



250 RIO Office Project

Traffic Impact Study

North-East Corner of Rio Salado Parkway
and Ash Avenue in Tempe, Arizona

June 2021
CivTech Project No. 18-0770

Prepared for:

Hines

2375 E. Camelback Rd. Suite 150
Phoenix, Arizona 85016

Submittal to:

City of Tempe

By:



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EXECUTIVE SUMMARY

The 250 Rio Office Project, is proposed for the northeast corner of Rio Salado Parkway and Ash Avenue in the City of Tempe, immediately west of Luis Gonzales Field and Tempe Beach Park. The project is proposed to include 216,000 square feet of office space on 8 floors constructed above a 6-level parking structure. The project will also provide 4,500 square feet of commercial space. The site is adjacent to a roundabout planned by the City of Tempe for the intersection of Rio Salado Parkway and Ash Avenue

Access to the site will be provided at two driveways on Rio Salado Parkway north of the intersection with 1st Street. This study analyzes the traffic impact of the proposed development on the surrounding street network.

The following conclusions and recommendations have been documented in this study:

Existing Conditions

- The results of the existing analyses indicate all study intersections operate with overall LOS D or better in the existing conditions. All study intersections operate with an LOS D or better in each approach in the existing conditions.

Future Conditions

- By opening year 2021, the proposed development will generate approximately 222 trips (177 in/45 out) during the AM peak hour and 231 trips (59 in/172 out) during the PM peak hour.
- The results of the intersection capacity analyses indicate that, for opening year 2021 and horizon year 2026, all study intersections could operate with overall LOS D or better in the background and total scenarios.

Preliminary Signal Needs Assessment – Rio Salado Parkway & Access A

- It could be concluded from a preliminary traffic signal needs assessment that a signal could be warranted at the intersection of **Rio Salado Parkway and Access A** with the opening of the project; as explained in the text, CivTech recommends that traffic at the intersection should be monitored in the future and that a full signal warrant be conducted after opening of the development.

Queue Storage

- Queuing analysis was prepared according to the methodology documented in *AASHTO's A Policy on Geometric Design of Highways and Streets*. The study intersections were analyzed to determine the left-turn and right-turn storage needed to accommodate the expected traffic volumes in the 2026 horizon year.

Sight Distance

- The site design engineer should ensure that adequate sight distance is provided at the intersections to allow safe left and right-turning movements from the development. Landscaping should be maintained at a maximum of three feet in height. Tree branches lower than seven feet should be trimmed to meet current acceptable landscape requirements while maintaining sight distance.

INTRODUCTION

The 250 Rio Office Project, is proposed for the northeast corner of Rio Salado Parkway and Ash Avenue in the City of Tempe, immediately west of Luis Gonzales Field and Tempe Beach Park. The project is proposed to include 216,000 square feet of office space on 8 floors constructed above a 6-floor parking structure. The project will also include 4,500 square feet of commercial space and a lobby on the second floor.

This study analyzes the traffic impact of the proposed development on the surrounding street network. Access to the site will be provided at two driveways on Rio Salado Parkway north of the intersection with 1st Street. A location map of the study area is provided in **Figure 1**.

CivTech Inc. has been retained by Hines to perform the traffic impact study for the proposed development during the planning process to determine the roadway improvements, such as intersection lane configurations, intersection traffic control, turn lane storage requirements, and roadway typical sections, necessary for the successful completion of the project.

STUDY REQUIREMENTS

This traffic impact study was prepared in accordance with the requirements of the City of Tempe Transportation Division's "Policy for Traffic Impact Studies" as revised in October 2019. According to these procedures the proposed development warrants a Level 2 Transportation Impact Study. This study includes the following intersections:

- (1) Ash Avenue and Rio Salado Parkway/1st Street
- (2) Mill Avenue and Rio Salado Parkway
- (3) Ash Avenue and 3rd Street
- (A) Rio Salado Parkway and Access A
- (B) Rio Salado Parkway and Access B

HORIZON YEAR AND ANALYSIS PERIODS

The City of Tempe requires a Level 2 Transportation Impact Study to consider AM and PM peak hour traffic conditions at all study intersections for the opening year (2021) and for a horizon year (2026) five years after opening.

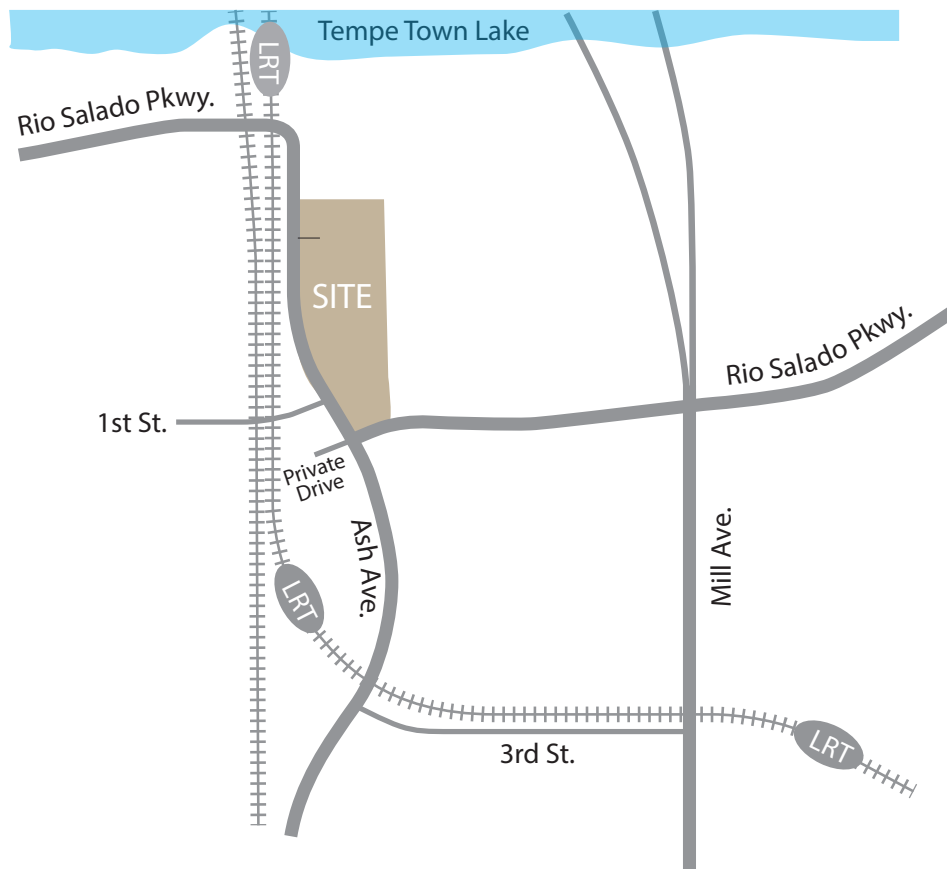
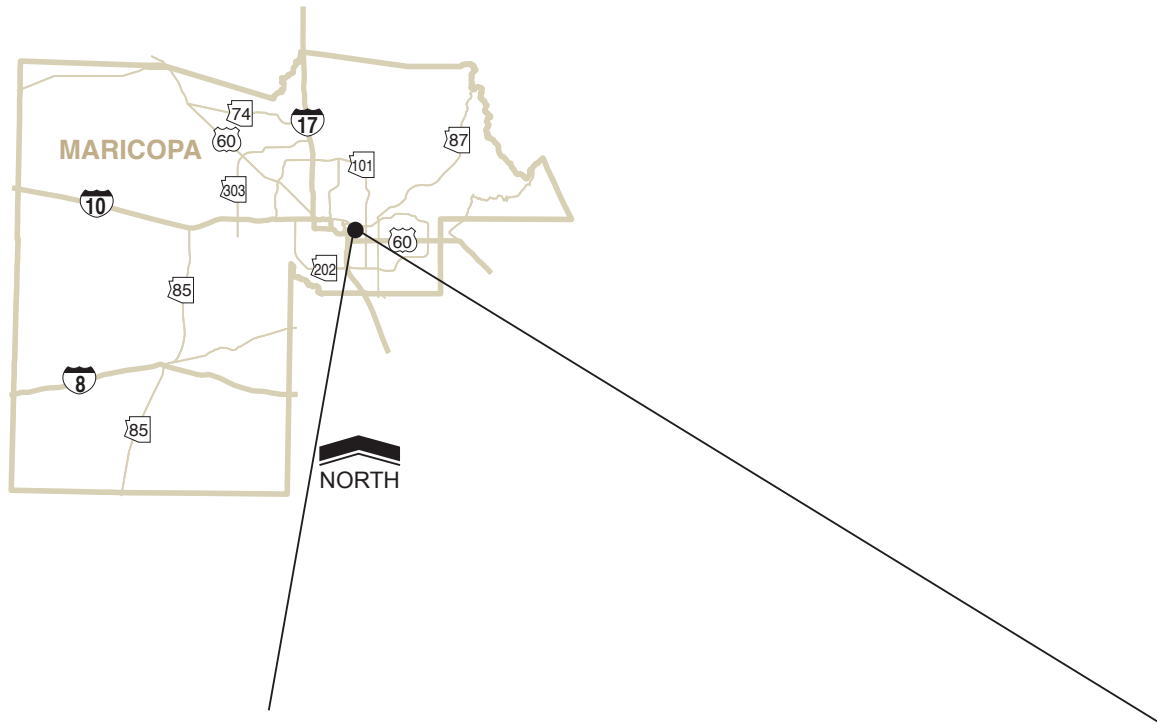


Figure 1: Vicinity Map

EXISTING CONDITIONS

SURROUNDING LAND USE

The 250 Rio Office project site is currently a parcel of land containing an office building on the northeast corner of Rio Salado Parkway and Ash Avenue. The site is directly west of Luis Gonzales Field and Tempe Beach Park. The site is bordered by the Tempe Beach Park parking lot on the north.

South of the site, south of Rio Salado Parkway are office buildings. West of the site, west of Rio Salado Parkway are light rail tracks, heavy rail tracks, and residential land. Southwest of the site, west of Ash Avenue are commercial buildings including historic sites.

ROADWAY NETWORK

The existing roadway network within the study area includes Rio Salado Parkway, Ash Avenue, 1st Street, 3rd Street, and Mill Avenue.

Rio Salado Parkway is an east-west minor arterial roadway. This road is a four (4) lane road, two (2) lanes in each direction with a raised center median. The road begins at Country Club Drive in Mesa and continues west for approximately eight (8) miles until it transitions into 52nd Street. The posted speed limit is 35 mph. The road is the east and north leg of the intersection Ash Avenue and Rio Salado Parkway. In the vicinity of the site the Tempe Streetcar operates in the westbound travel lane.

Ash Avenue is a north-south collector road located west and south of the proposed site. It is a two (2) lane road with one (1) lane in each direction and a center two way left-turn lane (TWLTL). The TWLTL is only present on Ash Avenue north of University Drive. There are designated bicycle lanes on either side of the road, and on street parking on either side of the road. The posted speed limit is 30 mph. In the vicinity of the site the Tempe Streetcar operated in the adjacent to the roadway.

1st Street is an east-west collector road. It is a two (2) lane road, with one (1) lane in each direction. There is on street parking on either side of the roadway as well as one bicycle lane on either side of the road. The road begins in the east at Rio Salado Parkway 130 feet north of the intersection of Ash Avenue and Rio Salado Parkway. The road terminates in the west at Rio Salado Parkway 525 feet east of the intersection of Priest Drive and Rio Salado Parkway. The posted speed limit is 35 mph.

3rd Street is an east/west collector road. It is a two (2) lane road, with one (1) lane in each direction. The road extends two blocks between Mill and Ash Avenues with on-street parallel parking along its south side and the light rail tracks along its north side. A speed limit is not posted.

Mill Avenue is north/south arterial roadway. This section of Mill Avenue starts approximately 1/2-mile south of Baseline Road and travels generally north until transitioning into Van Buren Street north of Curry Road. North of 7th Street, Mill Avenue consists of one (1) northbound lane and one (1) southbound lane, separated by a raised median and has bike lanes in both directions. Between 7th Street and University Drive, Mill Avenue consists of one (1) northbound lane and two (2) southbound lanes, separated by a raised median and has bike lanes in both directions. South of University Drive, Mill Avenue has one (1) northbound lane and three (3) southbound lanes, separated by a TWLTL and has bicycle lanes in both directions. Mill Avenue has a posted speed limit of 30 mph within the vicinity of

the site. Mill Avenue provides access to US-60 (Superstition Freeway). Within the vicinity of the site, Mill Avenue provides bus stops for Tempe Orbits: Earth, Mercury, Jupiter and Venus. In the vicinity of the site the Tempe Streetcar operated in the northbound travel lane.

INTERSECTION CONFIGURATIONS AND TRAFFIC CONTROLS

The intersection of **Ash Avenue and Rio Salado Parkway/1st Street** is a roundabout intersection. The northbound Ash Avenue approach consists of one (1) shared through lane. The southbound Rio Salado Parkway approach consists of an exclusive left-turn lane, and an all-movement lane. The westbound Rio Salado Parkway approach consists of one (1) shared through/left-turn lane, a dedicated right-turn lane. The eastbound approach is an offset that consists of a single right-turn lane that provides access to all movements and a bike lane. Directly across from the westbound approach of Rio Salado Parkway on the eastbound approach is a private driveway that is not considered in the analysis. Exiting the roundabout, there is a left-turn storage bay for the northbound left movement onto 1st Street with approximately 55 feet of storage space. There are signalized pedestrian cross walks on all approaches.

The intersection of **Mill Avenue and Rio Salado Parkway** is a signalized four-legged intersection with protected left-turn phasing on all approaches and permitted overlap right-turn phasing on the northbound and westbound approaches. The eastbound approach consists of an exclusive left-turn lane, a through lane, and a shared through/right-turn lane. The westbound approach consists of an exclusive left-turn lane, two (2) through lanes, a bike lane, and a dedicated right-turn lane. The northbound approach consists of an exclusive left-turn lane, a through lane, and a shared through/right-turn lane. The southbound approach consists of an exclusive left-turn lane, a through lane, a bike lane, and a dedicated right-turn lane. In the northbound approach, the streetcar shares the right travel lane but before approaching the intersection, it exits into its own dedicated right-turn lane. There are signalized pedestrian cross walks on all four legs.

