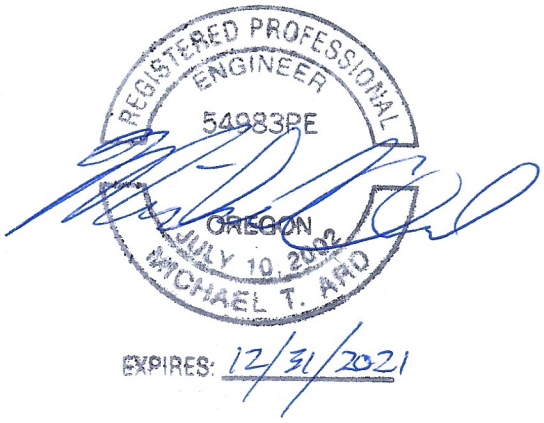
THE PAD
TRAFFIC IMPACT STUDY

SANDY, OREGON



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EXECUTIVE SUMMARY

1. A residential development is proposed on the east side of Highway 211 opposite Tupper Road in Sandy, Oregon. The proposed development will consist of 12 townhome dwelling units. As currently proposed, the site will take access via a new driveway on Highway 211 opposite Tupper Road.

2. Upon completion of proposed development, the subject property is projected to generate 6 new site trips during the morning peak hour, 7 trips during the evening peak hour, and 88 new daily site trips.

3. Based on the operational analysis, the study intersections currently operate acceptably and are projected to continue to operate acceptably under year 2022 traffic conditions either with or without the addition of site trips from the proposed development.

4. Based on the queuing analysis, the northbound 95th percentile queues on Highway 211 approaching Pioneer Boulevard are projected to extend beyond the Tupper Road/site access intersection during the peak hours. If sufficient width can be made available to accommodate a raised center median within Highway 211, it is recommended that the median be installed in conjunction with the proposed development. If a center median cannot be constructed within Highway 211, it is recommended that the site access be limited to right-in, right-out only through the installation of a "pork-chop" diverter within the new driveway approach.

5. Based on the crash data, the study intersections are currently operating acceptably with respect to safety.

6. Based on the detailed warrant analysis, no new traffic signals or turn lanes are recommended in conjunction with the proposed development.

7. At the request of ODOT staff, three potential site access alternatives were examined. Based on the analysis, it is recommended that site access be provided to Highway 211 directly opposite Tupper Road.

PROJECT DESCRIPTION & LOCATION

INTRODUCTION

A 12-unit residential townhome development is proposed for a property located on the east side of Highway 211 opposite Tupper Road in Sandy, Oregon.

As currently proposed, the site would take access via a new driveway intersecting Highway 211 directly opposite Tupper Road. At the request of the Oregon Department of Transportation, two alternative access scenarios are also considered within this study. Under the first alternative, access would be shared with the existing City Hall/Joe's Donuts access driveway on Highway 211 approximately 75 feet south of the near-side crosswalk at the signalized intersection of Highway 26 at Highway 211. Under the second alternative, a new driveway would be constructed at the north end of the subject property immediately adjacent to the exiting City Hall/Joe's Donuts access. All three potential access scenarios are discussed, with information regarding safety and operation at the time of project opening and farther into the future.

This report addresses the impacts of the proposed development on the surrounding street system. The purpose of this analysis is to determine whether the surrounding transportation system is capable of safely and efficiently supporting the proposed use and to identify any necessary improvements and mitigations.

SITE LOCATION AND STUDY AREA DESCRIPTION

The subject property has a total area of 0.59 acres and is zoned R-3 (High-Density Residential). The site is currently undeveloped, and the proposed development is permitted within the R-3 zone. The subject property is surrounded by existing commercial and institutional uses within the Central Business District zone to the west, north and east, and by parks property to the south.

Oregon Highway 211 (Eagle Creek Sandy Highway) is classified by the Oregon Department of Transportation as a District Highway. It has a two-lane cross-section with one through lane in each direction and added turn lanes at major intersections. It has a posted speed limit of 40 mph in the site vicinity.

Pioneer Boulevard forms the eastbound travel lanes of US Highway 26 (Mt. Hood Highway) in the site vicinity. The highway is classified by the Oregon Department of Transportation as a Statewide Highway and a Freight Route within a Special Transportation Area. It generally has two eastbound travel lanes plus a bike lane, with on-street parking and sidewalks in place on both sides of the roadway. It has a posted speed limit of 25 mph.

Tupper Road is classified by the City of Sandy as a collector street and is striped to prohibit passing. On the south side of the roadway existing curbs and sidewalks are in place in the site vicinity, while the north side has a narrow gravel shoulder.

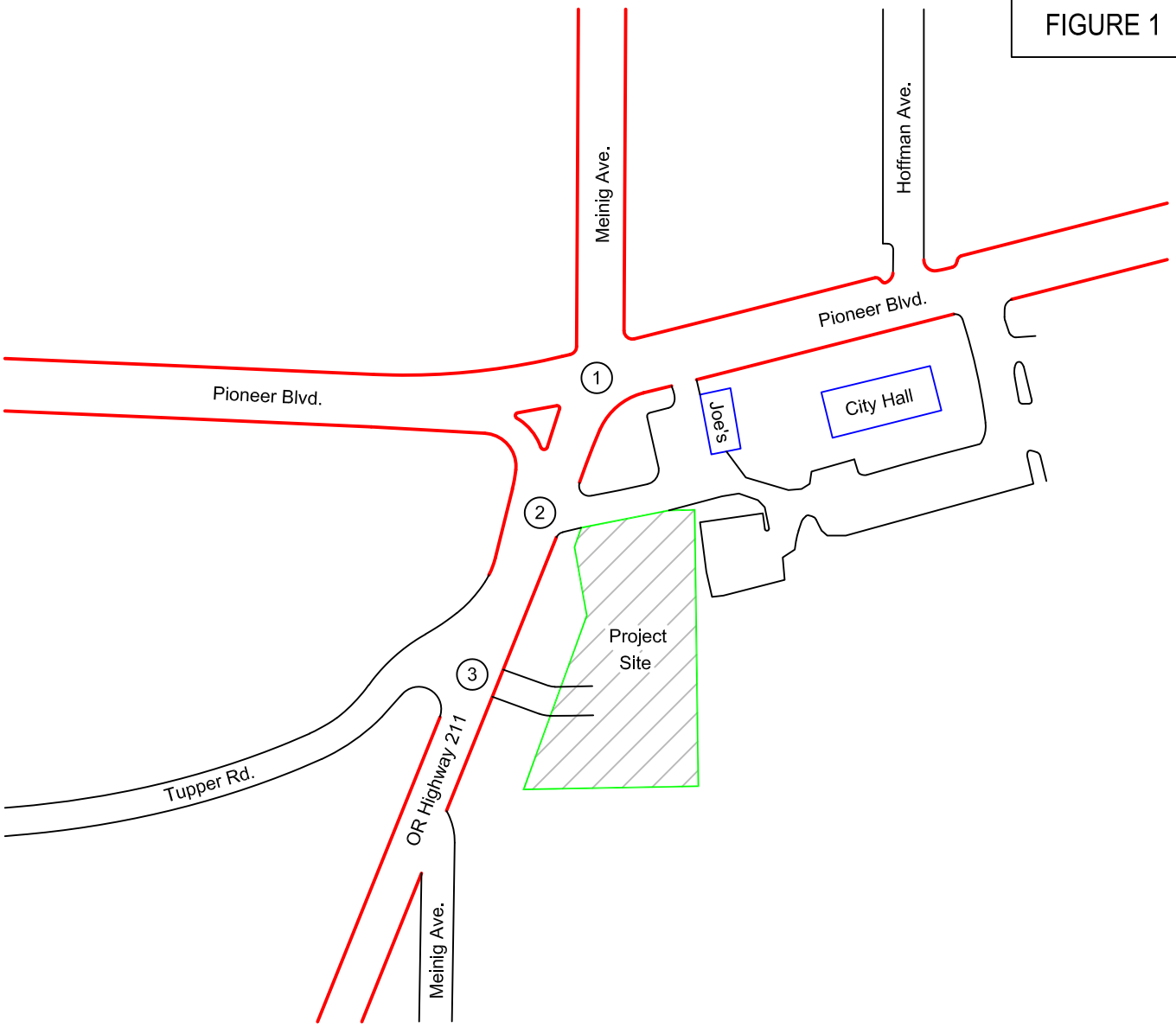
EXISTING CONDITIONS

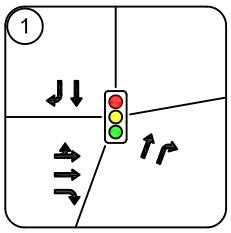
The intersection of Pioneer Boulevard/US Highway 26 at Highway 211 is currently a four-way intersection controlled by a traffic signal. The eastbound approach has a shared through/left lane, an exclusive through lane and a right-turn lane which operates under yield control. The northbound approach has a through lane and a right-turn lane. The southbound approach has a left-turn lane and a through lane. All four legs of the intersection have marked crosswalks in place with pedestrian signals.

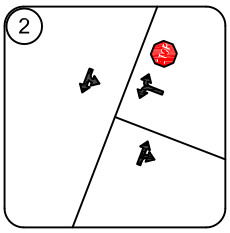
The intersection of Highway 211 at Tupper Road is currently a T-intersection controlled by a stop sign on the eastbound Tupper Road approach. Through traffic traveling along Highway 211 does not stop. Each approach has a single, shared lane for all turning movements.

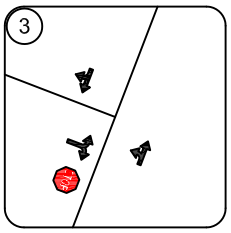
A vicinity map displaying the project site, vicinity streets, and the study intersections including lane configurations is provided in Figure 1 on page 6.

FIGURE 1









LEGEND

(#) Study Intersection

Traffic Signal

STOP Stop Control

VICINITY MAP
Study Intersections
Lane Configurations and Traffic Control

TRAFFIC COUNT DATA

Due to the current COVID-19 crisis, traffic volumes in the site vicinity are not representative of typical conditions. In order to provide count data that more conservatively reflects expectations regarding future traffic volumes, historical count data was used in conjunction with modeling data and intersection observations to develop estimates of the traffic volumes that would be expected absent the impacts of the current pandemic.

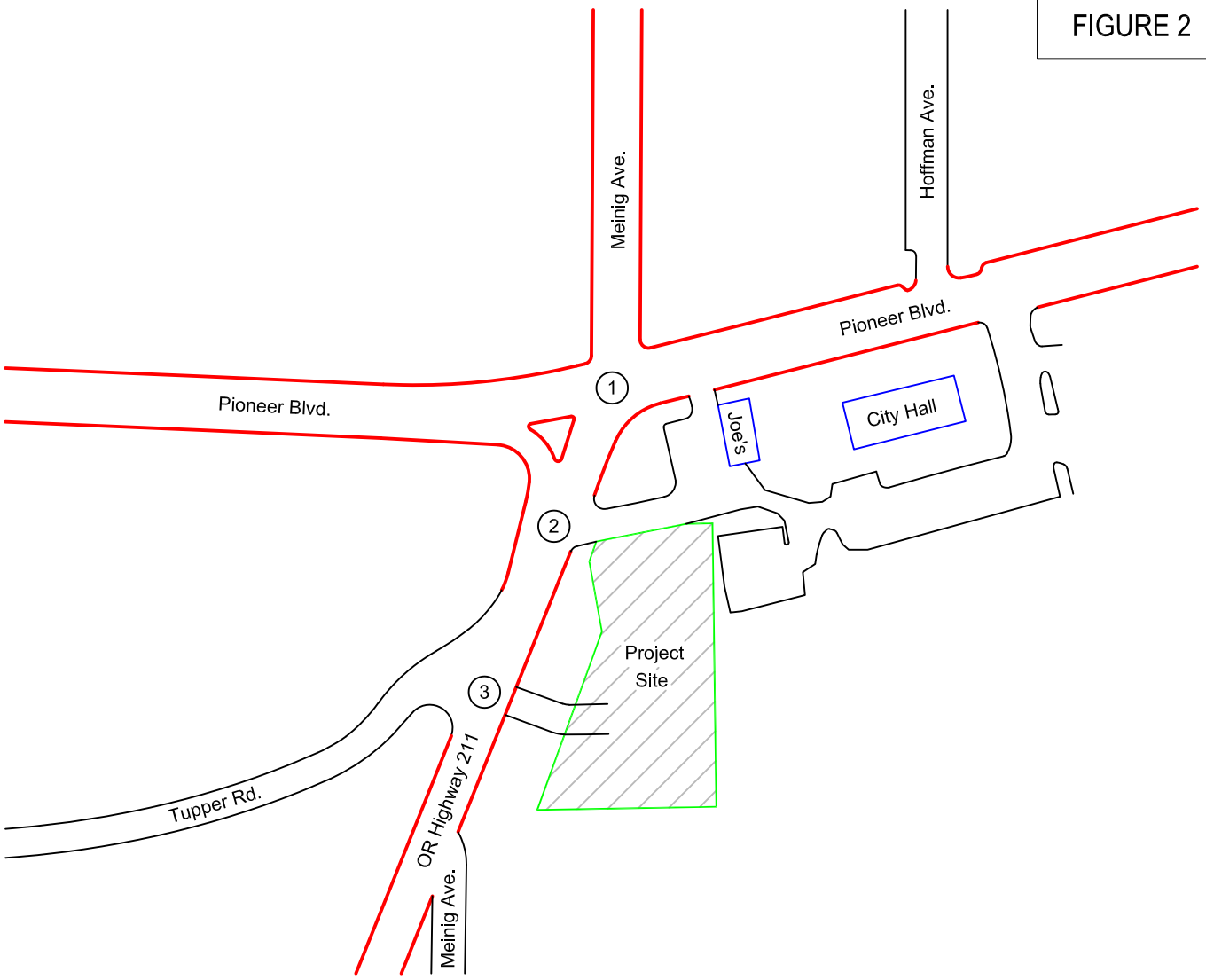
The data sources used include recent count data collected at the nearby intersections of Highway 211 at Dubarko Road and Highway 26 at Ten Eyck Road/Wolf Drive to determine through traffic volumes along the respective highways, along with seasonal data, growth data and planning model data from ODOT to determine how those volumes change over distance and time, as well as direct observation of the relative volumes for different turning movements at the intersections of Highway 26 at Highway 211 and Highway 211 at Tupper Road.

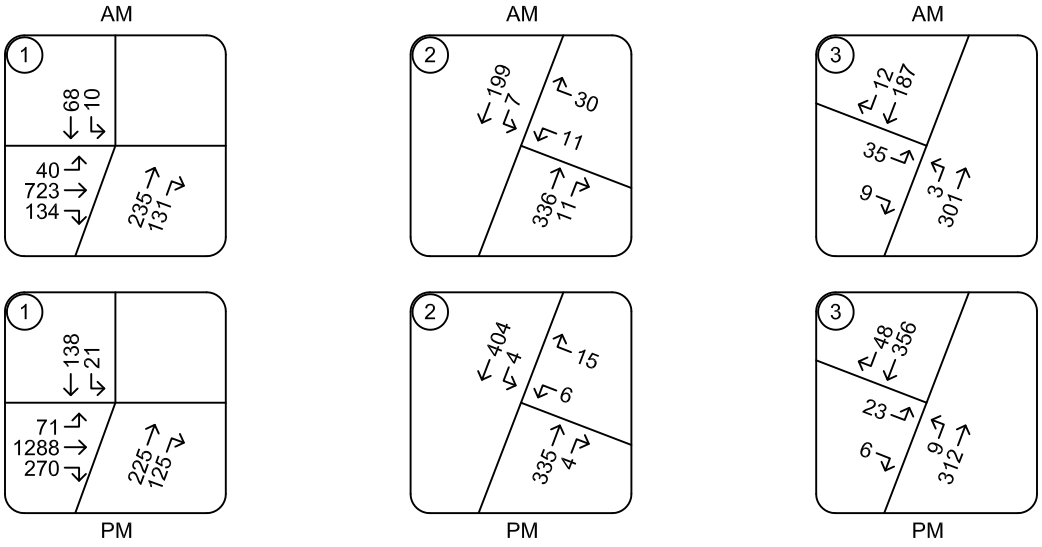
The historical count data for the intersections of Highway 211 at Dubarko Road and Highway 26 at Ten Eyck Road/Wolf Drive were conducted at the study intersections on Tuesday March 19th, 2019 from 4:00 to 6:00 PM and on Wednesday March 20th, 2019 from 7:00 to 9:00 AM. The resulting data was adjusted to reflect the projected 30th-highest hour volumes for year 2020 traffic conditions as part of the traffic impact study prepared for the Bull Run Terrace Subdivision project. These adjusted future volumes were used to determine the expected through traffic volumes along Highway 26 and Highway 211 in the site vicinity. A diagram excerpted from the Bull Run Terrace TIS showing the year 2020 traffic volumes is included in the attached technical appendix.

In addition to determination of the expected through traffic volumes, it was necessary to determine the turning movement volumes at the study intersections for year 2020 traffic conditions absent the pandemic. Turning movements were estimated based on direct observation of the relative volumes of traffic making each turning movement at the intersections. After calculating the through movement volumes, the percentage of traffic observed making turning movements was applied to determine the remaining hourly volumes.

Figure 2 on page 8 shows the existing 2020 30th-highest hour traffic volumes for the morning and evening peak hours at the study intersections.

FIGURE 2





TRAFFIC VOLUMES
2020 Existing 30th-Highest Hour (August) Conditions
Morning and Evening Peak Hours

OPERATIONAL ANALYSIS

An operational analysis was conducted for the study intersections using Synchro 10 software, with outputs calculated based on the *HIGHWAY CAPACITY MANUAL, 6th Edition.* The analysis was conducted for the weekday morning and evening peak hours.

The purpose of the existing conditions analysis is to establish how the study area intersections operate currently and allow for calibration of the operational analysis if required.

The results of the operational analysis are reported based on delay, Level of Service (LOS), and volume-to-capacity ratio (v/c). Delays are reported in seconds. Level of service is reported as a letter grade and can range from A to F, with level of service A representing nearly free-flow conditions and level of service F representing high delays and severe congestion. A report of level of service D generally indicates moderately high but tolerable delays, and typically occurs prior to reaching intersection capacity. For unsignalized intersections, the v/c represents the portion of the available intersection capacity that is being utilized on the worst intersection approach. A v/c ratio of 1.0 would indicate that the approach is operating at capacity.

A summary of the existing conditions operational analysis is provided in Table 1 below. For the signalized intersection of Highway 26 at Highway 211, the reported delays, levels of service and volume-to capacity ratios represent the overall operation of the intersection. For the two unsignalized study intersections, the reported delays and levels-of-service represent the approach lane which experiences the highest delays, while the reported v/c ratios represent the highest ratio for the major-street and minor-street movements.

The Oregon Department of Transportation requires that the study intersections operate with a volume-to-capacity ratio (v/c) of 0.90 or less.

Based on the analysis, the study intersections are currently operating acceptably. Detailed capacity analysis worksheets are provided in the technical appendix.

Table 1 - Operational Analysis Summary: 2020 Existing 30th-Highest Hour Conditions

Intersection	AM Peak Hour			PM Peak Hour		
	Delay	LOS	v/c	Delay	LOS	v/c
Highway 26 at Highway 211	18.2	B	0.53	20.7	C	0.71
Highway 211 at City Hall Access	11.6	B	0.22	12	B	0.25
Highway 211 at Tupper Road	12.3	B	0.19	14.7	B	0.25

SITE TRIPS

Proposed Development

The proposed new development will consist of 12 townhome dwelling units. To estimate the number of trips that will be generated by the proposed development, trip rates from the *TRIP GENERATION MANUAL, 10th EDITION* were used. Data from land-use code 220, *Multi-Family Housing*, were used. The trip estimates are based on the number of dwelling units.

A summary of the trip generation calculations is provided in Table 2 below. Detailed trip generation worksheets are also included in the technical appendix.

Table 2 - Proposed Development Trip Generation Summary

	AM Peak Hour			PM Peak Hour			Daily
	In	Out	Total	In	Out	Total	Total
12 Multi-Family Dwelling Units	1	5	6	4	3	7	88

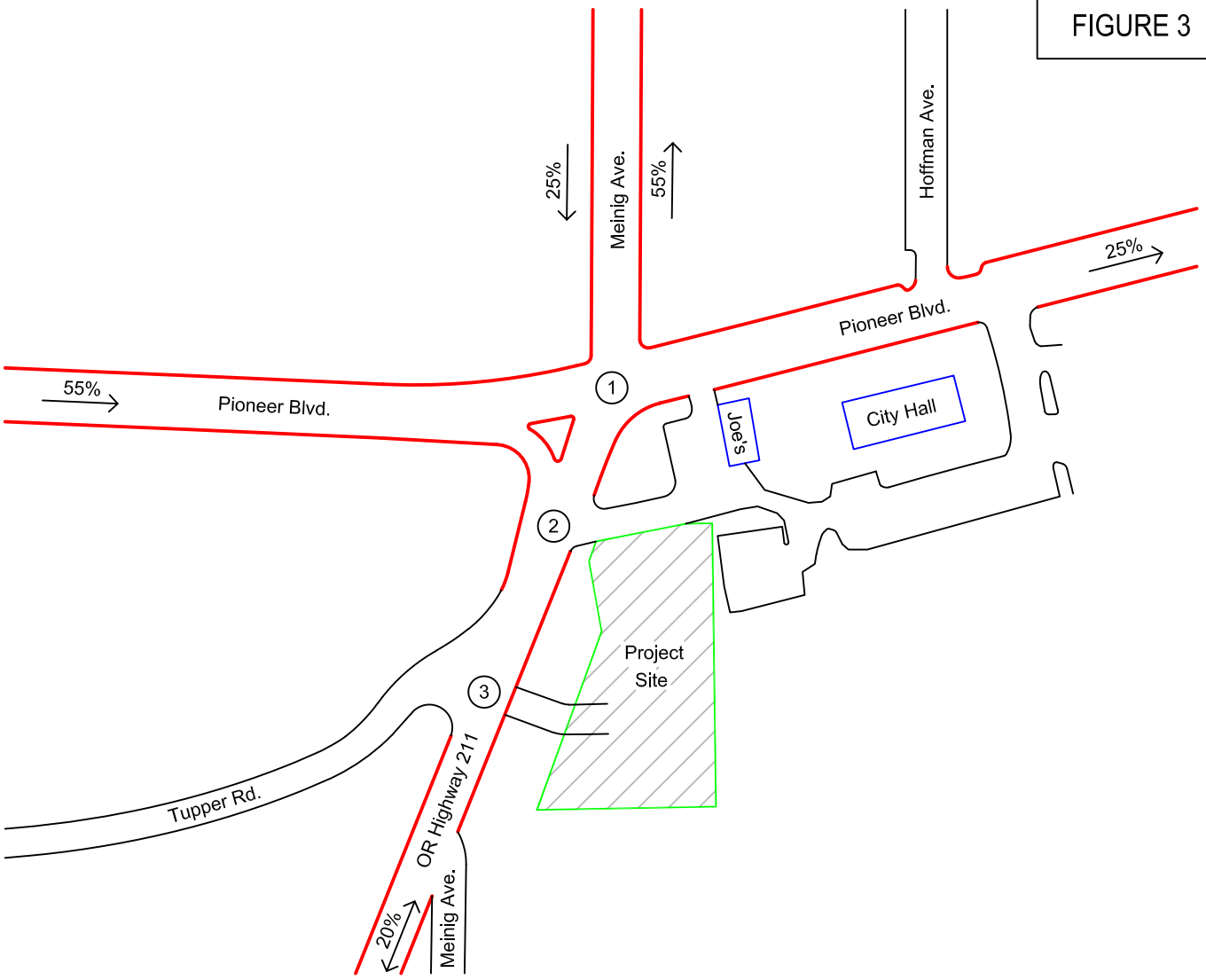
TRIP DISTRIBUTION

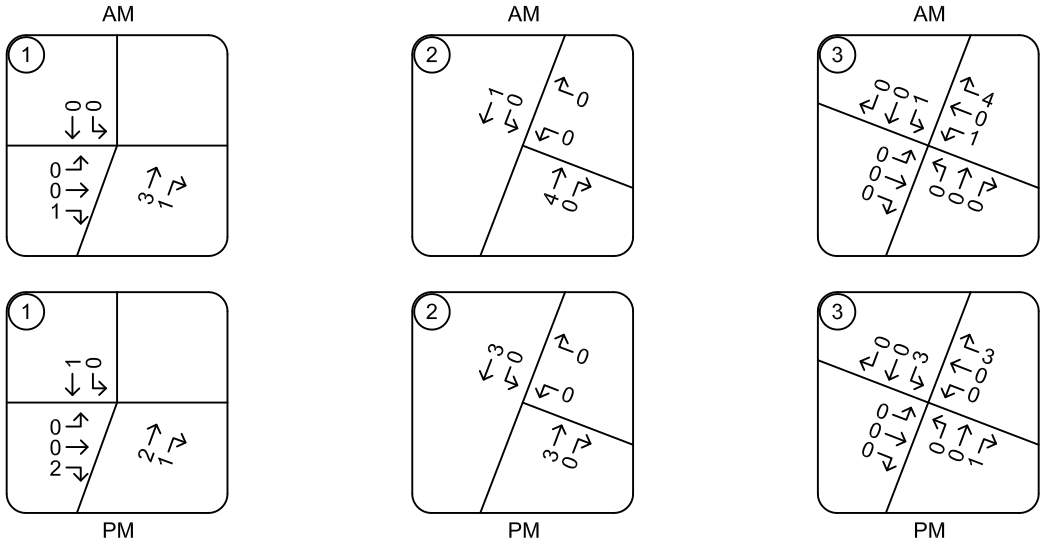
The directional distribution of site trips to and from the project site was estimated based the existing travel patterns in the site vicinity, as well as the locations of likely trip destinations and major transportation routes. Overall, 55 percent of the anticipated site trips are projected to travel to and from the west on Highway 26, 25 percent are projected to travel to and from the east on Highway 26, and 20 percent are projected to travel to and from the south on Highway 211.

