

# Traffic Impact Study

Prepared for submittal to:



for the project:

## Clearwater/44 West Subdivision

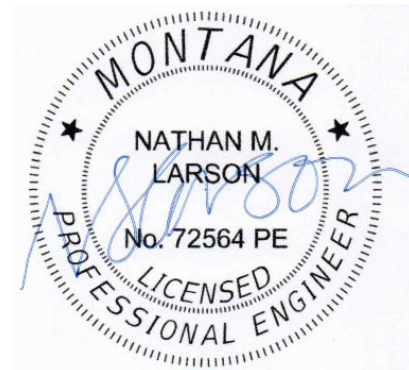
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# CONTENTS

- 1 Introduction.....1
- 1.1 Project Site and Study Area ..... 1
- 1.2 Land Use and Phasing..... 1
- 1.3 Analysis Methods and References..... 4
- 2 Existing and Background Conditions .....5
- 2.1 Streets and Intersections ..... 5
- 2.2 Existing Traffic Volumes ..... 6
- 2.3 Historic Growth and Background Condition Traffic ..... 6
- 2.4 Intersection Traffic Operations Without the Project..... 9
- 3 Project Trip Generation and Distribution ..... 10
- 3.1 Trip Generation ..... 10
- 3.2 Trip Distribution and Assignment ..... 11
- 4 Capacity Analysis..... 13
- 4.1 Phase 1A ..... 13
- 4.2 Phase 1B ..... 14
- 4.2 Phase 1C ..... 14
- 4.2 Phase 2..... 16
- 5 Cost Participation ..... 17

# EXHIBITS

- 1. Overall Site Location and Study Intersections ..... 2
- 2. Site Plan and Phasing ..... 3
- 3. LOS Definitions..... 4
- 4. Existing Road and Intersection Basics..... 7
- 5. Existing Traffic Volumes ..... 8
- 6. Historical Daily Traffic Volumes ..... 9
- 7. Existing and Future Background Intersection LOS and Delay..... 9
- 8. Trip Generation ..... 11
- 9. Trip Distribution Percentages for New Trips ..... 12
- 10. Projected 2027 Intersection LOS and Delay: Phase 1A ..... 13
- 11. Projected 2029 Intersection LOS and Delay: Phase 1B ..... 14
- 12. Projected 2031 Intersection LOS and Delay: Phase 1C ..... 15
- 13. Projected 2033 Intersection LOS and Delay: Phase 2..... 16
- 14. Intersection Cost Participation by Phase ..... 17

## **APPENDICES**

A: Original Raw Count Data for Intersections

B: Intersection Analysis Software Output

C: Estimated Future Traffic Volume Maps

D: Auxiliary Turn Lane Analysis Charts

E: 44<sup>th</sup> at Central Avenue Intersection Signal Warrant Summaries

F: Intersection Cost Participation Calculations

# 1 INTRODUCTION

This report documents the Traffic Impact Study (TIS) conducted for the Clearwater/44 West subdivision project in northwest Billings. This is a working title for the project. Some parts of the site could be marketed under a different name before final occupancy. The study was conducted by and under the direction of a Professional Traffic Operations Engineer and Montana-licensed PE with expertise and experience in traffic engineering.

## 1.1 PROJECT SITE AND STUDY AREA

The overall subdivision site is shown in **Exhibit 1** along with the intersections studied. The existing study intersections were identified during preapplication review with City of Billings staff as:

1. S. 48<sup>th</sup> Street West at Central Avenue
2. Shiloh Road at Broadwater Avenue
3. Shiloh Road at Central Avenue
4. Shiloh Road at Bell Avenue
5. Shiloh Road at Monad Road

From here forward in this report, existing intersections are generally referred to only by their distinguishing street names (e.g., “Shiloh at Central”) for the sake of brevity. The two new subdivision access points on Central Avenue, Double Haul Lane and S. 44<sup>th</sup> Street West, have been analyzed for all future scenarios that include project traffic. The site’s third access will be to existing Bell Avenue, which is expected to be extended west into the site to serve the final phase. The new western terminus of Bell will be built to accommodate a potential future connection to the property west of this site, but no such connection has been planned there at the time of this study. The east-west Bell Avenue alignment generally separates the subdivision site into northern and southern parts of similar size.

## 1.2 LAND USE AND PHASING

The site is currently agricultural land, though it was in the process of being cleared for construction at the time of this study. The subdivision’s proposed land uses will be almost exclusively residential, with 259 single-family detached homes and 125 attached ones. The latter will include 60 attached multi-story units (townhomes) and 65 “cottage” units that would be smaller units not directly classifiable as apartments. One commercial lot sized to support two 11,000 square-foot buildings will be situated near the northwest corner of the site, abutting Central Avenue and Double Haul Lane.

The project is divided into two logical phases. All 125 of the “attached” type of residential units are included in Phase 1 and are located on the northern part of the site. Phase 1 also includes about one half (131) of the total single-family detached units. Phase 2 includes the commercial parcel and all residential lots on the southern part of the site, which are for the remaining 128 single-family homes. Phase 1 is further divided into three sub-phases, termed A, B, and C for this study, to help identify when certain traffic impact mitigation improvements would be needed. The dwelling unit totals for each sub-phase are described later in this report, in the context of this sensitivity analysis. Bell Avenue access was only assumed to be available for Phase 2.

Because the site is generally rural, the types and locations of specific pathways or other facilities and connections for pedestrians and bicycles have not yet been identified. A brief examination of potential traffic calming needs indicated that some streets have long enough blocks that the need for such measures could arise. On-street parking is expected to be allowed throughout the site wherever street width and sight distance allow for it and such parking does not interfere with operations at the Central Avenue access intersections.

**Exhibit 2** shows the Clearwater/44 West site plan on which the analysis here is based. It includes land use types, streets, alleys, access points, and parkland areas, as well as phasing. This site plan drawing is provided for illustrative purposes only. The full high-resolution drawing is submitted separately by the applicant.

Exhibit 1. Overall Site Location and Study Intersections





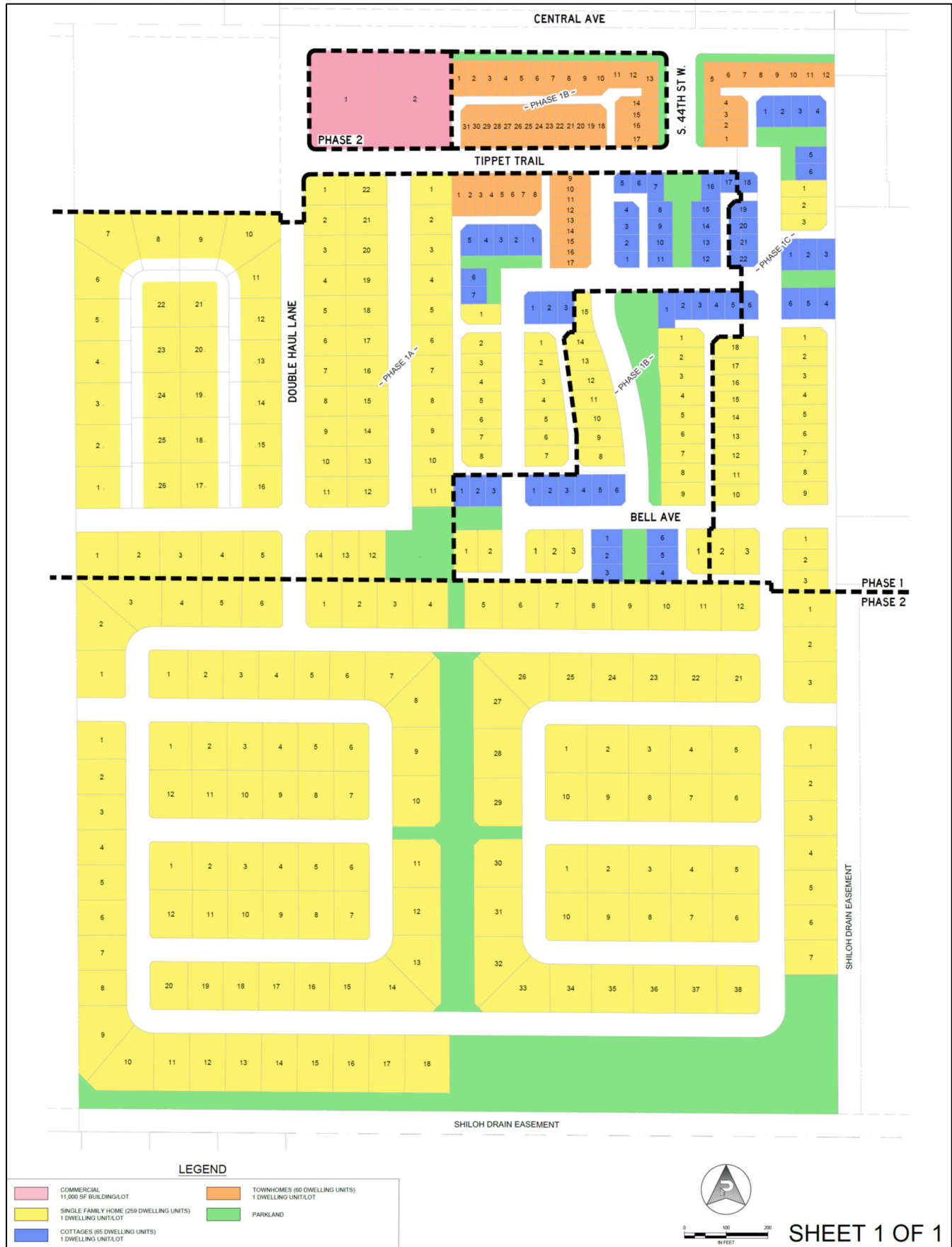
- Legend**
-  Study Intersection
  -  Project Location



Exhibit 2. Site Plan and Phasing



Excerpted from: Performance Engineering concept site plan provided 7/17/2025

For analysis purposes, both Double Haul Lane and S. 44<sup>th</sup> Street West are assumed to have one northbound lane and one southbound lane at their intersections with Central, such that vehicles leaving the site waits in a single shared lane whether they are turning right or left.

### 1.3 ANALYSIS METHODS AND REFERENCES

Raw field traffic counts were gathered from other recent traffic study work in the area by Sanbell and provided to this project’s applicant team. These raw counts were then adjusted slightly for this TIS based on both (a) recent traffic growth and (b) 2024 City of Billings annualization factors prior to their use in impact analysis.

Trip generation rates, or equations as applicable, are from the Institute of Transportation Engineers (ITE) Trip Generation suite’s 11<sup>th</sup> edition, which was the most current available at the onset of this study. ITE trip generation data, when aggregated across enough varied sites, produce both simple average rates and best-fit equations, either linear or logarithmic, to help the analyst derive proper estimates for their situation. Equations are generally preferred over rates, especially for larger sites where trip generation per unit of land use can diminish with increasing project size. General ITE guidance calls for the use of the fitted curve equation when the data set for the land use type in question is comprised of studies from 20 or more separate sites and when the equation produces a correlation coefficient ( $R^2$ ) of 0.75 or higher, with 1.0 being the best possible fit.

Operational performance was analyzed at the study intersections through the use of the industry-standard methods presented in the USDOT’s Highway Capacity Manual (HCM), published in its modern form as Transportation Research Board Special Report 209. Synchro Studio 12 was employed as both a data repository and a capacity analysis tool, with reports for each intersection generated using Synchro’s application of the assumptions of the HCM’s 7<sup>th</sup> edition, the most recent available at the time of this study.

The HCM methodology for intersection capacity analysis produces delay estimates for each turning movement (or “lane group”, when multiple turning movements operate from the same lane). These delay estimates are assigned Level of Service (LOS) grades that range from A (best) to F (worst), as indicated in **Exhibit 3**. It’s also important to note that for unsignalized intersections with only side-street Stop sign control, LOS for the intersection is represented by the LOS for the worst lane group. “T” intersections with side-street stop control also fall under this category. All stop-controlled intersections in this study area, including the two new proposed accesses to Central, are “T” intersections, where the approach on the stem of the T, rather than a main street turning movement, contains the worst lane group.

Operations impacts are determined by how peak hour LOS relates to acceptability standards. Billings employs a LOS standard of C or better. When LOS without the project is D or worse, an operations impact is usually defined when the project would increase delay.

**Exhibit 3. LOS Definitions**

LOS	Delay, seconds per vehicle
A	0 - 10.0
B	10.1 - 15.0
C	15.1 - 25.0
D	25.1 - 35.0
E	35.1 - 50.0
F	50.1 or more

Source: HCM 7<sup>th</sup> Edition

In addition to intersection operations analysis, the need for auxiliary left- and right-turn lanes was examined as part of this study effort. These movements on arterial roadways at stop-controlled site access points with volumes that meet MDT criteria with respect to the department’s guidelines indicated in Chapter 28 of its Traffic Engineering Manual. These auxiliary lanes would serve traffic entering the project site. Only locations with free-flowing traffic on the primary street are considered in this auxiliary lane analysis.

Potential mitigation of traffic impacts at the Central/44<sup>th</sup> intersection included the examination of traffic signal warrants according to the guidance in the Manual on Uniform Traffic Control Devices (MUTCD).

## 2 EXISTING AND BACKGROUND CONDITIONS

### 2.1 STREETS AND INTERSECTIONS

**Shiloh Road**, which also carries the designation of MT-302, is a north-south urban principal arterial according to the MDT (Montana Department of Transportation, and a principal arterial according to the 2023 Billings LRTP (Long Range Transportation Plan). It has two travel lanes in each direction and a speed limit of 45 mph in the study area. Shiloh Road has been a key facilitator of the city's westward expansion, with substantial residential and commercial growth having occurred adjacent to it in recent years. It is characterized by a series of roundabouts at intersections with several of western Billings's east-west arterials and collectors. It also provides access to Interstate 90 via Zoo Drive to the south. A raised median prevents left turns at many two-way stop-controlled intersections, including the one at Bell Avenue. Exclusive left-turn lanes exist at a few select site accesses and local streets. A sidewalk runs along the east side of the road, and a shared-use path called Shiloh Road Trail runs along the west side, much of it separated from the road by a large ditch. There are also two MET Transit bus stops on its east side between the Broadwater and Central roundabouts. These are not considered to be close enough to the project to site to provide meaningful transit access.

**Central Avenue** is an east-west road that is classified by the MDT as an urban collector to the west of Shiloh Road and as an urban principal arterial to the east of it. Accordingly, it has one travel lane in each direction to the west of Shiloh, and two travel lanes in each direction to the east of it. Its entire length from 64<sup>th</sup> St W to Montana Avenue is classified as a principal arterial in the 2023 Billings LRTP. It has a speed limit of 45 mph on both sides of Shiloh Road, but it becomes 50 mph to the west of 48<sup>th</sup> St W. It connects residential neighborhoods to many of western Billings' commercial centers. Central currently has no exclusive turning lanes or multimodal facilities to the west of Shiloh Road. However, the 2023 Billings LRTP shows that a shared-use path and/or trail are planned to be installed on Central Avenue to the west of Shiloh Road. There are also plans to expand Central Avenue to a three-lane cross-section to the west of Shiloh Road: one travel lane in each direction and a center left-turn lane.

**48<sup>th</sup> Street W** is a north-south local road according to the MDT, and a principal arterial according to the 2023 Billings LRTP. It has one travel lane in each direction, and its speed limit is 45 mph to the north of Central Avenue and 50 mph to the south of it. It links residences and agricultural properties on the western edges of Billings to the east-west routes that lead into the city, such as Central Avenue and King Avenue. No exclusive turning lanes or multimodal facilities currently exist on 48<sup>th</sup> in the study area.

**Bell Avenue** is an east-west local street according to both the MDT and the 2023 Billings LRTP. It has one travel lane in each direction and no posted speed limit. Currently, it provides access to Shiloh Road for a private senior living community and a few other residences. Its eastern terminus is at its intersection with Shiloh Road, where left turns are prohibited. Its western terminus is at a dead-end approximately 2300 feet to the west of this intersection, just past Big Pine Court. While three other streets that intersect Bell Avenue also lead to Central Avenue, these streets traverse private property. As such, Bell Avenue has no outlet for non-residents. The street has no exclusive turning lanes or bike infrastructure, but there is a sidewalk along most of its northern side, starting from the Shiloh Road Trail.

**Monad Road** is an east-west road that is classified by the MDT as an urban major collector to the east of Shiloh Road and as a local street to the west of it. The 2023 Billings LRTP classifies it as a minor arterial to the east of Shiloh Road, and it was planned to be a collector to the west of Shiloh Road at the time of the LRTP's publishing. West of Shiloh, it has one travel lane in each direction, as well as a center left-turn lane. East of Shiloh Road, it has one travel lane in each direction, but no center left-turn lane. Its speed limit is 35 mph to the east of Shiloh, but it does not have a speed limit posted on the west side. Monad Road connects many of western Billings' residential neighborhoods to the industrial areas near the railroad tracks and to north-south routes such as 32<sup>nd</sup> Street W and 24<sup>th</sup> Street W that lead to large commercial centers. It has exclusive right-turn lanes on the east and west legs of the roundabout at Shiloh Road, as well as an exclusive left-turn lane at

Henry Chapple Street. To the east of Shiloh Road, there are sidewalks, designated on-street parking, and unprotected bike lanes on both sides of the road. To the west of Shiloh, there is a shared-use path on much of the north side and a sidewalk on much of the south side of the street. There are also two nearby MET Transit bus stops on the south side of the road: one at Henry Chapple Street and the other at Hurdle Circle.

**Broadwater Avenue** is an east-west urban principal arterial according to the MDT, and a principal arterial according to the 2023 Billings LRTP. It has one travel lane in each direction and a speed limit of 35 mph in the study area. It serves as a link between residential neighborhoods in western Billings, some small commercial centers, and downtown Billings. Its eastern terminus is at its intersection with Division Street, 1<sup>st</sup> Ave N, and N 36<sup>th</sup> Street near downtown. Its western terminus is currently at a roundabout intersection with Shiloh Road. Currently, the roundabout's west leg only connects to two agricultural lots in active use, but the roundabout's infrastructure here has been built out in preparation for a potential westward extension of the road. 48<sup>th</sup> St W also intersects a road called Broadwater Avenue, but this local road segment is currently disconnected from the rest of the arterial network and is only accessible via 48<sup>th</sup> Street W. The arterial Broadwater Avenue has an exclusive westbound right-turn lane at the Shiloh roundabout. There is a shared-use path on the road's north side, and there is a sidewalk on the road's south side extending east.

Intersection traffic control currently comes in only three forms at the five existing study intersections: two-way stop control (TWSC), all-way stop control (AWSC), and roundabouts. Each leg of the three roundabouts has a crosswalk with a pedestrian refuge in the splitter island. Most of these crosswalks have solar-powered rectangular rapid flashing beacons. The intersection of Shiloh Road and Bell Avenue is considered two-way stop-controlled even though only one direction of traffic is stop-controlled. Only four movements are permitted at this intersection: northbound and southbound through movements and southbound and eastbound rights. Shiloh Road's center median prevents all left turns. The intersection of 48<sup>th</sup> Street and Central Avenue is all-way stop-controlled and is augmented with flashing red beacons facing all four directions, but it is projected to be upgraded to signalized control in 2026. **Exhibit 4** shows schematically the existing traffic control and lane arrangements at each existing intersection as well as posted speed limits on selected road segments as of the start of this study effort.

## 2.2 EXISTING TRAFFIC VOLUMES

Existing (2024) annualized volumes were estimated from raw field counts as described earlier in subsection 1.3 and are shown in **Exhibit 5**. These raw counts are provided in Appendix A.

## 2.3 HISTORIC GROWTH AND BACKGROUND CONDITION TRAFFIC

The "Background Condition" described here is represented by the volumes and intersection performance after multiple years of traffic growth assumed to occur during the permitting, construction, sales, and occupancy of the project. These steps are expected to be complete for Phase 1A in 2027. The resulting volumes and operating conditions form the basis for evaluating marginal intersection delay effects of traffic generated by this first phase of the Clearwater/44 West subdivision. Each new phase is projected to be completed two years before the last; Phase 1B in 2029, Phase 1C in 2031, and full buildout (Phase 2) in 2033. In order to estimate traffic growth without the project, average daily traffic volumes were gathered from selected MDT periodic data collection locations in the study area. The best and most logical data set available was represented by the four legs of the Shiloh intersection at Central. Data were recorded or estimated by MDT annually on each leg dating back at least 20 years. This historical traffic information is shown in the graph in **Exhibit 6**.

Counts from the most recent ten of these years were used to calculate the average annual growth rate in daily traffic for these four locations in aggregate, which was approximately 3.8% per year. This rate was then applied to the annualized peak hour intersection counts for each study year. Because the four phases of this project will be constructed sequentially and were not considered independent 'all-or-nothing' conditions at each two-year interval, each phase's traffic builds on that of the previous phase and each phase's traffic impacts were analyzed incrementally.

Exhibit 4. Existing Road and Intersection Basics

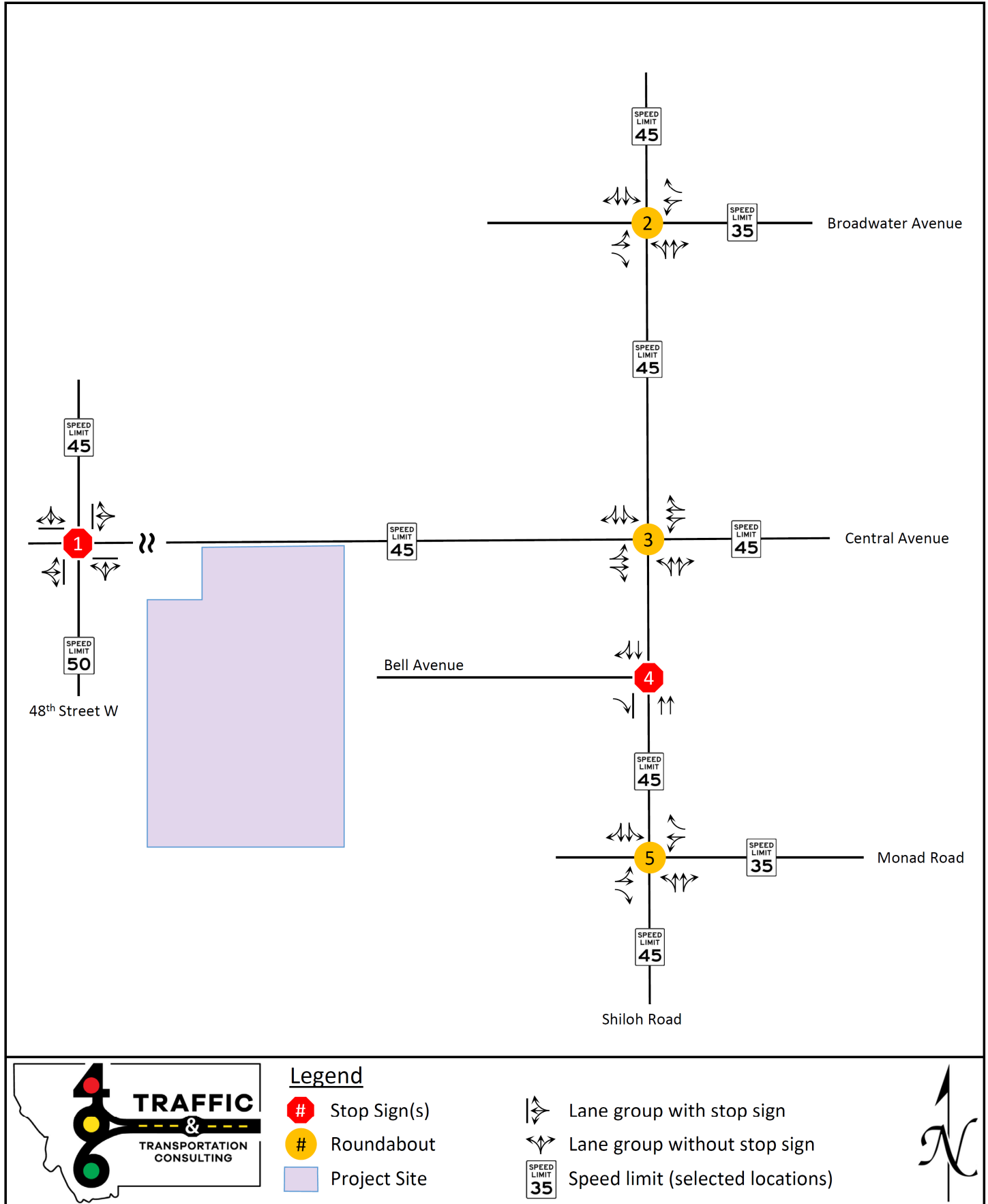
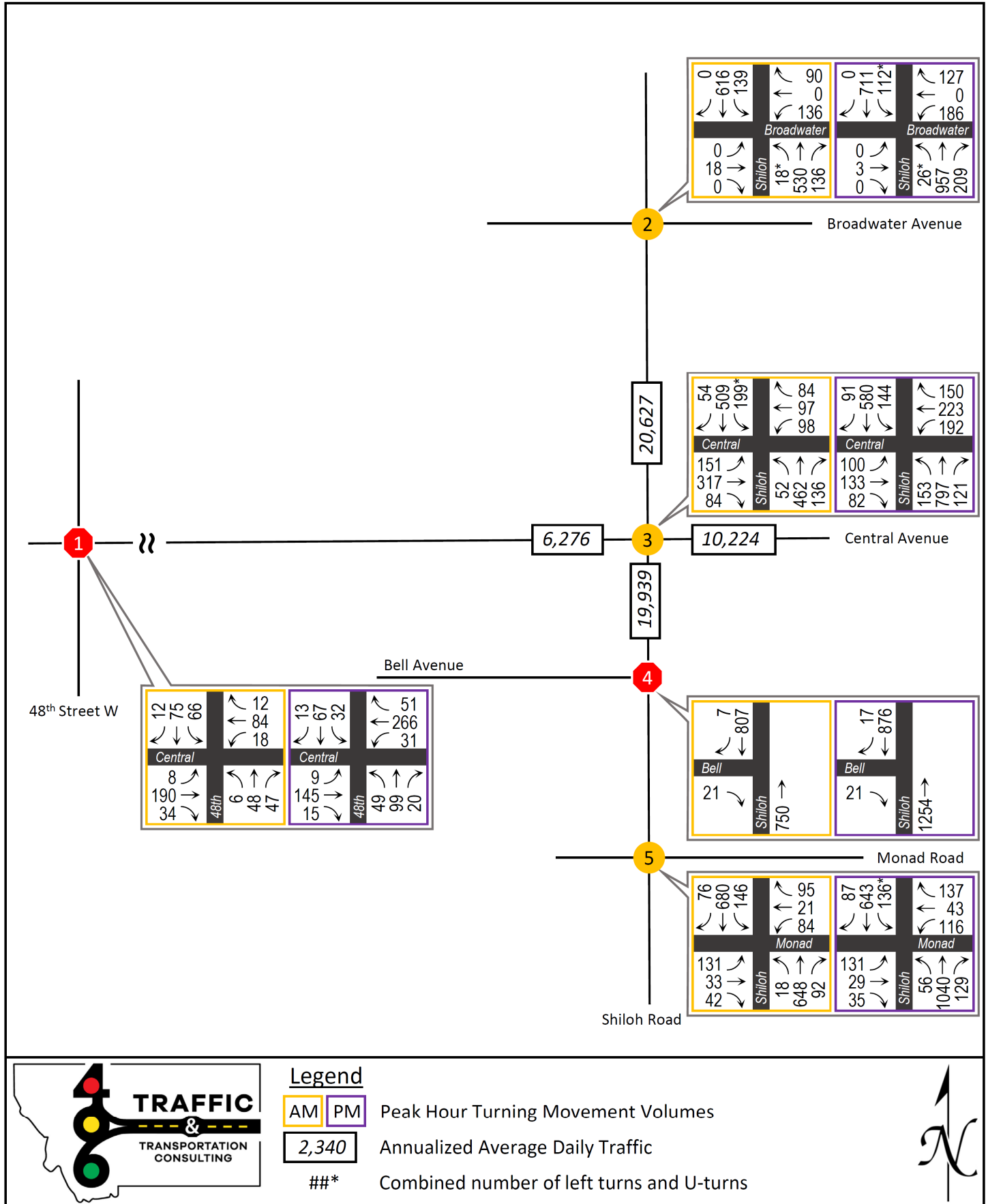
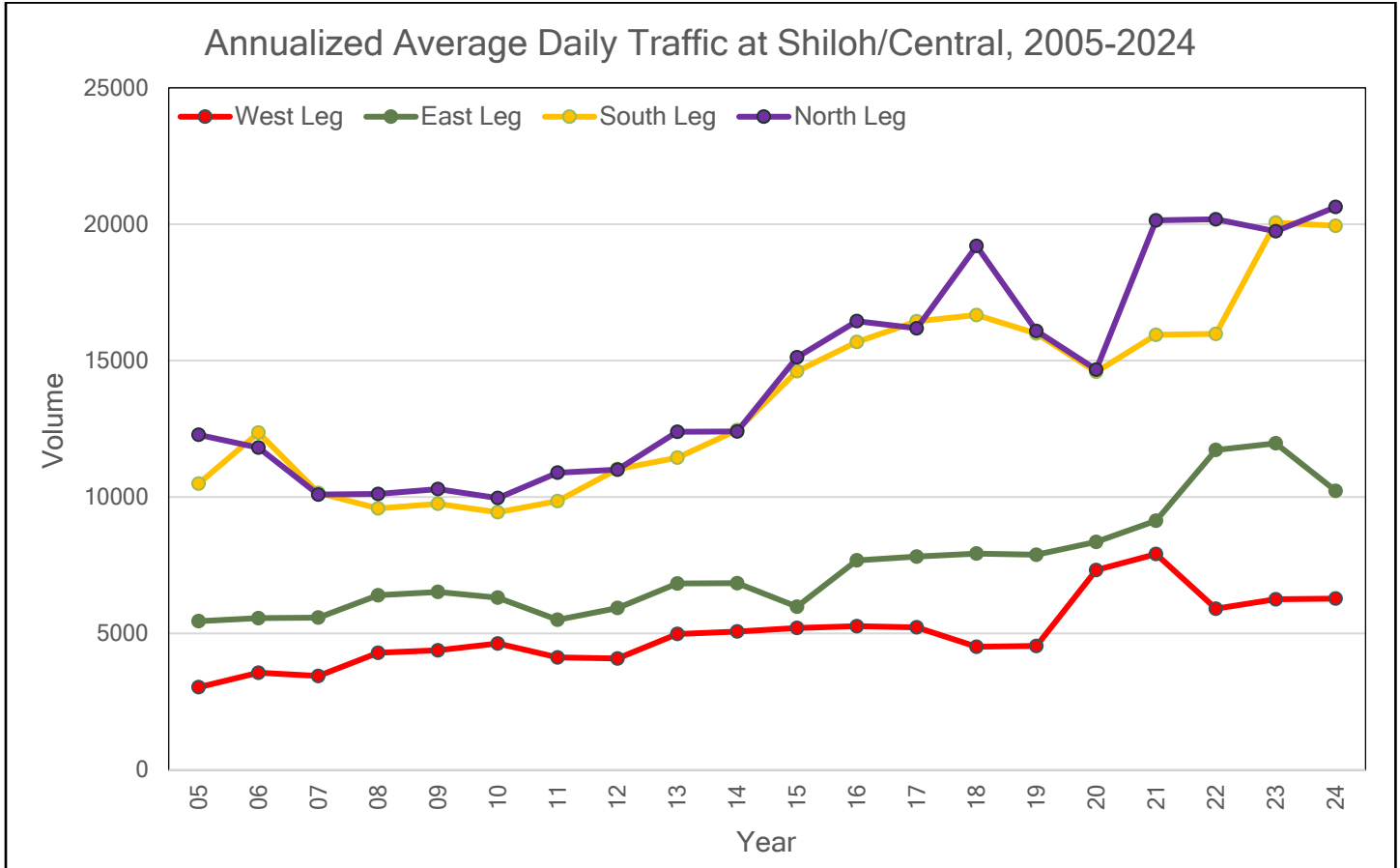


Exhibit 5. Existing Traffic Volumes



**Exhibit 6. Historical Daily Traffic Volumes**



**2.4 INTERSECTION TRAFFIC OPERATIONS WITHOUT THE PROJECT**

The existing and background peak hour intersection Level of Service (LOS) and delay results are shown in Exhibit 7. Analysis software results are provided in Appendix B.

**Exhibit 7. Existing and Future Background Intersection LOS and Delay**

	Intersection	Traffic Control	Peak Hour LOS (delay, in seconds/vehicle)
AM Peak Hour	1. 48 <sup>th</sup> at Central	AWSC	A ( 9.6)
	2. Shiloh at Broadwater	Roundabout	A ( 6.0)
	3. Shiloh at Central	Roundabout	B (11.2)
	4. Shiloh at Bell	TWSC*	B (11.9)
	5. Shiloh at Monad	Roundabout	A ( 9.0)
PM Peak Hour	1. 48 <sup>th</sup> at Central	AWSC	B (12.5)
	2. Shiloh at Broadwater	Roundabout	A ( 9.1)
	3. Shiloh at Central	Roundabout	B (13.6)
	4. Shiloh at Bell	TWSC*	B (12.2)
	5. Shiloh at Monad	Roundabout	B (10.0)

\* At Intersection 4, the worst lane group, which determines LOS, is Eastbound in both peak hours.

The results in the table indicate that with 2024 annualized average traffic volume, all intersections operate at LOS B or better. Each roundabout has at least one approach that operates at LOS C in one or both peaks, but no approaches at LOS D or worse. Note that the only movement that must yield at Intersection 4 is eastbound Bell Avenue and that northbound traffic is not considered part of the intersection, due to the median present on Shiloh Road. At Intersection 5 in the PM peak, the delay estimate appears consistent with LOS A, but it is a rounded value that is actually just over 10.0 seconds so the software returns a LOS B result.

### 3 PROJECT TRIP GENERATION AND DISTRIBUTION

#### 3.1 TRIP GENERATION

Trip generation rates, or equations as applicable, are from the Institute of Transportation Engineers (ITE) Trip Generation package's 11<sup>th</sup> edition. ITE trip generation data, when aggregated across enough varied sites, produce both simple average rates and best-fit equations, either linear or logarithmic, to help the analyst derive proper estimates for their situation. Equations are generally preferred over rates, especially for larger sites where trip generation per unit of land use can diminish with increasing project size.

Clearwater/44 West will consist almost entirely of residential land uses. Small parkland areas within the subdivision are designed and intended for use by residents and their guests, and will be similar to park spaces located in other residential areas around Billings. For that reason, they will not generate external traffic. The strip retail space in Phase 2, programmed for 22,000 square feet, has not had specific tenants or any sub-type(s) of retail use identified, but no drive-through activity is expected.

Three types of adjustments to trip generation were evaluated for this project. First, a discount is sometimes taken to reflect internal capture where multiple uses are present in a single project site. Second, a modal adjustment can be taken if a facility is clearly served by robust high-capacity transit and serves a clientele inclined to use transit to get there, or if the potential land use mix and walk/bike network are likely to lead to nonmotorized trips, either internal or external. Finally, some land uses such as gas stations or coffee shops attract trips that were already using the adjacent or nearby road network by virtue of improved convenience over a similar site that could have been used before. These are called "pass-by" and "diverted-linked" trips. Pass-by trips are those on streets bordering the site, while diverted-linked trips are those that might go slightly out of their way to stop at the establishment on their way to their destination.

The Phase 2 retail element is the only part of the site considered for these discounts. Due to the retail site's location, small size, and expected similarity to other sites along the Central Avenue corridor, only a small aggregate discount of the first two types was assumed here; it is not expected to support a use special enough or large enough to generate offsite multimodal or pass-by/diverted-linked trip activity. The estimated reduction in vehicle trip use for the on-site retail due to residents' use applied here is 10%. This reduction in retail vehicle trip use could take the form of subdivision residents (a) residents stopping at the on-site retail on their way to/from home, (b) choosing to drive to and from the on-site retail rather than a site farther away due to its proximity and convenience, or (c) choosing to walk or bike to and from the on-site retail for the same reason.

To arrive at phase-specific residential trip generation totals, the land use totals for the entire project (259 single family lots and 125 townhome or cottage lots) were first estimated, then the resulting trip totals were proportioned according to the amount of each home type in each phase. **Exhibit 8** shows trip generation details for each phase of the project.