The intersection of **Ash Avenue and 3rd Street** is a signalized four-legged intersection with no protected movements. The northbound and southbound approaches each consist of an exclusive left-turn lane, a shared through/right-turn lane, and a bike lane. The westbound approach consists of an exclusive left-turn lane, and a shared through/right-turn lane. The eastbound approach is a private driveway with an exclusive left-turn lane and a shared through/right-turn lane. There are signalized pedestrian crosswalks on all four legs.

The intersection of **Rio Salado Parkway and Park Driveway** is an un-signalized three-legged intersection with stop control in the westbound movement. The northbound approach consists of a through lane and a shared through/right-turn lane. The southbound approach consists of an exclusive left-turn lane, and two (2) through lanes. The westbound approach consists of an exclusive left-turn lane, and a dedicated right-turn lane.

BIKE, PEDESTRIAN, AND TRANSIT FACILITIES

Bikeways

Tempe has had a long-standing commitment to encourage bicycling since the inception of the Tempe Bicycle Program. The majority of the roadways within this study have dedicated bicycle lanes in both directions of traffic.

Pedestrians

Tempe's pedestrian network includes sidewalks, walkways, and multi-use paths. Within the vicinity of the site, Rio Salado Parkway has sidewalks on both sides of the street. Crosswalks are striped in all directions at the Mill Ave/Rio Salado Parkway, Ash Ave/Rio Salado Parkway/1st Street, and Ash Ave/3rd Street intersections and the traffic signals provide walk signals.

Transit

Valley Metro bus stops are located on Ash Avenue south of Rio Salado Parkway, Ash Avenue south of 3rd Street and Mill Avenue south of Rio Salado Parkway. The nearest light rail site is within a quarter mile of the site at Mill Ave and 3rd Street.

Streetcar

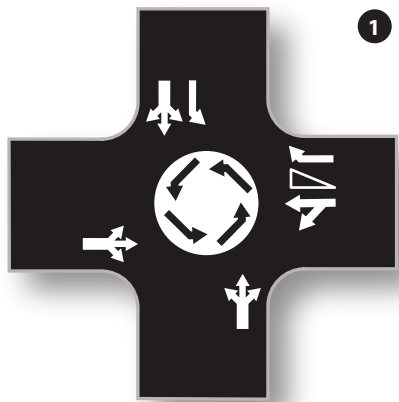
Streetcar stops are located on Ash Avenue south of 3rd Street, Mill Avenue and 3rd Street, Rio Salado Parkway and Tempe Beach Park, and University Drive and Ash Avenue. The streetcar is expected to begin operating in 2021.

The existing lane configurations and lane control within the study area are shown on **Figure 2**.

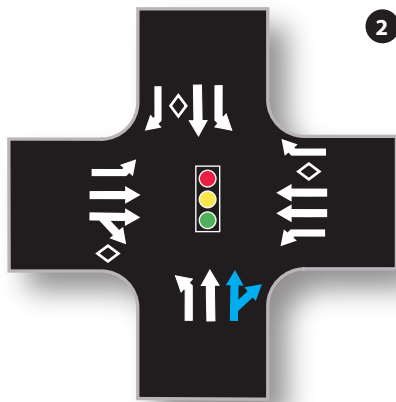
TRAFFIC VOLUMES

CivTech contracted Field Data Services of Arizona, Inc. to provide turning movement counts in 2015 between 7:00 AM and 9:00 AM and 4:00 PM and 6:00 PM during an average weekday for Ash Avenue and 3rd Street. Field Data Services of Arizona, Inc. was again contracted to provide turning movement counts in 2018 between 7:00 AM and 9:00 AM and 4:00 PM and 6:00 PM during an average weekday for the intersections of Mill Avenue & Rio Salado Parkway and Ash Avenue & Rio Salado Parkway. Field Data Services of Arizona, Inc. was contracted for a third time to provide turning movements counts in 2021 for the intersection of Ash Avenue and 1st Street. An internal count was conducted in 2021 for the intersection of Rio Salado Parkway and park driveway. A COVID adjustment factor of +20% was applied to the study intersections counted in 2021. The remaining intersections were grown to 2021 values with a growth factor of 1.061% for 2018 counts and 1.126% for 2015 counts.

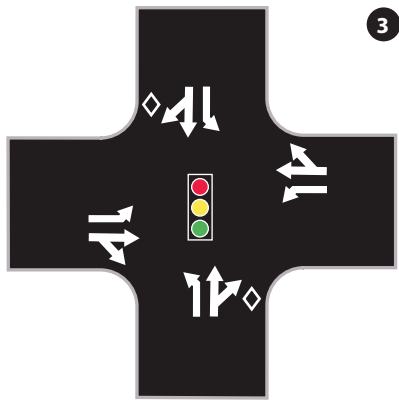
The traffic volumes counted at the intersection of Rio Salado Parkway and 1st Street and at the intersection of Ash Avenue and Rio Salado Parkway was used to establish existing 2021 counts at the roundabout of Ash Avenue and Rio Salado Parkway/1st Street. Study intersection through movements were balanced after being grown to 2021 values. The adjusted existing traffic volumes conducted for this study are presented in **Figure 3** for the AM and PM peak hours. The data sheets for the recorded volumes are provided in **Appendix B**.



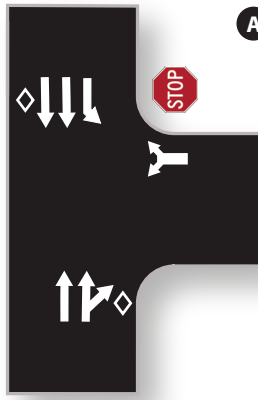
Ash Avenue & Rio Salado Parkway/Private Drive



Mill Avenue & Rio Salado Parkway



Ash Avenue and 3rd Street



Rio Salado Parkway & Access A

LEGEND

	Thru or Turning Movement		Traffic Signal	
	Two-Way Left Turn-Lane		Stop Sign	
	Bike Lane		Speed Limit	
	Raised Median			
	Streetcar in Driving Lane			
	Street Car Route			

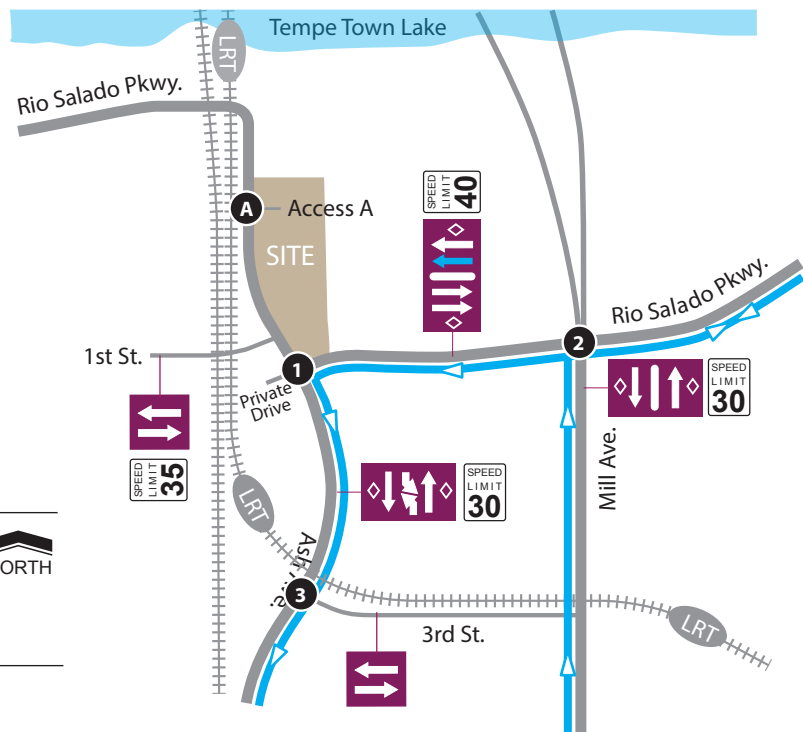
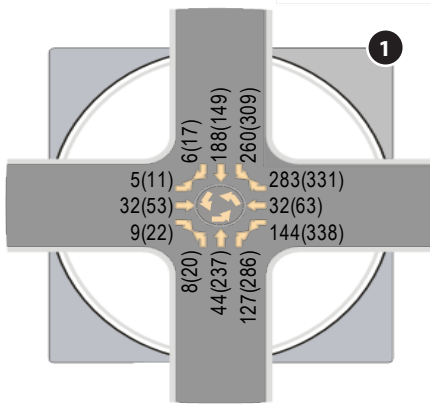
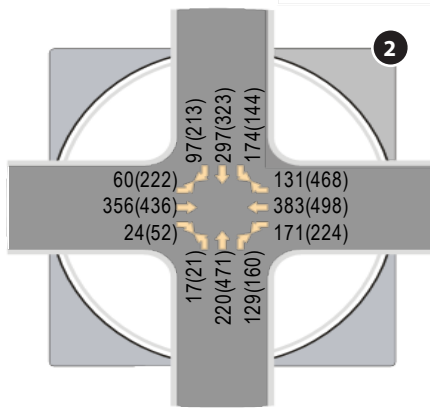


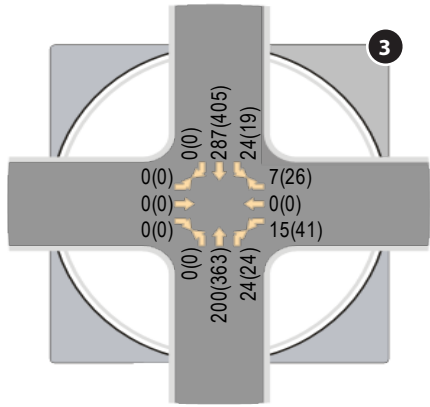
Figure 2: Existing Lane Configurations and Traffic Controls



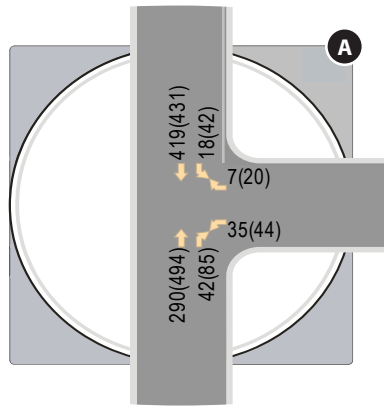
Ash Avenue & Rio Salado Parkway/1st Street



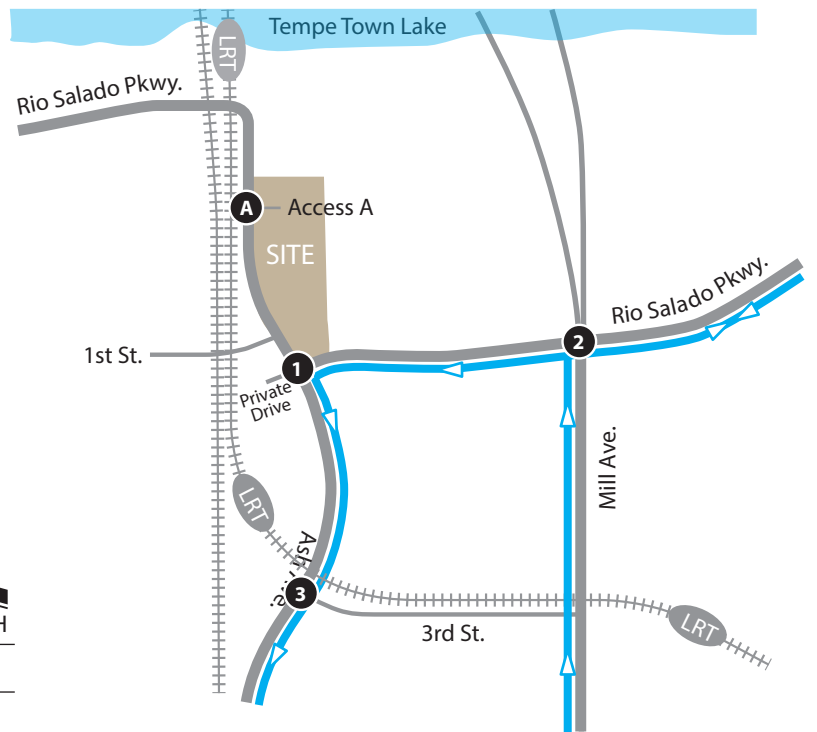
Mill Avenue & Rio Salado Parkway



Ash Avenue and 3rd Street



Rio Salado Parkway & Access A



LEGEND

XX(XX) - AM(PM) Peak Hour Traffic Volumes

Street Car Route



NORTH

Figure 3: Exiting Traffic Volumes

CAPACITY ANALYSIS

The concept of level of service (LOS) uses qualitative measures that characterize operational conditions within the traffic stream. The individual levels of service are described by factors that include speed, travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. Six levels of service are defined for each type of facility for which analysis procedures are available. They are given letter designations A through F, with LOS A representing the best operating conditions and LOS F the worst. Each level of service represents a range of operating conditions. Levels of service for intersections are defined within ranges of average control delay per vehicle, the number of seconds a vehicle can expect to wait due to the presence of a traffic control device. **Table 1** lists the level of service criteria for signalized and unsignalized intersections.

