Street/SE 192nd Street intersection to comply with City of Vancouver operating standards during the weekday p.m. peak hour.
 - Scenario 2 involves higher westbound approach traffic volumes as compared to Scenario 1.
 - Mitigation to restore acceptable operations includes provision of a second westbound left-turn lane and a separate westbound right-turn lane as well as corresponding signal retiming that allocates additional green time to the primary north-south traffic patterns along NE 192nd Avenue.

Recommendations

- The SE 20th Street/SE 192nd Street intersection should be mitigated to comply with City of Vancouver operating standards in conjunction with site development.
 - For network connectivity Scenario 1, mitigation should include provision of a second westbound left-turn lane and traffic signal retiming that allocates additional green time to the primary north-south traffic patterns along NE 192nd Avenue.
 - For network connectivity Scenario 2, mitigation should include provision of a second westbound left-turn lane and a separate westbound right-turn lane as well as corresponding signal retiming that allocates additional green time to the primary north-south traffic patterns along NE 192nd Avenue.

- On-site and off-site landscaping and any above ground utilities at the site driveways and internal roadways should be installed and maintained to ensure that adequate sight distance is provided upon buildout in accordance with City of Camas standards. Further, sight distance availability should be confirmed during the final engineering process.

We trust this report adequately addresses the traffic impacts associated with the proposed Grass Valley development. Please contact us if you have any questions.

Sincerely,
KITTELSON & ASSOCIATES, INC.



Chris Brehmer, P.E.
Senior Principal Engineer



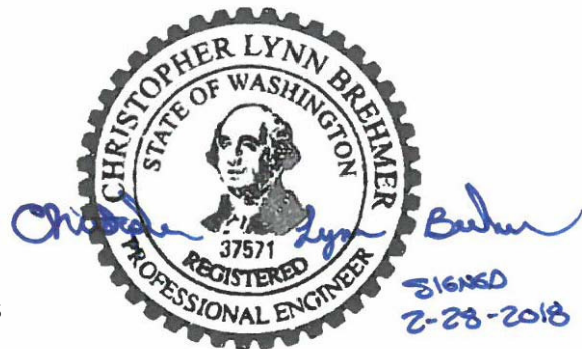
Kristine Connolly
Engineering Associate

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2. Institute of Transportation Engineers. *Trip Generation*, 9th Edition. 2012.
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4. Institute of Transportation Engineers. *Trip Generation Handbook*, 2nd Edition. 2004.
5. Transportation Research Board. *NCHRP Report 684*. 2011.

APPENDICES

- A. Crash data
- B. Description of Level of Service Criteria
- C. Traffic count data
- D. Existing Traffic Operations Analysis Worksheets
- E. In-process volumes
- F. Year 2021 Background Traffic Operations Analysis Worksheets
- G. OTISS Traffic Calculations
- H. Year 2021 Total Traffic Operations Analysis Worksheets



Appendix A

Crash Data

OFFICER REPORTED CRASHES THAT OCCURRED AT OR in the vicinity of the FOLLOWING INTERSECTIONS IN THE CITIES OF CAMAS & VANCOUVER

Parker St @ Pacific Rim Blvd
Parker St @ 38th Ave
Brady Rd @ 16th Ave
Bybee Rd @ 20th St
Fisher Creek Dr @ 20th St
192nd Ave @ Mill Plain Blvd
192nd Ave @ 15th St
192nd Ave @ 20th St
192nd Ave @ 34th St

01/01/2014 - 12/31/2016

Under 23 U.S. Code § 409 and 23 U.S. Code § 148, safety data, reports, surveys, schedules, lists compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential crash sites, hazardous roadway conditions, or railway-highway crossings are not subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or

PRIMARY TRAFFICWAY	INTERSECTING TRAFFICWAY	DIST FROM REF POINT	MI or FT	COMP DIR FROM REF POINT	REFERENCE POINT NAME	DATE	# J	# I	# F	# V	# P	# B	VEHICLE 1 TYPE	VEHICLE 2 TYPE	JUNCTION RELATIONSHIP	FIRST COLLISION TYPE / OBJECT STRUCK	VEHICLE 1 ACTION	VEHICLE 2 ACTION	VEHICLE 1 COMPASS DIRECTION FROM	VEHICLE 1 COMPASS DIRECTION TO	VEHICLE 2 COMPASS DIRECTION FROM	VEHICLE 2 COMPASS DIRECTION TO	MV DRIVER CONTRIBUTING CIRCUMSTANCE 1 (UNIT 1)	FIRST IMPACT LOCATION (City, County & Misc Trafficways - 2010 forward)
SE 20TH ST AT SE BYBEE RD						06/06/2013	0	0	1	0	0	0	Not Stated		Not at Intersection	Utility Pole	Going Straight Ahead		East	West			Exceeding Reas. Sa	Past the Outside Shoulder of Primary Trafficway
SE BYBEE RD AT SE 20TH ST						03/23/2013	1	0	1	0	0	0	Passenger Car		Not at Intersection	Utility Pole	Going Straight Ahead		North	East			Other	Past the Outside Shoulder of Primary Trafficway
NW BRADY RD	NW 16TH AVE					12/23/2013	0	0	2	0	0	0	Passenger Car	Passenger Car	At Intersection and	Entering at angle	Going Straight Ahead	Going Straight Ahead	West	East	South	North	None	Lane of Primary Trafficway
NW BRADY RD	NW 16TH AVE					12/27/2015	0	0	2	0	0	0	Pickup,Panel Truck or Vanette under 10,000 lb	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	From same direction - both going straight - one stopped - rear-end	Going Straight Ahead	Stopped at Signal or Stop Sign	North	South	North	South	Exceeding Reas. Safe Speed	Lane of Primary Trafficway
NW BRADY RD	NW 16TH AVE					01/07/2014	0	0	2	0	0	0	Passenger Car	Passenger Car	At Intersection and Related	Entering at angle	Going Straight Ahead	Going Straight Ahead	East	West	South	North	Inattention	Lane of Primary Trafficway
NW BRADY RD		0.25	M	N	NW 16TH AVE	05/15/2015	0	0	1	0	0	0	Passenger Car		Not at Intersection and Not Related	Vehicle overturned	Making Left Turn		North	South			Exceeding Stated Speed Limit	Past the Outside Shoulder of Primary Trafficway
NW BRADY RD		400	F	N	NW 16TH AVE	09/26/2016	0	0	1	0	0	0	Passenger Car		Not at Intersection and Not Related	Domestic animal other (cat, dog, etc)	Going Straight Ahead		North	South			Driver Not Distracted	Lane of Primary Trafficway
NW PACIFIC RIM BLVD		0.1	M	W	NW PARKER ST	03/18/2012	0	0	1	0	0	0	Passenger Car	Pickup,Panel Truck	At Driveway	Curb, Raised Traffic Island	Going Straight Ahead		West	East			Exceeding Stated Speed Limit	Outside Shoulder of Primary Trafficway
NW PARKER ST	NW PACIFIC RIM BLVD					02/12/2013	0	0	2	0	0	0	Passenger Car	Pickup,Panel Truck	At Intersection and	Entering at angle	Going Straight Ahead	Going Straight Ahead	North	South	East	West	Disregard Stop Sign	Lane of Primary Trafficway
NW PARKER ST	NW PACIFIC RIM BLVD					03/19/2012	0	0	2	0	0	0	Passenger Car	Passenger Car	At Intersection and	From opposite direction	Making Left Turn	Starting in Traffic Lane	South	West	North	South	Other	Lane of Primary Trafficway
NW PARKER ST	NW PACIFIC RIM DR					05/08/2014	0	0	2	0	0	0	Passenger Car	Passenger Car	At Intersection and Related	Entering at angle	Starting in Traffic Lane	Starting in Traffic Lane	North	South	East	West	None	Lane of Primary Trafficway
NW PARKER ST		40	F	E	NW PACIFIC RIM BLVD	11/18/2015	0	0	1	0	0	0	Passenger Car		Not at Intersection and Not Related	Fence	Making Left Turn		North	East			Apparently Asleep	Past the Outside Shoulder of Primary Trafficway
NW PARKER ST		115	F	S	NW PACIFIC	07/26/2014	0	0	1	0	0	0	Passenger Car		Not at	Metal Sign Post	Going Straight Ahead		South	North			Apparently	Past the Outside Shoulder of Primary Trafficway
SE 192ND AVE	SE 15TH ST					07/10/2012	0	0	2	0	0	0	Not Stated	Pickup,Panel Truck	At Intersection and	From same direction - both	Going Straight Ahead	Stopped at Signal	North	South	North	Vehicle Stop	Follow Too Closely	Lane of Primary Trafficway
SE 192ND AVE	SE 15TH ST					06/28/2013	1	0	3	0	0	0	Pickup,Panel Truck	Pickup,Panel Truck	At Intersection and	From same direction - both	Going Straight Ahead	Stopped for Traffic	South	North	South	North	Driver Operating Imp	Lane of Primary Trafficway
SE 192ND AVE	SE 15TH ST					10/05/2012	0	0	2	0	0	0	Pickup,Panel Truck	Passenger Car	At Intersection and	From same direction - both	Going Straight Ahead	Stopped for Traffic	South	North	South	Vehicle Stop	Other	Lane of Primary Trafficway
SE 192ND AVE	SE 15TH ST					02/28/2013	0	0	2	0	0	0	Passenger Car	Passenger Car	At Intersection and	Entering at angle	Going Straight Ahead	Going Straight Ahead	West	East	South	North	Disregard Stop Sign	Lane of Primary Trafficway
SE 192ND AVE	SE 15TH ST					02/24/2015	3	0	3	0	0	0	Passenger Car	Pickup,Panel Truck	At Intersection	From same direction -	Going Straight Ahead	Stopped at	North	South	Vehicle	Vehicle	Inattention	Lane of Primary Trafficway
SE 192ND AVE	SE 15TH ST					07/04/2015	0	0	3	0	0	0	Pickup,Panel Truck	Pickup,Panel Truck	At Intersection	From same direction -	Going Straight Ahead	Stopped for	North	South	Vehicle	Vehicle	Inattention	Lane of Primary Trafficway
SE 192ND AVE	SE 15TH ST					06/28/2016	5	0	2	0	0	0	Passenger Car	Passenger Car	At Intersection	From opposite	Making Left Turn	Going Straight Ahead	North	East	South	North	Disregard Stop Sign	Lane of Primary Trafficway
SE 192ND AVE	SE 15TH ST	391	F	S	SE 15TH ST	03/07/2014	0	0	3	0	0	0	Pickup,Panel Truck	Passenger Car	Intersection	From same direction -	Going Straight Ahead	Going Straight Ahead	South	North	South	North	Follow Too Closely	Lane of Primary Trafficway
SE 192ND AVE	SE 15TH ST	0.1	M	N	SE 15TH ST	05/25/2016	0	0	2	0	0	0	Passenger Car	Passenger Car	Not at	From same direction -	Going Straight Ahead	Making Right Turn	North	South	North	West	Follow Too Closely	Lane of Primary Trafficway
SE 192ND AVE	SE 20TH ST					07/03/2013	3	0	2	0	0	0	Pickup,Panel Truck	Pickup,Panel Truck	At Intersection and	From opposite direction	Going Straight Ahead	Making Left Turn	North	West	North	South	Under Influence of Alcohol	Lane of Primary Trafficway
SE 192ND AVE	SE 20TH ST					04/11/2013	0	0	1	0	0	0	Passenger Car	Passenger Car	At Intersection and	Tree or Stump (stationary)	Making Left Turn	Going Straight Ahead	South	West			Improper Turn	Past the Outside Shoulder of Primary Trafficway
SE 192ND AVE	SE 20TH ST					11/02/2013	0	0	2	0	0	0	Pickup,Panel Truck	Passenger Car	At Intersection and	From opposite direction	Going Straight Ahead	Making Left Turn	South	North	North	East	Disregard Stop Sign	Lane of Primary Trafficway
SE 192ND AVE	SE 20TH ST					11/20/2015	1	0	2	0	0	0	Pickup,Panel Truck	Not Stated	At Intersection	From same direction -	Stopped for Traffic	Going Straight Ahead	South	Vehicle	South	North	None	Lane of Primary Trafficway
SE 192ND AVE	SE 20TH ST					12/17/2015	1	0	2	0	0	0	Pickup,Panel Truck	Pickup,Panel Truck	At Intersection	From same direction -	Going Straight Ahead	Stopped at	North	South	Vehicle	Vehicle	Inattention	Lane of Primary Trafficway
SE 192ND AVE	SE 20TH ST					01/09/2016	1	0	2	0	0	0	Passenger Car	Passenger Car	Not at	From same direction -	Going Straight Ahead	Stopped for	South	North	Vehicle	Vehicle	Inattention	Lane of Primary Trafficway
SE 192ND AVE	SE 20TH ST	200	F	N	SE 20TH ST	05/23/2016	0	0	3	0	0	0	Passenger Car	Passenger Car	Not at	From same direction -	Going Straight Ahead	Stopped for	South	North	Vehicle	Vehicle	Inattention	Lane of Primary Trafficway
SE 20TH ST	SE 192ND AVE					12/20/2014	0	0	2	0	0	0	Passenger Car	Passenger Car	At Intersection	Entering at angle	Going Straight Ahead	Going Straight Ahead	North	South	East	West	Inattention	Lane of Primary Trafficway
SE 20TH ST	SE 192ND AVE	251	F	E	SE 192ND AVE	07/17/2015	1	0	2	0	0	0	Pickup,Panel Truck	Motorcycle	At Driveway	Same direction - both	Making Right Turn	Making Right Turn	East	North	East	North	None	Lane of Primary Trafficway
SE 34TH ST	SE 192ND AVE					08/14/2012	0	0	2	0	0	0	Passenger Car	Pickup,Panel Truck	At Intersection and	From same direction - both	Going Straight Ahead	Stopped at Signal	East	West	East	Vehicle Stop	Follow Too Closely	Lane of Primary Trafficway
SE 34TH ST	SE 192ND AVE					10/08/2013	0	0	2	0	0	0	Pickup,Panel Truck	Passenger Car	At Intersection and	From opposite direction	Going Straight Ahead	Making Left Turn	West	East	East	South	Disregard Stop Sign	Lane of Primary Trafficway
SE 34TH ST	SE 192ND AVE					12/10/2012	0	0	2	0	0	0	Pickup,Panel Truck	Passenger Car	At Intersection and	From opposite direction	Making Left Turn	Going Straight Ahead	West	North	East	West	Did Not Grant RW	Lane of Primary Trafficway
SE 192ND AVE	SE 34TH ST					01/14/2012	0	0	2	0	0	0	Passenger Car	Passenger Car	At Intersection and	From opposite direction	Going Straight Ahead	Making Left Turn	South	North	East	North	Disregard Stop Sign	Lane of Primary Trafficway
SE 192ND AVE	SE 34TH ST					11/06/2013	3	0	2	0	0	0	Pickup,Panel Truck	Passenger Car	At Intersection and	From opposite direction	Making Left Turn	Going Straight Ahead	North	East	South	North	Did Not Grant RW	Lane of Primary Trafficway
SE 192ND AVE	SE 34TH ST	0.25	M	S	SE 34TH ST	04/18/2016	0	0	2	0	0	0	Passenger Car	Pickup,Panel Truck	Not at	From same direction -	Merging (Entering)	Going Straight Ahead	South	North	South	North	Did Not Grant RW	Lane of Primary Trafficway
SE 192ND AVE	SE 34TH ST					09/30/2014	1	0	2	0	0	0	Passenger Car	Passenger Car	At Intersection	Entering at angle	Going Straight Ahead	Going Straight Ahead	North	South	West	East	Disregard Stop Sign	Lane of Primary Trafficway
SE 192ND AVE	SE 34TH ST					03/09/2015	0	0	2	0	0	0	Passenger Car	Pickup,Panel Truck	At Intersection	Entering at angle	Going Wrong Way	Going Straight Ahead	South	North	West	East	Disregard Stop Sign	Lane of Primary Trafficway
SE 192ND AVE	SE 34TH ST					11/05/2015	1	0	2	0	0	0	Pickup,Panel Truck	Passenger Car	At Intersection	From opposite	Making Left Turn	Going Straight Ahead	West	North	East	West	Improper Turn	Lane of Primary Trafficway
SE 192ND AVE	SE 34TH ST					01/12/2016	1	0	2	0	0	0	Passenger Car	Pickup,Panel Truck	At Intersection	From opposite	Making Left Turn	Going Straight Ahead	South	West	South	North	Unknown Driver	Lane of Primary Trafficway
SE 34TH ST	SE 192ND AVE					06/09/2014	0	0	2	0	0	0	Passenger Car	Passenger Car	At Intersection	From same direction -	Going Straight Ahead	Stopped at	East	West	East	West	Inattention	Lane of Primary Trafficway
SE 34TH ST	SE 192ND AVE					07/27/2014	0	0	2	0	0	0	Passenger Car	Passenger Car	At Intersection	From opposite	Making Left Turn	Going Straight Ahead	West	North	East	West	Improper Turn	Lane of Primary Trafficway
SE 34TH ST	SE 192ND AVE					06/20/2015	2	0	2	0	0	0	Pickup,Panel Truck	Pickup,Panel Truck	At Intersection	Entering at angle	Making Left Turn	Going Straight Ahead	East	West	East	South	Inattention	Lane of Primary Trafficway
SE 34TH ST	SE 192ND AVE					11/05/2015	0	0	2	0	0	0	Pickup,Panel Truck	Pickup,Panel Truck	At Intersection	From opposite	Going Straight Ahead	Making Left Turn	East	West	East	South	None	Lane of Primary Trafficway
SE MILL PLAIN BLVD	SE 192ND AVE					03/30/2012	0	0	2	0	0	0	Passenger Car	Pickup,Panel Truck	At Intersection and	Entering at angle	Making Right Turn	Stopped at Signal	West	South	South	Vehicle Stop	Exceeding Reas. Sa	Intersecting Trafficway
SE MILL PLAIN BLVD	SE 192ND AVE					09/22/2013	0	0	1	0	0	0	Pickup,Panel Truck or Vanette under 10,000 lb	Passenger Car	At Intersection and	Street Light Pole or Base	Going Straight Ahead		North	West			Other	Past the Outside Shoulder of Primary Trafficway
SE MILL PLAIN BLVD		177	F	W	SE 192ND AVE	02/17/2015	0	0	2	0	0	0	Passenger Car	Passenger Car	Not at	From same direction -	Going Straight Ahead	Going Straight Ahead	East	West	East	West	Follow Too Closely	Lane of Primary Trafficway

PRIMARY TRAFFICWAY	INTERSECTING TRAFFICWAY	DIST FROM REF POINT	M OR FT	COMP DIR FROM REF POINT	REFERENCE POINT NAME	DATE	# I N J	# F A T	# V E H I C L E S	VEHICLE 1 TYPE	VEHICLE 2 TYPE	JUNCTION RELATIONSHIP	FIRST COLLISION TYPE / OBJECT STRUCK	VEHICLE 1 ACTION	VEHICLE 2 ACTION	VEHICLE 1 COMPASS DIRECTION FROM	VEHICLE 1 COMPASS DIRECTION TO	VEHICLE 2 COMPASS DIRECTION FROM	VEHICLE 2 COMPASS DIRECTION TO	MV DRIVER CONTRIBUTING CIRCUMSTANCE 1 (UNIT 1)	FIRST IMPACT LOCATION (City, County & Misc Trafficways - 2010 forward)	
SE 192ND AVE	SE MILL PLAIN					08/28/2014	3	0	2	0	Pickup,Panel	Pickup,Panel	At Intersection	From opposite	Going Straight	Making Left	North	South	South	West	Disregard Stop	Lane of Primary Trafficway
SE 192ND AVE	SE MILL PLAIN					06/15/2015	1	0	2	0	Passenger Car	Pickup,Panel	At Intersection	Entering at angle	Going Straight	Going Straight	North	South	East	West	Disregard Stop	Lane of Primary Trafficway
SE 192ND AVE	SE MILL PLAIN					08/11/2015	2	0	2	0	Pickup,Panel	Pickup,Panel	At Intersection	From same direction -	Going Straight	Stopped at	North	South	Vehicle	Vehicle	Inattention	Lane of Primary Trafficway
SE 192ND AVE		299	F	N	SE MILL PLAIN	05/26/2015	1	0	2	0	Passenger Car	Pickup,Panel	Not at	From same direction -	Slowing	Stopped for	South	North	South	Vehicle	Inattention	Lane of Primary Trafficway
NW PARKER ST	NW 38TH AVE					11/23/2014	1	0	3	0	Passenger Car	Passenger Car	At Intersection	From opposite	Making Left Turn	Going Straight	North	West	North	South	Inattention	Lane of Primary Trafficway
NW PARKER ST	NW 38TH AVE					06/15/2015	1	0	1	0	Pickup,Panel		At Intersection	Wood Sign Post	Making Left Turn		East	South			Inattention	Median of Primary Trafficway
NW PARKER ST	NW 38TH AVE					12/10/2016	0	0	2	0	Passenger Car	Pickup,Panel	At Intersection	From opposite	Making Left Turn	Going Straight	North	East	South	North	Did Not Grant RW	Lane of Primary Trafficway
NW 38TH AVE		0.37	M	W	NW PARKER ST	01/03/2014	2	0	2	0	Pickup,Panel	Truck	Not at	One parked—one	Going Straight	Legally	West	East			Under Influence	Past the Outside Shoulder of Primary Trafficway
NW 38TH AVE		0.5	M	E	NW PARKER ST	06/01/2015	0	0	1	0	Pickup,Panel		Not at	Wood Sign Post	Going Straight		West	East			Unknown Driver	Past the Outside Shoulder of Primary Trafficway
NW 38TH AVE	NW PARKER ST					02/06/2013	0	0	2	0	Passenger Car	Passenger Car	At Intersection and	From opposite direction	Making Left Turn	Going Straight	East	South	West	East	Did Not Grant RW	Lane of Primary Trafficway
NW 38TH AVE	NW PARKER ST		M			03/13/2012	0	0	2	0	Passenger Car	Pickup,Panel Tru	At Intersection and	Entering at angle	Going Straight Ahead	Going Straight	South	North	East	West	Disregard Stop and	Lane of Primary Trafficway

Appendix B
Description of Level-of-Service Criteria

APPENDIX B LEVEL-OF-SERVICE CONCEPT

Level of service (LOS) is a concept developed to quantify the degree of comfort (including such elements as travel time, number of stops, total amount of stopped delay, and impediments caused by other vehicles) afforded to drivers as they travel through an intersection or roadway segment. Six grades are used to denote the various level of service from “A” to “F”.¹

SIGNALIZED INTERSECTIONS

The six level-of-service grades are described qualitatively for signalized intersections in Table B1. Additionally, Table B2 identifies the relationship between level of service and average control delay per vehicle. Control delay is defined to include initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. Using this definition, Level of Service “D” is generally considered to represent the minimum acceptable design standard.

Table B1. Level-of-Service Definitions (Signalized Intersections)¹

Level of Service	Average Delay per Vehicle
A	Very low average control delay, less than 10 seconds per vehicle. This occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.
B	Average control delay is greater than 10 seconds per vehicle and less than or equal to 20 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for a level of service A, causing higher levels of average delay.
C	Average control delay is greater than 20 seconds per vehicle and less than or equal to 35 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
D	Average control delay is greater than 35 seconds per vehicle and less than or equal to 55 seconds per vehicle. The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle length, or high volume/capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	Average control delay is greater than 55 seconds per vehicle and less than or equal to 80 seconds per vehicle. This is usually considered to be the limit of acceptable delay. These high delay values generally (but not always) indicate poor progression, long cycle lengths, and high volume/capacity ratios. Individual cycle failures are frequent occurrences.
F	Average control delay is in excess of 80 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with oversaturation. It may also occur at high volume/capacity ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also contribute to such high delay values.

¹ Most of the material in this appendix is adapted from the Transportation Research Board, Highway Capacity Manual, (2000).

Table B2. Level-of-Service Criteria for Signalized Intersections

Level of Service	Average Control Delay per Vehicle (Seconds)
A	<10.0
B	>10 and ≤20
C	>20 and ≤35
D	>35 and ≤55
E	>55 and ≤80
F	>80

UNSIGNALIZED INTERSECTIONS

Unsignalized intersections include two-way stop-controlled (TWSC) and all-way stop-controlled (AWSC) intersections. The 2000 Highway Capacity Manual (HCM) provides models for estimating control delay at both TWSC and AWSC intersections. A qualitative description of the various service levels associated with an unsignalized intersection is presented in Table B3. A quantitative definition of level of service for unsignalized intersections is presented in Table B4. Using this definition, Level of Service “E” is generally considered to represent the minimum acceptable design standard.

Table B3. Level-of-Service Criteria for Unsignalized Intersections

Level of Service	Average Delay per Vehicle to Minor Street
A	- Nearly all drivers find freedom of operation. - Very seldom is there more than one vehicle in queue.
B	- Some drivers begin to consider the delay an inconvenience. - Occasionally there is more than one vehicle in queue.
C	- Many times there is more than one vehicle in queue. - Most drivers feel restricted, but not objectionably so.
D	- Often there is more than one vehicle in queue. - Drivers feel quite restricted.
E	- Represents a condition in which the demand is near or equal to the probable maximum number of vehicles that can be accommodated by the movement. - There is almost always more than one vehicle in queue. - Drivers find the delays approaching intolerable levels.
F	- Forced flow. - Represents an intersection failure condition that is caused by geometric and/or operational constraints external to the intersection.

Table B4. Level-of-Service Criteria for Unsignalized Intersections

Level of Service	Average Control Delay per Vehicle (Seconds)
A	<10.0
B	>10.0 and ≤ 15.0
C	>15.0 and ≤ 25.0
D	>25.0 and ≤ 35.0
E	>35.0 and ≤ 50.0
F	>50.0

It should be noted that the level-of-service criteria for unsignalized intersections are somewhat different than the criteria used for signalized intersections. The primary reason for this difference is that drivers expect different levels of performance from different kinds of transportation facilities. The expectation is that a signalized intersection is designed to carry higher traffic volumes than an unsignalized intersection. Additionally, there are a number of driver behavior considerations that combine to make delays at signalized intersections less galling than at unsignalized intersections. For example, drivers at signalized intersections are able to relax during the red interval, while drivers on the minor street approaches to TWSC intersections must remain attentive to the task of identifying acceptable gaps and vehicle conflicts. Also, there is often much more variability in the amount of delay experienced by individual drivers at unsignalized intersections than signalized intersections. For these reasons, it is considered that the control delay threshold for any given level of service is less for an unsignalized intersection than for a signalized intersection. While overall intersection level of service is calculated for AWSC intersections, level of service is only calculated for the minor approaches and the major street left turn movements at TWSC intersections. No delay is assumed to the major street through movements. For TWSC intersections, the overall intersection level of service remains undefined: level of service is only calculated for each minor street lane.

In the performance evaluation of TWSC intersections, it is important to consider other measures of effectiveness (MOEs) in addition to delay, such as v/c ratios for individual movements, average queue lengths, and 95th-percentile queue lengths. By focusing on a single MOE for the worst movement only, such as delay for the minor-street left turn, users may make inappropriate traffic control decisions. The potential for making such inappropriate decisions is likely to be particularly pronounced when the HCM level-of-service thresholds are adopted as legal standards, as is the case in many public agencies.

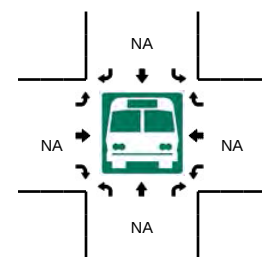
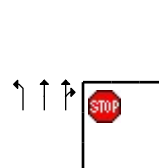
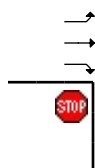
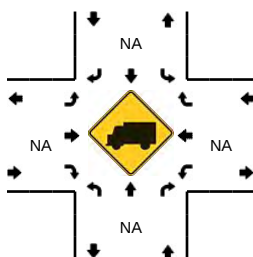
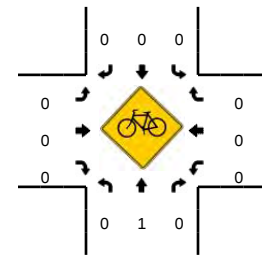
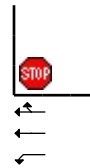
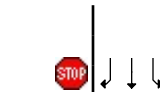
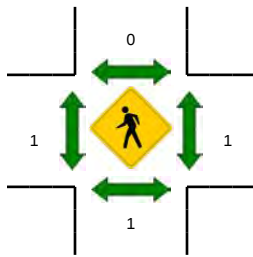
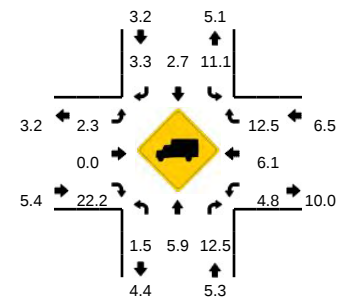
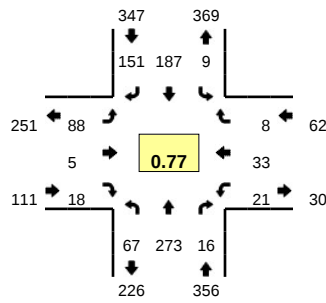
Appendix C

Traffic Count Data

LOCATION: NW Parker St -- NW Pacific Rim Blvd
CITY/STATE: Camas, WA

QC JOB #: 14421301
DATE: Thu, May 25 2017

Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 7:40 AM -- 7:55 AM

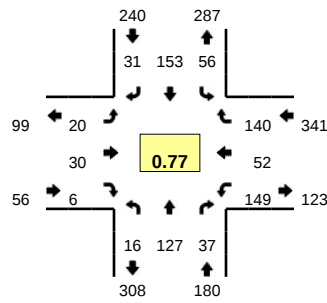


5-Min Count Period Beginning At	NW Parker St (Northbound)				NW Parker St (Southbound)				NW Pacific Rim Blvd (Eastbound)				NW Pacific Rim Blvd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	10	12	1	0	0	9	18	0	3	0	1	0	2	5	0	0	61	
7:05 AM	3	14	1	0	0	11	11	0	10	0	3	0	2	3	1	0	59	
7:10 AM	8	6	1	0	1	15	10	0	6	0	1	0	2	4	0	0	54	
7:15 AM	7	9	1	0	0	16	13	0	4	0	2	0	5	5	0	0	62	
7:20 AM	6	12	1	0	0	6	8	0	6	0	2	0	2	0	0	0	43	
7:25 AM	6	15	0	0	0	11	10	0	5	0	4	0	2	6	0	0	59	
7:30 AM	6	19	1	0	0	12	9	0	7	1	1	0	1	2	1	0	60	
7:35 AM	7	38	0	0	0	10	10	0	8	0	1	0	1	2	1	0	78	
7:40 AM	4	30	2	0	3	17	15	0	12	0	2	0	3	4	0	0	92	
7:45 AM	5	45	0	0	0	18	10	0	9	2	2	0	2	3	0	0	96	
7:50 AM	6	38	2	0	1	13	21	0	7	0	0	0	1	5	2	0	96	
7:55 AM	3	26	1	0	0	21	22	0	10	0	0	0	1	3	1	0	88	848
8:00 AM	4	11	1	0	2	21	16	0	4	1	0	0	1	7	1	0	69	856
8:05 AM	1	9	2	0	1	26	9	0	6	0	1	0	2	5	2	0	64	861
8:10 AM	14	15	2	0	1	11	8	0	7	1	3	0	3	1	0	0	66	873
8:15 AM	3	17	2	0	0	9	8	0	6	0	2	0	2	0	0	0	49	860
8:20 AM	8	15	1	0	0	15	12	0	8	0	3	0	2	1	0	0	65	882
8:25 AM	6	10	2	0	1	14	11	0	4	0	3	0	2	0	0	0	53	876
8:30 AM	2	8	0	0	1	12	12	0	9	2	2	0	1	2	0	0	51	867
8:35 AM	6	19	3	0	0	12	8	0	12	2	7	0	2	2	1	0	74	863
8:40 AM	3	17	1	0	0	16	14	0	7	0	6	0	3	3	1	0	71	842
8:45 AM	6	15	1	0	0	12	13	0	12	2	5	0	0	6	0	0	72	818
8:50 AM	4	16	1	0	1	11	12	0	12	2	4	0	3	1	2	0	69	791
8:55 AM	9	10	0	0	0	14	12	0	14	5	3	0	1	5	0	0	73	776
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	60	452	16	0	16	192	184	0	112	8	16	0	24	48	8	0	1136	
Heavy Trucks	0	8	0	0	0	0	4	0	4	0	0	0	4	8	0	0	28	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad																		
Stopped Buses																		

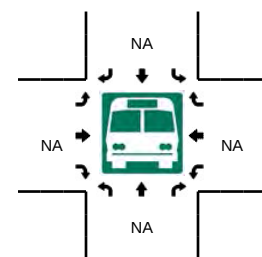
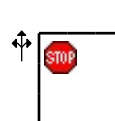
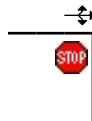
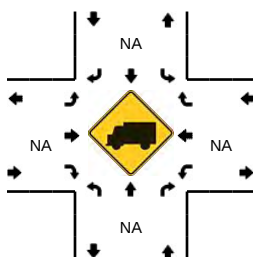
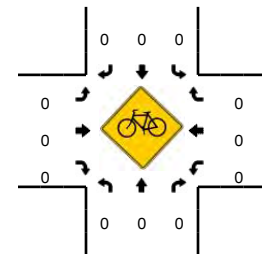
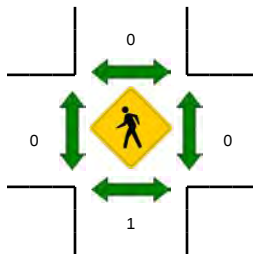
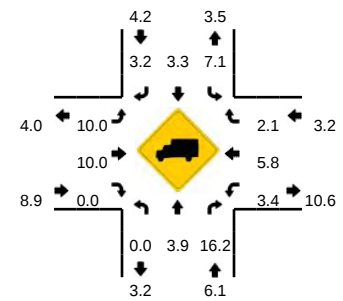
Comments:

LOCATION: NW Brady Rd -- NW 16th Ave
CITY/STATE: Camas, WA

QC JOB #: 14421303
DATE: Thu, Jun 08 2017



Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 7:45 AM -- 8:00 AM



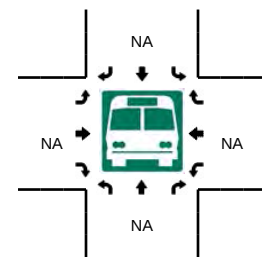
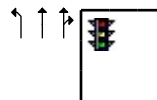
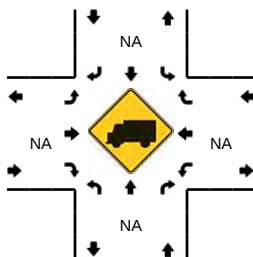
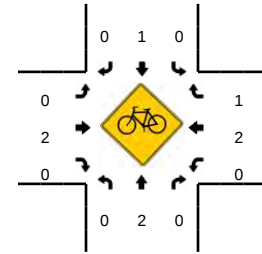
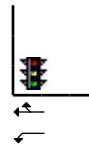
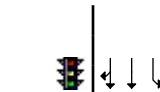
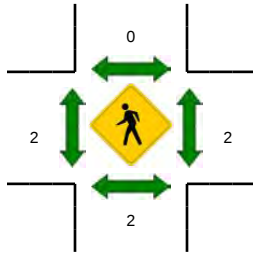
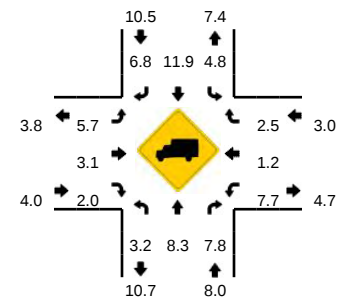
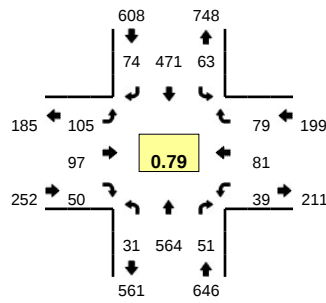
5-Min Count Period Beginning At	NW Brady Rd (Northbound)				NW Brady Rd (Southbound)				NW 16th Ave (Eastbound)				NW 16th Ave (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	6	1	0	2	14	0	0	2	2	0	0	13	4	4	0	48	
7:05 AM	1	7	2	0	1	10	2	0	2	1	0	0	17	5	6	0	54	
7:10 AM	0	6	2	0	1	14	2	0	2	1	1	0	17	6	6	0	58	
7:15 AM	1	5	0	0	2	11	1	0	0	2	0	0	13	2	4	0	41	
7:20 AM	0	8	4	0	4	5	1	0	2	5	1	0	12	4	9	0	55	
7:25 AM	1	6	4	0	4	9	0	0	3	0	0	0	17	2	8	0	54	
7:30 AM	0	8	3	0	5	11	2	0	1	2	0	0	14	3	11	0	60	
7:35 AM	1	15	3	0	5	6	1	0	2	3	0	0	6	2	16	0	60	
7:40 AM	0	12	2	0	5	17	3	0	2	2	0	0	12	4	23	0	82	
7:45 AM	0	15	2	0	4	16	2	0	3	0	1	0	14	5	22	0	84	
7:50 AM	1	10	3	0	5	15	4	0	3	4	1	0	21	8	14	0	89	
7:55 AM	4	19	3	0	3	17	1	0	2	2	2	0	18	8	14	0	93	778
8:00 AM	2	14	4	0	7	16	6	0	1	2	0	0	10	4	7	0	73	803
8:05 AM	3	7	1	0	8	12	3	0	0	3	1	0	12	2	6	0	58	807
8:10 AM	1	7	6	0	2	12	1	0	0	3	0	0	12	4	4	0	52	801
8:15 AM	1	5	4	0	7	10	2	0	5	3	0	0	10	3	9	0	59	819
8:20 AM	3	11	3	0	4	14	4	0	0	2	0	0	5	4	11	0	61	825
8:25 AM	0	4	3	0	1	7	2	0	1	4	1	0	15	5	3	0	46	817
8:30 AM	2	11	5	0	5	7	1	0	0	5	0	0	10	5	6	0	57	814
8:35 AM	1	5	6	0	5	13	3	0	3	0	3	0	5	5	6	0	55	809
8:40 AM	2	1	6	0	3	18	3	0	2	3	1	0	15	15	3	0	72	799
8:45 AM	16	3	4	0	3	10	10	0	3	9	11	0	7	18	3	0	97	812
8:50 AM	12	5	4	0	4	5	4	0	8	8	12	0	5	11	3	0	81	804
8:55 AM	9	6	3	0	3	9	8	0	4	12	15	0	9	16	10	0	104	815
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
All Vehicles	20	176	32	0	48	192	28	0	32	24	16	0	212	84	200	0	1064	
Heavy Trucks	0	4	4		0	0	0		0	0	0		8	0	0		16	
Pedestrians	0	0	0		0	0	0		0	0	0		0	0	0		0	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Railroad																		
Stopped Buses																		

Comments:

LOCATION: SE 192nd Ave -- SE 20th St
CITY/STATE: Camas, WA

QC JOB #: 14421305
DATE: Thu, May 25 2017

Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 7:45 AM -- 8:00 AM



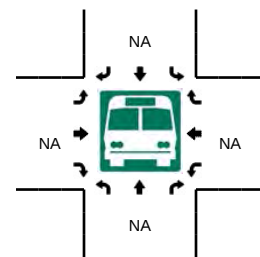
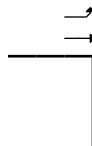
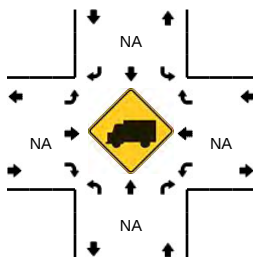
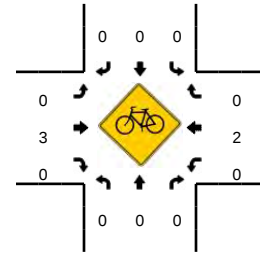
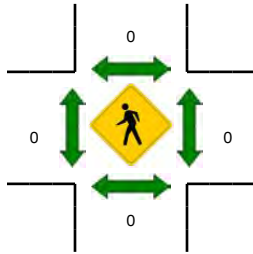
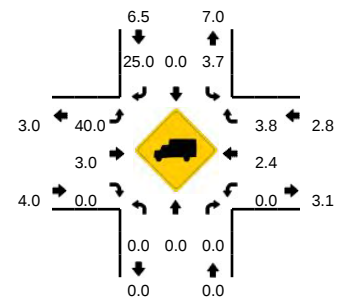
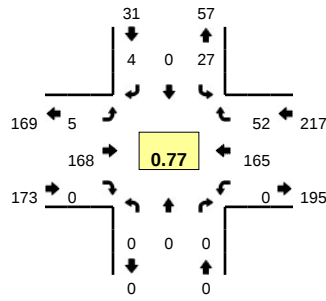
5-Min Count Period Beginning At	SE 192nd Ave (Northbound)				SE 192nd Ave (Southbound)				SE 20th St (Eastbound)				SE 20th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	2	28	1	0	8	22	0	0	1	14	0	0	0	7	3	0	86	
7:05 AM	5	33	3	0	7	18	4	0	1	1	5	0	1	8	7	0	93	
7:10 AM	1	31	2	0	4	23	2	0	3	2	8	0	2	7	1	0	86	
7:15 AM	1	32	1	0	2	25	4	0	1	6	2	0	1	4	5	0	84	
7:20 AM	1	29	1	0	2	26	2	0	2	5	7	0	4	8	2	0	89	
7:25 AM	3	38	3	0	0	40	2	0	6	5	5	0	2	7	2	0	113	
7:30 AM	1	51	4	0	3	22	5	0	7	11	5	0	2	5	7	0	123	
7:35 AM	2	59	0	0	4	39	8	0	16	9	5	0	3	8	12	0	165	
7:40 AM	2	43	8	0	5	38	6	0	9	10	5	0	2	10	7	0	145	
7:45 AM	7	55	11	0	5	61	9	0	16	9	2	0	2	4	11	0	192	
7:50 AM	4	69	6	0	11	47	10	0	12	9	2	0	1	5	5	0	181	
7:55 AM	3	45	4	0	10	47	9	0	9	13	5	0	2	6	11	0	164	1521
8:00 AM	2	39	3	0	8	46	8	0	3	7	3	0	6	4	7	0	136	1571
8:05 AM	4	38	4	0	3	35	5	0	12	8	2	0	5	10	7	0	133	1611
8:10 AM	1	40	1	1	1	33	4	0	4	4	2	0	3	3	0	0	97	1622
8:15 AM	1	36	3	0	4	30	1	0	7	8	5	0	3	7	6	0	111	1649
8:20 AM	2	40	5	0	4	36	7	0	5	3	7	0	5	9	3	0	126	1686
8:25 AM	1	49	2	0	5	37	2	0	5	6	7	0	5	10	3	0	132	1705
8:30 AM	4	37	4	1	5	31	3	0	2	5	7	0	8	0	3	0	110	1692
8:35 AM	4	48	6	0	2	30	6	0	3	5	4	0	7	5	5	0	125	1652
8:40 AM	2	32	2	0	0	44	0	0	7	5	3	0	9	13	3	0	120	1627
8:45 AM	3	49	3	0	10	27	3	0	9	10	5	0	2	8	6	0	135	1570
8:50 AM	3	54	4	0	1	29	4	0	2	7	12	0	6	10	7	0	139	1528
8:55 AM	2	43	4	0	8	46	5	0	9	7	11	0	4	10	11	0	160	1524
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
All Vehicles	56	676	84	0	104	620	112	0	148	124	36	0	20	60	108	0	2148	
Heavy Trucks	0	40	0		4	60	4		0	0	0		0	0	4		112	
Pedestrians	0	0	0		0	0	0		0	0	0		0	0	0		0	
Bicycles	0	0	0		0	0	0		0	1	0		0	1	0		2	
Railroad																		
Stopped Buses																		

Comments:

LOCATION: SE Bybee Rd -- SE 20th St
CITY/STATE: Camas, WA

QC JOB #: 14421307
DATE: Thu, May 25 2017

Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 7:45 AM -- 8:00 AM



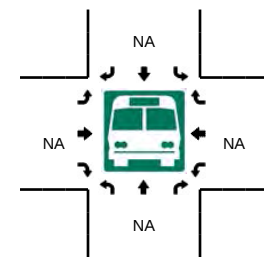
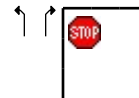
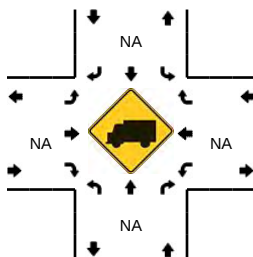
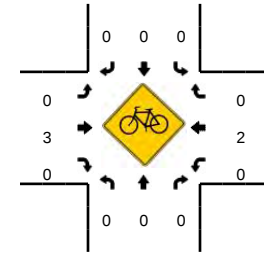
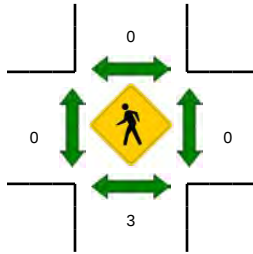
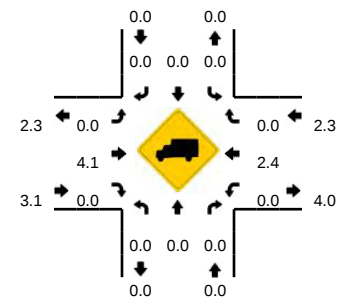
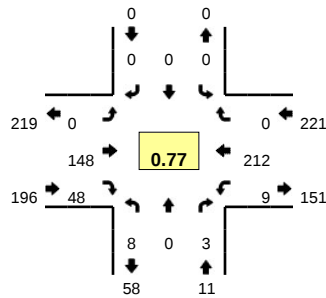
5-Min Count Period Beginning At	SE Bybee Rd (Northbound)				SE Bybee Rd (Southbound)				SE 20th St (Eastbound)				SE 20th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	0	0	0	6	0	0	0	0	25	0	0	0	8	2	0	41	
7:05 AM	0	0	0	0	7	0	0	0	0	12	0	0	0	16	2	0	37	
7:10 AM	0	0	0	0	3	0	0	0	0	7	0	0	0	7	4	0	21	
7:15 AM	0	0	0	0	2	0	0	0	1	7	0	0	0	11	2	0	23	
7:20 AM	0	0	0	0	1	0	0	0	0	7	0	0	0	11	7	0	26	
7:25 AM	0	0	0	0	0	0	1	0	0	7	0	0	0	9	3	0	20	
7:30 AM	0	0	0	0	0	0	0	0	0	14	0	0	0	9	3	0	26	
7:35 AM	0	0	0	0	3	0	0	0	1	8	0	0	0	18	5	0	35	
7:40 AM	0	0	0	0	0	0	0	0	0	16	0	0	0	19	6	0	41	
7:45 AM	0	0	0	0	1	0	0	0	0	22	0	0	0	12	4	0	39	
7:50 AM	0	0	0	0	5	0	0	0	0	24	0	0	0	14	3	0	46	
7:55 AM	0	0	0	0	7	0	0	0	0	19	0	0	0	17	8	0	51	406
8:00 AM	0	0	0	0	1	0	0	0	1	11	0	0	0	14	3	0	30	395
8:05 AM	0	0	0	0	2	0	1	0	1	16	0	0	0	13	2	0	35	393
8:10 AM	0	0	0	0	2	0	0	0	0	7	0	0	0	11	5	0	25	397
8:15 AM	0	0	0	0	2	0	1	0	1	11	0	0	0	9	2	0	26	400
8:20 AM	0	0	0	0	1	0	1	0	1	9	0	0	0	13	6	0	31	405
8:25 AM	0	0	0	0	3	0	1	0	0	11	0	0	0	16	5	0	36	421
8:30 AM	0	0	0	0	4	0	1	0	0	8	0	0	0	8	2	0	23	418
8:35 AM	0	0	0	0	0	0	1	0	0	10	0	0	0	12	0	0	23	406
8:40 AM	0	0	0	0	1	0	0	0	0	9	0	0	0	19	5	0	34	399
8:45 AM	0	0	0	0	2	0	0	0	0	17	0	0	0	15	4	0	38	398
8:50 AM	0	0	0	0	0	0	0	0	0	9	0	0	0	18	9	0	36	388
8:55 AM	0	0	0	0	1	0	1	0	0	17	0	0	0	24	5	0	48	385
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
All Vehicles	0	0	0	0	52	0	0	0	0	260	0	0	0	172	60	0	544	
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bicycles	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2	
Railroad																		
Stopped Buses																		

Comments:

LOCATION: SE Fisher Creek Rd -- SE 20th St
CITY/STATE: Camas, WA

QC JOB #: 14421309
DATE: Thu, May 25 2017

Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 7:45 AM -- 8:00 AM



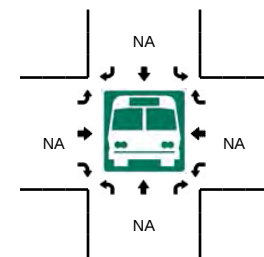
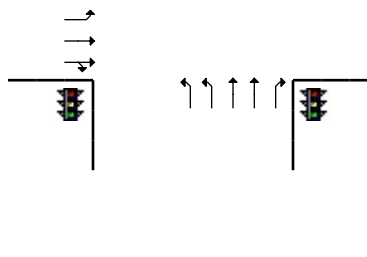
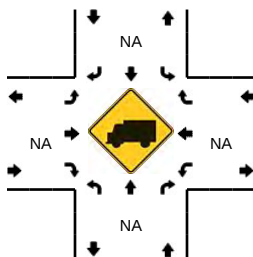
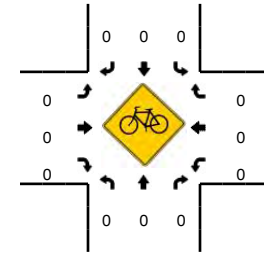
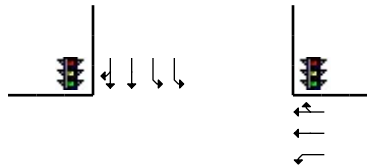
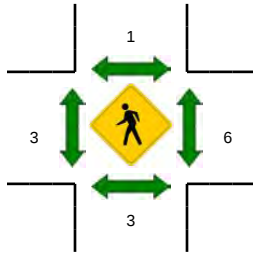
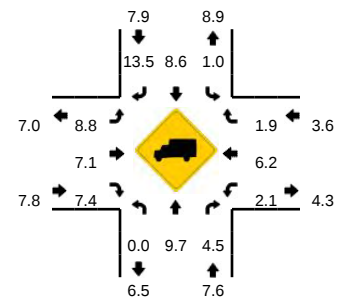
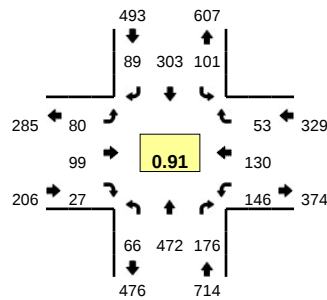
5-Min Count Period Beginning At	SE Fisher Creek Rd (Northbound)				SE Fisher Creek Rd (Southbound)				SE 20th St (Eastbound)				SE 20th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	0	0	0	0	0	0	0	0	7	24	0	3	9	0	0	43	
7:05 AM	0	0	0	1	0	0	0	0	0	4	16	0	3	18	0	0	42	
7:10 AM	0	0	0	0	0	0	0	0	0	3	7	0	0	11	0	0	21	
7:15 AM	0	0	0	0	0	0	0	0	0	6	4	0	1	13	0	0	24	
7:20 AM	0	0	1	0	0	0	0	0	0	4	3	0	1	18	0	0	27	
7:25 AM	0	0	0	0	0	0	0	0	0	7	1	0	2	12	0	0	22	
7:30 AM	0	0	1	0	0	0	0	0	0	11	2	0	0	12	0	0	26	
7:35 AM	2	0	0	1	0	0	0	0	0	9	4	0	0	22	0	0	38	
7:40 AM	0	0	0	0	0	0	0	0	0	13	2	0	1	24	0	0	40	
7:45 AM	1	0	1	0	0	0	0	0	0	18	6	0	0	16	0	0	42	
7:50 AM	0	0	0	0	0	0	0	0	0	22	5	0	0	17	0	0	44	
7:55 AM	0	0	0	0	0	0	0	0	0	16	10	0	2	25	0	0	53	422
8:00 AM	1	0	0	0	0	0	0	0	0	10	4	0	1	16	0	0	32	411
8:05 AM	1	0	0	0	0	0	0	0	0	12	4	0	1	14	0	0	32	401
8:10 AM	1	0	0	0	0	0	0	0	0	8	3	0	1	15	0	0	28	408
8:15 AM	1	0	0	0	0	0	0	0	0	11	2	0	1	10	0	0	25	409
8:20 AM	0	0	0	0	0	0	0	0	0	6	4	0	1	19	0	0	30	412
8:25 AM	0	0	1	0	0	0	0	0	0	12	2	0	1	22	0	0	38	428
8:30 AM	0	0	0	0	0	0	0	0	0	9	0	0	0	9	0	0	18	420
8:35 AM	0	0	0	0	0	0	0	0	0	7	3	0	3	12	0	0	25	407
8:40 AM	0	0	0	0	0	0	0	0	0	7	3	0	0	24	0	0	34	401
8:45 AM	0	0	0	0	0	0	0	0	0	13	7	0	0	19	0	0	39	398
8:50 AM	2	0	0	0	0	0	0	0	0	4	4	0	1	24	0	0	35	389
8:55 AM	2	0	0	0	0	0	0	0	0	14	4	0	0	27	0	0	47	383
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
All Vehicles	4	0	4	0	0	0	0	0	0	224	84	0	8	232	0	0	556	
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bicycles	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2	
Railroad																		
Stopped Buses																		

Comments:

LOCATION: SE 192nd Ave -- SE 34th St
CITY/STATE: Vancouver, WA

QC JOB #: 14421311
DATE: Thu, Jun 08 2017

Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 7:50 AM -- 8:05 AM



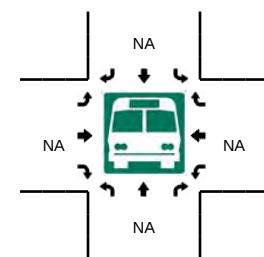
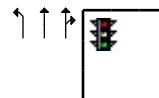
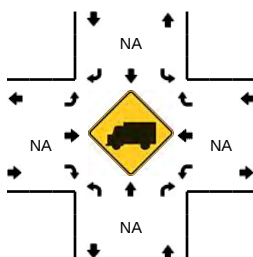
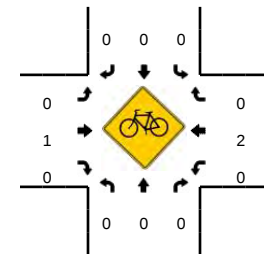
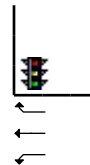
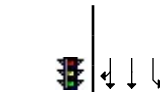
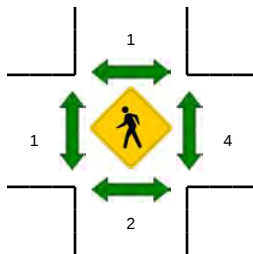
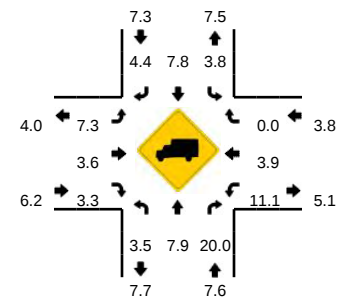
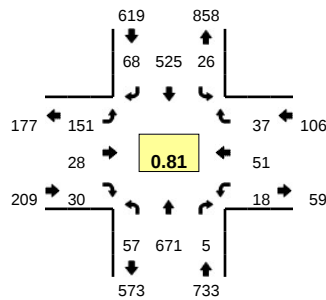
5-Min Count Period Beginning At	SE 192nd Ave (Northbound)				SE 192nd Ave (Southbound)				SE 34th St (Eastbound)				SE 34th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	31	37	0	8	18	5	0	5	9	0	0	13	6	5	0	137	
7:05 AM	2	29	27	0	4	22	3	0	4	7	0	0	16	8	7	0	129	
7:10 AM	3	28	17	0	7	18	5	0	2	6	3	0	5	14	6	0	114	
7:15 AM	1	31	19	0	6	28	3	0	1	6	1	0	9	13	6	0	124	
7:20 AM	2	25	9	0	6	23	4	0	0	6	0	0	11	9	6	0	101	
7:25 AM	6	36	9	0	11	27	6	0	3	8	0	0	9	11	1	0	127	
7:30 AM	5	48	19	0	6	20	4	0	7	13	3	0	12	19	3	0	159	
7:35 AM	2	35	21	0	6	26	6	0	9	9	4	0	21	11	7	0	157	
7:40 AM	5	28	18	0	6	27	3	0	10	3	3	0	13	9	5	0	130	
7:45 AM	4	43	12	0	10	33	12	0	7	6	0	0	10	9	7	0	153	
7:50 AM	7	63	20	0	11	28	8	0	7	9	1	0	13	9	6	0	182	
7:55 AM	8	26	19	0	1	28	11	1	11	10	1	0	9	14	6	0	145	1658
8:00 AM	5	44	13	0	9	25	13	0	8	8	4	0	11	11	3	0	154	1675
8:05 AM	5	39	15	0	10	21	11	0	3	5	3	0	10	14	1	0	137	1683
8:10 AM	1	37	11	0	8	26	5	0	4	10	2	0	9	6	4	0	123	1692
8:15 AM	13	41	5	0	9	21	4	0	6	10	2	0	15	7	7	0	140	1708
8:20 AM	7	33	13	0	6	31	4	0	6	10	2	0	11	9	4	0	136	1743
8:25 AM	4	35	10	0	17	17	8	1	2	6	2	0	12	12	0	0	126	1742
8:30 AM	4	44	5	0	9	23	4	0	0	9	0	0	12	5	4	0	119	1702
8:35 AM	3	44	4	0	6	25	9	0	3	6	3	0	15	8	4	0	130	1675
8:40 AM	1	37	8	0	7	30	5	0	1	15	5	0	11	9	2	0	131	1676
8:45 AM	5	51	8	0	12	32	4	0	6	8	0	0	14	7	9	0	156	1679
8:50 AM	4	41	12	0	17	30	8	0	3	10	2	0	10	11	14	0	162	1659
8:55 AM	9	56	12	0	17	31	15	0	3	9	1	0	6	4	7	0	170	1684
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
All Vehicles	80	532	208	0	84	324	128	4	104	108	24	0	132	136	60	0	1924	
Heavy Trucks	0	56	12		0	20	20		4	4	0		0	0	0		116	
Pedestrians		0				0				0				16			16	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Railroad																		
Stopped Buses																		

Comments:

LOCATION: SE 192nd Ave -- SE 15th St
CITY/STATE: Camas, WA

QC JOB #: 14421313
DATE: Thu, Jun 08 2017

Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

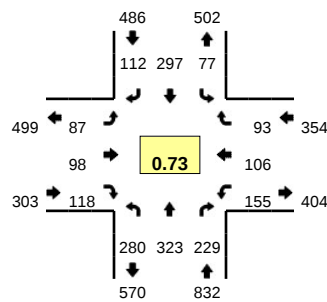


5-Min Count Period Beginning At	SE 192nd Ave (Northbound)				SE 192nd Ave (Southbound)				SE 15th St (Eastbound)				SE 15th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	5	37	2	0	5	40	1	0	3	1	1	0	0	2	0	0	97	
7:05 AM	0	40	0	0	4	30	0	0	3	3	5	0	2	1	0	0	88	
7:10 AM	1	38	0	0	1	16	1	0	2	3	6	0	1	3	5	0	77	
7:15 AM	3	37	0	0	2	34	6	0	3	3	3	0	5	2	5	0	103	
7:20 AM	5	40	1	0	0	43	4	0	3	0	0	0	1	3	0	0	100	
7:25 AM	5	43	0	0	2	27	2	0	2	2	2	0	2	2	0	0	89	
7:30 AM	4	58	0	0	0	28	0	0	11	0	5	0	1	2	2	0	111	
7:35 AM	2	67	1	0	2	39	7	0	16	1	0	0	1	2	3	0	141	
7:40 AM	4	62	0	0	2	43	6	0	13	3	5	0	1	6	6	0	151	
7:45 AM	6	61	1	0	0	51	6	0	12	4	4	0	2	7	5	0	159	
7:50 AM	4	72	0	0	3	67	7	0	17	1	0	0	2	6	3	0	182	
7:55 AM	5	67	2	0	5	62	9	0	8	1	3	0	5	7	1	0	175	1473
8:00 AM	11	63	0	0	2	49	10	0	14	2	3	0	1	3	1	0	159	1535
8:05 AM	4	38	1	0	5	46	8	0	9	4	1	0	0	7	5	0	128	1575
8:10 AM	3	40	0	0	1	39	3	0	11	4	1	0	2	3	6	0	113	1611
8:15 AM	4	49	0	0	0	25	4	0	13	4	3	0	1	2	2	0	107	1615
8:20 AM	7	39	0	0	4	43	4	0	12	1	2	1	2	2	2	0	119	1634
8:25 AM	3	55	0	0	2	33	4	0	14	3	3	0	0	4	1	0	122	1667
8:30 AM	6	36	0	0	0	39	5	0	9	2	2	0	0	2	1	0	102	1658
8:35 AM	2	44	0	0	0	45	8	0	7	4	1	0	3	0	3	0	117	1634
8:40 AM	7	55	0	0	1	43	10	0	6	1	2	0	1	2	4	0	132	1615
8:45 AM	3	51	0	0	1	45	11	0	5	0	1	0	1	6	2	0	126	1582
8:50 AM	6	60	0	0	0	56	2	0	5	1	6	0	4	5	4	0	149	1549
8:55 AM	7	68	1	0	0	41	3	0	9	0	4	0	1	7	3	0	144	1518
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	60	800	12	0	32	720	88	0	148	24	28	0	36	80	36	0	2064	
Heavy Trucks	0	44	0	0	0	48	4	0	4	0	0	0	0	0	0	0	100	
Pedestrians	8				4				0				8				20	
Bicycles	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0	0	3	
Railroad																		
Stopped Buses																		