**Exhibit 8. Clearwater/44 West Trip Generation**

		Daily	AM Peak Hour	PM Peak Hour
<b>Full Project</b>	ITE Land Use 210 – Single Family Detached Housing: X = 259 dwelling units			
	Equation	$\ln(T) = 0.92(X) + 2.68$	$\ln(T) = 0.91(X) + 0.12$	$T = 0.60(X) - 3.93$
	Peak hour in/out split		25% / 75%	63% / 37%
	Trips	2,422	177 (44 in / 133 out)	243 (153 in / 90 out)
	ITE Land Use 215 – Single Family Attached Housing: X = 125 dwelling units (townhomes and “cottage” homes)			
	Equation	$T = 7.62(X) - 50.48$	$T = 0.52(X) - 5.70$	$T = 0.60(X) - 3.93$
	Peak hour in/out split		25% / 75%	59% / 41%
	Trips	902	59 (15 in / 44 out)	71 (42 in / 29 out)
	ITE Land Use 822 – Strip Retail Plaza: X = 22 ksf (thousands of square feet)			
	Equation	$T = 42.2(X) + 229.68$	$T = 2.36(X)$	$T = 6.59(X)$
	Peak hour in/out split		60% / 40%	50% / 50%
	Gross retail trips	1,158	52 (31 in / 21 out)	145 (72 in / 73 out)
	Less 10% internal	-116	-5 (-3 in / -2 out)	-14 (-7 in / -7 out)
	Trips [net]	1,042	47 (28 in / 19 out)	131 (65 in, 66 out)
<b>Combined net trips, all uses:</b>	<b>4,366</b>	<b>283 (87 in / 196 out)</b>	<b>445 (260 in / 185 out)</b>	
by Phase	Daily	AM Peak Hour	PM Peak Hour	
<b>1A</b>	ITE Land Use 210 – Single Family Detached Housing: X = 82 dwelling units			
	Trips	767	56 (14 in / 42 out)	77 (48 in / 29 out)
	ITE Land Use 215 – Single Family Attached Housing: X = 44 dwelling units			
Trips	317	21 (5 in / 16 out)	25 (15 in / 10 out)	
Phase 1A Total Trips	1,084	77 (19 in / 58 out)	102 (63 in / 39 out)	
<b>1B</b>	ITE Land Use 210 – Single Family Detached Housing: X = 23 dwelling units			
	Trips	215	16 (4 in / 12 out)	22 (14 in / 8 out)
	ITE Land Use 215 – Single Family Attached Housing: X = 51 dwelling units (townhomes and cottages)			
Trips	368	24 (6 in / 18 out)	29 (17 in / 12 out)	
Phase 1B Total Trips	583	40 (10 in / 30 out)	51 (31 in / 20 out)	
<b>1C</b>	ITE Land Use 210 – Single Family Detached Housing: X = 26 dwelling units			
	Trips	243	17 (4 in / 13 out)	24 (15 in / 9 out)
	ITE Land Use 215 – Single Family Attached Housing: X = 30 dwelling units (townhomes and “cottage” homes)			
Trips	216	15 (4 in / 11 out)	17 (10 in / 7 out)	
Phase 1C Total Trips	459	32 (8 in / 24 out)	41 (25 in / 16 out)	
<b>2</b>	Phase 2 – Single Family Detached Housing: X = 128 dwelling units			
	Trips	1,197	88 (22 in / 66 out)	120 (76 in / 44 out)
	ITE Land Use 822 – Strip Retail Plaza: X = 22 ksf (thousands of square feet)			
Trips [net]	1,042	47 (28 in / 19 out)	131 (65 in, 66 out)	
Phase 2 Total Trips	2,239	135 (50 in / 85 out)	251 (141 in, 110 out)	
<b>Combined net trips, all phases:</b>	<b>4,366</b>	<b>283 (87 in / 196 out)</b>	<b>445 (260 in / 185 out)</b>	

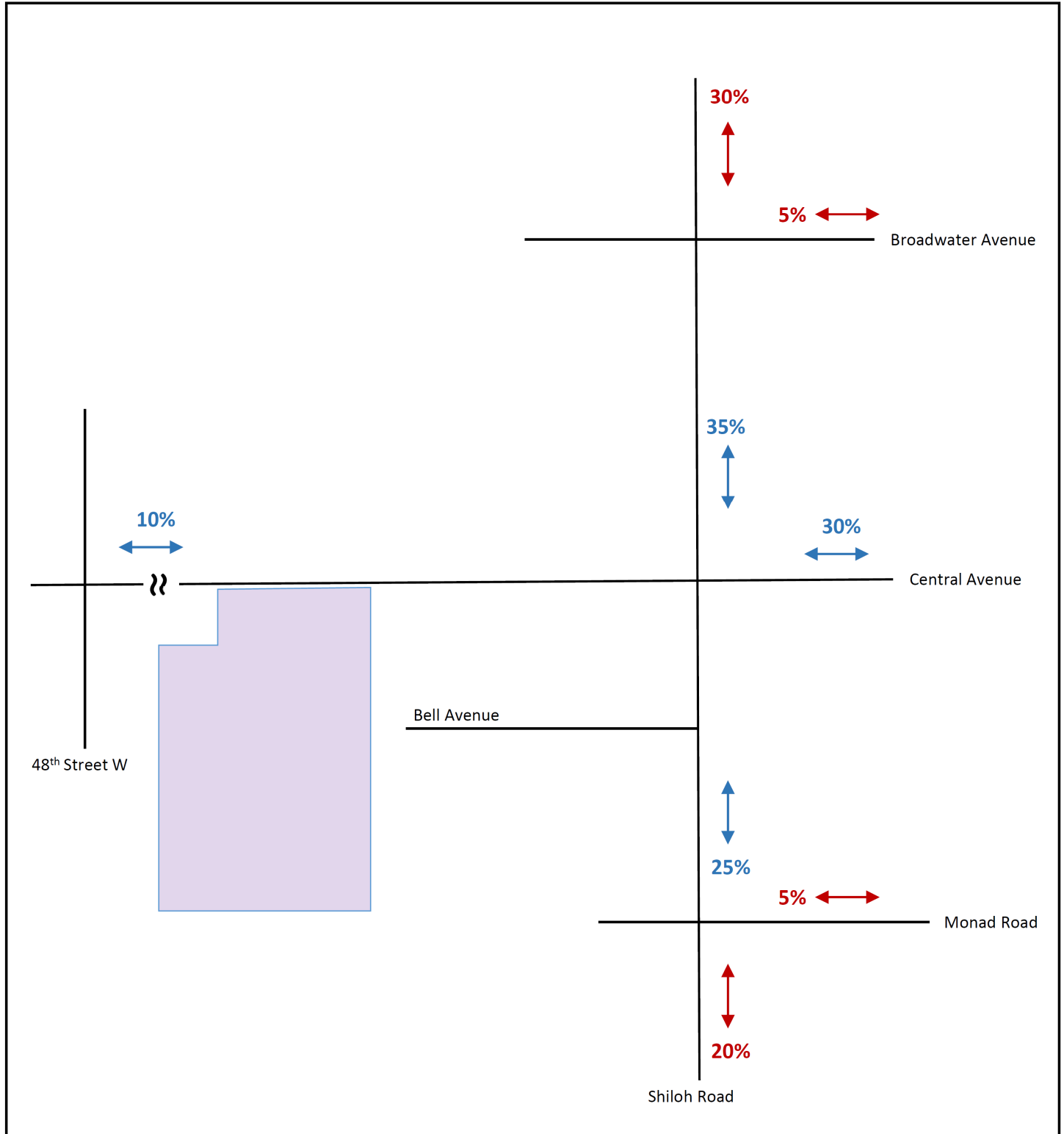
Source: Equations from ITE Trip Generation, 11<sup>th</sup> Edition.

**3.2 TRIP DISTRIBUTION AND ASSIGNMENT**

Trip distribution has been estimated for the streets surrounding the project site in percentages that add to 100%. Farther from the site, traffic eventually disperses in smaller percentages to/from other routes. Because there is no new information regarding a future developer’s plan to connect Bell Avenue and/or the similar connection in Phase 2 to the neighborhood to the west, no Clearwater traffic was assumed to use either such connection. Trip distribution and large-scale assignment percentages are shown in **Exhibit 9**.

Note that the Shiloh median that blocks all left turns results in some differences in routing of in-out pairs once Bell becomes available for Phase 2 access to this site. For example, many residents leaving the site bound for the Shiloh/Monad intersection can turn right at the Shiloh/Bell intersection, but when they return to this site they must go north on Shiloh past Bell, then make a u-turn or left turn at the Shiloh/Central roundabout.

Exhibit 9. Trip Distribution Percentages for New Trips



Legend

- 30% Primary Distribution (100%)
- 10% Secondary Assignment

} of New Vehicle Trips to Project Site



Background traffic, project trips and total traffic reflected as peak hour intersection turning movement volumes and selected daily link volumes are shown in exhibits for each future phase-specific study year. Only the future traffic for the first phase (1A) is a true “without the project” estimate. Each subsequent phase’s impact is assessed with the previous phase assumed to be open. As such, “Phase 2” conditions represent full project buildout. For the sake of report continuity, all ‘future traffic volume’ exhibits are provided in Appendix C.

## 4 CAPACITY ANALYSIS

The analysis results described in this section are organized by project phase order. Note again that project traffic by phase is additive such that, for example, Phase 1B also includes Phase 1A. Summaries of intersection capacity and auxiliary turn lane analysis results are provided for each phase in the study area when it’s projected to be fully open. As with the existing condition, intersection capacity analysis software output results for the future conditions analyzed are provided in Appendix B. Turn lane warrant summaries for applicable situations are provided in Appendix D and summaries of MUTCD signal warrant analysis for Intersection 7 are provided by phase in Appendix E.

### 4.1 PHASE 1A

The peak hour intersection Level of Service (LOS) and delay results in 2027 with and without Clearwater/ 44 West subdivision Phase 1A traffic are shown in **Exhibit 10**.

**Exhibit 10. Projected 2027 Intersection LOS and Delay: Phase 1A**

Intersection	Traffic Control	LOS (delay, in seconds/vehicle)		
		Background (Without Phase 1A)	With Phase 1A	
AM Peak Hour	1. 48 <sup>th</sup> at Central	Signal	A ( 6.2)	A ( 6.2)
	2. Shiloh at Broadwater	Roundabout	A ( 6.5)	A ( 6.6)
	3. Shiloh at Central	Roundabout	B (14.5)	C (15.9)
	4. Shiloh at Bell	TWSC*	B (12.6)	B (12.7)
	5. Shiloh at Monad	Roundabout	B (10.8)	B (10.9)
	6. Double Haul at Central	TWSC*	-	B (12.5)
	7. 44 <sup>th</sup> at Central	TWSC*	-	B (12.6)
PM Peak Hour	1. 48 <sup>th</sup> at Central	Signal	A ( 7.0)	A ( 7.0)
	2. Shiloh at Broadwater	Roundabout	B (11.0)	B (11.2)
	3. Shiloh at Central	Roundabout	C (18.9)	C (21.8)
	4. Shiloh at Bell	TWSC*	B (12.9)	B (13.0)
	5. Shiloh at Monad	Roundabout	B (12.5)	B (12.7)
	6. Double Haul at Central	TWSC*	-	B (11.3)
	7. 44 <sup>th</sup> at Central	TWSC*	-	B (10.7)

\* Worst lane group is Eastbound at Intersection 4 and Northbound at Intersections 6 and 7.

Both of the site accesses on Central would operate at LOS B in both 2027 peak hours. All intersections and both new site accesses would operate within the City’s LOS standard of C or better in both peak hours. As a result of this finding, no additional control beyond a side-street (northbound) stop sign is considered necessary.

A simple look at 2027 Phase 1 turning volumes on Central made it clear that the potential need for auxiliary left turn lanes was worth examining, in accord with the MDT procedures described earlier in this report, in subsection 1.3. Right turn lane volumes at Intersections 6 and 7 would be too low (under 40 vph) for potential auxiliary turn lane consideration. Although left-turning volumes into the site will be higher in the PM peak due to the project’s residential nature, conditions on the appropriate MDT left turn chart have been plotted for both peaks. While a westbound left turn auxiliary lane at Double Haul is not justified by Phase 1A traffic under the assumptions in this study, the potential case for such a lane at 44<sup>th</sup> appears to be inconclusive.

At Intersection 7, no signal warrants would be met under Phase 1A conditions.

## 4.2 PHASE 1B

The peak hour intersection Level of Service (LOS) and delay results in 2029 with and without Clearwater/44 West subdivision Phase 1B traffic are shown in **Exhibit 11**.

### Exhibit 11. Projected 2029 Intersection LOS and Delay: Phase 1B

Intersection	Traffic Control	LOS (delay, in seconds/vehicle)		
		Without Phase 1B	With Phase 1B	
AM Peak Hour	1. 48 <sup>th</sup> at Central	Signal	A ( 6.4)	A ( 6.4)
	2. Shiloh at Broadwater	Roundabout	A ( 7.2)	A ( 7.2)
	3. Shiloh at Central	Roundabout	C (20.9)	C (22.4)
	4. Shiloh at Bell	TWSC*	B (13.2)	B (13.3)
	5. Shiloh at Monad	Roundabout	B (12.8)	B (13.0)
	6. Double Haul at Central	TWSC*	B (13.0)	B (13.1)
	7. 44 <sup>th</sup> at Central	TWSC*	B (13.0)	B (13.6)
PM Peak Hour	1. 48 <sup>th</sup> at Central	Signal	A ( 7.3)	A ( 7.3)
	2. Shiloh at Broadwater	Roundabout	B (13.1)	B (13.3)
	3. Shiloh at Central	Roundabout	D (31.1)	D (33.7)
	4. Shiloh at Bell	TWSC*	B (13.6)	B (13.6)
	5. Shiloh at Monad	Roundabout	C (15.5)	C (15.7)
	6. Double Haul at Central	TWSC*	B (11.7)	B (12.1)
	7. 44 <sup>th</sup> at Central	TWSC*	B (11.0)	B (11.3)

\* Worst lane group is Eastbound at Intersection 4 and Northbound at Intersections 6 and 7.

Both of the site accesses on Central would operate at LOS B in both 2029 peak hours. The 2029 study year marks the first time an intersection's peak LOS would exceed the City's standard (C or better), with the Shiloh intersection at Central projected operate at LOS D with or without Phase 1B traffic. In addition, each of the four approaches to the intersection would operate at the same LOS with or without Phase 1B traffic. The discussion of mitigating the LOS impact at this location is deferred to the next subsection, on Phase 1C.

With respect to auxiliary turn lanes at Intersections 6 and 7, as with 2027, the 2029 right turn lane volumes would remain too low for potential consideration. Although left-turning volumes into the site will be higher in the PM peak due to the project's residential nature, conditions on the appropriate MDT chart have been plotted for both peaks. A westbound left turn auxiliary lane at 44<sup>th</sup> would be justified by Phase 1B traffic, but the potential case for such a lane at Double Haul Lane appears to be inconclusive.

Note that the LOS results shown in Exhibit 11 above for the 44<sup>th</sup> intersection do not reflect the addition of a westbound left turn auxiliary lane, but that lane addition could be expected to result in a slight improvement in overall operations.

At Intersection 7, no signal warrants would be met under Phase 1B conditions.

## 4.2 PHASE 1C

The peak hour intersection Level of Service (LOS) and delay results in 2031 with and without Clearwater/44 West subdivision Phase 1C traffic are shown in **Exhibit 12**.

**Exhibit 12. Projected 2031 Intersection LOS and Delay: Phase 1C**

Intersection	Traffic Control	LOS (delay, in seconds/vehicle)		
		Without Phase 1C	With Phase 1C	
AM Peak Hour	1. 48 <sup>th</sup> at Central	Signal	A ( 6.6)	A ( 6.6)
	2. Shiloh at Broadwater	Roundabout	A ( 7.8)	A ( 7.8)
	3. Shiloh at Central	Roundabout	D (32.8)	E (35.3)
	4. Shiloh at Bell	TWSC*	B (13.9)	B (14.0)
	5. Shiloh at Monad	Roundabout	C (15.8)	C (15.9)
	6. Double Haul at Central	TWSC*	B (13.7)	B (13.7)
	7. 44 <sup>th</sup> at Central	TWSC*	B (14.2)	B (15.0)
PM Peak Hour	1. 48 <sup>th</sup> at Central	Signal	A ( 7.7)	A ( 7.7)
	2. Shiloh at Broadwater	Roundabout	C (16.5)	C (16.7)
	3. Shiloh at Central	Roundabout	F (54.2)	F (58.6)
	4. Shiloh at Bell	TWSC*	B (14.3)	B (14.4)
	5. Shiloh at Monad	Roundabout	C (20.6)	C (20.9)
	6. Double Haul at Central	TWSC*	B (12.5)	B (12.5)
	7. 44 <sup>th</sup> at Central	TWSC*	B (11.6)	B (12.0)

\* Worst lane group is Eastbound at Intersection 4 and Northbound at Intersections 6 and 7.

Both of the site accesses on Central would operate at LOS B in both 2031 peak hours. The Shiloh intersection at Central would remain the only intersection projected operate at LOS D or worse, and it would do so in both peaks with or without Phase 1C traffic. PM peak hour traffic would be expected to experience considerably higher delay than AM peak hour traffic, so the PM case is the one subject to the examination of potential mitigation to reduce projected delay.

To address future capacity deficiencies, a primary tool at roundabouts is the addition of a channelized right turn bypass lane on the approach(es) with the highest right-turning volumes. Such a bypass lane requires widening and would lengthen pedestrian crossings, as with the addition of a turn lane at any intersection. The westbound approach to Shiloh/Central would exhibit the longest delays and queues in the 2031 PM peak hour scenario, so it was the one examined for potential benefit. It also has the highest right-turn volume of the four approaches. Simple testing shows that addition of a bypass lane would reduce westbound delay by about 67%, which would be enough of an improvement to improve the overall intersection PM peak LOS (and delay) from the F (58.6) shown in Exhibit 12 above to E (40.0). Synchro's estimate of the 95<sup>th</sup> percentile westbound queue would be reduced by about half, from 17 vehicles in each lane to 9 in one lane and 8 in the other. While no site-oriented movements would benefit directly from the bypass lane because it carries no such trips, the secondary benefit makes it worth exploring further as an intersection delay impact mitigation action.

The projection of substandard operations at Shiloh/Central, even without Phase 1C traffic, echoes similar findings for other major Shiloh roundabouts from recent studies. Some of this congestion stems from the scarcity of east-west street network connections other than the major arterials that are generally a mile apart. To that end, a secondary, "bigger-picture" part of the overall solution could involve the westward extension of the east-west streets a half-mile north/south of Central (Broadwater and/or Monad) to help relieve the traffic burden on Grand, Central, and King. Examination of the complex and detailed effects of such extensions are well outside the scope of this project's mitigation analysis but still bear mentioning for general interest. The applicant team encourages the City to consider prioritizing, to the extent practicable, additional east-west connectivity between Shiloh and 48<sup>th</sup> with eventual functional extensions of Broadwater and/or Monad as additional land use changes occur along those alignments.

With respect to auxiliary turn lanes at Intersections 6 and 7, as with 2027 and 2029 the 2031 right turn lane volumes would remain too low for potential consideration. Although left-turning volumes into the site will be higher in the PM peak due to the project's residential nature, conditions on the appropriate MDT chart have been plotted for both peaks. Westbound left turn auxiliary lanes would be justified by Phase 1C traffic at both Double Haul Lane and 44<sup>th</sup>.

Note that the LOS results shown in Exhibit 12 above for the Double Haul and 44<sup>th</sup> intersections do not reflect the addition of westbound left turn auxiliary lanes, but that lane addition could be expected to result in a slight improvement in overall operations.

At Intersection 7, only the Four-Hour signal warrant would be met under Phase 1C conditions.

## 4.2 PHASE 2

The peak hour intersection Level of Service (LOS) and delay results in 2033 with and without Clearwater/44 West subdivision Phase 2 traffic are shown in **Exhibit 13**.

### Exhibit 13. Projected 2033 Intersection LOS and Delay: Phase 2

Intersection	Traffic Control	LOS (delay, in seconds/vehicle)		
		Without Phase 2	With Phase 2	
AM Peak Hour	1. 48 <sup>th</sup> at Central	Signal	A ( 6.9)	A ( 6.9)
	2. Shiloh at Broadwater	Roundabout	A ( 8.5)	A ( 8.7)
	3. Shiloh at Central	Roundabout	F (58.5)	F (74.9)
	4. Shiloh at Bell	TWSC*	B (14.8)	C (15.6)
	5. Shiloh at Monad	Roundabout	C (21.1)	C (22.3)
	6. Double Haul at Central	TWSC*	B (14.4)	C (16.3)
	7. 44 <sup>th</sup> at Central	TWSC*	C (15.8)	C (18.0)
PM Peak Hour	1. 48 <sup>th</sup> at Central	Signal	A ( 8.2)	A ( 8.3)
	2. Shiloh at Broadwater	Roundabout	C (22.3)	C (24.6)
	3. Shiloh at Central	Roundabout	F (96.1)	F (144.6)
	4. Shiloh at Bell	TWSC*	C (15.2)	C (16.2)
	5. Shiloh at Monad	Roundabout	D (30.4)	D (33.5)
	6. Double Haul at Central	TWSC*	B (13.1)	B (14.8)
	7. 44 <sup>th</sup> at Central	TWSC*	B (12.5)	B (14.8)

\* Worst lane group is Eastbound at Intersection 4 and Northbound at Intersections 6 and 7.

In 2033, both of the site accesses on Central would operate at LOS B in the PM peak hour and at LOS C in the AM peak hour with or without the addition of Phase 2 traffic. The Shiloh intersection at Central would operate at LOS F in both peaks with or without Phase 2 traffic. Increasing background traffic also results in a projection that the Shiloh intersection at Monad would operate beyond the City's standard under the 2033 conditions examined, at LOS D, with or without Phase 2 traffic. At all roundabout intersections, PM peak hour traffic would be expected to experience considerably higher delay than AM peak hour traffic.

Mitigation of the Shiloh/Central condition would take the same form described for Phase 1C impacts, at least in concept: the eventual addition of a westbound right turn bypass lane. Testing with 2033 Phase 2 PM volumes indicates that addition of a bypass lane would reduce westbound delay by about 59%, which would be enough of an improvement to improve the overall intersection PM peak LOS (and delay) from the F (144.6) shown in Exhibit 13 above to F (105.9). Synchro's estimate of the 95<sup>th</sup> percentile westbound queue would be reduced by about 43%, from 29 vehicles per lane to 17. If additional delay mitigation is needed to reduce overall delay to pre-Phase 2 level [F (96.0)], a northbound right turn lane could also be considered.

No mitigations were tested for the LOS D condition at the Monad intersection.

With respect to auxiliary turn lanes at Intersections 6 and 7, as with previous phases the 2033 right turn lane volumes would remain too low for potential consideration. Because left turn lanes were justified by traffic from the previous phase, no new analysis of those lanes was conducted with the addition of Phase 2 traffic. The potential need for a right turn auxiliary lane was examined for the intersection of Shiloh at Bell, and this analysis indicated that PM peak hour traffic in Phase 2 would help to justify the addition of such a lane. As with previous phases, the LOS results shown in Exhibit 13 above do not reflect the addition of any auxiliary lanes.

At Intersection 7, the Four-Hour signal warrant would be met by a considerable margin under Phase 2 conditions, and the Eight-Hour warrant would be within the margin of estimating/forecasting uncertainty, with minor street volume slightly over the minimum threshold. With these two warrants technically met, a signal could be considered under 2033 conditions at this location. The project team recommends further monitoring of traffic volume conditions and consideration of future traffic to and from the property directly across Central to the north. That development project would create a new fourth leg (a southbound approach) to this intersection and was only in the early stages of planning/permitting at the time this TIS report was completed.

## 5 COST PARTICIPATION

The net new trips identified in this report were subject to examination under the City's arterial intersection cost participation program to the extent that they would travel through studied intersections. City staff also requested that the two project access intersections on Central be included even though they are effectively local streets (low-speed with parking and driveways, not connected to other major routes) rather than arterials. Critical traffic shares that drive intersection cost participation can be excluded if they fall below 2%, but project trips from all phases are considered together when evaluating such a possibility. Right turns are not considered in cost participation, so intersection 4 (Bell) was omitted here with the permission of City staff because the Shiloh Road median dictates that the intersection's only conflicting critical pairs involve right turns. Phase-specific project trips used in this calculation are documented in the traffic volume graphics provided in Appendix C.

The retail part of the site is scheduled to be developed in Phase 2 but it's located in the area covered by Phase 1A. Because that area is subject to a Subdivision Improvement Agreement that directly benefits the two future retail lots on the Phase 1 property, cost participation associated with retail trips was pulled forward from Phase 2 to Phase 1A.

**Exhibit 14** shows the incremental intersection cost participation for the new trips associated and the cost share calculation with each project phase. As shown in the table, no intersections qualify for the "sub-2%" waiver when all phases are considered.

### Exhibit 14. Intersection Cost Participation by Phase

Intersection	Phase				Project Total
	1A	1B	1C	2	
1. 48 <sup>th</sup> at Central	1.1%	0.3%	0.2%	0.6%	2.2%
2. Shiloh at Broadwater	1.9%	0.5%	0.4%	1.2%	4.0%
3. Shiloh at Central	7.4%	1.7%	1.4%	3.3%	13.8%
5. Shiloh at Monad	1.8%	0.4%	0.3%	1.0%	3.5%
<b>Arterial Intersection Subtotal:</b>	<b>12.2%</b>	<b>2.9%</b>	<b>2.3%</b>	<b>6.1%</b>	<b>23.5%</b>
6. Double Haul at Central (Local)	8.6%	0.3%	0.2%	2.0%	11.1%
7. 44 <sup>th</sup> at Central (Local)	9.2%	2.5%	2.1%	2.8%	16.6%
<b>Total Participation:</b>	<b>30.0%</b>	<b>5.7%</b>	<b>4.6%</b>	<b>10.9%</b>	<b>51.2%</b>

*Note: each % represents the highest project critical-volume share of the two peak hours (AM or PM)*

For all six intersections evaluated for cost participation in all phases, the PM peak hour critical-pair traffic volume would be equal to or greater than in the AM peak hour. It's important to note that more than half of the critical traffic shares indicated would occur at the two local intersections (6 and 7), both of which would operate within the City's LOS C standard in both peaks in all project phases. The details of these cost participation calculations are provided in Appendix F.

This concludes the Clearwater/44 West Subdivision TIS.

## Appendix A: Original Raw Traffic Count Data for Intersections

**Study Name Central and 48th**

**Start Date 8/8/2023**

**Start Time 7:30 AM**

**Type Road**

**Classification Totals**

Start Time	48th Street Southbound				Central Avenue Westbound				48th Street Northbound				Central Avenue Eastbound			
	Right	Thru	Left	U	Right	Thru	Left	U	Right	Thru	Left	U	Right	Thru	Left	U
7:00 AM																
7:15 AM																
7:30 AM	3	13	19	0	3	27	2	0	18	9	2	0	5	62	1	0
7:45 AM	3	26	21	0	3	24	5	0	9	10	1	0	12	48	1	0
8:00 AM	4	19	12	0	3	17	5	0	10	13	3	0	10	44	2	0
8:15 AM	2	15	13	0	3	14	5	0	8	14	0	0	6	31	4	0
8:30 AM																
8:45 AM																
4:00 PM																
4:15 PM																
4:30 PM																
4:45 PM																
5:00 PM	1	15	6	0	14	70	7	0	7	23	9	0	5	38	1	0
5:15 PM	3	19	12	0	17	60	12	0	5	30	19	0	5	40	2	0
5:30 PM	4	18	5	0	8	69	6	0	6	20	10	0	2	32	4	0
5:45 PM	5	14	8	0	10	60	5	0	1	23	9	0	2	31	2	0

**Study Name Shiloh & Broadwater**

**Start Date 3/7/2024**

**Start Time 7:00 AM**

**Type Road**

**Classification Totals**

Start Time	Shiloh Road Southbound				Broadwater Avenue Westbound				Shiloh Road Northbound				Eastbound Approach Eastbound			
	Right	Thru	Left	U	Right	Thru	Left	U	Right	Thru	Left	U	Right	Thru	Left	U
7:00 AM	0	111	22	0	17	0	8	0	23	52	0	0	0	1	0	0
7:15 AM	0	147	52	0	21	0	25	0	35	102	0	6	0	3	0	0
7:30 AM	0	182	63	0	18	0	33	0	28	122	0	2	0	4	0	0
7:45 AM	0	170	34	0	23	0	39	0	38	140	0	4	0	4	0	0
8:00 AM	0	131	22	0	26	0	29	0	39	143	0	6	0	6	0	0
8:15 AM	0	139	21	0	24	0	36	0	32	130	0	6	0	4	0	0
8:30 AM	0	133	23	0	18	0	28	0	42	137	0	5	0	3	0	0
8:45 AM	0	150	49	0	18	0	28	0	34	124	0	3	0	4	0	0
4:00 PM	0	143	17	0	33	0	42	0	27	244	0	5	0	2	0	0
4:15 PM	0	151	25	0	20	0	46	0	36	226	0	2	0	0	1	0
4:30 PM	0	151	31	0	21	0	38	0	50	238	2	2	0	0	0	0
4:45 PM	0	177	21	0	24	0	37	0	35	201	1	3	0	0	0	0
5:00 PM	0	169	23	0	40	0	56	0	56	281	0	8	0	3	0	0
5:15 PM	0	193	32	1	44	0	52	0	63	283	4	8	0	0	0	0
5:30 PM	0	179	35	1	20	0	43	0	57	202	1	1	0	0	0	0
5:45 PM	0	160	33	2	20	1	35	0	43	200	0	0	0	0	0	0

**Study Name Shiloh & Central**

**Start Date 3/21/2024**

**Start Time 7:00 AM**

**Type Road**

**Classification Totals**

Start Time	Shiloh Road Southbound				Central Avenue Westbound				Shiloh Road Northbound				Central Avenue Eastbound			
	Right	Thru	Left	U	Right	Thru	Left	U	Right	Thru	Left	U	Right	Thru	Left	U
7:00 AM	6	74	22	0	7	13	15	0	19	66	9	1	19	51	15	0
7:15 AM	8	118	48	0	7	18	28	0	32	84	14	0	25	90	17	0
7:30 AM	16	128	69	1	18	25	29	0	41	96	15	0	22	112	36	0
7:45 AM	17	135	67	0	26	19	34	0	36	130	19	0	20	91	42	0
8:00 AM	7	116	32	0	29	25	17	0	33	114	10	0	21	76	37	0
8:15 AM	15	135	31	1	12	29	19	0	27	127	9	0	22	41	38	0
8:30 AM	9	98	29	0	15	30	21	0	26	146	10	0	16	30	31	0
8:45 AM	10	102	31	1	20	22	24	0	17	119	20	0	22	40	30	0
4:00 PM	19	127	37	0	23	51	45	0	35	168	24	0	21	29	27	0
4:15 PM	20	100	34	0	35	41	58	0	26	156	45	0	20	39	25	0
4:30 PM	23	127	35	0	38	50	62	0	30	163	47	0	21	26	27	0
4:45 PM	19	153	33	0	41	45	49	0	26	174	41	0	15	36	23	0
5:00 PM	26	152	34	0	38	63	48	0	31	235	32	0	21	46	23	0
5:15 PM	24	154	43	0	35	67	35	0	35	233	35	0	26	26	28	0
5:30 PM	17	142	35	0	40	74	46	0	32	148	35	0	14	32	27	0
5:45 PM	21	148	30	0	31	46	41	0	32	162	26	0	24	22	30	0

**Study Name Shiloh & Bell**

**Start Date 5/18/2023**

**Start Time 7:00 AM**

**Type Road**

**Classification Totals**

Start Time	Shiloh Road Southbound				n/a Westbound				Shiloh Road Northbound				Bell Avenue Eastbound			
	Right	Thru	Left	U	Right	Thru	Left	U	Right	Thru	Left	U	Right	Thru	Left	U
7:00 AM	1	126		0					103	0	0		1		0	0
7:15 AM	0	186		0					111	0	0		2		0	0
7:30 AM	2	181		0					228	0	0		7		0	0
7:45 AM	2	239		0					213	0	0		7		0	0
8:00 AM	1	184		0					169	0	0		7		0	0
8:15 AM	3	233		0					167	0	0		1		0	0
8:30 AM	2	163		0					180	0	0		3		0	0
8:45 AM	6	174		0					169	0	0		5		0	0
4:00 PM	2	225		0					272	0	0		6		0	0
4:15 PM	4	224		0					262	0	0		3		0	0
4:30 PM	3	212		0					311	0	0		2		0	0
4:45 PM	5	212		0					307	0	0		7		0	0
5:00 PM	4	241		0					357	0	0		8		0	0
5:15 PM	5	243		0					324	0	0		4		0	0
5:30 PM	6	213		0					263	0	0		7		0	0
5:45 PM	6	219		0					254	0	0		2		0	0

**Study Name Shiloh & Monad**

**Start Date 10/24/2023**

**Start Time 7:00 AM**

**Type Road**

**Classification Totals**

Start Time	Shiloh Road Southbound				Monad Road Westbound				Shiloh Road Northbound				Monad Road Eastbound			
	Right	Thru	Left	U	Right	Thru	Left	U	Right	Thru	Left	U	Right	Thru	Left	U
7:00 AM	6	126	12	0	8	7	12	0	16	67	5	0	10	5	12	0
7:15 AM	12	129	36	0	11	9	15	0	22	113	1	0	13	3	25	0
7:30 AM	9	138	32	0	24	3	22	0	29	175	5	0	17	14	33	0
7:45 AM	16	215	49	0	29	8	21	0	21	190	8	0	12	7	36	0
8:00 AM	23	181	23	0	18	2	22	0	23	142	1	0	9	10	24	0
8:15 AM	26	128	38	0	22	7	17	0	17	123	3	0	2	1	34	0
8:30 AM	12	150	42	5	17	1	15	0	16	111	2	1	5	2	24	0
8:45 AM	10	135	20	0	20	5	9	0	14	109	1	0	10	3	16	0
4:00 PM	16	166	26	0	30	6	21	0	33	210	10	0	12	8	23	0
4:15 PM	15	162	23	0	25	10	20	0	30	203	7	0	6	15	23	0
4:30 PM	21	174	35	0	37	12	29	0	22	233	9	0	8	9	41	0
4:45 PM	18	154	27	1	29	8	32	0	28	236	18	0	6	0	35	0
5:00 PM	16	138	44	0	29	15	27	0	35	277	12	0	9	10	31	0
5:15 PM	30	160	25	0	38	6	25	0	40	266	16	0	11	9	20	0
5:30 PM	19	180	23	0	37	8	34	0	34	183	13	0	9	7	31	0
5:45 PM	24	156	28	0	37	10	16	0	25	176	13	0	11	12	21	0

## **Appendix B: Intersection Analysis Software Output**

### Scenario sequence:

Existing

2027 Background

2027 Phase 1A

2029 Without Phase 1B

2029 Phase 1B

2031 Without Phase 1C

2031 Phase 1C

2033 Without Phase 2

2033 Phase 2 (Full project buildout)

Intersection	
Intersection Delay, s/veh	9.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	8	188	33	18	83	12	6	47	46	66	75	12
Future Vol, veh/h	8	188	33	18	83	12	6	47	46	66	75	12
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	5	5	5	5	5	5	1	1	1
Mvmt Flow	9	211	37	20	93	13	7	53	52	74	84	13
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	10.2	9.1	8.8	9.7
HCM LOS	B	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	6%	3%	16%	43%
Vol Thru, %	47%	82%	73%	49%
Vol Right, %	46%	14%	11%	8%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	99	229	113	153
LT Vol	6	8	18	66
Through Vol	47	188	83	75
RT Vol	46	33	12	12
Lane Flow Rate	111	257	127	172
Geometry Grp	1	1	1	1
Degree of Util (X)	0.151	0.337	0.175	0.24
Departure Headway (Hd)	4.871	4.715	4.972	5.018
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	730	756	716	710
Service Time	2.946	2.777	3.045	3.088
HCM Lane V/C Ratio	0.152	0.34	0.177	0.242
HCM Control Delay, s/veh	8.8	10.2	9.1	9.7
HCM Lane LOS	A	B	A	A
HCM 95th-tile Q	0.5	1.5	0.6	0.9

Intersection									
Intersection Delay, s/veh	6.0								
Intersection LOS	A								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		1		1		
Adj Approach Flow, veh/h	0		241		728		803		
Demand Flow Rate, veh/h	0		243		742		811		
Vehicles Circulating, veh/h	957		594		149		165		
Vehicles Exiting, veh/h	19		297		808		672		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	0.0		6.1		5.7		6.1		
Approach LOS	-		A		A		A		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	R	LT	R	LT	TR	LT	TR	
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.500	0.500	0.601	0.399	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	1.000	2.535	2.667	2.535	2.535	2.535	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544	
A (Intercept)	3600	1420	1350	1420	1420	1420	1420	1420	
B (Slope)	1.151e-3	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4	
Entry Flow, veh/h	0	0	146	97	349	393	381	430	
Cap Entry Lane, veh/h	1196	629	782	857	1240	1240	1222	1222	
Entry HV Adj Factor	1.000	1.000	0.993	0.990	0.980	0.981	0.991	0.990	
Flow Entry, veh/h	0	0	145	96	342	386	378	426	
Cap Entry, veh/h	1196	629	776	848	1215	1217	1211	1210	
V/C Ratio	0.000	0.000	0.187	0.113	0.281	0.317	0.312	0.352	
Control Delay, s/veh	3.0	5.7	6.6	5.4	5.5	5.9	5.9	6.3	
LOS	A	A	A	A	A	A	A	A	
95th %tile Queue, veh	0	0	1	0	1	1	1	2	

Intersection									
Intersection Delay, s/veh	11.2								
Intersection LOS	B								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		2		2		
Adj Approach Flow, veh/h	620		313		730		857		
Demand Flow Rate, veh/h	632		322		753		866		
Vehicles Circulating, veh/h	917		768		762		285		
Vehicles Exiting, veh/h	234		747		787		805		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	14.6		8.0		13.7		7.6		
Approach LOS	B		A		B		A		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR	
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.470	0.530	0.469	0.531	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328	
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	
Entry Flow, veh/h	297	335	151	171	354	399	407	459	
Cap Entry Lane, veh/h	581	651	666	739	670	743	1039	1115	
Entry HV Adj Factor	0.981	0.981	0.973	0.969	0.970	0.970	0.990	0.990	
Flow Entry, veh/h	291	329	147	166	343	387	403	454	
Cap Entry, veh/h	570	639	648	717	649	721	1028	1103	
V/C Ratio	0.511	0.514	0.227	0.231	0.529	0.537	0.392	0.412	
Control Delay, s/veh	15.3	14.0	8.3	7.7	14.2	13.3	7.7	7.6	
LOS	C	B	A	A	B	B	A	A	
95th %tile Queue, veh	3	3	1	1	3	3	2	2	

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	
Traffic Vol, veh/h	0	22	0	766	825	8
Future Vol, veh/h	0	22	0	766	825	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	0	0	4	4	2	2
Mvmt Flow	0	25	0	861	927	9

Major/Minor	Minor2	Major1	Major2		
Conflicting Flow All	-	468	-	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-
Pot Cap-1 Maneuver	0	547	0	-	-
Stage 1	0	-	0	-	-
Stage 2	0	-	0	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	-	547	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	11.89	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	547	-	-
HCM Lane V/C Ratio	-	0.045	-	-
HCM Ctrl Dly (s/v)	-	11.9	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.1	-	-

Intersection									
Intersection Delay, s/veh	9.0								
Intersection LOS	A								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		1		1		
Adj Approach Flow, veh/h	251		244		924		1100		
Demand Flow Rate, veh/h	259		251		933		1111		
Vehicles Circulating, veh/h	1122		985		386		154		
Vehicles Exiting, veh/h	143		334		995		1082		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	14.0		9.3		9.2		7.6		
Approach LOS	B		A		A		A		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	R	LT	R	LT	TR	LT	TR	
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.795	0.205	0.526	0.474	0.471	0.529	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544	
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4	
Entry Flow, veh/h	206	53	132	119	439	494	522	589	
Cap Entry Lane, veh/h	481	547	545	615	999	999	1234	1234	
Entry HV Adj Factor	0.970	0.962	0.971	0.975	0.989	0.991	0.990	0.990	
Flow Entry, veh/h	200	51	128	116	434	490	517	583	
Cap Entry, veh/h	466	526	530	599	989	991	1222	1221	
V/C Ratio	0.428	0.097	0.242	0.194	0.439	0.494	0.423	0.477	
Control Delay, s/veh	15.5	8.1	10.2	8.4	8.7	9.6	7.2	8.0	
LOS	C	A	B	A	A	A	A	A	
95th %tile Queue, veh	2	0	1	1	2	3	2	3	

Intersection	
Intersection Delay, s/veh	12.5
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	9	143	15	30	264	50	48	98	20	31	67	13
Future Vol, veh/h	9	143	15	30	264	50	48	98	20	31	67	13
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	2	2	2	1	1	1	0	0	0	0	0	0
Mvmt Flow	10	166	17	35	307	58	56	114	23	36	78	15
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	10.7	14.6	11.2	10.4
HCM LOS	B	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	29%	5%	9%	28%
Vol Thru, %	59%	86%	77%	60%
Vol Right, %	12%	9%	15%	12%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	166	167	344	111
LT Vol	48	9	30	31
Through Vol	98	143	264	67
RT Vol	20	15	50	13
Lane Flow Rate	193	194	400	129
Geometry Grp	1	1	1	1
Degree of Util (X)	0.305	0.293	0.567	0.209
Departure Headway (Hd)	5.692	5.44	5.099	5.82
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	629	658	708	614
Service Time	3.742	3.488	3.138	3.873
HCM Lane V/C Ratio	0.307	0.295	0.565	0.21
HCM Control Delay, s/veh	11.2	10.7	14.6	10.4
HCM Lane LOS	B	B	B	B
HCM 95th-tile Q	1.3	1.2	3.6	0.8