Table 1 – Intersection Level of Service Criteria

Level of Service	Control Delay (sec/veh)	
	Signalized	Unsignalized
A	≤ 10	≤ 10
B	> 10-20	> 10-15
C	> 20-35	> 15-25
D	> 35-55	> 25-35
E	> 55-80	> 35-50
F*	> 80 (or v/c>1)	> 50 (or v/c>1)

Source: Exhibits 19-8, 20-2, 21-8, and 22-8, Highway Capacity Manual 2017

Synchro 11 software using the methodologies of the latest (6th) edition of the *Highway Capacity Manual* (HCM 2016) was used to calculate average per-vehicle control delays, from which movement, approach, and overall intersection levels of service are determined. The intersection of **Ash Avenue**

Table 2 – Existing Peak Hour Levels of Service

ID	Intersection	Traffic Control	Approach	AM Peak Hour	PM Peak Hour
1	Ash Avenue & Rio Salado Parkway/1 st Street	Roundabout	NB	A	B
			SB	A	A
			EB	A	A
			WB	A	A
			Overall	A	A
2	Mill Avenue & Rio Salado Parkway	Signal	NB	D	D
			SB	D	D
			EB	C	D
			WB	C	D
			Overall	C	D
3	Ash Avenue & 3 rd Street ¹	Signal	NB	A	A
			SB	A	A
			EB	A	A
			WB	C	C
			Overall	A	A
4	Rio Salado Parkway & Access A	1-way Stop (WB)	SB Left	A	A
			WB Left	B	C
			WB Right	A	B
5	Rio Salado Parkway & Access B	1-way Stop (WB)	WB Right	A	A

¹ Indicates intersections analyzed with HCM 2000. All other intersections analyzed with HCM 2016.

and 3rd Street was analyzed using the HCM 2000 methodologies. The signal timing for this intersection is not compatible with HCM 2016 analysis. The northbound approach for the intersection of Mill Avenue and Rio Salado Parkway was analyzed with a single through lane and a dedicated right-turn lane to allow for the overlap right-turn phasing as Synchro software can not analyze overlap phasing for a shared lane. The capacity analysis for the AM and PM peak hours under existing conditions are summarized in **Table 2**. Detailed analysis printouts are provided in **Appendix C**.

The results of the existing analyses summarized in **Table 2** indicate all study intersections operate with overall LOS D or better in the existing conditions. All study intersections operate with an LOS D or better in each approach in the existing conditions.

PROPOSED DEVELOPMENT

SITE DESCRIPTION

The proposed 250 Rio Office project is located on the north side of Rio Salado Parkway east of the Ash Avenue alignment. The development will include 216,000-SF of office space, and 4,500-SF of restaurant space. Two study years will be analyzed, opening year 2021 and horizon year 2026.

SITE ACCESS

There will be two (2) access points located on Rio Salado Parkway, both of which will also provide access for Tempe Beach Park parking.

- *Access A* – The southernmost of the two accesses, Access A, will be located approximately 550 feet north of the intersection of Ash Avenue & Rio Salado Parkway/1st Street on Rio Salado Parkway. The access will allow for full movements.
- *Access B* – The northernmost of the two accesses, Access B, will be located approximately 290 feet north of Access A, on the curve of the road, on Rio Salado Parkway. The access will allow for right-in and right-out movements only.

The proposed site plan is provided in **Figure 4**.

TRIP GENERATION

The potential trip generation for the proposed development was estimated using the latest (10th) edition of the Institute of Transportation Engineers (ITE) *Trip Generation Manual* and the 3rd edition of the ITE's *Trip Generation Handbook*. The ITE *Trip Generation Manual* contains data collected by various transportation professionals for a wide range of different land uses. The data are summarized in the report and average rates and equations have been established that correlate the relationship between an independent variable that describes the development size and generated trips for each categorized land use. The report provides information for daily and peak hour trips.

A total of 216,000 square feet (SF) of office space is expected. Also expected are 4,500-SF of restaurant space. The office space was analyzed with the ITE land use code (LUC) 710 General Office Building in a dense setting/location. The restaurant space used the LUC 932 High Turnover (Sit Down) Restaurant. The Dense setting/location narrows data used to produce average rates to those study sites with similar density, foot traffic, and public transit as this area of downtown Tempe. The trip generation calculations are summarized in **Table 3** and included in **Appendix D**.

Table 3 – Site Trip Generation Summary

Proposed Use	ITE LUC	SizeUnits	AM			PM		
			In	Out	Total	In	Out	Total
250 Rio Office Project								
General Office Building	710	216,000 SF	152	25	177	32	155	187
High Turnover (Sit Down) Restaurant	932	4,500 SF	25	20	45	27	17	44
		Total	177	45	222	59	172	231

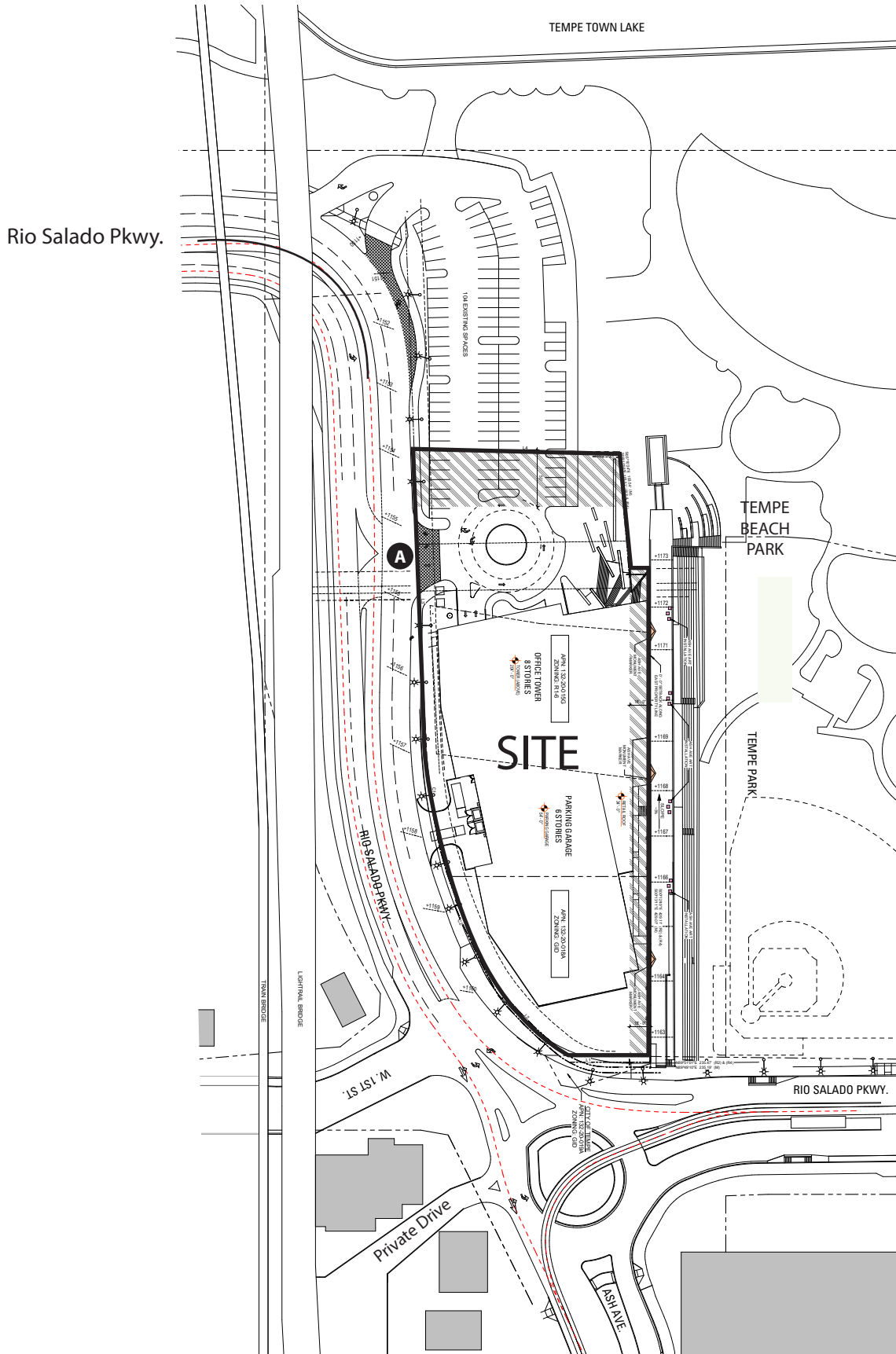


Figure 4: Site Plan and Access

A review of the trip generation summarized in **Table 3** reveals that, by opening year 2021, the proposed development will generate approximately 222 trips (177 in/45 out) during the AM peak hour and 231 trips (59 in/172 out) during the PM peak hour.

TRIP DISTRIBUTION AND TRIP ASSIGNMENT

A single trip distribution pattern was assumed for the proposed development. It is expected that the development will generate trips based on future population within a 10-mile radius of the site. Future total population within a 10-mile radius of the site, as predicted by the 2020 socio-economic data compiled by the Maricopa Association of Governments (MAG), was used as a basis to estimate trip distribution for the development. The resulting trip distribution percentages for the study area are shown in **Table 4**. The trip distribution calculations are included in **Appendix E**.

Figure 5 illustrates the trip distribution percentages shown in **Table 4** on the existing roadway network within the study area. The percentages presented in **Figure 5** were applied to the site trips generated to determine the AM and PM peak hour site traffic at the intersections within the study area. The resulting site generated traffic for the proposed development is presented in **Figure 6**.

Table 4 – Site Trip Distribution

Direction (To/From)	Trip Distribution
North on Rio Salado Parkway (north of 1 st Street)	40%
North on Mill Avenue (north of Rio Salado Parkway)	2%
East on Rio Salado Parkway (east of Mill Avenue)	35%
South on Mill Avenue (south of 3 rd Street)	7%
South on Ash Avenue (south of 3 rd Street)	13%
West on 1 st Street (west of Ash Avenue)	3%
Total	100%

FUTURE BACKGROUND TRAFFIC

The adjusted 2021 existing volumes were not grown for the opening year 2021 background volumes. The adjusted 2021 existing volumes were grown at a rate of 2% per year (factor of 1.104) to find the horizon year 2026 background volumes. Background AM and PM traffic volumes are depicted in **Figure 7**, and **Figure 8** for 2021, and 2026, respectively.

TOTAL TRAFFIC

Total traffic was determined for each study horizon year by adding the site traffic generated to the projected background traffic. Opening year 2021, and horizon year 2026 total AM and PM peak hour traffic volumes are shown on Figure 9, and Figure 10, respectively.

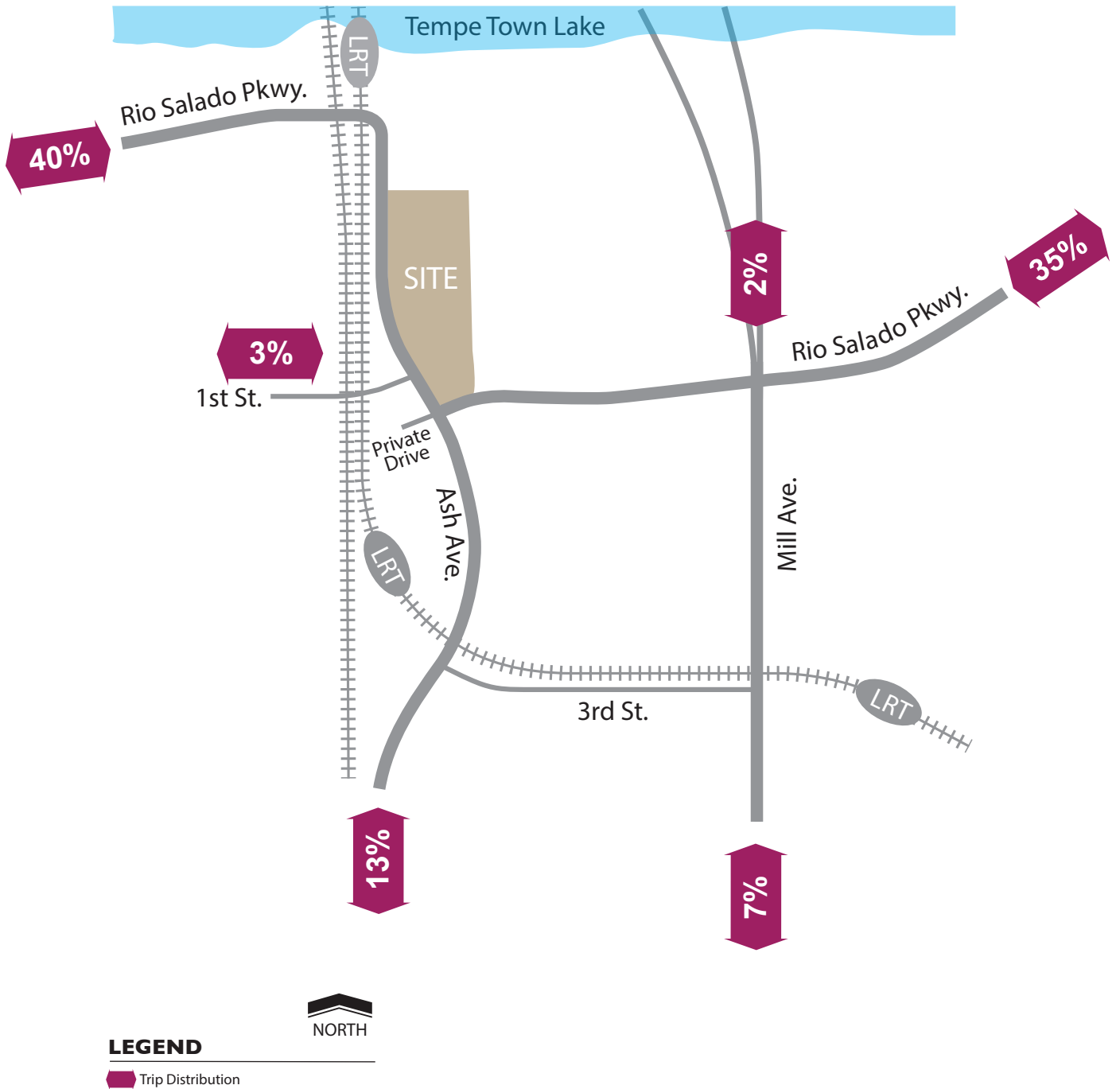
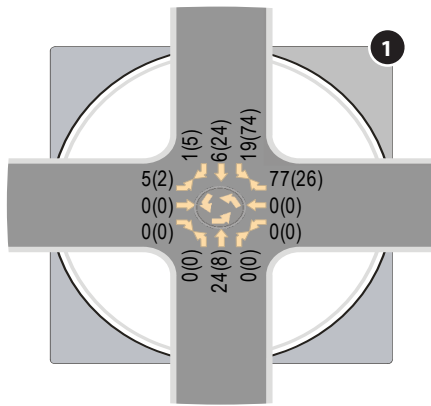
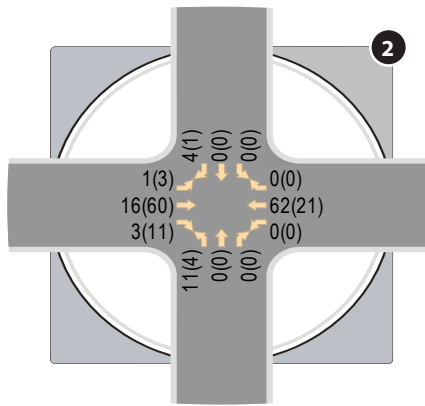


