

MEMORANDUM

Date:	September 20, 2018	Project #: 22856.0
To:	Pete Walter, City of Oregon City John Replinger, PE, Replinger & Associates, LLC	
From:	Matt Bell, Russ Doubleday, and Chris Brehmer, PE	
Project:	Oregon City Christian Church Master Plan	
Subject:	Traffic Impact Study	

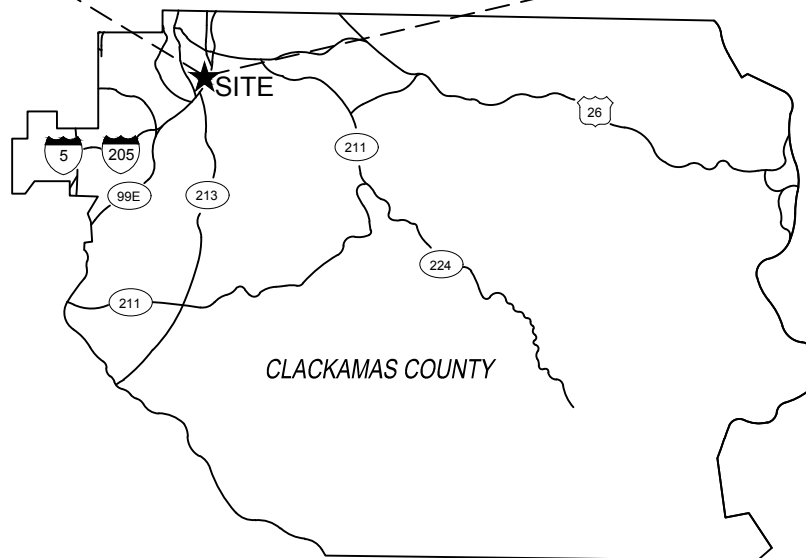
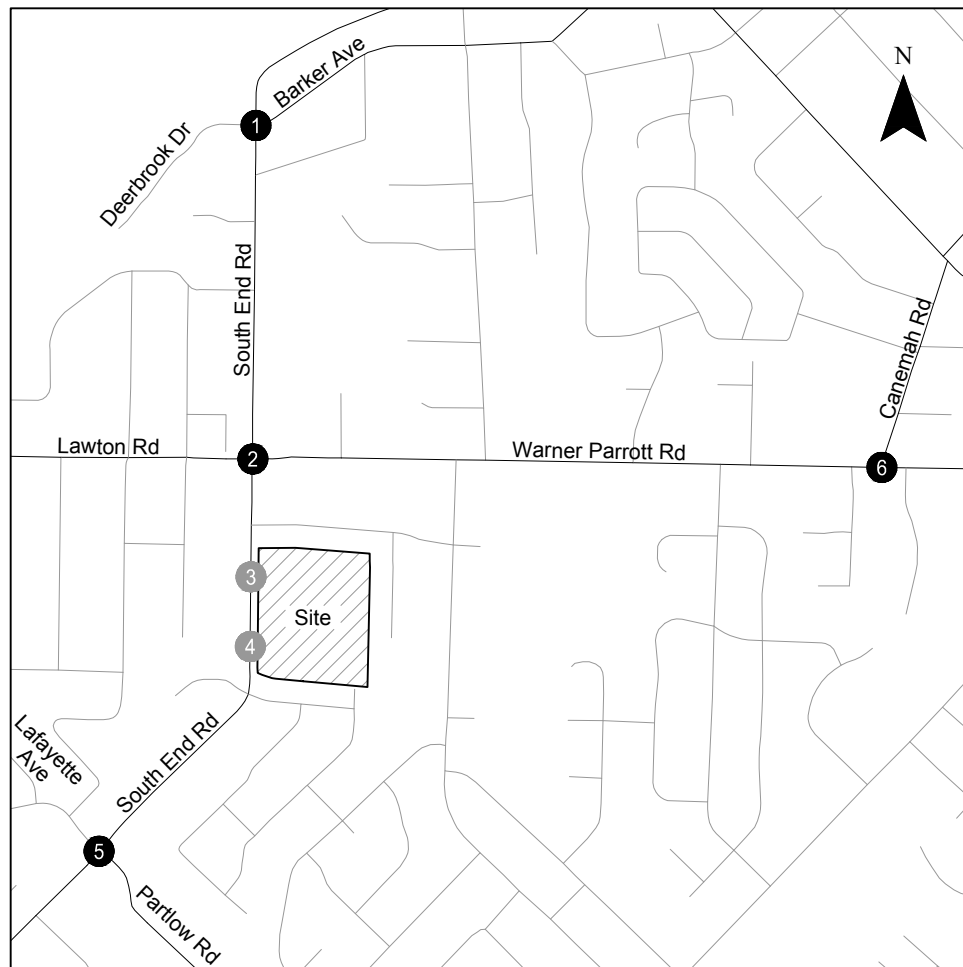
The Oregon City Christian Church recently developed a Master Plan that identifies the vision and long-term goals for future development of the church campus located along the east side of South End Road in Oregon City. Figure 1 illustrates the site vicinity map. The Master Plan includes phased construction of a new recreation center, a new student ministry center, a new administrative building, and renovation of the existing worship center and a new worship center and café. The Master Plan also includes expansion of the existing parking facilities and a new driveway along the southern boundary of the site. Figure 2 illustrates the conceptual master plan. Construction of the new facilities is expected to occur in four phases over a 10-year period as follows:

- Phase 1 is expected to occur in 2020 and include a new 8,168 square-foot (sf) recreation center, new parking facilities, and a new driveway along the southern boundary of the site;
- Phase 2 is expected to occur in 2022 and include a new 3,602 sf student ministry center;
- Phase 3 is expected to occur in 2025 and include a new 4,077 sf administrative building; and
- Phase 4 is expected to occur in 2030 and include renovation of the existing worship center and construction of the new worship center and café.
 - The size of the new worship center and café has not been determined; however, the church is planning to accommodate up to 600 parishioners.

The results of this study indicate that the Oregon City Christian Church Master Plan can be developed while maintaining acceptable traffic operations and safety at the study intersections, assuming provision of the following recommended mitigation measures:

- Subject to City direction, the Phase 3 and Phase 4 site development should pay a proportionate share contribution toward future installation of a traffic signal at the South End Road/Warner Parrott Road intersection prior to completion of the two respective development phases. Alternatively, the need for the South End Road/Warner Parrott Road intersection improvements associated with Phase 3 and Phase 4 site development could be re-evaluated prior to the two respective development phases.
- Adequate intersection sight distance should be provided at the site driveways on South End Road in accordance with City of Oregon City standards.

Additional details of the study methodology, findings, and recommendations are provided below.



- - Study Intersection
- - Site Driveway

**Site Vicinity Map
Oregon City, OR**

**Figure
1**

Source: Oregon City Church Master Plan

Conceptual Master Plan Oregon City, OR

Figure
2

SCOPE OF THE REPORT

This analysis determines the transportation-related impacts associated with the Oregon City Christian Church Master Plan and was prepared in accordance with the City of Oregon City's Guidelines for Transportation Impact Analyses (TIA Guidelines – Reference 1). The study intersections and scope of this project were selected based on the TIA guidelines and direction provide by City staff. *Appendix "A" contains the scoping memo prepared for this study.* The operational analyses were performed at the following intersections:

1. South End Road/Barker Avenue
2. South End Road/Warner Parrott Road
3. South End Road/Existing Church Driveway (Dwy 1)
4. South End Road/Future Church Driveway (Dwy 2)
5. South End Road/Partlow Road
6. Canemah Road/Warner Parrott Road

This report evaluates these transportation issues:

- Year 2018 existing land-use and transportation-system conditions within the site vicinity during the weekday PM and Sunday mid-day peak periods;
- Planned developments and transportation improvements in the study area;
- Trip generation and distribution estimates for each phase of the Master Plan;
- Year 2020 background traffic conditions (without the Master Plan) during the weekday PM and Sunday mid-day peak periods;
- Year 2020 total traffic conditions (with full build-out and occupancy of Phase 1 of the Master Plan) during the weekday PM and Sunday mid-day peak periods;
- Year 2022 background traffic conditions (with Phase 1 of the Master Plan) during the weekday PM and Sunday mid-day peak periods;
- Year 2022 total traffic conditions (with full build-out and occupancy of Phases 1-2 of the Master Plan) during the weekday PM and Sunday mid-day peak periods;
- Year 2025 background traffic conditions (with Phases 1-2 of the Master Plan) during the weekday PM and Sunday mid-day peak periods;
- Year 2025 total traffic conditions (with full build-out and occupancy of Phases 1-3 of the Master Plan) during the weekday PM and Sunday mid-day peak periods;
- Year 2030 background traffic conditions (with Phases 1-3 of the Master Plan) during the weekday PM and Sunday mid-day peak periods;
- Year 2030 total traffic conditions (with full build-out and occupancy of Phases 1-4 of the Master Plan) during the weekday PM and Sunday mid-day peak periods;
- On-site traffic operations and circulation.

EXISTING CONDITIONS

The existing conditions analysis identifies the site conditions and current physical and operational characteristics of the roadways within the study area. These conditions will be compared with future conditions later in this report. Kittelson & Associates, Inc. (Kittelson) staff visited and inventoried the Oregon City Christian Church campus and study intersections in August 2018. At that time, Kittelson collected information regarding site conditions, adjacent land uses, existing traffic operations, and transportation facilities in the study area.

Site Conditions and Adjacent Land Uses

The Oregon City Christian Church campus currently has a worship center that houses all administrative and other accessory uses to the church. The campus includes a 96-stall parking lot and a maintenance/storage shed. Access to the campus is provided by a single driveway located along the east side of South End Road. A gated emergency access is provided in the southeast corner of the campus that connects to Paulsen Drive¹.

The campus property is currently zoned R-10 (single-family residential), which allows religious institutions as a conditional use. Properties to the north, east, and west are also zoned R-10, while properties to the south are zoned R-8. The majority of adjacent properties have residential land uses consistent with the underlying zoning. The Oregon City United Methodist Church and Clackamas Fire Station 17 are located to the south along the west side of South End Road.

Transportation Facilities

Table 1 summarizes the existing transportation facilities and roadways in the study area.

Table 1: Existing Transportation Facilities and Roadways in the Study Area

Roadway	Functional Classification ¹	Number of Lanes	Posted Speed (mph)	Sidewalks	Bicycle Lanes	On-Street Parking
South End Road	Minor Arterial	2	35	Yes	Yes	Yes
Barker Avenue	Collector	2	25	No	No	No
Warner Parrott Road	Minor Arterial	2	30	Yes	Yes	Yes
S Partlow Road	Collector	2	25	Yes	Yes	No
Canemah Road	Collector	2	25	No	No	No

1. Per the Oregon City Transportation System Plan (TSP – Reference 2).

¹ Prior conditional use approval related to the gated access allows for use associated with church activities but is subject to a monitoring condition. In the event the church proposes to use the emergency access before and after worship services in the future, the church should coordinate with City staff to confirm the nature and extent of monitoring necessary to evaluate potential impacts to the adjacent neighborhood as well as other pertinent requirements, if any.

Roadway Facilities

South End Road borders the church campus to the west and connects the campus to several major roadways, including Warner Parrott Road, Barker Avenue, and OR 99E via S 2nd Avenue to the north and Partlow Road and OR 99E to the south. Warner Parrott Road also connects the campus to several major roadways, including Canemah Road, Linn Avenue, Leland Road, and Warner Milne Road to the east. Figure 3 illustrates the existing lane configurations and traffic control devices at the study intersections.

Pedestrian and Bicycle Facilities

Sidewalks and on-street bike lanes are currently provided along both sides of South End Road, Warner Parrott Road, and Partlow Road; however, there are several gaps in the sidewalk and bike lane networks. Continuous sidewalks with planted landscape buffers are provided along South End Road adjacent to the campus. The sidewalks appear to be in good shape and of appropriate width per Oregon City standards.

Transit Facilities

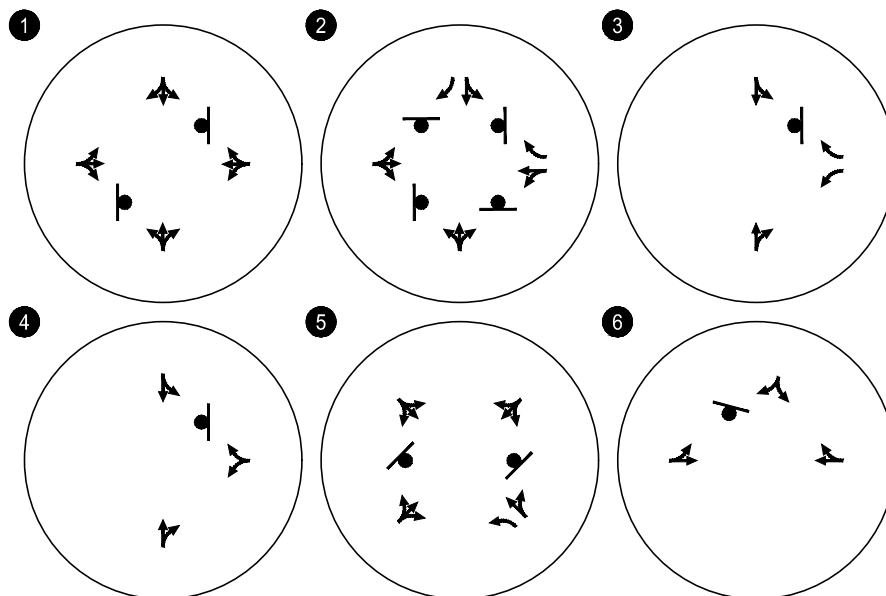
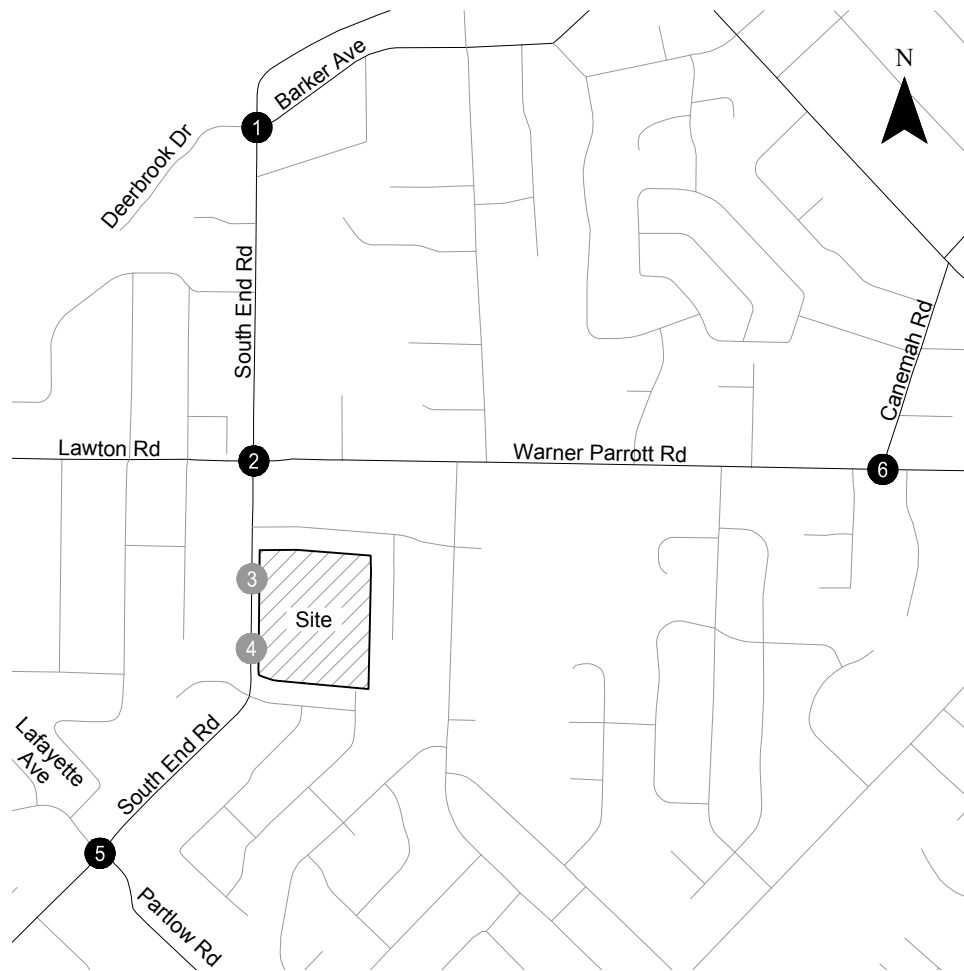
Local transit service is not provided in the study area. The closest transit service is provided to the east along Linn Avenue and Warner Milne Road. TriMet Bus Line 33 provides frequent service between Clackamas Town Center and Clackamas Community College Monday through Friday from 5:00 AM to 2:00 AM and from 6:00 AM to 2:00 AM Saturdays and Sundays. TriMet's Southeast Service Enhancement Plan identifies the area surrounding the campus as a Community/Jobs Connector Service Area and plans to provide future shuttle service to the area (TriMet – Reference 3).

Traffic Volumes and Peak Hour Operations

Turning movement counts were conducted at the study intersections in August 2018. The counts were conducted at the South End Road/Warner Parrott Road intersection and the site driveway on a typical mid-week day during the evening (4:00 to 6:00 PM) peak time period and at all study intersections on a typical Sunday morning (8:00 AM to 12:00 PM). The system-wide weekday PM and Sunday peak hours were found to occur from 5:00 to 6:00 PM and 10:15 to 11:15 AM, respectively. Figure 4 summarizes the year 2018 existing turning-movement counts at the study intersection for the weekday PM and Sunday peak hours. *Appendix "B" contains the traffic count worksheets used in this study.*

Current Levels of Service

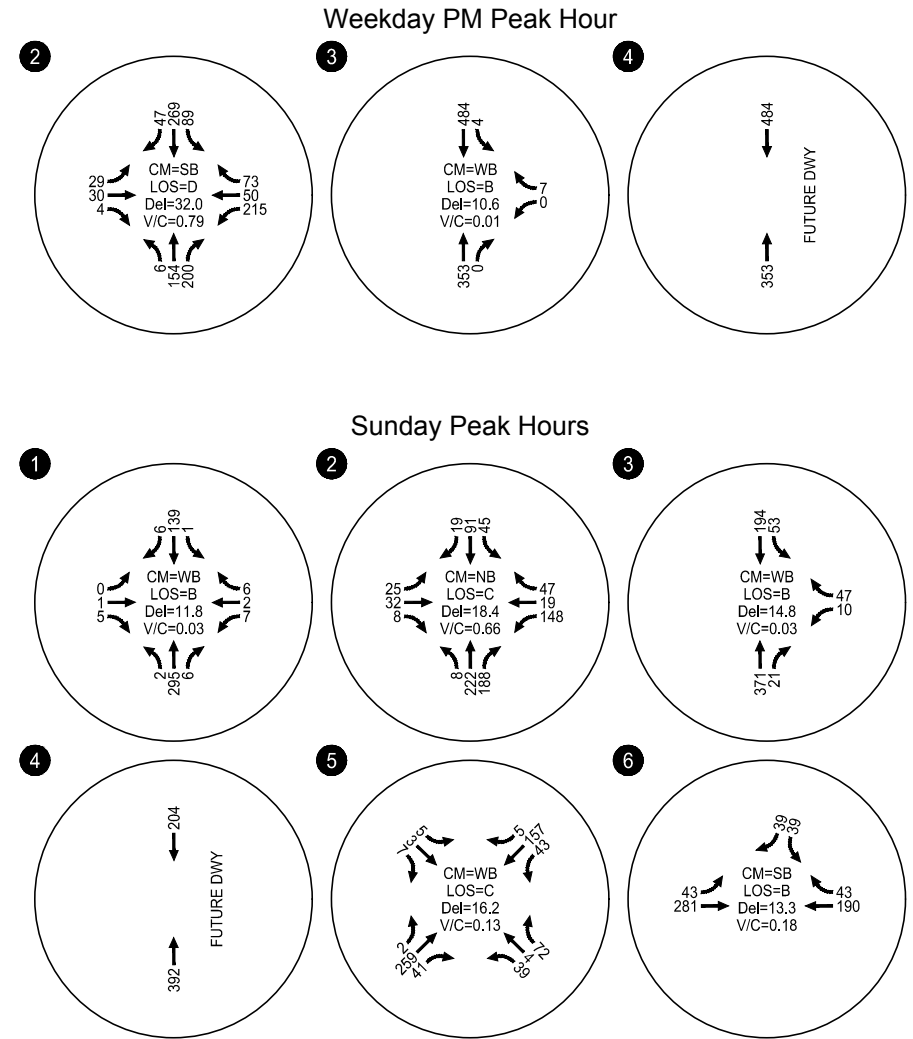
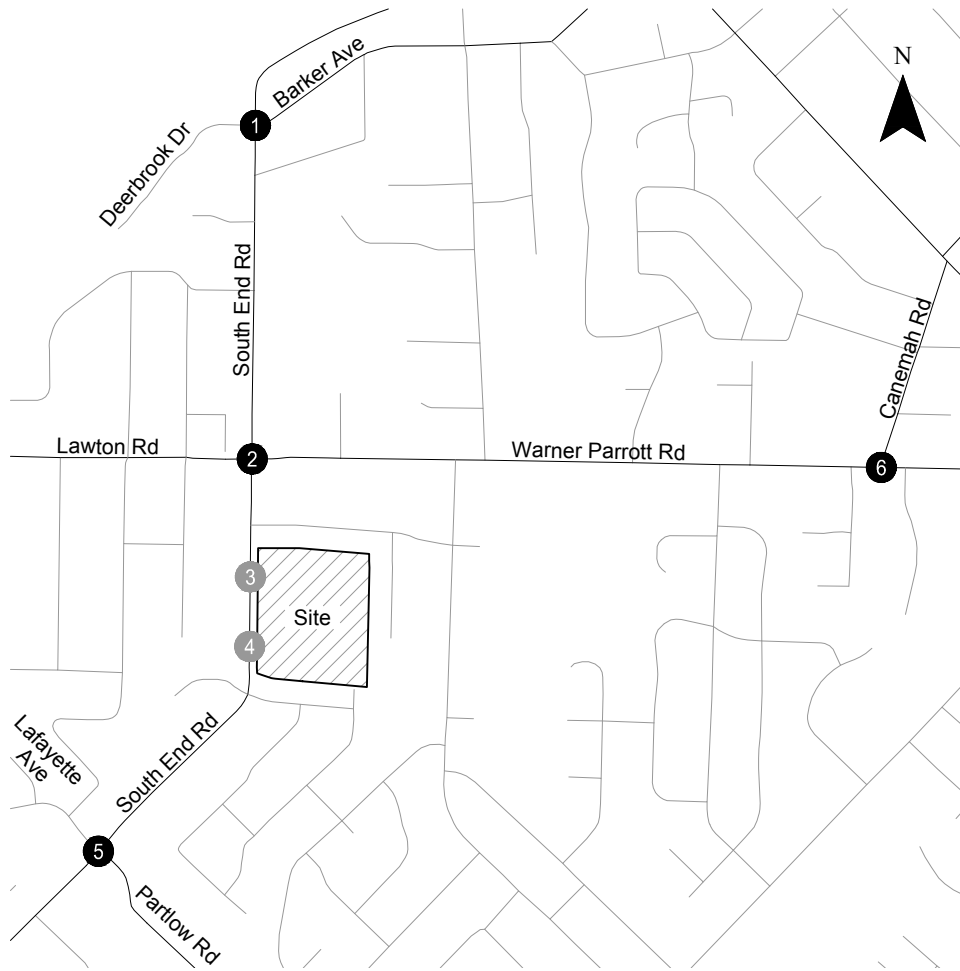
All level-of-service analyses described in this report were performed in accordance with the procedures stated in the *Highway Capacity Manual* (HCM – Reference 4). *A description of level of service and the criteria by which they are determined is presented in Appendix "C".* Appendix "C" also indicates how level of service is measured and what is generally considered an acceptable range.



-  - STOP SIGN
-  - TRAFFIC SIGNAL

**Existing Lane Configurations &
Traffic Control Devices
Oregon City, OR**

**Figure
3**



**Year 2018 Existing Traffic Conditions
Weekday PM and Sunday Peak Hours
Oregon City, OR**

**Figure
4**

Per the TIA Guidelines, Oregon City requires all signalized intersections located outside the Regional Center to operate at Level of Service (LOS) “D” or better for the intersection as a whole and no approach operating at worse than LOS “E” and a v/c ratio higher than 1.0 for the sum of critical movements. Oregon City requires all unsignalized intersection to operate at LOS “E” or better for the poorest operating approach and with no movement serving more than 20 peak hour vehicles operating worse than LOS “E”. Therefore, LOS “F” is tolerated for minor movements during the peak hour.

All intersection level-of-service analyses used the peak 15-minute flow rates that occur during the weekday PM and Sunday mid-day peak hours. Using the peak 15-minute flow rates ensures that this analysis is based on a reasonable worst-case scenario. For this reason, the analysis reflects conditions that are only likely to occur for 15 minutes out of each average peak hour.

Figure 4 summarizes the year 2018 existing traffic conditions at the study intersections during the weekday PM and Sunday peak hours. As shown, all of the study intersections currently operate acceptably per their applicable mobility standards. *Appendix “D” includes the year 2018 existing traffic conditions worksheets.*

Traffic Safety

The crash history of the study intersections was reviewed in an effort to identify potential safety issues in the study area. The Oregon Department of Transportation (ODOT) provided the five most recent years of crash data available for the study intersections, which includes the period from January 1, 2012, through December 31, 2016. Table 2 summarizes the crash data over the five-year period.

Table 2: Intersection Crash History (January 1, 2012 through December 31, 2016)

Intersection	Crash Type					Crash Severity			Total	Crash Rates (Crashes /MEV)	ODOT 90 th Percentile Rate
	Rear-End	Turn	Angle	Ped/ Bike	Other	PDO ¹	Injury	Fatality			
South End Road/ Barker Avenue	-	-	-	-	-	0	0	-	0	0.00	0.408
South End Road/ Warner Parrott Road	2	2	4	-	-	6	2	-	8	0.376	0.408
South End Road/ S Partlow Road	1	2	-	-	-	2	1	-	3	0.258	0.408
Canemah Road/ Warner Parrott Road	3	1	-	-	-	1	3	-	4	0.345	0.293

Source: ODOT
MEV=Million Entering Vehicles

The crash rates shown in Table 2 were compared to the 90th percentile rates for similar facilities shown in Table 4-1 of the ODOT Analysis Procedures Manual (APM). Per the APM, any intersection that has a crash rate equal to or greater than the corresponding 90th percentile rate is considered a high-risk intersection and is recommended for further review. Based on these criteria, no intersection is recommended for further crash pattern review. *Appendix “E” contains the crash data provided by ODOT.*

TRANSPORTATION IMPACT ANALYSIS

The transportation impact analysis identifies how the study area's transportation system will operate in the year each phase of the Master Plan is expected to be fully built. The impact of traffic generated by each phase of the Master Plan was examined as follows:

- Planned developments and transportation improvements in the site vicinity were identified.
- Background traffic conditions (with and without the Master Plan) were analyzed at the study intersections during the weekday PM and Sunday peak hours.
 - Background conditions were developed by applying a 1.9-percent annual growth rate to the existing traffic volumes to account for regional growth in the site vicinity.
- Site-generated trips were estimated for build-out of each phase of the Master Plan.
- Site trip-distribution patterns were identified and used to assign the site-generated trips to the study intersections.
- Total traffic conditions (with full build-out and occupancy of the Master Plan) were analyzed at the study intersections and site-access driveways during the weekday PM and Sunday peak hours.
- On-site circulation issues and site-access operations were evaluated.

YEAR 2020 BACKGROUND TRAFFIC CONDITIONS

The year 2020 background traffic conditions analysis identifies how the study area's transportation system will operate in the year Phase 1 of the Master Plan is expected to be fully built, 2020. This analysis includes traffic attributed to planned developments within the study area and to general growth in the region but does not include traffic from Phase 1 of the Master Plan.

Planned Developments and Transportation Improvements

Kittelson identified and reviewed the planned developments and transportation improvements within the study area. Based on discussions with City staff, there are no approved developments within the study area that impact the study intersections; however, there are two transportation projects identified in the TSP that could. Both projects are identified on the "likely to be funded" project list as medium-term priority. Projects identified as medium-term priority are recommended for implementation within 5 to 10 years of adoption of the TSP (2013). The projects include:

- Project D32: South End Road/Warner Parrott Road Operational Enhancement – Install a traffic signal with dedicated left-turn lanes for the South End Road approaches to Warner Parrott Road.
- Project D33: South End Road/Lafayette Avenue-Partlow Road Operational Enhancement – Install a single-lane roundabout.

Traffic Volumes

The growth rate used in this analysis was determined based on a review of historic traffic volumes provided in the TSP and direction provided by City staff. The TSP shows an increase of approximately 1.90 percent per year at several intersections within the south part of the City. Therefore, the year 2020 background traffic volumes were developed by applying a 3.8 percent growth rate (1.90 percent per year for two years) to the existing traffic volumes shown in Figure 4. Figure 5 illustrates the resulting forecast year 2020 background traffic volumes at the study intersection during the weekday PM and Sunday peak hours.

Level-of-Service Analysis

Figure 5 summarizes the year 2020 background traffic conditions at the study intersections during the weekday PM and Sunday peak hours. As shown, all of the study intersections are forecast to operate acceptably per their applicable mobility standards. *Appendix "F" includes the year 2020 background traffic conditions worksheets.*

PHASE 1 DEVELOPMENT PLAN

Phase 1 of the Master Plan includes construction of a new 8,168 sf recreation center, new parking facilities, and a new driveway along the southern boundary of the site. The new parking facilities will increase the parking supply from 96 stalls to 258 total stalls; the additional stalls will accommodate full build-out of the Mater Plan. The new driveway will connect with South End Road approximately 400-feet south of the existing driveway. Full build-out and occupancy of Phase 1 is expected to occur in 2020.

Trip Generation

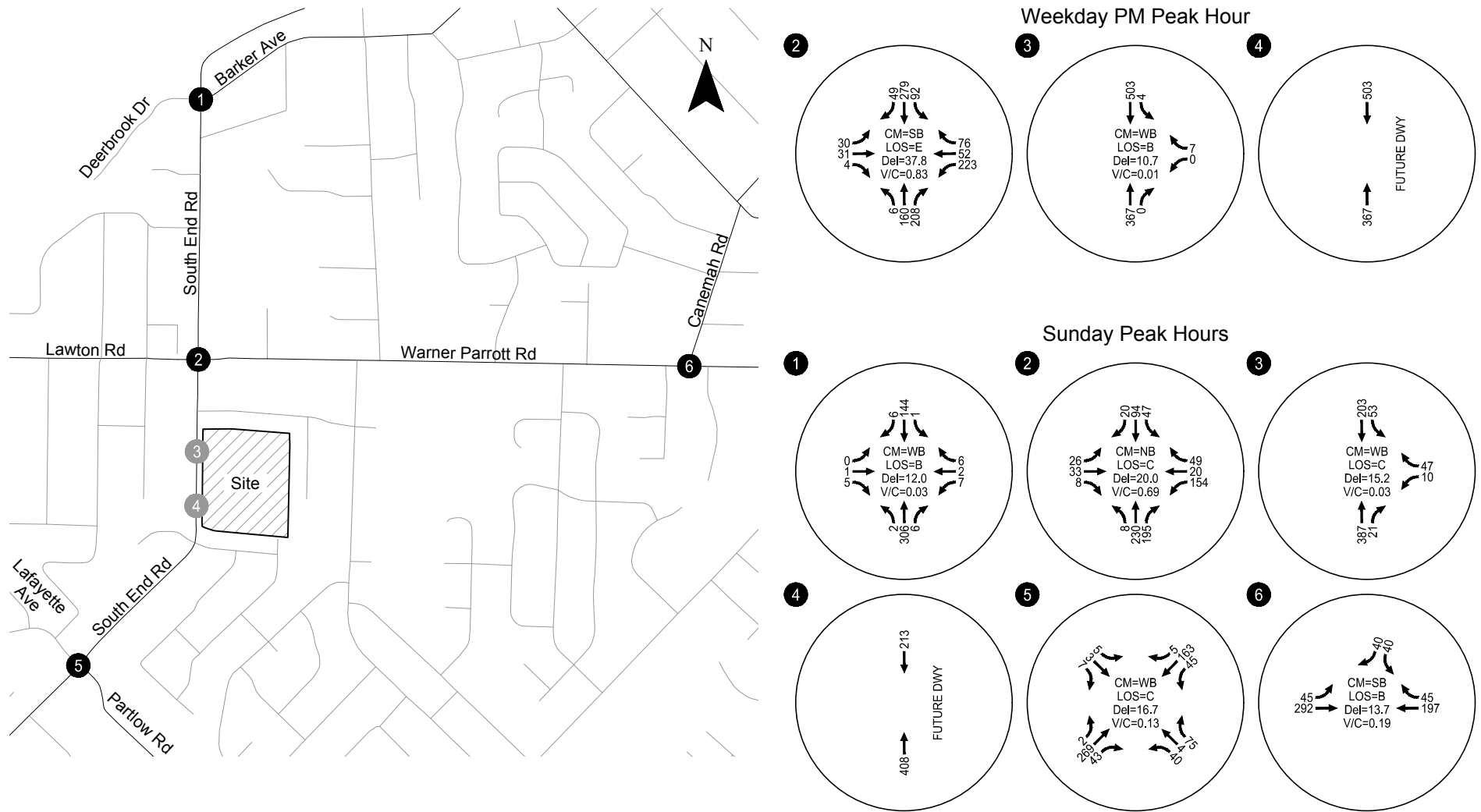
Trip generation estimates were prepared for Phase 1 of the Master Plan based on a trip generation study conducted at the church in July 2018. *Appendix "A" contains additional information related to the trip generation study.* Table 3 summarizes the daily, weekday PM, Sunday, and Sunday peak hour trips associated with Phase 1 of the Master Plan.

Table 3: Phase 1 Trip Generation

Phase	Size	Daily Trips (Weekday)	Weekday PM Peak Hour of Adjacent Street			Daily Trips (Sunday)	Sunday Peak Hour of Generator		
			Total	In	Out		Total	In	Out
1	8,168 sf	64	6	3	3	222	72	32	40

Site Trip Distribution/Trip Assignment

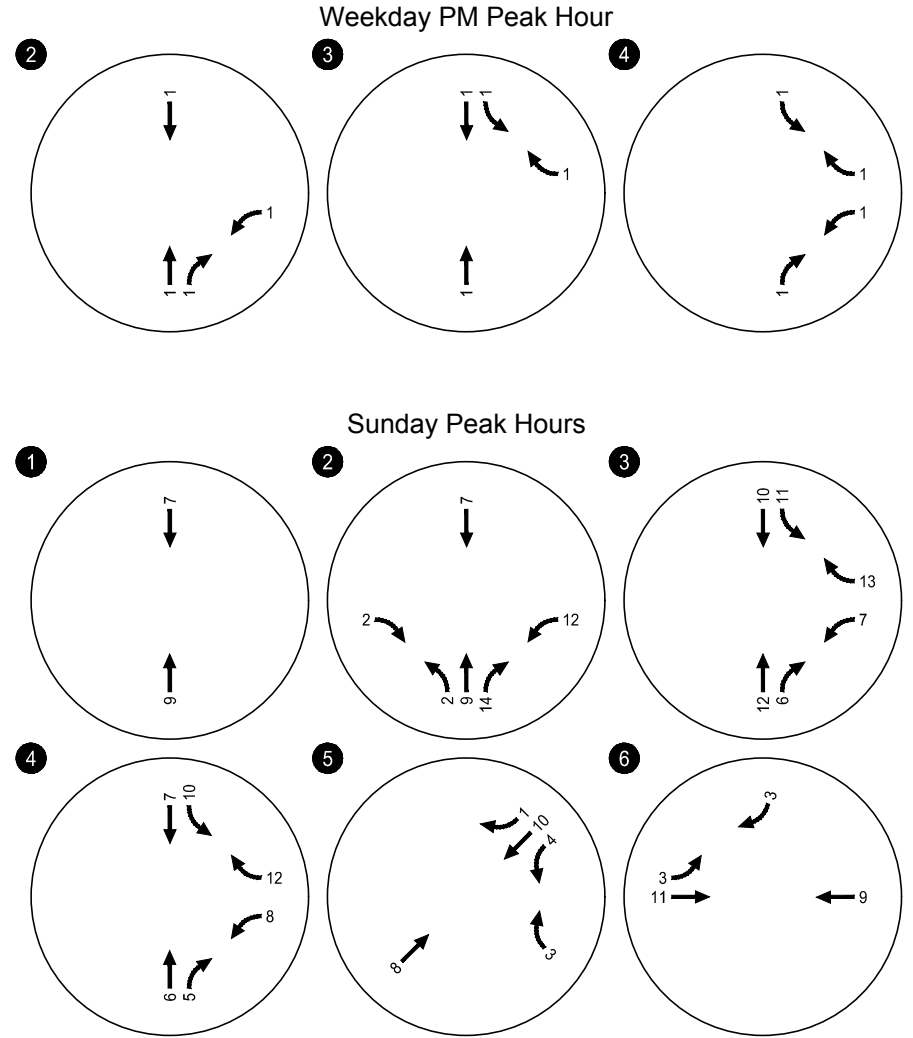
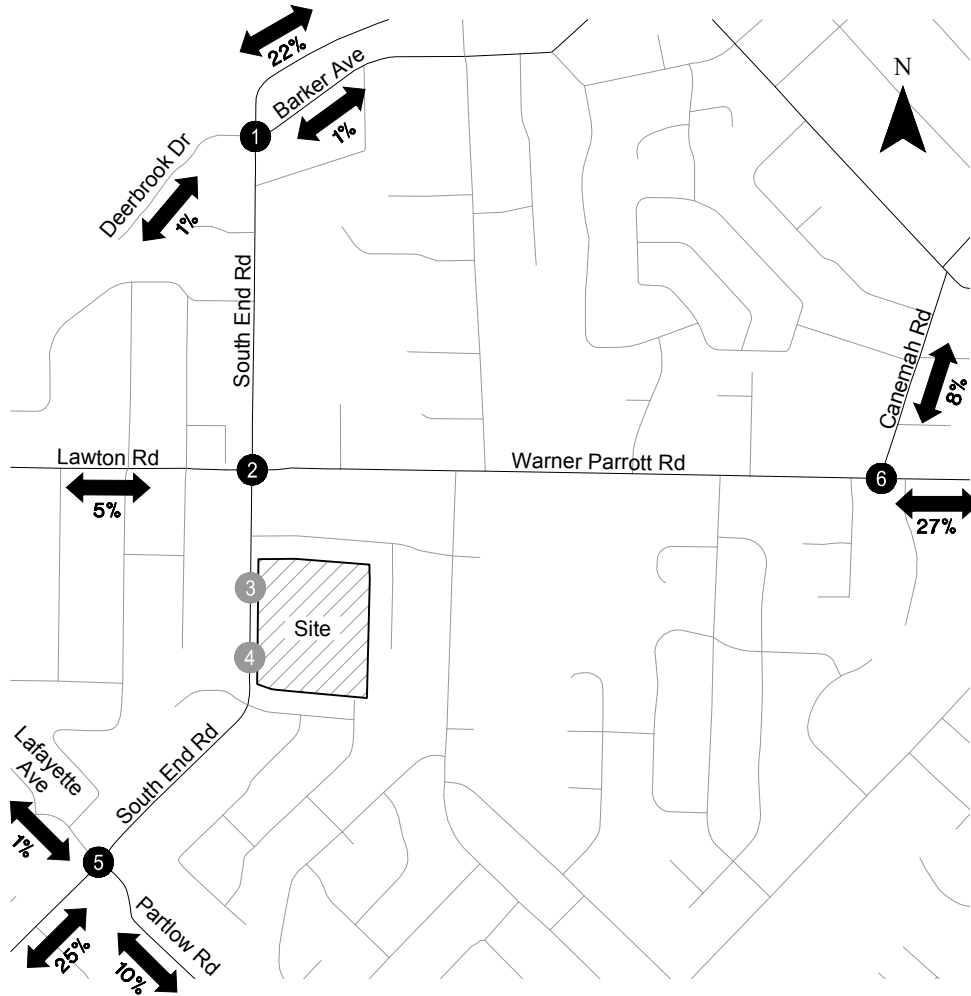
A trip distribution pattern was developed for the Master Plan based on existing traffic patterns and the location of major trip origins and destinations in the Oregon City area. Figure 6 illustrates the estimated trip distribution pattern.



**Year 2020 Background Traffic Conditions
Weekday PM and Sunday Peak Hours
Oregon City, OR**

**Figure
5**

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**Estimated Trip Distribution Pattern & Phase 1 Site-generated Trips
Weekday PM and Sunday Peak Hours
Oregon City, OR**

**Figure
6**

The site-generated trips shown in Table 3 were distributed to the study area roadways according to the trip distribution pattern shown in Figure 6. Figure 6 also illustrates the assignment of site-generated trips at the study intersections during the weekday PM and Sunday peak hours.