Intersection									
Intersection Delay, s/veh	9.1								
Intersection LOS	A								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		1		1		
Adj Approach Flow, veh/h	0		360		1370		946		
Demand Flow Rate, veh/h	0		360		1370		955		
Vehicles Circulating, veh/h	1169		1130		130		244		
Vehicles Exiting, veh/h	30		370		1039		1246		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	0.0		13.6		9.0		7.6		
Approach LOS	-		B		A		A		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	R	LT	R	LT	TR	LT	TR	
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.500	0.500	0.594	0.406	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544	
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4	
Entry Flow, veh/h	0	0	214	146	644	726	449	506	
Cap Entry Lane, veh/h	461	526	477	543	1262	1262	1137	1137	
Entry HV Adj Factor	1.000	1.000	1.000	1.000	1.000	1.000	0.990	0.991	
Flow Entry, veh/h	0	0	214	146	644	726	445	501	
Cap Entry, veh/h	461	526	477	543	1261	1262	1126	1127	
V/C Ratio	0.000	0.000	0.448	0.269	0.510	0.575	0.395	0.445	
Control Delay, s/veh	7.8	6.8	15.8	10.4	8.3	9.5	7.2	8.0	
LOS	A	A	C	B	A	A	A	A	
95th %tile Queue, veh	0	0	2	1	3	4	2	2	

Intersection									
Intersection Delay, s/veh	13.6								
Intersection LOS	B								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		2		2		
Adj Approach Flow, veh/h	339		607		1152		877		
Demand Flow Rate, veh/h	339		607		1152		886		
Vehicles Circulating, veh/h	993		1130		408		611		
Vehicles Exiting, veh/h	504		430		924		1126		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	10.3		19.9		12.1		12.6		
Approach LOS	B		C		B		B		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR	
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.469	0.531	0.470	0.530	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328	
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	
Entry Flow, veh/h	159	180	285	322	541	611	416	470	
Cap Entry Lane, veh/h	541	611	477	543	927	1004	769	845	
Entry HV Adj Factor	1.002	0.998	1.001	0.999	1.001	0.999	0.991	0.989	
Flow Entry, veh/h	159	180	285	322	541	611	412	465	
Cap Entry, veh/h	543	609	478	543	928	1003	762	835	
V/C Ratio	0.294	0.295	0.597	0.593	0.583	0.609	0.541	0.556	
Control Delay, s/veh	10.8	9.8	21.1	18.8	12.1	12.0	12.8	12.4	
LOS	B	A	C	C	B	B	B	B	
95th %tile Queue, veh	1	1	4	4	4	4	3	3	

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	
Traffic Vol, veh/h	0	21	0	1280	896	17
Future Vol, veh/h	0	21	0	1280	896	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	2	2
Mvmt Flow	0	23	0	1391	974	18

Major/Minor	Minor2	Major1	Major2		
Conflicting Flow All	-	496	-	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-
Pot Cap-1 Maneuver	0	525	0	-	-
Stage 1	0	-	0	-	-
Stage 2	0	-	0	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	-	525	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	12.18	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	525	-	-
HCM Lane V/C Ratio	-	0.044	-	-
HCM Ctrl Dly (s/v)	-	12.2	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.1	-	-

Intersection									
Intersection Delay, s/veh	10.0								
Intersection LOS	B								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		1		1		
Adj Approach Flow, veh/h	201		305		1263		893		
Demand Flow Rate, veh/h	206		305		1263		902		
Vehicles Circulating, veh/h	931		1268		310		222		
Vehicles Exiting, veh/h	193		305		827		1351		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	9.8		14.1		11.1		7.1		
Approach LOS	A		B		B		A		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	R	LT	R	LT	TR	LT	TR	
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.820	0.180	0.538	0.462	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544	
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4	
Entry Flow, veh/h	169	37	164	141	594	669	424	478	
Cap Entry Lane, veh/h	573	644	420	483	1071	1071	1160	1160	
Entry HV Adj Factor	0.979	0.973	1.000	1.000	0.999	1.001	0.990	0.991	
Flow Entry, veh/h	165	36	164	141	594	669	420	473	
Cap Entry, veh/h	561	626	420	483	1070	1072	1149	1149	
V/C Ratio	0.295	0.057	0.390	0.292	0.555	0.625	0.365	0.412	
Control Delay, s/veh	10.6	6.4	15.9	11.9	10.2	11.9	6.8	7.4	
LOS	B	A	C	B	B	B	A	A	
95th %tile Queue, veh	1	0	2	1	4	5	2	2	

HCM 7th Signalized Intersection Summary  
1: 48th & Central

Clearwater/44 West TIS  
08/11/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	9	210	37	20	93	13	7	53	51	74	84	13
Future Volume (veh/h)	9	210	37	20	93	13	7	53	51	74	84	13
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1682	1682	1682	1682	1682	1682	1736	1736	1736
Adj Flow Rate, veh/h	10	236	42	22	104	15	8	60	57	83	94	15
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	5	5	5	5	5	5	1	1	1
Cap, veh/h	197	404	70	250	371	49	207	200	178	395	228	31
Arrive On Green	0.29	0.29	0.29	0.29	0.29	0.29	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	28	1398	243	133	1285	169	50	787	702	526	899	121
Grp Volume(v), veh/h	288	0	0	141	0	0	125	0	0	192	0	0
Grp Sat Flow(s),veh/h/ln	1669	0	0	1587	0	0	1538	0	0	1546	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0
Cycle Q Clear(g_c), s	2.9	0.0	0.0	1.3	0.0	0.0	1.3	0.0	0.0	2.0	0.0	0.0
Prop In Lane	0.03		0.15	0.16		0.11	0.06		0.46	0.43		0.08
Lane Grp Cap(c), veh/h	671	0	0	670	0	0	585	0	0	654	0	0
V/C Ratio(X)	0.43	0.00	0.00	0.21	0.00	0.00	0.21	0.00	0.00	0.29	0.00	0.00
Avail Cap(c_a), veh/h	2341	0	0	2198	0	0	2171	0	0	2205	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.0	0.0	0.0	5.4	0.0	0.0	6.0	0.0	0.0	6.2	0.0	0.0
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	6.4	0.0	0.0	5.6	0.0	0.0	6.1	0.0	0.0	6.4	0.0	0.0
LnGrp LOS	A			A			A			A		
Approach Vol, veh/h		288			141			125			192	
Approach Delay, s/veh		6.4			5.6			6.1			6.4	
Approach LOS		A			A			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		9.5		10.2		9.5		10.2				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		25.5		25.5		25.5		25.5				
Max Q Clear Time (g_c+I1), s		3.3		4.9		4.0		3.3				
Green Ext Time (p_c), s		0.5		1.4		0.9		0.6				
<b>Intersection Summary</b>												
HCM 7th Control Delay, s/veh				6.2								
HCM 7th LOS				A								

Intersection									
Intersection Delay, s/veh	6.5								
Intersection LOS	A								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		1		1		
Adj Approach Flow, veh/h	0		269		813		862		
Demand Flow Rate, veh/h	0		272		829		871		
Vehicles Circulating, veh/h	1035		664		167		185		
Vehicles Exiting, veh/h	21		332		868		751		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	0.0		6.9		6.3		6.6		
Approach LOS	-		A		A		A		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	R	LT	R	LT	TR	LT	TR	
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.500	0.500	0.603	0.397	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544	
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4	
Entry Flow, veh/h	0	0	164	108	390	439	409	462	
Cap Entry Lane, veh/h	521	589	733	808	1220	1220	1200	1200	
Entry HV Adj Factor	1.000	1.000	0.988	0.991	0.980	0.982	0.991	0.989	
Flow Entry, veh/h	0	0	162	107	382	431	405	457	
Cap Entry, veh/h	521	589	724	800	1196	1198	1189	1187	
V/C Ratio	0.000	0.000	0.224	0.134	0.320	0.360	0.341	0.385	
Control Delay, s/veh	6.9	6.1	7.5	5.9	6.0	6.5	6.3	6.8	
LOS	A	A	A	A	A	A	A	A	
95th %tile Queue, veh	0	0	1	0	1	2	2	2	

Intersection									
Intersection Delay, s/veh	14.5								
Intersection LOS	B								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		2		2		
Adj Approach Flow, veh/h	694		349		816		955		
Demand Flow Rate, veh/h	708		360		840		964		
Vehicles Circulating, veh/h	1022		858		851		318		
Vehicles Exiting, veh/h	260		833		879		900		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	20.2		9.3		18.5		8.7		
Approach LOS	C		A		C		A		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR	
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.470	0.530	0.469	0.531	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328	
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	
Entry Flow, veh/h	333	375	169	191	395	445	453	511	
Cap Entry Lane, veh/h	527	596	613	685	617	689	1007	1084	
Entry HV Adj Factor	0.980	0.981	0.972	0.969	0.970	0.971	0.990	0.990	
Flow Entry, veh/h	326	368	164	185	383	432	449	506	
Cap Entry, veh/h	516	584	596	664	599	669	998	1073	
V/C Ratio	0.632	0.630	0.276	0.279	0.640	0.646	0.450	0.472	
Control Delay, s/veh	21.3	19.2	9.7	8.9	19.3	17.9	8.8	8.7	
LOS	C	C	A	A	C	C	A	A	
95th %tile Queue, veh	4	4	1	1	5	5	2	3	

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	
Traffic Vol, veh/h	0	25	0	856	922	9
Future Vol, veh/h	0	25	0	856	922	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	0	0	4	4	2	2
Mvmt Flow	0	28	0	962	1036	10

Major/Minor	Minor2	Major1	Major2		
Conflicting Flow All	-	523	-	0	0
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-
Pot Cap-1 Maneuver	0	504	0	-	-
Stage 1	0	-	0	-	-
Stage 2	0	-	0	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	-	504	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	12.57	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	504	-	-
HCM Lane V/C Ratio	-	0.056	-	-
HCM Ctrl Dly (s/v)	-	12.6	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.2	-	-

Intersection									
Intersection Delay, s/veh	10.8								
Intersection LOS	B								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		1		1		
Adj Approach Flow, veh/h	280		272		1033		1230		
Demand Flow Rate, veh/h	288		280		1043		1242		
Vehicles Circulating, veh/h	1255		1099		430		171		
Vehicles Exiting, veh/h	158		374		1113		1208		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	18.7		11.1		11.0		8.7		
Approach LOS	C		B		B		A		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	R	LT	R	LT	TR	LT	TR	
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.795	0.205	0.525	0.475	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544	
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4	
Entry Flow, veh/h	229	59	147	133	490	553	584	658	
Cap Entry Lane, veh/h	426	489	491	558	960	960	1215	1215	
Entry HV Adj Factor	0.972	0.966	0.974	0.970	0.991	0.990	0.990	0.991	
Flow Entry, veh/h	223	57	143	129	486	548	578	652	
Cap Entry, veh/h	414	472	478	541	952	951	1203	1204	
V/C Ratio	0.538	0.121	0.299	0.238	0.510	0.576	0.480	0.541	
Control Delay, s/veh	21.1	9.3	12.2	9.9	10.2	11.7	8.1	9.2	
LOS	C	A	B	A	B	B	A	A	
95th %tile Queue, veh	3	0	1	1	3	4	3	3	

HCM 7th Signalized Intersection Summary  
1: 48th & Central

Clearwater/44 West TIS  
08/11/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	10	160	17	34	295	56	54	109	22	35	75	15
Future Volume (veh/h)	10	160	17	34	295	56	54	109	22	35	75	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1736	1736	1736	1750	1750	1750	1750	1750	1750
Adj Flow Rate, veh/h	12	186	20	40	343	65	63	127	26	41	87	17
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	1	1	1	0	0	0	0	0	0
Cap, veh/h	168	587	61	190	530	95	270	255	46	259	270	45
Arrive On Green	0.40	0.40	0.40	0.40	0.40	0.40	0.24	0.24	0.24	0.24	0.24	0.24
Sat Flow, veh/h	33	1484	153	76	1341	241	340	1075	194	298	1139	191
Grp Volume(v), veh/h	218	0	0	448	0	0	216	0	0	145	0	0
Grp Sat Flow(s),veh/h/ln	1670	0	0	1658	0	0	1608	0	0	1628	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.7	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	2.2	0.0	0.0	5.4	0.0	0.0	2.8	0.0	0.0	1.7	0.0	0.0
Prop In Lane	0.06		0.09	0.09		0.15	0.29		0.12	0.28		0.12
Lane Grp Cap(c), veh/h	815	0	0	816	0	0	571	0	0	574	0	0
V/C Ratio(X)	0.27	0.00	0.00	0.55	0.00	0.00	0.38	0.00	0.00	0.25	0.00	0.00
Avail Cap(c_a), veh/h	1867	0	0	1866	0	0	1828	0	0	1817	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.1	0.0	0.0	6.1	0.0	0.0	8.2	0.0	0.0	7.8	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.6	0.0	0.0	0.4	0.0	0.0	0.2	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	0.5	0.0	0.0	0.4	0.0	0.0	0.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	5.3	0.0	0.0	6.7	0.0	0.0	8.6	0.0	0.0	8.0	0.0	0.0
LnGrp LOS	A			A			A			A		
Approach Vol, veh/h		218			448			216			145	
Approach Delay, s/veh		5.3			6.7			8.6			8.0	
Approach LOS		A			A			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		10.3		14.2		10.3		14.2				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		25.5		25.5		25.5		25.5				
Max Q Clear Time (g_c+I1), s		4.8		4.2		3.7		7.4				
Green Ext Time (p_c), s		1.0		1.0		0.7		2.4				
<b>Intersection Summary</b>												
HCM 7th Control Delay, s/veh				7.0								
HCM 7th LOS				A								

Intersection									
Intersection Delay, s/veh	11.0								
Intersection LOS	B								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		1		1		
Adj Approach Flow, veh/h	0		402		1531		1057		
Demand Flow Rate, veh/h	0		402		1531		1067		
Vehicles Circulating, veh/h	1306		1262		145		272		
Vehicles Exiting, veh/h	33		414		1161		1392		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	0.0		18.2		10.6		8.7		
Approach LOS	-		C		B		A		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	R	LT	R	LT	TR	LT	TR	
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.500	0.500	0.595	0.405	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544	
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4	
Entry Flow, veh/h	0	0	239	163	720	811	501	566	
Cap Entry Lane, veh/h	406	468	423	486	1245	1245	1109	1109	
Entry HV Adj Factor	1.000	1.000	1.000	1.000	0.999	1.001	0.991	0.990	
Flow Entry, veh/h	0	0	239	163	720	811	497	560	
Cap Entry, veh/h	406	468	423	486	1244	1245	1099	1097	
V/C Ratio	0.000	0.000	0.565	0.336	0.579	0.652	0.452	0.511	
Control Delay, s/veh	8.9	7.7	21.8	12.8	9.7	11.4	8.2	9.2	
LOS	A	A	C	B	A	B	A	A	
95th %tile Queue, veh	0	0	3	1	4	5	2	3	

Intersection									
Intersection Delay, s/veh	18.9								
Intersection LOS	C								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		2		2		
Adj Approach Flow, veh/h	379		680		1287		980		
Demand Flow Rate, veh/h	379		680		1287		990		
Vehicles Circulating, veh/h	1110		1262		455		683		
Vehicles Exiting, veh/h	563		480		1034		1259		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	12.7		31.8		15.7		16.6		
Approach LOS	B		D		C		C		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR	
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.470	0.530	0.471	0.529	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328	
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	
Entry Flow, veh/h	178	201	320	360	605	682	465	525	
Cap Entry Lane, veh/h	486	553	423	486	888	965	720	795	
Entry HV Adj Factor	1.001	0.999	0.999	1.001	1.000	1.000	0.991	0.989	
Flow Entry, veh/h	178	201	320	360	605	682	461	519	
Cap Entry, veh/h	487	552	422	486	888	965	713	786	
V/C Ratio	0.366	0.364	0.757	0.741	0.681	0.707	0.646	0.661	
Control Delay, s/veh	13.4	12.0	34.4	29.4	15.7	15.7	17.0	16.3	
LOS	B	B	D	D	C	C	C	C	
95th %tile Queue, veh	2	2	6	6	6	6	5	5	

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	
Traffic Vol, veh/h	0	23	0	1430	1001	19
Future Vol, veh/h	0	23	0	1430	1001	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	2	2
Mvmt Flow	0	25	0	1554	1088	21

Major/Minor	Minor2	Major1	Major2		
Conflicting Flow All	-	554	-	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-
Pot Cap-1 Maneuver	0	481	0	-	-
Stage 1	0	-	0	-	-
Stage 2	0	-	0	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	-	481	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	12.9	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	481	-	-
HCM Lane V/C Ratio	-	0.052	-	-
HCM Ctrl Dly (s/v)	-	12.9	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.2	-	-

Intersection									
Intersection Delay, s/veh	12.5								
Intersection LOS	B								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		1		1		
Adj Approach Flow, veh/h	224		341		1411		997		
Demand Flow Rate, veh/h	229		341		1411		1007		
Vehicles Circulating, veh/h	1040		1417		347		248		
Vehicles Exiting, veh/h	215		341		922		1510		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	11.8		18.7		14.2		8.0		
Approach LOS	B		C		B		A		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	R	LT	R	LT	TR	LT	TR	
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.821	0.179	0.537	0.463	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544	
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4	
Entry Flow, veh/h	188	41	183	158	663	748	473	534	
Cap Entry Lane, veh/h	519	587	367	426	1036	1036	1133	1133	
Entry HV Adj Factor	0.980	0.976	1.000	1.000	1.000	1.000	0.990	0.989	
Flow Entry, veh/h	184	40	183	158	663	748	468	528	
Cap Entry, veh/h	508	572	367	426	1036	1035	1122	1121	
V/C Ratio	0.363	0.070	0.499	0.371	0.640	0.722	0.417	0.471	
Control Delay, s/veh	12.9	7.1	21.7	15.2	12.6	15.6	7.6	8.4	
LOS	B	A	C	C	B	C	A	A	
95th %tile Queue, veh	2	0	3	2	5	7	2	3	

HCM 7th Signalized Intersection Summary  
1: 48th & Central

Clearwater/44 West TIS  
08/11/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	9	211	37	21	97	14	7	53	51	74	84	13
Future Volume (veh/h)	9	211	37	21	97	14	7	53	51	74	84	13
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1682	1682	1682	1682	1682	1682	1736	1736	1736
Adj Flow Rate, veh/h	10	237	42	24	109	16	8	60	57	83	94	15
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	5	5	5	5	5	5	1	1	1
Cap, veh/h	197	407	71	252	371	49	207	199	178	395	228	31
Arrive On Green	0.29	0.29	0.29	0.29	0.29	0.29	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	27	1399	243	139	1275	170	50	787	702	526	899	121
Grp Volume(v), veh/h	289	0	0	149	0	0	125	0	0	192	0	0
Grp Sat Flow(s),veh/h/ln	1669	0	0	1584	0	0	1538	0	0	1546	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0
Cycle Q Clear(g_c), s	2.9	0.0	0.0	1.4	0.0	0.0	1.3	0.0	0.0	2.0	0.0	0.0
Prop In Lane	0.03		0.15	0.16		0.11	0.06		0.46	0.43		0.08
Lane Grp Cap(c), veh/h	674	0	0	672	0	0	584	0	0	653	0	0
V/C Ratio(X)	0.43	0.00	0.00	0.22	0.00	0.00	0.21	0.00	0.00	0.29	0.00	0.00
Avail Cap(c_a), veh/h	2335	0	0	2189	0	0	2166	0	0	2200	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.0	0.0	0.0	5.5	0.0	0.0	6.0	0.0	0.0	6.2	0.0	0.0
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	6.4	0.0	0.0	5.6	0.0	0.0	6.2	0.0	0.0	6.5	0.0	0.0
LnGrp LOS	A			A			A			A		
Approach Vol, veh/h		289			149			125			192	
Approach Delay, s/veh		6.4			5.6			6.2			6.5	
Approach LOS		A			A			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		9.5		10.2		9.5		10.2				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		25.5		25.5		25.5		25.5				
Max Q Clear Time (g_c+I1), s		3.3		4.9		4.0		3.4				
Green Ext Time (p_c), s		0.5		1.4		0.9		0.7				
<b>Intersection Summary</b>												
HCM 7th Control Delay, s/veh				6.2								
HCM 7th LOS				A								

Intersection									
Intersection Delay, s/veh	6.6								
Intersection LOS	A								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		1		1		
Adj Approach Flow, veh/h	0		270		831		902		
Demand Flow Rate, veh/h	0		273		847		911		
Vehicles Circulating, veh/h	1076		679		167		186		
Vehicles Exiting, veh/h	21		335		909		766		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	0.0		7.0		6.4		6.8		
Approach LOS	-		A		A		A		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	R	LT	R	LT	TR	LT	TR	
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.500	0.500	0.604	0.396	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544	
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4	
Entry Flow, veh/h	0	0	165	108	398	449	428	483	
Cap Entry Lane, veh/h	502	569	723	797	1220	1220	1199	1199	
Entry HV Adj Factor	1.000	1.000	0.988	0.991	0.981	0.981	0.990	0.989	
Flow Entry, veh/h	0	0	163	107	391	440	424	478	
Cap Entry, veh/h	502	569	714	790	1197	1197	1187	1186	
V/C Ratio	0.000	0.000	0.228	0.135	0.326	0.368	0.357	0.403	
Control Delay, s/veh	7.2	6.3	7.7	5.9	6.1	6.6	6.5	7.1	
LOS	A	A	A	A	A	A	A	A	
95th %tile Queue, veh	0	0	1	0	1	2	2	2	

Intersection									
Intersection Delay, s/veh	15.9								
Intersection LOS	C								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		2		2		
Adj Approach Flow, veh/h	751		356		823		962		
Demand Flow Rate, veh/h	766		367		847		971		
Vehicles Circulating, veh/h	1022		884		889		332		
Vehicles Exiting, veh/h	281		852		899		919		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	22.8		9.7		20.3		8.9		
Approach LOS	C		A		C		A		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR	
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.470	0.530	0.469	0.531	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328	
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	
Entry Flow, veh/h	360	406	172	195	398	449	456	515	
Cap Entry Lane, veh/h	527	596	599	670	596	667	995	1071	
Entry HV Adj Factor	0.980	0.980	0.973	0.968	0.971	0.971	0.991	0.990	
Flow Entry, veh/h	353	398	167	189	387	436	452	510	
Cap Entry, veh/h	517	584	583	648	579	648	986	1060	
V/C Ratio	0.683	0.682	0.287	0.291	0.668	0.673	0.458	0.481	
Control Delay, s/veh	24.1	21.7	10.1	9.3	21.2	19.6	9.0	8.9	
LOS	C	C	B	A	C	C	A	A	
95th %tile Queue, veh	5	5	1	1	5	5	2	3	

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	
Traffic Vol, veh/h	0	25	0	862	939	9
Future Vol, veh/h	0	25	0	862	939	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	0	0	4	4	2	2
Mvmt Flow	0	28	0	969	1055	10

Major/Minor	Minor2	Major1	Major2		
Conflicting Flow All	-	533	-	0	0
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-
Pot Cap-1 Maneuver	0	497	0	-	-
Stage 1	0	-	0	-	-
Stage 2	0	-	0	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	-	497	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	12.68	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT EBLn1	SBT	SBR
Capacity (veh/h)	- 497	-	-
HCM Lane V/C Ratio	- 0.057	-	-
HCM Ctrl Dly (s/v)	- 12.7	-	-
HCM Lane LOS	- B	-	-
HCM 95th %tile Q(veh)	- 0.2	-	-

Intersection									
Intersection Delay, s/veh	10.9								
Intersection LOS	B								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		1		1		
Adj Approach Flow, veh/h	280		273		1039		1250		
Demand Flow Rate, veh/h	288		281		1049		1262		
Vehicles Circulating, veh/h	1275		1105		433		171		
Vehicles Exiting, veh/h	158		377		1130		1215		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	19.3		11.2		11.1		8.8		
Approach LOS	C		B		B		A		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	R	LT	R	LT	TR	LT	TR	
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.795	0.205	0.523	0.477	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544	
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4	
Entry Flow, veh/h	229	59	147	134	493	556	593	669	
Cap Entry Lane, veh/h	418	480	488	555	958	958	1215	1215	
Entry HV Adj Factor	0.972	0.966	0.974	0.970	0.991	0.991	0.990	0.990	
Flow Entry, veh/h	223	57	143	130	488	551	587	662	
Cap Entry, veh/h	406	464	476	538	949	948	1204	1203	
V/C Ratio	0.548	0.123	0.301	0.241	0.515	0.581	0.488	0.550	
Control Delay, s/veh	21.8	9.5	12.3	10.0	10.3	11.8	8.2	9.3	
LOS	C	A	B	B	B	B	A	A	
95th %tile Queue, veh	3	0	1	1	3	4	3	3	

Intersection						
Int Delay, s/veh	0.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Vol, veh/h	477	1	9	178	4	26
Future Vol, veh/h	477	1	9	178	4	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	536	1	10	200	4	29

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	537	0	757 537
Stage 1	-	-	-	-	537 -
Stage 2	-	-	-	-	220 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1031	-	376 544
Stage 1	-	-	-	-	586 -
Stage 2	-	-	-	-	816 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1031	-	371 544
Mov Cap-2 Maneuver	-	-	-	-	371 -
Stage 1	-	-	-	-	586 -
Stage 2	-	-	-	-	807 -

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.41	12.52
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	512	-	-	87	-
HCM Lane V/C Ratio	0.066	-	-	0.01	-
HCM Ctrl Dly (s/v)	12.5	-	-	8.5	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Intersection						
Int Delay, s/veh	0.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Vol, veh/h	502	1	9	185	2	26
Future Vol, veh/h	502	1	9	185	2	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	564	1	10	208	2	29

















Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	565	0	793
Stage 1	-	-	-	-	565
Stage 2	-	-	-	-	228
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1007	-	358
Stage 1	-	-	-	-	569
Stage 2	-	-	-	-	810
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1007	-	354
Mov Cap-2 Maneuver	-	-	-	-	354
Stage 1	-	-	-	-	569
Stage 2	-	-	-	-	801

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.4	12.57
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	507	-	-	84	-
HCM Lane V/C Ratio	0.062	-	-	0.01	-
HCM Ctrl Dly (s/v)	12.6	-	-	8.6	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

HCM 7th Signalized Intersection Summary  
1: 48th & Central

Clearwater/44 West TIS  
08/11/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	165	17	34	298	57	54	109	23	36	75	15
Future Volume (veh/h)	10	165	17	34	298	57	54	109	23	36	75	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1736	1736	1736	1750	1750	1750	1750	1750	1750
Adj Flow Rate, veh/h	12	192	20	40	347	66	63	127	27	42	87	17
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	1	1	1	0	0	0	0	0	0
Cap, veh/h	167	593	59	189	534	96	268	254	47	260	269	45
Arrive On Green	0.40	0.40	0.40	0.40	0.40	0.40	0.24	0.24	0.24	0.24	0.24	0.24
Sat Flow, veh/h	32	1490	149	75	1341	241	338	1070	200	304	1134	189
Grp Volume(v), veh/h	224	0	0	453	0	0	217	0	0	146	0	0
Grp Sat Flow(s),veh/h/ln	1671	0	0	1658	0	0	1608	0	0	1627	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.8	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	2.3	0.0	0.0	5.5	0.0	0.0	2.8	0.0	0.0	1.8	0.0	0.0
Prop In Lane	0.05		0.09	0.09		0.15	0.29		0.12	0.29		0.12
Lane Grp Cap(c), veh/h	819	0	0	819	0	0	569	0	0	574	0	0
V/C Ratio(X)	0.27	0.00	0.00	0.55	0.00	0.00	0.38	0.00	0.00	0.25	0.00	0.00
Avail Cap(c_a), veh/h	1855	0	0	1852	0	0	1814	0	0	1802	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.1	0.0	0.0	6.1	0.0	0.0	8.2	0.0	0.0	7.8	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.6	0.0	0.0	0.4	0.0	0.0	0.2	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	0.5	0.0	0.0	0.4	0.0	0.0	0.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	5.3	0.0	0.0	6.7	0.0	0.0	8.7	0.0	0.0	8.1	0.0	0.0
LnGrp LOS	A			A			A			A		
Approach Vol, veh/h		224			453			217				146
Approach Delay, s/veh		5.3			6.7			8.7				8.1
Approach LOS		A			A			A				A
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		10.3		14.3		10.3		14.3				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		25.5		25.5		25.5		25.5				
Max Q Clear Time (g_c+I1), s		4.8		4.3		3.8		7.5				
Green Ext Time (p_c), s		1.0		1.1		0.7		2.4				
<b>Intersection Summary</b>												
HCM 7th Control Delay, s/veh				7.0								
HCM 7th LOS				A								

Intersection									
Intersection Delay, s/veh	11.2								
Intersection LOS	B								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		1		1		
Adj Approach Flow, veh/h	0		406		1544		1075		
Demand Flow Rate, veh/h	0		406		1544		1085		
Vehicles Circulating, veh/h	1328		1273		145		276		
Vehicles Exiting, veh/h	33		416		1183		1403		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	0.0		18.8		10.7		8.9		
Approach LOS	-		C		B		A		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	R	LT	R	LT	TR	LT	TR	
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.500	0.500	0.599	0.401	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544	
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4	
Entry Flow, veh/h	0	0	243	163	726	818	510	575	
Cap Entry Lane, veh/h	398	459	419	481	1245	1245	1105	1105	
Entry HV Adj Factor	1.000	1.000	1.000	1.000	1.000	1.000	0.990	0.991	
Flow Entry, veh/h	0	0	243	163	726	818	505	570	
Cap Entry, veh/h	398	459	419	481	1244	1245	1094	1094	
V/C Ratio	0.000	0.000	0.581	0.339	0.583	0.657	0.462	0.521	
Control Delay, s/veh	9.0	7.8	22.7	13.0	9.8	11.5	8.4	9.4	
LOS	A	A	C	B	A	B	A	A	
95th %tile Queue, veh	0	0	4	1	4	5	2	3	

Intersection									
Intersection Delay, s/veh	21.8								
Intersection LOS	C								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		2		2		
Adj Approach Flow, veh/h	418		713		1307		1000		
Demand Flow Rate, veh/h	418		713		1307		1010		
Vehicles Circulating, veh/h	1110		1295		481		736		
Vehicles Exiting, veh/h	636		493		1047		1272		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	13.5		38.6		17.2		19.3		
Approach LOS	B		E		C		C		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR	
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.469	0.531	0.470	0.530	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328	
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	
Entry Flow, veh/h	196	222	335	378	614	693	475	535	
Cap Entry Lane, veh/h	486	553	410	472	867	943	686	760	
Entry HV Adj Factor	1.002	0.998	1.000	1.000	1.000	1.000	0.990	0.991	
Flow Entry, veh/h	196	222	335	378	614	693	470	530	
Cap Entry, veh/h	487	552	410	472	868	943	679	753	
V/C Ratio	0.403	0.402	0.817	0.800	0.708	0.735	0.693	0.704	
Control Delay, s/veh	14.3	12.8	41.8	35.7	17.1	17.3	19.8	18.9	
LOS	B	B	E	E	C	C	C	C	
95th %tile Queue, veh	2	2	7	7	6	7	6	6	

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	
Traffic Vol, veh/h	0	23	0	1449	1013	19
Future Vol, veh/h	0	23	0	1449	1013	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	2	2
Mvmt Flow	0	25	0	1575	1101	21

Major/Minor	Minor2	Major1	Major2		
Conflicting Flow All	-	561	-	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-
Pot Cap-1 Maneuver	0	476	0	-	-
Stage 1	0	-	0	-	-
Stage 2	0	-	0	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	-	476	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	12.98	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	476	-	-
HCM Lane V/C Ratio	-	0.052	-	-
HCM Ctrl Dly (s/v)	-	13	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.2	-	-

Intersection									
Intersection Delay, s/veh	12.7								
Intersection LOS	B								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		1		1		
Adj Approach Flow, veh/h	224		344		1427		1010		
Demand Flow Rate, veh/h	229		344		1427		1021		
Vehicles Circulating, veh/h	1054		1433		349		248		
Vehicles Exiting, veh/h	215		343		934		1529		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	12.1		19.2		14.5		8.1		
Approach LOS	B		C		B		A		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	R	LT	R	LT	TR	LT	TR	
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.821	0.179	0.532	0.468	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544	
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4	
Entry Flow, veh/h	188	41	183	161	671	756	480	541	
Cap Entry Lane, veh/h	512	580	361	420	1034	1034	1133	1133	
Entry HV Adj Factor	0.980	0.976	1.000	1.000	1.000	1.000	0.989	0.990	
Flow Entry, veh/h	184	40	183	161	671	756	475	536	
Cap Entry, veh/h	502	566	361	420	1033	1034	1121	1122	
V/C Ratio	0.367	0.071	0.507	0.383	0.649	0.731	0.424	0.477	
Control Delay, s/veh	13.1	7.2	22.3	15.7	12.9	16.0	7.7	8.5	
LOS	B	A	C	C	B	C	A	A	
95th %tile Queue, veh	2	0	3	2	5	7	2	3	

Intersection						
Int Delay, s/veh	0.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Vol, veh/h	287	4	28	455	3	17
Future Vol, veh/h	287	4	28	455	3	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	322	4	31	511	3	19

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	327	0	899 325
Stage 1	-	-	-	-	325 -
Stage 2	-	-	-	-	574 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1233	-	310 716
Stage 1	-	-	-	-	732 -
Stage 2	-	-	-	-	563 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1233	-	298 716
Mov Cap-2 Maneuver	-	-	-	-	298 -
Stage 1	-	-	-	-	732 -
Stage 2	-	-	-	-	543 -

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.46	11.32
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	592	-	-	104	-
HCM Lane V/C Ratio	0.038	-	-	0.026	-
HCM Ctrl Dly (s/v)	11.3	-	-	8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

Intersection						
Int Delay, s/veh	0.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Vol, veh/h	302	2	28	482	1	17
Future Vol, veh/h	302	2	28	482	1	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	339	2	31	542	1	19

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	342	0	945 340
Stage 1	-	-	-	-	340 -
Stage 2	-	-	-	-	604 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1217	-	291 702
Stage 1	-	-	-	-	721 -
Stage 2	-	-	-	-	545 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1217	-	280 702
Mov Cap-2 Maneuver	-	-	-	-	280 -
Stage 1	-	-	-	-	721 -
Stage 2	-	-	-	-	525 -

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.44	10.74
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	648	-	-	99	-
HCM Lane V/C Ratio	0.031	-	-	0.026	-
HCM Ctrl Dly (s/v)	10.7	-	-	8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

HCM 7th Signalized Intersection Summary  
1: 48th & Central

Clearwater/44 West TIS  
08/11/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	10	227	40	23	104	15	7	57	55	79	90	14
Future Volume (veh/h)	10	227	40	23	104	15	7	57	55	79	90	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1682	1682	1682	1682	1682	1682	1736	1736	1736
Adj Flow Rate, veh/h	11	255	45	26	117	17	8	64	62	89	101	16
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	5	5	5	5	5	5	1	1	1
Cap, veh/h	190	430	74	245	392	52	197	199	181	386	228	31
Arrive On Green	0.31	0.31	0.31	0.31	0.31	0.31	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	27	1401	242	135	1278	168	45	781	711	529	897	120
Grp Volume(v), veh/h	311	0	0	160	0	0	134	0	0	206	0	0
Grp Sat Flow(s),veh/h/ln	1669	0	0	1582	0	0	1538	0	0	1546	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0
Cycle Q Clear(g_c), s	3.2	0.0	0.0	1.5	0.0	0.0	1.4	0.0	0.0	2.2	0.0	0.0
Prop In Lane	0.04		0.14	0.16		0.11	0.06		0.46	0.43		0.08
Lane Grp Cap(c), veh/h	694	0	0	689	0	0	577	0	0	645	0	0
V/C Ratio(X)	0.45	0.00	0.00	0.23	0.00	0.00	0.23	0.00	0.00	0.32	0.00	0.00
Avail Cap(c_a), veh/h	2245	0	0	2100	0	0	2083	0	0	2111	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.1	0.0	0.0	5.5	0.0	0.0	6.2	0.0	0.0	6.5	0.0	0.0
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	6.5	0.0	0.0	5.6	0.0	0.0	6.4	0.0	0.0	6.8	0.0	0.0
LnGrp LOS	A			A			A			A		
Approach Vol, veh/h		311			160			134			206	
Approach Delay, s/veh		6.5			5.6			6.4			6.8	
Approach LOS		A			A			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		9.7		10.8		9.7		10.8				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		25.5		25.5		25.5		25.5				
Max Q Clear Time (g_c+I1), s		3.4		5.2		4.2		3.5				
Green Ext Time (p_c), s		0.6		1.5		1.0		0.8				
<b>Intersection Summary</b>												
HCM 7th Control Delay, s/veh				6.4								
HCM 7th LOS				A								

Intersection									
Intersection Delay, s/veh	7.2								
Intersection LOS	A								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		1		1		
Adj Approach Flow, veh/h	0		291		895		972		
Demand Flow Rate, veh/h	0		294		913		982		
Vehicles Circulating, veh/h	1160		731		180		201		
Vehicles Exiting, veh/h	23		362		980		824		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	0.0		7.6		6.8		7.3		
Approach LOS	-		A		A		A		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	R	LT	R	LT	TR	LT	TR	
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.500	0.500	0.605	0.395	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544	
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4	
Entry Flow, veh/h	0	0	178	116	429	484	462	520	
Cap Entry Lane, veh/h	464	530	689	763	1206	1206	1183	1183	
Entry HV Adj Factor	1.000	1.000	0.989	0.991	0.981	0.980	0.989	0.991	
Flow Entry, veh/h	0	0	176	115	421	474	457	515	
Cap Entry, veh/h	464	530	681	756	1182	1182	1170	1172	
V/C Ratio	0.000	0.000	0.258	0.152	0.356	0.401	0.391	0.440	
Control Delay, s/veh	7.8	6.8	8.4	6.4	6.5	7.1	7.0	7.7	
LOS	A	A	A	A	A	A	A	A	
95th %tile Queue, veh	0	0	1	1	2	2	2	2	

Intersection									
Intersection Delay, s/veh	20.9								
Intersection LOS	C								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		2		2		
Adj Approach Flow, veh/h	804		384		887		1037		
Demand Flow Rate, veh/h	820		395		914		1048		
Vehicles Circulating, veh/h	1104		952		956		359		
Vehicles Exiting, veh/h	303		918		968		988		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	32.0		10.9		27.7		10.0		
Approach LOS	D		B		D		B		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR	
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.470	0.530	0.471	0.529	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328	
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	
Entry Flow, veh/h	385	435	186	209	430	484	493	555	
Cap Entry Lane, veh/h	489	556	562	632	560	630	970	1047	
Entry HV Adj Factor	0.982	0.980	0.970	0.973	0.970	0.972	0.989	0.990	
Flow Entry, veh/h	378	426	180	203	417	470	487	550	
Cap Entry, veh/h	480	544	545	615	543	612	959	1037	
V/C Ratio	0.787	0.783	0.331	0.331	0.768	0.768	0.508	0.530	
Control Delay, s/veh	33.9	30.4	11.5	10.4	29.0	26.5	10.1	10.0	
LOS	D	D	B	B	D	D	B	A	
95th %tile Queue, veh	7	7	1	1	7	7	3	3	