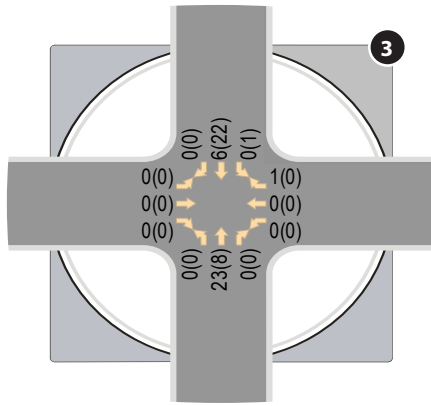
Figure 5: Trip Distribution



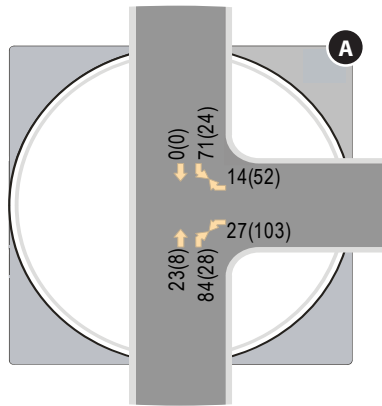
Ash Avenue & Rio Salado Parkway/1st Street



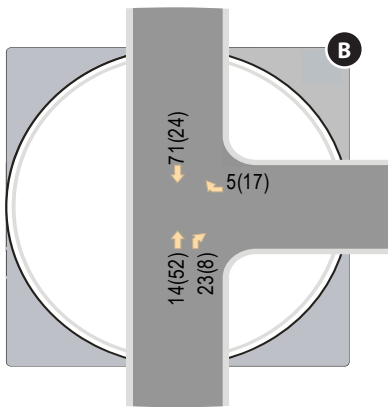
Mill Avenue & Rio Salado Parkway



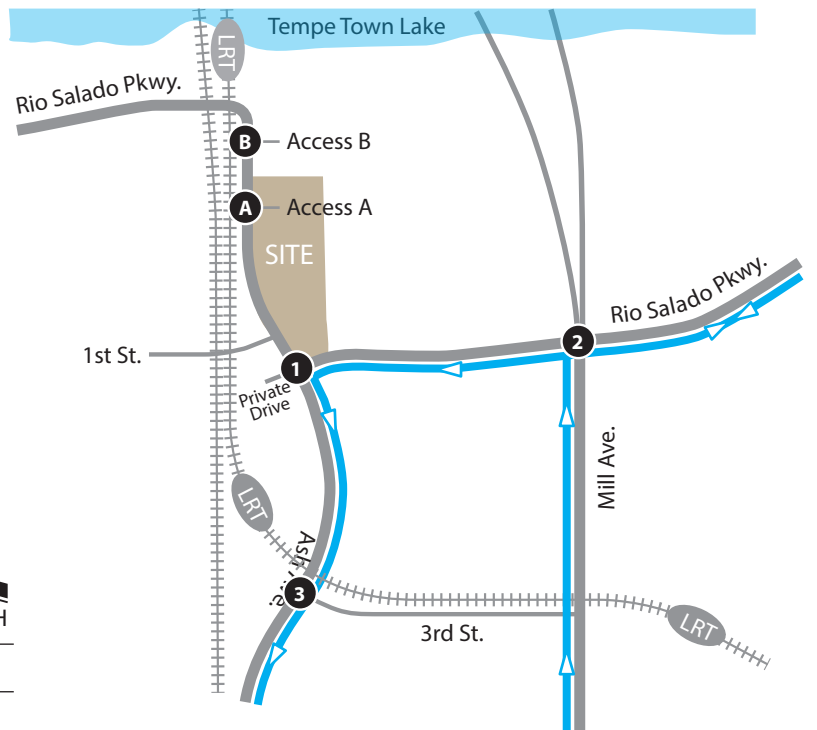
Ash Avenue and 3rd Street



Rio Salado Parkway & Access A



Rio Salado Parkway & Access B



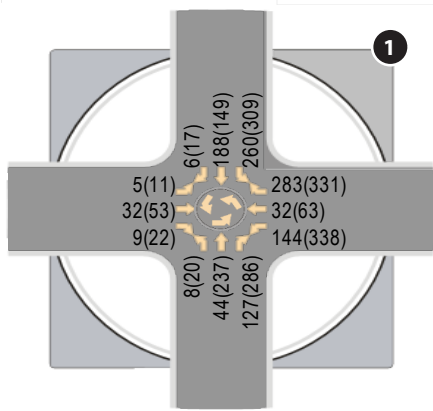
LEGEND

XX(XX) - AM(PM) Peak Hour Traffic Volumes

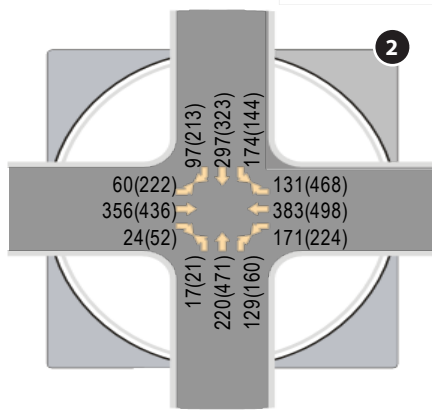
Street Car Route



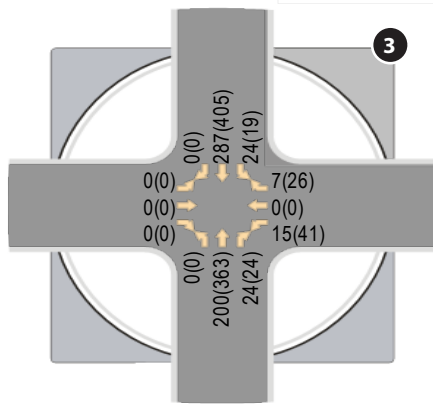
Figure 6: Site Generated Traffic Volumes



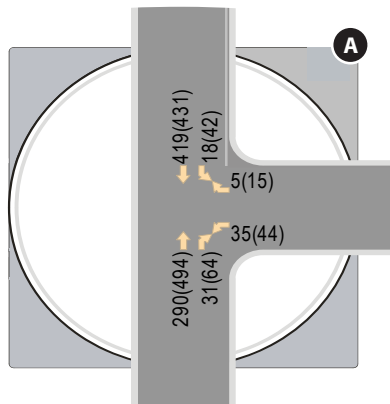
Ash Avenue & Rio Salado Parkway/1st Street



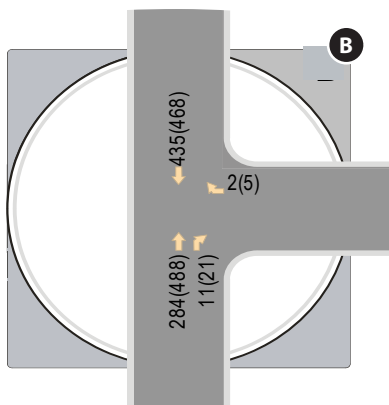
Mill Avenue & Rio Salado Parkway



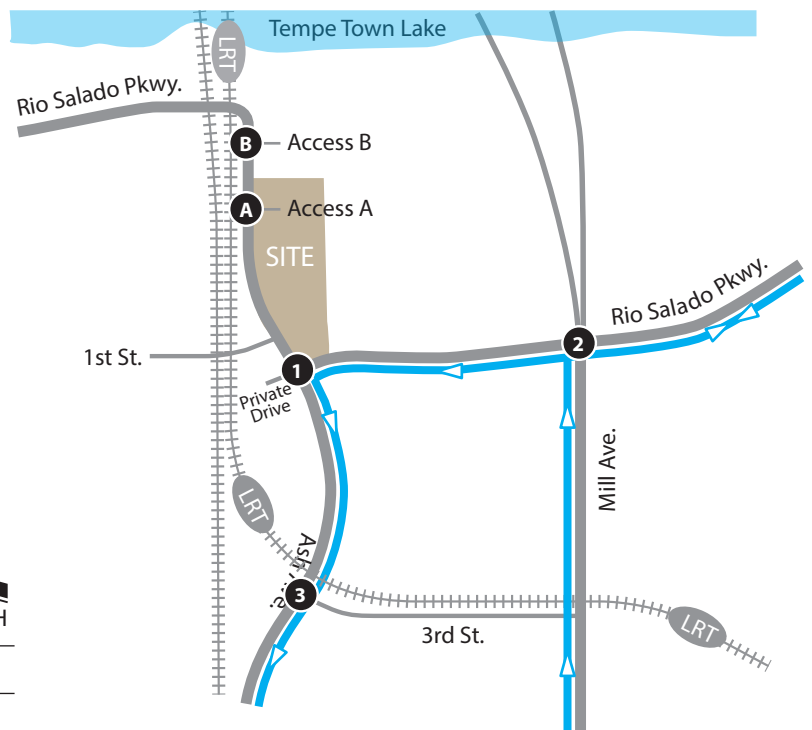
Ash Avenue and 3rd Street



Rio Salado Parkway & Access A



Rio Salado Parkway & Access B



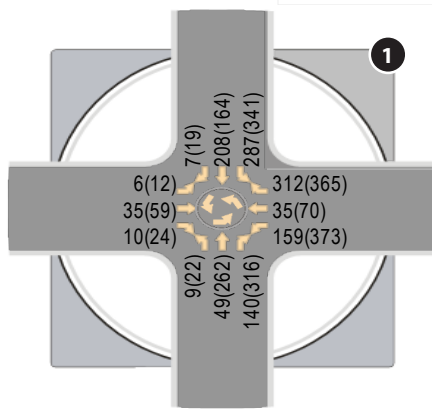
LEGEND

XX(XX) - AM(PM) Peak Hour Traffic Volumes

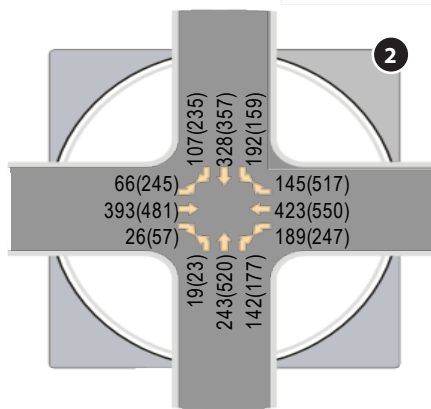
Street Car Route



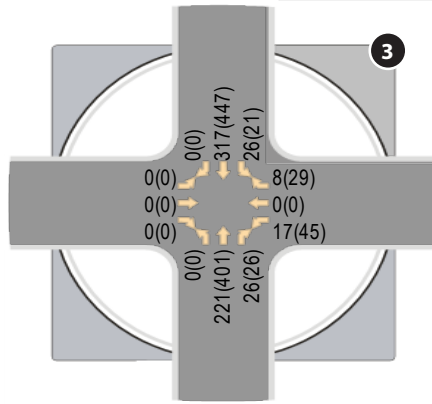
Figure 7: 2021 Background Traffic Volumes



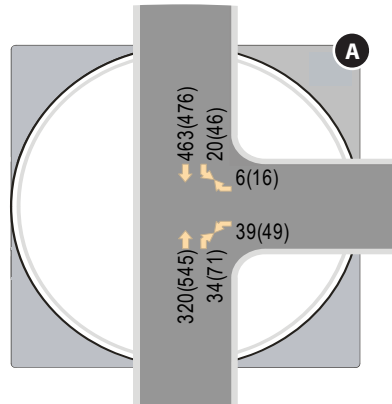
Ash Avenue & Rio Salado Parkway/1st Street