Since it is anticipated that any future site access to Highway 211 will be restricted to right-in, right-out movements only, drivers entering from the north will need to pass the site access and turn around prior to lawfully entering the project site. Similarly, drivers exiting the site intending to travel to the south will need to turn right then turn around to reach their intended destination. Accordingly, these trips may pass through the study intersections more than once. The additional trips resulting from vehicles turning around are included in the trip assignment diagram.

The trip distribution percentages and trip assignment for the proposed development are shown in Figure 3 on page 11.

FIGURE 3





TRAFFIC VOLUMES
Proposed Development - Primary Site Trips
Morning and Evening Peak Hours

FUTURE CONDITIONS ANALYSIS

BACKGROUND VOLUMES

In order to determine the expected impact of site trips on the study area intersections, it is necessary to compare traffic conditions both with and without the addition of the projected traffic from the proposed development. Since the proposed use cannot be constructed and occupied immediately, the comparison is made for future traffic conditions at the time of project completion. It is anticipated that the proposed use will be completed and occupied by 2022. Accordingly, the analysis was conducted for year 2022 traffic conditions.

Similar to the existing year 2020 conditions analysis, the year 2022 traffic volumes were determined using data from the Bull Run Terrace Subdivision TIS as well as ODOT data resources and the direct observations of turning movement volumes at the study area intersections to determine the likely traffic volumes during the peak hours absent the current COVID-19 pandemic.

Since the data used was drawn from the year 2022 background traffic volume for the Bull Run Terrace Subdivision, the projected volumes already account for future site trips from development within the in-process developments considered in that report as well as the anticipated background growth rates for highway volumes in the site vicinity. Site trips from the Bull Run Terrace Subdivision were not directly included in the analysis since completion of the Bull Run Terrace project will result in diversion of trips to the new Dubarko Road connection between Highway 211 and Highway 26 at the east side of the City of Sandy. Accordingly, the 2022 background conditions analysis represents the highest traffic volumes which may reasonably occur in association with the proposed development.

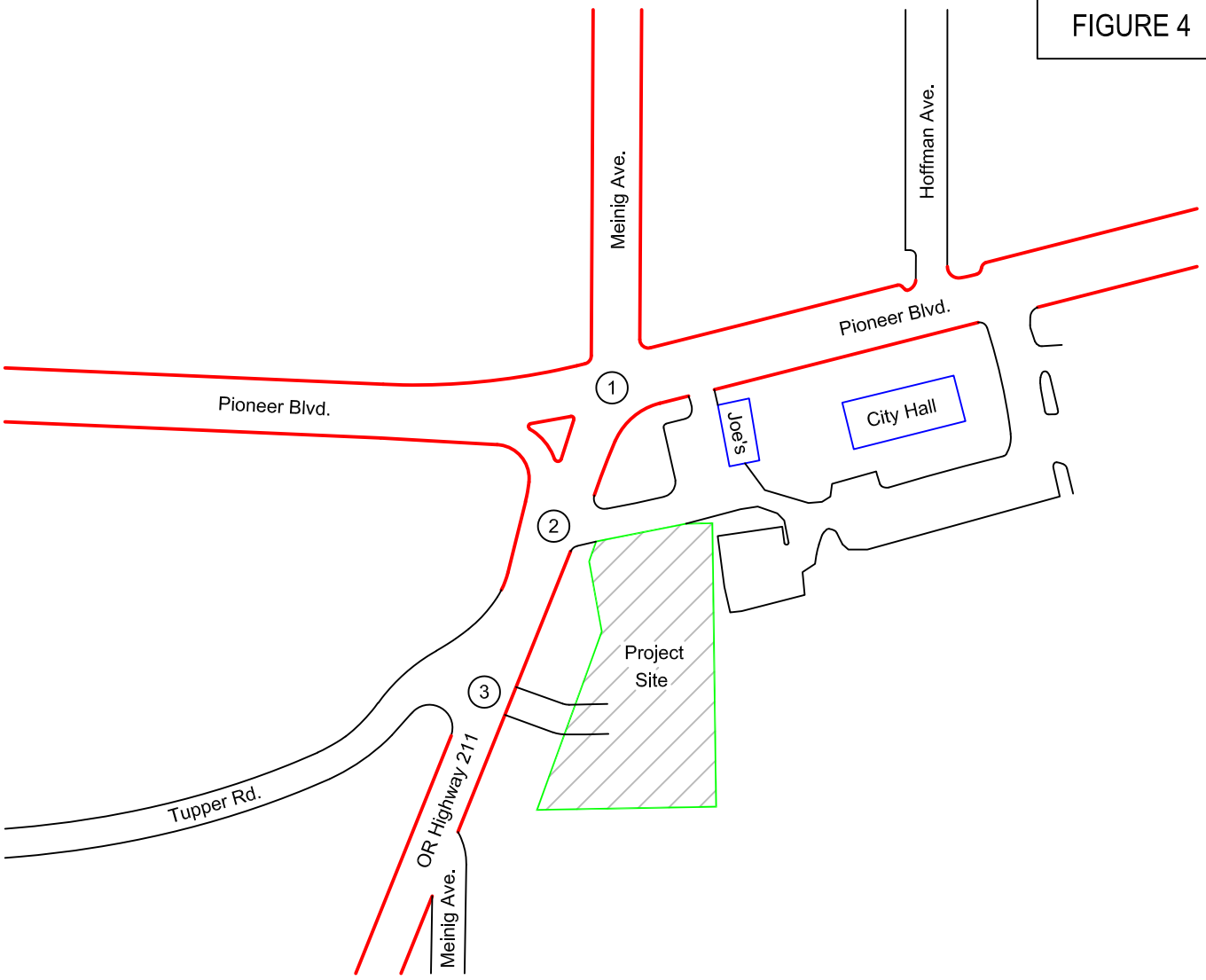
Figure 4 on page 13 shows the projected year 2022 background traffic volumes at the study intersections during the morning and evening peak hours, including anticipated future traffic from in-process developments.

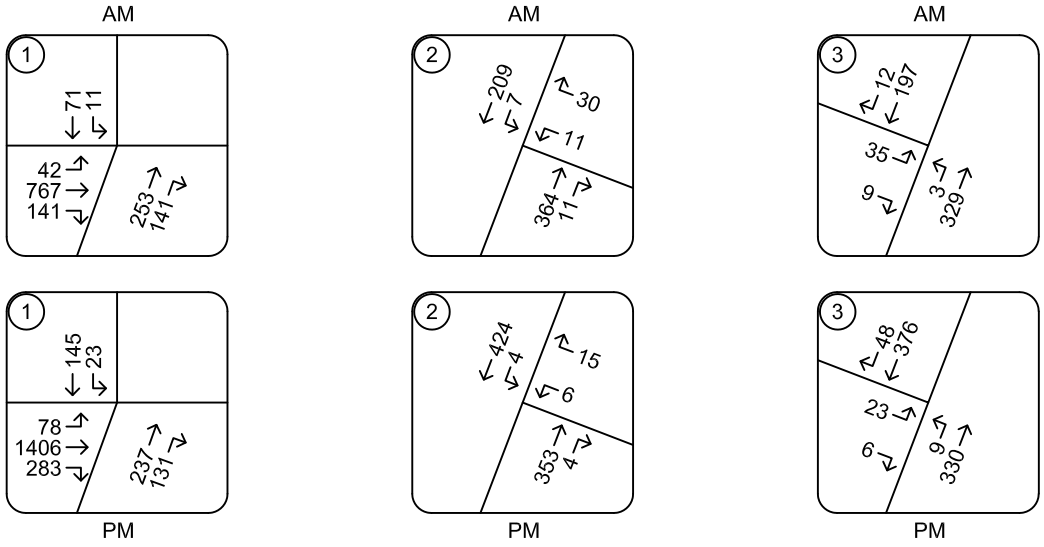
BACKGROUND VOLUMES PLUS SITE TRIPS

Peak hour trips calculated to be generated by the proposed development were added to the projected year 2022 background traffic volumes to obtain the year 2022 total traffic volumes following completion of the proposed residential development. The resulting total traffic volumes are shown in figure 5 on page 14.

Based on discussions with ODOT staff, it is anticipated that the study intersections along Highway 211 south of Pioneer Boulevard may be restricted to right-in, right-out operation only in conjunction with the proposed development in order to reduce concerns associated with limited access spacing and queues. An additional diagram showing the year 2022 background plus site trips volumes with traffic diversions resulting from right-in, right-out restriction of these intersections is provided in Figure 6 on page 15.

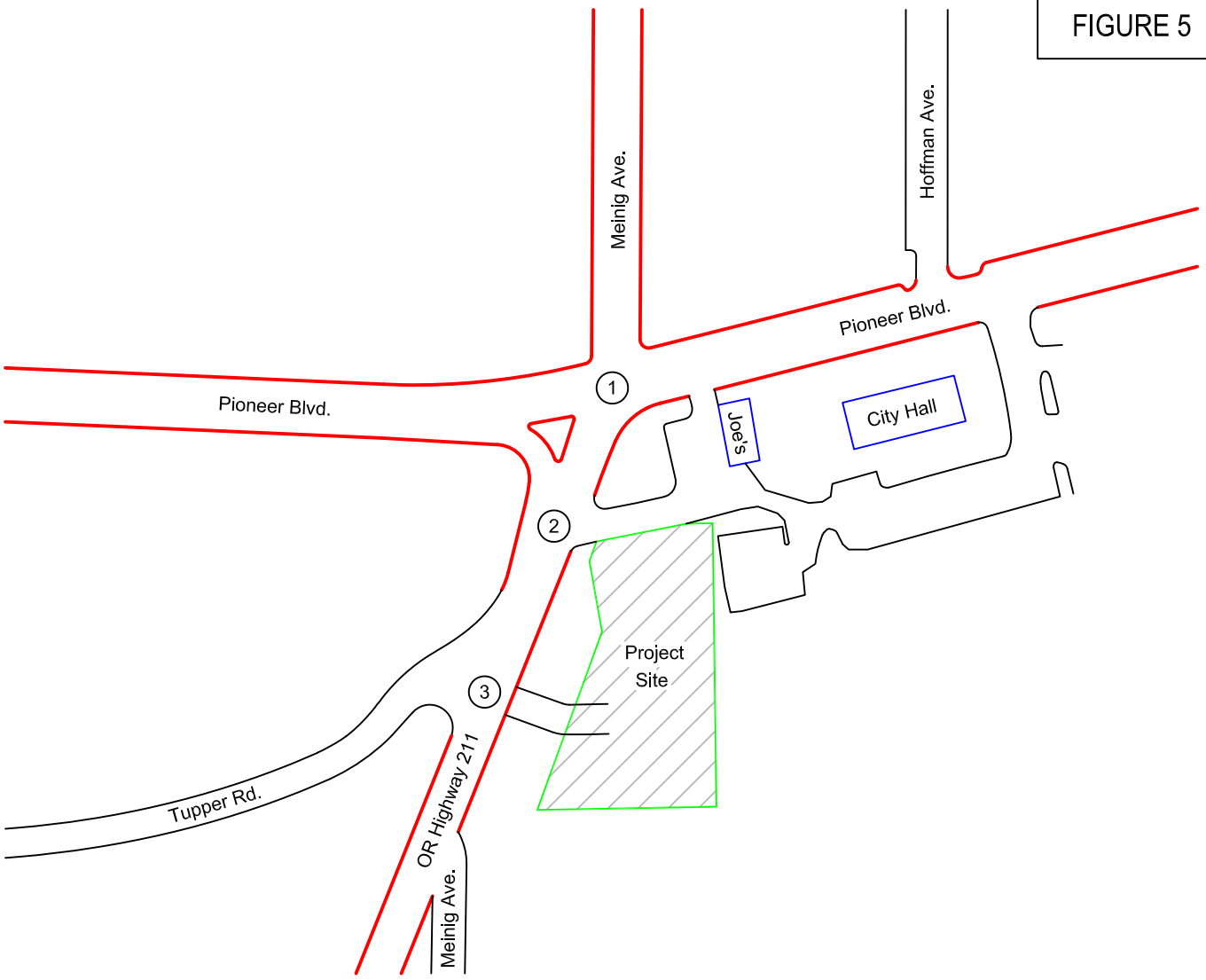
FIGURE 4

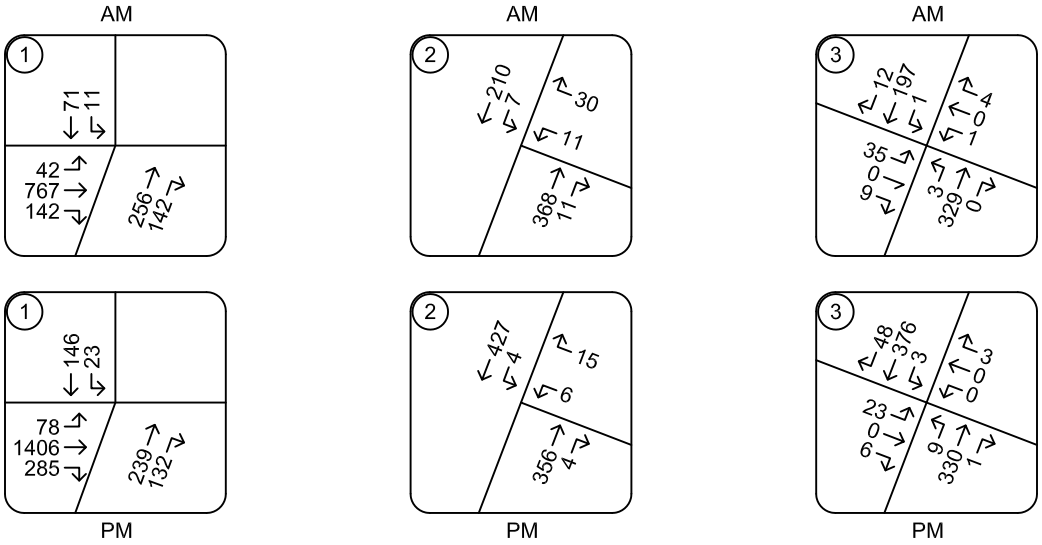




TRAFFIC VOLUMES
2022 Background Conditions
Morning and Evening Peak Hours

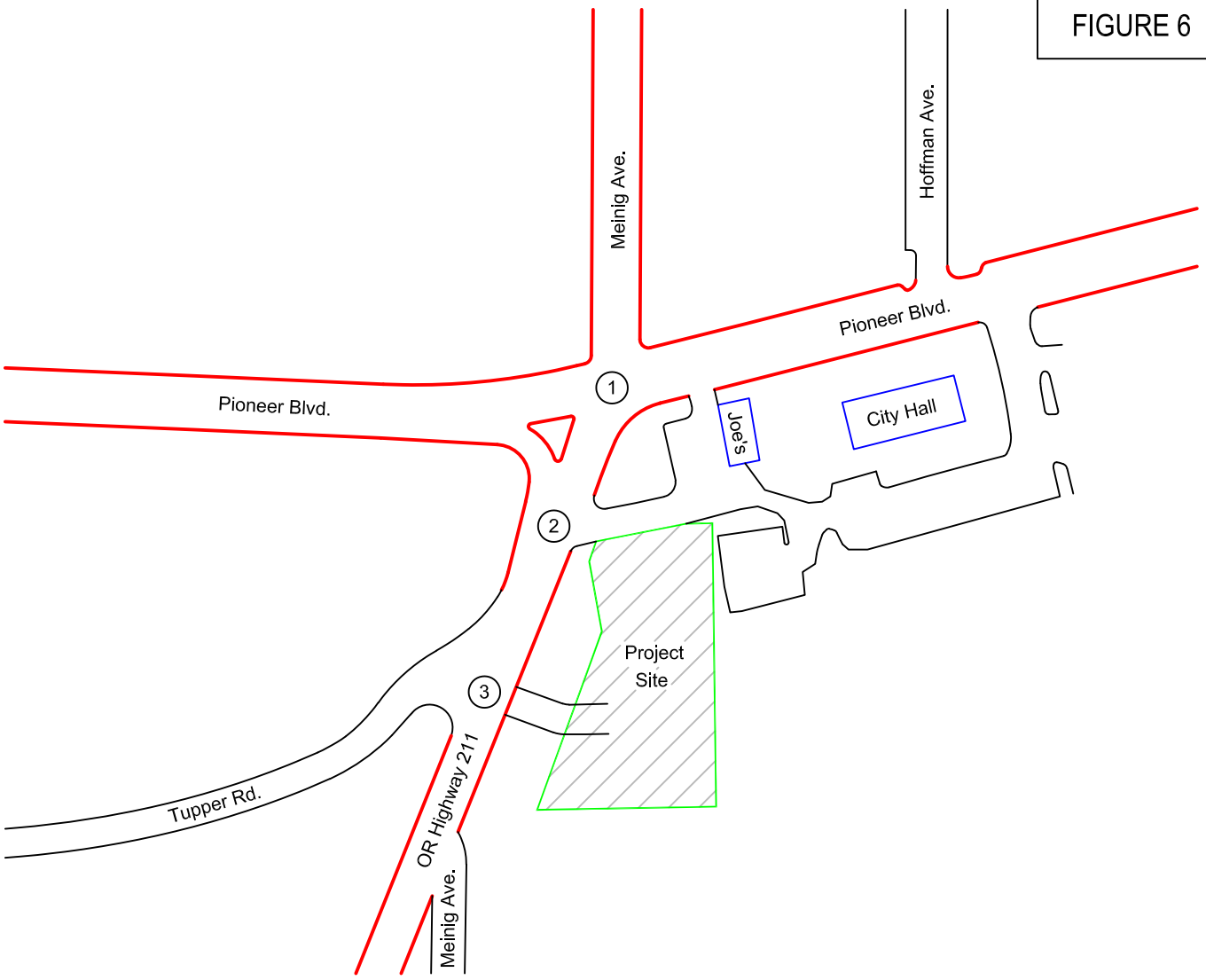
FIGURE 5

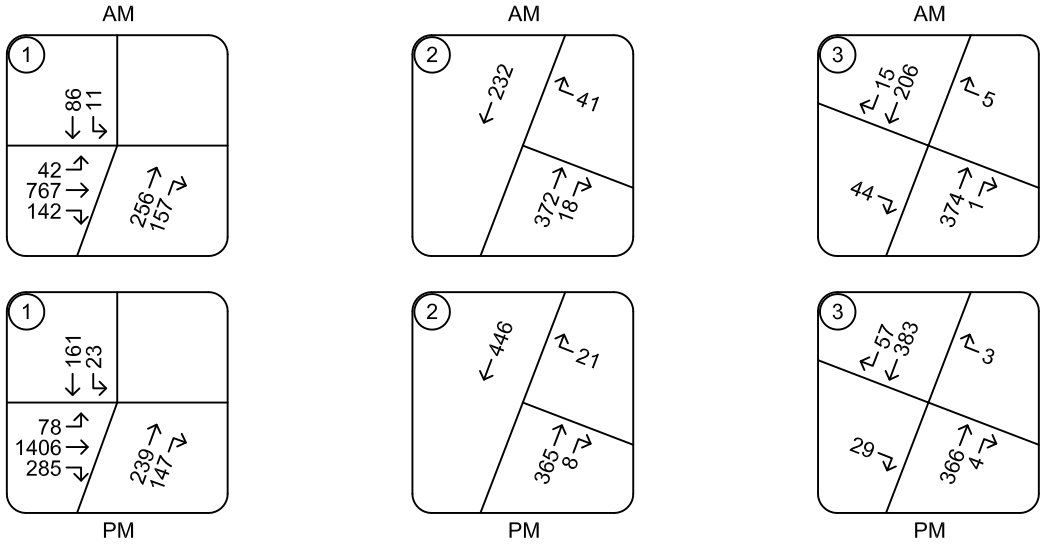




TRAFFIC VOLUMES
2022 Background Plus Site Trips
Morning and Evening Peak Hours

FIGURE 6





TRAFFIC VOLUMES
2022 Background Plus Site Trips Conditions (RIRO)
Morning and Evening Peak Hours

OPERATIONAL ANALYSIS

The operational analysis for future traffic conditions was again conducted using Synchro analysis software, with outputs based on the analysis methodologies contained in the *HIGHWAY CAPACITY MANUAL, 6th Edition*. The analysis was prepared for the intersections' morning and evening peak hours.

The results of the operational analysis are summarized in Table 3 below. Detailed analysis worksheets are also included in the technical appendix.

Table 3 - Operational Analysis Summary: Year 2022 Future Conditions

Intersection	AM Peak Hour			PM Peak Hour		
	Delay	LOS	v/c	Delay	LOS	v/c
Pioneer Blvd. at Highway 211						
2022 Background Conditions	18.6	B	0.56	22.6	C	0.77
2022 Background plus Site	18.7	B	0.57	22.7	C	0.77
2022 Bkgd plus Site (w/ Median Barrier)	19.1	B	0.57	23.1	C	0.77
Highway 211 at City Hall Driveway						
2022 Background Conditions	11.9	B	0.23	12.3	B	0.26
2022 Background Plus Site	12.0	B	0.24	12.4	B	0.26
2022 Bkgd Plus Site (w/ Median Barrier)	11.2	B	0.24	10.8	B	0.27
Highway 211 at Tupper Road						
2022 Background Conditions	15.2	C	0.21	15.2	C	0.26
2022 Background plus Site	13.8	B	0.21	17.1	C	0.26
2022 Bkgd plus Site (w/ Median Barrier)	10.6	B	0.23	11.2	B	0.27

Based on the results of the operational analysis, the study intersections are projected to operate acceptably per ODOT standards either with or without the addition of site trips from the proposed development, and with or without conversion of the stop-controlled minor-street approaches to right-in, right-out only. No operational mitigations are necessary or recommended in conjunction with the proposed development.

QUEUING ANALYSIS

In addition to the operational analysis, a queuing analysis was conducted to determine whether northbound queues on Highway 211 may extend to the proposed site access driveway during the peak hours. The queuing analysis was prepared using SimTraffic simulation software with model calibrations as required per ODOT's Analysis Procedures Manual. The results of the analysis are reported as 95th percentile queues, which represent the queue length that is exceeded during less than 5 percent of the peak hour. Queue lengths in excess of the 95th percentile do not occur with sufficient frequency to allow for cost-effective design.

Based on the analysis, the projected 95th percentile queue lengths for the northbound Highway 211 approach to Pioneer Boulevard were determined to be 263 feet during the morning peak hour and 308 feet during the evening peak hour. (The average queue lengths during these analysis periods were projected to be 145 feet and 177 feet, respectively.)

The intersection of Highway 211 at the existing City Hall/Joe's Donuts driveway is centered approximately 70 feet south of the northbound stop bar on Highway 211 at Pioneer Boulevard. Accordingly, the average peak-hour queues projected during the peak hours will extend beyond this driveway.

The intersection of Highway 211 at Tupper Road is centered approximately 225 feet south of the northbound stop bar on Highway 211 at Pioneer Boulevard. Accordingly, this intersection is within the 95th percentile queue length during the morning and evening peak hours, although it is outside the average projected queue lengths during the peak hours.

Based on the queueing analysis, both unsignalized study intersections are within the 95th percentile queue lengths for northbound traffic approaching Pioneer Boulevard along Highway 211. Accordingly, it is appropriate to consider some form of turning movement restriction in order to avoid having vehicles make potentially unsafe left-turn maneuvers through stopped vehicle queues and to avoid congestion within the through travel lanes which may occur when vehicles stop within an otherwise free-flowing travel lane to wait to make left turns across these queues.

Typically, the most effective mechanism for restricting turning movements is the installation of a raised median within the major street. A raised median provides a physical barrier resulting in high compliance with the intended turning movement restriction. Where it is not possible to install a raised median within the major street, the side-street approaches may have "pork-chop" diverters installed which also physically direct vehicles toward the permitted turning movements only.

If sufficient width can be made available to accommodate a raised center median within Highway 211, it is recommended that the median be installed in conjunction with the proposed development. If a center median cannot be constructed within Highway 211, it is recommended that the site access be limited to right-in, right-out only through the installation of a "pork-chop" diverter within the new driveway approach.

SAFETY ANALYSIS

CRASH DATA ANALYSIS

Using data obtained from the Oregon Department of Transportation, a review of the five most recent years of available crash history (from January 2013 through December 2017) was performed for the study intersections. In addition to examination of the crash data, crash rates are calculated for the intersections. Crash rates allow for comparison of relative risk by accounting for both the number of crashes and the number of vehicles travelling through the intersection. Crash rates are reported as the number of crashes per million entering vehicles.

The intersection of Pioneer Boulevard at OR Highway 211/Meinig Road had a total of 10 reported crashes during the 5-year analysis period. These included 6 rear-end collisions, 2 angle collisions, 1 sideswipe-overtaking collision and one fixed-object collision. The crashes resulted in one non-incapacitating injury and 4 reports of a "possible injury/complaint of pain." The crash rate for the intersection was calculated to be 0.256 crashes per million entering vehicles. This is roughly the median crash rate for urban 3-way signalized intersections in Oregon (0.252 crashes per million entering vehicles), indicating that the intersection is operating similar to average intersections in Oregon with respect to safety.

The other study intersections had no reported crashes during the five-year analysis period.

Based on the detailed examination of crash data, no significant safety concerns were identified and no specific safety mitigations are recommended.

WARRANT ANALYSIS

Traffic signal and turn-lane warrants were examined for the study intersections.

Based on the projected side-street traffic volumes, traffic signal warrants are not projected to be met at either of the unsignalized study intersections under any of the analysis scenarios. Accordingly, no new traffic signals are recommended in conjunction with the proposed development.