YEAR 2020 TOTAL TRAFFIC CONDITIONS

The total traffic conditions analysis forecasts how the study area's transportation system will operate with traffic generated by Phase 1 of the Master Plan. The year 2020 background traffic volumes shown in Figure 5 were added to the site-generated trips shown in Figure 6 to arrive at the total traffic volumes shown in Figure 7.

Intersection Level of Service

Figure 7 summarizes the year 2020 Phase 1 total traffic conditions analysis results at the study intersections during the weekday PM and Sunday peak hours. As shown, all of the study intersections and site driveways are forecast to operate acceptably per their applicable mobility standards. *Appendix "G" includes the year 2020 total traffic conditions worksheets.*

YEAR 2022 BACKGROUND TRAFFIC CONDITIONS

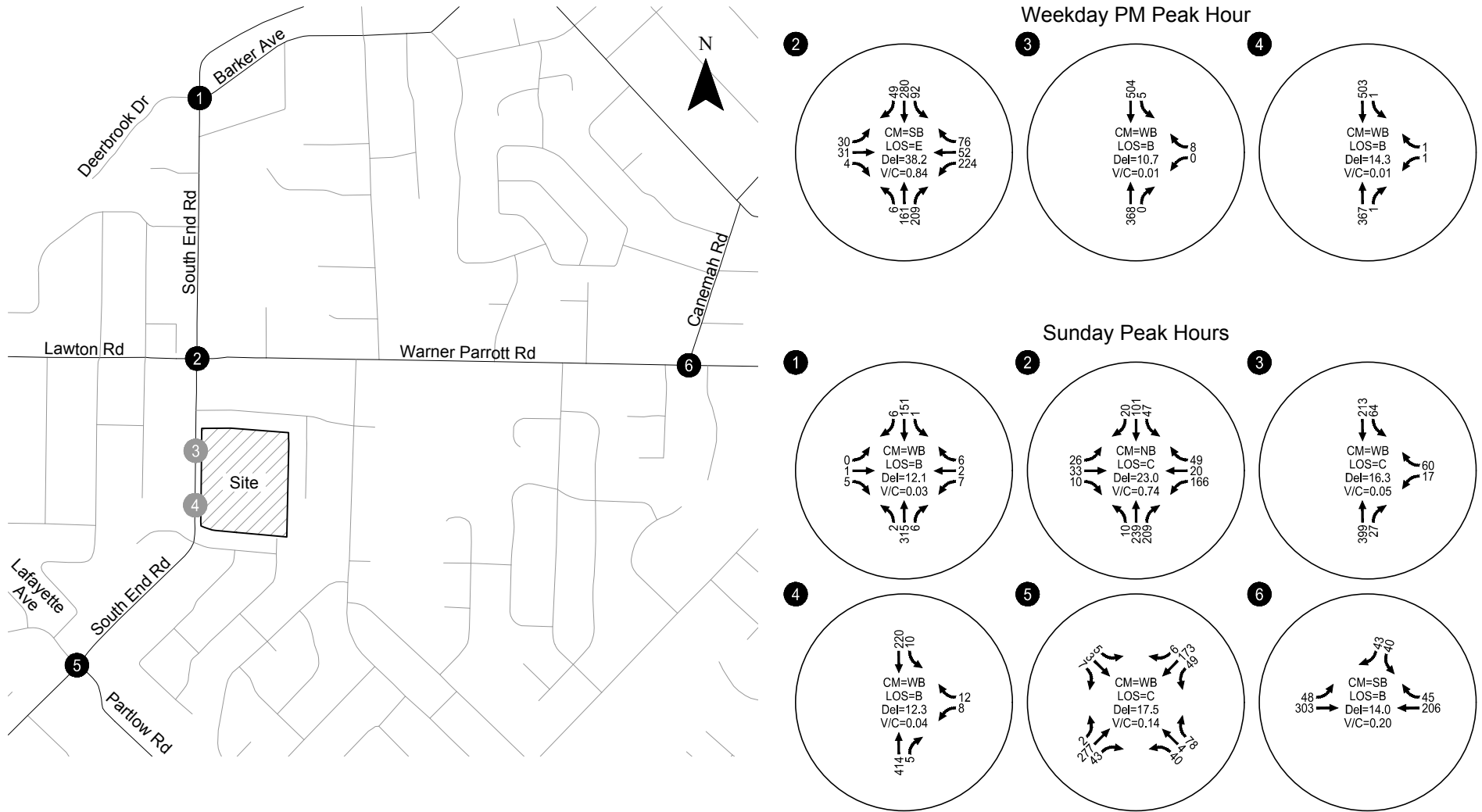
The year 2022 background traffic conditions analysis identifies how the study area's transportation system will operate in the year Phase 2 of the Master Plan is expected to be fully built, 2022. This analysis includes traffic attributed to Phase 1 of the Master Plan and to general growth in the region but does not include traffic from Phase 2 of the Master Plan.

Traffic Volumes

The year 2022 background traffic volumes were developed by applying a 7.6 percent growth rate (1.90 percent per year for four years) to the existing traffic volumes shown in Figure 4 and by adding the Phase 1 site-generated trips shown in Figure 6. Figure 8 illustrates the resulting forecast year 2022 background traffic volumes at the study intersection during the weekday PM and Sunday peak hours.

Level-of-Service Analysis

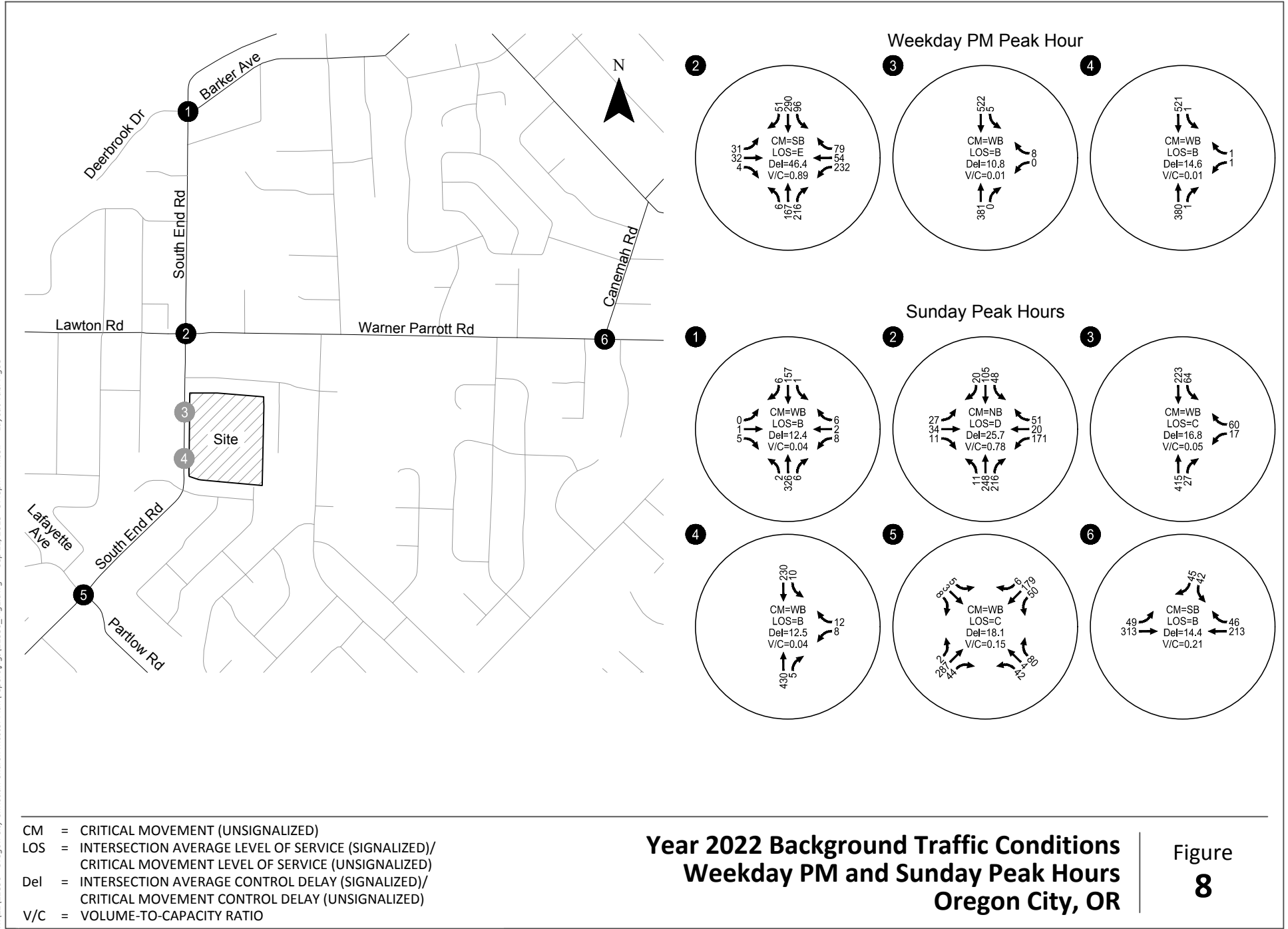
Figure 8 summarizes the year 2022 background traffic conditions at the study intersections during the weekday PM and Sunday mid-day peak hours. As shown, all of the study intersections are forecast to operate acceptably per their applicable mobility standards. *Appendix "H" includes the year 2022 background traffic conditions worksheets.*



**Year 2020 Phase 1 Total Traffic Conditions
Weekday PM and Sunday Peak Hours
Oregon City, OR**

Figure
7

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Year 2022 Background Traffic Conditions
Weekday PM and Sunday Peak Hours
Oregon City, OR

Figure
8

PHASE 2 DEVELOPMENT PLAN

Phase 2 of the Master Plan includes construction of a new 3,602 sf student ministry center. Full build-out and occupancy of Phase 2 is expected to occur in 2022.

Trip Generation

Trip generation estimates were prepared for Phase 2 of the Master Plan based on a trip generation study conducted at the church in July 2018. *Appendix "A" contains additional information related to the trip generation study.* Table 4 summarizes the daily, weekday PM, Sunday, and Sunday peak hour trips associated with Phase 2 of the Master Plan.

Table 4: Phase 2 Trip Generation

Phase	Size	Daily Trips (Weekday)	Weekday PM Peak Hour of Adjacent Street			Daily Trips (Sunday)	Sunday Peak Hour of Generator		
			Total	In	Out		Total	In	Out
2	3,602 sf	28	2	1	1	98	32	14	18

Site Trip Distribution/Trip Assignment

The site-generated trips shown in Table 4 were distributed to the study area roadways according to the trip distribution pattern shown in Figure 9. Figure 9 also illustrates the assignment of Phase 2 site-generated trips at the study intersections during the weekday PM and Sunday peak hours.

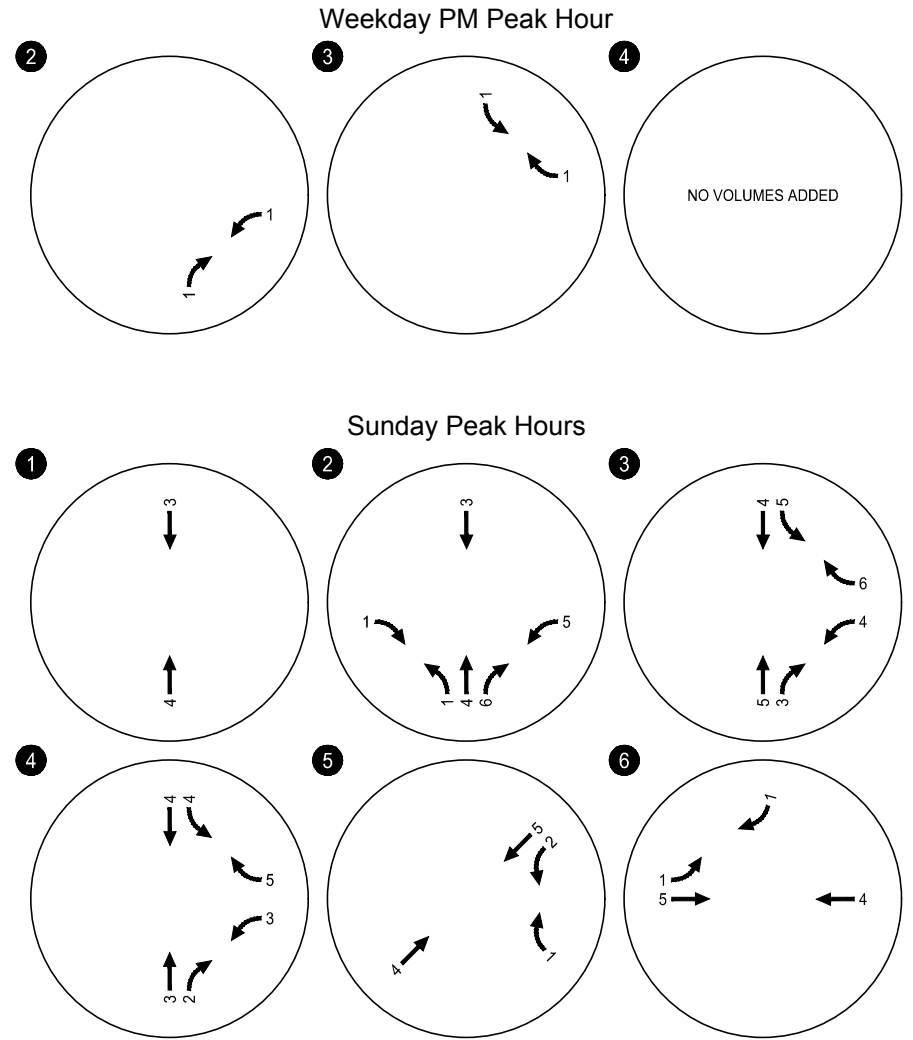
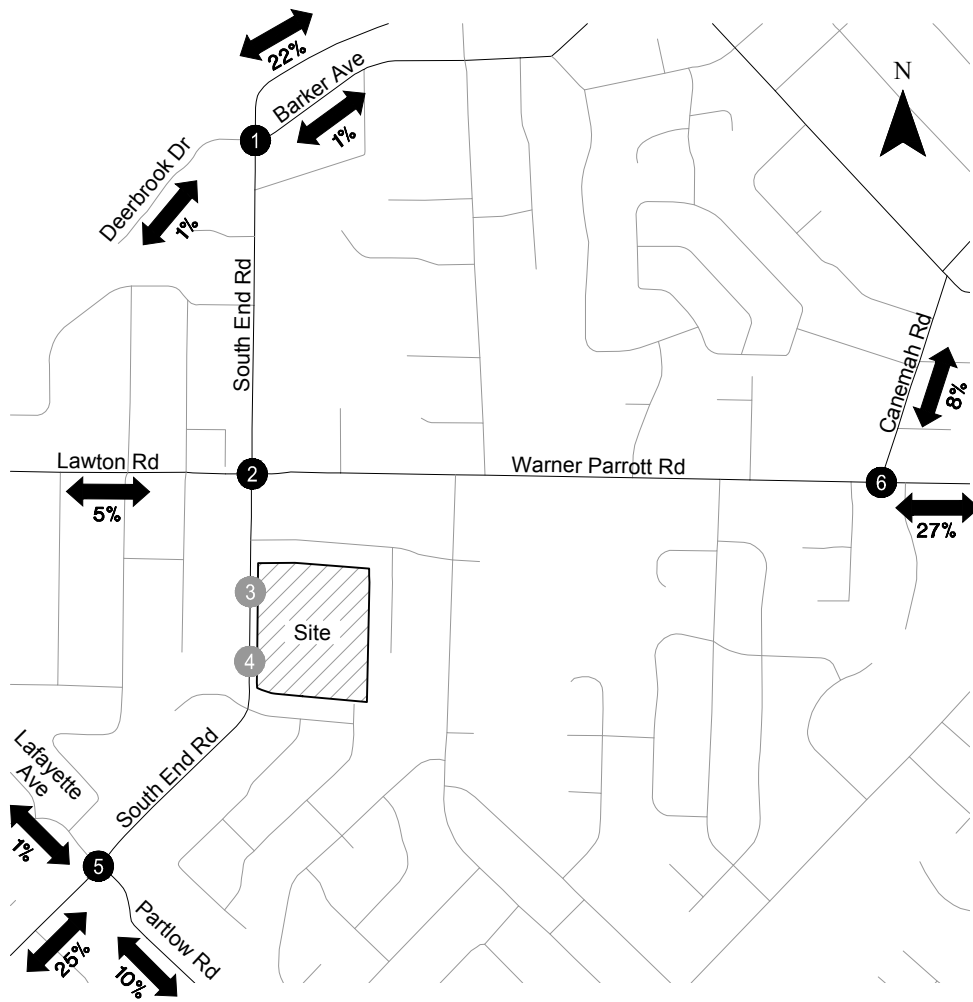
YEAR 2022 TOTAL TRAFFIC CONDITIONS

The total traffic conditions analysis forecasts how the study area's transportation system will operate with traffic generated by Phases 1-2 of the Master Plan. The year 2022 background traffic volumes shown in Figure 8 were added to the site-generated trips shown in Figure 9 to arrive at the total traffic volumes shown in Figure 10.

Intersection Level of Service

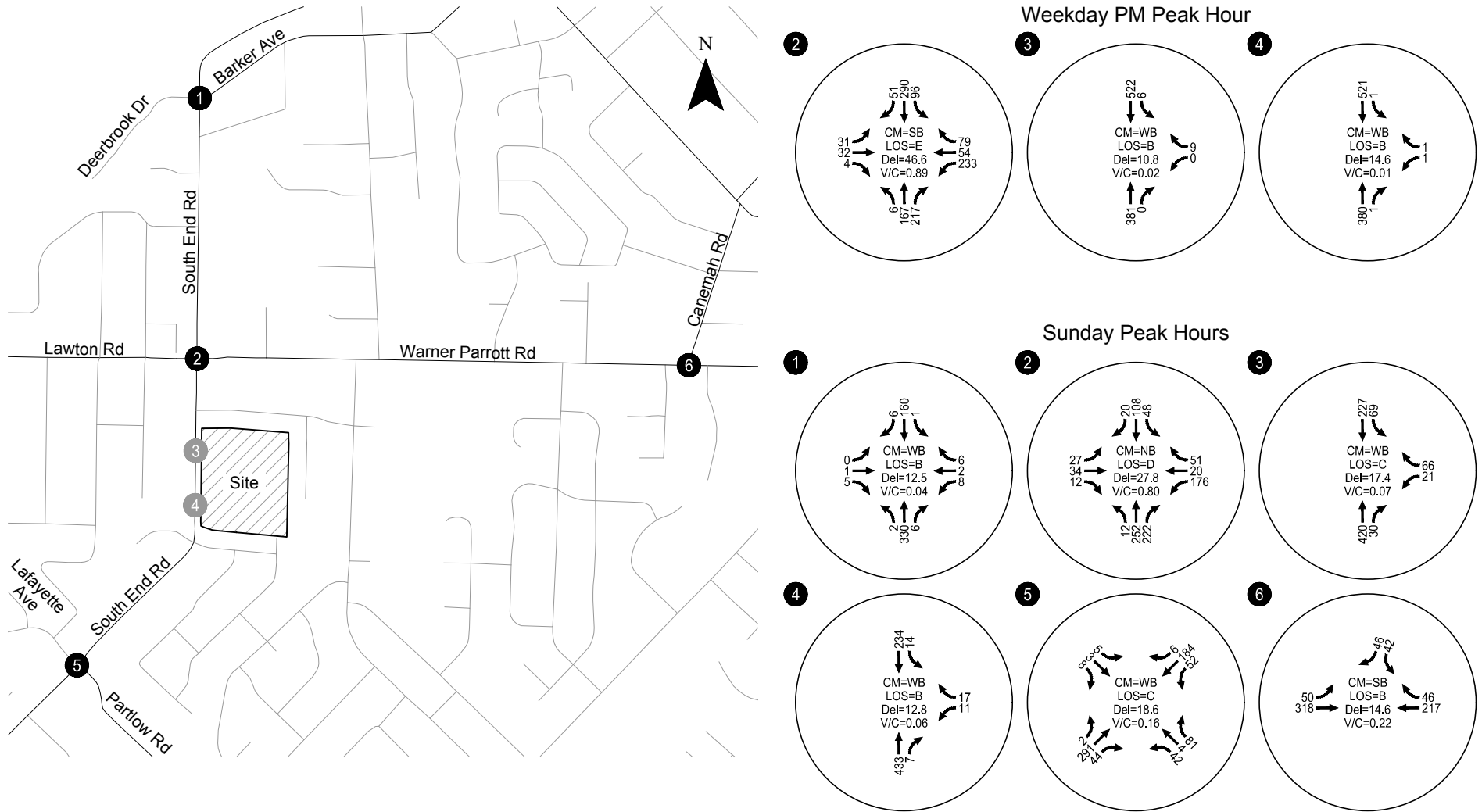
Figure 10 summarizes the year 2022 Phases 1-2 total traffic conditions analysis results at the study intersections during the weekday PM and Sunday peak hours. As shown, all of the study intersections and site driveways are forecast to operate acceptably per their applicable mobility standards. *Appendix "I" includes the year 2022 total traffic conditions worksheets.*

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**Estimated Trip Distribution Pattern & Phase 2 Site-generated Trips
Weekday PM and Sunday Peak Hours
Oregon City, OR**

**Figure
9**



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

**Year 2022 Phase 1-2 Total Traffic Conditions
 Weekday PM and Sunday Peak Hours
 Oregon City, OR**

**Figure
 10**

YEAR 2025 BACKGROUND TRAFFIC CONDITIONS

The year 2025 background traffic conditions analysis identifies how the study area's transportation system will operate in the year Phase 3 of the Master Plan is expected to be fully built, 2025. This analysis includes traffic attributed to Phases 1-2 of the Master Plan and to general growth in the region but does not include traffic from Phase 3 of the Master Plan.

Traffic Volumes

The year 2025 background traffic volumes were developed by applying a 13.3 percent growth rate (1.90 percent per year for seven years) to the existing traffic volumes shown in Figure 4 and by adding the Phase 1 site-generated trips shown in Figure 6 and the Phase 2 site-generated trips shown in Figure 9. Figure 11 illustrates the resulting forecast year 2025 background traffic volumes at the study intersection during the weekday PM and Sunday peak hours.

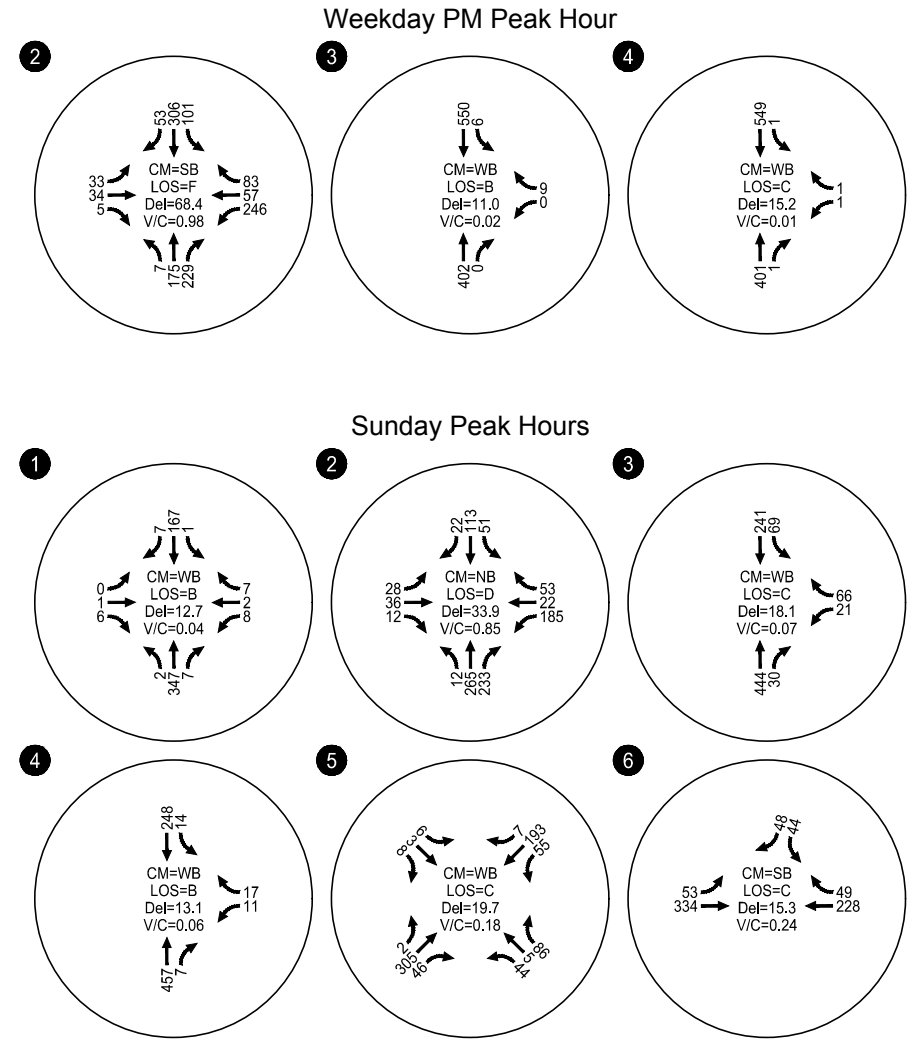
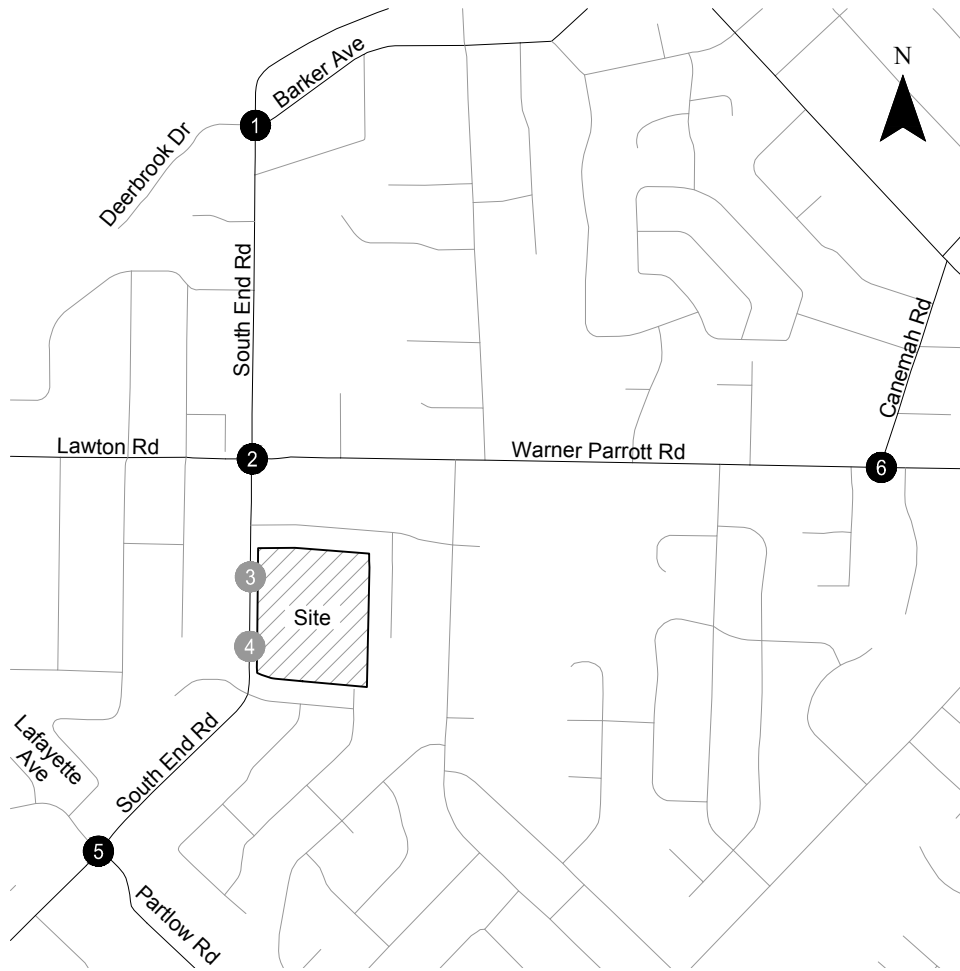
Level-of-Service Analysis

Figure 11 summarizes the year 2025 background traffic conditions at the study intersections during the weekday PM and Sunday peak hours. As shown, all of the study intersections are forecast to operate acceptably per their applicable mobility standards with the exception of the South End Road/Warner Parrott Road intersection. *Appendix "J" includes the year 2025 background traffic conditions worksheets.*

South End Road/Warner Parrott Road

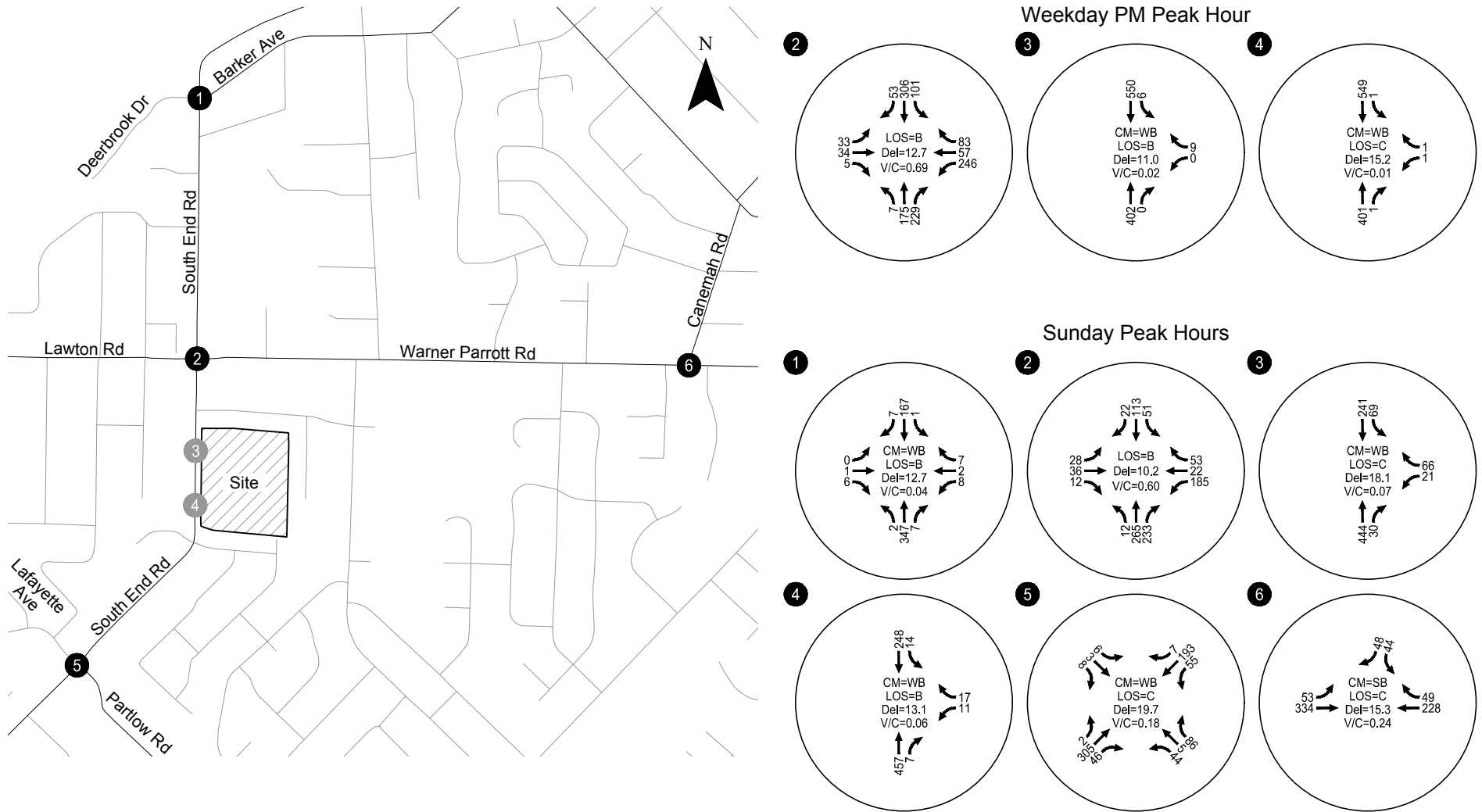
The northbound and southbound approaches to the South End Road/Warner Parrott Road intersection are projected to operate at LOS "F" and near capacity during the weekday PM peak hour. A preliminary signal warrant analysis indicates that a traffic signal is expected to be warranted. This finding is consistent with the Oregon City Transportation System Plan and its identified Project D32². Figure 12 summarizes the year 2025 background traffic condition at the study intersections during the weekday PM and Sunday peak hours assuming installation of a traffic signal at the intersection (but without the additional left-turn lanes identified in TSP Project D32). *Appendix "K" includes the year 2025 background traffic conditions (mitigated) worksheets.*

² As previously noted, project D32 is the South End Road/Warner Parrott Road Operational Enhancement – Install a traffic signal with dedicated left-turn lanes for the South End Road approaches to Warner Parrott Road



**Year 2025 Background Traffic Conditions
Weekday PM and Sunday Peak Hours
Oregon City, OR**

**Figure
11**



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

Year 2025 Background Traffic Conditions - Mitigated Weekday PM and Sunday Peak Hours Oregon City, OR

Figure
12

PHASE 3 DEVELOPMENT PLAN

Phase 3 of the Master Plan includes construction of a new 4,077 sf administrative building. Full build-out and occupancy of Phase 3 is expected to occur in 2025.

Trip Generation

Recognizing there is already an administrative function on-site today, a trip generation estimate was prepared for Phase 3 of the Master Plan based on information provided in the standard reference manual, *Trip Generation, 10th Edition*, published by the Institute of Transportation Engineers (ITE – Reference 5). ITE Land Use Code 710 (General Office) was used as a basis for the analysis. Table 5 summarizes the daily, weekday PM, Sunday, and Sunday peak hour trips associated with Phase 3 of the Master Plan.

Table 5: Phase 3 Trip Generation

Phase	Size	Daily Trips (Weekday)	Weekday PM Peak Hour of Adjacent Street			Daily Trips (Sunday)	Sunday Peak Hour of Generator		
			Total	In	Out		Total	In	Out
3	3,602 sf	40	5	1	4	3	1	1	0

Site Trip Distribution/Trip Assignment

The site-generated trips shown in Table 5 were distributed to the study area roadways according to the trip distribution pattern shown in Figure 13. Figure 13 also illustrates the assignment of Phase 3 site-generated trips at the study intersections during the weekday PM and Sunday peak hours.

YEAR 2025 TOTAL TRAFFIC CONDITIONS

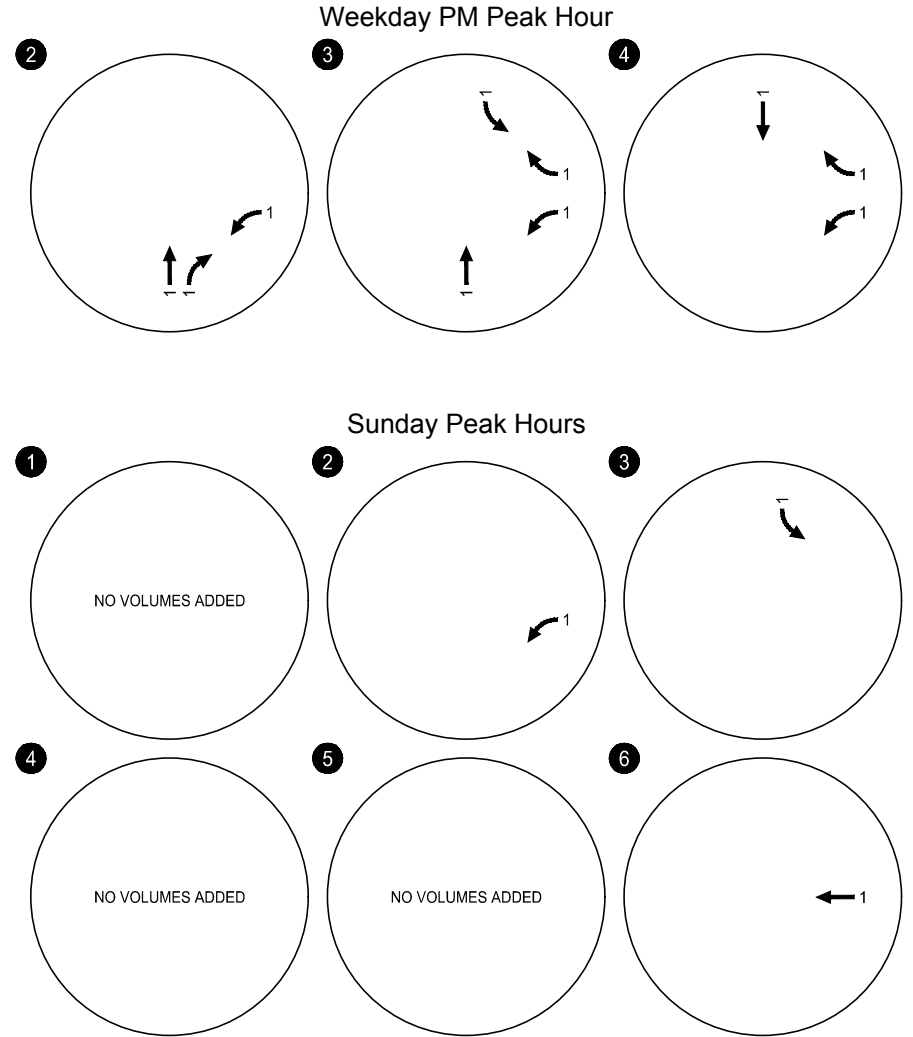
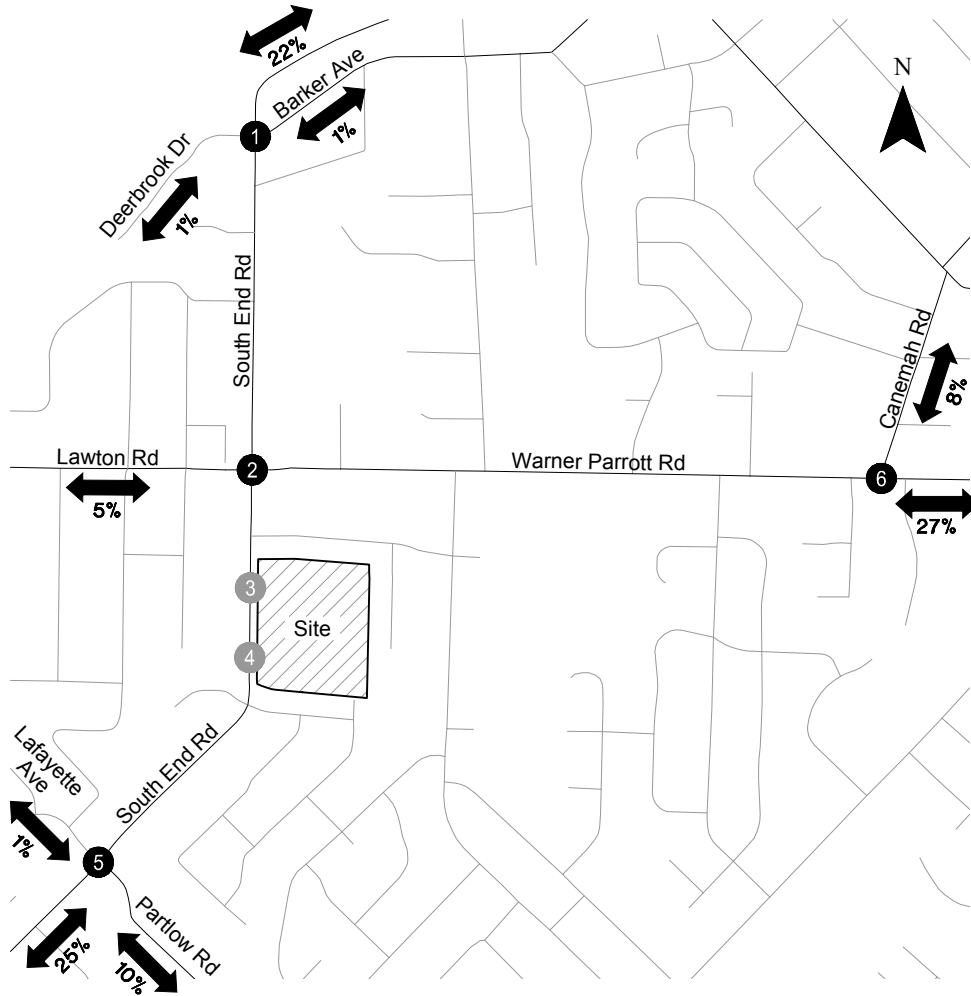
The total traffic conditions analysis forecasts how the study area’s transportation system will operate with traffic generated by Phases 1-3 of the Master Plan. The year 2025 background traffic volumes shown in Figure 12 were added to the site-generated trips shown in Figure 13 to arrive at the total traffic volumes shown in Figure 14.