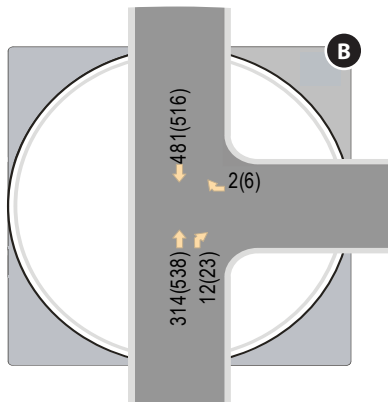
Mill Avenue & Rio Salado Parkway



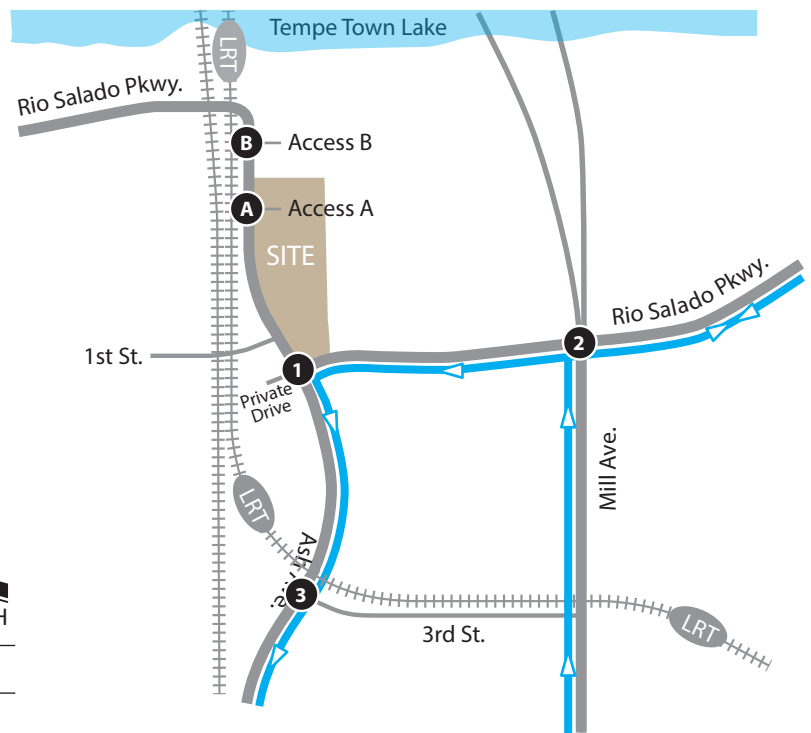
Ash Avenue and 3rd Street



Rio Salado Parkway & Access A



Rio Salado Parkway & Access B



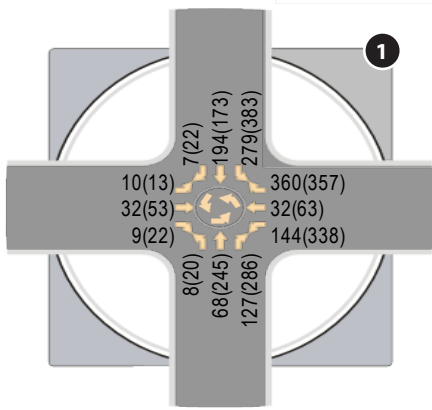
LEGEND

XX(XX) - AM(PM) Peak Hour Traffic Volumes

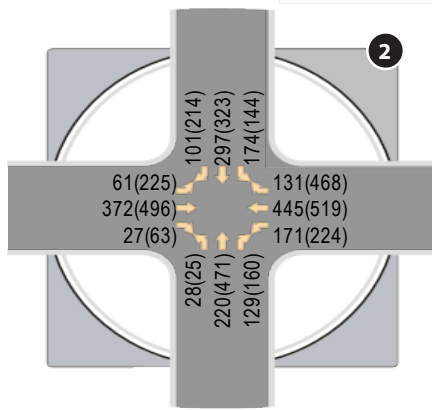
Street Car Route



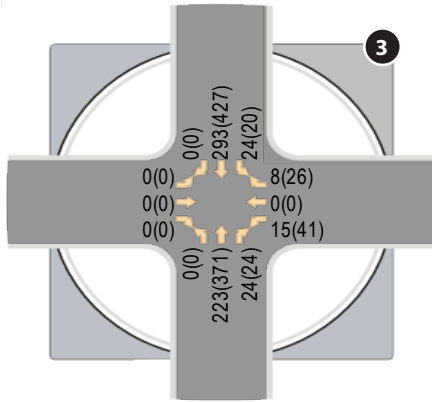
Figure 8: 2026 Background Traffic Volumes



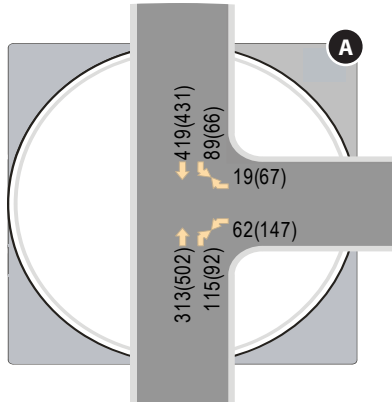
Ash Avenue & Rio Salado Parkway/1st Street



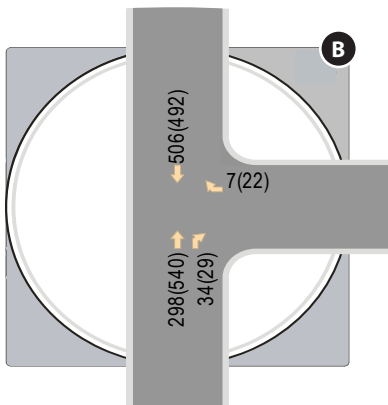
Mill Avenue & Rio Salado Parkway



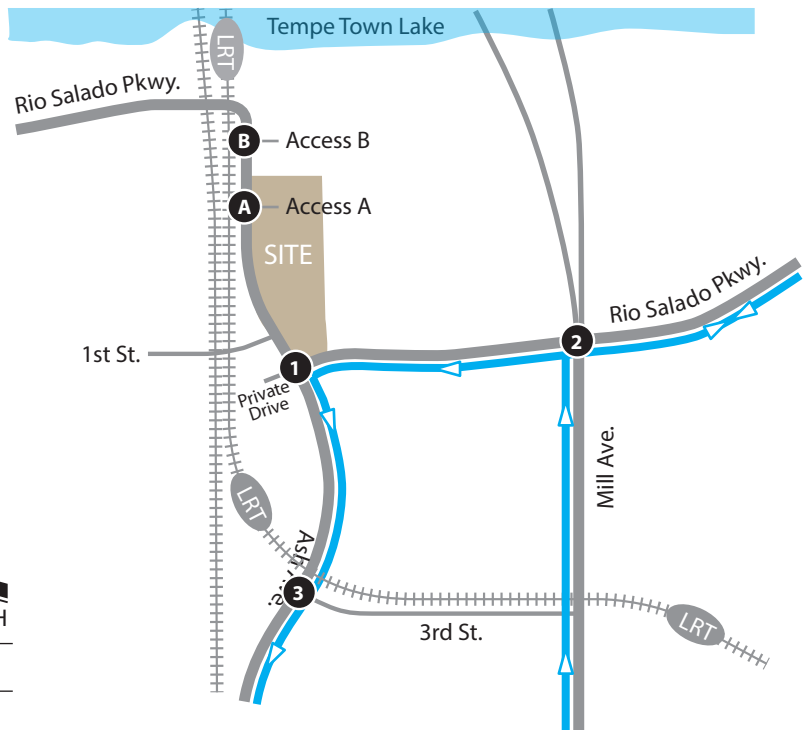
Ash Avenue and 3rd Street



Rio Salado Parkway & Access A



Rio Salado Parkway & Access B



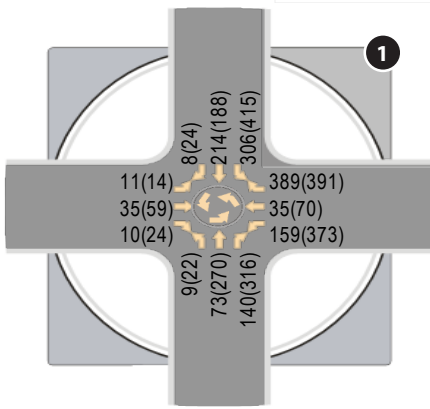
LEGEND

XX(XX) - AM(PM) Peak Hour Traffic Volumes

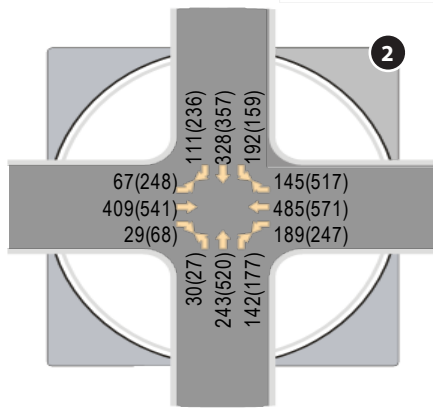
Street Car Route



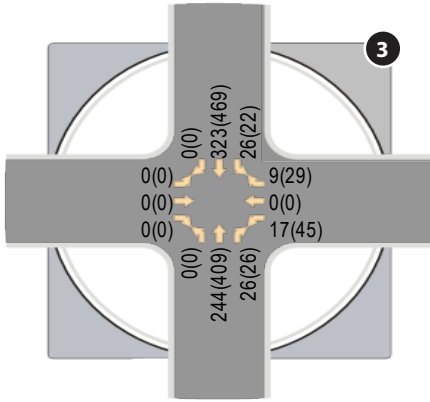
Figure 9: 2021 Total Traffic Volumes



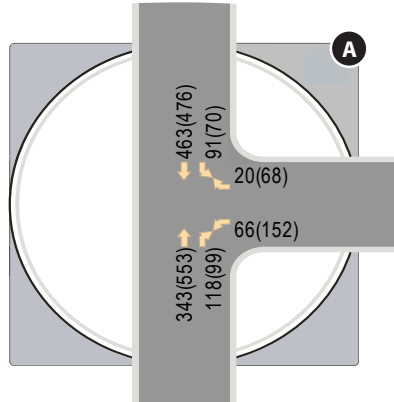
Ash Avenue & Rio Salado Parkway/1st Street



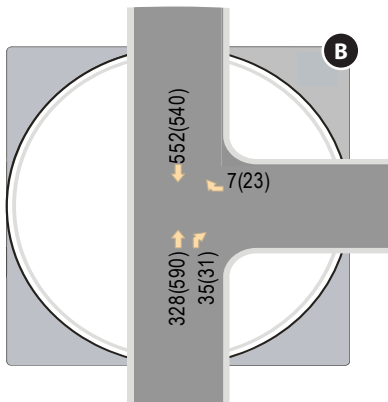
Mill Avenue & Rio Salado Parkway



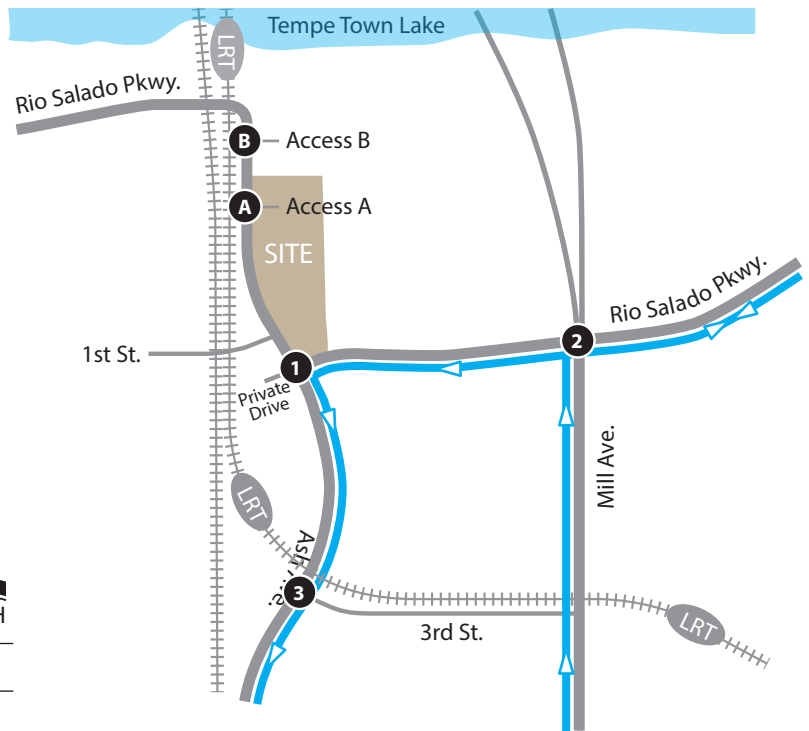
Ash Avenue and 3rd Street



Rio Salado Parkway & Access A



Rio Salado Parkway & Access B



LEGEND

XX(X) - AM(PM) Peak Hour Traffic Volumes

Street Car Route



Figure 10: 2026 Total Traffic Volumes

TRAFFIC AND IMPROVEMENT ANALYSIS

INTERSECTION LEVEL OF SERVICE ANALYSIS

Peak hour capacity analyses were conducted for all the intersections within the study area. All intersections were analyzed using Synchro 11 analysis software and the methodologies previously described.

The northbound approach for the intersection of Mill Avenue and Rio Salado Parkway was analyzed with a single through lane and a dedicated right-turn lane to allow for the overlap right-turn phasing as Synchro software cannot analyze overlap phasing for a shared lane.

The overall intersection and approach levels of service are summarized in **Table 5** for the two analysis years. Detailed analysis worksheets can be found in **Appendix F** for the 2021 opening year, and **Appendix G** for the 2026 horizon year. The analysis assumed the future lane configurations and traffic control illustrated in **Figure 11**.

Table 5 – Future Peak Hour Levels of Service

ID	Intersection	Intersection Control	Approach/Movement	Opening 2021 LOS AM(PM)		Horizon 2026 LOS AM(PM)	
				No Build	Build	No Build	Build
1	Ash Avenue & Rio Salado Parkway/1 st Street	Roundabout	NB	A(B)	A(C)	A(C)	A(C)
			SB	A(A)	A(A)	A(A)	A(A)
			EB	A(A)	A(A)	A(A)	A(A)
			WB	A(A)	A(A)	A(A)	A(A)
			Overall	A(A)	A(B)	A(B)	A(B)
2	Mill Avenue & Rio Salado Parkway	Signal	NB	D(D)	D(D)	D(D)	D(D)
			SB	D(D)	D(D)	D(D)	D(D)
			EB	C(D)	C(D)	C(D)	C(D)
			WB	C(D)	C(D)	C(D)	C(D)
			Overall	C(D)	C(D)	C(D)	C(D)
3	Ash Avenue & 3 rd Street ¹	Signal	NB	A(A)	A(A)	A(A)	A(A)
			SB	A(A)	A(A)	A(A)	A(A)
			EB	A(A)	A(A)	A(A)	A(A)
			WB	C(C)	C(C)	C(C)	C(C)
			Overall	A(A)	A(A)	A(A)	A(A)
A	Rio Salado Parkway & Access A	One-Way Stop (WB)	SB Left	A(A)	A(A)	A(A)	A(A)
			WB Left	B(C)	C(C)	B(C)	C(D)
			WB Right	A(B)	A(B)	A(B)	B(B)
B	Rio Salado Parkway & Access B	One-Way Stop (WB)	WB Right	A(A)	A(B)	A(B)	A(B)

¹ Indicates intersections analyzed with HCM 2000. All other intersections analyzed with HCM 2016.

The results of the intersection capacity analyses summarized in **Table 5** indicate that, for opening year 2021 and horizon year 2026, all study intersections could operate with overall LOS D or better in the background and total scenarios.

TRANSPORTATION DEMAND MANAGEMENT

City guidelines require a TIS include a Trip Reduction Plan (TRP) for all new development expected to generate 75 new trips or more during a peak hour. City guidelines require that the TRP “shall identify the transportation demand management (TDM) strategies or policies that reduce the travel demand or redistribute that demand in space or in time. Transportation demand management strategies or policies “shall be implemented either in the development or through ongoing policies and programs.” Measures are worth different points and divided into three categories: Alternative Mode Strategies, Employer Scheduling Policies, and Parking Management Strategies. A total of 20 points are required, with a maximum number of points from each category. The following are several of the TDM measures that are intended to reduce trips.