Left-turn lane warrants were examined for the major-street approaches to the unsignalized study intersections. Left-turn lane warrants are intended to evaluate whether a meaningful safety benefit may be expected if the turning vehicles are provided with turn lane within the street, allowing left-turning drivers to move out of the through travel lane so that following vehicles may pass without conflicts. The left-turn lane warrant analysis methodology utilizes the number of travel lanes in conjunction with the volume of advancing and opposing traffic to determine the minimum number of left-turning vehicles which would result in a meaningful safety benefit. This threshold left-turn volume may be as low as 10 vehicles per hour. Notably, fewer than 10 left-turn movements are projected for all unsignalized major-street approaches during each of the peak hours. Accordingly, by inspection left-turn lane warrants will not be met. No new left-turn lanes are recommended in conjunction with the proposed development.

Right-turn lane warrants were also examined for the major-street approaches to the unsignalized study intersections. Right-turn lanes reduce the likelihood of rear-end collisions as vehicles slow or

stop to turn right from a free-flowing through travel lane. Generally, right-turn lane warrants are not met where the hourly right-turn volume is 20 vehicles or fewer. However, if the total approach volume in the outside lane is in excess of 700 vehicles per hour, a shoulder or right-turn lane treatment may be appropriate even if the right-turn volume is fewer than 20 vehicles. Examining the study intersections shows that none of the highway through lanes carries more than 700 vehicles per hour under any of the analysis scenarios. Accordingly, right-turn lane warrants will not be met for any intersections with fewer than 20 right-turning vehicles per hour.

Only one unsignalized major-street right-turn movement carries more than 20 vehicles per hour. This movement is the southbound right-turn movement from Highway 211 onto Tupper Road. Accordingly, a detailed right-turn lane warrant analysis was prepared for this intersection approach. Based on the analysis, right turn lane warrants would not be met under year 2022 background conditions or year 2022 background plus site trips conditions. With conversion of the intersection to right-in, right-out only and assuming that all northbound left-turning traffic diverts by passing Tupper Road northbound, turning around, then returning southbound, right-turn lane warrants would be marginally met. However, since some left-turning drivers would be expected to divert by turning left onto Dubarko Road prior to reaching Tupper Road, the actual volume of southbound right-turning traffic is expected to be below the threshold that would trigger the need for a right-turn lane. Additionally, no site trips from the proposed development would make this turning movement. Accordingly, installation of a new southbound right-turn lane serving Tupper Road is not recommended in conjunction with the proposed development.

Based on the detailed warrant analysis, no new traffic signals or turn lanes are recommended in conjunction with the proposed development.

INTERSECTION SIGHT DISTANCE

Based on the posted speed limit of 40 mph, a minimum of 445 feet of intersection sight distance is required to the south of the proposed site access on Highway 211. Vehicles approaching from the north are within a 25-mph speed zone on SE Meinig Avenue, requiring a minimum of 280 feet of intersection sight distance to the north.

In accordance with the procedures described in *A Policy On Geometric Design of Highways and Streets*, published by the American Association of State Highway and Transportation Officials, intersection sight distance was measured from a driver's eye position within the proposed driveway 15 feet behind the edge of the traveled way and 3.5 feet above the driveway surface. The available intersection sight distances in each direction were measured to the oncoming driver's eye position within the oncoming travel lane 3.5 feet above the roadway surface.

Intersection sight distance was measured to be in excess of 600 feet to the south from the proposed site access location. Sight distance to the north is restricted by a crest vertical curve where Highway 211 meets Pioneer Boulevard. The available intersection sight distance in this direction was measured to be 330 feet.

In addition to evaluation of intersection sight distance for the northbound and southbound approaches along Highway 211/SE Meinig Avenue, it is appropriate to evaluate whether adequate

stopping sight distance is available for vehicles turning from Highway 26 onto Highway 211 to stop if necessary to avoid a collision.

Vehicles turning from Highway 26 would be expected to turn at speeds of up to approximately 20 mph. Based on this design speed and the 6 percent downhill grade on the approach, the minimum required stopping sight distance for this approach speed was calculated to be 120 feet. The available intersection sight distance for vehicles approaching from this direction was measured to be 203 feet. Accordingly, the access can operate safely with respect to vehicles approaching from Highway 26.

Based on the sight distance analysis, adequate sight lines can be attained for safe and efficient operation at the proposed site access location on Highway 211.

SITE ACCESS ALTERNATIVES ANALYSIS

At the direction of ODOT staff, three total site access scenarios were examined. The potential site access options include:

1) Shared site access to Highway 211 at the existing City Hall/Joe's Donuts Driveway;
2) A new site access driveway on Highway 211 immediately south of the existing City Hall/Joes' Donuts driveway; and
3) A new site access driveway on Highway 211 directly opposite Tupper Road.

These potential site access scenarios were evaluated in order to determine the relative merits of each. It should be noted that given the low delays, high levels of service and low v/c ratios projected in the operational analysis portion of this report, it is anticipated that any of the three site access scenarios would result in acceptable operation per ODOT standards. However, the access scenarios differ significantly in near-term and long-term access spacing and safety, as well as viability.

Access Scenario 1

A shared access to Highway 211 at the existing City Hall/Joe's Donuts Driveway would result in increasing traffic volumes at an intersection in very close proximity to the traffic signal at Pioneer Boulevard. Based on the queueing analysis, this existing driveway is well within the average queue length for northbound vehicles approaching the signal during both the morning and evening peak hours. Conflicts between turning vehicles and through traffic would remain frequent, and the increased traffic volumes using the driveway would exacerbate existing problems at this driveway.

In addition to the operational concerns associated with shared access at the existing City Hall/Joe's Donuts driveway, sharing this access would require approval from the City of Sandy for sharing the access. This approval was previously formally requested of the Sandy City Council and was denied. City staff are also unsupportive of a shared access. As such, this option was determined to be infeasible.

Access Scenario 2

Although the subject property cannot share access with the existing city driveway, it would be possible to construct a new driveway immediately south of and adjacent to the City Hall/Joe's

Donuts driveway within the subject property. The idea would be to align the driveway at the north end of the property and provide an easement for future use by the city. Given such an easement, at any time that the city and/or Joe's makes substantive changes to their sites the existing driveway could be closed and consolidated with the driveway serving the subject property. In the long term, this would result in (marginally) increased access spacing between the driveway and Pioneer Boulevard as well as a reduction in the number of points of access to Highway 211.

This access alternative also has some substantial weaknesses.

First, since near-term operation would require that both the existing city driveway and the proposed site access operate simultaneously. Since drivers turning right onto Highway 211 primarily focus on conflicts approaching along the highway, they may begin turns only to find they are obstructed by a vehicle that has entered Highway 211 from the adjacent driveway. This may lead to both operational and safety concerns.

Second, since the new driveway would need to be located at the extreme north end of the subject property, it would be placed at the location providing the least possible access spacing between the new driveway and the traffic signal at Pioneer Boulevard. Again, this driveway would be located well within the average northbound queue length during the morning and evening peak hours.

Third, this scenario would result in an immediate degradation to access spacing and safety in the site vicinity which would continue indefinitely until such time as the City of Sandy could be forced to move their access to a shared alignment with the proposed development. Since no improvements are currently planned within the City Hall or Joe's Donuts sites, it is expected that this degradation would continue well into the future.

Fourth, providing exclusive site access to The Pad at the north end of the subject property would result in a permanent driveway which cannot be either closed or relocated at any point in the future. Since Joe's Donuts and the Sandy City Hall currently also have access to Highway 26 (two driveways), it may be possible to close their existing driveway at some point in the future. However, if site access for the Pad is placed at the north end of the subject property, it will not be possible to remove that access in the future.

Fifth, the subject property is located on a slope, with the north end of the site forming the highest point of the subject property. If access is taken at the north end of the site, it will be necessary to provide a long driveway carrying site traffic to the lower elevation from which vehicles will access parking spaces within the site. This will result in a meaningful reduction in the development potential of the subject property.

Based on the analysis, selection of site access at the north end of the site is not recommended.

Access Scenario 3

Under the third access scenario, a new driveway would be constructed intersecting Highway 211 directly opposite Tupper Road.

Since there is an existing intersection at this location, construction of the driveway would result in no change to the existing access spacing on Highway 211. Although access spacing between the site access and the City Hall/Joe's Donuts access would only be approximately 150 feet, this would be considerably in excess of the access spacing that results from implementation of Access Scenario 2, with ample room for drivers simultaneously exiting the two driveways to anticipate and avoid collisions with each other.

Although the site access would be located within the 95th percentile queue length for northbound traffic on Highway 211, it would be well outside the average queue length during the peak hours. This indicates that although there may be some obstruction of the site access by through traffic, the standing queues would be expected to clear during each signal cycle, allowing for safe and efficient access to and from the site in conjunction with the proposed right-in, right-out restriction.

Although this site access would also be permanent (similar to Access Scenario 2), it may be possible to remove the City Hall/Joe's Donuts access in the future since alternative access is available for these uses. Accordingly, selection of this access alternative results not only in maximizing access spacing in the near term, but in the potential for maximizing access spacing in the long term as well.

Since Tupper Road intersects Highway 211 near the middle of the subject property, this access scenario also results in the most efficient site plan, since vehicles entering the site from the middle of the property can easily access dwelling units on the north and south sides of the site without the need for significant changes in elevation.

Based on the detailed analysis of the three site access scenarios, it is recommended that site access be taken to Highway 211 directly opposite Tupper Road.

CONCLUSIONS

Based on the operational analysis, the study intersections currently operate acceptably and are projected to continue to operate acceptably under year 2022 traffic conditions either with or without the addition of site trips from the proposed development.

Based on the queuing analysis, the northbound 95th percentile queues on Highway 211 approaching Pioneer Boulevard are projected to extend beyond the Tupper Road/site access intersection during the peak hours. If sufficient width can be made available to accommodate a raised center median within Highway 211, it is recommended that the median be installed in conjunction with the proposed development. If a center median cannot be constructed within Highway 211, it is recommended that the site access be limited to right-in, right-out only through the installation of a "pork-chop" diverter within the new driveway approach.

Based on the crash data, the study intersections are currently operating acceptably with respect to safety.

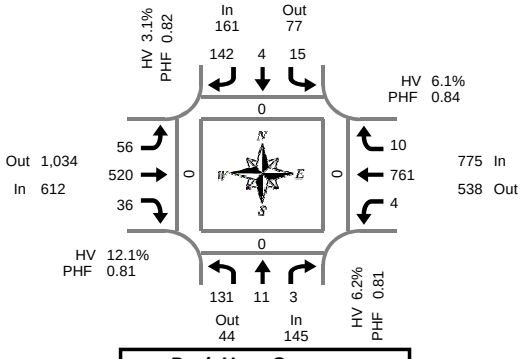
Based on the detailed warrant analysis, no new traffic signals or turn lanes are recommended in conjunction with the proposed development.

At the request of ODOT staff, three potential site access alternatives were examined. Based on the analysis, it is recommended that site access be provided to Highway 211 directly opposite Tupper Road.

APPENDIX

Total Vehicle Summary

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



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

SE Ten Eyck Rd & Hwy 26

Wednesday, March 20, 2019
7:00 AM to 9:00 AM

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

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	16	0	0	0	0	0	17	0	5	26	2	0	0	74	0	0	140	0	0	0	0
7:05 AM	10	0	1	0	1	0	10	0	2	18	3	0	1	65	2	0	113	0	0	0	0
7:10 AM	17	1	0	0	2	0	11	0	7	36	2	0	2	74	1	0	153	0	0	0	0
7:15 AM	12	0	0	0	1	2	9	0	9	40	2	0	1	84	1	0	161	0	0	0	0
7:20 AM	15	0	0	0	3	0	11	0	3	40	1	0	0	68	0	0	141	0	0	0	0
7:25 AM	14	1	0	0	1	1	16	0	2	40	4	0	0	70	1	0	150	0	0	0	0
7:30 AM	7	1	1	0	0	0	16	0	8	43	2	0	0	67	0	0	145	0	0	0	0
7:35 AM	12	2	0	0	3	0	12	0	0	56	5	0	0	57	1	0	148	0	0	0	0
7:40 AM	8	2	0	0	0	0	11	0	4	59	3	0	0	53	0	0	140	0	0	0	0
7:45 AM	12	1	1	0	2	0	11	0	4	53	3	0	0	45	2	0	134	0	0	0	0
7:50 AM	4	2	0	0	1	0	10	0	9	47	4	0	0	62	0	0	139	0	0	0	0
7:55 AM	4	1	0	0	1	1	8	0	3	62	5	0	0	42	2	0	129	0	0	0	0
8:00 AM	5	0	1	0	2	1	13	0	2	46	2	0	0	41	0	0	113	0	0	0	0
8:05 AM	6	0	0	0	1	1	5	0	8	50	2	0	0	42	2	0	117	0	0	0	0
8:10 AM	3	0	0	0	2	1	10	0	5	45	4	0	0	53	1	0	124	0	0	0	1
8:15 AM	12	0	0	0	2	0	7	0	3	38	1	0	0	34	1	0	98	0	0	0	0
8:20 AM	6	2	0	0	2	0	9	0	5	38	1	0	1	49	0	0	113	0	0	0	0
8:25 AM	8	0	0	0	1	0	11	0	4	44	3	0	0	39	2	0	112	0	0	0	1
8:30 AM	5	0	0	0	2	1	10	0	4	66	2	0	0	47	0	0	137	1	0	0	0
8:35 AM	10	0	0	0	3	0	13	0	6	59	5	0	0	45	1	0	142	0	0	0	0
8:40 AM	7	0	0	0	5	1	15	0	10	62	3	0	1	43	1	0	148	0	0	0	0
8:45 AM	5	0	0	0	1	0	12	0	5	69	5	0	0	63	0	0	160	0	0	0	0
8:50 AM	9	2	0	0	3	0	12	0	7	56	8	0	1	46	1	0	145	0	0	0	0
8:55 AM	8	1	0	0	2	0	13	0	6	51	8	0	2	44	1	0	136	0	0	0	0
Total Survey	215	16	4	0	41	9	272	0	121	1,144	80	0	9	1,307	20	0	3,238	1	0	0	2

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

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	43	1	1	0	3	0	38	0	14	80	7	0	3	213	3	0	406	0	0	0	0
7:15 AM	41	1	0	0	5	3	36	0	14	120	7	0	1	222	2	0	452	0	0	0	0
7:30 AM	27	5	1	0	3	0	39	0	12	158	10	0	0	177	1	0	433	0	0	0	0
7:45 AM	20	4	1	0	4	1	29	0	16	162	12	0	0	149	4	0	402	0	0	0	0
8:00 AM	14	0	1	0	5	3	28	0	15	141	8	0	0	136	3	0	354	0	0	0	1
8:15 AM	26	2	0	0	5	0	27	0	12	120	5	0	1	122	3	0	323	0	0	0	1
8:30 AM	22	0	0	0	10	2	38	0	20	187	10	0	1	135	2	0	427	1	0	0	0
8:45 AM	22	3	0	0	6	0	37	0	18	176	21	0	3	153	2	0	441	0	0	0	0
Total Survey	215	16	4	0	41	9	272	0	121	1,144	80	0	9	1,307	20	0	3,238	1	0	0	2

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

By Approach	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	145	44	189	0	161	77	238	0	612	1,034	1,646	0	775	538	1,313	0	1,693	0	0	0	0
%HV	6.2%				3.1%				12.1%				6.1%				8.0%				
PHF	0.81				0.82				0.81				0.84				0.93				

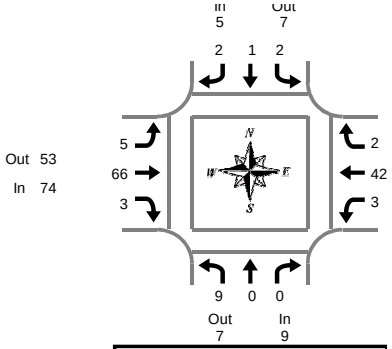
By Movement	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	131	11	3	145	15	4	142	161	56	520	36	612	4	761	10	775	1,693
%HV	6.9%	0.0%	0.0%	6.2%	13.3%	25.0%	1.4%	3.1%	8.9%	12.7%	8.3%	12.1%	75.0%	5.5%	20.0%	6.1%	8.0%
PHF	0.74	0.55	0.75	0.81	0.63	0.33	0.81	0.82	0.74	0.77	0.75	0.81	0.25	0.84	0.63	0.84	0.93

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

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	131	11	3	0	15	4	142	0	56	520	36	0	4	761	10	0	1,693	0	0	0	0
7:15 AM	102	10	3	0	17	7	132	0	57	581	37	0	1	684	10	0	1,641	0	0	0	1
7:30 AM	87	11	3	0	17	4	123	0	55	581	35	0	1	584	11	0	1,512	0	0	0	2
7:45 AM	82	6	2	0	24	6	122	0	63	610	35	0	2	542	12	0	1,506	1	0	0	2
8:00 AM	84	5	1	0	26	5	130	0	65	624	44	0	5	546	10	0	1,545	1	0	0	2

Heavy Vehicle Summary

Clay Carney
(503) 833-2740



SE Ten Eyck Rd & Hwy 26

Wednesday, March 20, 2019
7:00 AM to 9:00 AM

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

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

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	1	0	0	1	0	0	0	0	1	6	1	8	0	6	0	6	15
7:05 AM	0	0	0	0	0	0	0	0	0	5	0	5	0	5	0	5	10
7:10 AM	3	0	0	3	0	0	0	0	0	3	0	3	2	2	1	5	11
7:15 AM	1	0	0	1	0	1	0	1	2	6	0	8	1	1	0	2	12
7:20 AM	2	0	0	2	1	0	0	1	0	5	0	5	0	1	0	1	9
7:25 AM	0	0	0	0	0	0	0	0	0	6	1	7	0	1	0	1	8
7:30 AM	0	0	0	0	0	0	0	0	0	7	0	7	0	7	0	7	14
7:35 AM	0	0	0	0	1	0	0	1	0	7	0	7	0	6	0	6	14
7:40 AM	0	0	0	0	0	0	0	0	1	8	0	9	0	1	0	1	10
7:45 AM	0	0	0	0	0	0	1	1	0	6	0	6	0	4	0	4	11
7:50 AM	0	0	0	0	0	0	1	1	0	3	0	3	0	7	0	7	11
7:55 AM	2	0	0	2	0	0	0	0	1	4	1	6	0	1	1	2	10
8:00 AM	1	0	0	1	0	0	1	1	0	10	1	11	0	2	0	2	15
8:05 AM	0	0	0	0	1	0	1	2	0	9	0	9	0	7	1	8	19
8:10 AM	0	0	0	0	0	0	0	0	0	2	0	2	0	6	0	6	8
8:15 AM	0	0	0	0	0	0	0	0	0	4	0	4	0	3	0	3	7
8:20 AM	0	0	0	0	0	0	1	1	0	5	0	5	1	2	0	3	9
8:25 AM	0	0	0	0	0	0	0	0	0	6	1	7	0	3	0	3	10
8:30 AM	0	0	0	0	1	0	0	1	2	6	0	8	0	3	0	3	12
8:35 AM	0	0	0	0	0	0	0	0	1	5	0	6	0	8	0	8	14
8:40 AM	0	0	0	0	0	0	1	1	0	5	0	5	0	1	0	1	7
8:45 AM	0	0	0	0	0	0	0	0	0	9	0	9	0	3	0	3	12
8:50 AM	0	0	0	0	0	0	0	0	1	4	0	5	1	8	0	9	14
8:55 AM	0	0	0	0	0	0	3	3	0	0	2	2	0	3	0	3	8
Total Survey	10	0	0	10	4	1	9	14	9	131	7	147	5	91	3	99	270

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

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	4	0	0	4	0	0	0	0	1	14	1	16	2	13	1	16	36
7:15 AM	3	0	0	3	1	1	0	2	2	17	1	20	1	3	0	4	29
7:30 AM	0	0	0	0	1	0	0	1	1	22	0	23	0	14	0	14	38
7:45 AM	2	0	0	2	0	0	2	2	1	13	1	15	0	12	1	13	32
8:00 AM	1	0	0	1	1	0	2	3	0	21	1	22	0	15	1	16	42
8:15 AM	0	0	0	0	0	0	1	1	0	15	1	16	1	8	0	9	26
8:30 AM	0	0	0	0	1	0	1	2	3	16	0	19	0	12	0	12	33
8:45 AM	0	0	0	0	0	0	3	3	1	13	2	16	1	14	0	15	34
Total Survey	10	0	0	10	4	1	9	14	9	131	7	147	5	91	3	99	270

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

By Approach	Northbound SE Ten Eyck Rd			Southbound SE Ten Eyck Rd			Eastbound Hwy 26			Westbound Hwy 26			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	9	7	16	5	7	12	74	53	127	47	68	115	135
PHF	0.38			0.63			0.80			0.73			0.89

By Movement	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	9	0	0	9	2	1	2	5	5	66	3	74	3	42	2	47	135
PHF	0.38	0.00	0.00	0.38	0.50	0.25	0.25	0.63	0.63	0.75	0.75	0.80	0.25	0.75	0.50	0.73	0.89

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

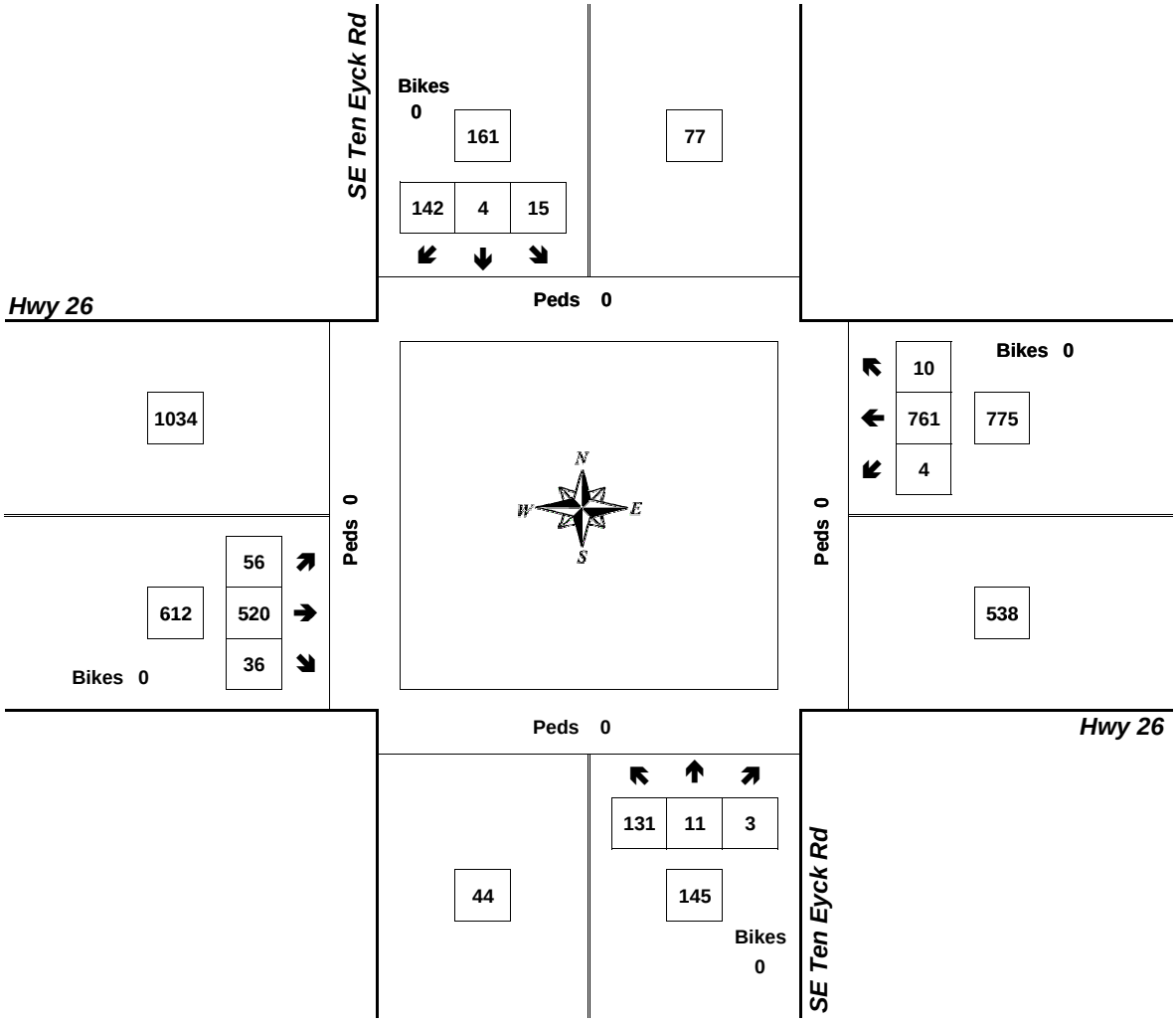
Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	9	0	0	9	2	1	2	5	5	66	3	74	3	42	2	47	135
7:15 AM	6	0	0	6	3	1	4	8	4	73	3	80	1	44	2	47	141
7:30 AM	3	0	0	3	2	0	5	7	2	71	3	76	1	49	2	52	138
7:45 AM	3	0	0	3	2	0	6	8	4	65	3	72	1	47	2	50	133
8:00 AM	1	0	0	1	2	0	7	9	4	65	4	73	2	49	1	52	135

Peak Hour Summary

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

SE Ten Eyck Rd & Hwy 26

7:00 AM to 8:00 AM
Wednesday, March 20, 2019

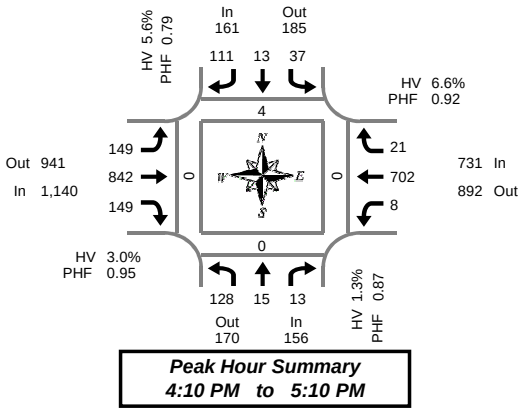


Approach	PHF	HV%	Volume
EB	0.81	12.1%	612
WB	0.84	6.1%	775
NB	0.81	6.2%	145
SB	0.82	3.1%	161
Intersection	0.93	8.0%	1,693