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	
Traffic Vol, veh/h	0	26	0	928	1010	10
Future Vol, veh/h	0	26	0	928	1010	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	0	0	4	4	2	2
Mvmt Flow	0	29	0	1043	1135	11

Major/Minor	Minor2	Major1	Major2		
Conflicting Flow All	-	573	-	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-
Pot Cap-1 Maneuver	0	468	0	-	-
Stage 1	0	-	0	-	-
Stage 2	0	-	0	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	-	468	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	13.21	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	468	-	-
HCM Lane V/C Ratio	-	0.062	-	-
HCM Ctrl Dly (s/v)	-	13.2	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.2	-	-

Intersection									
Intersection Delay, s/veh	12.8								
Intersection LOS	B								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		1		1		
Adj Approach Flow, veh/h	304		293		1119		1344		
Demand Flow Rate, veh/h	313		302		1130		1357		
Vehicles Circulating, veh/h	1372		1193		469		185		
Vehicles Exiting, veh/h	170		406		1216		1310		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	25.6		12.9		13.0		9.8		
Approach LOS	D		B		B		A		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	R	LT	R	LT	TR	LT	TR	
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.796	0.204	0.523	0.477	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544	
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4	
Entry Flow, veh/h	249	64	158	144	531	599	638	719	
Cap Entry Lane, veh/h	382	442	450	515	927	927	1200	1200	
Entry HV Adj Factor	0.970	0.969	0.969	0.972	0.991	0.990	0.990	0.991	
Flow Entry, veh/h	242	62	153	140	526	593	632	712	
Cap Entry, veh/h	371	429	437	501	918	918	1188	1189	
V/C Ratio	0.652	0.145	0.351	0.280	0.573	0.646	0.532	0.599	
Control Delay, s/veh	29.4	10.5	14.4	11.4	11.9	14.0	9.1	10.4	
LOS	D	B	B	B	B	B	A	B	
95th %tile Queue, veh	4	1	2	1	4	5	3	4	

Intersection						
Int Delay, s/veh	0.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Vol, veh/h	514	1	9	192	4	26
Future Vol, veh/h	514	1	9	192	4	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	578	1	10	216	4	29

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	579	0	814
Stage 1	-	-	-	-	578
Stage 2	-	-	-	-	236
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	995	-	347
Stage 1	-	-	-	-	561
Stage 2	-	-	-	-	803
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	995	-	343
Mov Cap-2 Maneuver	-	-	-	-	343
Stage 1	-	-	-	-	561
Stage 2	-	-	-	-	794

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.39	13.01
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	483	-	-	81	-
HCM Lane V/C Ratio	0.07	-	-	0.01	-
HCM Ctrl Dly (s/v)	13	-	-	8.7	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Intersection						
Int Delay, s/veh	0.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Vol, veh/h	539	1	9	199	2	26
Future Vol, veh/h	539	1	9	199	2	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	606	1	10	224	2	29

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	607	0	850
Stage 1	-	-	-	-	606
Stage 2	-	-	-	-	244
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	971	-	331
Stage 1	-	-	-	-	544
Stage 2	-	-	-	-	797
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	971	-	327
Mov Cap-2 Maneuver	-	-	-	-	327
Stage 1	-	-	-	-	544
Stage 2	-	-	-	-	787

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.38	13.04
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	479	-	-	78	-
HCM Lane V/C Ratio	0.066	-	-	0.01	-
HCM Ctrl Dly (s/v)	13	-	-	8.7	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

HCM 7th Signalized Intersection Summary  
1: 48th & Central

Clearwater/44 West TIS  
08/11/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	11	177	18	36	321	61	58	118	25	38	81	16
Future Volume (veh/h)	11	177	18	36	321	61	58	118	25	38	81	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1736	1736	1736	1750	1750	1750	1750	1750	1750
Adj Flow Rate, veh/h	13	206	21	42	373	71	67	137	29	44	94	19
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	1	1	1	0	0	0	0	0	0
Cap, veh/h	158	617	60	180	555	100	258	261	49	247	276	48
Arrive On Green	0.41	0.41	0.41	0.41	0.41	0.41	0.24	0.24	0.24	0.24	0.24	0.24
Sat Flow, veh/h	32	1492	146	73	1342	242	333	1075	200	293	1140	197
Grp Volume(v), veh/h	240	0	0	486	0	0	233	0	0	157	0	0
Grp Sat Flow(s),veh/h/ln	1670	0	0	1657	0	0	1608	0	0	1630	0	0
Q Serve(g_s), s	0.0	0.0	0.0	1.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	2.5	0.0	0.0	6.2	0.0	0.0	3.2	0.0	0.0	2.0	0.0	0.0
Prop In Lane	0.05		0.09	0.09		0.15	0.29		0.12	0.28		0.12
Lane Grp Cap(c), veh/h	836	0	0	835	0	0	567	0	0	571	0	0
V/C Ratio(X)	0.29	0.00	0.00	0.58	0.00	0.00	0.41	0.00	0.00	0.27	0.00	0.00
Avail Cap(c_a), veh/h	1747	0	0	1746	0	0	1709	0	0	1698	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.2	0.0	0.0	6.3	0.0	0.0	8.7	0.0	0.0	8.3	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.6	0.0	0.0	0.5	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	0.6	0.0	0.0	0.5	0.0	0.0	0.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	5.4	0.0	0.0	7.0	0.0	0.0	9.2	0.0	0.0	8.5	0.0	0.0
LnGrp LOS	A			A			A			A		
Approach Vol, veh/h		240			486			233				157
Approach Delay, s/veh		5.4			7.0			9.2				8.5
Approach LOS		A			A			A				A
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		10.8		15.3		10.8		15.3				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		25.5		25.5		25.5		25.5				
Max Q Clear Time (g_c+I1), s		5.2		4.5		4.0		8.2				
Green Ext Time (p_c), s		1.1		1.1		0.7		2.6				
<b>Intersection Summary</b>												
HCM 7th Control Delay, s/veh				7.3								
HCM 7th LOS				A								

Intersection									
Intersection Delay, s/veh	13.1								
Intersection LOS	B								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		1		1		
Adj Approach Flow, veh/h	0		437		1661		1155		
Demand Flow Rate, veh/h	0		437		1661		1167		
Vehicles Circulating, veh/h	1428		1370		156		297		
Vehicles Exiting, veh/h	36		447		1272		1510		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	0.0		24.5		12.3		10.0		
Approach LOS	-		C		B		A		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	R	LT	R	LT	TR	LT	TR	
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.500	0.500	0.597	0.403	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544	
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4	
Entry Flow, veh/h	0	0	261	176	781	880	548	619	
Cap Entry Lane, veh/h	363	422	383	443	1232	1232	1084	1084	
Entry HV Adj Factor	1.000	1.000	1.000	1.000	1.000	1.000	0.991	0.989	
Flow Entry, veh/h	0	0	261	176	781	880	543	612	
Cap Entry, veh/h	363	422	383	443	1232	1233	1074	1072	
V/C Ratio	0.000	0.000	0.682	0.397	0.634	0.714	0.506	0.571	
Control Delay, s/veh	9.9	8.5	30.7	15.4	11.0	13.4	9.3	10.6	
LOS	A	A	D	C	B	B	A	B	
95th %tile Queue, veh	0	0	5	2	5	7	3	4	

Intersection									
Intersection Delay, s/veh	31.1								
Intersection LOS	D								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		2		2		
Adj Approach Flow, veh/h	446		764		1406		1075		
Demand Flow Rate, veh/h	446		764		1406		1086		
Vehicles Circulating, veh/h	1195		1391		515		788		
Vehicles Exiting, veh/h	679		530		1126		1367		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	16.1		63.5		22.3		25.7		
Approach LOS	C		F		C		D		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR	
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.471	0.529	0.470	0.530	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328	
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	
Entry Flow, veh/h	210	236	359	405	661	745	510	576	
Cap Entry Lane, veh/h	450	514	375	435	841	917	654	727	
Entry HV Adj Factor	0.998	1.002	1.000	1.000	1.000	1.000	0.991	0.990	
Flow Entry, veh/h	210	236	359	405	661	745	505	570	
Cap Entry, veh/h	449	515	376	435	840	917	648	719	
V/C Ratio	0.467	0.459	0.956	0.930	0.786	0.813	0.780	0.793	
Control Delay, s/veh	17.2	15.1	69.5	58.2	22.0	22.5	26.3	25.3	
LOS	C	C	F	F	C	C	D	D	
95th %tile Queue, veh	2	2	11	11	8	9	7	8	

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	
Traffic Vol, veh/h	0	25	0	1559	1090	20
Future Vol, veh/h	0	25	0	1559	1090	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	2	2
Mvmt Flow	0	27	0	1695	1185	22

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	-	603	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	6.9	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	3.3	-
Pot Cap-1 Maneuver	0	447	0
Stage 1	0	-	0
Stage 2	0	-	0
Platoon blocked, %			-
Mov Cap-1 Maneuver	-	447	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	13.58	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT EBLn1	SBT	SBR
Capacity (veh/h)	- 447	-	-
HCM Lane V/C Ratio	- 0.061	-	-
HCM Ctrl Dly (s/v)	- 13.6	-	-
HCM Lane LOS	- B	-	-
HCM 95th %tile Q(veh)	- 0.2	-	-

Intersection									
Intersection Delay, s/veh	15.5								
Intersection LOS	C								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		1		1		
Adj Approach Flow, veh/h	242		371		1535		1086		
Demand Flow Rate, veh/h	247		371		1535		1097		
Vehicles Circulating, veh/h	1132		1541		375		267		
Vehicles Exiting, veh/h	232		369		1004		1645		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	14.1		24.7		18.2		8.9		
Approach LOS	B		C		C		A		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	R	LT	R	LT	TR	LT	TR	
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.822	0.178	0.534	0.466	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544	
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4	
Entry Flow, veh/h	203	44	198	173	721	814	516	581	
Cap Entry Lane, veh/h	476	542	327	383	1009	1009	1114	1114	
Entry HV Adj Factor	0.982	0.977	1.000	1.000	1.001	0.999	0.989	0.991	
Flow Entry, veh/h	199	43	198	173	721	814	510	576	
Cap Entry, veh/h	468	530	327	383	1010	1009	1102	1103	
V/C Ratio	0.426	0.081	0.605	0.452	0.714	0.806	0.463	0.522	
Control Delay, s/veh	15.4	7.8	29.6	19.2	15.5	20.5	8.4	9.4	
LOS	C	A	D	C	C	C	A	A	
95th %tile Queue, veh	2	0	4	2	6	9	3	3	

Intersection						
Int Delay, s/veh	0.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Vol, veh/h	309	4	28	489	3	17
Future Vol, veh/h	309	4	28	489	3	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	347	4	31	549	3	19

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	352	0	962 349
Stage 1	-	-	-	-	349 -
Stage 2	-	-	-	-	612 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1207	-	284 694
Stage 1	-	-	-	-	714 -
Stage 2	-	-	-	-	541 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1207	-	273 694
Mov Cap-2 Maneuver	-	-	-	-	273 -
Stage 1	-	-	-	-	714 -
Stage 2	-	-	-	-	521 -

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.44	11.65
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	564	-	-	97	-
HCM Lane V/C Ratio	0.04	-	-	0.026	-
HCM Ctrl Dly (s/v)	11.7	-	-	8.1	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

Intersection						
Int Delay, s/veh	0.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Vol, veh/h	324	2	28	516	1	17
Future Vol, veh/h	324	2	28	516	1	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	364	2	31	580	1	19

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	366	0	1008
Stage 1	-	-	-	-	365
Stage 2	-	-	-	-	643
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1192	-	267
Stage 1	-	-	-	-	702
Stage 2	-	-	-	-	524
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1192	-	256
Mov Cap-2 Maneuver	-	-	-	-	256
Stage 1	-	-	-	-	702
Stage 2	-	-	-	-	503

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.42	10.98
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	623	-	-	93	-
HCM Lane V/C Ratio	0.032	-	-	0.026	-
HCM Ctrl Dly (s/v)	11	-	-	8.1	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

HCM 7th Signalized Intersection Summary  
1: 48th & Central

Clearwater/44 West TIS  
08/11/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	10	228	40	23	106	16	7	57	55	79	90	14
Future Volume (veh/h)	10	228	40	23	106	16	7	57	55	79	90	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1682	1682	1682	1682	1682	1682	1736	1736	1736
Adj Flow Rate, veh/h	11	256	45	26	119	18	8	64	62	89	101	16
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	5	5	5	5	5	5	1	1	1
Cap, veh/h	190	431	74	244	392	54	197	199	181	385	228	31
Arrive On Green	0.31	0.31	0.31	0.31	0.31	0.31	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	27	1402	241	132	1274	175	45	781	712	529	897	120
Grp Volume(v), veh/h	312	0	0	163	0	0	134	0	0	206	0	0
Grp Sat Flow(s),veh/h/ln	1669	0	0	1582	0	0	1538	0	0	1546	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0
Cycle Q Clear(g_c), s	3.2	0.0	0.0	1.6	0.0	0.0	1.4	0.0	0.0	2.2	0.0	0.0
Prop In Lane	0.04		0.14	0.16		0.11	0.06		0.46	0.43		0.08
Lane Grp Cap(c), veh/h	695	0	0	690	0	0	577	0	0	644	0	0
V/C Ratio(X)	0.45	0.00	0.00	0.24	0.00	0.00	0.23	0.00	0.00	0.32	0.00	0.00
Avail Cap(c_a), veh/h	2242	0	0	2097	0	0	2079	0	0	2107	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.0	0.0	0.0	5.5	0.0	0.0	6.3	0.0	0.0	6.5	0.0	0.0
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	6.5	0.0	0.0	5.6	0.0	0.0	6.5	0.0	0.0	6.8	0.0	0.0
LnGrp LOS	A			A			A			A		
Approach Vol, veh/h		312			163			134			206	
Approach Delay, s/veh		6.5			5.6			6.5			6.8	
Approach LOS		A			A			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		9.7		10.8		9.7		10.8				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		25.5		25.5		25.5		25.5				
Max Q Clear Time (g_c+I1), s		3.4		5.2		4.2		3.6				
Green Ext Time (p_c), s		0.6		1.5		1.0		0.8				
<b>Intersection Summary</b>												
HCM 7th Control Delay, s/veh				6.4								
HCM 7th LOS				A								

Intersection									
Intersection Delay, s/veh	7.2								
Intersection LOS	A								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		1		1		
Adj Approach Flow, veh/h	0		291		903		974		
Demand Flow Rate, veh/h	0		294		921		984		
Vehicles Circulating, veh/h	1162		738		180		201		
Vehicles Exiting, veh/h	23		363		982		831		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	0.0		7.7		6.8		7.4		
Approach LOS	-		A		A		A		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	R	LT	R	LT	TR	LT	TR	
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.500	0.500	0.605	0.395	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544	
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4	
Entry Flow, veh/h	0	0	178	116	433	488	462	522	
Cap Entry Lane, veh/h	464	529	685	758	1206	1206	1183	1183	
Entry HV Adj Factor	1.000	1.000	0.989	0.991	0.980	0.981	0.991	0.989	
Flow Entry, veh/h	0	0	176	115	424	479	458	516	
Cap Entry, veh/h	464	529	677	752	1182	1182	1172	1170	
V/C Ratio	0.000	0.000	0.260	0.153	0.359	0.405	0.391	0.441	
Control Delay, s/veh	7.8	6.8	8.5	6.4	6.5	7.1	7.0	7.7	
LOS	A	A	A	A	A	A	A	A	
95th %tile Queue, veh	0	0	1	1	2	2	2	2	

Intersection									
Intersection Delay, s/veh	22.4								
Intersection LOS	C								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		2		2		
Adj Approach Flow, veh/h	834		388		890		1040		
Demand Flow Rate, veh/h	851		399		917		1051		
Vehicles Circulating, veh/h	1104		966		977		366		
Vehicles Exiting, veh/h	313		928		978		999		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	35.1		11.1		29.6		10.2		
Approach LOS	E		B		D		B		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR	
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.470	0.530	0.471	0.529	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328	
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	
Entry Flow, veh/h	400	451	188	211	431	486	494	557	
Cap Entry Lane, veh/h	489	556	555	625	550	619	964	1040	
Entry HV Adj Factor	0.980	0.980	0.969	0.974	0.971	0.971	0.990	0.990	
Flow Entry, veh/h	392	442	182	206	418	472	489	551	
Cap Entry, veh/h	479	544	538	608	533	601	954	1030	
V/C Ratio	0.818	0.812	0.339	0.338	0.784	0.785	0.512	0.535	
Control Delay, s/veh	37.3	33.2	11.8	10.6	31.0	28.3	10.2	10.1	
LOS	E	D	B	B	D	D	B	B	
95th %tile Queue, veh	8	8	1	1	7	7	3	3	

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	
Traffic Vol, veh/h	0	26	0	931	1019	10
Future Vol, veh/h	0	26	0	931	1019	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	0	0	4	4	2	2
Mvmt Flow	0	29	0	1046	1145	11

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	-	578	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	6.9	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	3.3	-
Pot Cap-1 Maneuver	0	464	0
Stage 1	0	-	0
Stage 2	0	-	0
Platoon blocked, %			-
Mov Cap-1 Maneuver	-	464	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	13.28	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	464	-	-
HCM Lane V/C Ratio	-	0.063	-	-
HCM Ctrl Dly (s/v)	-	13.3	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.2	-	-

Intersection									
Intersection Delay, s/veh	13.0								
Intersection LOS	B								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		1		1		
Adj Approach Flow, veh/h	304		293		1122		1354		
Demand Flow Rate, veh/h	313		302		1133		1367		
Vehicles Circulating, veh/h	1382		1196		471		185		
Vehicles Exiting, veh/h	170		408		1224		1313		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	26.1		13.0		13.1		9.9		
Approach LOS	D		B		B		A		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	R	LT	R	LT	TR	LT	TR	
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.796	0.204	0.523	0.477	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544	
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4	
Entry Flow, veh/h	249	64	158	144	533	600	642	725	
Cap Entry Lane, veh/h	379	439	449	514	925	925	1200	1200	
Entry HV Adj Factor	0.970	0.969	0.969	0.972	0.990	0.991	0.991	0.990	
Flow Entry, veh/h	242	62	153	140	528	595	636	717	
Cap Entry, veh/h	367	425	435	499	916	917	1189	1188	
V/C Ratio	0.658	0.146	0.352	0.280	0.576	0.649	0.535	0.604	
Control Delay, s/veh	30.1	10.6	14.4	11.4	12.0	14.1	9.1	10.6	
LOS	D	B	B	B	B	B	A	B	
95th %tile Queue, veh	4	1	2	1	4	5	3	4	

Intersection						
Int Delay, s/veh	0.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Vol, veh/h	514	1	9	193	5	26
Future Vol, veh/h	514	1	9	193	5	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	578	1	10	217	6	29

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	579	0	815
Stage 1	-	-	-	-	578
Stage 2	-	-	-	-	237
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	995	-	347
Stage 1	-	-	-	-	561
Stage 2	-	-	-	-	802
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	995	-	343
Mov Cap-2 Maneuver	-	-	-	-	343
Stage 1	-	-	-	-	561
Stage 2	-	-	-	-	793

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.39	13.14
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	477	-	-	80	-
HCM Lane V/C Ratio	0.073	-	-	0.01	-
HCM Ctrl Dly (s/v)	13.1	-	-	8.7	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Intersection						
Int Delay, s/veh	1.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Vol, veh/h	539	1	18	199	3	53
Future Vol, veh/h	539	1	18	199	3	53
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	606	1	20	224	3	60

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	607	0	870
Stage 1	-	-	-	-	606
Stage 2	-	-	-	-	264
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	971	-	322
Stage 1	-	-	-	-	544
Stage 2	-	-	-	-	780
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	971	-	314
Mov Cap-2 Maneuver	-	-	-	-	314
Stage 1	-	-	-	-	544
Stage 2	-	-	-	-	762

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.73	13.59
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	482	-	-	149	-
HCM Lane V/C Ratio	0.131	-	-	0.021	-
HCM Ctrl Dly (s/v)	13.6	-	-	8.8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.4	-	-	0.1	-

HCM 7th Signalized Intersection Summary  
1: 48th & Central

Clearwater/44 West TIS  
08/11/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	11	179	18	36	322	61	58	118	25	39	81	16
Future Volume (veh/h)	11	179	18	36	322	61	58	118	25	39	81	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1736	1736	1736	1750	1750	1750	1750	1750	1750
Adj Flow Rate, veh/h	13	208	21	42	374	71	67	137	29	45	94	19
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	1	1	1	0	0	0	0	0	0
Cap, veh/h	158	619	60	179	556	100	258	261	49	249	275	47
Arrive On Green	0.41	0.41	0.41	0.41	0.41	0.41	0.24	0.24	0.24	0.24	0.24	0.24
Sat Flow, veh/h	32	1494	145	73	1342	242	333	1076	200	299	1134	196
Grp Volume(v), veh/h	242	0	0	487	0	0	233	0	0	158	0	0
Grp Sat Flow(s),veh/h/ln	1671	0	0	1657	0	0	1609	0	0	1629	0	0
Q Serve(g_s), s	0.0	0.0	0.0	1.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	2.6	0.0	0.0	6.3	0.0	0.0	3.3	0.0	0.0	2.0	0.0	0.0
Prop In Lane	0.05		0.09	0.09		0.15	0.29		0.12	0.28		0.12
Lane Grp Cap(c), veh/h	837	0	0	835	0	0	567	0	0	571	0	0
V/C Ratio(X)	0.29	0.00	0.00	0.58	0.00	0.00	0.41	0.00	0.00	0.28	0.00	0.00
Avail Cap(c_a), veh/h	1746	0	0	1744	0	0	1707	0	0	1694	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.2	0.0	0.0	6.3	0.0	0.0	8.7	0.0	0.0	8.3	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.6	0.0	0.0	0.5	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	0.6	0.0	0.0	0.5	0.0	0.0	0.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	5.4	0.0	0.0	7.0	0.0	0.0	9.2	0.0	0.0	8.5	0.0	0.0
LnGrp LOS	A			A			A			A		
Approach Vol, veh/h		242			487			233				158
Approach Delay, s/veh		5.4			7.0			9.2				8.5
Approach LOS		A			A			A				A
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		10.8		15.4		10.8		15.4				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		25.5		25.5		25.5		25.5				
Max Q Clear Time (g_c+I1), s		5.3		4.6		4.0		8.3				
Green Ext Time (p_c), s		1.1		1.2		0.7		2.6				
<b>Intersection Summary</b>												
HCM 7th Control Delay, s/veh				7.3								
HCM 7th LOS				A								

Intersection									
Intersection Delay, s/veh	13.3								
Intersection LOS	B								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		1		1		
Adj Approach Flow, veh/h	0		439		1668		1164		
Demand Flow Rate, veh/h	0		439		1668		1176		
Vehicles Circulating, veh/h	1439		1376		156		299		
Vehicles Exiting, veh/h	36		448		1283		1516		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	0.0		25.1		12.4		10.1		
Approach LOS	-		D		B		B		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	R	LT	R	LT	TR	LT	TR	
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.500	0.500	0.599	0.401	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544	
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4	
Entry Flow, veh/h	0	0	263	176	784	884	553	623	
Cap Entry Lane, veh/h	359	418	381	441	1232	1232	1082	1082	
Entry HV Adj Factor	1.000	1.000	1.000	1.000	1.000	1.000	0.989	0.990	
Flow Entry, veh/h	0	0	263	176	784	884	547	617	
Cap Entry, veh/h	359	418	381	441	1232	1232	1070	1071	
V/C Ratio	0.000	0.000	0.691	0.399	0.636	0.717	0.511	0.576	
Control Delay, s/veh	10.0	8.6	31.5	15.5	11.1	13.5	9.4	10.7	
LOS	B	A	D	C	B	B	A	B	
95th %tile Queue, veh	0	0	5	2	5	7	3	4	

Intersection									
Intersection Delay, s/veh	33.7								
Intersection LOS	D								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		2		2		
Adj Approach Flow, veh/h	465		775		1416		1084		
Demand Flow Rate, veh/h	465		775		1416		1095		
Vehicles Circulating, veh/h	1195		1407		527		809		
Vehicles Exiting, veh/h	709		536		1133		1373		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	16.7		70.2		23.6		28.0		
Approach LOS	C		F		C		D		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR	
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.471	0.529	0.470	0.530	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328	
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	
Entry Flow, veh/h	219	246	364	411	666	750	515	580	
Cap Entry Lane, veh/h	450	514	370	429	831	907	641	714	
Entry HV Adj Factor	0.998	1.002	1.001	0.999	0.999	1.001	0.990	0.991	
Flow Entry, veh/h	219	246	364	411	666	750	510	575	
Cap Entry, veh/h	449	515	370	429	831	908	635	707	
V/C Ratio	0.487	0.478	0.984	0.957	0.801	0.827	0.803	0.812	
Control Delay, s/veh	17.8	15.6	76.7	64.4	23.3	23.8	28.7	27.3	
LOS	C	C	F	F	C	C	D	D	
95th %tile Queue, veh	3	3	11	11	9	10	8	9	

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	
Traffic Vol, veh/h	0	25	0	1568	1096	20
Future Vol, veh/h	0	25	0	1568	1096	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	2	2
Mvmt Flow	0	27	0	1704	1191	22

Major/Minor	Minor2	Major1	Major2		
Conflicting Flow All	-	607	-	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-
Pot Cap-1 Maneuver	0	445	0	-	-
Stage 1	0	-	0	-	-
Stage 2	0	-	0	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	-	445	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	13.62	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	445	-	-
HCM Lane V/C Ratio	-	0.061	-	-
HCM Ctrl Dly (s/v)	-	13.6	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.2	-	-

Intersection									
Intersection Delay, s/veh	15.7								
Intersection LOS	C								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		1		1		
Adj Approach Flow, veh/h	242		373		1543		1092		
Demand Flow Rate, veh/h	247		373		1543		1103		
Vehicles Circulating, veh/h	1138		1549		376		267		
Vehicles Exiting, veh/h	232		370		1009		1655		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	14.2		25.1		18.5		9.0		
Approach LOS	B		D		C		A		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	R	LT	R	LT	TR	LT	TR	
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.822	0.178	0.531	0.469	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544	
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4	
Entry Flow, veh/h	203	44	198	175	725	818	518	585	
Cap Entry Lane, veh/h	474	540	325	381	1009	1009	1114	1114	
Entry HV Adj Factor	0.982	0.977	1.000	1.000	1.000	1.000	0.991	0.989	
Flow Entry, veh/h	199	43	198	175	725	818	513	579	
Cap Entry, veh/h	465	527	325	381	1009	1008	1103	1102	
V/C Ratio	0.428	0.082	0.610	0.460	0.719	0.811	0.465	0.525	
Control Delay, s/veh	15.6	7.8	30.0	19.6	15.7	20.9	8.4	9.4	
LOS	C	A	D	C	C	C	A	A	
95th %tile Queue, veh	2	0	4	2	6	9	3	3	

Intersection						
Int Delay, s/veh	0.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Vol, veh/h	311	6	28	490	4	17
Future Vol, veh/h	311	6	28	490	4	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	349	7	31	551	4	19

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	356	0	966 353
Stage 1	-	-	-	-	353 -
Stage 2	-	-	-	-	613 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1203	-	282 691
Stage 1	-	-	-	-	711 -
Stage 2	-	-	-	-	540 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1203	-	272 691
Mov Cap-2 Maneuver	-	-	-	-	272 -
Stage 1	-	-	-	-	711 -
Stage 2	-	-	-	-	520 -

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.44	12.05
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	534	-	-	97	-
HCM Lane V/C Ratio	0.044	-	-	0.026	-
HCM Ctrl Dly (s/v)	12.1	-	-	8.1	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

Intersection						
Int Delay, s/veh	0.9					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Vol, veh/h	324	4	56	516	2	35
Future Vol, veh/h	324	4	56	516	2	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	364	4	63	580	2	39

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	369	0	1072
Stage 1	-	-	-	-	366
Stage 2	-	-	-	-	706
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1190	-	244
Stage 1	-	-	-	-	701
Stage 2	-	-	-	-	490
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1190	-	225
Mov Cap-2 Maneuver	-	-	-	-	225
Stage 1	-	-	-	-	701
Stage 2	-	-	-	-	451

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.8	11.31
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	612	-	-	176	-
HCM Lane V/C Ratio	0.068	-	-	0.053	-
HCM Ctrl Dly (s/v)	11.3	-	-	8.2	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.2	-

HCM 7th Signalized Intersection Summary  
1: 48th & Central

Clearwater/44 West TIS  
08/11/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	10	246	43	24	114	18	8	61	60	86	97	16
Future Volume (veh/h)	10	246	43	24	114	18	8	61	60	86	97	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1682	1682	1682	1682	1682	1682	1736	1736	1736
Adj Flow Rate, veh/h	11	276	48	27	128	20	9	69	67	97	109	18
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	5	5	5	5	5	5	1	1	1
Cap, veh/h	179	453	77	232	411	58	189	205	186	377	234	32
Arrive On Green	0.32	0.32	0.32	0.32	0.32	0.32	0.26	0.26	0.26	0.26	0.26	0.26
Sat Flow, veh/h	23	1408	239	124	1276	181	45	782	710	528	891	124
Grp Volume(v), veh/h	335	0	0	175	0	0	145	0	0	224	0	0
Grp Sat Flow(s),veh/h/ln	1670	0	0	1581	0	0	1537	0	0	1543	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0
Cycle Q Clear(g_c), s	3.7	0.0	0.0	1.7	0.0	0.0	1.6	0.0	0.0	2.6	0.0	0.0
Prop In Lane	0.03		0.14	0.15		0.11	0.06		0.46	0.43		0.08
Lane Grp Cap(c), veh/h	710	0	0	701	0	0	580	0	0	643	0	0
V/C Ratio(X)	0.47	0.00	0.00	0.25	0.00	0.00	0.25	0.00	0.00	0.35	0.00	0.00
Avail Cap(c_a), veh/h	2130	0	0	1989	0	0	1973	0	0	1995	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.2	0.0	0.0	5.6	0.0	0.0	6.5	0.0	0.0	6.8	0.0	0.0
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	6.7	0.0	0.0	5.7	0.0	0.0	6.7	0.0	0.0	7.1	0.0	0.0
LnGrp LOS	A			A			A			A		
Approach Vol, veh/h		335			175			145			224	
Approach Delay, s/veh		6.7			5.7			6.7			7.1	
Approach LOS		A			A			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		10.2		11.5		10.2		11.5				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		25.5		25.5		25.5		25.5				
Max Q Clear Time (g_c+I1), s		3.6		5.7		4.6		3.7				
Green Ext Time (p_c), s		0.7		1.7		1.1		0.8				
<b>Intersection Summary</b>												
HCM 7th Control Delay, s/veh			6.6									
HCM 7th LOS			A									

Intersection									
Intersection Delay, s/veh	7.8								
Intersection LOS	A								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		1		1		
Adj Approach Flow, veh/h	0		312		968		1047		
Demand Flow Rate, veh/h	0		315		987		1058		
Vehicles Circulating, veh/h	1248		792		193		214		
Vehicles Exiting, veh/h	24		388		1055		893		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	0.0		8.4		7.3		8.0		
Approach LOS	-		A		A		A		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	R	LT	R	LT	TR	LT	TR	
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.500	0.500	0.603	0.397	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544	
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4	
Entry Flow, veh/h	0	0	190	125	464	523	497	561	
Cap Entry Lane, veh/h	428	492	651	724	1191	1191	1169	1169	
Entry HV Adj Factor	1.000	1.000	0.989	0.992	0.980	0.981	0.991	0.990	
Flow Entry, veh/h	0	0	188	124	455	513	492	555	
Cap Entry, veh/h	428	492	645	718	1168	1169	1158	1157	
V/C Ratio	0.000	0.000	0.292	0.173	0.389	0.439	0.425	0.480	
Control Delay, s/veh	8.4	7.3	9.3	6.9	7.0	7.7	7.5	8.4	
LOS	A	A	A	A	A	A	A	A	
95th %tile Queue, veh	0	0	1	1	2	2	2	3	

Intersection									
Intersection Delay, s/veh	32.8								
Intersection LOS	D								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		2		2		
Adj Approach Flow, veh/h	892		417		956		1116		
Demand Flow Rate, veh/h	910		430		985		1127		
Vehicles Circulating, veh/h	1184		1035		1045		392		
Vehicles Exiting, veh/h	335		995		1049		1073		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	55.8		12.8		44.8		11.5		
Approach LOS	F		B		E		B		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR	
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.470	0.530	0.470	0.530	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328	
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	
Entry Flow, veh/h	428	482	202	228	463	522	530	597	
Cap Entry Lane, veh/h	454	519	521	589	516	584	941	1018	
Entry HV Adj Factor	0.980	0.981	0.971	0.970	0.970	0.970	0.989	0.990	
Flow Entry, veh/h	419	473	196	221	449	507	524	591	
Cap Entry, veh/h	445	509	506	572	501	567	931	1008	
V/C Ratio	0.942	0.929	0.388	0.387	0.897	0.894	0.563	0.587	
Control Delay, s/veh	59.8	52.3	13.5	12.2	47.1	42.8	11.5	11.4	
LOS	F	F	B	B	E	E	B	B	
95th %tile Queue, veh	11	11	2	2	10	11	4	4	

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	
Traffic Vol, veh/h	0	29	0	1001	1095	10
Future Vol, veh/h	0	29	0	1001	1095	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	0	0	4	4	2	2
Mvmt Flow	0	33	0	1125	1230	11

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	-	621	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	6.9	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	3.3	-
Pot Cap-1 Maneuver	0	435	0
Stage 1	0	-	0
Stage 2	0	-	0
Platoon blocked, %			-
Mov Cap-1 Maneuver	-	435	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	13.94	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	435	-	-
HCM Lane V/C Ratio	-	0.075	-	-
HCM Ctrl Dly (s/v)	-	13.9	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.2	-	-

Intersection									
Intersection Delay, s/veh	15.8								
Intersection LOS	C								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		1		1		
Adj Approach Flow, veh/h	325		317		1205		1455		
Demand Flow Rate, veh/h	335		327		1216		1469		
Vehicles Circulating, veh/h	1485		1283		504		199		
Vehicles Exiting, veh/h	183		437		1316		1411		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	37.1		15.2		15.7		11.2		
Approach LOS	E		C		C		B		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	R	LT	R	LT	TR	LT	TR	
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.797	0.203	0.523	0.477	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544	
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4	
Entry Flow, veh/h	267	68	171	156	572	644	690	779	
Cap Entry Lane, veh/h	344	402	415	477	898	898	1185	1185	
Entry HV Adj Factor	0.972	0.971	0.971	0.968	0.990	0.991	0.991	0.990	
Flow Entry, veh/h	259	66	166	151	566	638	684	771	
Cap Entry, veh/h	335	390	403	462	889	890	1174	1173	
V/C Ratio	0.775	0.169	0.412	0.327	0.637	0.717	0.582	0.657	
Control Delay, s/veh	43.5	11.9	17.1	13.2	14.1	17.2	10.2	12.0	
LOS	E	B	C	B	B	C	B	B	
95th %tile Queue, veh	6	1	2	1	5	6	4	5	

Intersection						
Int Delay, s/veh	0.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Vol, veh/h	553	1	9	208	5	26
Future Vol, veh/h	553	1	9	208	5	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	621	1	10	234	6	29

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	622	0	876 622
Stage 1	-	-	-	-	622 -
Stage 2	-	-	-	-	254 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	958	-	319 487
Stage 1	-	-	-	-	535 -
Stage 2	-	-	-	-	788 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	958	-	316 487
Mov Cap-2 Maneuver	-	-	-	-	316 -
Stage 1	-	-	-	-	535 -
Stage 2	-	-	-	-	779 -

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.36	13.72
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	448	-	-	75	-
HCM Lane V/C Ratio	0.078	-	-	0.011	-
HCM Ctrl Dly (s/v)	13.7	-	-	8.8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0	-

Intersection						
Int Delay, s/veh	1.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Vol, veh/h	578	1	18	214	3	53
Future Vol, veh/h	578	1	18	214	3	53
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	649	1	20	240	3	60

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	651	0	931
Stage 1	-	-	-	-	650
Stage 2	-	-	-	-	281
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	936	-	296
Stage 1	-	-	-	-	520
Stage 2	-	-	-	-	767
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	936	-	289
Mov Cap-2 Maneuver	-	-	-	-	289
Stage 1	-	-	-	-	520
Stage 2	-	-	-	-	748

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.69	14.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	454	-	-	140	-
HCM Lane V/C Ratio	0.139	-	-	0.022	-
HCM Ctrl Dly (s/v)	14.2	-	-	8.9	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.5	-	-	0.1	-

HCM 7th Signalized Intersection Summary  
1: 48th & Central

Clearwater/44 West TIS  
08/11/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	12	192	19	39	346	66	62	127	27	42	87	17
Future Volume (veh/h)	12	192	19	39	346	66	62	127	27	42	87	17
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1736	1736	1736	1750	1750	1750	1750	1750	1750
Adj Flow Rate, veh/h	14	223	22	45	402	77	72	148	31	49	101	20
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	1	1	1	0	0	0	0	0	0
Cap, veh/h	149	644	61	171	576	105	248	268	49	241	282	48
Arrive On Green	0.43	0.43	0.43	0.43	0.43	0.43	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	31	1496	142	73	1339	243	333	1078	199	303	1136	192
Grp Volume(v), veh/h	259	0	0	524	0	0	251	0	0	170	0	0
Grp Sat Flow(s),veh/h/ln	1670	0	0	1655	0	0	1609	0	0	1631	0	0
Q Serve(g_s), s	0.0	0.0	0.0	1.5	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	2.9	0.0	0.0	7.3	0.0	0.0	3.8	0.0	0.0	2.3	0.0	0.0
Prop In Lane	0.05		0.08	0.09		0.15	0.29		0.12	0.29		0.12
Lane Grp Cap(c), veh/h	854	0	0	852	0	0	565	0	0	571	0	0
V/C Ratio(X)	0.30	0.00	0.00	0.62	0.00	0.00	0.44	0.00	0.00	0.30	0.00	0.00
Avail Cap(c_a), veh/h	1631	0	0	1629	0	0	1595	0	0	1582	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.4	0.0	0.0	6.6	0.0	0.0	9.3	0.0	0.0	8.8	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.7	0.0	0.0	0.5	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	0.8	0.0	0.0	0.7	0.0	0.0	0.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	5.6	0.0	0.0	7.3	0.0	0.0	9.8	0.0	0.0	9.1	0.0	0.0
LnGrp LOS	A			A			A			A		
Approach Vol, veh/h		259			524			251				170
Approach Delay, s/veh		5.6			7.3			9.8				9.1
Approach LOS		A			A			A				A
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		11.5		16.6		11.5		16.6				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		25.5		25.5		25.5		25.5				
Max Q Clear Time (g_c+I1), s		5.8		4.9		4.3		9.3				
Green Ext Time (p_c), s		1.2		1.2		0.8		2.8				
<b>Intersection Summary</b>												
HCM 7th Control Delay, s/veh				7.7								
HCM 7th LOS				A								