Alternate Mode Strategies

- A. Carpooling or Vanpooling, including Guaranteed Ride Home – 10
- B. Rideshare, Carshare or Bikeshare – 5
- C. Transit Passes – 10
- D. Multimodal Infrastructure – 5
- E. On-Site Services – 5
- F. Real Time Transportation Information Displays (“Transit Screens”) – 5

Section 5 of the City’s “Policy for Transportation Impact Studies” provides two tables of TDM or Alternative Mode Strategies. Most are focused on what employers can do to facilitate their employees’ using alternative modes of transportation, such as providing showers and lockers for those who bicycle or walk/jog to work.

While the private employers that are expected to lease office space in the 250 Rio building are free to offer free or discounted transit passes, those new to the Valley may not be aware of services already available. Thus, they can be made aware of the availability of bus passes from Valley Metro by the building management at the time the lease is executed. In addition to this type of service, the building management can offer to potential lessees certain no- or low-cost services. These are described here:

Carpool/Vanpool. The 250 Rio leasing office can provide information to tenants available from SharetheRide.com on carpooling/vanpooling matching services. The lessee can sign for the information so that the information can be reported to the City on a periodic basis, as required/requested. (It is not the responsibility of the building management to set up its own program, especially when there is a comprehensive, successful program already available to all residents of the Valley of the Sun.) This strategy is worth 10 points toward the targeted reduction.

Multimodal Infrastructure. The development will satisfy the “Multimodal Infrastructure” strategy by providing the bicycle racks/lockers/enclosures required in the City’s Bicycle Commute Area. Satisfying this strategy is worth another 5 points.

On-Site Services. There will be some ground-floor commercial space which can provide on-site services, although whether the occupant(s) will be one or more of the same types of services that the City cites as examples, which focus on the services that employers can provide, such as on-site

day care, an ATM, etc., has yet to be determined. Satisfying this strategy is worth an additional 5 points.

Real Time Transportation Information Displays ("Transit Screens"). A computer-based interactive kiosk in the lobby with transit and other information could be provided by the building management at relatively low cost. At even lower cost, a display board of area bus routes and timetables could be provided. Satisfying this strategy is worth an additional 5 points.

A maximum of ten (10) points can be earned from this category. CivTech estimates that the proposed development will qualify for all ten points.

Employer Scheduling Policies

- A. Telecommuting – 10
- B. Compressed Work Week– 5
- C. Flexible Schedule – 10
- D. Staggered Shifts – 5

A maximum of five (5) points can be earned from this category. As with the strategies above, building management can provide to lessees information regarding the advantages of implementing any or all of the listed scheduling policies. It would, of course, be up to those future tenants to determine which, if any, would be of value to them and, therefore, be implemented. The proposed office building is expected to house numerous tenants. City requirements do not specify how the points are to be credited to a multi-tenant project; e.g., if one tenant in the building with a half-dozen employees—of potentially several dozen tenants employing 150 or 200 others—offers telecommuting, does the entire project qualify for the full 10 points? Given the lack of specificity in City guidelines in this case, CivTech cannot estimate the number of points for which the proposed development may qualify. However, by virtue of this discussion herein, the developer has been made aware of and obligated to consider these strategies to satisfy City requirements.

Parking Management Strategies

- A. Parking Cash Out – 5
- B. Pay for Parking / Unbundled Parking – 10
- C. Bicycle Parking above (double) the Zoning Code Requirement – 5
- D. Bicycle Services – 5
- E. Carpool or Carshare Preferential Parking – 5

A maximum of ten (10) points can be earned from this category. A review of these strategies reveals that these can be the responsibility of the building management or the tenants or both. Since the first two involve the exchange of money out (to pay tenants/employees not to park) or in (for employees/ tenants to pay for parking), it is not the developer's responsibility to divulge such confidential information or details to the traffic engineer. Regarding the others, the developer has not revealed to CivTech as to whether or not any of these specific strategies will be implemented or, if so, how. Again, by virtue of CivTech's including this discussion herein, the developer has been made aware of and is now obligated to consider these strategies to satisfy City requirements.

Therefore, CivTech concludes the no- or low-cost measures for trip reduction or Alternative Mode Strategies that can be implemented represent at least ten of a maximum possible total of 20 target points. It will be up to the developer to provide additional information to the City regarding other strategies intended for implementation.

PRELIMINARY SIGNAL NEEDS ASSESSMENT – ACCESS A

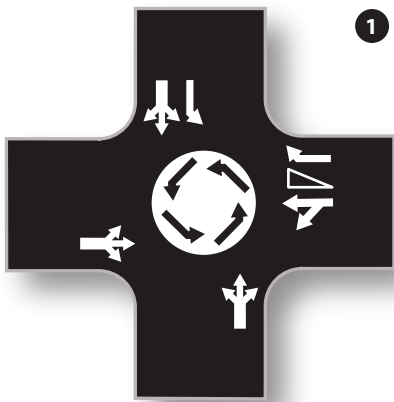
A preliminary traffic signal needs assessment was conducted for the intersection of **Rio Salado Parkway and Access A** using projected approach volumes. This assessment considers the three volume-based warrants of the nine signal warrants provided in *Manual on Uniform Traffic Control Devices* (MUTCD).

To formally apply these MUTCD signal warrants, actual traffic volumes must be recorded. Since future volumes can only be projected, the Arizona Department of Transportation *Traffic Engineering Guidelines, and Processes* Number 611, Traffic Signal Needs Studies (TGP 611), outlines a process in which the potential need for a traffic signal can be assessed. This assessment uses percent-of-daily-traffic factors published in TGP 611 (the source of which was another ITE reference) to estimate future 8th, 4th, and 1st highest (i.e., peak) hour approach volumes. These estimated volumes are then used to determine if Warrant 1 (based on the 8th highest hourly volumes), Warrant 2 (based on the 4th highest hour), Warrant 3 (based on the 1st highest or peak hour) would likely be satisfied in the future.

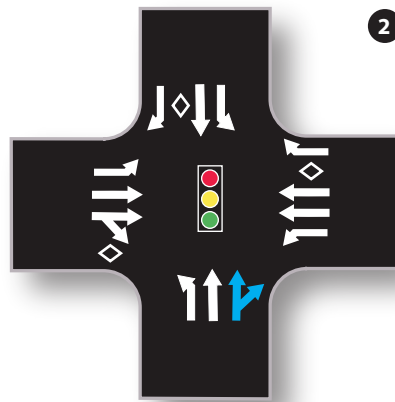
Total traffic volumes were projected for the AM and PM peak hour for the two study years. The assessment showed that the 1st highest hour approach volumes estimated from the total AM and total PM peak hour volumes could satisfy the 1st highest hour volume-based warrants as early as the opening year (2021). The assessment showed that the 4th highest hour approach volumes estimated from the total PM peak hour volumes could satisfy the 4th highest hour volume-based warrants as early as the opening year (2021) and that total AM peak hour volumes could satisfy the 8th highest hour volume-based warrants by the horizon year (2026). The assessment showed that the 8th highest hour approach volumes estimated from the total PM peak hour volumes could satisfy the 8th highest hour volume-based warrants as early as the opening year (2021).

The MUTCD suggests that traffic control signals should not be installed unless one or more of the signal warrants are met; however, the satisfaction of a warrant or warrants is not in itself justification for a signal. Every situation is unique and warrant guidelines must be supplemented by the effects of specific site conditions and the application of good engineering judgment. Installation of a traffic signal should improve the overall safety and/or operation of an intersection and should be considered only when deemed necessary by careful traffic analysis and after less restrictive solutions have been attempted. Addition of a signal at a side street or driveway approach to an arterial roadway may satisfy the warrants but would result in increased delay for the through traffic on the arterial roadway.

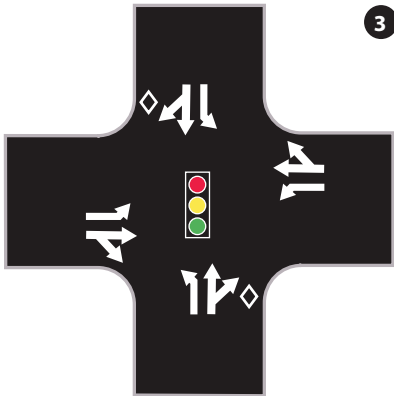
CivTech thus recommends that traffic on the driveway should be monitored in the future and that a full signal warrant be conducted after opening of development. Detailed calculations and criteria comparisons are included within **Appendix H**.



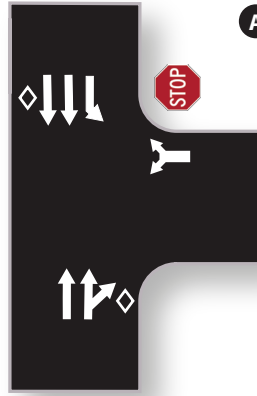
Ash Avenue & Rio Salado Parkway/Private Drive



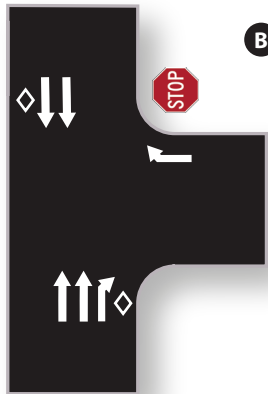
Mill Avenue & Rio Salado Parkway



Ash Avenue and 3rd Street



Rio Salado Parkway & Access A



Rio Salado Parkway & Access B

LEGEND

	Thru or Turning Movement		Traffic Signal	
	Two-Way Left Turn-Lane		Stop Sign	
	Bike Lane		Speed Limit	
	Raised Median			
	Streetcar in Driving Lane			
	Street Car Route			

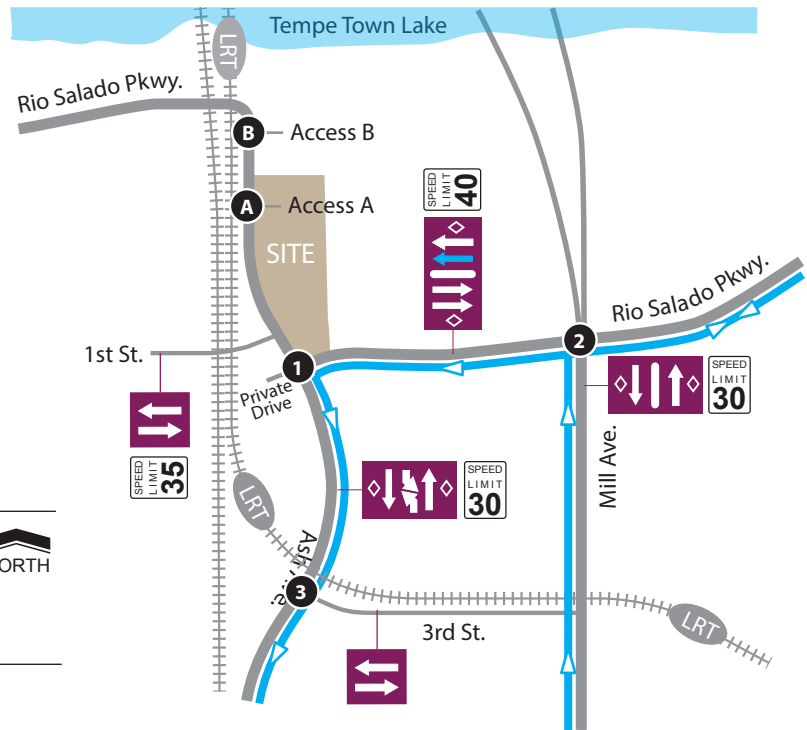


Figure 11: Proposed Lane Configurations and Traffic Controls

QUEUE STORAGE ANALYSIS

A queuing analysis was prepared according to the methodology documented in *AASHTO's A Policy on Geometric Design of Highways and Streets*. The study intersections were analyzed to determine the left-turn and right-turn storage needed to accommodate the expected traffic volumes in the 2026 horizon year.

The storage length for a turn lane is typically estimated as the length required to hold the average number of arriving vehicles per two minutes, where unsignalized, or per one-and-a-half to two signal cycles, where signalized.¹ The formulas used for the calculations are shown below, and the resulting turn lane storage requirements for the study intersections are summarized in **Table 6**. Detailed queue storage calculation worksheets using the AASHTO method are included in **Appendix I**.

For signalized intersections, the storage length is determined by the following formula:

$$\text{Storage Length} = \left[\frac{1.5 \times (\text{veh/hr})}{(\text{cycles/hr})} \right] \times 25 \text{ feet}$$

For unsignalized intersections, the storage length for a left turn lane is determined by the following formula:

$$\text{Storage Length} = \left\{ \frac{\ln[P(n>N)]}{\ln \frac{v}{c}} - 1 \right\} \times 25 \text{ feet}$$

where:

$$c = \frac{V_0 e^{-V_0 t_c / 3600}}{1 - e^{-V_0 t_c / 3600}}$$

as defined in *AASHTO's A Policy on Geometric Design of Highways and Streets Equations 9-3 and 9-4*.

The calculated AASHTO queue storage was based on the horizon year 2026 because it had the greatest volume passing through the intersection.

¹ The American Association of Highway and Transportation Officials on pages 718-719 of its publication, *Geometric Design of Highways and Streets* ("AASHTO Green Book"), indicates that storage length for a turn lane, exclusive of taper, "should usually be based on one and one-half to two times the average number of vehicles that would store per cycle" at a signalized intersection.

Table 6 – Turn Lane Queue Length Analysis Summary

ID	Intersection	Traffic Control	Approach	Existing Storage	Calculated AASHTO Storage	Recommended
1	Ash Avenue & Rio Salado Parkway/1 st Street	Roundabout	SB Left WB Right	Drop Lane 315'	125' 350'	Drop Lane ⁽²⁾ 315' ⁽²⁾
2	Mill Avenue & Rio Salado Parkway	Signal	NB Left SB Left EB Left WB Left SB Right WB Right	90' 155' 135' 225' 155' 225'	50' 300' 400' 400' 375' 800'	90' ⁽²⁾ 155' ⁽²⁾ 135' ⁽²⁾ 225' ⁽²⁾ 155' ⁽²⁾ 225' ⁽²⁾
3	Ash Avenue & 3 rd Street	Signal	SB Left WB Left	60' 105'	50' 50'	60' ⁽²⁾⁽³⁾ 105' ⁽²⁾
A	Rio Salado Parkway & Access A	1-way Stop (WB)	SB Left	85'	25'	85' ⁽²⁾
B	Rio Salado Parkway & Access B	1-way Stop (WB)	NB Right	–	50'	75' ⁽¹⁾

1. Maximum queue storage for a turn lane is 350' with a minimum 150' for signalized intersections and a minimum 75' for unsignalized intersections.
2. The existing queue storage length provides sufficient storage or cannot be extended due to restrictions from existing conditions.
3. Existing Two-Way Left-Turn Lane allows for sufficient storage beyond marked queue storage.