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

Total Vehicle Summary

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



Peak Hour Summary
4:10 PM to 5:10 PM

SE Ten Eyck Rd & Hwy 26

Tuesday, March 19, 2019
4:00 PM to 6:00 PM

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

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	4	0	2	0	4	3	11	0	8	58	12	0	1	49	2	0	154	0	1	0	0
4:05 PM	10	1	0	0	7	1	5	0	12	63	8	0	1	53	3	0	164	0	0	0	0
4:10 PM	7	2	3	0	1	0	17	0	12	76	11	0	0	65	1	0	195	0	0	0	0
4:15 PM	14	0	1	0	7	1	9	0	18	71	15	0	0	62	1	0	199	0	0	0	0
4:20 PM	9	0	1	0	4	1	11	0	9	75	10	0	0	62	7	0	189	0	0	0	0
4:25 PM	12	2	0	0	5	0	10	0	12	61	14	0	0	52	0	0	168	0	0	0	0
4:30 PM	11	1	4	0	3	2	12	0	17	87	16	1	1	58	1	0	213	0	0	0	0
4:35 PM	15	0	0	0	2	2	6	0	6	59	14	0	0	65	3	0	172	0	0	0	0
4:40 PM	7	1	1	0	3	0	7	0	7	54	9	0	1	57	0	0	147	1	0	0	0
4:45 PM	8	1	0	0	4	1	3	0	13	71	15	1	3	51	3	0	173	0	0	0	0
4:50 PM	13	2	1	0	1	1	6	0	19	74	8	0	0	56	0	0	181	0	0	0	0
4:55 PM	7	1	0	0	1	0	12	0	10	67	14	0	3	57	1	0	173	1	0	0	0
5:00 PM	13	3	1	0	2	2	14	0	12	81	12	0	0	49	1	0	190	2	0	0	0
5:05 PM	12	2	1	0	4	3	4	0	14	66	11	0	0	68	3	1	188	0	0	0	0
5:10 PM	8	0	0	0	6	2	10	0	13	60	12	0	0	68	2	0	181	2	0	0	0
5:15 PM	8	2	1	0	6	2	8	0	9	70	11	0	0	57	1	0	175	0	0	0	0
5:20 PM	8	1	1	1	1	4	10	0	15	73	10	0	0	43	1	0	167	0	1	0	0
5:25 PM	9	1	0	0	4	2	8	0	14	74	11	0	0	43	0	0	166	0	0	0	0
5:30 PM	5	0	1	0	4	0	5	0	15	64	10	0	0	44	0	0	148	1	0	0	0
5:35 PM	5	1	0	0	7	0	9	0	17	50	4	1	0	39	0	0	132	0	0	0	0
5:40 PM	4	0	0	0	2	1	5	0	11	56	7	0	0	30	1	0	117	2	0	0	2
5:45 PM	4	1	0	0	3	2	8	0	14	76	6	0	3	41	1	0	159	0	0	0	0
5:50 PM	7	1	0	0	0	1	6	0	14	69	8	0	0	42	0	0	148	0	0	0	0
5:55 PM	10	1	0	0	0	2	3	0	16	65	10	0	0	51	1	0	159	0	0	0	0
Total Survey	210	24	18	1	81	33	199	0	307	1,620	258	3	13	1,262	33	1	4,058	9	2	0	2

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

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	21	3	5	0	12	4	33	0	32	197	31	0	2	167	6	0	513	0	1	0	0
4:15 PM	35	2	2	0	16	2	30	0	39	207	39	0	0	176	8	0	556	0	0	0	0
4:30 PM	33	2	5	0	8	4	25	0	30	200	39	1	2	180	4	0	532	1	0	0	0
4:45 PM	28	4	1	0	6	2	21	0	42	212	37	1	6	164	4	0	527	1	0	0	0
5:00 PM	33	5	2	0	12	7	28	0	39	207	35	0	0	185	6	1	559	4	0	0	0
5:15 PM	25	4	2	1	11	8	26	0	38	217	32	0	0	143	2	0	508	0	1	0	0
5:30 PM	14	1	1	0	13	1	19	0	43	170	21	1	0	113	1	0	397	3	0	0	2
5:45 PM	21	3	0	0	3	5	17	0	44	210	24	0	3	134	2	0	466	0	0	0	0
Total Survey	210	24	18	1	81	33	199	0	307	1,620	258	3	13	1,262	33	1	4,058	9	2	0	2

Peak Hour Summary
4:10 PM to 5:10 PM

By Approach	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	156	170	326	0	161	185	346	0	1,140	941	2,081	2	731	892	1,623	1	2,188	4	0	0	0
%HV	1.3%				5.6%				3.0%				6.6%				4.3%				
PHF	0.87				0.79				0.95				0.92				0.94				

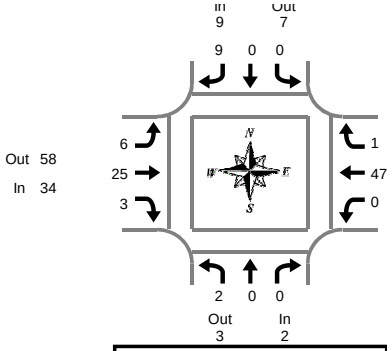
By Movement	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	128	15	13	156	37	13	111	161	149	842	149	1,140	8	702	21	731	2,188
%HV	1.6%	0.0%	0.0%	1.3%	0.0%	0.0%	8.1%	5.6%	4.0%	3.0%	2.0%	3.0%	0.0%	6.7%	4.8%	6.6%	4.3%
PHF	0.84	0.63	0.65	0.87	0.58	0.65	0.75	0.79	0.89	0.94	0.85	0.95	0.33	0.93	0.58	0.92	0.94

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

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	117	11	13	0	42	12	109	0	143	816	146	2	10	687	22	0	2,128	2	1	0	0
4:15 PM	129	13	10	0	42	15	104	0	150	826	150	2	8	705	22	1	2,174	6	0	0	0
4:30 PM	119	15	10	1	37	21	100	0	149	836	143	2	8	672	16	1	2,126	6	1	0	0
4:45 PM	100	14	6	1	42	18	94	0	162	806	125	2	6	605	13	1	1,991	8	1	0	2
5:00 PM	93	13	5	1	39	21	90	0	164	804	112	1	3	575	11	1	1,930	7	1	0	2

Heavy Vehicle Summary

Clay Carney
(503) 833-2740



SE Ten Eyck Rd & Hwy 26

Tuesday, March 19, 2019
4:00 PM to 6:00 PM

Peak Hour Summary
4:10 PM to 5:10 PM

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

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	0	0	0	0	0	0	0	0	4	0	4	0	10	1	11	15
4:05 PM	0	0	0	0	1	0	0	1	0	6	0	6	0	3	1	4	11
4:10 PM	0	0	0	0	0	0	0	0	0	2	0	2	0	8	0	8	10
4:15 PM	2	0	0	2	0	0	2	2	2	3	0	5	0	3	0	3	12
4:20 PM	0	0	0	0	0	0	2	2	1	3	0	4	0	5	1	6	12
4:25 PM	0	0	0	0	0	0	1	1	0	5	1	6	0	4	0	4	11
4:30 PM	0	0	0	0	0	0	2	2	1	0	0	1	0	3	0	3	6
4:35 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	5	5
4:40 PM	0	0	0	0	0	0	1	1	0	3	0	3	0	2	0	2	6
4:45 PM	0	0	0	0	0	0	0	0	1	1	0	2	0	4	0	4	6
4:50 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	7	7
4:55 PM	0	0	0	0	0	0	1	1	1	2	1	4	0	0	0	0	5
5:00 PM	0	0	0	0	0	0	0	0	0	4	1	5	0	1	0	1	6
5:05 PM	0	0	0	0	0	0	0	0	0	2	0	2	0	5	0	5	7
5:10 PM	0	0	0	0	0	0	0	0	1	3	0	4	0	4	0	4	8
5:15 PM	0	0	0	0	0	0	0	0	1	1	0	2	0	2	0	2	4
5:20 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	5	0	5	6
5:25 PM	0	0	0	0	0	0	0	0	0	2	0	2	0	1	0	1	3
5:30 PM	0	0	0	0	0	0	0	0	0	3	1	4	0	3	0	3	7
5:35 PM	0	0	0	0	0	0	0	0	1	1	0	2	0	4	0	4	6
5:40 PM	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	2
5:45 PM	1	0	0	1	0	0	0	0	0	2	0	2	0	3	0	3	6
5:50 PM	1	0	0	1	0	0	0	0	0	1	1	2	0	4	0	4	7
5:55 PM	0	0	0	0	0	0	0	0	1	2	0	3	0	5	0	5	8
Total Survey	4	0	0	4	1	0	9	10	10	53	5	68	0	91	3	94	176

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

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	0	0	0	1	0	0	1	0	12	0	12	0	21	2	23	36
4:15 PM	2	0	0	2	0	0	5	5	3	11	1	15	0	12	1	13	35
4:30 PM	0	0	0	0	0	0	3	3	1	3	0	4	0	10	0	10	17
4:45 PM	0	0	0	0	0	0	1	1	2	3	1	6	0	11	0	11	18
5:00 PM	0	0	0	0	0	0	0	0	1	9	1	11	0	10	0	10	21
5:15 PM	0	0	0	0	0	0	0	0	1	4	0	5	0	8	0	8	13
5:30 PM	0	0	0	0	0	0	0	0	1	6	1	8	0	7	0	7	15
5:45 PM	2	0	0	2	0	0	0	0	1	5	1	7	0	12	0	12	21
Total Survey	4	0	0	4	1	0	9	10	10	53	5	68	0	91	3	94	176

Heavy Vehicle Peak Hour Summary
4:10 PM to 5:10 PM

By Approach	Northbound SE Ten Eyck Rd			Southbound SE Ten Eyck Rd			Eastbound Hwy 26			Westbound Hwy 26			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	2	3	5	9	7	16	34	58	92	48	25	73	93
PHF	0.25			0.45			0.57			0.71			0.66

By Movement	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	2	0	0	2	0	0	9	9	6	25	3	34	0	47	1	48	93
PHF	0.25	0.00	0.00	0.25	0.00	0.00	0.45	0.45	0.50	0.57	0.38	0.57	0.00	0.73	0.25	0.71	0.66

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

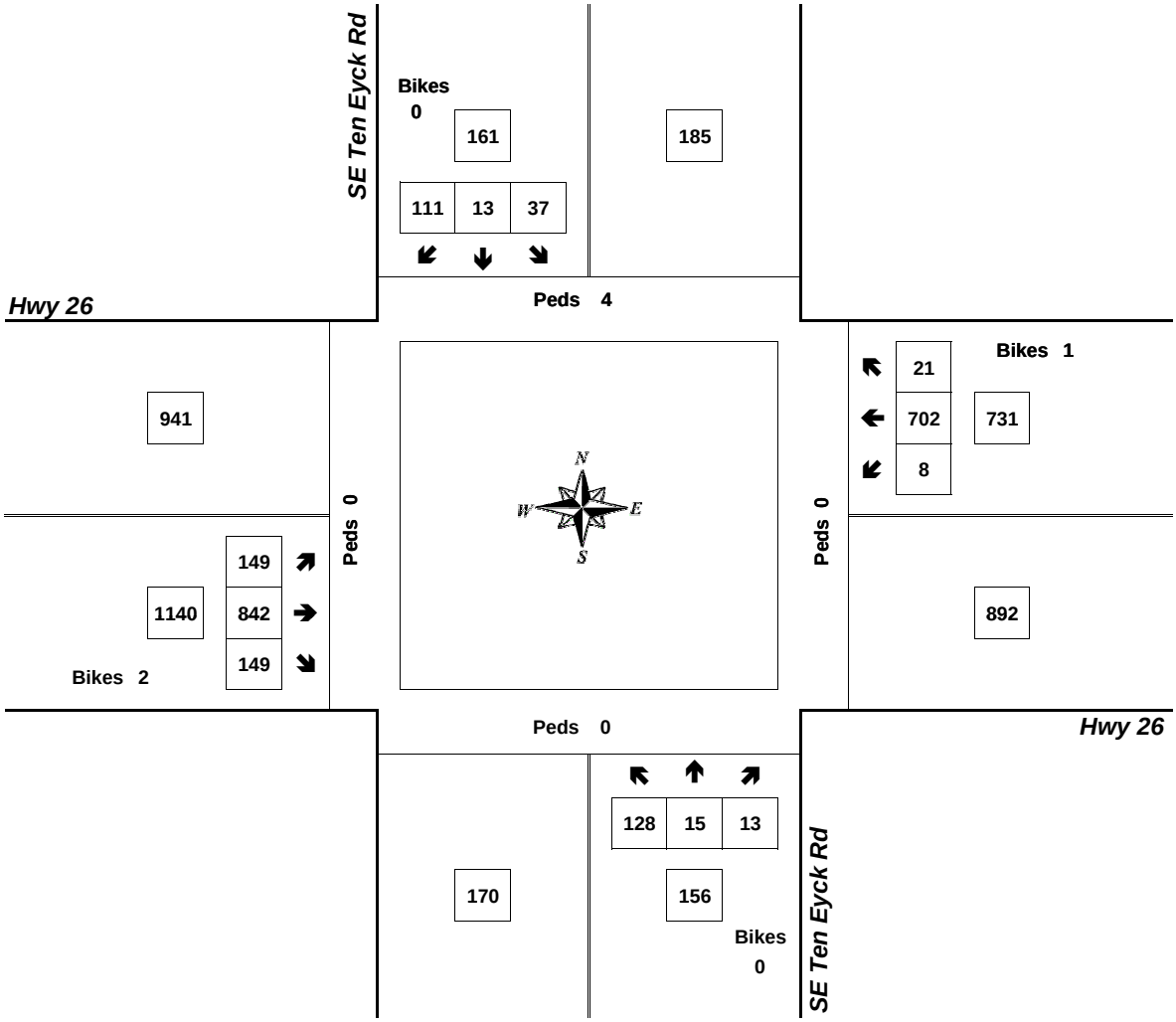
Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	2	0	0	2	1	0	9	10	6	29	2	37	0	54	3	57	106
4:15 PM	2	0	0	2	0	0	9	9	7	26	3	36	0	43	1	44	91
4:30 PM	0	0	0	0	0	0	4	4	5	19	2	26	0	39	0	39	69
4:45 PM	0	0	0	0	0	0	1	1	5	22	3	30	0	36	0	36	67
5:00 PM	2	0	0	2	0	0	0	0	4	24	3	31	0	37	0	37	70

Peak Hour Summary

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

SE Ten Eyck Rd & Hwy 26

4:10 PM to 5:10 PM
Tuesday, March 19, 2019

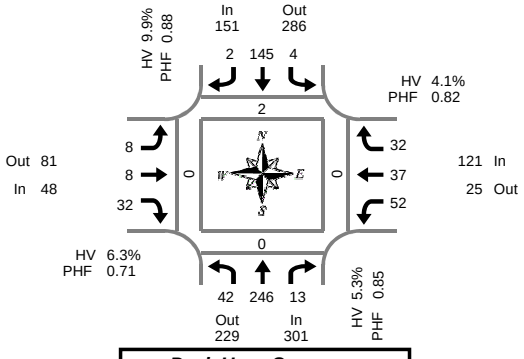


Approach	PHF	HV%	Volume
EB	0.95	3.0%	1,140
WB	0.92	6.6%	731
NB	0.87	1.3%	156
SB	0.79	5.6%	161
Intersection	0.94	4.3%	2,188

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

Total Vehicle Summary

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



Peak Hour Summary
7:05 AM to 8:05 AM

Hwy 211 & Dubarko Rd

Wednesday, March 20, 2019
7:00 AM to 9:00 AM

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

Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	2	18	1	0	0	8	0	0	0	0	0	0	4	5	0	0	38	0	1	0	0
7:05 AM	3	20	1	0	0	12	0	0	0	0	0	0	3	1	5	0	45	0	0	0	0
7:10 AM	5	23	0	0	0	12	0	0	2	2	4	0	4	3	9	0	64	0	0	0	0
7:15 AM	5	32	0	0	0	9	0	0	1	0	2	0	4	2	2	0	57	1	0	0	0
7:20 AM	8	13	0	0	2	13	1	0	0	0	2	0	5	3	5	0	52	0	0	0	0
7:25 AM	1	23	2	0	0	13	0	0	1	1	5	0	4	3	3	0	56	0	0	0	0
7:30 AM	3	17	0	0	1	12	0	0	0	0	3	0	4	9	1	0	50	1	0	0	0
7:35 AM	2	23	0	0	0	17	0	0	0	0	7	0	6	5	1	0	61	0	0	0	0
7:40 AM	2	23	1	0	0	6	1	0	1	2	4	0	6	4	1	0	51	0	0	0	0
7:45 AM	4	20	3	0	0	14	0	0	0	1	0	0	3	1	0	0	46	0	0	0	0
7:50 AM	5	15	3	0	0	10	0	0	1	1	1	0	5	4	2	0	47	0	0	0	0
7:55 AM	1	21	2	0	1	15	0	0	1	0	3	0	3	1	1	0	49	0	0	0	0
8:00 AM	3	16	1	0	0	12	0	0	1	1	1	0	5	1	2	0	43	0	0	0	0
8:05 AM	2	15	0	0	0	7	0	0	1	1	2	0	4	0	3	0	35	1	0	0	0
8:10 AM	2	19	1	0	1	8	0	0	3	1	2	0	3	4	1	0	45	0	0	0	0
8:15 AM	3	27	1	0	0	8	0	0	0	0	1	0	1	3	2	0	46	0	0	0	0
8:20 AM	0	19	0	0	0	10	0	0	0	1	0	0	1	3	0	0	34	0	0	0	0
8:25 AM	6	8	1	0	0	8	0	0	0	1	1	0	1	1	2	0	29	0	0	0	0
8:30 AM	3	27	2	0	0	10	0	0	0	1	1	0	2	2	5	0	53	0	0	0	0
8:35 AM	1	14	0	0	0	16	0	0	0	1	0	0	2	2	0	0	36	0	0	0	0
8:40 AM	0	19	1	0	0	15	0	0	0	1	1	0	1	3	1	0	42	0	0	0	0
8:45 AM	1	21	1	0	0	15	1	0	0	2	3	0	1	2	4	0	51	0	0	0	0
8:50 AM	0	21	0	0	0	9	0	0	0	2	0	0	3	3	2	0	40	0	0	0	0
8:55 AM	4	20	1	0	1	10	0	0	1	3	2	0	3	3	3	0	51	0	0	0	0
Total Survey	66	474	22	0	6	269	3	0	13	22	45	0	78	68	55	0	1,121	3	1	0	0

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

Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	10	61	2	0	0	32	0	0	2	2	4	0	11	9	14	0	147	0	1	0	0
7:15 AM	14	68	2	0	2	35	1	0	2	1	9	0	13	8	10	0	165	1	0	0	0
7:30 AM	7	63	1	0	1	35	1	0	1	2	14	0	16	18	3	0	162	1	0	0	0
7:45 AM	10	56	8	0	1	39	0	0	2	2	4	0	11	6	3	0	142	0	0	0	0
8:00 AM	7	50	2	0	1	27	0	0	5	3	5	0	12	5	6	0	123	1	0	0	0
8:15 AM	9	54	2	0	0	26	0	0	0	2	2	0	3	7	4	0	109	0	0	0	0
8:30 AM	4	60	3	0	0	41	0	0	0	3	2	0	5	7	6	0	131	0	0	0	0
8:45 AM	5	62	2	0	1	34	1	0	1	7	5	0	7	8	9	0	142	0	0	0	0
Total Survey	66	474	22	0	6	269	3	0	13	22	45	0	78	68	55	0	1,121	3	1	0	0

Peak Hour Summary
7:05 AM to 8:05 AM

By Approach	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	301	229	530	0	151	286	437	0	48	81	129	0	121	25	146	0	621	2	0	0	0
%HV	5.3%				9.9%				6.3%				4.1%				6.3%				
PHF	0.85				0.88				0.71				0.82				0.90				

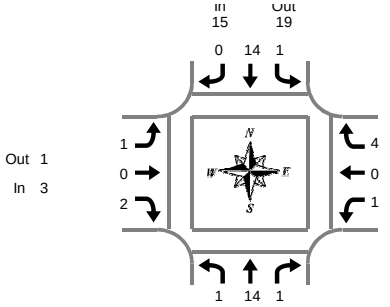
By Movement	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	42	246	13	301	4	145	2	151	8	8	32	48	52	37	32	121	621
%HV	2.4%	5.7%	7.7%	5.3%	25.0%	9.7%	0.0%	9.9%	12.5%	0.0%	6.3%	6.3%	1.9%	0.0%	12.5%	4.1%	6.3%
PHF	0.58	0.82	0.41	0.85	0.33	0.86	0.50	0.88	0.67	0.50	0.53	0.71	0.81	0.51	0.50	0.82	0.90

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

Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	41	248	13	0	4	141	2	0	7	7	31	0	51	41	30	0	616	2	1	0	0
7:15 AM	38	237	13	0	5	136	2	0	10	8	32	0	52	37	22	0	592	3	0	0	0
7:30 AM	33	223	13	0	3	127	1	0	8	9	25	0	42	36	16	0	536	2	0	0	0
7:45 AM	30	220	15	0	2	133	0	0	7	10	13	0	31	25	19	0	505	1	0	0	0
8:00 AM	25	226	9	0	2	128	1	0	6	15	14	0	27	27	25	0	505	1	0	0	0

Heavy Vehicle Summary

Clay Carney
(503) 833-2740



Hwy 211 & Dubarko Rd

Wednesday, March 20, 2019
7:00 AM to 9:00 AM

Peak Hour Summary
7:05 AM to 8:05 AM

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

Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
7:05 AM	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	2
7:10 AM	0	1	0	1	0	0	0	0	0	0	1	1	0	0	1	1	3
7:15 AM	0	1	0	1	0	0	0	0	0	0	1	1	0	0	0	0	2
7:20 AM	0	0	0	0	1	1	0	2	0	0	0	0	1	0	0	1	3
7:25 AM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	2	2	3
7:30 AM	0	1	0	1	0	2	0	2	0	0	0	0	0	0	0	0	3
7:35 AM	0	1	0	1	0	2	0	2	0	0	0	0	0	0	0	0	3
7:40 AM	0	3	1	4	0	0	0	0	0	0	0	0	0	0	1	1	5
7:45 AM	0	0	0	0	0	3	0	3	0	0	0	0	0	0	0	0	3
7:50 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:55 AM	1	0	0	1	0	3	0	3	0	0	0	0	0	0	0	0	4
8:00 AM	0	6	0	6	0	2	0	2	0	0	0	0	0	0	0	0	8
8:05 AM	0	0	0	0	0	3	0	3	0	0	0	0	1	0	0	1	4
8:10 AM	0	2	0	2	0	0	0	0	0	0	0	0	1	1	0	2	4
8:15 AM	1	2	0	3	0	1	0	1	0	0	0	0	0	0	0	0	4
8:20 AM	0	2	0	2	0	2	0	2	0	1	0	1	0	0	0	0	5
8:25 AM	0	2	0	2	0	1	0	1	0	0	0	0	0	0	0	0	3
8:30 AM	0	3	0	3	0	2	0	2	0	0	0	0	0	0	0	0	5
8:35 AM	0	3	0	3	0	4	0	4	0	0	0	0	0	0	0	0	7
8:40 AM	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	2
8:45 AM	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
8:50 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
8:55 AM	0	0	0	0	0	2	0	2	0	0	0	0	0	1	0	1	3
Total Survey	2	31	1	34	1	31	0	32	1	1	2	4	3	3	4	10	80

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

Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	0	2	0	2	0	1	0	1	0	0	1	1	0	1	1	2	6
7:15 AM	0	1	0	1	1	1	0	2	1	0	1	2	1	0	2	3	8
7:30 AM	0	5	1	6	0	4	0	4	0	0	0	0	0	0	1	1	11
7:45 AM	1	0	0	1	0	6	0	6	0	0	0	0	0	0	0	0	7
8:00 AM	0	8	0	8	0	5	0	5	0	0	0	0	2	1	0	3	16
8:15 AM	1	6	0	7	0	4	0	4	0	1	0	1	0	0	0	0	12
8:30 AM	0	7	0	7	0	7	0	7	0	0	0	0	0	0	0	0	14
8:45 AM	0	2	0	2	0	3	0	3	0	0	0	0	0	1	0	1	6
Total Survey	2	31	1	34	1	31	0	32	1	1	2	4	3	3	4	10	80

Heavy Vehicle Peak Hour Summary
7:05 AM to 8:05 AM

By Approach	Northbound Hwy 211			Southbound Hwy 211			Eastbound Dubarko Rd			Westbound Dubarko Rd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	16	17	33	15	19	34	3	1	4	5	2	7	39
PHF	0.57			0.63			0.38			0.42			0.81

By Movement	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	1	14	1	16	1	14	0	15	1	0	2	3	1	0	4	5	39
PHF	0.25	0.58	0.25	0.57	0.25	0.58	0.00	0.63	0.25	0.00	0.25	0.38	0.25	0.00	0.50	0.42	0.81