Intersection									
Intersection Delay, s/veh	16.5								
Intersection LOS	C								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		1		1		
Adj Approach Flow, veh/h	0		473		1797		1254		
Demand Flow Rate, veh/h	0		473		1797		1267		
Vehicles Circulating, veh/h	1550		1482		170		322		
Vehicles Exiting, veh/h	39		485		1380		1633		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	0.0		36.4		14.8		11.5		
Approach LOS	-		E		B		B		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	R	LT	R	LT	TR	LT	TR	
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.500	0.500	0.598	0.402	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544	
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4	
Entry Flow, veh/h	0	0	283	190	845	952	595	672	
Cap Entry Lane, veh/h	324	380	345	403	1217	1217	1059	1059	
Entry HV Adj Factor	1.000	1.000	1.000	1.000	1.000	1.000	0.991	0.989	
Flow Entry, veh/h	0	0	283	190	845	952	589	665	
Cap Entry, veh/h	324	380	345	403	1216	1217	1049	1048	
V/C Ratio	0.000	0.000	0.820	0.472	0.695	0.783	0.562	0.634	
Control Delay, s/veh	11.1	9.5	48.0	19.0	12.9	16.6	10.5	12.4	
LOS	B	A	E	C	B	C	B	B	
95th %tile Queue, veh	0	0	7	2	6	9	4	5	

Intersection									
Intersection Delay, s/veh	54.2								
Intersection LOS	F								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		2		2		
Adj Approach Flow, veh/h	496		833		1522		1166		
Demand Flow Rate, veh/h	496		833		1522		1178		
Vehicles Circulating, veh/h	1287		1512		566		867		
Vehicles Exiting, veh/h	758		576		1217		1478		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	20.7		125.6		34.6		42.9		
Approach LOS	C		F		D		E		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR	
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.470	0.530	0.471	0.529	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328	
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	
Entry Flow, veh/h	233	263	392	441	715	807	554	624	
Cap Entry Lane, veh/h	413	475	336	393	802	878	608	680	
Entry HV Adj Factor	1.001	1.000	0.999	1.001	1.000	1.000	0.989	0.990	
Flow Entry, veh/h	233	263	392	441	715	807	548	618	
Cap Entry, veh/h	413	475	336	393	802	877	601	673	
V/C Ratio	0.564	0.553	1.167	1.123	0.892	0.919	0.911	0.918	
Control Delay, s/veh	22.2	19.3	137.2	115.3	33.5	35.6	44.0	42.0	
LOS	C	C	F	F	D	E	E	E	
95th %tile Queue, veh	3	3	16	16	12	14	11	12	

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	
Traffic Vol, veh/h	0	27	0	1686	1179	22
Future Vol, veh/h	0	27	0	1686	1179	22
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	2	2
Mvmt Flow	0	29	0	1833	1282	24

Major/Minor	Minor2	Major1	Major2		
Conflicting Flow All	-	653	-	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-
Pot Cap-1 Maneuver	0	415	0	-	-
Stage 1	0	-	0	-	-
Stage 2	0	-	0	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	-	415	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	14.34	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT EBLn1	SBT	SBR
Capacity (veh/h)	- 415	-	-
HCM Lane V/C Ratio	- 0.071	-	-
HCM Ctrl Dly (s/v)	- 14.3	-	-
HCM Lane LOS	- B	-	-
HCM 95th %tile Q(veh)	- 0.2	-	-

Intersection									
Intersection Delay, s/veh	20.6								
Intersection LOS	C								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		1		1		
Adj Approach Flow, veh/h	260		401		1660		1175		
Demand Flow Rate, veh/h	266		401		1660		1187		
Vehicles Circulating, veh/h	1225		1666		405		288		
Vehicles Exiting, veh/h	250		399		1085		1780		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	17.2		34.8		25.2		10.0		
Approach LOS	C		D		D		A		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	R	LT	R	LT	TR	LT	TR	
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.823	0.177	0.531	0.469	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544	
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4	
Entry Flow, veh/h	219	47	213	188	780	880	558	629	
Cap Entry Lane, veh/h	437	501	292	345	982	982	1093	1093	
Entry HV Adj Factor	0.978	0.979	1.000	1.000	1.000	1.000	0.990	0.990	
Flow Entry, veh/h	214	46	213	188	780	880	552	623	
Cap Entry, veh/h	428	491	292	345	983	982	1082	1082	
V/C Ratio	0.501	0.094	0.731	0.546	0.794	0.896	0.511	0.576	
Control Delay, s/veh	19.1	8.6	43.3	25.0	20.1	29.7	9.3	10.6	
LOS	C	A	E	D	C	D	A	B	
95th %tile Queue, veh	3	0	5	3	9	13	3	4	

Intersection						
Int Delay, s/veh	0.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Vol, veh/h	334	6	28	528	4	17
Future Vol, veh/h	334	6	28	528	4	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	375	7	31	593	4	19

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	382	0	1035 379
Stage 1	-	-	-	-	379 -
Stage 2	-	-	-	-	656 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1176	-	257 668
Stage 1	-	-	-	-	692 -
Stage 2	-	-	-	-	516 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1176	-	247 668
Mov Cap-2 Maneuver	-	-	-	-	247 -
Stage 1	-	-	-	-	692 -
Stage 2	-	-	-	-	496 -

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.41	12.49
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	504	-	-	91	-
HCM Lane V/C Ratio	0.047	-	-	0.027	-
HCM Ctrl Dly (s/v)	12.5	-	-	8.1	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

Intersection						
Int Delay, s/veh	0.9					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Vol, veh/h	347	4	56	554	2	35
Future Vol, veh/h	347	4	56	554	2	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	390	4	63	622	2	39

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	394	0	1140
Stage 1	-	-	-	-	392
Stage 2	-	-	-	-	748
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1164	-	222
Stage 1	-	-	-	-	683
Stage 2	-	-	-	-	468
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1164	-	204
Mov Cap-2 Maneuver	-	-	-	-	204
Stage 1	-	-	-	-	683
Stage 2	-	-	-	-	429

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.76	11.61
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	586	-	-	165	-
HCM Lane V/C Ratio	0.071	-	-	0.054	-
HCM Ctrl Dly (s/v)	11.6	-	-	8.3	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.2	-

HCM 7th Signalized Intersection Summary  
1: 48th & Central

Clearwater/44 West TIS  
08/11/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	10	247	43	24	116	18	8	61	60	86	97	16
Future Volume (veh/h)	10	247	43	24	116	18	8	61	60	86	97	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1682	1682	1682	1682	1682	1682	1736	1736	1736
Adj Flow Rate, veh/h	11	278	48	27	130	20	9	69	67	97	109	18
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	5	5	5	5	5	5	1	1	1
Cap, veh/h	179	456	77	231	414	58	188	205	186	376	233	32
Arrive On Green	0.32	0.32	0.32	0.32	0.32	0.32	0.26	0.26	0.26	0.26	0.26	0.26
Sat Flow, veh/h	23	1410	238	122	1281	179	45	782	710	528	891	124
Grp Volume(v), veh/h	337	0	0	177	0	0	145	0	0	224	0	0
Grp Sat Flow(s),veh/h/ln	1671	0	0	1581	0	0	1537	0	0	1543	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0
Cycle Q Clear(g_c), s	3.7	0.0	0.0	1.8	0.0	0.0	1.7	0.0	0.0	2.6	0.0	0.0
Prop In Lane	0.03		0.14	0.15		0.11	0.06		0.46	0.43		0.08
Lane Grp Cap(c), veh/h	712	0	0	703	0	0	579	0	0	642	0	0
V/C Ratio(X)	0.47	0.00	0.00	0.25	0.00	0.00	0.25	0.00	0.00	0.35	0.00	0.00
Avail Cap(c_a), veh/h	2125	0	0	1985	0	0	1968	0	0	1990	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.2	0.0	0.0	5.6	0.0	0.0	6.5	0.0	0.0	6.8	0.0	0.0
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	6.7	0.0	0.0	5.7	0.0	0.0	6.7	0.0	0.0	7.1	0.0	0.0
LnGrp LOS	A			A			A			A		
Approach Vol, veh/h		337			177			145			224	
Approach Delay, s/veh		6.7			5.7			6.7			7.1	
Approach LOS		A			A			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		10.2		11.5		10.2		11.5				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		25.5		25.5		25.5		25.5				
Max Q Clear Time (g_c+I1), s		3.7		5.7		4.6		3.8				
Green Ext Time (p_c), s		0.7		1.7		1.1		0.9				
<b>Intersection Summary</b>												
HCM 7th Control Delay, s/veh				6.6								
HCM 7th LOS				A								

Intersection									
Intersection Delay, s/veh	7.8								
Intersection LOS	A								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		1		1		
Adj Approach Flow, veh/h	0		312		977		1050		
Demand Flow Rate, veh/h	0		315		996		1061		
Vehicles Circulating, veh/h	1251		799		193		214		
Vehicles Exiting, veh/h	24		390		1058		900		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	0.0		8.4		7.4		8.0		
Approach LOS	-		A		A		A		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	R	LT	R	LT	TR	LT	TR	
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.500	0.500	0.603	0.397	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544	
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4	
Entry Flow, veh/h	0	0	190	125	468	528	499	562	
Cap Entry Lane, veh/h	427	490	647	720	1191	1191	1169	1169	
Entry HV Adj Factor	1.000	1.000	0.989	0.992	0.981	0.981	0.989	0.991	
Flow Entry, veh/h	0	0	188	124	459	518	494	557	
Cap Entry, veh/h	427	490	640	714	1169	1168	1156	1158	
V/C Ratio	0.000	0.000	0.294	0.174	0.393	0.443	0.427	0.481	
Control Delay, s/veh	8.4	7.3	9.4	7.0	7.0	7.7	7.5	8.4	
LOS	A	A	A	A	A	A	A	A	
95th %tile Queue, veh	0	0	1	1	2	2	2	3	

Intersection									
Intersection Delay, s/veh	35.3								
Intersection LOS	E								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		2		2		
Adj Approach Flow, veh/h	916		419		959		1118		
Demand Flow Rate, veh/h	934		432		988		1129		
Vehicles Circulating, veh/h	1184		1046		1061		397		
Vehicles Exiting, veh/h	342		1003		1057		1081		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	61.1		13.0		47.9		11.6		
Approach LOS	F		B		E		B		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR	
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.470	0.530	0.470	0.530	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328	
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	
Entry Flow, veh/h	439	495	203	229	464	524	531	598	
Cap Entry Lane, veh/h	454	519	516	584	509	576	937	1013	
Entry HV Adj Factor	0.981	0.981	0.971	0.971	0.971	0.970	0.989	0.991	
Flow Entry, veh/h	431	485	197	222	451	508	525	592	
Cap Entry, veh/h	445	509	501	566	494	559	927	1004	
V/C Ratio	0.966	0.954	0.394	0.392	0.912	0.909	0.567	0.590	
Control Delay, s/veh	65.1	57.5	13.7	12.4	50.2	45.8	11.7	11.6	
LOS	F	F	B	B	F	E	B	B	
95th %tile Queue, veh	12	12	2	2	11	11	4	4	

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	
Traffic Vol, veh/h	0	29	0	1003	1102	10
Future Vol, veh/h	0	29	0	1003	1102	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	0	0	4	4	2	2
Mvmt Flow	0	33	0	1127	1238	11

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	-	625	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	6.9	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	3.3	-
Pot Cap-1 Maneuver	0	433	0
Stage 1	0	-	0
Stage 2	0	-	0
Platoon blocked, %			-
Mov Cap-1 Maneuver	-	433	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	14	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	433	-	-
HCM Lane V/C Ratio	-	0.075	-	-
HCM Ctrl Dly (s/v)	-	14	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.2	-	-

Intersection									
Intersection Delay, s/veh	15.9								
Intersection LOS	C								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		1		1		
Adj Approach Flow, veh/h	325		317		1207		1464		
Demand Flow Rate, veh/h	335		327		1218		1478		
Vehicles Circulating, veh/h	1494		1285		506		199		
Vehicles Exiting, veh/h	183		439		1323		1413		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	38.0		15.3		15.9		11.2		
Approach LOS	E		C		C		B		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	R	LT	R	LT	TR	LT	TR	
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.797	0.203	0.523	0.477	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544	
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4	
Entry Flow, veh/h	267	68	171	156	572	646	695	783	
Cap Entry Lane, veh/h	342	399	414	476	896	896	1185	1185	
Entry HV Adj Factor	0.972	0.971	0.971	0.968	0.991	0.990	0.990	0.991	
Flow Entry, veh/h	259	66	166	151	567	640	688	776	
Cap Entry, veh/h	332	387	402	461	888	887	1173	1174	
V/C Ratio	0.782	0.171	0.413	0.328	0.638	0.721	0.587	0.661	
Control Delay, s/veh	44.6	12.1	17.2	13.2	14.1	17.4	10.3	12.1	
LOS	E	B	C	B	B	C	B	B	
95th %tile Queue, veh	6	1	2	1	5	6	4	5	

Intersection						
Int Delay, s/veh	0.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Vol, veh/h	554	1	9	210	5	26
Future Vol, veh/h	554	1	9	210	5	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	622	1	10	236	6	29

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	624	0	879
Stage 1	-	-	-	-	623
Stage 2	-	-	-	-	256
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	958	-	318
Stage 1	-	-	-	-	535
Stage 2	-	-	-	-	787
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	958	-	314
Mov Cap-2 Maneuver	-	-	-	-	314
Stage 1	-	-	-	-	535
Stage 2	-	-	-	-	777

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.36	13.74
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	447	-	-	74	-
HCM Lane V/C Ratio	0.078	-	-	0.011	-
HCM Ctrl Dly (s/v)	13.7	-	-	8.8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0	-

Intersection						
Int Delay, s/veh	1.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Vol, veh/h	578	2	25	214	5	75
Future Vol, veh/h	578	2	25	214	5	75
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	649	2	28	240	6	84

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	652	0	947 651
Stage 1	-	-	-	-	651 -
Stage 2	-	-	-	-	297 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	935	-	290 469
Stage 1	-	-	-	-	519 -
Stage 2	-	-	-	-	754 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	935	-	280 469
Mov Cap-2 Maneuver	-	-	-	-	280 -
Stage 1	-	-	-	-	519 -
Stage 2	-	-	-	-	728 -

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.94	14.99
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	450	-	-	188	-
HCM Lane V/C Ratio	0.2	-	-	0.03	-
HCM Ctrl Dly (s/v)	15	-	-	9	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.7	-	-	0.1	-

HCM 7th Signalized Intersection Summary  
1: 48th & Central

Clearwater/44 West TIS  
08/11/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	12	194	19	39	347	66	62	127	27	42	87	17
Future Volume (veh/h)	12	194	19	39	347	66	62	127	27	42	87	17
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1736	1736	1736	1750	1750	1750	1750	1750	1750
Adj Flow Rate, veh/h	14	226	22	45	403	77	72	148	31	49	101	20
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	1	1	1	0	0	0	0	0	0
Cap, veh/h	149	646	60	171	577	105	248	268	49	241	282	48
Arrive On Green	0.43	0.43	0.43	0.43	0.43	0.43	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	31	1499	140	73	1339	243	333	1078	199	303	1136	192
Grp Volume(v), veh/h	262	0	0	525	0	0	251	0	0	170	0	0
Grp Sat Flow(s),veh/h/ln	1670	0	0	1655	0	0	1609	0	0	1631	0	0
Q Serve(g_s), s	0.0	0.0	0.0	1.5	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	2.9	0.0	0.0	7.3	0.0	0.0	3.8	0.0	0.0	2.3	0.0	0.0
Prop In Lane	0.05		0.08	0.09		0.15	0.29		0.12	0.29		0.12
Lane Grp Cap(c), veh/h	855	0	0	853	0	0	565	0	0	570	0	0
V/C Ratio(X)	0.31	0.00	0.00	0.62	0.00	0.00	0.44	0.00	0.00	0.30	0.00	0.00
Avail Cap(c_a), veh/h	1630	0	0	1627	0	0	1593	0	0	1580	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.4	0.0	0.0	6.6	0.0	0.0	9.3	0.0	0.0	8.8	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.7	0.0	0.0	0.6	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	0.8	0.0	0.0	0.7	0.0	0.0	0.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	5.6	0.0	0.0	7.3	0.0	0.0	9.9	0.0	0.0	9.1	0.0	0.0
LnGrp LOS	A			A			A			A		
Approach Vol, veh/h		262			525			251				170
Approach Delay, s/veh		5.6			7.3			9.9				9.1
Approach LOS		A			A			A				A
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		11.5		16.6		11.5		16.6				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		25.5		25.5		25.5		25.5				
Max Q Clear Time (g_c+I1), s		5.8		4.9		4.3		9.3				
Green Ext Time (p_c), s		1.2		1.3		0.8		2.8				
<b>Intersection Summary</b>												
HCM 7th Control Delay, s/veh				7.7								
HCM 7th LOS				A								

Intersection									
Intersection Delay, s/veh	16.7								
Intersection LOS	C								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		1		1		
Adj Approach Flow, veh/h	0		474		1802		1261		
Demand Flow Rate, veh/h	0		474		1802		1274		
Vehicles Circulating, veh/h	1558		1486		170		323		
Vehicles Exiting, veh/h	39		486		1388		1637		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	0.0		37.0		14.9		11.6		
Approach LOS	-		E		B		B		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	R	LT	R	LT	TR	LT	TR	
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.500	0.500	0.599	0.401	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544	
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4	
Entry Flow, veh/h	0	0	284	190	847	955	599	675	
Cap Entry Lane, veh/h	322	378	344	401	1217	1217	1058	1058	
Entry HV Adj Factor	1.000	1.000	1.000	1.000	1.000	1.000	0.989	0.990	
Flow Entry, veh/h	0	0	284	190	847	955	593	668	
Cap Entry, veh/h	322	378	344	401	1216	1217	1047	1048	
V/C Ratio	0.000	0.000	0.825	0.473	0.696	0.785	0.566	0.638	
Control Delay, s/veh	11.2	9.5	49.0	19.1	12.9	16.7	10.7	12.5	
LOS	B	A	E	C	B	C	B	B	
95th %tile Queue, veh	0	0	7	2	6	9	4	5	

Intersection									
Intersection Delay, s/veh	58.6								
Intersection LOS	F								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		2		2		
Adj Approach Flow, veh/h	514		842		1531		1175		
Demand Flow Rate, veh/h	514		842		1531		1187		
Vehicles Circulating, veh/h	1287		1527		578		885		
Vehicles Exiting, veh/h	785		582		1223		1484		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	21.6		135.9		37.2		47.4		
Approach LOS	C		F		E		E		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR	
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.471	0.529	0.470	0.530	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328	
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	
Entry Flow, veh/h	242	272	396	446	720	811	558	629	
Cap Entry Lane, veh/h	413	475	331	388	793	869	598	669	
Entry HV Adj Factor	0.998	1.002	0.999	1.001	0.999	1.001	0.990	0.990	
Flow Entry, veh/h	242	272	396	446	720	811	552	623	
Cap Entry, veh/h	412	476	331	388	793	869	592	663	
V/C Ratio	0.586	0.572	1.195	1.150	0.908	0.933	0.933	0.940	
Control Delay, s/veh	23.3	20.0	148.0	125.2	36.1	38.2	48.4	46.4	
LOS	C	C	F	F	E	E	E	E	
95th %tile Queue, veh	4	4	17	17	12	14	12	13	

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	
Traffic Vol, veh/h	0	27	0	1694	1184	22
Future Vol, veh/h	0	27	0	1694	1184	22
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	2	2
Mvmt Flow	0	29	0	1841	1287	24

Major/Minor	Minor2	Major1	Major2		
Conflicting Flow All	-	655	-	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-
Pot Cap-1 Maneuver	0	413	0	-	-
Stage 1	0	-	0	-	-
Stage 2	0	-	0	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	-	413	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	14.38	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	413	-	-
HCM Lane V/C Ratio	-	0.071	-	-
HCM Ctrl Dly (s/v)	-	14.4	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.2	-	-

Intersection									
Intersection Delay, s/veh	20.9								
Intersection LOS	C								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		1		1		
Adj Approach Flow, veh/h	260		402		1667		1180		
Demand Flow Rate, veh/h	266		402		1667		1192		
Vehicles Circulating, veh/h	1230		1673		406		288		
Vehicles Exiting, veh/h	250		400		1089		1788		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	17.3		35.3		25.7		10.0		
Approach LOS	C		E		D		B		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	R	LT	R	LT	TR	LT	TR	
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.823	0.177	0.530	0.470	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544	
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4	
Entry Flow, veh/h	219	47	213	189	783	884	560	632	
Cap Entry Lane, veh/h	435	499	290	342	981	981	1093	1093	
Entry HV Adj Factor	0.978	0.979	1.000	1.000	1.001	0.999	0.991	0.990	
Flow Entry, veh/h	214	46	213	189	783	884	555	626	
Cap Entry, veh/h	426	488	290	342	982	981	1082	1081	
V/C Ratio	0.503	0.094	0.735	0.552	0.798	0.901	0.513	0.578	
Control Delay, s/veh	19.2	8.6	44.1	25.5	20.4	30.4	9.3	10.7	
LOS	C	A	E	D	C	D	A	B	
95th %tile Queue, veh	3	0	5	3	9	13	3	4	

Intersection						
Int Delay, s/veh	0.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Vol, veh/h	336	7	28	529	4	17
Future Vol, veh/h	336	7	28	529	4	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	378	8	31	594	4	19

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	385	0	1039 381
Stage 1	-	-	-	-	381 -
Stage 2	-	-	-	-	657 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1173	-	256 666
Stage 1	-	-	-	-	690 -
Stage 2	-	-	-	-	516 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1173	-	245 666
Mov Cap-2 Maneuver	-	-	-	-	245 -
Stage 1	-	-	-	-	690 -
Stage 2	-	-	-	-	495 -

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.41	12.53
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	502	-	-	90	-
HCM Lane V/C Ratio	0.047	-	-	0.027	-
HCM Ctrl Dly (s/v)	12.5	-	-	8.2	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

Intersection						
Int Delay, s/veh	1.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Vol, veh/h	347	6	79	554	3	49
Future Vol, veh/h	347	6	79	554	3	49
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	390	7	89	622	3	55

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	397	0	1193 393
Stage 1	-	-	-	-	393 -
Stage 2	-	-	-	-	800 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1162	-	206 656
Stage 1	-	-	-	-	682 -
Stage 2	-	-	-	-	442 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1162	-	182 656
Mov Cap-2 Maneuver	-	-	-	-	182 -
Stage 1	-	-	-	-	682 -
Stage 2	-	-	-	-	391 -

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	1.04	12.03
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	570	-	-	225	-
HCM Lane V/C Ratio	0.102	-	-	0.076	-
HCM Ctrl Dly (s/v)	12	-	-	8.4	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0.2	-

HCM 7th Signalized Intersection Summary  
1: 48th & Central

Clearwater/44 West TIS  
08/11/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	11	265	46	26	124	19	8	66	64	92	105	17
Future Volume (veh/h)	11	265	46	26	124	19	8	66	64	92	105	17
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1682	1682	1682	1682	1682	1682	1736	1736	1736
Adj Flow Rate, veh/h	12	298	52	29	139	21	9	74	72	103	118	19
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	5	5	5	5	5	5	1	1	1
Cap, veh/h	171	476	81	222	434	59	178	210	191	365	241	33
Arrive On Green	0.34	0.34	0.34	0.34	0.34	0.34	0.27	0.27	0.27	0.27	0.27	0.27
Sat Flow, veh/h	23	1408	240	120	1285	176	41	783	714	522	899	122
Grp Volume(v), veh/h	362	0	0	189	0	0	155	0	0	240	0	0
Grp Sat Flow(s),veh/h/ln	1670	0	0	1580	0	0	1538	0	0	1543	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0
Cycle Q Clear(g_c), s	4.2	0.0	0.0	2.0	0.0	0.0	1.9	0.0	0.0	2.9	0.0	0.0
Prop In Lane	0.03		0.14	0.15		0.11	0.06		0.46	0.43		0.08
Lane Grp Cap(c), veh/h	727	0	0	716	0	0	579	0	0	639	0	0
V/C Ratio(X)	0.50	0.00	0.00	0.26	0.00	0.00	0.27	0.00	0.00	0.38	0.00	0.00
Avail Cap(c_a), veh/h	2018	0	0	1882	0	0	1870	0	0	1887	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.4	0.0	0.0	5.7	0.0	0.0	6.8	0.0	0.0	7.1	0.0	0.0
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.4	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	6.9	0.0	0.0	5.8	0.0	0.0	7.0	0.0	0.0	7.5	0.0	0.0
LnGrp LOS	A			A			A			A		
Approach Vol, veh/h		362			189			155				240
Approach Delay, s/veh		6.9			5.8			7.0				7.5
Approach LOS		A			A			A				A
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		10.6		12.2		10.6		12.2				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		25.5		25.5		25.5		25.5				
Max Q Clear Time (g_c+I1), s		3.9		6.2		4.9		4.0				
Green Ext Time (p_c), s		0.7		1.8		1.2		0.9				
<b>Intersection Summary</b>												
HCM 7th Control Delay, s/veh				6.9								
HCM 7th LOS				A								

Intersection									
Intersection Delay, s/veh	8.5								
Intersection LOS	A								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		1		1		
Adj Approach Flow, veh/h	0		337		1049		1129		
Demand Flow Rate, veh/h	0		340		1070		1140		
Vehicles Circulating, veh/h	1345		859		208		233		
Vehicles Exiting, veh/h	28		419		1137		966		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	0.0		9.4		8.0		8.8		
Approach LOS	-		A		A		A		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	R	LT	R	LT	TR	LT	TR	
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.500	0.500	0.603	0.397	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544	
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4	
Entry Flow, veh/h	0	0	205	135	503	567	536	604	
Cap Entry Lane, veh/h	392	453	613	684	1175	1175	1149	1149	
Entry HV Adj Factor	1.000	1.000	0.990	0.993	0.980	0.980	0.990	0.990	
Flow Entry, veh/h	0	0	203	134	493	556	531	598	
Cap Entry, veh/h	392	453	607	679	1152	1152	1137	1138	
V/C Ratio	0.000	0.000	0.335	0.197	0.428	0.482	0.467	0.526	
Control Delay, s/veh	9.2	8.0	10.6	7.6	7.6	8.4	8.2	9.2	
LOS	A	A	B	A	A	A	A	A	
95th %tile Queue, veh	0	0	1	1	2	3	3	3	

Intersection									
Intersection Delay, s/veh	58.5								
Intersection LOS	F								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		2		2		
Adj Approach Flow, veh/h	977		449		1031		1207		
Demand Flow Rate, veh/h	996		463		1062		1219		
Vehicles Circulating, veh/h	1280		1122		1139		425		
Vehicles Exiting, veh/h	364		1079		1137		1160		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	107.9		15.3		83.1		13.6		
Approach LOS	F		C		F		B		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR	
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.470	0.530	0.471	0.529	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328	
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	
Entry Flow, veh/h	468	528	218	245	499	563	573	646	
Cap Entry Lane, veh/h	416	478	481	547	473	539	913	989	
Entry HV Adj Factor	0.981	0.981	0.968	0.971	0.971	0.971	0.990	0.990	
Flow Entry, veh/h	459	518	211	238	485	547	567	640	
Cap Entry, veh/h	408	469	466	531	460	524	904	980	
V/C Ratio	1.125	1.104	0.453	0.448	1.054	1.044	0.628	0.653	
Control Delay, s/veh	114.6	102.0	16.3	14.4	87.1	79.5	13.6	13.6	
LOS	F	F	C	B	F	F	B	B	
95th %tile Queue, veh	17	17	2	2	15	16	5	5	

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	
Traffic Vol, veh/h	0	31	0	1080	1184	11
Future Vol, veh/h	0	31	0	1080	1184	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	0	0	4	4	2	2
Mvmt Flow	0	35	0	1213	1330	12

Major/Minor	Minor2	Major1	Major2		
Conflicting Flow All	-	671	-	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-
Pot Cap-1 Maneuver	0	403	0	-	-
Stage 1	0	-	0	-	-
Stage 2	0	-	0	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	-	403	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	14.77	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT EBLn1	SBT	SBR
Capacity (veh/h)	- 403	-	-
HCM Lane V/C Ratio	- 0.086	-	-
HCM Ctrl Dly (s/v)	- 14.8	-	-
HCM Lane LOS	- B	-	-
HCM 95th %tile Q(veh)	- 0.3	-	-

Intersection									
Intersection Delay, s/veh	21.1								
Intersection LOS	C								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		1		1		
Adj Approach Flow, veh/h	351		341		1299		1574		
Demand Flow Rate, veh/h	362		351		1312		1590		
Vehicles Circulating, veh/h	1607		1384		546		213		
Vehicles Exiting, veh/h	196		474		1423		1522		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	62.4		18.4		20.5		13.0		
Approach LOS	F		C		C		B		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	R	LT	R	LT	TR	LT	TR	
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.796	0.204	0.521	0.479	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544	
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4	
Entry Flow, veh/h	288	74	183	168	617	695	747	843	
Cap Entry Lane, veh/h	308	362	378	438	864	864	1170	1170	
Entry HV Adj Factor	0.970	0.973	0.972	0.970	0.989	0.991	0.990	0.990	
Flow Entry, veh/h	279	72	178	163	610	688	740	834	
Cap Entry, veh/h	299	352	367	425	855	856	1159	1158	
V/C Ratio	0.936	0.204	0.484	0.384	0.714	0.804	0.639	0.721	
Control Delay, s/veh	75.0	13.8	21.1	15.6	17.6	23.0	11.6	14.3	
LOS	F	B	C	C	C	C	B	B	
95th %tile Queue, veh	9	1	3	2	6	9	5	7	

Intersection						
Int Delay, s/veh	0.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Vol, veh/h	596	1	9	225	5	26
Future Vol, veh/h	596	1	9	225	5	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	670	1	10	253	6	29

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	671	0	943
Stage 1	-	-	-	-	670
Stage 2	-	-	-	-	273
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	920	-	291
Stage 1	-	-	-	-	508
Stage 2	-	-	-	-	773
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	920	-	288
Mov Cap-2 Maneuver	-	-	-	-	288
Stage 1	-	-	-	-	508
Stage 2	-	-	-	-	763

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.34	14.41
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	417	-	-	69	-
HCM Lane V/C Ratio	0.083	-	-	0.011	-
HCM Ctrl Dly (s/v)	14.4	-	-	9	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0	-

Intersection						
Int Delay, s/veh	1.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Vol, veh/h	620	2	25	229	5	75
Future Vol, veh/h	620	2	25	229	5	75
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	697	2	28	257	6	84

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	699	0	1011
Stage 1	-	-	-	-	698
Stage 2	-	-	-	-	313
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	898	-	265
Stage 1	-	-	-	-	494
Stage 2	-	-	-	-	741
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	898	-	256
Mov Cap-2 Maneuver	-	-	-	-	256
Stage 1	-	-	-	-	494
Stage 2	-	-	-	-	714

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.9	15.84
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	422	-	-	177	-
HCM Lane V/C Ratio	0.213	-	-	0.031	-
HCM Ctrl Dly (s/v)	15.8	-	-	9.1	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.8	-	-	0.1	-

HCM 7th Signalized Intersection Summary  
1: 48th & Central

Clearwater/44 West TIS  
08/11/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	13	208	21	42	373	71	67	137	29	45	93	18
Future Volume (veh/h)	13	208	21	42	373	71	67	137	29	45	93	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1736	1736	1736	1750	1750	1750	1750	1750	1750
Adj Flow Rate, veh/h	15	242	24	49	434	83	78	159	34	52	108	21
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	1	1	1	0	0	0	0	0	0
Cap, veh/h	139	670	64	163	598	109	239	273	51	230	292	48
Arrive On Green	0.45	0.45	0.45	0.45	0.45	0.45	0.26	0.26	0.26	0.26	0.26	0.26
Sat Flow, veh/h	31	1495	142	75	1334	242	336	1070	202	302	1144	190
Grp Volume(v), veh/h	281	0	0	566	0	0	271	0	0	181	0	0
Grp Sat Flow(s),veh/h/ln	1668	0	0	1652	0	0	1608	0	0	1635	0	0
Q Serve(g_s), s	0.0	0.0	0.0	2.3	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	3.3	0.0	0.0	8.6	0.0	0.0	4.4	0.0	0.0	2.7	0.0	0.0
Prop In Lane	0.05		0.09	0.09		0.15	0.29		0.13	0.29		0.12
Lane Grp Cap(c), veh/h	872	0	0	869	0	0	563	0	0	570	0	0
V/C Ratio(X)	0.32	0.00	0.00	0.65	0.00	0.00	0.48	0.00	0.00	0.32	0.00	0.00
Avail Cap(c_a), veh/h	1507	0	0	1504	0	0	1472	0	0	1462	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.5	0.0	0.0	7.0	0.0	0.0	10.0	0.0	0.0	9.4	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.8	0.0	0.0	0.6	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	1.1	0.0	0.0	0.9	0.0	0.0	0.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	5.7	0.0	0.0	7.8	0.0	0.0	10.7	0.0	0.0	9.7	0.0	0.0
LnGrp LOS	A			A			B			A		
Approach Vol, veh/h		281			566			271				181
Approach Delay, s/veh		5.7			7.8			10.7				9.7
Approach LOS		A			A			B				A
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		12.2		18.1		12.2		18.1				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		25.5		25.5		25.5		25.5				
Max Q Clear Time (g_c+I1), s		6.4		5.3		4.7		10.6				
Green Ext Time (p_c), s		1.3		1.4		0.9		3.0				
<b>Intersection Summary</b>												
HCM 7th Control Delay, s/veh				8.2								
HCM 7th LOS				A								

Intersection									
Intersection Delay, s/veh	22.3								
Intersection LOS	C								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		1		1		
Adj Approach Flow, veh/h	0		508		1937		1354		
Demand Flow Rate, veh/h	0		508		1937		1368		
Vehicles Circulating, veh/h	1673		1597		181		346		
Vehicles Exiting, veh/h	41		521		1492		1759		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	0.0		60.2		18.6		13.5		
Approach LOS	-		F		C		B		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	R	LT	R	LT	TR	LT	TR	
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.500	0.500	0.600	0.400	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544	
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4	
Entry Flow, veh/h	0	0	305	203	910	1027	643	725	
Cap Entry Lane, veh/h	290	342	311	365	1204	1204	1036	1036	
Entry HV Adj Factor	1.000	1.000	1.000	1.000	1.000	1.000	0.990	0.990	
Flow Entry, veh/h	0	0	305	203	910	1027	636	718	
Cap Entry, veh/h	290	342	311	365	1205	1204	1026	1026	
V/C Ratio	0.000	0.000	0.982	0.556	0.756	0.853	0.620	0.699	
Control Delay, s/veh	12.4	10.5	84.1	24.3	15.3	21.5	12.2	14.7	
LOS	B	B	F	C	C	C	B	B	
95th %tile Queue, veh	0	0	10	3	8	11	4	6	

Intersection									
Intersection Delay, s/veh	96.1								
Intersection LOS	F								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		2		2		
Adj Approach Flow, veh/h	546		903		1646		1261		
Demand Flow Rate, veh/h	546		903		1646		1274		
Vehicles Circulating, veh/h	1385		1638		617		946		
Vehicles Exiting, veh/h	835		625		1314		1595		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	28.4		222.9		61.1		80.2		
Approach LOS	D		F		F		F		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR	
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.471	0.529	0.470	0.530	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328	
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	
Entry Flow, veh/h	257	289	424	479	774	872	599	675	
Cap Entry Lane, veh/h	378	437	299	353	765	840	565	635	
Entry HV Adj Factor	0.999	1.001	1.001	0.999	1.000	1.000	0.990	0.990	
Flow Entry, veh/h	257	289	424	479	774	872	593	668	
Cap Entry, veh/h	377	438	299	353	765	841	560	629	
V/C Ratio	0.681	0.661	1.417	1.358	1.011	1.038	1.059	1.062	
Control Delay, s/veh	31.0	26.1	239.3	208.4	58.6	63.2	81.8	78.9	
LOS	D	D	F	F	F	F	F	F	
95th %tile Queue, veh	5	5	23	23	18	20	17	18	

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	
Traffic Vol, veh/h	0	29	0	1821	1273	24
Future Vol, veh/h	0	29	0	1821	1273	24
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	2	2
Mvmt Flow	0	32	0	1979	1384	26

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	-	705	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	6.9	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	3.3	-
Pot Cap-1 Maneuver	0	384	0
Stage 1	0	-	0
Stage 2	0	-	0
Platoon blocked, %			-
Mov Cap-1 Maneuver	-	384	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	15.22	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT EBLn1	SBT	SBR
Capacity (veh/h)	- 384	-	-
HCM Lane V/C Ratio	- 0.082	-	-
HCM Ctrl Dly (s/v)	- 15.2	-	-
HCM Lane LOS	- C	-	-
HCM 95th %tile Q(veh)	- 0.3	-	-

Intersection									
Intersection Delay, s/veh	30.4								
Intersection LOS	D								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		1		1		
Adj Approach Flow, veh/h	281		432		1793		1268		
Demand Flow Rate, veh/h	287		432		1793		1280		
Vehicles Circulating, veh/h	1321		1800		436		309		
Vehicles Exiting, veh/h	268		429		1172		1923		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	21.7		54.7		39.3		11.4		
Approach LOS	C		F		E		B		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	R	LT	R	LT	TR	LT	TR	
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.819	0.181	0.530	0.470	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544	
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4	
Entry Flow, veh/h	235	52	229	203	843	950	602	678	
Cap Entry Lane, veh/h	400	462	258	307	955	955	1072	1072	
Entry HV Adj Factor	0.979	0.981	1.000	1.000	1.000	1.000	0.990	0.991	
Flow Entry, veh/h	230	51	229	203	843	950	596	672	
Cap Entry, veh/h	392	453	258	307	955	955	1061	1062	
V/C Ratio	0.587	0.113	0.888	0.660	0.883	0.995	0.562	0.632	
Control Delay, s/veh	24.3	9.5	72.1	35.1	28.6	48.7	10.5	12.2	
LOS	C	A	F	E	D	E	B	B	
95th %tile Queue, veh	4	0	8	4	12	19	4	5	

Intersection						
Int Delay, s/veh	0.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Vol, veh/h	362	7	28	569	4	17
Future Vol, veh/h	362	7	28	569	4	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	407	8	31	639	4	19

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	415	0	1113
Stage 1	-	-	-	-	411
Stage 2	-	-	-	-	702
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1144	-	231
Stage 1	-	-	-	-	669
Stage 2	-	-	-	-	491
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1144	-	221
Mov Cap-2 Maneuver	-	-	-	-	221
Stage 1	-	-	-	-	669
Stage 2	-	-	-	-	470