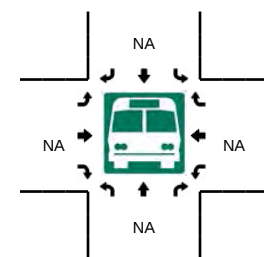
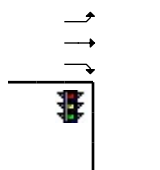
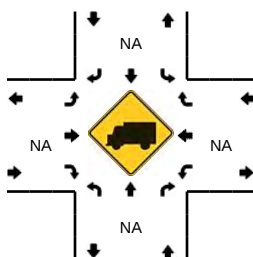
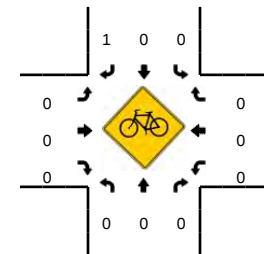
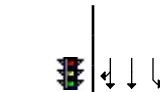
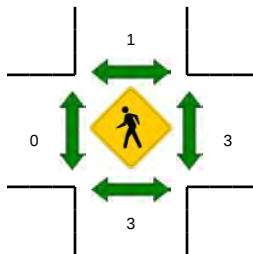
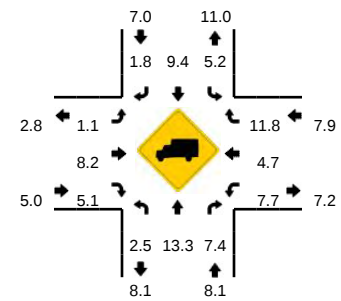
Comments:

LOCATION: SE 192nd Ave -- Mill Plain Blvd
CITY/STATE: Vancouver, WA

QC JOB #: 14421315
DATE: Thu, Jun 08 2017



Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

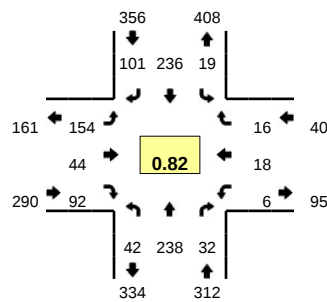


5-Min Count Period Beginning At	SE 192nd Ave (Northbound)				SE 192nd Ave (Southbound)				Mill Plain Blvd (Eastbound)				Mill Plain Blvd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	15	21	4	0	1	35	5	0	2	0	3	0	0	0	1	0	87	
7:05 AM	14	25	2	0	2	19	4	0	6	3	9	0	0	1	1	0	86	
7:10 AM	14	20	3	0	1	22	8	0	4	1	5	0	0	2	0	0	80	
7:15 AM	21	20	2	0	3	23	9	0	5	1	7	0	0	0	0	0	91	
7:20 AM	17	26	2	0	1	35	9	0	4	2	7	0	1	0	1	0	105	
7:25 AM	17	16	8	0	7	23	9	0	5	5	8	0	0	1	1	0	100	
7:30 AM	17	20	17	0	8	17	3	0	8	9	8	1	4	10	3	0	125	
7:35 AM	22	13	34	0	13	18	7	0	7	17	9	0	12	9	2	0	163	
7:40 AM	28	20	39	0	11	24	7	0	4	16	15	0	14	10	5	0	193	
7:45 AM	22	16	36	0	15	30	14	0	6	10	8	0	23	14	16	0	210	
7:50 AM	17	22	45	0	10	30	5	0	7	11	10	0	31	13	23	0	224	
7:55 AM	34	31	36	0	11	30	8	0	8	13	7	0	30	17	14	0	239	1703
8:00 AM	24	44	15	0	4	32	17	0	10	9	7	0	16	16	15	0	209	1825
8:05 AM	29	27	3	0	2	28	6	0	4	1	12	0	17	6	5	0	140	1879
8:10 AM	14	30	1	0	2	19	9	0	9	4	11	0	1	3	3	0	106	1905
8:15 AM	20	39	0	0	0	19	7	0	10	6	8	0	3	4	3	0	119	1933
8:20 AM	30	26	2	0	0	30	17	0	4	2	15	0	3	3	2	0	134	1962
8:25 AM	23	35	1	0	1	20	12	0	9	0	8	0	1	1	2	0	113	1975
8:30 AM	17	34	1	0	1	26	10	0	10	2	12	0	0	1	0	0	114	1964
8:35 AM	23	26	1	0	0	37	11	0	7	0	7	0	2	2	0	0	116	1917
8:40 AM	18	37	4	0	1	41	12	1	6	0	13	0	1	0	0	0	134	1858
8:45 AM	19	24	2	0	1	45	13	0	14	0	6	0	1	0	0	0	125	1773
8:50 AM	30	45	2	0	0	36	13	0	5	2	18	0	0	1	0	0	152	1701
8:55 AM	34	32	1	0	5	24	13	0	6	1	12	0	1	2	1	0	132	1594
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	292	276	468	0	144	360	108	0	84	136	100	0	336	176	212	0	2692	
Heavy Trucks	8	28	16		8	16	0		0	8	4		20	8	28		144	
Pedestrians	0	0	0		0	0	0		0	0	0		0	0	0		0	
Bicycles	0	0	0		0	0	1		0	0	0		0	0	0		1	
Railroad																		
Stopped Buses																		

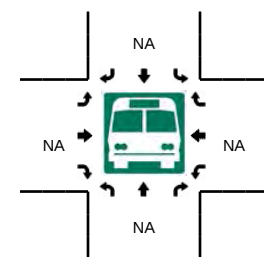
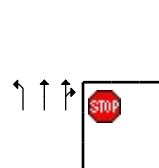
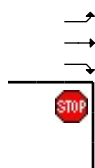
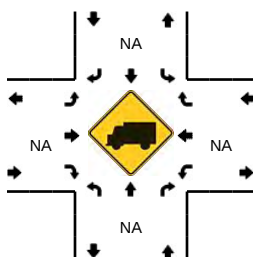
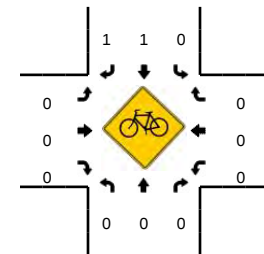
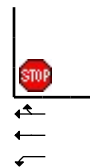
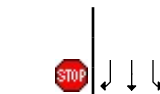
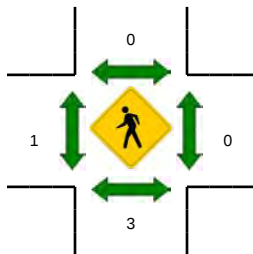
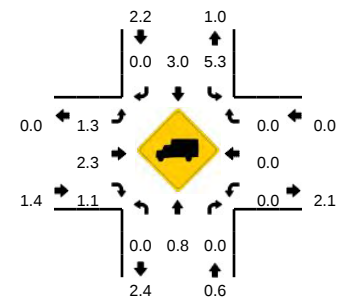
Comments:

LOCATION: NW Parker St -- NW Pacific Rim Blvd
CITY/STATE: Camas, WA

QC JOB #: 14421302
DATE: Wed, May 24 2017



Peak-Hour: 4:35 PM -- 5:35 PM
Peak 15-Min: 5:00 PM -- 5:15 PM

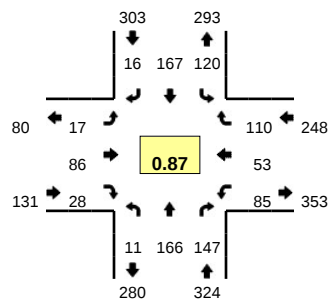


5-Min Count Period Beginning At	NW Parker St (Northbound)				NW Parker St (Southbound)				NW Pacific Rim Blvd (Eastbound)				NW Pacific Rim Blvd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	3	24	3	0	2	23	11	0	11	3	2	0	1	2	0	0	85	
4:05 PM	1	20	3	0	2	34	9	0	8	1	10	0	3	3	4	0	98	
4:10 PM	1	12	5	0	0	28	13	0	15	3	7	0	0	2	0	0	86	
4:15 PM	3	22	6	0	0	13	4	0	11	3	5	0	0	4	0	0	71	
4:20 PM	0	20	3	0	0	10	9	0	13	4	7	0	1	4	1	0	72	
4:25 PM	2	12	5	0	0	20	8	0	13	2	4	0	4	3	0	0	73	
4:30 PM	2	20	2	0	1	19	5	0	9	5	6	0	1	1	0	0	71	
4:35 PM	3	18	2	0	1	20	8	0	13	6	9	0	1	1	1	0	83	
4:40 PM	2	9	4	0	0	10	8	0	8	4	2	0	0	1	4	0	52	
4:45 PM	3	17	3	0	2	12	7	0	5	3	10	0	1	2	3	0	68	
4:50 PM	4	13	2	0	1	19	2	0	6	4	5	0	1	1	2	0	60	
4:55 PM	4	19	1	0	1	16	2	0	7	2	6	0	0	3	1	0	62	881
5:00 PM	3	25	3	0	2	25	13	0	20	5	10	0	0	2	1	0	109	905
5:05 PM	3	25	3	0	1	28	10	0	11	2	12	0	1	3	0	0	99	906
5:10 PM	6	23	2	0	0	21	8	0	16	3	15	0	0	1	1	0	96	916
5:15 PM	6	22	4	0	4	24	13	0	14	4	7	0	0	1	1	0	100	945
5:20 PM	3	18	2	0	2	17	14	0	19	3	4	0	1	2	1	0	86	959
5:25 PM	3	28	5	0	3	25	11	0	17	4	7	0	1	0	1	0	105	991
5:30 PM	2	21	1	0	2	19	5	0	18	4	5	0	0	1	0	0	78	998
5:35 PM	4	14	1	0	2	32	10	0	16	4	6	0	0	4	0	0	93	1008
5:40 PM	3	20	3	0	1	16	7	0	9	9	7	0	1	2	0	0	78	1034
5:45 PM	4	21	2	0	0	13	11	0	12	3	5	1	0	0	2	0	74	1040
5:50 PM	2	15	3	0	3	20	5	0	14	5	4	0	0	0	1	0	72	1052
5:55 PM	0	20	2	0	0	16	10	0	10	1	7	0	2	2	2	0	72	1062
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
All Vehicles	48	292	32	0	12	296	124	0	188	40	148	0	4	24	8	0	1216	
Heavy Trucks	0	0	0	0	0	12	0	0	0	0	4	0	0	0	0	0	16	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bicycles	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	2	
Railroad																		
Stopped Buses																		

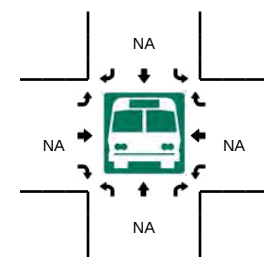
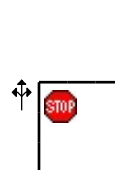
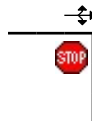
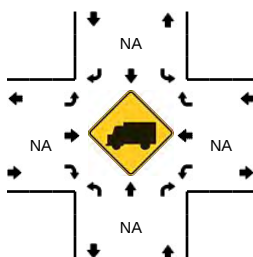
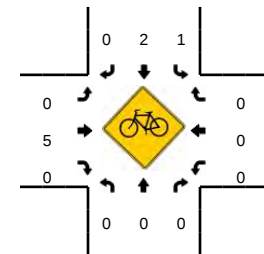
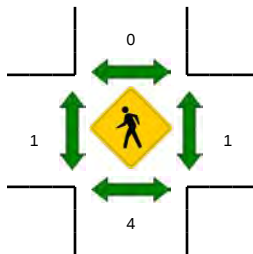
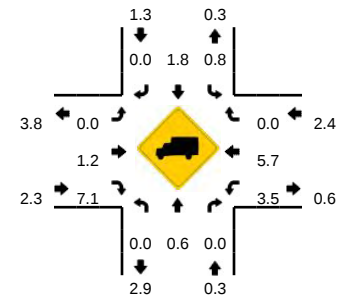
Comments:

LOCATION: NW Brady Rd -- NW 16th Ave
CITY/STATE: Camas, WA

QC JOB #: 14421304
DATE: Wed, May 24 2017



Peak-Hour: 4:35 PM -- 5:35 PM
Peak 15-Min: 5:00 PM -- 5:15 PM



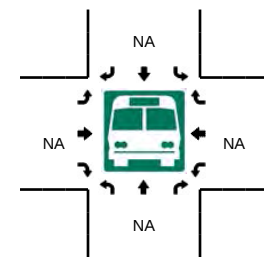
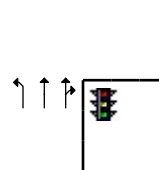
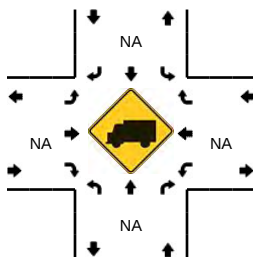
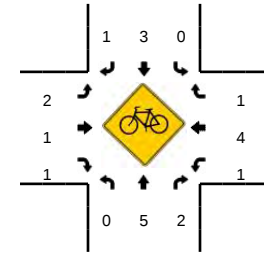
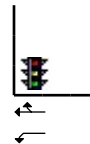
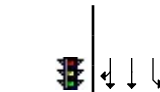
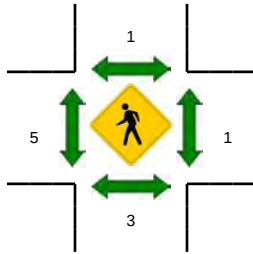
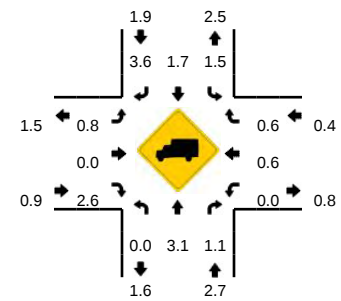
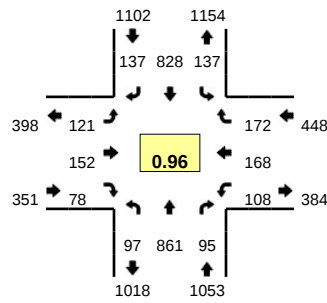
5-Min Count Period Beginning At	NW Brady Rd (Northbound)				NW Brady Rd (Southbound)				NW 16th Ave (Eastbound)				NW 16th Ave (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	4	15	12	0	12	9	2	0	3	3	3	0	3	7	10	0	83	
4:05 PM	2	11	9	0	17	15	1	0	3	7	0	0	6	2	5	0	78	
4:10 PM	0	14	10	0	16	12	3	0	6	9	4	0	11	6	6	0	97	
4:15 PM	0	17	14	0	10	5	2	0	2	8	0	0	12	3	6	0	79	
4:20 PM	1	13	11	0	5	6	1	0	1	3	2	0	8	4	5	0	60	
4:25 PM	1	10	10	0	7	9	3	0	1	20	1	0	8	1	8	0	79	
4:30 PM	2	15	15	0	17	9	2	0	2	9	1	0	12	5	6	0	95	
4:35 PM	1	14	14	0	7	13	2	0	0	11	3	0	9	4	8	0	86	
4:40 PM	1	11	16	0	7	10	0	0	3	7	2	0	3	3	5	0	68	
4:45 PM	3	13	15	0	10	8	1	0	1	5	0	0	7	4	2	0	69	
4:50 PM	2	13	18	0	7	14	1	0	2	9	4	0	7	4	13	0	94	
4:55 PM	0	10	8	0	11	11	1	0	0	7	4	0	3	8	8	0	71	959
5:00 PM	0	21	13	0	10	12	1	0	4	6	2	0	12	3	9	0	93	969
5:05 PM	1	13	14	0	12	19	2	0	1	9	3	0	11	3	10	0	98	989
5:10 PM	1	17	14	0	17	19	0	0	0	1	1	0	12	5	11	0	98	990
5:15 PM	0	15	9	0	8	20	2	0	0	13	3	0	5	2	16	0	93	1004
5:20 PM	1	11	15	0	7	16	1	0	2	8	2	0	3	8	8	0	82	1026
5:25 PM	0	12	7	0	10	15	2	0	3	5	3	0	7	5	9	0	78	1025
5:30 PM	1	16	4	0	14	10	3	0	1	5	1	0	6	4	11	0	76	1006
5:35 PM	0	9	9	0	8	11	0	0	2	8	2	0	6	3	2	0	60	980
5:40 PM	0	16	8	0	10	14	1	0	1	6	0	0	12	3	8	0	79	991
5:45 PM	1	14	10	0	11	8	3	0	0	9	2	0	4	2	8	0	72	994
5:50 PM	2	17	18	0	13	11	1	0	2	7	0	0	8	6	5	0	90	990
5:55 PM	0	14	21	0	11	7	0	0	1	3	2	0	4	6	4	0	73	992
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	8	204	164	0	156	200	12	0	20	64	24	0	140	44	120	0	1156	
Heavy Trucks	0	0	0	0	4	8	0	0	0	0	8	0	8	4	0	0	32	
Pedestrians	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	4	
Bicycles	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	
Railroad																		
Stopped Buses																		

Comments:

LOCATION: SE 192nd Ave -- SE 20th St
CITY/STATE: Camas, WA

QC JOB #: 14421306
DATE: Wed, May 24 2017

Peak-Hour: 4:35 PM -- 5:35 PM
Peak 15-Min: 5:00 PM -- 5:15 PM

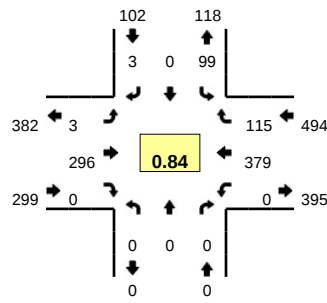


5-Min Count Period Beginning At	SE 192nd Ave (Northbound)				SE 192nd Ave (Southbound)				SE 20th St (Eastbound)				SE 20th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	8	53	4	0	12	60	14	0	13	8	4	0	7	14	9	0	206	
4:05 PM	6	66	4	0	7	73	13	0	11	16	6	0	10	13	11	0	236	
4:10 PM	7	58	3	0	7	72	8	0	6	8	4	0	3	12	8	0	196	
4:15 PM	7	49	2	0	10	62	6	0	15	14	5	0	6	12	10	0	198	
4:20 PM	12	78	6	0	10	77	12	0	11	12	5	0	7	11	6	0	247	
4:25 PM	11	74	6	1	10	67	10	0	11	18	9	0	11	9	6	0	243	
4:30 PM	7	60	2	1	14	77	16	0	13	11	3	0	8	10	11	0	233	
4:35 PM	9	80	8	0	9	82	7	0	7	7	5	0	10	12	22	0	258	
4:40 PM	9	49	6	0	7	70	20	0	7	12	8	0	9	11	13	0	221	
4:45 PM	7	71	9	1	11	58	14	0	12	14	9	0	10	14	15	0	245	
4:50 PM	11	76	9	0	13	56	12	0	6	16	3	0	6	13	3	0	224	
4:55 PM	6	71	10	1	13	72	16	0	14	12	7	0	7	15	13	0	257	2764
5:00 PM	6	63	6	1	9	64	13	0	15	11	8	0	9	17	7	0	229	2787
5:05 PM	8	81	6	1	9	75	13	0	9	19	3	0	13	23	16	0	276	2827
5:10 PM	3	71	4	0	15	92	12	0	7	14	6	0	12	16	16	0	268	2899
5:15 PM	11	66	6	0	9	72	4	0	8	9	6	0	9	7	18	0	225	2926
5:20 PM	9	73	13	0	13	59	9	0	17	11	15	0	5	18	15	0	257	2936
5:25 PM	5	86	9	0	14	61	11	0	6	17	4	0	9	10	15	0	247	2940
5:30 PM	9	74	9	0	15	67	6	0	13	10	4	0	9	12	19	0	247	2954
5:35 PM	7	68	6	0	15	61	9	0	14	17	8	0	5	17	9	0	236	2932
5:40 PM	6	61	4	0	8	86	5	0	13	9	4	0	6	15	5	0	222	2933
5:45 PM	9	50	5	0	10	82	9	0	10	15	9	0	7	10	14	0	230	2918
5:50 PM	6	65	5	0	4	67	10	0	15	6	2	0	9	14	8	0	211	2905
5:55 PM	8	43	3	0	10	68	6	0	9	9	3	0	3	5	5	0	172	2820
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	68	860	64	8	132	924	152	0	124	176	68	0	136	224	156	0	3092	
Heavy Trucks	0	20	0		4	16	4		4	0	0		0	0	0		48	
Pedestrians		4				0				0				0			4	
Bicycles	0	2	0		0	2	0		1	0	0		0	0	0		5	
Railroad																		
Stopped Buses																		

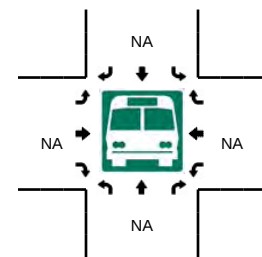
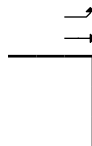
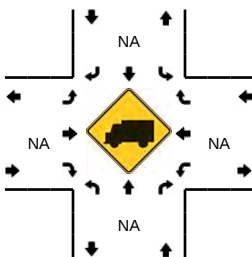
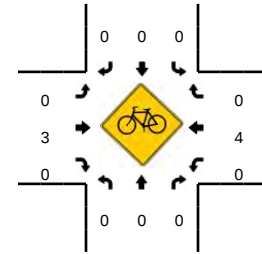
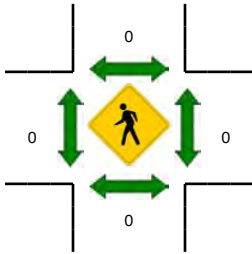
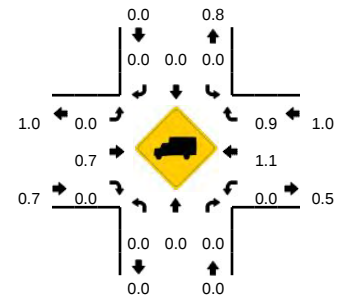
Comments:

LOCATION: SE Bybee Rd -- SE 20th St
CITY/STATE: Camas, WA

QC JOB #: 14421308
DATE: Wed, May 24 2017



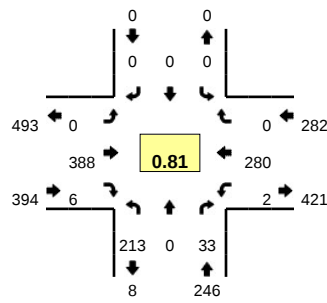
Peak-Hour: 4:35 PM -- 5:35 PM
Peak 15-Min: 5:00 PM -- 5:15 PM

[illegible]

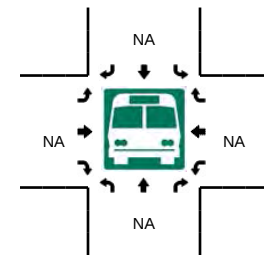
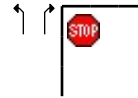
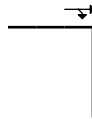
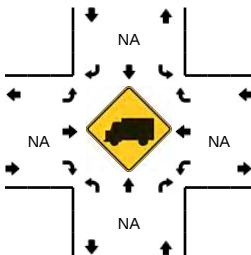
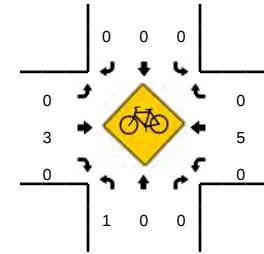
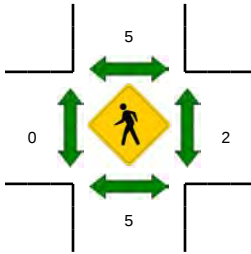
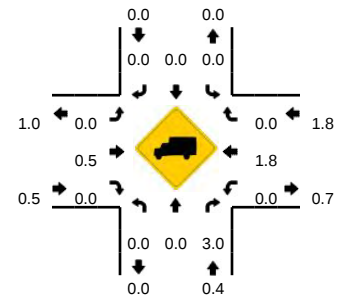
Comments:

LOCATION: SE Fisher Creek Rd -- SE 20th St
CITY/STATE: Camas, WA

QC JOB #: 14421310
DATE: Wed, May 24 2017



Peak-Hour: 4:35 PM -- 5:35 PM
Peak 15-Min: 5:00 PM -- 5:15 PM

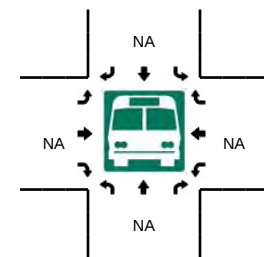
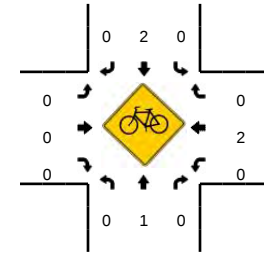
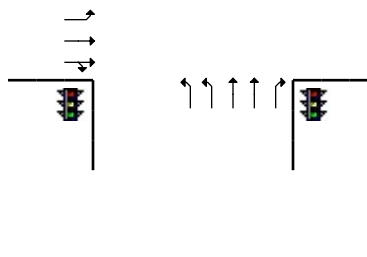
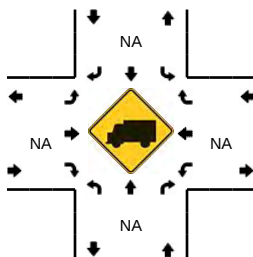
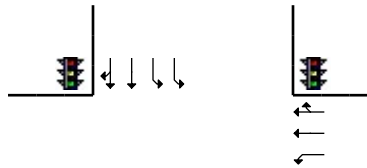
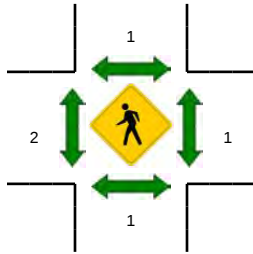
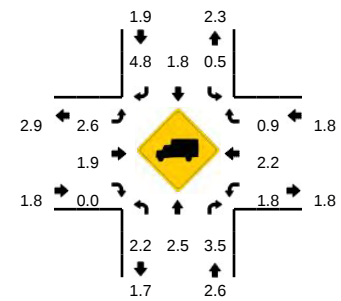
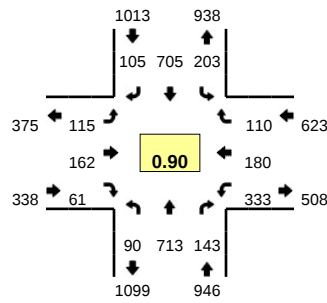
[illegible]

Comments:

LOCATION: SE 192nd Ave -- SE 34th St
CITY/STATE: Vancouver, WA

QC JOB #: 14421312
DATE: Thu, Jun 08 2017

Peak-Hour: 4:35 PM -- 5:35 PM
Peak 15-Min: 5:10 PM -- 5:25 PM



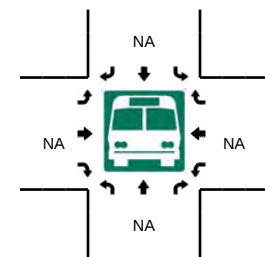
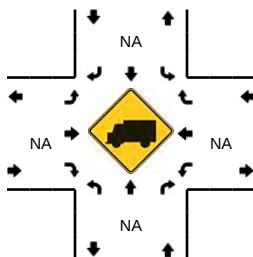
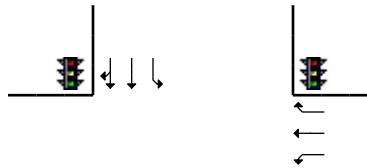
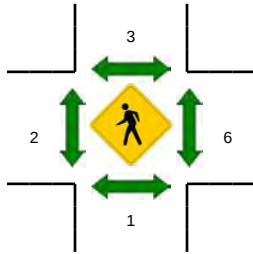
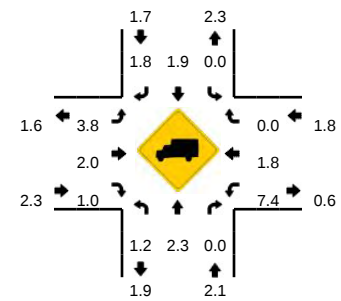
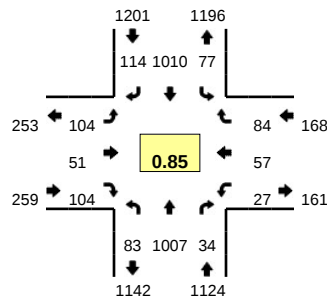
5-Min Count Period Beginning At	SE 192nd Ave (Northbound)				SE 192nd Ave (Southbound)				SE 34th St (Eastbound)				SE 34th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	7	64	15	0	13	45	3	0	21	11	11	0	25	3	8	0	226	
4:05 PM	5	51	13	0	19	61	6	0	21	11	9	0	27	17	8	0	248	
4:10 PM	7	59	10	0	17	40	12	0	11	22	9	0	28	21	14	0	250	
4:15 PM	9	59	11	0	18	70	6	0	5	15	13	0	28	10	18	0	262	
4:20 PM	15	71	8	0	16	51	9	0	8	8	3	0	14	10	5	0	218	
4:25 PM	3	67	13	0	10	47	8	0	15	13	11	0	24	10	14	0	235	
4:30 PM	4	67	12	0	20	59	9	0	7	12	6	0	20	5	7	0	228	
4:35 PM	8	61	15	0	15	55	3	0	10	13	7	0	27	12	7	0	233	
4:40 PM	10	59	12	0	15	55	5	0	10	19	6	0	39	15	7	0	252	
4:45 PM	6	53	11	0	12	47	7	0	10	4	4	0	22	8	7	0	191	
4:50 PM	10	63	16	0	16	57	7	0	11	9	5	0	22	3	1	0	220	
4:55 PM	5	45	15	0	20	61	4	0	13	27	4	0	19	16	11	0	240	2803
5:00 PM	7	74	12	0	19	44	8	0	9	10	1	0	26	20	11	0	241	2818
5:05 PM	6	68	5	0	26	51	6	0	5	13	4	0	33	17	12	0	246	2816
5:10 PM	13	48	5	0	19	64	13	0	12	14	7	0	34	24	15	0	268	2834
5:15 PM	5	52	20	0	17	89	8	0	8	13	5	0	32	26	11	0	286	2858
5:20 PM	9	65	10	0	18	72	13	0	8	16	7	0	26	10	6	0	260	2900
5:25 PM	4	54	13	0	14	55	23	0	11	16	5	0	26	14	13	0	248	2913
5:30 PM	7	71	9	0	12	55	8	0	8	8	6	0	27	15	9	0	235	2920
5:35 PM	8	54	13	0	14	61	7	0	6	14	4	0	23	7	12	0	223	2910
5:40 PM	8	69	4	0	13	57	9	0	8	8	3	0	16	8	6	0	209	2867
5:45 PM	6	61	7	1	15	67	8	1	7	19	3	0	17	11	4	0	227	2903
5:50 PM	3	58	18	0	18	56	8	0	8	16	7	0	15	7	13	0	227	2910
5:55 PM	5	62	6	0	15	36	7	0	10	12	1	0	15	3	0	0	172	2842
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
All Vehicles	108	660	140	0	216	900	136	0	112	172	76	0	368	240	128	0	3256	
Heavy Trucks	0	4	4		4	24	16		4	4	0		4	0	0		64	
Pedestrians		4				0				4				0			8	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Railroad																		
Stopped Buses																		

Comments:

LOCATION: SE 192nd Ave -- SE 15th St
CITY/STATE: Camas, WA

QC JOB #: 14421314
DATE: Thu, Jun 08 2017

Peak-Hour: 4:35 PM -- 5:35 PM
Peak 15-Min: 5:10 PM -- 5:25 PM

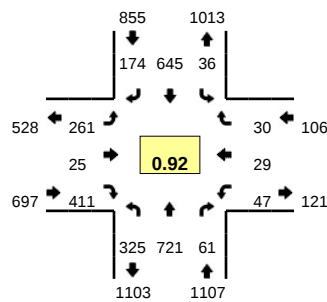


5-Min Count Period Beginning At	SE 192nd Ave (Northbound)				SE 192nd Ave (Southbound)				SE 15th St (Eastbound)				SE 15th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	3	89	0	1	2	85	14	0	5	7	8	0	2	7	1	0	224	
4:05 PM	5	87	5	0	4	79	14	0	6	4	2	0	5	8	6	0	225	
4:10 PM	10	87	3	0	2	97	10	0	7	7	9	0	4	8	6	0	250	
4:15 PM	3	84	3	0	8	79	16	0	6	7	5	0	0	2	3	0	216	
4:20 PM	10	75	0	0	4	82	12	0	12	6	7	0	2	3	2	0	215	
4:25 PM	3	89	3	0	4	70	4	0	8	2	8	0	3	2	6	0	202	
4:30 PM	5	98	6	0	5	90	8	0	10	5	9	0	1	5	2	0	244	
4:35 PM	5	81	1	0	6	69	7	0	9	5	7	0	3	2	10	0	205	
4:40 PM	10	87	2	0	7	81	9	0	6	4	5	0	5	1	1	0	218	
4:45 PM	8	85	2	1	11	75	12	0	10	1	6	0	1	5	7	0	224	
4:50 PM	7	72	2	0	6	71	12	0	14	6	16	0	0	7	7	0	220	
4:55 PM	7	90	2	0	4	77	5	0	10	2	7	0	4	4	7	0	219	2662
5:00 PM	5	87	6	0	7	83	8	0	5	1	8	0	1	3	6	0	220	2658
5:05 PM	10	75	2	0	6	87	5	0	11	7	12	0	3	6	10	0	234	2667
5:10 PM	10	110	7	0	8	113	13	0	7	4	5	0	2	4	6	0	289	2706
5:15 PM	7	78	2	0	11	96	14	0	5	4	14	0	4	11	4	0	250	2740
5:20 PM	5	89	4	0	4	103	14	1	11	9	10	0	0	6	13	0	269	2794
5:25 PM	3	77	1	0	6	82	8	0	8	3	9	0	3	4	7	0	211	2803
5:30 PM	5	76	3	0	0	73	7	0	8	5	5	0	1	4	6	0	193	2752
5:35 PM	4	76	0	0	4	79	4	0	10	8	5	0	0	7	3	0	200	2747
5:40 PM	7	96	2	0	3	98	4	0	7	3	8	0	1	0	8	0	237	2766
5:45 PM	5	81	6	1	3	86	9	0	9	3	8	0	3	5	3	0	222	2764
5:50 PM	6	84	5	0	4	67	8	0	6	5	5	0	2	1	5	0	198	2742
5:55 PM	1	81	2	0	4	66	8	0	6	5	4	0	1	4	5	0	187	2710
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
All Vehicles	88	1108	52	0	92	1248	164	4	92	68	116	0	24	84	92	0	3232	
Heavy Trucks	0	20	0		0	36	0		8	4	4		0	0	0		72	
Pedestrians	0	0	0		0	0	0		0	0	0		0	0	0		0	
Bicycles	0	0	0		0	1	0		0	0	0		0	0	0		1	
Railroad																		
Stopped Buses																		

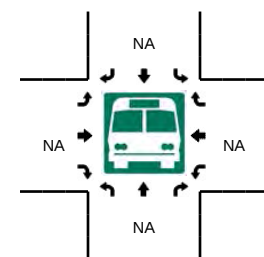
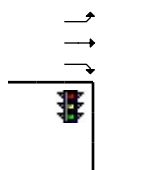
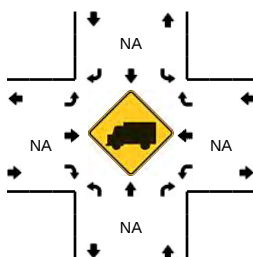
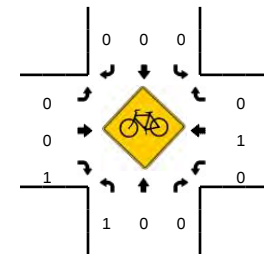
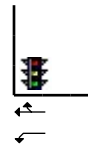
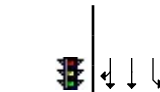
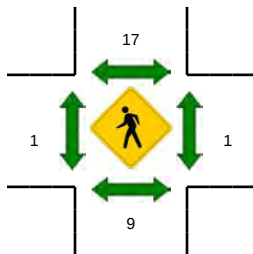
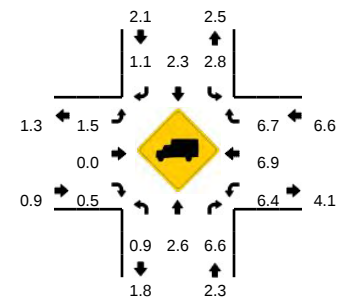
Comments:

LOCATION: SE 192nd Ave -- Mill Plain Blvd
CITY/STATE: Vancouver, WA

QC JOB #: 14421316
DATE: Thu, Jun 08 2017



Peak-Hour: 4:35 PM -- 5:35 PM
Peak 15-Min: 5:05 PM -- 5:20 PM



5-Min Count Period Beginning At	SE 192nd Ave (Northbound)				SE 192nd Ave (Southbound)				Mill Plain Blvd (Eastbound)				Mill Plain Blvd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	27	63	3	0	2	54	16	0	23	0	33	0	2	0	2	0	225	
4:05 PM	24	68	0	0	2	50	16	0	18	0	22	0	7	0	2	0	209	
4:10 PM	28	61	2	0	1	50	15	0	24	1	35	0	4	0	1	0	222	
4:15 PM	24	55	0	0	3	41	12	1	20	3	37	0	1	2	0	0	199	
4:20 PM	23	46	2	0	2	47	12	2	19	1	40	0	0	1	0	0	195	
4:25 PM	31	58	1	0	1	47	12	0	26	2	30	0	1	1	3	0	213	
4:30 PM	35	56	1	0	1	62	13	0	20	2	39	0	4	2	1	0	236	
4:35 PM	23	72	2	0	1	45	16	0	20	2	30	0	2	1	1	0	215	
4:40 PM	23	63	4	0	1	59	13	0	28	0	23	0	1	1	0	0	216	
4:45 PM	24	71	4	0	5	48	13	0	11	1	34	0	4	1	2	0	218	
4:50 PM	29	46	10	0	2	33	17	0	26	1	37	0	2	3	2	0	208	
4:55 PM	25	62	10	0	6	56	14	0	20	2	19	0	7	2	3	0	226	2582
5:00 PM	30	54	3	0	1	60	18	0	31	1	27	0	3	1	4	0	233	2590
5:05 PM	26	67	7	0	7	73	17	0	20	1	47	0	1	1	4	0	271	2652
5:10 PM	35	60	12	0	3	43	12	1	18	3	47	0	2	2	1	0	239	2669
5:15 PM	31	48	1	0	0	71	20	0	12	2	50	0	3	2	3	0	243	2713
5:20 PM	23	58	6	0	6	56	9	0	21	4	40	0	13	9	6	0	251	2769
5:25 PM	33	69	1	0	1	47	11	0	32	6	30	0	8	5	3	0	246	2802
5:30 PM	23	51	1	0	2	54	14	0	22	2	27	0	1	1	1	0	199	2765
5:35 PM	26	60	2	0	1	46	18	0	29	1	36	0	0	1	0	0	220	2770
5:40 PM	26	68	2	0	4	47	11	0	29	0	32	0	1	2	3	0	225	2779
5:45 PM	28	47	1	0	1	59	21	0	17	3	29	0	0	0	0	0	206	2767
5:50 PM	32	58	2	0	2	49	10	0	29	2	30	0	0	1	0	0	215	2774
5:55 PM	29	50	3	0	1	45	14	0	26	1	26	0	1	3	1	0	200	2748
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
All Vehicles	368	700	80	0	40	748	196	4	200	24	576	0	24	20	32	0	3012	
Heavy Trucks	8	12	12		0	16	0		4	0	0		8	4	0		64	
Pedestrians		8				8				4				4			24	
Bicycles	0	0	0		0	0	0		0	0	1		0	0	0		1	
Railroad																		
Stopped Buses																		

Comments:

Appendix D
Existing Traffic Operations
Analysis Worksheets

HCM Signalized Intersection Capacity Analysis

1: SE 192nd Ave & Mill Plain Blvd

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	87	98	118	155	106	93	280	323	229	77	297	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.93		1.00	0.94		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1759	1526	1671	1622		3433	3029		1719	3233	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1787	1759	1526	1671	1622		3433	3029		1719	3233	
Peak-hour factor, PHF	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73
Adj. Flow (vph)	119	134	162	212	145	127	384	442	314	105	407	153
RTOR Reduction (vph)	0	0	96	0	35	0	0	108	0	0	35	0
Lane Group Flow (vph)	119	134	66	212	237	0	384	648	0	105	525	0
Confl. Peds. (#/hr)	1		3	3		1			3	3		
Heavy Vehicles (%)	1%	8%	5%	8%	5%	12%	2%	13%	7%	5%	9%	2%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2									
Actuated Green, G (s)	10.5	16.9	32.3	13.0	19.4		15.4	40.2		9.9	34.7	
Effective Green, g (s)	10.5	16.9	32.3	13.0	19.4		15.4	40.2		9.9	34.7	
Actuated g/C Ratio	0.10	0.17	0.32	0.13	0.19		0.15	0.40		0.10	0.35	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	187	297	569	217	314		528	1217		170	1121	
v/s Ratio Prot	0.07	0.08	0.02	c0.13	c0.15		c0.11	c0.21		0.06	0.16	
v/s Ratio Perm			0.03									
v/c Ratio	0.64	0.45	0.12	0.98	0.75		0.73	0.53		0.62	0.47	
Uniform Delay, d1	42.9	37.4	23.8	43.4	38.0		40.3	22.7		43.2	25.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.10	0.65		1.00	1.00	
Incremental Delay, d2	5.1	0.4	0.0	53.8	8.8		3.8	1.5		4.6	1.4	
Delay (s)	48.0	37.8	23.8	97.1	46.8		48.3	16.4		47.9	26.9	
Level of Service	D	D	C	F	D		D	B		D	C	
Approach Delay (s)		35.3			68.8			27.1			30.2	
Approach LOS		D			E			C			C	
Intersection Summary												
HCM 2000 Control Delay			36.6			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.73									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			55.7%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: SE 192nd Ave & SE 15th St

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	151	28	30	18	51	37	57	671	5	26	525	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.92		1.00	1.00	0.85	1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1687	1681		1626	1827	1598	1736	3336		1736	3291	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1687	1681		1626	1827	1598	1736	3336		1736	3291	
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	186	35	37	22	63	46	70	828	6	32	648	84
RTOR Reduction (vph)	0	30	0	0	0	40	0	0	0	0	7	0
Lane Group Flow (vph)	186	42	0	22	63	6	70	834	0	32	725	0
Confl. Peds. (#/hr)	1		2	2		1	1		4	4		1
Confl. Bikes (#/hr)			1			2						
Heavy Vehicles (%)	7%	4%	3%	11%	4%	0%	4%	8%	20%	4%	8%	4%
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6	3	7	4		3	8	
Permitted Phases						6						
Actuated Green, G (s)	12.4	18.0		2.5	8.1	13.0	6.7	54.6		4.9	52.8	
Effective Green, g (s)	12.4	18.0		2.5	8.1	13.0	6.7	54.6		4.9	52.8	
Actuated g/C Ratio	0.12	0.18		0.02	0.08	0.13	0.07	0.55		0.05	0.53	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lane Grp Cap (vph)	209	302		40	147	287	116	1821		85	1737	
v/s Ratio Prot	c0.11	0.02		0.01	c0.03	0.00	c0.04	c0.25		0.02	0.22	
v/s Ratio Perm						0.00						
v/c Ratio	0.89	0.14		0.55	0.43	0.02	0.60	0.46		0.38	0.42	
Uniform Delay, d1	43.1	34.5		48.2	43.7	37.9	45.4	13.7		46.1	14.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.07	0.65		1.33	0.32	
Incremental Delay, d2	32.8	0.1		9.0	0.7	0.0	5.5	0.8		0.8	0.6	
Delay (s)	76.0	34.6		57.1	44.5	38.0	54.0	9.7		62.2	5.1	
Level of Service	E	C		E	D	D	D	A		E	A	
Approach Delay (s)		64.4			44.3			13.2			7.5	
Approach LOS		E			D			B			A	
Intersection Summary												
HCM 2000 Control Delay			19.5									HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio			0.54									
Actuated Cycle Length (s)			100.0									Sum of lost time (s) 20.0
Intersection Capacity Utilization			52.9%									ICU Level of Service A
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: SE 192nd Ave & SE 20th St

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	105	97	50	39	81	79	31	564	51	63	471	74
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	0.97	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.93		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3303	1746		1671	1712		1752	3294		1719	3166	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3303	1746		1671	1712		1752	3294		1719	3166	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	133	123	63	49	103	100	39	714	65	80	596	94
RTOR Reduction (vph)	0	20	0	0	40	0	0	5	0	0	9	0
Lane Group Flow (vph)	133	166	0	49	163	0	39	774	0	80	681	0
Confl. Peds. (#/hr)			2	2			2		2	2		2
Confl. Bikes (#/hr)			2			2			2			1
Heavy Vehicles (%)	6%	3%	2%	8%	1%	3%	3%	8%	8%	5%	12%	7%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	7.5	15.6		5.8	13.9		4.2	51.3		7.3	54.4	
Effective Green, g (s)	7.5	15.6		5.8	13.9		4.2	51.3		7.3	54.4	
Actuated g/C Ratio	0.08	0.16		0.06	0.14		0.04	0.51		0.07	0.54	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lane Grp Cap (vph)	247	272		96	237		73	1689		125	1722	
v/s Ratio Prot	c0.04	0.09		0.03	c0.10		0.02	c0.24		c0.05	c0.22	
v/s Ratio Perm												
v/c Ratio	0.54	0.61		0.51	0.69		0.53	0.46		0.64	0.40	
Uniform Delay, d1	44.6	39.4		45.7	41.0		46.9	15.5		45.1	13.2	
Progression Factor	1.00	1.00		1.00	1.00		1.37	0.83		0.96	0.91	
Incremental Delay, d2	1.1	2.6		1.9	6.5		3.7	0.9		7.8	0.7	
Delay (s)	45.7	42.0		47.6	47.5		67.8	13.8		51.2	12.6	
Level of Service	D	D		D	D		E	B		D	B	
Approach Delay (s)		43.6			47.5			16.4			16.7	
Approach LOS		D			D			B			B	
Intersection Summary												
HCM 2000 Control Delay	24.1			HCM 2000 Level of Service			C					
HCM 2000 Volume to Capacity ratio	0.52											
Actuated Cycle Length (s)	100.0			Sum of lost time (s)			20.0					
Intersection Capacity Utilization	52.4%			ICU Level of Service			A					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

4: SE 192nd Ave & SE 34th St

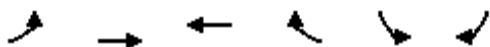
2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	99	27	146	130	53	66	472	176	101	303	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.97		1.00	0.96		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1655	3254		1768	3282		3502	3282	1490	3467	3162	
Flt Permitted	0.63	1.00		0.51	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1090	3254		954	3282		3502	3282	1490	3467	3162	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	88	109	30	160	143	58	73	519	193	111	333	98
RTOR Reduction (vph)	0	27	0	0	52	0	0	0	86	0	17	0
Lane Group Flow (vph)	88	112	0	160	149	0	73	519	107	111	414	0
Confl. Peds. (#/hr)	1		3	3		1	3		6	6		3
Heavy Vehicles (%)	9%	7%	7%	2%	6%	2%	0%	10%	5%	1%	9%	13%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6					4			
Actuated Green, G (s)	15.2	8.5		20.2	11.0		4.8	55.5	55.5	6.8	57.5	
Effective Green, g (s)	15.2	8.5		20.2	11.0		4.8	55.5	55.5	6.8	57.5	
Actuated g/C Ratio	0.15	0.08		0.20	0.11		0.05	0.56	0.56	0.07	0.58	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lane Grp Cap (vph)	203	276		267	361		168	1821	826	235	1818	
v/s Ratio Prot	0.03	0.03		c0.06	0.05		0.02	c0.16		c0.03	0.13	
v/s Ratio Perm	0.04			c0.07					0.07			
v/c Ratio	0.43	0.40		0.60	0.41		0.43	0.29	0.13	0.47	0.23	
Uniform Delay, d1	38.0	43.4		35.0	41.5		46.3	11.8	10.7	44.9	10.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	0.85	1.45	
Incremental Delay, d2	0.5	0.4		2.4	0.3		0.7	0.4	0.3	0.5	0.3	
Delay (s)	38.5	43.7		37.5	41.8		46.9	12.2	11.0	38.9	15.4	
Level of Service	D	D		D	D		D	B	B	D	B	
Approach Delay (s)		41.7			39.9			15.1			20.2	
Approach LOS		D			D			B			C	
Intersection Summary												
HCM 2000 Control Delay			24.4			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.39									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			58.5%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

8: SE 20th Street & Bybee

2/26/2018



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	5	168	165	55	28	4
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	6	218	214	71	36	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLT	TWLT			
Median storage (veh)		2	2			
Upstream signal (ft)		1053				
pX, platoon unblocked						
vC, conflicting volume	286				481	250
vC1, stage 1 conf vol					250	
vC2, stage 2 conf vol					231	
vCu, unblocked vol	286				481	250
tC, single (s)	4.5				6.4	6.5
tC, 2 stage (s)					5.4	
tF (s)	2.6				3.5	3.5
p0 queue free %	99				95	99
cM capacity (veh/h)	1087				690	736
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	225	286	42			
Volume Left	6	0	36			
Volume Right	0	71	5			
cSH	1087	1700	696			
Volume to Capacity	0.01	0.17	0.06			
Queue Length 95th (ft)	0	0	5			
Control Delay (s)	0.3	0.0	10.5			
Lane LOS	A		B			
Approach Delay (s)	0.3	0.0	10.5			
Approach LOS			B			
Intersection Summary						
Average Delay		0.9				
Intersection Capacity Utilization		22.9%		ICU Level of Service	A	
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

9: SE Fisher Creek Rd & SE 20th St

2/26/2018

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	148	48	9	212	8	3
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	192	62	12	275	10	4
Pedestrians					3	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					3.5	
Percent Blockage					0	
Right turn flare (veh)						5
Median type	TWLT			TWLT		
Median storage veh)	2			2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			258		525	226
vC1, stage 1 conf vol					226	
vC2, stage 2 conf vol					299	
vCu, unblocked vol			258		525	226
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			99		98	100
cM capacity (veh/h)			1315		672	816
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	255	12	275	14		
Volume Left	0	12	0	10		
Volume Right	62	0	0	4		
cSH	1700	1315	1700	924		
Volume to Capacity	0.15	0.01	0.16	0.02		
Queue Length 95th (ft)	0	1	0	1		
Control Delay (s)	0.0	7.8	0.0	10.2		
Lane LOS		A		B		
Approach Delay (s)	0.0	0.3		10.2		
Approach LOS				B		
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			21.2%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

10: NW Parker St & NW 38th Ave

2/26/2018

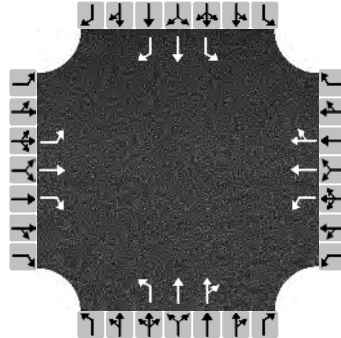
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	68	34	33	128	117	56	69	227	67	20	199	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.93		1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1722		1769	1779		1805	1827	1528	1805	1792	1538
Flt Permitted	0.50	1.00		0.69	1.00		0.39	1.00	1.00	0.32	1.00	1.00
Satd. Flow (perm)	959	1722		1290	1779		736	1827	1528	602	1792	1538
Peak-hour factor, PHF	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68
Adj. Flow (vph)	100	50	49	188	172	82	101	334	99	29	293	59
RTOR Reduction (vph)	0	34	0	0	27	0	0	0	65	0	0	39
Lane Group Flow (vph)	100	65	0	188	227	0	101	334	34	29	293	20
Confl. Peds. (#/hr)			1	1					1	1		
Heavy Vehicles (%)	0%	0%	3%	2%	0%	5%	0%	4%	4%	0%	6%	5%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	3	8		7	4		1	6	7	5	2	3
Permitted Phases	8			4			6		6	2		2
Actuated Green, G (s)	26.0	20.0		26.0	20.0		22.0	16.0	22.0	22.0	16.0	22.0
Effective Green, g (s)	26.0	20.0		26.0	20.0		22.0	16.0	22.0	22.0	16.0	22.0
Actuated g/C Ratio	0.41	0.31		0.41	0.31		0.34	0.25	0.34	0.34	0.25	0.34
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	0.2	1.5		0.2	1.5		0.2	1.5	0.2	0.2	1.5	0.2
Lane Grp Cap (vph)	468	538		568	555		353	456	620	319	448	624
v/s Ratio Prot	0.02	0.04		c0.03	c0.13		c0.03	c0.18	0.01	0.01	0.16	0.00
v/s Ratio Perm	0.07			0.10			0.07		0.02	0.02		0.01
v/c Ratio	0.21	0.12		0.33	0.41		0.29	0.73	0.05	0.09	0.65	0.03
Uniform Delay, d1	12.0	15.7		12.6	17.3		14.8	22.0	14.0	14.4	21.5	13.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	0.5		1.6	2.2		2.0	10.0	0.2	0.6	7.3	0.1
Delay (s)	13.1	16.2		14.2	19.6		16.9	32.0	14.2	15.0	28.8	14.0
Level of Service	B	B		B	B		B	C	B	B	C	B
Approach Delay (s)		14.6			17.3			25.9			25.4	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			21.9			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.49									
Actuated Cycle Length (s)			64.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			53.8%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

HCS7 All-Way Stop Control Report

General Information

Analyst	KMC	Intersection	Pacific Rim/Parker
Agency/Co.		Jurisdiction	
Date Performed	2/13/2018	East/West Street	NW Pacific Rim Blvd
Analysis Year	2018	North/South Street	NW Parker St
Analysis Time Period (hrs)	0.25	Peak Hour Factor	0.77
Time Analyzed	AM Peak EX		
Project Description	22300 Grass Valley		

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	88	5	18	21	33	8	67	273	16	9	187	151
% Thrus in Shared Lane						50			50			
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	L	T	R	L	T	TR	L	T	TR	L	T	R
Flow Rate, v (veh/h)	114	6	23	27	21	32	87	177	198	12	243	196
Percent Heavy Vehicles	2	0	22	5	6	12	1	6	12	11	3	3

Departure Headway and Service Time

Initial Departure Headway, hd (s)	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
Initial Degree of Utilization, x	0.102	0.006	0.021	0.024	0.019	0.028	0.077	0.158	0.176	0.010	0.216	0.174
Final Departure Headway, hd (s)	7.83	7.30	6.97	8.08	7.60	7.47	6.94	6.53	6.55	7.17	6.53	5.83
Final Degree of Utilization, x	0.249	0.013	0.045	0.061	0.045	0.066	0.168	0.321	0.361	0.023	0.441	0.318
Move-Up Time, m (s)	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Service Time, ts (s)	5.53	5.00	4.67	5.78	5.30	5.17	4.64	4.23	4.25	4.87	4.23	3.53

Capacity, Delay and Level of Service

Flow Rate, v (veh/h)	114	6	23	27	21	32	87	177	198	12	243	196
Capacity	459	493	516	445	474	482	519	552	549	502	551	617
95% Queue Length, Q ₉₅ (veh)	1.0	0.0	0.1	0.2	0.1	0.2	0.6	1.4	1.6	0.1	2.2	1.4
Control Delay (s/veh)	13.1	10.1	10.0	11.3	10.7	10.7	11.0	12.3	12.9	10.0	14.3	11.2
Level of Service, LOS	B	B	B	B	B	B	B	B	B	B	B	B
Approach Delay (s/veh)	12.5			10.9			12.3			12.8		
Approach LOS	B			B			B			B		
Intersection Delay, s/veh LOS	12.4						B					

HCM Unsignalized Intersection Capacity Analysis 12: NW Brady Rd & NW 16th Ave

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	20	30	6	149	52	140	16	127	37	56	153	31
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	26	39	8	194	68	182	21	165	48	73	199	40
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	73	443	234	312								
Volume Left (vph)	26	194	21	73								
Volume Right (vph)	8	182	48	40								
Hadj (s)	0.16	-0.11	0.00	0.04								
Departure Headway (s)	6.7	5.6	6.1	6.0								
Degree Utilization, x	0.13	0.69	0.40	0.52								
Capacity (veh/h)	443	615	536	563								
Control Delay (s)	10.7	20.1	13.0	15.2								
Approach Delay (s)	10.7	20.1	13.0	15.2								
Approach LOS	B	C	B	C								
Intersection Summary												
Delay			16.5									
Level of Service			C									
Intersection Capacity Utilization			58.6%		ICU Level of Service				B			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

1: SE 192nd Ave & Mill Plain Blvd

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	261	25	411	47	29	30	325	721	61	36	645	174
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.92		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1900	1598	1703	1612		3467	3448		1752	3424	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1900	1598	1703	1612		3467	3448		1752	3424	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	284	27	447	51	32	33	353	784	66	39	701	189
RTOR Reduction (vph)	0	0	124	0	31	0	0	4	0	0	19	0
Lane Group Flow (vph)	284	27	323	51	34	0	353	846	0	39	871	0
Confl. Peds. (#/hr)	17		9	9		17	1		1	1		1
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	2%	0%	0%	6%	7%	7%	1%	3%	7%	3%	2%	1%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2									
Actuated Green, G (s)	13.0	14.8	30.5	5.1	6.9		15.7	55.4		4.7	44.4	
Effective Green, g (s)	13.0	14.8	30.5	5.1	6.9		15.7	55.4		4.7	44.4	
Actuated g/C Ratio	0.13	0.15	0.30	0.05	0.07		0.16	0.55		0.05	0.44	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	230	281	567	86	111		544	1910		82	1520	
v/s Ratio Prot	c0.16	0.01	c0.09	0.03	0.02		c0.10	0.25		0.02	c0.25	
v/s Ratio Perm			0.11									
v/c Ratio	1.23	0.10	0.57	0.59	0.31		0.65	0.44		0.48	0.57	
Uniform Delay, d1	43.5	36.8	29.2	46.4	44.3		39.6	13.2		46.4	20.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.13	0.40		1.00	1.00	
Incremental Delay, d2	137.3	0.1	0.9	7.1	0.6		1.6	0.6		1.6	1.6	
Delay (s)	180.8	36.9	30.1	53.5	44.9		46.4	5.9		48.0	22.3	
Level of Service	F	D	C	D	D		D	A		D	C	
Approach Delay (s)		86.8			48.7			17.8			23.4	
Approach LOS		F			D			B			C	
Intersection Summary												
HCM 2000 Control Delay			38.1				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.74									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			66.7%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: SE 192nd Ave & SE 15th St

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	104	51	104	27	57	84	83	1007	34	77	1010	114
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.90		1.00	1.00	0.85	1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1736	1670		1687	1863	1603	1787	3520		1805	3477	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1736	1670		1687	1863	1603	1787	3520		1805	3477	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	122	60	122	32	67	99	98	1185	40	91	1188	134
RTOR Reduction (vph)	0	84	0	0	0	63	0	2	0	0	6	0
Lane Group Flow (vph)	122	98	0	32	67	36	98	1223	0	91	1316	0
Confl. Peds. (#/hr)	3		1	1		3	2		6	6		2
Confl. Bikes (#/hr)			1									1
Heavy Vehicles (%)	4%	2%	1%	7%	2%	0%	1%	2%	0%	0%	2%	2%
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6	3	7	4		3	8	
Permitted Phases						6						
Actuated Green, G (s)	9.0	13.0		3.9	7.9	16.5	8.1	54.5		8.6	55.0	
Effective Green, g (s)	9.0	13.0		3.9	7.9	16.5	8.1	54.5		8.6	55.0	
Actuated g/C Ratio	0.09	0.13		0.04	0.08	0.16	0.08	0.54		0.09	0.55	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lane Grp Cap (vph)	156	217		65	147	344	144	1918		155	1912	
v/s Ratio Prot	c0.07	c0.06		0.02	0.04	0.01	c0.05	0.35		0.05	c0.38	
v/s Ratio Perm						0.01						
v/c Ratio	0.78	0.45		0.49	0.46	0.10	0.68	0.64		0.59	0.69	
Uniform Delay, d1	44.5	40.2		47.1	44.0	35.5	44.7	15.9		44.0	16.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.96	0.83		1.18	0.81	
Incremental Delay, d2	20.5	0.6		2.1	0.8	0.0	7.9	1.3		3.2	1.8	
Delay (s)	65.1	40.8		49.2	44.8	35.5	50.7	14.4		55.2	15.0	
Level of Service	E	D		D	D	D	D	B		E	B	
Approach Delay (s)		50.5			40.9			17.1			17.6	
Approach LOS		D			D			B			B	
Intersection Summary												
HCM 2000 Control Delay			21.9									
HCM 2000 Volume to Capacity ratio			0.69									
Actuated Cycle Length (s)			100.0									
Intersection Capacity Utilization			66.5%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: SE 192nd Ave & SE 20th St