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

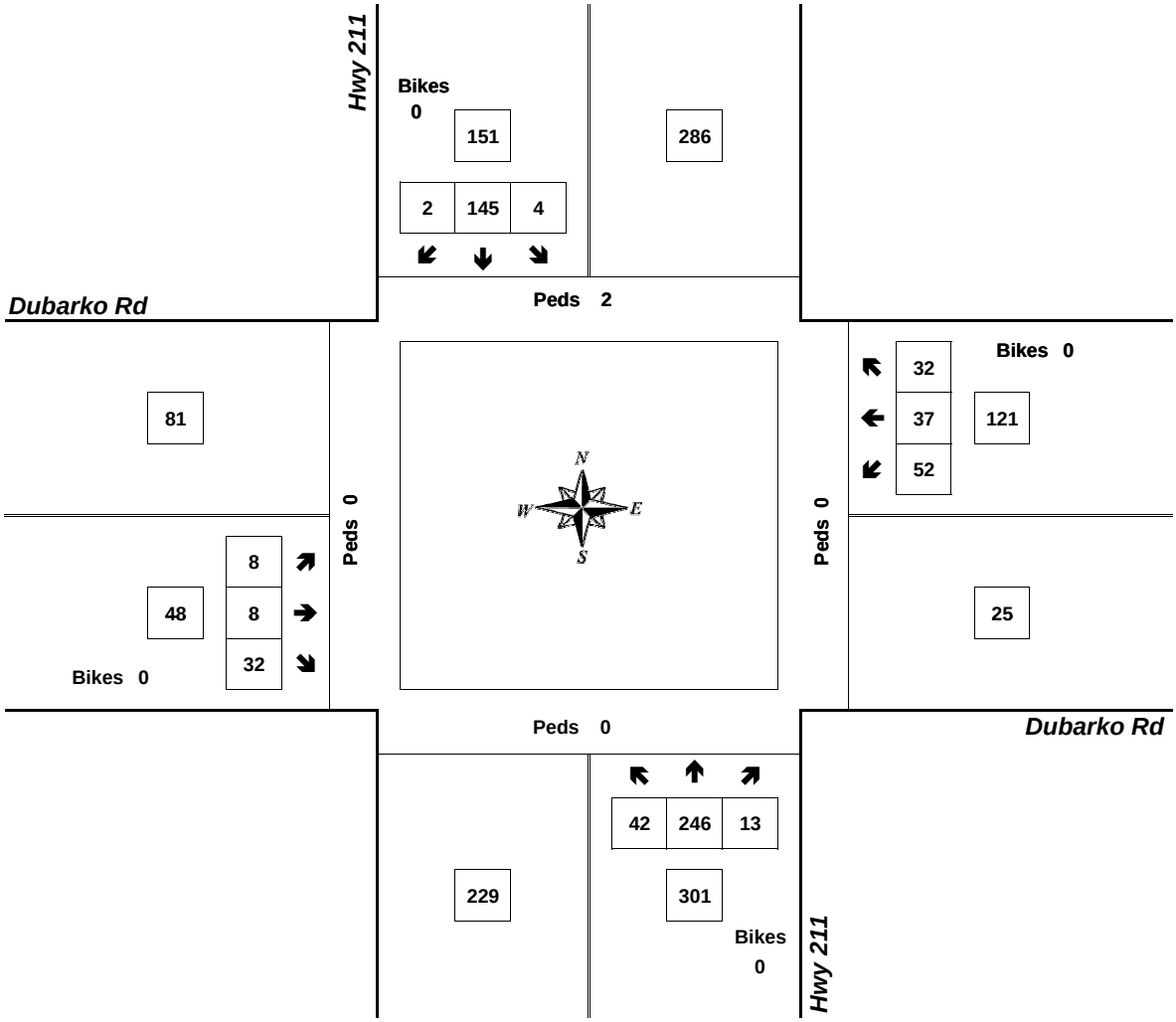
Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	1	8	1	10	1	12	0	13	1	0	2	3	1	1	4	6	32
7:15 AM	1	14	1	16	1	16	0	17	1	0	1	2	3	1	3	7	42
7:30 AM	2	19	1	22	0	19	0	19	0	1	0	1	2	1	1	4	46
7:45 AM	2	21	0	23	0	22	0	22	0	1	0	1	2	1	0	3	49
8:00 AM	1	23	0	24	0	19	0	19	0	1	0	1	2	2	0	4	48

Peak Hour Summary

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

Hwy 211 & Dubarko Rd

7:05 AM to 8:05 AM
Wednesday, March 20, 2019

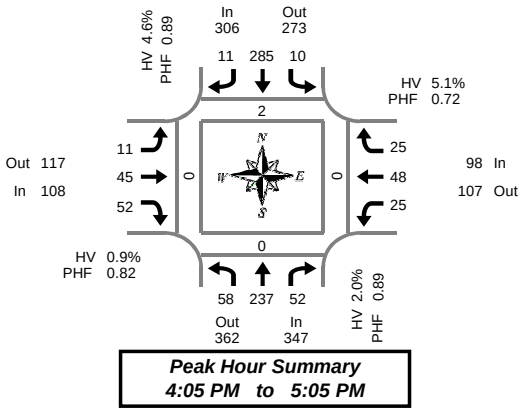


Approach	PHF	HV%	Volume
EB	0.71	6.3%	48
WB	0.82	4.1%	121
NB	0.85	5.3%	301
SB	0.88	9.9%	151
Intersection	0.90	6.3%	621

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

Total Vehicle Summary

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



Peak Hour Summary
4:05 PM to 5:05 PM

Hwy 211 & Dubarko Rd

Tuesday, March 19, 2019
4:00 PM to 6:00 PM

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

Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	4	14	0	0	2	25	1	0	0	3	3	0	2	3	3	0	60	0	0	1	0
4:05 PM	4	28	3	0	1	31	0	0	1	7	6	0	2	6	2	0	91	0	0	0	0
4:10 PM	10	17	2	0	1	19	0	0	0	4	3	0	3	4	3	0	66	0	0	0	0
4:15 PM	4	20	6	0	2	20	1	0	2	7	3	1	1	5	1	0	72	0	0	0	0
4:20 PM	6	12	1	0	1	14	1	0	2	3	4	0	5	7	4	0	60	1	0	0	0
4:25 PM	5	16	4	0	1	21	1	0	3	3	4	0	2	4	1	0	65	0	0	0	0
4:30 PM	4	22	3	0	0	19	3	0	1	2	2	0	5	5	1	0	67	1	0	0	0
4:35 PM	2	23	7	0	0	29	1	0	1	2	1	0	0	1	3	0	70	0	0	0	0
4:40 PM	2	17	4	0	0	22	0	0	0	2	1	0	1	3	3	0	55	0	0	0	0
4:45 PM	10	23	7	0	2	29	1	0	0	6	8	0	3	2	0	0	91	0	0	0	0
4:50 PM	3	22	6	0	1	19	1	0	1	0	4	0	1	1	2	0	61	0	0	0	0
4:55 PM	4	20	3	0	0	20	2	0	0	6	2	0	1	6	1	0	65	0	0	0	0
5:00 PM	4	17	6	0	1	42	0	0	0	3	14	0	1	4	4	0	96	0	0	0	0
5:05 PM	2	24	5	0	0	20	0	0	0	4	5	0	1	2	3	0	66	0	0	0	0
5:10 PM	8	24	4	0	1	13	1	0	1	8	2	0	2	1	3	0	68	0	0	0	0
5:15 PM	4	13	4	0	1	19	1	0	0	4	3	0	5	3	0	0	57	0	0	0	0
5:20 PM	1	19	6	0	1	29	1	0	1	2	2	0	1	4	0	0	67	0	0	0	0
5:25 PM	5	14	6	0	0	17	1	0	1	3	9	0	2	4	3	0	65	0	0	0	0
5:30 PM	5	19	6	0	0	19	1	0	1	5	5	0	0	2	3	0	66	0	0	0	0
5:35 PM	5	15	1	0	2	24	0	0	1	5	6	0	1	2	1	0	63	0	0	0	0
5:40 PM	5	19	7	0	0	29	1	0	0	8	3	0	1	2	0	1	75	0	0	0	0
5:45 PM	4	15	8	0	0	16	1	0	0	7	3	0	3	0	0	0	57	0	0	0	0
5:50 PM	4	13	2	0	0	20	3	0	2	5	3	0	0	5	3	0	60	0	0	0	0
5:55 PM	5	13	2	0	1	18	0	0	0	2	3	0	2	1	1	0	48	0	0	0	0
Total Survey	110	439	103	0	18	534	22	0	18	101	99	1	45	77	45	1	1,611	2	0	1	0

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

Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	18	59	5	0	4	75	1	0	1	14	12	0	7	13	8	0	217	0	0	1	0
4:15 PM	15	48	11	0	4	55	3	0	7	13	11	1	8	16	6	0	197	1	0	0	0
4:30 PM	8	62	14	0	0	70	4	0	2	6	4	0	6	9	7	0	192	1	0	0	0
4:45 PM	17	65	16	0	3	68	4	0	1	12	14	0	5	9	3	0	217	0	0	0	0
5:00 PM	14	65	15	0	2	75	1	0	1	15	21	0	4	7	10	0	230	0	0	0	0
5:15 PM	10	46	16	0	2	65	3	0	2	9	14	0	8	11	3	0	189	0	0	0	0
5:30 PM	15	53	14	0	2	72	2	0	2	18	14	0	2	6	4	1	204	0	0	0	0
5:45 PM	13	41	12	0	1	54	4	0	2	14	9	0	5	6	4	0	165	0	0	0	0
Total Survey	110	439	103	0	18	534	22	0	18	101	99	1	45	77	45	1	1,611	2	0	1	0

Peak Hour Summary
4:05 PM to 5:05 PM

By Approach	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	347	362	709	0	306	273	579	0	108	117	225	1	98	107	205	0	859	2	0	0	0
%HV	2.0%				4.6%				0.9%				5.1%				3.1%				
PHF	0.89				0.89				0.82				0.72				0.94				

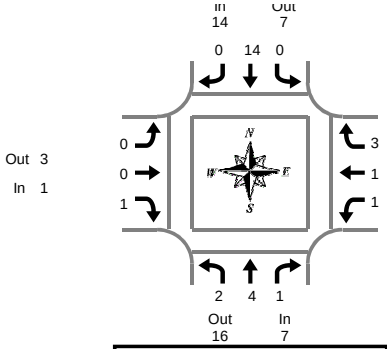
By Movement	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	58	237	52	347	10	285	11	306	11	45	52	108	25	48	25	98	859
%HV	3.4%	1.7%	1.9%	2.0%	0.0%	4.9%	0.0%	4.6%	0.0%	0.0%	1.9%	0.9%	4.0%	2.1%	12.0%	5.1%	3.1%
PHF	0.73	0.91	0.72	0.89	0.63	0.88	0.55	0.89	0.39	0.63	0.65	0.82	0.52	0.75	0.78	0.72	0.94

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

Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	58	234	46	0	11	268	12	0	11	45	41	1	26	47	24	0	823	2	0	1	0
4:15 PM	54	240	56	0	9	268	12	0	11	46	50	1	23	41	26	0	836	2	0	0	0
4:30 PM	49	238	61	0	7	278	12	0	6	42	53	0	23	36	23	0	828	1	0	0	0
4:45 PM	56	229	61	0	9	280	10	0	6	54	63	0	19	33	20	1	840	0	0	0	0
5:00 PM	52	205	57	0	7	266	10	0	7	56	58	0	19	30	21	1	788	0	0	0	0

Heavy Vehicle Summary

Clay Carney
(503) 833-2740



Hwy 211 & Dubarko Rd

Tuesday, March 19, 2019
4:00 PM to 6:00 PM

Peak Hour Summary
4:05 PM to 5:05 PM

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

Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	1	0	1	0	4	0	4	0	0	1	1	1	0	0	1	7
4:05 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
4:10 PM	2	0	0	2	0	0	0	0	0	0	0	0	0	0	1	1	3
4:15 PM	0	1	0	1	0	4	0	4	0	0	0	0	0	0	0	0	5
4:20 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2	2
4:25 PM	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	2
4:30 PM	0	0	0	0	0	2	0	2	0	0	0	0	0	0	1	1	3
4:35 PM	0	1	0	1	0	1	0	1	0	0	0	0	0	0	1	1	3
4:40 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
4:45 PM	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1
4:50 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
4:55 PM	0	0	1	1	0	1	0	1	0	0	0	0	0	0	0	0	2
5:00 PM	0	1	0	1	0	2	0	2	0	0	0	0	0	0	0	0	3
5:05 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
5:10 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
5:15 PM	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
5:20 PM	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1
5:25 PM	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:35 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
5:40 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:50 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
5:55 PM	0	0	0	0	0	2	0	2	0	0	1	1	1	0	0	1	4
Total Survey	3	9	2	14	0	23	0	23	0	0	3	3	3	1	3	7	47

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

Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	2	1	0	3	0	5	0	5	0	0	1	1	1	0	1	2	11
4:15 PM	0	1	0	1	0	6	0	6	0	0	0	0	1	1	0	2	9
4:30 PM	0	1	0	1	0	4	0	4	0	0	0	0	0	0	2	2	7
4:45 PM	0	1	1	2	0	1	0	1	0	0	1	1	0	0	0	0	4
5:00 PM	0	2	0	2	0	3	0	3	0	0	0	0	0	0	0	0	5
5:15 PM	1	2	1	4	0	0	0	0	0	0	0	0	0	0	0	0	4
5:30 PM	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	2
5:45 PM	0	0	0	0	0	3	0	3	0	0	1	1	1	0	0	1	5
Total Survey	3	9	2	14	0	23	0	23	0	0	3	3	3	1	3	7	47

Heavy Vehicle Peak Hour Summary
4:05 PM to 5:05 PM

By Approach	Northbound Hwy 211			Southbound Hwy 211			Eastbound Dubarko Rd			Westbound Dubarko Rd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	7	16	23	14	7	21	1	3	4	5	1	6	27
PHF	0.58			0.58			0.25			0.42			0.68

By Movement	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	2	4	1	7	0	14	0	14	0	0	1	1	1	1	3	5	27
PHF	0.25	0.50	0.25	0.58	0.00	0.58	0.00	0.58	0.00	0.00	0.25	0.25	0.25	0.25	0.38	0.42	0.68

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

Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	2	4	1	7	0	16	0	16	0	0	2	2	2	1	3	6	31
4:15 PM	0	5	1	6	0	14	0	14	0	0	1	1	1	1	2	4	25
4:30 PM	1	6	2	9	0	8	0	8	0	0	1	1	0	0	2	2	20
4:45 PM	1	6	2	9	0	5	0	5	0	0	1	1	0	0	0	0	15
5:00 PM	1	5	1	7	0	7	0	7	0	0	1	1	1	0	0	1	16

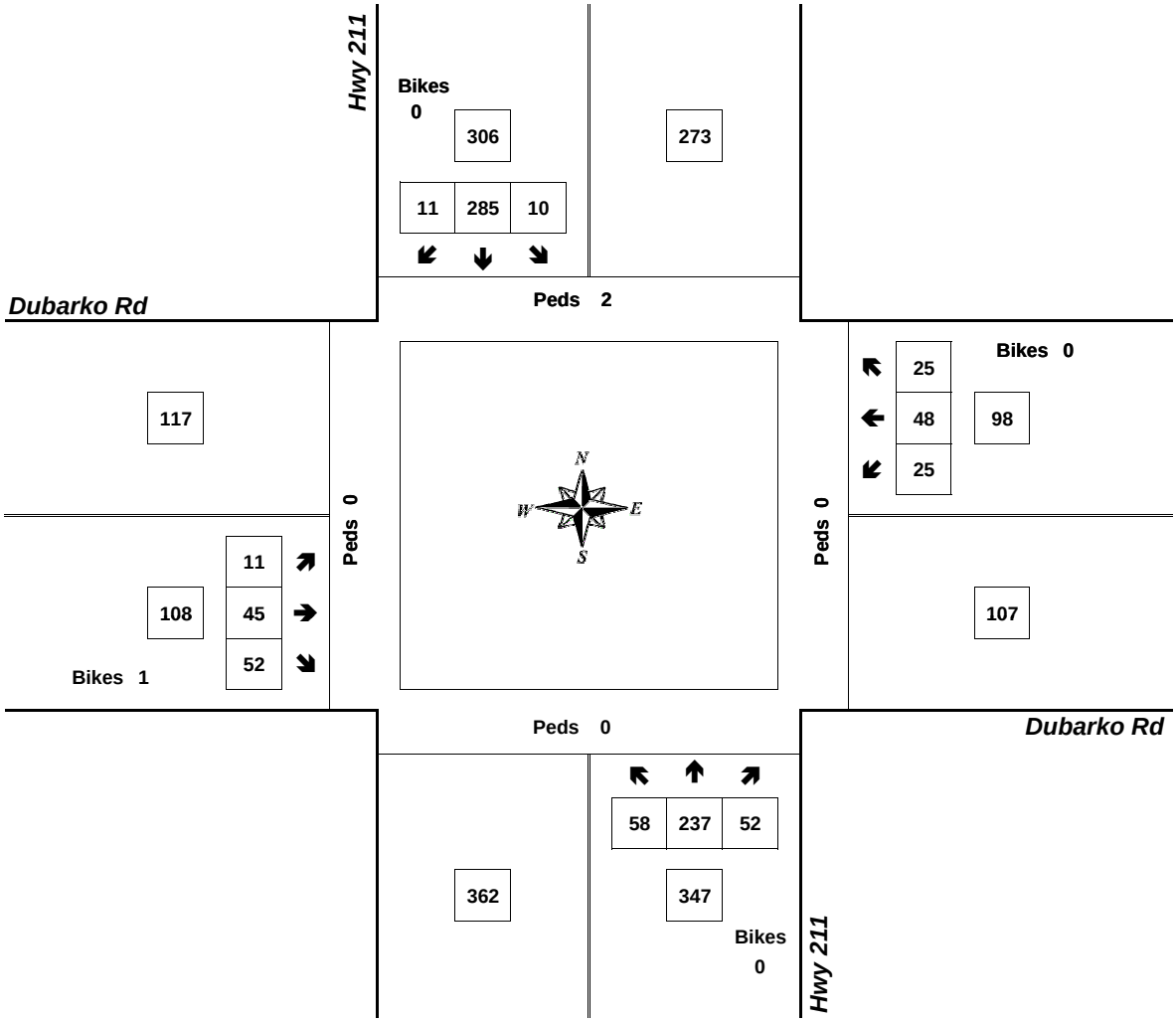
Peak Hour Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740

Hwy 211 & Dubarko Rd

4:05 PM to 5:05 PM
Tuesday, March 19, 2019



Approach	PHF	HV%	Volume
EB	0.82	0.9%	108
WB	0.72	5.1%	98
NB	0.89	2.0%	347
SB	0.89	4.6%	306
Intersection	0.94	3.1%	859

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

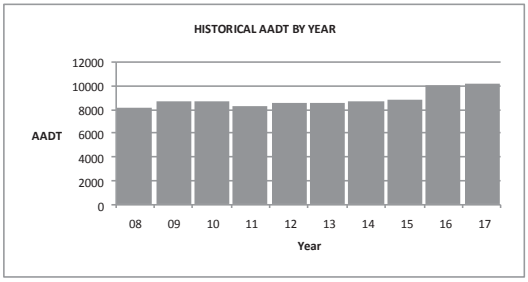
HWY	MP	DIR	HS	Location	2014	2015	2016	2036	RSQ
026	22.72	1		0.02 mile northwest of S.E. 362nd Drive, west city limits of Sandy		29500		41400	MODEL
026	23.85	1		0.02 mile west of Bluff Road		30100		42600	MODEL
026	23.89	1		0.02 mile east of Bluff Road		15100		21600	MODEL
026	24.02	1		0.02 mile west of Beers Avenue		15100		21600	MODEL
026	24.35	1		0.05 mile west of Eagle Creek-Sandy Highway (OR211)		14800		21600	MODEL
026	24.42	1		0.02 mile east of Eagle Creek-Sandy Highway (OR211)		12000		17100	MODEL
026	24.59	1		0.02 mile west of Ten Eyck Road		11200		16000	MODEL
026	23.89	2	W	0.02 mile east of Bluff Road		15200		21300	MODEL
026	24.04	2	W	0.02 mile west of Beers Avenue		15200		21300	MODEL
026	24.36	2	W	0.05 mile west of Eagle Creek-Sandy Highway (OR211)		14500		20700	MODEL
026	24.40	2	W	0.02 mile east of Eagle Creek-Sandy Highway (OR211)		12100		16900	MODEL
026	24.61	2	W	0.02 mile west of Ten Eyck Road		11700		16400	MODEL
026	25.10	1		0.02 mile west of Langensand Road		18000		25400	MODEL
026	25.66	1		0.10 mile east of Vista Loop Drive		19700		27600	MODEL

HWY	MP	DIR	HS	Location	2014	2015	2016	2036	RSQ
172	-0.13	1		0.10 mile east of Clackamas Highway (OR224)			5600	8800	MODEL
172	1.45	1		0.10 mile southwest of Judd Road			5800	9100	MODEL
172	1.65	1		0.10 mile northeast of Judd Road			6200	9600	MODEL
172	3.65	1		0.05 mile west of 362nd Drive			7600	11600	MODEL
172	3.75	1		0.05 mile east of 362nd Drive			5300	7900	MODEL
172	5.07	1		0.10 mile west of Bornstedt Road			4200	6900	MODEL
172	5.29	1		0.10 mile south of Dubarko Road			6500	10700	MODEL
172	5.50	1		0.11 mile north of Dubarko Road			5700	9200	MODEL
172	5.83	1		0.05 mile south of Mt. Hood Highway (US26-Eastbound)			5700	9200	MODEL
172	5.92	1		0.02 mile south of Mt. Hood Highway (US26-Westbound)			5000	8100	MODEL

Location:	US26; MP 46.38; MT. HOOD HIGHWAY NO. 26; 0.30 mile east of Camp Creek Rd (USFS 28)	Site Name:	Rhododendron (03-006)
		Installed:	August, 1995

HISTORICAL TRAFFIC DATA

		Percent of AADT				
Year	AADT	Max Day	Max Hour	10TH Hour	20TH Hour	30TH Hour
2008	8162	233	22.9	20.1	19.1	18.2
2009	8737	197	22.3	19.6	18.4	17.8
2010	8714	207	21.6	19.8	18.9	18.5
2011	8330	214	24.7	20.0	18.6	18.1
2012	8480	227	24.0	21.0	20.2	19.4
2013	8527	213	23.4	21.1	20.3	19.1
2014	8652	216	23.2	21.1	20.3	19.2
2015	8861	242	21.4	20.3	19.4	18.7
2016	10071	208	22.9	19.6	18.8	17.9
2017	10223	200	19.9	19.1	18.1	17.5



2017 TRAFFIC DATA

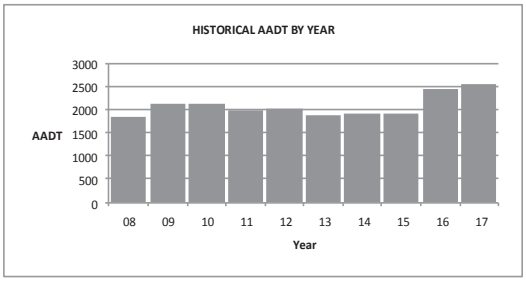
	Average Weekday Traffic	Percent of AADT	Average Daily Traffic	Percent of AADT
January	6744	66	9080	89
February	6533	64	9496	93
March	6763	66	9337	91
April	6166	60	8675	85
May	7675	75	9598	94
June	8568	84	10695	105
July	11291	110	13874	136
August	11738	115	13623	133
September	11300	111	12734	125
October	6589	64	8087	79
November	5493	54	7313	72
December	8753	86	10161	99

For Vehicle Classification data near your project, please go to the following web page: https://www.oregon.gov/ODOT/Data/Documents/TVT_2017.xlsx

Location:	OR35; MP 57.79; MT. HOOD HIGHWAY NO. 26; 0.02 mile east of Warm Springs Highway No. 53 (US26)	Site Name:	Mt. Hood Meadows (03-007)
		Installed:	September, 1995

HISTORICAL TRAFFIC DATA

		Percent of AADT				
Year	AADT	Max Day	Max Hour	10TH Hour	20TH Hour	30TH Hour
2008	1854	398	56.8	44.2	39.9	36.1
2009	2130	***	***	***	***	***
2010	2145	374	49.2	39.5	34.8	33.2
2011	1976	476	79.2	49.1	45.0	39.1
2012	2023	452	65.4	43.4	40.3	37.7
2013	1868	427	68.1	48.7	42.0	37.1
2014	1908	400	60.0	41.9	37.4	33.6
2015	1931	393	50.4	38.6	34.4	32.6
2016	2455	366	55.9	38.3	33.1	31.2
2017	2565	340	52.1	37.7	32.5	31.3