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.39	13.05
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	471	-	-	84	-
HCM Lane V/C Ratio	0.05	-	-	0.027	-
HCM Ctrl Dly (s/v)	13.1	-	-	8.2	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-

Intersection						
Int Delay, s/veh	1.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Vol, veh/h	373	6	79	594	3	49
Future Vol, veh/h	373	6	79	594	3	49
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	419	7	89	667	3	55

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	426	0	1267
Stage 1	-	-	-	-	422
Stage 2	-	-	-	-	845
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1133	-	186
Stage 1	-	-	-	-	661
Stage 2	-	-	-	-	421
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1133	-	163
Mov Cap-2 Maneuver	-	-	-	-	163
Stage 1	-	-	-	-	661
Stage 2	-	-	-	-	369

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.99	12.45
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	542	-	-	211	-
HCM Lane V/C Ratio	0.108	-	-	0.078	-
HCM Ctrl Dly (s/v)	12.5	-	-	8.4	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.4	-	-	0.3	-

HCM 7th Signalized Intersection Summary  
1: 48th & Central

Clearwater/44 West TIS  
08/11/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	11	268	46	27	130	20	8	66	65	93	105	17
Future Volume (veh/h)	11	268	46	27	130	20	8	66	65	93	105	17
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1682	1682	1682	1682	1682	1682	1736	1736	1736
Adj Flow Rate, veh/h	12	301	52	30	146	22	9	74	73	104	118	19
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	5	5	5	5	5	5	1	1	1
Cap, veh/h	170	479	81	221	437	60	177	208	193	365	240	33
Arrive On Green	0.34	0.34	0.34	0.34	0.34	0.34	0.27	0.27	0.27	0.27	0.27	0.27
Sat Flow, veh/h	23	1410	238	119	1286	176	40	778	719	525	895	122
Grp Volume(v), veh/h	365	0	0	198	0	0	156	0	0	241	0	0
Grp Sat Flow(s),veh/h/ln	1671	0	0	1581	0	0	1537	0	0	1542	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0
Cycle Q Clear(g_c), s	4.2	0.0	0.0	2.1	0.0	0.0	1.9	0.0	0.0	2.9	0.0	0.0
Prop In Lane	0.03		0.14	0.15		0.11	0.06		0.47	0.43		0.08
Lane Grp Cap(c), veh/h	730	0	0	718	0	0	578	0	0	638	0	0
V/C Ratio(X)	0.50	0.00	0.00	0.28	0.00	0.00	0.27	0.00	0.00	0.38	0.00	0.00
Avail Cap(c_a), veh/h	2007	0	0	1872	0	0	1859	0	0	1876	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.4	0.0	0.0	5.7	0.0	0.0	6.8	0.0	0.0	7.2	0.0	0.0
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.4	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	6.9	0.0	0.0	5.9	0.0	0.0	7.1	0.0	0.0	7.6	0.0	0.0
LnGrp LOS	A			A			A			A		
Approach Vol, veh/h		365			198			156				241
Approach Delay, s/veh		6.9			5.9			7.1				7.6
Approach LOS		A			A			A				A
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		10.7		12.3		10.7		12.3				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		25.5		25.5		25.5		25.5				
Max Q Clear Time (g_c+I1), s		3.9		6.2		4.9		4.1				
Green Ext Time (p_c), s		0.7		1.8		1.2		1.0				
<b>Intersection Summary</b>												
HCM 7th Control Delay, s/veh			6.9									
HCM 7th LOS			A									

Intersection									
Intersection Delay, s/veh	8.7								
Intersection LOS	A								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		1		1		
Adj Approach Flow, veh/h	0		340		1078		1143		
Demand Flow Rate, veh/h	0		343		1100		1154		
Vehicles Circulating, veh/h	1362		883		208		236		
Vehicles Exiting, veh/h	28		425		1154		990		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	0.0		9.7		8.2		8.9		
Approach LOS	-		A		A		A		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	R	LT	R	LT	TR	LT	TR	
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.500	0.500	0.606	0.394	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544	
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4	
Entry Flow, veh/h	0	0	208	135	517	583	542	612	
Cap Entry Lane, veh/h	386	446	599	670	1175	1175	1146	1146	
Entry HV Adj Factor	1.000	1.000	0.990	0.993	0.980	0.980	0.991	0.990	
Flow Entry, veh/h	0	0	206	134	507	571	537	606	
Cap Entry, veh/h	386	446	593	665	1152	1152	1135	1134	
V/C Ratio	0.000	0.000	0.347	0.201	0.440	0.496	0.473	0.534	
Control Delay, s/veh	9.3	8.1	11.0	7.8	7.8	8.6	8.4	9.4	
LOS	A	A	B	A	A	A	A	A	
95th %tile Queue, veh	0	0	2	1	2	3	3	3	

Intersection									
Intersection Delay, s/veh	74.9								
Intersection LOS	F								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		2		2		
Adj Approach Flow, veh/h	1041		466		1049		1223		
Demand Flow Rate, veh/h	1062		480		1080		1235		
Vehicles Circulating, veh/h	1287		1170		1198		460		
Vehicles Exiting, veh/h	408		1108		1151		1190		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	137.0		16.9		108.8		14.9		
Approach LOS	F		C		F		B		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR	
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.470	0.530	0.471	0.529	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328	
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	
Entry Flow, veh/h	499	563	226	254	508	572	580	655	
Cap Entry Lane, veh/h	413	475	460	525	448	513	884	960	
Entry HV Adj Factor	0.980	0.980	0.968	0.972	0.971	0.972	0.991	0.990	
Flow Entry, veh/h	489	552	219	247	493	556	575	648	
Cap Entry, veh/h	405	466	446	510	435	499	876	950	
V/C Ratio	1.208	1.184	0.491	0.484	1.133	1.115	0.656	0.682	
Control Delay, s/veh	144.4	130.5	18.1	15.9	114.6	103.7	14.9	14.9	
LOS	F	F	C	C	F	F	B	B	
95th %tile Queue, veh	20	21	3	3	18	18	5	6	

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	
Traffic Vol, veh/h	0	51	0	1095	1190	21
Future Vol, veh/h	0	51	0	1095	1190	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	0	0	4	4	2	2
Mvmt Flow	0	57	0	1230	1337	24

Major/Minor	Minor2	Major1	Major2		
Conflicting Flow All	-	680	-	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-
Pot Cap-1 Maneuver	0	398	0	-	-
Stage 1	0	-	0	-	-
Stage 2	0	-	0	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	-	398	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	15.56	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT EBLn1	SBT	SBR
Capacity (veh/h)	- 398	-	-
HCM Lane V/C Ratio	- 0.144	-	-
HCM Ctrl Dly (s/v)	- 15.6	-	-
HCM Lane LOS	- C	-	-
HCM 95th %tile Q(veh)	- 0.5	-	-

Intersection									
Intersection Delay, s/veh	22.3								
Intersection LOS	C								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		1		1		
Adj Approach Flow, veh/h	351		345		1315		1607		
Demand Flow Rate, veh/h	362		355		1328		1623		
Vehicles Circulating, veh/h	1640		1400		552		213		
Vehicles Exiting, veh/h	196		480		1450		1542		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	69.0		19.0		21.5		13.5		
Approach LOS	F		C		C		B		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	R	LT	R	LT	TR	LT	TR	
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.796	0.204	0.515	0.485	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544	
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4	
Entry Flow, veh/h	288	74	183	172	624	704	763	860	
Cap Entry Lane, veh/h	299	352	372	432	859	859	1170	1170	
Entry HV Adj Factor	0.970	0.973	0.972	0.971	0.990	0.990	0.990	0.990	
Flow Entry, veh/h	279	72	178	167	618	697	755	852	
Cap Entry, veh/h	290	343	362	419	851	850	1158	1158	
V/C Ratio	0.964	0.210	0.491	0.398	0.726	0.819	0.652	0.735	
Control Delay, s/veh	83.1	14.3	21.6	16.1	18.2	24.4	12.0	14.9	
LOS	F	B	C	C	C	C	B	B	
95th %tile Queue, veh	10	1	3	2	7	9	5	7	

Intersection						
Int Delay, s/veh	1.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Vol, veh/h	597	6	39	228	12	62
Future Vol, veh/h	597	6	39	228	12	62
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	671	7	44	256	13	70

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	678	0	1018
Stage 1	-	-	-	-	674
Stage 2	-	-	-	-	344
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	914	-	263
Stage 1	-	-	-	-	506
Stage 2	-	-	-	-	718
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	914	-	248
Mov Cap-2 Maneuver	-	-	-	-	248
Stage 1	-	-	-	-	506
Stage 2	-	-	-	-	678

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	1.33	16.33
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	401	-	-	263	-
HCM Lane V/C Ratio	0.208	-	-	0.048	-
HCM Ctrl Dly (s/v)	16.3	-	-	9.1	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.8	-	-	0.2	-

Intersection						
Int Delay, s/veh	2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Vol, veh/h	656	3	30	259	8	94
Future Vol, veh/h	656	3	30	259	8	94
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	737	3	34	291	9	106

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	740	0	1097
Stage 1	-	-	-	-	739
Stage 2	-	-	-	-	358
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	866	-	236
Stage 1	-	-	-	-	472
Stage 2	-	-	-	-	707
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	866	-	225
Mov Cap-2 Maneuver	-	-	-	-	225
Stage 1	-	-	-	-	472
Stage 2	-	-	-	-	674

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.97	17.97
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	391	-	-	187	-
HCM Lane V/C Ratio	0.293	-	-	0.039	-
HCM Ctrl Dly (s/v)	18	-	-	9.3	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	1.2	-	-	0.1	-

HCM 7th Signalized Intersection Summary  
1: 48th & Central

Clearwater/44 West TIS  
08/11/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	13	218	21	44	381	73	67	137	31	47	93	18
Future Volume (veh/h)	13	218	21	44	381	73	67	137	31	47	93	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1736	1736	1736	1750	1750	1750	1750	1750	1750
Adj Flow Rate, veh/h	15	253	24	51	443	85	78	159	36	55	108	21
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	1	1	1	0	0	0	0	0	0
Cap, veh/h	136	683	62	162	604	110	235	271	54	232	287	47
Arrive On Green	0.45	0.45	0.45	0.45	0.45	0.45	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	29	1503	137	77	1330	242	333	1063	212	319	1128	186
Grp Volume(v), veh/h	292	0	0	579	0	0	273	0	0	184	0	0
Grp Sat Flow(s),veh/h/ln	1670	0	0	1649	0	0	1608	0	0	1633	0	0
Q Serve(g_s), s	0.0	0.0	0.0	2.5	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	3.5	0.0	0.0	9.0	0.0	0.0	4.6	0.0	0.0	2.8	0.0	0.0
Prop In Lane	0.05		0.08	0.09		0.15	0.29		0.13	0.30		0.11
Lane Grp Cap(c), veh/h	881	0	0	876	0	0	559	0	0	567	0	0
V/C Ratio(X)	0.33	0.00	0.00	0.66	0.00	0.00	0.49	0.00	0.00	0.32	0.00	0.00
Avail Cap(c_a), veh/h	1480	0	0	1474	0	0	1444	0	0	1431	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.6	0.0	0.0	7.0	0.0	0.0	10.2	0.0	0.0	9.6	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.9	0.0	0.0	0.7	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	1.2	0.0	0.0	1.0	0.0	0.0	0.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	5.8	0.0	0.0	7.9	0.0	0.0	10.9	0.0	0.0	9.9	0.0	0.0
LnGrp LOS	A			A			B			A		
Approach Vol, veh/h		292			579			273			184	
Approach Delay, s/veh		5.8			7.9			10.9			9.9	
Approach LOS		A			A			B			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		12.4		18.5		12.4		18.5				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		25.5		25.5		25.5		25.5				
Max Q Clear Time (g_c+I1), s		6.6		5.5		4.8		11.0				
Green Ext Time (p_c), s		1.3		1.4		0.9		3.1				
<b>Intersection Summary</b>												
HCM 7th Control Delay, s/veh				8.3								
HCM 7th LOS				A								

Intersection									
Intersection Delay, s/veh	24.6								
Intersection LOS	C								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		1		1		
Adj Approach Flow, veh/h	0		516		1974		1394		
Demand Flow Rate, veh/h	0		516		1974		1408		
Vehicles Circulating, veh/h	1721		1628		181		354		
Vehicles Exiting, veh/h	41		527		1540		1790		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	0.0		70.8		19.7		14.5		
Approach LOS	-		F		C		B		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	R	LT	R	LT	TR	LT	TR	
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.500	0.500	0.607	0.393	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544	
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4	
Entry Flow, veh/h	0	0	313	203	928	1046	662	746	
Cap Entry Lane, veh/h	277	329	302	356	1204	1204	1029	1029	
Entry HV Adj Factor	1.000	1.000	1.000	1.000	1.000	1.000	0.990	0.990	
Flow Entry, veh/h	0	0	313	203	928	1046	655	739	
Cap Entry, veh/h	277	329	302	356	1204	1205	1018	1019	
V/C Ratio	0.000	0.000	1.037	0.570	0.770	0.868	0.643	0.725	
Control Delay, s/veh	13.0	10.9	100.2	25.6	16.1	22.9	12.9	15.9	
LOS	B	B	F	D	C	C	B	C	
95th %tile Queue, veh	0	0	12	3	8	12	5	7	

Intersection									
Intersection Delay, s/veh	144.6								
Intersection LOS	F								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		2		2		
Adj Approach Flow, veh/h	636		969		1691		1306		
Demand Flow Rate, veh/h	636		969		1691		1319		
Vehicles Circulating, veh/h	1431		1718		686		1057		
Vehicles Exiting, veh/h	945		659		1381		1630		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	43.0		313.7		92.6		136.1		
Approach LOS	E		F		F		F		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR	
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.470	0.530	0.470	0.530	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328	
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	
Entry Flow, veh/h	299	337	455	514	795	896	620	699	
Cap Entry Lane, veh/h	362	421	278	330	718	793	511	578	
Entry HV Adj Factor	1.000	1.000	1.001	0.999	1.000	1.000	0.990	0.990	
Flow Entry, veh/h	299	337	455	514	795	896	614	692	
Cap Entry, veh/h	362	421	278	329	718	793	505	573	
V/C Ratio	0.826	0.801	1.637	1.559	1.107	1.130	1.214	1.209	
Control Delay, s/veh	47.3	39.1	334.7	295.1	89.6	95.2	139.2	133.3	
LOS	E	E	F	F	F	F	F	F	
95th %tile Queue, veh	7	7	28	30	23	26	23	25	

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	
Traffic Vol, veh/h	0	42	0	1863	1292	58
Future Vol, veh/h	0	42	0	1863	1292	58
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	2	2
Mvmt Flow	0	46	0	2025	1404	63

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	-	734	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	6.9	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	3.3	-
Pot Cap-1 Maneuver	0	367	0
Stage 1	0	-	0
Stage 2	0	-	0
Platoon blocked, %			-
Mov Cap-1 Maneuver	-	367	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	16.19	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT EBLn1	SBT	SBR
Capacity (veh/h)	- 367	-	-
HCM Lane V/C Ratio	- 0.124	-	-
HCM Ctrl Dly (s/v)	- 16.2	-	-
HCM Lane LOS	- C	-	-
HCM 95th %tile Q(veh)	- 0.4	-	-

Intersection									
Intersection Delay, s/veh	33.5								
Intersection LOS	D								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		1		1		
Adj Approach Flow, veh/h	281		439		1829		1301		
Demand Flow Rate, veh/h	287		439		1829		1314		
Vehicles Circulating, veh/h	1355		1836		441		309		
Vehicles Exiting, veh/h	268		434		1201		1966		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	23.1		60.9		44.0		11.8		
Approach LOS	C		F		E		B		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	R	LT	R	LT	TR	LT	TR	
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.819	0.181	0.522	0.478	0.470	0.530	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544	
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420	
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4	
Entry Flow, veh/h	235	52	229	210	860	969	618	696	
Cap Entry Lane, veh/h	388	449	249	298	951	951	1072	1072	
Entry HV Adj Factor	0.979	0.981	1.000	1.000	1.000	1.000	0.990	0.991	
Flow Entry, veh/h	230	51	229	210	860	969	612	690	
Cap Entry, veh/h	380	440	249	298	950	951	1061	1062	
V/C Ratio	0.605	0.116	0.918	0.704	0.905	1.019	0.577	0.649	
Control Delay, s/veh	26.0	9.8	80.1	39.9	31.6	55.0	10.8	12.7	
LOS	D	A	F	E	D	F	B	B	
95th %tile Queue, veh	4	0	8	5	13	20	4	5	

Intersection						
Int Delay, s/veh	1.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Vol, veh/h	366	16	84	573	11	69
Future Vol, veh/h	366	16	84	573	11	69
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	411	18	94	644	12	78

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	429	0	1253
Stage 1	-	-	-	-	420
Stage 2	-	-	-	-	833
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1130	-	190
Stage 1	-	-	-	-	663
Stage 2	-	-	-	-	427
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1130	-	165
Mov Cap-2 Maneuver	-	-	-	-	165
Stage 1	-	-	-	-	663
Stage 2	-	-	-	-	371

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	1.08	14.83
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	456	-	-	230	-
HCM Lane V/C Ratio	0.197	-	-	0.084	-
HCM Ctrl Dly (s/v)	14.8	-	-	8.5	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.7	-	-	0.3	-

Intersection						
Int Delay, s/veh	1.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Vol, veh/h	425	10	65	650	7	62
Future Vol, veh/h	425	10	65	650	7	62
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	478	11	73	730	8	70

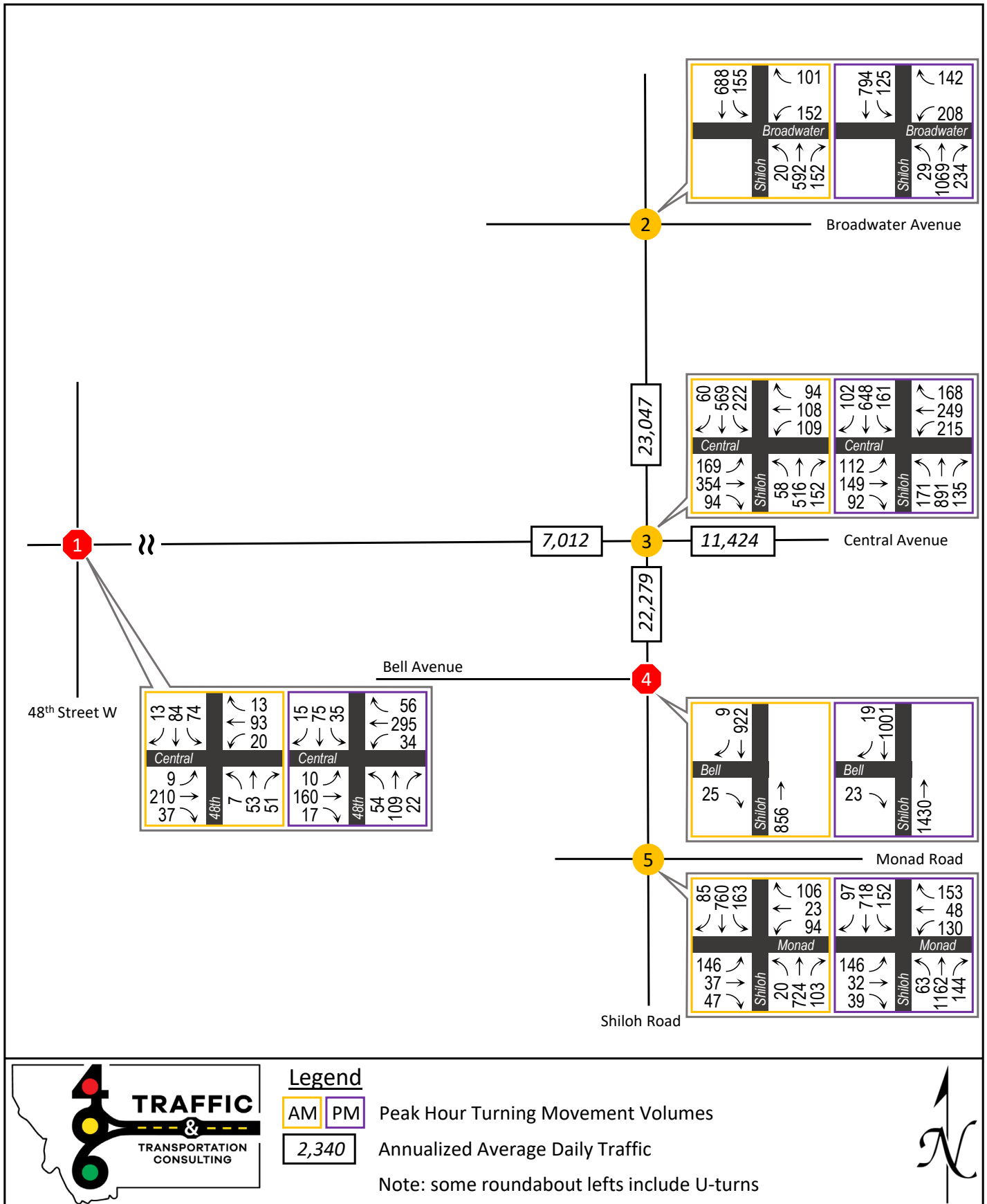
Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	489	0	1360 483
Stage 1	-	-	-	-	483 -
Stage 2	-	-	-	-	876 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1074	-	164 583
Stage 1	-	-	-	-	620 -
Stage 2	-	-	-	-	407 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1074	-	145 583
Mov Cap-2 Maneuver	-	-	-	-	145 -
Stage 1	-	-	-	-	620 -
Stage 2	-	-	-	-	361 -

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.78	14.75
HCM LOS			B

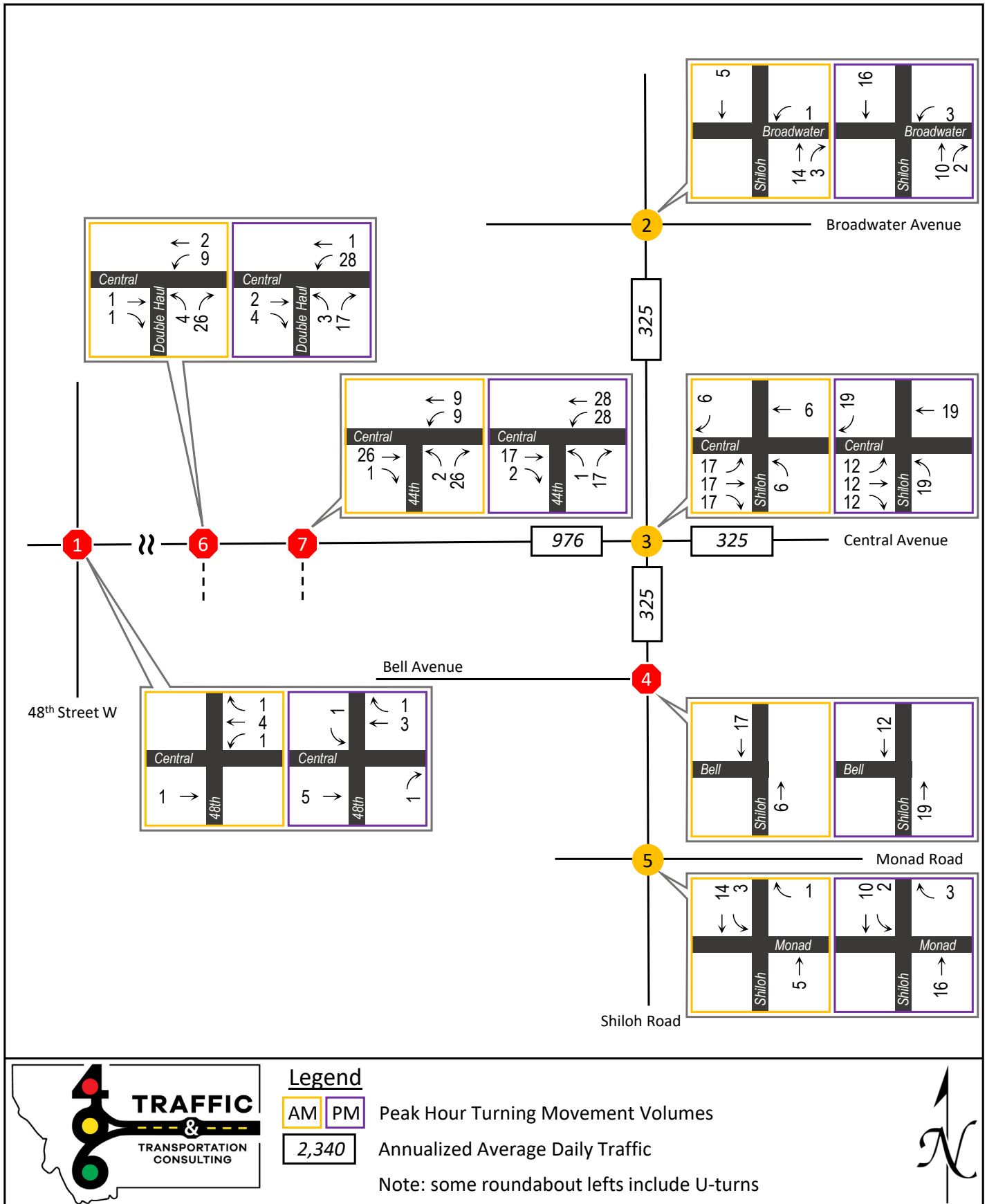
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	446	-	-	164	-
HCM Lane V/C Ratio	0.174	-	-	0.068	-
HCM Ctrl Dly (s/v)	14.8	-	-	8.6	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.6	-	-	0.2	-

## **Appendix C: Estimated Future Traffic Volume Maps**

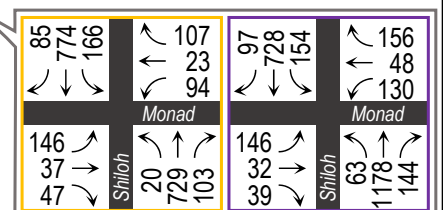
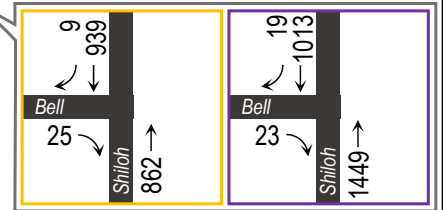
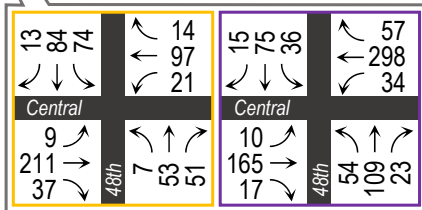
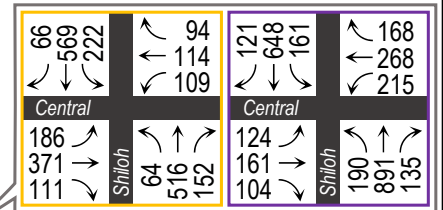
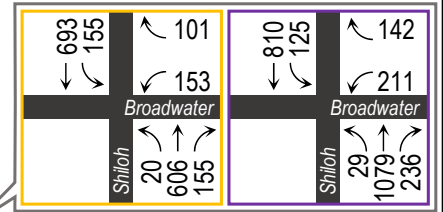
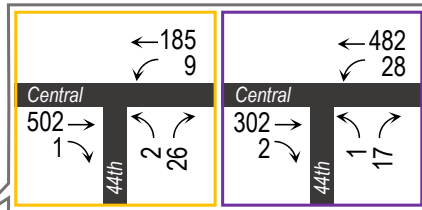
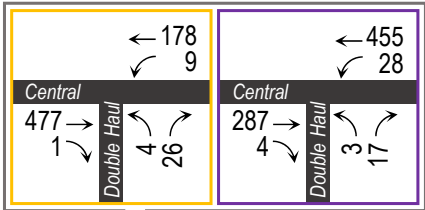
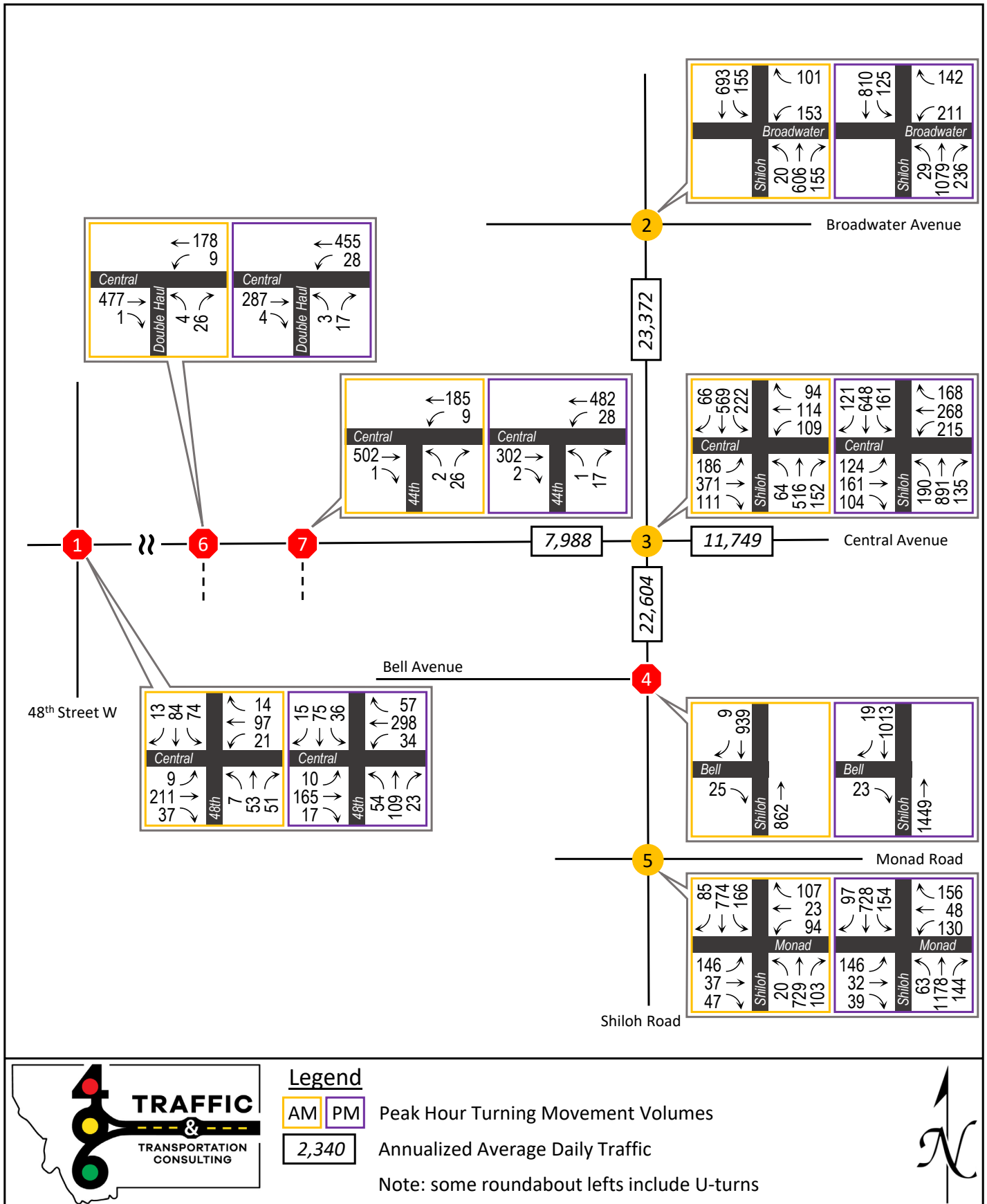
# Exhibit C-1. 2027 Background Traffic



# Exhibit C-2. 2027 Phase 1A Project Trips



# Exhibit C-3. 2027 Phase 1A Total Traffic



1  
6  
7  
48th Street W

Bell Avenue

Shiloh Road

2  
Broadwater Avenue

23,372

7,988

22,604

11,749

3  
Central Avenue

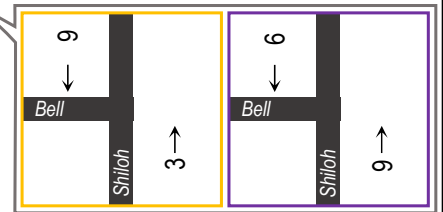
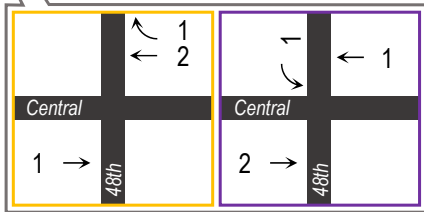
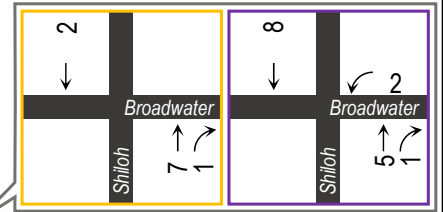
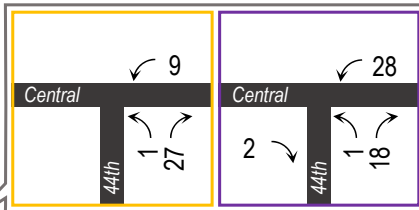
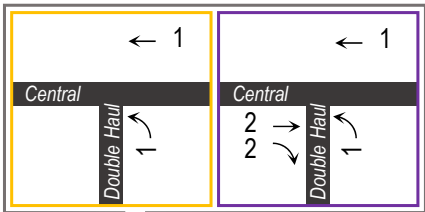
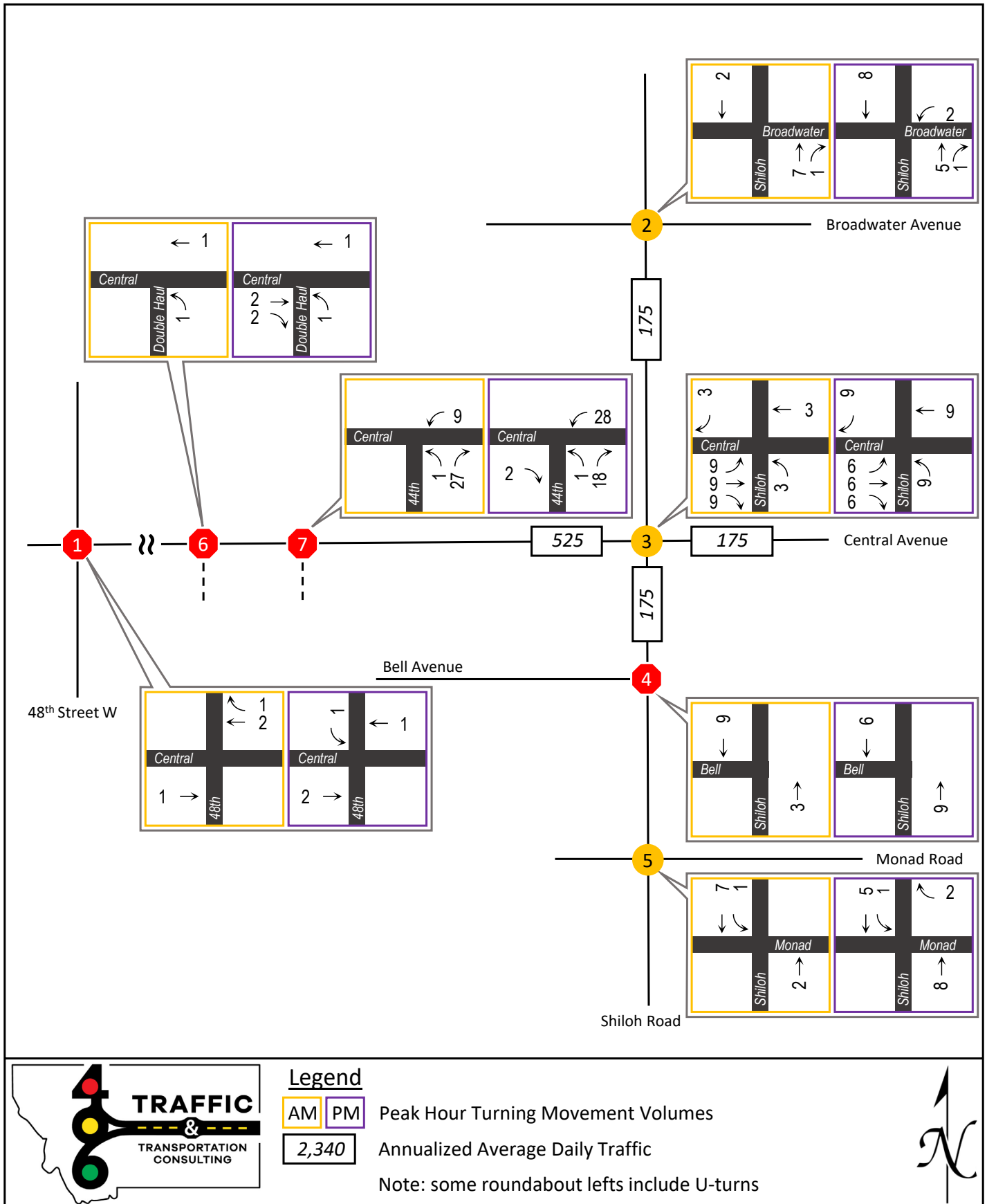
4

5  
Monad Road





# Exhibit C-5. 2029 Phase 1B Project Trips



48<sup>th</sup> Street W

Bell Avenue

Broadwater Avenue

Central Avenue

Monad Road

Shiloh Road

1

6

7

2

3

4

5

525

175

175

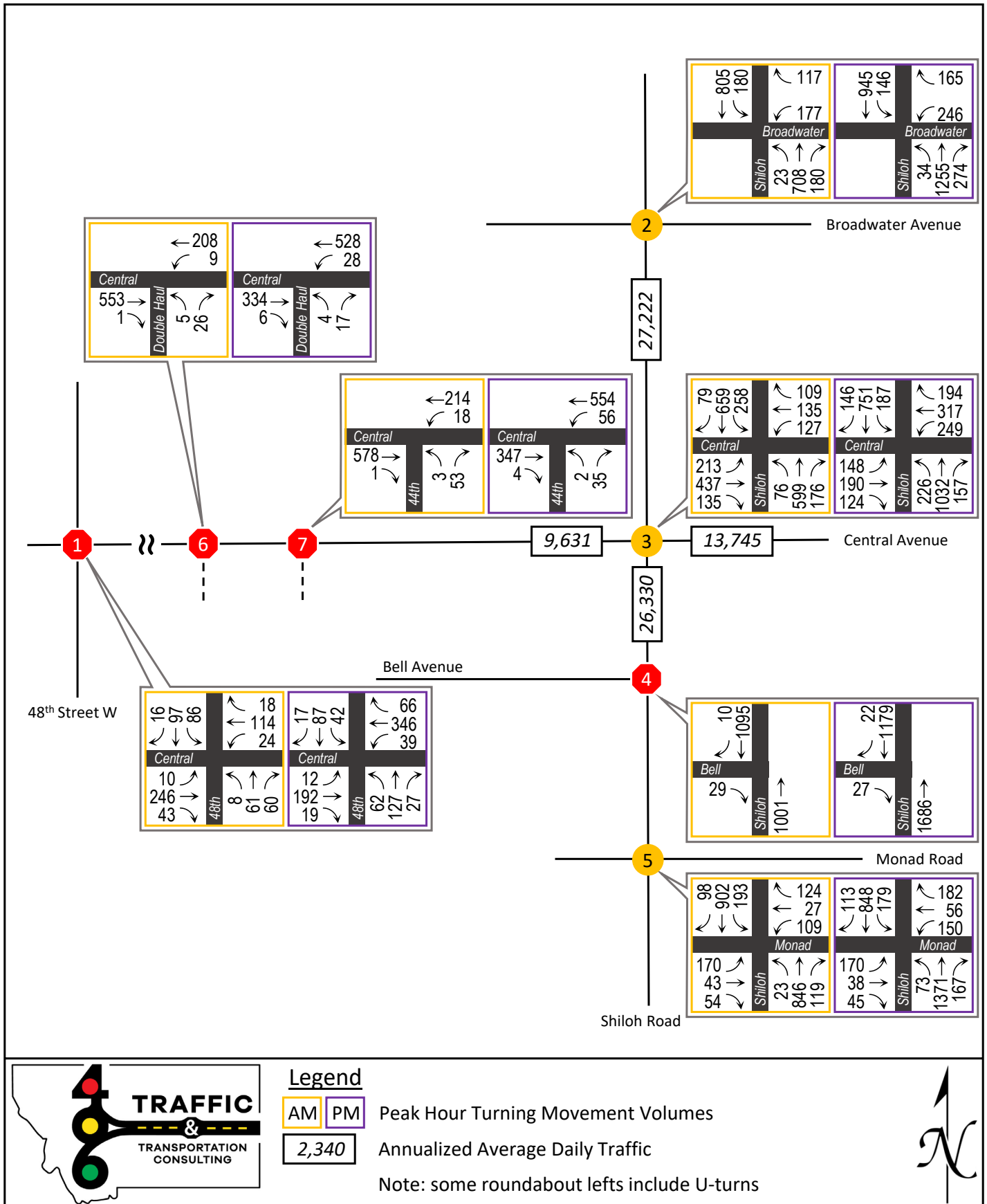
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175