SIGHT DISTANCE ANALYSIS

A sight triangle is the area encompassed by the line of sight from a stopped vehicle on the minor roadway to the approaching vehicle on the major roadway. There must be sufficient unobstructed sight distance along both approaches of a street or driveway intersection and across their included corners to allow operators of vehicles to see each other. There must also be sufficient sight distance along the major street to allow a driver intending to turn left into the site to see a vehicle approaching in the opposite direction. Existing sight distance was not measured at the site access points. The City of Tempe's *Intersection Sight Distance* is included in **Appendix J**.

The site design engineer should ensure that adequate sight distance is provided at the intersections to allow safe left and right-turning movements from the development. Landscaping should be maintained at a maximum of three feet in height. Tree branches lower than seven feet should be trimmed to meet current acceptable landscape requirements while maintaining sight distance.

CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations have been documented in this study:

Existing Conditions

- The results of the existing analyses indicate all study intersections operate with overall LOS D or better in the existing conditions. All study intersections operate with an LOS D or better in each approach in the existing conditions.

Future Conditions

- By opening year 2021, the proposed development will generate approximately 222 trips (177 in/45 out) during the AM peak hour and 231 trips (59 in/172 out) during the PM peak hour.
- The results of the intersection capacity analyses indicate that, for opening year 2021 and horizon year 2026, all study intersections could operate with overall LOS D or better in the background and total scenarios.

Preliminary Signal Needs Assessment – Rio Salado Parkway & Access A

- It could be concluded from a preliminary traffic signal needs assessment that a signal could be warranted at the intersection of **Rio Salado Parkway and Access A** with the opening of the project; as explained in the text, CivTech recommends that traffic at the intersection should be monitored in the future and that a full signal warrant be conducted after opening of the development.

Queue Storage

- Queuing analysis was prepared according to the methodology documented in *AASHTO's A Policy on Geometric Design of Highways and Streets*. The study intersections were analyzed to determine the left-turn and right-turn storage needed to accommodate the expected traffic volumes in the 2026 horizon year.

Sight Distance

- The site design engineer should ensure that adequate sight distance is provided at the intersections to allow safe left and right-turning movements from the development. Landscaping should be maintained at a maximum of three feet in height. Tree branches lower than seven feet should be trimmed to meet current acceptable landscape requirements while maintaining sight distance.

LIST OF REFERENCES

A Policy on Geometric Design of Highways and Streets, 6th Edition, American Association of State Highway and Transportation Officials, Washington, D.C., 2011.

Highway Capacity Manual. Transportation Research Board, National Research Council, Washington, D.C., 2010.

Manual on Uniform Traffic Control Devices. U.S. Department of Transportation, Federal Highways Administration, Washington, D.C., 2009.

Trip Generation, 10th Edition, Institute of Transportation Engineers, Washington, D.C., 2017.

Trip Generation Handbook, 3rd Edition, Institute of Transportation Engineers, Washington, D.C., 2017.

City of Tempe, Public Works Department, Engineering Design Criteria, May 2015.

TECHNICAL APPENDICES

- APPENDIX A: REVIEW COMMENTS AND RESPONSES (RESERVED)**
- APPENDIX B: EXISTING TRAFFIC COUNT DATA**
- APPENDIX C: 2018 PEAK HOUR CAPACITY ANALYSIS**
- APPENDIX D: TRIP GENERATION CALCULATIONS**
- APPENDIX E: TRIP DISTRIBUTION CALCULATIONS**
- APPENDIX F: 2021 OPENING YEAR PEAK HOUR CAPACITY ANALYSIS**
- APPENDIX G: 2025 HORIZON YEAR PEAK HOUR CAPACITY ANALYSIS**
- APPENDIX H: QUEUE STORAGE CALCULATIONS**
- APPENDIX I: SIGHT DISTANCE ANALYSIS**

APPENDIX A

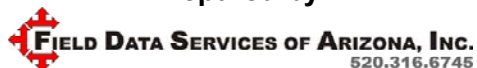
REVIEW COMMENTS AND RESPONSES (RESERVED)

APPENDIX B

EXISTING TRAFFIC COUNT DATA

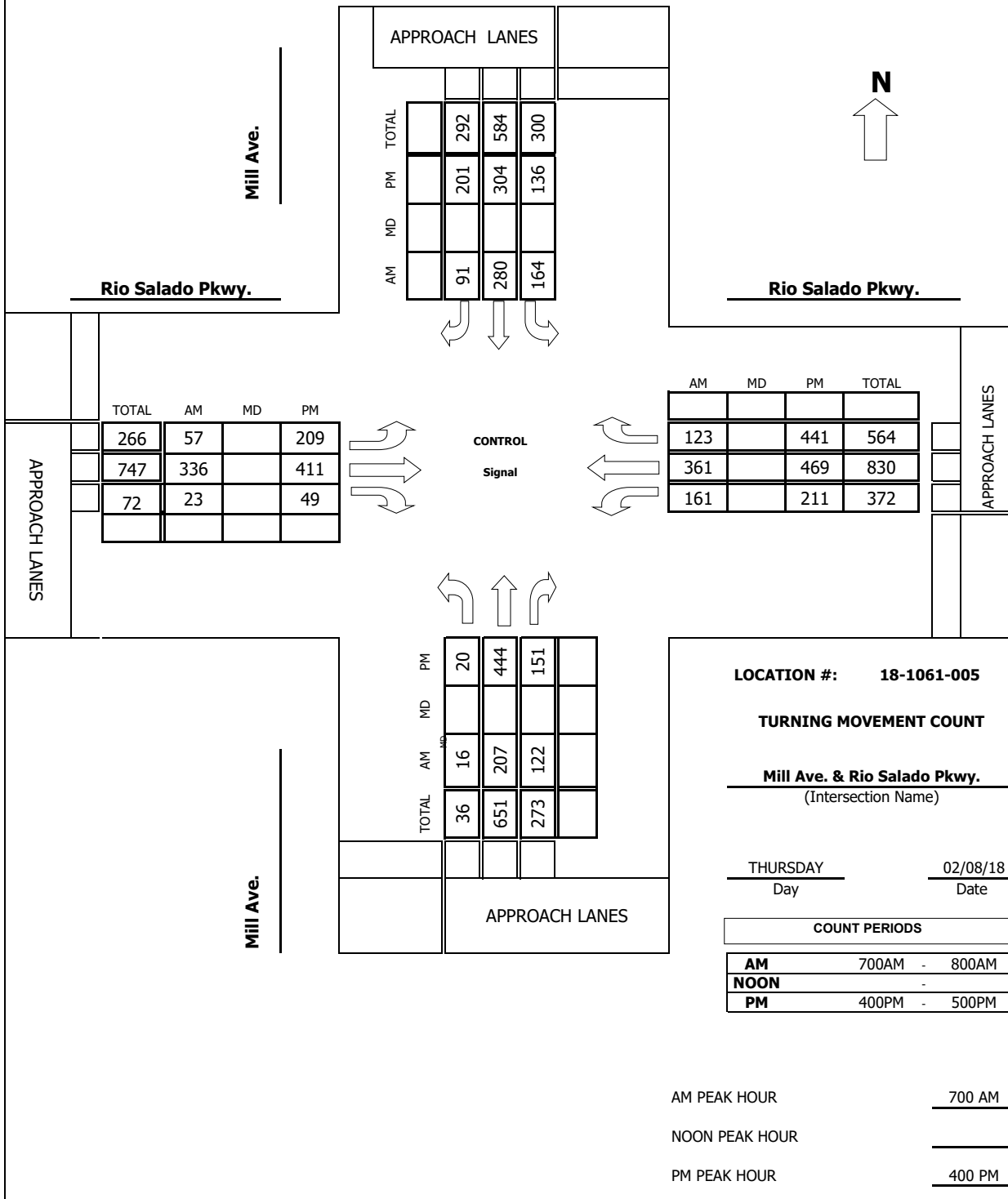
Intersection Turning Movement

Prepared by:



Project #: 18-1061-005

TMC SUMMARY OF Mill Ave. & Rio Salado Pkwy.



Intersection Turning Movement Prepared by:



FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745



N-S STREET: Mill Ave. DATE: 02/08/18 LOCATION: Tempe
 E-W STREET: Rio Salado Pkwy. DAY: THURSDAY PROJECT#: 18-1061-005

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
	1	1	0	1	1	1	1	2	0	1	2	0	

6:00 AM													
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM	3	53	27	34	49	12	12	68	4	41	78	21	402
7:15 AM	4	51	37	38	57	16	5	89	9	35	84	31	456
7:30 AM	4	40	24	45	71	30	20	85	6	38	98	32	493
7:45 AM	5	63	34	47	103	33	20	94	4	47	101	39	590
8:00 AM													
8:15 AM													
8:30 AM													
8:45 AM													
9:00 AM													
9:15 AM													
9:30 AM													
9:45 AM													
10:00 AM													
10:15 AM													
10:30 AM													
10:45 AM													
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	16	207	122	164	280	91	57	336	23	161	361	123	1941
Approach %	4.64	60.00	35.36	30.65	52.34	17.01	13.70	80.77	5.53	24.96	55.97	19.07	
App/Depart	345	/	387	535	/	464	416	/	622	645	/	468	

AM Peak Hr Begins at: 700 AM

PEAK

Volumes	16	207	122	164	280	91	57	336	23	161	361	123	1941
Approach %	4.64	60.00	35.36	30.65	52.34	17.01	13.70	80.77	5.53	24.96	55.97	19.07	

PEAK HR.

FACTOR:	0.846	0.731	0.881	0.862	0.822
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CONTROL: Signal
 COMMENT 1:
 GPS: 33.429612, -111.940013

Intersection Turning Movement



FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745



N-S STREET: Mill Ave. DATE: 02/08/18 LOCATION: Tempe
 E-W STREET: Rio Salado Pkwy. DAY: THURSDAY PROJECT#: 18-1061-005

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
	1	1	0	1	1	1	1	2	0	1	2	0	

1:00 PM													
1:15 PM													
1:30 PM													
1:45 PM													
2:00 PM													
2:15 PM													
2:30 PM													
2:45 PM													
3:00 PM													
3:15 PM													
3:30 PM													
3:45 PM													
4:00 PM	6	95	40	37	78	30	51	128	8	68	115	117	773
4:15 PM	1	119	46	27	75	37	59	86	15	45	112	94	716
4:30 PM	7	119	25	33	61	62	50	112	15	55	152	124	815
4:45 PM	6	111	40	39	90	72	49	85	11	43	90	106	742
5:00 PM													
5:15 PM													
5:30 PM													
5:45 PM													
6:00 PM													
6:15 PM													
6:30 PM													
6:45 PM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	20	444	151	136	304	201	209	411	49	211	469	441	3046
Approach %	3.25	72.20	24.55	21.22	47.43	31.36	31.24	61.43	7.32	18.82	41.84	39.34	
App/Depart	615	/	1094	641	/	564	669	/	698	1121	/	690	

PM Peak Hr Begins at: 400 PM

PEAK

Volumes	20	444	151	136	304	201	209	411	49	211	469	441	3046
Approach %	3.25	72.20	24.55	21.22	47.43	31.36	31.24	61.43	7.32	18.82	41.84	39.34	

PEAK HR.

FACTOR:	0.926	0.797	0.894	0.847	0.934
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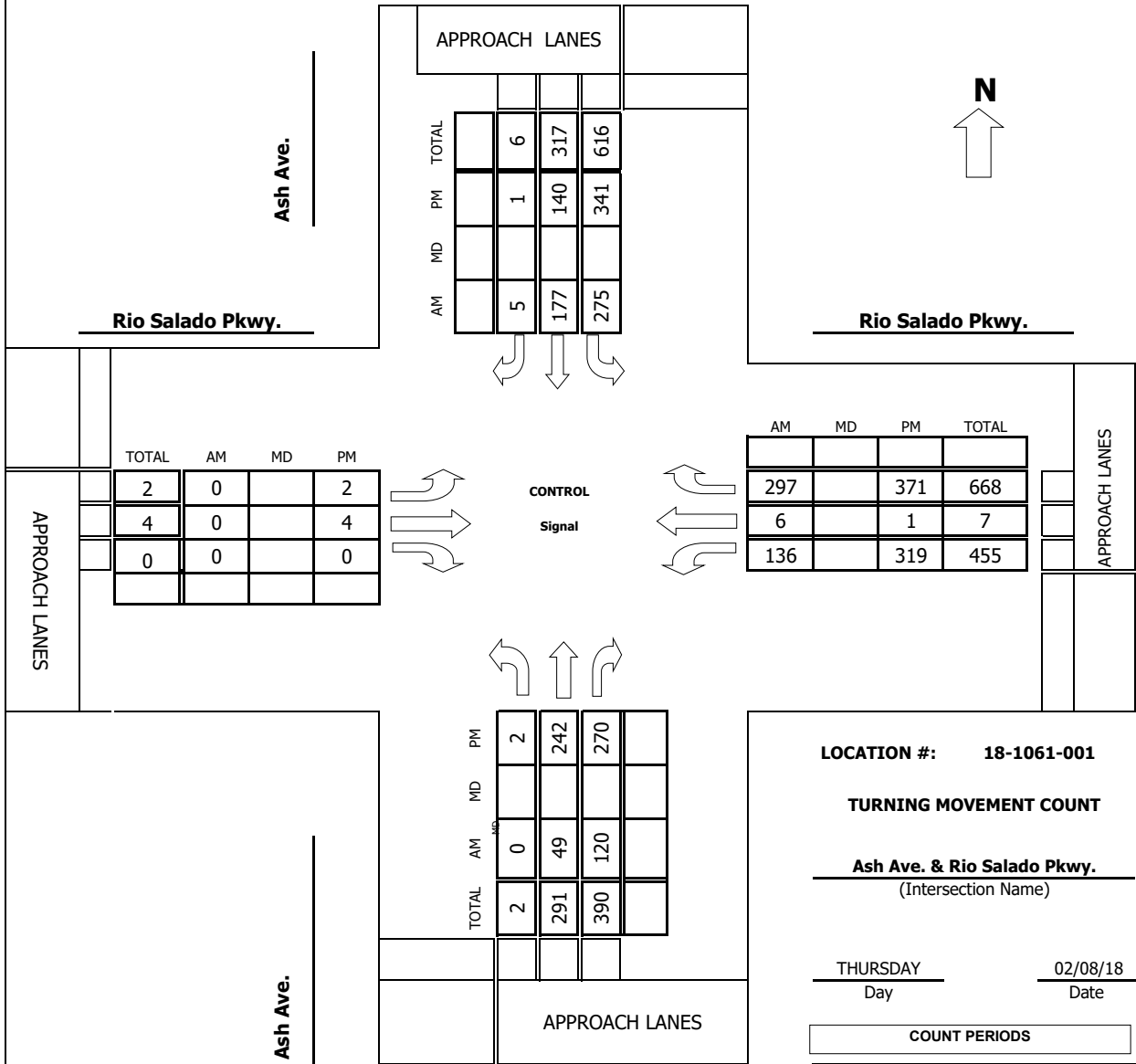
CONTROL: Signal
 COMMENT 1: 0
 GPS: 33.429612, -111.940013

Intersection Turning Movement
Prepared by:



Project #: 18-1061-001

TMC SUMMARY OF Ash Ave. & Rio Salado Pkwy.