Intersection Level of Service

Figure 14 summarizes the year 2025 Phases 1-3 total traffic conditions analysis results at the study intersections during the weekday PM and Sunday peak hours. As shown, all of the study intersections and site driveway are forecast to operate acceptably per their applicable mobility standards assuming provision of a traffic signal at the South End Road/Warner Parrott Road intersection.

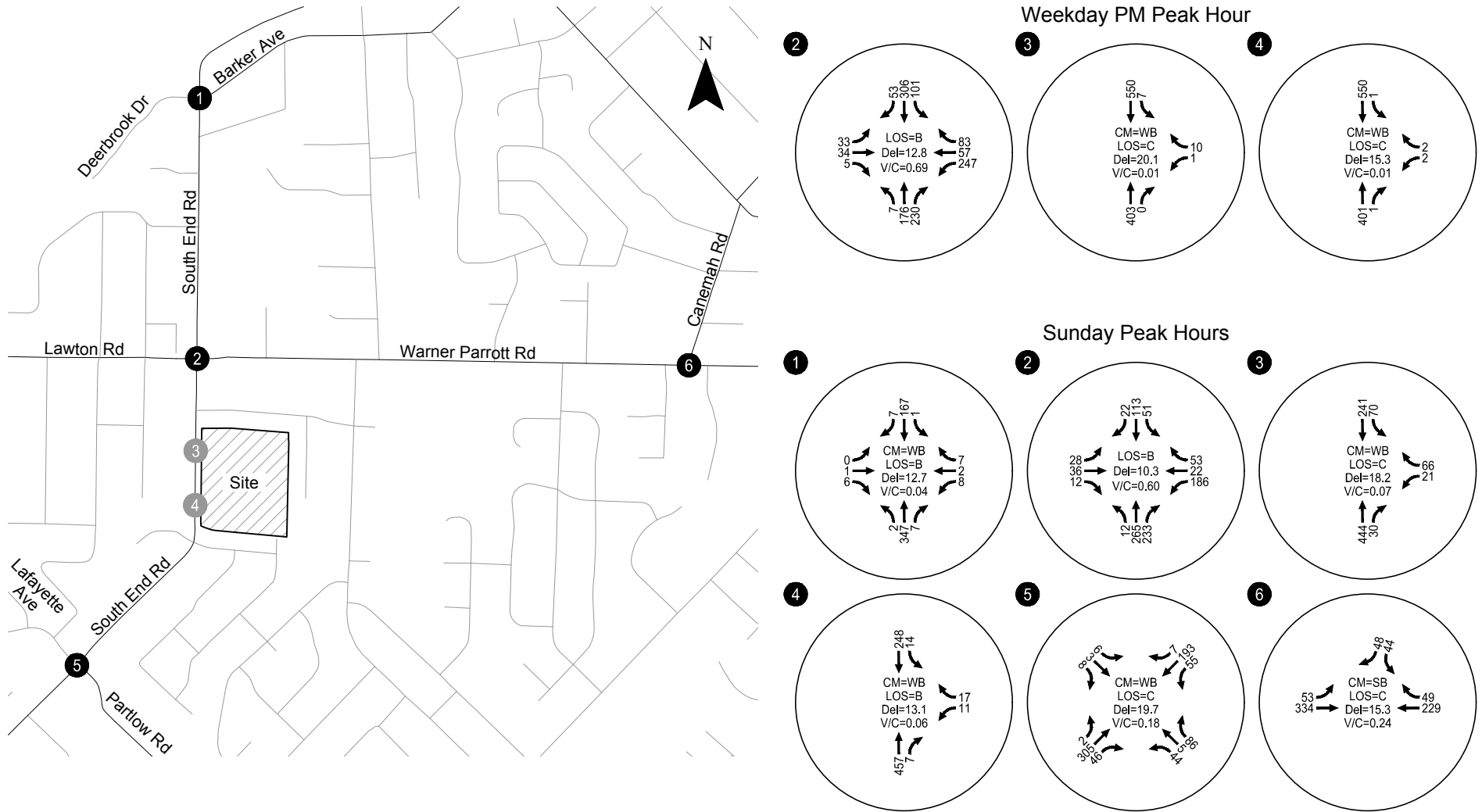
Subject to City direction, the Church Master Plan Phase 3 traffic impacts to the South End Road/Warner Parrott Road intersection could potentially be mitigated through payment of a proportionate share towards the City’s Transportation System Plan Project D32. Alternatively, the need for intersection improvements associated with site development could be re-evaluated prior to Phase 3 development. *Appendix “L” includes the year 2025 total traffic conditions worksheets.*

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**Estimated Trip Distribution Pattern & Phase 3 Site-generated Trips
Weekday PM and Sunday Peak Hours
Oregon City, OR**

**Figure
13**



**Year 2025 Phase 1-3 Total Traffic Conditions
Weekday PM and Sunday Peak Hours
Oregon City, OR**

**Figure
14**

YEAR 2030 BACKGROUND TRAFFIC CONDITIONS

The year 2030 background traffic conditions analysis identifies how the study area's transportation system will operate in the year Phase 4 of the Master Plan is expected to be fully built, 2030. This analysis includes traffic attributed to Phases 1-3 of the Master Plan and to general growth in the region but does not include traffic from Phase 4 of the Master Plan.

Traffic Volumes

The year 2030 background traffic volumes were developed by applying a 22.8 percent growth rate (1.90 percent per year for 12 years) to the existing traffic volumes shown in Figure 4 and by adding the Phase 1 site-generated trips shown in Figure 6, the Phase 2 site-generated trips shown in Figure 9, and the Phase 3 site-generated trips shown in Figure 13. Figure 15 illustrates the resulting forecast year 2030 background traffic volumes at the study intersection during the weekday PM and Sunday peak hours.

Level-of-Service Analysis

Figure 15 summarizes the year 2030 background traffic conditions at the study intersections during the weekday PM and Sunday peak hours. As shown, all of the study intersections are forecast to operate acceptably per their applicable mobility standards. *Appendix "M" includes the year 2030 background traffic conditions worksheets.*

PHASE 4 DEVELOPMENT PLAN

Phase 4 of the Master Plan includes renovation of the existing worship center and construction of the new worship center and café. While the size of the new worship center and café has not been determined; the church is planning to develop the new worship center to accommodate up to 600 parishioners. Full build-out and occupancy of Phase 4 is expected to occur in 2030.

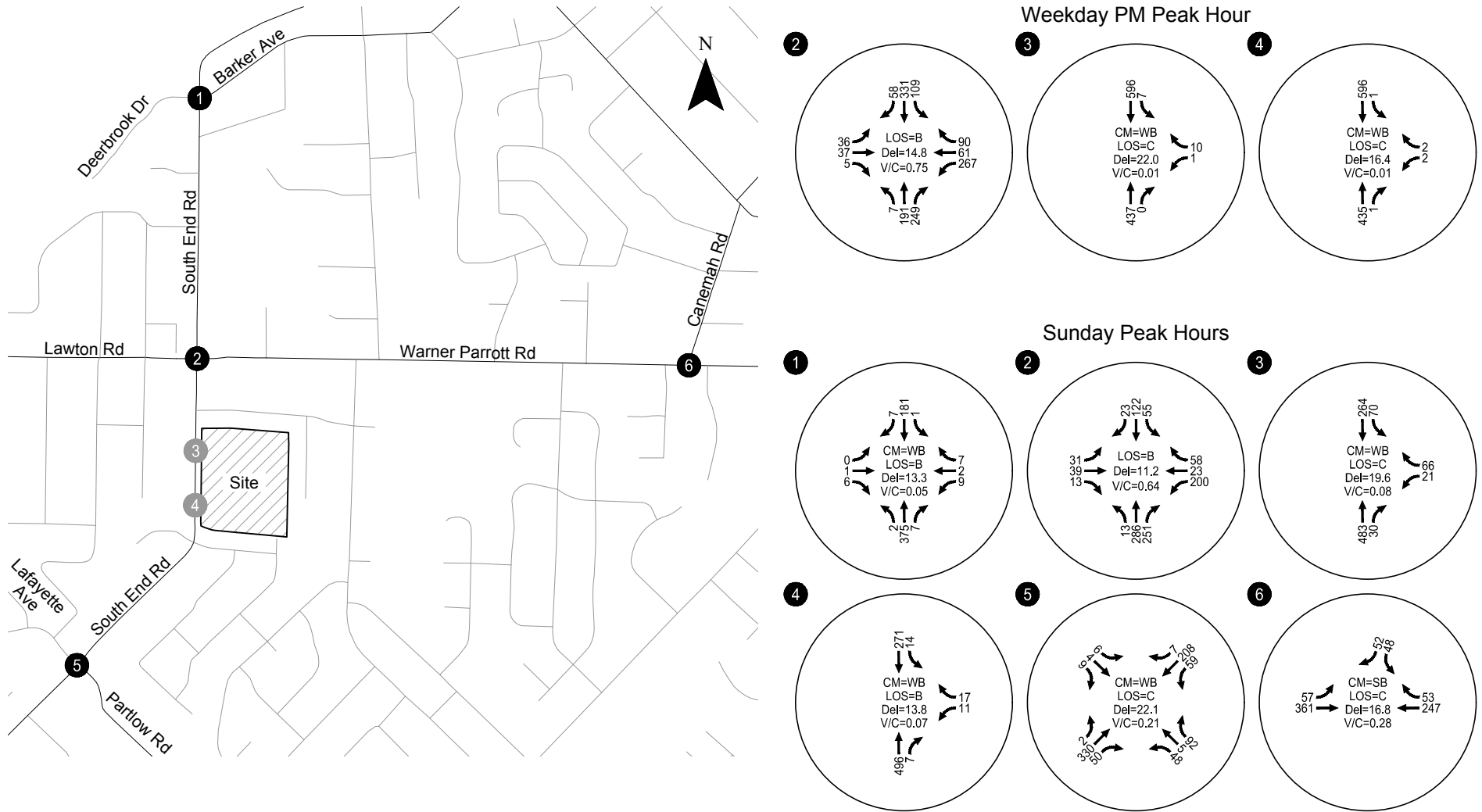
Trip Generation

Trip generation estimates were prepared for Phase 4 of the Master Plan based on a trip generation study conducted at the church in July 2018. *Appendix "A" contains additional information related to the trip generation study.* Table 6 summarizes the daily, weekday PM, Sunday, and Sunday peak hour trips associated with Phase 4 of the Master Plan.

Table 6: Phase 4 Trip Generation

Phase	Size	Daily Trips (Weekday)	Weekday PM Peak Hour of Adjacent Street			Daily Trips (Sunday)	Sunday Peak Hour of Generator		
			Total	In	Out		Total	In	Out
4	17,000 sf ¹	134	12	6	6	464	149	66	83

1. While the size of the new worship center and café has not been determined, the church is planning to accommodate up to 600 parishioners. This represents a 100 percent increase in the churches current seating capacity (300), which is accommodated by their current 17,000 square-foot building.



**Year 2030 Background Traffic Conditions
Weekday PM and Sunday Peak Hours
Oregon City, OR**

**Figure
15**

Site Trip Distribution/Trip Assignment

The site-generated trips shown in Table 6 were distributed to the study area roadways according to the trip distribution pattern shown in Figure 16. Figure 16 also illustrates the assignment of Phase 4 site-generated trips at the study intersections during the weekday PM and Sunday peak hours.

YEAR 2030 TOTAL TRAFFIC CONDITIONS

The total traffic conditions analysis forecasts how the study area's transportation system will operate with traffic generated by Phases 1-4 of the Master Plan. The year 2030 background traffic volumes shown in Figure 15 were added to the site-generated trips shown in Figure 16 to arrive at the total traffic volumes shown in Figure 17.

Intersection Level of Service

Figure 17 summarizes the year 2030 total traffic conditions analysis results at the study intersections during the weekday PM and Sunday peak hours. As shown, all of the study intersections are forecast to operate acceptably per their applicable mobility standards.

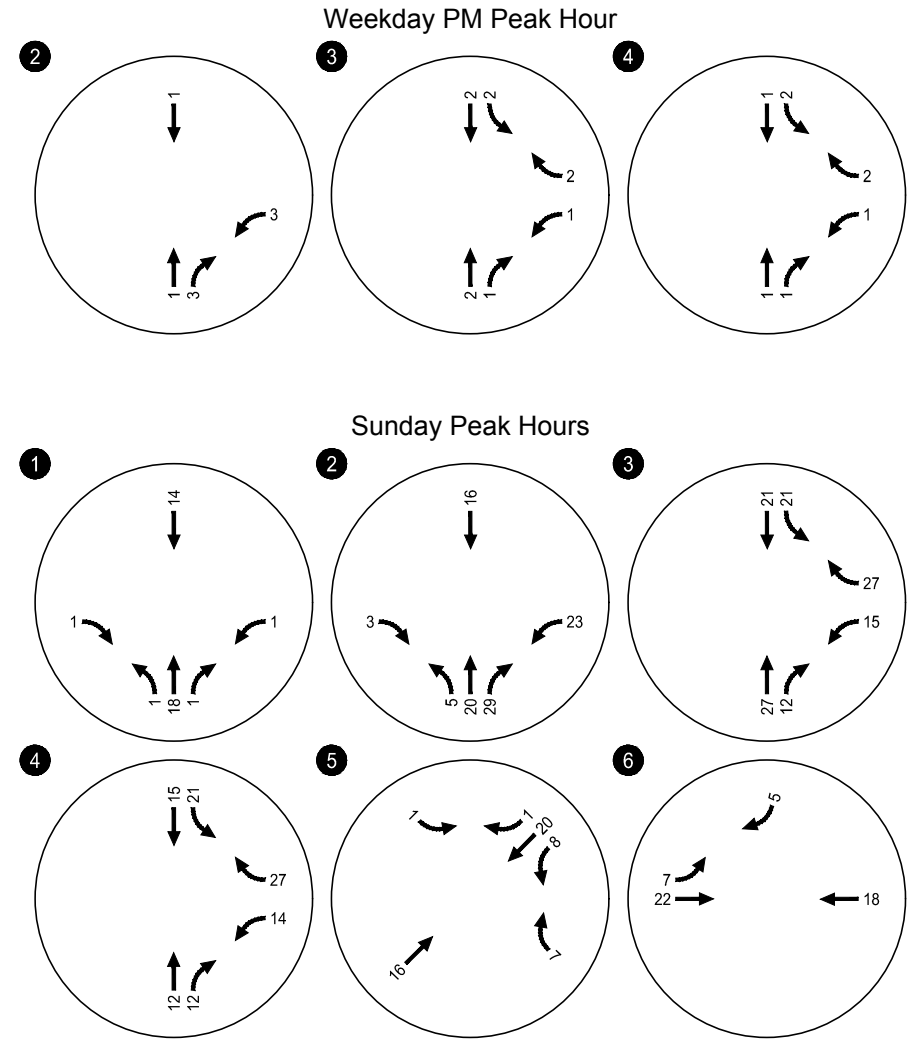
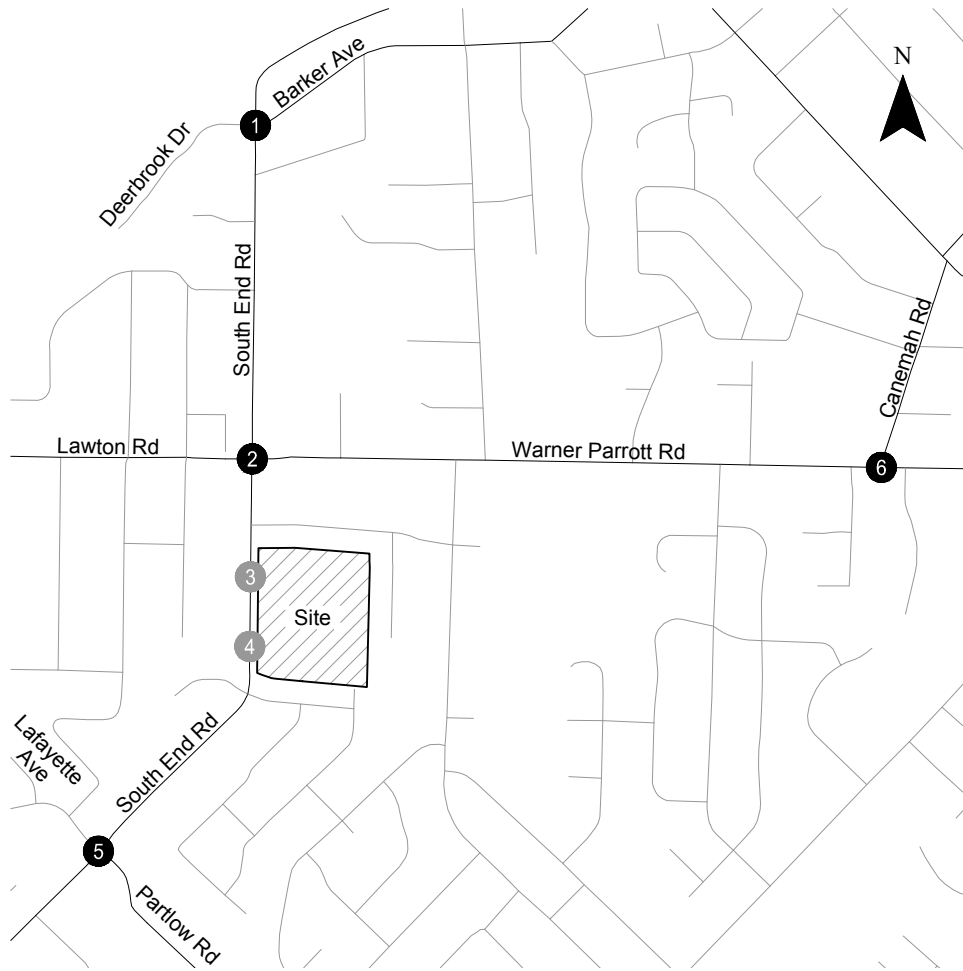
Subject to City direction, the Church Master Plan Phase 4 traffic impacts to the South End Road/Warner Parrott Road intersection could potentially be mitigated through payment of a proportionate share towards the City's Transportation System Plan Project D32. Alternatively, the need for the South End Road/Warner Parrott Road intersection improvements associated with site development could be re-evaluated prior to Phase 4 development. *Appendix "N" includes the year 2030 total traffic conditions worksheets.*

SITE-ACCESS OPERATIONS

Figure 2 illustrates the conceptual site plan. As shown, access to the site is planned to be provided by one full movement driveway toward the northern end of the site and one full movement driveway toward the southern end of the site. Both driveways are expected to operate acceptably in the future under stop control and queues at the driveways are not expected to exceed one vehicle entering the site. While the Synchro analysis shows that queues exiting the site are also not expected to exceed one vehicle, the site provides storage for up to four vehicles per lane.

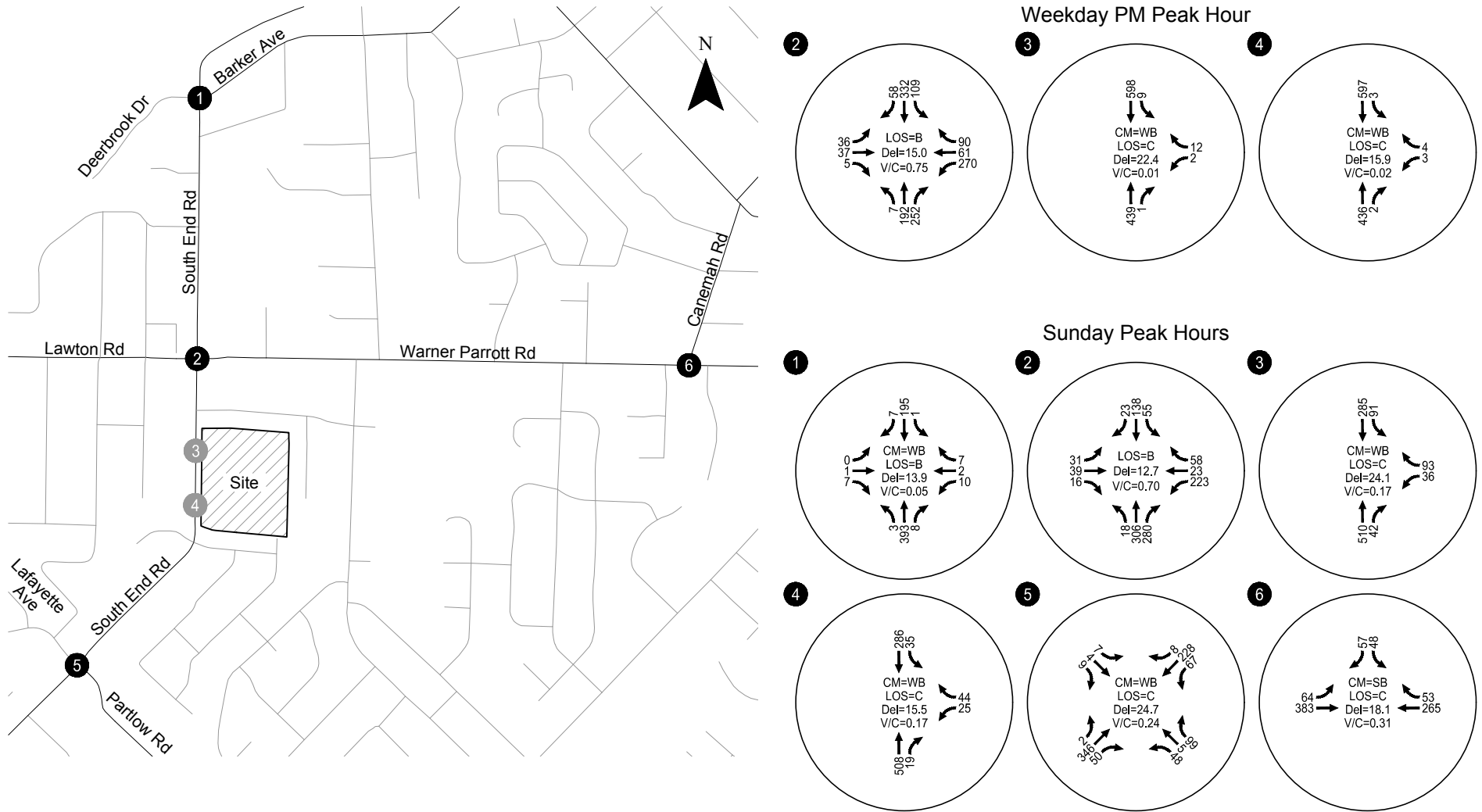
We recommend that adequate intersection sight distance should be provided at both site driveways in accordance with City of Oregon City standards.

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**Estimated Trip Distribution Pattern & Phase 4 Site-generated Trips
Weekday PM and Sunday Peak Hours
Oregon City, OR**

**Figure
16**



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

**Year 2030 Phase 1-4 Total Traffic Conditions
 Weekday PM and Sunday Peak Hours
 Oregon City, OR**

**Figure
 17**

CONCLUSIONS AND RECOMMENDATIONS

The results of this study indicate that the Oregon City Christian Church Master Plan can be developed while maintaining acceptable traffic operations and safety at the study intersections, assuming provision of the recommended mitigation measures. The findings of this analysis and our recommendations are discussed below.

FINDINGS

Year 2018 Existing Traffic Conditions

- All of the study intersections operate acceptably during the weekday PM and Sunday peak hours.
- A review of historical crash data did not reveal any patterns or trends in the site vicinity that require mitigation associated with this project.

Year 2020 Background Traffic Conditions

- All of the study intersections are forecast to operate acceptably during the weekday PM and Sunday peak hours.

Phase 1 Development Plan

- Phase 1 of the Master Plan includes construction of a new 8,168 sf recreation center, new parking facilities, and a new driveway along the southern boundary of the site.
- Phase 1 is estimated to generate 64 weekday daily trips, including 6 trips (3 inbound, 3 outbound) during the weekday PM peak hour, and 222 Sunday daily trips, including 72 trips (32 inbound, 40 outbound) during the Sunday peak hour.

Year 2020 Total Traffic Conditions (Master Plan Phase 1)

- All of the study intersections and site driveways are forecast to operate acceptably during the weekday PM and Sunday peak hours.

Year 2022 Background Traffic Conditions

- All of the study intersections are forecast to operate acceptably during the weekday PM and Sunday peak hours.

Phase 2 Development Plan

- Phase 2 of the Master Plan includes construction of a new 3,602 sf student ministry center.

- Phase 2 is estimated to generate 28 weekday daily trips, including 2 trips (1 inbound, 1 outbound) during the weekday PM peak hour, and 98 Sunday daily trips, including 32 trips (14 inbound, 18 outbound) during the Sunday peak hour.

Year 2022 Total Traffic Conditions (Master Plan Phases 1 & 2)

- All of the study intersections and site driveways are forecast to operate acceptably during the weekday PM and Sunday peak hours.

Year 2025 Background Traffic Conditions

- All but one of the study intersections are forecast to operate acceptably during the weekday PM and Sunday peak hours.
- The northbound and southbound approaches to the South End Road/Warner Parrott Road intersection are projected to operate at LOS “F” and near capacity during the weekday PM peak hour. A preliminary signal warrant analysis indicates that a traffic signal is expected to be warranted.
 - The City of Oregon City Transportation Plan project D32 includes installation of a traffic signal with dedicated left-turn lanes for the South End Road approaches to Warner Parrott Road in the 2018 to 2023 horizon period. Project D32 is not currently programmed or funded.
 - Signalization of the intersection without the additional turn lanes would restore acceptable peak hour operations.

Phase 3 Development Plan

- Phase 3 of the Master Plan includes construction of a new 4,077 sf administrative building.
- Phase 3 is estimated to generate 40 weekday daily trips, including 5 trips (1 inbound, 4 outbound) during the weekday PM peak hour, and 3 Sunday daily trips, including 1 trip (1 inbound, 0 outbound) during the Sunday peak hour.

Year 2025 Total Traffic Conditions (Master Plan Phases 1-3)

- All of the study intersections and site driveways are forecast to operate acceptably per their applicable mobility standards assuming provision of a traffic signal at the South End Road/Warner Parrott Road intersection.
 - The Church Master Plan Phase 3 traffic impacts to the South End Road/Warner Parrott Road intersection could potentially be mitigated through payment of a proportionate share towards the City’s Transportation System Plan Project D32. Alternatively, the need for the South End Road/Warner Parrott Road intersection improvements associated with site development could be re-evaluated prior to Phase 3 development.

Year 2030 Background Traffic Conditions

- All of the study intersections are forecast to operate acceptably during the weekday PM and Sunday peak hours.

Phase 4 Development Plan

- Phase 4 of the Master Plan includes renovation of the existing worship center and construction of the new worship center and café.
- Phase 4 is estimated to generate 134 weekday daily trips, including 12 trips (6 inbound, 6 outbound) during the weekday PM peak hour, and 464 Sunday daily trips, including 149 trip (66 inbound, 83 outbound) during the Sunday peak hour.

Year 2030 Total Traffic Conditions (Master Plan Phase 1-4)

- All of the study intersections and site driveway are forecast to operate acceptably per their applicable mobility standards.
 - The Church Master Plan Phase 4 traffic impacts to the South End Road/Warner Parrott Road intersection could potentially be mitigated through payment of a proportional share towards the City's Transportation System Plan Project D32. Alternatively, the need for the South End Road/Warner Parrott Road intersection improvements associated with site development could be re-evaluated prior to Phase 4 development.

Site Access Operations

- The two site driveways on South End Road will operate acceptably with stop control approaching South End Road.
- Queues at the site driveways are not expected to exceed 25 feet entering or exiting the site.

RECOMMENDATIONS

The following list summarizes the mitigation measures recommended as part of this proposed development.

- Subject to City direction, the Phase 3 and Phase 4 site development should pay a proportionate share contribution toward future installation of a traffic signal at the South End Road/Warner Parrott Road intersection prior to completion of the two respective development phases. Alternatively, the need for the South End Road/Warner Parrott Road intersection improvements associated with Phase 3 and Phase 4 site development could be re-evaluated prior to the two respective development phases.
- Adequate intersection sight distance should be provided at both site driveways on South End Road in accordance with City of Oregon City standards.

REFERENCES

1. Oregon City. *Guidelines for Transportation Impact Analyses*. 2005.
2. Oregon City. *Oregon City Transportation System Plan*. 2013.
3. TriMet: <https://trimet.org/>
4. Transportation Research Board. *Highway Capacity Manual*. 2000 and 2010.
5. Institute of Transportation Engineers. *Trip Generation Manual, 10th Edition*. 2017.

Appendix A Scoping Letter

MEMORANDUM

Date: August 23, 2018 Project #: 22856.0

To: Pete Walter, City of Oregon City
John Replinger, P.E., Replinger & Associates, LLC

CC: Brent Brelje, Oregon City Christian Church

From: Matt Bell and Chris Brehmer, P.E., Kittelson & Associates, Inc.

Project: Oregon City Christian Church Master Plan

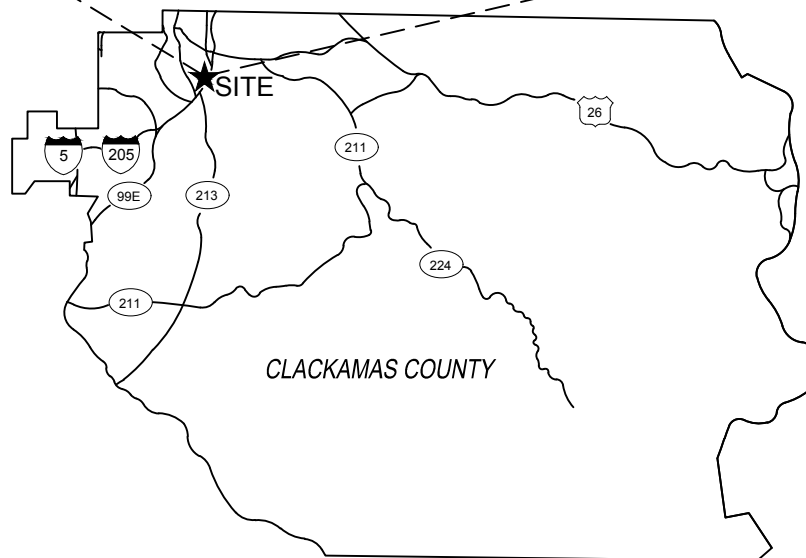
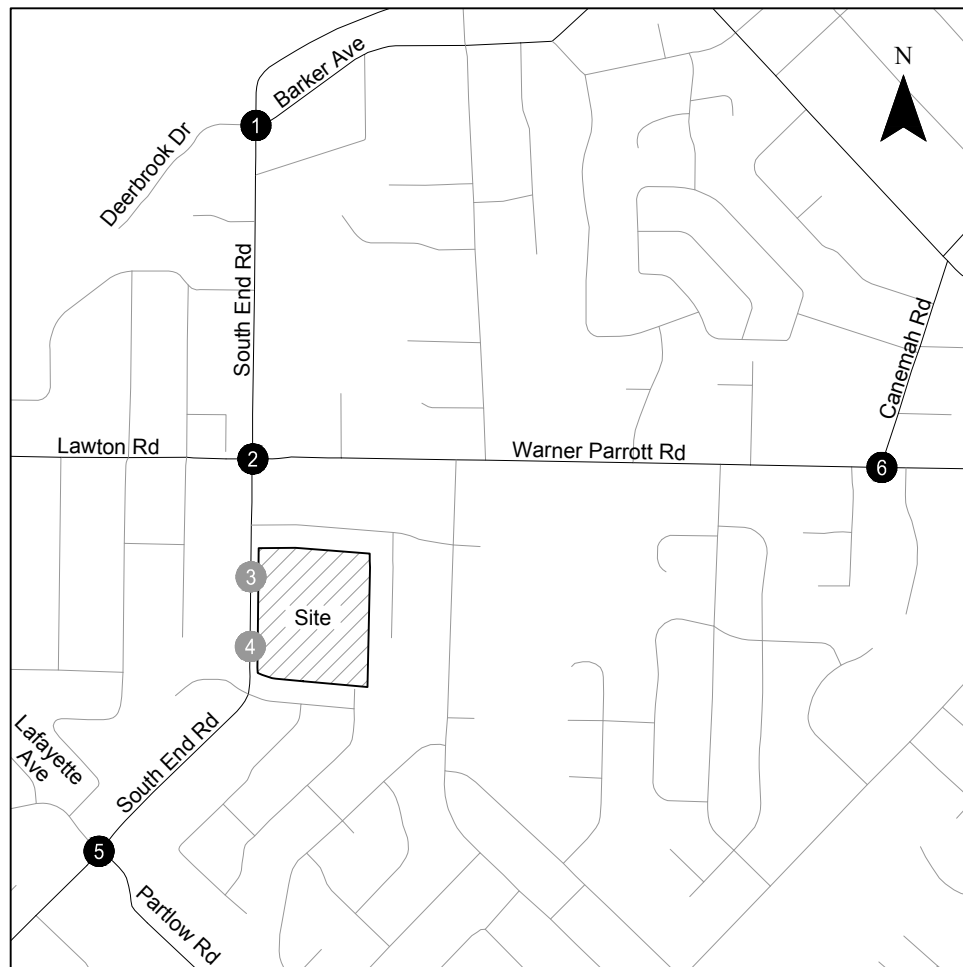
Subject: Transportation Impact Study – Key Assumptions

This memorandum summarizes key assumptions associated with preparing a Transportation Impact Study (TIS) for the proposed Oregon City Christian Church Master Plan. These assumptions are based on a review of the proposed Master Plan, the City of Oregon City Guidelines for Transportation Impact Analyses (TIA Guidelines), and pre-application conference notes prepared by City of Oregon City, and discussions with the project team.

Project Background

The proposed Oregon City Christian Church Master Plan identifies the vision and long-term goals for the existing church campus located along the east side of South End Road in Oregon City. Figure 1 illustrates the site vicinity map. The Master Plan includes renovation of the existing worship center and phased construction of a new recreation center, a new student ministry center, a new administrative building, and a new worship center and café. The Master Plan also includes expansion of the existing parking facilities and a new driveway along the southern boundary of the site. Figure 2 illustrates the conceptual site plan. Construction of the new facilities is expected to occur in four phases over a 10-year period as follows:

- Phase 1 is expected to occur in 2020 and include a new 8,168 square-foot recreation center, new parking facilities, and a new driveway along the southern boundary of the site;
- Phase 2 is expected to occur in 2022 and include new 3,602 square-foot student ministry center;
- Phase 3 is expected to occur in 2025 and include a new 4,077 square-foot administrative building; and
- Phase 4 is expected to occur in 2030 and include renovation of the existing worship center and construction of the new worship center and café.
 - The size of the new worship center and café has not been determined; however, the church is planning to develop the new worship center to accommodate up to 600 parishioners.



- - Study Intersection
- - Site Driveway

**Site Vicinity Map
Oregon City, OR**

**Figure
1**

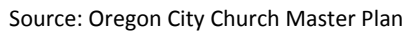


Figure
2

The TIS will include an evaluation of traffic operations during each phase of the Master Plan as necessary to determine the transportation-related impacts and potential off-site mitigations.

Trip Generation

Trip generation estimates were prepared for Phases 1, 2, and 4 of the Master Plan based on data collected at the existing church over three consecutive mid-week days (Tuesday, Wednesday, and Thursday) and one weekend day (Sunday). The data includes the total number of vehicles that entered and exited the main entrance to the church in 15-minute increments. Supplemental data provided by the church includes the size of the existing worship center and the total number of people that participated in events on Sunday. The data was used to develop trip rates per 1,000 square-feet of building space and per attendee.

Recognizing there is already an administrative function on-site today, a trip generation estimate was prepared for Phase 3 of the master plan (new administrative building) based on information provided in the standard reference manual, *Trip Generation, 10th Edition*, published by the Institute of Transportation Engineers (ITE). ITE Land Use Code 710 (General Office) was used as a basis for the analysis.

The existing church and ITE trip rates were used to develop trip generation estimates for the Master Plan. Table 1 summarizes the daily, weekday AM, weekday PM, Sunday, and Sunday peak hour trips associated with each phase of the Master Plan. *Attachment A contains additional information related to the trip generation rates.*

Table 1: Trip Generation

Phase	Size	Daily Trips (Weekday)	Weekday AM Peak Hour of Adjacent Street			Weekday PM Peak Hour of Adjacent Street			Daily Trips (Sunday)	Sunday Peak Hour of Generator		
			Total	In	Out	Total	In	Out		Total	In	Out
1	8,168 SF	64	3	2	1	6	3	3	222	72	32	40
2	3,602 SF	28	1	1	0	2	1	1	98	32	14	18
3	4,077 SF	40	5	4	1	5	1	4	3	1	1	0
4	17,000 SF ¹	134	7	3	4	12	6	6	464	149	66	83
Total Phase 1-4 Trips		266	16	10	6	25	11	14	787	254	113	141

1. While the size of the new worship center and café has not been determined, the church is planning to accommodate up to 600 parishioners. This represents a 100 percent increase in the churches current seating capacity (300), which is accommodated by their current 17,000 square-foot building.

Trip Distribution/Assignment

The trips shown in Table 1 will be distributed onto the study area roadways based on existing traffic patterns and the location of major trip origins and destinations in the study area. The trips will be assigned to the site driveways and study intersections in accordance with the trip distribution pattern.

Study Area

The study area for the TIS will include the major streets (collector and above) located adjacent to the proposed development site along with the site access driveways and several major intersections. The intersections were determined based on a review of the City's functional classification plan, a review of historical traffic data within the study area, and guidance provided in the TIA Guidelines. The intersections include:

1. South End Road/Barker Avenue
2. South End Road/Warner Parrot Road
3. South End Road/Existing Church Driveway (Dwy 1)
4. South End Road/Future Church Driveway (Dwy 2)
5. South End Road/Partlow Road
6. Canemah Road/Warner Parrot Road

Analysis Years

The analysis years for the TIS reflect each phase of the Master Plan. The analysis years include:

- Existing traffic conditions
- Year 2020 Background traffic conditions, without the proposed development
- Year 2020 Total Traffic Conditions, with Phase 1 of the proposed development
- Year 2022 Background traffic conditions, with Phase 1 of the proposed development
- Year 2022 Total Traffic Conditions, with Phase 1-2 of the proposed development
- Year 2025 Background Traffic Conditions, with Phase 1-2 of the proposed development
- Year 2025 Total Traffic Conditions, with Phase 1-3 of the proposed development
- Year 2030 Background Traffic Conditions, with Phase 1-3 of the proposed development
- Year 2030 Total Traffic Conditions, with Phase 1-4 of the proposed development

It may be determined that some phases do not result in significant impacts to the transportation system. These phases may be combined with other phases in the TIS if appropriate to simplify the City's review and approval conditions.

Analysis Periods

The analysis periods for the TIS were determined based on the type of use, the type of adjacent uses, the trip generation estimate provided above, and guidance provided in the TIA Guidelines. The TIS will include an evaluation of the weekday evening (4:00 to 6:00 PM) peak period at the site driveways and the South End Road/Warner Parrot Road intersection and the Sunday mid-day (8:00 to 12:00) peak period at the site driveways and all six study intersections identified above.

Analysis Tools and Methodology

The TIA will evaluate traffic operations at the study intersections based on the methodologies identified in the 2010 Highway Capacity Manual (HCM – Reference 1). Synchro 9 will be used to evaluate traffic operations at the study intersections. Synchro 9 is a software tool designed to assist with operations analysis in accordance with 2010 HCM methodologies.

Performance Measures

Traffic operations at the study intersections will be evaluated based on the applicable performance measures. Per the TIA Guidelines, all of the unsignalized study intersections are expected to operate at Level of Service (LOS) “E” or better for the poorest operating approach and with no movement serving more than 20 peak hour vehicles operating at worse than LOS “E”. In other words, LOS “F” will be tolerated for minor movements during a peak hour.

Next Steps

We trust this memorandum provides adequate documentation of the key assumptions associated with the TIS for the proposed Oregon City Church Master Plan development.

We request that the City provide written confirmation regarding the proposed methodology and project assumptions as soon as possible so that we may proceed with our analysis. In addition, we would appreciate the City providing timing of planned improvements at the study intersections, information on planned developments and in-process trips that could impact the study intersections, and an approved background growth rate that should be incorporated into the traffic analysis.

Reference

1. Transportation Research Board. *Highway Capacity Manual*. 2010.

Attachment A Trip Generation Rates

TRIP GENERATION STUDY

Trip generation data was collected at the main entrance to the Oregon City Christian Church over three consecutive mid-week days (Tuesday, Wednesday, and Thursday) and one weekend day (Sunday) in July 2018. The data includes the total number of vehicles that entered and exited the main entrance to the church in 15-minute increments. Supplemental data provided by the church includes the size of the existing building and the total number of people that participated in events on Sunday. The data was used to develop trip rates per 1,000 square-feet of building space and per attendee as described below.