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	121	152	78	108	168	172	97	861	95	137	828	137
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	0.97	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.92		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3467	1775		1805	1723		1805	3450		1787	3437	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3467	1775		1805	1723		1805	3450		1787	3437	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	126	158	81	112	175	179	101	897	99	143	862	143
RTOR Reduction (vph)	0	20	0	0	35	0	0	7	0	0	12	0
Lane Group Flow (vph)	126	219	0	112	319	0	101	989	0	143	993	0
Confl. Peds. (#/hr)	1		3	3		1	5		1	1		5
Confl. Bikes (#/hr)			1			4			5			3
Heavy Vehicles (%)	1%	0%	3%	0%	1%	1%	0%	3%	1%	1%	2%	4%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	7.2	22.4		8.2	23.4		7.4	38.7		10.7	42.0	
Effective Green, g (s)	7.2	22.4		8.2	23.4		7.4	38.7		10.7	42.0	
Actuated g/C Ratio	0.07	0.22		0.08	0.23		0.07	0.39		0.11	0.42	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lane Grp Cap (vph)	249	397		148	403		133	1335		191	1443	
v/s Ratio Prot	0.04	0.12		c0.06	c0.18		0.06	c0.29		c0.08	c0.29	
v/s Ratio Perm												
v/c Ratio	0.51	0.55		0.76	0.79		0.76	0.74		0.75	0.69	
Uniform Delay, d1	44.7	34.3		44.9	36.0		45.4	26.3		43.3	23.7	
Progression Factor	1.00	1.00		1.00	1.00		1.44	0.67		1.14	1.00	
Incremental Delay, d2	0.6	0.9		17.6	9.5		18.1	3.4		10.5	2.1	
Delay (s)	45.3	35.3		62.5	45.5		83.3	21.1		59.8	25.7	
Level of Service	D	D		E	D		F	C		E	C	
Approach Delay (s)		38.7			49.6			26.8			30.0	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			32.9			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			74.7%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

4: SE 192nd Ave & SE 34th St

2/26/2018

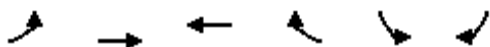
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	115	162	61	333	180	110	90	713	143	203	705	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.96		1.00	0.94		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1752	3400		1769	3330		3433	3505	1532	3502	3450	
Flt Permitted	0.56	1.00		0.30	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1027	3400		561	3330		3433	3505	1532	3502	3450	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	128	180	68	370	200	122	100	792	159	226	783	117
RTOR Reduction (vph)	0	48	0	0	103	0	0	0	84	0	8	0
Lane Group Flow (vph)	128	200	0	370	219	0	100	792	75	226	892	0
Confl. Peds. (#/hr)	1		1	1		1	2		1	1		2
Confl. Bikes (#/hr)						2			1			2
Heavy Vehicles (%)	3%	2%	0%	2%	2%	1%	2%	3%	3%	0%	2%	5%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6					4			
Actuated Green, G (s)	17.3	9.3		28.3	15.3		5.5	46.9	46.9	9.8	51.2	
Effective Green, g (s)	17.3	9.3		28.3	15.3		5.5	46.9	46.9	9.8	51.2	
Actuated g/C Ratio	0.17	0.09		0.28	0.15		0.06	0.47	0.47	0.10	0.51	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lane Grp Cap (vph)	235	316		327	509		188	1643	718	343	1766	
v/s Ratio Prot	0.04	0.06		c0.16	0.07		0.03	0.23		c0.06	c0.26	
v/s Ratio Perm	0.05			c0.16					0.05			
v/c Ratio	0.54	0.63		1.13	0.43		0.53	0.48	0.10	0.66	0.50	
Uniform Delay, d1	36.9	43.7		33.0	38.4		46.0	18.2	14.8	43.5	16.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	0.89	1.47	
Incremental Delay, d2	1.4	3.0		90.2	0.2		1.4	1.0	0.3	2.7	0.8	
Delay (s)	38.3	46.7		123.2	38.6		47.4	19.2	15.1	41.4	24.4	
Level of Service	D	D		F	D		D	B	B	D	C	
Approach Delay (s)		43.9			83.8			21.3			27.8	
Approach LOS		D			F			C			C	
Intersection Summary												
HCM 2000 Control Delay			39.5			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			69.7%			ICU Level of Service			C			
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

8: SE 20th Street & Bybee

2/26/2018



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	3	296	379	115	99	3
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	4	352	451	137	118	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLT	TWLT			
Median storage veh		2	2			
Upstream signal (ft)		1053				
pX, platoon unblocked						
vC, conflicting volume	588				879	520
vC1, stage 1 conf vol					520	
vC2, stage 2 conf vol					360	
vCu, unblocked vol	588				879	520
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	100				77	99
cM capacity (veh/h)	997				523	560
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	356	588	121			
Volume Left	4	0	118			
Volume Right	0	137	4			
cSH	997	1700	524			
Volume to Capacity	0.00	0.35	0.23			
Queue Length 95th (ft)	0	0	22			
Control Delay (s)	0.1	0.0	13.9			
Lane LOS	A		B			
Approach Delay (s)	0.1	0.0	13.9			
Approach LOS			B			
Intersection Summary						
Average Delay			1.6			
Intersection Capacity Utilization			39.3%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

9: SE Fisher Creek Rd & SE 20th St

2/26/2018

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	388	7	2	280	214	33
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	479	9	2	346	264	41
Pedestrians				2	5	
Lane Width (ft)				12.0	12.0	
Walking Speed (ft/s)				3.5	3.5	
Percent Blockage				0	0	
Right turn flare (veh)						5
Median type	TWLT			TWLT		
Median storage veh)	2			2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			493		839	490
vC1, stage 1 conf vol					488	
vC2, stage 2 conf vol					351	
vCu, unblocked vol			493		839	490
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		51	93
cM capacity (veh/h)			1076		537	572
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	488	2	346	305		
Volume Left	0	2	0	264		
Volume Right	9	0	0	41		
cSH	1700	1076	1700	620		
Volume to Capacity	0.29	0.00	0.20	0.49		
Queue Length 95th (ft)	0	0	0	68		
Control Delay (s)	0.0	8.4	0.0	17.2		
Lane LOS		A		C		
Approach Delay (s)	0.0	0.1		17.2		
Approach LOS				C		
Intersection Summary						
Average Delay			4.6			
Intersection Capacity Utilization			39.5%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

10: NW Parker St & NW 38th Ave

2/26/2018

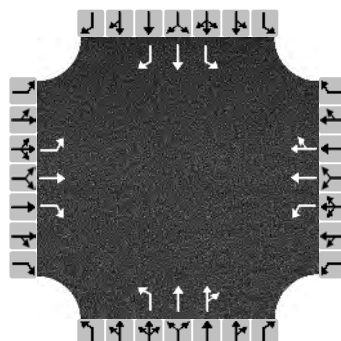
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	63	218	106	70	133	32	62	195	157	48	191	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.95		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1804	1798		1735	1822		1805	1881	1580	1799	1845	1583
Flt Permitted	0.60	1.00		0.34	1.00		0.52	1.00	1.00	0.51	1.00	1.00
Satd. Flow (perm)	1139	1798		616	1822		982	1881	1580	965	1845	1583
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	72	251	122	80	153	37	71	224	180	55	220	60
RTOR Reduction (vph)	0	28	0	0	14	0	0	0	118	0	0	39
Lane Group Flow (vph)	72	346	0	80	176	0	71	224	62	55	220	21
Confl. Peds. (#/hr)	1		2	2		1			5	5		
Confl. Bikes (#/hr)			1			1						
Heavy Vehicles (%)	0%	0%	0%	4%	1%	0%	0%	1%	0%	0%	3%	2%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	3	8		7	4		1	6	7	5	2	3
Permitted Phases	8			4			6		6	2		2
Actuated Green, G (s)	26.0	20.0		26.0	20.0		22.0	16.0	22.0	22.0	16.0	22.0
Effective Green, g (s)	26.0	20.0		26.0	20.0		22.0	16.0	22.0	22.0	16.0	22.0
Actuated g/C Ratio	0.41	0.31		0.41	0.31		0.34	0.25	0.34	0.34	0.25	0.34
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	0.2	1.5		0.2	1.5		0.2	1.5	0.2	0.2	1.5	0.2
Lane Grp Cap (vph)	525	561		355	569		414	470	641	409	461	643
v/s Ratio Prot	0.01	c0.19		c0.02	0.10		c0.02	0.12	0.01	0.01	c0.12	0.00
v/s Ratio Perm	0.04			0.07			0.04		0.03	0.03		0.01
v/c Ratio	0.14	0.62		0.23	0.31		0.17	0.48	0.10	0.13	0.48	0.03
Uniform Delay, d1	11.8	18.7		12.3	16.7		14.4	20.4	14.3	14.3	20.4	13.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	5.0		1.5	1.4		0.9	3.4	0.3	0.7	3.5	0.1
Delay (s)	12.3	23.7		13.8	18.2		15.3	23.9	14.6	15.0	24.0	14.0
Level of Service	B	C		B	B		B	C	B	B	C	B
Approach Delay (s)		21.9			16.9			19.1			20.7	
Approach LOS		C			B			B			C	
Intersection Summary												
HCM 2000 Control Delay			19.9			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.46									
Actuated Cycle Length (s)			64.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			51.9%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

HCS7 All-Way Stop Control Report

General Information

Analyst	KMC	Intersection	Pacific Rim/Parker
Agency/Co.		Jurisdiction	
Date Performed	2/13/2018	East/West Street	NW Pacific Rim Blvd
Analysis Year	2018	North/South Street	NW Parker St
Analysis Time Period (hrs)	0.25	Peak Hour Factor	0.82
Time Analyzed	PM Peak EX		
Project Description	22300 Grass Valley		

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	154	44	92	6	18	16	42	238	32	19	236	101
% Thrus in Shared Lane						50			50			
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	L	T	R	L	T	TR	L	T	TR	L	T	R
Flow Rate, v (veh/h)	188	54	112	7	11	30	51	145	184	23	288	123
Percent Heavy Vehicles	1	2	1	0	0	0	0	1	0	5	3	0

Departure Headway and Service Time

Initial Departure Headway, hd (s)	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
Initial Degree of Utilization, x	0.167	0.048	0.100	0.007	0.010	0.027	0.046	0.129	0.164	0.021	0.256	0.109
Final Departure Headway, hd (s)	7.64	7.16	6.44	8.43	7.93	7.48	7.46	6.98	6.82	7.44	6.91	6.16
Final Degree of Utilization, x	0.399	0.107	0.201	0.017	0.024	0.063	0.106	0.281	0.349	0.048	0.552	0.211
Move-Up Time, m (s)	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Service Time, ts (s)	5.34	4.86	4.14	6.13	5.63	5.18	5.16	4.68	4.52	5.14	4.61	3.86

Capacity, Delay and Level of Service

Flow Rate, v (veh/h)	188	54	112	7	11	30	51	145	184	23	288	123
Capacity	471	503	559	427	454	481	482	516	528	484	521	585
95% Queue Length, Q ₉₅ (veh)	1.9	0.4	0.7	0.1	0.1	0.2	0.4	1.1	1.5	0.2	3.3	0.8
Control Delay (s/veh)	15.3	10.7	10.8	11.3	10.8	10.7	11.0	12.4	13.1	10.5	17.8	10.5
Level of Service, LOS	C	B	B	B	B	B	B	B	B	B	C	B
Approach Delay (s/veh)	13.2			10.8			12.6			15.3		
Approach LOS	B			B			B			C		
Intersection Delay, s/veh LOS	13.7						B					

HCM Unsignalized Intersection Capacity Analysis 12: NW Brady Rd & NW 16th Ave

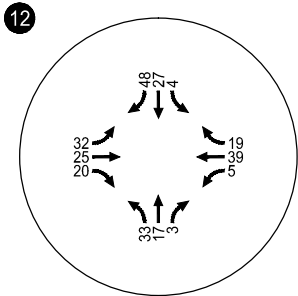
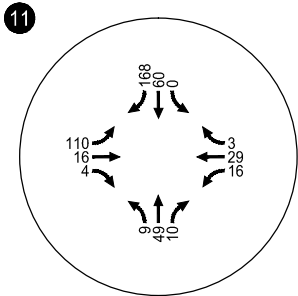
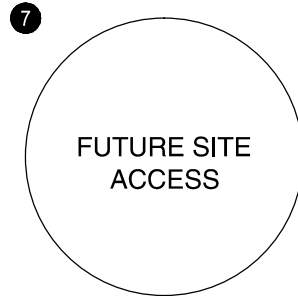
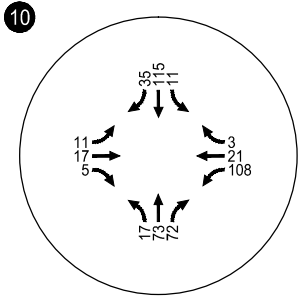
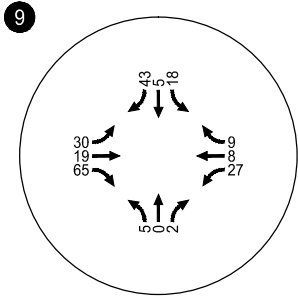
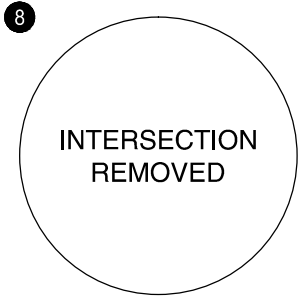
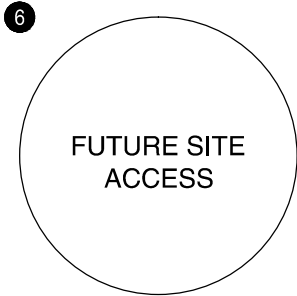
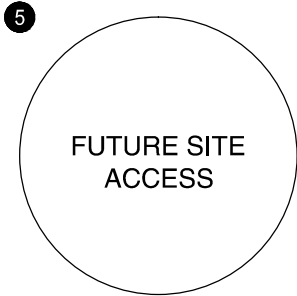
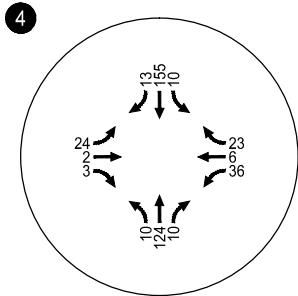
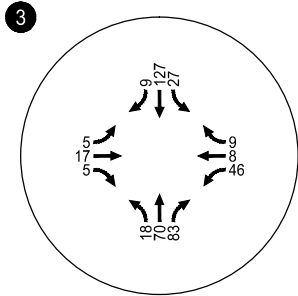
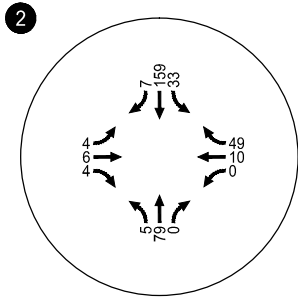
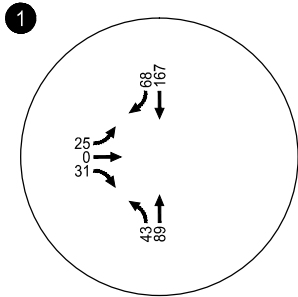
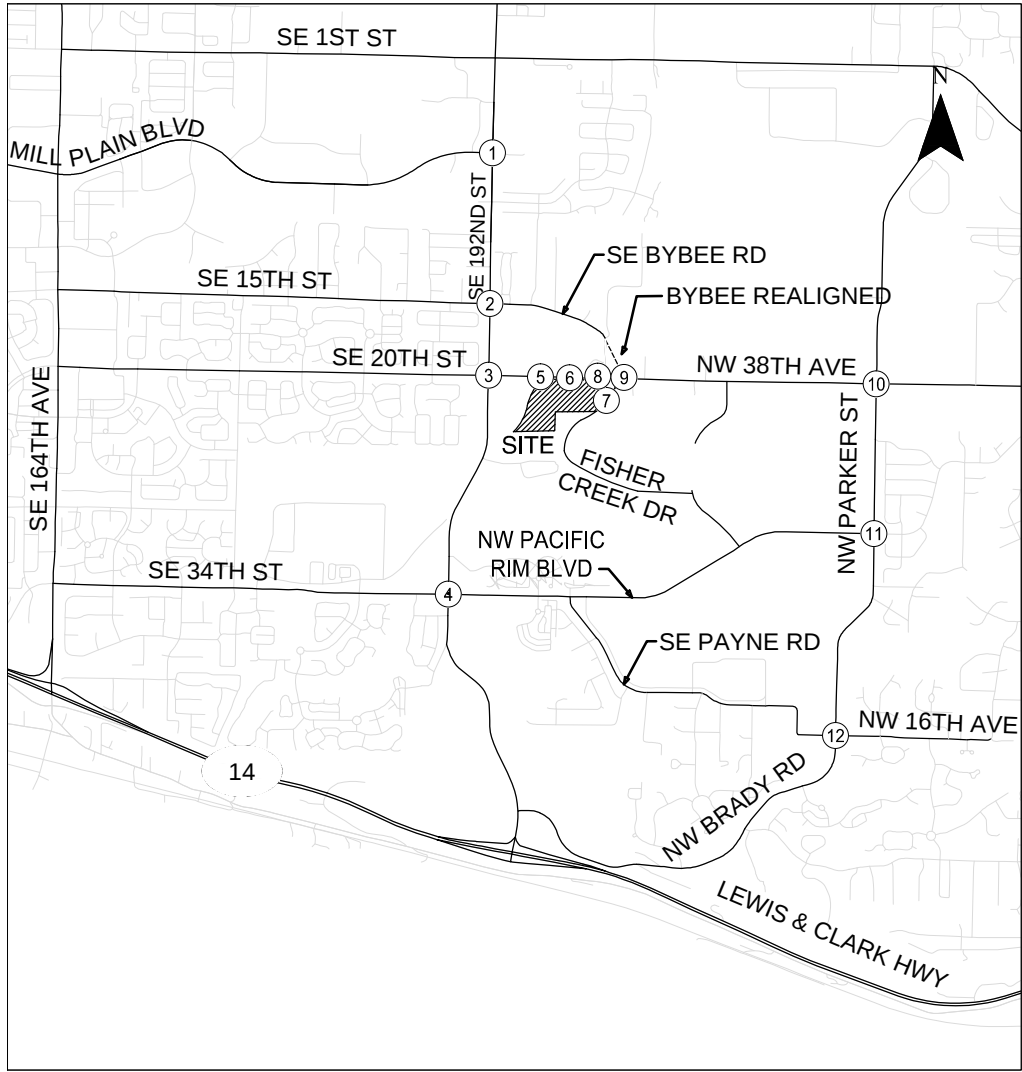
2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	17	86	28	85	53	110	11	166	147	120	167	16
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	20	99	32	98	61	126	13	191	169	138	192	18
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	151	285	372	348								
Volume Left (vph)	20	98	13	138								
Volume Right (vph)	32	126	169	18								
Hadj (s)	-0.07	-0.15	-0.26	0.07								
Departure Headway (s)	6.7	6.3	5.8	6.2								
Degree Utilization, x	0.28	0.50	0.60	0.60								
Capacity (veh/h)	444	508	578	540								
Control Delay (s)	12.4	15.4	17.2	17.9								
Approach Delay (s)	12.4	15.4	17.2	17.9								
Approach LOS	B	C	C	C								
Intersection Summary												
Delay				16.3								
Level of Service				C								
Intersection Capacity Utilization				65.7%	ICU Level of Service		C					
Analysis Period (min)				15								

Appendix E

In-process Traffic Volumes

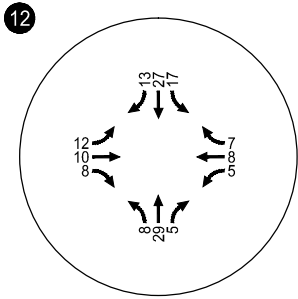
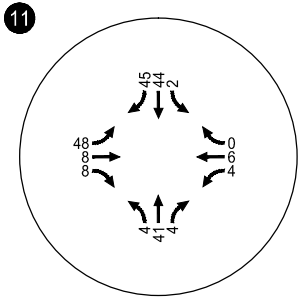
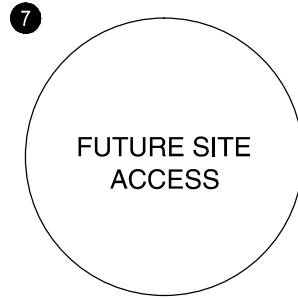
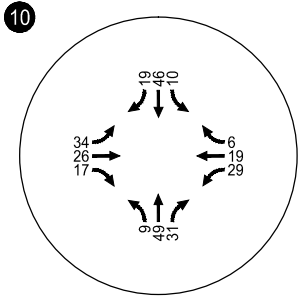
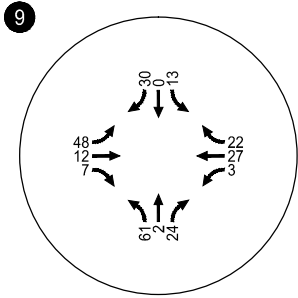
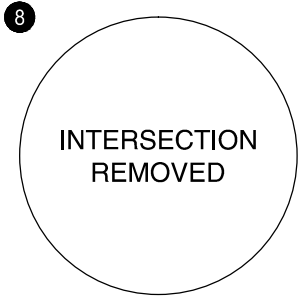
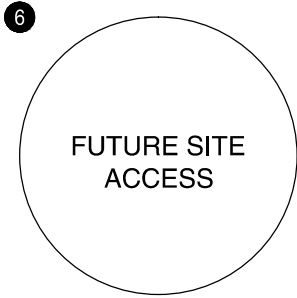
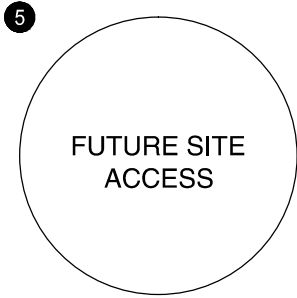
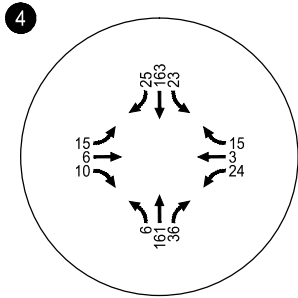
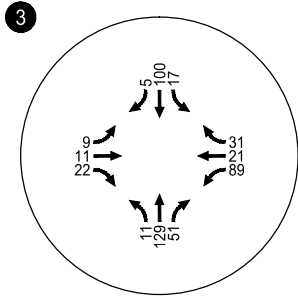
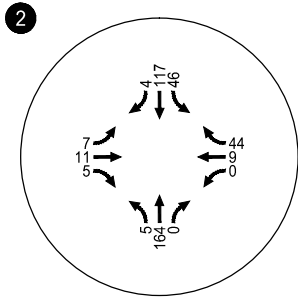
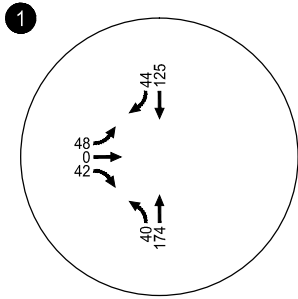
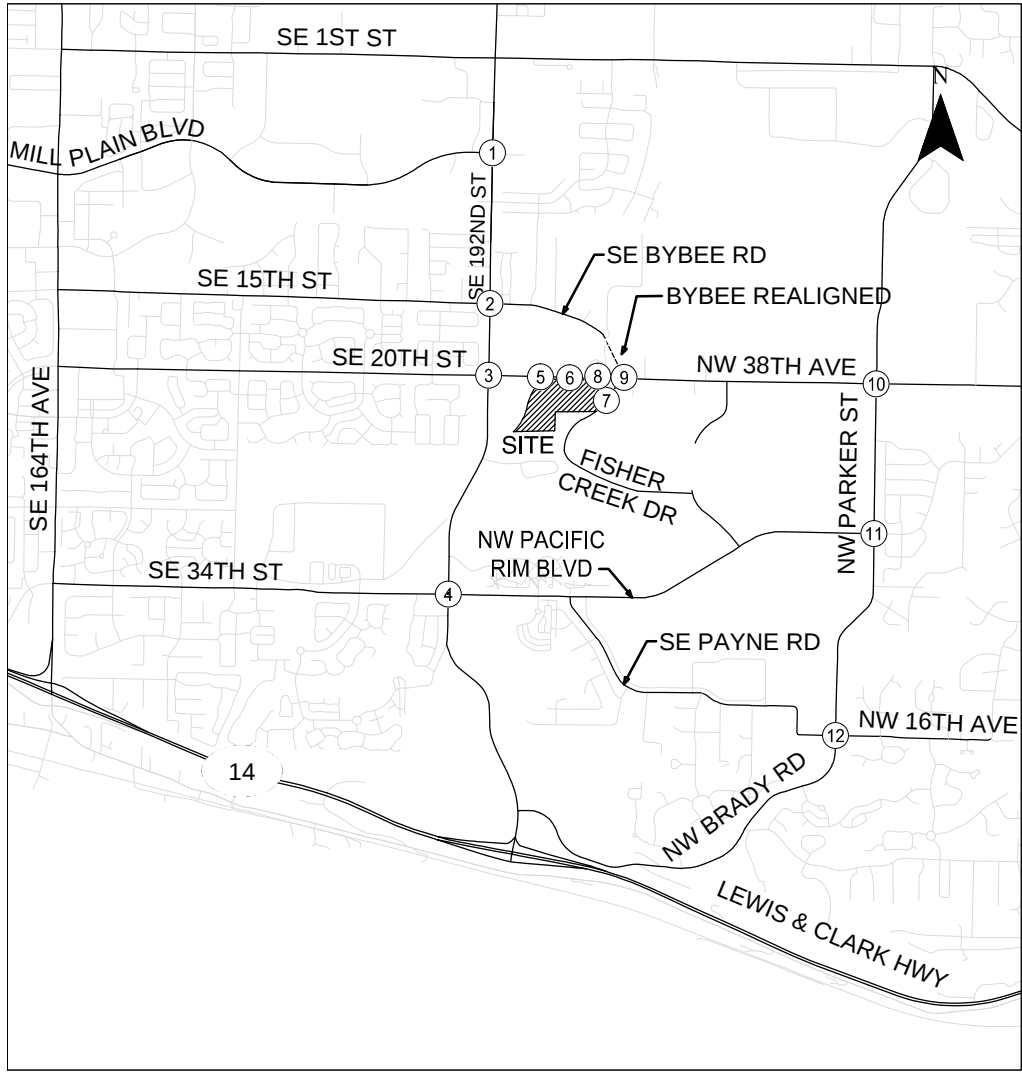
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Scenario 1 In-Process Trip Assignment
Weekday AM Peak Hour
Camas, Washington

Figure
E1

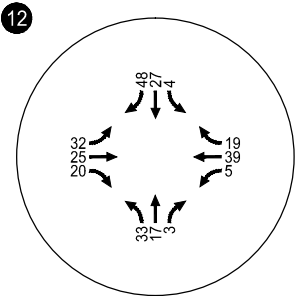
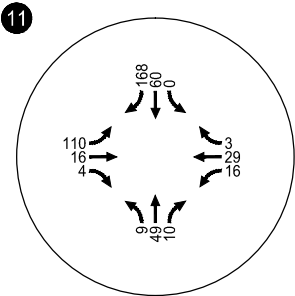
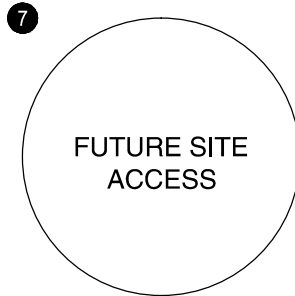
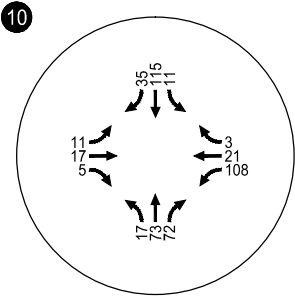
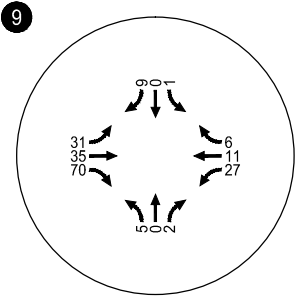
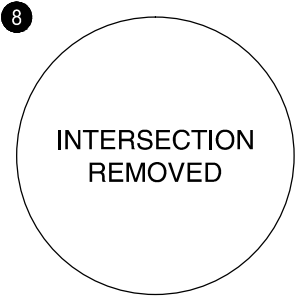
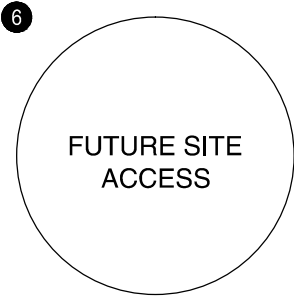
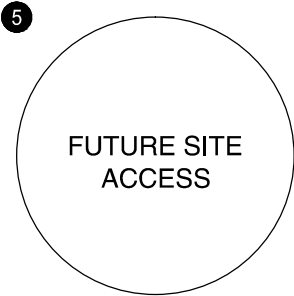
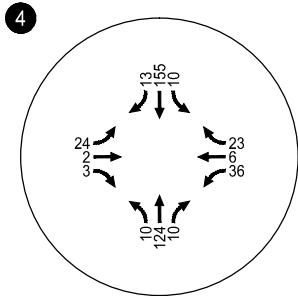
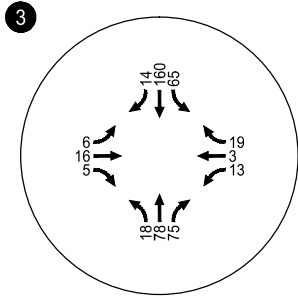
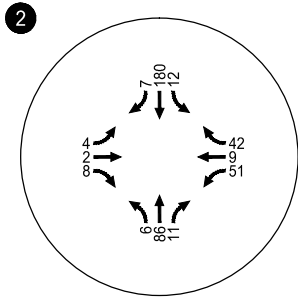
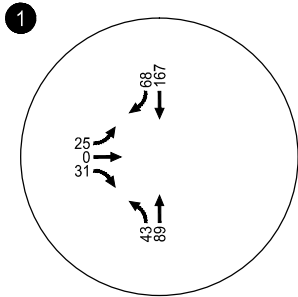
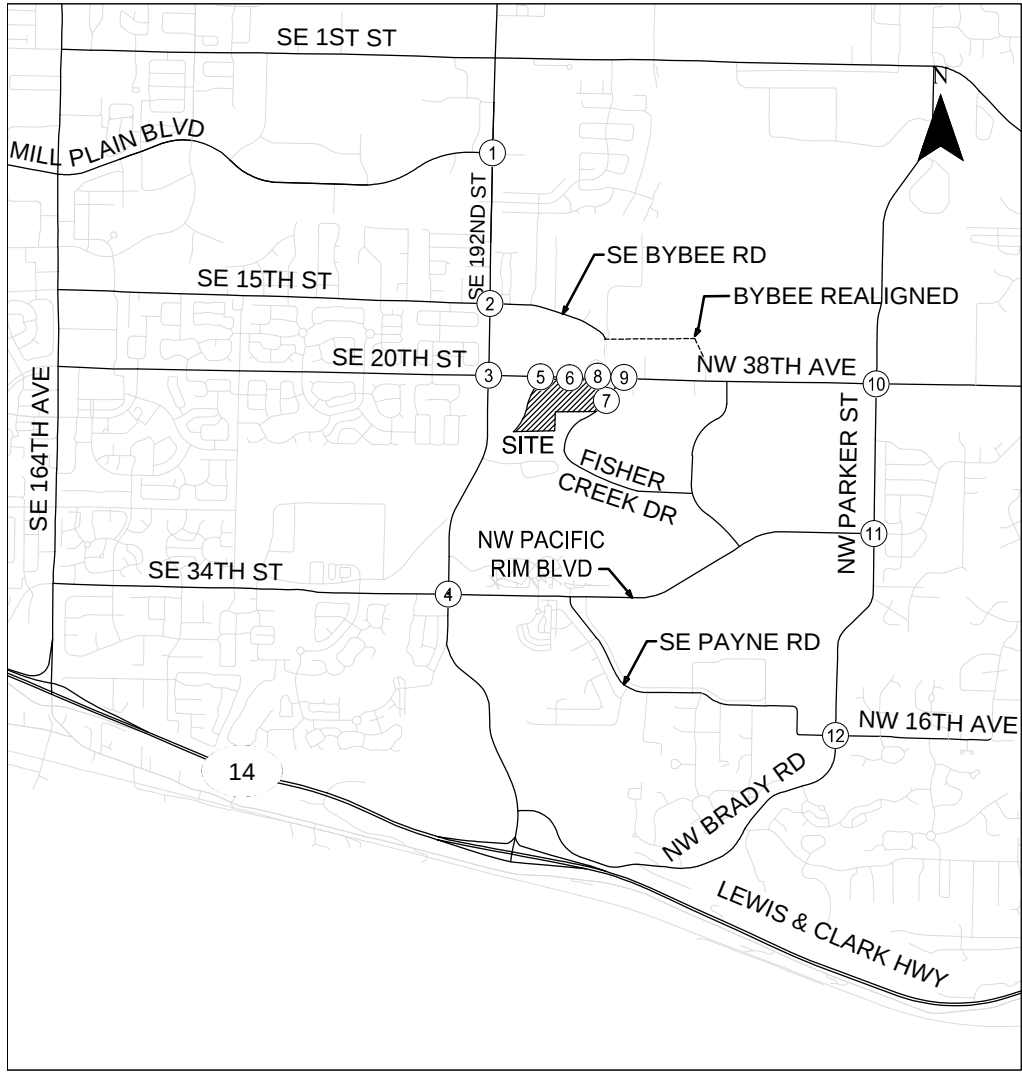
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Scenario 1 In-Process Trip Assignment
Weekday PM Peak Hour
Camas, Washington

Figure
E2

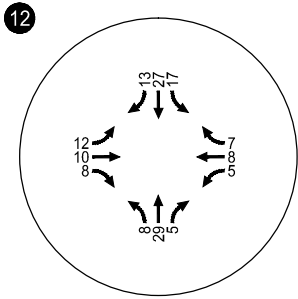
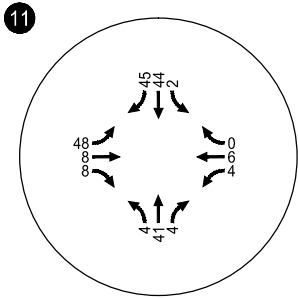
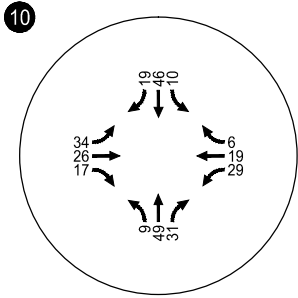
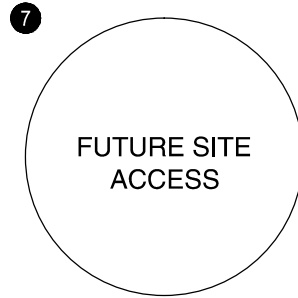
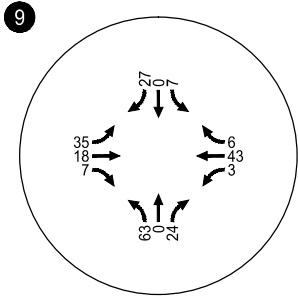
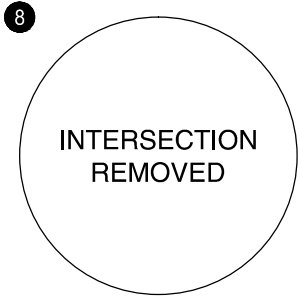
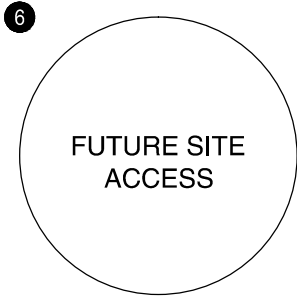
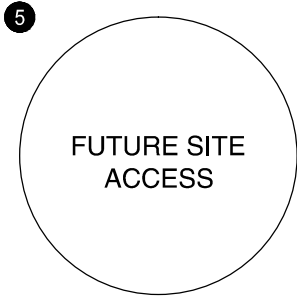
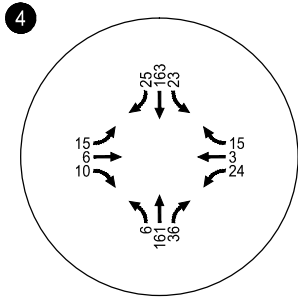
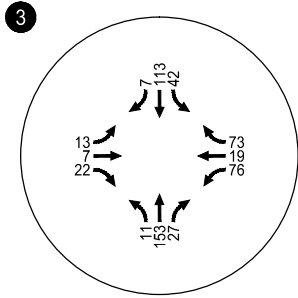
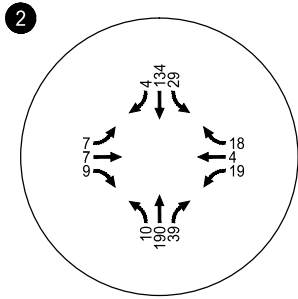
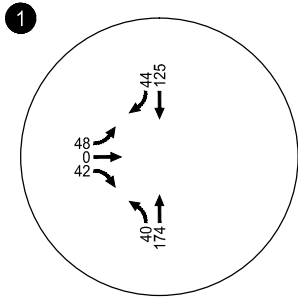
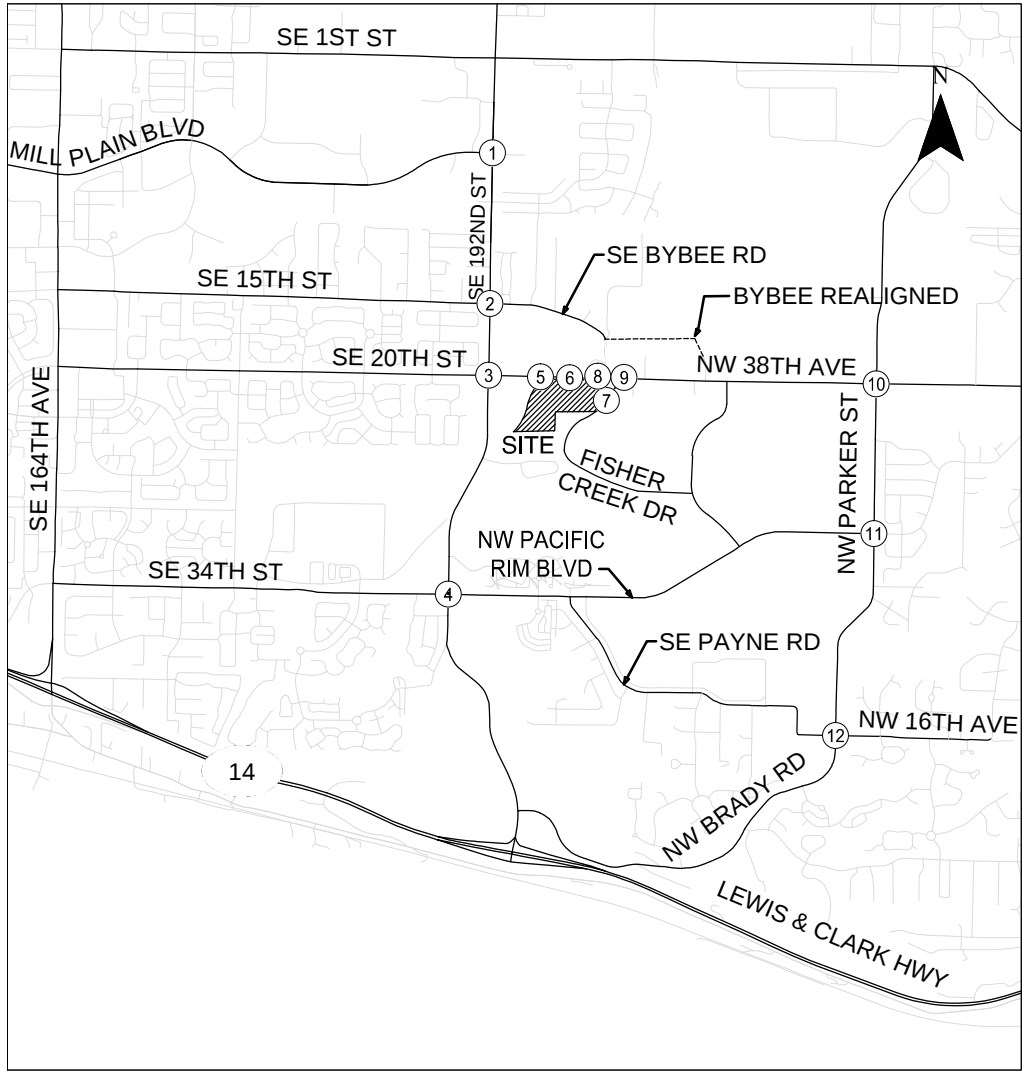
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Scenario 2 In-Process Trip Assignment
Weekday AM Peak Hour
Camas, Washington

Figure
E3

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Scenario 2 In-Process Trip Assignment
Weekday PM Peak Hour
Camas, Washington

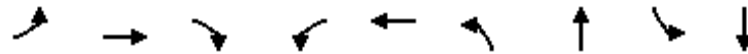
Figure
E4

Appendix F
Year 2021 Background Traffic
Operations Analysis
Worksheets

Queues

1: SE 192nd Ave & Mill Plain Blvd

2/26/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	163	145	216	212	272	473	914	105	927
v/c Ratio	0.77	0.46	0.35	0.98	0.79	0.69	0.73	0.62	0.94
Control Delay	67.0	39.7	13.2	100.6	48.1	50.3	21.3	59.0	51.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.0	39.7	13.2	100.6	48.1	50.3	21.3	59.0	51.6
Queue Length 50th (ft)	101	82	53	137	141	131	145	65	~304
Queue Length 95th (ft)	135	102	74	#202	157	#180	91	94	283
Internal Link Dist (ft)		517			357		2419		550
Turn Bay Length (ft)	225		125	400		200		150	
Base Capacity (vph)	232	492	623	217	485	683	1258	186	985
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.29	0.35	0.98	0.56	0.69	0.73	0.56	0.94

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

1: SE 192nd Ave & Mill Plain Blvd

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	119	106	158	155	106	93	345	438	229	77	488	189
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.93		1.00	0.95		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1759	1527	1671	1622		3433	3058		1719	3231	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1787	1759	1527	1671	1622		3433	3058		1719	3231	
Peak-hour factor, PHF	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73
Adj. Flow (vph)	163	145	216	212	145	127	473	600	314	105	668	259
RTOR Reduction (vph)	0	0	47	0	36	0	0	58	0	0	40	0
Lane Group Flow (vph)	163	145	169	212	236	0	473	856	0	105	887	0
Confl. Peds. (#/hr)	1		3	3		1			3	3		
Heavy Vehicles (%)	1%	8%	5%	8%	5%	12%	2%	13%	7%	5%	9%	2%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2	7	1	6		7	4		3	8	
Permitted Phases			2									
Actuated Green, G (s)	11.8	17.8	37.7	13.0	19.0		19.9	39.3		9.9	29.3	
Effective Green, g (s)	11.8	17.8	37.7	13.0	19.0		19.9	39.3		9.9	29.3	
Actuated g/C Ratio	0.12	0.18	0.38	0.13	0.19		0.20	0.39		0.10	0.29	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	210	313	652	217	308		683	1201		170	946	
v/s Ratio Prot	0.09	0.08	0.05	c0.13	c0.15		c0.14	c0.28		0.06	c0.27	
v/s Ratio Perm			0.06									
v/c Ratio	0.78	0.46	0.26	0.98	0.77		0.69	0.71		0.62	0.94	
Uniform Delay, d1	42.8	36.8	21.5	43.4	38.4		37.2	25.6		43.2	34.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.18	0.68		1.00	1.00	
Incremental Delay, d2	15.0	0.4	0.1	53.8	9.9		2.0	3.0		4.6	17.6	
Delay (s)	57.8	37.2	21.6	97.1	48.3		46.1	20.4		47.9	52.1	
Level of Service	E	D	C	F	D		D	C		D	D	
Approach Delay (s)		37.2			69.7			29.1			51.7	
Approach LOS		D			E			C			D	
Intersection Summary												
HCM 2000 Control Delay			42.9			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			64.3%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

2: SE 192nd Ave & SE 15th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	206	89	23	83	141	80	968	106	964
v/c Ratio	0.95	0.25	0.26	0.56	0.42	0.57	0.57	0.62	0.53
Control Delay	93.9	21.8	51.8	57.7	18.2	58.2	15.4	69.2	7.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	93.9	21.8	51.8	57.7	18.2	58.2	15.4	69.2	7.6
Queue Length 50th (ft)	132	23	14	52	33	54	104	72	60
Queue Length 95th (ft)	#230	59	36	86	64	m87	187	m84	m148
Internal Link Dist (ft)		621		676			1122		2419
Turn Bay Length (ft)	100		100		100	150		475	
Base Capacity (vph)	219	504	178	475	349	180	1705	185	1811
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.94	0.18	0.13	0.17	0.40	0.44	0.57	0.57	0.53

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

2: SE 192nd Ave & SE 15th St

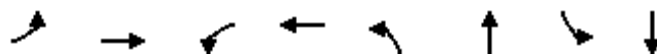
2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	167	38	34	19	67	114	65	779	5	86	701	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	1.00	0.85	1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1687	1693		1626	1827	1603	1736	3337		1736	3296	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1687	1693		1626	1827	1603	1736	3337		1736	3296	
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	206	47	42	23	83	141	80	962	6	106	865	99
RTOR Reduction (vph)	0	34	0	0	0	62	0	1	0	0	6	0
Lane Group Flow (vph)	206	55	0	23	83	79	80	967	0	106	958	0
Confl. Peds. (#/hr)	1		2	2		1	1		4	4		1
Confl. Bikes (#/hr)			1			2						
Heavy Vehicles (%)	7%	4%	3%	11%	4%	0%	4%	8%	20%	4%	8%	4%
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6	3	7	4		3	8	
Permitted Phases						6						
Actuated Green, G (s)	12.9	19.5		2.6	9.2	19.0	7.2	48.1		9.8	50.7	
Effective Green, g (s)	12.9	19.5		2.6	9.2	19.0	7.2	48.1		9.8	50.7	
Actuated g/C Ratio	0.13	0.20		0.03	0.09	0.19	0.07	0.48		0.10	0.51	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lane Grp Cap (vph)	217	330		42	168	384	124	1605		170	1671	
v/s Ratio Prot	c0.12	0.03		0.01	c0.05	0.02	0.05	0.29		c0.06	c0.29	
v/s Ratio Perm						0.03						
v/c Ratio	0.95	0.17		0.55	0.49	0.21	0.65	0.60		0.62	0.57	
Uniform Delay, d1	43.2	33.5		48.1	43.2	34.1	45.2	19.0		43.3	17.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.04	0.75		1.42	0.41	
Incremental Delay, d2	46.0	0.1		7.6	0.8	0.1	6.9	1.4		2.7	0.8	
Delay (s)	89.2	33.6		55.7	44.0	34.2	54.0	15.7		64.1	7.8	
Level of Service	F	C		E	D	C	D	B		E	A	
Approach Delay (s)		72.4			39.5			18.6			13.4	
Approach LOS		E			D			B			B	
Intersection Summary												
HCM 2000 Control Delay			24.4									
HCM 2000 Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			100.0									
Intersection Capacity Utilization			55.1%									
Analysis Period (min)			15									
c Critical Lane Group												

Queues

3: SE 192nd Ave & SE 20th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	149	219	108	190	65	1029	80	918
v/c Ratio	0.57	0.79	0.69	0.62	0.50	0.63	0.57	0.57
Control Delay	52.7	55.8	65.9	40.2	70.7	19.9	58.5	21.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.7	55.8	65.9	40.2	70.7	19.9	58.5	21.5
Queue Length 50th (ft)	47	121	67	94	44	277	55	152
Queue Length 95th (ft)	68	158	106	130	69	345	90	217
Internal Link Dist (ft)		1188		2143		3702		1122
Turn Bay Length (ft)	100		100		325		400	
Base Capacity (vph)	396	438	200	442	177	1626	178	1614
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.50	0.54	0.43	0.37	0.63	0.45	0.57

Intersection Summary

HCM Signalized Intersection Capacity Analysis

3: SE 192nd Ave & SE 20th St

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	118	114	59	85	89	61	51	679	134	63	636	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	0.97	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.94		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3303	1745		1671	1742		1752	3246		1719	3171	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3303	1745		1671	1742		1752	3246		1719	3171	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	149	144	75	108	113	77	65	859	170	80	805	113
RTOR Reduction (vph)	0	21	0	0	27	0	0	13	0	0	9	0
Lane Group Flow (vph)	149	198	0	108	163	0	65	1016	0	80	909	0
Confl. Peds. (#/hr)			2	2			2		2	2		2
Confl. Bikes (#/hr)			2			2			2			1
Heavy Vehicles (%)	6%	3%	2%	8%	1%	3%	3%	8%	8%	5%	12%	7%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	7.9	14.7		9.3	16.1		6.4	48.7		7.3	49.6	
Effective Green, g (s)	7.9	14.7		9.3	16.1		6.4	48.7		7.3	49.6	
Actuated g/C Ratio	0.08	0.15		0.09	0.16		0.06	0.49		0.07	0.50	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lane Grp Cap (vph)	260	256		155	280		112	1580		125	1572	
v/s Ratio Prot	0.05	c0.11		c0.06	0.09		0.04	c0.31		c0.05	0.29	
v/s Ratio Perm												
v/c Ratio	0.57	0.77		0.70	0.58		0.58	0.64		0.64	0.58	
Uniform Delay, d1	44.4	41.0		44.0	38.8		45.5	19.2		45.1	17.8	
Progression Factor	1.00	1.00		1.00	1.00		1.31	0.82		1.03	1.01	
Incremental Delay, d2	1.9	12.3		10.5	2.0		4.7	2.0		7.3	1.4	
Delay (s)	46.3	53.4		54.4	40.8		64.3	17.7		53.6	19.4	
Level of Service	D	D		D	D		E	B		D	B	
Approach Delay (s)		50.5			45.8			20.5			22.1	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			27.8			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.67									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			58.9%			ICU Level of Service			B			
Analysis Period (min)			15									

c Critical Lane Group

Queues

4: SE 192nd Ave & SE 34th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	121	155	213	248	89	697	220	131	650
v/c Ratio	0.55	0.51	0.78	0.64	0.41	0.39	0.24	0.52	0.35
Control Delay	41.3	39.2	54.7	35.6	50.6	14.6	2.7	39.3	19.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.3	39.2	54.7	35.6	50.6	14.6	2.7	39.3	19.9
Queue Length 50th (ft)	64	38	119	52	28	127	0	41	125
Queue Length 95th (ft)	110	68	#191	90	53	196	38	73	230
Internal Link Dist (ft)		670		7104		563			3702
Turn Bay Length (ft)	150		150		300		300	175	
Base Capacity (vph)	243	1031	277	1069	350	1795	915	346	1854
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.15	0.77	0.23	0.25	0.39	0.24	0.38	0.35

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

4: SE 192nd Ave & SE 34th St

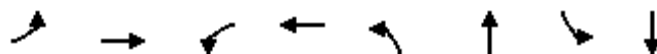
2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	110	109	32	194	146	80	81	634	200	119	482	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.97		1.00	0.95		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1655	3249		1767	3253		3502	3282	1490	3467	3190	
Flt Permitted	0.53	1.00		0.57	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	932	3249		1063	3253		3502	3282	1490	3467	3190	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	121	120	35	213	160	88	89	697	220	131	530	120
RTOR Reduction (vph)	0	32	0	0	80	0	0	0	100	0	12	0
Lane Group Flow (vph)	121	123	0	213	168	0	89	697	120	131	638	0
Confl. Peds. (#/hr)	1		3	3		1	3		6	6		3
Heavy Vehicles (%)	9%	7%	7%	2%	6%	2%	0%	10%	5%	1%	9%	13%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6					4			
Actuated Green, G (s)	16.8	8.3		19.2	9.5		5.2	54.7	54.7	7.3	56.8	
Effective Green, g (s)	16.8	8.3		19.2	9.5		5.2	54.7	54.7	7.3	56.8	
Actuated g/C Ratio	0.17	0.08		0.19	0.10		0.05	0.55	0.55	0.07	0.57	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lane Grp Cap (vph)	218	269		272	309		182	1795	815	253	1811	
v/s Ratio Prot	0.05	0.04		c0.08	0.05		0.03	c0.21		c0.04	0.20	
v/s Ratio Perm	0.05			c0.07					0.08			
v/c Ratio	0.56	0.46		0.78	0.54		0.49	0.39	0.15	0.52	0.35	
Uniform Delay, d1	37.3	43.7		37.3	43.2		46.1	13.0	11.2	44.7	11.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	0.74	1.62	
Incremental Delay, d2	1.7	0.4		12.7	1.1		0.8	0.6	0.4	0.6	0.5	
Delay (s)	39.1	44.2		50.0	44.2		46.9	13.7	11.5	33.8	19.4	
Level of Service	D	D		D	D		D	B	B	C	B	
Approach Delay (s)		41.9			46.9			16.1			21.8	
Approach LOS		D			D			B			C	
Intersection Summary												
HCM 2000 Control Delay			26.3			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.50									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			61.1%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

9: Site Driveway 3/SE Fisher Creek Rd & SE 20th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	45	292	47	298	14	9	92	70
v/c Ratio	0.08	0.30	0.08	0.30	0.04	0.02	0.26	0.16
Control Delay	6.4	5.0	6.4	5.8	8.5	6.4	11.2	4.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.4	5.0	6.4	5.8	8.5	6.4	11.2	4.6
Queue Length 50th (ft)	4	15	4	20	1	0	10	1
Queue Length 95th (ft)	12	37	13	44	7	5	27	12
Internal Link Dist (ft)		2143		4148		120		206
Turn Bay Length (ft)	100		100				100	
Base Capacity (vph)	1022	1592	1024	1637	894	1134	946	1113
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.18	0.05	0.18	0.02	0.01	0.10	0.06
Intersection Summary								

HCM Signalized Intersection Capacity Analysis

9: Site Driveway 3/SE Fisher Creek Rd & SE 20th St

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	35	114	111	36	140	89	11	2	5	71	7	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	0.94		1.00	0.90		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1703		1802	1753		1805	1710		1805	1652	
Flt Permitted	0.58	1.00		0.58	1.00		0.71	1.00		0.75	1.00	
Satd. Flow (perm)	1098	1703		1102	1753		1352	1710		1428	1652	
Peak-hour factor, PHF	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Adj. Flow (vph)	45	148	144	47	182	116	14	3	6	92	9	61
RTOR Reduction (vph)	0	59	0	0	39	0	0	5	0	0	49	0
Lane Group Flow (vph)	45	233	0	47	259	0	14	4	0	92	21	0
Confl. Peds. (#/hr)			3	3								
Confl. Bikes (#/hr)			3			2						
Heavy Vehicles (%)	0%	4%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.7	15.7		15.7	15.7		6.2	6.2		6.2	6.2	
Effective Green, g (s)	15.7	15.7		15.7	15.7		6.2	6.2		6.2	6.2	
Actuated g/C Ratio	0.49	0.49		0.49	0.49		0.19	0.19		0.19	0.19	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	540	838		542	862		262	332		277	321	
v/s Ratio Prot		0.14			c0.15			0.00			0.01	
v/s Ratio Perm	0.04			0.04			0.01			c0.06		
v/c Ratio	0.08	0.28		0.09	0.30		0.05	0.01		0.33	0.06	
Uniform Delay, d1	4.3	4.8		4.3	4.8		10.5	10.4		11.1	10.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.2		0.1	0.2		0.1	0.0		0.7	0.1	
Delay (s)	4.4	4.9		4.4	5.0		10.5	10.4		11.8	10.6	
Level of Service	A	A		A	A		B	B		B	B	
Approach Delay (s)		4.9			4.9			10.5			11.3	
Approach LOS		A			A			B			B	
Intersection Summary												
HCM 2000 Control Delay			6.2			HCM 2000 Level of Service				A		
HCM 2000 Volume to Capacity ratio			0.31									
Actuated Cycle Length (s)			31.9			Sum of lost time (s)			10.0			
Intersection Capacity Utilization			40.4%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

10: NW Parker St & NW 38th Ave

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	116	131	347	290	126	441	204	46	462	110
v/c Ratio	0.26	0.22	0.62	0.50	0.44	0.97	0.31	0.16	1.03	0.16
Control Delay	11.5	11.2	18.6	19.2	17.5	62.2	3.6	13.1	78.6	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.5	11.2	18.6	19.2	17.5	62.2	3.6	13.1	78.6	3.6
Queue Length 50th (ft)	24	21	84	79	30	170	0	11	~189	0
Queue Length 95th (ft)	36	37	98	98	44	#207	12	21	#225	12
Internal Link Dist (ft)		4148		899		2420			638	
Turn Bay Length (ft)	125		150		125			250		125
Base Capacity (vph)	438	584	557	582	287	456	659	287	448	690
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.22	0.62	0.50	0.44	0.97	0.31	0.16	1.03	0.16

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

10: NW Parker St & NW 38th Ave

2/26/2018

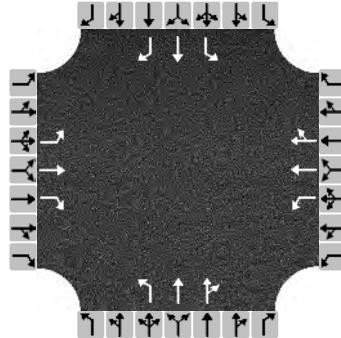
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	79	51	38	236	138	59	86	300	139	31	314	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.94		1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1746		1769	1788		1805	1827	1528	1805	1792	1538
Flt Permitted	0.45	1.00		0.67	1.00		0.25	1.00	1.00	0.25	1.00	1.00
Satd. Flow (perm)	860	1746		1253	1788		475	1827	1528	475	1792	1538
Peak-hour factor, PHF	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68
Adj. Flow (vph)	116	75	56	347	203	87	126	441	204	46	462	110
RTOR Reduction (vph)	0	39	0	0	24	0	0	0	134	0	0	72
Lane Group Flow (vph)	116	93	0	347	266	0	126	441	70	46	462	38
Confl. Peds. (#/hr)			1	1					1	1		
Heavy Vehicles (%)	0%	0%	3%	2%	0%	5%	0%	4%	4%	0%	6%	5%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	3	8		7	4		1	6	7	5	2	3
Permitted Phases	8			4			6		6	2		2
Actuated Green, G (s)	26.0	20.0		26.0	20.0		22.0	16.0	22.0	22.0	16.0	22.0
Effective Green, g (s)	26.0	20.0		26.0	20.0		22.0	16.0	22.0	22.0	16.0	22.0
Actuated g/C Ratio	0.41	0.31		0.41	0.31		0.34	0.25	0.34	0.34	0.25	0.34
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	0.2	1.5		0.2	1.5		0.2	1.5	0.2	0.2	1.5	0.2
Lane Grp Cap (vph)	437	545		557	558		287	456	620	287	448	624
v/s Ratio Prot	0.02	0.05		c0.06	0.15		c0.04	0.24	0.01	0.01	c0.26	0.01
v/s Ratio Perm	0.08			c0.19			0.11		0.04	0.04		0.02
v/c Ratio	0.27	0.17		0.62	0.48		0.44	0.97	0.11	0.16	1.03	0.06
Uniform Delay, d1	12.2	16.0		14.2	17.8		16.0	23.7	14.3	15.2	24.0	14.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.5	0.7		5.2	2.9		4.8	34.7	0.4	1.2	50.8	0.2
Delay (s)	13.7	16.6		19.4	20.7		20.8	58.4	14.7	16.4	74.8	14.3
Level of Service	B	B		B	C		C	E	B	B	E	B
Approach Delay (s)		15.3			20.0			40.7			59.7	
Approach LOS		B			B			D			E	
Intersection Summary												
HCM 2000 Control Delay			37.3			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.74									
Actuated Cycle Length (s)			64.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			64.4%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCS7 All-Way Stop Control Report

General Information

Analyst	KMC	Intersection	Pacific Rim/Parker
Agency/Co.		Jurisdiction	
Date Performed	2/13/2018	East/West Street	NW Pacific Rim Blvd
Analysis Year	2018	North/South Street	NW Parker St
Analysis Time Period (hrs)	0.25	Peak Hour Factor	0.77
Time Analyzed	AM Peak BKG Option 1		
Project Description	22300 Grass Valley		

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	198	21	22	37	62	11	76	322	26	9	247	319
% Thrus in Shared Lane						50			50			
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	L	T	R	L	T	TR	L	T	TR	L	T	R
Flow Rate, v (veh/h)	257	27	29	48	40	55	99	209	243	12	321	414
Percent Heavy Vehicles	2	0	22	5	6	12	1	6	12	11	3	3

Departure Headway and Service Time

Initial Departure Headway, hd (s)	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
Initial Degree of Utilization, x	0.229	0.024	0.025	0.043	0.036	0.048	0.088	0.186	0.216	0.010	0.285	0.368
Final Departure Headway, hd (s)	9.66	9.12	8.80	10.37	9.88	9.80	9.02	8.61	8.61	8.89	8.25	7.55
Final Degree of Utilization, x	0.690	0.069	0.070	0.138	0.111	0.149	0.247	0.500	0.581	0.029	0.735	0.869
Move-Up Time, m (s)	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Service Time, ts (s)	7.36	6.82	6.50	8.07	7.58	7.50	6.72	6.31	6.31	6.59	5.95	5.25

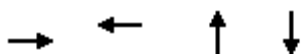
Capacity, Delay and Level of Service

Flow Rate, v (veh/h)	257	27	29	48	40	55	99	209	243	12	321	414
Capacity	373	395	409	347	364	367	399	418	418	405	436	477
95% Queue Length, Q ₉₅ (veh)	5.0	0.2	0.2	0.5	0.4	0.5	1.0	2.7	3.6	0.1	5.9	9.2
Control Delay (s/veh)	31.3	12.5	12.2	14.7	13.8	14.2	14.7	19.6	22.6	11.9	30.6	42.6
Level of Service, LOS	D	B	B	B	B	B	B	C	C	B	D	E
Approach Delay (s/veh)	27.9			14.3			20.0			37.0		
Approach LOS	D			B			C			E		
Intersection Delay, s/veh LOS	28.2						D					