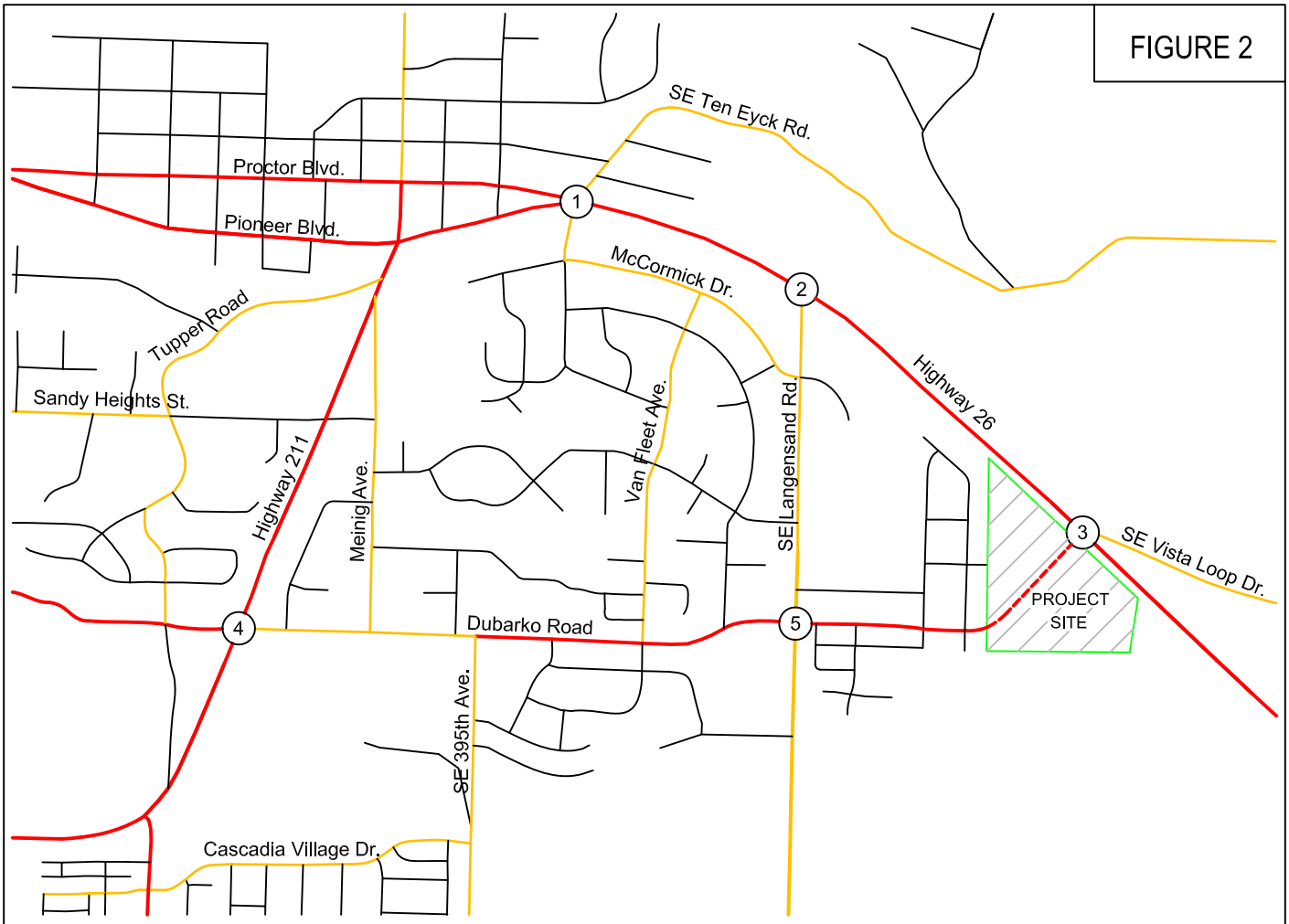


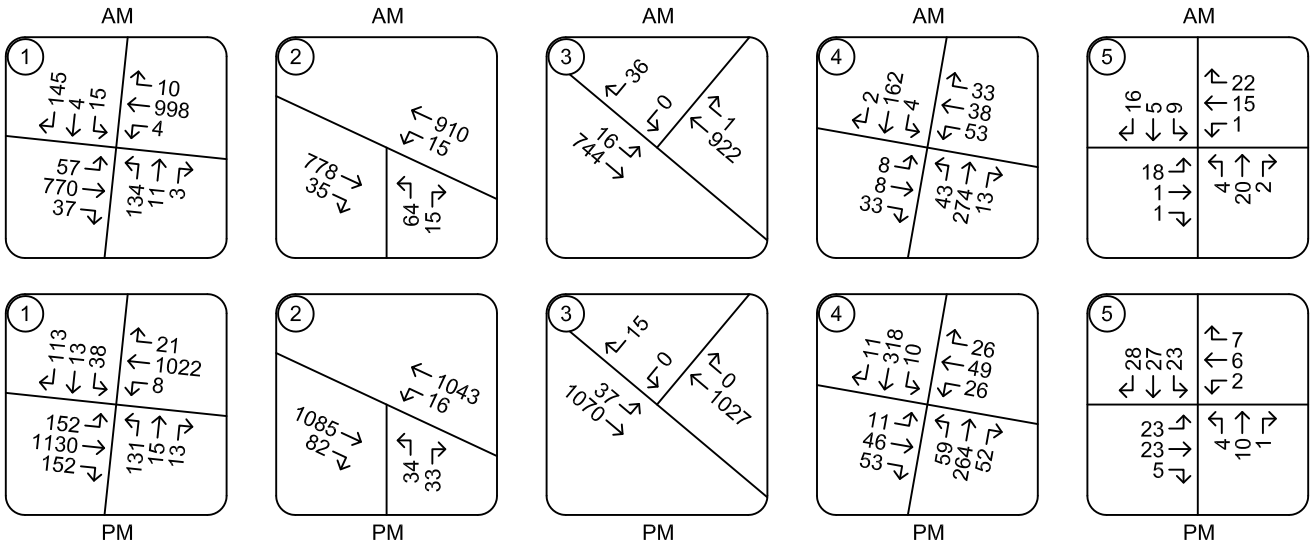
2017 TRAFFIC DATA

	Average Weekday Traffic	Percent of AADT	Average Daily Traffic	Percent of AADT
January	2449	95	3616	141
February	1978	77	3362	131
March	1781	69	2833	110
April	1116	44	2050	80
May	1202	47	1609	63
June	1794	70	2070	81
July	2405	94	2837	111
August	2302	90	2614	102
September	3956	154	3993	156
October	1387	54	1614	63
November	768	30	1156	45
December	2499	97	2966	116

For Vehicle Classification data near your project, please go to the following web page: https://www.oregon.gov/ODOT/Data/Documents/TVT_2017.xlsx

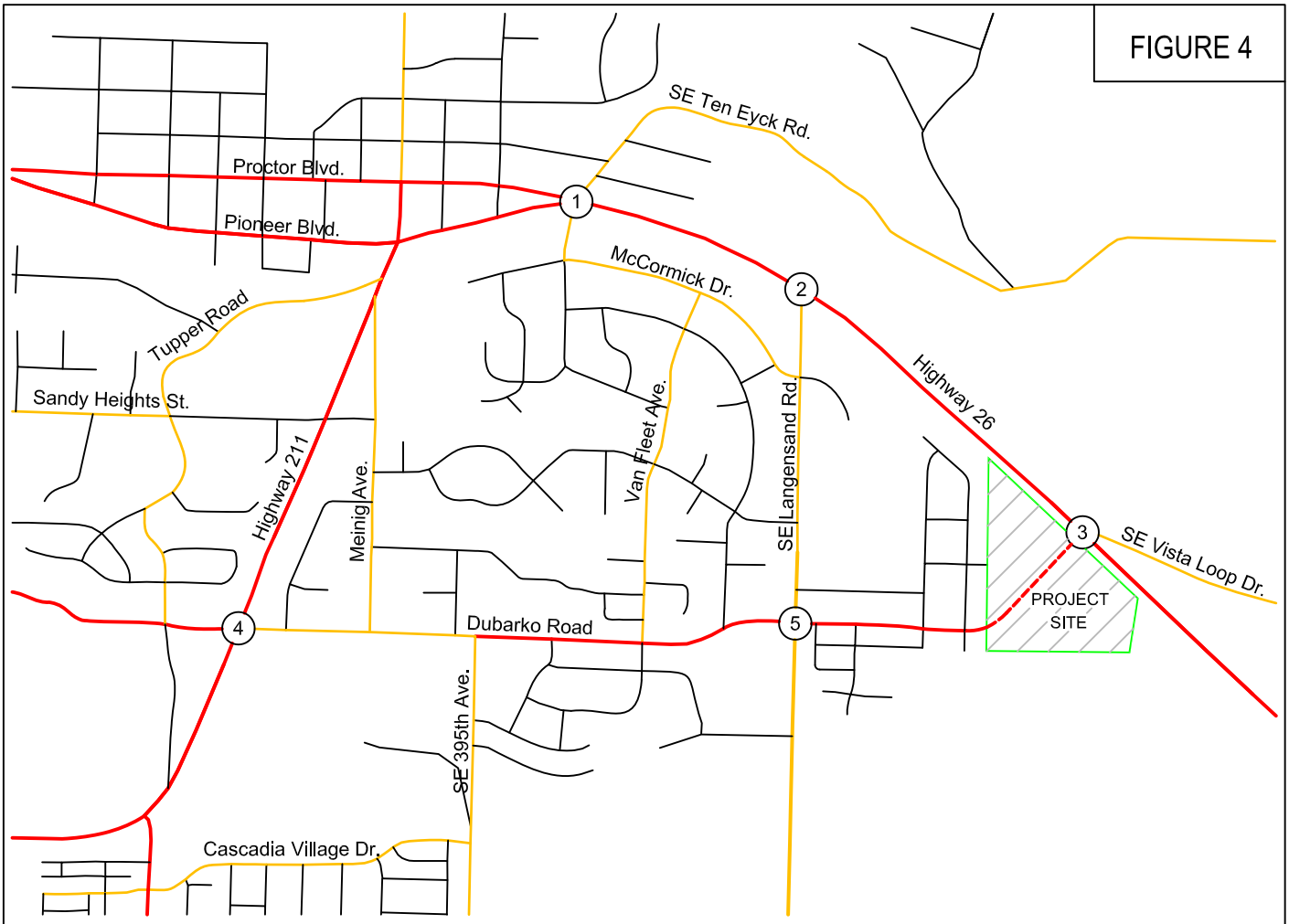
FIGURE 2

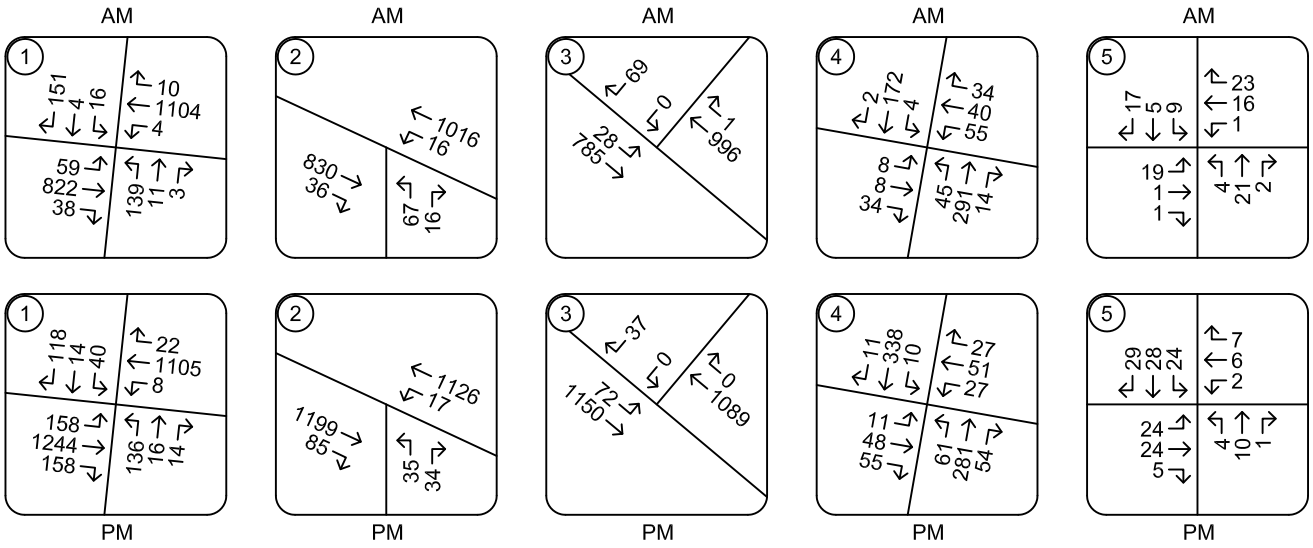




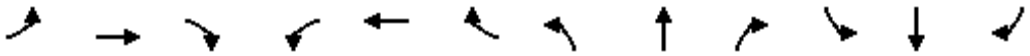
TRAFFIC VOLUMES
2020 Existing 30th-Highest Hour (August) Conditions
Morning and Evening Peak Hours

FIGURE 4





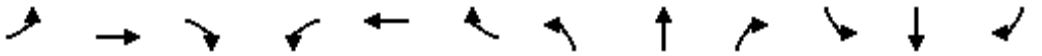
TRAFFIC VOLUMES
2022 Background Conditions
Morning and Evening Peak Hours



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	723	134	0	0	0	0	235	131	10	68	0
Future Volume (vph)	40	723	134	0	0	0	0	235	131	10	68	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.5	4.5					4.5	4.5	4.5	4.5	
Lane Util. Factor		0.95	1.00					1.00	1.00	1.00	1.00	
Frpb, ped/bikes		1.00	0.97					1.00	0.98	1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		2664	1154					1500	1245	1354	1432	
Flt Permitted		1.00	1.00					1.00	1.00	0.40	1.00	
Satd. Flow (perm)		2664	1154					1500	1245	573	1432	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	43	777	144	0	0	0	0	253	141	11	73	0
RTOR Reduction (vph)	0	0	39	0	0	0	0	0	109	0	0	0
Lane Group Flow (vph)	0	820	105	0	0	0	0	253	32	11	73	0
Confl. Peds. (#/hr)	3		6						8	5		
Heavy Vehicles (%)	12%	12%	12%	2%	2%	2%	5%	5%	5%	10%	10%	10%
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA	
Protected Phases		2						4			8	
Permitted Phases	2		2						4	8		
Actuated Green, G (s)		60.4	60.4					20.6	20.6	20.6	20.6	
Effective Green, g (s)		60.4	60.4					20.6	20.6	20.6	20.6	
Actuated g/C Ratio		0.67	0.67					0.23	0.23	0.23	0.23	
Clearance Time (s)		4.5	4.5					4.5	4.5	4.5	4.5	
Vehicle Extension (s)		3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		1787	774					343	284	131	327	
v/s Ratio Prot								c0.17			0.05	
v/s Ratio Perm		0.31	0.09						0.03	0.02		
v/c Ratio		0.46	0.14					0.74	0.11	0.08	0.22	
Uniform Delay, d1		7.0	5.4					32.2	27.5	27.3	28.2	
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.9	0.4					8.0	0.2	0.3	0.3	
Delay (s)		7.9	5.7					40.2	27.7	27.6	28.5	
Level of Service		A	A					D	C	C	C	
Approach Delay (s)		7.6			0.0			35.7			28.4	
Approach LOS		A			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	16.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	52.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	723	134	0	0	0	0	235	131	10	68	0
Future Volume (veh/h)	40	723	134	0	0	0	0	235	131	10	68	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98	0.99		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1428	1428	1428				0	1514	1514	1452	1452	0
Adj Flow Rate, veh/h	43	777	0				0	253	141	11	73	0
Peak Hour Factor	0.93	0.93	0.93				0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	12	12	12				0	5	5	10	10	0
Cap, veh/h	97	1845					0	303	252	110	291	0
Arrive On Green	0.70	0.70	0.00				0.00	0.20	0.20	0.20	0.20	0.00
Sat Flow, veh/h	139	2638	1210				0	1514	1257	763	1452	0
Grp Volume(v), veh/h	439	381	0				0	253	141	11	73	0
Grp Sat Flow(s),veh/h/ln	1421	1356	1210				0	1514	1257	763	1452	0
Q Serve(g_s), s	12.1	10.6	0.0				0.0	14.4	9.1	1.3	3.8	0.0
Cycle Q Clear(g_c), s	12.1	10.6	0.0				0.0	14.4	9.1	15.7	3.8	0.0
Prop In Lane	0.10		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	994	949					0	303	252	110	291	0
V/C Ratio(X)	0.44	0.40					0.00	0.83	0.56	0.10	0.25	0.00
Avail Cap(c_a), veh/h	994	949					0	530	440	225	508	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	5.9	5.6	0.0				0.0	34.6	32.4	42.1	30.3	0.0
Incr Delay (d2), s/veh	1.4	1.3	0.0				0.0	6.0	1.9	0.4	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	2.9	0.0				0.0	5.6	2.8	0.3	1.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.3	6.9	0.0				0.0	40.5	34.4	42.5	30.7	0.0
LnGrp LOS	A	A					A	D	C	D	C	A
Approach Vol, veh/h		820	A					394			84	
Approach Delay, s/veh		7.1						38.3			32.3	
Approach LOS		A						D			C	

Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		67.5		22.5				22.5				
Change Period (Y+Rc), s		4.5		4.5				4.5				
Max Green Setting (Gmax), s		49.5		31.5				31.5				
Max Q Clear Time (g_c+I1), s		14.1		16.4				17.7				
Green Ext Time (p_c), s		6.5		1.6				0.3				

Intersection Summary	
HCM 6th Ctrl Delay	18.2
HCM 6th LOS	B

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	11	30	336	11	7	199
Future Vol, veh/h	11	30	336	11	7	199
Conflicting Peds, #/hr	3	3	0	3	3	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	5	2	2	10
Mvmt Flow	12	33	365	12	8	216

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	609	377	0	0	380	0
Stage 1	374	-	-	-	-	-
Stage 2	235	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	458	670	-	-	1178	-
Stage 1	696	-	-	-	-	-
Stage 2	804	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	452	666	-	-	1175	-
Mov Cap-2 Maneuver	452	-	-	-	-	-
Stage 1	694	-	-	-	-	-
Stage 2	795	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.6	0	0.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	591	1175	-
HCM Lane V/C Ratio	-	-	0.075	0.006	-
HCM Control Delay (s)	-	-	11.6	8.1	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0	-

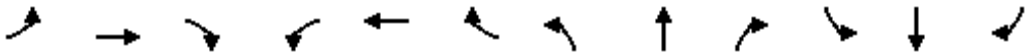
Intersection	
Int Delay, s/veh	1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	35	9	3	301	187	12
Future Vol, veh/h	35	9	3	301	187	12
Conflicting Peds, #/hr	2	2	2	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	10	5	2
Mvmt Flow	38	10	3	327	203	13

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	547	214	218	0	-	0
Stage 1	212	-	-	-	-	-
Stage 2	335	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	498	826	1352	-	-	-
Stage 1	823	-	-	-	-	-
Stage 2	725	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	495	823	1349	-	-	-
Mov Cap-2 Maneuver	495	-	-	-	-	-
Stage 1	819	-	-	-	-	-
Stage 2	724	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.3	0.1	0
HCM LOS	B		

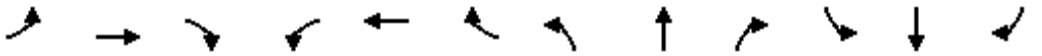
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1349	-	539	-	-
HCM Lane V/C Ratio	0.002	-	0.089	-	-
HCM Control Delay (s)	7.7	0	12.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	71	1288	270	0	0	0	0	225	125	21	138	0
Future Volume (vph)	71	1288	270	0	0	0	0	225	125	21	138	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.5	4.5					4.5	4.5	4.5	4.5	
Lane Util. Factor		0.95	1.00					1.00	1.00	1.00	1.00	
Frpb, ped/bikes		1.00	0.96					1.00	0.97	1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		2896	1250					1544	1278	1418	1500	
Flt Permitted		1.00	1.00					1.00	1.00	0.36	1.00	
Satd. Flow (perm)		2896	1250					1544	1278	537	1500	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	76	1370	287	0	0	0	0	239	133	22	147	0
RTOR Reduction (vph)	0	0	41	0	0	0	0	0	53	0	0	0
Lane Group Flow (vph)	0	1446	246	0	0	0	0	239	80	22	147	0
Confl. Peds. (#/hr)	3		6						8	5		
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	5%	5%	5%
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA	
Protected Phases		2						4			8	
Permitted Phases	2		2						4	8		
Actuated Green, G (s)		79.1	79.1					21.9	21.9	21.9	21.9	
Effective Green, g (s)		79.1	79.1					21.9	21.9	21.9	21.9	
Actuated g/C Ratio		0.72	0.72					0.20	0.20	0.20	0.20	
Clearance Time (s)		4.5	4.5					4.5	4.5	4.5	4.5	
Vehicle Extension (s)		3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		2082	898					307	254	106	298	
v/s Ratio Prot								c0.15			0.10	
v/s Ratio Perm		0.50	0.20						0.06	0.04		
v/c Ratio		0.69	0.27					0.78	0.32	0.21	0.49	
Uniform Delay, d1		8.7	5.4					41.8	37.6	36.8	39.1	
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2		1.9	0.8					11.8	0.7	1.0	1.3	
Delay (s)		10.6	6.2					53.5	38.4	37.8	40.4	
Level of Service		B	A					D	D	D	D	
Approach Delay (s)		9.9			0.0			48.1			40.1	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	18.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	74.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	71	1288	270	0	0	0	0	225	125	21	138	0
Future Volume (veh/h)	71	1288	270	0	0	0	0	225	125	21	138	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1538	1538	1538				0	1550	1550	1514	1514	0
Adj Flow Rate, veh/h	76	1370	0				0	239	133	22	147	0
Peak Hour Factor	0.94	0.94	0.94				0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	3	3	3				0	2	2	5	5	0
Cap, veh/h	109	2053					0	303	252	105	296	0
Arrive On Green	0.72	0.72	0.00				0.00	0.20	0.20	0.20	0.20	0.00
Sat Flow, veh/h	150	2842	1304				0	1550	1287	815	1514	0
Grp Volume(v), veh/h	774	672	0				0	239	133	22	147	0
Grp Sat Flow(s),veh/h/ln	1531	1461	1304				0	1550	1287	815	1514	0
Q Serve(g_s), s	31.2	26.0	0.0				0.0	16.1	10.2	2.9	9.5	0.0
Cycle Q Clear(g_c), s	31.2	26.0	0.0				0.0	16.1	10.2	19.0	9.5	0.0
Prop In Lane	0.10		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1106	1056					0	303	252	105	296	0
V/C Ratio(X)	0.70	0.64					0.00	0.79	0.53	0.21	0.50	0.00
Avail Cap(c_a), veh/h	1106	1056					0	402	333	157	392	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	8.6	7.8	0.0				0.0	42.1	39.7	51.1	39.4	0.0
Incr Delay (d2), s/veh	3.7	2.9	0.0				0.0	7.5	1.7	1.0	1.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.3	8.1	0.0				0.0	6.6	3.3	0.6	3.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.3	10.8	0.0				0.0	49.6	41.4	52.1	40.7	0.0
LnGrp LOS	B	B					A	D	D	D	D	A
Approach Vol, veh/h		1446	A					372			169	
Approach Delay, s/veh		11.6						46.6			42.2	
Approach LOS		B						D			D	

Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		84.0		26.0				26.0				
Change Period (Y+Rc), s		4.5		4.5				4.5				
Max Green Setting (Gmax), s		72.5		28.5				28.5				
Max Q Clear Time (g_c+I1), s		33.2		18.1				21.0				
Green Ext Time (p_c), s		15.4		1.2				0.5				

Intersection Summary												
HCM 6th Ctrl Delay			20.7									
HCM 6th LOS			C									

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	6	15	335	4	4	404
Future Vol, veh/h	6	15	335	4	4	404
Conflicting Peds, #/hr	3	3	0	3	3	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	5
Mvmt Flow	6	16	356	4	4	430

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	802	364	0	0	363	0
Stage 1	361	-	-	-	-	-
Stage 2	441	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	353	681	-	-	1196	-
Stage 1	705	-	-	-	-	-
Stage 2	648	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	349	677	-	-	1193	-
Mov Cap-2 Maneuver	349	-	-	-	-	-
Stage 1	703	-	-	-	-	-
Stage 2	643	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	534	1193	-
HCM Lane V/C Ratio	-	-	0.042	0.004	-
HCM Control Delay (s)	-	-	12	8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	23	6	9	312	356	48
Future Vol, veh/h	23	6	9	312	356	48
Conflicting Peds, #/hr	2	2	2	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	10	5	2
Mvmt Flow	24	6	10	332	379	51

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	761	409	432	0	-	0
Stage 1	407	-	-	-	-	-
Stage 2	354	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	373	642	1128	-	-	-
Stage 1	672	-	-	-	-	-
Stage 2	710	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	367	640	1126	-	-	-
Mov Cap-2 Maneuver	367	-	-	-	-	-
Stage 1	663	-	-	-	-	-
Stage 2	709	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.7	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1126	-	403	-	-
HCM Lane V/C Ratio	0.009	-	0.077	-	-
HCM Control Delay (s)	8.2	0	14.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Trip Generation Calculation Worksheet

Land Use Description: Multi-Family Housing (Low-Rise)
ITE Land Use Code: 220
Independent Variable: Dwelling Units
Quantity: 12 Dwelling Units

Summary of ITE Trip Generation Data

AM Peak Hour of Adjacent Street Traffic
Trip Rate: 0.46 trips per dwelling unit
Directional Distribution: 23% Entering 77% Exiting

PM Peak Hour of Adjacent Street Traffic
Trip Rate: 0.56 trips per dwelling unit
Directional Distribution: 63% Entering 37% Exiting

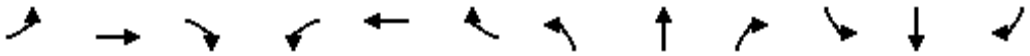
Total Weekday Traffic
Trip Rate: 7.32 trips per dwelling unit
Directional Distribution: 50% Entering 50% Exiting

Site Trip Generation Calculations

12 Dwelling Units

	Entering	Exiting	Total
AM Peak Hour	1	5	6
PM Peak Hour	4	3	7
Weekday	44	44	88

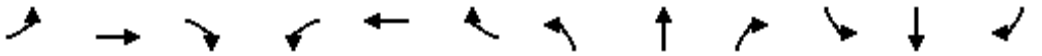
Data Source: *Trip Generation Manual, 10th Edition* , Institute of Transportation Engineers, 2017