Mid-week Trip Rates

The mid-week data shows an average of 133 daily trips at the main entrance to the church over the three-day period, including 6 trips (3 inbound, 3 outbound) during the weekday AM peak hour and 11 trips (5 inbound, 6 outbound) during the weekday PM peak hour. Trip rates were developed for the church by dividing the daily, weekday AM, and weekday PM peak hours trips by the gross square-feet of the existing church (i.e. 133 daily trips / 17,000 square-feet = 7.82 trips per 1,000 square-feet). Table A-1 summarizes the mid-week trip rates developed for the church and compares the rates to data provided in the standard reference manual, *Trip Generation Manual*, published by the Institute of Transportation Engineers (ITE). As shown, the calculated rates are similar to the ITE rates during all time periods.

Table A-1: Trip Rates per 1,000 square-feet

Trip Rates	Daily	Weekday AM Peak Hour			Weekday PM Peak Hour		
		Total	In	Out	Total	In	Out
Calculated Rates	7.82	0.39	50%	50%	0.69	46%	54%
<i>Trip Generation Manual</i>	6.95	0.33	60%	40%	0.49	45%	55%

Sunday Trip Rates

The Sunday data shows a total of 463 daily trips at the main entrance to the driveway, including 149 trips (66 inbound, 83 outbound) during the peak hour. Trip rates (per 1,000 square-feet) were developed for the church by dividing the daily and peak hour trips by the gross square-feet of the existing church (i.e. 463 daily trips / 17,000 square-feet = 27.24 trips per 1,000 square-feet). Table A-2 summarizes the Sunday trip rates developed for the church and compares the rates to data provided in ITE. As shown, the calculated rates are similar to the ITE rates during both time periods.

Table A-2: Trip Rates per 1,000 square-feet

Trip Rates	Daily	Sunday Peak Hour		
		Total	In	Out
Calculated Rates	27.24	8.76	44%	56%
<i>Trip Generation Manual</i>	27.63	9.99	48%	52%

Supplemental data provided by the church shows that 190 parishioners were present for the 9:00 a.m. service and 221 were present for the 10:45 a.m. service. Trip rates (per attendee) were developed for the church by dividing the daily and peak hours trips by the total number of parishioners (i.e. 463 daily trips / 411 daily attendees = 1.13 trips per attendee). Table A-3 summarizes the Sunday trip rates developed for the church and compares the rates to data provided in ITE. As shown, the calculated rate for the peak hour is similar to the ITE rate; however, ITE does not provide a daily rate per attendee.

Table A-3: Trip Rates per Attendee

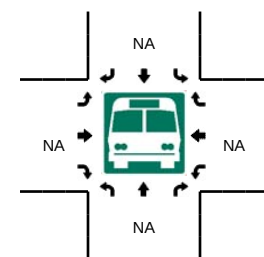
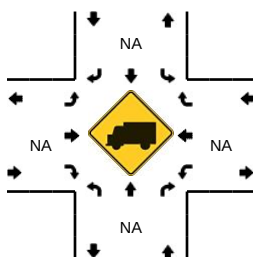
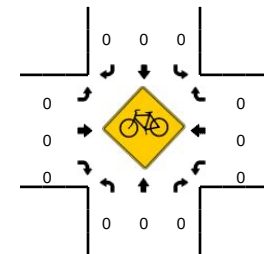
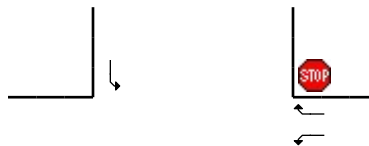
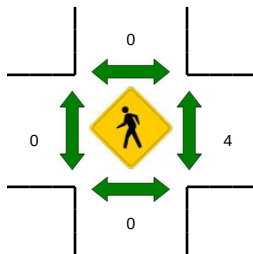
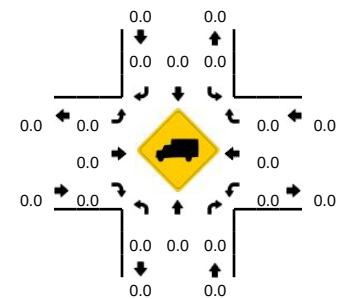
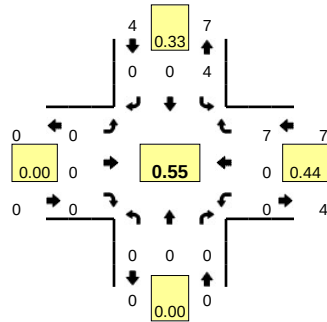
Trip Rates	Daily	Sunday Peak Hour		
		Total	In	Out
Calculated Rates	1.13	0.67	44%	56%
<i>Trip Generation Manual</i>	NA	0.53	50%	50%

Appendix B Traffic Counts

LOCATION: South End Rd -- Oregon City Christian Church Dwy
CITY/STATE: Oregon City, OR

QC JOB #: 14771002
DATE: Thu, Aug 16 2018

Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:35 PM -- 5:50 PM



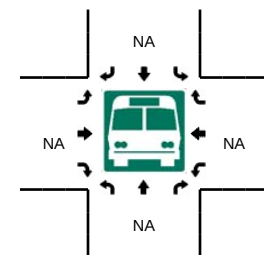
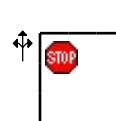
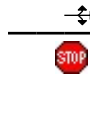
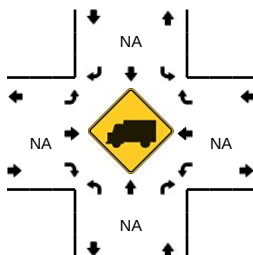
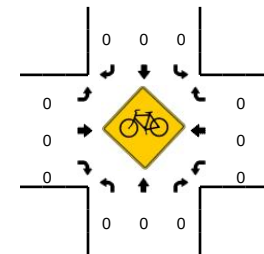
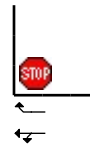
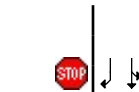
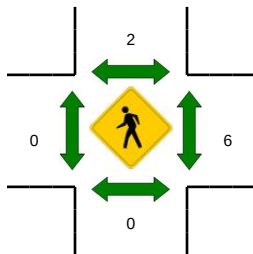
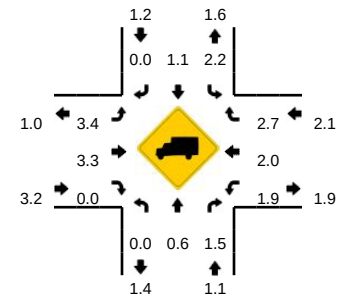
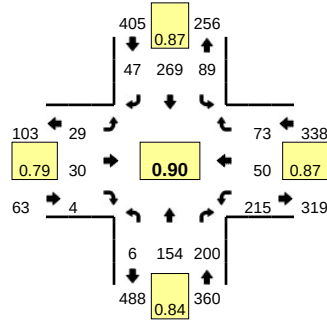
5-Min Count Period Beginning At	South End Rd (Northbound)				South End Rd (Southbound)				Oregon City Christian Church (Eastbound)				Oregon City Christian Church (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:05 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:10 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:20 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	
4:25 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:35 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:40 PM	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	3	
4:45 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	
4:50 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	
4:55 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
5:05 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	7
5:10 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	8
5:15 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	9
5:20 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	10
5:25 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	11
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
5:35 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	13
5:40 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	11
5:45 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	2	12
5:50 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
5:55 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	0	0	0	0	4	0	0	0	0	0	0	0	0	0	16	0	20	
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	8	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Comments:

LOCATION: South End Rd -- Warner Parrot Rd
CITY/STATE: Oregon City, OR

QC JOB #: 14771001
DATE: Thu, Aug 16 2018

Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:10 PM -- 5:25 PM



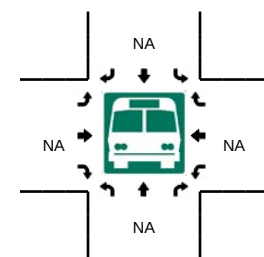
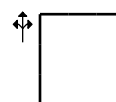
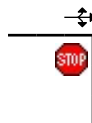
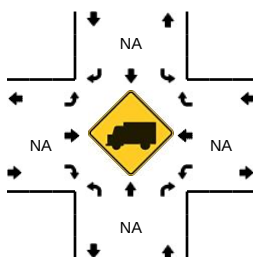
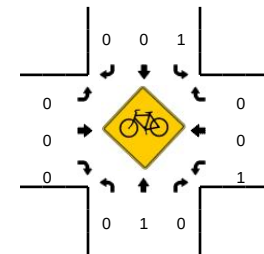
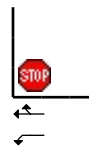
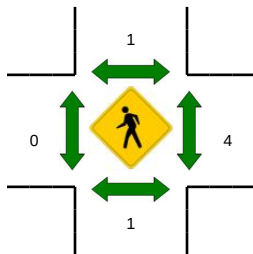
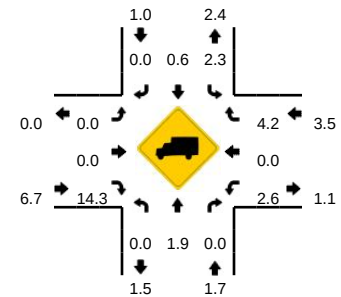
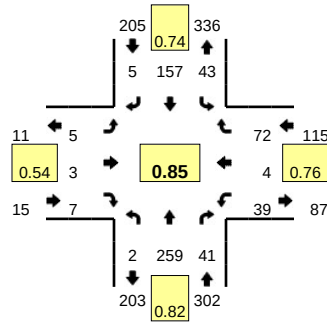
5-Min Count Period Beginning At	South End Rd (Northbound)				South End Rd (Southbound)				Warner Parrot Rd (Eastbound)				Warner Parrot Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	8	12	0	4	16	2	0	3	1	0	0	20	4	7	0	77	
4:05 PM	0	21	5	0	7	20	0	0	1	6	1	0	19	4	5	0	89	
4:10 PM	0	14	15	0	11	24	3	0	0	5	0	0	10	6	6	0	94	
4:15 PM	0	10	12	0	7	19	2	0	1	4	0	0	20	9	4	0	88	
4:20 PM	0	12	17	0	7	25	4	0	2	0	0	0	17	3	5	0	92	
4:25 PM	0	10	7	0	8	22	4	0	0	1	0	0	7	1	7	0	67	
4:30 PM	0	13	10	0	4	13	2	0	1	2	0	0	18	5	6	0	74	
4:35 PM	0	17	13	0	9	18	0	0	1	3	0	0	16	6	5	0	88	
4:40 PM	0	9	14	0	7	23	5	0	1	1	0	0	19	3	6	0	88	
4:45 PM	0	8	14	0	9	24	3	0	2	3	0	0	15	2	2	0	82	
4:50 PM	0	6	12	0	7	24	6	0	0	0	0	0	25	2	9	0	91	
4:55 PM	0	14	13	0	7	21	3	0	3	6	1	0	14	4	2	0	88	1018
5:00 PM	0	11	21	0	3	16	6	0	2	2	0	0	22	3	5	0	91	1032
5:05 PM	1	11	11	0	5	22	2	0	2	2	0	0	16	5	3	0	80	1023
5:10 PM	0	6	19	0	9	28	5	0	2	3	0	0	17	5	8	0	102	1031
5:15 PM	2	13	14	0	7	25	5	0	0	4	2	0	18	4	9	0	103	1046
5:20 PM	1	11	26	0	10	22	6	0	4	1	1	0	19	7	10	0	118	1072
5:25 PM	0	19	15	0	7	20	3	0	0	1	0	0	16	4	8	0	93	1098
5:30 PM	0	16	19	0	8	24	5	0	5	2	0	0	18	2	5	0	104	1128
5:35 PM	0	22	15	0	8	22	3	0	2	1	1	0	19	4	6	0	103	1143
5:40 PM	2	16	17	0	7	24	1	0	3	3	0	0	23	8	4	0	108	1163
5:45 PM	0	11	11	0	4	23	4	0	5	3	0	0	13	1	6	0	81	1162
5:50 PM	0	11	17	0	9	15	3	0	1	4	0	0	13	5	4	0	82	1153
5:55 PM	0	7	15	0	12	28	4	0	3	4	0	0	21	2	5	0	101	1166
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	12	120	236	0	104	300	64	0	24	32	12	0	216	64	108	0	1292	
Heavy Trucks	0	0	0	0	0	4	0	0	0	0	0	0	0	4	0	0	8	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad																		
Stopped Buses																		

Comments:

LOCATION: South End Rd -- Lafayette Ave/S Partlow Rd
CITY/STATE: Oregon City, OR

QC JOB #: 14771006
DATE: Sun, Aug 19 2018

Peak-Hour: 10:15 AM -- 11:15 AM
Peak 15-Min: 10:50 AM -- 11:05 AM



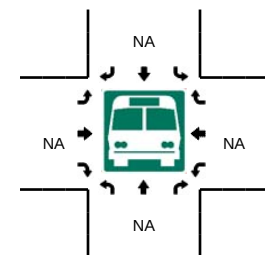
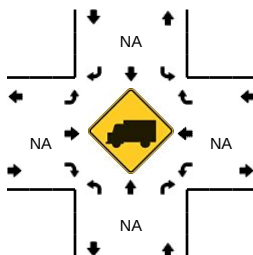
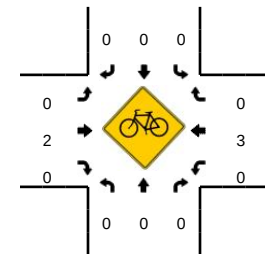
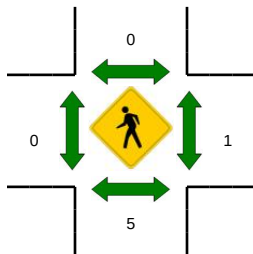
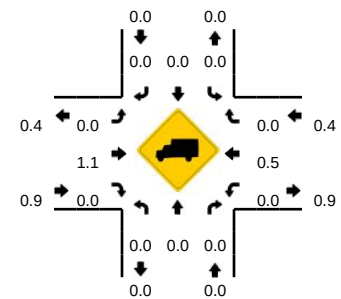
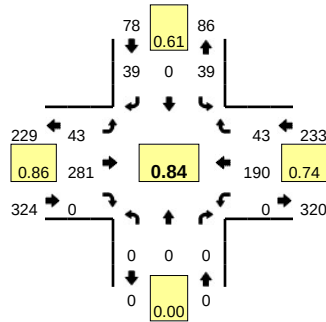
5-Min Count Period Beginning At	South End Rd (Northbound)				South End Rd (Southbound)				Lafayette Ave/S Partlow Rd (Eastbound)				Lafayette Ave/S Partlow Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
9:45 AM	1	18	1	0	6	10	0	0	1	0	1	0	4	0	5	0	47	440
9:50 AM	0	26	2	0	3	12	0	0	0	0	0	0	6	0	8	0	57	458
9:55 AM	0	14	3	0	1	15	0	0	1	0	0	0	2	0	9	0	45	475
10:00 AM	0	19	4	0	4	9	2	0	2	1	0	0	2	0	6	0	49	493
10:05 AM	0	18	2	0	2	14	1	0	0	1	0	0	3	1	1	0	43	501
10:10 AM	1	15	3	0	4	16	0	0	0	0	3	0	3	0	5	0	50	519
10:15 AM	1	20	5	0	3	12	0	0	1	0	0	0	4	0	2	0	48	528
10:20 AM	0	24	7	0	6	8	0	0	1	0	0	0	2	0	9	0	57	544
10:25 AM	0	22	4	0	2	10	1	0	0	1	0	0	5	2	7	0	54	567
10:30 AM	0	32	3	0	1	16	1	0	0	0	0	0	2	1	5	0	61	594
10:35 AM	0	22	6	0	4	10	1	0	0	0	0	0	1	0	8	0	52	603
10:40 AM	0	23	4	0	3	11	0	0	0	1	0	0	3	0	4	0	49	612
10:45 AM	1	16	1	0	3	9	0	0	0	0	1	0	2	0	3	0	36	601
10:50 AM	0	30	3	0	3	17	0	0	0	0	0	0	5	0	6	0	64	608
10:55 AM	0	16	3	0	6	21	0	0	2	0	3	0	5	1	7	0	64	627
11:00 AM	0	19	3	0	6	16	0	0	1	0	0	0	4	0	10	0	59	637
11:05 AM	0	23	2	0	1	14	1	0	0	0	1	0	3	0	4	0	49	643
11:10 AM	0	12	0	0	5	13	1	0	0	1	2	0	3	0	7	0	44	637
11:15 AM	0	19	1	0	8	10	0	0	2	0	0	0	4	0	7	0	51	640
11:20 AM	0	17	3	0	5	16	1	0	0	0	0	0	1	0	5	0	48	631
11:25 AM	0	17	1	0	6	12	0	0	1	2	1	0	4	1	3	0	48	625
11:30 AM	5	14	3	0	1	10	0	0	0	1	1	0	0	0	7	0	42	606
11:35 AM	0	20	3	0	0	9	0	0	1	0	0	0	5	0	10	0	48	602
11:40 AM	0	18	7	0	3	14	2	0	0	0	2	0	1	0	4	0	51	604
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
All Vehicles	0	260	36	0	60	216	0	0	12	0	12	0	56	4	92	0	748	
Heavy Trucks	0	0	0	0	0	4	0	0	0	0	4	0	0	0	0	0	8	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad																		
Stopped Buses																		

Comments:

LOCATION: Canemah Rd -- Warner Parrot Rd
CITY/STATE: Oregon City, OR

QC JOB #: 14771007
DATE: Sun, Aug 19 2018

Peak-Hour: 10:15 AM -- 11:15 AM
Peak 15-Min: 10:30 AM -- 10:45 AM



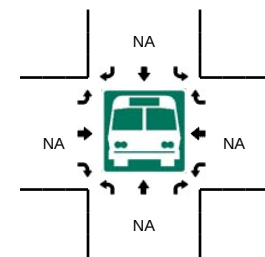
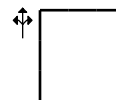
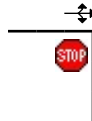
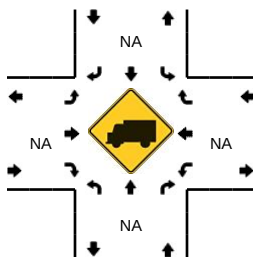
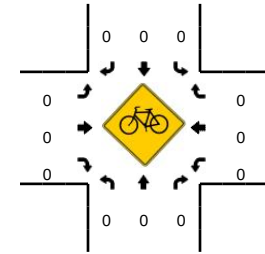
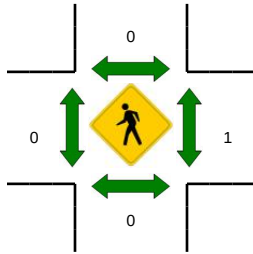
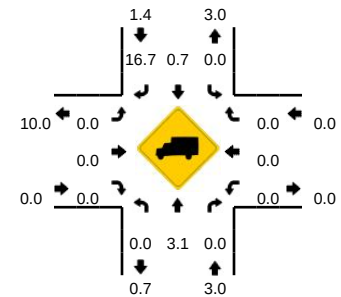
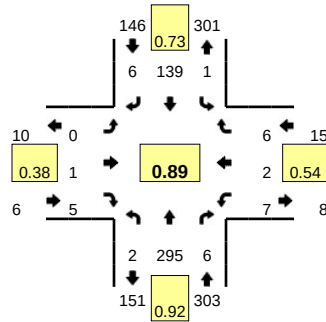
5-Min Count Period Beginning At	Canemah Rd (Northbound)				Canemah Rd (Southbound)				Warner Parrot Rd (Eastbound)				Warner Parrot Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
9:45 AM	0	0	0	0	5	0	1	0	5	22	0	0	0	18	1	0	52	432
9:50 AM	0	0	0	0	3	0	4	0	3	17	0	0	0	14	3	0	44	432
9:55 AM	0	0	0	0	3	0	5	0	1	19	0	0	0	18	2	0	48	433
10:00 AM	0	0	0	0	4	0	2	0	3	16	0	0	0	14	2	0	41	447
10:05 AM	0	0	0	0	3	0	3	0	1	17	0	0	0	12	4	0	40	461
10:10 AM	0	0	0	0	2	0	3	0	1	14	0	0	0	12	6	0	38	468
10:15 AM	0	0	0	0	3	0	2	0	6	26	0	0	0	8	6	0	51	482
10:20 AM	0	0	0	0	3	0	2	0	1	23	0	0	0	18	6	0	53	504
10:25 AM	0	0	0	0	8	0	7	0	5	33	0	0	0	8	2	0	63	527
10:30 AM	0	0	0	0	4	0	3	0	6	20	0	0	0	24	6	0	63	561
10:35 AM	0	0	0	0	7	0	3	0	3	26	0	0	0	22	1	0	62	587
10:40 AM	0	0	0	0	2	0	5	0	5	26	0	0	0	21	5	0	64	619
10:45 AM	0	0	0	0	3	0	2	0	2	20	0	0	0	17	7	0	51	618
10:50 AM	0	0	0	0	1	0	4	0	1	20	0	0	0	19	1	0	46	620
10:55 AM	0	0	0	0	5	0	2	0	2	20	0	0	0	17	2	0	48	620
11:00 AM	0	0	0	0	1	0	5	0	5	13	0	0	0	5	1	0	30	609
11:05 AM	0	0	0	0	1	0	2	0	2	31	0	0	0	10	2	0	48	617
11:10 AM	0	0	0	0	1	0	2	0	5	23	0	0	0	21	4	0	56	635
11:15 AM	0	0	0	0	1	0	4	0	6	13	0	0	0	14	1	0	39	623
11:20 AM	0	0	0	0	3	0	2	0	1	26	0	0	0	13	2	0	47	617
11:25 AM	0	0	0	0	4	0	1	0	2	18	0	0	0	20	2	0	47	601
11:30 AM	0	0	0	0	7	0	2	0	1	14	0	0	0	8	3	0	35	573
11:35 AM	0	0	0	0	1	0	1	0	4	21	0	0	0	16	5	0	48	559
11:40 AM	0	0	0	0	0	0	0	0	4	31	0	0	0	22	3	0	60	555
Peak 15-Min Flowrates																		
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Total	
All Vehicles	0	0	0	0	52	0	44	0	56	288	0	0	0	268	48	0	756	
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Pedestrians		12				0				0				0			12	
Bicycles	0	0	0		0	0	0		0	1	0		0	2	0		3	
Railroad																		
Stopped Buses																		

Comments:

LOCATION: South End Rd -- Deerbrook Dr/Barker Ave
CITY/STATE: Oregon City, OR

QC JOB #: 14771003
DATE: Sun, Aug 19 2018

Peak-Hour: 10:15 AM -- 11:15 AM
Peak 15-Min: 10:20 AM -- 10:35 AM



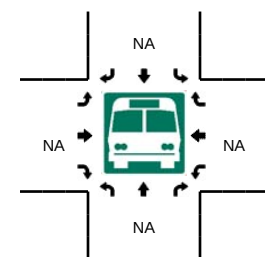
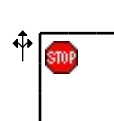
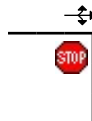
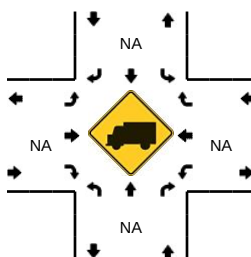
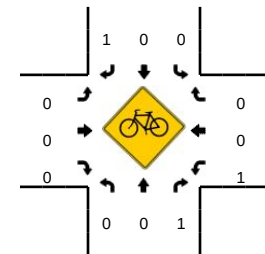
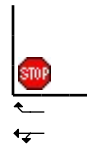
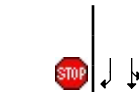
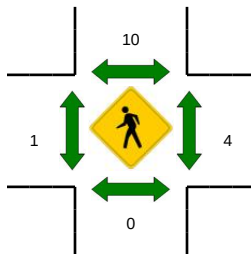
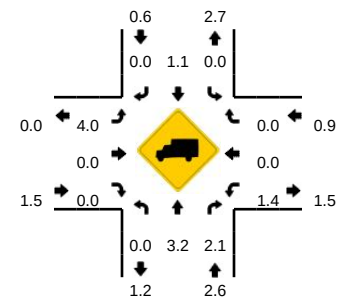
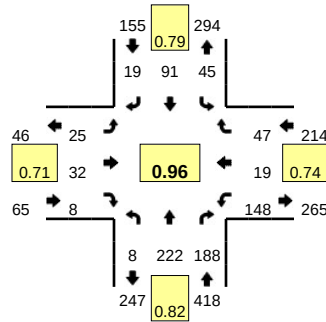
5-Min Count Period Beginning At	South End Rd (Northbound)				South End Rd (Southbound)				Deerbrook Dr/Barker Ave (Eastbound)				Deerbrook Dr/Barker Ave (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
9:45 AM	1	16	0	0	1	18	0	0	0	0	0	0	0	0	1	0	37	364
9:50 AM	0	28	2	0	0	23	1	0	0	0	0	0	1	0	0	0	55	391
9:55 AM	0	13	0	0	0	16	1	0	0	0	1	0	1	0	0	0	32	387
10:00 AM	0	24	1	0	0	13	0	0	1	0	0	0	1	0	2	0	42	413
10:05 AM	0	19	0	0	0	16	1	0	0	0	0	0	0	0	1	0	37	423
10:10 AM	0	19	0	0	1	17	0	0	0	0	1	0	3	0	0	0	41	432
10:15 AM	0	29	0	0	1	6	0	0	0	0	0	0	0	0	0	0	36	436
10:20 AM	0	34	1	0	0	11	0	0	0	0	2	0	2	1	0	0	51	453
10:25 AM	0	18	0	0	0	15	0	0	0	0	1	0	0	0	1	0	35	453
10:30 AM	0	22	0	0	0	20	2	0	0	1	0	0	0	0	1	0	46	469
10:35 AM	0	27	1	0	0	13	0	0	0	0	0	0	1	0	2	0	44	480
10:40 AM	0	19	0	0	0	9	1	0	0	0	0	0	1	0	1	0	31	487
10:45 AM	1	22	0	0	0	13	1	0	0	0	0	0	1	0	1	0	39	489
10:50 AM	0	23	2	0	0	13	0	0	0	0	1	0	0	1	0	0	40	474
10:55 AM	0	24	1	0	0	12	1	0	0	0	0	0	0	0	0	0	38	480
11:00 AM	0	20	0	0	0	11	1	0	0	0	1	0	1	0	0	0	34	472
11:05 AM	1	28	1	0	0	10	0	0	0	0	0	0	1	0	0	0	41	476
11:10 AM	0	29	0	0	0	6	0	0	0	0	0	0	0	0	0	0	35	470
11:15 AM	0	23	1	0	1	14	0	0	1	0	0	0	1	0	0	0	41	475
11:20 AM	0	24	0	0	1	19	0	0	0	0	0	0	0	0	1	0	45	469
11:25 AM	0	24	1	0	0	14	1	0	0	0	0	0	0	0	1	0	41	475
11:30 AM	0	31	0	0	0	10	0	0	0	0	1	0	0	0	0	0	42	471
11:35 AM	0	27	1	0	0	6	2	0	1	0	0	0	0	0	1	0	38	465
11:40 AM	0	22	0	0	0	13	0	0	1	0	0	0	0	0	0	0	36	470
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
	0	296	4	0	0	184	8	0	0	4	12	0	8	4	8	0	528	
	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	
	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Stopped Buses																		

Comments:

LOCATION: South End Rd -- Warner Parrot Rd
CITY/STATE: Oregon City, OR

QC JOB #: 14771004
DATE: Sun, Aug 19 2018

Peak-Hour: 10:15 AM -- 11:15 AM
Peak 15-Min: 10:30 AM -- 10:45 AM



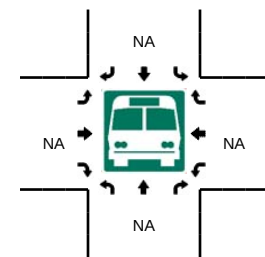
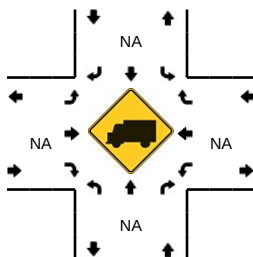
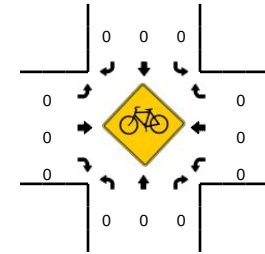
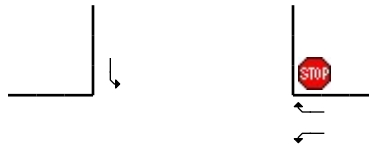
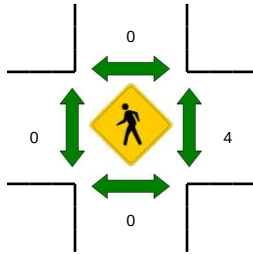
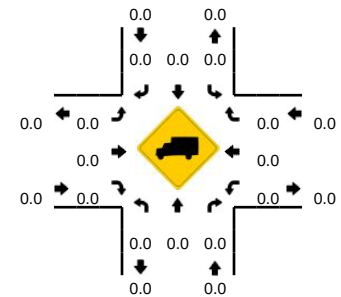
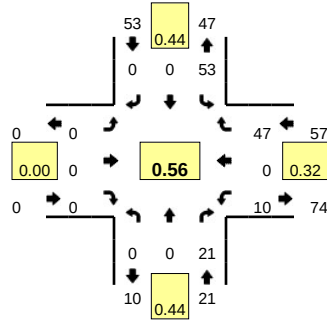
5-Min Count Period Beginning At	South End Rd (Northbound)				South End Rd (Southbound)				Warner Parrot Rd (Eastbound)				Warner Parrot Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
9:45 AM	0	14	15	0	2	17	0	0	1	5	0	0	5	1	8	0	68	598
9:50 AM	1	22	13	0	4	14	1	0	2	4	0	0	9	1	11	0	82	626
9:55 AM	0	9	10	0	3	11	0	0	1	3	0	0	9	2	8	0	56	622
10:00 AM	0	18	10	0	6	8	1	0	1	5	0	0	10	0	11	0	70	660
10:05 AM	1	14	8	0	6	9	1	0	1	1	0	0	7	4	5	0	57	671
10:10 AM	0	14	9	0	4	9	1	0	2	3	0	0	8	4	6	0	60	686
10:15 AM	2	23	20	0	7	4	1	0	6	3	2	0	7	2	3	0	80	717
10:20 AM	1	24	18	0	4	3	4	0	1	3	2	0	10	1	3	0	74	745
10:25 AM	2	13	24	0	6	8	1	0	0	3	1	0	6	1	2	0	67	762
10:30 AM	0	20	17	0	5	12	3	0	0	1	0	0	16	0	4	0	78	797
10:35 AM	0	15	12	0	3	11	0	0	0	4	1	0	15	3	4	0	68	806
10:40 AM	1	14	21	0	5	5	0	0	1	3	0	0	19	2	6	0	77	837
10:45 AM	0	8	11	0	2	9	3	0	3	5	0	0	13	3	7	0	64	833
10:50 AM	0	26	9	0	2	7	4	0	1	1	0	0	16	1	2	0	69	820
10:55 AM	0	15	11	0	0	11	2	0	1	4	2	0	15	0	3	0	64	828
11:00 AM	1	16	13	0	3	8	1	0	8	1	0	0	9	1	3	0	64	822
11:05 AM	1	24	16	0	4	10	0	0	3	4	0	0	10	1	5	0	78	843
11:10 AM	0	24	16	0	4	3	0	0	1	0	0	0	12	4	5	0	69	852
11:15 AM	0	19	14	0	4	8	1	0	1	6	0	0	6	2	2	0	63	835
11:20 AM	3	16	11	0	4	12	2	0	1	1	1	0	12	1	8	0	72	833
11:25 AM	1	16	8	0	4	8	0	0	5	2	0	0	7	2	7	0	60	826
11:30 AM	1	13	3	0	4	4	2	0	5	1	0	0	8	1	6	0	48	796
11:35 AM	0	20	12	0	4	4	0	0	3	7	0	0	7	2	2	0	61	789
11:40 AM	0	16	13	0	1	8	0	0	5	5	1	0	6	6	3	0	64	776
Peak 15-Min Flowrates																		
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Total	
All Vehicles	4	196	200	0	52	112	12	0	4	32	4	0	200	20	56	0	892	
Heavy Trucks	0	12	4	0	0	4	0	0	0	0	0	0	0	0	0	0	20	
Pedestrians	0	0	0	0	16	0	0	0	0	0	0	0	0	0	0	0	16	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad																		
Stopped Buses																		

Comments:

LOCATION: South End Rd -- Oregon City Christian Church Dwy
CITY/STATE: Oregon City, OR

QC JOB #: 14771005
DATE: Sun, Aug 19 2018

Peak-Hour: 10:15 AM -- 11:15 AM
Peak 15-Min: 10:15 AM -- 10:30 AM



5-Min Count Period Beginning At	South End Rd (Northbound)				South End Rd (Southbound)				Oregon City Christian Church (Eastbound)				Oregon City Christian Church (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	46
9:50 AM	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	2	35
9:55 AM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	18
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12
10:05 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	13
10:10 AM	0	0	0	0	0	0	0	0	0	0	0	0	2	0	6	0	8	19
10:15 AM	0	0	0	0	2	0	0	0	0	0	0	0	5	0	17	0	24	42
10:20 AM	0	0	2	0	4	0	0	0	0	0	0	0	3	0	10	0	19	61
10:25 AM	0	0	3	0	3	0	0	0	0	0	0	0	1	0	9	0	16	76
10:30 AM	0	0	6	0	10	0	0	0	0	0	0	0	1	0	3	0	20	95
10:35 AM	0	0	3	0	9	0	0	0	0	0	0	0	0	0	2	0	14	109
10:40 AM	0	0	2	0	11	0	0	0	0	0	0	0	0	0	4	0	17	125
10:45 AM	0	0	1	0	6	0	0	0	0	0	0	0	0	0	1	0	8	132
10:50 AM	0	0	1	0	6	0	0	0	0	0	0	0	0	0	0	0	7	137
10:55 AM	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	2	138
11:00 AM	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	3	141
11:05 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	139
11:10 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	131
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	108
11:20 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	89
11:25 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	73
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	53
11:35 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	39
11:40 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	0	0	20	0	36	0	0	0	0	0	0	0	36	0	144	0	236	
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad																		
Stopped Buses																		

Comments:

Appendix C Level of Service Concept

LEVEL OF SERVICE CONCEPT

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

Signalized Intersections

The six level-of-service grades are described qualitatively for signalized intersections in Table C1. Additionally, Table C2 identifies the relationship between level of service and average control delay per vehicle. Control delay is defined to include initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. Using this definition, Level of Service “D” is generally considered to represent the minimum acceptable design standard.

Table C1: Level-of-Service Definitions (Signalized Intersections)

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

¹ Most of the material in this appendix is adapted from the Transportation Research Board, Highway Capacity Manual, (2010).

Table C2: Level-of-Service Criteria for Signalized Intersections

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

UNSIGNALIZED INTERSECTIONS

Unsignalized intersections include two-way stop-controlled (TWSC) and all-way stop-controlled (AWSC) intersections. The 2010 Highway Capacity Manual (HCM) provides models for estimating control delay at both TWSC and AWSC intersections. A qualitative description of the various service levels associated with an unsignalized intersection is presented in Table C3. A quantitative definition of level of service for unsignalized intersections is presented in Table C4. Using this definition, Level of Service “E” is generally considered to represent the minimum acceptable design standard.

Table C3: Level-of-Service Criteria for Unsignalized Intersections

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

Table C4: Level-of-Service Criteria for Unsignalized Intersections

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

It should be noted that the level-of-service criteria for unsignalized intersections are somewhat different than the criteria used for signalized intersections. The primary reason for this difference is that drivers expect different levels of performance from different kinds of transportation facilities. The expectation is that a signalized intersection is designed to carry higher traffic volumes than an unsignalized intersection. Additionally, there are a number of driver behavior considerations that combine to make delays at signalized intersections less galling than at unsignalized intersections. For example, drivers at signalized intersections are able to relax during the red interval, while drivers on the minor street approaches to TWSC intersections must remain attentive to the task of identifying acceptable gaps and

vehicle conflicts. Also, there is often much more variability in the amount of delay experienced by individual drivers at unsignalized intersections than signalized intersections. For these reasons, it is considered that the control delay threshold for any given level of service is less for an unsignalized intersection than for a signalized intersection. While overall intersection level of service is calculated for AWSC intersections, level of service is only calculated for the minor approaches and the major street left turn movements at TWSC intersections. No delay is assumed to the major street through movements. For TWSC intersections, the overall intersection level of service remains undefined: level of service is only calculated for each minor street lane.