Queues

12: NW Brady Rd & NW 16th Ave

2/26/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	173	524	303	415
v/c Ratio	0.29	0.77	0.46	0.61
Control Delay	10.3	21.8	14.6	17.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	10.3	21.8	14.6	17.3
Queue Length 50th (ft)	31	130	70	102
Queue Length 95th (ft)	54	182	104	144
Internal Link Dist (ft)	675	942	393	3387
Turn Bay Length (ft)				
Base Capacity (vph)	599	680	653	677
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.29	0.77	0.46	0.61
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

12: NW Brady Rd & NW 16th Ave

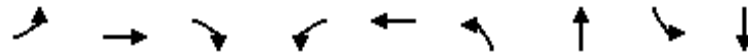
2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	52	55	26	154	91	159	49	144	40	60	180	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.97			0.95			0.98			0.97	
Flt Protected		0.98			0.98			0.99			0.99	
Satd. Flow (prot)		1672			1708			1746			1753	
Flt Permitted		0.76			0.82			0.87			0.89	
Satd. Flow (perm)		1301			1426			1538			1579	
Peak-hour factor, PHF	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Adj. Flow (vph)	68	71	34	200	118	206	64	187	52	78	234	103
RTOR Reduction (vph)	0	15	0	0	39	0	0	12	0	0	20	0
Lane Group Flow (vph)	0	158	0	0	485	0	0	291	0	0	395	0
Confl. Peds. (#/hr)			1	1								
Heavy Vehicles (%)	10%	10%	0%	3%	6%	2%	0%	4%	16%	7%	3%	3%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		27.0			27.0			25.0			25.0	
Effective Green, g (s)		27.0			27.0			25.0			25.0	
Actuated g/C Ratio		0.45			0.45			0.42			0.42	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		1.5			1.5			1.5			1.5	
Lane Grp Cap (vph)		585			641			640			657	
v/s Ratio Prot												
v/s Ratio Perm		0.12			0.34			0.19			0.25	
v/c Ratio		0.27			0.76			0.45			0.60	
Uniform Delay, d1		10.3			13.8			12.6			13.6	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.1			4.5			2.3			4.0	
Delay (s)		11.5			18.3			14.9			17.7	
Level of Service		B			B			B			B	
Approach Delay (s)		11.5			18.3			14.9			17.7	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			16.5			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			60.0			Sum of lost time (s)			8.0			
Intersection Capacity Utilization			59.0%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

1: SE 192nd Ave & Mill Plain Blvd

2/26/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	347	28	512	49	63	412	1067	38	1109
v/c Ratio	1.51	0.13	0.84	0.27	0.45	0.56	0.52	0.32	0.78
Control Delay	282.8	40.8	33.0	45.8	35.5	49.6	5.2	51.0	31.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	282.8	40.8	33.0	45.8	35.5	49.6	5.2	51.0	31.4
Queue Length 50th (ft)	~309	16	200	31	19	131	56	24	296
Queue Length 95th (ft)	#484	42	284	66	59	m148	m70	55	#521
Internal Link Dist (ft)		517			357		2419		550
Turn Bay Length (ft)	225		125	400		200		150	
Base Capacity (vph)	230	513	612	214	411	731	2059	175	1424
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.51	0.05	0.84	0.23	0.15	0.56	0.52	0.22	0.78

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

1: SE 192nd Ave & Mill Plain Blvd

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	330	27	486	47	29	30	391	953	61	36	822	232
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.92		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1900	1604	1703	1612		3467	3461		1752	3420	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1900	1604	1703	1612		3467	3461		1752	3420	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	347	28	512	49	31	32	412	1003	64	38	865	244
RTOR Reduction (vph)	0	0	110	0	30	0	0	3	0	0	23	0
Lane Group Flow (vph)	347	28	402	49	33	0	412	1064	0	38	1086	0
Confl. Peds. (#/hr)	17		9	9		17	1		1	1		1
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	2%	0%	0%	6%	7%	7%	1%	3%	7%	3%	2%	1%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2									
Actuated Green, G (s)	13.0	10.2	31.3	9.7	6.9		21.1	55.4		4.7	39.0	
Effective Green, g (s)	13.0	10.2	31.3	9.7	6.9		21.1	55.4		4.7	39.0	
Actuated g/C Ratio	0.13	0.10	0.31	0.10	0.07		0.21	0.55		0.05	0.39	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	230	193	582	165	111		731	1917		82	1333	
v/s Ratio Prot	c0.20	0.01	c0.15	0.03	0.02		0.12	0.31		0.02	c0.32	
v/s Ratio Perm			0.10									
v/c Ratio	1.51	0.15	0.69	0.30	0.30		0.56	0.55		0.46	0.82	
Uniform Delay, d1	43.5	40.9	30.1	42.0	44.3		35.3	14.4		46.4	27.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.36	0.33		1.00	1.00	
Incremental Delay, d2	250.2	0.1	2.9	0.4	0.6		0.3	0.6		1.5	5.6	
Delay (s)	293.7	41.1	33.0	42.3	44.8		48.5	5.4		47.9	32.9	
Level of Service	F	D	C	D	D		D	A		D	C	
Approach Delay (s)		135.2			43.7			17.4			33.4	
Approach LOS		F			D			B			C	
Intersection Summary												
HCM 2000 Control Delay			52.1				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.94									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			78.8%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

2: SE 192nd Ave & SE 15th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	140	215	34	86	188	109	1488	181	1541
v/c Ratio	0.85	0.67	0.34	0.48	0.43	0.62	0.88	0.68	0.83
Control Delay	85.6	35.2	53.7	50.4	17.9	50.3	26.8	60.0	21.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	85.6	35.2	53.7	50.4	17.9	50.3	26.8	60.0	21.1
Queue Length 50th (ft)	89	84	21	54	55	71	263	120	482
Queue Length 95th (ft)	#175	140	49	88	86	m81	m#599	m153	#681
Internal Link Dist (ft)		621		676			1122		2419
Turn Bay Length (ft)	100		100		100	150		475	
Base Capacity (vph)	173	464	168	447	436	191	1696	270	1852
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.46	0.20	0.19	0.43	0.57	0.88	0.67	0.83

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

2: SE 192nd Ave & SE 15th St

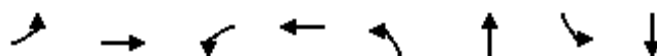
2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	119	68	115	29	73	160	93	1227	37	154	1183	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.91		1.00	1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1736	1682		1687	1863	1605	1787	3522		1805	3480	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1736	1682		1687	1863	1605	1787	3522		1805	3480	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	140	80	135	34	86	188	109	1444	44	181	1392	149
RTOR Reduction (vph)	0	68	0	0	0	57	0	2	0	0	6	0
Lane Group Flow (vph)	140	147	0	34	86	131	109	1486	0	181	1535	0
Confl. Peds. (#/hr)	3		1	1		3	2		6	6		2
Confl. Bikes (#/hr)			1									1
Heavy Vehicles (%)	4%	2%	1%	7%	2%	0%	1%	2%	0%	0%	2%	2%
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6	3	7	4		3	8	
Permitted Phases						6						
Actuated Green, G (s)	9.5	15.1		4.0	9.6	24.4	9.8	46.1		14.8	51.1	
Effective Green, g (s)	9.5	15.1		4.0	9.6	24.4	9.8	46.1		14.8	51.1	
Actuated g/C Ratio	0.10	0.15		0.04	0.10	0.24	0.10	0.46		0.15	0.51	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lane Grp Cap (vph)	164	253		67	178	471	175	1623		267	1778	
v/s Ratio Prot	c0.08	c0.09		0.02	0.05	0.04	0.06	c0.42		c0.10	c0.44	
v/s Ratio Perm						0.04						
v/c Ratio	0.85	0.58		0.51	0.48	0.28	0.62	0.92		0.68	0.86	
Uniform Delay, d1	44.6	39.5		47.0	42.8	30.6	43.3	25.1		40.3	21.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.97	0.82		1.25	0.72	
Incremental Delay, d2	31.6	2.2		2.2	0.8	0.1	2.8	5.8		4.0	4.5	
Delay (s)	76.2	41.7		49.2	43.6	30.8	44.8	26.5		54.4	19.9	
Level of Service	E	D		D	D	C	D	C		D	B	
Approach Delay (s)		55.3			36.4			27.8			23.5	
Approach LOS		E			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			29.0									
HCM 2000 Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			100.0									
Intersection Capacity Utilization			75.5%									
Analysis Period (min)			15									
c Critical Lane Group												

Queues

3: SE 192nd Ave & SE 20th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	146	280	205	380	121	1255	132	1194
v/c Ratio	0.55	0.61	1.27	0.78	0.75	1.01	0.72	0.92
Control Delay	52.3	34.9	198.2	42.9	86.2	50.0	61.1	42.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.3	34.9	198.2	42.9	86.2	50.0	61.1	42.2
Queue Length 50th (ft)	46	139	~165	199	83	~461	89	240
Queue Length 95th (ft)	76	218	#307	#337	m#135	#627	m111	#540
Internal Link Dist (ft)		1188		2143		3702		1122
Turn Bay Length (ft)	100		100		325		400	
Base Capacity (vph)	589	514	162	485	181	1242	232	1291
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.54	1.27	0.78	0.67	1.01	0.57	0.92

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

3: SE 192nd Ave & SE 20th St

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	140	163	106	197	189	176	116	1059	146	127	994	153
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	0.97	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	0.93		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3467	1755		1805	1731		1805	3438		1787	3444	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3467	1755		1805	1731		1805	3438		1787	3444	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	146	170	110	205	197	183	121	1103	152	132	1035	159
RTOR Reduction (vph)	0	24	0	0	31	0	0	10	0	0	11	0
Lane Group Flow (vph)	146	256	0	205	349	0	121	1245	0	132	1183	0
Confl. Peds. (#/hr)	1		3	3		1	5		1	1		5
Confl. Bikes (#/hr)			1			4			5			3
Heavy Vehicles (%)	1%	0%	3%	0%	1%	1%	0%	3%	1%	1%	2%	4%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	7.6	24.9		9.0	26.3		8.9	35.8		10.3	37.2	
Effective Green, g (s)	7.6	24.9		9.0	26.3		8.9	35.8		10.3	37.2	
Actuated g/C Ratio	0.08	0.25		0.09	0.26		0.09	0.36		0.10	0.37	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lane Grp Cap (vph)	263	436		162	455		160	1230		184	1281	
v/s Ratio Prot	0.04	0.15		c0.11	c0.20		0.07	c0.36		c0.07	0.34	
v/s Ratio Perm												
v/c Ratio	0.56	0.59		1.27	0.77		0.76	1.01		0.72	0.92	
Uniform Delay, d1	44.6	33.0		45.5	34.0		44.5	32.1		43.4	30.0	
Progression Factor	1.00	1.00		1.00	1.00		1.44	0.64		1.10	1.09	
Incremental Delay, d2	1.4	1.3		159.2	6.9		13.5	26.1		6.4	8.1	
Delay (s)	46.0	34.3		204.7	40.9		77.5	46.6		54.2	40.9	
Level of Service	D	C		F	D		E	D		D	D	
Approach Delay (s)		38.3			98.3			49.3			42.2	
Approach LOS		D			F			D			D	
Intersection Summary												
HCM 2000 Control Delay			53.3			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.94									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			84.0%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

4: SE 192nd Ave & SE 34th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	154	285	427	368	114	1034	211	269	1180
v/c Ratio	0.63	0.71	1.33	0.57	0.49	0.66	0.26	0.68	0.69
Control Delay	40.0	43.6	195.8	26.1	51.5	25.4	3.9	40.6	29.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.0	43.6	195.8	26.1	51.5	25.4	3.9	40.6	29.8
Queue Length 50th (ft)	76	73	~303	67	37	265	0	91	306
Queue Length 95th (ft)	122	112	#470	109	63	385	46	m100	m340
Internal Link Dist (ft)		670		7104		563			3702
Turn Bay Length (ft)	150		150		300		300	175	
Base Capacity (vph)	257	961	322	1162	282	1562	799	411	1700
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.30	1.33	0.32	0.40	0.66	0.26	0.65	0.69

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

4: SE 192nd Ave & SE 34th St

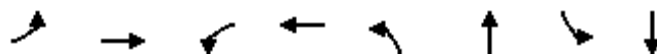
2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	139	181	76	384	197	134	103	931	190	242	924	138
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.96		1.00	0.94		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1752	3389		1769	3316		3433	3505	1532	3502	3450	
Flt Permitted	0.53	1.00		0.26	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	982	3389		493	3316		3433	3505	1532	3502	3450	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	154	201	84	427	219	149	114	1034	211	269	1027	153
RTOR Reduction (vph)	0	57	0	0	125	0	0	0	117	0	9	0
Lane Group Flow (vph)	154	228	0	427	243	0	114	1034	94	269	1171	0
Confl. Peds. (#/hr)	1		1	1		1	2		1	1		2
Confl. Bikes (#/hr)						2			1			2
Heavy Vehicles (%)	3%	2%	0%	2%	2%	1%	2%	3%	3%	0%	2%	5%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6					4			
Actuated Green, G (s)	18.4	10.1		29.1	15.8		6.9	44.6	44.6	11.3	49.0	
Effective Green, g (s)	18.4	10.1		29.1	15.8		6.9	44.6	44.6	11.3	49.0	
Actuated g/C Ratio	0.18	0.10		0.29	0.16		0.07	0.45	0.45	0.11	0.49	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lane Grp Cap (vph)	244	342		322	523		236	1563	683	395	1690	
v/s Ratio Prot	0.05	0.07		c0.19	0.07		0.03	0.30		c0.08	c0.34	
v/s Ratio Perm	0.06			c0.20					0.06			
v/c Ratio	0.63	0.67		1.33	0.46		0.48	0.66	0.14	0.68	0.69	
Uniform Delay, d1	36.5	43.3		32.2	38.3		44.8	21.8	16.4	42.6	19.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	0.86	1.39	
Incremental Delay, d2	3.9	3.8		166.7	0.2		0.6	2.2	0.4	1.7	1.1	
Delay (s)	40.4	47.1		198.9	38.5		45.4	24.0	16.8	38.4	28.5	
Level of Service	D	D		F	D		D	C	B	D	C	
Approach Delay (s)		44.8			124.7			24.7			30.3	
Approach LOS		D			F			C			C	
Intersection Summary												
HCM 2000 Control Delay			48.6			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.96									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			80.1%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

9: NW Fisher Creek Drive & SE 20th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	63	356	6	406	254	158	169	43
v/c Ratio	0.19	0.50	0.02	0.59	0.54	0.24	0.40	0.07
Control Delay	10.9	12.7	9.0	13.4	14.5	6.4	12.3	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.9	12.7	9.0	13.4	14.5	6.4	12.3	4.0
Queue Length 50th (ft)	8	49	1	53	37	11	23	0
Queue Length 95th (ft)	28	115	6	127	80	34	55	11
Internal Link Dist (ft)		2143		4148		110		206
Turn Bay Length (ft)	100		100				100	
Base Capacity (vph)	420	893	475	866	1230	1563	1108	1450
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.40	0.01	0.47	0.21	0.10	0.15	0.03
Intersection Summary								

HCM Signalized Intersection Capacity Analysis

9: NW Fisher Creek Drive & SE 20th St

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	51	276	12	5	234	95	206	71	57	137	2	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.96		1.00	0.93		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1868		1802	1780		1805	1750		1805	1628	
Flt Permitted	0.46	1.00		0.53	1.00		0.73	1.00		0.66	1.00	
Satd. Flow (perm)	882	1868		997	1780		1385	1750		1248	1628	
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	63	341	15	6	289	117	254	88	70	169	2	41
RTOR Reduction (vph)	0	2	0	0	21	0	0	46	0	0	27	0
Lane Group Flow (vph)	63	354	0	6	385	0	254	112	0	169	16	0
Confl. Peds. (#/hr)			3	3								
Confl. Bikes (#/hr)			3			5						
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	0%	0%	3%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	13.9	13.9		13.9	13.9		12.6	12.6		12.6	12.6	
Effective Green, g (s)	13.9	13.9		13.9	13.9		12.6	12.6		12.6	12.6	
Actuated g/C Ratio	0.38	0.38		0.38	0.38		0.35	0.35		0.35	0.35	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	335	711		379	677		478	604		430	561	
v/s Ratio Prot		0.19			c0.22			0.06			0.01	
v/s Ratio Perm	0.07			0.01			c0.18			0.14		
v/c Ratio	0.19	0.50		0.02	0.57		0.53	0.19		0.39	0.03	
Uniform Delay, d1	7.5	8.6		7.0	8.9		9.6	8.4		9.1	7.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.5		0.0	1.1		1.1	0.1		0.6	0.0	
Delay (s)	7.8	9.2		7.1	10.0		10.7	8.5		9.6	7.9	
Level of Service	A	A		A	B		B	A		A	A	
Approach Delay (s)		9.0			10.0			9.9			9.3	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM 2000 Control Delay			9.6			HCM 2000 Level of Service				A		
HCM 2000 Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			36.5			Sum of lost time (s)				10.0		
Intersection Capacity Utilization			54.5%			ICU Level of Service				A		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

10: NW Parker St & NW 38th Ave

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	111	421	114	219	82	280	216	67	272	82
v/c Ratio	0.22	0.71	0.36	0.38	0.22	0.60	0.32	0.19	0.59	0.12
Control Delay	11.1	25.8	13.2	17.7	13.6	27.3	3.5	13.2	27.2	3.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.1	25.8	13.2	17.7	13.6	27.3	3.5	13.2	27.2	3.3
Queue Length 50th (ft)	23	129	24	59	19	96	0	15	93	0
Queue Length 95th (ft)	46	211	48	107	42	159	31	35	155	18
Internal Link Dist (ft)		4148		899		2420			638	
Turn Bay Length (ft)	125		150		125			250		125
Base Capacity (vph)	498	589	318	583	370	470	685	362	461	697
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.71	0.36	0.38	0.22	0.60	0.32	0.19	0.59	0.12

Intersection Summary

HCM Signalized Intersection Capacity Analysis

10: NW Parker St & NW 38th Ave

2/26/2018

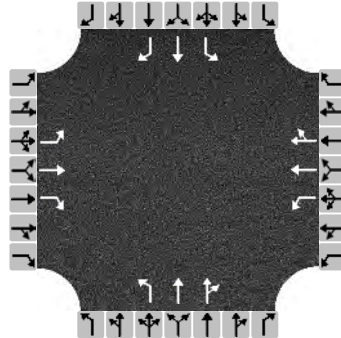
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	97	244	123	99	152	38	71	244	188	58	237	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.95		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1804	1796		1735	1820		1805	1881	1580	1801	1845	1583
Flt Permitted	0.56	1.00		0.27	1.00		0.42	1.00	1.00	0.41	1.00	1.00
Satd. Flow (perm)	1056	1796		498	1820		805	1881	1580	777	1845	1583
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	111	280	141	114	175	44	82	280	216	67	272	82
RTOR Reduction (vph)	0	28	0	0	14	0	0	0	142	0	0	54
Lane Group Flow (vph)	111	393	0	114	205	0	82	280	74	67	272	28
Confl. Peds. (#/hr)	1		2	2		1			5	5		
Confl. Bikes (#/hr)			1			1						
Heavy Vehicles (%)	0%	0%	0%	4%	1%	0%	0%	1%	0%	0%	3%	2%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	3	8		7	4		1	6	7	5	2	3
Permitted Phases	8			4			6		6	2		2
Actuated Green, G (s)	26.0	20.0		26.0	20.0		22.0	16.0	22.0	22.0	16.0	22.0
Effective Green, g (s)	26.0	20.0		26.0	20.0		22.0	16.0	22.0	22.0	16.0	22.0
Actuated g/C Ratio	0.41	0.31		0.41	0.31		0.34	0.25	0.34	0.34	0.25	0.34
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	0.2	1.5		0.2	1.5		0.2	1.5	0.2	0.2	1.5	0.2
Lane Grp Cap (vph)	499	561		318	568		370	470	641	363	461	643
v/s Ratio Prot	0.02	c0.22		c0.03	0.11		c0.02	c0.15	0.01	0.02	0.15	0.00
v/s Ratio Perm	0.07			0.11			0.06		0.04	0.05		0.01
v/c Ratio	0.22	0.70		0.36	0.36		0.22	0.60	0.12	0.18	0.59	0.04
Uniform Delay, d1	12.1	19.4		12.9	17.0		14.6	21.1	14.4	14.5	21.1	14.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	7.1		3.1	1.8		1.4	5.5	0.4	1.1	5.5	0.1
Delay (s)	13.1	26.5		16.0	18.8		16.0	26.6	14.7	15.6	26.6	14.1
Level of Service	B	C		B	B		B	C	B	B	C	B
Approach Delay (s)		23.7			17.9			20.7			22.4	
Approach LOS		C			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			21.4				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.56									
Actuated Cycle Length (s)			64.0				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			55.9%				ICU Level of Service			B		
Analysis Period (min)			15									
c Critical Lane Group												

HCS7 All-Way Stop Control Report

General Information

Analyst	KMC	Intersection	Pacific Rim/Parker
Agency/Co.		Jurisdiction	
Date Performed	2/13/2018	East/West Street	NW Pacific Rim Blvd
Analysis Year	2018	North/South Street	NW Parker St
Analysis Time Period (hrs)	0.25	Peak Hour Factor	0.82
Time Analyzed	PM Peak BKG Option 1		
Project Description	22300 Grass Valley		

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	202	52	100	10	24	16	46	279	36	21	280	146
% Thrus in Shared Lane						50			50			
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	L	T	R	L	T	TR	L	T	TR	L	T	R
Flow Rate, v (veh/h)	246	63	122	12	15	34	56	170	214	26	341	178
Percent Heavy Vehicles	1	2	1	0	0	0	0	1	0	5	3	0

Departure Headway and Service Time

Initial Departure Headway, hd (s)	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
Initial Degree of Utilization, x	0.219	0.056	0.108	0.011	0.013	0.030	0.050	0.151	0.190	0.023	0.304	0.158
Final Departure Headway, hd (s)	8.31	7.83	7.11	9.37	8.87	8.47	8.21	7.73	7.57	8.09	7.56	6.80
Final Degree of Utilization, x	0.569	0.138	0.241	0.032	0.036	0.080	0.128	0.365	0.450	0.058	0.717	0.337
Move-Up Time, m (s)	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Service Time, ts (s)	6.01	5.53	4.81	7.07	6.57	6.17	5.91	5.43	5.27	5.79	5.26	4.50

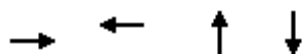
Capacity, Delay and Level of Service

Flow Rate, v (veh/h)	246	63	122	12	15	34	56	170	214	26	341	178
Capacity	433	460	506	384	406	425	439	466	476	445	476	529
95% Queue Length, Q ₉₅ (veh)	3.4	0.5	0.9	0.1	0.1	0.3	0.4	1.7	2.3	0.2	5.7	1.5
Control Delay (s/veh)	21.4	11.8	12.1	12.4	11.9	11.9	12.1	14.8	16.3	11.3	27.1	12.9
Level of Service, LOS	C	B	B	B	B	B	B	B	C	B	D	B
Approach Delay (s/veh)	17.3			12.0			15.2			21.7		
Approach LOS	C			B			C			C		
Intersection Delay, s/veh LOS	18.1						C					

Queues

12: NW Brady Rd & NW 16th Ave

2/26/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	184	307	421	413
v/c Ratio	0.33	0.57	0.44	0.56
Control Delay	14.8	17.4	8.3	12.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	14.8	17.4	8.3	12.8
Queue Length 50th (ft)	41	67	62	87
Queue Length 95th (ft)	82	130	111	153
Internal Link Dist (ft)	675	942	393	3387
Turn Bay Length (ft)				
Base Capacity (vph)	561	542	959	732
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.33	0.57	0.44	0.56
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

12: NW Brady Rd & NW 16th Ave

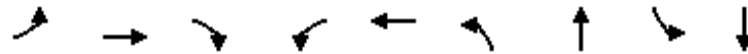
2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	29	96	36	90	61	117	19	195	152	137	194	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			1.00			0.99			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.97			0.94			0.94			0.99	
Flt Protected		0.99			0.98			1.00			0.98	
Satd. Flow (prot)		1775			1709			1763			1814	
Flt Permitted		0.91			0.85			0.97			0.74	
Satd. Flow (perm)		1633			1485			1720			1364	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	33	110	41	103	70	134	22	224	175	157	223	33
RTOR Reduction (vph)	0	17	0	0	47	0	0	42	0	0	5	0
Lane Group Flow (vph)	0	167	0	0	260	0	0	379	0	0	408	0
Confl. Peds. (#/hr)			4	4			1		1	1		1
Confl. Bikes (#/hr)			5									2
Heavy Vehicles (%)	0%	1%	7%	4%	6%	0%	0%	1%	0%	1%	2%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		20.0			20.0			32.0			32.0	
Effective Green, g (s)		20.0			20.0			32.0			32.0	
Actuated g/C Ratio		0.33			0.33			0.53			0.53	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		1.5			1.5			1.5			1.5	
Lane Grp Cap (vph)		544			495			917			727	
v/s Ratio Prot												
v/s Ratio Perm		0.10			c0.18			0.22			c0.30	
v/c Ratio		0.31			0.53			0.41			0.56	
Uniform Delay, d1		14.8			16.2			8.4			9.3	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.5			4.0			1.4			3.1	
Delay (s)		16.3			20.1			9.8			12.4	
Level of Service		B			C			A			B	
Approach Delay (s)		16.3			20.1			9.8			12.4	
Approach LOS		B			C			A			B	
Intersection Summary												
HCM 2000 Control Delay			13.9		HCM 2000 Level of Service					B		
HCM 2000 Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			60.0		Sum of lost time (s)					8.0		
Intersection Capacity Utilization			77.3%		ICU Level of Service					D		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

1: SE 192nd Ave & Mill Plain Blvd

2/26/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	163	145	216	212	272	473	914	105	927
v/c Ratio	0.77	0.46	0.35	0.98	0.79	0.69	0.73	0.62	0.94
Control Delay	67.0	39.7	13.2	100.6	48.1	45.0	23.2	59.0	51.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.0	39.7	13.2	100.6	48.1	45.0	23.2	59.0	51.6
Queue Length 50th (ft)	101	82	53	137	141	117	190	65	~304
Queue Length 95th (ft)	135	102	74	#202	157	#180	213	94	283
Internal Link Dist (ft)		517			357		2419		550
Turn Bay Length (ft)	225		125	400		200		150	
Base Capacity (vph)	232	492	623	217	485	683	1258	186	985
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.29	0.35	0.98	0.56	0.69	0.73	0.56	0.94

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

1: SE 192nd Ave & Mill Plain Blvd

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	119	106	158	155	106	93	345	438	229	77	488	189
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.93		1.00	0.95		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1759	1527	1671	1622		3433	3058		1719	3231	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1787	1759	1527	1671	1622		3433	3058		1719	3231	
Peak-hour factor, PHF	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73
Adj. Flow (vph)	163	145	216	212	145	127	473	600	314	105	668	259
RTOR Reduction (vph)	0	0	47	0	36	0	0	58	0	0	40	0
Lane Group Flow (vph)	163	145	169	212	236	0	473	856	0	105	887	0
Confl. Peds. (#/hr)	1		3	3		1			3	3		
Heavy Vehicles (%)	1%	8%	5%	8%	5%	12%	2%	13%	7%	5%	9%	2%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2	7	1	6		7	4		3	8	
Permitted Phases			2									
Actuated Green, G (s)	11.8	17.8	37.7	13.0	19.0		19.9	39.3		9.9	29.3	
Effective Green, g (s)	11.8	17.8	37.7	13.0	19.0		19.9	39.3		9.9	29.3	
Actuated g/C Ratio	0.12	0.18	0.38	0.13	0.19		0.20	0.39		0.10	0.29	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	210	313	652	217	308		683	1201		170	946	
v/s Ratio Prot	0.09	0.08	0.05	c0.13	c0.15		c0.14	c0.28		0.06	c0.27	
v/s Ratio Perm			0.06									
v/c Ratio	0.78	0.46	0.26	0.98	0.77		0.69	0.71		0.62	0.94	
Uniform Delay, d1	42.8	36.8	21.5	43.4	38.4		37.2	25.6		43.2	34.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.03	0.76		1.00	1.00	
Incremental Delay, d2	15.0	0.4	0.1	53.8	9.9		2.1	3.1		4.6	17.6	
Delay (s)	57.8	37.2	21.6	97.1	48.3		40.3	22.5		47.9	52.1	
Level of Service	E	D	C	F	D		D	C		D	D	
Approach Delay (s)		37.2			69.7			28.6			51.7	
Approach LOS		D			E			C			D	
Intersection Summary												
HCM 2000 Control Delay			42.7			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			64.3%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

2: SE 192nd Ave & SE 15th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	206	89	91	48	77	115	1052	36	1035
v/c Ratio	0.95	0.38	0.65	0.41	0.31	0.65	0.54	0.35	0.60
Control Delay	93.9	20.7	65.2	54.6	11.4	49.9	15.3	62.1	8.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	93.9	20.7	65.2	54.6	11.4	49.9	15.3	62.1	8.3
Queue Length 50th (ft)	132	13	57	30	1	74	164	25	66
Queue Length 95th (ft)	#230	49	95	59	30	m96	216	m30	m182
Internal Link Dist (ft)		621		676			1122		2419
Turn Bay Length (ft)	100		100		100	150		475	
Base Capacity (vph)	219	500	178	475	297	198	1945	156	1733
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.94	0.18	0.51	0.10	0.26	0.58	0.54	0.23	0.60

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

2: SE 192nd Ave & SE 15th St

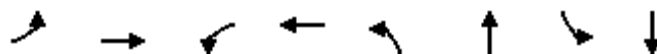
2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	167	18	54	74	39	62	93	831	21	29	758	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.89		1.00	1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1687	1612		1626	1827	1600	1736	3319		1736	3299	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1687	1612		1626	1827	1600	1736	3319		1736	3299	
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	206	22	67	91	48	77	115	1026	26	36	936	99
RTOR Reduction (vph)	0	60	0	0	0	68	0	1	0	0	6	0
Lane Group Flow (vph)	206	29	0	91	48	9	115	1051	0	36	1029	0
Confl. Peds. (#/hr)	1		2	2		1	1		4	4		1
Confl. Bikes (#/hr)			1			2						
Heavy Vehicles (%)	7%	4%	3%	11%	4%	0%	4%	8%	20%	4%	8%	4%
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6	3	7	4		3	8	
Permitted Phases						6						
Actuated Green, G (s)	12.9	10.8		7.6	5.5	10.5	10.3	56.6		5.0	51.3	
Effective Green, g (s)	12.9	10.8		7.6	5.5	10.5	10.3	56.6		5.0	51.3	
Actuated g/C Ratio	0.13	0.11		0.08	0.06	0.10	0.10	0.57		0.05	0.51	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lane Grp Cap (vph)	217	174		123	100	248	178	1878		86	1692	
v/s Ratio Prot	c0.12	0.02		0.06	c0.03	0.00	c0.07	0.32		0.02	c0.31	
v/s Ratio Perm						0.00						
v/c Ratio	0.95	0.17		0.74	0.48	0.04	0.65	0.56		0.42	0.61	
Uniform Delay, d1	43.2	40.5		45.2	45.9	40.2	43.1	13.8		46.1	17.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.91	1.01		1.28	0.41	
Incremental Delay, d2	46.0	0.2		18.0	1.3	0.0	3.9	0.8		0.6	0.9	
Delay (s)	89.2	40.7		63.3	47.2	40.2	43.1	14.7		59.5	8.0	
Level of Service	F	D		E	D	D	D	B		E	A	
Approach Delay (s)		74.6			51.5			17.5			9.7	
Approach LOS		E			D			B			A	
Intersection Summary												
HCM 2000 Control Delay	23.2			HCM 2000 Level of Service			C					
HCM 2000 Volume to Capacity ratio	0.66											
Actuated Cycle Length (s)	100.0			Sum of lost time (s)			20.0					
Intersection Capacity Utilization	57.3%			ICU Level of Service			B					
Analysis Period (min)	15											
c Critical Lane Group												

Queues

3: SE 192nd Ave & SE 20th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	151	228	61	287	65	1034	200	971
v/c Ratio	0.57	0.65	0.50	0.84	0.50	0.83	0.66	0.61
Control Delay	52.7	42.4	57.6	49.6	69.5	31.9	54.7	23.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.7	42.4	57.6	49.6	69.5	31.9	54.7	23.3
Queue Length 50th (ft)	48	124	38	130	44	325	135	172
Queue Length 95th (ft)	68	159	68	167	65	350	#244	245
Internal Link Dist (ft)		1188		2143		3702		1122
Turn Bay Length (ft)	100		100		325		400	
Base Capacity (vph)	396	439	200	462	177	1252	301	1602
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.52	0.30	0.62	0.37	0.83	0.66	0.61

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

3: SE 192nd Ave & SE 20th St

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	119	121	59	48	84	143	51	692	125	158	673	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	0.97	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.91		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3303	1749		1671	1667		1752	3253		1719	3172	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3303	1749		1671	1667		1752	3253		1719	3172	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	151	153	75	61	106	181	65	876	158	200	852	119
RTOR Reduction (vph)	0	19	0	0	67	0	0	14	0	0	9	0
Lane Group Flow (vph)	151	209	0	61	220	0	65	1020	0	200	962	0
Confl. Peds. (#/hr)			2	2			2		2	2		2
Confl. Bikes (#/hr)			2			2			2			1
Heavy Vehicles (%)	6%	3%	2%	8%	1%	3%	3%	8%	8%	5%	12%	7%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	8.0	19.0		6.4	17.4		6.4	37.1		17.5	48.2	
Effective Green, g (s)	8.0	19.0		6.4	17.4		6.4	37.1		17.5	48.2	
Actuated g/C Ratio	0.08	0.19		0.06	0.17		0.06	0.37		0.18	0.48	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lane Grp Cap (vph)	264	332		106	290		112	1206		300	1528	
v/s Ratio Prot	c0.05	0.12		0.04	c0.13		0.04	c0.31		c0.12	0.30	
v/s Ratio Perm												
v/c Ratio	0.57	0.63		0.58	0.76		0.58	0.85		0.67	0.63	
Uniform Delay, d1	44.3	37.3		45.5	39.3		45.5	28.8		38.5	19.3	
Progression Factor	1.00	1.00		1.00	1.00		1.28	0.88		1.11	1.04	
Incremental Delay, d2	1.9	2.9		4.6	9.7		4.7	7.2		3.7	1.7	
Delay (s)	46.2	40.1		50.1	49.0		63.0	32.6		46.4	21.7	
Level of Service	D	D		D	D		E	C		D	C	
Approach Delay (s)		42.6			49.2			34.4			25.9	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			33.8			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			65.9%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

4: SE 192nd Ave & SE 34th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	121	155	213	248	89	697	220	131	650
v/c Ratio	0.55	0.51	0.78	0.64	0.41	0.39	0.24	0.52	0.35
Control Delay	41.3	39.2	54.7	35.6	50.6	14.6	2.7	40.9	20.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.3	39.2	54.7	35.6	50.6	14.6	2.7	40.9	20.7
Queue Length 50th (ft)	64	38	119	52	28	127	0	43	113
Queue Length 95th (ft)	110	68	#191	90	53	196	38	m76	238
Internal Link Dist (ft)		670		7104		563			3702
Turn Bay Length (ft)	150		150		300		300	175	
Base Capacity (vph)	243	1031	277	1069	350	1795	915	346	1854
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.15	0.77	0.23	0.25	0.39	0.24	0.38	0.35

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

4: SE 192nd Ave & SE 34th St

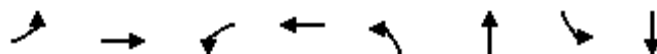
2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	110	109	32	194	146	80	81	634	200	119	482	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.97		1.00	0.95		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1655	3249		1767	3253		3502	3282	1490	3467	3190	
Flt Permitted	0.53	1.00		0.57	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	932	3249		1063	3253		3502	3282	1490	3467	3190	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	121	120	35	213	160	88	89	697	220	131	530	120
RTOR Reduction (vph)	0	32	0	0	80	0	0	0	100	0	12	0
Lane Group Flow (vph)	121	123	0	213	168	0	89	697	120	131	638	0
Confl. Peds. (#/hr)	1		3	3		1	3		6	6		3
Heavy Vehicles (%)	9%	7%	7%	2%	6%	2%	0%	10%	5%	1%	9%	13%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6					4			
Actuated Green, G (s)	16.8	8.3		19.2	9.5		5.2	54.7	54.7	7.3	56.8	
Effective Green, g (s)	16.8	8.3		19.2	9.5		5.2	54.7	54.7	7.3	56.8	
Actuated g/C Ratio	0.17	0.08		0.19	0.10		0.05	0.55	0.55	0.07	0.57	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lane Grp Cap (vph)	218	269		272	309		182	1795	815	253	1811	
v/s Ratio Prot	0.05	0.04		c0.08	0.05		0.03	c0.21		c0.04	0.20	
v/s Ratio Perm	0.05			c0.07					0.08			
v/c Ratio	0.56	0.46		0.78	0.54		0.49	0.39	0.15	0.52	0.35	
Uniform Delay, d1	37.3	43.7		37.3	43.2		46.1	13.0	11.2	44.7	11.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	0.78	1.69	
Incremental Delay, d2	1.7	0.4		12.7	1.1		0.8	0.6	0.4	0.6	0.4	
Delay (s)	39.1	44.2		50.0	44.2		46.9	13.7	11.5	35.5	20.1	
Level of Service	D	D		D	D		D	B	B	D	C	
Approach Delay (s)		41.9			46.9			16.1			22.7	
Approach LOS		D			D			B			C	
Intersection Summary												
HCM 2000 Control Delay			26.6			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.50									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			61.1%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

9: Site Driveway 3/SE Fisher Creek Rd & SE 20th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	40	387	47	285	17	6	1	12
v/c Ratio	0.04	0.25	0.05	0.17	0.04	0.01	0.00	0.02
Control Delay	2.2	2.0	2.2	2.0	11.4	0.0	12.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.2	2.0	2.2	2.0	11.4	0.0	12.0	0.0
Queue Length 50th (ft)	0	0	0	0	2	0	0	0
Queue Length 95th (ft)	9	48	10	42	11	0	2	0
Internal Link Dist (ft)	2143		4148		120		206	
Turn Bay Length (ft)	100	100				100		
Base Capacity (vph)	1066	1658	968	1778	1313	1298	1313	1282
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.23	0.05	0.16	0.01	0.00	0.00	0.01
Intersection Summary								

HCM Signalized Intersection Capacity Analysis

9: Site Driveway 3/SE Fisher Creek Rd & SE 20th St

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	31	180	118	36	213	6	13	0	5	1	0	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	1.00		1.00	0.85		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1728		1802	1855		1805	1615		1805	1615	
Flt Permitted	0.59	1.00		0.53	1.00		1.00	1.00		1.00	1.00	
Satd. Flow (perm)	1112	1728		1011	1855		1900	1615		1900	1615	
Peak-hour factor, PHF	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Adj. Flow (vph)	40	234	153	47	277	8	17	0	6	1	0	12
RTOR Reduction (vph)	0	26	0	0	1	0	0	6	0	0	12	0
Lane Group Flow (vph)	40	361	0	47	284	0	17	0	0	1	0	0
Confl. Peds. (#/hr)			3	3								
Confl. Bikes (#/hr)			3			2						
Heavy Vehicles (%)	0%	4%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	22.5	22.5		22.5	22.5		1.1	1.1		1.1	1.1	
Effective Green, g (s)	22.5	22.5		22.5	22.5		1.1	1.1		1.1	1.1	
Actuated g/C Ratio	0.67	0.67		0.67	0.67		0.03	0.03		0.03	0.03	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	744	1157		677	1242		62	52		62	52	
v/s Ratio Prot		c0.21			0.15			0.00			0.00	
v/s Ratio Perm	0.04			0.05			c0.01			0.00		
v/c Ratio	0.05	0.31		0.07	0.23		0.27	0.00		0.02	0.01	
Uniform Delay, d1	1.9	2.3		1.9	2.2		15.9	15.7		15.7	15.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.2		0.0	0.1		2.4	0.0		0.1	0.1	
Delay (s)	1.9	2.5		2.0	2.3		18.3	15.7		15.8	15.8	
Level of Service	A	A		A	A		B	B		B	B	
Approach Delay (s)		2.4			2.2			17.6			15.8	
Approach LOS		A			A			B			B	
Intersection Summary												
HCM 2000 Control Delay			3.0			HCM 2000 Level of Service				A		
HCM 2000 Volume to Capacity ratio			0.31									
Actuated Cycle Length (s)			33.6			Sum of lost time (s)			10.0			
Intersection Capacity Utilization			40.9%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

10: NW Parker St & NW 38th Ave

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	116	131	347	290	126	441	204	46	462	110
v/c Ratio	0.26	0.22	0.62	0.50	0.44	0.97	0.31	0.16	1.03	0.16
Control Delay	11.5	11.2	18.6	19.2	17.5	62.2	3.6	13.1	78.6	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.5	11.2	18.6	19.2	17.5	62.2	3.6	13.1	78.6	3.6
Queue Length 50th (ft)	24	21	84	79	30	170	0	11	~189	0
Queue Length 95th (ft)	36	37	98	98	44	#207	12	21	#225	12
Internal Link Dist (ft)		4148		899		2420			638	
Turn Bay Length (ft)	125		150		125			250		125
Base Capacity (vph)	438	584	557	582	287	456	659	287	448	690
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.22	0.62	0.50	0.44	0.97	0.31	0.16	1.03	0.16

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

10: NW Parker St & NW 38th Ave

2/26/2018

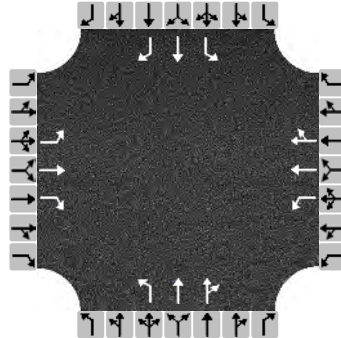
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	79	51	38	236	138	59	86	300	139	31	314	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.94		1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1746		1769	1788		1805	1827	1528	1805	1792	1538
Flt Permitted	0.45	1.00		0.67	1.00		0.25	1.00	1.00	0.25	1.00	1.00
Satd. Flow (perm)	860	1746		1253	1788		475	1827	1528	475	1792	1538
Peak-hour factor, PHF	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68
Adj. Flow (vph)	116	75	56	347	203	87	126	441	204	46	462	110
RTOR Reduction (vph)	0	39	0	0	24	0	0	0	134	0	0	72
Lane Group Flow (vph)	116	93	0	347	266	0	126	441	70	46	462	38
Confl. Peds. (#/hr)			1	1					1	1		
Heavy Vehicles (%)	0%	0%	3%	2%	0%	5%	0%	4%	4%	0%	6%	5%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	3	8		7	4		1	6	7	5	2	3
Permitted Phases	8			4			6		6	2		2
Actuated Green, G (s)	26.0	20.0		26.0	20.0		22.0	16.0	22.0	22.0	16.0	22.0
Effective Green, g (s)	26.0	20.0		26.0	20.0		22.0	16.0	22.0	22.0	16.0	22.0
Actuated g/C Ratio	0.41	0.31		0.41	0.31		0.34	0.25	0.34	0.34	0.25	0.34
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	0.2	1.5		0.2	1.5		0.2	1.5	0.2	0.2	1.5	0.2
Lane Grp Cap (vph)	437	545		557	558		287	456	620	287	448	624
v/s Ratio Prot	0.02	0.05		c0.06	0.15		c0.04	0.24	0.01	0.01	c0.26	0.01
v/s Ratio Perm	0.08			c0.19			0.11		0.04	0.04		0.02
v/c Ratio	0.27	0.17		0.62	0.48		0.44	0.97	0.11	0.16	1.03	0.06
Uniform Delay, d1	12.2	16.0		14.2	17.8		16.0	23.7	14.3	15.2	24.0	14.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.5	0.7		5.2	2.9		4.8	34.7	0.4	1.2	50.8	0.2
Delay (s)	13.7	16.6		19.4	20.7		20.8	58.4	14.7	16.4	74.8	14.3
Level of Service	B	B		B	C		C	E	B	B	E	B
Approach Delay (s)		15.3			20.0			40.7			59.7	
Approach LOS		B			B			D			E	
Intersection Summary												
HCM 2000 Control Delay			37.3			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.74									
Actuated Cycle Length (s)			64.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			64.4%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCS7 All-Way Stop Control Report

General Information

Analyst	KMC	Intersection	Pacific Rim/Parker
Agency/Co.		Jurisdiction	
Date Performed	2/13/2018	East/West Street	NW Pacific Rim Blvd
Analysis Year	2018	North/South Street	NW Parker St
Analysis Time Period (hrs)	0.25	Peak Hour Factor	0.77
Time Analyzed	AM Peak BKG Option 2		
Project Description	22300 Grass Valley		

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	198	21	22	37	62	11	76	322	26	9	247	319
% Thrus in Shared Lane						50			50			
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	L	T	R	L	T	TR	L	T	TR	L	T	R
Flow Rate, v (veh/h)	257	27	29	48	40	55	99	209	243	12	321	414
Percent Heavy Vehicles	2	0	22	5	6	12	1	6	12	11	3	3

Departure Headway and Service Time

Initial Departure Headway, hd (s)	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
Initial Degree of Utilization, x	0.229	0.024	0.025	0.043	0.036	0.048	0.088	0.186	0.216	0.010	0.285	0.368
Final Departure Headway, hd (s)	9.66	9.12	8.80	10.37	9.88	9.80	9.02	8.61	8.61	8.89	8.25	7.55
Final Degree of Utilization, x	0.690	0.069	0.070	0.138	0.111	0.149	0.247	0.500	0.581	0.029	0.735	0.869
Move-Up Time, m (s)	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Service Time, ts (s)	7.36	6.82	6.50	8.07	7.58	7.50	6.72	6.31	6.31	6.59	5.95	5.25

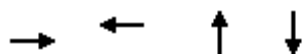
Capacity, Delay and Level of Service

Flow Rate, v (veh/h)	257	27	29	48	40	55	99	209	243	12	321	414
Capacity	373	395	409	347	364	367	399	418	418	405	436	477
95% Queue Length, Q ₉₅ (veh)	5.0	0.2	0.2	0.5	0.4	0.5	1.0	2.7	3.6	0.1	5.9	9.2
Control Delay (s/veh)	31.3	12.5	12.2	14.7	13.8	14.2	14.7	19.6	22.6	11.9	30.6	42.6
Level of Service, LOS	D	B	B	B	B	B	B	C	C	B	D	E
Approach Delay (s/veh)	27.9			14.3			20.0			37.0		
Approach LOS	D			B			C			E		
Intersection Delay, s/veh LOS	28.2						D					

Queues

12: NW Brady Rd & NW 16th Ave

2/26/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	173	524	303	415
v/c Ratio	0.29	0.77	0.46	0.61
Control Delay	10.3	21.8	14.6	17.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	10.3	21.8	14.6	17.3
Queue Length 50th (ft)	31	130	70	102
Queue Length 95th (ft)	54	182	104	144
Internal Link Dist (ft)	675	942	393	3387
Turn Bay Length (ft)				
Base Capacity (vph)	599	680	653	677
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.29	0.77	0.46	0.61
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

12: NW Brady Rd & NW 16th Ave

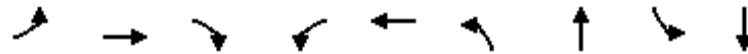
2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	52	55	26	154	91	159	49	144	40	60	180	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.97			0.95			0.98			0.97	
Flt Protected		0.98			0.98			0.99			0.99	
Satd. Flow (prot)		1672			1708			1746			1753	
Flt Permitted		0.76			0.82			0.87			0.89	
Satd. Flow (perm)		1301			1426			1538			1579	
Peak-hour factor, PHF	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Adj. Flow (vph)	68	71	34	200	118	206	64	187	52	78	234	103
RTOR Reduction (vph)	0	15	0	0	39	0	0	12	0	0	20	0
Lane Group Flow (vph)	0	158	0	0	485	0	0	291	0	0	395	0
Confl. Peds. (#/hr)			1	1								
Heavy Vehicles (%)	10%	10%	0%	3%	6%	2%	0%	4%	16%	7%	3%	3%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		27.0			27.0			25.0			25.0	
Effective Green, g (s)		27.0			27.0			25.0			25.0	
Actuated g/C Ratio		0.45			0.45			0.42			0.42	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		1.5			1.5			1.5			1.5	
Lane Grp Cap (vph)		585			641			640			657	
v/s Ratio Prot												
v/s Ratio Perm		0.12			0.34			0.19			0.25	
v/c Ratio		0.27			0.76			0.45			0.60	
Uniform Delay, d1		10.3			13.8			12.6			13.6	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.1			8.1			2.3			4.0	
Delay (s)		11.5			21.9			14.9			17.7	
Level of Service		B			C			B			B	
Approach Delay (s)		11.5			21.9			14.9			17.7	
Approach LOS		B			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			17.9			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			60.0			Sum of lost time (s)			8.0			
Intersection Capacity Utilization			59.0%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

1: SE 192nd Ave & Mill Plain Blvd

2/26/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	347	28	512	49	63	412	1067	38	1109
v/c Ratio	1.51	0.13	0.84	0.27	0.45	0.56	0.52	0.32	0.78
Control Delay	282.8	40.8	33.0	45.8	35.5	39.8	6.0	51.0	31.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	282.8	40.8	33.0	45.8	35.5	39.8	6.0	51.0	31.4
Queue Length 50th (ft)	~309	16	200	31	19	104	135	24	296
Queue Length 95th (ft)	#484	42	284	66	59	m131	80	55	#521
Internal Link Dist (ft)		517			357		2419		550
Turn Bay Length (ft)	225		125	400		200		150	
Base Capacity (vph)	230	513	612	214	411	731	2059	175	1424
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.51	0.05	0.84	0.23	0.15	0.56	0.52	0.22	0.78

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

1: SE 192nd Ave & Mill Plain Blvd

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	330	27	486	47	29	30	391	953	61	36	822	232
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.92		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1900	1604	1703	1612		3467	3461		1752	3420	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1900	1604	1703	1612		3467	3461		1752	3420	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	347	28	512	49	31	32	412	1003	64	38	865	244
RTOR Reduction (vph)	0	0	110	0	30	0	0	3	0	0	23	0
Lane Group Flow (vph)	347	28	402	49	33	0	412	1064	0	38	1086	0
Confl. Peds. (#/hr)	17		9	9		17	1		1	1		1
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	2%	0%	0%	6%	7%	7%	1%	3%	7%	3%	2%	1%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2									
Actuated Green, G (s)	13.0	10.2	31.3	9.7	6.9		21.1	55.4		4.7	39.0	
Effective Green, g (s)	13.0	10.2	31.3	9.7	6.9		21.1	55.4		4.7	39.0	
Actuated g/C Ratio	0.13	0.10	0.31	0.10	0.07		0.21	0.55		0.05	0.39	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	230	193	582	165	111		731	1917		82	1333	
v/s Ratio Prot	c0.20	0.01	c0.15	0.03	0.02		0.12	0.31		0.02	c0.32	
v/s Ratio Perm			0.10									
v/c Ratio	1.51	0.15	0.69	0.30	0.30		0.56	0.55		0.46	0.82	
Uniform Delay, d1	43.5	40.9	30.1	42.0	44.3		35.3	14.4		46.4	27.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.08	0.38		1.00	1.00	
Incremental Delay, d2	250.2	0.1	2.9	0.4	0.6		0.4	0.7		1.5	5.6	
Delay (s)	293.7	41.1	33.0	42.3	44.8		38.5	6.2		47.9	32.9	
Level of Service	F	D	C	D	D		D	A		D	C	
Approach Delay (s)		135.2			43.7			15.2			33.4	
Approach LOS		F			D			B			C	
Intersection Summary												
HCM 2000 Control Delay			51.2				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.94									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			78.8%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

2: SE 192nd Ave & SE 15th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	140	215	60	35	65	160	1660	75	1647
v/c Ratio	0.77	0.70	0.50	0.26	0.24	0.60	0.78	0.53	0.92
Control Delay	70.5	23.2	58.0	46.7	7.3	40.3	21.1	60.0	27.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	70.5	23.2	58.0	46.7	7.3	40.3	21.1	60.0	27.6
Queue Length 50th (ft)	89	21	38	22	0	102	341	47	548
Queue Length 95th (ft)	#175	77	73	46	22	m97	m307	m63	#757
Internal Link Dist (ft)		621		676			1122		2419
Turn Bay Length (ft)	100		100		100	150		475	
Base Capacity (vph)	192	526	168	447	326	265	2117	199	1789
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.41	0.36	0.08	0.20	0.60	0.78	0.38	0.92

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

2: SE 192nd Ave & SE 15th St

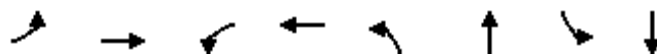
2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	119	30	153	51	30	55	136	1332	79	64	1273	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.87		1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1736	1621		1687	1863	1604	1787	3507		1805	3483	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1736	1621		1687	1863	1604	1787	3507		1805	3483	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	140	35	180	60	35	65	160	1567	93	75	1498	149
RTOR Reduction (vph)	0	163	0	0	0	57	0	3	0	0	6	0
Lane Group Flow (vph)	140	52	0	60	35	8	160	1657	0	75	1641	0
Confl. Peds. (#/hr)	3		1	1		3	2		6	6		2
Confl. Bikes (#/hr)			1									1
Heavy Vehicles (%)	4%	2%	1%	7%	2%	0%	1%	2%	0%	0%	2%	2%
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6	3	7	4		3	8	
Permitted Phases						6						
Actuated Green, G (s)	10.6	9.7		6.2	5.3	12.1	14.9	57.3		6.8	49.2	
Effective Green, g (s)	10.6	9.7		6.2	5.3	12.1	14.9	57.3		6.8	49.2	
Actuated g/C Ratio	0.11	0.10		0.06	0.05	0.12	0.15	0.57		0.07	0.49	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lane Grp Cap (vph)	184	157		104	98	274	266	2009		122	1713	
v/s Ratio Prot	c0.08	c0.03		0.04	0.02	0.00	c0.09	c0.47		0.04	c0.47	
v/s Ratio Perm						0.00						
v/c Ratio	0.76	0.33		0.58	0.36	0.03	0.60	0.82		0.61	0.96	
Uniform Delay, d1	43.5	42.1		45.6	45.7	38.8	39.8	17.3		45.3	24.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.94	1.08		1.13	0.75	
Incremental Delay, d2	15.3	0.5		4.7	0.8	0.0	0.8	1.2		4.8	11.4	
Delay (s)	58.7	42.6		50.4	46.5	38.8	38.0	20.0		56.0	29.6	
Level of Service	E	D		D	D	D	D	B		E	C	
Approach Delay (s)		49.0			44.8			21.6			30.8	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay	28.8			HCM 2000 Level of Service			C					
HCM 2000 Volume to Capacity ratio	0.84											
Actuated Cycle Length (s)	100.0			Sum of lost time (s)			20.0					
Intersection Capacity Utilization	79.0%			ICU Level of Service			D					
Analysis Period (min)	15											
c Critical Lane Group												

Queues

3: SE 192nd Ave & SE 20th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	150	288	189	544	121	1263	281	1213
v/c Ratio	0.56	0.56	1.17	0.99	0.76	1.21	1.21	1.02
Control Delay	52.1	32.2	164.4	68.5	87.1	127.9	158.3	60.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.1	32.2	164.4	68.5	87.1	127.9	158.3	60.3
Queue Length 50th (ft)	48	139	~144	303	83	~524	~229	~430
Queue Length 95th (ft)	78	225	#283	#557	m#137	#633	m#281	m#504
Internal Link Dist (ft)		1188		2143		3702		1122
Turn Bay Length (ft)	100		100		325		400	
Base Capacity (vph)	589	515	162	548	180	1042	232	1187
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.56	1.17	0.99	0.67	1.21	1.21	1.02

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

3: SE 192nd Ave & SE 20th St

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 			 	 		 	 		 	 	 
Volume (vph)	144	171	106	181	187	335	116	1086	127	270	1010	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	0.97	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	0.90		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3467	1759		1805	1682		1805	3447		1787	3444	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3467	1759		1805	1682		1805	3447		1787	3444	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	150	178	110	189	195	349	121	1131	132	281	1052	161
RTOR Reduction (vph)	0	22	0	0	57	0	0	9	0	0	12	0
Lane Group Flow (vph)	150	266	0	189	487	0	121	1254	0	281	1201	0
Confl. Peds. (#/hr)	1		3	3		1	5		1	1		5
Confl. Bikes (#/hr)			1			4			5			3
Heavy Vehicles (%)	1%	0%	3%	0%	1%	1%	0%	3%	1%	1%	2%	4%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	7.8	28.0		9.0	29.2		8.9	30.0		13.0	34.1	
Effective Green, g (s)	7.8	28.0		9.0	29.2		8.9	30.0		13.0	34.1	
Actuated g/C Ratio	0.08	0.28		0.09	0.29		0.09	0.30		0.13	0.34	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lane Grp Cap (vph)	270	492		162	491		160	1034		232	1174	
v/s Ratio Prot	0.04	0.15		c0.10	c0.29		0.07	c0.36		c0.16	c0.35	
v/s Ratio Perm												
v/c Ratio	0.56	0.54		1.17	0.99		0.76	1.21		1.21	1.02	
Uniform Delay, d1	44.4	30.5		45.5	35.3		44.5	35.0		43.5	33.0	
Progression Factor	1.00	1.00		1.00	1.00		1.44	0.69		1.21	1.10	
Incremental Delay, d2	1.4	0.7		122.6	38.1		13.5	103.1		113.7	24.7	
Delay (s)	45.8	31.2		168.1	73.4		77.5	127.3		166.4	60.8	
Level of Service	D	C		F	E		E	F		F	E	
Approach Delay (s)		36.2			97.8			122.9			80.7	
Approach LOS		D			F			F			F	
Intersection Summary												
HCM 2000 Control Delay			93.4			HCM 2000 Level of Service				F		
HCM 2000 Volume to Capacity ratio			1.14									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			100.3%			ICU Level of Service			G			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

4: SE 192nd Ave & SE 34th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	154	285	427	368	114	1034	211	269	1180
v/c Ratio	0.63	0.71	1.33	0.57	0.49	0.66	0.26	0.68	0.69
Control Delay	40.0	43.6	195.8	26.1	51.5	25.4	3.9	39.1	32.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.0	43.6	195.8	26.1	51.5	25.4	3.9	39.1	32.2
Queue Length 50th (ft)	76	73	~303	67	37	265	0	91	318
Queue Length 95th (ft)	122	112	#470	109	63	385	46	m93	m317
Internal Link Dist (ft)		670		7104		563			3702
Turn Bay Length (ft)	150		150		300		300	175	
Base Capacity (vph)	257	961	322	1162	282	1562	799	411	1700
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.30	1.33	0.32	0.40	0.66	0.26	0.65	0.69

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

4: SE 192nd Ave & SE 34th St

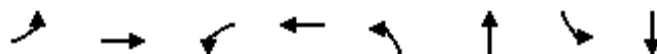
2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	139	181	76	384	197	134	103	931	190	242	924	138
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.96		1.00	0.94		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1752	3389		1769	3316		3433	3505	1532	3502	3450	
Flt Permitted	0.53	1.00		0.26	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	982	3389		493	3316		3433	3505	1532	3502	3450	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	154	201	84	427	219	149	114	1034	211	269	1027	153
RTOR Reduction (vph)	0	57	0	0	125	0	0	0	117	0	9	0
Lane Group Flow (vph)	154	228	0	427	243	0	114	1034	94	269	1171	0
Confl. Peds. (#/hr)	1		1	1		1	2		1	1		2
Confl. Bikes (#/hr)						2			1			2
Heavy Vehicles (%)	3%	2%	0%	2%	2%	1%	2%	3%	3%	0%	2%	5%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6					4			
Actuated Green, G (s)	18.4	10.1		29.1	15.8		6.9	44.6	44.6	11.3	49.0	
Effective Green, g (s)	18.4	10.1		29.1	15.8		6.9	44.6	44.6	11.3	49.0	
Actuated g/C Ratio	0.18	0.10		0.29	0.16		0.07	0.45	0.45	0.11	0.49	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lane Grp Cap (vph)	244	342		322	523		236	1563	683	395	1690	
v/s Ratio Prot	0.05	0.07		c0.19	0.07		0.03	0.30		c0.08	c0.34	
v/s Ratio Perm	0.06			c0.20					0.06			
v/c Ratio	0.63	0.67		1.33	0.46		0.48	0.66	0.14	0.68	0.69	
Uniform Delay, d1	36.5	43.3		32.2	38.3		44.8	21.8	16.4	42.6	19.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	0.85	1.52	
Incremental Delay, d2	3.9	3.8		166.7	0.2		0.6	2.2	0.4	1.4	0.8	
Delay (s)	40.4	47.1		198.9	38.5		45.4	24.0	16.8	37.4	30.8	
Level of Service	D	D		F	D		D	C	B	D	C	
Approach Delay (s)		44.8			124.7			24.7			32.0	
Approach LOS		D			F			C			C	
Intersection Summary												
HCM 2000 Control Delay			49.1			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.96									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			80.1%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

9: NW Fisher Creek Drive & SE 20th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	43	495	6	375	342	70	9	33
v/c Ratio	0.12	0.66	0.02	0.50	0.67	0.11	0.02	0.05
Control Delay	11.7	19.0	11.2	14.4	18.1	1.2	7.7	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.7	19.0	11.2	14.4	18.1	1.2	7.7	0.1
Queue Length 50th (ft)	6	88	1	62	66	0	1	0
Queue Length 95th (ft)	25	#229	7	145	108	5	6	0
Internal Link Dist (ft)		2143		4148		110		206
Turn Bay Length (ft)	100		100				100	
Base Capacity (vph)	369	755	266	749	1114	1273	1077	1327
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.66	0.02	0.50	0.31	0.05	0.01	0.02