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	767	141	0	0	0	0	253	141	11	71	0
Future Volume (vph)	42	767	141	0	0	0	0	253	141	11	71	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.5	4.5					4.5	4.5	4.5	4.5	
Lane Util. Factor		0.95	1.00					1.00	1.00	1.00	1.00	
Frpb, ped/bikes		1.00	0.97					1.00	0.98	1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		2664	1154					1500	1245	1355	1432	
Flt Permitted		1.00	1.00					1.00	1.00	0.38	1.00	
Satd. Flow (perm)		2664	1154					1500	1245	548	1432	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	45	825	152	0	0	0	0	272	152	12	76	0
RTOR Reduction (vph)	0	0	39	0	0	0	0	0	107	0	0	0
Lane Group Flow (vph)	0	870	113	0	0	0	0	272	45	12	76	0
Confl. Peds. (#/hr)	3		6						8	5		
Heavy Vehicles (%)	12%	12%	12%	2%	2%	2%	5%	5%	5%	10%	10%	10%
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA	
Protected Phases		2						4			8	
Permitted Phases	2		2						4	8		
Actuated Green, G (s)		59.2	59.2					21.8	21.8	21.8	21.8	
Effective Green, g (s)		59.2	59.2					21.8	21.8	21.8	21.8	
Actuated g/C Ratio		0.66	0.66					0.24	0.24	0.24	0.24	
Clearance Time (s)		4.5	4.5					4.5	4.5	4.5	4.5	
Vehicle Extension (s)		3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		1752	759					363	301	132	346	
v/s Ratio Prot								c0.18			0.05	
v/s Ratio Perm		0.33	0.10						0.04	0.02		
v/c Ratio		0.50	0.15					0.75	0.15	0.09	0.22	
Uniform Delay, d1		7.8	5.8					31.6	26.8	26.4	27.3	
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2		1.0	0.4					8.2	0.2	0.3	0.3	
Delay (s)		8.8	6.3					39.8	27.0	26.7	27.6	
Level of Service		A	A					D	C	C	C	
Approach Delay (s)		8.5			0.0			35.2			27.5	
Approach LOS		A			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	16.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	54.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	42	767	141	0	0	0	0	253	141	11	71	0
Future Volume (veh/h)	42	767	141	0	0	0	0	253	141	11	71	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1428	1428	1428				0	1514	1514	1452	1452	0
Adj Flow Rate, veh/h	45	825	0				0	272	152	12	76	0
Peak Hour Factor	0.93	0.93	0.93				0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	12	12	12				0	5	5	10	10	0
Cap, veh/h	94	1812					0	323	269	111	310	0
Arrive On Green	0.69	0.69	0.00				0.00	0.21	0.21	0.21	0.21	0.00
Sat Flow, veh/h	137	2640	1210				0	1514	1259	745	1452	0
Grp Volume(v), veh/h	466	404	0				0	272	152	12	76	0
Grp Sat Flow(s),veh/h/ln	1421	1356	1210				0	1514	1259	745	1452	0
Q Serve(g_s), s	13.8	12.0	0.0				0.0	15.5	9.7	1.4	3.9	0.0
Cycle Q Clear(g_c), s	13.8	12.0	0.0				0.0	15.5	9.7	16.9	3.9	0.0
Prop In Lane	0.10		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	975	931					0	323	269	111	310	0
V/C Ratio(X)	0.48	0.43					0.00	0.84	0.57	0.11	0.24	0.00
Avail Cap(c_a), veh/h	975	931					0	547	455	221	524	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	6.6	6.3	0.0				0.0	33.9	31.6	42.0	29.4	0.0
Incr Delay (d2), s/veh	1.7	1.5	0.0				0.0	5.9	1.9	0.4	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	3.4	0.0				0.0	5.9	3.0	0.3	1.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.3	7.8	0.0				0.0	39.8	33.5	42.5	29.8	0.0
LnGrp LOS	A	A					A	D	C	D	C	A
Approach Vol, veh/h		870	A					424			88	
Approach Delay, s/veh		8.0						37.5			31.5	
Approach LOS		A						D			C	

Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		66.3		23.7				23.7				
Change Period (Y+Rc), s		4.5		4.5				4.5				
Max Green Setting (Gmax), s		48.5		32.5				32.5				
Max Q Clear Time (g_c+I1), s		15.8		17.5				18.9				
Green Ext Time (p_c), s		6.9		1.7				0.3				

Intersection Summary		
HCM 6th Ctrl Delay		18.6
HCM 6th LOS		B

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	11	30	364	11	7	209
Future Vol, veh/h	11	30	364	11	7	209
Conflicting Peds, #/hr	3	3	0	3	3	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	5	2	2	10
Mvmt Flow	12	33	396	12	8	227

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	651	408	0	0	411	0
Stage 1	405	-	-	-	-	-
Stage 2	246	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	433	643	-	-	1148	-
Stage 1	673	-	-	-	-	-
Stage 2	795	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	427	639	-	-	1145	-
Mov Cap-2 Maneuver	427	-	-	-	-	-
Stage 1	671	-	-	-	-	-
Stage 2	786	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.9	0	0.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	564	1145	-
HCM Lane V/C Ratio	-	-	0.079	0.007	-
HCM Control Delay (s)	-	-	11.9	8.2	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.3	0	-

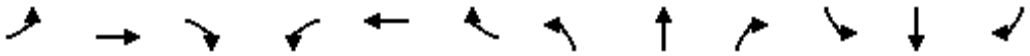
Intersection	
Int Delay, s/veh	1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	35	9	3	329	197	12
Future Vol, veh/h	35	9	3	329	197	12
Conflicting Peds, #/hr	2	2	2	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	10	5	2
Mvmt Flow	38	10	3	358	214	13

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	589	225	229	0	-	0
Stage 1	223	-	-	-	-	-
Stage 2	366	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	471	814	1339	-	-	-
Stage 1	814	-	-	-	-	-
Stage 2	702	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	468	811	1336	-	-	-
Mov Cap-2 Maneuver	468	-	-	-	-	-
Stage 1	810	-	-	-	-	-
Stage 2	701	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.8	0.1	0
HCM LOS	B		

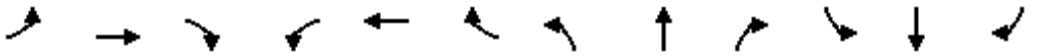
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1336	-	512	-	-
HCM Lane V/C Ratio	0.002	-	0.093	-	-
HCM Control Delay (s)	7.7	0	12.8	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	78	1406	283	0	0	0	0	237	131	23	145	0
Future Volume (vph)	78	1406	283	0	0	0	0	237	131	23	145	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.5	4.5					4.5	4.5	4.5	4.5	
Lane Util. Factor		0.95	1.00					1.00	1.00	1.00	1.00	
Frpb, ped/bikes		1.00	0.96					1.00	0.97	1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		2896	1250					1544	1278	1418	1500	
Flt Permitted		1.00	1.00					1.00	1.00	0.34	1.00	
Satd. Flow (perm)		2896	1250					1544	1278	505	1500	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	83	1496	301	0	0	0	0	252	139	24	154	0
RTOR Reduction (vph)	0	0	41	0	0	0	0	0	42	0	0	0
Lane Group Flow (vph)	0	1579	260	0	0	0	0	252	97	24	154	0
Confl. Peds. (#/hr)	3		6						8	5		
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	5%	5%	5%
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA	
Protected Phases		2						4			8	
Permitted Phases	2		2						4	8		
Actuated Green, G (s)		78.7	78.7					22.3	22.3	22.3	22.3	
Effective Green, g (s)		78.7	78.7					22.3	22.3	22.3	22.3	
Actuated g/C Ratio		0.72	0.72					0.20	0.20	0.20	0.20	
Clearance Time (s)		4.5	4.5					4.5	4.5	4.5	4.5	
Vehicle Extension (s)		3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		2071	894					313	259	102	304	
v/s Ratio Prot								c0.16			0.10	
v/s Ratio Perm		0.55	0.21						0.08	0.05		
v/c Ratio		0.76	0.29					0.81	0.37	0.24	0.51	
Uniform Delay, d1		9.8	5.6					41.8	37.8	36.7	39.0	
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2		2.7	0.8					13.9	0.9	1.2	1.3	
Delay (s)		12.5	6.4					55.7	38.7	37.9	40.3	
Level of Service		B	A					E	D	D	D	
Approach Delay (s)		11.5			0.0			49.7			40.0	
Approach LOS		B			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	19.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	80.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	78	1406	283	0	0	0	0	237	131	23	145	0
Future Volume (veh/h)	78	1406	283	0	0	0	0	237	131	23	145	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1538	1538	1538				0	1550	1550	1514	1514	0
Adj Flow Rate, veh/h	83	1496	0				0	252	139	24	154	0
Peak Hour Factor	0.94	0.94	0.94				0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	3	3	3				0	2	2	5	5	0
Cap, veh/h	107	2026					0	318	265	106	311	0
Arrive On Green	0.71	0.71	0.00				0.00	0.21	0.21	0.21	0.21	0.00
Sat Flow, veh/h	150	2842	1304				0	1550	1288	802	1514	0
Grp Volume(v), veh/h	846	733	0				0	252	139	24	154	0
Grp Sat Flow(s),veh/h/ln	1531	1461	1304				0	1550	1288	802	1514	0
Q Serve(g_s), s	39.0	31.8	0.0				0.0	17.0	10.6	3.2	9.9	0.0
Cycle Q Clear(g_c), s	39.0	31.8	0.0				0.0	17.0	10.6	20.2	9.9	0.0
Prop In Lane	0.10		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1091	1042					0	318	265	106	311	0
V/C Ratio(X)	0.78	0.70					0.00	0.79	0.53	0.23	0.50	0.00
Avail Cap(c_a), veh/h	1091	1042					0	388	322	142	378	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	10.1	9.1	0.0				0.0	41.5	38.9	51.1	38.7	0.0
Incr Delay (d2), s/veh	5.4	4.0	0.0				0.0	8.9	1.6	1.1	1.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.2	10.1	0.0				0.0	7.1	3.4	0.7	3.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.5	13.1	0.0				0.0	50.3	40.5	52.1	39.9	0.0
LnGrp LOS	B	B					A	D	D	D	D	A
Approach Vol, veh/h		1579	A					391			178	
Approach Delay, s/veh		14.4						46.9			41.5	
Approach LOS		B						D			D	

Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		82.9		27.1				27.1				
Change Period (Y+Rc), s		4.5		4.5				4.5				
Max Green Setting (Gmax), s		73.5		27.5				27.5				
Max Q Clear Time (g_c+I1), s		41.0		19.0				22.2				
Green Ext Time (p_c), s		16.4		1.2				0.4				

Intersection Summary		
HCM 6th Ctrl Delay		22.6
HCM 6th LOS		C

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	6	15	353	4	4	424
Future Vol, veh/h	6	15	353	4	4	424
Conflicting Peds, #/hr	3	3	0	3	3	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	5
Mvmt Flow	6	16	376	4	4	451

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	843	384	0	0	383	0
Stage 1	381	-	-	-	-	-
Stage 2	462	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	334	664	-	-	1175	-
Stage 1	691	-	-	-	-	-
Stage 2	634	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	330	660	-	-	1172	-
Mov Cap-2 Maneuver	330	-	-	-	-	-
Stage 1	689	-	-	-	-	-
Stage 2	629	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.3	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	513	1172	-
HCM Lane V/C Ratio	-	-	0.044	0.004	-
HCM Control Delay (s)	-	-	12.3	8.1	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

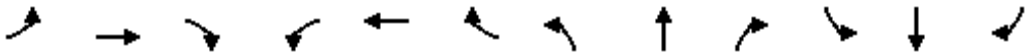
Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	23	6	9	330	376	48
Future Vol, veh/h	23	6	9	330	376	48
Conflicting Peds, #/hr	2	2	2	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	10	5	2
Mvmt Flow	24	6	10	351	400	51

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	801	430	453	0	-	0
Stage 1	428	-	-	-	-	-
Stage 2	373	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	354	625	1108	-	-	-
Stage 1	657	-	-	-	-	-
Stage 2	696	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	349	623	1106	-	-	-
Mov Cap-2 Maneuver	349	-	-	-	-	-
Stage 1	648	-	-	-	-	-
Stage 2	695	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.2	0.2	0
HCM LOS	C		

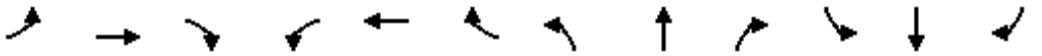
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1106	-	384	-	-
HCM Lane V/C Ratio	0.009	-	0.08	-	-
HCM Control Delay (s)	8.3	0	15.2	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	767	142	0	0	0	0	256	142	11	71	0
Future Volume (vph)	42	767	142	0	0	0	0	256	142	11	71	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.5	4.5					4.5	4.5	4.5	4.5	
Lane Util. Factor		0.95	1.00					1.00	1.00	1.00	1.00	
Frpb, ped/bikes		1.00	0.97					1.00	0.98	1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		2664	1154					1500	1245	1355	1432	
Flt Permitted		1.00	1.00					1.00	1.00	0.38	1.00	
Satd. Flow (perm)		2664	1154					1500	1245	545	1432	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	45	825	153	0	0	0	0	275	153	12	76	0
RTOR Reduction (vph)	0	0	40	0	0	0	0	0	107	0	0	0
Lane Group Flow (vph)	0	870	113	0	0	0	0	275	46	12	76	0
Confl. Peds. (#/hr)	3		6						8	5		
Heavy Vehicles (%)	12%	12%	12%	2%	2%	2%	5%	5%	5%	10%	10%	10%
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA	
Protected Phases		2						4			8	
Permitted Phases	2		2						4	8		
Actuated Green, G (s)		59.0	59.0					22.0	22.0	22.0	22.0	
Effective Green, g (s)		59.0	59.0					22.0	22.0	22.0	22.0	
Actuated g/C Ratio		0.66	0.66					0.24	0.24	0.24	0.24	
Clearance Time (s)		4.5	4.5					4.5	4.5	4.5	4.5	
Vehicle Extension (s)		3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		1746	756					366	304	133	350	
v/s Ratio Prot								c0.18			0.05	
v/s Ratio Perm		0.33	0.10						0.04	0.02		
v/c Ratio		0.50	0.15					0.75	0.15	0.09	0.22	
Uniform Delay, d1		7.9	5.9					31.5	26.7	26.3	27.1	
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2		1.0	0.4					8.4	0.2	0.3	0.3	
Delay (s)		8.9	6.3					39.9	26.9	26.6	27.4	
Level of Service		A	A					D	C	C	C	
Approach Delay (s)		8.6			0.0			35.3			27.3	
Approach LOS		A			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	17.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	54.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	42	767	142	0	0	0	0	256	142	11	71	0
Future Volume (veh/h)	42	767	142	0	0	0	0	256	142	11	71	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1428	1428	1428				0	1514	1514	1452	1452	0
Adj Flow Rate, veh/h	45	825	0				0	275	153	12	76	0
Peak Hour Factor	0.93	0.93	0.93				0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	12	12	12				0	5	5	10	10	0
Cap, veh/h	94	1806					0	326	271	111	313	0
Arrive On Green	0.68	0.68	0.00				0.00	0.22	0.22	0.22	0.22	0.00
Sat Flow, veh/h	137	2640	1210				0	1514	1259	742	1452	0
Grp Volume(v), veh/h	466	404	0				0	275	153	12	76	0
Grp Sat Flow(s),veh/h/ln	1421	1356	1210				0	1514	1259	742	1452	0
Q Serve(g_s), s	13.8	12.1	0.0				0.0	15.7	9.8	1.4	3.9	0.0
Cycle Q Clear(g_c), s	13.8	12.1	0.0				0.0	15.7	9.8	17.1	3.9	0.0
Prop In Lane	0.10		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	972	928					0	326	271	111	313	0
V/C Ratio(X)	0.48	0.44					0.00	0.84	0.56	0.11	0.24	0.00
Avail Cap(c_a), veh/h	972	928					0	547	455	219	524	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	6.7	6.4	0.0				0.0	33.8	31.5	42.0	29.2	0.0
Incr Delay (d2), s/veh	1.7	1.5	0.0				0.0	6.0	1.8	0.4	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	3.4	0.0				0.0	6.0	3.0	0.3	1.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.4	7.9	0.0				0.0	39.8	33.3	42.4	29.6	0.0
LnGrp LOS	A	A					A	D	C	D	C	A
Approach Vol, veh/h		870	A					428			88	
Approach Delay, s/veh		8.1						37.5			31.4	
Approach LOS		A						D			C	

Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		66.1		23.9				23.9				
Change Period (Y+Rc), s		4.5		4.5				4.5				
Max Green Setting (Gmax), s		48.5		32.5				32.5				
Max Q Clear Time (g_c+I1), s		15.8		17.7				19.1				
Green Ext Time (p_c), s		6.9		1.7				0.3				

Intersection Summary		
HCM 6th Ctrl Delay		18.7
HCM 6th LOS		B

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	11	30	368	11	7	210
Future Vol, veh/h	11	30	368	11	7	210
Conflicting Peds, #/hr	3	3	0	3	3	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	5	2	2	10
Mvmt Flow	12	33	400	12	8	228

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	656	412	0	0	415	0
Stage 1	409	-	-	-	-	-
Stage 2	247	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	430	640	-	-	1144	-
Stage 1	671	-	-	-	-	-
Stage 2	794	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	424	636	-	-	1141	-
Mov Cap-2 Maneuver	424	-	-	-	-	-
Stage 1	669	-	-	-	-	-
Stage 2	785	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12	0	0.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	561	1141	-
HCM Lane V/C Ratio	-	-	0.079	0.007	-
HCM Control Delay (s)	-	-	12	8.2	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.3	0	-

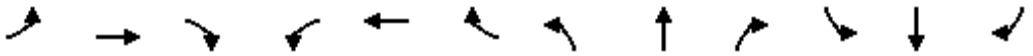
Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	35	0	9	1	0	4	3	329	0	1	197	12
Future Vol, veh/h	35	0	9	1	0	4	3	329	0	1	197	12
Conflicting Peds, #/hr	2	0	2	0	0	0	2	0	0	0	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	10	2	2	5	2
Mvmt Flow	38	0	10	1	0	4	3	358	0	1	214	13

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	593	589	225	594	595	360	229	0	0	358	0	0
Stage 1	225	225	-	364	364	-	-	-	-	-	-	-
Stage 2	368	364	-	230	231	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	417	421	814	417	417	684	1339	-	-	1201	-	-
Stage 1	778	718	-	655	624	-	-	-	-	-	-	-
Stage 2	652	624	-	773	713	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	412	418	811	410	414	683	1336	-	-	1201	-	-
Mov Cap-2 Maneuver	412	418	-	410	414	-	-	-	-	-	-	-
Stage 1	774	716	-	653	622	-	-	-	-	-	-	-
Stage 2	645	622	-	761	711	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.8	11	0.1	0
HCM LOS	B	B		

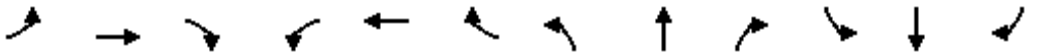
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1336	-	-	458	603	1201	-	-
HCM Lane V/C Ratio	0.002	-	-	0.104	0.009	0.001	-	-
HCM Control Delay (s)	7.7	0	-	13.8	11	8	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0	0	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	78	1406	285	0	0	0	0	239	132	23	146	0
Future Volume (vph)	78	1406	285	0	0	0	0	239	132	23	146	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.5	4.5					4.5	4.5	4.5	4.5	
Lane Util. Factor		0.95	1.00					1.00	1.00	1.00	1.00	
Frpb, ped/bikes		1.00	0.96					1.00	0.97	1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		2896	1250					1544	1278	1418	1500	
Flt Permitted		1.00	1.00					1.00	1.00	0.34	1.00	
Satd. Flow (perm)		2896	1250					1544	1278	502	1500	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	83	1496	303	0	0	0	0	254	140	24	155	0
RTOR Reduction (vph)	0	0	41	0	0	0	0	0	42	0	0	0
Lane Group Flow (vph)	0	1579	262	0	0	0	0	254	98	24	155	0
Confl. Peds. (#/hr)	3		6						8	5		
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	5%	5%	5%
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA	
Protected Phases		2						4			8	
Permitted Phases	2		2						4	8		
Actuated Green, G (s)		78.6	78.6					22.4	22.4	22.4	22.4	
Effective Green, g (s)		78.6	78.6					22.4	22.4	22.4	22.4	
Actuated g/C Ratio		0.71	0.71					0.20	0.20	0.20	0.20	
Clearance Time (s)		4.5	4.5					4.5	4.5	4.5	4.5	
Vehicle Extension (s)		3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		2069	893					314	260	102	305	
v/s Ratio Prot								c0.16			0.10	
v/s Ratio Perm		0.55	0.21						0.08	0.05		
v/c Ratio		0.76	0.29					0.81	0.38	0.24	0.51	
Uniform Delay, d1		9.9	5.7					41.8	37.8	36.6	38.9	
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2		2.7	0.8					14.2	0.9	1.2	1.3	
Delay (s)		12.6	6.5					55.9	38.7	37.8	40.2	
Level of Service		B	A					E	D	D	D	
Approach Delay (s)		11.6			0.0			49.8			39.9	
Approach LOS		B			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	19.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	80.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	78	1406	285	0	0	0	0	239	132	23	146	0
Future Volume (veh/h)	78	1406	285	0	0	0	0	239	132	23	146	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1538	1538	1538				0	1550	1550	1514	1514	0
Adj Flow Rate, veh/h	83	1496	0				0	254	140	24	155	0
Peak Hour Factor	0.94	0.94	0.94				0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	3	3	3				0	2	2	5	5	0
Cap, veh/h	107	2022					0	320	266	106	313	0
Arrive On Green	0.71	0.71	0.00				0.00	0.21	0.21	0.21	0.21	0.00
Sat Flow, veh/h	150	2842	1304				0	1550	1288	800	1514	0
Grp Volume(v), veh/h	846	733	0				0	254	140	24	155	0
Grp Sat Flow(s),veh/h/ln	1531	1461	1304				0	1550	1288	800	1514	0
Q Serve(g_s), s	39.2	32.0	0.0				0.0	17.1	10.6	3.2	10.0	0.0
Cycle Q Clear(g_c), s	39.2	32.0	0.0				0.0	17.1	10.6	20.3	10.0	0.0
Prop In Lane	0.10		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1089	1040					0	320	266	106	313	0
V/C Ratio(X)	0.78	0.71					0.00	0.79	0.53	0.23	0.50	0.00
Avail Cap(c_a), veh/h	1089	1040					0	388	322	141	378	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	10.2	9.2	0.0				0.0	41.4	38.8	51.1	38.6	0.0
Incr Delay (d2), s/veh	5.4	4.0	0.0				0.0	9.0	1.6	1.1	1.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.3	10.2	0.0				0.0	7.2	3.4	0.7	3.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.7	13.2	0.0				0.0	50.4	40.5	52.1	39.8	0.0
LnGrp LOS	B	B					A	D	D	D	D	A
Approach Vol, veh/h		1579	A					394			179	
Approach Delay, s/veh		14.5						46.9			41.4	
Approach LOS		B						D			D	

Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		82.8		27.2				27.2				
Change Period (Y+Rc), s		4.5		4.5				4.5				
Max Green Setting (Gmax), s		73.5		27.5				27.5				
Max Q Clear Time (g_c+I1), s		41.2		19.1				22.3				
Green Ext Time (p_c), s		16.3		1.2				0.4				

Intersection Summary												
HCM 6th Ctrl Delay			22.7									
HCM 6th LOS			C									

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	6	15	356	4	4	427
Future Vol, veh/h	6	15	356	4	4	427
Conflicting Peds, #/hr	3	3	0	3	3	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	5
Mvmt Flow	6	16	379	4	4	454

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	849	387	0	0	386	0
Stage 1	384	-	-	-	-	-
Stage 2	465	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	331	661	-	-	1172	-
Stage 1	688	-	-	-	-	-
Stage 2	632	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	327	657	-	-	1169	-
Mov Cap-2 Maneuver	327	-	-	-	-	-
Stage 1	686	-	-	-	-	-
Stage 2	627	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.4	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	510	1169	-
HCM Lane V/C Ratio	-	-	0.044	0.004	-
HCM Control Delay (s)	-	-	12.4	8.1	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

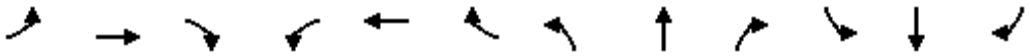
Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	23	0	6	0	0	3	9	330	1	3	376	48
Future Vol, veh/h	23	0	6	0	0	3	9	330	1	3	376	48
Conflicting Peds, #/hr	2	0	2	0	0	0	2	0	0	0	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	92	94	92	92	92	94	94	92	92	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	10	2	2	5	2
Mvmt Flow	24	0	6	0	0	3	10	351	1	3	400	51

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	809	806	430	809	831	354	453	0	0	352	0	0
Stage 1	434	434	-	372	372	-	-	-	-	-	-	-
Stage 2	375	372	-	437	459	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	299	316	625	299	305	690	1108	-	-	1207	-	-
Stage 1	600	581	-	648	619	-	-	-	-	-	-	-
Stage 2	646	619	-	598	566	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	293	311	623	292	300	689	1106	-	-	1207	-	-
Mov Cap-2 Maneuver	293	311	-	292	300	-	-	-	-	-	-	-
Stage 1	592	578	-	641	612	-	-	-	-	-	-	-
Stage 2	635	612	-	589	563	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	17.1	10.3	0.2	0.1
HCM LOS	C	B		