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

Appendix D Year 2018 Existing Traffic Conditions Worksheets

Existing Traffic Conditions
2: South End Rd & Lawton Rd/Warner Parrott Rd

Weekday PM Peak

09/12/2018

Intersection												
Intersection Delay, s/veh	25.7											
Intersection LOS	D											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔		↔			↔	↔
Traffic Vol, veh/h	29	30	4	215	50	73	6	154	200	89	269	47
Future Vol, veh/h	29	30	4	215	50	73	6	154	200	89	269	47
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	3	3	0	2	2	3	0	1	2	2	1	0
Mvmt Flow	32	33	4	239	56	81	7	171	222	99	299	52
Number of Lanes	0	1	0	0	1	1	0	1	0	0	1	1
Approach	EB	WB			NB			SB				
Opposing Approach	WB	EB			SB			NB				
Opposing Lanes	2	1			2			1				
Conflicting Approach Left	SB	NB			EB			WB				
Conflicting Lanes Left	2	1			1			2				
Conflicting Approach Right	NB	SB			WB			EB				
Conflicting Lanes Right	1	2			2			1				
HCM Control Delay	13.5	21			28.2			29.4				
HCM LOS	B	C			D			D				
Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2						
Vol Left, %	2%	46%	81%	0%	25%	0%						
Vol Thru, %	43%	48%	19%	0%	75%	0%						
Vol Right, %	56%	6%	0%	100%	0%	100%						
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop						
Traffic Vol by Lane	360	63	265	73	358	47						
LT Vol	6	29	215	0	89	0						
Through Vol	154	30	50	0	269	0						
RT Vol	200	4	0	73	0	47						
Lane Flow Rate	400	70	294	81	398	52						
Geometry Grp	6	6	7	7	7	7						
Degree of Util (X)	0.757	0.169	0.644	0.152	0.791	0.091						
Departure Headway (Hd)	6.809	8.669	7.87	6.735	7.16	6.299						
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes						
Cap	532	412	459	531	505	567						
Service Time	4.869	6.766	5.631	4.495	4.92	4.058						
HCM Lane V/C Ratio	0.752	0.17	0.641	0.153	0.788	0.092						
HCM Control Delay	28.2	13.5	23.9	10.7	32	9.7						
HCM Lane LOS	D	B	C	B	D	A						
HCM 95th-tile Q	6.6	0.6	4.4	0.5	7.3	0.3						

Existing Traffic Conditions
3: South End Rd & Oregon City Christian Church Dwy 1

Weekday PM Peak
09/12/2018

Intersection						
Int Delay, s/veh	0.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	7	353	0	4	484
Future Vol, veh/h	0	7	353	0	4	484
Conflicting Peds, #/hr	0	0	0	4	4	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	125	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	0	8	392	0	4	538

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	943	396	0	0	396
Stage 1	396	-	-	-	-
Stage 2	547	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	294	658	-	-	1174
Stage 1	684	-	-	-	-
Stage 2	584	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	291	655	-	-	1174
Mov Cap-2 Maneuver	291	-	-	-	-
Stage 1	681	-	-	-	-
Stage 2	581	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.6	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT
Capacity (veh/h)	-	-	655	1174
HCM Lane V/C Ratio	-	-	0.012	0.004
HCM Control Delay (s)	-	-	0	10.6
HCM Lane LOS	-	-	A	B
HCM 95th %tile Q(veh)	-	-	0	0

Existing Traffic Conditions
4: South End Rd & Oregon City Christian Church Dwy 2

Weekday PM Peak
09/12/2018

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔		↔			↔
Traffic Vol, veh/h	0	0	353	0	0	484
Future Vol, veh/h	0	0	353	0	0	484
Conflicting Peds, #/hr	0	0	0	4	4	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	90	90	90	90	90	90
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	0	0	392	0	0	538
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	934	396	0	0	396	0
Stage 1	396	-	-	-	-	-
Stage 2	538	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	297	658	-	-	1174	-
Stage 1	684	-	-	-	-	-
Stage 2	589	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	296	655	-	-	1174	-
Mov Cap-2 Maneuver	296	-	-	-	-	-
Stage 1	681	-	-	-	-	-
Stage 2	589	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	0	0	0			
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	-	1174	-	
HCM Lane V/C Ratio	-	-	-	-	-	
HCM Control Delay (s)	-	-	0	0	-	
HCM Lane LOS	-	-	A	A	-	
HCM 95th %tile Q(veh)	-	-	-	0	-	

Existing Traffic Conditions
1: South End Rd & Deerbrook Dr/Barker Ave

Sunday Mid-day Peak
09/12/2018

Intersection												
Int Delay, s/veh	0.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	0	1	5	7	2	6	2	295	6	1	139	6
Future Vol, veh/h	0	1	5	7	2	6	2	295	6	1	139	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	1	1	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	0	0	0	0	0	0	0	3	0	0	1	17
Mvmt Flow	0	1	6	8	2	7	2	331	7	1	156	7

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	506	506	160	505	505	336	163	0	0	339	0	0
Stage 1	162	162	-	340	340	-	-	-	-	-	-	-
Stage 2	344	344	-	165	165	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	480	472	890	481	473	711	1428	-	-	1231	-	-
Stage 1	845	768	-	679	643	-	-	-	-	-	-	-
Stage 2	676	640	-	842	766	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	473	470	890	476	471	710	1428	-	-	1231	-	-
Mov Cap-2 Maneuver	473	470	-	476	471	-	-	-	-	-	-	-
Stage 1	843	767	-	677	641	-	-	-	-	-	-	-
Stage 2	666	638	-	835	765	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.7	11.8	0	0.1
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1428	-	-	775 547	1231	-	-
HCM Lane V/C Ratio	0.002	-	-	0.009 0.031	0.001	-	-
HCM Control Delay (s)	7.5	0	-	9.7 11.8	7.9	0	-
HCM Lane LOS	A	A	-	A B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0 0.1	0	-	-

Existing Traffic Conditions
2: South End Rd & Lawton Rd/Warner Parrott Rd

Sunday Mid-day Peak
09/12/2018

Intersection	
Intersection Delay, s/veh	14.8
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔		↔			↔	↔
Traffic Vol, veh/h	25	32	8	148	19	47	8	222	188	45	91	19
Future Vol, veh/h	25	32	8	148	19	47	8	222	188	45	91	19
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	4	0	0	1	0	0	0	3	2	0	1	0
Mvmt Flow	26	33	8	154	20	49	8	231	196	47	95	20
Number of Lanes	0	1	0	0	1	1	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	1
HCM Control Delay	10.8	11.9	18.4	10.6
HCM LOS	B	B	C	B

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	2%	38%	89%	0%	33%	0%
Vol Thru, %	53%	49%	11%	0%	67%	0%
Vol Right, %	45%	12%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	418	65	167	47	136	19
LT Vol	8	25	148	0	45	0
Through Vol	222	32	19	0	91	0
RT Vol	188	8	0	47	0	19
Lane Flow Rate	435	68	174	49	142	20
Geometry Grp	6	6	7	7	7	7
Degree of Util (X)	0.659	0.127	0.327	0.076	0.244	0.029
Departure Headway (Hd)	5.45	6.752	6.772	5.595	6.198	5.336
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	662	530	531	639	579	670
Service Time	3.482	4.806	4.514	3.337	3.941	3.079
HCM Lane V/C Ratio	0.657	0.128	0.328	0.077	0.245	0.03
HCM Control Delay	18.4	10.8	12.8	8.8	10.9	8.2
HCM Lane LOS	C	B	B	A	B	A
HCM 95th-tile Q	4.9	0.4	1.4	0.2	1	0.1

Existing Traffic Conditions
3: South End Rd & Oregon City Christian Church Dwy 1

Sunday Mid-day Peak
09/12/2018

Intersection

Int Delay, s/veh 1.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	47	371	21	53	194
Future Vol, veh/h	10	47	371	21	53	194
Conflicting Peds, #/hr	0	0	0	4	4	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	125	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	3	0	0	1
Mvmt Flow	10	49	386	22	55	202

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	714	401	0	0	412
Stage 1	401	-	-	-	-
Stage 2	313	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	401	653	-	-	1158
Stage 1	681	-	-	-	-
Stage 2	746	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	378	651	-	-	1158
Mov Cap-2 Maneuver	378	-	-	-	-
Stage 1	678	-	-	-	-
Stage 2	706	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.7	0	1.8
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT
Capacity (veh/h)	-	- 378 651 1158	-	-
HCM Lane V/C Ratio	-	- 0.028 0.075 0.048	-	-
HCM Control Delay (s)	-	- 14.8 11 8.3	0	0
HCM Lane LOS	-	- B B A A		
HCM 95th %tile Q(veh)	-	- 0.1 0.2 0.1	-	-

Existing Traffic Conditions
4: South End Rd & Oregon City Christian Church Dwy 2

Sunday Mid-day Peak
09/12/2018

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T	T	T	T
Traffic Vol, veh/h	0	0	392	0	0	204
Future Vol, veh/h	0	0	392	0	0	204
Conflicting Peds, #/hr	0	0	0	4	4	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	96	96	96	96	96	96
Heavy Vehicles, %	0	0	3	0	0	1
Mvmt Flow	0	0	408	0	0	213

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	625	412	0	0	412	0
Stage 1	412	-	-	-	-	-
Stage 2	213	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	452	644	-	-	1158	-
Stage 1	673	-	-	-	-	-
Stage 2	827	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	450	642	-	-	1158	-
Mov Cap-2 Maneuver	450	-	-	-	-	-
Stage 1	670	-	-	-	-	-
Stage 2	827	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	1158	-
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s)	-	-	0	-
HCM Lane LOS	-	-	A	-
HCM 95th %tile Q(veh)	-	-	0	-

Existing Traffic Conditions
5: South End Rd & Lafayette Ave/S Partlow Rd

Sunday Mid-day Peak
09/12/2018

Intersection												
Int Delay, s/veh	3.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔			↔			↔	
Traffic Vol, veh/h	5	3	7	39	4	72	2	259	41	43	157	5
Future Vol, veh/h	5	3	7	39	4	72	2	259	41	43	157	5
Conflicting Peds, #/hr	1	0	1	1	0	1	0	0	4	4	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	75	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	0	0	14	3	0	4	0	2	0	2	1	0
Mvmt Flow	6	4	8	46	5	85	2	305	48	51	185	6

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	668	651	189	634	630	334	191	0	0	357	0	0
Stage 1	289	289	-	338	338	-	-	-	-	-	-	-
Stage 2	379	362	-	296	292	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.34	7.13	6.5	6.24	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.13	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.13	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.426	3.527	4	3.336	2.2	-	-	2.218	-	-
Pot Cap-1 Maneuver	375	390	823	390	401	703	1395	-	-	1202	-	-
Stage 1	723	677	-	674	644	-	-	-	-	-	-	-
Stage 2	647	629	-	710	675	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	314	369	822	367	380	700	1394	-	-	1201	-	-
Mov Cap-2 Maneuver	314	369	-	367	380	-	-	-	-	-	-	-
Stage 1	722	645	-	670	640	-	-	-	-	-	-	-
Stage 2	563	625	-	665	643	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	13.1		12.9		0.1		1.7	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1394	-	-	461 367 670	1201	-	-
HCM Lane V/C Ratio	0.002	-	-	0.038 0.125 0.133	0.042	-	-
HCM Control Delay (s)	7.6	0	-	13.1 16.2 11.2	8.1	0	-
HCM Lane LOS	A	A	-	B C B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1 0.4 0.5	0.1	-	-

Existing Traffic Conditions
6: Warner Parrott Rd & Camenah Rd

Sunday Mid-day Peak
09/12/2018

Intersection						
Int Delay, s/veh	2.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	43	281	190	43	39	39
Future Vol, veh/h	43	281	190	43	39	39
Conflicting Peds, #/hr	0	0	0	0	1	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	0	1	1	0	0	0
Mvmt Flow	51	335	226	51	46	46
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	277	0	-	0	690	252
Stage 1	-	-	-	-	252	-
Stage 2	-	-	-	-	438	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1298	-	-	-	414	792
Stage 1	-	-	-	-	795	-
Stage 2	-	-	-	-	655	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1298	-	-	-	394	792
Mov Cap-2 Maneuver	-	-	-	-	394	-
Stage 1	-	-	-	-	795	-
Stage 2	-	-	-	-	624	-
Approach	EB	WB		SB		
HCM Control Delay, s	1	0		13.3		
HCM LOS				B		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1298	-	-	-	526	
HCM Lane V/C Ratio	0.039	-	-	-	0.177	
HCM Control Delay (s)	7.9	0	-	-	13.3	
HCM Lane LOS	A	A	-	-	B	
HCM 95th %tile Q(veh)	0.1	-	-	-	0.6	

Appendix E ODOT Crash Data

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CRASH SUMMARIES BY YEAR BY COLLISION TYPE

Canemah Rd & Warner Parrott Rd
January 1, 2012 through December 31, 2016

COLLISION TYPE	FATAL CRASHES	NON- FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER- SECTION	INTER- SECTION RELATED	OFF- ROAD
YEAR: 2016														
TURNING MOVEMENTS	0	1	0	1	0	1	0	0	1	1	0	1	0	0
2016 TOTAL	0	1	0	1	0	1	0	0	1	1	0	1	0	0
YEAR: 2015														
REAR-END	0	0	1	1	0	0	0	0	1	0	1	1	0	0
2015 TOTAL	0	0	1	1	0	0	0	0	1	0	1	1	0	0
YEAR: 2012														
REAR-END	0	2	0	2	0	2	0	2	0	2	0	2	0	0
2012 TOTAL	0	2	0	2	0	2	0	2	0	2	0	2	0	0
FINAL TOTAL	0	3	1	4	0	3	0	2	2	3	1	4	0	0

Disclaimer: A higher number of crashes may be reported as of 2011 compared to prior years. This does not reflect an increase in annual crashes. The higher numbers result from a change to an internal departmental process that allows the Crash Analysis and Reporting Unit to add previously unavailable, non-fatal crash reports to the annual data file. Please be aware of this change when comparing pre-2011 crash statistics.

Canemah Rd & Warner Parrott Rd
January 1, 2012 through December 31, 2016

SER#	P E L G H R D C S L K	D A U C O DATE DAY/TIME LAT/LONG	CITY STREET FIRST STREET SECOND STREET INTERSECTION SEQ #	RD CHAR DIRECT LOCTN	INT-TYP (MEDIAN) LEGS (#LANES)	INT-REL TRAF- CONTL	OFF-RD RNDBT DRVWY	WTHR SURF LIGHT	CRASH TYP COLL TYP SVRTY	SPCL USE TRLR QTY OWNER VEH TYPE	MOVE FROM TO	A S LICNS E X RES	PED LOC ERROR	ACTN EVENT CAUSE
01312 NONE No	N N N 45 20 14.57	04/08/2012 16 Sun 1P 0 -122 36 36.69	CANEMAH RD WARNER-PARROTT RD 1	INTER W 06	3-LEG 0	N UNKNOWN	N DAY	CLR DRY	S-1STOP REAR INJ	01 NONE 0 PSNGR CAR	STRGHT W E	64 M OR-Y OR<25	026	000 007
										02 NONE 0 PSNGR CAR	STOP W E	65 M OR-Y OR<25	000	012 000 00
03180 NONE No	N N N 45 20 14.57	08/27/2012 16 Mon 8A 0 -122 36 36.69	CANEMAH RD WARNER-PARROTT RD 1	INTER W 06	3-LEG 0	N UNKNOWN	N DAY	CLR DRY	S-1STOP REAR INJ	01 NONE 0 RENTL UNKNOWN	STRGHT W E	00 F OTH-Y N-RES	026	000 007
										02 NONE 0 PSNGR CAR	STOP W E	53 F OR-Y OR<25	000	011 000 00
04488 NONE No	N N N 45 20 14.62	10/30/2015 16 Fri 6P 0 -122 36 36.56	CANEMAH RD WARNER-PARROTT RD 1	INTER W 06	3-LEG 0	N UNKNOWN	N DUSK	RAIN WET	S-1STOP REAR PDO	01 NONE 0 PSNGR CAR	STRGHT W E	16 M OR-Y OR<25	026	000 029
										02 NONE 0 PSNGR CAR	STOP W E	28 M OR-Y OR<25	000	012 000 00
05511 CITY No	N N N N N 45 20 14.62	11/26/2016 16 Sat 7A 0 -122 36 36.56	CANEMAH RD WARNER-PARROTT RD 1	INTER CN 01	3-LEG 0	N STOP SIGN	N DAY	CLD WET	ANGL-OTH TURN INJ	01 NONE 0 PSNGR CAR	STRGHT E W	41 M OR-Y OR<25	000	000 000 00
										02 NONE 0 PSNGR CAR	TURN-L NE E	16 F OR-Y OR<25	028	015 000 00 02

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CRASH SUMMARIES BY YEAR BY COLLISION TYPESouth End Rd & Barker Ave
January 1, 2012 through December 31, 2016

COLLISION TYPE	FATAL CRASHES	NON- FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER- SECTION	INTER- SECTION RELATED	OFF- ROAD
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YEAR:

TOTAL

FINAL TOTAL

Disclaimer: A higher number of crashes may be reported as of 2011 compared to prior years. This does not reflect an increase in annual crashes. The higher numbers result from a change to an internal departmental process that allows the Crash Analysis and Reporting Unit to add previously unavailable, non-fatal crash reports to the annual data file. Please be aware of this change when comparing pre-2011 crash statistics.

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CRASH SUMMARIES BY YEAR BY COLLISION TYPE

South End Rd & Partlow Rd / Lafayette Rd
January 1, 2012 through December 31, 2016

COLLISION TYPE	FATAL CRASHES	NON- FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER- SECTION	INTER- SECTION RELATED	OFF- ROAD
YEAR: 2016														
TURNING MOVEMENTS	0	1	0	1	0	1	0	1	0	1	0	1	0	0
2016 TOTAL	0	1	0	1	0	1	0	1	0	1	0	1	0	0
YEAR: 2014														
TURNING MOVEMENTS	0	0	1	1	0	0	0	0	1	1	0	1	0	0
2014 TOTAL	0	0	1	1	0	0	0	0	1	1	0	1	0	0
YEAR: 2012														
REAR-END	0	0	1	1	0	0	0	1	0	1	0	1	0	0
2012 TOTAL	0	0	1	1	0	0	0	1	0	1	0	1	0	0
FINAL TOTAL	0	1	2	3	0	1	0	2	1	3	0	3	0	0

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TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT

URBAN NON-SYSTEM CRASH LISTING

CITY OF OREGON CITY, CLACKAMAS COUNTY

South End Rd & Partlow Rd / Lafayette Rd
January 1, 2012 through December 31, 2016

SER#	INVEST	UNLOC?	S P D C S L K	D R S W O H R	DATE	FC	CITY STREET FIRST STREET SECOND STREET INTERSECTION SEQ #	RD CHAR DIRECT LOCTN	INT-TYP (MEDIAN) LEGS (#LANES)	INT-REL TRAF- CONTL	OFF-RD RNDBT DRVWY	WTHR SURF LIGHT	CRASH TYP COLL TYP SVRTY	SPCL USE TRLR QTY OWNER VEH TYPE	MOVE FROM TO	P#	PRTC TYPE	INJ SVRTY	A G E X	S E LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE	
01409	NO RPT	NO	N	N	N	04/10/2012 Tue 11A 0	16 SOUTH END RD 1	16 INTER NE 06	CROSS 0	N UNKNOWN	N N	CLR DRY DAY	S-1STOP REAR PDO	01 PSNGR CAR	NONE PRVTE NE SW	0	STRGHT	01	DRVR	NONE	85	M	OR-Y OR<25	026	000	007
			45	19	53.83	-122 37 32.90								02 PSNGR CAR	NONE PRVTE NE SW	0	STOP	01	DRVR	NONE	67	F	OR-Y OR<25	000	011	000
01556	NONE	NO	N	N	N	04/23/2014 Wed 6P 0	16 SOUTH END RD 1	16 INTER CN 04	CROSS 0	N UNKNOWN	N N	RAIN WET DAY	O-1 L-TURN TURN PDO	01 PSNGR CAR	NONE PRVTE SW NE	0	STRGHT	01	DRVR	NONE	60	M	OR-Y OR<25	000	000	002
			45	19	53.83	-122 37 32.90								02 PSNGR CAR	NONE PRVTE NE SE	0	TURN-L	01	DRVR	NONE	19	F	OR-Y OR<25	028,004	000	002
02915	CITY	NO	N	N	N	06/28/2016 Tue 4P 0	16 SOUTH END RD 1	16 INTER CN 04	CROSS 0	N UNKNOWN	N N	CLR DRY DAY	O-1 L-TURN TURN INJ	01 PSNGR CAR	NONE PRVTE SW NE	0	STRGHT	01	DRVR	INJC	41	F	OR-Y OR<25	000	000	002
			45	19	53.83	-122 37 32.90								02 PSNGR CAR	NONE PRVTE NE SE	0	TURN-L	01	DRVR	NONE	28	F	OR-Y OR<25	028,004	000	002

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CRASH SUMMARIES BY YEAR BY COLLISION TYPE

South End Rd & Warner Parrott Rd / Lawton Rd
January 1, 2012 through December 31, 2016

COLLISION TYPE	FATAL CRASHES	NON- FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER- SECTION	INTER- SECTION RELATED	OFF- ROAD
YEAR: 2016														
ANGLE	0	0	1	1	0	0	0	1	0	1	0	1	0	0
REAR-END	0	0	1	1	0	0	0	0	1	1	0	1	0	0
TURNING MOVEMENTS	0	0	1	1	0	0	0	0	1	1	0	1	0	0
2016 TOTAL	0	0	3	3	0	0	0	1	2	3	0	3	0	0
YEAR: 2015														
ANGLE	0	0	1	1	0	0	0	0	0	1	0	1	0	0
REAR-END	0	1	0	1	0	1	0	0	0	1	0	1	0	0
2015 TOTAL	0	1	1	2	0	1	0	0	0	2	0	2	0	0
YEAR: 2013														
ANGLE	0	0	2	2	0	0	0	1	1	0	2	2	0	0
TURNING MOVEMENTS	0	1	0	1	0	2	0	1	0	1	0	1	0	0
2013 TOTAL	0	1	2	3	0	2	0	2	1	1	2	3	0	0
FINAL TOTAL	0	2	6	8	0	3	0	3	3	6	2	8	0	0

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South End Rd & Warner Parrott Rd / Lawton Rd
January 1, 2012 through December 31, 2016

SER#	P E L G H R	D A U C O	S W	DATE	FC	CITY STREET	RD CHAR	INT-TYP	INT-REL	OFF-RD	WTHR	CRASH TYP	SPCL USE	MOVE	A S	PED	ACTN	EVENT	CAUSE				
UNLOC?	D C S L K			LAT/LONG	DISTNC	INTERSECTION SEQ #	DIRECT	(#LANES)	TRAF-CONTL	RNDBT	SURF	COLL TYP	VEH TYPE	FROM	E X RES	LOC							
00122	N N N			01/11/2013	16	LAWTON RD	INTER	CROSS	N		FOG	ANGL-OTH	01	NONE	0				02				
NONE				Fri 8A	0	SOUTH END RD	CN		FLASHBCN-R	N	ICE	ANGL		PRVTE	W E			015	00				
No	45	20	14.21	-122 37 22.44		1	04	0		N	DAWN	PDO		PSNGR CAR		01	DRVR	NONE	16 M OR-Y OR<25	028	000	002	
													02	NONE	0								
														PRVTE	S E				015	00			
														PSNGR CAR		01	DRVR	NONE	16 M OR-Y OR<25	000	000	000	
05900	N N N			12/15/2016	16	SOUTH END RD	INTER	CROSS	N		CLR	S-STRGHT	01	NONE	9				29				
NONE				Thu 2P	0	WARNER-PARROTT RD	E		FLASHBCN-R	N	ICE	REAR		N/A		E W			000	00			
No	45	20	14.21	-122 37 22.44		1	06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00 U UNK UNK	000	000	000	
													02	NONE	9								
														N/A		E W			006	00			
														PSNGR CAR		01	DRVR	NONE	00 U UNK UNK	000	000	000	
03380	N N N			08/18/2015	16	SOUTH END RD	INTER	CROSS	N		UNK	S-1STOP	01	NONE	0				29				
NONE				Tue 3P	0	WARNER-PARROTT RD	S		UNKNOWN	N	UNK	REAR		UNKN		S N			000	00			
No	45	20	14.21	-122 37 22.44		1	06	0		N	DAY	INJ		UNKNOWN			01	DRVR	NONE	00 U UNK UNK	026	000	29
													02	NONE	0								
														PRVTE	S N				011	00			
														PSNGR CAR		01	DRVR	INJC	45 M OR-Y OR<25	000	000	000	
01077	N N N			03/08/2016	16	SOUTH END RD	INTER	CROSS	N		RAIN	O-1 L-TURN	01	NONE	9				02				
NO RPT				Tue 1P	0	WARNER-PARROTT RD	CN		STOP SIGN	N	WET	TURN		N/A		E W			000	00			
No	45	20	14.21	-122 37 22.44		1	02	0		N	DAY	PDO		PSNGR CAR			01	DRVR	NONE	00 U UNK UNK	000	000	000
													02	NONE	9								
														N/A		W N			000	00			
														SCHL BUS			01	DRVR	NONE	00 U UNK UNK	000	000	000
02411	N N N			06/07/2013	16	SOUTH END RD	INTER	CROSS	N		CLR	ANGL-OTH	01	NONE	0				08				
NO RPT				Fri 8P	0	WARNER-PARROTT RD	CN		FLASHBCN-R	N	DRY	TURN		PRVTE	E S				015	00			
No	45	20	14.21	-122 37 22.44		1	04	0		N	DAY	INJ		PSNGR CAR			01	DRVR	NONE	39 F OR-Y OR<25	002	000	008
																	02	PSNG	INJC	16 F		000	000
													02	NONE	0								
														PRVTE	S E				015	00			
														PSNGR CAR		01	DRVR	INJC	41 F OR-Y OR<25	000	000	000	
04076	N N N			10/24/2013	16	SOUTH END RD	INTER	CROSS	N		FOG	ANGL-OTH	01	NONE	0				02				
NONE				Thu 7A	0	WARNER-PARROTT RD	CN		FLASHBCN-R	N	DRY	ANGL		PRVTE	W E				015	00			
No	45	20	14.21	-122 37 22.44		1	04	0		N	DAWN	PDO		PSNGR CAR			01	DRVR	NONE	00 F OR-Y UNK	028	000	002

CITY OF OREGON CITY, CLACKAMAS COUNTY

South End Rd & Warner Parrott Rd / Lawton Rd
January 1, 2012 through December 31, 2016

[illegible]

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CRASH SUMMARIES BY YEAR BY COLLISION TYPE

South End Rd between Glacier Ct and Gentry Wy / Maxwell Ct
January 1, 2012 through December 31, 2016

COLLISION TYPE	FATAL CRASHES	NON- FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER- SECTION	INTER- SECTION RELATED	OFF- ROAD
YEAR: 2015														
TURNING MOVEMENTS	0	0	1	1	0	0	0	0	1	0	1	0	0	0
2015 TOTAL	0	0	1	1	0	0	0	0	1	0	1	0	0	0
FINAL TOTAL	0	0	1	1	0	0	0	0	1	0	1	0	0	0

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

ACTION CODE TRANSLATION LIST		
ACTION CODE	SHORT DESCRIPTION	LONG DESCRIPTION
088	OTHER	OTHER ACTION
099	UNK	UNKNOWN ACTION

CAUSE CODE TRANSLATION LIST		
CAUSE CODE	SHORT DESCRIPTION	LONG DESCRIPTION
00	NO CODE	NO CAUSE ASSOCIATED AT THIS LEVEL
01	TOO-FAST	TOO FAST FOR CONDITIONS (NOT EXCEED POSTED SPEED)
02	NO-YIELD	DID NOT YIELD RIGHT-OF-WAY
03	PAS-STOP	PASSED STOP SIGN OR RED FLASHER
04	DIS SIG	DISREGARDED TRAFFIC SIGNAL
05	LEFT-CTR	DROVE LEFT OF CENTER ON TWO-WAY ROAD; STRADDLING
06	IMP-OVER	IMPROPER OVERTAKING
07	TOO-CLOS	FOLLOWED TOO CLOSELY
08	IMP-TURN	MADE IMPROPER TURN
09	DRINKING	ALCOHOL OR DRUG INVOLVED
10	OTHR-IMP	OTHER IMPROPER DRIVING
11	MECH-DEF	MECHANICAL DEFECT
12	OTHER	OTHER (NOT IMPROPER DRIVING)
13	IMP LN C	IMPROPER CHANGE OF TRAFFIC LANES
14	DIS TCD	DISREGARDED OTHER TRAFFIC CONTROL DEVICE
15	WRNG WAY	WRONG WAY ON ONE-WAY ROAD; WRONG SIDE DIVIDED ROAD
16	FATIGUE	DRIVER DROWSY/FATIGUED/SLEEPY
17	ILLNESS	PHYSICAL ILLNESS
18	IN RDWY	NON-MOTORIST ILLEGALLY IN ROADWAY
19	NT VISBL	NON-MOTORIST NOT VISIBLE; NON-REFLECTIVE CLOTHING
20	IMP PKNG	VEHICLE IMPROPERLY PARKED
21	DEF STER	DEFECTIVE STEERING MECHANISM
22	DEF BRKE	INADEQUATE OR NO BRAKES
24	LOADSHT	VEHICLE LOST LOAD OR LOAD SHIFTED
25	TIREFAIL	TIRE FAILURE
26	PHANTOM	PHANTOM / NON-CONTACT VEHICLE
27	INATTENT	INATTENTION
28	NM INATT	NON-MOTORIST INATTENTION
29	F AVOID	FAILED TO AVOID VEHICLE AHEAD
30	SPEED	DRIVING IN EXCESS OF POSTED SPEED
31	RACING	SPEED RACING (PER PAR)
32	CARELESS	CARELESS DRIVING (PER PAR)
33	RECKLESS	RECKLESS DRIVING (PER PAR)
34	AGGRESV	AGGRESSIVE DRIVING (PER PAR)
35	RD RAGE	ROAD RAGE (PER PAR)
40	VIEW OBS	VIEW OBSCURED
50	USED MDN	IMPROPER USE OF MEDIAN OR SHOULDER
51	FAIL LN	FAILED TO MAINTAIN LANE
52	OFF RD	RAN OFF ROAD

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

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

DRIVER LICENSE CODE TRANSLATION LIST			DRIVER RESIDENCE CODE TRANSLATION LIST		
LIC CODE	SHORT DESC	LONG DESCRIPTION	RES CODE	SHORT DESC	LONG DESCRIPTION
0	NONE	NOT LICENSED (HAD NEVER BEEN LICENSED)	1	OR<25	OREGON RESIDENT WITHIN 25 MILE OF HOME
1	OR-Y	VALID OREGON LICENSE	2	OR>25	OREGON RESIDENT 25 OR MORE MILES FROM HOME
2	OTH-Y	VALID LICENSE, OTHER STATE OR COUNTRY	3	OR-?	OREGON RESIDENT - UNKNOWN DISTANCE FROM HOME
3	SUSP	SUSPENDED/REVOKED	4	N-RES	NON-RESIDENT
4	EXP	EXPIRED	9	UNK	UNKNOWN IF OREGON RESIDENT
8	N-VAL	OTHER NON-VALID LICENSE			
9	UNK	UNKNOWN IF DRIVER WAS LICENSED AT TIME OF CRASH			

ERROR CODE TRANSLATION LIST		
ERROR CODE	SHORT DESCRIPTION	FULL DESCRIPTION
000	NONE	NO ERROR
001	WIDE TRN	WIDE TURN
002	CUT CORN	CUT CORNER ON TURN
003	FAIL TRN	FAILED TO OBEY MANDATORY TRAFFIC TURN SIGNAL, SIGN OR LANE MARKINGS
004	L IN TRF	LEFT TURN IN FRONT OF ONCOMING TRAFFIC
005	L PROHIB	LEFT TURN WHERE PROHIBITED
006	FRM WRNG	TURNED FROM WRONG LANE
007	TO WRONG	TURNED INTO WRONG LANE
008	ILLEG U	U-TURNED ILLEGALLY
009	IMP STOP	IMPROPERLY STOPPED IN TRAFFIC LANE
010	IMP SIG	IMPROPER SIGNAL OR FAILURE TO SIGNAL
011	IMP BACK	BACKING IMPROPERLY (NOT PARKING)
012	IMP PARK	IMPROPERLY PARKED
013	UNPARK	IMPROPER START LEAVING PARKED POSITION
014	IMP STRT	IMPROPER START FROM STOPPED POSITION
015	IMP LGHT	IMPROPER OR NO LIGHTS (VEHICLE IN TRAFFIC)
016	INATTENT	INATTENTION (FAILURE TO DIM LIGHTS PRIOR TO 4/1/97)
017	UNSF VEH	DRIVING UNSAFE VEHICLE (NO OTHER ERROR APPARENT)
018	OTH PARK	ENTERING/EXITING PARKED POSITION W/ INSUFFICIENT CLEARANCE; OTHER IMPROPER PARKING MANEUVER
019	DIS DRIV	DISREGARDED OTHER DRIVER'S SIGNAL
020	DIS SGNL	DISREGARDED TRAFFIC SIGNAL
021	RAN STOP	DISREGARDED STOP SIGN OR FLASHING RED
022	DIS SIGN	DISREGARDED WARNING SIGN, FLARES OR FLASHING AMBER
023	DIS OFCR	DISREGARDED POLICE OFFICER OR FLAGMAN
024	DIS EMER	DISREGARDED SIREN OR WARNING OF EMERGENCY VEHICLE
025	DIS RR	DISREGARDED RR SIGNAL, RR SIGN, OR RR FLAGMAN
026	REAR-END	FAILED TO AVOID STOPPED OR PARKED VEHICLE AHEAD OTHER THAN SCHOOL BUS
027	BIKE ROW	DID NOT HAVE RIGHT-OF-WAY OVER PEDALCYCLIST
028	NO ROW	DID NOT HAVE RIGHT-OF-WAY
029	PED ROW	FAILED TO YIELD RIGHT-OF-WAY TO PEDESTRIAN
030	PAS CURV	PASSING ON A CURVE
031	PAS WRNG	PASSING ON THE WRONG SIDE
032	PAS TANG	PASSING ON STRAIGHT ROAD UNDER UNSAFE CONDITIONS
033	PAS X-WK	PASSED VEHICLE STOPPED AT CROSSWALK FOR PEDESTRIAN
034	PAS INTR	PASSING AT INTERSECTION
035	PAS HILL	PASSING ON CREST OF HILL
036	N/PAS ZN	PASSING IN "NO PASSING" ZONE
037	PAS TRAF	PASSING IN FRONT OF ONCOMING TRAFFIC
038	CUT-IN	CUTTING IN (TWO LANES - TWO WAY ONLY)
039	WRNGSIDE	DRIVING ON WRONG SIDE OF THE ROAD (2-WAY UNDIVIDED ROADWAYS)
040	THRU MED	DRIVING THROUGH SAFETY ZONE OR OVER ISLAND
041	F/ST BUS	FAILED TO STOP FOR SCHOOL BUS

ERROR CODE TRANSLATION LIST

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

EVENT CODE TRANSLATION LIST

EVENT CODE	SHORT DESCRIPTION	LONG DESCRIPTION
001	FEL/JUMP	OCCUPANT FELL, JUMPED OR WAS EJECTED FROM MOVING VEHICLE
002	INTERFER	PASSENGER INTERFERED WITH DRIVER
003	BUG INTF	ANIMAL OR INSECT IN VEHICLE INTERFERED WITH DRIVER
004	INDRCT PED	PEDESTRIAN INDIRECTLY INVOLVED (NOT STRUCK)
005	SUB-PED	"SUB-PED": PEDESTRIAN INJURED SUBSEQUENT TO COLLISION, ETC.
006	INDRCT BIK	PEDALCYCLIST INDIRECTLY INVOLVED (NOT STRUCK)
007	HITCHIKR	HITCHHIKER (SOLICITING A RIDE)
008	PSNGR TOW	PASSENGER OR NON-MOTORIST BEING TOWED OR PUSHED ON CONVEYANCE
009	ON/OFF V	GETTING ON/OFF STOPPED/PARKED VEHICLE (OCCUPANTS ONLY; MUST HAVE PHYSICAL CONTACT W/ VEHICLE)
010	SUB OTRN	OVERTURNED AFTER FIRST HARMFUL EVENT
011	MV PUSHD	VEHICLE BEING PUSHED
012	MV TOWED	VEHICLE TOWED OR HAD BEEN TOWING ANOTHER VEHICLE
013	FORCED	VEHICLE FORCED BY IMPACT INTO ANOTHER VEHICLE, PEDALCYCLIST OR PEDESTRIAN
014	SET MOTN	VEHICLE SET IN MOTION BY NON-DRIVER (CHILD RELEASED BRAKES, ETC.)
015	RR ROW	AT OR ON RAILROAD RIGHT-OF-WAY (NOT LIGHT RAIL)
016	LT RL ROW	AT OR ON LIGHT-RAIL RIGHT-OF-WAY
017	RR HIT V	TRAIN STRUCK VEHICLE
018	V HIT RR	VEHICLE STRUCK TRAIN
019	HIT RR CAR	VEHICLE STRUCK RAILROAD CAR ON ROADWAY
020	JACKNIFE	JACKKNIFE; TRAILER OR TOWED VEHICLE STRUCK TOWING VEHICLE
021	TRL OTRN	TRAILER OR TOWED VEHICLE OVERTURNED
022	CN BROKE	TRAILER CONNECTION BROKE
023	DETACH TRL	DETACHED TRAILING OBJECT STRUCK OTHER VEHICLE, NON-MOTORIST, OR OBJECT
024	V DOOR OPN	VEHICLE DOOR OPENED INTO ADJACENT TRAFFIC LANE
025	WHEELOFF	WHEEL CAME OFF
026	HOOD UP	HOOD FLEW UP
028	LOAD SHIFT	LOST LOAD, LOAD MOVED OR SHIFTED
029	TIREFAIL	TIRE FAILURE
030	PET	PET: CAT, DOG AND SIMILAR
031	LVSTOCK	STOCK: COW, CALF, BULL, STEER, SHEEP, ETC.
032	HORSE	HORSE, MULE, OR DONKEY
033	HRSE&RID	HORSE AND RIDER
034	GAME	WILD ANIMAL, GAME (INCLUDES BIRDS; NOT DEER OR ELK)
035	DEER ELK	DEER OR ELK, WAPITI
036	ANML VEH	ANIMAL-DRAWN VEHICLE
037	CULVERT	CULVERT, OPEN LOW OR HIGH MANHOLE
038	ATENUATN	IMPACT ATTENUATOR
039	PK METER	PARKING METER
040	CURB	CURB (ALSO NARROW SIDEWALKS ON BRIDGES)
041	JIGGLE	JIGGLE BAR OR TRAFFIC SNAKE FOR CHANNELIZATION
042	GDRL END	LEADING EDGE OF GUARDRAIL
043	GARDRAIL	GUARD RAIL (NOT METAL MEDIAN BARRIER)
044	BARRIER	MEDIAN BARRIER (RAISED OR METAL)
045	WALL	RETAINING WALL OR TUNNEL WALL
046	BR RAIL	BRIDGE RAILING OR PARAPET (ON BRIDGE OR APPROACH)
047	BR ABUTMNT	BRIDGE ABUTMENT (INCLUDED "APPROACH END" THRU 2013)
048	BR COLMN	BRIDGE PILLAR OR COLUMN
049	BR GIRDR	BRIDGE GIRDER (HORIZONTAL BRIDGE STRUCTURE OVERHEAD)
050	ISLAND	TRAFFIC RAISED ISLAND
051	GORE	GORE
052	POLE UNK	POLE - TYPE UNKNOWN
053	POLE UTL	POLE - POWER OR TELEPHONE
054	ST LIGHT	POLE - STREET LIGHT ONLY
055	TRF SGNL	POLE - TRAFFIC SIGNAL AND PED SIGNAL ONLY
056	SGN BRDG	POLE - SIGN BRIDGE
057	STOPSIGN	STOP OR YIELD SIGN
058	OTH SIGN	OTHER SIGN, INCLUDING STREET SIGNS
059	HYDRANT	HYDRANT

EVENT CODE TRANSLATION LIST		
EVENT CODE	SHORT DESCRIPTION	LONG DESCRIPTION
060	MARKER	DELINEATOR OR MARKER (REFLECTOR POSTS)
061	MAILBOX	MAILBOX
062	TREE	TREE, STUMP OR SHRUBS
063	VEG OHED	TREE BRANCH OR OTHER VEGETATION OVERHEAD, ETC.
064	WIRE/CBL	WIRE OR CABLE ACROSS OR OVER THE ROAD
065	TEMP SGN	TEMPORARY SIGN OR BARRICADE IN ROAD, ETC.
066	PERM SGN	PERMANENT SIGN OR BARRICADE IN/OFF ROAD
067	SLIDE	SLIDES, FALLEN OR FALLING ROCKS
068	FRGN OBJ	FOREIGN OBSTRUCTION/DEBRIS IN ROAD (NOT GRAVEL)
069	EQP WORK	EQUIPMENT WORKING IN/OFF ROAD
070	OTH EQP	OTHER EQUIPMENT IN OR OFF ROAD (INCLUDES PARKED TRAILER, BOAT)
071	MAIN EQP	WRECKER, STREET SWEEPER, SNOW PLOW OR SANDING EQUIPMENT
072	OTHER WALL	ROCK, BRICK OR OTHER SOLID WALL
073	IRRG L PVMT	OTHER BUMP (NOT SPEED BUMP), POTHOLE OR PAVEMENT IRREGULARITY (PER PAR)
074	OVERHD OBJ	OTHER OVERHEAD OBJECT (HIGHWAY SIGN, SIGNAL HEAD, ETC.); NOT BRIDGE
075	CAVE IN	BRIDGE OR ROAD CAVE IN
076	HI WATER	HIGH WATER
077	SNO BANK	SNOW BANK
078	LO-HI EDGE	LOW OR HIGH SHOULDER AT PAVEMENT EDGE
079	DITCH	CUT SLOPE OR DITCH EMBANKMENT
080	OBJ FRM MV	STRUCK BY ROCK OR OTHER OBJECT SET IN MOTION BY OTHER VEHICLE (INCL. LOST LOADS)
081	FLY-OBJ	STRUCK BY ROCK OR OTHER MOVING OR FLYING OBJECT (NOT SET IN MOTION BY VEHICLE)
082	VEH HID	VEHICLE OBSCURED VIEW
083	VEG HID	VEGETATION OBSCURED VIEW
084	BLDG HID	VIEW OBSCURED BY FENCE, SIGN, PHONE BOOTH, ETC.
085	WIND GUST	WIND GUST
086	IMMERSED	VEHICLE IMMERSED IN BODY OF WATER
087	FIRE/EXP	FIRE OR EXPLOSION
088	FENC/BLD	FENCE OR BUILDING, ETC.
089	OTHR CRASH	CRASH RELATED TO ANOTHER SEPARATE CRASH
090	TO 1 SIDE	TWO-WAY TRAFFIC ON DIVIDED ROADWAY ALL ROUTED TO ONE SIDE
091	BUILDING	BUILDING OR OTHER STRUCTURE
092	PHANTOM	OTHER (PHANTOM) NON-CONTACT VEHICLE
093	CELL PHONE	CELL PHONE (ON PAR OR DRIVER IN USE)
094	VIOL GDL	TEENAGE DRIVER IN VIOLATION OF GRADUATED LICENSE PGM
095	GUY WIRE	GUY WIRE
096	BERM	BERM (EARTHEN OR GRAVEL MOUND)
097	GRAVEL	GRAVEL IN ROADWAY
098	ABR EDGE	ABRUPT EDGE
099	CELL WTNSD	CELL PHONE USE WITNESSED BY OTHER PARTICIPANT
100	UNK FIXD	FIXED OBJECT, UNKNOWN TYPE.
101	OTHER OBJ	NON-FIXED OBJECT, OTHER OR UNKNOWN TYPE
102	TEXTING	TEXTING
103	WZ WORKER	WORK ZONE WORKER
104	ON VEHICLE	PASSENGER RIDING ON VEHICLE EXTERIOR
105	PEDAL PSGR	PASSENGER RIDING ON PEDALCYCLE
106	MAN WHLCHR	PEDESTRIAN IN NON-MOTORIZED WHEELCHAIR
107	MTR WHLCHR	PEDESTRIAN IN MOTORIZED WHEELCHAIR
108	OFFICER	LAW ENFORCEMENT / POLICE OFFICER
109	SUB-BIKE	"SUB-BIKE": PEDALCYCLIST INJURED SUBSEQUENT TO COLLISION, ETC.
110	N-MTR	NON-MOTORIST STRUCK VEHICLE
111	S CAR VS V	STREET CAR/TROLLEY (ON RAILS OR OVERHEAD WIRE SYSTEM) STRUCK VEHICLE
112	V VS S CAR	VEHICLE STRUCK STREET CAR/TROLLEY (ON RAILS OR OVERHEAD WIRE SYSTEM)
113	S CAR ROW	AT OR ON STREET CAR OR TROLLEY RIGHT-OF-WAY
114	RR EQUIP	VEHICLE STRUCK RAILROAD EQUIPMENT (NOT TRAIN) ON TRACKS
115	DSTRCT GPS	DISTRACTED BY NAVIGATION SYSTEM OR GPS DEVICE
116	DSTRCT OTH	DISTRACTED BY OTHER ELECTRONIC DEVICE
117	RR GATE	RAIL CROSSING DROP-ARM GATE