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

9: NW Fisher Creek Drive & SE 20th St

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	35	387	14	5	298	6	277	0	57	7	0	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00		1.00	0.85		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1870		1802	1857		1805	1568		1805	1615	
Flt Permitted	0.48	1.00		0.35	1.00		0.74	1.00		0.71	1.00	
Satd. Flow (perm)	917	1870		661	1857		1398	1568		1352	1615	
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	43	478	17	6	368	7	342	0	70	9	0	33
RTOR Reduction (vph)	0	2	0	0	1	0	0	44	0	0	21	0
Lane Group Flow (vph)	43	493	0	6	374	0	342	26	0	9	12	0
Confl. Peds. (#/hr)			3	3								
Confl. Bikes (#/hr)			3			5						
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	0%	0%	3%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	17.4	17.4		17.4	17.4		15.9	15.9		15.9	15.9	
Effective Green, g (s)	17.4	17.4		17.4	17.4		15.9	15.9		15.9	15.9	
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.37	0.37		0.37	0.37	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	368	751		265	746		513	575		496	593	
v/s Ratio Prot		c0.26			0.20			0.02			0.01	
v/s Ratio Perm	0.05			0.01			c0.24			0.01		
v/c Ratio	0.12	0.66		0.02	0.50		0.67	0.04		0.02	0.02	
Uniform Delay, d1	8.1	10.5		7.8	9.7		11.5	8.8		8.7	8.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	2.1		0.0	0.5		3.3	0.0		0.0	0.0	
Delay (s)	8.3	12.6		7.9	10.2		14.7	8.8		8.7	8.7	
Level of Service	A	B		A	B		B	A		A	A	
Approach Delay (s)		12.3			10.2			13.7			8.7	
Approach LOS		B			B			B			A	
Intersection Summary												
HCM 2000 Control Delay			12.0			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			43.3			Sum of lost time (s)				10.0		
Intersection Capacity Utilization			59.4%			ICU Level of Service				B		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

10: NW Parker St & NW 38th Ave

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	111	421	114	219	82	280	216	67	272	82
v/c Ratio	0.22	0.71	0.36	0.38	0.22	0.60	0.32	0.19	0.59	0.12
Control Delay	11.1	25.8	13.2	17.7	13.6	27.3	3.5	13.2	27.2	3.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.1	25.8	13.2	17.7	13.6	27.3	3.5	13.2	27.2	3.3
Queue Length 50th (ft)	23	129	24	59	19	96	0	15	93	0
Queue Length 95th (ft)	46	211	48	107	42	159	31	35	155	18
Internal Link Dist (ft)		4148		899		2420			638	
Turn Bay Length (ft)	125		150		125			250		125
Base Capacity (vph)	498	589	318	583	370	470	685	362	461	697
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.71	0.36	0.38	0.22	0.60	0.32	0.19	0.59	0.12

Intersection Summary

HCM Signalized Intersection Capacity Analysis

10: NW Parker St & NW 38th Ave

2/26/2018

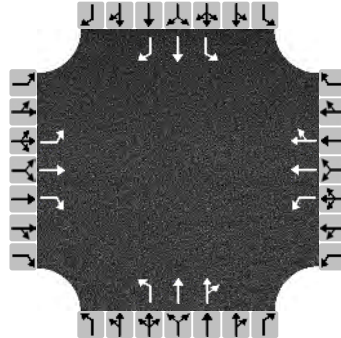
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	97	244	123	99	152	38	71	244	188	58	237	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.95		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1804	1796		1735	1820		1805	1881	1580	1801	1845	1583
Flt Permitted	0.56	1.00		0.27	1.00		0.42	1.00	1.00	0.41	1.00	1.00
Satd. Flow (perm)	1056	1796		498	1820		805	1881	1580	777	1845	1583
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	111	280	141	114	175	44	82	280	216	67	272	82
RTOR Reduction (vph)	0	28	0	0	14	0	0	0	142	0	0	54
Lane Group Flow (vph)	111	393	0	114	205	0	82	280	74	67	272	28
Confl. Peds. (#/hr)	1		2	2		1			5	5		
Confl. Bikes (#/hr)			1			1						
Heavy Vehicles (%)	0%	0%	0%	4%	1%	0%	0%	1%	0%	0%	3%	2%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	3	8		7	4		1	6	7	5	2	3
Permitted Phases	8			4			6		6	2		2
Actuated Green, G (s)	26.0	20.0		26.0	20.0		22.0	16.0	22.0	22.0	16.0	22.0
Effective Green, g (s)	26.0	20.0		26.0	20.0		22.0	16.0	22.0	22.0	16.0	22.0
Actuated g/C Ratio	0.41	0.31		0.41	0.31		0.34	0.25	0.34	0.34	0.25	0.34
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	0.2	1.5		0.2	1.5		0.2	1.5	0.2	0.2	1.5	0.2
Lane Grp Cap (vph)	499	561		318	568		370	470	641	363	461	643
v/s Ratio Prot	0.02	c0.22		c0.03	0.11		c0.02	c0.15	0.01	0.02	0.15	0.00
v/s Ratio Perm	0.07			0.11			0.06		0.04	0.05		0.01
v/c Ratio	0.22	0.70		0.36	0.36		0.22	0.60	0.12	0.18	0.59	0.04
Uniform Delay, d1	12.1	19.4		12.9	17.0		14.6	21.1	14.4	14.5	21.1	14.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	7.1		3.1	1.8		1.4	5.5	0.4	1.1	5.5	0.1
Delay (s)	13.1	26.5		16.0	18.8		16.0	26.6	14.7	15.6	26.6	14.1
Level of Service	B	C		B	B		B	C	B	B	C	B
Approach Delay (s)		23.7			17.9			20.7			22.4	
Approach LOS		C			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			21.4			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.56									
Actuated Cycle Length (s)			64.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			55.9%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCS7 All-Way Stop Control Report

General Information

Analyst	KMC	Intersection	Pacific Rim/Parker
Agency/Co.		Jurisdiction	
Date Performed	2/13/2018	East/West Street	NW Pacific Rim Blvd
Analysis Year	2018	North/South Street	NW Parker St
Analysis Time Period (hrs)	0.25	Peak Hour Factor	0.82
Time Analyzed	PM Peak BKG Option 2		
Project Description	22300 Grass Valley		

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	202	52	100	10	24	16	46	279	36	21	280	146
% Thrus in Shared Lane						50			50			
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	L	T	R	L	T	TR	L	T	TR	L	T	R
Flow Rate, v (veh/h)	246	63	122	12	15	34	56	170	214	26	341	178
Percent Heavy Vehicles	1	2	1	0	0	0	0	1	0	5	3	0

Departure Headway and Service Time

Initial Departure Headway, hd (s)	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
Initial Degree of Utilization, x	0.219	0.056	0.108	0.011	0.013	0.030	0.050	0.151	0.190	0.023	0.304	0.158
Final Departure Headway, hd (s)	8.31	7.83	7.11	9.37	8.87	8.47	8.21	7.73	7.57	8.09	7.56	6.80
Final Degree of Utilization, x	0.569	0.138	0.241	0.032	0.036	0.080	0.128	0.365	0.450	0.058	0.717	0.337
Move-Up Time, m (s)	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Service Time, ts (s)	6.01	5.53	4.81	7.07	6.57	6.17	5.91	5.43	5.27	5.79	5.26	4.50

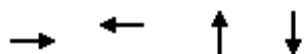
Capacity, Delay and Level of Service

Flow Rate, v (veh/h)	246	63	122	12	15	34	56	170	214	26	341	178
Capacity	433	460	506	384	406	425	439	466	476	445	476	529
95% Queue Length, Q ₉₅ (veh)	3.4	0.5	0.9	0.1	0.1	0.3	0.4	1.7	2.3	0.2	5.7	1.5
Control Delay (s/veh)	21.4	11.8	12.1	12.4	11.9	11.9	12.1	14.8	16.3	11.3	27.1	12.9
Level of Service, LOS	C	B	B	B	B	B	B	B	C	B	D	B
Approach Delay (s/veh)	17.3			12.0			15.2			21.7		
Approach LOS	C			B			C			C		
Intersection Delay, s/veh LOS	18.1						C					

Queues

12: NW Brady Rd & NW 16th Ave

2/26/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	184	307	421	413
v/c Ratio	0.33	0.57	0.44	0.56
Control Delay	14.8	17.4	8.3	12.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	14.8	17.4	8.3	12.8
Queue Length 50th (ft)	41	67	62	87
Queue Length 95th (ft)	82	130	111	153
Internal Link Dist (ft)	675	942	393	3387
Turn Bay Length (ft)				
Base Capacity (vph)	561	542	959	732
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.33	0.57	0.44	0.56
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

12: NW Brady Rd & NW 16th Ave

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	29	96	36	90	61	117	19	195	152	137	194	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			1.00			0.99			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.97			0.94			0.94			0.99	
Flt Protected		0.99			0.98			1.00			0.98	
Satd. Flow (prot)		1775			1709			1763			1814	
Flt Permitted		0.91			0.85			0.97			0.74	
Satd. Flow (perm)		1633			1485			1720			1364	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	33	110	41	103	70	134	22	224	175	157	223	33
RTOR Reduction (vph)	0	17	0	0	47	0	0	42	0	0	5	0
Lane Group Flow (vph)	0	167	0	0	260	0	0	379	0	0	408	0
Confl. Peds. (#/hr)			4	4			1		1	1		1
Confl. Bikes (#/hr)			5									2
Heavy Vehicles (%)	0%	1%	7%	4%	6%	0%	0%	1%	0%	1%	2%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		20.0			20.0			32.0			32.0	
Effective Green, g (s)		20.0			20.0			32.0			32.0	
Actuated g/C Ratio		0.33			0.33			0.53			0.53	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		1.5			1.5			1.5			1.5	
Lane Grp Cap (vph)		544			495			917			727	
v/s Ratio Prot												
v/s Ratio Perm		0.10			c0.18			0.22			c0.30	
v/c Ratio		0.31			0.53			0.41			0.56	
Uniform Delay, d1		14.8			16.2			8.4			9.3	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.5			4.0			1.4			3.1	
Delay (s)		16.3			20.1			9.8			12.4	
Level of Service		B			C			A			B	
Approach Delay (s)		16.3			20.1			9.8			12.4	
Approach LOS		B			C			A			B	
Intersection Summary												
HCM 2000 Control Delay			13.9		HCM 2000 Level of Service					B		
HCM 2000 Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			60.0		Sum of lost time (s)					8.0		
Intersection Capacity Utilization			77.3%		ICU Level of Service					D		
Analysis Period (min)			15									
c Critical Lane Group												

Appendix G

OTISS Traffic Calculations

PERIOD SETTING

Analysis Name :	Daily	No :	
Project Name :	Grass Valley	City:	
Date:	12/13/2017	Zip/Postal Code:	
State/Province:		Client Name:	
Country:		Edition:	ITE-TGM 9th Edition
Analyst's Name:	KMC		

Land Use	Independent Variable	Size	Time Period	Method	Entry	Exit	Total
220 - Apartment (General Urban/Suburban)	Dwelling Units	276	Weekday	Average 6.65	918 50%	917 50%	1835
714 - Corporate Headquarters Building (General Urban/Suburban)	1000 Sq. Feet Gross Floor Area	100	Weekday	Average 7.98	399 50%	399 50%	798
710 - General Office Building (General Urban/Suburban)	1000 Sq. Feet Gross Floor Area	150	Weekday	Average 11.03	827 50%	827 50%	1654
932 - High-Turnover (Sit-Down) Restaurant (General Urban/Suburban)	1000 Sq. Feet Gross Floor Area	10	Weekday	Average 127.15	636 50%	636 50%	1272
850 - Supermarket (General Urban/Suburban)	1000 Sq. Feet Gross Floor Area	10 ⁽⁰⁾	Weekday	Average 102.24	511 ⁽¹⁾ 50%	511 ⁽¹⁾ 50%	1022 ⁽¹⁾

(0) indicates size out of range.

(1) indicates small sample size, use carefully.

TRAFFIC REDUCTIONS

Land Use	Entry Reduction	Adjusted Entry	Exit Reduction	Adjusted Exit
220 - Apartment	0 %	918	0 %	917
714 - Corporate Headquarters Building	0 %	399	0 %	399
710 - General Office Building	0 %	827	0 %	827
932 - High-Turnover (Sit-Down) Restaurant	0 %	636	0 %	636
850 - Supermarket	0 %	511	0 %	511

INTERNAL TRIPS

220 - Apartment

Exit	917	Demand Exit:	0 % (0)
Entry	918	Demand Entry:	1 % (9)

Balanced:
0Balanced:
8

714 - Corporate Headquarters Building

Demand Entry:	0 % (0)	Entry	399
Demand Exit:	2 % (8)	Exit	399

220 - Apartment

Exit 917 Demand Exit: 0 % (0) Balanced: 0

Entry 918 Demand Entry: 2 % (18) Balanced: 17

710 - General Office Building

Demand Entry: 0 % (0) **Entry** 827

Demand Exit: 2 % (17) **Exit** 827

220 - Apartment

Exit 917 Demand Exit: 19 % (174) Balanced: 57

Entry 918 Demand Entry: 16 % (147) Balanced: 70

932 - High-Turnover (Sit-Down) Restaurant

Demand Entry: 9 % (57) **Entry** 636

Demand Exit: 11 % (70) **Exit** 636

220 - Apartment

Exit 917 Demand Exit: 19 % (174) Balanced: 46

Entry 918 Demand Entry: 17 % (156) Balanced: 56

850 - Supermarket

Demand Entry: 9 % (46) **Entry** 511

Demand Exit: 11 % (56) **Exit** 511

714 - Corporate Headquarters Building

Exit 399 Demand Exit: 2 % (8) Balanced: 8

Entry 399 Demand Entry: 2 % (8) Balanced: 8

710 - General Office Building

Demand Entry: 2 % (17) **Entry** 827

Demand Exit: 2 % (17) **Exit** 827

714 - Corporate Headquarters Building

Exit 399 Demand Exit: 11 % (44) Balanced: 0

Entry 399 Demand Entry: 8 % (32) Balanced: 6

932 - High-Turnover (Sit-Down) Restaurant

Demand Entry: 0 % (0) **Entry** 636

Demand Exit: 1 % (6) **Exit** 636

714 - Corporate Headquarters Building

Exit 399 Demand Exit: 11 % (44) Balanced: 10

Entry 399 Demand Entry: 7 % (28) Balanced: 10

850 - Supermarket

Demand Entry: 2 % (10) **Entry** 511

Demand Exit: 2 % (10) **Exit** 511

710 - General Office Building

Exit 827 Demand Exit: 11 % (91) Balanced: 13

Entry 827 Demand Entry: 7 % (58) Balanced: 13

932 - High-Turnover (Sit-Down) Restaurant

Demand Entry: 2 % (13) **Entry** 636

Demand Exit: 2 % (13) **Exit** 636

710 - General Office Building

Exit 827 Demand Exit: 11 % (91) Balanced: 10

Entry 827 Demand Entry: 8 % (66) Balanced: 5

850 - Supermarket

Demand Entry: 2 % (10) **Entry** 511

Demand Exit: 1 % (5) **Exit** 511

932 - High-Turnover (Sit-Down) Restaurant

Exit 636 Demand Exit: 30 % (191) Balanced: 143

Entry 636 Demand Entry: 28 % (178) Balanced: 153

850 - Supermarket

Demand Entry: 28 % (143) **Entry** 511

Demand Exit: 30 % (153) **Exit** 511

220 - Apartment

		Internal Trips					External Trips
Total Trips		714 - Corporate Headquarters Building	710 - General Office Building	932 - High-Turnover (Sit-Down) Restaurant	850 - Supermarket	Total	
Entry	918 (100%)	8 (1%)	17 (2%)	70 (8%)	56 (6%)	151 (16%)	767 (84%)

Exit	917 (100%)	0 (0%)	0 (0%)	57 (6%)	46 (5%)	103 (11%)	814 (89%)
Total	1835 (100%)	8 (0%)	17 (1%)	127 (7%)	102 (6%)	254 (14%)	1581 (86%)

714 - Corporate Headquarters Building

		Internal Trips				Total	External Trips
Total Trips		220 - Apartment	710 - General Office Building	932 - High-Turnover (Sit-Down) Restaurant	850 - Supermarket		
Entry	399 (100%)	0 (0%)	8 (2%)	6 (2%)	10 (3%)	24 (6%)	375 (94%)
Exit	399 (100%)	8 (2%)	8 (2%)	0 (0%)	10 (3%)	26 (7%)	373 (93%)
Total	798 (100%)	8 (1%)	16 (2%)	6 (1%)	20 (3%)	50 (6%)	748 (94%)

710 - General Office Building

		Internal Trips				Total	External Trips
Total Trips		220 - Apartment	714 - Corporate Headquarters Building	932 - High-Turnover (Sit-Down) Restaurant	850 - Supermarket		
Entry	827 (100%)	0 (0%)	8 (1%)	13 (2%)	5 (1%)	26 (3%)	801 (97%)
Exit	827 (100%)	17 (2%)	8 (1%)	13 (2%)	10 (1%)	48 (6%)	779 (94%)
Total	1654 (100%)	17 (1%)	16 (1%)	26 (2%)	15 (1%)	74 (4%)	1580 (96%)

932 - High-Turnover (Sit-Down) Restaurant

		Internal Trips				Total	External Trips
Total Trips		220 - Apartment	714 - Corporate Headquarters Building	710 - General Office Building	850 - Supermarket		
Entry	636 (100%)	57 (9%)	0 (0%)	13 (2%)	153 (24%)	223 (35%)	413 (65%)
Exit	636 (100%)	70 (11%)	6 (1%)	13 (2%)	143 (22%)	232 (36%)	404 (64%)
Total	1272 (100%)	127 (10%)	6 (0%)	26 (2%)	296 (23%)	455 (36%)	817 (64%)

850 - Supermarket

		Internal Trips				Total	External Trips
Total Trips		220 - Apartment	714 - Corporate Headquarters Building	710 - General Office Building	932 - High-Turnover (Sit-Down) Restaurant		
Entry	511 (100%)	46 (9%)	10 (2%)	10 (2%)	143 (28%)	209 (41%)	302 (59%)
Exit	511 (100%)	56 (11%)	10 (2%)	5 (1%)	153 (30%)	224 (44%)	287 (56%)
Total	1022 (100%)	102 (10%)	20 (2%)	15 (1%)	296 (29%)	433 (42%)	589 (58%)

EXTERNAL TRIPS

Land Use	External Trips	Pass-by%	Pass-by Trips	Non-pass-by Trips
220 - Apartment	1581	0	0	1581
714 - Corporate Headquarters Building	748	0	0	748
710 - General Office Building	1580	0	0	1580

Land Use	External Trips	Pass-by%	Pass-by Trips	Non-pass-by Trips
932 - High-Turnover (Sit-Down) Restaurant	817	21	172	645
850 - Supermarket	589	18	106	483

ITE DEVIATION DETAILS

Weekday

Landuse	No deviations from ITE.
Methods	220 - Apartment (General Urban/Suburban) The chosen method (Average) is not recommended by ITE. ITE recommends LIN based on the criterion. 710 - General Office Building (General Urban/Suburban) The chosen method (Average) is not recommended by ITE. ITE recommends LOG based on the criterion.
External Trips	220 - Apartment (General Urban/Suburban) ITE does not recommend a particular pass-by% for this case. 714 - Corporate Headquarters Building (General Urban/Suburban) ITE does not recommend a particular pass-by% for this case. 710 - General Office Building (General Urban/Suburban) ITE does not recommend a particular pass-by% for this case. 932 - High-Turnover (Sit-Down) Restaurant (General Urban/Suburban) ITE does not recommend a particular pass-by% for this case. 850 - Supermarket (General Urban/Suburban) ITE does not recommend a particular pass-by% for this case.

SUMMARY

Total Entering	3291
Total Exiting	3290
Total Entering Reduction	0
Total Exiting Reduction	0
Total Entering Internal Capture Reduction	633
Total Exiting Internal Capture Reduction	633
Total Entering Pass-by Reduction	141
Total Exiting Pass-by Reduction	137
Total Entering Non-Pass-by Trips	2517
Total Exiting Non-Pass-by Trips	2520

PERIOD SETTING

Analysis Name :	AM Peak	No :	
Project Name :	Grass Valley	City:	
Date:	12/13/2017	Zip/Postal Code:	
State/Province:		Client Name:	
Country:		Edition:	ITE-TGM 9th Edition
Analyst's Name:	KMC		

Land Use	Independent Variable	Size	Time Period	Method	Entry	Exit	Total
220 - Apartment (General Urban/Suburban)	Dwelling Units	276	Weekday, Peak Hour of Adjacent Street Traffic, One Hour Between 7 and 9 a.m.	Average 0.51	28 20%	113 80%	141
714 - Corporate Headquarters Building (General Urban/Suburban)	1000 Sq. Feet Gross Floor Area	100	Weekday, AM Peak Hour of Generator	Average 1.52	141 93%	11 7%	152
710 - General Office Building (General Urban/Suburban)	1000 Sq. Feet Gross Floor Area	150	Weekday, AM Peak Hour of Generator	Average 1.56	206 88%	28 12%	234
932 - High-Turnover (Sit-Down) Restaurant (General Urban/Suburban)	1000 Sq. Feet Gross Floor Area	10	Weekday, Peak Hour of Adjacent Street Traffic, One Hour Between 7 and 9 a.m.	Average 10.81	59 55%	49 45%	108
850 - Supermarket (General Urban/Suburban)	1000 Sq. Feet Gross Floor Area	10 ⁽⁰⁾	Weekday, Peak Hour of Adjacent Street Traffic, One Hour Between 7 and 9 a.m.	Average 3.4	21 62%	13 38%	34

(0) indicates size out of range.

 The time periods do not match.

TRAFFIC REDUCTIONS

Land Use	Entry Reduction	Adjusted Entry	Exit Reduction	Adjusted Exit
220 - Apartment	0 %	28	0 %	113
714 - Corporate Headquarters Building	0 %	141	0 %	11
710 - General Office Building	0 %	206	0 %	28
932 - High-Turnover (Sit-Down) Restaurant	0 %	59	0 %	49
850 - Supermarket	0 %	21	0 %	13

INTERNAL TRIPS

220 - Apartment**Exit** 113 Demand Exit: 1 % (1)**Entry** 28 Demand Entry: 2 % (1)Balanced:
1Balanced:
0**714 - Corporate Headquarters Building**Demand Entry: 57 % (80) **Entry** 141Demand Exit: 1 % (0) **Exit** 11**220 - Apartment****Exit** 113 Demand Exit: 1 % (1)**Entry** 28 Demand Entry: 2 % (1)Balanced:
1Balanced:
0**710 - General Office Building**Demand Entry: 57 % (117) **Entry** 206Demand Exit: 1 % (0) **Exit** 28**220 - Apartment****Exit** 113 Demand Exit: 20 % (23)**Entry** 28 Demand Entry: 5 % (1)Balanced:
12Balanced:
1**932 - High-Turnover (Sit-Down) Restaurant**Demand Entry: 20 % (12) **Entry** 59Demand Exit: 4 % (2) **Exit** 49**220 - Apartment****Exit** 113 Demand Exit: 1 % (1)**Entry** 28 Demand Entry: 2 % (1)Balanced:
1Balanced:
1**850 - Supermarket**Demand Entry: 17 % (4) **Entry** 21Demand Exit: 14 % (2) **Exit** 13**714 - Corporate Headquarters Building****Exit** 11 Demand Exit: 0 % (0)**Entry** 141 Demand Entry: 0 % (0)Balanced:
0Balanced:
0**710 - General Office Building**Demand Entry: 0 % (0) **Entry** 206Demand Exit: 0 % (0) **Exit** 28**714 - Corporate Headquarters Building****Exit** 11 Demand Exit: 63 % (7)**Entry** 141 Demand Entry: 14 % (20)Balanced:
6Balanced:
7**932 - High-Turnover (Sit-Down) Restaurant**Demand Entry: 11 % (6) **Entry** 59Demand Exit: 15 % (7) **Exit** 49**714 - Corporate Headquarters Building****Exit** 11 Demand Exit: 28 % (3)**Entry** 141 Demand Entry: 4 % (6)Balanced:
3Balanced:
2**850 - Supermarket**Demand Entry: 16 % (3) **Entry** 21Demand Exit: 14 % (2) **Exit** 13**710 - General Office Building****Exit** 28 Demand Exit: 63 % (18)**Entry** 206 Demand Entry: 14 % (29)Balanced:
7Balanced:
8**932 - High-Turnover (Sit-Down) Restaurant**Demand Entry: 12 % (7) **Entry** 59Demand Exit: 16 % (8) **Exit** 49**710 - General Office Building****Exit** 28 Demand Exit: 28 % (8)**Entry** 206 Demand Entry: 4 % (8)Balanced:
3Balanced:
2**850 - Supermarket**Demand Entry: 16 % (3) **Entry** 21Demand Exit: 15 % (2) **Exit** 13**932 - High-Turnover (Sit-Down) Restaurant****Exit** 49 Demand Exit: 14 % (7)**Entry** 59 Demand Entry: 50 % (30)Balanced:
2Balanced:
2**850 - Supermarket**Demand Entry: 8 % (2) **Entry** 21Demand Exit: 13 % (2) **Exit** 13**220 - Apartment**

	Total Trips	Internal Trips					External Trips
		714 - Corporate Headquarters Building	710 - General Office Building	932 - High-Turnover (Sit-Down) Restaurant	850 - Supermarket	Total	
Entry	28 (100%)	0 (0%)	0 (0%)	1 (4%)	1 (4%)	2 (7%)	26 (93%)
Exit	113 (100%)	1 (1%)	1 (1%)	12 (11%)	1 (1%)	15 (13%)	98 (87%)
Total	141 (100%)	1 (1%)	1 (1%)	13 (9%)	2 (1%)	17 (12%)	124 (88%)

714 - Corporate Headquarters Building

	Total Trips	Internal Trips				Total	External Trips
		220 - Apartment	710 - General Office Building	932 - High-Turnover (Sit-Down) Restaurant	850 - Supermarket		
Entry	141 (100%)	1 (1%)	0 (0%)	7 (5%)	2 (1%)	10 (7%)	131 (93%)
Exit	11 (100%)	0 (0%)	0 (0%)	6 (55%)	3 (27%)	9 (82%)	2 (18%)
Total	152 (100%)	1 (1%)	0 (0%)	13 (9%)	5 (3%)	19 (13%)	133 (87%)

710 - General Office Building

	Total Trips	Internal Trips				Total	External Trips
		220 - Apartment	714 - Corporate Headquarters Building	932 - High-Turnover (Sit-Down) Restaurant	850 - Supermarket		
Entry	206 (100%)	1 (0%)	0 (0%)	8 (4%)	2 (1%)	11 (5%)	195 (95%)
Exit	28 (100%)	0 (0%)	0 (0%)	7 (25%)	3 (11%)	10 (36%)	18 (64%)
Total	234 (100%)	1 (0%)	0 (0%)	15 (6%)	5 (2%)	21 (9%)	213 (91%)

932 - High-Turnover (Sit-Down) Restaurant

	Total Trips	Internal Trips				Total	External Trips
		220 - Apartment	714 - Corporate Headquarters Building	710 - General Office Building	850 - Supermarket		
Entry	59 (100%)	12 (20%)	6 (10%)	7 (12%)	2 (3%)	27 (46%)	32 (54%)
Exit	49 (100%)	1 (2%)	7 (14%)	8 (16%)	2 (4%)	18 (37%)	31 (63%)
Total	108 (100%)	13 (12%)	13 (12%)	15 (14%)	4 (4%)	45 (42%)	63 (58%)

850 - Supermarket

	Total Trips	Internal Trips				Total	External Trips
		220 - Apartment	714 - Corporate Headquarters Building	710 - General Office Building	932 - High-Turnover (Sit-Down) Restaurant		
Entry	21 (100%)	1 (5%)	3 (14%)	3 (14%)	2 (10%)	9 (43%)	12 (57%)
Exit	13 (100%)	1 (8%)	2 (15%)	2 (15%)	2 (15%)	7 (54%)	6 (46%)
Total	34 (100%)	2 (6%)	5 (15%)	5 (15%)	4 (12%)	16 (47%)	18 (53%)

EXTERNAL TRIPS

Land Use	External Trips	Pass-by%	Pass-by Trips	Non-pass-by Trips
220 - Apartment	124	0	0	124
714 - Corporate Headquarters Building	133	0	0	133
710 - General Office Building	213	0	0	213
932 - High-Turnover (Sit-Down) Restaurant	63	21	13	50
850 - Supermarket	18	18	3	15

ITE DEVIATION DETAILS

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

Landuse	No deviations from ITE.
Methods	220 - Apartment (General Urban/Suburban) The chosen method (Average) is not recommended by ITE. ITE recommends LIN based on the criterion.
External Trips	220 - Apartment (General Urban/Suburban) ITE does not recommend a particular pass-by% for this case. 932 - High-Turnover (Sit-Down) Restaurant (General Urban/Suburban) ITE does not recommend a particular pass-by% for this case. 850 - Supermarket (General Urban/Suburban) ITE does not recommend a particular pass-by% for this case.

Weekday, AM Peak Hour of Generator

Landuse	No deviations from ITE.
Methods	714 - Corporate Headquarters Building (General Urban/Suburban) The chosen method (Average) is not recommended by ITE. ITE recommends LOG based on the criterion. 710 - General Office Building (General Urban/Suburban) The chosen method (Average) is not recommended by ITE. ITE recommends LOG based on the criterion.
External Trips	714 - Corporate Headquarters Building (General Urban/Suburban) ITE does not recommend a particular pass-by% for this case. 710 - General Office Building (General Urban/Suburban) ITE does not recommend a particular pass-by% for this case.

SUMMARY

Total Entering	455
Total Exiting	214
Total Entering Reduction	0
Total Exiting Reduction	0
Total Entering Internal Capture Reduction	59
Total Exiting Internal Capture Reduction	59

Total Entering Pass-by Reduction	9
Total Exiting Pass-by Reduction	7
Total Entering Non-Pass-by Trips	387
Total Exiting Non-Pass-by Trips	148

PERIOD SETTING

Analysis Name :	PM Peak	No :	
Project Name :	Grass Valley	City:	
Date:	12/13/2017	Zip/Postal Code:	
State/Province:		Client Name:	
Country:		Edition:	ITE-TGM 9th Edition
Analyst's Name:	KMC		

Land Use	Independent Variable	Size	Time Period	Method	Entry	Exit	Total
220 - Apartment (General Urban/Suburban)	Dwelling Units	276	Weekday, Peak Hour of Adjacent Street Traffic, One Hour Between 4 and 6 p.m.	Average 0.62	111 65%	60 35%	171
714 - Corporate Headquarters Building (General Urban/Suburban)	1000 Sq. Feet Gross Floor Area	100	Weekday, PM Peak Hour of Generator	Average 1.41	14 10%	127 90%	141
710 - General Office Building (General Urban/Suburban)	1000 Sq. Feet Gross Floor Area	150	Weekday, PM Peak Hour of Generator	Average 1.49	38 17%	186 83%	224
932 - High-Turnover (Sit-Down) Restaurant (General Urban/Suburban)	1000 Sq. Feet Gross Floor Area	10	Weekday, Peak Hour of Adjacent Street Traffic, One Hour Between 4 and 6 p.m.	Average 9.85	59 60%	40 40%	99
850 - Supermarket (General Urban/Suburban)	1000 Sq. Feet Gross Floor Area	10 ⁽⁰⁾	Weekday, Peak Hour of Adjacent Street Traffic, One Hour Between 4 and 6 p.m.	Average 9.48	48 51%	47 49%	95

(0) indicates size out of range.

 The time periods do not match.

TRAFFIC REDUCTIONS

Land Use	Entry Reduction	Adjusted Entry	Exit Reduction	Adjusted Exit
220 - Apartment	0 %	111	0 %	60
714 - Corporate Headquarters Building	0 %	14	0 %	127
710 - General Office Building	0 %	38	0 %	186
932 - High-Turnover (Sit-Down) Restaurant	0 %	59	0 %	40
850 - Supermarket	0 %	48	0 %	47

INTERNAL TRIPS

220 - Apartment**Exit** 60 Demand Exit: 2 % (1)**Entry** 111 Demand Entry: 2 % (2)Balanced:
1Balanced:
2**714 - Corporate Headquarters Building**Demand Entry: 57 % (8) **Entry** 14Demand Exit: 2 % (3) **Exit** 127**220 - Apartment****Exit** 60 Demand Exit: 2 % (1)**Entry** 111 Demand Entry: 2 % (2)Balanced:
1Balanced:
2**710 - General Office Building**Demand Entry: 57 % (22) **Entry** 38Demand Exit: 2 % (4) **Exit** 186**220 - Apartment****Exit** 60 Demand Exit: 21 % (13)**Entry** 111 Demand Entry: 16 % (18)Balanced:
8Balanced:
7**932 - High-Turnover (Sit-Down) Restaurant**Demand Entry: 14 % (8) **Entry** 59Demand Exit: 18 % (7) **Exit** 40**220 - Apartment****Exit** 60 Demand Exit: 42 % (25)**Entry** 111 Demand Entry: 46 % (51)Balanced:
5Balanced:
12**850 - Supermarket**Demand Entry: 10 % (5) **Entry** 48Demand Exit: 26 % (12) **Exit** 47**714 - Corporate Headquarters Building****Exit** 127 Demand Exit: 0 % (0)**Entry** 14 Demand Entry: 0 % (0)Balanced:
0Balanced:
0**710 - General Office Building**Demand Entry: 0 % (0) **Entry** 38Demand Exit: 0 % (0) **Exit** 186**714 - Corporate Headquarters Building****Exit** 127 Demand Exit: 4 % (5)**Entry** 14 Demand Entry: 30 % (4)Balanced:
1Balanced:
0**932 - High-Turnover (Sit-Down) Restaurant**Demand Entry: 1 % (1) **Entry** 59Demand Exit: 1 % (0) **Exit** 40**714 - Corporate Headquarters Building****Exit** 127 Demand Exit: 20 % (25)**Entry** 14 Demand Entry: 31 % (4)Balanced:
2Balanced:
0**850 - Supermarket**Demand Entry: 4 % (2) **Entry** 48Demand Exit: 1 % (0) **Exit** 47**710 - General Office Building****Exit** 186 Demand Exit: 4 % (7)**Entry** 38 Demand Entry: 30 % (11)Balanced:
1Balanced:
0**932 - High-Turnover (Sit-Down) Restaurant**Demand Entry: 1 % (1) **Entry** 59Demand Exit: 1 % (0) **Exit** 40**710 - General Office Building****Exit** 186 Demand Exit: 20 % (37)**Entry** 38 Demand Entry: 31 % (12)Balanced:
2Balanced:
0**850 - Supermarket**Demand Entry: 4 % (2) **Entry** 48Demand Exit: 1 % (0) **Exit** 47**932 - High-Turnover (Sit-Down) Restaurant****Exit** 40 Demand Exit: 41 % (16)**Entry** 59 Demand Entry: 29 % (17)Balanced:
16Balanced:
14**850 - Supermarket**Demand Entry: 50 % (24) **Entry** 48Demand Exit: 29 % (14) **Exit** 47**220 - Apartment**

	Total Trips	Internal Trips					External Trips
		714 - Corporate Headquarters Building	710 - General Office Building	932 - High-Turnover (Sit-Down) Restaurant	850 - Supermarket	Total	
Entry	111 (100%)	2 (2%)	2 (2%)	7 (6%)	12 (11%)	23 (21%)	88 (79%)
Exit	60 (100%)	1 (2%)	1 (2%)	8 (13%)	5 (8%)	15 (25%)	45 (75%)
Total	171 (100%)	3 (2%)	3 (2%)	15 (9%)	17 (10%)	38 (22%)	133 (78%)

714 - Corporate Headquarters Building

	Total Trips	Internal Trips				Total	External Trips
		220 - Apartment	710 - General Office Building	932 - High-Turnover (Sit-Down) Restaurant	850 - Supermarket		
Entry	14 (100%)	1 (7%)	0 (0%)	0 (0%)	0 (0%)	1 (7%)	13 (93%)
Exit	127 (100%)	2 (2%)	0 (0%)	1 (1%)	2 (2%)	5 (4%)	122 (96%)
Total	141 (100%)	3 (2%)	0 (0%)	1 (1%)	2 (1%)	6 (4%)	135 (96%)

710 - General Office Building

	Total Trips	Internal Trips				Total	External Trips
		220 - Apartment	714 - Corporate Headquarters Building	932 - High-Turnover (Sit-Down) Restaurant	850 - Supermarket		
Entry	38 (100%)	1 (3%)	0 (0%)	0 (0%)	0 (0%)	1 (3%)	37 (97%)
Exit	186 (100%)	2 (1%)	0 (0%)	1 (1%)	2 (1%)	5 (3%)	181 (97%)
Total	224 (100%)	3 (1%)	0 (0%)	1 (0%)	2 (1%)	6 (3%)	218 (97%)

932 - High-Turnover (Sit-Down) Restaurant

	Total Trips	Internal Trips				Total	External Trips
		220 - Apartment	714 - Corporate Headquarters Building	710 - General Office Building	850 - Supermarket		
Entry	59 (100%)	8 (14%)	1 (2%)	1 (2%)	14 (24%)	24 (41%)	35 (59%)
Exit	40 (100%)	7 (18%)	0 (0%)	0 (0%)	16 (40%)	23 (57%)	17 (43%)
Total	99 (100%)	15 (15%)	1 (1%)	1 (1%)	30 (30%)	47 (47%)	52 (53%)

850 - Supermarket

	Total Trips	Internal Trips				Total	External Trips
		220 - Apartment	714 - Corporate Headquarters Building	710 - General Office Building	932 - High-Turnover (Sit-Down) Restaurant		
Entry	48 (100%)	5 (10%)	2 (4%)	2 (4%)	16 (33%)	25 (52%)	23 (48%)
Exit	47 (100%)	12 (26%)	0 (0%)	0 (0%)	14 (30%)	26 (55%)	21 (45%)
Total	95 (100%)	17 (18%)	2 (2%)	2 (2%)	30 (32%)	51 (54%)	44 (46%)

EXTERNAL TRIPS

Land Use	External Trips	Pass-by%	Pass-by Trips	Non-pass-by Trips
220 - Apartment	133	0	0	133
714 - Corporate Headquarters Building	135	0	0	135
710 - General Office Building	218	0	0	218
932 - High-Turnover (Sit-Down) Restaurant	52	 43	22	30
850 - Supermarket	44	 36	16	28

ITE DEVIATION DETAILS

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

Landuse No deviations from ITE.

Methods 220 - Apartment (General Urban/Suburban)
The chosen method (Average) is not recommended by ITE. ITE recommends LIN based on the criterion.

External Trips 220 - Apartment (General Urban/Suburban)
ITE does not recommend a particular pass-by% for this case.

Weekday, PM Peak Hour of Generator

Landuse No deviations from ITE.

Methods 714 - Corporate Headquarters Building (General Urban/Suburban)
The chosen method (Average) is not recommended by ITE. ITE recommends LOG based on the criterion.

710 - General Office Building (General Urban/Suburban)
The chosen method (Average) is not recommended by ITE. ITE recommends LIN based on the criterion.

External Trips 714 - Corporate Headquarters Building (General Urban/Suburban)
ITE does not recommend a particular pass-by% for this case.

710 - General Office Building (General Urban/Suburban)
ITE does not recommend a particular pass-by% for this case.

SUMMARY

Total Entering	270
Total Exiting	460
Total Entering Reduction	0
Total Exiting Reduction	0
Total Entering Internal Capture Reduction	74
Total Exiting Internal Capture Reduction	74
Total Entering Pass-by Reduction	23
Total Exiting Pass-by Reduction	15
Total Entering Non-Pass-by Trips	173
Total Exiting Non-Pass-by Trips	371

Unconstrained Internal Capture Rates for Trip Origins and Destinations Within a Multi-use Development

ITE Trip Generation Handbook, 2nd Edition

Table 7.1 Unconstrained Internal Capture Rates for Trip Origins Within a Multi-Use Development

			WEEKDAY	
		MIDDAY PEAK HOUR	p.m. PEAK HOUR OF ADJACENT STREET TRAFFIC	DAILY
from OFFICE	to Office	2%	1%	2%
	to Retail	20%	23%	22%
	to Residential	0%	2%	2%
from RETAIL	to Office	3%	3%	3%
	to Retail	29%	20%	30%
	to Residential	7%	12%	11%
from RESIDENTIAL	to Office	N/A	N/A	N/A
	to Retail	34%	53%	38%
	to Residential	N/A	N/A	N/A

Table 7.2 Unconstrained Internal Capture Rates for Trip Destinations Within a Multi-Use Development

			WEEKDAY	
		MIDDAY PEAK HOUR	p.m. PEAK HOUR OF ADJACENT STREET TRAFFIC	DAILY
to OFFICE	from Office	6%	6%	2%
	from Retail	38%	31%	15%
	from Residential	0%	0%	N/A
to RETAIL	from Office	4%	2%	4%
	from Retail	31%	20%	28%
	from Residential	5%	9%	9%
to RESIDENTIAL	from Office	0%	2%	3%
	from Retail	37%	31%	33%
	from Residential	N/A	N/A	N/A

Caution: The estimated typical internal capture rates presented in Tables 7.1 and 7.2 rely directly on data collected at a limited number of multi-use sites in Florida. While ITE recognizes the limitations of these data, they represent the only known credible data on multi-use internal capture rates and are provided as illustrative of typical rates. ***If local data on internal capture rates by paired land uses can be obtained, the local data may be given preference.***

N/A - Not Available; logic indicates there is some interaction between these two land uses; however, the limited data sample on which this table is based did not record any interaction.

Proposed Unconstrained Values for Percent Distribution of Internal Trip Destinations for Exiting Trips and for Internal Trip Origins for Entering Trips

NCHRP Report 684

Table 99. Proposed unconstrained values for percent distribution of internal trip destinations for exiting trips - A.M. peak period.

Origin Land Use	Destination Land Use					
	Office	Retail	Restaurant	Residential	Cinema	Hotel
Office	N/A	28%	63%	1%	N/A	0%
Retail	29%	N/A	13%	14%	N/A	0%
Restaurant	31%	14%	N/A	4%	N/A	3%
Residential	2%	1%	20%	N/A	N/A	0%
Cinema	N/A	N/A	N/A	N/A	N/A	N/A
Hotel	75%	14%	9%	0%	N/A	N/A

Note: The values presented in the table above are based on Table 7.1 in ITE Trip Generation Handbook, 2nd Edition.

N/A - Not Available; indicates no data or interaction between the land uses within the same category accounted for within ITE trip generation rates.

Table 100. Proposed unconstrained values for percent distribution of internal trip destinations for exiting trips - P.M. peak period.

Origin Land Use	Destination Land Use					
	Office	Retail	Restaurant	Residential	Cinema	Hotel
Office	N/A	20%	4%	2%	0%	0%
Retail	2%	N/A	29%	26%	4%	5%
Restaurant	3%	41%	N/A	18%	8%	7%
Residential	4%	42%	21%	N/A	0%	3%
Cinema	2%	21%	31%	8%	N/A	2%
Hotel	0%	16%	68%	2%	0%	N/A

Note: The values presented in the table above are based on Table 7.1 in ITE Trip Generation Handbook, 2nd Edition.

N/A - Not Available; indicates no data or interaction between the land uses within the same category accounted for within ITE trip generation rates.

Table 101. Proposed unconstrained values for percent distribution of internal trip origins for entering trips - A.M. peak period.

Origin Land Use	Destination Land Use					
	Office	Retail	Restaurant	Residential	Cinema	Hotel
Office	N/A	32%	23%	0%	N/A	0%
Retail	4%	N/A	50%	2%	N/A	0%
Restaurant	14%	8%	N/A	5%	N/A	4%
Residential	3%	17%	20%	N/A	N/A	0%
Cinema	N/A	N/A	N/A	N/A	N/A	N/A
Hotel	3%	4%	6%	0%	N/A	N/A

Note: The values presented in the table above are based on Table 7.2 in ITE Trip Generation Handbook, 2nd Edition.

N/A - Not Available; indicates no data or interaction between the land uses within the same category accounted for within ITE trip generation rates.

Table 102. Proposed unconstrained values for percent distribution of internal trip origins for entering trips - P.M. peak period.

Origin Land Use	Destination Land Use					
	Office	Retail	Restaurant	Residential	Cinema	Hotel
Office	N/A	8%	2%	4%	1%	0%

Retail	31%	N/A	29%	46%	26%	17%
Restaurant	30%	50%	N/A	16%	32%	71%
Residential	57%	10%	14%	N/A	0%	12%
Cinema	6%	4%	3%	4%	N/A	1%
Hotel	0%	2%	5%	0%	0%	N/A

Note: The values presented in the table above are based on Table 7.2 in ITE Trip Generation Handbook, 2nd Edition.

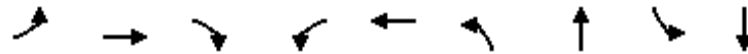
N/A - Not Available; indicates no data or interaction between the land uses within the same category accounted for within ITE trip generation rates.

Appendix H
Year 2021 Total Traffic
Operations Analysis
Worksheets

Queues

1: SE 192nd Ave & Mill Plain Blvd

2/26/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	163	145	337	212	272	514	940	105	980
v/c Ratio	0.77	0.46	0.52	0.98	0.79	0.69	0.75	0.62	1.06
Control Delay	67.0	39.7	18.0	100.6	48.1	55.6	21.1	59.0	81.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.0	39.7	18.0	100.6	48.1	55.6	21.1	59.0	81.1
Queue Length 50th (ft)	101	82	110	137	141	158	160	65	~356
Queue Length 95th (ft)	135	102	132	#202	157	#221	98	94	#328
Internal Link Dist (ft)		517			357		2419		550
Turn Bay Length (ft)	225		125	400		200		150	
Base Capacity (vph)	232	492	649	217	485	743	1256	186	925
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.29	0.52	0.98	0.56	0.69	0.75	0.56	1.06

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

1: SE 192nd Ave & Mill Plain Blvd

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	119	106	246	155	106	93	375	457	229	77	526	189
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.93		1.00	0.95		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1759	1528	1671	1622		3433	3062		1719	3236	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1787	1759	1528	1671	1622		3433	3062		1719	3236	
Peak-hour factor, PHF	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73
Adj. Flow (vph)	163	145	337	212	145	127	514	626	314	105	721	259
RTOR Reduction (vph)	0	0	46	0	36	0	0	53	0	0	36	0
Lane Group Flow (vph)	163	145	291	212	236	0	514	887	0	105	944	0
Confl. Peds. (#/hr)	1		3	3		1			3	3		
Heavy Vehicles (%)	1%	8%	5%	8%	5%	12%	2%	13%	7%	5%	9%	2%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2	7	1	6		7	4		3	8	
Permitted Phases			2									
Actuated Green, G (s)	11.8	17.8	39.5	13.0	19.0		21.7	39.3		9.9	27.5	
Effective Green, g (s)	11.8	17.8	39.5	13.0	19.0		21.7	39.3		9.9	27.5	
Actuated g/C Ratio	0.12	0.18	0.40	0.13	0.19		0.22	0.39		0.10	0.28	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	210	313	679	217	308		744	1203		170	889	
v/s Ratio Prot	0.09	0.08	0.09	c0.13	c0.15		c0.15	c0.29		0.06	c0.29	
v/s Ratio Perm			0.10									
v/c Ratio	0.78	0.46	0.43	0.98	0.77		0.69	0.74		0.62	1.06	
Uniform Delay, d1	42.8	36.8	22.0	43.4	38.4		36.1	25.9		43.2	36.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.39	0.65		1.00	1.00	
Incremental Delay, d2	15.0	0.4	0.2	53.8	9.9		1.7	3.0		4.6	47.9	
Delay (s)	57.8	37.2	22.2	97.1	48.3		51.8	19.8		47.9	84.2	
Level of Service	E	D	C	F	D		D	B		D	F	
Approach Delay (s)		34.6			69.7			31.1			80.6	
Approach LOS		C			E			C			F	
Intersection Summary												
HCM 2000 Control Delay			51.5			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.90									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			66.2%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

2: SE 192nd Ave & SE 15th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	206	132	23	84	146	89	1023	178	1048
v/c Ratio	0.95	0.36	0.26	0.56	0.32	0.59	0.71	0.57	0.58
Control Delay	93.9	25.4	51.8	58.0	14.2	46.7	25.9	56.8	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	93.9	25.4	51.8	58.0	14.2	46.7	25.9	56.8	11.1
Queue Length 50th (ft)	132	42	14	53	33	58	199	120	94
Queue Length 95th (ft)	#230	88	36	87	61	m66	m204	m116	m231
Internal Link Dist (ft)		621		676			1122		2419
Turn Bay Length (ft)	100		100		100	150		475	
Base Capacity (vph)	219	506	178	475	461	183	1433	311	1795
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.94	0.26	0.13	0.18	0.32	0.49	0.71	0.57	0.58

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

2: SE 192nd Ave & SE 15th St

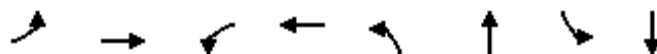
2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	167	55	52	19	68	118	72	824	5	144	769	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1687	1689		1626	1827	1607	1736	3337		1736	3300	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1687	1689		1626	1827	1607	1736	3337		1736	3300	
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	206	68	64	23	84	146	89	1017	6	178	949	99
RTOR Reduction (vph)	0	38	0	0	0	55	0	1	0	0	5	0
Lane Group Flow (vph)	206	94	0	23	84	91	89	1022	0	178	1043	0
Confl. Peds. (#/hr)	1		2	2		1	1		4	4		1
Confl. Bikes (#/hr)			1			2						
Heavy Vehicles (%)	7%	4%	3%	11%	4%	0%	4%	8%	20%	4%	8%	4%
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6	3	7	4		3	8	
Permitted Phases						6						
Actuated Green, G (s)	12.9	19.5		2.6	9.2	27.1	7.6	40.0		17.9	50.3	
Effective Green, g (s)	12.9	19.5		2.6	9.2	27.1	7.6	40.0		17.9	50.3	
Actuated g/C Ratio	0.13	0.20		0.03	0.09	0.27	0.08	0.40		0.18	0.50	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lane Grp Cap (vph)	217	329		42	168	515	131	1334		310	1659	
v/s Ratio Prot	c0.12	0.06		0.01	c0.05	0.03	0.05	c0.31		c0.10	c0.32	
v/s Ratio Perm						0.02						
v/c Ratio	0.95	0.29		0.55	0.50	0.18	0.68	0.77		0.57	0.63	
Uniform Delay, d1	43.2	34.3		48.1	43.2	27.9	45.0	26.0		37.6	18.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.90	0.97		1.41	0.58	
Incremental Delay, d2	46.0	0.2		7.6	0.9	0.1	5.1	2.0		0.7	0.8	
Delay (s)	89.2	34.5		55.7	44.1	28.0	45.4	27.2		53.5	11.3	
Level of Service	F	C		E	D	C	D	C		D	B	
Approach Delay (s)		67.8			35.8			28.6			17.4	
Approach LOS		E			D			C			B	
Intersection Summary												
HCM 2000 Control Delay			29.1									
HCM 2000 Volume to Capacity ratio			0.73									
Actuated Cycle Length (s)			100.0									
Intersection Capacity Utilization			59.6%									
Analysis Period (min)			15									
c Critical Lane Group												

Queues

3: SE 192nd Ave & SE 20th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	149	267	165	273	65	1181	189	918
v/c Ratio	0.57	0.82	0.87	0.69	0.51	1.00	0.72	0.63
Control Delay	52.7	56.8	83.7	38.2	66.7	54.6	63.8	25.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.7	56.8	83.7	38.2	66.7	54.6	63.8	25.4
Queue Length 50th (ft)	47	154	104	129	39	~426	130	142
Queue Length 95th (ft)	68	191	#174	172	m65	#440	#235	235
Internal Link Dist (ft)		1188		973		3702		1122
Turn Bay Length (ft)	100		100		325		400	
Base Capacity (vph)	396	437	200	452	175	1181	261	1465
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.61	0.82	0.60	0.37	1.00	0.72	0.63

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

3: SE 192nd Ave & SE 20th St

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	118	152	59	130	103	113	51	679	254	149	636	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	0.97	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.92		1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3303	1763		1671	1703		1752	3183		1719	3171	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3303	1763		1671	1703		1752	3183		1719	3171	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	149	192	75	165	130	143	65	859	322	189	805	113
RTOR Reduction (vph)	0	16	0	0	41	0	0	38	0	0	9	0
Lane Group Flow (vph)	149	251	0	165	232	0	65	1143	0	189	909	0
Confl. Peds. (#/hr)			2	2			2		2	2		2
Confl. Bikes (#/hr)			2			2			2			1
Heavy Vehicles (%)	6%	3%	2%	8%	1%	3%	3%	8%	8%	5%	12%	7%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	7.9	17.5		11.3	20.9		6.3	36.0		15.2	44.9	
Effective Green, g (s)	7.9	17.5		11.3	20.9		6.3	36.0		15.2	44.9	
Actuated g/C Ratio	0.08	0.18		0.11	0.21		0.06	0.36		0.15	0.45	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lane Grp Cap (vph)	260	308		188	355		110	1145		261	1423	
v/s Ratio Prot	0.05	c0.14		c0.10	c0.14		0.04	c0.36		c0.11	0.29	
v/s Ratio Perm												
v/c Ratio	0.57	0.82		0.88	0.65		0.59	1.00		0.72	0.64	
Uniform Delay, d1	44.4	39.7		43.7	36.2		45.6	32.0		40.4	21.3	
Progression Factor	1.00	1.00		1.00	1.00		1.21	0.90		1.18	1.02	
Incremental Delay, d2	1.9	14.5		32.9	3.3		5.2	25.5		7.1	1.9	
Delay (s)	46.3	54.2		76.6	39.5		60.3	54.1		54.9	23.7	
Level of Service	D	D		E	D		E	D		D	C	
Approach Delay (s)		51.4			53.5			54.4			29.0	
Approach LOS		D			D			D			C	
Intersection Summary												
HCM 2000 Control Delay			45.1			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.89									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			71.2%			ICU Level of Service				C		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

4: SE 192nd Ave & SE 34th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	159	155	213	259	89	779	220	136	693
v/c Ratio	0.72	0.50	0.77	0.68	0.41	0.44	0.24	0.53	0.38
Control Delay	50.8	38.6	53.3	35.9	50.6	15.5	2.7	37.7	21.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.8	38.6	53.3	35.9	50.6	15.5	2.7	37.7	21.1
Queue Length 50th (ft)	86	38	118	52	28	148	0	42	148
Queue Length 95th (ft)	139	68	181	90	53	226	38	m67	m256
Internal Link Dist (ft)		670		7104		563			3702
Turn Bay Length (ft)	150		150		300		300	175	
Base Capacity (vph)	235	1031	280	1073	350	1783	910	346	1848
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.15	0.76	0.24	0.25	0.44	0.24	0.39	0.38

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

4: SE 192nd Ave & SE 34th St

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	145	109	32	194	146	90	81	709	200	124	517	114
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.97		1.00	0.94		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1655	3249		1767	3241		3502	3282	1490	3467	3192	
Flt Permitted	0.47	1.00		0.62	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	811	3249		1149	3241		3502	3282	1490	3467	3192	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	159	120	35	213	160	99	89	779	220	136	568	125
RTOR Reduction (vph)	0	32	0	0	90	0	0	0	101	0	11	0
Lane Group Flow (vph)	159	123	0	213	169	0	89	779	119	136	682	0
Confl. Peds. (#/hr)	1		3	3		1	3		6	6		3
Heavy Vehicles (%)	9%	7%	7%	2%	6%	2%	0%	10%	5%	1%	9%	13%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6					4			
Actuated Green, G (s)	17.8	8.6		18.8	9.1		5.2	54.3	54.3	7.4	56.5	
Effective Green, g (s)	17.8	8.6		18.8	9.1		5.2	54.3	54.3	7.4	56.5	
Actuated g/C Ratio	0.18	0.09		0.19	0.09		0.05	0.54	0.54	0.07	0.56	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lane Grp Cap (vph)	222	279		275	294		182	1782	809	256	1803	
v/s Ratio Prot	0.07	0.04		c0.07	0.05		0.03	c0.24		c0.04	0.21	
v/s Ratio Perm	0.06			c0.07					0.08			
v/c Ratio	0.72	0.44		0.77	0.57		0.49	0.44	0.15	0.53	0.38	
Uniform Delay, d1	37.4	43.4		37.6	43.6		46.1	13.7	11.4	44.6	12.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	0.72	1.67	
Incremental Delay, d2	8.8	0.4		11.7	1.7		0.8	0.8	0.4	0.8	0.5	
Delay (s)	46.2	43.8		49.3	45.3		46.9	14.5	11.7	32.9	20.5	
Level of Service	D	D		D	D		D	B	B	C	C	
Approach Delay (s)		45.0			47.1			16.6			22.6	
Approach LOS		D			D			B			C	
Intersection Summary												
HCM 2000 Control Delay			27.0			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.53									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			61.1%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

5: Site Driveway 1/South Site Driveway & SE 20th Street

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	4	479	24	2	219	2	88	0	10	1	0	6
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	5	622	31	3	284	3	114	0	13	1	0	8
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	TWLTL			TWLTL								
Median storage veh	2			2								
Upstream signal (ft)	1053			1170								
pX, platoon unblocked				0.95			0.95	0.95	0.95	0.95	0.95	
vC, conflicting volume	287				653				945	940	638	936
vC1, stage 1 conf vol							648	648				291
vC2, stage 2 conf vol							297	292				645
vCu, unblocked vol	287				611				918	912	595	908
tC, single (s)	4.1				4.1				7.1	6.5	6.2	7.1
tC, 2 stage (s)							6.1	5.5				6.1
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5
p0 queue free %	100				100				73	100	97	100
cM capacity (veh/h)	1287				931				422	425	484	414
							418					
							758					
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	5	653	3	287	127	9						
Volume Left	5	0	3	0	114	1						
Volume Right	0	31	0	3	13	8						
cSH	1287	1700	931	1700	427	678						
Volume to Capacity	0.00	0.38	0.00	0.17	0.30	0.01						
Queue Length 95th (ft)	0	0	0	0	31	1						
Control Delay (s)	7.8	0.0	8.9	0.0	17.0	10.4						
Lane LOS	A		A		C	B						
Approach Delay (s)	0.1			0.1	17.0	10.4						
Approach LOS					C	B						
Intersection Summary												
Average Delay				2.1								
Intersection Capacity Utilization				45.5%	ICU Level of Service			A				
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

6: Site Driveway 2 & SE 20th St/SE 20th Street

2/26/2018

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	267	223	14	198	25	11
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	347	290	18	257	32	14
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLT			TWLT		
Median storage veh)	2			2		
Upstream signal (ft)				530		
pX, platoon unblocked						
vC, conflicting volume			636		785	492
vC1, stage 1 conf vol					492	
vC2, stage 2 conf vol					294	
vCu, unblocked vol			636		785	492
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			98		94	98
cM capacity (veh/h)			957		550	581
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	636	18	257	47		
Volume Left	0	18	0	32		
Volume Right	290	0	0	14		
cSH	1700	957	1700	559		
Volume to Capacity	0.37	0.02	0.15	0.08		
Queue Length 95th (ft)	0	1	0	7		
Control Delay (s)	0.0	8.8	0.0	12.0		
Lane LOS		A		B		
Approach Delay (s)	0.0	0.6		12.0		
Approach LOS				B		
Intersection Summary						
Average Delay		0.8				
Intersection Capacity Utilization		37.7%	ICU Level of Service	A		
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

7: SE Fisher Creek Rd/Site Driveway 3

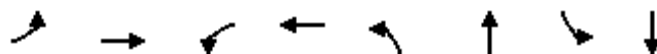
2/26/2018

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	17	4	5	18	154	128
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	23	5	7	24	205	171
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)					400	
pX, platoon unblocked						
vC, conflicting volume	316	291	376			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	316	291	376			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	99	99			
cM capacity (veh/h)	654	712	1194			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	28	15	16	376		
Volume Left	23	7	0	0		
Volume Right	5	0	0	171		
cSH	664	1194	1700	1700		
Volume to Capacity	0.04	0.01	0.01	0.22		
Queue Length 95th (ft)	3	0	0	0		
Control Delay (s)	10.7	3.7	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s)	10.7	1.8		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			0.8			
Intersection Capacity Utilization			25.9%	ICU Level of Service		A
Analysis Period (min)			15			

Queues

9: Site Driveway 3/SE Fisher Creek Rd & SE 20th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	45	315	114	313	17	28	92	167
v/c Ratio	0.08	0.34	0.21	0.34	0.05	0.06	0.25	0.33
Control Delay	6.7	6.0	7.9	6.5	8.8	5.9	10.6	8.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.7	6.0	7.9	6.5	8.8	5.9	10.6	8.4
Queue Length 50th (ft)	4	19	10	22	2	1	9	11
Queue Length 95th (ft)	14	48	29	52	9	9	28	35
Internal Link Dist (ft)		450		4148		320		206
Turn Bay Length (ft)	100		100				100	
Base Capacity (vph)	1045	1654	1040	1698	869	1204	986	1277
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.19	0.11	0.18	0.02	0.02	0.09	0.13
Intersection Summary								