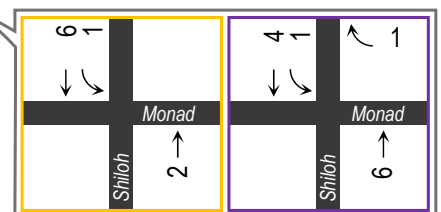
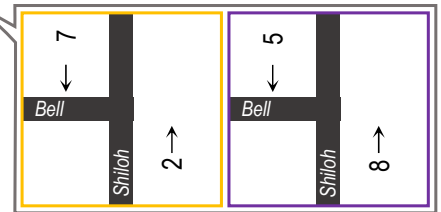
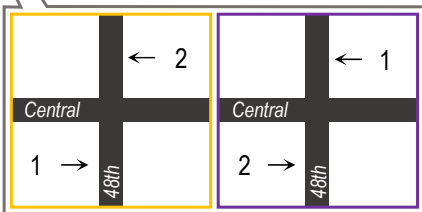
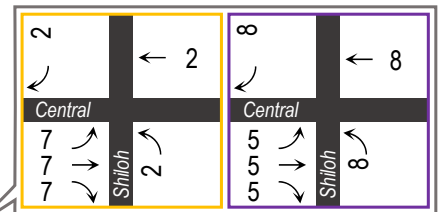
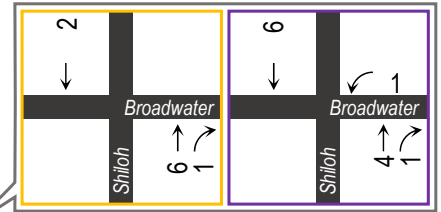
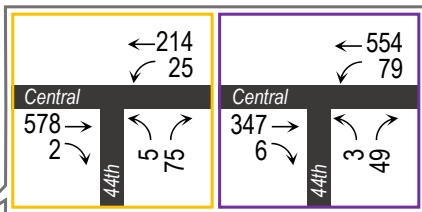
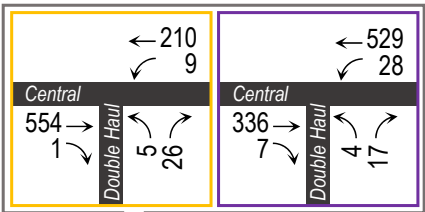
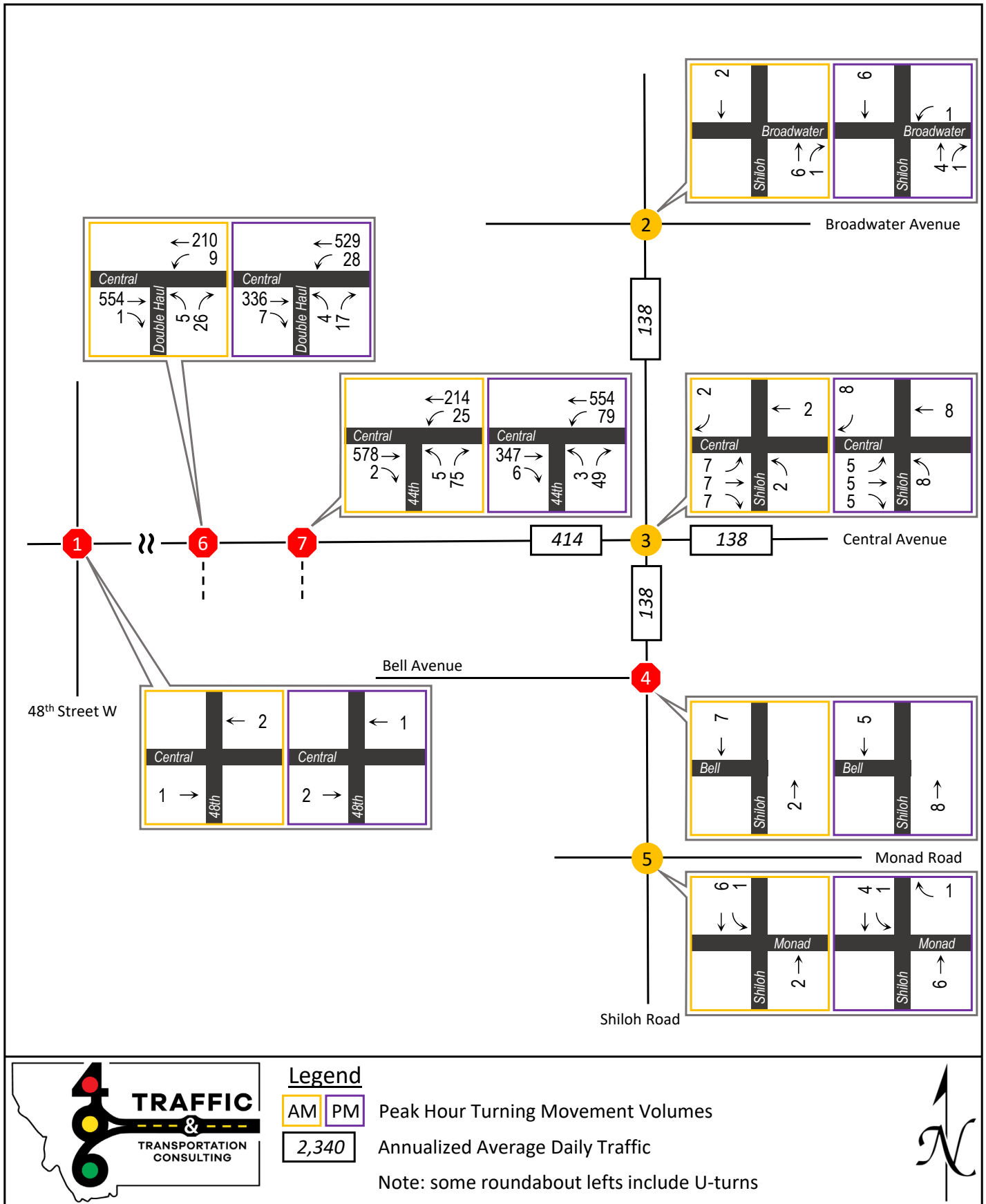




# Exhibit C-7. 2031 Traffic Without Phase 1C



# Exhibit C-8. 2031 Phase 1C Project Trips



1  
48th Street W

6

7

414

2

3

4

5

138

138

138

Broadwater Avenue

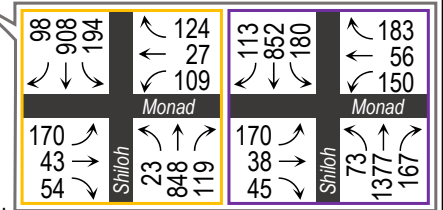
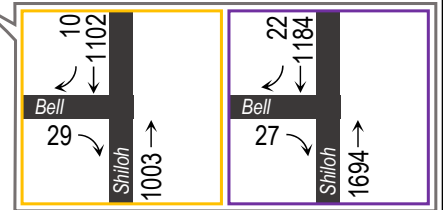
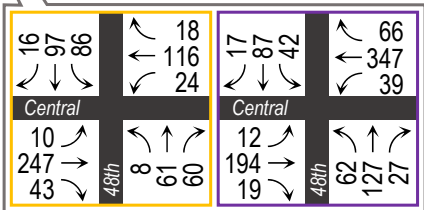
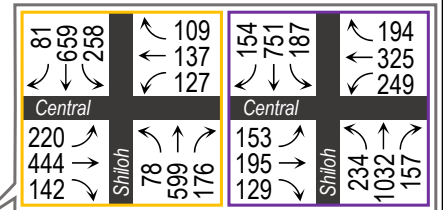
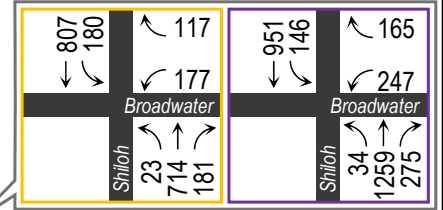
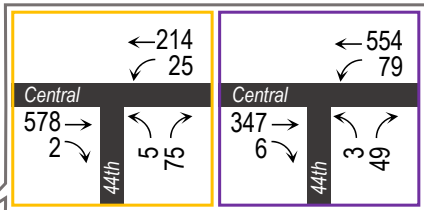
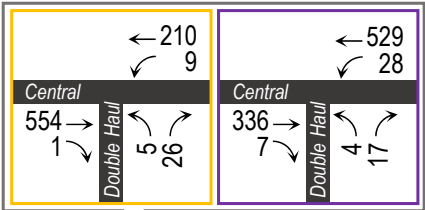
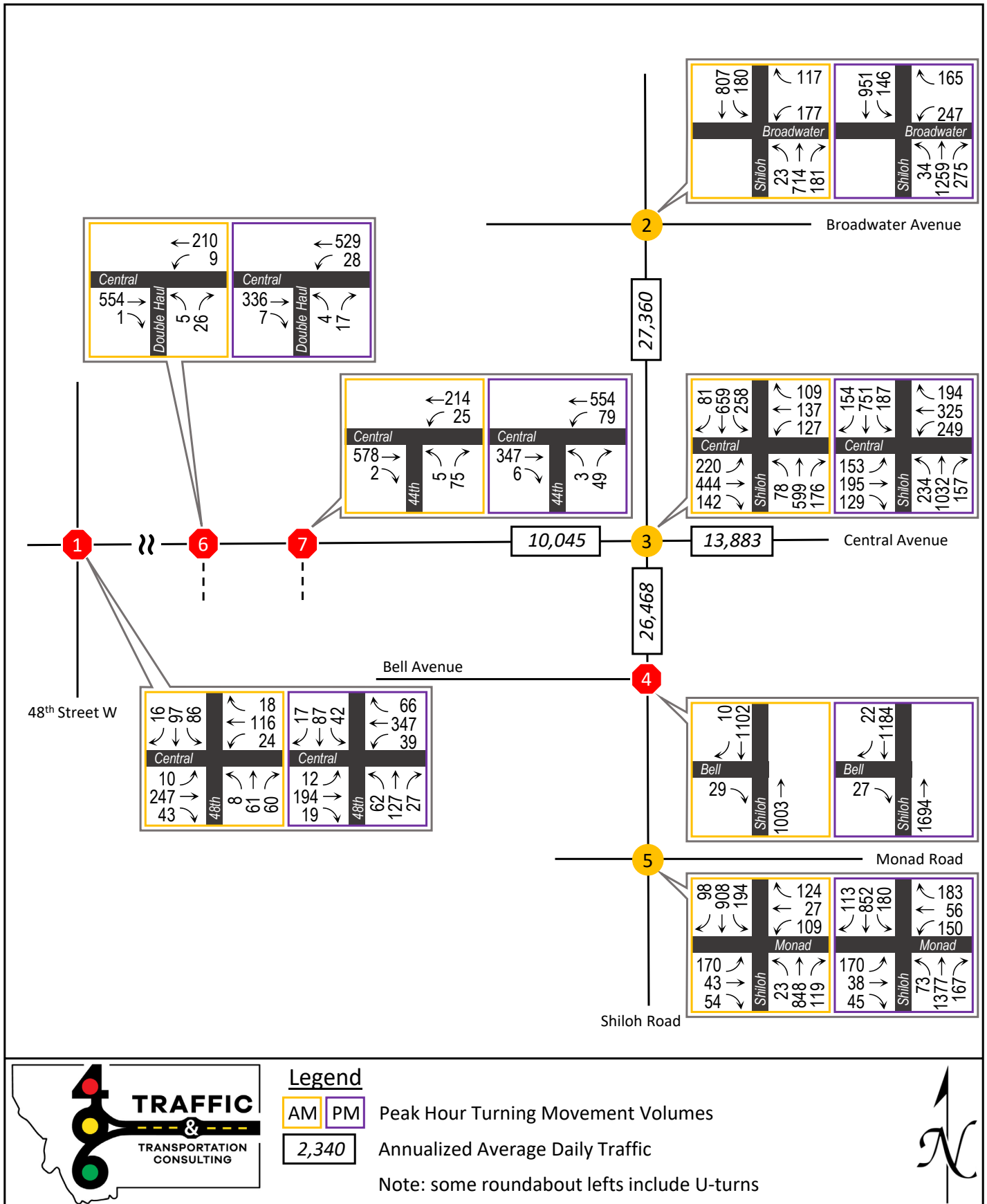
Central Avenue

Bell Avenue

Monad Road

Shiloh Road

# Exhibit C-9. 2031 Phase 1C Total Traffic



48th Street W

Bell Avenue

Broadwater Avenue

Central Avenue

Monad Road

Shiloh Road

1

6

7

2

3

4

5

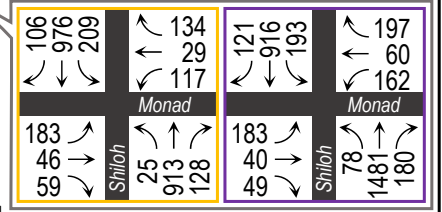
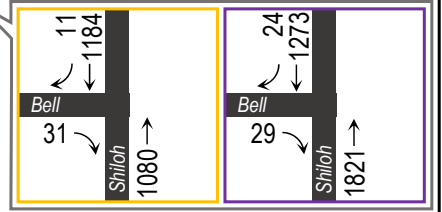
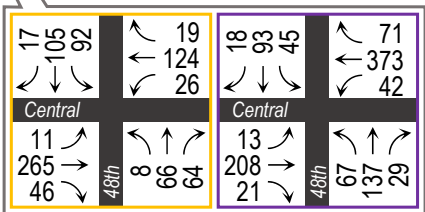
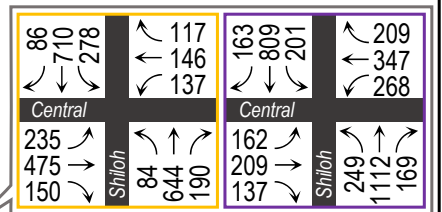
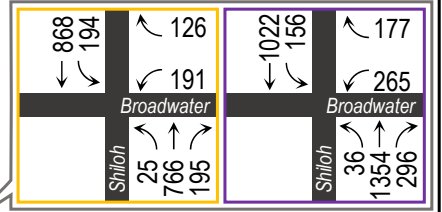
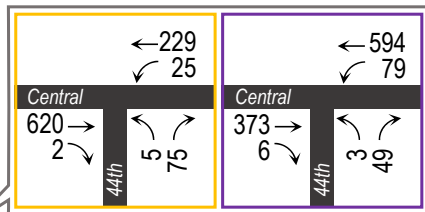
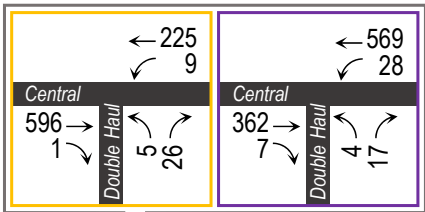
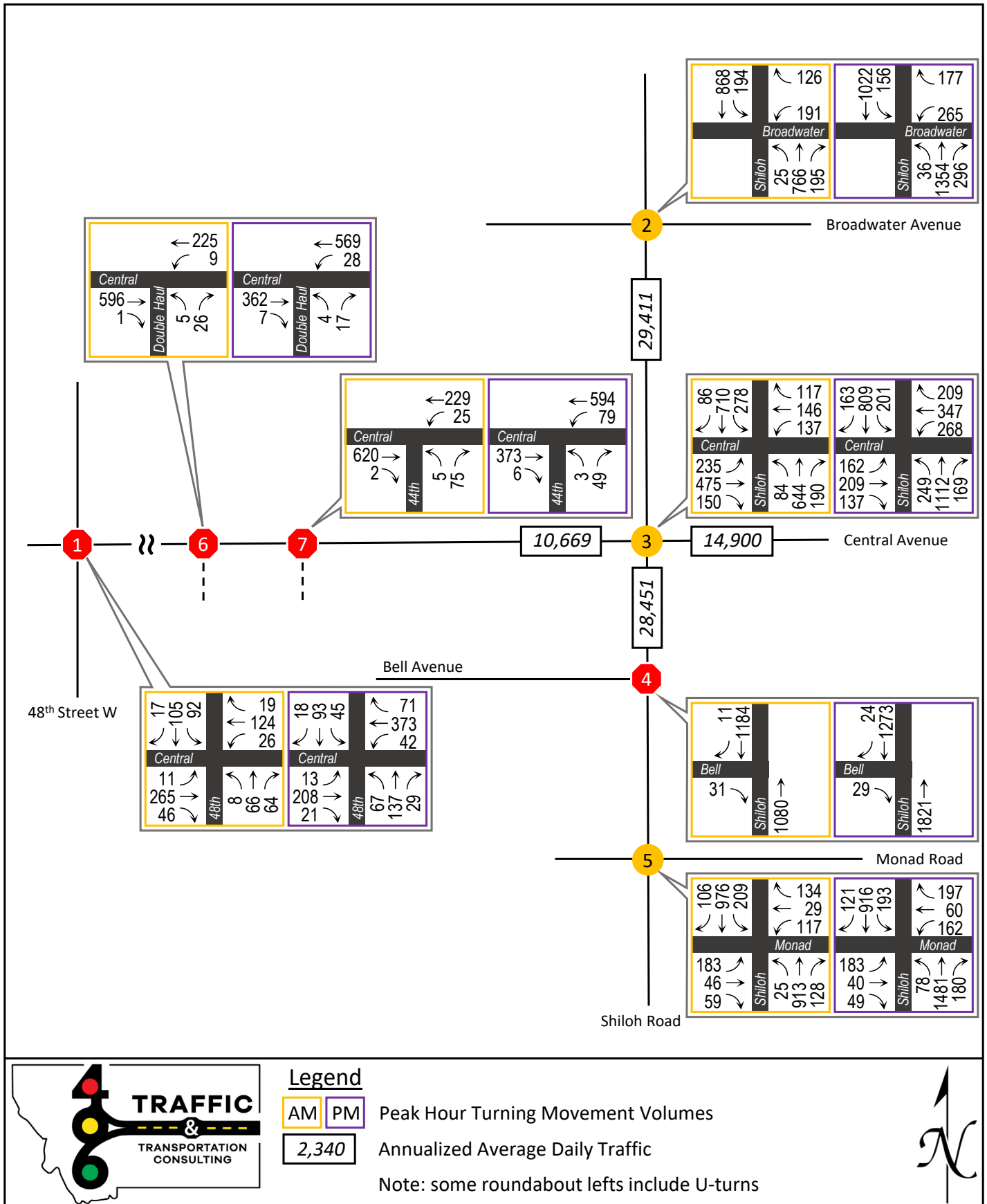
10,045

27,360

13,883

26,468

# Exhibit C-10. 2033 Traffic Without Phase 2



1  
48th Street W

6

7

10,669

2

29,411

3

28,451

4

5

Broadwater Avenue

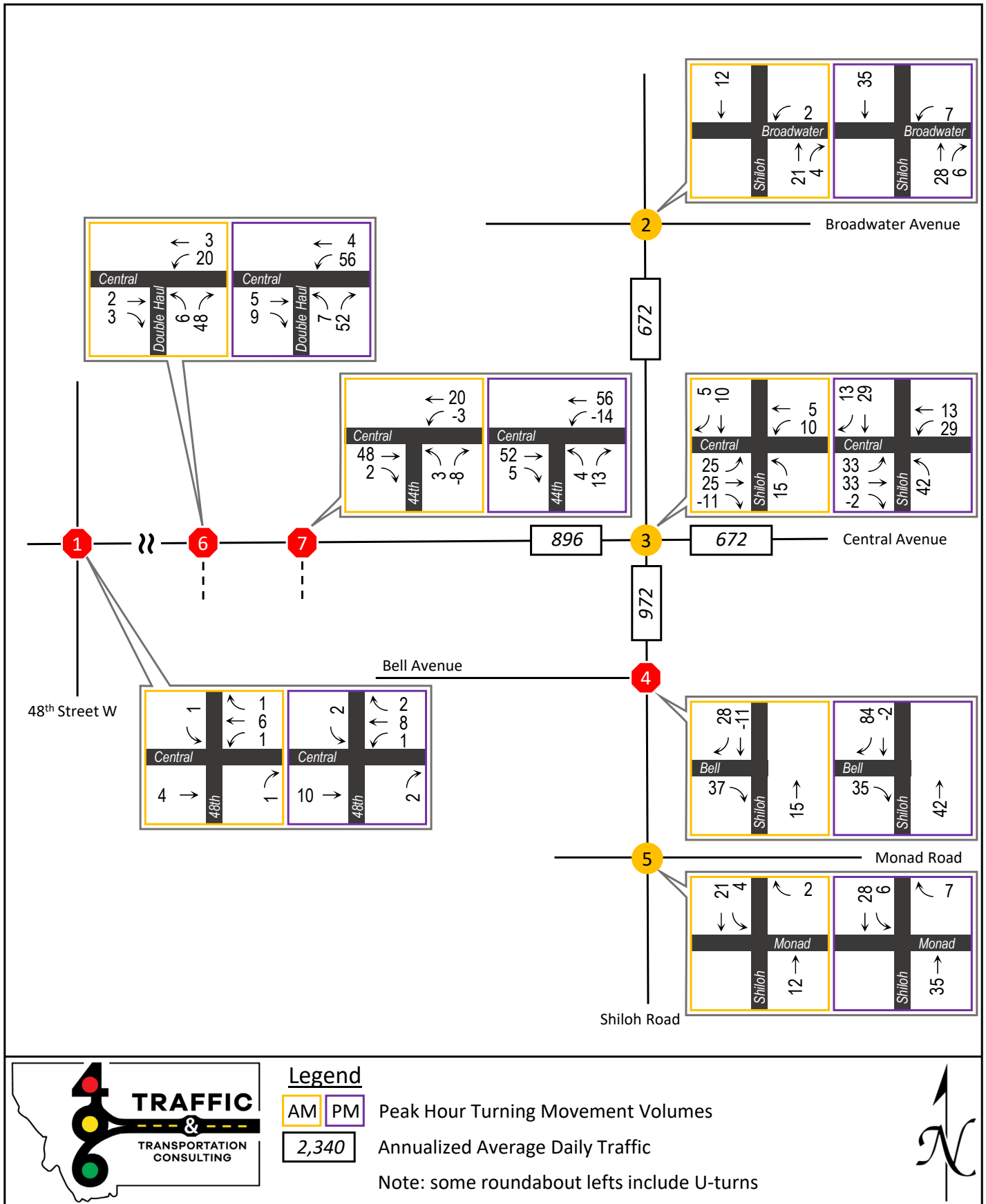
Central Avenue

Bell Avenue

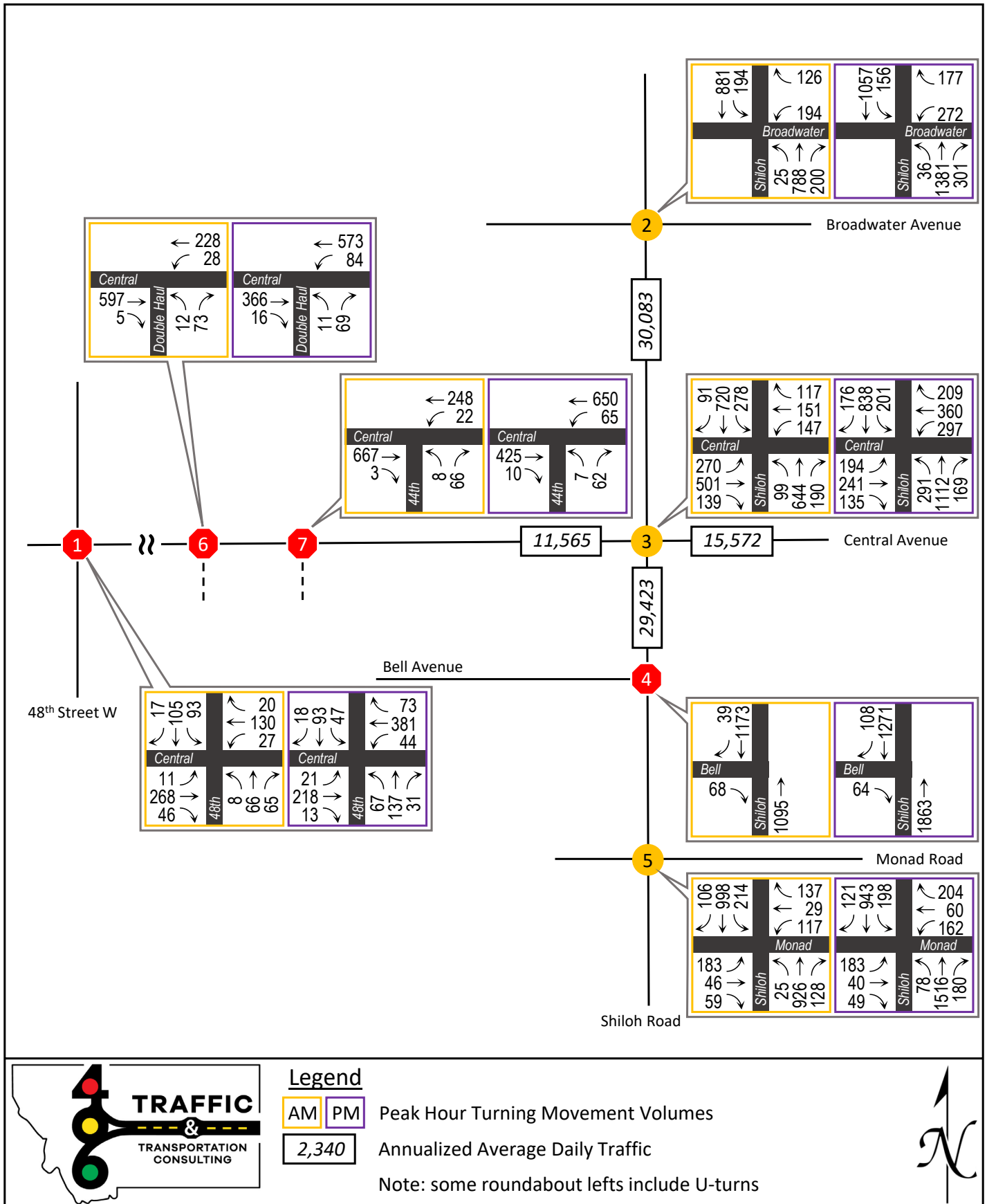
Monad Road

Shiloh Road

# Exhibit C-11. 2033 Phase 2 Project Trips

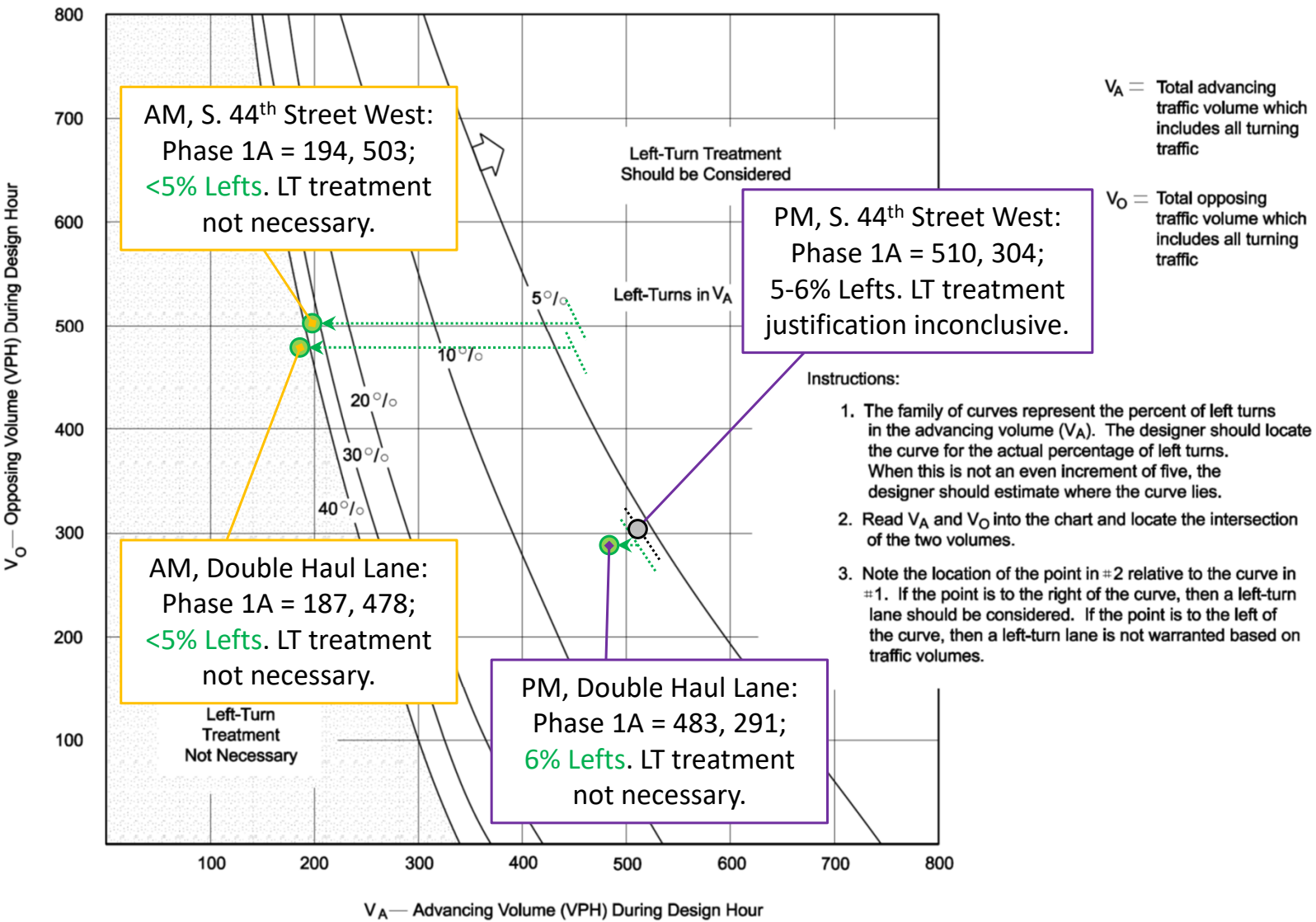


# Exhibit C-12. 2033 Total Traffic with Phase 2 (Full project buildout)



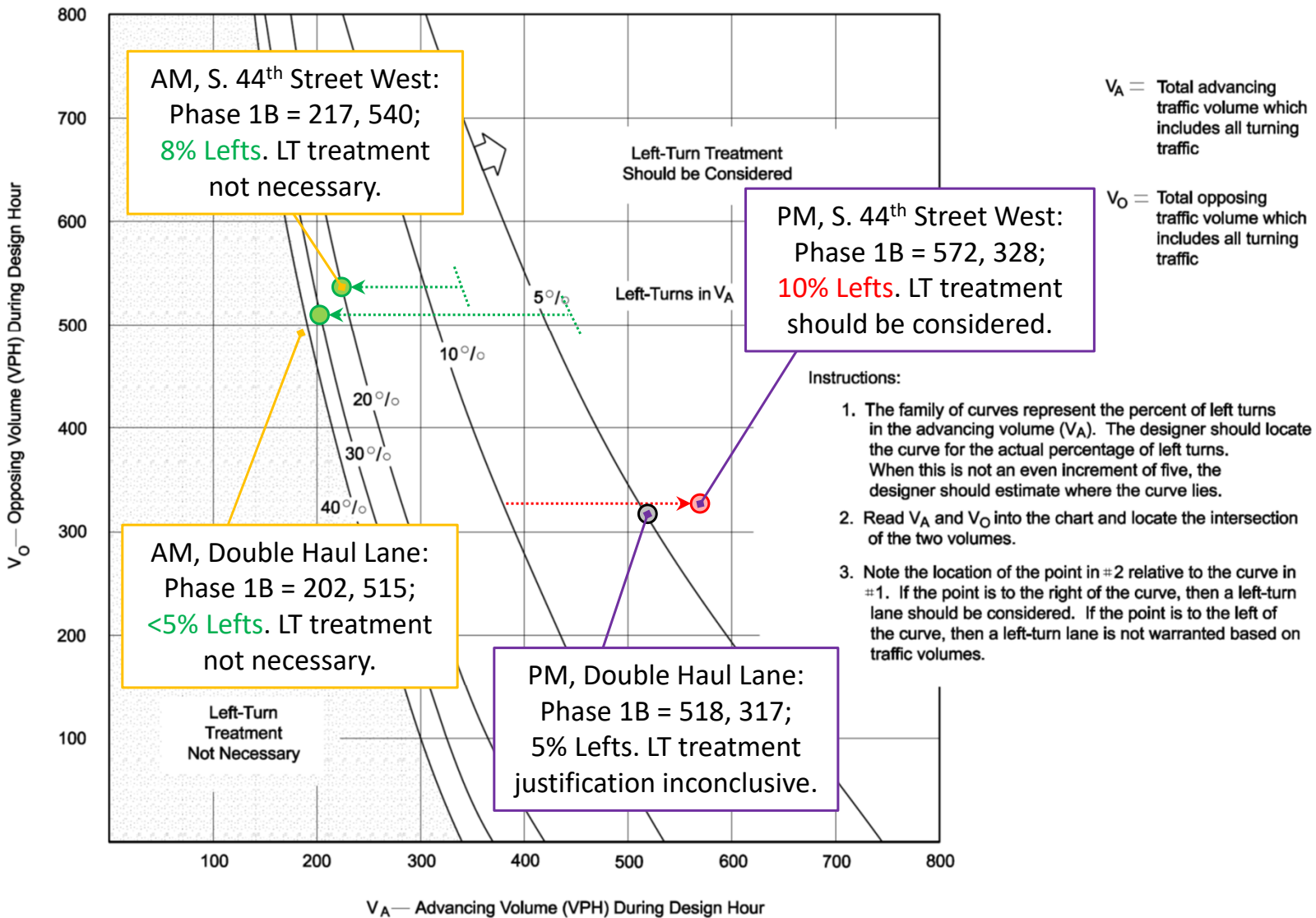
## Appendix D: Auxiliary Turn Lane Analysis Charts

# Exhibit D-1. 2027 Phase 1A Left Turn Lane Chart



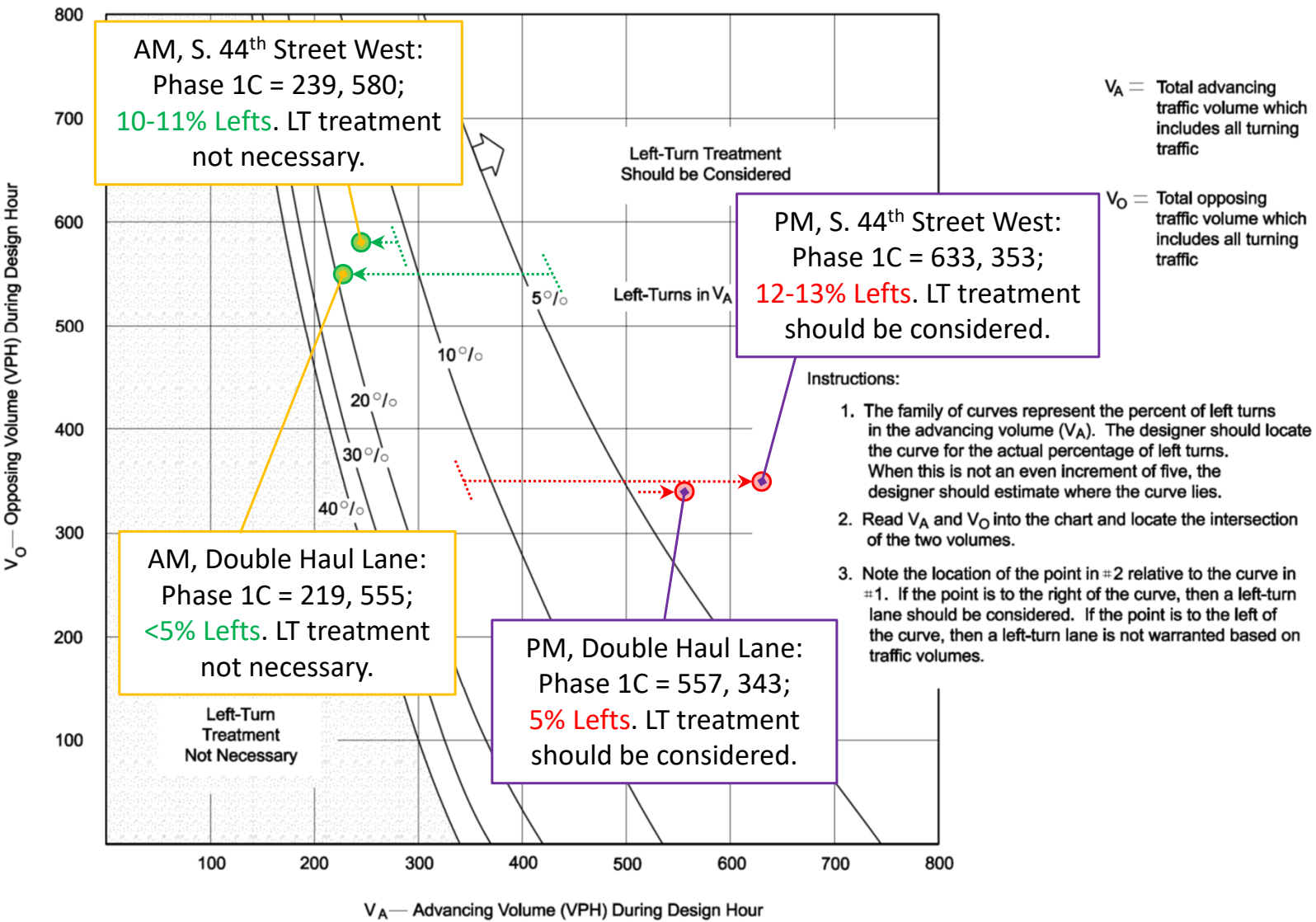
## VOLUME GUIDELINES FOR LEFT-TURN LANES AT UNSIGNALIZED INTERSECTIONS ON 2-LANE HIGHWAYS (45 MPH)