EVENT CODE TRANSLATION LIST		
EVENT CODE	SHORT DESCRIPTION	LONG DESCRIPTION
118	EXPNSN JNT	EXPANSION JOINT
119	JERSEY BAR	JERSEY BARRIER
120	WIRE BAR	WIRE OR CABLE MEDIAN BARRIER
121	FENCE	FENCE
123	OBJ IN VEH	LOOSE OBJECT IN VEHICLE STRUCK OCCUPANT
124	SLIPPERY	SLIDING OR SWERVING DUE TO WET, ICY, SLIPPERY OR LOOSE SURFACE (NOT GRAVEL)
125	SHLDR	SHOULDER GAVE WAY
126	BOULDER	ROCK(S), BOULDER (NOT GRAVEL; NOT ROCK SLIDE)
127	LAND SLIDE	ROCK SLIDE OR LAND SLIDE
128	CURVE INV	CURVE PRESENT AT CRASH LOCATION
129	HILL INV	VERTICAL GRADE / HILL PRESENT AT CRASH LOCATION
130	CURVE HID	VIEW OBSCURED BY CURVE
131	HILL HID	VIEW OBSCURED BY VERTICAL GRADE / HILL
132	WINDOW HID	VIEW OBSCURED BY VEHICLE WINDOW CONDITIONS
133	SPRAY HID	VIEW OBSCURED BY WATER SPRAY
134	TORRENTIAL	TORRENTIAL RAIN (EXCEPTIONALLY HEAVY RAIN)

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

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

INJURY SEVERITY CODE TRANSLATION LIST		
CODE	SHORT DESC	LONG DESCRIPTION
1	KILL	FATAL INJURY
2	INJA	INCAPACITATING INJURY - BLEEDING, BROKEN BONES
3	INJB	NON-INCAPACITATING INJURY
4	INJC	POSSIBLE INJURY - COMPLAINT OF PAIN
5	PRI	DIED PRIOR TO CRASH
7	NO<5	NO INJURY - 0 TO 4 YEARS OF AGE
9	NONE	PARTICIPANT UNINJURED, OVER THE AGE OF 4

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

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

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

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

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

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

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

TRAFFIC CONTROL DEVICE CODE TRANSLATION LIST		
CODE	SHORT DESC	LONG DESCRIPTION
000	NONE	NO CONTROL
001	TRF SIGNAL	TRAFFIC SIGNALS
002	FLASHBCN-R	FLASHING BEACON - RED (STOP)
003	FLASHBCN-A	FLASHING BEACON - AMBER (SLOW)
004	STOP SIGN	STOP SIGN
005	SLOW SIGN	SLOW SIGN
006	REG-SIGN	REGULATORY SIGN
007	YIELD	YIELD SIGN
008	WARNING	WARNING SIGN
009	CURVE	CURVE SIGN
010	SCHL X-ING	SCHOOL CROSSING SIGN OR SPECIAL SIGNAL
011	OFCR/FLAG	POLICE OFFICER, FLAGMAN - SCHOOL PATROL
012	BRDG-GATE	BRIDGE GATE - BARRIER
013	TEMP-BARR	TEMPORARY BARRIER
014	NO-PASS-ZN	NO PASSING ZONE
015	ONE-WAY	ONE-WAY STREET
016	CHANNEL	CHANNELIZATION
017	MEDIAN BAR	MEDIAN BARRIER
018	PILOT CAR	PILOT CAR
019	SP PED SIG	SPECIAL PEDESTRIAN SIGNAL
020	X-BUCK	CROSSBUCK
021	THR-GN-SIG	THROUGH GREEN ARROW OR SIGNAL
022	L-GRN-SIG	LEFT TURN GREEN ARROW, LANE MARKINGS, OR SIGNAL
023	R-GRN-SIG	RIGHT TURN GREEN ARROW, LANE MARKINGS, OR SIGNAL
024	WIGWAG	WIGWAG OR FLASHING LIGHTS W/O DROP-ARM GATE
025	X-BUCK WRN	CROSSBUCK AND ADVANCE WARNING
026	WW W/ GATE	FLASHING LIGHTS WITH DROP-ARM GATES
027	OVRHD SGNL	SUPPLEMENTAL OVERHEAD SIGNAL (RR XING ONLY)
028	SP RR STOP	SPECIAL RR STOP SIGN
029	ILUM GRD X	ILLUMINATED GRADE CROSSING
037	RAMP METER	METERED RAMP
038	RUMBLE STR	RUMBLE STRIP
090	L-TURN REF	LEFT TURN REFUGE (WHEN REFUGE IS INVOLVED)
091	R-TURN ALL	RIGHT TURN AT ALL TIMES SIGN, ETC.
092	EMR SGN/FL	EMERGENCY SIGNS OR FLARES
093	ACCEL LANE	ACCELERATION OR DECELERATION LANES
094	R-TURN PRO	RIGHT TURN PROHIBITED ON RED AFTER STOPPING
095	BUS STPSGN	BUS STOP SIGN AND RED LIGHTS
099	UNKNOWN	UNKNOWN OR NOT DEFINITE

VEHICLE TYPE CODE TRANSLATION LIST		
CODE	SHORT DESC	LONG DESCRIPTION
00	PDO	NOT COLLECTED FOR PDO CRASHES
01	PSNGR CAR	PASSENGER CAR, PICKUP, LIGHT DELIVERY, ETC.
02	BOBTAIL	TRUCK TRACTOR WITH NO TRAILERS (BOBTAIL)
03	FARM TRCTR	FARM TRACTOR OR SELF-PROPELLED FARM EQUIPMENT
04	SEMI TOW	TRUCK TRACTOR WITH TRAILER/MOBILE HOME IN TOW
05	TRUCK	TRUCK WITH NON-DETACHABLE BED, PANEL, ETC.
06	MOPED	MOPED, MINIBIKE, SEATED MOTOR SCOOTER, MOTOR BIKE
07	SCHL BUS	SCHOOL BUS (INCLUDES VAN)
08	OTH BUS	OTHER BUS
09	MTRCYCLE	MOTORCYCLE, DIRT BIKE
10	OTHER	OTHER: FORKLIFT, BACKHOE, ETC.
11	MOTRHOME	MOTORHOME
12	TROLLEY	MOTORIZED STREET CAR/TROLLEY (NO RAILS/WIRES)
13	ATV	ATV
14	MTRSCTR	MOTORIZED SCOOTER (STANDING)
15	SNOWMOBILE	SNOWMOBILE
99	UNKNOWN	UNKNOWN VEHICLE TYPE

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

Appendix F 2020 Background Traffic Conditions Worksheets

Year 2020 Background Traffic Conditions
1: South End Rd & Deerbrook Dr/Barker Ave

Sunday Mid-day Peak
09/12/2018

Intersection												
Int Delay, s/veh	0.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	0	1	5	7	2	6	2	306	6	1	144	6
Future Vol, veh/h	0	1	5	7	2	6	2	306	6	1	144	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	1	1	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	0	0	0	0	0	0	0	3	0	0	1	17
Mvmt Flow	0	1	6	8	2	7	2	344	7	1	162	7

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	523	523	165	524	524	348	169	0	0	352	0	0
Stage 1	167	167	-	353	353	-	-	-	-	-	-	-
Stage 2	356	356	-	171	171	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	468	462	885	467	461	700	1421	-	-	1218	-	-
Stage 1	840	764	-	668	634	-	-	-	-	-	-	-
Stage 2	666	633	-	836	761	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	461	460	885	462	459	699	1421	-	-	1218	-	-
Mov Cap-2 Maneuver	461	460	-	462	459	-	-	-	-	-	-	-
Stage 1	838	763	-	666	632	-	-	-	-	-	-	-
Stage 2	656	631	-	829	760	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.7	12	0	0.1
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1421	-	-	767	534	1218	-
HCM Lane V/C Ratio	0.002	-	-	0.009	0.032	0.001	-
HCM Control Delay (s)	7.5	0	-	9.7	12	8	0
HCM Lane LOS	A	A	-	A	B	A	A
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0	-

Year 2020 Background Traffic Conditions
2: South End Rd & Lawton Rd/Warner Parrott Rd

Sunday Mid-day Peak
09/12/2018

Intersection	
Intersection Delay, s/veh	15.7
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔		↔			↔	↔
Traffic Vol, veh/h	26	33	8	154	20	49	8	230	195	47	94	20
Future Vol, veh/h	26	33	8	154	20	49	8	230	195	47	94	20
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	4	0	0	1	0	0	0	3	2	0	1	0
Mvmt Flow	27	34	8	160	21	51	8	240	203	49	98	21
Number of Lanes	0	1	0	0	1	1	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	1
HCM Control Delay	11	12.3	20	10.8
HCM LOS	B	B	C	B

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	2%	39%	89%	0%	33%	0%
Vol Thru, %	53%	49%	11%	0%	67%	0%
Vol Right, %	45%	12%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	433	67	174	49	141	20
LT Vol	8	26	154	0	47	0
Through Vol	230	33	20	0	94	0
RT Vol	195	8	0	49	0	20
Lane Flow Rate	451	70	181	51	147	21
Geometry Grp	6	6	7	7	7	7
Degree of Util (X)	0.69	0.133	0.345	0.08	0.256	0.031
Departure Headway (Hd)	5.511	6.865	6.854	5.676	6.284	5.42
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	654	521	524	630	571	659
Service Time	3.547	4.926	4.601	3.423	4.031	3.167
HCM Lane V/C Ratio	0.69	0.134	0.345	0.081	0.257	0.032
HCM Control Delay	20	11	13.2	8.9	11.2	8.3
HCM Lane LOS	C	B	B	A	B	A
HCM 95th-tile Q	5.5	0.5	1.5	0.3	1	0.1

Year 2020 Background Traffic Conditions
3: South End Rd & Oregon City Christian Church Dwy 1

Sunday Mid-day Peak
09/12/2018

Intersection						
Int Delay, s/veh	1.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	47	387	21	53	203
Future Vol, veh/h	10	47	387	21	53	203
Conflicting Peds, #/hr	0	0	0	4	4	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	125	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	3	0	0	1
Mvmt Flow	10	49	403	22	55	211
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	740	418	0	0	429	0
Stage 1	418	-	-	-	-	-
Stage 2	322	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	387	639	-	-	1141	-
Stage 1	669	-	-	-	-	-
Stage 2	739	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	364	637	-	-	1141	-
Mov Cap-2 Maneuver	364	-	-	-	-	-
Stage 1	666	-	-	-	-	-
Stage 2	698	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	11.8	0	1.7			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	- 364 637 1141	-	-		
HCM Lane V/C Ratio	-	- 0.029 0.077 0.048	-	-		
HCM Control Delay (s)	-	- 15.2 11.1 8.3	0			
HCM Lane LOS	-	- C B A A				
HCM 95th %tile Q(veh)	-	- 0.1 0.2 0.2	-	-		

Year 2020 Background Traffic Conditions
4: South End Rd & Oregon City Christian Church Dwy 2

Sunday Mid-day Peak
09/12/2018

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T	T	T	T
Traffic Vol, veh/h	0	0	408	0	0	213
Future Vol, veh/h	0	0	408	0	0	213
Conflicting Peds, #/hr	0	0	0	4	4	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	96	96	96	96	96	96
Heavy Vehicles, %	0	0	3	0	0	1
Mvmt Flow	0	0	425	0	0	222
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	651	429	0	0	429	0
Stage 1	429	-	-	-	-	-
Stage 2	222	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	436	630	-	-	1141	-
Stage 1	661	-	-	-	-	-
Stage 2	820	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	434	628	-	-	1141	-
Mov Cap-2 Maneuver	434	-	-	-	-	-
Stage 1	658	-	-	-	-	-
Stage 2	820	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	0	0	0			
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	-	1141	-	
HCM Lane V/C Ratio	-	-	-	-	-	
HCM Control Delay (s)	-	-	0	0	-	
HCM Lane LOS	-	-	A	A	-	
HCM 95th %tile Q(veh)	-	-	-	0	-	

Year 2020 Background Traffic Conditions
5: South End Rd & Lafayette Ave/S Partlow Rd

Sunday Mid-day Peak
09/12/2018

Intersection												
Int Delay, s/veh	3.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕			↕	
Traffic Vol, veh/h	5	3	7	40	4	75	2	269	43	45	163	5
Future Vol, veh/h	5	3	7	40	4	75	2	269	43	45	163	5
Conflicting Peds, #/hr	1	0	1	1	0	1	0	0	4	4	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	75	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	0	0	14	3	0	4	0	2	0	2	1	0
Mvmt Flow	6	4	8	47	5	88	2	316	51	53	192	6

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	695	677	196	657	654	347	198	0	0	371	0	0
Stage 1	301	301	-	350	350	-	-	-	-	-	-	-
Stage 2	394	376	-	307	304	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.34	7.13	6.5	6.24	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.13	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.13	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.426	3.527	4	3.336	2.2	-	-	2.218	-	-
Pot Cap-1 Maneuver	359	377	816	377	389	692	1387	-	-	1188	-	-
Stage 1	712	669	-	664	636	-	-	-	-	-	-	-
Stage 2	635	620	-	701	667	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	297	356	815	354	367	689	1386	-	-	1187	-	-
Mov Cap-2 Maneuver	297	356	-	354	367	-	-	-	-	-	-	-
Stage 1	711	636	-	660	632	-	-	-	-	-	-	-
Stage 2	548	616	-	655	634	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	13.5		13.1		0		1.7	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1386	-	-	443 354 660	1187	-	-
HCM Lane V/C Ratio	0.002	-	-	0.04 0.133 0.141	0.045	-	-
HCM Control Delay (s)	7.6	0	-	13.5 16.7 11.3	8.2	0	-
HCM Lane LOS	A	A	-	B C B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1 0.5 0.5	0.1	-	-

Intersection						
Int Delay, s/veh	2.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	45	292	197	45	40	40
Future Vol, veh/h	45	292	197	45	40	40
Conflicting Peds, #/hr	0	0	0	0	1	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	0	1	1	0	0	0
Mvmt Flow	54	348	235	54	48	48
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	288	0	-	0	717	261
Stage 1	-	-	-	-	261	-
Stage 2	-	-	-	-	456	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1286	-	-	-	399	783
Stage 1	-	-	-	-	787	-
Stage 2	-	-	-	-	643	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1286	-	-	-	378	783
Mov Cap-2 Maneuver	-	-	-	-	378	-
Stage 1	-	-	-	-	787	-
Stage 2	-	-	-	-	610	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.1	0		13.7		
HCM LOS				B		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1286	-	-	-	510	
HCM Lane V/C Ratio	0.042	-	-	-	0.187	
HCM Control Delay (s)	7.9	0	-	-	13.7	
HCM Lane LOS	A	A	-	-	B	
HCM 95th %tile Q(veh)	0.1	-	-	-	0.7	

Year 2020 Background Traffic Conditions
2: South End Rd & Lawton Rd/Warner Parrott Rd

Weekday PM Peak
09/12/2018

Intersection	
Intersection Delay, s/veh	29.6
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔		↔			↔	↔
Traffic Vol, veh/h	30	31	4	223	52	76	6	160	208	92	279	49
Future Vol, veh/h	30	31	4	223	52	76	6	160	208	92	279	49
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	3	3	0	2	2	3	0	1	2	2	1	0
Mvmt Flow	33	34	4	248	58	84	7	178	231	102	310	54
Number of Lanes	0	1	0	0	1	1	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	1
HCM Control Delay	14.1	23.1	33	34.5
HCM LOS	B	C	D	D

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	2%	46%	81%	0%	25%	0%
Vol Thru, %	43%	48%	19%	0%	75%	0%
Vol Right, %	56%	6%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	374	65	275	76	371	49
LT Vol	6	30	223	0	92	0
Through Vol	160	31	52	0	279	0
RT Vol	208	4	0	76	0	49
Lane Flow Rate	416	72	306	84	412	54
Geometry Grp	6	6	7	7	7	7
Degree of Util (X)	0.804	0.182	0.681	0.162	0.838	0.098
Departure Headway (Hd)	6.965	9.054	8.023	6.886	7.317	6.454
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	519	399	449	518	495	552
Service Time	5.041	7.054	5.8	4.662	5.091	4.228
HCM Lane V/C Ratio	0.802	0.18	0.682	0.162	0.832	0.098
HCM Control Delay	33	14.1	26.4	11	37.8	9.9
HCM Lane LOS	D	B	D	B	E	A
HCM 95th-tile Q	7.6	0.7	5	0.6	8.4	0.3

Year 2020 Background Traffic Conditions
3: South End Rd & Oregon City Christian Church Dwy 1

Weekday PM Peak

09/12/2018

Intersection						
Int Delay, s/veh	0.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	7	367	0	4	503
Future Vol, veh/h	0	7	367	0	4	503
Conflicting Peds, #/hr	0	0	0	4	4	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	125	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	0	8	408	0	4	559
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	980	412	0	0	412	0
Stage 1	412	-	-	-	-	-
Stage 2	568	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	279	644	-	-	1158	-
Stage 1	673	-	-	-	-	-
Stage 2	571	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	277	642	-	-	1158	-
Mov Cap-2 Maneuver	277	-	-	-	-	-
Stage 1	670	-	-	-	-	-
Stage 2	568	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	10.7	0	0.1			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	-	642	1158	-	
HCM Lane V/C Ratio	-	-	0.012	0.004	-	
HCM Control Delay (s)	-	-	0	10.7	8.1	0
HCM Lane LOS	-	-	A	B	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-	

Year 2020 Background Traffic Conditions
4: South End Rd & Oregon City Christian Church Dwy 2

Weekday PM Peak
09/12/2018

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔		↔			↔
Traffic Vol, veh/h	0	0	367	0	0	503
Future Vol, veh/h	0	0	367	0	0	503
Conflicting Peds, #/hr	0	0	0	4	4	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	90	90	90	90	90	90
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	0	0	408	0	0	559

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	971	412	0	0	412
Stage 1	412	-	-	-	-
Stage 2	559	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	283	644	-	-	1158
Stage 1	673	-	-	-	-
Stage 2	576	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	282	642	-	-	1158
Mov Cap-2 Maneuver	282	-	-	-	-
Stage 1	670	-	-	-	-
Stage 2	576	-	-	-	-

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

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	1158
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s)	-	-	0	0
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	-	0

Appendix G Year 2020 Total Traffic Conditions Worksheets

Year 2020 Total Traffic Conditions
2: South End Rd & Lawton Rd/Warner Parrott Rd

Weekday PM Peak
09/12/2018

Intersection	
Intersection Delay, s/veh	30
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔		↔			↔	↔
Traffic Vol, veh/h	30	31	4	224	52	76	6	161	209	92	280	49
Future Vol, veh/h	30	31	4	224	52	76	6	161	209	92	280	49
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	3	3	0	2	2	3	0	1	2	2	1	0
Mvmt Flow	33	34	4	249	58	84	7	179	232	102	311	54
Number of Lanes	0	1	0	0	1	1	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	1
HCM Control Delay	14.1	23.3	33.6	34.9
HCM LOS	B	C	D	D

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	2%	46%	81%	0%	25%	0%
Vol Thru, %	43%	48%	19%	0%	75%	0%
Vol Right, %	56%	6%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	376	65	276	76	372	49
LT Vol	6	30	224	0	92	0
Through Vol	161	31	52	0	280	0
RT Vol	209	4	0	76	0	49
Lane Flow Rate	418	72	307	84	413	54
Geometry Grp	6	6	7	7	7	7
Degree of Util (X)	0.81	0.182	0.685	0.162	0.841	0.098
Departure Headway (Hd)	6.976	9.082	8.037	6.9	7.329	6.467
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	518	397	448	518	492	551
Service Time	5.053	7.082	5.813	4.675	5.107	4.244
HCM Lane V/C Ratio	0.807	0.181	0.685	0.162	0.839	0.098
HCM Control Delay	33.6	14.1	26.7	11	38.2	10
HCM Lane LOS	D	B	D	B	E	A
HCM 95th-tile Q	7.8	0.7	5.1	0.6	8.5	0.3

Year 2020 Total Traffic Conditions
3: South End Rd & Oregon City Christian Church Dwy 1

Weekday PM Peak
09/12/2018

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	8	368	0	5	504
Future Vol, veh/h	0	8	368	0	5	504
Conflicting Peds, #/hr	0	0	0	4	4	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	125	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	0	9	409	0	6	560

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	984	413	0	0	413	0
Stage 1	413	-	-	-	-	-
Stage 2	571	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	278	643	-	-	1157	-
Stage 1	672	-	-	-	-	-
Stage 2	569	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	275	641	-	-	1157	-
Mov Cap-2 Maneuver	275	-	-	-	-	-
Stage 1	669	-	-	-	-	-
Stage 2	564	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.7	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT
Capacity (veh/h)	-	-	641	1157
HCM Lane V/C Ratio	-	-	0.014	0.005
HCM Control Delay (s)	-	0	10.7	8.1
HCM Lane LOS	-	A	B	A
HCM 95th %tile Q(veh)	-	-	0	0

Year 2020 Total Traffic Conditions
4: South End Rd & Oregon City Christian Church Dwy 2

Weekday PM Peak
09/12/2018

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔		↔			↔
Traffic Vol, veh/h	1	1	367	1	1	503
Future Vol, veh/h	1	1	367	1	1	503
Conflicting Peds, #/hr	0	0	0	4	4	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	90	90	90	90	90	90
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	1	1	408	1	1	559
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	973	412	0	0	413	0
Stage 1	412	-	-	-	-	-
Stage 2	561	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	282	644	-	-	1157	-
Stage 1	673	-	-	-	-	-
Stage 2	575	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	281	642	-	-	1157	-
Mov Cap-2 Maneuver	281	-	-	-	-	-
Stage 1	670	-	-	-	-	-
Stage 2	574	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	14.3	0	0			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	391	1157	-	
HCM Lane V/C Ratio	-	-	0.006	0.001	-	
HCM Control Delay (s)	-	-	14.3	8.1	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0	0	-	

Year 2020 Total Traffic Conditions
1: South End Rd & Deerbrook Dr/Barker Ave

Sunday Mid-day Peak
09/12/2018

Intersection												
Int Delay, s/veh	0.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	1	5	7	2	6	2	315	6	1	151	6
Future Vol, veh/h	0	1	5	7	2	6	2	315	6	1	151	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	1	1	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	0	0	0	0	0	0	0	3	0	0	1	17
Mvmt Flow	0	1	6	8	2	7	2	354	7	1	170	7

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	541	541	173	542	542	358	176	0	0	362	0	0
Stage 1	175	175	-	363	363	-	-	-	-	-	-	-
Stage 2	366	366	-	179	179	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	455	451	876	454	450	691	1412	-	-	1208	-	-
Stage 1	832	758	-	660	628	-	-	-	-	-	-	-
Stage 2	657	626	-	827	755	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	448	449	876	449	448	690	1412	-	-	1208	-	-
Mov Cap-2 Maneuver	448	449	-	449	448	-	-	-	-	-	-	-
Stage 1	830	757	-	658	626	-	-	-	-	-	-	-
Stage 2	647	624	-	820	754	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	9.8		12.1		0		0.1	
HCM LOS	A		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1412	-	-	756	522	1208	-
HCM Lane V/C Ratio	0.002	-	-	0.009	0.032	0.001	-
HCM Control Delay (s)	7.6	0	-	9.8	12.1	8	0
HCM Lane LOS	A	A	-	A	B	A	A
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0	-

Year 2020 Total Traffic Conditions
2: South End Rd & Lawton Rd/Warner Parrott Rd

Sunday Mid-day Peak
09/12/2018

Intersection

Intersection Delay, s/veh 17.4
Intersection LOS C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔		↔			↔	↔
Traffic Vol, veh/h	26	33	10	166	20	49	10	239	209	47	101	20
Future Vol, veh/h	26	33	10	166	20	49	10	239	209	47	101	20
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	4	0	0	1	0	0	0	3	2	0	1	0
Mvmt Flow	27	34	10	173	21	51	10	249	218	49	105	21
Number of Lanes	0	1	0	0	1	1	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	1
HCM Control Delay	11.2	12.9	23	11.2
HCM LOS	B	B	C	B

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	2%	38%	89%	0%	32%	0%
Vol Thru, %	52%	48%	11%	0%	68%	0%
Vol Right, %	46%	14%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	458	69	186	49	148	20
LT Vol	10	26	166	0	47	0
Through Vol	239	33	20	0	101	0
RT Vol	209	10	0	49	0	20
Lane Flow Rate	477	72	194	51	154	21
Geometry Grp	6	6	7	7	7	7
Degree of Util (X)	0.741	0.14	0.376	0.082	0.274	0.032
Departure Headway (Hd)	5.595	7.02	6.983	5.801	6.401	5.544
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	644	509	513	616	560	643
Service Time	3.639	5.094	4.739	3.556	4.16	3.303
HCM Lane V/C Ratio	0.741	0.141	0.378	0.083	0.275	0.033
HCM Control Delay	23	11.2	13.9	9.1	11.6	8.5
HCM Lane LOS	C	B	B	A	B	A
HCM 95th-tile Q	6.5	0.5	1.7	0.3	1.1	0.1

Year 2020 Total Traffic Conditions
3: South End Rd & Oregon City Christian Church Dwy 1

Sunday Mid-day Peak
09/12/2018

Intersection						
Int Delay, s/veh	1.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	17	60	399	27	64	213
Future Vol, veh/h	17	60	399	27	64	213
Conflicting Peds, #/hr	0	0	0	4	4	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	125	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	3	0	0	1
Mvmt Flow	18	63	416	28	67	222

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	789	434	0	0	448	0
Stage 1	434	-	-	-	-	-
Stage 2	355	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	362	626	-	-	1123	-
Stage 1	658	-	-	-	-	-
Stage 2	714	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	336	624	-	-	1123	-
Mov Cap-2 Maneuver	336	-	-	-	-	-
Stage 1	655	-	-	-	-	-
Stage 2	665	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.5	0	1.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT
Capacity (veh/h)	-	- 336 624 1123	-	-
HCM Lane V/C Ratio	-	- 0.053 0.1 0.059	-	-
HCM Control Delay (s)	-	- 16.3 11.4 8.4	0	
HCM Lane LOS	-	- C B A	A	
HCM 95th %tile Q(veh)	-	- 0.2 0.3 0.2	-	-

Year 2020 Total Traffic Conditions
4: South End Rd & Oregon City Christian Church Dwy 2

Sunday Mid-day Peak
09/12/2018

Intersection						
Int Delay, s/veh	0.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T	T	T	T
Traffic Vol, veh/h	8	12	414	5	10	220
Future Vol, veh/h	8	12	414	5	10	220
Conflicting Peds, #/hr	0	0	0	4	4	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	96	96	96	96	96	96
Heavy Vehicles, %	0	0	3	0	0	1
Mvmt Flow	8	13	431	5	10	229
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	688	438	0	0	440	0
Stage 1	438	-	-	-	-	-
Stage 2	250	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	415	623	-	-	1131	-
Stage 1	655	-	-	-	-	-
Stage 2	796	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	409	621	-	-	1131	-
Mov Cap-2 Maneuver	409	-	-	-	-	-
Stage 1	653	-	-	-	-	-
Stage 2	788	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	12.3	0	0.4			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	514	1131	-	
HCM Lane V/C Ratio	-	-	0.041	0.009	-	
HCM Control Delay (s)	-	-	12.3	8.2	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.1	0	-	

Year 2020 Total Traffic Conditions
5: South End Rd & Lafayette Ave/S Partlow Rd

Sunday Mid-day Peak
09/12/2018

Intersection												
Int Delay, s/veh	3.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔			↔			↔	
Traffic Vol, veh/h	5	3	7	40	4	78	2	277	43	49	173	6
Future Vol, veh/h	5	3	7	40	4	78	2	277	43	49	173	6
Conflicting Peds, #/hr	1	0	1	1	0	1	0	0	4	4	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	75	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	0	0	14	3	0	4	0	2	0	2	1	0
Mvmt Flow	6	4	8	47	5	92	2	326	51	58	204	7

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	727	707	208	689	686	356	211	0	0	380	0	0
Stage 1	322	322	-	360	360	-	-	-	-	-	-	-
Stage 2	405	385	-	329	326	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.34	7.13	6.5	6.24	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.13	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.13	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.426	3.527	4	3.336	2.2	-	-	2.218	-	-
Pot Cap-1 Maneuver	342	363	803	359	373	684	1372	-	-	1178	-	-
Stage 1	694	655	-	656	630	-	-	-	-	-	-	-
Stage 2	626	614	-	682	652	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	280	341	802	335	350	681	1371	-	-	1177	-	-
Mov Cap-2 Maneuver	280	341	-	335	350	-	-	-	-	-	-	-
Stage 1	693	618	-	652	626	-	-	-	-	-	-	-
Stage 2	536	610	-	633	615	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	13.9		13.5		0		1.8	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1371	-	-	424 335 651 1177	-	-	-
HCM Lane V/C Ratio	0.002	-	-	0.042 0.14 0.148 0.049	-	-	-
HCM Control Delay (s)	7.6	0	-	13.9 17.5 11.5 8.2	0	-	-
HCM Lane LOS	A	A	-	B C B A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1 0.5 0.5 0.2	-	-	-

Year 2020 Total Traffic Conditions
6: Warner Parrott Rd & Camenah Rd

Sunday Mid-day Peak
09/12/2018

Intersection

Int Delay, s/veh 2.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	48	303	206	45	40	43
Future Vol, veh/h	48	303	206	45	40	43
Conflicting Peds, #/hr	0	0	0	0	1	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	0	1	1	0	0	0
Mvmt Flow	57	361	245	54	48	51

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	299	0	0 748 272
Stage 1	-	-	- 272 -
Stage 2	-	-	- 476 -
Critical Hdwy	4.1	-	- 6.4 6.2
Critical Hdwy Stg 1	-	-	- 5.4 -
Critical Hdwy Stg 2	-	-	- 5.4 -
Follow-up Hdwy	2.2	-	- 3.5 3.3
Pot Cap-1 Maneuver	1274	-	- 383 772
Stage 1	-	-	- 778 -
Stage 2	-	-	- 629 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1274	-	- 362 772
Mov Cap-2 Maneuver	-	-	- 362 -
Stage 1	-	-	- 778 -
Stage 2	-	-	- 594 -

Approach	EB	WB	SB
HCM Control Delay, s	1.1	0	14
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1274	-	-	-	499
HCM Lane V/C Ratio	0.045	-	-	-	0.198
HCM Control Delay (s)	8	0	-	-	14
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.7

Appendix H Year 2022 Background Traffic Conditions Worksheets

Year 2022 Background Traffic Conditions
1: South End Rd & Deerbrook Dr/Barker Ave

Sunday Mid-day Peak
09/12/2018

Intersection												
Int Delay, s/veh	0.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	0	1	5	8	2	6	2	326	6	1	157	6
Future Vol, veh/h	0	1	5	8	2	6	2	326	6	1	157	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	1	1	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	0	0	0	0	0	0	0	3	0	0	1	17
Mvmt Flow	0	1	6	9	2	7	2	366	7	1	176	7

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	561	561	180	560	560	371	183	0	0	374	0	0
Stage 1	182	182	-	375	375	-	-	-	-	-	-	-
Stage 2	379	379	-	185	185	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	441	439	868	442	440	679	1404	-	-	1196	-	-
Stage 1	824	753	-	650	621	-	-	-	-	-	-	-
Stage 2	647	618	-	821	751	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	434	437	868	437	438	678	1404	-	-	1196	-	-
Mov Cap-2 Maneuver	434	437	-	437	438	-	-	-	-	-	-	-
Stage 1	822	752	-	648	619	-	-	-	-	-	-	-
Stage 2	637	616	-	814	750	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.9	12.4	0	0
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1404	-	-	745 504	1196	-	-
HCM Lane V/C Ratio	0.002	-	-	0.009 0.036	0.001	-	-
HCM Control Delay (s)	7.6	0	-	9.9 12.4	8	0	-
HCM Lane LOS	A	A	-	A B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0 0.1	0	-	-

Year 2022 Background Traffic Conditions
2: South End Rd & Lawton Rd/Warner Parrott Rd

Sunday Mid-day Peak
09/12/2018

Intersection	
Intersection Delay, s/veh	18.9
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔		↔			↔	↔
Traffic Vol, veh/h	27	34	11	171	20	51	11	248	216	48	105	20
Future Vol, veh/h	27	34	11	171	20	51	11	248	216	48	105	20
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	4	0	0	1	0	0	0	3	2	0	1	0
Mvmt Flow	28	35	11	178	21	53	11	258	225	50	109	21
Number of Lanes	0	1	0	0	1	1	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	1
HCM Control Delay	11.5	13.2	25.7	11.5
HCM LOS	B	B	D	B

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	2%	38%	90%	0%	31%	0%
Vol Thru, %	52%	47%	10%	0%	69%	0%
Vol Right, %	45%	15%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	475	72	191	51	153	20
LT Vol	11	27	171	0	48	0
Through Vol	248	34	20	0	105	0
RT Vol	216	11	0	51	0	20
Lane Flow Rate	495	75	199	53	159	21
Geometry Grp	6	6	7	7	7	7
Degree of Util (X)	0.777	0.148	0.391	0.087	0.287	0.033
Departure Headway (Hd)	5.653	7.127	7.073	5.888	6.484	5.629
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	638	500	507	606	551	632
Service Time	3.705	5.216	4.84	3.654	4.254	3.398
HCM Lane V/C Ratio	0.776	0.15	0.393	0.087	0.289	0.033
HCM Control Delay	25.7	11.5	14.3	9.2	11.9	8.6
HCM Lane LOS	D	B	B	A	B	A
HCM 95th-tile Q	7.4	0.5	1.8	0.3	1.2	0.1

Year 2022 Background Traffic Conditions
3: South End Rd & Oregon City Christian Church Dwy 1

Sunday Mid-day Peak
09/12/2018

Intersection						
Int Delay, s/veh	1.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	17	60	415	27	64	223
Future Vol, veh/h	17	60	415	27	64	223
Conflicting Peds, #/hr	0	0	0	4	4	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	125	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	3	0	0	1
Mvmt Flow	18	63	432	28	67	232
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	816	450	0	0	464	0
Stage 1	450	-	-	-	-	-
Stage 2	366	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	349	613	-	-	1108	-
Stage 1	647	-	-	-	-	-
Stage 2	706	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	324	611	-	-	1108	-
Mov Cap-2 Maneuver	324	-	-	-	-	-
Stage 1	645	-	-	-	-	-
Stage 2	657	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	12.7	0	1.9			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	- 324 611 1108			-	
HCM Lane V/C Ratio	-	- 0.055 0.102 0.06			-	
HCM Control Delay (s)	-	- 16.8 11.6 8.5			0	
HCM Lane LOS	-	- C B A A				
HCM 95th %tile Q(veh)	-	- 0.2 0.3 0.2			-	

Year 2022 Background Traffic Conditions
4: South End Rd & Oregon City Christian Church Dwy 2

Sunday Mid-day Peak
09/12/2018

Intersection						
Int Delay, s/veh	0.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T	T	T	T
Traffic Vol, veh/h	8	12	430	5	10	230
Future Vol, veh/h	8	12	430	5	10	230
Conflicting Peds, #/hr	0	0	0	4	4	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	96	96	96	96	96	96
Heavy Vehicles, %	0	0	3	0	0	1
Mvmt Flow	8	13	448	5	10	240
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	715	455	0	0	457	0
Stage 1	455	-	-	-	-	-
Stage 2	260	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	400	609	-	-	1114	-
Stage 1	643	-	-	-	-	-
Stage 2	788	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	394	607	-	-	1114	-
Mov Cap-2 Maneuver	394	-	-	-	-	-
Stage 1	641	-	-	-	-	-
Stage 2	780	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	12.5	0	0.3			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	499	1114	-	
HCM Lane V/C Ratio	-	-	0.042	0.009	-	
HCM Control Delay (s)	-	-	12.5	8.3	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.1	0	-	

Year 2022 Background Traffic Conditions
5: South End Rd & Lafayette Ave/S Partlow Rd

Sunday Mid-day Peak
09/12/2018

Intersection												
Int Delay, s/veh	3.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔			↔			↔	
Traffic Vol, veh/h	5	3	8	42	4	80	2	287	44	50	179	6
Future Vol, veh/h	5	3	8	42	4	80	2	287	44	50	179	6
Conflicting Peds, #/hr	1	0	1	1	0	1	0	0	4	4	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	75	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	0	0	14	3	0	4	0	2	0	2	1	0
Mvmt Flow	6	4	9	49	5	94	2	338	52	59	211	7

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	751	730	215	711	707	369	218	0	0	393	0	0
Stage 1	332	332	-	372	372	-	-	-	-	-	-	-
Stage 2	419	398	-	339	335	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.34	7.13	6.5	6.24	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.13	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.13	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.426	3.527	4	3.336	2.2	-	-	2.218	-	-
Pot Cap-1 Maneuver	330	352	796	347	363	672	1364	-	-	1166	-	-
Stage 1	686	648	-	646	622	-	-	-	-	-	-	-
Stage 2	616	606	-	673	646	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	268	330	795	323	340	669	1363	-	-	1165	-	-
Mov Cap-2 Maneuver	268	330	-	323	340	-	-	-	-	-	-	-
Stage 1	685	610	-	642	618	-	-	-	-	-	-	-
Stage 2	524	602	-	622	609	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	13.9		13.8		0		1.8	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1363	-	-	423 323 640	1165	-	-
HCM Lane V/C Ratio	0.002	-	-	0.045 0.153 0.154	0.05	-	-
HCM Control Delay (s)	7.6	0	-	13.9 18.1 11.6	8.3	0	-
HCM Lane LOS	A	A	-	B C B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1 0.5 0.5	0.2	-	-

Intersection						
Int Delay, s/veh	2.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	49	313	213	46	42	45
Future Vol, veh/h	49	313	213	46	42	45
Conflicting Peds, #/hr	0	0	0	0	1	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	0	1	1	0	0	0
Mvmt Flow	58	373	254	55	50	54
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	308	0	-	0	771	281
Stage 1	-	-	-	-	281	-
Stage 2	-	-	-	-	490	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1264	-	-	-	371	763
Stage 1	-	-	-	-	771	-
Stage 2	-	-	-	-	620	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1264	-	-	-	349	763
Mov Cap-2 Maneuver	-	-	-	-	349	-
Stage 1	-	-	-	-	771	-
Stage 2	-	-	-	-	584	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.1	0		14.4		
HCM LOS				B		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1264	-	-	-	485	
HCM Lane V/C Ratio	0.046	-	-	-	0.214	
HCM Control Delay (s)	8	0	-	-	14.4	
HCM Lane LOS	A	A	-	-	B	
HCM 95th %tile Q(veh)	0.1	-	-	-	0.8	

Year 2022 Background Traffic Conditions
2: South End Rd & Lawton Rd/Warner Parrott Rd

Weekday PM Peak
09/12/2018

Intersection	
Intersection Delay, s/veh	35.3
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔		↔			↔	↔
Traffic Vol, veh/h	31	32	4	232	54	79	6	167	216	96	290	51
Future Vol, veh/h	31	32	4	232	54	79	6	167	216	96	290	51
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	3	3	0	2	2	3	0	1	2	2	1	0
Mvmt Flow	34	36	4	258	60	88	7	186	240	107	322	57
Number of Lanes	0	1	0	0	1	1	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	1
HCM Control Delay	14.6	25.8	39.9	42.2
HCM LOS	B	D	E	E

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	2%	46%	81%	0%	25%	0%
Vol Thru, %	43%	48%	19%	0%	75%	0%
Vol Right, %	56%	6%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	389	67	286	79	386	51
LT Vol	6	31	232	0	96	0
Through Vol	167	32	54	0	290	0
RT Vol	216	4	0	79	0	51
Lane Flow Rate	432	74	318	88	429	57
Geometry Grp	6	6	7	7	7	7
Degree of Util (X)	0.857	0.194	0.723	0.172	0.893	0.104
Departure Headway (Hd)	7.141	9.387	8.195	7.056	7.492	6.627
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	506	385	439	506	480	537
Service Time	5.232	7.387	5.985	4.844	5.28	4.414
HCM Lane V/C Ratio	0.854	0.192	0.724	0.174	0.894	0.106
HCM Control Delay	39.9	14.6	29.8	11.3	46.4	10.2
HCM Lane LOS	E	B	D	B	E	B
HCM 95th-tile Q	9	0.7	5.7	0.6	9.8	0.3