HCM Signalized Intersection Capacity Analysis

9: Site Driveway 3/SE Fisher Creek Rd & SE 20th St

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	35	131	112	88	152	89	13	7	15	71	82	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	0.94		1.00	0.90		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1712		1802	1758		1805	1707		1805	1796	
Flt Permitted	0.57	1.00		0.57	1.00		0.65	1.00		0.74	1.00	
Satd. Flow (perm)	1083	1712		1080	1758		1238	1707		1404	1796	
Peak-hour factor, PHF	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Adj. Flow (vph)	45	170	145	114	197	116	17	9	19	92	106	61
RTOR Reduction (vph)	0	56	0	0	39	0	0	15	0	0	41	0
Lane Group Flow (vph)	45	259	0	114	274	0	17	13	0	92	126	0
Confl. Peds. (#/hr)			3	3								
Confl. Bikes (#/hr)			3			2						
Heavy Vehicles (%)	0%	4%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	13.5	13.5		13.5	13.5		6.4	6.4		6.4	6.4	
Effective Green, g (s)	13.5	13.5		13.5	13.5		6.4	6.4		6.4	6.4	
Actuated g/C Ratio	0.45	0.45		0.45	0.45		0.21	0.21		0.21	0.21	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	488	772		487	793		264	365		300	384	
v/s Ratio Prot		0.15			c0.16			0.01			c0.07	
v/s Ratio Perm	0.04			0.11			0.01			0.07		
v/c Ratio	0.09	0.34		0.23	0.35		0.06	0.04		0.31	0.33	
Uniform Delay, d1	4.7	5.3		5.0	5.3		9.4	9.3		9.9	9.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.3		0.2	0.3		0.1	0.0		0.6	0.5	
Delay (s)	4.8	5.6		5.3	5.6		9.5	9.3		10.5	10.4	
Level of Service	A	A		A	A		A	A		B	B	
Approach Delay (s)		5.5			5.5			9.4			10.4	
Approach LOS		A			A			A			B	
Intersection Summary												
HCM 2000 Control Delay			6.8			HCM 2000 Level of Service				A		
HCM 2000 Volume to Capacity ratio			0.34									
Actuated Cycle Length (s)			29.9			Sum of lost time (s)			10.0			
Intersection Capacity Utilization			42.2%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

10: NW Parker St & NW 38th Ave

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	125	161	347	322	172	441	204	46	462	126
v/c Ratio	0.30	0.27	0.64	0.55	0.60	0.97	0.31	0.16	1.03	0.18
Control Delay	12.0	10.9	19.3	20.8	23.0	62.2	3.6	13.1	78.6	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.0	10.9	19.3	20.8	23.0	62.2	3.6	13.1	78.6	3.5
Queue Length 50th (ft)	26	24	84	92	42	170	0	11	~189	0
Queue Length 95th (ft)	39	41	98	111	58	#207	12	21	#225	13
Internal Link Dist (ft)		4148		899		2420			638	
Turn Bay Length (ft)	125		150		125			250		125
Base Capacity (vph)	411	590	540	582	287	456	659	287	448	699
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.27	0.64	0.55	0.60	0.97	0.31	0.16	1.03	0.18

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

10: NW Parker St & NW 38th Ave

2/26/2018

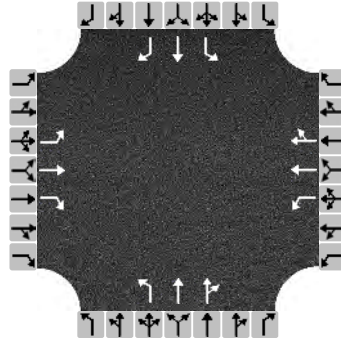
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	58	52	236	160	59	117	300	139	31	314	86
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.93		1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1730		1769	1799		1805	1827	1528	1805	1792	1538
Flt Permitted	0.41	1.00		0.64	1.00		0.25	1.00	1.00	0.25	1.00	1.00
Satd. Flow (perm)	774	1730		1200	1799		475	1827	1528	475	1792	1538
Peak-hour factor, PHF	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68
Adj. Flow (vph)	125	85	76	347	235	87	172	441	204	46	462	126
RTOR Reduction (vph)	0	50	0	0	21	0	0	0	134	0	0	83
Lane Group Flow (vph)	125	111	0	347	301	0	172	441	70	46	462	43
Confl. Peds. (#/hr)			1	1					1	1		
Heavy Vehicles (%)	0%	0%	3%	2%	0%	5%	0%	4%	4%	0%	6%	5%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	3	8		7	4		1	6	7	5	2	3
Permitted Phases	8			4			6		6	2		2
Actuated Green, G (s)	26.0	20.0		26.0	20.0		22.0	16.0	22.0	22.0	16.0	22.0
Effective Green, g (s)	26.0	20.0		26.0	20.0		22.0	16.0	22.0	22.0	16.0	22.0
Actuated g/C Ratio	0.41	0.31		0.41	0.31		0.34	0.25	0.34	0.34	0.25	0.34
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	0.2	1.5		0.2	1.5		0.2	1.5	0.2	0.2	1.5	0.2
Lane Grp Cap (vph)	411	540		540	562		287	456	620	287	448	624
v/s Ratio Prot	0.03	0.06		c0.06	0.17		c0.06	0.24	0.01	0.01	c0.26	0.01
v/s Ratio Perm	0.09			c0.20			0.15		0.04	0.04		0.02
v/c Ratio	0.30	0.21		0.64	0.54		0.60	0.97	0.11	0.16	1.03	0.07
Uniform Delay, d1	12.4	16.2		14.3	18.2		16.5	23.7	14.3	15.2	24.0	14.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.9	0.9		5.8	3.6		8.9	34.7	0.4	1.2	50.8	0.2
Delay (s)	14.3	17.0		20.1	21.8		25.4	58.4	14.7	16.4	74.8	14.3
Level of Service	B	B		C	C		C	E	B	B	E	B
Approach Delay (s)		15.8			20.9			40.6			58.5	
Approach LOS		B			C			D			E	
Intersection Summary												
HCM 2000 Control Delay			36.9			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			64.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			66.1%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCS7 All-Way Stop Control Report

General Information

Analyst	KMC	Intersection	Pacific Rim/Parker
Agency/Co.		Jurisdiction	
Date Performed	2/13/2018	East/West Street	NW Pacific Rim Blvd
Analysis Year	2018	North/South Street	NW Parker St
Analysis Time Period (hrs)	0.25	Peak Hour Factor	0.77
Time Analyzed	AM Peak TT Option 1		
Project Description	22300 Grass Valley		

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	205	21	22	37	62	11	76	342	26	9	257	321
% Thrus in Shared Lane						50			50			
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	L	T	R	L	T	TR	L	T	TR	L	T	R
Flow Rate, v (veh/h)	266	27	29	48	40	55	99	222	256	12	334	417
Percent Heavy Vehicles	2	0	22	5	6	12	1	6	12	11	3	3

Departure Headway and Service Time

Initial Departure Headway, hd (s)	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
Initial Degree of Utilization, x	0.237	0.024	0.025	0.043	0.036	0.048	0.088	0.197	0.227	0.010	0.297	0.371
Final Departure Headway, hd (s)	9.83	9.30	8.97	10.59	10.11	10.03	9.16	8.75	8.76	9.05	8.42	7.72
Final Degree of Utilization, x	0.727	0.070	0.071	0.141	0.113	0.152	0.251	0.540	0.622	0.029	0.780	0.893
Move-Up Time, m (s)	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Service Time, ts (s)	7.53	7.00	6.67	8.29	7.81	7.73	6.86	6.45	6.46	6.75	6.12	5.42

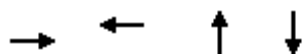
Capacity, Delay and Level of Service

Flow Rate, v (veh/h)	266	27	29	48	40	55	99	222	256	12	334	417
Capacity	366	387	401	340	356	359	393	412	411	398	428	467
95% Queue Length, Q ₉₅ (veh)	5.5	0.2	0.2	0.5	0.4	0.5	1.0	3.1	4.1	0.1	6.8	9.8
Control Delay (s/veh)	34.7	12.7	12.4	15.0	14.1	14.5	14.9	21.2	24.8	12.0	35.2	47.1
Level of Service, LOS	D	B	B	C	B	B	B	C	C	B	E	E
Approach Delay (s/veh)	30.9			14.6			21.7			41.3		
Approach LOS	D			B			C			E		
Intersection Delay, s/veh LOS	31.1						D					

Queues

12: NW Brady Rd & NW 16th Ave

2/26/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	173	535	316	425
v/c Ratio	0.29	0.78	0.48	0.63
Control Delay	10.4	22.5	15.0	17.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	10.4	22.5	15.0	17.8
Queue Length 50th (ft)	31	133	74	106
Queue Length 95th (ft)	54	187	109	149
Internal Link Dist (ft)	675	942	393	3387
Turn Bay Length (ft)				
Base Capacity (vph)	597	683	655	675
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.29	0.78	0.48	0.63
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

12: NW Brady Rd & NW 16th Ave

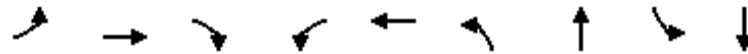
2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Volume (vph)	52	55	26	154	91	167	49	154	40	63	185	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.97			0.95			0.98			0.97	
Flt Protected		0.98			0.98			0.99			0.99	
Satd. Flow (prot)		1672			1707			1749			1754	
Flt Permitted		0.76			0.82			0.87			0.89	
Satd. Flow (perm)		1296			1429			1545			1575	
Peak-hour factor, PHF	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Adj. Flow (vph)	68	71	34	200	118	217	64	200	52	82	240	103
RTOR Reduction (vph)	0	15	0	0	41	0	0	12	0	0	19	0
Lane Group Flow (vph)	0	158	0	0	494	0	0	304	0	0	406	0
Confl. Peds. (#/hr)			1	1								
Heavy Vehicles (%)	10%	10%	0%	3%	6%	2%	0%	4%	16%	7%	3%	3%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		27.0			27.0			25.0			25.0	
Effective Green, g (s)		27.0			27.0			25.0			25.0	
Actuated g/C Ratio		0.45			0.45			0.42			0.42	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		1.5			1.5			1.5			1.5	
Lane Grp Cap (vph)		583			643			643			656	
v/s Ratio Prot												
v/s Ratio Perm		0.12			0.35			0.20			0.26	
v/c Ratio		0.27			0.77			0.47			0.62	
Uniform Delay, d1		10.3			13.9			12.7			13.8	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.1			5.0			2.5			4.3	
Delay (s)		11.5			18.8			15.2			18.1	
Level of Service		B			B			B			B	
Approach Delay (s)		11.5			18.8			15.2			18.1	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			17.0			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			60.0			Sum of lost time (s)			8.0			
Intersection Capacity Utilization			60.5%			ICU Level of Service				B		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

1: SE 192nd Ave & Mill Plain Blvd

2/26/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	347	28	548	49	63	503	1106	38	1130
v/c Ratio	1.51	0.13	0.81	0.27	0.45	0.57	0.54	0.32	0.88
Control Delay	282.8	40.8	30.4	45.8	35.5	46.9	5.4	51.0	39.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	282.8	40.8	30.4	45.8	35.5	46.9	5.4	51.0	39.1
Queue Length 50th (ft)	~309	16	211	31	19	153	67	24	332
Queue Length 95th (ft)	#484	42	322	66	59	m163	m74	55	#536
Internal Link Dist (ft)		517			357		2419		550
Turn Bay Length (ft)	225		125	400		200		150	
Base Capacity (vph)	230	513	673	214	411	877	2059	175	1282
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.51	0.05	0.81	0.23	0.15	0.57	0.54	0.22	0.88

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

1: SE 192nd Ave & Mill Plain Blvd

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	330	27	521	47	29	30	478	990	61	36	842	232
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.92		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1900	1605	1703	1612		3467	3462		1752	3422	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1900	1605	1703	1612		3467	3462		1752	3422	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	347	28	548	49	31	32	503	1042	64	38	886	244
RTOR Reduction (vph)	0	0	103	0	30	0	0	3	0	0	23	0
Lane Group Flow (vph)	347	28	445	49	33	0	503	1103	0	38	1107	0
Confl. Peds. (#/hr)	17		9	9		17	1		1	1		1
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	2%	0%	0%	6%	7%	7%	1%	3%	7%	3%	2%	1%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2									
Actuated Green, G (s)	13.0	10.2	35.5	9.7	6.9		25.3	55.4		4.7	34.8	
Effective Green, g (s)	13.0	10.2	35.5	9.7	6.9		25.3	55.4		4.7	34.8	
Actuated g/C Ratio	0.13	0.10	0.36	0.10	0.07		0.25	0.55		0.05	0.35	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	230	193	650	165	111		877	1917		82	1190	
v/s Ratio Prot	c0.20	0.01	c0.17	0.03	0.02		0.15	0.32		0.02	c0.32	
v/s Ratio Perm			0.10									
v/c Ratio	1.51	0.15	0.69	0.30	0.30		0.57	0.58		0.46	0.93	
Uniform Delay, d1	43.5	40.9	27.5	42.0	44.3		32.6	14.6		46.4	31.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.38	0.35		1.00	1.00	
Incremental Delay, d2	250.2	0.1	2.4	0.4	0.6		0.2	0.5		1.5	13.9	
Delay (s)	293.7	41.1	29.9	42.3	44.8		45.3	5.6		47.9	45.3	
Level of Service	F	D	C	D	D		D	A		D	D	
Approach Delay (s)		129.4			43.7			18.0			45.4	
Approach LOS		F			D			B			D	
Intersection Summary												
HCM 2000 Control Delay			54.1			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.98									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			81.8%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

2: SE 192nd Ave & SE 15th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	140	228	34	104	251	129	1571	192	1595
v/c Ratio	0.85	0.62	0.34	0.54	0.53	0.64	1.00	0.67	0.93
Control Delay	85.6	32.7	53.7	51.8	22.0	44.8	40.8	57.9	28.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	85.6	32.7	53.7	51.8	22.0	44.8	40.8	57.9	28.4
Queue Length 50th (ft)	89	91	21	65	88	83	~318	126	528
Queue Length 95th (ft)	#175	148	49	101	125	m81	m#539	m153	#744
Internal Link Dist (ft)		621		676			1122		2419
Turn Bay Length (ft)	100		100		100	150		475	
Base Capacity (vph)	173	465	168	447	475	209	1567	285	1708
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.49	0.20	0.23	0.53	0.62	1.00	0.67	0.93

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

2: SE 192nd Ave & SE 15th St

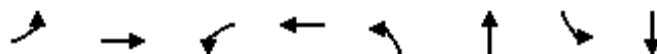
2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	119	71	122	29	88	213	110	1298	37	163	1229	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.91		1.00	1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1736	1681		1687	1863	1604	1787	3523		1805	3482	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1736	1681		1687	1863	1604	1787	3523		1805	3482	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	140	84	144	34	104	251	129	1527	44	192	1446	149
RTOR Reduction (vph)	0	67	0	0	0	55	0	2	0	0	6	0
Lane Group Flow (vph)	140	161	0	34	104	196	129	1569	0	192	1589	0
Confl. Peds. (#/hr)	3		1	1		3	2		6	6		2
Confl. Bikes (#/hr)			1									1
Heavy Vehicles (%)	4%	2%	1%	7%	2%	0%	1%	2%	0%	0%	2%	2%
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6	3	7	4		3	8	
Permitted Phases						6						
Actuated Green, G (s)	9.5	17.8		4.0	12.3	28.1	11.3	42.4		15.8	46.9	
Effective Green, g (s)	9.5	17.8		4.0	12.3	28.1	11.3	42.4		15.8	46.9	
Actuated g/C Ratio	0.10	0.18		0.04	0.12	0.28	0.11	0.42		0.16	0.47	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lane Grp Cap (vph)	164	299		67	229	530	201	1493		285	1633	
v/s Ratio Prot	c0.08	c0.10		0.02	0.06	0.06	0.07	c0.45		c0.11	c0.46	
v/s Ratio Perm						0.06						
v/c Ratio	0.85	0.54		0.51	0.45	0.37	0.64	1.05		0.67	0.97	
Uniform Delay, d1	44.6	37.4		47.0	40.7	28.9	42.4	28.8		39.7	25.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.96	0.92		1.23	0.70	
Incremental Delay, d2	31.6	0.9		2.2	0.5	0.2	1.5	28.7		3.5	13.4	
Delay (s)	76.2	38.3		49.2	41.3	29.0	42.4	55.2		52.5	31.5	
Level of Service	E	D		D	D	C	D	E		D	C	
Approach Delay (s)		52.7			34.1			54.2			33.7	
Approach LOS		D			C			D			C	
Intersection Summary												
HCM 2000 Control Delay			43.6				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.90									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			78.5%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

3: SE 192nd Ave & SE 20th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	146	296	324	509	121	1308	188	1194
v/c Ratio	0.55	0.57	2.00	0.94	0.76	1.22	0.87	1.01
Control Delay	52.3	32.8	497.6	59.7	86.2	132.3	68.0	56.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.3	32.8	497.6	59.7	86.2	132.3	68.0	56.5
Queue Length 50th (ft)	46	145	~324	288	83	~555	130	~361
Queue Length 95th (ft)	76	233	#495	#526	m124	#665	m142	m#475
Internal Link Dist (ft)		1188		973		3702		1122
Turn Bay Length (ft)	100		100		325		400	
Base Capacity (vph)	589	515	162	540	180	1068	232	1187
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.57	2.00	0.94	0.67	1.22	0.81	1.01

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

3: SE 192nd Ave & SE 20th St

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	140	179	106	311	225	264	116	1059	197	180	994	153
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	0.97	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	0.92		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3467	1763		1805	1713		1805	3418		1787	3444	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3467	1763		1805	1713		1805	3418		1787	3444	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	146	186	110	324	234	275	121	1103	205	188	1035	159
RTOR Reduction (vph)	0	22	0	0	37	0	0	15	0	0	12	0
Lane Group Flow (vph)	146	274	0	324	472	0	121	1293	0	188	1182	0
Confl. Peds. (#/hr)	1		3	3		1	5		1	1		5
Confl. Bikes (#/hr)			1			4			5			3
Heavy Vehicles (%)	1%	0%	3%	0%	1%	1%	0%	3%	1%	1%	2%	4%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	7.6	28.0		9.0	29.4		8.9	30.8		12.2	34.1	
Effective Green, g (s)	7.6	28.0		9.0	29.4		8.9	30.8		12.2	34.1	
Actuated g/C Ratio	0.08	0.28		0.09	0.29		0.09	0.31		0.12	0.34	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lane Grp Cap (vph)	263	493		162	503		160	1052		218	1174	
v/s Ratio Prot	0.04	0.16		c0.18	c0.28		0.07	c0.38		c0.11	c0.34	
v/s Ratio Perm												
v/c Ratio	0.56	0.56		2.00	0.94		0.76	1.23		0.86	1.01	
Uniform Delay, d1	44.6	30.7		45.5	34.4		44.5	34.6		43.1	33.0	
Progression Factor	1.00	1.00		1.00	1.00		1.43	0.67		1.14	1.14	
Incremental Delay, d2	1.4	0.8		471.2	24.9		13.0	109.7		14.2	19.3	
Delay (s)	46.0	31.5		516.7	59.3		76.8	133.0		63.2	56.7	
Level of Service	D	C		F	E		E	F		E	E	
Approach Delay (s)		36.3			237.2			128.3			57.6	
Approach LOS		D			F			F			E	
Intersection Summary												
HCM 2000 Control Delay			116.6			HCM 2000 Level of Service				F		
HCM 2000 Volume to Capacity ratio			1.17									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			95.7%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

4: SE 192nd Ave & SE 34th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	163	285	427	373	114	1077	211	278	1298
v/c Ratio	0.66	0.71	1.33	0.57	0.49	0.69	0.27	0.68	0.77
Control Delay	41.9	43.6	195.8	26.0	51.5	26.5	3.9	34.5	33.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.9	43.6	195.8	26.0	51.5	26.5	3.9	34.5	33.0
Queue Length 50th (ft)	81	73	~303	67	37	283	0	94	363
Queue Length 95th (ft)	129	112	#470	110	63	410	46	m90	m332
Internal Link Dist (ft)		670		7104		563			3702
Turn Bay Length (ft)	150		150		300		300	175	
Base Capacity (vph)	256	961	322	1164	282	1551	795	419	1695
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.64	0.30	1.33	0.32	0.40	0.69	0.27	0.66	0.77

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

4: SE 192nd Ave & SE 34th St

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	147	181	76	384	197	139	103	969	190	250	999	169
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.96		1.00	0.94		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1752	3389		1769	3312		3433	3505	1532	3502	3440	
Flt Permitted	0.53	1.00		0.26	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	977	3389		493	3312		3433	3505	1532	3502	3440	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	163	201	84	427	219	154	114	1077	211	278	1110	188
RTOR Reduction (vph)	0	57	0	0	130	0	0	0	118	0	10	0
Lane Group Flow (vph)	163	228	0	427	243	0	114	1077	93	278	1288	0
Confl. Peds. (#/hr)	1		1	1		1	2		1	1		2
Confl. Bikes (#/hr)						2			1			2
Heavy Vehicles (%)	3%	2%	0%	2%	2%	1%	2%	3%	3%	0%	2%	5%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6					4			
Actuated Green, G (s)	18.5	10.1		29.1	15.7		6.9	44.3	44.3	11.6	49.0	
Effective Green, g (s)	18.5	10.1		29.1	15.7		6.9	44.3	44.3	11.6	49.0	
Actuated g/C Ratio	0.18	0.10		0.29	0.16		0.07	0.44	0.44	0.12	0.49	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lane Grp Cap (vph)	245	342		322	519		236	1552	678	406	1685	
v/s Ratio Prot	0.06	0.07		c0.19	0.07		0.03	0.31		c0.08	c0.37	
v/s Ratio Perm	0.07			c0.20					0.06			
v/c Ratio	0.67	0.67		1.33	0.47		0.48	0.69	0.14	0.68	0.76	
Uniform Delay, d1	36.6	43.3		32.2	38.4		44.8	22.4	16.5	42.4	20.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	0.80	1.51	
Incremental Delay, d2	5.2	3.8		166.7	0.2		0.6	2.6	0.4	0.3	0.3	
Delay (s)	41.8	47.1		198.9	38.6		45.4	25.0	16.9	34.3	31.7	
Level of Service	D	D		F	D		D	C	B	C	C	
Approach Delay (s)		45.2			124.2			25.4			32.2	
Approach LOS		D			F			C			C	
Intersection Summary												
HCM 2000 Control Delay			48.7			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			1.00									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			83.2%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

5: Site Driveway & SE 20th Street

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	6	378	79	9	669	2	40	0	5	2	0	15
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	7	467	98	11	826	2	49	0	6	2	0	19
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	TWLTL			TWLTL								
Median storage veh	2			2								
Upstream signal (ft)	1053			1170								
pX, platoon unblocked				1.00			1.00			1.00		
vC, conflicting volume	828			564			1397			1381		
vC1, stage 1 conf vol							530			530		
vC2, stage 2 conf vol							867			851		
vCu, unblocked vol	828			564			1397			1381		
tC, single (s)	4.1			4.1			7.1			6.5		
tC, 2 stage (s)							6.1			5.5		
tF (s)	2.2			2.2			3.5			4.0		
p0 queue free %	99			99			83			100		
cM capacity (veh/h)	812			1017			285			320		
							285			320		
							563			310		
							310			315		
							374					
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	7	564	11	828	56	21						
Volume Left	7	0	11	0	49	2						
Volume Right	0	98	0	2	6	19						
cSH	812	1700	1017	1700	302	366						
Volume to Capacity	0.01	0.33	0.01	0.49	0.18	0.06						
Queue Length 95th (ft)	1	0	1	0	17	5						
Control Delay (s)	9.5	0.0	8.6	0.0	19.6	15.4						
Lane LOS	A		A		C	C						
Approach Delay (s)	0.1		0.1		19.6	15.4						
Approach LOS					C	C						
Intersection Summary												
Average Delay				1.1								
Intersection Capacity Utilization				Err%			ICU Level of Service			H		
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

6: Site Driveway 2 & SE 20th Street

2/26/2018

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	332	53	10	476	204	33
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	410	65	12	588	252	41
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLT			TWLT		
Median storage veh	2			2		
Upstream signal (ft)				530		
pX, platoon unblocked					0.86	
vC, conflicting volume			475		1055	443
vC1, stage 1 conf vol					443	
vC2, stage 2 conf vol					612	
vCu, unblocked vol			475		983	443
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			99		45	93
cM capacity (veh/h)			1097		457	619
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	475	12	588	293		
Volume Left	0	12	0	252		
Volume Right	65	0	0	41		
cSH	1700	1097	1700	474		
Volume to Capacity	0.28	0.01	0.35	0.62		
Queue Length 95th (ft)	0	1	0	102		
Control Delay (s)	0.0	8.3	0.0	24.0		
Lane LOS		A		C		
Approach Delay (s)	0.0	0.2		24.0		
Approach LOS				C		
Intersection Summary						
Average Delay			5.2			
Intersection Capacity Utilization			45.0%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

7: NW Fisher Creek Drive & Site Driveway 3

2/26/2018

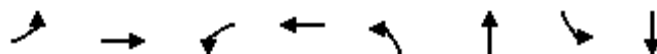


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	103	1	4	334	19	41
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	137	1	5	445	25	55
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)					380	
pX, platoon unblocked						
vC, conflicting volume	286	53	80			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	286	53	80			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	80	100	100			
cM capacity (veh/h)	684	1010	1531			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	139	154	297	80		
Volume Left	137	5	0	0		
Volume Right	1	0	0	55		
cSH	686	1531	1700	1700		
Volume to Capacity	0.20	0.00	0.17	0.05		
Queue Length 95th (ft)	19	0	0	0		
Control Delay (s)	11.6	0.3	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s)	11.6	0.1		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			2.5			
Intersection Capacity Utilization			24.5%		ICU Level of Service	A
Analysis Period (min)			15			

Queues

9: NW Fisher Creek Drive & SE 20th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	63	388	38	411	265	274	169	58
v/c Ratio	0.21	0.58	0.12	0.63	0.54	0.40	0.42	0.09
Control Delay	12.0	14.8	10.8	15.1	14.2	8.2	12.8	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.0	14.8	10.8	15.1	14.2	8.2	12.8	4.7
Queue Length 50th (ft)	8	59	5	59	40	27	24	2
Queue Length 95th (ft)	31	135	20	138	83	60	56	14
Internal Link Dist (ft)		450		4148		300		206
Turn Bay Length (ft)	100		100				100	
Base Capacity (vph)	403	894	428	867	1178	1541	969	1471
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.43	0.09	0.47	0.22	0.18	0.17	0.04

Intersection Summary

HCM Signalized Intersection Capacity Analysis

9: NW Fisher Creek Drive & SE 20th St

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	51	299	15	31	238	95	215	139	83	137	14	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.96		1.00	0.94		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1866		1802	1780		1805	1774		1805	1699	
Flt Permitted	0.44	1.00		0.47	1.00		0.72	1.00		0.59	1.00	
Satd. Flow (perm)	844	1866		898	1780		1366	1774		1123	1699	
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	63	369	19	38	294	117	265	172	102	169	17	41
RTOR Reduction (vph)	0	3	0	0	21	0	0	50	0	0	26	0
Lane Group Flow (vph)	63	385	0	38	390	0	265	224	0	169	32	0
Confl. Peds. (#/hr)			3	3								
Confl. Bikes (#/hr)			3			5						
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	0%	0%	3%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	13.4	13.4		13.4	13.4		13.6	13.6		13.6	13.6	
Effective Green, g (s)	13.4	13.4		13.4	13.4		13.6	13.6		13.6	13.6	
Actuated g/C Ratio	0.36	0.36		0.36	0.36		0.37	0.37		0.37	0.37	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	305	675		325	644		502	652		412	624	
v/s Ratio Prot		0.21			c0.22			0.13			0.02	
v/s Ratio Perm	0.07			0.04			c0.19			0.15		
v/c Ratio	0.21	0.57		0.12	0.61		0.53	0.34		0.41	0.05	
Uniform Delay, d1	8.1	9.5		7.9	9.6		9.2	8.5		8.7	7.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	1.2		0.2	1.6		1.0	0.3		0.7	0.0	
Delay (s)	8.5	10.7		8.0	11.3		10.2	8.8		9.4	7.6	
Level of Service	A	B		A	B		B	A		A	A	
Approach Delay (s)		10.4			11.0			9.5			8.9	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM 2000 Control Delay			10.0			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.57									
Actuated Cycle Length (s)			37.0			Sum of lost time (s)			10.0			
Intersection Capacity Utilization			59.1%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

10: NW Parker St & NW 38th Ave

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	121	469	114	229	98	280	216	67	272	90
v/c Ratio	0.25	0.79	0.40	0.39	0.26	0.60	0.32	0.19	0.59	0.13
Control Delay	11.3	30.4	14.4	18.2	14.1	27.3	3.5	13.2	27.2	3.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.3	30.4	14.4	18.2	14.1	27.3	3.5	13.2	27.2	3.7
Queue Length 50th (ft)	25	149	24	63	23	96	0	15	93	0
Queue Length 95th (ft)	50	#275	48	112	47	159	31	35	155	21
Internal Link Dist (ft)		4148		899		2420			638	
Turn Bay Length (ft)	125		150		125			250		125
Base Capacity (vph)	490	590	282	582	370	470	685	362	461	697
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.79	0.40	0.39	0.26	0.60	0.32	0.19	0.59	0.13

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

10: NW Parker St & NW 38th Ave

2/26/2018

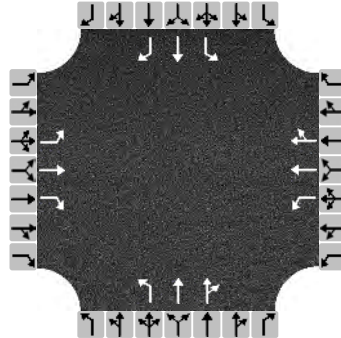
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	105	261	147	99	161	38	85	244	188	58	237	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.95		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1804	1788		1735	1822		1805	1881	1580	1801	1845	1583
Flt Permitted	0.54	1.00		0.21	1.00		0.42	1.00	1.00	0.41	1.00	1.00
Satd. Flow (perm)	1028	1788		383	1822		805	1881	1580	777	1845	1583
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	121	300	169	114	185	44	98	280	216	67	272	90
RTOR Reduction (vph)	0	32	0	0	13	0	0	0	142	0	0	59
Lane Group Flow (vph)	121	437	0	114	216	0	98	280	74	67	272	31
Confl. Peds. (#/hr)	1		2	2		1			5	5		
Confl. Bikes (#/hr)			1			1						
Heavy Vehicles (%)	0%	0%	0%	4%	1%	0%	0%	1%	0%	0%	3%	2%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	3	8		7	4		1	6	7	5	2	3
Permitted Phases	8			4			6		6	2		2
Actuated Green, G (s)	26.0	20.0		26.0	20.0		22.0	16.0	22.0	22.0	16.0	22.0
Effective Green, g (s)	26.0	20.0		26.0	20.0		22.0	16.0	22.0	22.0	16.0	22.0
Actuated g/C Ratio	0.41	0.31		0.41	0.31		0.34	0.25	0.34	0.34	0.25	0.34
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	0.2	1.5		0.2	1.5		0.2	1.5	0.2	0.2	1.5	0.2
Lane Grp Cap (vph)	490	558		282	569		370	470	641	363	461	643
v/s Ratio Prot	0.02	c0.24		c0.04	0.12		c0.02	c0.15	0.01	0.02	0.15	0.00
v/s Ratio Perm	0.08			0.13			0.07		0.04	0.05		0.02
v/c Ratio	0.25	0.78		0.40	0.38		0.26	0.60	0.12	0.18	0.59	0.05
Uniform Delay, d1	12.1	20.0		13.3	17.2		14.7	21.1	14.4	14.5	21.1	14.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	10.6		4.3	1.9		1.7	5.5	0.4	1.1	5.5	0.1
Delay (s)	13.3	30.6		17.5	19.1		16.5	26.6	14.7	15.6	26.6	14.2
Level of Service	B	C		B	B		B	C	B	B	C	B
Approach Delay (s)		27.0			18.6			20.6			22.3	
Approach LOS		C			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			22.6			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.61									
Actuated Cycle Length (s)			64.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			58.8%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCS7 All-Way Stop Control Report

General Information

Analyst	KMC	Intersection	Pacific Rim/Parker
Agency/Co.		Jurisdiction	
Date Performed	2/13/2018	East/West Street	NW Pacific Rim Blvd
Analysis Year	2018	North/South Street	NW Parker St
Analysis Time Period (hrs)	0.25	Peak Hour Factor	0.82
Time Analyzed	PM Peak TT Option 1		
Project Description	22300 Grass Valley		

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	204	52	100	10	24	16	46	289	36	21	296	153
% Thrus in Shared Lane						50			50			
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	L	T	R	L	T	TR	L	T	TR	L	T	R
Flow Rate, v (veh/h)	249	63	122	12	15	34	56	176	220	26	361	187
Percent Heavy Vehicles	1	2	1	0	0	0	0	1	0	5	3	0

Departure Headway and Service Time

Initial Departure Headway, hd (s)	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
Initial Degree of Utilization, x	0.221	0.056	0.108	0.011	0.013	0.030	0.050	0.157	0.196	0.023	0.321	0.166
Final Departure Headway, hd (s)	8.44	7.96	7.24	9.54	9.04	8.64	8.32	7.84	7.68	8.17	7.64	6.88
Final Degree of Utilization, x	0.583	0.140	0.245	0.032	0.037	0.082	0.130	0.384	0.470	0.058	0.766	0.357
Move-Up Time, m (s)	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Service Time, ts (s)	6.14	5.66	4.94	7.24	6.74	6.34	6.02	5.54	5.38	5.87	5.34	4.58

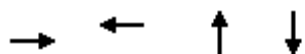
Capacity, Delay and Level of Service

Flow Rate, v (veh/h)	249	63	122	12	15	34	56	176	220	26	361	187
Capacity	426	452	497	377	398	417	433	459	469	441	471	523
95% Queue Length, Q ₉₅ (veh)	3.6	0.5	1.0	0.1	0.1	0.3	0.4	1.8	2.5	0.2	6.6	1.6
Control Delay (s/veh)	22.3	12.0	12.3	12.6	12.1	12.1	12.3	15.3	17.0	11.4	31.2	13.4
Level of Service, LOS	C	B	B	B	B	B	B	C	C	B	D	B
Approach Delay (s/veh)	18.0			12.2			15.8			24.5		
Approach LOS	C			B			C			C		
Intersection Delay, s/veh LOS	19.5						C					

Queues

12: NW Brady Rd & NW 16th Ave

2/26/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	184	312	427	431
v/c Ratio	0.33	0.57	0.45	0.60
Control Delay	14.8	17.5	8.4	13.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	14.8	17.5	8.4	13.7
Queue Length 50th (ft)	41	68	64	94
Queue Length 95th (ft)	82	132	114	165
Internal Link Dist (ft)	675	942	393	3387
Turn Bay Length (ft)				
Base Capacity (vph)	562	543	959	721
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.33	0.57	0.45	0.60
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

12: NW Brady Rd & NW 16th Ave

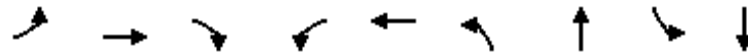
2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	29	96	36	90	61	121	19	200	152	144	202	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			1.00			0.99			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.97			0.94			0.94			0.99	
Flt Protected		0.99			0.98			1.00			0.98	
Satd. Flow (prot)		1775			1708			1765			1814	
Flt Permitted		0.91			0.86			0.97			0.73	
Satd. Flow (perm)		1635			1487			1721			1342	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	33	110	41	103	70	139	22	230	175	166	232	33
RTOR Reduction (vph)	0	17	0	0	48	0	0	42	0	0	5	0
Lane Group Flow (vph)	0	167	0	0	264	0	0	385	0	0	426	0
Confl. Peds. (#/hr)			4	4			1		1	1		1
Confl. Bikes (#/hr)			5									2
Heavy Vehicles (%)	0%	1%	7%	4%	6%	0%	0%	1%	0%	1%	2%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		20.0			20.0			32.0			32.0	
Effective Green, g (s)		20.0			20.0			32.0			32.0	
Actuated g/C Ratio		0.33			0.33			0.53			0.53	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		1.5			1.5			1.5			1.5	
Lane Grp Cap (vph)		545			495			917			715	
v/s Ratio Prot												
v/s Ratio Perm		0.10			c0.18			0.22			c0.32	
v/c Ratio		0.31			0.53			0.42			0.60	
Uniform Delay, d1		14.8			16.2			8.4			9.6	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.4			4.1			1.4			3.6	
Delay (s)		16.3			20.3			9.8			13.2	
Level of Service		B			C			A			B	
Approach Delay (s)		16.3			20.3			9.8			13.2	
Approach LOS		B			C			A			B	
Intersection Summary												
HCM 2000 Control Delay			14.2			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.57									
Actuated Cycle Length (s)			60.0			Sum of lost time (s)				8.0		
Intersection Capacity Utilization			78.5%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

1: SE 192nd Ave & Mill Plain Blvd

2/26/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	163	145	337	212	272	514	940	105	980
v/c Ratio	0.77	0.46	0.52	0.98	0.79	0.69	0.75	0.62	1.06
Control Delay	67.0	39.7	18.0	100.6	48.1	45.8	23.0	59.0	81.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.0	39.7	18.0	100.6	48.1	45.8	23.0	59.0	81.1
Queue Length 50th (ft)	101	82	110	137	141	122	226	65	~356
Queue Length 95th (ft)	135	102	132	#202	157	#207	218	94	#328
Internal Link Dist (ft)		517			357		2419		550
Turn Bay Length (ft)	225		125	400		200		150	
Base Capacity (vph)	232	492	649	217	485	743	1256	186	925
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.29	0.52	0.98	0.56	0.69	0.75	0.56	1.06

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

1: SE 192nd Ave & Mill Plain Blvd

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	119	106	246	155	106	93	375	457	229	77	526	189
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.93		1.00	0.95		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1759	1528	1671	1622		3433	3062		1719	3236	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1787	1759	1528	1671	1622		3433	3062		1719	3236	
Peak-hour factor, PHF	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73
Adj. Flow (vph)	163	145	337	212	145	127	514	626	314	105	721	259
RTOR Reduction (vph)	0	0	46	0	36	0	0	53	0	0	36	0
Lane Group Flow (vph)	163	145	291	212	236	0	514	887	0	105	944	0
Confl. Peds. (#/hr)	1		3	3		1			3	3		
Heavy Vehicles (%)	1%	8%	5%	8%	5%	12%	2%	13%	7%	5%	9%	2%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2	7	1	6		7	4		3	8	
Permitted Phases			2									
Actuated Green, G (s)	11.8	17.8	39.5	13.0	19.0		21.7	39.3		9.9	27.5	
Effective Green, g (s)	11.8	17.8	39.5	13.0	19.0		21.7	39.3		9.9	27.5	
Actuated g/C Ratio	0.12	0.18	0.40	0.13	0.19		0.22	0.39		0.10	0.28	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	210	313	679	217	308		744	1203		170	889	
v/s Ratio Prot	0.09	0.08	0.09	c0.13	c0.15		c0.15	c0.29		0.06	c0.29	
v/s Ratio Perm			0.10									
v/c Ratio	0.78	0.46	0.43	0.98	0.77		0.69	0.74		0.62	1.06	
Uniform Delay, d1	42.8	36.8	22.0	43.4	38.4		36.1	25.9		43.2	36.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.09	0.72		1.00	1.00	
Incremental Delay, d2	15.0	0.4	0.2	53.8	9.9		1.8	3.2		4.6	47.9	
Delay (s)	57.8	37.2	22.2	97.1	48.3		41.0	21.9		47.9	84.2	
Level of Service	E	D	C	F	D		D	C		D	F	
Approach Delay (s)		34.6			69.7			28.7			80.6	
Approach LOS		C			E			C			F	
Intersection Summary												
HCM 2000 Control Delay			50.5			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.90									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			66.2%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

2: SE 192nd Ave & SE 15th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	206	132	91	49	81	123	1107	107	1119
v/c Ratio	0.95	0.51	0.65	0.40	0.26	0.66	0.63	0.63	0.65
Control Delay	93.9	23.7	65.2	53.8	9.6	44.1	21.1	62.6	12.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	93.9	23.7	65.2	53.8	9.6	44.1	21.1	62.6	12.5
Queue Length 50th (ft)	132	26	57	31	3	78	224	72	102
Queue Length 95th (ft)	#230	67	95	59	29	m83	m222	m81	m297
Internal Link Dist (ft)		621		676			1122		2419
Turn Bay Length (ft)	100		100		100	150		475	
Base Capacity (vph)	219	522	178	475	328	204	1744	187	1709
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.94	0.25	0.51	0.10	0.25	0.60	0.63	0.57	0.65

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

2: SE 192nd Ave & SE 15th St

2/26/2018

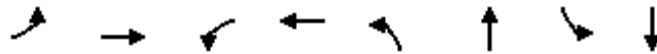
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	167	35	72	74	40	66	100	876	21	87	826	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.90		1.00	1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1687	1635		1626	1827	1606	1736	3320		1736	3303	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1687	1635		1626	1827	1606	1736	3320		1736	3303	
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	206	43	89	91	49	81	123	1081	26	107	1020	99
RTOR Reduction (vph)	0	79	0	0	0	64	0	1	0	0	5	0
Lane Group Flow (vph)	206	53	0	91	49	17	123	1106	0	107	1114	0
Confl. Peds. (#/hr)	1		2	2		1	1		4	4		1
Confl. Bikes (#/hr)			1			2						
Heavy Vehicles (%)	7%	4%	3%	11%	4%	0%	4%	8%	20%	4%	8%	4%
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	7	4		3	8
Permitted Phases						6						
Actuated Green, G (s)	12.9	11.0		7.6	5.7	15.6	10.8	51.5		9.9	50.6	
Effective Green, g (s)	12.9	11.0		7.6	5.7	15.6	10.8	51.5		9.9	50.6	
Actuated g/C Ratio	0.13	0.11		0.08	0.06	0.16	0.11	0.52		0.10	0.51	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lane Grp Cap (vph)	217	179		123	104	330	187	1709		171	1671	
v/s Ratio Prot	c0.12	0.03		0.06	c0.03	0.01	c0.07	0.33		0.06	c0.34	
v/s Ratio Perm						0.01						
v/c Ratio	0.95	0.29		0.74	0.47	0.05	0.66	0.65		0.63	0.67	
Uniform Delay, d1	43.2	40.9		45.2	45.7	35.9	42.8	17.6		43.3	18.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.89	1.08		1.31	0.59	
Incremental Delay, d2	46.0	0.3		18.0	1.2	0.0	2.4	0.7		2.1	0.9	
Delay (s)	89.2	41.3		63.3	46.9	35.9	40.6	19.8		58.8	11.8	
Level of Service	F	D		E	D	D	D	B		E	B	
Approach Delay (s)		70.5			49.6			21.8			15.9	
Approach LOS		E			D			C			B	
Intersection Summary												
HCM 2000 Control Delay			26.9				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			59.6%				ICU Level of Service			B		
Analysis Period (min)			15									

c Critical Lane Group

Queues

3: SE 192nd Ave & SE 20th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	151	276	118	371	65	1186	309	971
v/c Ratio	0.57	0.79	0.73	0.89	0.51	1.06	1.04	0.66
Control Delay	52.7	52.1	68.6	52.2	66.1	72.4	106.3	26.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.7	52.1	68.6	52.2	66.1	72.4	106.3	26.9
Queue Length 50th (ft)	48	158	74	174	39	~431	~236	162
Queue Length 95th (ft)	68	199	113	222	m65	#444	#408	265
Internal Link Dist (ft)		1188		973		3702		1122
Turn Bay Length (ft)	100		100		325		400	
Base Capacity (vph)	396	437	200	477	175	1120	298	1472
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.63	0.59	0.78	0.37	1.06	1.04	0.66

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

3: SE 192nd Ave & SE 20th St

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	119	159	59	93	98	195	51	692	245	244	673	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	0.97	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.90		1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3303	1766		1671	1656		1752	3189		1719	3172	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3303	1766		1671	1656		1752	3189		1719	3172	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	151	201	75	118	124	247	65	876	310	309	852	119
RTOR Reduction (vph)	0	15	0	0	75	0	0	36	0	0	9	0
Lane Group Flow (vph)	151	261	0	118	296	0	65	1150	0	309	962	0
Confl. Peds. (#/hr)			2	2			2		2	2		2
Confl. Bikes (#/hr)			2			2			2			1
Heavy Vehicles (%)	6%	3%	2%	8%	1%	3%	3%	8%	8%	5%	12%	7%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	8.0	19.0		9.7	20.7		6.3	33.9		17.4	45.0	
Effective Green, g (s)	8.0	19.0		9.7	20.7		6.3	33.9		17.4	45.0	
Actuated g/C Ratio	0.08	0.19		0.10	0.21		0.06	0.34		0.17	0.45	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lane Grp Cap (vph)	264	335		162	342		110	1081		299	1427	
v/s Ratio Prot	0.05	0.15		c0.07	c0.18		0.04	c0.36		c0.18	0.30	
v/s Ratio Perm												
v/c Ratio	0.57	0.78		0.73	0.87		0.59	1.06		1.03	0.67	
Uniform Delay, d1	44.3	38.5		43.9	38.3		45.6	33.0		41.3	21.7	
Progression Factor	1.00	1.00		1.00	1.00		1.19	0.90		1.18	1.05	
Incremental Delay, d2	1.9	10.4		12.9	19.4		5.2	45.4		56.1	2.1	
Delay (s)	46.2	48.9		56.8	57.7		59.6	75.3		105.1	24.8	
Level of Service	D	D		E	E		E	E		F	C	
Approach Delay (s)		47.9			57.5			74.5			44.2	
Approach LOS		D			E			E			D	
Intersection Summary												
HCM 2000 Control Delay			57.5			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			0.99									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			78.5%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

4: SE 192nd Ave & SE 34th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	159	155	213	259	89	779	220	136	693
v/c Ratio	0.72	0.50	0.77	0.68	0.41	0.44	0.24	0.53	0.38
Control Delay	50.8	38.6	53.3	35.9	50.6	15.5	2.7	37.5	22.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.8	38.6	53.3	35.9	50.6	15.5	2.7	37.5	22.0
Queue Length 50th (ft)	86	38	118	52	28	148	0	43	135
Queue Length 95th (ft)	139	68	181	90	53	226	38	m69	254
Internal Link Dist (ft)		670		7104		563			3702
Turn Bay Length (ft)	150		150		300		300	175	
Base Capacity (vph)	235	1031	280	1073	350	1783	910	346	1848
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.15	0.76	0.24	0.25	0.44	0.24	0.39	0.38

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

4: SE 192nd Ave & SE 34th St

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	145	109	32	194	146	90	81	709	200	124	517	114
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.97		1.00	0.94		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1655	3249		1767	3241		3502	3282	1490	3467	3192	
Flt Permitted	0.47	1.00		0.62	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	811	3249		1149	3241		3502	3282	1490	3467	3192	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	159	120	35	213	160	99	89	779	220	136	568	125
RTOR Reduction (vph)	0	32	0	0	90	0	0	0	101	0	11	0
Lane Group Flow (vph)	159	123	0	213	169	0	89	779	119	136	682	0
Confl. Peds. (#/hr)	1		3	3		1	3		6	6		3
Heavy Vehicles (%)	9%	7%	7%	2%	6%	2%	0%	10%	5%	1%	9%	13%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6					4			
Actuated Green, G (s)	17.8	8.6		18.8	9.1		5.2	54.3	54.3	7.4	56.5	
Effective Green, g (s)	17.8	8.6		18.8	9.1		5.2	54.3	54.3	7.4	56.5	
Actuated g/C Ratio	0.18	0.09		0.19	0.09		0.05	0.54	0.54	0.07	0.56	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lane Grp Cap (vph)	222	279		275	294		182	1782	809	256	1803	
v/s Ratio Prot	0.07	0.04		c0.07	0.05		0.03	c0.24		c0.04	0.21	
v/s Ratio Perm	0.06			c0.07					0.08			
v/c Ratio	0.72	0.44		0.77	0.57		0.49	0.44	0.15	0.53	0.38	
Uniform Delay, d1	37.4	43.4		37.6	43.6		46.1	13.7	11.4	44.6	12.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	0.72	1.74	
Incremental Delay, d2	8.8	0.4		11.7	1.7		0.8	0.8	0.4	0.8	0.5	
Delay (s)	46.2	43.8		49.3	45.3		46.9	14.5	11.7	32.7	21.4	
Level of Service	D	D		D	D		D	B	B	C	C	
Approach Delay (s)		45.0			47.1			16.6			23.2	
Approach LOS		D			D			B			C	
Intersection Summary												
HCM 2000 Control Delay			27.2			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.53									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			61.1%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

5: Site Driveway 1/South Site Driveway & SE 20th Street

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	11	623	24	2	261	2	88	0	10	1	0	9
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	14	809	31	3	339	3	114	0	13	1	0	12
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	TWLTL			TWLTL								
Median storage veh	2			2								
Upstream signal (ft)	1053			1170								
pX, platoon unblocked				0.93			0.93	0.93	0.93	0.93	0.93	
vC, conflicting volume	342			840			1209	1200	825	1196	1214	340
vC1, stage 1 conf vol							853	853		345	345	
vC2, stage 2 conf vol							356	347		851	869	
vCu, unblocked vol	342			788			1186	1176	771	1172	1192	340
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			64	100	97	100	100	98
cM capacity (veh/h)	1229			779			320	336	374	312	330	707
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	14	840	3	342	127	13						
Volume Left	14	0	3	0	114	1						
Volume Right	0	31	0	3	13	12						
cSH	1229	1700	779	1700	325	627						
Volume to Capacity	0.01	0.49	0.00	0.20	0.39	0.02						
Queue Length 95th (ft)	1	0	0	0	45	2						
Control Delay (s)	8.0	0.0	9.6	0.0	23.1	10.9						
Lane LOS	A		A		C	B						
Approach Delay (s)	0.1		0.1		23.1	10.9						
Approach LOS					C	B						
Intersection Summary												
Average Delay			2.4									
Intersection Capacity Utilization			53.1%		ICU Level of Service		A					
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

6: Site Driveway 2 & SE 20th St/SE 20th Street

2/26/2018

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	411	223	14	240	25	11
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	534	290	18	312	32	14
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (ft)				530		
pX, platoon unblocked						
vC, conflicting volume			823		1027	679
vC1, stage 1 conf vol					679	
vC2, stage 2 conf vol					348	
vCu, unblocked vol			823		1027	679
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			98		93	97
cM capacity (veh/h)			815		454	455
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	823	18	312	47		
Volume Left	0	18	0	32		
Volume Right	290	0	0	14		
cSH	1700	815	1700	455		
Volume to Capacity	0.48	0.02	0.18	0.10		
Queue Length 95th (ft)	0	2	0	9		
Control Delay (s)	0.0	9.5	0.0	13.8		
Lane LOS		A		B		
Approach Delay (s)	0.0	0.5		13.8		
Approach LOS				B		
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			45.2%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

7: SE Fisher Creek Rd/Site Driveway 3

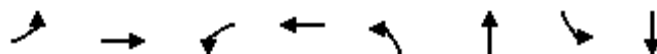
2/26/2018

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	17	4	5	18	154	128
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	23	5	7	24	205	171
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					400	
pX, platoon unblocked						
vC, conflicting volume	316	291	376			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	316	291	376			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	99	99			
cM capacity (veh/h)	654	712	1194			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	28	15	16	376		
Volume Left	23	7	0	0		
Volume Right	5	0	0	171		
cSH	664	1194	1700	1700		
Volume to Capacity	0.04	0.01	0.01	0.22		
Queue Length 95th (ft)	3	0	0	0		
Control Delay (s)	10.7	3.7	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s)	10.7	1.8		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			0.8			
Intersection Capacity Utilization			25.9%	ICU Level of Service		A
Analysis Period (min)			15			

Queues

9: Site Driveway 3/SE Fisher Creek Rd & SE 20th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	40	508	114	300	26	19	1	12
v/c Ratio	0.04	0.36	0.15	0.20	0.07	0.02	0.00	0.02
Control Delay	3.4	3.5	3.9	3.3	13.5	0.1	13.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.4	3.5	3.9	3.3	13.5	0.1	13.0	0.0
Queue Length 50th (ft)	0	0	0	0	3	0	0	0
Queue Length 95th (ft)	10	66	23	47	15	0	2	0
Internal Link Dist (ft)		450		4148		320		206
Turn Bay Length (ft)	100		100				100	
Base Capacity (vph)	982	1536	810	1662	1200	1225	1200	1209
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.33	0.14	0.18	0.02	0.02	0.00	0.01
Intersection Summary								

HCM Signalized Intersection Capacity Analysis

9: Site Driveway 3/SE Fisher Creek Rd & SE 20th St

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	31	197	194	88	225	6	20	0	15	1	0	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	1.00		1.00	0.85		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1703		1802	1855		1805	1615		1805	1615	
Flt Permitted	0.58	1.00		0.48	1.00		1.00	1.00		1.00	1.00	
Satd. Flow (perm)	1096	1703		904	1855		1900	1615		1900	1615	
Peak-hour factor, PHF	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Adj. Flow (vph)	40	256	252	114	292	8	26	0	19	1	0	12
RTOR Reduction (vph)	0	41	0	0	1	0	0	18	0	0	11	0
Lane Group Flow (vph)	40	467	0	114	299	0	26	1	0	1	1	0
Confl. Peds. (#/hr)			3	3								
Confl. Bikes (#/hr)			3			2						
Heavy Vehicles (%)	0%	4%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	23.6	23.6		23.6	23.6		2.4	2.4		2.4	2.4	
Effective Green, g (s)	23.6	23.6		23.6	23.6		2.4	2.4		2.4	2.4	
Actuated g/C Ratio	0.66	0.66		0.66	0.66		0.07	0.07		0.07	0.07	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	718	1116		592	1216		126	107		126	107	
v/s Ratio Prot		c0.27			0.16			0.00			0.00	
v/s Ratio Perm	0.04			0.13			c0.01			0.00		
v/c Ratio	0.06	0.42		0.19	0.25		0.21	0.01		0.01	0.01	
Uniform Delay, d1	2.2	2.9		2.4	2.5		15.9	15.7		15.7	15.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.3		0.2	0.1		0.8	0.0		0.0	0.0	
Delay (s)	2.2	3.2		2.6	2.7		16.7	15.7		15.7	15.7	
Level of Service	A	A		A	A		B	B		B	B	
Approach Delay (s)		3.1			2.6			16.3			15.7	
Approach LOS		A			A			B			B	
Intersection Summary												
HCM 2000 Control Delay			3.7				HCM 2000 Level of Service			A		
HCM 2000 Volume to Capacity ratio			0.40									
Actuated Cycle Length (s)			36.0				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			47.5%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

10: NW Parker St & NW 38th Ave

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	125	161	347	322	172	441	204	46	462	126
v/c Ratio	0.30	0.27	0.64	0.55	0.60	0.97	0.31	0.16	1.03	0.18
Control Delay	12.0	10.9	19.3	20.8	23.0	62.2	3.6	13.1	78.6	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.0	10.9	19.3	20.8	23.0	62.2	3.6	13.1	78.6	3.5
Queue Length 50th (ft)	26	24	84	92	42	170	0	11	~189	0
Queue Length 95th (ft)	39	41	98	111	58	#207	12	21	#225	13
Internal Link Dist (ft)		4148		899		2420			638	
Turn Bay Length (ft)	125		150		125			250		125
Base Capacity (vph)	411	590	540	582	287	456	659	287	448	699
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.27	0.64	0.55	0.60	0.97	0.31	0.16	1.03	0.18

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

10: NW Parker St & NW 38th Ave

2/26/2018

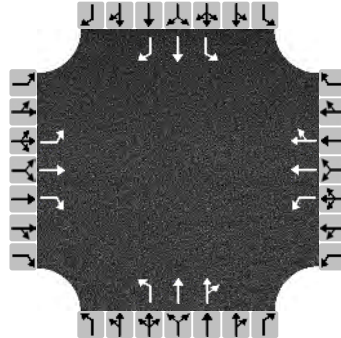
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	58	52	236	160	59	117	300	139	31	314	86
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.93		1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1730		1769	1799		1805	1827	1528	1805	1792	1538
Flt Permitted	0.41	1.00		0.64	1.00		0.25	1.00	1.00	0.25	1.00	1.00
Satd. Flow (perm)	774	1730		1200	1799		475	1827	1528	475	1792	1538
Peak-hour factor, PHF	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68
Adj. Flow (vph)	125	85	76	347	235	87	172	441	204	46	462	126
RTOR Reduction (vph)	0	50	0	0	21	0	0	0	134	0	0	83
Lane Group Flow (vph)	125	111	0	347	301	0	172	441	70	46	462	43
Confl. Peds. (#/hr)			1	1					1	1		
Heavy Vehicles (%)	0%	0%	3%	2%	0%	5%	0%	4%	4%	0%	6%	5%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	3	8		7	4		1	6	7	5	2	3
Permitted Phases	8			4			6		6	2		2
Actuated Green, G (s)	26.0	20.0		26.0	20.0		22.0	16.0	22.0	22.0	16.0	22.0
Effective Green, g (s)	26.0	20.0		26.0	20.0		22.0	16.0	22.0	22.0	16.0	22.0
Actuated g/C Ratio	0.41	0.31		0.41	0.31		0.34	0.25	0.34	0.34	0.25	0.34
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	0.2	1.5		0.2	1.5		0.2	1.5	0.2	0.2	1.5	0.2
Lane Grp Cap (vph)	411	540		540	562		287	456	620	287	448	624
v/s Ratio Prot	0.03	0.06		c0.06	0.17		c0.06	0.24	0.01	0.01	c0.26	0.01
v/s Ratio Perm	0.09			c0.20			0.15		0.04	0.04		0.02
v/c Ratio	0.30	0.21		0.64	0.54		0.60	0.97	0.11	0.16	1.03	0.07
Uniform Delay, d1	12.4	16.2		14.3	18.2		16.5	23.7	14.3	15.2	24.0	14.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.9	0.9		5.8	3.6		8.9	34.7	0.4	1.2	50.8	0.2
Delay (s)	14.3	17.0		20.1	21.8		25.4	58.4	14.7	16.4	74.8	14.3
Level of Service	B	B		C	C		C	E	B	B	E	B
Approach Delay (s)		15.8			20.9			40.6			58.5	
Approach LOS		B			C			D			E	
Intersection Summary												
HCM 2000 Control Delay			36.9			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			64.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			66.1%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCS7 All-Way Stop Control Report

General Information

Analyst	KMC	Intersection	Pacific Rim/Parker
Agency/Co.		Jurisdiction	
Date Performed	2/13/2018	East/West Street	NW Pacific Rim Blvd
Analysis Year	2018	North/South Street	NW Parker St
Analysis Time Period (hrs)	0.25	Peak Hour Factor	0.77
Time Analyzed	AM Peak TT Option 2		
Project Description	22300 Grass Valley		

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	205	21	22	37	62	11	76	342	26	9	257	321
% Thrus in Shared Lane						50			50			
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	L	T	R	L	T	TR	L	T	TR	L	T	R
Flow Rate, v (veh/h)	266	27	29	48	40	55	99	222	256	12	334	417
Percent Heavy Vehicles	2	0	22	5	6	12	1	6	12	11	3	3

Departure Headway and Service Time

Initial Departure Headway, hd (s)	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
Initial Degree of Utilization, x	0.237	0.024	0.025	0.043	0.036	0.048	0.088	0.197	0.227	0.010	0.297	0.371
Final Departure Headway, hd (s)	9.83	9.30	8.97	10.59	10.11	10.03	9.16	8.75	8.76	9.05	8.41	7.71
Final Degree of Utilization, x	0.727	0.070	0.071	0.141	0.113	0.152	0.251	0.540	0.622	0.029	0.780	0.893
Move-Up Time, m (s)	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Service Time, ts (s)	7.53	7.00	6.67	8.29	7.81	7.73	6.86	6.45	6.46	6.75	6.11	5.41

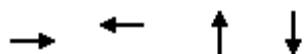
Capacity, Delay and Level of Service

Flow Rate, v (veh/h)	266	27	29	48	40	55	99	222	256	12	334	417
Capacity	366	387	401	340	356	359	393	412	411	398	428	467
95% Queue Length, Q ₉₅ (veh)	5.5	0.2	0.2	0.5	0.4	0.5	1.0	3.1	4.1	0.1	6.8	9.8
Control Delay (s/veh)	34.7	12.7	12.4	15.0	14.1	14.5	14.9	21.2	24.8	12.0	35.1	47.1
Level of Service, LOS	D	B	B	C	B	B	B	C	C	B	E	E
Approach Delay (s/veh)	30.9			14.6			21.7			41.3		
Approach LOS	D			B			C			E		
Intersection Delay, s/veh LOS	31.1						D					

Queues

12: NW Brady Rd & NW 16th Ave

2/26/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	173	535	316	425
v/c Ratio	0.29	0.78	0.48	0.63
Control Delay	10.4	22.5	15.0	17.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	10.4	22.5	15.0	17.8
Queue Length 50th (ft)	31	133	74	106
Queue Length 95th (ft)	54	187	109	149
Internal Link Dist (ft)	675	942	393	3387
Turn Bay Length (ft)				
Base Capacity (vph)	597	683	655	675
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.29	0.78	0.48	0.63
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

12: NW Brady Rd & NW 16th Ave

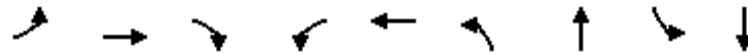
2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	52	55	26	154	91	167	49	154	40	63	185	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.97			0.95			0.98			0.97	
Flt Protected		0.98			0.98			0.99			0.99	
Satd. Flow (prot)		1672			1707			1749			1754	
Flt Permitted		0.76			0.82			0.87			0.89	
Satd. Flow (perm)		1296			1429			1545			1575	
Peak-hour factor, PHF	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Adj. Flow (vph)	68	71	34	200	118	217	64	200	52	82	240	103
RTOR Reduction (vph)	0	15	0	0	41	0	0	12	0	0	19	0
Lane Group Flow (vph)	0	158	0	0	494	0	0	304	0	0	406	0
Confl. Peds. (#/hr)			1	1								
Heavy Vehicles (%)	10%	10%	0%	3%	6%	2%	0%	4%	16%	7%	3%	3%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		27.0			27.0			25.0			25.0	
Effective Green, g (s)		27.0			27.0			25.0			25.0	
Actuated g/C Ratio		0.45			0.45			0.42			0.42	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		1.5			1.5			1.5			1.5	
Lane Grp Cap (vph)		583			643			643			656	
v/s Ratio Prot												
v/s Ratio Perm		0.12			0.35			0.20			0.26	
v/c Ratio		0.27			0.77			0.47			0.62	
Uniform Delay, d1		10.3			13.9			12.7			13.8	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.1			8.6			2.5			4.3	
Delay (s)		11.5			22.5			15.2			18.1	
Level of Service		B			C			B			B	
Approach Delay (s)		11.5			22.5			15.2			18.1	
Approach LOS		B			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			18.3			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			60.0			Sum of lost time (s)			8.0			
Intersection Capacity Utilization			60.5%			ICU Level of Service				B		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