## Exhibit D-2. 2029 Phase 1B Left Turn Lane Chart



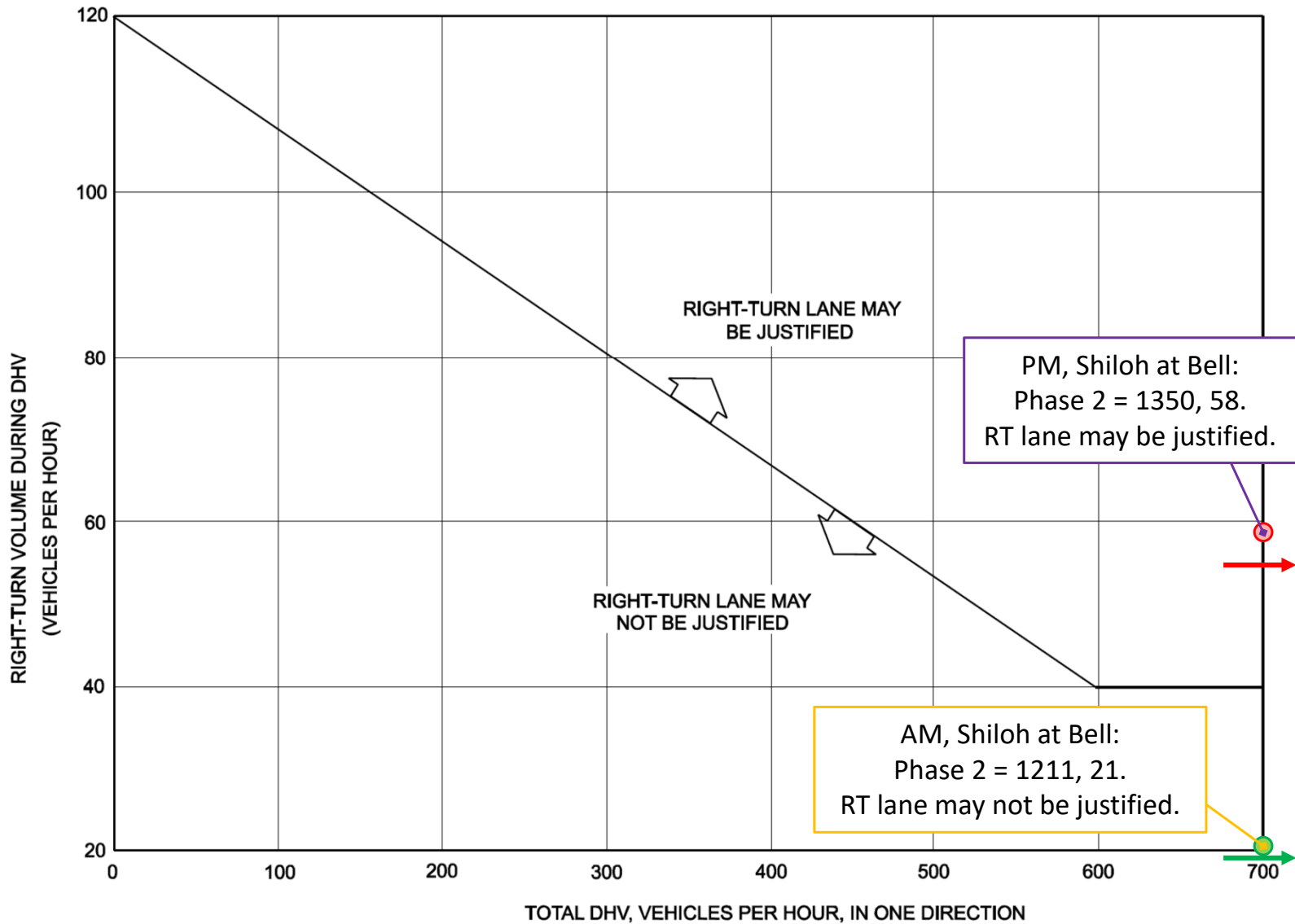
### VOLUME GUIDELINES FOR LEFT-TURN LANES AT UNSIGNALIZED INTERSECTIONS ON 2-LANE HIGHWAYS (45 MPH)

# Exhibit D-3. 2031 Phase 1C Left Turn Lane Chart



## VOLUME GUIDELINES FOR LEFT-TURN LANES AT UNSIGNALIZED INTERSECTIONS ON 2-LANE HIGHWAYS (45 MPH)

## Exhibit D-4. 2033 Phase 2 Right Turn Lane Chart



*Note: For highways with a design speed below 50 mph (80 km/h) with a DHV < 300 and where right turns are > 40, an adjustment should be used. To read the vertical axis of the chart, subtract 20 from the actual number of right turns.*

## **Appendix E: 44<sup>th</sup> at Central Avenue Intersection Signal Warrant Summaries**

**Traffic Signal Needs Analysis Summary: S 44th St W at Central Ave**

Scenario: <b>Completion of Phase 1A in 2027</b>	
Analysis Date: 8/13/2025	Conducted by: 406 Traffic & Transportation Consulting
Major Street: Central Ave (E/W), 1 moving lane per direction	Minor Street: S 44th St W (N/S), 1 moving lane per direction
Speed Limit: 45 mph	Number of Approaches: 3

**Traffic Volumes**

Hour:	1	2	3	4	5	6	7	8	9	10	11	12
Start Time:	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM
Central Ave Eastbound:	471	452	395	354	370	373	312	263	275	255	304	207
Central Ave Westbound:	179	178	194	215	272	323	317	316	391	425	502	345
S 44th St W Northbound:	28	23	16	14	14	14	15	16	15	18	19	16
Total Entering Volume:	678	653	605	583	656	710	644	595	681	698	825	568
TEV Rank:	5	7	9	11	6	2	8	10	4	3	1	12
Use for:							Warrant 1		Warrant 2		Warrant 3	
Major, Both Directions:	650	630	589	569	642	696	629	579	666	680	806	552
Minor, Higher Direction:	28	23	16	14	14	14	15	16	15	18	19	16

**Warrants**

												Met?	
1 Eight-Hour Vehicular Volume (either condition)	<i>Condition A: Large Volume of Intersecting Traffic</i>		Major (Both Dir.)		Minor (Higher Dir.)		<i>or Condition B: Interruption of Continuous Traffic</i>		Major (Both Dir.)		Minor (Higher Dir.)		
	Value	Minimum	Value	Minimum	Value	Minimum	Value	Minimum	Value	Minimum	Value	Minimum	Met?
	629	350 <sup>c</sup>	15	105 <sup>c</sup>	No		629	525 <sup>c</sup>	15	53 <sup>c</sup>	No		No
2 Four-Hour Vehicular Volume	<i>MUTCD Figure 4C-2 for speed over 40 mph</i>												
	Major (Both Dir.)		Minor (Higher Dir.)										
	Value	Minimum	Value	Minimum	Value	Minimum	Value	Minimum	Value	Minimum	Value	Minimum	Met?
	666	-	15	60	No								No
3 Peak Hour* (either condition)	<i>Condition A (must meet all three subconditions)</i>						<i>or Condition B (MUTCD Figure 4C-4)</i>						
			Value		Minimum		Major (Both Dir.)		Minor (Higher Dir.)				
			Value		Minimum		Value		Minimum		Value		Met?
	1. Veh-Hrs of Delay		0.1		4		No		806		N/A		No
	2. Minor Volume		19		100		No						
	3. Total Ent. Volume		825		650		Yes						No
4 Pedestrian Volume (either criterion)	<i>Criterion A: Four-hour (MUTCD Figure 4C-7)</i>						<i>or Criterion B: One Hour (MUTCD Figure 4C-8)</i>						
	Major (Both Dir.)		Pedestrians				Major (Both Dir.)		Pedestrians				
	Value	Minimum	Value	Minimum	Value	Minimum	Value	Minimum	Value	Minimum	Value	Minimum	Met?
	666				n/a		806				n/a		Not Evaluated
5 School Crossing	No students projected to cross the major street at this location.												No
6 Coordinated Signal System	Only one signal in the roadway network nearby.												No
7 Crash Experience ** Condition A not evaluated (all conditions)	<i>Condition B, 1-year Period (Table 4C-4)</i>						<i>and Condition C, 80% of Warrant 1 [Condition A]</i>						
	Angle+Ped Crashes		or Fatal+Injury		Angle+Ped		Major (Both Dir.)		Minor (Higher Dir.)				
	Value	Minimum	Value	Minimum	Value	Minimum	Value	Minimum	Value	Minimum	Value	Minimum	Met?
	n/a	4	n/a	3	n/a		629	15	n/a				n/a
	<i>or Condition B, 3-year Period (Table 4C-5)</i>						<i>or Condition C, 80% of Warrant 1 [Condition B]</i>						
	Angle+Ped Crashes		or Fatal+Injury		Angle+Ped		Major (Both Dir.)		Minor (Higher Dir.)				
	Value	Minimum	Value	Minimum	Value	Minimum	Value	Minimum	Value	Minimum	Value	Minimum	Met?
	n/a	6	n/a	4	n/a		629	15	n/a				n/a
							<i>or Condition C, 80% of Warrant 4</i>						
	Four Hour Ped		One Hour Ped				Value		Minimum		Value		Met?
													Not Evaluated
8 Roadway Network	Not an intersection of two or more major routes.												No
9 Intersection Near Grade Xing	No railroad grade crossing nearby.												No
	Warrants Met:											0	
	Recommendation: <b>No Signal</b>												

**Notes:**

- c: Warrant 1 minimum values used for "70%" to account to reflect major-street speed over 40 mph
- \* Warrant 3, Peak Hour, is indicated by the MUTCD as follows: "This signal warrant should be applied only in unusual cases, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time."
- \*\* No trial of alternatives with observance and enforcement has been attempted for crash reduction at this location.

**Traffic Signal Needs Analysis Summary: S 44th St W at Central Ave**

Scenario: <b>Completion of Phase 1B in 2029</b>	
Analysis Date: 8/13/2025	Conducted by: 406 Traffic & Transportation Consulting
Major Street: Central Ave (E/W), 1 moving lane per direction	Minor Street: S 44th St W (N/S), 1 moving lane per direction
Speed Limit: 45 mph	Number of Approaches: 3

**Traffic Volumes**

Hour:	1	2	3	4	5	6	7	8	9	10	11	12
Start Time:	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM
Central Ave Eastbound:	506	486	425	381	399	401	336	283	296	275	328	223
Central Ave Westbound:	199	200	217	241	304	360	353	353	440	480	566	392
S 44th St W Northbound:	62	48	34	27	29	29	29	33	30	34	38	33
Total Entering Volume:	767	734	676	649	732	790	718	669	766	789	932	648
TEV Rank:	4	6	9	11	7	2	8	10	5	3	1	12
Use for:	Warrant 2					Warrant 1			Warrant 3			
Major, Both Directions:	705	686	642	622	703	761	689	636	736	755	894	615
Minor, Higher Direction:	62	48	34	27	29	29	29	33	30	34	38	33

**Warrants**

												Met?	
1 Eight-Hour Vehicular Volume (either condition)	<i>Condition A: Large Volume of Intersecting Traffic</i>		Major (Both Dir.)		Minor (Higher Dir.)		<i>or Condition B: Interruption of Continuous Traffic</i>		Major (Both Dir.)		Minor (Higher Dir.)		
	Value	Minimum	Value	Minimum	Value	Minimum	Value	Minimum	Value	Minimum	Value	Minimum	Met?
	689	350 <sup>c</sup>	29	105 <sup>c</sup>		No	689	525 <sup>c</sup>	29	53 <sup>c</sup>		No	No
2 Four-Hour Vehicular Volume	<i>MUTCD Figure 4C-2 for speed over 40 mph</i>												
	Major (Both Dir.)		Minor (Higher Dir.)		Value		Minimum		Value		Minimum		Met?
	705	-	62	65		Yes							No
3 Peak Hour* (either condition)	<i>Condition A (must meet all three subconditions)</i>												
	Value		Minimum		Value		Minimum		Value		Minimum		Met?
	1. Veh-Hrs of Delay	0.1	4	No	894	N/A	38	75	No				No
	2. Minor Volume	38	100	No									No
	3. Total Ent. Volume	932	650	Yes									No
4 Pedestrian Volume (either criterion)	<i>Criterion A: Four-hour (MUTCD Figure 4C-7)</i>						<i>or Criterion B: One Hour (MUTCD Figure 4C-8)</i>						
	Major (Both Dir.)		Pedestrians		Value		Minimum		Value		Minimum		Met?
	705					n/a			894				n/a
5 School Crossing	No students projected to cross the major street at this location.												
6 Coordinated Signal System	Only one signal in the roadway network nearby.												
7 Crash Experience ** Condition A not evaluated (all conditions)	<i>Condition B, 1-year Period (Table 4C-4)</i>						<i>and Condition C, 80% of Warrant 1 [Condition A]</i>						
	Angle+Ped Crashes		or Fatal+Injury Angle+Ped		Value		Minimum		Value		Minimum		Met?
	n/a	4	n/a	3	n/a				689	29			n/a
	<i>or Condition B, 3-year Period (Table 4C-5)</i>						<i>or Condition C, 80% of Warrant 1 [Condition B]</i>						
	Angle+Ped Crashes		or Fatal+Injury Angle+Ped		Value		Minimum		Value		Minimum		Met?
	n/a	6	n/a	4	n/a				689	29			n/a
							<i>or Condition C, 80% of Warrant 4</i>						
	Four Hour Ped		One Hour Ped		Value		Minimum		Value		Minimum		Met?
													n/a
8 Roadway Network	Not an intersection of two or more major routes.												
9 Intersection Near Grade Xing	No railroad grade crossing nearby.												
	Warrants Met:											0	
	<b>Recommendation: No Signal</b>												

**Notes:**

- c: Warrant 1 minimum values used for "70%" to account to reflect major-street speed over 40 mph
- \* Warrant 3, Peak Hour, is indicated by the MUTCD as follows: "This signal warrant should be applied only in unusual cases, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time."
- \*\* No trial of alternatives with observance and enforcement has been attempted for crash reduction at this location.

**Traffic Signal Needs Analysis Summary: S 44th St W at Central Ave**

Scenario: <b>Completion of Phase 1C in 2031</b>	
Analysis Date: 8/13/2025	Conducted by: 406 Traffic & Transportation Consulting
Major Street: Central Ave (E/W), 1 moving lane per direction	Minor Street: S 44th St W (N/S), 1 moving lane per direction
Speed Limit: 45 mph	Number of Approaches: 3

**Traffic Volumes**

Hour:	1	2	3	4	5	6	7	8	9	10	11	12
Start Time:	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM
Central Ave Eastbound:	543	522	457	410	429	432	361	304	319	296	353	240
Central Ave Westbound:	219	221	239	266	335	396	388	390	487	532	626	436
S 44th St W Northbound:	87	68	48	38	41	41	41	46	42	48	54	47
Total Entering Volume:	849	811	744	714	805	869	790	740	848	876	1033	723
TEV Rank:	4	6	9	12	7	3	8	10	5	2	1	11
Use for:	Warrant 2					Warrant 1			Warrant 3			
Major, Both Directions:	762	743	696	676	764	828	749	694	806	828	979	676
Minor, Higher Direction:	87	68	48	38	41	41	41	46	42	48	54	47

**Warrants**

												Met?		
1 Eight-Hour Vehicular Volume (either condition)	<i>Condition A: Large Volume of Intersecting Traffic</i>		Major (Both Dir.)		Minor (Higher Dir.)		<i>or Condition B: Interruption of Continuous Traffic</i>		Major (Both Dir.)		Minor (Higher Dir.)			
	Value	Minimum	Value	Minimum	Value	Minimum	Value	Minimum	Value	Minimum	Value	Minimum	Met?	
	749	350 <sup>c</sup>	41	105 <sup>c</sup>			749	525 <sup>c</sup>	41	53 <sup>c</sup>			No	
2 Four-Hour Vehicular Volume	<i>MUTCD Figure 4C-2 for speed over 40 mph</i>													
	Major (Both Dir.)		Minor (Higher Dir.)											
	Value	Minimum	Value	Minimum	Value	Minimum	Value	Minimum	Value	Minimum	Value	Minimum	Met?	
	762	-	87	60									Yes	
3 Peak Hour* (either condition)	<i>Condition A (must meet all three subconditions)</i>						<i>or Condition B (MUTCD Figure 4C-4)</i>							
	1. Veh-Hrs of Delay		2. Minor Volume		3. Total Ent. Volume		Major (Both Dir.)		Minor (Higher Dir.)					
	Value	Minimum	Value	Minimum	Value	Minimum	Value	Minimum	Value	Minimum	Value	Minimum	Met?	
	0.2	4	54	100	1033	650	979	-	54	75			No	
4 Pedestrian Volume (either criterion)	<i>Criterion A: Four-hour (MUTCD Figure 4C-7)</i>						<i>or Criterion B: One Hour (MUTCD Figure 4C-8)</i>							
	Major (Both Dir.)		Pedestrians				Major (Both Dir.)		Pedestrians					
	Value	Minimum	Value	Minimum	Value	Minimum	Value	Minimum	Value	Minimum	Value	Minimum	Met?	
	762						979						n/a	
5 School Crossing	No students projected to cross the major street at this location.												No	
6 Coordinated Signal System	Only one signal in the roadway network nearby.												No	
7 Crash Experience ** Condition A not evaluated (all conditions)	<i>Condition B, 1-year Period (Table 4C-4)</i>						<i>and Condition C, 80% of Warrant 1 [Condition A]</i>							
	Angle+Ped Crashes		or Fatal+Injury Angle+Ped				Major (Both Dir.)		Minor (Higher Dir.)					
	Value	Minimum	Value	Minimum	Value	Minimum	Value	Minimum	Value	Minimum	Value	Minimum	Met?	
	n/a	4	n/a	3	n/a		749		41				n/a	
	<i>or Condition B, 3-year Period (Table 4C-5)</i>						<i>or Condition C, 80% of Warrant 1 [Condition B]</i>							
	Angle+Ped Crashes		or Fatal+Injury Angle+Ped				Major (Both Dir.)		Minor (Higher Dir.)					
	Value	Minimum	Value	Minimum	Value	Minimum	Value	Minimum	Value	Minimum	Value	Minimum	Met?	
	n/a	6	n/a	4	n/a		749		41				n/a	
							<i>or Condition C, 80% of Warrant 4</i>							
	Four Hour Ped		One Hour Ped				Value		Minimum		Value		Minimum	Met?
													n/a	
8 Roadway Network	Not an intersection of two or more major routes.												No	
9 Intersection Near Grade Xing	No railroad grade crossing nearby.												No	
													Warrants Met:	1
													<b>Recommendation:</b>	<b>No Signal</b>

**Notes:**

- c: Warrant 1 minimum values used for "70%" to account to reflect major-street speed over 40 mph
- \* Warrant 3, Peak Hour, is indicated by the MUTCD as follows: "This signal warrant should be applied only in unusual cases, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time."
- \*\* No trial of alternatives with observance and enforcement has been attempted for crash reduction at this location.

**Traffic Signal Needs Analysis Summary: S 44th St W at Central Ave**

Scenario: <b>Completion of Phase 2 in 2033</b>	
Analysis Date: 8/13/2025	Conducted by: 406 Traffic & Transportation Consulting
Major Street: Central Ave (E/W), 1 moving lane per direction	Minor Street: S 44th St W (N/S), 1 moving lane per direction
Speed Limit: 45 mph	Number of Approaches: 3

**Traffic Volumes**

Hour:	1	2	3	4	5	6	7	8	9	10	11	12
Start Time:	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM
Central Ave Eastbound:	610	596	527	481	500	503	431	366	389	369	430	306
Central Ave Westbound:	251	266	258	264	301	325	461	461	574	628	728	521
S 44th St W Northbound:	106	83	59	48	50	52	52	58	54	62	67	58
Total Entering Volume:	967	945	844	793	851	880	944	885	1017	1059	1225	885
TEV Rank:	4	5	11	12	10	9	6	7	3	2	1	8
Use for:	Warrant 2										Warrant 3	Warrant 1
Major, Both Directions:	861	862	785	745	801	828	892	828	963	997	1158	827
Minor, Higher Direction:	106	83	59	48	50	52	52	58	54	62	67	58

**Warrants**

												Met?
1 Eight-Hour Vehicular Volume (either condition)	<i>Condition A: Large Volume of Intersecting Traffic</i>		<i>or Condition B: Interruption of Continuous Traffic</i>									
	Major (Both Dir.)	Minor (Higher Dir.)	Major (Both Dir.)	Minor (Higher Dir.)								
	Value	Minimum	Value	Minimum	Met?	Value	Minimum	Value	Minimum	Met?		
	827	350 <sup>c</sup>	58	105 <sup>c</sup>	No	827	525 <sup>c</sup>	58	53 <sup>c</sup>	Yes		Yes
2 Four-Hour Vehicular Volume	<i>MUTCD Figure 4C-2 for speed over 40 mph</i>											
	Major (Both Dir.)	Minor (Higher Dir.)										
	Value	Minimum	Value	Minimum	Met?							
	861	-	106	60	Yes							Yes
3 Peak Hour* (either condition)	<i>Condition A (must meet all three subconditions)</i>					<i>or Condition B (MUTCD Figure 4C-4)</i>						
			Value	Minimum	Met?	Major (Both Dir.)	Minor (Higher Dir.)					
			Value	Minimum	Met?	Value	Minimum	Value	Minimum	Met?		
	1. Veh-Hrs of Delay		0.3	4		1158	-	67	75	No		
	2. Minor Volume		67	100	No							
	3. Total Ent. Volume		1225	650	Yes							No
4 Pedestrian Volume (either criterion)	<i>Criterion A: Four-hour (MUTCD Figure 4C-7)</i>					<i>or Criterion B: One Hour (MUTCD Figure 4C-8)</i>						
	Major (Both Dir.)	Pedestrians				Major (Both Dir.)	Pedestrians					
	Value	Minimum	Value	Minimum	Met?	Value	Minimum	Value	Minimum	Met?		
	861				n/a	1158				n/a		Not Evaluated
5 School Crossing	No students projected to cross the major street at this location.											No
6 Coordinated Signal System	Only one signal in the roadway network nearby.											No
7 Crash Experience ** Condition A not evaluated (all conditions)	<i>Condition B, 1-year Period (Table 4C-4)</i>					<i>and Condition C, 80% of Warrant 1 [Condition A]</i>						
	Angle+Ped Crashes	or Fatal+Injury	Angle+Ped			Major (Both Dir.)	Minor (Higher Dir.)					
	Value	Minimum	Value	Minimum	Met?	Value	Minimum	Value	Minimum	Met?		
	n/a	4	n/a	3	n/a	827		58		n/a		
	<i>or Condition B, 3-year Period (Table 4C-5)</i>					<i>or Condition C, 80% of Warrant 1 [Condition B]</i>						
	Angle+Ped Crashes	or Fatal+Injury	Angle+Ped			Major (Both Dir.)	Minor (Higher Dir.)					
	Value	Minimum	Value	Minimum	Met?	Value	Minimum	Value	Minimum	Met?		
	n/a	6	n/a	4	n/a	827		58		n/a		
						<i>or Condition C, 80% of Warrant 4</i>						
	Four Hour Ped		One Hour Ped			Value	Minimum	Value	Minimum	Met?		
										n/a		Not Evaluated
8 Roadway Network	Not an intersection of two or more major routes.											No
9 Intersection Near Grade Xing	No railroad grade crossing nearby.											No

Warrants Met: **2**  
**Recommendation: Consider Signal**

**Notes:**

- c: Warrant 1 minimum values used for "70%" to account to reflect major-street speed over 40 mph
- \* Warrant 3, Peak Hour, is indicated by the MUTCD as follows: "This signal warrant should be applied only in unusual cases, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time."
- \*\* No trial of alternatives with observance and enforcement has been attempted for crash reduction at this location.

## **Appendix F: Intersection Cost Participation Calculations**

**City of Billings Intersection Cost Participation Worksheet: Clearwater/44 West Phase 1A + Phase 2 Retail**

**1: Central at 48th**

Lane Group (critical)	Lanes	AM Peak Hour		PM Peak Hour	
		Vproject	Per Lane	Vproject	Per Lane
EB T	1	3	3	10	10
WB L	1	1	1	1	1
WB T	1	5	5	8	8
EB L	1	No project traffic			
NB T	1	No project traffic			
SB L	1	0	0	2	2
SB T	1	No project traffic			
NB L	1	No project traffic			
Project Critical Lane Volume		5		13	
Critical Lane Capacity		1200		1200	
% Increase		0.4%		1.1%	
Max % Increase		1.1%			

**2: Shiloh at Broadwater**

Lane Group (critical)	Lanes	AM Peak Hour		PM Peak Hour	
		Vproject	Per Lane	Vproject	Per Lane
EB T	1	No project traffic			
WB L	1	2	2	6	6
WB T	1	No project traffic			
EB L	1	No project traffic			
NB T	2	19	10	26	13
SB L	1	No project traffic			
SB T	2	12	6	32	16
NB L	1	No project traffic			
Project Critical Lane Volume		12		22	
Critical Lane Capacity		1140		1140	
% Increase		1.1%		1.9%	
Max % Increase		1.9%			

**3: Shiloh at Central**

Lane Group (critical)	Lanes	AM Peak Hour		PM Peak Hour	
		Vproject	Per Lane	Vproject	Per Lane
EB T	2	23	12	32	16
WB L	1	No project traffic			
WB T	2	14	7	38	19
EB L	1	23	23	32	32
NB T	2	No project traffic			
SB L	1	No project traffic			
SB T	2	No project traffic			
NB L	1	14	14	38	38
Project Critical Lane Volume		44		89	
Critical Lane Capacity		1200		1200	
% Increase		3.7%		7.4%	
Max % Increase		7.4%			

**5: Shiloh at Monad**

Lane Group (critical)	Lanes	AM Peak Hour		PM Peak Hour	
		Vproject	Per Lane	Vproject	Per Lane
EB T	1	No project traffic			
WB L	1	No project traffic			
WB T	1	No project traffic			
EB L	1	No project traffic			
NB T	2	12	6	32	16
SB L	1	4	4	5	5
SB T	2	19	10	26	13
NB L	1	No project traffic			
Project Critical Lane Volume		10		21	
Critical Lane Capacity		1200		1200	
% Increase		0.8%		1.8%	
Max % Increase		1.8%			

**6: West Central Ave Site Access (Double Haul Lane)**

Lane Group (critical)	Lanes	AM Peak Hour		PM Peak Hour	
		Vproject	Per Lane	Vproject	Per Lane
EB T	1	1	1	2	2
WB L	1	34	34	86	86
WB T	1	2	2	1	1
EB L	0	No project traffic			
NB T	0	No project traffic			
SB L	0	No project traffic			
SB T	0	No project traffic			
NB L	1	6	6	10	10
Project Critical Lane Volume		41		98	
Critical Lane Capacity		1140		1140	
% Increase		3.6%		8.6%	
Max % Increase		8.6%			

**7: East Central Ave Site Access (S. 44th St W.)**

Lane Group (critical)	Lanes	AM Peak Hour		PM Peak Hour	
		Vproject	Per Lane	Vproject	Per Lane
EB T	1	43	43	76	76
WB L	1	9	9	28	28
WB T	1	34	34	86	86
EB L	1	No project traffic			
NB T	1	No project traffic			
SB L	1	No project traffic			
SB T	1	No project traffic			
NB L	1	2	2	1	1
Project Critical Lane Volume		54		105	
Critical Lane Capacity		1140		1140	
% Increase		4.7%		9.2%	
Max % Increase		9.2%			

**City of Billings Intersection Cost Participation Worksheet: Clearwater Phase 1B**

**1: Central at 48th**

Lane Group (critical)	Lanes	AM Peak Hour		PM Peak Hour	
		Vproject	Per Lane	Vproject	Per Lane
EB T	1	1	1	2	2
WB L	1	No project traffic			
WB T	1	2	2	1	1
EB L	1	No project traffic			
NB T	1	No project traffic			
SB L	1	0	0	1	1
SB T	1	No project traffic			
NB L	1	No project traffic			
Project Critical Lane Volume		2		3	
Critical Lane Capacity		1200		1200	
% Increase		0.2%		0.3%	
Max % Increase		0.3%			

**2: Shiloh at Broadwater**

Lane Group (critical)	Lanes	AM Peak Hour		PM Peak Hour	
		Vproject	Per Lane	Vproject	Per Lane
EB T	1	No project traffic			
WB L	1	0	0	2	2
WB T	1	No project traffic			
EB L	1	No project traffic			
NB T	2	7	4	5	3
SB L	1	No project traffic			
SB T	2	2	1	8	4
NB L	1	No project traffic			
Project Critical Lane Volume		4		6	
Critical Lane Capacity		1140		1140	
% Increase		0.4%		0.5%	
Max % Increase		0.5%			

**3: Shiloh at Central**

Lane Group (critical)	Lanes	AM Peak Hour		PM Peak Hour	
		Vproject	Per Lane	Vproject	Per Lane
EB T	2	9	5	6	3
WB L	1	No project traffic			
WB T	2	3	2	9	5
EB L	1	9	9	6	6
NB T	2	No project traffic			
SB L	1	No project traffic			
SB T	2	No project traffic			
NB L	1	3	3	9	9
Project Critical Lane Volume		14		20	
Critical Lane Capacity		1200		1200	
% Increase		1.2%		1.7%	
Max % Increase		1.7%			

**5: Shiloh at Monad**

Lane Group (critical)	Lanes	AM Peak Hour		PM Peak Hour	
		Vproject	Per Lane	Vproject	Per Lane
EB T	1	No project traffic			
WB L	1	No project traffic			
WB T	1	No project traffic			
EB L	1	No project traffic			
NB T	2	2	1	8	4
SB L	1	1	1	1	1
SB T	2	7	4	5	3
NB L	1	No project traffic			
Project Critical Lane Volume		4		5	
Critical Lane Capacity		1200		1200	
% Increase		0.3%		0.4%	
Max % Increase		0.4%			

**6: West Central Ave Site Access (Double Haul Lane)**

Lane Group (critical)	Lanes	AM Peak Hour		PM Peak Hour	
		Vproject	Per Lane	Vproject	Per Lane
EB T	1	0	0	2	2
WB L	1	No project traffic			
WB T	1	1	1	1	1
EB L	0	No project traffic			
NB T	0	No project traffic			
SB L	0	No project traffic			
SB T	0	No project traffic			
NB L	1	1	1	1	1
Project Critical Lane Volume		2		3	
Critical Lane Capacity		1140		1140	
% Increase		0.2%		0.3%	
Max % Increase		0.3%			

**7: East Central Ave Site Access (S. 44th St W.)**

Lane Group (critical)	Lanes	AM Peak Hour		PM Peak Hour	
		Vproject	Per Lane	Vproject	Per Lane
EB T	1	No project traffic			
WB L	1	9	9	28	28
WB T	1	No project traffic			
EB L	1	No project traffic			
NB T	1	No project traffic			
SB L	1	No project traffic			
SB T	1	No project traffic			
NB L	1	1	1	1	1
Project Critical Lane Volume		10		29	
Critical Lane Capacity		1140		1140	
% Increase		0.9%		2.5%	
Max % Increase		2.5%			

**City of Billings Intersection Cost Participation Worksheet: Clearwater Phase 1C**

**1: Central at 48th**

Lane Group (critical)	Lanes	AM Peak Hour		PM Peak Hour	
		Vproject	Per Lane	Vproject	Per Lane
EB T	1	1	1	2	2
WB L	1	0	0	0	0
WB T	1	2	2	1	1
EB L	1	No project traffic			
NB T	1	No project traffic			
SB L	1	0	0	0	0
SB T	1	No project traffic			
NB L	1	No project traffic			
Project Critical Lane Volume		2		2	
Critical Lane Capacity		1200		1200	
% Increase		0.2%		0.2%	
Max % Increase		0.2%			

**2: Shiloh at Broadwater**

Lane Group (critical)	Lanes	AM Peak Hour		PM Peak Hour	
		Vproject	Per Lane	Vproject	Per Lane
EB T	1	No project traffic			
WB L	1	0	0	1	1
WB T	1	No project traffic			
EB L	1	No project traffic			
NB T	2	6	3	4	2
SB L	1	No project traffic			
SB T	2	2	1	6	3
NB L	1	No project traffic			
Project Critical Lane Volume		3		4	
Critical Lane Capacity		1140		1140	
% Increase		0.3%		0.4%	
Max % Increase		0.4%			

**3: Shiloh at Central**

Lane Group (critical)	Lanes	AM Peak Hour		PM Peak Hour	
		Vproject	Per Lane	Vproject	Per Lane
EB T	2	7	4	5	3
WB L	1	No project traffic			
WB T	2	2	1	8	4
EB L	1	7	7	5	5
NB T	2	No project traffic			
SB L	1	No project traffic			
SB T	2	No project traffic			
NB L	1	2	2	8	8
Project Critical Lane Volume		10		17	
Critical Lane Capacity		1200		1200	
% Increase		0.8%		1.4%	
Max % Increase		1.4%			

**5: Shiloh at Monad**

Lane Group (critical)	Lanes	AM Peak Hour		PM Peak Hour	
		Vproject	Per Lane	Vproject	Per Lane
EB T	1	No project traffic			
WB L	1	No project traffic			
WB T	1	No project traffic			
EB L	1	No project traffic			
NB T	2	2	1	6	3
SB L	1	1	1	1	1
SB T	2	6	3	4	2
NB L	1	No project traffic			
Project Critical Lane Volume		3		4	
Critical Lane Capacity		1200		1200	
% Increase		0.3%		0.3%	
Max % Increase		0.3%			

**6: West Central Ave Site Access (Double Haul Lane)**

Lane Group (critical)	Lanes	AM Peak Hour		PM Peak Hour	
		Vproject	Per Lane	Vproject	Per Lane
EB T	1	1	1	2	2
WB L	1	No project traffic			
WB T	1	2	2	1	1
EB L	0	No project traffic			
NB T	0	No project traffic			
SB L	0	No project traffic			
SB T	0	No project traffic			
NB L	1	0	0	0	0
Project Critical Lane Volume		2		2	
Critical Lane Capacity		1140		1140	
% Increase		0.2%		0.2%	
Max % Increase		0.2%			

**7: East Central Ave Site Access (S. 44th St W.)**

Lane Group (critical)	Lanes	AM Peak Hour		PM Peak Hour	
		Vproject	Per Lane	Vproject	Per Lane
EB T	1	No project traffic			
WB L	1	7	7	23	23
WB T	1	No project traffic			
EB L	1	No project traffic			
NB T	1	No project traffic			
SB L	1	No project traffic			
SB T	1	No project traffic			
NB L	1	2	2	1	1
Project Critical Lane Volume		9		24	
Critical Lane Capacity		1140		1140	
% Increase		0.8%		2.1%	
Max % Increase		2.1%			

**City of Billings Intersection Cost Participation Worksheet: Clearwater Phase 2 (residential only, no retail)**

**1: Central at 48th**

Lane Group (critical)	Lanes	AM Peak Hour		PM Peak Hour	
		Vproject	Per Lane	Vproject	Per Lane
EB T	1	2	2	5	5
WB L	1	1	1	1	1
WB T	1	5	5	3	3
EB L	1	No project traffic			
NB T	1	No project traffic			
SB L	1	0	0	1	1
SB T	1	No project traffic			
NB L	1	No project traffic			
Project Critical Lane Volume		5		7	
Critical Lane Capacity		1200		1200	
% Increase		0.4%		0.6%	
Max % Increase		0.6%			

**2: Shiloh at Broadwater**

Lane Group (critical)	Lanes	AM Peak Hour		PM Peak Hour	
		Vproject	Per Lane	Vproject	Per Lane
EB T	1	No project traffic			
WB L	1	1	1	4	4
WB T	1	No project traffic			
EB L	1	No project traffic			
NB T	2	16	8	11	6
SB L	1	No project traffic			
SB T	2	5	3	19	10
NB L	1	No project traffic			
Project Critical Lane Volume		9		14	
Critical Lane Capacity		1140		1140	
% Increase		0.8%		1.2%	
Max % Increase		1.2%			

**3: Shiloh at Central**

Lane Group (critical)	Lanes	AM Peak Hour		PM Peak Hour	
		Vproject	Per Lane	Vproject	Per Lane
EB T	2	20	10	13	7
WB L	1	3	3	11	11
WB T	2	3	2	11	6
EB L	1	20	20	13	13
NB T	2	No project traffic			
SB L	1	No project traffic			
SB T	2	4	2	14	7
NB L	1	4	4	14	14
Project Critical Lane Volume		28		40	
Critical Lane Capacity		1200		1200	
% Increase		2.3%		3.3%	
Max % Increase		3.3%			

**5: Shiloh at Monad**

Lane Group (critical)	Lanes	AM Peak Hour		PM Peak Hour	
		Vproject	Per Lane	Vproject	Per Lane
EB T	1	No project traffic			
WB L	1	No project traffic			
WB T	1	No project traffic			
EB L	1	No project traffic			
NB T	2	5	3	19	10
SB L	1	3	3	2	2
SB T	2	16	8	11	6
NB L	1	No project traffic			
Project Critical Lane Volume		8		12	
Critical Lane Capacity		1200		1200	
% Increase		0.7%		1.0%	
Max % Increase		1.0%			

**6: West Central Ave Site Access (Double Haul Lane)**

Lane Group (critical)	Lanes	AM Peak Hour		PM Peak Hour	
		Vproject	Per Lane	Vproject	Per Lane
EB T	1	1	1	3	3
WB L	1	5	5	17	17
WB T	1	3	3	2	2
EB L	0	No project traffic			
NB T	0	No project traffic			
SB L	0	No project traffic			
SB T	0	No project traffic			
NB L	1	4	4	3	3
Project Critical Lane Volume		10		23	
Critical Lane Capacity		1140		1140	
% Increase		0.9%		2.0%	
Max % Increase		2.0%			

**7: East Central Ave Site Access (S. 44th St W.)**

Lane Group (critical)	Lanes	AM Peak Hour		PM Peak Hour	
		Vproject	Per Lane	Vproject	Per Lane
EB T	1	20	20	13	13
WB L	1	5	5	17	17
WB T	1	5	5	17	17
EB L	1	No project traffic			
NB T	1	No project traffic			
SB L	1	No project traffic			
SB T	1	No project traffic			
NB L	1	3	3	2	2
Project Critical Lane Volume		28		32	
Critical Lane Capacity		1140		1140	
% Increase		2.5%		2.8%	
Max % Increase		2.8%			