Year 2022 Background Traffic Conditions
3: South End Rd & Oregon City Christian Church Dwy 1

Weekday PM Peak
09/12/2018

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	8	381	0	5	522
Future Vol, veh/h	0	8	381	0	5	522
Conflicting Peds, #/hr	0	0	0	4	4	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	125	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	0	9	423	0	6	580
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1018	427	0	0	427	0
Stage 1	427	-	-	-	-	-
Stage 2	591	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	265	632	-	-	1143	-
Stage 1	662	-	-	-	-	-
Stage 2	557	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	262	630	-	-	1143	-
Mov Cap-2 Maneuver	262	-	-	-	-	-
Stage 1	659	-	-	-	-	-
Stage 2	553	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	10.8	0	0.1			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	-	630	1143	-	
HCM Lane V/C Ratio	-	-	0.014	0.005	-	
HCM Control Delay (s)	-	-	0	10.8	8.2	0
HCM Lane LOS	-	-	A	B	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-	

Year 2022 Background Traffic Conditions
4: South End Rd & Oregon City Christian Church Dwy 2

Weekday PM Peak
09/12/2018

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T	T	T	T
Traffic Vol, veh/h	1	1	380	1	1	521
Future Vol, veh/h	1	1	380	1	1	521
Conflicting Peds, #/hr	0	0	0	4	4	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	90	90	90	90	90	90
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	1	1	422	1	1	579
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1008	427	0	0	427	0
Stage 1	427	-	-	-	-	-
Stage 2	581	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	269	632	-	-	1143	-
Stage 1	662	-	-	-	-	-
Stage 2	563	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	268	630	-	-	1143	-
Mov Cap-2 Maneuver	268	-	-	-	-	-
Stage 1	659	-	-	-	-	-
Stage 2	562	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	14.6	0	0			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	376	1143	-	
HCM Lane V/C Ratio	-	-	0.006	0.001	-	
HCM Control Delay (s)	-	-	14.6	8.2	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0	0	-	

Appendix I Year 2022 Total Traffic Conditions Worksheets

Year 2022 Total Traffic Conditions
1: South End Rd & Deerbrook Dr/Barker Ave

Sunday Mid-day Peak
09/12/2018

Intersection												
Int Delay, s/veh	0.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	0	1	5	8	2	6	2	330	6	1	160	6
Future Vol, veh/h	0	1	5	8	2	6	2	330	6	1	160	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	1	1	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	0	0	0	0	0	0	0	3	0	0	1	17
Mvmt Flow	0	1	6	9	2	7	2	371	7	1	180	7

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	568	568	183	569	569	375	187	0	0	379	0	0
Stage 1	185	185	-	380	380	-	-	-	-	-	-	-
Stage 2	383	383	-	189	189	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	437	435	865	436	435	676	1399	-	-	1191	-	-
Stage 1	821	751	-	646	617	-	-	-	-	-	-	-
Stage 2	644	616	-	817	748	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	430	433	865	431	433	675	1399	-	-	1191	-	-
Mov Cap-2 Maneuver	430	433	-	431	433	-	-	-	-	-	-	-
Stage 1	819	750	-	644	615	-	-	-	-	-	-	-
Stage 2	634	614	-	810	747	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	9.9		12.5		0		0	
HCM LOS	A		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1399	-	-	742	499	1191	-
HCM Lane V/C Ratio	0.002	-	-	0.009	0.036	0.001	-
HCM Control Delay (s)	7.6	0	-	9.9	12.5	8	0
HCM Lane LOS	A	A	-	A	B	A	A
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0	-

Year 2022 Total Traffic Conditions
2: South End Rd & Lawton Rd/Warner Parrott Rd

Sunday Mid-day Peak
09/12/2018

Intersection

Intersection Delay, s/veh 20.1
Intersection LOS C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔		↔			↔	↔
Traffic Vol, veh/h	27	34	12	176	20	51	12	252	222	48	108	20
Future Vol, veh/h	27	34	12	176	20	51	12	252	222	48	108	20
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	4	0	0	1	0	0	0	3	2	0	1	0
Mvmt Flow	28	35	13	183	21	53	13	263	231	50	113	21
Number of Lanes	0	1	0	0	1	1	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	1
HCM Control Delay	11.6	13.6	27.8	11.7
HCM LOS	B	B	D	B

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	2%	37%	90%	0%	31%	0%
Vol Thru, %	52%	47%	10%	0%	69%	0%
Vol Right, %	46%	16%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	486	73	196	51	156	20
LT Vol	12	27	176	0	48	0
Through Vol	252	34	20	0	108	0
RT Vol	222	12	0	51	0	20
Lane Flow Rate	506	76	204	53	162	21
Geometry Grp	6	6	7	7	7	7
Degree of Util (X)	0.801	0.152	0.405	0.088	0.295	0.033
Departure Headway (Hd)	5.693	7.2	7.135	5.947	6.541	5.688
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	633	494	502	599	546	625
Service Time	3.748	5.295	4.904	3.716	4.317	3.464
HCM Lane V/C Ratio	0.799	0.154	0.406	0.088	0.297	0.034
HCM Control Delay	27.8	11.6	14.7	9.3	12.1	8.7
HCM Lane LOS	D	B	B	A	B	A
HCM 95th-tile Q	8	0.5	1.9	0.3	1.2	0.1

Year 2022 Total Traffic Conditions
3: South End Rd & Oregon City Christian Church Dwy 1

Sunday Mid-day Peak
09/12/2018

Intersection

Int Delay, s/veh 2.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	21	66	420	30	69	227
Future Vol, veh/h	21	66	420	30	69	227
Conflicting Peds, #/hr	0	0	0	4	4	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	125	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	3	0	0	1
Mvmt Flow	22	69	438	31	72	236

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	837	457	0	0	473
Stage 1	457	-	-	-	-
Stage 2	380	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	339	608	-	-	1099
Stage 1	642	-	-	-	-
Stage 2	696	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	312	606	-	-	1099
Mov Cap-2 Maneuver	312	-	-	-	-
Stage 1	640	-	-	-	-
Stage 2	644	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.1	0	2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT
Capacity (veh/h)	-	- 312 606 1099	-	-
HCM Lane V/C Ratio	-	- 0.07 0.113 0.065	-	-
HCM Control Delay (s)	-	- 17.4 11.7 8.5	0	
HCM Lane LOS	-	- C B A	A	
HCM 95th %tile Q(veh)	-	- 0.2 0.4 0.2	-	-

Year 2022 Total Traffic Conditions
4: South End Rd & Oregon City Christian Church Dwy 2

Sunday Mid-day Peak
09/12/2018

Intersection						
Int Delay, s/veh	0.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T	T	T	T
Traffic Vol, veh/h	11	17	433	7	14	234
Future Vol, veh/h	11	17	433	7	14	234
Conflicting Peds, #/hr	0	0	0	4	4	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	96	96	96	96	96	96
Heavy Vehicles, %	0	0	3	0	0	1
Mvmt Flow	11	18	451	7	15	244

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	732	459	0
Stage 1	459	-	-
Stage 2	273	-	-
Critical Hdwy	6.4	6.2	-
Critical Hdwy Stg 1	5.4	-	-
Critical Hdwy Stg 2	5.4	-	-
Follow-up Hdwy	3.5	3.3	-
Pot Cap-1 Maneuver	391	606	-
Stage 1	641	-	-
Stage 2	778	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	383	604	-
Mov Cap-2 Maneuver	383	-	-
Stage 1	639	-	-
Stage 2	766	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.8	0	0.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	492	1110
HCM Lane V/C Ratio	-	-	0.059	0.013
HCM Control Delay (s)	-	-	12.8	8.3
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.2	0

Year 2022 Total Traffic Conditions
5: South End Rd & Lafayette Ave/S Partlow Rd

Sunday Mid-day Peak
09/12/2018

Intersection												
Int Delay, s/veh	3.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔			↔			↔	
Traffic Vol, veh/h	5	3	8	42	4	81	2	291	44	52	184	6
Future Vol, veh/h	5	3	8	42	4	81	2	291	44	52	184	6
Conflicting Peds, #/hr	1	0	1	1	0	1	0	0	4	4	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	75	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	0	0	14	3	0	4	0	2	0	2	1	0
Mvmt Flow	6	4	9	49	5	95	2	342	52	61	216	7
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	766	745	221	727	723	373	224	0	0	398	0	0
Stage 1	342	342	-	377	377	-	-	-	-	-	-	-
Stage 2	424	403	-	350	346	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.34	7.13	6.5	6.24	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.13	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.13	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.426	3.527	4	3.336	2.2	-	-	2.218	-	-
Pot Cap-1 Maneuver	322	345	790	338	355	669	1357	-	-	1161	-	-
Stage 1	677	642	-	642	619	-	-	-	-	-	-	-
Stage 2	612	603	-	664	639	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	260	322	789	314	332	666	1356	-	-	1160	-	-
Mov Cap-2 Maneuver	260	322	-	314	332	-	-	-	-	-	-	-
Stage 1	676	603	-	638	615	-	-	-	-	-	-	-
Stage 2	519	600	-	613	601	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	14.1		14		0		1.8					
HCM LOS	B		B									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1WBLn2	SBL	SBT	SBR					
Capacity (veh/h)	1356	-	-	414 314 636	1160	-	-					
HCM Lane V/C Ratio	0.002	-	-	0.045 0.157 0.157	0.053	-	-					
HCM Control Delay (s)	7.7	0	-	14.1 18.6 11.7	8.3	0	-					
HCM Lane LOS	A	A	-	B C B	A	A	-					
HCM 95th %tile Q(veh)	0	-	-	0.1 0.6 0.6	0.2	-	-					

Year 2022 Total Traffic Conditions
6: Warner Parrott Rd & Camenah Rd

Sunday Mid-day Peak
09/12/2018

Intersection

Int Delay, s/veh 2.3

Movement EBL EBT WBT WBR SBL SBR

Lane Configurations 

Traffic Vol, veh/h 50 318 217 46 42 46

Future Vol, veh/h 50 318 217 46 42 46

Conflicting Peds, #/hr 0 0 0 0 1 0

Sign Control Free Free Free Free Stop Stop

RT Channelized - None - None - None

Storage Length - - - - 0 -

Veh in Median Storage, # - 0 0 - 0 -

Grade, % - 0 0 - 0 -

Peak Hour Factor 84 84 84 84 84 84

Heavy Vehicles, % 0 1 1 0 0 0

Mvmt Flow 60 379 258 55 50 55

Major/Minor Major1 Major2 Minor2

Conflicting Flow All 313 0 - 0 785 286

Stage 1 - - - - 286 -

Stage 2 - - - - 499 -

Critical Hdwy 4.1 - - - 6.4 6.2

Critical Hdwy Stg 1 - - - - 5.4 -

Critical Hdwy Stg 2 - - - - 5.4 -

Follow-up Hdwy 2.2 - - - 3.5 3.3

Pot Cap-1 Maneuver 1259 - - - 364 758

Stage 1 - - - - 767 -

Stage 2 - - - - 614 -

Platoon blocked, % - - - -

Mov Cap-1 Maneuver 1259 - - - 342 758

Mov Cap-2 Maneuver - - - - 342 -

Stage 1 - - - - 767 -

Stage 2 - - - - 577 -

Approach EB WB SB

HCM Control Delay, s 1.1 0 14.6

HCM LOS B

Minor Lane/Major Mvmt EBL EBT WBT WBR SBLn1

Capacity (veh/h) 1259 - - - 480

HCM Lane V/C Ratio 0.047 - - - 0.218

HCM Control Delay (s) 8 0 - - 14.6

HCM Lane LOS A A - - B

HCM 95th %tile Q(veh) 0.1 - - - 0.8

Year 2022 Total Traffic Conditions
2: South End Rd & Lawton Rd/Warner Parrott Rd

Weekday PM Peak
09/12/2018

Intersection	
Intersection Delay, s/veh	35.6
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔		↔			↔	↔
Traffic Vol, veh/h	31	32	4	233	54	79	6	167	217	96	290	51
Future Vol, veh/h	31	32	4	233	54	79	6	167	217	96	290	51
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	3	3	0	2	2	3	0	1	2	2	1	0
Mvmt Flow	34	36	4	259	60	88	7	186	241	107	322	57
Number of Lanes	0	1	0	0	1	1	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	1
HCM Control Delay	14.7	26	40.5	42.4
HCM LOS	B	D	E	E

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	2%	46%	81%	0%	25%	0%
Vol Thru, %	43%	48%	19%	0%	75%	0%
Vol Right, %	56%	6%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	390	67	287	79	386	51
LT Vol	6	31	233	0	96	0
Through Vol	167	32	54	0	290	0
RT Vol	217	4	0	79	0	51
Lane Flow Rate	433	74	319	88	429	57
Geometry Grp	6	6	7	7	7	7
Degree of Util (X)	0.861	0.195	0.727	0.172	0.894	0.105
Departure Headway (Hd)	7.151	9.406	8.202	7.062	7.504	6.639
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	503	384	440	505	480	536
Service Time	5.243	7.406	5.995	4.854	5.295	4.43
HCM Lane V/C Ratio	0.861	0.193	0.725	0.174	0.894	0.106
HCM Control Delay	40.5	14.7	30.1	11.3	46.6	10.2
HCM Lane LOS	E	B	D	B	E	B
HCM 95th-tile Q	9.1	0.7	5.8	0.6	9.9	0.3

Year 2022 Total Traffic Conditions
3: South End Rd & Oregon City Christian Church Dwy 1

Weekday PM Peak
09/12/2018

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	9	381	0	6	522
Future Vol, veh/h	0	9	381	0	6	522
Conflicting Peds, #/hr	0	0	0	4	4	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	125	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	0	10	423	0	7	580

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1020	427	0	0	427	0
Stage 1	427	-	-	-	-	-
Stage 2	593	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	264	632	-	-	1143	-
Stage 1	662	-	-	-	-	-
Stage 2	556	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	261	630	-	-	1143	-
Mov Cap-2 Maneuver	261	-	-	-	-	-
Stage 1	659	-	-	-	-	-
Stage 2	551	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.8	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT
Capacity (veh/h)	-	-	630	1143
HCM Lane V/C Ratio	-	-	0.016	0.006
HCM Control Delay (s)	-	-	0	10.8
HCM Lane LOS	-	-	A	B
HCM 95th %tile Q(veh)	-	-	0	0

Year 2022 Total Traffic Conditions
4: South End Rd & Oregon City Christian Church Dwy 2

Weekday PM Peak
09/12/2018

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T	T	T	T
Traffic Vol, veh/h	1	1	380	1	1	521
Future Vol, veh/h	1	1	380	1	1	521
Conflicting Peds, #/hr	0	0	0	4	4	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	90	90	90	90	90	90
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	1	1	422	1	1	579
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1008	427	0	0	427	0
Stage 1	427	-	-	-	-	-
Stage 2	581	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	269	632	-	-	1143	-
Stage 1	662	-	-	-	-	-
Stage 2	563	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	268	630	-	-	1143	-
Mov Cap-2 Maneuver	268	-	-	-	-	-
Stage 1	659	-	-	-	-	-
Stage 2	562	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	14.6	0	0			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	376	1143	-	
HCM Lane V/C Ratio	-	-	0.006	0.001	-	
HCM Control Delay (s)	-	-	14.6	8.2	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0	0	-	

Appendix J Year 2025 Background Traffic Conditions Worksheets

Year 2025 Background Traffic Conditions
2: South End Rd & Lawton Rd/Warner Parrott Rd

Weekday PM Peak
09/12/2018

Intersection	
Intersection Delay, s/veh	49.9
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔		↔			↔	↔
Traffic Vol, veh/h	33	34	5	246	57	83	7	175	229	101	306	53
Future Vol, veh/h	33	34	5	246	57	83	7	175	229	101	306	53
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	3	3	0	2	2	3	0	1	2	2	1	0
Mvmt Flow	37	38	6	273	63	92	8	194	254	112	340	59
Number of Lanes	0	1	0	0	1	1	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	1
HCM Control Delay	15.8	32.5	58.9	61.8
HCM LOS	C	D	F	F

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	2%	46%	81%	0%	25%	0%
Vol Thru, %	43%	47%	19%	0%	75%	0%
Vol Right, %	56%	7%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	411	72	303	83	407	53
LT Vol	7	33	246	0	101	0
Through Vol	175	34	57	0	306	0
RT Vol	229	5	0	83	0	53
Lane Flow Rate	457	80	337	92	452	59
Geometry Grp	6	6	7	7	7	7
Degree of Util (X)	0.957	0.221	0.802	0.19	0.992	0.115
Departure Headway (Hd)	7.546	9.924	8.58	7.435	7.894	7.026
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	480	361	421	482	461	509
Service Time	5.599	8.012	6.33	5.185	5.645	4.777
HCM Lane V/C Ratio	0.952	0.222	0.8	0.191	0.98	0.116
HCM Control Delay	58.9	15.8	38.2	11.9	68.4	10.7
HCM Lane LOS	F	C	E	B	F	B
HCM 95th-tile Q	11.8	0.8	7.2	0.7	12.8	0.4

Year 2025 Background Traffic Conditions
3: South End Rd & Oregon City Christian Church Dwy 1

Weekday PM Peak
09/12/2018

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	9	402	0	6	550
Future Vol, veh/h	0	9	402	0	6	550
Conflicting Peds, #/hr	0	0	0	4	4	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	125	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	0	10	447	0	7	611
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1075	451	0	0	451	0
Stage 1	451	-	-	-	-	-
Stage 2	624	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	245	613	-	-	1120	-
Stage 1	646	-	-	-	-	-
Stage 2	538	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	242	611	-	-	1120	-
Mov Cap-2 Maneuver	242	-	-	-	-	-
Stage 1	644	-	-	-	-	-
Stage 2	533	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	11	0	0.1			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	-	611	1120	-	
HCM Lane V/C Ratio	-	-	0.016	0.006	-	
HCM Control Delay (s)	-	-	0	11	8.2	0
HCM Lane LOS	-	-	A	B	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-	

Year 2025 Background Traffic Conditions
4: South End Rd & Oregon City Christian Church Dwy 2

Weekday PM Peak

09/12/2018

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T	T	T	T
Traffic Vol, veh/h	1	1	401	1	1	549
Future Vol, veh/h	1	1	401	1	1	549
Conflicting Peds, #/hr	0	0	0	4	4	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	90	90	90	90	90	90
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	1	1	446	1	1	610
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1062	450	0	0	451	0
Stage 1	450	-	-	-	-	-
Stage 2	612	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	250	613	-	-	1120	-
Stage 1	647	-	-	-	-	-
Stage 2	545	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	249	611	-	-	1120	-
Mov Cap-2 Maneuver	249	-	-	-	-	-
Stage 1	645	-	-	-	-	-
Stage 2	544	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	15.2	0	0			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	354	1120	-	
HCM Lane V/C Ratio	-	-	0.006	0.001	-	
HCM Control Delay (s)	-	-	15.2	8.2	0	
HCM Lane LOS	-	-	C	A	A	
HCM 95th %tile Q(veh)	-	-	0	0	-	

Year 2025 Background Traffic Conditions
1: South End Rd & Deerbrook Dr/Barker Ave

Sunday Mid-day Peak
09/12/2018

Intersection												
Int Delay, s/veh	0.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	0	1	6	8	2	7	2	347	7	1	167	7
Future Vol, veh/h	0	1	6	8	2	7	2	347	7	1	167	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	1	1	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	0	0	0	0	0	0	0	3	0	0	1	17
Mvmt Flow	0	1	7	9	2	8	2	390	8	1	188	8

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	597	597	192	597	597	395	196	0	0	399	0	0
Stage 1	194	194	-	399	399	-	-	-	-	-	-	-
Stage 2	403	403	-	198	198	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	418	419	855	418	419	659	1389	-	-	1171	-	-
Stage 1	812	744	-	631	606	-	-	-	-	-	-	-
Stage 2	628	603	-	808	741	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	410	417	855	413	417	658	1389	-	-	1171	-	-
Mov Cap-2 Maneuver	410	417	-	413	417	-	-	-	-	-	-	-
Stage 1	810	743	-	629	604	-	-	-	-	-	-	-
Stage 2	617	601	-	800	740	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	9.9		12.7		0		0	
HCM LOS	A		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1389	-	-	743	488	1171	-
HCM Lane V/C Ratio	0.002	-	-	0.011	0.039	0.001	-
HCM Control Delay (s)	7.6	0	-	9.9	12.7	8.1	0
HCM Lane LOS	A	A	-	A	B	A	A
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0	-

Year 2025 Background Traffic Conditions
2: South End Rd & Lawton Rd/Warner Parrott Rd

Sunday Mid-day Peak
09/12/2018

Intersection	
Intersection Delay, s/veh	23.5
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	28	36	12	185	22	53	12	265	233	51	113	22
Future Vol, veh/h	28	36	12	185	22	53	12	265	233	51	113	22
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	4	0	0	1	0	0	0	3	2	0	1	0
Mvmt Flow	29	38	13	193	23	55	13	276	243	53	118	23
Number of Lanes	0	1	0	0	1	1	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	1
HCM Control Delay	12	14.4	33.9	12.2
HCM LOS	B	B	D	B

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	2%	37%	89%	0%	31%	0%
Vol Thru, %	52%	47%	11%	0%	69%	0%
Vol Right, %	46%	16%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	510	76	207	53	164	22
LT Vol	12	28	185	0	51	0
Through Vol	265	36	22	0	113	0
RT Vol	233	12	0	53	0	22
Lane Flow Rate	531	79	216	55	171	23
Geometry Grp	6	6	7	7	7	7
Degree of Util (X)	0.855	0.165	0.436	0.093	0.317	0.037
Departure Headway (Hd)	5.794	7.511	7.273	6.086	6.685	5.83
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	622	481	492	584	533	608
Service Time	3.865	5.511	5.06	3.872	4.482	3.626
HCM Lane V/C Ratio	0.854	0.164	0.439	0.094	0.321	0.038
HCM Control Delay	33.9	12	15.6	9.5	12.6	8.9
HCM Lane LOS	D	B	C	A	B	A
HCM 95th-tile Q	9.5	0.6	2.2	0.3	1.4	0.1

Year 2025 Background Traffic Conditions
3: South End Rd & Oregon City Christian Church Dwy 1

Sunday Mid-day Peak
09/12/2018

Intersection						
Int Delay, s/veh	2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	21	66	444	30	69	241
Future Vol, veh/h	21	66	444	30	69	241
Conflicting Peds, #/hr	0	0	0	4	4	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	125	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	3	0	0	1
Mvmt Flow	22	69	463	31	72	251
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	877	482	0	0	498	0
Stage 1	482	-	-	-	-	-
Stage 2	395	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	322	588	-	-	1076	-
Stage 1	625	-	-	-	-	-
Stage 2	685	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	296	586	-	-	1076	-
Mov Cap-2 Maneuver	296	-	-	-	-	-
Stage 1	623	-	-	-	-	-
Stage 2	632	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	13.5	0		1.9		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	296	586	1076	-
HCM Lane V/C Ratio	-	-	0.074	0.117	0.067	-
HCM Control Delay (s)	-	-	18.1	12	8.6	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.4	0.2	-

Year 2025 Background Traffic Conditions
4: South End Rd & Oregon City Christian Church Dwy 2

Sunday Mid-day Peak
09/12/2018

Intersection						
Int Delay, s/veh	0.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T	T	T	T
Traffic Vol, veh/h	11	17	457	7	14	248
Future Vol, veh/h	11	17	457	7	14	248
Conflicting Peds, #/hr	0	0	0	4	4	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	96	96	96	96	96	96
Heavy Vehicles, %	0	0	3	0	0	1
Mvmt Flow	11	18	476	7	15	258
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	772	484	0	0	487	0
Stage 1	484	-	-	-	-	-
Stage 2	288	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	371	587	-	-	1086	-
Stage 1	624	-	-	-	-	-
Stage 2	766	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	364	585	-	-	1086	-
Mov Cap-2 Maneuver	364	-	-	-	-	-
Stage 1	622	-	-	-	-	-
Stage 2	754	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	13.1	0	0.4			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	472	1086	-	
HCM Lane V/C Ratio	-	-	0.062	0.013	-	
HCM Control Delay (s)	-	-	13.1	8.4	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.2	0	-	

Year 2025 Background Traffic Conditions
5: South End Rd & Lafayette Ave/S Partlow Rd

Sunday Mid-day Peak
09/12/2018

Intersection												
Int Delay, s/veh	3.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕			↕	
Traffic Vol, veh/h	6	3	8	44	5	86	2	305	46	55	193	7
Future Vol, veh/h	6	3	8	44	5	86	2	305	46	55	193	7
Conflicting Peds, #/hr	1	0	1	1	0	1	0	0	4	4	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	75	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	0	0	14	3	0	4	0	2	0	2	1	0
Mvmt Flow	7	4	9	52	6	101	2	359	54	65	227	8

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	806	783	232	763	760	391	235	0	0	417	0	0
Stage 1	361	361	-	395	395	-	-	-	-	-	-	-
Stage 2	445	422	-	368	365	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.34	7.13	6.5	6.24	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.13	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.13	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.426	3.527	4	3.336	2.2	-	-	2.218	-	-
Pot Cap-1 Maneuver	303	328	778	320	338	653	1344	-	-	1142	-	-
Stage 1	662	629	-	628	608	-	-	-	-	-	-	-
Stage 2	596	592	-	650	627	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	239	305	777	296	314	650	1343	-	-	1141	-	-
Mov Cap-2 Maneuver	239	305	-	296	314	-	-	-	-	-	-	-
Stage 1	661	587	-	624	604	-	-	-	-	-	-	-
Stage 2	497	589	-	596	586	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	15.1		14.6		0		1.8	
HCM LOS	C		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1343	-	-	376 296 614	1141	-	-
HCM Lane V/C Ratio	0.002	-	-	0.053 0.175 0.174	0.057	-	-
HCM Control Delay (s)	7.7	0	-	15.1 19.7 12.1	8.3	0	-
HCM Lane LOS	A	A	-	C C B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2 0.6 0.6	0.2	-	-

Year 2025 Background Traffic Conditions
6: Warner Parrott Rd & Camenah Rd

Sunday Mid-day Peak
09/12/2018

Intersection						
Int Delay, s/veh	2.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	53	334	228	49	44	48
Future Vol, veh/h	53	334	228	49	44	48
Conflicting Peds, #/hr	0	0	0	0	1	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	0	1	1	0	0	0
Mvmt Flow	63	398	271	58	52	57
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	330	0	-	0	826	301
Stage 1	-	-	-	-	301	-
Stage 2	-	-	-	-	525	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1241	-	-	-	345	743
Stage 1	-	-	-	-	755	-
Stage 2	-	-	-	-	598	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1241	-	-	-	323	743
Mov Cap-2 Maneuver	-	-	-	-	323	-
Stage 1	-	-	-	-	755	-
Stage 2	-	-	-	-	559	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.1	0		15.3		
HCM LOS				C		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1241	-	-	-	458	
HCM Lane V/C Ratio	0.051	-	-	-	0.239	
HCM Control Delay (s)	8.1	0	-	-	15.3	
HCM Lane LOS	A	A	-	-	C	
HCM 95th %tile Q(veh)	0.2	-	-	-	0.9	

Appendix K Year 2025 Background Traffic Conditions Worksheets
(Mitigated)

Year 2025 Background Traffic Conditions (Mitigated)
2: South End Rd & Lawton Rd/Warner Parrott Rd

Weekday PM Peak
09/12/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	34	5	246	57	83	7	175	229	101	306	53
Future Volume (vph)	33	34	5	246	57	83	7	175	229	101	306	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5	4.5		4.5			4.5	4.5
Lane Util. Factor		1.00			1.00	1.00		1.00			1.00	1.00
Frpb, ped/bikes		1.00			1.00	0.98		0.98			1.00	1.00
Flpb, ped/bikes		1.00			1.00	1.00		1.00			1.00	1.00
Frt		0.99			1.00	0.85		0.92			1.00	0.85
Flt Protected		0.98			0.96	1.00		1.00			0.99	1.00
Satd. Flow (prot)		1788			1790	1533		1703			1852	1615
Flt Permitted		0.79			0.71	1.00		0.99			0.81	1.00
Satd. Flow (perm)		1448			1325	1533		1690			1526	1615
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	37	38	6	273	63	92	8	194	254	112	340	59
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	81	0	0	336	92	0	456	0	0	452	59
Confl. Peds. (#/hr)	2					2			6	6		
Heavy Vehicles (%)	3%	3%	0%	2%	2%	3%	0%	1%	2%	2%	1%	0%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)		16.4			16.4	16.4		20.1			20.1	20.1
Effective Green, g (s)		16.4			16.4	16.4		20.1			20.1	20.1
Actuated g/C Ratio		0.36			0.36	0.36		0.44			0.44	0.44
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)		521			477	552		746			674	713
v/s Ratio Prot												
v/s Ratio Perm		0.06			c0.25	0.06		0.27			c0.30	0.04
v/c Ratio		0.16			0.70	0.17		0.61			0.67	0.08
Uniform Delay, d1		9.9			12.5	9.9		9.7			10.1	7.4
Progression Factor		1.00			1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2		0.1			4.7	0.1		1.5			2.6	0.1
Delay (s)		10.0			17.2	10.0		11.2			12.7	7.4
Level of Service		A			B	B		B			B	A
Approach Delay (s)		10.0			15.6			11.2			12.1	
Approach LOS		A			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			12.7				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.69									
Actuated Cycle Length (s)			45.5				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

Year 2025 Background Traffic Conditions (Mitigated)
3: South End Rd & Oregon City Christian Church Dwy 1

Weekday PM Peak
09/12/2018

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	9	402	0	6	550
Future Vol, veh/h	0	9	402	0	6	550
Conflicting Peds, #/hr	0	0	0	4	4	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	125	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	0	10	447	0	7	611

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1075	451	0	0	451	0
Stage 1	451	-	-	-	-	-
Stage 2	624	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	245	613	-	-	1120	-
Stage 1	646	-	-	-	-	-
Stage 2	538	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	242	611	-	-	1120	-
Mov Cap-2 Maneuver	242	-	-	-	-	-
Stage 1	644	-	-	-	-	-
Stage 2	533	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT
Capacity (veh/h)	-	-	611	1120
HCM Lane V/C Ratio	-	-	0.016	0.006
HCM Control Delay (s)	-	-	0	11
HCM Lane LOS	-	-	A	B
HCM 95th %tile Q(veh)	-	-	0.1	0

Year 2025 Background Traffic Conditions (Mitigated)
4: South End Rd & Oregon City Christian Church Dwy 2

Weekday PM Peak
09/12/2018

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	1	401	1	1	549
Future Vol, veh/h	1	1	401	1	1	549
Conflicting Peds, #/hr	0	0	0	4	4	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	90	90	90	90	90	90
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	1	1	446	1	1	610

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1062	450	0	0	451
Stage 1	450	-	-	-	-
Stage 2	612	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	250	613	-	-	1120
Stage 1	647	-	-	-	-
Stage 2	545	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	249	611	-	-	1120
Mov Cap-2 Maneuver	249	-	-	-	-
Stage 1	645	-	-	-	-
Stage 2	544	-	-	-	-

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

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	354	1120
HCM Lane V/C Ratio	-	-	0.006	0.001
HCM Control Delay (s)	-	-	15.2	8.2
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	0	0

Year 2025 Background Traffic Conditions (Mitigated)
1: South End Rd & Deerbrook Dr/Barker Ave

Sunday Mid-day Peak
09/12/2018

Intersection												
Int Delay, s/veh	0.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	0	1	6	8	2	7	2	347	7	1	167	7
Future Vol, veh/h	0	1	6	8	2	7	2	347	7	1	167	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	1	1	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	0	0	0	0	0	0	0	3	0	0	1	17
Mvmt Flow	0	1	7	9	2	8	2	390	8	1	188	8

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	597	597	192	597	597	395	196	0	0	399	0	0
Stage 1	194	194	-	399	399	-	-	-	-	-	-	-
Stage 2	403	403	-	198	198	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	418	419	855	418	419	659	1389	-	-	1171	-	-
Stage 1	812	744	-	631	606	-	-	-	-	-	-	-
Stage 2	628	603	-	808	741	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	410	417	855	413	417	658	1389	-	-	1171	-	-
Mov Cap-2 Maneuver	410	417	-	413	417	-	-	-	-	-	-	-
Stage 1	810	743	-	629	604	-	-	-	-	-	-	-
Stage 2	617	601	-	800	740	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.9	12.7	0	0
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1389	-	-	743	488	1171	-
HCM Lane V/C Ratio	0.002	-	-	0.011	0.039	0.001	-
HCM Control Delay (s)	7.6	0	-	9.9	12.7	8.1	0
HCM Lane LOS	A	A	-	A	B	A	A
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0	-

Year 2025 Background Traffic Conditions (Mitigated)
2: South End Rd & Lawton Rd/Warner Parrott Rd

Sunday Mid-day Peak
09/12/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	36	12	185	22	53	12	265	233	51	113	22
Future Volume (vph)	28	36	12	185	22	53	12	265	233	51	113	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5	4.5		4.5			4.5	4.5
Lane Util. Factor		1.00			1.00	1.00		1.00			1.00	1.00
Frpb, ped/bikes		1.00			1.00	0.97		0.99			1.00	0.98
Flpb, ped/bikes		1.00			1.00	1.00		1.00			1.00	1.00
Frt		0.98			1.00	0.85		0.94			1.00	0.85
Flt Protected		0.98			0.96	1.00		1.00			0.98	1.00
Satd. Flow (prot)		1793			1803	1564		1718			1857	1581
Flt Permitted		0.85			0.69	1.00		0.99			0.79	1.00
Satd. Flow (perm)		1558			1303	1564		1708			1498	1581
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	29	38	12	193	23	55	12	276	243	53	118	23
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	80	0	0	216	55	0	532	0	0	171	23
Confl. Peds. (#/hr)	10					10	1		4	4		1
Heavy Vehicles (%)	4%	0%	0%	1%	0%	0%	0%	3%	2%	0%	1%	0%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)		13.0			13.0	13.0		21.2			21.2	21.2
Effective Green, g (s)		13.0			13.0	13.0		21.2			21.2	21.2
Actuated g/C Ratio		0.30			0.30	0.30		0.49			0.49	0.49
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)		468			392	470		838			735	775
v/s Ratio Prot												
v/s Ratio Perm		0.05			c0.17	0.04		c0.31			0.11	0.01
v/c Ratio		0.17			0.55	0.12		0.63			0.23	0.03
Uniform Delay, d1		11.1			12.7	10.9		8.1			6.3	5.7
Progression Factor		1.00			1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2		0.2			1.7	0.1		1.6			0.2	0.0
Delay (s)		11.3			14.3	11.1		9.7			6.5	5.7
Level of Service		B			B	B		A			A	A
Approach Delay (s)		11.3			13.7			9.7			6.4	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM 2000 Control Delay			10.2				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.60									
Actuated Cycle Length (s)			43.2				Sum of lost time (s)			9.0		
Intersection Capacity Utilization			61.3%				ICU Level of Service			B		
Analysis Period (min)			15									

c Critical Lane Group

Year 2025 Background Traffic Conditions (Mitigated)
3: South End Rd & Oregon City Christian Church Dwy 1

Sunday Mid-day Peak
09/12/2018

Intersection						
Int Delay, s/veh	2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	21	66	444	30	69	241
Future Vol, veh/h	21	66	444	30	69	241
Conflicting Peds, #/hr	0	0	0	4	4	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	125	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	3	0	0	1
Mvmt Flow	22	69	463	31	72	251
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	877	482	0	0	498	0
Stage 1	482	-	-	-	-	-
Stage 2	395	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	322	588	-	-	1076	-
Stage 1	625	-	-	-	-	-
Stage 2	685	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	296	586	-	-	1076	-
Mov Cap-2 Maneuver	296	-	-	-	-	-
Stage 1	623	-	-	-	-	-
Stage 2	632	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	13.5	0	1.9			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	- 296 586 1076		-		
HCM Lane V/C Ratio	-	- 0.074 0.117 0.067		-		
HCM Control Delay (s)	-	- 18.1 12 8.6		0		
HCM Lane LOS	-	- C B A A				
HCM 95th %tile Q(veh)	-	- 0.2 0.4 0.2		-		

Year 2025 Background Traffic Conditions (Mitigated)
4: South End Rd & Oregon City Christian Church Dwy 2

Sunday Mid-day Peak
09/12/2018

Intersection						
Int Delay, s/veh	0.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	11	17	457	7	14	248
Future Vol, veh/h	11	17	457	7	14	248
Conflicting Peds, #/hr	0	0	0	4	4	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	96	96	96	96	96	96
Heavy Vehicles, %	0	0	3	0	0	1
Mvmt Flow	11	18	476	7	15	258

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	772	484	0	0	487
Stage 1	484	-	-	-	-
Stage 2	288	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	371	587	-	-	1086
Stage 1	624	-	-	-	-
Stage 2	766	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	364	585	-	-	1086
Mov Cap-2 Maneuver	364	-	-	-	-
Stage 1	622	-	-	-	-
Stage 2	754	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.1	0	0.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	472	1086
HCM Lane V/C Ratio	-	-	0.062	0.013
HCM Control Delay (s)	-	-	13.1	8.4
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.2	0

Year 2025 Background Traffic Conditions (Mitigated)
5: South End Rd & Lafayette Ave/S Partlow Rd

Sunday Mid-day Peak
09/12/2018

Intersection												
Int Delay, s/veh	3.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕			↕	
Traffic Vol, veh/h	6	3	8	44	5	86	2	305	46	55	193	7
Future Vol, veh/h	6	3	8	44	5	86	2	305	46	55	193	7
Conflicting Peds, #/hr	1	0	1	1	0	1	0	0	4	4	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	75	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	0	0	14	3	0	4	0	2	0	2	1	0
Mvmt Flow	7	4	9	52	6	101	2	359	54	65	227	8

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	806	783	232	763	760	391	235	0	0	417	0	0
Stage 1	361	361	-	395	395	-	-	-	-	-	-	-
Stage 2	445	422	-	368	365	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.34	7.13	6.5	6.24	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.13	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.13	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.426	3.527	4	3.336	2.2	-	-	2.218	-	-
Pot Cap-1 Maneuver	303	328	778	320	338	653	1344	-	-	1142	-	-
Stage 1	662	629	-	628	608	-	-	-	-	-	-	-
Stage 2	596	592	-	650	627	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	239	305	777	296	314	650	1343	-	-	1141	-	-
Mov Cap-2 Maneuver	239	305	-	296	314	-	-	-	-	-	-	-
Stage 1	661	587	-	624	604	-	-	-	-	-	-	-
Stage 2	497	589	-	596	586	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	15.1		14.6		0		1.8	
HCM LOS	C		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1343	-	-	376 296 614	1141	-	-
HCM Lane V/C Ratio	0.002	-	-	0.053 0.175 0.174	0.057	-	-
HCM Control Delay (s)	7.7	0	-	15.1 19.7 12.1	8.3	0	-
HCM Lane LOS	A	A	-	C C B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2 0.6 0.6	0.2	-	-

Year 2025 Background Traffic Conditions (Mitigated)
6: Warner Parrott Rd & Camenah Rd

Sunday Mid-day Peak
09/12/2018

Intersection

Int Delay, s/veh 2.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	53	334	228	49	44	48
Future Vol, veh/h	53	334	228	49	44	48
Conflicting Peds, #/hr	0	0	0	0	1	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	0	1	1	0	0	0
Mvmt Flow	63	398	271	58	52	57

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	330	0	826
Stage 1	-	-	301
Stage 2	-	-	525
Critical Hdwy	4.1	-	6.4
Critical Hdwy Stg 1	-	-	5.4
Critical Hdwy Stg 2	-	-	5.4
Follow-up Hdwy	2.2	-	3.5
Pot Cap-1 Maneuver	1241	-	345
Stage 1	-	-	755
Stage 2	-	-	598
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1241	-	323
Mov Cap-2 Maneuver	-	-	323
Stage 1	-	-	755
Stage 2	-	-	559

Approach	EB	WB	SB
HCM Control Delay, s	1.1	0	15.3
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1241	-	-	-	458
HCM Lane V/C Ratio	0.051	-	-	-	0.239
HCM Control Delay (s)	8.1	0	-	-	15.3
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	-	0.9

Appendix L Year 2025 Total Traffic Conditions Worksheets

Year 2025 Total Traffic Conditions
1: South End Rd & Deerbrook Dr/Barker Ave

Sunday Mid-day Peak
09/12/2018

Intersection												
Int Delay, s/veh	0.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	0	1	6	8	2	7	2	347	7	1	167	7
Future Vol, veh/h	0	1	6	8	2	7	2	347	7	1	167	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	1	1	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	0	0	0	0	0	0	0	3	0	0	1	17
Mvmt Flow	0	1	7	9	2	8	2	390	8	1	188	8