1: SE 192nd Ave & Mill Plain Blvd

2/26/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	347	28	548	49	63	503	1106	38	1130
v/c Ratio	1.51	0.13	0.81	0.27	0.45	0.57	0.54	0.32	0.88
Control Delay	282.8	40.8	30.4	45.8	35.5	37.4	5.6	51.0	39.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	282.8	40.8	30.4	45.8	35.5	37.4	5.6	51.0	39.1
Queue Length 50th (ft)	~309	16	211	31	19	120	124	24	332
Queue Length 95th (ft)	#484	42	322	66	59	m148	68	55	#536
Internal Link Dist (ft)		517			357		2419		550
Turn Bay Length (ft)	225		125	400		200		150	
Base Capacity (vph)	230	513	673	214	411	877	2059	175	1282
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.51	0.05	0.81	0.23	0.15	0.57	0.54	0.22	0.88

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

1: SE 192nd Ave & Mill Plain Blvd

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	330	27	521	47	29	30	478	990	61	36	842	232
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.92		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1900	1605	1703	1612		3467	3462		1752	3422	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1900	1605	1703	1612		3467	3462		1752	3422	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	347	28	548	49	31	32	503	1042	64	38	886	244
RTOR Reduction (vph)	0	0	103	0	30	0	0	3	0	0	23	0
Lane Group Flow (vph)	347	28	445	49	33	0	503	1103	0	38	1107	0
Confl. Peds. (#/hr)	17		9	9		17	1		1	1		1
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	2%	0%	0%	6%	7%	7%	1%	3%	7%	3%	2%	1%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2									
Actuated Green, G (s)	13.0	10.2	35.5	9.7	6.9		25.3	55.4		4.7	34.8	
Effective Green, g (s)	13.0	10.2	35.5	9.7	6.9		25.3	55.4		4.7	34.8	
Actuated g/C Ratio	0.13	0.10	0.36	0.10	0.07		0.25	0.55		0.05	0.35	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	230	193	650	165	111		877	1917		82	1190	
v/s Ratio Prot	c0.20	0.01	c0.17	0.03	0.02		0.15	0.32		0.02	c0.32	
v/s Ratio Perm			0.10									
v/c Ratio	1.51	0.15	0.69	0.30	0.30		0.57	0.58		0.46	0.93	
Uniform Delay, d1	43.5	40.9	27.5	42.0	44.3		32.6	14.6		46.4	31.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.08	0.35		1.00	1.00	
Incremental Delay, d2	250.2	0.1	2.4	0.4	0.6		0.3	0.7		1.5	13.9	
Delay (s)	293.7	41.1	29.9	42.3	44.8		35.6	5.8		47.9	45.3	
Level of Service	F	D	C	D	D		D	A		D	D	
Approach Delay (s)		129.4			43.7			15.1			45.4	
Approach LOS		F			D			B			D	
Intersection Summary												
HCM 2000 Control Delay			52.9				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.98									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			81.8%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

2: SE 192nd Ave & SE 15th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	140	227	60	35	65	198	1806	75	1711
v/c Ratio	0.77	0.72	0.50	0.26	0.23	0.56	0.85	0.53	1.06
Control Delay	70.5	22.9	58.0	46.5	7.3	35.6	21.5	58.9	58.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	70.5	22.9	58.0	46.5	7.3	35.6	21.5	58.9	58.4
Queue Length 50th (ft)	89	21	38	22	0	120	396	47	~635
Queue Length 95th (ft)	#175	79	73	46	21	m105	m325	m60	#824
Internal Link Dist (ft)		621		676			1122		2419
Turn Bay Length (ft)	100		100		100	150		475	
Base Capacity (vph)	192	534	168	447	327	351	2114	199	1620
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.43	0.36	0.08	0.20	0.56	0.85	0.38	1.06

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

2: SE 192nd Ave & SE 15th St

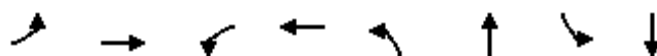
2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	119	30	163	51	30	55	168	1456	79	64	1328	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.87		1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1736	1619		1687	1863	1604	1787	3509		1805	3485	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1736	1619		1687	1863	1604	1787	3509		1805	3485	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	140	35	192	60	35	65	198	1713	93	75	1562	149
RTOR Reduction (vph)	0	173	0	0	0	57	0	3	0	0	6	0
Lane Group Flow (vph)	140	54	0	60	35	8	198	1803	0	75	1705	0
Confl. Peds. (#/hr)	3		1	1		3	2		6	6		2
Confl. Bikes (#/hr)			1									1
Heavy Vehicles (%)	4%	2%	1%	7%	2%	0%	1%	2%	0%	0%	2%	2%
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6	3	7	4		3	8	
Permitted Phases						6						
Actuated Green, G (s)	10.6	9.8		6.2	5.4	12.2	19.7	57.2		6.8	44.3	
Effective Green, g (s)	10.6	9.8		6.2	5.4	12.2	19.7	57.2		6.8	44.3	
Actuated g/C Ratio	0.11	0.10		0.06	0.05	0.12	0.20	0.57		0.07	0.44	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lane Grp Cap (vph)	184	158		104	100	275	352	2007		122	1543	
v/s Ratio Prot	c0.08	c0.03		0.04	0.02	0.00	c0.11	c0.51		0.04	c0.49	
v/s Ratio Perm						0.00						
v/c Ratio	0.76	0.34		0.58	0.35	0.03	0.56	0.90		0.61	1.10	
Uniform Delay, d1	43.5	42.1		45.6	45.6	38.7	36.3	18.8		45.3	27.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.93	1.05		1.12	0.74	
Incremental Delay, d2	15.3	0.5		4.7	0.8	0.0	0.1	0.7		4.5	54.7	
Delay (s)	58.7	42.6		50.4	46.4	38.7	34.0	20.4		55.3	75.2	
Level of Service	E	D		D	D	D	C	C		E	E	
Approach Delay (s)		48.7			44.8			21.8			74.4	
Approach LOS		D			D			C			E	
Intersection Summary												
HCM 2000 Control Delay			46.7				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.92									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			82.9%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

3: SE 192nd Ave & SE 20th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	150	305	307	743	121	1316	349	1213
v/c Ratio	0.56	0.59	1.90	1.33	0.76	1.26	1.50	1.02
Control Delay	52.1	33.6	452.7	190.4	86.1	149.7	269.1	60.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.1	33.6	452.7	190.4	86.1	149.7	269.1	60.0
Queue Length 50th (ft)	48	152	~301	~576	84	~561	~322	~428
Queue Length 95th (ft)	78	241	#468	#833	m#125	#671	m#327	m#373
Internal Link Dist (ft)		1188		973		3702		1122
Turn Bay Length (ft)	100		100		325		400	
Base Capacity (vph)	589	514	162	557	180	1041	232	1187
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.59	1.90	1.33	0.67	1.26	1.50	1.02

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

3: SE 192nd Ave & SE 20th St

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	144	187	106	295	223	491	116	1086	178	335	1010	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	0.97	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.90		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3467	1767		1805	1668		1805	3427		1787	3444	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3467	1767		1805	1668		1805	3427		1787	3444	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	150	195	110	307	232	511	121	1131	185	349	1052	161
RTOR Reduction (vph)	0	20	0	0	70	0	0	13	0	0	12	0
Lane Group Flow (vph)	150	285	0	307	673	0	121	1303	0	349	1201	0
Confl. Peds. (#/hr)	1		3	3		1	5		1	1		5
Confl. Bikes (#/hr)			1			4			5			3
Heavy Vehicles (%)	1%	0%	3%	0%	1%	1%	0%	3%	1%	1%	2%	4%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	7.8	28.0		9.0	29.2		8.9	30.0		13.0	34.1	
Effective Green, g (s)	7.8	28.0		9.0	29.2		8.9	30.0		13.0	34.1	
Actuated g/C Ratio	0.08	0.28		0.09	0.29		0.09	0.30		0.13	0.34	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lane Grp Cap (vph)	270	494		162	487		160	1028		232	1174	
v/s Ratio Prot	0.04	0.16		c0.17	c0.40		0.07	c0.38		c0.20	c0.35	
v/s Ratio Perm												
v/c Ratio	0.56	0.58		1.90	1.38		0.76	1.27		1.50	1.02	
Uniform Delay, d1	44.4	30.9		45.5	35.4		44.5	35.0		43.5	33.0	
Progression Factor	1.00	1.00		1.00	1.00		1.43	0.68		1.15	1.23	
Incremental Delay, d2	1.4	1.0		425.1	184.3		13.1	126.4		233.5	20.5	
Delay (s)	45.8	31.9		470.6	219.7		76.7	150.4		283.6	61.2	
Level of Service	D	C		F	F		E	F		F	E	
Approach Delay (s)		36.5			293.0			144.2			110.9	
Approach LOS		D			F			F			F	
Intersection Summary												
HCM 2000 Control Delay			156.5			HCM 2000 Level of Service				F		
HCM 2000 Volume to Capacity ratio			1.43									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			117.1%			ICU Level of Service			H			
Analysis Period (min)			15									

c Critical Lane Group

Queues

4: SE 192nd Ave & SE 34th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	163	285	427	373	114	1077	211	278	1298
v/c Ratio	0.66	0.71	1.33	0.57	0.49	0.69	0.27	0.68	0.77
Control Delay	41.9	43.6	195.8	26.0	51.5	26.5	3.9	34.8	33.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.9	43.6	195.8	26.0	51.5	26.5	3.9	34.8	33.1
Queue Length 50th (ft)	81	73	~303	67	37	283	0	95	361
Queue Length 95th (ft)	129	112	#470	110	63	410	46	m90	m331
Internal Link Dist (ft)		670		7104		563			3702
Turn Bay Length (ft)	150		150		300		300	175	
Base Capacity (vph)	256	961	322	1164	282	1551	795	419	1695
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.64	0.30	1.33	0.32	0.40	0.69	0.27	0.66	0.77

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

4: SE 192nd Ave & SE 34th St

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	147	181	76	384	197	139	103	969	190	250	999	169
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.96		1.00	0.94		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1752	3389		1769	3312		3433	3505	1532	3502	3440	
Flt Permitted	0.53	1.00		0.26	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	977	3389		493	3312		3433	3505	1532	3502	3440	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	163	201	84	427	219	154	114	1077	211	278	1110	188
RTOR Reduction (vph)	0	57	0	0	130	0	0	0	118	0	10	0
Lane Group Flow (vph)	163	228	0	427	243	0	114	1077	93	278	1288	0
Confl. Peds. (#/hr)	1		1	1		1	2		1	1		2
Confl. Bikes (#/hr)						2			1			2
Heavy Vehicles (%)	3%	2%	0%	2%	2%	1%	2%	3%	3%	0%	2%	5%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6					4			
Actuated Green, G (s)	18.5	10.1		29.1	15.7		6.9	44.3	44.3	11.6	49.0	
Effective Green, g (s)	18.5	10.1		29.1	15.7		6.9	44.3	44.3	11.6	49.0	
Actuated g/C Ratio	0.18	0.10		0.29	0.16		0.07	0.44	0.44	0.12	0.49	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lane Grp Cap (vph)	245	342		322	519		236	1552	678	406	1685	
v/s Ratio Prot	0.06	0.07		c0.19	0.07		0.03	0.31		c0.08	c0.37	
v/s Ratio Perm	0.07			c0.20					0.06			
v/c Ratio	0.67	0.67		1.33	0.47		0.48	0.69	0.14	0.68	0.76	
Uniform Delay, d1	36.6	43.3		32.2	38.4		44.8	22.4	16.5	42.4	20.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	0.81	1.51	
Incremental Delay, d2	5.2	3.8		166.7	0.2		0.6	2.6	0.4	0.3	0.3	
Delay (s)	41.8	47.1		198.9	38.6		45.4	25.0	16.9	34.6	31.8	
Level of Service	D	D		F	D		D	C	B	C	C	
Approach Delay (s)		45.2			124.2			25.4			32.3	
Approach LOS		D			F			C			C	
Intersection Summary												
HCM 2000 Control Delay			48.8			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			1.00									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			83.2%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

5: Site Driveway & SE 20th Street

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	487	79	9	866	2	40	0	5	2	0	27
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	12	601	98	11	1069	2	49	0	6	2	0	33
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	TWLTL				TWLTL							
Median storage veh	2				2							
Upstream signal (ft)	1053				1170							
pX, platoon unblocked	0.76			0.99			0.77	0.77	0.99	0.77	0.77	0.76
vC, conflicting volume	1072			699			1799	1769	650	1725	1816	1070
vC1, stage 1 conf vol							675	675		1093	1093	
vC2, stage 2 conf vol							1125	1094		632	723	
vCu, unblocked vol	938			693			1870	1829	644	1772	1891	937
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			99			70	100	99	99	100	87
cM capacity (veh/h)	563			905			162	211	473	204	214	247
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	12	699	11	1072	56	36						
Volume Left	12	0	11	0	49	2						
Volume Right	0	98	0	2	6	33						
cSH	563	1700	905	1700	175	243						
Volume to Capacity	0.02	0.41	0.01	0.63	0.32	0.15						
Queue Length 95th (ft)	2	0	1	0	32	13						
Control Delay (s)	11.5	0.0	9.0	0.0	34.9	22.3						
Lane LOS	B		A		D	C						
Approach Delay (s)	0.2		0.1		34.9	22.3						
Approach LOS					D	C						
Intersection Summary												
Average Delay			1.6									
Intersection Capacity Utilization			Err%		ICU Level of Service		H					
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

6: Site Driveway 2 & SE 20th Street

2/26/2018

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	441	53	10	673	204	33
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	544	65	12	831	252	41
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLT			TWLT		
Median storage veh	2			2		
Upstream signal (ft)				530		
pX, platoon unblocked					0.66	
vC, conflicting volume			610		1433	577
vC1, stage 1 conf vol					577	
vC2, stage 2 conf vol					856	
vCu, unblocked vol			610		1398	577
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			99		23	92
cM capacity (veh/h)			979		327	520
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	610	12	831	293		
Volume Left	0	12	0	252		
Volume Right	65	0	0	41		
cSH	1700	979	1700	345		
Volume to Capacity	0.36	0.01	0.49	0.85		
Queue Length 95th (ft)	0	1	0	193		
Control Delay (s)	0.0	8.7	0.0	53.2		
Lane LOS		A		F		
Approach Delay (s)	0.0	0.1		53.2		
Approach LOS				F		
Intersection Summary						
Average Delay			9.0			
Intersection Capacity Utilization			55.4%	ICU Level of Service	B	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

7: NW Fisher Creek Drive & Site Driveway 3

2/26/2018

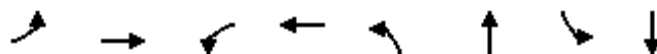


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	103	1	4	334	19	41
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	137	1	5	445	25	55
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)					380	
pX, platoon unblocked						
vC, conflicting volume	286	53	80			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	286	53	80			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	80	100	100			
cM capacity (veh/h)	684	1010	1531			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	139	154	297	80		
Volume Left	137	5	0	0		
Volume Right	1	0	0	55		
cSH	686	1531	1700	1700		
Volume to Capacity	0.20	0.00	0.17	0.05		
Queue Length 95th (ft)	19	0	0	0		
Control Delay (s)	11.6	0.3	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s)	11.6	0.1		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			2.5			
Intersection Capacity Utilization			24.5%	ICU Level of Service		A
Analysis Period (min)			15			

Queues

9: NW Fisher Creek Drive & SE 20th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	43	542	38	380	437	102	9	33
v/c Ratio	0.14	0.80	0.22	0.56	0.74	0.14	0.02	0.04
Control Delay	15.3	28.8	18.5	19.2	19.4	2.5	6.7	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.3	28.8	18.5	19.2	19.4	2.5	6.7	0.1
Queue Length 50th (ft)	8	125	7	79	93	1	1	0
Queue Length 95th (ft)	30	#325	31	180	140	14	6	0
Internal Link Dist (ft)		450		4148		300		206
Turn Bay Length (ft)	100		100				100	
Base Capacity (vph)	304	681	171	677	985	1134	925	1195
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.80	0.22	0.56	0.44	0.09	0.01	0.03

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

9: NW Fisher Creek Drive & SE 20th St

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	35	410	29	31	302	6	354	0	83	7	0	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00		1.00	0.85		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1860		1802	1857		1805	1568		1805	1615	
Flt Permitted	0.44	1.00		0.25	1.00		0.74	1.00		0.69	1.00	
Satd. Flow (perm)	838	1860		473	1857		1398	1568		1313	1615	
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	43	506	36	38	373	7	437	0	102	9	0	33
RTOR Reduction (vph)	0	4	0	0	1	0	0	57	0	0	19	0
Lane Group Flow (vph)	43	538	0	38	379	0	437	45	0	9	14	0
Confl. Peds. (#/hr)			3	3								
Confl. Bikes (#/hr)			3			5						
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	0%	0%	3%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	17.5	17.5		17.5	17.5		20.3	20.3		20.3	20.3	
Effective Green, g (s)	17.5	17.5		17.5	17.5		20.3	20.3		20.3	20.3	
Actuated g/C Ratio	0.37	0.37		0.37	0.37		0.42	0.42		0.42	0.42	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	306	680		173	679		593	665		557	685	
v/s Ratio Prot		c0.29			0.20			0.03			0.01	
v/s Ratio Perm	0.05			0.08			c0.31			0.01		
v/c Ratio	0.14	0.79		0.22	0.56		0.74	0.07		0.02	0.02	
Uniform Delay, d1	10.1	13.5		10.4	12.1		11.5	8.1		8.0	8.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	6.3		0.6	1.0		4.8	0.0		0.0	0.0	
Delay (s)	10.3	19.8		11.1	13.1		16.3	8.2		8.0	8.0	
Level of Service	B	B		B	B		B	A		A	A	
Approach Delay (s)		19.1			12.9			14.7			8.0	
Approach LOS		B			B			B			A	
Intersection Summary												
HCM 2000 Control Delay			15.7			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			47.8			Sum of lost time (s)			10.0			
Intersection Capacity Utilization			63.7%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

10: NW Parker St & NW 38th Ave

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	121	469	114	229	98	280	216	67	272	90
v/c Ratio	0.25	0.79	0.40	0.39	0.26	0.60	0.32	0.19	0.59	0.13
Control Delay	11.3	30.4	14.4	18.2	14.1	27.3	3.5	13.2	27.2	3.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.3	30.4	14.4	18.2	14.1	27.3	3.5	13.2	27.2	3.7
Queue Length 50th (ft)	25	149	24	63	23	96	0	15	93	0
Queue Length 95th (ft)	50	#275	48	112	47	159	31	35	155	21
Internal Link Dist (ft)		4148		899		2420			638	
Turn Bay Length (ft)	125		150		125			250		125
Base Capacity (vph)	490	590	282	582	370	470	685	362	461	697
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.79	0.40	0.39	0.26	0.60	0.32	0.19	0.59	0.13

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

10: NW Parker St & NW 38th Ave

2/26/2018

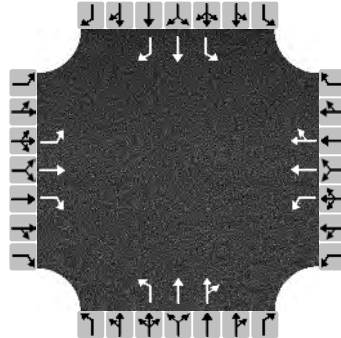
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	105	261	147	99	161	38	85	244	188	58	237	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.95		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1804	1788		1735	1822		1805	1881	1580	1801	1845	1583
Flt Permitted	0.54	1.00		0.21	1.00		0.42	1.00	1.00	0.41	1.00	1.00
Satd. Flow (perm)	1028	1788		383	1822		805	1881	1580	777	1845	1583
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	121	300	169	114	185	44	98	280	216	67	272	90
RTOR Reduction (vph)	0	32	0	0	13	0	0	0	142	0	0	59
Lane Group Flow (vph)	121	437	0	114	216	0	98	280	74	67	272	31
Confl. Peds. (#/hr)	1		2	2		1			5	5		
Confl. Bikes (#/hr)			1			1						
Heavy Vehicles (%)	0%	0%	0%	4%	1%	0%	0%	1%	0%	0%	3%	2%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	3	8		7	4		1	6	7	5	2	3
Permitted Phases	8			4			6		6	2		2
Actuated Green, G (s)	26.0	20.0		26.0	20.0		22.0	16.0	22.0	22.0	16.0	22.0
Effective Green, g (s)	26.0	20.0		26.0	20.0		22.0	16.0	22.0	22.0	16.0	22.0
Actuated g/C Ratio	0.41	0.31		0.41	0.31		0.34	0.25	0.34	0.34	0.25	0.34
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	0.2	1.5		0.2	1.5		0.2	1.5	0.2	0.2	1.5	0.2
Lane Grp Cap (vph)	490	558		282	569		370	470	641	363	461	643
v/s Ratio Prot	0.02	c0.24		c0.04	0.12		c0.02	c0.15	0.01	0.02	0.15	0.00
v/s Ratio Perm	0.08			0.13			0.07		0.04	0.05		0.02
v/c Ratio	0.25	0.78		0.40	0.38		0.26	0.60	0.12	0.18	0.59	0.05
Uniform Delay, d1	12.1	20.0		13.3	17.2		14.7	21.1	14.4	14.5	21.1	14.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	10.6		4.3	1.9		1.7	5.5	0.4	1.1	5.5	0.1
Delay (s)	13.3	30.6		17.5	19.1		16.5	26.6	14.7	15.6	26.6	14.2
Level of Service	B	C		B	B		B	C	B	B	C	B
Approach Delay (s)		27.0			18.6			20.6			22.3	
Approach LOS		C			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			22.6			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.61									
Actuated Cycle Length (s)			64.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			58.8%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCS7 All-Way Stop Control Report

General Information

Analyst	KMC	Intersection	Pacific Rim/Parker
Agency/Co.		Jurisdiction	
Date Performed	2/13/2018	East/West Street	NW Pacific Rim Blvd
Analysis Year	2018	North/South Street	NW Parker St
Analysis Time Period (hrs)	0.25	Peak Hour Factor	0.82
Time Analyzed	PM Peak TT Option 2		
Project Description	22300 Grass Valley		

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	204	52	100	10	24	16	46	289	36	21	296	153
% Thrus in Shared Lane						50			50			
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	L	T	R	L	T	TR	L	T	TR	L	T	R
Flow Rate, v (veh/h)	249	63	122	12	15	34	56	176	220	26	361	187
Percent Heavy Vehicles	1	2	1	0	0	0	0	1	0	5	3	0

Departure Headway and Service Time

Initial Departure Headway, hd (s)	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
Initial Degree of Utilization, x	0.221	0.056	0.108	0.011	0.013	0.030	0.050	0.157	0.196	0.023	0.321	0.166
Final Departure Headway, hd (s)	8.44	7.96	7.24	9.54	9.04	8.64	8.32	7.84	7.68	8.17	7.63	6.88
Final Degree of Utilization, x	0.583	0.140	0.245	0.032	0.037	0.082	0.130	0.384	0.470	0.058	0.765	0.357
Move-Up Time, m (s)	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Service Time, ts (s)	6.14	5.66	4.94	7.24	6.74	6.34	6.02	5.54	5.38	5.87	5.33	4.58

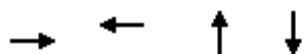
Capacity, Delay and Level of Service

Flow Rate, v (veh/h)	249	63	122	12	15	34	56	176	220	26	361	187
Capacity	427	452	497	378	398	417	433	459	469	441	472	523
95% Queue Length, Q ₉₅ (veh)	3.6	0.5	1.0	0.1	0.1	0.3	0.4	1.8	2.5	0.2	6.6	1.6
Control Delay (s/veh)	22.3	11.9	12.3	12.6	12.1	12.1	12.3	15.3	17.0	11.4	31.1	13.3
Level of Service, LOS	C	B	B	B	B	B	B	C	C	B	D	B
Approach Delay (s/veh)	18.0			12.2			15.8			24.5		
Approach LOS	C			B			C			C		
Intersection Delay, s/veh LOS	19.5						C					

Queues

12: NW Brady Rd & NW 16th Ave

2/26/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	184	312	427	431
v/c Ratio	0.33	0.57	0.45	0.60
Control Delay	14.8	17.5	8.4	13.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	14.8	17.5	8.4	13.7
Queue Length 50th (ft)	41	68	64	94
Queue Length 95th (ft)	82	132	114	165
Internal Link Dist (ft)	675	942	393	3387
Turn Bay Length (ft)				
Base Capacity (vph)	562	543	959	721
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.33	0.57	0.45	0.60
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

12: NW Brady Rd & NW 16th Ave

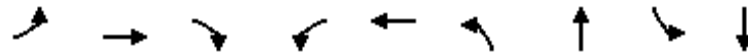
2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	29	96	36	90	61	121	19	200	152	144	202	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			1.00			0.99			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.97			0.94			0.94			0.99	
Flt Protected		0.99			0.98			1.00			0.98	
Satd. Flow (prot)		1775			1708			1765			1814	
Flt Permitted		0.91			0.86			0.97			0.73	
Satd. Flow (perm)		1635			1487			1721			1342	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	33	110	41	103	70	139	22	230	175	166	232	33
RTOR Reduction (vph)	0	17	0	0	48	0	0	42	0	0	5	0
Lane Group Flow (vph)	0	167	0	0	264	0	0	385	0	0	426	0
Confl. Peds. (#/hr)			4	4			1		1	1		1
Confl. Bikes (#/hr)			5									2
Heavy Vehicles (%)	0%	1%	7%	4%	6%	0%	0%	1%	0%	1%	2%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		20.0			20.0			32.0			32.0	
Effective Green, g (s)		20.0			20.0			32.0			32.0	
Actuated g/C Ratio		0.33			0.33			0.53			0.53	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		1.5			1.5			1.5			1.5	
Lane Grp Cap (vph)		545			495			917			715	
v/s Ratio Prot												
v/s Ratio Perm		0.10			c0.18			0.22			c0.32	
v/c Ratio		0.31			0.53			0.42			0.60	
Uniform Delay, d1		14.8			16.2			8.4			9.6	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.4			4.1			1.4			3.6	
Delay (s)		16.3			20.3			9.8			13.2	
Level of Service		B			C			A			B	
Approach Delay (s)		16.3			20.3			9.8			13.2	
Approach LOS		B			C			A			B	
Intersection Summary												
HCM 2000 Control Delay		14.2			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.57										
Actuated Cycle Length (s)		60.0			Sum of lost time (s)			8.0				
Intersection Capacity Utilization		78.5%			ICU Level of Service			D				
Analysis Period (min)		15										
c Critical Lane Group												

Queues

1: SE 192nd Ave & Mill Plain Blvd

2/26/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	163	145	337	212	272	514	940	105	980
v/c Ratio	0.77	0.46	0.52	0.98	0.79	0.69	0.75	0.62	1.06
Control Delay	67.0	39.7	18.0	100.6	48.1	55.6	20.9	59.0	81.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.0	39.7	18.0	100.6	48.1	55.6	20.9	59.0	81.1
Queue Length 50th (ft)	101	82	110	137	141	158	157	65	~356
Queue Length 95th (ft)	135	102	132	#202	157	#221	99	94	#328
Internal Link Dist (ft)		517			357		2419		550
Turn Bay Length (ft)	225		125	400		200		150	
Base Capacity (vph)	232	492	649	217	485	743	1256	186	925
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.29	0.52	0.98	0.56	0.69	0.75	0.56	1.06

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

1: SE 192nd Ave & Mill Plain Blvd

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	119	106	246	155	106	93	375	457	229	77	526	189
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.93		1.00	0.95		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1759	1528	1671	1622		3433	3062		1719	3236	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1787	1759	1528	1671	1622		3433	3062		1719	3236	
Peak-hour factor, PHF	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73
Adj. Flow (vph)	163	145	337	212	145	127	514	626	314	105	721	259
RTOR Reduction (vph)	0	0	46	0	36	0	0	53	0	0	36	0
Lane Group Flow (vph)	163	145	291	212	236	0	514	887	0	105	944	0
Confl. Peds. (#/hr)	1		3	3		1			3	3		
Heavy Vehicles (%)	1%	8%	5%	8%	5%	12%	2%	13%	7%	5%	9%	2%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2	7	1	6		7	4		3	8	
Permitted Phases			2									
Actuated Green, G (s)	11.8	17.8	39.5	13.0	19.0		21.7	39.3		9.9	27.5	
Effective Green, g (s)	11.8	17.8	39.5	13.0	19.0		21.7	39.3		9.9	27.5	
Actuated g/C Ratio	0.12	0.18	0.40	0.13	0.19		0.22	0.39		0.10	0.28	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	210	313	679	217	308		744	1203		170	889	
v/s Ratio Prot	0.09	0.08	0.09	c0.13	c0.15		c0.15	c0.29		0.06	c0.29	
v/s Ratio Perm			0.10									
v/c Ratio	0.78	0.46	0.43	0.98	0.77		0.69	0.74		0.62	1.06	
Uniform Delay, d1	42.8	36.8	22.0	43.4	38.4		36.1	25.9		43.2	36.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.39	0.64		1.00	1.00	
Incremental Delay, d2	15.0	0.4	0.2	53.8	9.9		1.7	3.0		4.6	47.9	
Delay (s)	57.8	37.2	22.2	97.1	48.3		51.8	19.6		47.9	84.2	
Level of Service	E	D	C	F	D		D	B		D	F	
Approach Delay (s)		34.6			69.7			31.0			80.6	
Approach LOS		C			E			C			F	
Intersection Summary												
HCM 2000 Control Delay			51.4			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.90									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			66.2%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

2: SE 192nd Ave & SE 15th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	206	132	23	84	146	89	1023	178	1048
v/c Ratio	0.95	0.36	0.26	0.56	0.32	0.59	0.71	0.57	0.58
Control Delay	93.9	25.4	51.8	58.0	14.2	47.5	27.2	56.8	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	93.9	25.4	51.8	58.0	14.2	47.5	27.2	56.8	11.1
Queue Length 50th (ft)	132	42	14	53	33	58	208	120	94
Queue Length 95th (ft)	#230	88	36	87	61	m71	247	m116	m231
Internal Link Dist (ft)		621		676			1122		2419
Turn Bay Length (ft)	100		100		100	150		475	
Base Capacity (vph)	219	506	178	475	461	183	1433	311	1795
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.94	0.26	0.13	0.18	0.32	0.49	0.71	0.57	0.58

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

2: SE 192nd Ave & SE 15th St

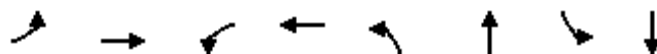
2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	167	55	52	19	68	118	72	824	5	144	769	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1687	1689		1626	1827	1607	1736	3337		1736	3300	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1687	1689		1626	1827	1607	1736	3337		1736	3300	
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	206	68	64	23	84	146	89	1017	6	178	949	99
RTOR Reduction (vph)	0	38	0	0	0	55	0	1	0	0	5	0
Lane Group Flow (vph)	206	94	0	23	84	91	89	1022	0	178	1043	0
Confl. Peds. (#/hr)	1		2	2		1	1		4	4		1
Confl. Bikes (#/hr)			1			2						
Heavy Vehicles (%)	7%	4%	3%	11%	4%	0%	4%	8%	20%	4%	8%	4%
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6	3	7	4		3	8	
Permitted Phases						6						
Actuated Green, G (s)	12.9	19.5		2.6	9.2	27.1	7.6	40.0		17.9	50.3	
Effective Green, g (s)	12.9	19.5		2.6	9.2	27.1	7.6	40.0		17.9	50.3	
Actuated g/C Ratio	0.13	0.20		0.03	0.09	0.27	0.08	0.40		0.18	0.50	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lane Grp Cap (vph)	217	329		42	168	515	131	1334		310	1659	
v/s Ratio Prot	c0.12	0.06		0.01	c0.05	0.03	0.05	c0.31		c0.10	c0.32	
v/s Ratio Perm						0.02						
v/c Ratio	0.95	0.29		0.55	0.50	0.18	0.68	0.77		0.57	0.63	
Uniform Delay, d1	43.2	34.3		48.1	43.2	27.9	45.0	26.0		37.6	18.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.87	1.01		1.41	0.58	
Incremental Delay, d2	46.0	0.2		7.6	0.9	0.1	6.2	2.5		0.7	0.8	
Delay (s)	89.2	34.5		55.7	44.1	28.0	45.5	28.7		53.5	11.3	
Level of Service	F	C		E	D	C	D	C		D	B	
Approach Delay (s)		67.8			35.8			30.0			17.4	
Approach LOS		E			D			C			B	
Intersection Summary												
HCM 2000 Control Delay			29.6									
HCM 2000 Volume to Capacity ratio			0.73									
Actuated Cycle Length (s)			100.0									
Intersection Capacity Utilization			59.6%									
Analysis Period (min)			15									
c Critical Lane Group												

Queues

3: SE 192nd Ave & SE 20th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	149	267	165	273	65	1181	189	918
v/c Ratio	0.77	0.91	0.76	0.84	0.53	0.81	0.86	0.55
Control Delay	72.1	72.9	67.8	56.0	68.7	28.6	80.1	13.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	72.1	72.9	67.8	56.0	68.7	28.6	80.1	13.9
Queue Length 50th (ft)	48	157	54	139	36	368	130	91
Queue Length 95th (ft)	#78	#232	#78	193	m73	383	#187	168
Internal Link Dist (ft)		1188		973		3702		1122
Turn Bay Length (ft)	100		100		325		400	
Base Capacity (vph)	198	313	226	345	157	1454	240	1668
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.75	0.85	0.73	0.79	0.41	0.81	0.79	0.55

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

3: SE 192nd Ave & SE 20th St

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	118	152	59	130	103	113	51	679	254	149	636	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	0.97	1.00		0.97	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.92		1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3303	1763		3242	1702		1752	3183		1719	3171	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3303	1763		3242	1702		1752	3183		1719	3171	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	149	192	75	165	130	143	65	859	322	189	805	113
RTOR Reduction (vph)	0	14	0	0	40	0	0	37	0	0	10	0
Lane Group Flow (vph)	149	253	0	165	233	0	65	1144	0	189	908	0
Confl. Peds. (#/hr)			2	2			2		2	2		2
Confl. Bikes (#/hr)			2			2			2			1
Heavy Vehicles (%)	6%	3%	2%	8%	1%	3%	3%	8%	8%	5%	12%	7%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	5.9	15.9		6.8	16.8		6.1	44.5		12.8	51.2	
Effective Green, g (s)	5.9	15.9		6.8	16.8		6.1	44.5		12.8	51.2	
Actuated g/C Ratio	0.06	0.16		0.07	0.17		0.06	0.44		0.13	0.51	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lane Grp Cap (vph)	194	280		220	285		106	1416		220	1623	
v/s Ratio Prot	0.05	c0.14		c0.05	0.14		0.04	c0.36		c0.11	0.29	
v/s Ratio Perm												
v/c Ratio	0.77	0.90		0.75	0.82		0.61	0.81		0.86	0.56	
Uniform Delay, d1	46.4	41.3		45.8	40.1		45.8	24.0		42.7	16.7	
Progression Factor	1.00	1.00		1.00	1.00		1.22	0.99		1.17	0.75	
Incremental Delay, d2	15.0	29.3		12.0	15.7		6.8	4.8		23.1	1.2	
Delay (s)	61.4	70.6		57.7	55.8		62.5	28.6		73.3	13.7	
Level of Service	E	E		E	E		E	C		E	B	
Approach Delay (s)		67.3			56.5			30.4			23.8	
Approach LOS		E			E			C			C	
Intersection Summary												
HCM 2000 Control Delay			36.5			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			68.4%			ICU Level of Service			C			
Analysis Period (min)			15									

c Critical Lane Group

Queues

4: SE 192nd Ave & SE 34th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	159	155	213	259	89	779	220	136	693
v/c Ratio	0.72	0.50	0.77	0.68	0.41	0.44	0.24	0.53	0.38
Control Delay	50.8	38.6	53.3	35.9	50.6	15.5	2.7	40.0	18.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.8	38.6	53.3	35.9	50.6	15.5	2.7	40.0	18.8
Queue Length 50th (ft)	86	38	118	52	28	148	0	44	151
Queue Length 95th (ft)	139	68	181	90	53	226	38	m64	m207
Internal Link Dist (ft)		670		7104		563			3702
Turn Bay Length (ft)	150		150		300		300	175	
Base Capacity (vph)	235	1031	280	1073	350	1783	910	346	1848
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.15	0.76	0.24	0.25	0.44	0.24	0.39	0.38

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

4: SE 192nd Ave & SE 34th St

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	145	109	32	194	146	90	81	709	200	124	517	114
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.97		1.00	0.94		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1655	3249		1767	3241		3502	3282	1490	3467	3192	
Flt Permitted	0.47	1.00		0.62	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	811	3249		1149	3241		3502	3282	1490	3467	3192	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	159	120	35	213	160	99	89	779	220	136	568	125
RTOR Reduction (vph)	0	32	0	0	90	0	0	0	101	0	11	0
Lane Group Flow (vph)	159	123	0	213	169	0	89	779	119	136	682	0
Confl. Peds. (#/hr)	1		3	3		1	3		6	6		3
Heavy Vehicles (%)	9%	7%	7%	2%	6%	2%	0%	10%	5%	1%	9%	13%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6					4			
Actuated Green, G (s)	17.8	8.6		18.8	9.1		5.2	54.3	54.3	7.4	56.5	
Effective Green, g (s)	17.8	8.6		18.8	9.1		5.2	54.3	54.3	7.4	56.5	
Actuated g/C Ratio	0.18	0.09		0.19	0.09		0.05	0.54	0.54	0.07	0.56	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lane Grp Cap (vph)	222	279		275	294		182	1782	809	256	1803	
v/s Ratio Prot	0.07	0.04		c0.07	0.05		0.03	c0.24		c0.04	0.21	
v/s Ratio Perm	0.06			c0.07					0.08			
v/c Ratio	0.72	0.44		0.77	0.57		0.49	0.44	0.15	0.53	0.38	
Uniform Delay, d1	37.4	43.4		37.6	43.6		46.1	13.7	11.4	44.6	12.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	0.76	1.47	
Incremental Delay, d2	8.8	0.4		11.7	1.7		0.8	0.8	0.4	0.9	0.5	
Delay (s)	46.2	43.8		49.3	45.3		46.9	14.5	11.7	34.9	18.2	
Level of Service	D	D		D	D		D	B	B	C	B	
Approach Delay (s)		45.0			47.1			16.6			21.0	
Approach LOS		D			D			B			C	
Intersection Summary												
HCM 2000 Control Delay			26.6			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.53									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			61.1%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

5: Site Driveway 1/South Site Driveway & SE 20th Street

2/26/2018

																		
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR						
Lane Configurations																		
Volume (veh/h)	4	479	24	2	219	2	88	0	10	1	0	6						
Sign Control	Free			Free			Stop			Stop								
Grade	0%			0%			0%			0%								
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77						
Hourly flow rate (vph)	5	622	31	3	284	3	114	0	13	1	0	8						
Pedestrians																		
Lane Width (ft)																		
Walking Speed (ft/s)																		
Percent Blockage																		
Right turn flare (veh)																		
Median type	TWLTL			TWLTL														
Median storage veh	2			2														
Upstream signal (ft)	1053			1170														
pX, platoon unblocked				0.95			0.95	0.95	0.95	0.95	0.95							
vC, conflicting volume	287				653				945	940	638	936						
vC1, stage 1 conf vol							648	648				291						
vC2, stage 2 conf vol							297	292				645						
vCu, unblocked vol	287				608				916	911	592	906						
tC, single (s)	4.1				4.1				7.1	6.5	6.2	7.1						
tC, 2 stage (s)							6.1	5.5				6.1						
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5						
p0 queue free %	100				100				73	100	97	100						
cM capacity (veh/h)	1287				931				422	425	484	414						
												418						
												758						
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1												
Volume Total	5	653	3	287	127	9												
Volume Left	5	0	3	0	114	1												
Volume Right	0	31	0	3	13	8												
cSH	1287	1700	931	1700	428	678												
Volume to Capacity	0.00	0.38	0.00	0.17	0.30	0.01												
Queue Length 95th (ft)	0	0	0	0	31	1												
Control Delay (s)	7.8	0.0	8.9	0.0	16.9	10.4												
Lane LOS	A		A		C	B												
Approach Delay (s)	0.1		0.1		16.9	10.4												
Approach LOS					C	B												
Intersection Summary																		
Average Delay				2.1														
Intersection Capacity Utilization				45.5%	ICU Level of Service			A										
Analysis Period (min)				15														

HCM Unsignalized Intersection Capacity Analysis

6: Site Driveway 2 & SE 20th St/SE 20th Street

2/26/2018

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	267	223	14	198	25	11
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	347	290	18	257	32	14
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLT			TWLT		
Median storage veh	2			2		
Upstream signal (ft)				530		
pX, platoon unblocked						
vC, conflicting volume			636		785	492
vC1, stage 1 conf vol					492	
vC2, stage 2 conf vol					294	
vCu, unblocked vol			636		785	492
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			98		94	98
cM capacity (veh/h)			957		550	581
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	
Volume Total	636	18	257	32	14	
Volume Left	0	18	0	32	0	
Volume Right	290	0	0	0	14	
cSH	1700	957	1700	550	581	
Volume to Capacity	0.37	0.02	0.15	0.06	0.02	
Queue Length 95th (ft)	0	1	0	5	2	
Control Delay (s)	0.0	8.8	0.0	12.0	11.4	
Lane LOS		A		B	B	
Approach Delay (s)	0.0	0.6		11.8		
Approach LOS				B		
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			37.7%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

7: SE Fisher Creek Rd/Site Driveway 3

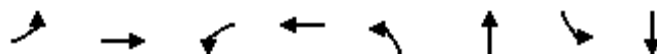
2/26/2018

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	17	4	5	18	154	128
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	23	5	7	24	205	171
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)					400	
pX, platoon unblocked						
vC, conflicting volume	316	291	376			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	316	291	376			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	99	99			
cM capacity (veh/h)	654	712	1194			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	28	15	16	376		
Volume Left	23	7	0	0		
Volume Right	5	0	0	171		
cSH	664	1194	1700	1700		
Volume to Capacity	0.04	0.01	0.01	0.22		
Queue Length 95th (ft)	3	0	0	0		
Control Delay (s)	10.7	3.7	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s)	10.7	1.8		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			0.8			
Intersection Capacity Utilization		25.9%		ICU Level of Service		A
Analysis Period (min)		15				

Queues

9: Site Driveway 3/SE Fisher Creek Rd & SE 20th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	45	315	114	313	17	28	92	167
v/c Ratio	0.08	0.34	0.21	0.34	0.05	0.06	0.25	0.33
Control Delay	6.7	6.0	7.9	6.5	8.8	5.9	10.6	8.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.7	6.0	7.9	6.5	8.8	5.9	10.6	8.4
Queue Length 50th (ft)	4	19	10	22	2	1	9	11
Queue Length 95th (ft)	14	48	29	52	9	9	28	35
Internal Link Dist (ft)		450		4148		320		206
Turn Bay Length (ft)	100		100				100	
Base Capacity (vph)	1045	1654	1040	1698	869	1204	986	1277
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.19	0.11	0.18	0.02	0.02	0.09	0.13
Intersection Summary								

HCM Signalized Intersection Capacity Analysis

9: Site Driveway 3/SE Fisher Creek Rd & SE 20th St

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	35	131	112	88	152	89	13	7	15	71	82	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	0.94		1.00	0.90		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1712		1802	1758		1805	1707		1805	1796	
Flt Permitted	0.57	1.00		0.57	1.00		0.65	1.00		0.74	1.00	
Satd. Flow (perm)	1083	1712		1080	1758		1238	1707		1404	1796	
Peak-hour factor, PHF	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Adj. Flow (vph)	45	170	145	114	197	116	17	9	19	92	106	61
RTOR Reduction (vph)	0	56	0	0	39	0	0	15	0	0	41	0
Lane Group Flow (vph)	45	259	0	114	274	0	17	13	0	92	126	0
Confl. Peds. (#/hr)			3	3								
Confl. Bikes (#/hr)			3			2						
Heavy Vehicles (%)	0%	4%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	13.5	13.5		13.5	13.5		6.4	6.4		6.4	6.4	
Effective Green, g (s)	13.5	13.5		13.5	13.5		6.4	6.4		6.4	6.4	
Actuated g/C Ratio	0.45	0.45		0.45	0.45		0.21	0.21		0.21	0.21	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	488	772		487	793		264	365		300	384	
v/s Ratio Prot		0.15			c0.16			0.01			c0.07	
v/s Ratio Perm	0.04			0.11			0.01			0.07		
v/c Ratio	0.09	0.34		0.23	0.35		0.06	0.04		0.31	0.33	
Uniform Delay, d1	4.7	5.3		5.0	5.3		9.4	9.3		9.9	9.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.3		0.2	0.3		0.1	0.0		0.6	0.5	
Delay (s)	4.8	5.6		5.3	5.6		9.5	9.3		10.5	10.4	
Level of Service	A	A		A	A		A	A		B	B	
Approach Delay (s)		5.5			5.5			9.4			10.4	
Approach LOS		A			A			A			B	
Intersection Summary												
HCM 2000 Control Delay			6.8				HCM 2000 Level of Service			A		
HCM 2000 Volume to Capacity ratio			0.34									
Actuated Cycle Length (s)			29.9				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			42.2%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

10: NW Parker St & NW 38th Ave

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	125	161	347	322	172	441	204	46	462	126
v/c Ratio	0.30	0.27	0.64	0.55	0.60	0.97	0.31	0.16	1.03	0.18
Control Delay	12.0	10.9	19.3	20.8	23.0	62.2	3.6	13.1	78.6	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.0	10.9	19.3	20.8	23.0	62.2	3.6	13.1	78.6	3.5
Queue Length 50th (ft)	26	24	84	92	42	170	0	11	~189	0
Queue Length 95th (ft)	39	41	98	111	58	#207	12	21	#225	13
Internal Link Dist (ft)		4148		899		2420			638	
Turn Bay Length (ft)	125		150		125			250		125
Base Capacity (vph)	411	590	540	582	287	456	659	287	448	699
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.27	0.64	0.55	0.60	0.97	0.31	0.16	1.03	0.18

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

10: NW Parker St & NW 38th Ave

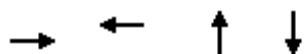
2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	58	52	236	160	59	117	300	139	31	314	86
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.93		1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1730		1769	1799		1805	1827	1528	1805	1792	1538
Flt Permitted	0.41	1.00		0.64	1.00		0.25	1.00	1.00	0.25	1.00	1.00
Satd. Flow (perm)	774	1730		1200	1799		475	1827	1528	475	1792	1538
Peak-hour factor, PHF	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68
Adj. Flow (vph)	125	85	76	347	235	87	172	441	204	46	462	126
RTOR Reduction (vph)	0	50	0	0	21	0	0	0	134	0	0	83
Lane Group Flow (vph)	125	111	0	347	301	0	172	441	70	46	462	43
Confl. Peds. (#/hr)			1	1					1	1		
Heavy Vehicles (%)	0%	0%	3%	2%	0%	5%	0%	4%	4%	0%	6%	5%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	3	8		7	4		1	6	7	5	2	3
Permitted Phases	8			4			6		6	2		2
Actuated Green, G (s)	26.0	20.0		26.0	20.0		22.0	16.0	22.0	22.0	16.0	22.0
Effective Green, g (s)	26.0	20.0		26.0	20.0		22.0	16.0	22.0	22.0	16.0	22.0
Actuated g/C Ratio	0.41	0.31		0.41	0.31		0.34	0.25	0.34	0.34	0.25	0.34
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	0.2	1.5		0.2	1.5		0.2	1.5	0.2	0.2	1.5	0.2
Lane Grp Cap (vph)	411	540		540	562		287	456	620	287	448	624
v/s Ratio Prot	0.03	0.06		c0.06	0.17		c0.06	0.24	0.01	0.01	c0.26	0.01
v/s Ratio Perm	0.09			c0.20			0.15		0.04	0.04		0.02
v/c Ratio	0.30	0.21		0.64	0.54		0.60	0.97	0.11	0.16	1.03	0.07
Uniform Delay, d1	12.4	16.2		14.3	18.2		16.5	23.7	14.3	15.2	24.0	14.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.9	0.9		5.8	3.6		8.9	34.7	0.4	1.2	50.8	0.2
Delay (s)	14.3	17.0		20.1	21.8		25.4	58.4	14.7	16.4	74.8	14.3
Level of Service	B	B		C	C		C	E	B	B	E	B
Approach Delay (s)		15.8			20.9			40.6			58.5	
Approach LOS		B			C			D			E	
Intersection Summary												
HCM 2000 Control Delay			36.9			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			64.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			66.1%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

12: NW Brady Rd & NW 16th Ave

2/26/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	173	535	316	425
v/c Ratio	0.29	0.78	0.48	0.63
Control Delay	10.4	22.5	15.0	17.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	10.4	22.5	15.0	17.8
Queue Length 50th (ft)	31	133	74	106
Queue Length 95th (ft)	54	187	109	149
Internal Link Dist (ft)	675	942	393	3387
Turn Bay Length (ft)				
Base Capacity (vph)	597	683	655	675
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.29	0.78	0.48	0.63
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

12: NW Brady Rd & NW 16th Ave

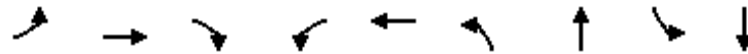
2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	52	55	26	154	91	167	49	154	40	63	185	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.97			0.95			0.98			0.97	
Flt Protected		0.98			0.98			0.99			0.99	
Satd. Flow (prot)		1672			1707			1749			1754	
Flt Permitted		0.76			0.82			0.87			0.89	
Satd. Flow (perm)		1296			1429			1545			1575	
Peak-hour factor, PHF	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Adj. Flow (vph)	68	71	34	200	118	217	64	200	52	82	240	103
RTOR Reduction (vph)	0	15	0	0	41	0	0	12	0	0	19	0
Lane Group Flow (vph)	0	158	0	0	494	0	0	304	0	0	406	0
Confl. Peds. (#/hr)			1	1								
Heavy Vehicles (%)	10%	10%	0%	3%	6%	2%	0%	4%	16%	7%	3%	3%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		27.0			27.0			25.0			25.0	
Effective Green, g (s)		27.0			27.0			25.0			25.0	
Actuated g/C Ratio		0.45			0.45			0.42			0.42	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		1.5			1.5			1.5			1.5	
Lane Grp Cap (vph)		583			643			643			656	
v/s Ratio Prot												
v/s Ratio Perm		0.12			0.35			0.20			0.26	
v/c Ratio		0.27			0.77			0.47			0.62	
Uniform Delay, d1		10.3			13.9			12.7			13.8	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.1			5.0			2.5			4.3	
Delay (s)		11.5			18.8			15.2			18.1	
Level of Service		B			B			B			B	
Approach Delay (s)		11.5			18.8			15.2			18.1	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			17.0									
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			60.0									
Intersection Capacity Utilization			60.5%									
Analysis Period (min)			15									
c Critical Lane Group												

Queues

1: SE 192nd Ave & Mill Plain Blvd

2/26/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	347	28	548	49	63	503	1106	38	1130
v/c Ratio	1.51	0.13	0.81	0.27	0.45	0.57	0.54	0.32	0.88
Control Delay	282.8	40.8	30.4	45.8	35.5	47.1	5.4	51.0	39.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	282.8	40.8	30.4	45.8	35.5	47.1	5.4	51.0	39.1
Queue Length 50th (ft)	~309	16	211	31	19	153	67	24	332
Queue Length 95th (ft)	#484	42	322	66	59	m163	m74	55	#536
Internal Link Dist (ft)		517			357		2419		550
Turn Bay Length (ft)	225		125	400		200		150	
Base Capacity (vph)	230	513	673	214	411	877	2059	175	1282
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.51	0.05	0.81	0.23	0.15	0.57	0.54	0.22	0.88

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

1: SE 192nd Ave & Mill Plain Blvd

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	330	27	521	47	29	30	478	990	61	36	842	232
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.92		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1900	1605	1703	1612		3467	3462		1752	3422	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1900	1605	1703	1612		3467	3462		1752	3422	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	347	28	548	49	31	32	503	1042	64	38	886	244
RTOR Reduction (vph)	0	0	103	0	30	0	0	3	0	0	23	0
Lane Group Flow (vph)	347	28	445	49	33	0	503	1103	0	38	1107	0
Confl. Peds. (#/hr)	17		9	9		17	1		1	1		1
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	2%	0%	0%	6%	7%	7%	1%	3%	7%	3%	2%	1%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2									
Actuated Green, G (s)	13.0	10.2	35.5	9.7	6.9		25.3	55.4		4.7	34.8	
Effective Green, g (s)	13.0	10.2	35.5	9.7	6.9		25.3	55.4		4.7	34.8	
Actuated g/C Ratio	0.13	0.10	0.36	0.10	0.07		0.25	0.55		0.05	0.35	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	230	193	650	165	111		877	1917		82	1190	
v/s Ratio Prot	c0.20	0.01	c0.17	0.03	0.02		0.15	0.32		0.02	c0.32	
v/s Ratio Perm			0.10									
v/c Ratio	1.51	0.15	0.69	0.30	0.30		0.57	0.58		0.46	0.93	
Uniform Delay, d1	43.5	40.9	27.5	42.0	44.3		32.6	14.6		46.4	31.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.39	0.35		1.00	1.00	
Incremental Delay, d2	250.2	0.1	2.4	0.4	0.6		0.2	0.5		1.5	13.9	
Delay (s)	293.7	41.1	29.9	42.3	44.8		45.5	5.6		47.9	45.3	
Level of Service	F	D	C	D	D		D	A		D	D	
Approach Delay (s)		129.4			43.7			18.0			45.4	
Approach LOS		F			D			B			D	
Intersection Summary												
HCM 2000 Control Delay			54.1				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.98									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			81.8%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

2: SE 192nd Ave & SE 15th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	140	228	34	104	251	129	1571	192	1595
v/c Ratio	0.85	0.62	0.34	0.54	0.53	0.64	1.00	0.67	0.93
Control Delay	85.6	32.7	53.7	51.8	22.0	45.3	46.6	57.9	28.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	85.6	32.7	53.7	51.8	22.0	45.3	46.6	57.9	28.4
Queue Length 50th (ft)	89	91	21	65	88	83	~365	126	528
Queue Length 95th (ft)	#175	148	49	101	125	m86	m#650	m153	#744
Internal Link Dist (ft)		621		676			1122		2419
Turn Bay Length (ft)	100		100		100	150		475	
Base Capacity (vph)	173	465	168	447	475	209	1567	285	1708
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.49	0.20	0.23	0.53	0.62	1.00	0.67	0.93

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

2: SE 192nd Ave & SE 15th St

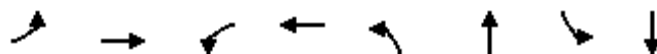
2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	119	71	122	29	88	213	110	1298	37	163	1229	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.91		1.00	1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1736	1681		1687	1863	1604	1787	3523		1805	3482	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1736	1681		1687	1863	1604	1787	3523		1805	3482	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	140	84	144	34	104	251	129	1527	44	192	1446	149
RTOR Reduction (vph)	0	67	0	0	0	55	0	2	0	0	6	0
Lane Group Flow (vph)	140	161	0	34	104	196	129	1569	0	192	1589	0
Confl. Peds. (#/hr)	3		1	1		3	2		6	6		2
Confl. Bikes (#/hr)			1									1
Heavy Vehicles (%)	4%	2%	1%	7%	2%	0%	1%	2%	0%	0%	2%	2%
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	4		3	8	
Permitted Phases						6						
Actuated Green, G (s)	9.5	17.8		4.0	12.3	28.1	11.3	42.4		15.8	46.9	
Effective Green, g (s)	9.5	17.8		4.0	12.3	28.1	11.3	42.4		15.8	46.9	
Actuated g/C Ratio	0.10	0.18		0.04	0.12	0.28	0.11	0.42		0.16	0.47	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lane Grp Cap (vph)	164	299		67	229	530	201	1493		285	1633	
v/s Ratio Prot	c0.08	c0.10		0.02	0.06	0.06	0.07	c0.45		c0.11	c0.46	
v/s Ratio Perm						0.06						
v/c Ratio	0.85	0.54		0.51	0.45	0.37	0.64	1.05		0.67	0.97	
Uniform Delay, d1	44.6	37.4		47.0	40.7	28.9	42.4	28.8		39.7	25.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.93	1.06		1.23	0.70	
Incremental Delay, d2	31.6	0.9		2.2	0.5	0.2	2.2	30.7		3.5	13.4	
Delay (s)	76.2	38.3		49.2	41.3	29.0	41.8	61.3		52.5	31.5	
Level of Service	E	D		D	D	C	D	E		D	C	
Approach Delay (s)		52.7			34.1			59.8			33.7	
Approach LOS		D			C			E			C	
Intersection Summary												
HCM 2000 Control Delay			45.9			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.90									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			78.5%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

3: SE 192nd Ave & SE 20th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	146	296	324	509	121	1308	188	1194
v/c Ratio	0.84	0.76	0.82	1.01	0.80	1.02	0.96	0.87
Control Delay	85.3	48.7	61.1	76.2	91.5	49.5	86.0	30.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	85.3	48.7	61.1	76.2	91.5	49.5	86.0	30.4
Queue Length 50th (ft)	48	165	104	~300	82	~470	130	209
Queue Length 95th (ft)	#104	#296	#166	#517	m#137	#584	m#154	m312
Internal Link Dist (ft)		1188		973		3702		1122
Turn Bay Length (ft)	100		100		325		400	
Base Capacity (vph)	173	387	420	504	162	1279	196	1375
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.84	0.76	0.77	1.01	0.75	1.02	0.96	0.87

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

3: SE 192nd Ave & SE 20th St

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	140	179	106	311	225	264	116	1059	197	180	994	153
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	0.97	1.00		0.97	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	0.92		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3467	1763		3502	1713		1805	3418		1787	3444	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3467	1763		3502	1713		1805	3418		1787	3444	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	146	186	110	324	234	275	121	1103	205	188	1035	159
RTOR Reduction (vph)	0	21	0	0	42	0	0	15	0	0	12	0
Lane Group Flow (vph)	146	275	0	324	467	0	121	1293	0	188	1182	0
Confl. Peds. (#/hr)	1		3	3		1	5		1	1		5
Confl. Bikes (#/hr)			1			4			5			3
Heavy Vehicles (%)	1%	0%	3%	0%	1%	1%	0%	3%	1%	1%	2%	4%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	5.0	20.7		11.3	27.0		8.4	37.0		11.0	39.6	
Effective Green, g (s)	5.0	20.7		11.3	27.0		8.4	37.0		11.0	39.6	
Actuated g/C Ratio	0.05	0.21		0.11	0.27		0.08	0.37		0.11	0.40	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lane Grp Cap (vph)	173	364		395	462		151	1264		196	1363	
v/s Ratio Prot	0.04	0.16		c0.09	c0.27		0.07	c0.38		c0.11	c0.34	
v/s Ratio Perm												
v/c Ratio	0.84	0.75		0.82	1.01		0.80	1.02		0.96	0.87	
Uniform Delay, d1	47.1	37.3		43.4	36.5		45.0	31.5		44.3	27.8	
Progression Factor	1.00	1.00		1.00	1.00		1.42	0.63		1.15	0.95	
Incremental Delay, d2	28.5	7.7		12.2	44.4		19.6	28.3		32.2	3.7	
Delay (s)	75.6	44.9		55.6	80.9		83.3	48.0		83.2	30.0	
Level of Service	E	D		E	F		F	D		F	C	
Approach Delay (s)		55.1			71.1			51.0			37.3	
Approach LOS		E			E			D			D	
Intersection Summary												
HCM 2000 Control Delay			50.9				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			1.02									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			94.4%				ICU Level of Service			F		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

4: SE 192nd Ave & SE 34th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	163	285	427	373	114	1077	211	278	1298
v/c Ratio	0.66	0.71	1.33	0.57	0.49	0.69	0.27	0.68	0.77
Control Delay	41.9	43.6	195.8	26.0	51.5	26.5	3.9	38.0	34.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.9	43.6	195.8	26.0	51.5	26.5	3.9	38.0	34.3
Queue Length 50th (ft)	81	73	~303	67	37	283	0	91	375
Queue Length 95th (ft)	129	112	#470	110	63	410	46	m116	#451
Internal Link Dist (ft)		670		7104		563			3702
Turn Bay Length (ft)	150		150		300		300	175	
Base Capacity (vph)	256	961	322	1164	282	1551	795	419	1695
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.64	0.30	1.33	0.32	0.40	0.69	0.27	0.66	0.77