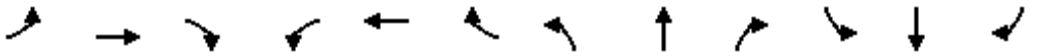
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1106	-	-	329	689	1207	-	-
HCM Lane V/C Ratio	0.009	-	-	0.094	0.005	0.003	-	-
HCM Control Delay (s)	8.3	0	-	17.1	10.3	8	0	-
HCM Lane LOS	A	A	-	C	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0	0	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	767	142	0	0	0	0	256	157	11	86	0
Future Volume (vph)	42	767	142	0	0	0	0	256	157	11	86	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.5	4.5					4.5	4.5	4.5	4.5	
Lane Util. Factor		0.95	1.00					1.00	1.00	1.00	1.00	
Frpb, ped/bikes		1.00	0.97					1.00	0.98	1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		2664	1154					1500	1245	1355	1432	
Flt Permitted		1.00	1.00					1.00	1.00	0.38	1.00	
Satd. Flow (perm)		2664	1154					1500	1245	547	1432	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	45	825	153	0	0	0	0	275	169	12	92	0
RTOR Reduction (vph)	0	0	40	0	0	0	0	0	106	0	0	0
Lane Group Flow (vph)	0	870	113	0	0	0	0	275	63	12	92	0
Confl. Peds. (#/hr)	3		6						8	5		
Heavy Vehicles (%)	12%	12%	12%	2%	2%	2%	5%	5%	5%	10%	10%	10%
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA	
Protected Phases		2						4			8	
Permitted Phases	2		2						4	8		
Actuated Green, G (s)		58.9	58.9					22.1	22.1	22.1	22.1	
Effective Green, g (s)		58.9	58.9					22.1	22.1	22.1	22.1	
Actuated g/C Ratio		0.65	0.65					0.25	0.25	0.25	0.25	
Clearance Time (s)		4.5	4.5					4.5	4.5	4.5	4.5	
Vehicle Extension (s)		3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		1743	755					368	305	134	351	
v/s Ratio Prot								c0.18			0.06	
v/s Ratio Perm		0.33	0.10						0.05	0.02		
v/c Ratio		0.50	0.15					0.75	0.21	0.09	0.26	
Uniform Delay, d1		8.0	6.0					31.4	27.0	26.2	27.4	
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2		1.0	0.4					8.1	0.3	0.3	0.4	
Delay (s)		9.0	6.4					39.4	27.3	26.5	27.8	
Level of Service		A	A					D	C	C	C	
Approach Delay (s)		8.6			0.0			34.8			27.6	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	17.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	55.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	42	767	142	0	0	0	0	256	157	11	86	0
Future Volume (veh/h)	42	767	142	0	0	0	0	256	157	11	86	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1428	1428	1428				0	1514	1514	1452	1452	0
Adj Flow Rate, veh/h	45	825	0				0	275	169	12	92	0
Peak Hour Factor	0.93	0.93	0.93				0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	12	12	12				0	5	5	10	10	0
Cap, veh/h	94	1804					0	328	273	111	314	0
Arrive On Green	0.68	0.68	0.00				0.00	0.22	0.22	0.22	0.22	0.00
Sat Flow, veh/h	137	2640	1210				0	1514	1259	731	1452	0
Grp Volume(v), veh/h	466	404	0				0	275	169	12	92	0
Grp Sat Flow(s),veh/h/ln	1421	1356	1210				0	1514	1259	731	1452	0
Q Serve(g_s), s	13.9	12.1	0.0				0.0	15.7	10.9	1.4	4.8	0.0
Cycle Q Clear(g_c), s	13.9	12.1	0.0				0.0	15.7	10.9	17.1	4.8	0.0
Prop In Lane	0.10		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	971	927					0	328	273	111	314	0
V/C Ratio(X)	0.48	0.44					0.00	0.84	0.62	0.11	0.29	0.00
Avail Cap(c_a), veh/h	971	927					0	547	455	217	524	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	6.7	6.4	0.0				0.0	33.8	31.9	41.9	29.5	0.0
Incr Delay (d2), s/veh	1.7	1.5	0.0				0.0	5.9	2.3	0.4	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	3.4	0.0				0.0	6.0	3.3	0.3	1.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.4	7.9	0.0				0.0	39.6	34.2	42.4	30.0	0.0
LnGrp LOS	A	A					A	D	C	D	C	A
Approach Vol, veh/h		870	A					444			104	
Approach Delay, s/veh		8.2						37.6			31.4	
Approach LOS		A						D			C	

Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		66.0		24.0				24.0				
Change Period (Y+Rc), s		4.5		4.5				4.5				
Max Green Setting (Gmax), s		48.5		32.5				32.5				
Max Q Clear Time (g_c+I1), s		15.9		17.7				19.1				
Green Ext Time (p_c), s		6.9		1.8				0.4				

Intersection Summary		
HCM 6th Ctrl Delay		19.1
HCM 6th LOS		B

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	41	372	18	0	232
Future Vol, veh/h	0	41	372	18	0	232
Conflicting Peds, #/hr	0	3	0	3	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	5	2	2	10
Mvmt Flow	0	45	404	20	0	252

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	420	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	633	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	629	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.2	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	629	-
HCM Lane V/C Ratio	-	-	0.071	-
HCM Control Delay (s)	-	-	11.2	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q(veh)	-	-	0.2	-

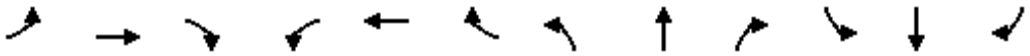
Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	44	0	0	5	0	374	1	0	206	15
Future Vol, veh/h	0	0	44	0	0	5	0	374	1	0	206	15
Conflicting Peds, #/hr	2	0	2	0	0	0	2	0	0	0	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	10	2	2	5	2
Mvmt Flow	0	0	48	0	0	5	0	407	1	0	224	16

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	236	-	-	408	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.22	-	-	6.22	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.318	-	-	3.318	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	803	0	0	643	0	-	-	0	-	-
Stage 1	0	0	-	0	0	-	0	-	-	0	-	-
Stage 2	0	0	-	0	0	-	0	-	-	0	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	800	-	-	643	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.8	10.6	0	0
HCM LOS	A	B		

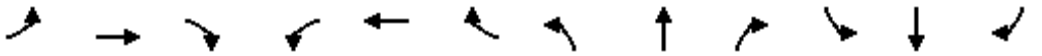
Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	-	800	643	-	-
HCM Lane V/C Ratio	-	-	0.06	0.008	-	-
HCM Control Delay (s)	-	-	9.8	10.6	-	-
HCM Lane LOS	-	-	A	B	-	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	78	1406	285	0	0	0	0	239	147	23	161	0
Future Volume (vph)	78	1406	285	0	0	0	0	239	147	23	161	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.5	4.5					4.5	4.5	4.5	4.5	
Lane Util. Factor		0.95	1.00					1.00	1.00	1.00	1.00	
Frpb, ped/bikes		1.00	0.96					1.00	0.97	1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		2896	1250					1544	1278	1418	1500	
Flt Permitted		1.00	1.00					1.00	1.00	0.34	1.00	
Satd. Flow (perm)		2896	1250					1544	1278	502	1500	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	83	1496	303	0	0	0	0	254	156	24	171	0
RTOR Reduction (vph)	0	0	41	0	0	0	0	0	42	0	0	0
Lane Group Flow (vph)	0	1579	262	0	0	0	0	254	114	24	171	0
Confl. Peds. (#/hr)	3		6						8	5		
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	5%	5%	5%
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA	
Protected Phases		2						4			8	
Permitted Phases	2		2						4	8		
Actuated Green, G (s)		78.6	78.6					22.4	22.4	22.4	22.4	
Effective Green, g (s)		78.6	78.6					22.4	22.4	22.4	22.4	
Actuated g/C Ratio		0.71	0.71					0.20	0.20	0.20	0.20	
Clearance Time (s)		4.5	4.5					4.5	4.5	4.5	4.5	
Vehicle Extension (s)		3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		2069	893					314	260	102	305	
v/s Ratio Prot								c0.16			0.11	
v/s Ratio Perm		0.55	0.21						0.09	0.05		
v/c Ratio		0.76	0.29					0.81	0.44	0.24	0.56	
Uniform Delay, d1		9.9	5.7					41.8	38.3	36.6	39.4	
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2		2.7	0.8					14.2	1.2	1.2	2.4	
Delay (s)		12.6	6.5					55.9	39.5	37.8	41.7	
Level of Service		B	A					E	D	D	D	
Approach Delay (s)		11.6			0.0			49.7			41.2	
Approach LOS		B			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	20.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	80.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	78	1406	285	0	0	0	0	239	147	23	161	0
Future Volume (veh/h)	78	1406	285	0	0	0	0	239	147	23	161	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1538	1538	1538				0	1550	1550	1514	1514	0
Adj Flow Rate, veh/h	83	1496	0				0	254	156	24	171	0
Peak Hour Factor	0.94	0.94	0.94				0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	3	3	3				0	2	2	5	5	0
Cap, veh/h	107	2020					0	321	267	106	314	0
Arrive On Green	0.71	0.71	0.00				0.00	0.21	0.21	0.21	0.21	0.00
Sat Flow, veh/h	150	2842	1304				0	1550	1289	789	1514	0
Grp Volume(v), veh/h	846	733	0				0	254	156	24	171	0
Grp Sat Flow(s),veh/h/ln	1531	1461	1304				0	1550	1289	789	1514	0
Q Serve(g_s), s	39.3	32.0	0.0				0.0	17.1	12.0	3.3	11.1	0.0
Cycle Q Clear(g_c), s	39.3	32.0	0.0				0.0	17.1	12.0	20.4	11.1	0.0
Prop In Lane	0.10		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1088	1039					0	321	267	106	314	0
V/C Ratio(X)	0.78	0.71					0.00	0.79	0.58	0.23	0.55	0.00
Avail Cap(c_a), veh/h	1088	1039					0	388	322	140	378	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	10.3	9.2	0.0				0.0	41.3	39.3	51.0	39.0	0.0
Incr Delay (d2), s/veh	5.5	4.0	0.0				0.0	8.9	2.0	1.1	1.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.4	10.3	0.0				0.0	7.1	3.9	0.7	4.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.7	13.3	0.0				0.0	50.2	41.3	52.0	40.4	0.0
LnGrp LOS	B	B					A	D	D	D	D	A
Approach Vol, veh/h		1579	A					410			195	
Approach Delay, s/veh		14.6						46.8			41.9	
Approach LOS		B						D			D	

Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		82.7		27.3				27.3				
Change Period (Y+Rc), s		4.5		4.5				4.5				
Max Green Setting (Gmax), s		73.5		27.5				27.5				
Max Q Clear Time (g_c+I1), s		41.3		19.1				22.4				
Green Ext Time (p_c), s		16.3		1.2				0.4				

Intersection Summary												
HCM 6th Ctrl Delay			23.1									
HCM 6th LOS			C									

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	21	365	8	0	446
Future Vol, veh/h	0	21	365	8	0	446
Conflicting Peds, #/hr	3	3	0	3	3	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	5
Mvmt Flow	0	22	388	9	0	474

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	399	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	651	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	647	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.8	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	647	-
HCM Lane V/C Ratio	-	-	0.035	-
HCM Control Delay (s)	-	-	10.8	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q(veh)	-	-	0.1	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	29	0	0	3	0	366	4	0	383	57
Future Vol, veh/h	0	0	29	0	0	3	0	366	4	0	383	57
Conflicting Peds, #/hr	2	0	2	0	0	0	2	0	0	0	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	92	94	92	92	92	94	94	92	92	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	10	2	2	5	2
Mvmt Flow	0	0	31	0	0	3	0	389	4	0	407	61

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	442	-	-	391	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.22	-	-	6.22	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.318	-	-	3.318	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	615	0	0	658	0	-	-	0	-	-
Stage 1	0	0	-	0	0	-	0	-	-	0	-	-
Stage 2	0	0	-	0	0	-	0	-	-	0	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	613	-	-	658	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.2	10.5	0	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	-	613	658	-	-
HCM Lane V/C Ratio	-	-	0.05	0.005	-	-
HCM Control Delay (s)	-	-	11.2	10.5	-	-
HCM Lane LOS	-	-	B	B	-	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-	-

Intersection: 1: Highway 211/Meinig Ave & Pioneer Blvd

Movement	EB	EB	EB	NB	NB	SB	SB
Directions Served	LT	T	R	T	R	L	T
Maximum Queue (ft)	322	286	100	310	125	59	155
Average Queue (ft)	153	104	32	145	62	11	48
95th Queue (ft)	273	225	102	263	138	39	112
Link Distance (ft)	612	612		310			343
Upstream Blk Time (%)				0			
Queuing Penalty (veh)				1			
Storage Bay Dist (ft)			75		100	100	
Storage Blk Time (%)		7	0	17	0	0	2
Queuing Penalty (veh)		9	1	24	1	0	0

Intersection: 2: Highway 211 & City Hall Driveway

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	48	44	44
Average Queue (ft)	26	3	3
95th Queue (ft)	52	24	21
Link Distance (ft)	182	193	310
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Highway 211 & Tupper Road/Site Access

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	62	35	12	13
Average Queue (ft)	29	4	1	0
95th Queue (ft)	57	23	9	6
Link Distance (ft)	276	224	171	193
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 37

Intersection: 1: Highway 211/Meinig Ave & Pioneer Blvd

Movement	EB	EB	EB	NB	NB	SB	SB
Directions Served	LT	T	R	T	R	L	T
Maximum Queue (ft)	616	600	100	307	125	108	254
Average Queue (ft)	304	272	59	177	90	28	108
95th Queue (ft)	505	497	134	308	162	82	200
Link Distance (ft)	612	612		310			343
Upstream Blk Time (%)	1	1		1			0
Queuing Penalty (veh)	0	0		3			0
Storage Bay Dist (ft)			75		100	100	
Storage Blk Time (%)		17	1	28	2	1	15
Queuing Penalty (veh)		49	6	37	4	1	3

Intersection: 2: Highway 211 & City Hall Driveway

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	44	69	48
Average Queue (ft)	15	5	3
95th Queue (ft)	42	36	25
Link Distance (ft)	182	193	310
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Highway 211 & Tupper Road/Site Access

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	50	34	83	36
Average Queue (ft)	23	3	7	1
95th Queue (ft)	52	20	41	13
Link Distance (ft)	276	224	171	193
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 103

CITY OF SANDY, CLACKAMAS COUNTY **PIONEER BLVD at MEINIG AVE, City of Sandy, Clackamas County, 01/01/2014 to 05/31/2018**

1 - 5 of 10 Crash records shown.

SER# / INVEST / RD DPT / UNLOC?	S P E D	D R A L	M J U G	S I N V	W C H L	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACT	EVENT	CAUSE
02013	N	N	N			05/02/2015	16	MEINIG AVE	INTER	CROSS	N	N	RAIN	S-1STOP	01	NONE 0	STRGHT											29
NONE						SA		PIONEER BLVD	N		TRF SIGNAL	N	WET	REAR		UNKN	N -S									000		00
N						3P			06	0		N	DAY	PDO		UNKNOWN		01	DRVR	NONE	00	Unk	UNK		026	000		29
N						45 23 46.73	-122 15 35.13	017200100S00															UNK					
															02	NONE 0	STOP											
																PRVTE	N -S									011		00
																PSNGR CAR		01	DRVR	NONE	23	M	OR-Y		000	000		00
																							OR<25					
00025	N	N	N			01/03/2014	16	MEINIG AVE	INTER	CROSS	N	N	CLR	S-STRGHT	01	NONE 0	STRGHT											13
NONE						FR		PIONEER BLVD	S		TRF SIGNAL	N	DRY	SS-O		PRVTE	S -N									000		00
N						10A			06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	68	M	OR-Y		045	000		13
N						45 23 46.7267279	-122 15 35.125776	017200100S00															OR<25					
															02	NONE 0	STRGHT											
																PRVTE	S -N									000		00
																PSNGR CAR		01	DRVR	NONE	44	M	OR-Y		000	000		00
																							OR<25					
03127	N	N	N	N	N	08/03/2015	16	MEINIG AVE	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT											29
NONE						MO		PIONEER BLVD	S		TRF SIGNAL	N	DRY	REAR		PRVTE	S -N									000		00
N						12P			06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	24	M	OR-Y		026	000		29
N						45 23 46.73	-122 15 35.13	017200100S00															OR<25					
															02	NONE 0	STOP											
																PRVTE	S -N									011		00
																PSNGR CAR		01	DRVR	INJC	23	F	OR-Y		000	000		00
																							OR<25					
04757	N	Y	N	N	N	10/14/2016	16	MEINIG AVE	INTER	CROSS	N	Y	UNK	FIX OBJ	01	NONE 9	TURN-R										100	08
CITY						FR		PIONEER BLVD	S		TRF SIGNAL	N	WET	FIX		N/A	W -S									000		00
N						11P			06	1		N	DARK	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00
N						45 23 45.91	-122 15 35.58	017200100S00															UNK					
02544	N	N	N			06/27/2017	14	MEINIG AVE	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 9	STRGHT											29
NONE						TU		PIONEER BLVD	SW		YIELD	N	DRY	REAR		N/A	NW-SE									000		00
N						2P			09	1		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00
N						45 23 46.73	-122 15 35.13	002600100S00															UNK					
															02	NONE 9	STOP											
																N/A	NW-SE									011		00
																PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00
																							UNK					

SER# / INVEST / RD DPT / UNLOC?	S P E D	D R A C	M J U S	S I G V	W C N L	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACT EVENT	CAUSE
04274	N	N	N			10/10/2017	14	MEINIG AVE	INTER	CROSS	N	N	UNK	S-1STOP	01	NONE 9	STRGHT										29
NONE						TU		PIONEER BLVD	SW		YIELD	N	WET	REAR		N/A	NW-SE									000	00
N						4P			09	1		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000	00
N						45 23 46.73	-122 15 35.13	002600100S00		(02)													UNK				
															02	NONE 9	STOP										
																N/A	NW-SE									011	00
																PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000	00
																							UNK				
02787	N	N	N	N	N	07/11/2015	14	MEINIG AVE	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT										29
CITY						SA		PIONEER BLVD	W		TRF SIGNAL	N	DRY	REAR		PRVTE	W -E									000	00
N						6P			06	1		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	68	M	UNK		026	000	29
N						45 23 46.73	-122 15 35.13	002600100S00															OR<25				
															02	NONE 0	STOP										
																PRVTE	W -E									011	00
																PSNGR CAR		01	DRVR	INJC	32	M	OR-Y		000	000	00
																							OR<25				
01847	N	N	N			04/22/2016	14	MEINIG AVE	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT										29
NONE						FR		PIONEER BLVD	W		TRF SIGNAL	N	DRY	REAR		PRVTE	W -E									000	00
N						5P			05	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	45	M	OR-Y		026	000	29
N						45 23 46.73	-122 15 35.13	002600100S00															OR<25				
															02	NONE 0	STOP										
																PRVTE	W -E									011	00
																PSNGR CAR		01	DRVR	INJC	22	M	OR-Y		000	000	00
																							OR<25				
04316	N	N	N	N	N	10/20/2015	14	MEINIG AVE	INTER	CROSS	N	N	CLD	ANGL-OTH	01	NONE 0	STRGHT										04
CITY						TU		PIONEER BLVD	CN		TRF SIGNAL	N	DRY	ANGL		PRVTE	N -S									000	00
N						9P			03	0		N	DLIT	INJ		PSNGR CAR		01	DRVR	NONE	44	M	OR-Y		097	000	00
N						45 23 46.73	-122 15 35.13	002600100S00															OR<25				
															01	NONE 0	STRGHT										
																PRVTE	N -S									000	00
																PSNGR CAR		02	PSNG	INJC	13	F			000	000	00
															02	NONE 0	STRGHT										
																PRVTE	W -E									000	00
																PSNGR CAR		01	DRVR	NONE	44	F	OR-Y		000	000	00
																							OR<25				
03085	N	N	N			07/08/2016	14	MEINIG AVE	INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT										04
CITY						FR		PIONEER BLVD	CN		TRF SIGNAL	N	DRY	ANGL		PRVTE	W -E									000	00
N						8A			01	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	51	F	OR-Y		000	000	00
N						45 23 46.73	-122 15 35.13	002600100S00															OR<25				

CITY OF SANDY, CLACKAMAS COUNTY **PIONEER BLVD at MEINIG AVE, City of Sandy, Clackamas County, 01/01/2014 to 05/31/2018**

10 - 10 of 10 Crash records shown.

SER# / INVEST / RD DPT / UNLOC?	S P E D	D R E A	M J L C	S U G S	W I N V	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACT	EVENT	CAUSE
															02	NONE 0	STRGHT											
																PRVTE	N -S									000		00
																PSNGR CAR		01	DRVR	INJB	51	F	OR-Y		020	000		04
																							OR<25					

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

CITY OF SANDY, CLACKAMAS COUNTY

PIONEER BLVD at EAGLE CRK-SANDY HY, City of Sandy, Clackamas County, 01/01/2014 to 05/31/2018

	S		D	M																							
SER#	P		R	J	S	W	DATE	CLASS	CITY STREET		INT-TYPE						SPCL USE										
INVEST	E	A	U	I	C	O	DAY	DIST	FIRST STREET	RD CHAR	(MEDIAN)	INT-REL	OFFRD	WTHR	CRASH		TRLR QTY	MOVE			A	S					
RD DPT	E	L	G	N	H	R	TIME	FROM	SECOND STREET	DIRECT	LEGS	TRAF-	RNDBT	SURF	COLL		OWNER	FROM	PRTC	INJ	G	E	LICNS	PED			
UNLOC?	D	C	S	V	L	K	LAT	LONG	LRS	LOCTN	(#LANES)	CONTL	DRVWY	LIGHT	SVRTY	V#	TYPE	TO	P# TYPE	SVRTY	E	X	RES	LOC	ERROR	ACT EVENT	CAUSE

CITY OF SANDY, CLACKAMAS COUNTY

EAGLE CRK-SANDY HY at TUPPER RD, City of Sandy, Clackamas County, 01/01/2014 to 05/31/2018

SER# / INVEST / RD DPT / UNLOC?	S P E D C	D E A L S	M R U G V	J I N L	S C H K	W O R	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACT	EVENT	CAUSE

CITY OF SANDY, CLACKAMAS COUNTY

MEINIG AVE at TUPPER RD, City of Sandy, Clackamas County, 01/01/2014 to 05/31/2018

SER# / INVEST / RD DPT / UNLOC?	S P E D C	D R E A L S	M J U G N V	S I C H L	W C O R K	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACT	EVENT	CAUSE

Right-Turn Lane Warrant Analysis (ODOT Methodology)

Project Name: The Pad Residential Development
Approach: Southbound Highway 211 at Tupper Road
Scenario: 2022 Background Plus Site Trips (RIRO)

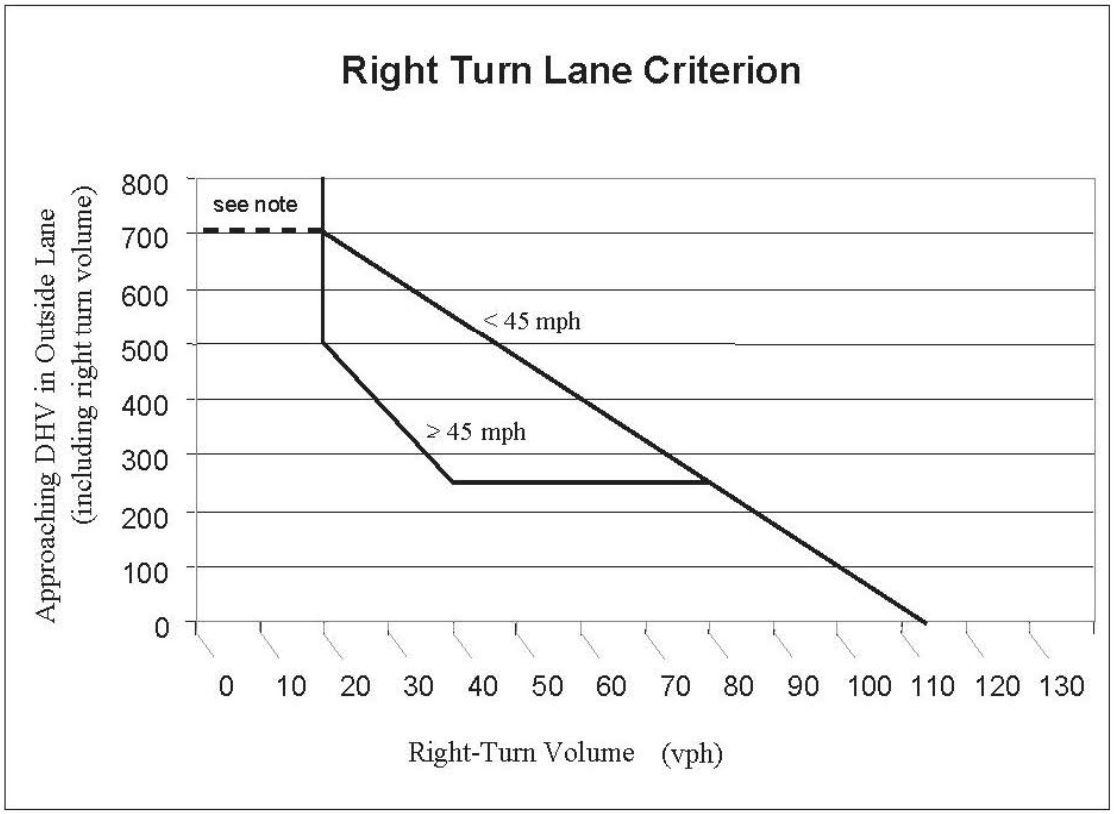
Major-Street Design Speed: 40 mph

	AM Volume	PM Volume
Number of Right Turns per Hour:	15	54
Approaching DVH in Outside Lane:	221	437
Calculated Turn Volume Threshold:	84	55
Right Turn Volume Exceeds Threshold?	**NO**	**NO**

Criterion 1: Vehicular Volume

The vehicular volume criterion is intended for application where the volume of intersecting traffic is the principal reason for considering installation of a right turn lane. The vehicular volume criteria are determined using the curve in Exhibit 7-2.

Exhibit 7-2 Right Turn Lane Criterion



Note: If there is no right turn lane, a shoulder needs to be provided. If this intersection is in a rural area and is a connection to a public street, a right turn lane is needed.

Stopping Sight Distance

Design Speed	20	mph
Reaction Time	2.5	seconds
Acceleration	11.2	ft/sec^2
Grade (percent)	-6.00%	

Distance **119.8 feet**

Reaction Distance

Travel Speed	20	mph
Travel Speed	29.4	fps
Reaction Time	2.5	seconds

Reaction Distance **73.5 feet**

Braking Distance

Travel Speed	20	mph
Acceleration	11.2	ft/sec^2
Grade (percent)	-6.00%	

Braking Distance **46.3 feet**

For standard roadways >400 ADT, use 2.5 seconds perception/reaction time and 11.2 ft/sec^2 deceleration.
(95th percentile reaction time and 10th percentile deceleration)

For VLV roadways < 400 ADT, use 2.0 seconds perception/reaction time and 13.4 ft/sec^2 deceleration.
(90th percentile reaction time and 50th percentile deceleration)