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	597	597	192	597	597	395	196	0	0	399	0	0
Stage 1	194	194	-	399	399	-	-	-	-	-	-	-
Stage 2	403	403	-	198	198	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	418	419	855	418	419	659	1389	-	-	1171	-	-
Stage 1	812	744	-	631	606	-	-	-	-	-	-	-
Stage 2	628	603	-	808	741	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	410	417	855	413	417	658	1389	-	-	1171	-	-
Mov Cap-2 Maneuver	410	417	-	413	417	-	-	-	-	-	-	-
Stage 1	810	743	-	629	604	-	-	-	-	-	-	-
Stage 2	617	601	-	800	740	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	9.9		12.7		0		0	
HCM LOS	A		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1389	-	-	743	488	1171	-
HCM Lane V/C Ratio	0.002	-	-	0.011	0.039	0.001	-
HCM Control Delay (s)	7.6	0	-	9.9	12.7	8.1	0
HCM Lane LOS	A	A	-	A	B	A	A
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0	-

Year 2025 Total Traffic Conditions
2: South End Rd & Lawton Rd/Warner Parrott Rd

Sunday Mid-day Peak
09/12/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	36	12	186	22	53	12	265	233	51	113	22
Future Volume (vph)	28	36	12	186	22	53	12	265	233	51	113	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5	4.5		4.5			4.5	4.5
Lane Util. Factor		1.00			1.00	1.00		1.00			1.00	1.00
Frpb, ped/bikes		1.00			1.00	0.97		0.99			1.00	0.98
Flpb, ped/bikes		1.00			1.00	1.00		1.00			1.00	1.00
Frt		0.98			1.00	0.85		0.94			1.00	0.85
Flt Protected		0.98			0.96	1.00		1.00			0.98	1.00
Satd. Flow (prot)		1793			1803	1564		1718			1857	1581
Flt Permitted		0.85			0.69	1.00		0.99			0.79	1.00
Satd. Flow (perm)		1558			1303	1564		1708			1498	1581
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	29	38	12	194	23	55	12	276	243	53	118	23
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	80	0	0	217	55	0	532	0	0	171	23
Confl. Peds. (#/hr)	10					10	1		4	4		1
Heavy Vehicles (%)	4%	0%	0%	1%	0%	0%	0%	3%	2%	0%	1%	0%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)		13.1			13.1	13.1		21.2			21.2	21.2
Effective Green, g (s)		13.1			13.1	13.1		21.2			21.2	21.2
Actuated g/C Ratio		0.30			0.30	0.30		0.49			0.49	0.49
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)		471			394	473		836			733	774
v/s Ratio Prot												
v/s Ratio Perm		0.05			c0.17	0.04		c0.31			0.11	0.01
v/c Ratio		0.17			0.55	0.12		0.64			0.23	0.03
Uniform Delay, d1		11.1			12.6	10.9		8.2			6.4	5.7
Progression Factor		1.00			1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2		0.2			1.7	0.1		1.6			0.2	0.0
Delay (s)		11.3			14.3	11.0		9.8			6.5	5.7
Level of Service		B			B	B		A			A	A
Approach Delay (s)		11.3			13.6			9.8			6.4	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM 2000 Control Delay			10.3				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.60									
Actuated Cycle Length (s)			43.3				Sum of lost time (s)			9.0		
Intersection Capacity Utilization			61.3%				ICU Level of Service			B		
Analysis Period (min)			15									

c Critical Lane Group

Year 2025 Total Traffic Conditions
3: South End Rd & Oregon City Christian Church Dwy 1

Sunday Mid-day Peak
09/12/2018

Intersection						
Int Delay, s/veh	2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	21	66	444	30	70	241
Future Vol, veh/h	21	66	444	30	70	241
Conflicting Peds, #/hr	0	0	0	4	4	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	125	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	3	0	0	1
Mvmt Flow	22	69	463	31	73	251

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	879	482	0	0	498	0
Stage 1	482	-	-	-	-	-
Stage 2	397	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	321	588	-	-	1076	-
Stage 1	625	-	-	-	-	-
Stage 2	683	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	295	586	-	-	1076	-
Mov Cap-2 Maneuver	295	-	-	-	-	-
Stage 1	623	-	-	-	-	-
Stage 2	629	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.5	0	1.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT
Capacity (veh/h)	-	- 295 586 1076	-	-
HCM Lane V/C Ratio	-	- 0.074 0.117 0.068	-	-
HCM Control Delay (s)	-	- 18.2 12 8.6	0	
HCM Lane LOS	-	- C B A A		
HCM 95th %tile Q(veh)	-	- 0.2 0.4 0.2	-	-

Year 2025 Total Traffic Conditions
4: South End Rd & Oregon City Christian Church Dwy 2

Sunday Mid-day Peak
09/12/2018

Intersection						
Int Delay, s/veh	0.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T	T	T	T
Traffic Vol, veh/h	11	17	457	7	14	248
Future Vol, veh/h	11	17	457	7	14	248
Conflicting Peds, #/hr	0	0	0	4	4	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	96	96	96	96	96	96
Heavy Vehicles, %	0	0	3	0	0	1
Mvmt Flow	11	18	476	7	15	258
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	772	484	0	0	487	0
Stage 1	484	-	-	-	-	-
Stage 2	288	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	371	587	-	-	1086	-
Stage 1	624	-	-	-	-	-
Stage 2	766	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	364	585	-	-	1086	-
Mov Cap-2 Maneuver	364	-	-	-	-	-
Stage 1	622	-	-	-	-	-
Stage 2	754	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	13.1	0	0.4			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	472	1086	-	
HCM Lane V/C Ratio	-	-	0.062	0.013	-	
HCM Control Delay (s)	-	-	13.1	8.4	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.2	0	-	

Year 2025 Total Traffic Conditions
5: South End Rd & Lafayette Ave/S Partlow Rd

Sunday Mid-day Peak
09/12/2018

Intersection												
Int Delay, s/veh	3.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕			↕	
Traffic Vol, veh/h	6	3	8	44	5	86	2	305	46	55	193	7
Future Vol, veh/h	6	3	8	44	5	86	2	305	46	55	193	7
Conflicting Peds, #/hr	1	0	1	1	0	1	0	0	4	4	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	75	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	0	0	14	3	0	4	0	2	0	2	1	0
Mvmt Flow	7	4	9	52	6	101	2	359	54	65	227	8

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	806	783	232	763	760	391	235	0	0	417	0	0
Stage 1	361	361	-	395	395	-	-	-	-	-	-	-
Stage 2	445	422	-	368	365	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.34	7.13	6.5	6.24	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.13	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.13	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.426	3.527	4	3.336	2.2	-	-	2.218	-	-
Pot Cap-1 Maneuver	303	328	778	320	338	653	1344	-	-	1142	-	-
Stage 1	662	629	-	628	608	-	-	-	-	-	-	-
Stage 2	596	592	-	650	627	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	239	305	777	296	314	650	1343	-	-	1141	-	-
Mov Cap-2 Maneuver	239	305	-	296	314	-	-	-	-	-	-	-
Stage 1	661	587	-	624	604	-	-	-	-	-	-	-
Stage 2	497	589	-	596	586	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	15.1		14.6		0		1.8	
HCM LOS	C		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1343	-	-	376 296 614	1141	-	-
HCM Lane V/C Ratio	0.002	-	-	0.053 0.175 0.174	0.057	-	-
HCM Control Delay (s)	7.7	0	-	15.1 19.7 12.1	8.3	0	-
HCM Lane LOS	A	A	-	C C B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2 0.6 0.6	0.2	-	-

Year 2025 Total Traffic Conditions
6: Warner Parrott Rd & Camenah Rd

Sunday Mid-day Peak
09/12/2018

Intersection						
Int Delay, s/veh	2.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	53	334	229	49	44	48
Future Vol, veh/h	53	334	229	49	44	48
Conflicting Peds, #/hr	0	0	0	0	1	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	0	1	1	0	0	0
Mvmt Flow	63	398	273	58	52	57
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	331	0	-	0	827	302
Stage 1	-	-	-	-	302	-
Stage 2	-	-	-	-	525	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1240	-	-	-	344	742
Stage 1	-	-	-	-	755	-
Stage 2	-	-	-	-	598	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1240	-	-	-	322	742
Mov Cap-2 Maneuver	-	-	-	-	322	-
Stage 1	-	-	-	-	755	-
Stage 2	-	-	-	-	559	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.1	0		15.3		
HCM LOS				C		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1240	-	-	-	457	
HCM Lane V/C Ratio	0.051	-	-	-	0.24	
HCM Control Delay (s)	8.1	0	-	-	15.3	
HCM Lane LOS	A	A	-	-	C	
HCM 95th %tile Q(veh)	0.2	-	-	-	0.9	

Year 2025 Total Traffic Conditions
2: South End Rd & Lawton Rd/Warner Parrott Rd

Weekday PM Peak
09/12/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	34	5	247	57	83	7	176	230	101	306	53
Future Volume (vph)	33	34	5	247	57	83	7	176	230	101	306	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5	4.5		4.5			4.5	4.5
Lane Util. Factor		1.00			1.00	1.00		1.00			1.00	1.00
Frpb, ped/bikes		1.00			1.00	0.98		0.98			1.00	1.00
Flpb, ped/bikes		1.00			1.00	1.00		1.00			1.00	1.00
Frt		0.99			1.00	0.85		0.92			1.00	0.85
Flt Protected		0.98			0.96	1.00		1.00			0.99	1.00
Satd. Flow (prot)		1788			1790	1533		1703			1852	1615
Flt Permitted		0.79			0.71	1.00		0.99			0.81	1.00
Satd. Flow (perm)		1448			1325	1533		1690			1522	1615
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	37	38	6	274	63	92	8	196	256	112	340	59
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	81	0	0	337	92	0	460	0	0	452	59
Confl. Peds. (#/hr)	2					2			6	6		
Heavy Vehicles (%)	3%	3%	0%	2%	2%	3%	0%	1%	2%	2%	1%	0%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)		16.5			16.5	16.5		20.1			20.1	20.1
Effective Green, g (s)		16.5			16.5	16.5		20.1			20.1	20.1
Actuated g/C Ratio		0.36			0.36	0.36		0.44			0.44	0.44
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)		523			479	554		744			670	711
v/s Ratio Prot												
v/s Ratio Perm		0.06			c0.25	0.06		0.27			c0.30	0.04
v/c Ratio		0.15			0.70	0.17		0.62			0.67	0.08
Uniform Delay, d1		9.8			12.5	9.9		9.8			10.1	7.4
Progression Factor		1.00			1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2		0.1			4.7	0.1		1.5			2.7	0.1
Delay (s)		10.0			17.1	10.0		11.3			12.8	7.5
Level of Service		A			B	B		B			B	A
Approach Delay (s)		10.0			15.6			11.3			12.2	
Approach LOS		A			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			12.8		HCM 2000 Level of Service					B		
HCM 2000 Volume to Capacity ratio			0.69									
Actuated Cycle Length (s)			45.6		Sum of lost time (s)				9.0			
Intersection Capacity Utilization			80.4%		ICU Level of Service				D			
Analysis Period (min)			15									

c Critical Lane Group

Year 2025 Total Traffic Conditions
3: South End Rd & Oregon City Christian Church Dwy 1

Weekday PM Peak
09/12/2018

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	10	403	0	7	550
Future Vol, veh/h	1	10	403	0	7	550
Conflicting Peds, #/hr	0	0	0	4	4	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	125	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	1	11	448	0	8	611

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1079	452	0	0	452	0
Stage 1	452	-	-	-	-	-
Stage 2	627	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	244	612	-	-	1119	-
Stage 1	645	-	-	-	-	-
Stage 2	536	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	240	610	-	-	1119	-
Mov Cap-2 Maneuver	240	-	-	-	-	-
Stage 1	643	-	-	-	-	-
Stage 2	530	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.8	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT
Capacity (veh/h)	-	- 240 610 1119	-	-
HCM Lane V/C Ratio	-	- 0.005 0.018 0.007	-	-
HCM Control Delay (s)	-	- 20.1 11 8.2	0	
HCM Lane LOS	-	- C B A A		
HCM 95th %tile Q(veh)	-	- 0 0.1 0	-	-

Year 2025 Total Traffic Conditions
4: South End Rd & Oregon City Christian Church Dwy 2

Weekday PM Peak
09/12/2018

Intersection						
Int Delay, s/veh	0.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T	T	T	T
Traffic Vol, veh/h	2	2	401	1	1	550
Future Vol, veh/h	2	2	401	1	1	550
Conflicting Peds, #/hr	0	0	0	4	4	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	90	90	90	90	90	90
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	2	2	446	1	1	611

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	1063	450	0
Stage 1	450	-	-
Stage 2	613	-	-
Critical Hdwy	6.4	6.2	-
Critical Hdwy Stg 1	5.4	-	-
Critical Hdwy Stg 2	5.4	-	-
Follow-up Hdwy	3.5	3.3	-
Pot Cap-1 Maneuver	249	613	-
Stage 1	647	-	-
Stage 2	544	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	248	611	-
Mov Cap-2 Maneuver	248	-	-
Stage 1	645	-	-
Stage 2	543	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15.3	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	353	1120
HCM Lane V/C Ratio	-	-	0.013	0.001
HCM Control Delay (s)	-	-	15.3	8.2
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	0	0

Appendix M Year 2030 Background Traffic Conditions Worksheets

Year 2030 Background Traffic Conditions
1: South End Rd & Deerbrook Dr/Barker Ave

Sunday Mid-day Peak
09/12/2018

Intersection												
Int Delay, s/veh	0.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	0	1	6	9	2	7	2	375	7	1	181	7
Future Vol, veh/h	0	1	6	9	2	7	2	375	7	1	181	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	1	1	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	0	0	0	0	0	0	0	3	0	0	1	17
Mvmt Flow	0	1	7	10	2	8	2	421	8	1	203	8

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	645	645	207	644	644	426	211	0	0	430	0	0
Stage 1	210	210	-	431	431	-	-	-	-	-	-	-
Stage 2	435	435	-	213	213	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	388	393	839	389	394	633	1372	-	-	1140	-	-
Stage 1	797	732	-	607	586	-	-	-	-	-	-	-
Stage 2	604	584	-	794	730	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	381	391	839	384	392	632	1372	-	-	1140	-	-
Mov Cap-2 Maneuver	381	391	-	384	392	-	-	-	-	-	-	-
Stage 1	795	731	-	605	584	-	-	-	-	-	-	-
Stage 2	593	582	-	786	729	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10	13.3	0	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1372	-	-	721 454	1140	-	-
HCM Lane V/C Ratio	0.002	-	-	0.011 0.045	0.001	-	-
HCM Control Delay (s)	7.6	0	-	10 13.3	8.2	0	-
HCM Lane LOS	A	A	-	B B	A A	-	-
HCM 95th %tile Q(veh)	0	-	-	0 0.1	0	-	-

Year 2030 Background Traffic Conditions
2: South End Rd & Lawton Rd/Warner Parrott Rd

Sunday Mid-day Peak
09/12/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	39	13	200	23	58	13	286	251	55	122	23
Future Volume (vph)	31	39	13	200	23	58	13	286	251	55	122	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5	4.5		4.5			4.5	4.5
Lane Util. Factor		1.00			1.00	1.00		1.00			1.00	1.00
Frpb, ped/bikes		1.00			1.00	0.97		0.99			1.00	0.98
Flpb, ped/bikes		1.00			1.00	1.00		1.00			1.00	1.00
Frt		0.98			1.00	0.85		0.94			1.00	0.85
Flt Protected		0.98			0.96	1.00		1.00			0.98	1.00
Satd. Flow (prot)		1793			1802	1563		1718			1857	1581
Flt Permitted		0.85			0.69	1.00		0.99			0.78	1.00
Satd. Flow (perm)		1545			1293	1563		1708			1471	1581
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	32	41	14	208	24	60	14	298	261	57	127	24
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	87	0	0	232	60	0	573	0	0	184	24
Confl. Peds. (#/hr)	10					10	1		4	4		1
Heavy Vehicles (%)	4%	0%	0%	1%	0%	0%	0%	3%	2%	0%	1%	0%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)		13.9			13.9	13.9		22.4			22.4	22.4
Effective Green, g (s)		13.9			13.9	13.9		22.4			22.4	22.4
Actuated g/C Ratio		0.31			0.31	0.31		0.49			0.49	0.49
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)		474			396	479		844			727	781
v/s Ratio Prot												
v/s Ratio Perm		0.06			c0.18	0.04		c0.34			0.13	0.02
v/c Ratio		0.18			0.59	0.13		0.68			0.25	0.03
Uniform Delay, d1		11.5			13.3	11.3		8.7			6.6	5.9
Progression Factor		1.00			1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2		0.2			2.2	0.1		2.2			0.2	0.0
Delay (s)		11.7			15.5	11.4		10.9			6.8	5.9
Level of Service		B			B	B		B			A	A
Approach Delay (s)		11.7			14.6			10.9			6.7	
Approach LOS		B			B			B			A	
Intersection Summary												
HCM 2000 Control Delay			11.2				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.64									
Actuated Cycle Length (s)			45.3				Sum of lost time (s)			9.0		
Intersection Capacity Utilization			68.2%				ICU Level of Service			C		
Analysis Period (min)			15									

c Critical Lane Group

Year 2030 Background Traffic Conditions
3: South End Rd & Oregon City Christian Church Dwy 1

Sunday Mid-day Peak
09/12/2018

Intersection						
Int Delay, s/veh	2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	21	66	483	30	70	264
Future Vol, veh/h	21	66	483	30	70	264
Conflicting Peds, #/hr	0	0	0	4	4	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	125	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	3	0	0	1
Mvmt Flow	22	69	503	31	73	275

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	944	523	0	0	538	0
Stage 1	523	-	-	-	-	-
Stage 2	421	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	293	558	-	-	1040	-
Stage 1	599	-	-	-	-	-
Stage 2	667	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	268	556	-	-	1040	-
Mov Cap-2 Maneuver	268	-	-	-	-	-
Stage 1	597	-	-	-	-	-
Stage 2	612	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.1	0	1.8
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT
Capacity (veh/h)	-	- 268 556 1040	-	-
HCM Lane V/C Ratio	-	- 0.082 0.124 0.07	-	-
HCM Control Delay (s)	-	- 19.6 12.4 8.7	0	
HCM Lane LOS	-	- C B A A		
HCM 95th %tile Q(veh)	-	- 0.3 0.4 0.2	-	-

Year 2030 Background Traffic Conditions
4: South End Rd & Oregon City Christian Church Dwy 2

Sunday Mid-day Peak
09/12/2018

Intersection						
Int Delay, s/veh	0.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T	T	T	T
Traffic Vol, veh/h	11	17	496	7	14	271
Future Vol, veh/h	11	17	496	7	14	271
Conflicting Peds, #/hr	0	0	0	4	4	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	96	96	96	96	96	96
Heavy Vehicles, %	0	0	3	0	0	1
Mvmt Flow	11	18	517	7	15	282
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	835	524	0	0	528	0
Stage 1	524	-	-	-	-	-
Stage 2	311	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	340	557	-	-	1049	-
Stage 1	598	-	-	-	-	-
Stage 2	748	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	333	555	-	-	1049	-
Mov Cap-2 Maneuver	333	-	-	-	-	-
Stage 1	596	-	-	-	-	-
Stage 2	735	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	13.8	0	0.4			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	440	1049	-	
HCM Lane V/C Ratio	-	-	0.066	0.014	-	
HCM Control Delay (s)	-	-	13.8	8.5	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.2	0	-	

Year 2030 Background Traffic Conditions
5: South End Rd & Lafayette Ave/S Partlow Rd

Sunday Mid-day Peak
09/12/2018

Intersection												
Int Delay, s/veh	3.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↖	↖			↕			↕	
Traffic Vol, veh/h	6	4	9	48	5	92	2	330	50	59	208	7
Future Vol, veh/h	6	4	9	48	5	92	2	330	50	59	208	7
Conflicting Peds, #/hr	1	0	1	1	0	1	0	0	4	4	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	75	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	0	0	14	3	0	4	0	2	0	2	1	0
Mvmt Flow	7	5	11	56	6	108	2	388	59	69	245	8
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	868	844	250	822	818	423	253	0	0	451	0	0
Stage 1	388	388	-	426	426	-	-	-	-	-	-	-
Stage 2	480	456	-	396	392	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.34	7.13	6.5	6.24	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.13	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.13	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.426	3.527	4	3.336	2.2	-	-	2.218	-	-
Pot Cap-1 Maneuver	275	302	760	292	313	627	1324	-	-	1109	-	-
Stage 1	640	612	-	604	589	-	-	-	-	-	-	-
Stage 2	571	572	-	627	610	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	211	278	759	267	288	624	1323	-	-	1108	-	-
Mov Cap-2 Maneuver	211	278	-	267	288	-	-	-	-	-	-	-
Stage 1	639	567	-	600	586	-	-	-	-	-	-	-
Stage 2	466	569	-	568	565	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	16.1		15.7		0		1.8					
HCM LOS	C		C									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1WBLn2	SBL	SBT	SBR					
Capacity (veh/h)	1323	-	-	347 267 589	1108	-	-					
HCM Lane V/C Ratio	0.002	-	-	0.064 0.212 0.194	0.063	-	-					
HCM Control Delay (s)	7.7	0	-	16.1 22.1 12.6	8.5	0	-					
HCM Lane LOS	A	A	-	C C B	A	A	-					
HCM 95th %tile Q(veh)	0	-	-	0.2 0.8 0.7	0.2	-	-					

Year 2030 Background Traffic Conditions
6: Warner Parrott Rd & Camenah Rd

Sunday Mid-day Peak
09/12/2018

Intersection						
Int Delay, s/veh	2.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	57	361	247	53	48	52
Future Vol, veh/h	57	361	247	53	48	52
Conflicting Peds, #/hr	0	0	0	0	1	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	0	1	1	0	0	0
Mvmt Flow	68	430	294	63	57	62
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	357	0	-	0	892	326
Stage 1	-	-	-	-	326	-
Stage 2	-	-	-	-	566	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1213	-	-	-	315	720
Stage 1	-	-	-	-	736	-
Stage 2	-	-	-	-	572	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1213	-	-	-	292	720
Mov Cap-2 Maneuver	-	-	-	-	292	-
Stage 1	-	-	-	-	736	-
Stage 2	-	-	-	-	530	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.1	0		16.8		
HCM LOS				C		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1213	-	-	-	423	
HCM Lane V/C Ratio	0.056	-	-	-	0.281	
HCM Control Delay (s)	8.1	0	-	-	16.8	
HCM Lane LOS	A	A	-	-	C	
HCM 95th %tile Q(veh)	0.2	-	-	-	1.1	

Year 2030 Background Traffic Conditions
2: South End Rd & Lawton Rd/Warner Parrott Rd

Weekday PM Peak
09/12/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	37	5	267	61	90	7	191	249	109	331	58
Future Volume (vph)	36	37	5	267	61	90	7	191	249	109	331	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5	4.5		4.5			4.5	4.5
Lane Util. Factor		1.00			1.00	1.00		1.00			1.00	1.00
Frpb, ped/bikes		1.00			1.00	0.98		0.98			1.00	1.00
Flpb, ped/bikes		1.00			1.00	1.00		1.00			1.00	1.00
Frt		0.99			1.00	0.85		0.92			1.00	0.85
Flt Protected		0.98			0.96	1.00		1.00			0.99	1.00
Satd. Flow (prot)		1789			1790	1532		1702			1852	1615
Flt Permitted		0.78			0.71	1.00		0.99			0.79	1.00
Satd. Flow (perm)		1427			1317	1532		1690			1473	1615
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	40	41	6	297	68	100	8	212	277	121	368	64
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	87	0	0	365	100	0	497	0	0	489	64
Confl. Peds. (#/hr)	2					2			6	6		
Heavy Vehicles (%)	3%	3%	0%	2%	2%	3%	0%	1%	2%	2%	1%	0%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)		17.8			17.8	17.8		21.8			21.8	21.8
Effective Green, g (s)		17.8			17.8	17.8		21.8			21.8	21.8
Actuated g/C Ratio		0.37			0.37	0.37		0.45			0.45	0.45
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)		522			482	561		758			660	724
v/s Ratio Prot												
v/s Ratio Perm		0.06			c0.28	0.07		0.29			c0.33	0.04
v/c Ratio		0.17			0.76	0.18		0.66			0.74	0.09
Uniform Delay, d1		10.4			13.5	10.4		10.5			11.1	7.7
Progression Factor		1.00			1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2		0.2			6.7	0.2		2.1			4.5	0.1
Delay (s)		10.5			20.2	10.6		12.5			15.5	7.7
Level of Service		B			C	B		B			B	A
Approach Delay (s)		10.5			18.1			12.5			14.6	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			14.8		HCM 2000 Level of Service					B		
HCM 2000 Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			48.6		Sum of lost time (s)					9.0		
Intersection Capacity Utilization			85.4%		ICU Level of Service					E		
Analysis Period (min)			15									

c Critical Lane Group

Year 2030 Background Traffic Conditions
3: South End Rd & Oregon City Christian Church Dwy 1

Weekday PM Peak
09/12/2018

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	10	437	0	7	596
Future Vol, veh/h	1	10	437	0	7	596
Conflicting Peds, #/hr	0	0	0	4	4	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	125	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	1	11	486	0	8	662

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1168	490	0	0	490
Stage 1	490	-	-	-	-
Stage 2	678	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	216	582	-	-	1084
Stage 1	620	-	-	-	-
Stage 2	508	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	213	580	-	-	1084
Mov Cap-2 Maneuver	213	-	-	-	-
Stage 1	618	-	-	-	-
Stage 2	502	-	-	-	-

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

Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT
Capacity (veh/h)	-	- 213 580 1084	-	-
HCM Lane V/C Ratio	-	- 0.005 0.019 0.007	-	-
HCM Control Delay (s)	-	- 22 11.3 8.3	0	
HCM Lane LOS	-	- C B A	A	
HCM 95th %tile Q(veh)	-	- 0 0.1 0	-	-

Year 2030 Background Traffic Conditions
4: South End Rd & Oregon City Christian Church Dwy 2

Weekday PM Peak
09/12/2018

Intersection						
Int Delay, s/veh	0.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T	T	T	T
Traffic Vol, veh/h	2	2	435	1	1	596
Future Vol, veh/h	2	2	435	1	1	596
Conflicting Peds, #/hr	0	0	0	4	4	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	90	90	90	90	90	90
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	2	2	483	1	1	662
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1152	488	0	0	488	0
Stage 1	488	-	-	-	-	-
Stage 2	664	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	221	584	-	-	1086	-
Stage 1	621	-	-	-	-	-
Stage 2	516	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	220	582	-	-	1086	-
Mov Cap-2 Maneuver	220	-	-	-	-	-
Stage 1	619	-	-	-	-	-
Stage 2	515	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	16.4	0	0			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	319	1086	-	
HCM Lane V/C Ratio	-	-	0.014	0.001	-	
HCM Control Delay (s)	-	-	16.4	8.3	0	
HCM Lane LOS	-	-	C	A	A	
HCM 95th %tile Q(veh)	-	-	0	0	-	

Appendix N Year 2030 Total Traffic Conditions Worksheets

Year 2030 Total Traffic Conditions
2: South End Rd & Lawton Rd/Warner Parrott Rd

Weekday PM Peak

09/12/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	37	5	270	61	90	7	192	252	109	332	58
Future Volume (vph)	36	37	5	270	61	90	7	192	252	109	332	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5	4.5		4.5			4.5	4.5
Lane Util. Factor		1.00			1.00	1.00		1.00			1.00	1.00
Frpb, ped/bikes		1.00			1.00	0.98		0.98			1.00	1.00
Flpb, ped/bikes		1.00			1.00	1.00		1.00			1.00	1.00
Frt		0.99			1.00	0.85		0.92			1.00	0.85
Flt Protected		0.98			0.96	1.00		1.00			0.99	1.00
Satd. Flow (prot)		1789			1790	1532		1702			1852	1615
Flt Permitted		0.78			0.71	1.00		0.99			0.78	1.00
Satd. Flow (perm)		1426			1317	1532		1689			1468	1615
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	40	41	6	300	68	100	8	213	280	121	369	64
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	87	0	0	368	100	0	501	0	0	490	64
Confl. Peds. (#/hr)	2					2			6	6		
Heavy Vehicles (%)	3%	3%	0%	2%	2%	3%	0%	1%	2%	2%	1%	0%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)		17.9			17.9	17.9		21.8			21.8	21.8
Effective Green, g (s)		17.9			17.9	17.9		21.8			21.8	21.8
Actuated g/C Ratio		0.37			0.37	0.37		0.45			0.45	0.45
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)		524			484	563		756			657	722
v/s Ratio Prot												
v/s Ratio Perm		0.06			c0.28	0.07		0.30			c0.33	0.04
v/c Ratio		0.17			0.76	0.18		0.66			0.75	0.09
Uniform Delay, d1		10.4			13.5	10.4		10.6			11.2	7.7
Progression Factor		1.00			1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2		0.2			6.9	0.2		2.2			4.6	0.1
Delay (s)		10.5			20.4	10.6		12.8			15.8	7.8
Level of Service		B			C	B		B			B	A
Approach Delay (s)		10.5			18.3			12.8			14.8	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			15.0		HCM 2000 Level of Service					B		
HCM 2000 Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			48.7		Sum of lost time (s)					9.0		
Intersection Capacity Utilization			85.9%		ICU Level of Service					E		
Analysis Period (min)			15									

c Critical Lane Group

Year 2030 Total Traffic Conditions
3: South End Rd & Oregon City Christian Church Dwy 1

Weekday PM Peak
09/12/2018

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	12	439	1	9	598
Future Vol, veh/h	2	12	439	1	9	598
Conflicting Peds, #/hr	0	0	0	4	4	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	125	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	2	13	488	1	10	664
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1176	492	0	0	493	0
Stage 1	492	-	-	-	-	-
Stage 2	684	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	213	581	-	-	1081	-
Stage 1	619	-	-	-	-	-
Stage 2	505	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	209	579	-	-	1081	-
Mov Cap-2 Maneuver	209	-	-	-	-	-
Stage 1	617	-	-	-	-	-
Stage 2	497	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	13	0		0.1		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	WBLn2	SBL	SBT	
Capacity (veh/h)	-	-	209	579	1081	-
HCM Lane V/C Ratio	-	-	0.011	0.023	0.009	-
HCM Control Delay (s)	-	-	22.4	11.4	8.4	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	0	0.1	0	-

Year 2030 Total Traffic Conditions
4: South End Rd & Oregon City Christian Church Dwy 2

Weekday PM Peak
09/12/2018

Intersection						
Int Delay, s/veh	0.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T	T	T	T
Traffic Vol, veh/h	3	4	436	2	3	597
Future Vol, veh/h	3	4	436	2	3	597
Conflicting Peds, #/hr	0	0	0	4	4	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	90	90	90	90	90	90
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	3	4	484	2	3	663

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	1160	490	0
Stage 1	490	-	-
Stage 2	670	-	-
Critical Hdwy	6.4	6.2	-
Critical Hdwy Stg 1	5.4	-	-
Critical Hdwy Stg 2	5.4	-	-
Follow-up Hdwy	3.5	3.3	-
Pot Cap-1 Maneuver	218	582	-
Stage 1	620	-	-
Stage 2	512	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	216	580	-
Mov Cap-2 Maneuver	216	-	-
Stage 1	618	-	-
Stage 2	510	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15.9	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	337	1083
HCM Lane V/C Ratio	-	-	0.023	0.003
HCM Control Delay (s)	-	-	15.9	8.3
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	0.1	0

Year 2030 Total Traffic Conditions
1: South End Rd & Deerbrook Dr/Barker Ave

Sunday Mid-day Peak
09/12/2018

Intersection												
Int Delay, s/veh	0.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	1	7	10	2	7	3	393	8	1	195	7
Future Vol, veh/h	0	1	7	10	2	7	3	393	8	1	195	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	1	1	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	0	0	0	0	0	0	0	3	0	0	1	17
Mvmt Flow	0	1	8	11	2	8	3	442	9	1	219	8

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	683	683	223	684	683	447	227	0	0	452	0	0
Stage 1	225	225	-	454	454	-	-	-	-	-	-	-
Stage 2	458	458	-	230	229	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	366	374	822	365	374	616	1353	-	-	1119	-	-
Stage 1	782	721	-	589	573	-	-	-	-	-	-	-
Stage 2	587	570	-	777	718	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	359	372	822	359	372	615	1353	-	-	1119	-	-
Mov Cap-2 Maneuver	359	372	-	359	372	-	-	-	-	-	-	-
Stage 1	780	720	-	587	571	-	-	-	-	-	-	-
Stage 2	575	568	-	768	717	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	10.1		13.9		0.1		0	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1353	-	-	714	426	1119	-
HCM Lane V/C Ratio	0.002	-	-	0.013	0.05	0.001	-
HCM Control Delay (s)	7.7	0	-	10.1	13.9	8.2	0
HCM Lane LOS	A	A	-	B	B	A	A
HCM 95th %tile Q(veh)	0	-	-	0	0.2	0	-

Year 2030 Total Traffic Conditions
2: South End Rd & Lawton Rd/Warner Parrott Rd

Sunday Mid-day Peak
09/12/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	39	16	223	23	58	18	306	280	55	138	23
Future Volume (vph)	31	39	16	223	23	58	18	306	280	55	138	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5	4.5		4.5			4.5	4.5
Lane Util. Factor		1.00			1.00	1.00		1.00			1.00	1.00
Frpb, ped/bikes		1.00			1.00	0.97		0.99			1.00	0.98
Flpb, ped/bikes		1.00			1.00	1.00		1.00			1.00	1.00
Frt		0.97			1.00	0.85		0.94			1.00	0.85
Flt Protected		0.98			0.96	1.00		1.00			0.99	1.00
Satd. Flow (prot)		1788			1801	1561		1716			1859	1581
Flt Permitted		0.85			0.68	1.00		0.99			0.78	1.00
Satd. Flow (perm)		1538			1285	1561		1701			1471	1581
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	32	41	17	232	24	60	19	319	292	57	144	24
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	90	0	0	256	60	0	630	0	0	201	24
Confl. Peds. (#/hr)	10					10	1		4	4		1
Heavy Vehicles (%)	4%	0%	0%	1%	0%	0%	0%	3%	2%	0%	1%	0%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)		15.0			15.0	15.0		24.9			24.9	24.9
Effective Green, g (s)		15.0			15.0	15.0		24.9			24.9	24.9
Actuated g/C Ratio		0.31			0.31	0.31		0.51			0.51	0.51
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)		471			394	478		866			749	805
v/s Ratio Prot												
v/s Ratio Perm		0.06			c0.20	0.04		c0.37			0.14	0.02
v/c Ratio		0.19			0.65	0.13		0.73			0.27	0.03
Uniform Delay, d1		12.5			14.7	12.2		9.4			6.8	6.0
Progression Factor		1.00			1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2		0.2			3.7	0.1		3.1			0.2	0.0
Delay (s)		12.7			18.4	12.3		12.4			7.0	6.0
Level of Service		B			B	B		B			A	A
Approach Delay (s)		12.7			17.2			12.4			6.9	
Approach LOS		B			B			B			A	
Intersection Summary												
HCM 2000 Control Delay			12.7				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			48.9				Sum of lost time (s)			9.0		
Intersection Capacity Utilization			76.4%				ICU Level of Service			D		
Analysis Period (min)			15									

c Critical Lane Group

Year 2030 Total Traffic Conditions
3: South End Rd & Oregon City Christian Church Dwy 1

Sunday Mid-day Peak
09/12/2018

Intersection						
Int Delay, s/veh	2.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	36	93	510	42	91	285
Future Vol, veh/h	36	93	510	42	91	285
Conflicting Peds, #/hr	0	0	0	4	4	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	125	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	3	0	0	1
Mvmt Flow	38	97	531	44	95	297
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1043	557	0	0	579	0
Stage 1	557	-	-	-	-	-
Stage 2	486	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	256	534	-	-	1005	-
Stage 1	578	-	-	-	-	-
Stage 2	623	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	226	532	-	-	1005	-
Mov Cap-2 Maneuver	226	-	-	-	-	-
Stage 1	576	-	-	-	-	-
Stage 2	553	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	16.3	0	2.2			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	- 226 532 1005	-	-		
HCM Lane V/C Ratio	-	- 0.166 0.182 0.094	-	-		
HCM Control Delay (s)	-	- 24.1 13.3 9	-	0		
HCM Lane LOS	-	- C B A A	-	-		
HCM 95th %tile Q(veh)	-	- 0.6 0.7 0.3	-	-		

Year 2030 Total Traffic Conditions
4: South End Rd & Oregon City Christian Church Dwy 2

Sunday Mid-day Peak

09/12/2018

Intersection						
Int Delay, s/veh	1.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	25	44	508	19	35	286
Future Vol, veh/h	25	44	508	19	35	286
Conflicting Peds, #/hr	0	0	0	4	4	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	96	96	96	96	96	96
Heavy Vehicles, %	0	0	3	0	0	1
Mvmt Flow	26	46	529	20	36	298
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	914	543	0	0	553	0
Stage 1	543	-	-	-	-	-
Stage 2	371	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	306	544	-	-	1027	-
Stage 1	586	-	-	-	-	-
Stage 2	702	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	292	542	-	-	1027	-
Mov Cap-2 Maneuver	292	-	-	-	-	-
Stage 1	584	-	-	-	-	-
Stage 2	673	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	15.5	0	0.9			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	414	1027	-	
HCM Lane V/C Ratio	-	-	0.174	0.035	-	
HCM Control Delay (s)	-	-	15.5	8.6	0	
HCM Lane LOS	-	-	C	A	A	
HCM 95th %tile Q(veh)	-	-	0.6	0.1	-	

Year 2030 Total Traffic Conditions
5: South End Rd & Lafayette Ave/S Partlow Rd

Sunday Mid-day Peak
09/12/2018

Intersection												
Int Delay, s/veh	4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕			↕	
Traffic Vol, veh/h	7	4	9	48	5	99	2	346	50	67	228	8
Future Vol, veh/h	7	4	9	48	5	99	2	346	50	67	228	8
Conflicting Peds, #/hr	1	0	1	1	0	1	0	0	4	4	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	75	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	0	0	14	3	0	4	0	2	0	2	1	0
Mvmt Flow	8	5	11	56	6	116	2	407	59	79	268	9

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	934	906	274	884	880	441	278	0	0	470	0	0
Stage 1	431	431	-	445	445	-	-	-	-	-	-	-
Stage 2	503	475	-	439	435	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.34	7.13	6.5	6.24	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.13	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.13	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.426	3.527	4	3.336	2.2	-	-	2.218	-	-
Pot Cap-1 Maneuver	248	278	737	265	288	612	1296	-	-	1092	-	-
Stage 1	607	586	-	590	578	-	-	-	-	-	-	-
Stage 2	555	561	-	595	584	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	184	253	736	239	262	609	1295	-	-	1091	-	-
Mov Cap-2 Maneuver	184	253	-	239	262	-	-	-	-	-	-	-
Stage 1	606	536	-	587	575	-	-	-	-	-	-	-
Stage 2	443	558	-	531	534	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	17.9		16.7		0		1.9	
HCM LOS	C		C					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1295	-	-	303 239 573	1091	-	-
HCM Lane V/C Ratio	0.002	-	-	0.078 0.236 0.214	0.072	-	-
HCM Control Delay (s)	7.8	0	-	17.9 24.7 13	8.6	0	-
HCM Lane LOS	A	A	-	C C B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.3 0.9 0.8	0.2	-	-

Year 2030 Total Traffic Conditions
6: Warner Parrott Rd & Camenah Rd

Sunday Mid-day Peak
09/12/2018

Intersection						
Int Delay, s/veh	2.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	64	383	265	53	48	57
Future Vol, veh/h	64	383	265	53	48	57
Conflicting Peds, #/hr	0	0	0	0	1	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	0	1	1	0	0	0
Mvmt Flow	76	456	315	63	57	68
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	379	0	-	0	956	347
Stage 1	-	-	-	-	347	-
Stage 2	-	-	-	-	609	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1191	-	-	-	289	701
Stage 1	-	-	-	-	720	-
Stage 2	-	-	-	-	547	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1191	-	-	-	264	701
Mov Cap-2 Maneuver	-	-	-	-	264	-
Stage 1	-	-	-	-	720	-
Stage 2	-	-	-	-	501	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.2	0		18.1		
HCM LOS				C		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1191	-	-	-	399	
HCM Lane V/C Ratio	0.064	-	-	-	0.313	
HCM Control Delay (s)	8.2	0	-	-	18.1	
HCM Lane LOS	A	A	-	-	C	
HCM 95th %tile Q(veh)	0.2	-	-	-	1.3	