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

4: SE 192nd Ave & SE 34th St

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	147	181	76	384	197	139	103	969	190	250	999	169
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.96		1.00	0.94		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1752	3389		1769	3312		3433	3505	1532	3502	3440	
Flt Permitted	0.53	1.00		0.26	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	977	3389		493	3312		3433	3505	1532	3502	3440	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	163	201	84	427	219	154	114	1077	211	278	1110	188
RTOR Reduction (vph)	0	57	0	0	130	0	0	0	118	0	10	0
Lane Group Flow (vph)	163	228	0	427	243	0	114	1077	93	278	1288	0
Confl. Peds. (#/hr)	1		1	1		1	2		1	1		2
Confl. Bikes (#/hr)						2			1			2
Heavy Vehicles (%)	3%	2%	0%	2%	2%	1%	2%	3%	3%	0%	2%	5%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6					4			
Actuated Green, G (s)	18.5	10.1		29.1	15.7		6.9	44.3	44.3	11.6	49.0	
Effective Green, g (s)	18.5	10.1		29.1	15.7		6.9	44.3	44.3	11.6	49.0	
Actuated g/C Ratio	0.18	0.10		0.29	0.16		0.07	0.44	0.44	0.12	0.49	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lane Grp Cap (vph)	245	342		322	519		236	1552	678	406	1685	
v/s Ratio Prot	0.06	0.07		c0.19	0.07		0.03	0.31		c0.08	c0.37	
v/s Ratio Perm	0.07			c0.20					0.06			
v/c Ratio	0.67	0.67		1.33	0.47		0.48	0.69	0.14	0.68	0.76	
Uniform Delay, d1	36.6	43.3		32.2	38.4		44.8	22.4	16.5	42.4	20.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	0.77	1.49	
Incremental Delay, d2	5.2	3.8		166.7	0.2		0.6	2.6	0.4	2.3	2.0	
Delay (s)	41.8	47.1		198.9	38.6		45.4	25.0	16.9	35.0	33.1	
Level of Service	D	D		F	D		D	C	B	C	C	
Approach Delay (s)		45.2			124.2			25.4			33.4	
Approach LOS		D			F			C			C	
Intersection Summary												
HCM 2000 Control Delay			49.2			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			1.00									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			83.2%			ICU Level of Service			E			
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

5: Site Driveway & SE 20th Street

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	6	378	79	9	669	2	40	0	5	2	0	15
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	7	467	98	11	826	2	49	0	6	2	0	19
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	TWLTL			TWLTL								
Median storage veh	2			2								
Upstream signal (ft)	1053			1170								
pX, platoon unblocked				0.98				0.98	0.98	0.98	0.98	0.98
vC, conflicting volume	828				564				1397	1381	515	1337
vC1, stage 1 conf vol							530	530				849
vC2, stage 2 conf vol							867	851				488
vCu, unblocked vol	828				549				1395	1379	499	1334
tC, single (s)	4.1				4.1				7.1	6.5	6.2	7.1
tC, 2 stage (s)							6.1	5.5				6.1
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5
p0 queue free %	99				99				83	100	99	99
cM capacity (veh/h)	812				1014				285	319	566	310
											315	374
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	7	564	11	828	56	21						
Volume Left	7	0	11	0	49	2						
Volume Right	0	98	0	2	6	19						
cSH	812	1700	1014	1700	301	366						
Volume to Capacity	0.01	0.33	0.01	0.49	0.18	0.06						
Queue Length 95th (ft)	1	0	1	0	17	5						
Control Delay (s)	9.5	0.0	8.6	0.0	19.6	15.4						
Lane LOS	A		A		C	C						
Approach Delay (s)	0.1		0.1		19.6	15.4						
Approach LOS					C	C						
Intersection Summary												
Average Delay				1.1								
Intersection Capacity Utilization				Err%	ICU Level of Service			H				
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

6: Site Driveway 2 & SE 20th Street

2/26/2018

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	332	53	10	476	204	33
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	410	65	12	588	252	41
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (ft)				530		
pX, platoon unblocked				0.86		
vC, conflicting volume			475	1055 443		
vC1, stage 1 conf vol				443		
vC2, stage 2 conf vol				612		
vCu, unblocked vol			475	983 443		
tC, single (s)			4.1	6.4 6.2		
tC, 2 stage (s)				5.4		
tF (s)			2.2	3.5 3.3		
p0 queue free %			99	45 93		
cM capacity (veh/h)			1097	457 619		
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	
Volume Total	475	12	588	252	41	
Volume Left	0	12	0	252	0	
Volume Right	65	0	0	0	41	
cSH	1700	1097	1700	457	619	
Volume to Capacity	0.28	0.01	0.35	0.55	0.07	
Queue Length 95th (ft)	0	1	0	82	5	
Control Delay (s)	0.0	8.3	0.0	22.1	11.2	
Lane LOS		A		C	B	
Approach Delay (s)	0.0	0.2		20.6		
Approach LOS				C		
Intersection Summary						
Average Delay			4.5			
Intersection Capacity Utilization			43.0%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

7: NW Fisher Creek Drive & Site Driveway 3

2/26/2018

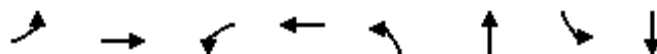


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	103	1	4	334	19	41
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	137	1	5	445	25	55
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)					380	
pX, platoon unblocked						
vC, conflicting volume	286	53	80			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	286	53	80			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	80	100	100			
cM capacity (veh/h)	684	1010	1531			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	139	154	297	80		
Volume Left	137	5	0	0		
Volume Right	1	0	0	55		
cSH	686	1531	1700	1700		
Volume to Capacity	0.20	0.00	0.17	0.05		
Queue Length 95th (ft)	19	0	0	0		
Control Delay (s)	11.6	0.3	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s)	11.6	0.1		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			2.5			
Intersection Capacity Utilization			24.5%	ICU Level of Service		A
Analysis Period (min)			15			

Queues

9: NW Fisher Creek Drive & SE 20th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	63	388	38	411	265	274	169	58
v/c Ratio	0.21	0.58	0.12	0.63	0.54	0.40	0.42	0.09
Control Delay	12.0	14.8	10.8	15.1	14.2	8.2	12.8	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.0	14.8	10.8	15.1	14.2	8.2	12.8	4.7
Queue Length 50th (ft)	8	59	5	59	40	27	24	2
Queue Length 95th (ft)	31	135	20	138	83	60	56	14
Internal Link Dist (ft)		450		4148		300		206
Turn Bay Length (ft)	100		100				100	
Base Capacity (vph)	403	894	428	867	1178	1541	969	1471
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.43	0.09	0.47	0.22	0.18	0.17	0.04

Intersection Summary

HCM Signalized Intersection Capacity Analysis

9: NW Fisher Creek Drive & SE 20th St

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	51	299	15	31	238	95	215	139	83	137	14	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.96		1.00	0.94		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1866		1802	1780		1805	1774		1805	1699	
Flt Permitted	0.44	1.00		0.47	1.00		0.72	1.00		0.59	1.00	
Satd. Flow (perm)	844	1866		898	1780		1366	1774		1123	1699	
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	63	369	19	38	294	117	265	172	102	169	17	41
RTOR Reduction (vph)	0	3	0	0	21	0	0	50	0	0	26	0
Lane Group Flow (vph)	63	385	0	38	390	0	265	224	0	169	32	0
Confl. Peds. (#/hr)			3	3								
Confl. Bikes (#/hr)			3			5						
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	0%	0%	3%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	13.4	13.4		13.4	13.4		13.6	13.6		13.6	13.6	
Effective Green, g (s)	13.4	13.4		13.4	13.4		13.6	13.6		13.6	13.6	
Actuated g/C Ratio	0.36	0.36		0.36	0.36		0.37	0.37		0.37	0.37	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	305	675		325	644		502	652		412	624	
v/s Ratio Prot		0.21			c0.22			0.13			0.02	
v/s Ratio Perm	0.07			0.04			c0.19			0.15		
v/c Ratio	0.21	0.57		0.12	0.61		0.53	0.34		0.41	0.05	
Uniform Delay, d1	8.1	9.5		7.9	9.6		9.2	8.5		8.7	7.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	1.2		0.2	1.6		1.0	0.3		0.7	0.0	
Delay (s)	8.5	10.7		8.0	11.3		10.2	8.8		9.4	7.6	
Level of Service	A	B		A	B		B	A		A	A	
Approach Delay (s)		10.4			11.0			9.5			8.9	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM 2000 Control Delay			10.0			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.57									
Actuated Cycle Length (s)			37.0			Sum of lost time (s)			10.0			
Intersection Capacity Utilization			59.1%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

10: NW Parker St & NW 38th Ave

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	121	469	114	229	98	280	216	67	272	90
v/c Ratio	0.25	0.79	0.40	0.39	0.26	0.60	0.32	0.19	0.59	0.13
Control Delay	11.3	30.4	14.4	18.2	14.1	27.3	3.5	13.2	27.2	3.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.3	30.4	14.4	18.2	14.1	27.3	3.5	13.2	27.2	3.7
Queue Length 50th (ft)	25	149	24	63	23	96	0	15	93	0
Queue Length 95th (ft)	50	#275	48	112	47	159	31	35	155	21
Internal Link Dist (ft)		4148		899		2420			638	
Turn Bay Length (ft)	125		150		125			250		125
Base Capacity (vph)	490	590	282	582	370	470	685	362	461	697
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.79	0.40	0.39	0.26	0.60	0.32	0.19	0.59	0.13

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

10: NW Parker St & NW 38th Ave

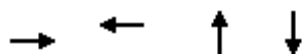
2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	105	261	147	99	161	38	85	244	188	58	237	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.95		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1804	1788		1735	1822		1805	1881	1580	1801	1845	1583
Flt Permitted	0.54	1.00		0.21	1.00		0.42	1.00	1.00	0.41	1.00	1.00
Satd. Flow (perm)	1028	1788		383	1822		805	1881	1580	777	1845	1583
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	121	300	169	114	185	44	98	280	216	67	272	90
RTOR Reduction (vph)	0	32	0	0	13	0	0	0	142	0	0	59
Lane Group Flow (vph)	121	437	0	114	216	0	98	280	74	67	272	31
Confl. Peds. (#/hr)	1		2	2		1			5	5		
Confl. Bikes (#/hr)			1			1						
Heavy Vehicles (%)	0%	0%	0%	4%	1%	0%	0%	1%	0%	0%	3%	2%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	3	8		7	4		1	6	7	5	2	3
Permitted Phases	8			4			6		6	2		2
Actuated Green, G (s)	26.0	20.0		26.0	20.0		22.0	16.0	22.0	22.0	16.0	22.0
Effective Green, g (s)	26.0	20.0		26.0	20.0		22.0	16.0	22.0	22.0	16.0	22.0
Actuated g/C Ratio	0.41	0.31		0.41	0.31		0.34	0.25	0.34	0.34	0.25	0.34
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	0.2	1.5		0.2	1.5		0.2	1.5	0.2	0.2	1.5	0.2
Lane Grp Cap (vph)	490	558		282	569		370	470	641	363	461	643
v/s Ratio Prot	0.02	c0.24		c0.04	0.12		c0.02	c0.15	0.01	0.02	0.15	0.00
v/s Ratio Perm	0.08			0.13			0.07		0.04	0.05		0.02
v/c Ratio	0.25	0.78		0.40	0.38		0.26	0.60	0.12	0.18	0.59	0.05
Uniform Delay, d1	12.1	20.0		13.3	17.2		14.7	21.1	14.4	14.5	21.1	14.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	10.6		4.3	1.9		1.7	5.5	0.4	1.1	5.5	0.1
Delay (s)	13.3	30.6		17.5	19.1		16.5	26.6	14.7	15.6	26.6	14.2
Level of Service	B	C		B	B		B	C	B	B	C	B
Approach Delay (s)		27.0			18.6			20.6			22.3	
Approach LOS		C			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			22.6			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.61									
Actuated Cycle Length (s)			64.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			58.8%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

12: NW Brady Rd & NW 16th Ave

2/26/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	184	312	427	431
v/c Ratio	0.33	0.57	0.45	0.60
Control Delay	14.8	17.5	8.4	13.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	14.8	17.5	8.4	13.7
Queue Length 50th (ft)	41	68	64	94
Queue Length 95th (ft)	82	132	114	165
Internal Link Dist (ft)	675	942	393	3387
Turn Bay Length (ft)				
Base Capacity (vph)	562	543	959	721
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.33	0.57	0.45	0.60
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

12: NW Brady Rd & NW 16th Ave

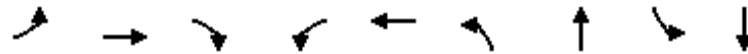
2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	29	96	36	90	61	121	19	200	152	144	202	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			1.00			0.99			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.97			0.94			0.94			0.99	
Flt Protected		0.99			0.98			1.00			0.98	
Satd. Flow (prot)		1775			1708			1765			1814	
Flt Permitted		0.91			0.86			0.97			0.73	
Satd. Flow (perm)		1635			1487			1721			1342	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	33	110	41	103	70	139	22	230	175	166	232	33
RTOR Reduction (vph)	0	17	0	0	48	0	0	42	0	0	5	0
Lane Group Flow (vph)	0	167	0	0	264	0	0	385	0	0	426	0
Confl. Peds. (#/hr)			4	4			1		1	1		1
Confl. Bikes (#/hr)			5									2
Heavy Vehicles (%)	0%	1%	7%	4%	6%	0%	0%	1%	0%	1%	2%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		20.0			20.0			32.0			32.0	
Effective Green, g (s)		20.0			20.0			32.0			32.0	
Actuated g/C Ratio		0.33			0.33			0.53			0.53	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		1.5			1.5			1.5			1.5	
Lane Grp Cap (vph)		545			495			917			715	
v/s Ratio Prot												
v/s Ratio Perm		0.10			c0.18			0.22			c0.32	
v/c Ratio		0.31			0.53			0.42			0.60	
Uniform Delay, d1		14.8			16.2			8.4			9.6	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.4			4.1			1.4			3.6	
Delay (s)		16.3			20.3			9.8			13.2	
Level of Service		B			C			A			B	
Approach Delay (s)		16.3			20.3			9.8			13.2	
Approach LOS		B			C			A			B	
Intersection Summary												
HCM 2000 Control Delay			14.2		HCM 2000 Level of Service					B		
HCM 2000 Volume to Capacity ratio			0.57									
Actuated Cycle Length (s)			60.0		Sum of lost time (s)					8.0		
Intersection Capacity Utilization			78.5%		ICU Level of Service					D		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

1: SE 192nd Ave & Mill Plain Blvd

2/26/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	163	145	337	212	272	514	940	105	980
v/c Ratio	0.77	0.46	0.52	0.98	0.79	0.69	0.75	0.62	1.06
Control Delay	67.0	39.7	18.0	100.6	48.1	46.7	22.6	59.0	81.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.0	39.7	18.0	100.6	48.1	46.7	22.6	59.0	81.1
Queue Length 50th (ft)	101	82	110	137	141	122	231	65	~356
Queue Length 95th (ft)	135	102	132	#202	157	#207	212	94	#328
Internal Link Dist (ft)		517			357		2419		550
Turn Bay Length (ft)	225		125	400		200		150	
Base Capacity (vph)	232	492	649	217	485	743	1256	186	925
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.29	0.52	0.98	0.56	0.69	0.75	0.56	1.06

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

1: SE 192nd Ave & Mill Plain Blvd

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	119	106	246	155	106	93	375	457	229	77	526	189
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.93		1.00	0.95		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1759	1528	1671	1622		3433	3062		1719	3236	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1787	1759	1528	1671	1622		3433	3062		1719	3236	
Peak-hour factor, PHF	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73
Adj. Flow (vph)	163	145	337	212	145	127	514	626	314	105	721	259
RTOR Reduction (vph)	0	0	46	0	36	0	0	53	0	0	36	0
Lane Group Flow (vph)	163	145	291	212	236	0	514	887	0	105	944	0
Confl. Peds. (#/hr)	1		3	3		1			3	3		
Heavy Vehicles (%)	1%	8%	5%	8%	5%	12%	2%	13%	7%	5%	9%	2%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2	7	1	6		7	4		3	8	
Permitted Phases			2									
Actuated Green, G (s)	11.8	17.8	39.5	13.0	19.0		21.7	39.3		9.9	27.5	
Effective Green, g (s)	11.8	17.8	39.5	13.0	19.0		21.7	39.3		9.9	27.5	
Actuated g/C Ratio	0.12	0.18	0.40	0.13	0.19		0.22	0.39		0.10	0.28	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	210	313	679	217	308		744	1203		170	889	
v/s Ratio Prot	0.09	0.08	0.09	c0.13	c0.15		c0.15	c0.29		0.06	c0.29	
v/s Ratio Perm			0.10									
v/c Ratio	0.78	0.46	0.43	0.98	0.77		0.69	0.74		0.62	1.06	
Uniform Delay, d1	42.8	36.8	22.0	43.4	38.4		36.1	25.9		43.2	36.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.12	0.70		1.00	1.00	
Incremental Delay, d2	15.0	0.4	0.2	53.8	9.9		1.8	3.2		4.6	47.9	
Delay (s)	57.8	37.2	22.2	97.1	48.3		42.0	21.4		47.9	84.2	
Level of Service	E	D	C	F	D		D	C		D	F	
Approach Delay (s)		34.6			69.7			28.7			80.6	
Approach LOS		C			E			C			F	
Intersection Summary												
HCM 2000 Control Delay			50.5			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.90									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			66.2%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

2: SE 192nd Ave & SE 15th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	206	132	91	49	81	123	1107	107	1119
v/c Ratio	0.95	0.51	0.65	0.40	0.26	0.66	0.63	0.63	0.65
Control Delay	93.9	23.7	65.2	53.8	9.6	47.6	21.6	62.6	12.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	93.9	23.7	65.2	53.8	9.6	47.6	21.6	62.6	12.5
Queue Length 50th (ft)	132	26	57	31	3	76	225	72	102
Queue Length 95th (ft)	#230	67	95	59	29	m98	265	m81	m297
Internal Link Dist (ft)		621		676			1122		2419
Turn Bay Length (ft)	100		100		100	150		475	
Base Capacity (vph)	219	522	178	475	328	204	1744	187	1709
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.94	0.25	0.51	0.10	0.25	0.60	0.63	0.57	0.65

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

2: SE 192nd Ave & SE 15th St

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	167	35	72	74	40	66	100	876	21	87	826	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.90		1.00	1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1687	1635		1626	1827	1606	1736	3320		1736	3303	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1687	1635		1626	1827	1606	1736	3320		1736	3303	
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	206	43	89	91	49	81	123	1081	26	107	1020	99
RTOR Reduction (vph)	0	79	0	0	0	64	0	1	0	0	5	0
Lane Group Flow (vph)	206	53	0	91	49	17	123	1106	0	107	1114	0
Confl. Peds. (#/hr)	1		2	2		1	1		4	4		1
Confl. Bikes (#/hr)			1			2						
Heavy Vehicles (%)	7%	4%	3%	11%	4%	0%	4%	8%	20%	4%	8%	4%
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases						6						
Actuated Green, G (s)	12.9	11.0		7.6	5.7	15.6	10.8	51.5		9.9	50.6	
Effective Green, g (s)	12.9	11.0		7.6	5.7	15.6	10.8	51.5		9.9	50.6	
Actuated g/C Ratio	0.13	0.11		0.08	0.06	0.16	0.11	0.52		0.10	0.51	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lane Grp Cap (vph)	217	179		123	104	330	187	1709		171	1671	
v/s Ratio Prot	c0.12	0.03		0.06	c0.03	0.01	c0.07	0.33		0.06	c0.34	
v/s Ratio Perm						0.01						
v/c Ratio	0.95	0.29		0.74	0.47	0.05	0.66	0.65		0.63	0.67	
Uniform Delay, d1	43.2	40.9		45.2	45.7	35.9	42.8	17.6		43.3	18.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.88	1.08		1.31	0.59	
Incremental Delay, d2	46.0	0.3		18.0	1.2	0.0	4.0	1.2		2.1	0.9	
Delay (s)	89.2	41.3		63.3	46.9	35.9	41.5	20.3		58.8	11.8	
Level of Service	F	D		E	D	D	D	C		E	B	
Approach Delay (s)		70.5			49.6			22.4			15.9	
Approach LOS		E			D			C			B	
Intersection Summary												
HCM 2000 Control Delay			27.1				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			59.6%				ICU Level of Service			B		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

3: SE 192nd Ave & SE 20th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	151	276	118	124	247	65	1186	309	971
v/c Ratio	0.60	0.95	0.73	0.50	0.45	0.53	0.89	0.96	0.56
Control Delay	54.9	82.7	72.6	48.7	19.3	73.7	36.5	84.3	16.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.9	82.7	72.6	48.7	19.3	73.7	36.5	84.3	16.0
Queue Length 50th (ft)	48	166	39	75	77	42	387	213	121
Queue Length 95th (ft)	70	#259	#66	117	119	m77	397	#301	215
Internal Link Dist (ft)		1188		973			3702		1122
Turn Bay Length (ft)	100		100		200	325		400	
Base Capacity (vph)	297	295	162	246	552	157	1330	326	1731
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.94	0.73	0.50	0.45	0.41	0.89	0.95	0.56

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

3: SE 192nd Ave & SE 20th St

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	119	159	59	93	98	195	51	692	245	244	673	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	0.97	1.00		0.97	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3303	1766		3242	1881	1559	1752	3189		1719	3172	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3303	1766		3242	1881	1559	1752	3189		1719	3172	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	151	201	75	118	124	247	65	876	310	309	852	119
RTOR Reduction (vph)	0	13	0	0	0	52	0	35	0	0	10	0
Lane Group Flow (vph)	151	263	0	118	124	195	65	1151	0	309	961	0
Confl. Peds. (#/hr)			2	2			2		2	2		2
Confl. Bikes (#/hr)			2			2			2			1
Heavy Vehicles (%)	6%	3%	2%	8%	1%	3%	3%	8%	8%	5%	12%	7%
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6	3	7	4		3	8	
Permitted Phases						6						
Actuated Green, G (s)	7.6	15.7		5.0	13.1	31.8	6.1	40.6		18.7	53.2	
Effective Green, g (s)	7.6	15.7		5.0	13.1	31.8	6.1	40.6		18.7	53.2	
Actuated g/C Ratio	0.08	0.16		0.05	0.13	0.32	0.06	0.41		0.19	0.53	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lane Grp Cap (vph)	251	277		162	246	573	106	1294		321	1687	
v/s Ratio Prot	c0.05	c0.15		0.04	0.07	0.06	0.04	c0.36		c0.18	0.30	
v/s Ratio Perm						0.06						
v/c Ratio	0.60	0.95		0.73	0.50	0.34	0.61	0.89		0.96	0.57	
Uniform Delay, d1	44.7	41.7		46.8	40.4	26.1	45.8	27.6		40.3	15.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.33	1.02		1.15	0.94	
Incremental Delay, d2	2.8	39.3		12.9	0.6	0.1	6.8	8.9		35.5	1.2	
Delay (s)	47.5	81.1		59.8	41.0	26.2	67.6	37.1		81.9	15.9	
Level of Service	D	F		E	D	C	E	D		F	B	
Approach Delay (s)		69.2			38.1			38.7			31.8	
Approach LOS		E			D			D			C	
Intersection Summary												
HCM 2000 Control Delay			39.8									HCM 2000 Level of Service D
HCM 2000 Volume to Capacity ratio			0.92									
Actuated Cycle Length (s)			100.0									Sum of lost time (s) 20.0
Intersection Capacity Utilization			73.8%									ICU Level of Service D
Analysis Period (min)			15									
c Critical Lane Group												

Queues

4: SE 192nd Ave & SE 34th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	159	155	213	259	89	779	220	136	693
v/c Ratio	0.72	0.50	0.77	0.68	0.41	0.44	0.24	0.53	0.38
Control Delay	50.8	38.6	53.3	35.9	50.6	15.5	2.7	40.1	16.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.8	38.6	53.3	35.9	50.6	15.5	2.7	40.1	16.9
Queue Length 50th (ft)	86	38	118	52	28	148	0	43	128
Queue Length 95th (ft)	139	68	181	90	53	226	38	m68	m190
Internal Link Dist (ft)		670		7104		563			3702
Turn Bay Length (ft)	150		150		300		300	175	
Base Capacity (vph)	235	1031	280	1073	350	1783	910	346	1848
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.15	0.76	0.24	0.25	0.44	0.24	0.39	0.38

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

4: SE 192nd Ave & SE 34th St

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	145	109	32	194	146	90	81	709	200	124	517	114
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.97		1.00	0.94		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1655	3249		1767	3241		3502	3282	1490	3467	3192	
Flt Permitted	0.47	1.00		0.62	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	811	3249		1149	3241		3502	3282	1490	3467	3192	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	159	120	35	213	160	99	89	779	220	136	568	125
RTOR Reduction (vph)	0	32	0	0	90	0	0	0	101	0	11	0
Lane Group Flow (vph)	159	123	0	213	169	0	89	779	119	136	682	0
Confl. Peds. (#/hr)	1		3	3		1	3		6	6		3
Heavy Vehicles (%)	9%	7%	7%	2%	6%	2%	0%	10%	5%	1%	9%	13%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6					4			
Actuated Green, G (s)	17.8	8.6		18.8	9.1		5.2	54.3	54.3	7.4	56.5	
Effective Green, g (s)	17.8	8.6		18.8	9.1		5.2	54.3	54.3	7.4	56.5	
Actuated g/C Ratio	0.18	0.09		0.19	0.09		0.05	0.54	0.54	0.07	0.56	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lane Grp Cap (vph)	222	279		275	294		182	1782	809	256	1803	
v/s Ratio Prot	0.07	0.04		c0.07	0.05		0.03	c0.24		c0.04	0.21	
v/s Ratio Perm	0.06			c0.07					0.08			
v/c Ratio	0.72	0.44		0.77	0.57		0.49	0.44	0.15	0.53	0.38	
Uniform Delay, d1	37.4	43.4		37.6	43.6		46.1	13.7	11.4	44.6	12.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	0.77	1.32	
Incremental Delay, d2	8.8	0.4		11.7	1.7		0.8	0.8	0.4	0.8	0.5	
Delay (s)	46.2	43.8		49.3	45.3		46.9	14.5	11.7	35.0	16.4	
Level of Service	D	D		D	D		D	B	B	D	B	
Approach Delay (s)		45.0			47.1			16.6			19.5	
Approach LOS		D			D			B			B	
Intersection Summary												
HCM 2000 Control Delay			26.1			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.53									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			61.1%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

5: Site Driveway 1/South Site Driveway & SE 20th Street

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	11	623	24	2	261	2	88	0	10	1	0	9
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	14	809	31	3	339	3	114	0	13	1	0	12
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	TWLTL			TWLTL								
Median storage veh	2			2								
Upstream signal (ft)	1053			1170								
pX, platoon unblocked				0.92			0.92	0.92	0.92	0.92	0.92	
vC, conflicting volume	342			840			1209	1200	825	1196	1214	340
vC1, stage 1 conf vol							853	853		345	345	
vC2, stage 2 conf vol							356	347		851	869	
vCu, unblocked vol	342			784			1184	1174	767	1170	1190	340
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			64	100	97	100	100	98
cM capacity (veh/h)	1229			777			320	336	373	312	330	707
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	14	840	3	342	127	13						
Volume Left	14	0	3	0	114	1						
Volume Right	0	31	0	3	13	12						
cSH	1229	1700	777	1700	324	627						
Volume to Capacity	0.01	0.49	0.00	0.20	0.39	0.02						
Queue Length 95th (ft)	1	0	0	0	45	2						
Control Delay (s)	8.0	0.0	9.6	0.0	23.1	10.9						
Lane LOS	A		A		C	B						
Approach Delay (s)	0.1		0.1		23.1	10.9						
Approach LOS					C	B						
Intersection Summary												
Average Delay			2.4									
Intersection Capacity Utilization			53.1%		ICU Level of Service		A					
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

6: Site Driveway 2 & SE 20th St/SE 20th Street

2/26/2018

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	411	223	14	240	25	11
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	534	290	18	312	32	14
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLT			TWLT		
Median storage veh	2			2		
Upstream signal (ft)				530		
pX, platoon unblocked						
vC, conflicting volume			823		1027	679
vC1, stage 1 conf vol					679	
vC2, stage 2 conf vol					348	
vCu, unblocked vol			823		1027	679
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			98		93	97
cM capacity (veh/h)			815		454	455
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	
Volume Total	823	18	312	32	14	
Volume Left	0	18	0	32	0	
Volume Right	290	0	0	0	14	
cSH	1700	815	1700	454	455	
Volume to Capacity	0.48	0.02	0.18	0.07	0.03	
Queue Length 95th (ft)	0	2	0	6	2	
Control Delay (s)	0.0	9.5	0.0	13.5	13.2	
Lane LOS		A		B	B	
Approach Delay (s)	0.0	0.5		13.4		
Approach LOS				B		
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			45.2%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

7: SE Fisher Creek Rd/Site Driveway 3

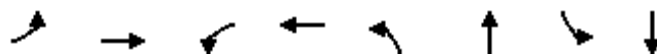
2/26/2018

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	17	4	5	18	154	128
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	23	5	7	24	205	171
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)					400	
pX, platoon unblocked						
vC, conflicting volume	316	291	376			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	316	291	376			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	99	99			
cM capacity (veh/h)	654	712	1194			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	28	15	16	376		
Volume Left	23	7	0	0		
Volume Right	5	0	0	171		
cSH	664	1194	1700	1700		
Volume to Capacity	0.04	0.01	0.01	0.22		
Queue Length 95th (ft)	3	0	0	0		
Control Delay (s)	10.7	3.7	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s)	10.7	1.8		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			0.8			
Intersection Capacity Utilization		25.9%		ICU Level of Service		A
Analysis Period (min)		15				

Queues

9: Site Driveway 3/SE Fisher Creek Rd & SE 20th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	40	508	114	300	26	19	1	12
v/c Ratio	0.04	0.36	0.15	0.20	0.07	0.02	0.00	0.02
Control Delay	3.4	3.5	3.9	3.3	13.5	0.1	13.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.4	3.5	3.9	3.3	13.5	0.1	13.0	0.0
Queue Length 50th (ft)	0	0	0	0	3	0	0	0
Queue Length 95th (ft)	10	66	23	47	15	0	2	0
Internal Link Dist (ft)		450		4148		320		206
Turn Bay Length (ft)	100		100				100	
Base Capacity (vph)	982	1536	810	1662	1200	1225	1200	1209
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.33	0.14	0.18	0.02	0.02	0.00	0.01
Intersection Summary								

HCM Signalized Intersection Capacity Analysis

9: Site Driveway 3/SE Fisher Creek Rd & SE 20th St

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	31	197	194	88	225	6	20	0	15	1	0	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	1.00		1.00	0.85		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1703		1802	1855		1805	1615		1805	1615	
Flt Permitted	0.58	1.00		0.48	1.00		1.00	1.00		1.00	1.00	
Satd. Flow (perm)	1096	1703		904	1855		1900	1615		1900	1615	
Peak-hour factor, PHF	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Adj. Flow (vph)	40	256	252	114	292	8	26	0	19	1	0	12
RTOR Reduction (vph)	0	41	0	0	1	0	0	18	0	0	11	0
Lane Group Flow (vph)	40	467	0	114	299	0	26	1	0	1	1	0
Confl. Peds. (#/hr)			3	3								
Confl. Bikes (#/hr)			3			2						
Heavy Vehicles (%)	0%	4%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	23.6	23.6		23.6	23.6		2.4	2.4		2.4	2.4	
Effective Green, g (s)	23.6	23.6		23.6	23.6		2.4	2.4		2.4	2.4	
Actuated g/C Ratio	0.66	0.66		0.66	0.66		0.07	0.07		0.07	0.07	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	718	1116		592	1216		126	107		126	107	
v/s Ratio Prot		c0.27			0.16			0.00			0.00	
v/s Ratio Perm	0.04			0.13			c0.01			0.00		
v/c Ratio	0.06	0.42		0.19	0.25		0.21	0.01		0.01	0.01	
Uniform Delay, d1	2.2	2.9		2.4	2.5		15.9	15.7		15.7	15.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.3		0.2	0.1		0.8	0.0		0.0	0.0	
Delay (s)	2.2	3.2		2.6	2.7		16.7	15.7		15.7	15.7	
Level of Service	A	A		A	A		B	B		B	B	
Approach Delay (s)		3.1			2.6			16.3			15.7	
Approach LOS		A			A			B			B	
Intersection Summary												
HCM 2000 Control Delay			3.7			HCM 2000 Level of Service				A		
HCM 2000 Volume to Capacity ratio			0.40									
Actuated Cycle Length (s)			36.0			Sum of lost time (s)			10.0			
Intersection Capacity Utilization			47.5%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

10: NW Parker St & NW 38th Ave

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	125	161	347	322	172	441	204	46	462	126
v/c Ratio	0.30	0.27	0.64	0.55	0.60	0.97	0.31	0.16	1.03	0.18
Control Delay	12.0	10.9	19.3	20.8	23.0	62.2	3.6	13.1	78.6	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.0	10.9	19.3	20.8	23.0	62.2	3.6	13.1	78.6	3.5
Queue Length 50th (ft)	26	24	84	92	42	170	0	11	~189	0
Queue Length 95th (ft)	39	41	98	111	58	#207	12	21	#225	13
Internal Link Dist (ft)		4148		899		2420			638	
Turn Bay Length (ft)	125		150		125			250		125
Base Capacity (vph)	411	590	540	582	287	456	659	287	448	699
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.27	0.64	0.55	0.60	0.97	0.31	0.16	1.03	0.18

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

10: NW Parker St & NW 38th Ave

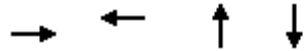
2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	58	52	236	160	59	117	300	139	31	314	86
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.93		1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1730		1769	1799		1805	1827	1528	1805	1792	1538
Flt Permitted	0.41	1.00		0.64	1.00		0.25	1.00	1.00	0.25	1.00	1.00
Satd. Flow (perm)	774	1730		1200	1799		475	1827	1528	475	1792	1538
Peak-hour factor, PHF	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68
Adj. Flow (vph)	125	85	76	347	235	87	172	441	204	46	462	126
RTOR Reduction (vph)	0	50	0	0	21	0	0	0	134	0	0	83
Lane Group Flow (vph)	125	111	0	347	301	0	172	441	70	46	462	43
Confl. Peds. (#/hr)			1	1					1	1		
Heavy Vehicles (%)	0%	0%	3%	2%	0%	5%	0%	4%	4%	0%	6%	5%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	3	8		7	4		1	6	7	5	2	3
Permitted Phases	8			4			6		6	2		2
Actuated Green, G (s)	26.0	20.0		26.0	20.0		22.0	16.0	22.0	22.0	16.0	22.0
Effective Green, g (s)	26.0	20.0		26.0	20.0		22.0	16.0	22.0	22.0	16.0	22.0
Actuated g/C Ratio	0.41	0.31		0.41	0.31		0.34	0.25	0.34	0.34	0.25	0.34
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	0.2	1.5		0.2	1.5		0.2	1.5	0.2	0.2	1.5	0.2
Lane Grp Cap (vph)	411	540		540	562		287	456	620	287	448	624
v/s Ratio Prot	0.03	0.06		c0.06	0.17		c0.06	0.24	0.01	0.01	c0.26	0.01
v/s Ratio Perm	0.09			c0.20			0.15		0.04	0.04		0.02
v/c Ratio	0.30	0.21		0.64	0.54		0.60	0.97	0.11	0.16	1.03	0.07
Uniform Delay, d1	12.4	16.2		14.3	18.2		16.5	23.7	14.3	15.2	24.0	14.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.9	0.9		5.8	3.6		8.9	34.7	0.4	1.2	50.8	0.2
Delay (s)	14.3	17.0		20.1	21.8		25.4	58.4	14.7	16.4	74.8	14.3
Level of Service	B	B		C	C		C	E	B	B	E	B
Approach Delay (s)		15.8			20.9			40.6			58.5	
Approach LOS		B			C			D			E	
Intersection Summary												
HCM 2000 Control Delay			36.9			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			64.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			66.1%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

12: NW Brady Rd & NW 16th Ave

2/26/2018

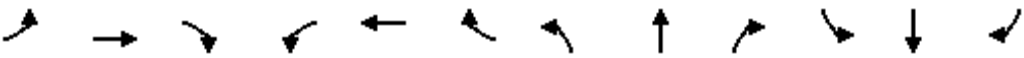


Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	173	535	316	425
v/c Ratio	0.29	0.78	0.48	0.63
Control Delay	10.4	22.5	15.0	17.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	10.4	22.5	15.0	17.8
Queue Length 50th (ft)	31	133	74	106
Queue Length 95th (ft)	54	187	109	149
Internal Link Dist (ft)	675	942	393	3387
Turn Bay Length (ft)				
Base Capacity (vph)	597	683	655	675
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.29	0.78	0.48	0.63
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

12: NW Brady Rd & NW 16th Ave

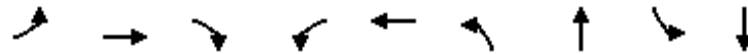
2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Volume (vph)	52	55	26	154	91	167	49	154	40	63	185	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.97			0.95			0.98			0.97	
Flt Protected		0.98			0.98			0.99			0.99	
Satd. Flow (prot)		1672			1707			1749			1754	
Flt Permitted		0.76			0.82			0.87			0.89	
Satd. Flow (perm)		1296			1429			1545			1575	
Peak-hour factor, PHF	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Adj. Flow (vph)	68	71	34	200	118	217	64	200	52	82	240	103
RTOR Reduction (vph)	0	15	0	0	41	0	0	12	0	0	19	0
Lane Group Flow (vph)	0	158	0	0	494	0	0	304	0	0	406	0
Confl. Peds. (#/hr)			1	1								
Heavy Vehicles (%)	10%	10%	0%	3%	6%	2%	0%	4%	16%	7%	3%	3%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		27.0			27.0			25.0			25.0	
Effective Green, g (s)		27.0			27.0			25.0			25.0	
Actuated g/C Ratio		0.45			0.45			0.42			0.42	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		1.5			1.5			1.5			1.5	
Lane Grp Cap (vph)		583			643			643			656	
v/s Ratio Prot												
v/s Ratio Perm		0.12			0.35			0.20			0.26	
v/c Ratio		0.27			0.77			0.47			0.62	
Uniform Delay, d1		10.3			13.9			12.7			13.8	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.1			8.6			2.5			4.3	
Delay (s)		11.5			22.5			15.2			18.1	
Level of Service		B			C			B			B	
Approach Delay (s)		11.5			22.5			15.2			18.1	
Approach LOS		B			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			18.3			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			60.0			Sum of lost time (s)			8.0			
Intersection Capacity Utilization			60.5%			ICU Level of Service				B		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

1: SE 192nd Ave & Mill Plain Blvd

2/26/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	347	28	548	49	63	503	1106	38	1130
v/c Ratio	1.51	0.13	0.81	0.27	0.45	0.57	0.54	0.32	0.88
Control Delay	282.8	40.8	30.4	45.8	35.5	37.8	5.5	51.0	39.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	282.8	40.8	30.4	45.8	35.5	37.8	5.5	51.0	39.1
Queue Length 50th (ft)	~309	16	211	31	19	120	124	24	332
Queue Length 95th (ft)	#484	42	322	66	59	m148	68	55	#536
Internal Link Dist (ft)		517			357		2419		550
Turn Bay Length (ft)	225		125	400		200		150	
Base Capacity (vph)	230	513	673	214	411	877	2059	175	1282
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.51	0.05	0.81	0.23	0.15	0.57	0.54	0.22	0.88

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

1: SE 192nd Ave & Mill Plain Blvd

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	330	27	521	47	29	30	478	990	61	36	842	232
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.92		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1900	1605	1703	1612		3467	3462		1752	3422	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1900	1605	1703	1612		3467	3462		1752	3422	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	347	28	548	49	31	32	503	1042	64	38	886	244
RTOR Reduction (vph)	0	0	103	0	30	0	0	3	0	0	23	0
Lane Group Flow (vph)	347	28	445	49	33	0	503	1103	0	38	1107	0
Confl. Peds. (#/hr)	17		9	9		17	1		1	1		1
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	2%	0%	0%	6%	7%	7%	1%	3%	7%	3%	2%	1%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2									
Actuated Green, G (s)	13.0	10.2	35.5	9.7	6.9		25.3	55.4		4.7	34.8	
Effective Green, g (s)	13.0	10.2	35.5	9.7	6.9		25.3	55.4		4.7	34.8	
Actuated g/C Ratio	0.13	0.10	0.36	0.10	0.07		0.25	0.55		0.05	0.35	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	230	193	650	165	111		877	1917		82	1190	
v/s Ratio Prot	c0.20	0.01	c0.17	0.03	0.02		0.15	0.32		0.02	c0.32	
v/s Ratio Perm			0.10									
v/c Ratio	1.51	0.15	0.69	0.30	0.30		0.57	0.58		0.46	0.93	
Uniform Delay, d1	43.5	40.9	27.5	42.0	44.3		32.6	14.6		46.4	31.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.09	0.34		1.00	1.00	
Incremental Delay, d2	250.2	0.1	2.4	0.4	0.6		0.3	0.7		1.5	13.9	
Delay (s)	293.7	41.1	29.9	42.3	44.8		36.0	5.7		47.9	45.3	
Level of Service	F	D	C	D	D		D	A		D	D	
Approach Delay (s)		129.4			43.7			15.2			45.4	
Approach LOS		F			D			B			D	
Intersection Summary												
HCM 2000 Control Delay			52.9				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.98									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			81.8%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

2: SE 192nd Ave & SE 15th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	140	227	60	35	65	198	1806	75	1711
v/c Ratio	0.77	0.72	0.50	0.26	0.23	0.56	0.85	0.53	1.06
Control Delay	70.5	22.9	58.0	46.5	7.3	40.1	24.0	58.9	58.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	70.5	22.9	58.0	46.5	7.3	40.1	24.0	58.9	58.4
Queue Length 50th (ft)	89	21	38	22	0	119	429	47	~635
Queue Length 95th (ft)	#175	79	73	46	21	m145	m#708	m60	#824
Internal Link Dist (ft)		621		676			1122		2419
Turn Bay Length (ft)	100		100		100	150		475	
Base Capacity (vph)	192	534	168	447	327	351	2114	199	1620
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.43	0.36	0.08	0.20	0.56	0.85	0.38	1.06

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

2: SE 192nd Ave & SE 15th St

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	119	30	163	51	30	55	168	1456	79	64	1328	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.87		1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1736	1619		1687	1863	1604	1787	3509		1805	3485	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1736	1619		1687	1863	1604	1787	3509		1805	3485	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	140	35	192	60	35	65	198	1713	93	75	1562	149
RTOR Reduction (vph)	0	173	0	0	0	57	0	3	0	0	6	0
Lane Group Flow (vph)	140	54	0	60	35	8	198	1803	0	75	1705	0
Confl. Peds. (#/hr)	3		1	1		3	2		6	6		2
Confl. Bikes (#/hr)			1									1
Heavy Vehicles (%)	4%	2%	1%	7%	2%	0%	1%	2%	0%	0%	2%	2%
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6	3	7	4		3	8	
Permitted Phases						6						
Actuated Green, G (s)	10.6	9.8		6.2	5.4	12.2	19.7	57.2		6.8	44.3	
Effective Green, g (s)	10.6	9.8		6.2	5.4	12.2	19.7	57.2		6.8	44.3	
Actuated g/C Ratio	0.11	0.10		0.06	0.05	0.12	0.20	0.57		0.07	0.44	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lane Grp Cap (vph)	184	158		104	100	275	352	2007		122	1543	
v/s Ratio Prot	c0.08	c0.03		0.04	0.02	0.00	c0.11	c0.51		0.04	c0.49	
v/s Ratio Perm						0.00						
v/c Ratio	0.76	0.34		0.58	0.35	0.03	0.56	0.90		0.61	1.10	
Uniform Delay, d1	43.5	42.1		45.6	45.6	38.7	36.3	18.8		45.3	27.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.98	1.07		1.12	0.74	
Incremental Delay, d2	15.3	0.5		4.7	0.8	0.0	0.6	3.8		4.5	54.7	
Delay (s)	58.7	42.6		50.4	46.4	38.7	36.2	24.0		55.3	75.2	
Level of Service	E	D		D	D	D	D	C		E	E	
Approach Delay (s)		48.7			44.8			25.2			74.4	
Approach LOS		D			D			C			E	
Intersection Summary												
HCM 2000 Control Delay			48.3				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.92									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			82.9%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

3: SE 192nd Ave & SE 20th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	150	305	307	232	511	121	1316	349	1213
v/c Ratio	0.74	1.07	0.97	0.68	0.80	0.76	1.03	1.03	0.74
Control Delay	68.3	112.0	91.4	49.6	32.7	81.8	51.0	80.4	25.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.3	112.0	91.4	49.6	32.7	81.8	51.0	80.4	25.6
Queue Length 50th (ft)	49	~203	102	140	226	84	~475	~248	238
Queue Length 95th (ft)	#96	#372	#188	#227	#386	m#125	#590	m#253	m284
Internal Link Dist (ft)		1188		973			3702		1122
Turn Bay Length (ft)	100		100		200	325		400	
Base Capacity (vph)	208	285	315	341	637	180	1281	339	1635
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.72	1.07	0.97	0.68	0.80	0.67	1.03	1.03	0.74

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

3: SE 192nd Ave & SE 20th St

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 			 				 			 	
Volume (vph)	144	187	106	295	223	491	116	1086	178	335	1010	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	0.97	1.00		0.97	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3467	1767		3502	1881	1587	1805	3427		1787	3444	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3467	1767		3502	1881	1587	1805	3427		1787	3444	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	150	195	110	307	232	511	121	1131	185	349	1052	161
RTOR Reduction (vph)	0	20	0	0	0	48	0	13	0	0	12	0
Lane Group Flow (vph)	150	285	0	307	232	463	121	1303	0	349	1201	0
Confl. Peds. (#/hr)	1		3	3		1	5		1	1		5
Confl. Bikes (#/hr)			1			4			5			3
Heavy Vehicles (%)	1%	0%	3%	0%	1%	1%	0%	3%	1%	1%	2%	4%
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6	3	7	4		3	8	
Permitted Phases						6						
Actuated Green, G (s)	5.9	15.0		9.0	18.1	37.1	8.9	37.0		19.0	47.1	
Effective Green, g (s)	5.9	15.0		9.0	18.1	37.1	8.9	37.0		19.0	47.1	
Actuated g/C Ratio	0.06	0.15		0.09	0.18	0.37	0.09	0.37		0.19	0.47	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lane Grp Cap (vph)	204	265		315	340	668	160	1267		339	1622	
v/s Ratio Prot	0.04	c0.16		c0.09	0.12	c0.13	0.07	c0.38		c0.20	0.35	
v/s Ratio Perm						0.16						
v/c Ratio	0.74	1.07		0.97	0.68	0.69	0.76	1.03		1.03	0.74	
Uniform Delay, d1	46.3	42.5		45.4	38.3	26.6	44.5	31.5		40.5	21.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.33	0.63		1.15	1.14	
Incremental Delay, d2	11.2	76.3		43.3	4.5	2.5	13.1	29.8		34.3	0.9	
Delay (s)	57.5	118.8		88.7	42.7	29.2	72.2	49.7		80.7	25.4	
Level of Service	E	F		F	D	C	E	D		F	C	
Approach Delay (s)		98.6			49.6			51.6			37.8	
Approach LOS		F			D			D			D	
Intersection Summary												
HCM 2000 Control Delay			51.1			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			1.03									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			96.0%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

4: SE 192nd Ave & SE 34th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	163	285	427	373	114	1077	211	278	1298
v/c Ratio	0.66	0.71	1.33	0.57	0.49	0.69	0.27	0.68	0.77
Control Delay	41.9	43.6	195.8	26.0	51.5	26.5	3.9	40.2	28.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.9	43.6	195.8	26.0	51.5	26.5	3.9	40.2	28.9
Queue Length 50th (ft)	81	73	~303	67	37	283	0	91	311
Queue Length 95th (ft)	129	112	#470	110	63	410	46	m119	m380
Internal Link Dist (ft)		670		7104		563			3702
Turn Bay Length (ft)	150		150		300		300	175	
Base Capacity (vph)	256	961	322	1164	282	1551	795	419	1695
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.64	0.30	1.33	0.32	0.40	0.69	0.27	0.66	0.77

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

4: SE 192nd Ave & SE 34th St

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	147	181	76	384	197	139	103	969	190	250	999	169
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.96		1.00	0.94		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1752	3389		1769	3312		3433	3505	1532	3502	3440	
Flt Permitted	0.53	1.00		0.26	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	977	3389		493	3312		3433	3505	1532	3502	3440	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	163	201	84	427	219	154	114	1077	211	278	1110	188
RTOR Reduction (vph)	0	57	0	0	130	0	0	0	118	0	10	0
Lane Group Flow (vph)	163	228	0	427	243	0	114	1077	93	278	1288	0
Confl. Peds. (#/hr)	1		1	1		1	2		1	1		2
Confl. Bikes (#/hr)						2			1			2
Heavy Vehicles (%)	3%	2%	0%	2%	2%	1%	2%	3%	3%	0%	2%	5%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6					4			
Actuated Green, G (s)	18.5	10.1		29.1	15.7		6.9	44.3	44.3	11.6	49.0	
Effective Green, g (s)	18.5	10.1		29.1	15.7		6.9	44.3	44.3	11.6	49.0	
Actuated g/C Ratio	0.18	0.10		0.29	0.16		0.07	0.44	0.44	0.12	0.49	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lane Grp Cap (vph)	245	342		322	519		236	1552	678	406	1685	
v/s Ratio Prot	0.06	0.07		c0.19	0.07		0.03	0.31		c0.08	c0.37	
v/s Ratio Perm	0.07			c0.20					0.06			
v/c Ratio	0.67	0.67		1.33	0.47		0.48	0.69	0.14	0.68	0.76	
Uniform Delay, d1	36.6	43.3		32.2	38.4		44.8	22.4	16.5	42.4	20.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	0.82	1.23	
Incremental Delay, d2	5.2	3.8		166.7	0.2		0.6	2.6	0.4	2.4	2.1	
Delay (s)	41.8	47.1		198.9	38.6		45.4	25.0	16.9	37.1	27.7	
Level of Service	D	D		F	D		D	C	B	D	C	
Approach Delay (s)		45.2			124.2			25.4			29.3	
Approach LOS		D			F			C			C	
Intersection Summary												
HCM 2000 Control Delay			47.7			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			1.00									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			83.2%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

5: Site Driveway & SE 20th Street

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	487	79	9	866	2	40	0	5	2	0	27
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	12	601	98	11	1069	2	49	0	6	2	0	33
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	TWLTL			TWLTL								
Median storage veh	2			2								
Upstream signal (ft)	1053			1170								
pX, platoon unblocked	0.76			0.93			0.80	0.80	0.93	0.80	0.80	0.76
vC, conflicting volume	1072			699			1799	1769	650	1725	1816	1070
vC1, stage 1 conf vol							675	675		1093	1093	
vC2, stage 2 conf vol							1125	1094		632	723	
vCu, unblocked vol	938			641			1685	1646	588	1591	1706	937
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			99			70	100	99	99	100	87
cM capacity (veh/h)	563			889			165	215	478	208	219	247
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	12	699	11	1072	56	36						
Volume Left	12	0	11	0	49	2						
Volume Right	0	98	0	2	6	33						
cSH	563	1700	889	1700	178	244						
Volume to Capacity	0.02	0.41	0.01	0.63	0.31	0.15						
Queue Length 95th (ft)	2	0	1	0	32	13						
Control Delay (s)	11.5	0.0	9.1	0.0	34.2	22.3						
Lane LOS	B		A		D	C						
Approach Delay (s)	0.2		0.1		34.2	22.3						
Approach LOS					D	C						
Intersection Summary												
Average Delay				1.6								
Intersection Capacity Utilization				Err%	ICU Level of Service			H				
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

6: Site Driveway 2 & SE 20th Street

2/26/2018

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	441	53	10	673	204	33
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	544	65	12	831	252	41
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage (veh)	2			2		
Upstream signal (ft)				530		
pX, platoon unblocked					0.66	
vC, conflicting volume			610		1433	577
vC1, stage 1 conf vol					577	
vC2, stage 2 conf vol					856	
vCu, unblocked vol			610		1398	577
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			99		23	92
cM capacity (veh/h)			979		327	520
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	
Volume Total	610	12	831	252	41	
Volume Left	0	12	0	252	0	
Volume Right	65	0	0	0	41	
cSH	1700	979	1700	327	520	
Volume to Capacity	0.36	0.01	0.49	0.77	0.08	
Queue Length 95th (ft)	0	1	0	153	6	
Control Delay (s)	0.0	8.7	0.0	45.0	12.5	
Lane LOS		A		E	B	
Approach Delay (s)	0.0	0.1		40.4		
Approach LOS				E		
Intersection Summary						
Average Delay			6.8			
Intersection Capacity Utilization			53.4%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

7: NW Fisher Creek Drive & Site Driveway 3

2/26/2018

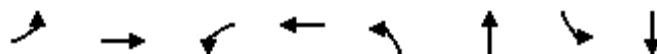


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	103	1	4	334	19	41
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	137	1	5	445	25	55
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)					380	
pX, platoon unblocked						
vC, conflicting volume	286	53	80			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	286	53	80			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	80	100	100			
cM capacity (veh/h)	684	1010	1531			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	139	154	297	80		
Volume Left	137	5	0	0		
Volume Right	1	0	0	55		
cSH	686	1531	1700	1700		
Volume to Capacity	0.20	0.00	0.17	0.05		
Queue Length 95th (ft)	19	0	0	0		
Control Delay (s)	11.6	0.3	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s)	11.6	0.1		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			2.5			
Intersection Capacity Utilization			24.5%		ICU Level of Service	A
Analysis Period (min)			15			

Queues

9: NW Fisher Creek Drive & SE 20th St

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	43	542	38	380	437	102	9	33
v/c Ratio	0.14	0.80	0.22	0.56	0.74	0.14	0.02	0.04
Control Delay	15.3	28.8	18.5	19.2	19.4	2.5	6.7	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.3	28.8	18.5	19.2	19.4	2.5	6.7	0.1
Queue Length 50th (ft)	8	125	7	79	93	1	1	0
Queue Length 95th (ft)	30	#325	31	180	140	14	6	0
Internal Link Dist (ft)		450		4148		300		206
Turn Bay Length (ft)	100		100				100	
Base Capacity (vph)	304	681	171	677	985	1134	925	1195
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.80	0.22	0.56	0.44	0.09	0.01	0.03

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

9: NW Fisher Creek Drive & SE 20th St

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	35	410	29	31	302	6	354	0	83	7	0	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00		1.00	0.85		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1860		1802	1857		1805	1568		1805	1615	
Flt Permitted	0.44	1.00		0.25	1.00		0.74	1.00		0.69	1.00	
Satd. Flow (perm)	838	1860		473	1857		1398	1568		1313	1615	
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	43	506	36	38	373	7	437	0	102	9	0	33
RTOR Reduction (vph)	0	4	0	0	1	0	0	57	0	0	19	0
Lane Group Flow (vph)	43	538	0	38	379	0	437	45	0	9	14	0
Confl. Peds. (#/hr)			3	3								
Confl. Bikes (#/hr)			3			5						
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	0%	0%	3%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	17.5	17.5		17.5	17.5		20.3	20.3		20.3	20.3	
Effective Green, g (s)	17.5	17.5		17.5	17.5		20.3	20.3		20.3	20.3	
Actuated g/C Ratio	0.37	0.37		0.37	0.37		0.42	0.42		0.42	0.42	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	306	680		173	679		593	665		557	685	
v/s Ratio Prot		c0.29			0.20			0.03			0.01	
v/s Ratio Perm	0.05			0.08			c0.31			0.01		
v/c Ratio	0.14	0.79		0.22	0.56		0.74	0.07		0.02	0.02	
Uniform Delay, d1	10.1	13.5		10.4	12.1		11.5	8.1		8.0	8.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	6.3		0.6	1.0		4.8	0.0		0.0	0.0	
Delay (s)	10.3	19.8		11.1	13.1		16.3	8.2		8.0	8.0	
Level of Service	B	B		B	B		B	A		A	A	
Approach Delay (s)		19.1			12.9			14.7			8.0	
Approach LOS		B			B			B			A	
Intersection Summary												
HCM 2000 Control Delay			15.7			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			47.8			Sum of lost time (s)			10.0			
Intersection Capacity Utilization			63.7%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

10: NW Parker St & NW 38th Ave

2/26/2018



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	121	469	114	229	98	280	216	67	272	90
v/c Ratio	0.25	0.79	0.40	0.39	0.26	0.60	0.32	0.19	0.59	0.13
Control Delay	11.3	30.4	14.4	18.2	14.1	27.3	3.5	13.2	27.2	3.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.3	30.4	14.4	18.2	14.1	27.3	3.5	13.2	27.2	3.7
Queue Length 50th (ft)	25	149	24	63	23	96	0	15	93	0
Queue Length 95th (ft)	50	#275	48	112	47	159	31	35	155	21
Internal Link Dist (ft)		4148		899		2420			638	
Turn Bay Length (ft)	125		150		125			250		125
Base Capacity (vph)	490	590	282	582	370	470	685	362	461	697
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.79	0.40	0.39	0.26	0.60	0.32	0.19	0.59	0.13

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

10: NW Parker St & NW 38th Ave

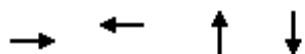
2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	105	261	147	99	161	38	85	244	188	58	237	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.95		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1804	1788		1735	1822		1805	1881	1580	1801	1845	1583
Flt Permitted	0.54	1.00		0.21	1.00		0.42	1.00	1.00	0.41	1.00	1.00
Satd. Flow (perm)	1028	1788		383	1822		805	1881	1580	777	1845	1583
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	121	300	169	114	185	44	98	280	216	67	272	90
RTOR Reduction (vph)	0	32	0	0	13	0	0	0	142	0	0	59
Lane Group Flow (vph)	121	437	0	114	216	0	98	280	74	67	272	31
Confl. Peds. (#/hr)	1		2	2		1			5	5		
Confl. Bikes (#/hr)			1			1						
Heavy Vehicles (%)	0%	0%	0%	4%	1%	0%	0%	1%	0%	0%	3%	2%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	3	8		7	4		1	6	7	5	2	3
Permitted Phases	8			4			6		6	2		2
Actuated Green, G (s)	26.0	20.0		26.0	20.0		22.0	16.0	22.0	22.0	16.0	22.0
Effective Green, g (s)	26.0	20.0		26.0	20.0		22.0	16.0	22.0	22.0	16.0	22.0
Actuated g/C Ratio	0.41	0.31		0.41	0.31		0.34	0.25	0.34	0.34	0.25	0.34
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	0.2	1.5		0.2	1.5		0.2	1.5	0.2	0.2	1.5	0.2
Lane Grp Cap (vph)	490	558		282	569		370	470	641	363	461	643
v/s Ratio Prot	0.02	c0.24		c0.04	0.12		c0.02	c0.15	0.01	0.02	0.15	0.00
v/s Ratio Perm	0.08			0.13			0.07		0.04	0.05		0.02
v/c Ratio	0.25	0.78		0.40	0.38		0.26	0.60	0.12	0.18	0.59	0.05
Uniform Delay, d1	12.1	20.0		13.3	17.2		14.7	21.1	14.4	14.5	21.1	14.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	10.6		4.3	1.9		1.7	5.5	0.4	1.1	5.5	0.1
Delay (s)	13.3	30.6		17.5	19.1		16.5	26.6	14.7	15.6	26.6	14.2
Level of Service	B	C		B	B		B	C	B	B	C	B
Approach Delay (s)		27.0			18.6			20.6			22.3	
Approach LOS		C			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			22.6			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.61									
Actuated Cycle Length (s)			64.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			58.8%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

12: NW Brady Rd & NW 16th Ave

2/26/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	184	312	427	431
v/c Ratio	0.33	0.57	0.45	0.60
Control Delay	14.8	17.5	8.4	13.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	14.8	17.5	8.4	13.7
Queue Length 50th (ft)	41	68	64	94
Queue Length 95th (ft)	82	132	114	165
Internal Link Dist (ft)	675	942	393	3387
Turn Bay Length (ft)				
Base Capacity (vph)	562	543	959	721
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.33	0.57	0.45	0.60
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

12: NW Brady Rd & NW 16th Ave

2/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	29	96	36	90	61	121	19	200	152	144	202	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			1.00			0.99			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.97			0.94			0.94			0.99	
Flt Protected		0.99			0.98			1.00			0.98	
Satd. Flow (prot)		1775			1708			1765			1814	
Flt Permitted		0.91			0.86			0.97			0.73	
Satd. Flow (perm)		1635			1487			1721			1342	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	33	110	41	103	70	139	22	230	175	166	232	33
RTOR Reduction (vph)	0	17	0	0	48	0	0	42	0	0	5	0
Lane Group Flow (vph)	0	167	0	0	264	0	0	385	0	0	426	0
Confl. Peds. (#/hr)			4	4			1		1	1		1
Confl. Bikes (#/hr)			5									2
Heavy Vehicles (%)	0%	1%	7%	4%	6%	0%	0%	1%	0%	1%	2%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		20.0			20.0			32.0			32.0	
Effective Green, g (s)		20.0			20.0			32.0			32.0	
Actuated g/C Ratio		0.33			0.33			0.53			0.53	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		1.5			1.5			1.5			1.5	
Lane Grp Cap (vph)		545			495			917			715	
v/s Ratio Prot												
v/s Ratio Perm		0.10			c0.18			0.22			c0.32	
v/c Ratio		0.31			0.53			0.42			0.60	
Uniform Delay, d1		14.8			16.2			8.4			9.6	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.4			4.1			1.4			3.6	
Delay (s)		16.3			20.3			9.8			13.2	
Level of Service		B			C			A			B	
Approach Delay (s)		16.3			20.3			9.8			13.2	
Approach LOS		B			C			A			B	
Intersection Summary												
HCM 2000 Control Delay			14.2									
HCM 2000 Volume to Capacity ratio			0.57									
Actuated Cycle Length (s)			60.0									
Intersection Capacity Utilization			78.5%									
Analysis Period (min)			15									
c Critical Lane Group												