TOTAL	AM	MD	PM
2	0		2
4	0		4
0	0		0

AM	MD	PM	TOTAL
297		371	668
6		1	7
136		319	455

TOTAL	AM	MD	PM
2	0		2
291	49		242
390	120		270

LOCATION #: 18-1061-001

TURNING MOVEMENT COUNT

Ash Ave. & Rio Salado Pkwy.
(Intersection Name)

THURSDAY 02/08/18
Day Date

COUNT PERIODS		
AM	700AM	- 800AM
NOON	-	-
PM	400PM	- 500PM

AM PEAK HOUR 700 AM

NOON PEAK HOUR _____

PM PEAK HOUR 400 PM

Intersection Turning Movement Prepared by:



FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745



N-S STREET: **Ash Ave.** DATE: **02/08/18** LOCATION: **Tempe**
 E-W STREET: **Rio Salado Pkwy.** DAY: **THURSDAY** PROJECT# **18-1061-001**

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
	1	2	0	2	0.5	0.5	0	1	0	0.5	0.5	2	

6:00 AM													
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM	0	10	30	64	35	2	0	0	0	20	1	53	215
7:15 AM	0	13	28	76	55	2	0	0	0	27	0	78	279
7:30 AM	0	12	33	88	47	1	0	0	0	42	5	81	309
7:45 AM	0	14	29	47	40	0	0	0	0	47	0	85	262
8:00 AM													
8:15 AM													
8:30 AM													
8:45 AM													
9:00 AM													
9:15 AM													
9:30 AM													
9:45 AM													
10:00 AM													
10:15 AM													
10:30 AM													
10:45 AM													
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	0	49	120	275	177	5	0	0	0	136	6	297	1065
Approach %	0.00	28.99	71.01	60.18	38.73	1.09	####	####	####	30.98	1.37	67.65	
App/Depart	169	/	346	457	/	313	0	/	395	439	/	11	

AM Peak Hr Begins at: 700 AM

PEAK													
Volumes	0	49	120	275	177	5	0	0	0	136	6	297	1065
Approach %	0.00	28.99	71.01	60.18	38.73	1.09	####	####	####	30.98	1.37	67.65	

PEAK HR.													
FACTOR:		0.939		0.840		0.000		0.831		0.862			

CONTROL: **Signal**
 COMMENT 1:
 GPS: **33.429366, -111.942811**

Intersection Turning Movement



FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745



N-S STREET: **Ash Ave.** DATE: **02/08/18** LOCATION: **Tempe**
 E-W STREET: **Rio Salado Pkwy.** DAY: **THURSDAY** PROJECT# **18-1061-001**

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
	1	2	0	2	0.5	0.5	0	1	0	0.5	0.5	2	

1:00 PM													
1:15 PM													
1:30 PM													
1:45 PM													
2:00 PM													
2:15 PM													
2:30 PM													
2:45 PM													
3:00 PM													
3:15 PM													
3:30 PM													
3:45 PM													
4:00 PM	0	72	81	80	32	0	1	2	0	73	0	82	423
4:15 PM	0	61	74	90	31	0	0	0	0	60	1	102	419
4:30 PM	1	56	60	98	35	0	0	1	0	100	0	110	461
4:45 PM	1	53	55	73	42	1	1	1	0	86	0	77	390
5:00 PM													
5:15 PM													
5:30 PM													
5:45 PM													
6:00 PM													
6:15 PM													
6:30 PM													
6:45 PM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	2	242	270	341	140	1	2	4	0	319	1	371	1693
Approach %	0.39	47.08	52.53	70.75	29.05	0.21	33.33	66.67	0.00	46.16	0.14	53.69	
App/Depart	514	/	615	482	/	459	6	/	615	691	/	4	

PM Peak Hr Begins at: 400 PM

PEAK

Volumes	2	242	270	341	140	1	2	4	0	319	1	371	1693
Approach %	0.39	47.08	52.53	70.75	29.05	0.21	33.33	66.67	0.00	46.16	0.14	53.69	

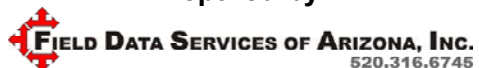
PEAK HR.

FACTOR:	0.840	0.906	0.500	0.823	0.918
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CONTROL: **Signal**
 COMMENT 1: **0**
 GPS: **33.429366, -111.942811**

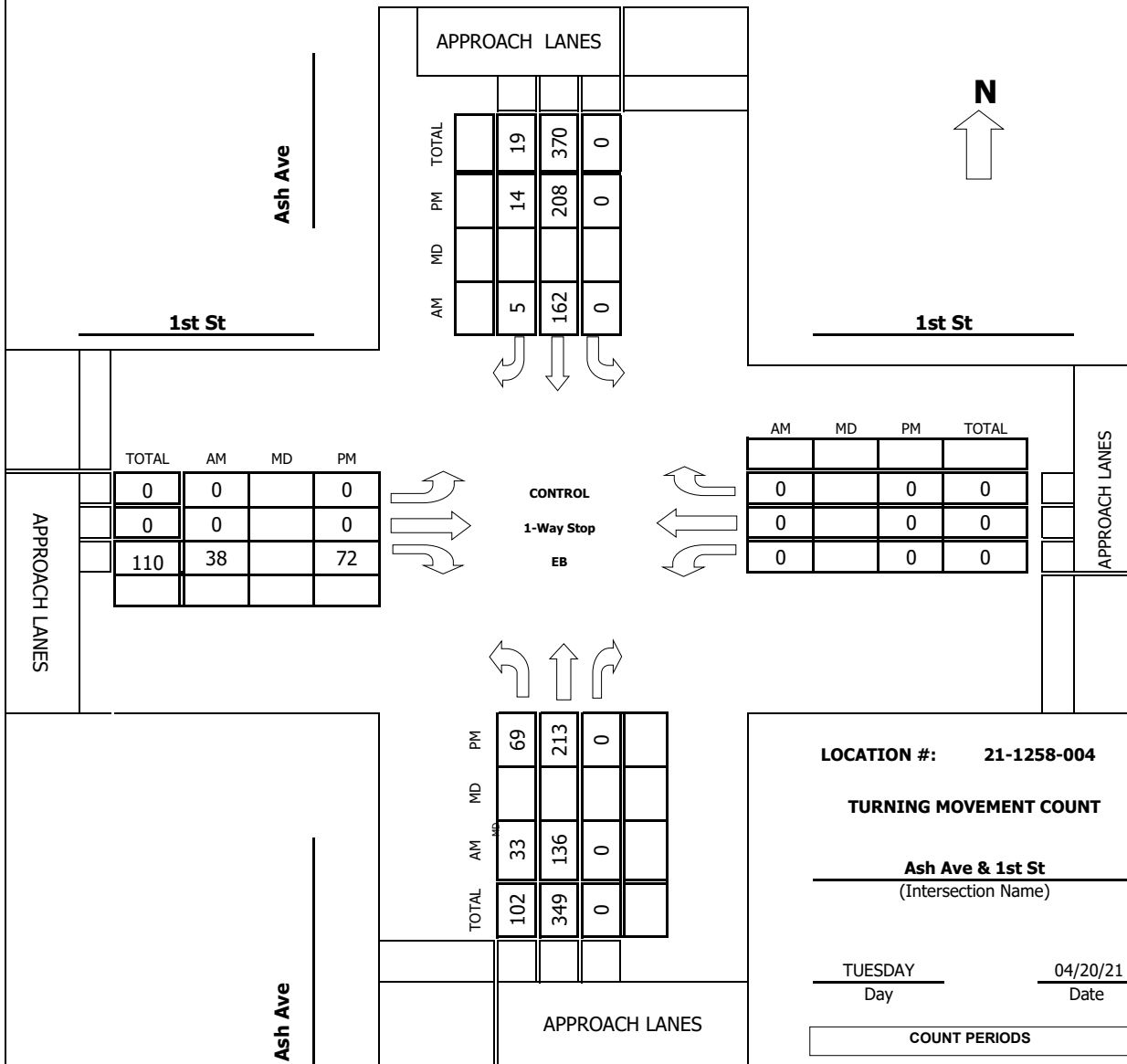
Intersection Turning Movement

Prepared by:



Project #: 21-1258-004

TMC SUMMARY OF Ash Ave & 1st St



APPROACH LANES					
	AM	MD	PM	TOTAL	
Left	5		14	19	
Through	162		208	370	
Right	0		0	0	

	AM	MD	PM	TOTAL
Left	0		0	0
Through	0		0	0
Right	0		0	0

	TOTAL	AM	MD	PM
Left	0	0		0
Through	0	0		0
Right	110	38		72

	TOTAL	AM	MD	PM
Left	102	33		69
Through	349	136		213
Right	0	0		0

LOCATION #: **21-1258-004**

TURNING MOVEMENT COUNT

Ash Ave & 1st St
(Intersection Name)

TUESDAY 04/20/21
Day Date

COUNT PERIODS	
AM	700AM - 900AM
NOON	-
PM	400PM - 600PM

AM PEAK HOUR 800 AM
NOON PEAK HOUR _____
PM PEAK HOUR 445 PM

Intersection Turning Movement Prepared by:



FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745



N-S STREET: **Ash Ave** DATE: **04/20/21** LOCATION: **Tempe**
 E-W STREET: **1st St** DAY: **TUESDAY** PROJECT# **21-1258-004**

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
	1	1	0	0	3	0	0	0	1	0	0	0	
6:00 AM													
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM	2	26	0	0	25	0	0	0	7	0	0	0	60
7:15 AM	3	33	0	0	35	1	0	0	7	0	0	0	79
7:30 AM	8	30	0	0	32	2	0	0	5	0	0	0	77
7:45 AM	12	40	0	0	34	6	2	0	4	0	0	0	98
8:00 AM	6	36	0	0	34	1	0	0	9	0	0	0	86
8:15 AM	3	27	0	0	48	1	0	0	15	0	0	0	94
8:30 AM	7	32	0	0	37	2	0	0	7	0	0	0	85
8:45 AM	17	41	0	0	43	1	0	0	7	0	0	0	109
9:00 AM													
9:15 AM													
9:30 AM													
9:45 AM													
10:00 AM													
10:15 AM													
10:30 AM													
10:45 AM													
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	58	265	0	0	288	14	2	0	61	0	0	0	688
Approach %	17.96	82.04	0.00	0.00	95.36	4.64	3.17	0.00	96.83	####	####	####	
App/Depart	323	/	267	302	/	349	63	/	0	0	/	72	

AM Peak Hr Begins at: 800 AM

PEAK

Volumes	33	136	0	0	162	5	0	0	38	0	0	0	374
Approach %	19.53	80.47	0.00	0.00	97.01	2.99	0.00	0.00	100.00	####	####	####	

PEAK HR.

FACTOR:	0.728	0.852	0.633	0.000	0.858
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CONTROL: **1-Way Stop (EB)**
 COMMENT 1:
 GPS: **33.429701, -111.943024**

Intersection Turning Movement



FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745



N-S STREET: **Ash Ave** DATE: **04/20/21** LOCATION: **Tempe**
 E-W STREET: **1st St** DAY: **TUESDAY** PROJECT#: **21-1258-004**

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
	1	1	0	0	3	0	0	0	1	0	0	0	

1:00 PM													
1:15 PM													
1:30 PM													
1:45 PM													
2:00 PM													
2:15 PM													
2:30 PM													
2:45 PM													
3:00 PM													
3:15 PM													
3:30 PM													
3:45 PM													
4:00 PM	24	31	0	0	53	1	0	0	25	0	0	0	134
4:15 PM	10	67	0	0	51	1	0	0	9	0	0	0	138
4:30 PM	12	46	0	0	43	2	0	0	20	0	0	0	123
4:45 PM	18	59	0	0	44	5	0	0	23	0	0	0	149
5:00 PM	20	46	0	0	69	2	0	0	29	0	0	0	166
5:15 PM	16	52	0	0	46	3	0	0	13	0	0	0	130
5:30 PM	15	56	0	0	49	4	0	0	7	0	0	0	131
5:45 PM	16	57	0	0	55	1	0	0	16	0	0	0	145
6:00 PM													
6:15 PM													
6:30 PM													
6:45 PM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	131	414	0	0	410	19	0	0	142	0	0	0	1116
Approach %	24.04	75.96	0.00	0.00	95.57	4.43	0.00	0.00	100.00	####	####	####	
App/Depart	545	/	414	429	/	552	142	/	0	0	/	150	

PM Peak Hr Begins at: 445 PM

PEAK

Volumes	69	213	0	0	208	14	0	0	72	0	0	0	576
Approach %	24.47	75.53	0.00	0.00	93.69	6.31	0.00	0.00	100.00	####	####	####	

PEAK HR.

FACTOR:	0.916	0.782	0.621	0.000	0.867
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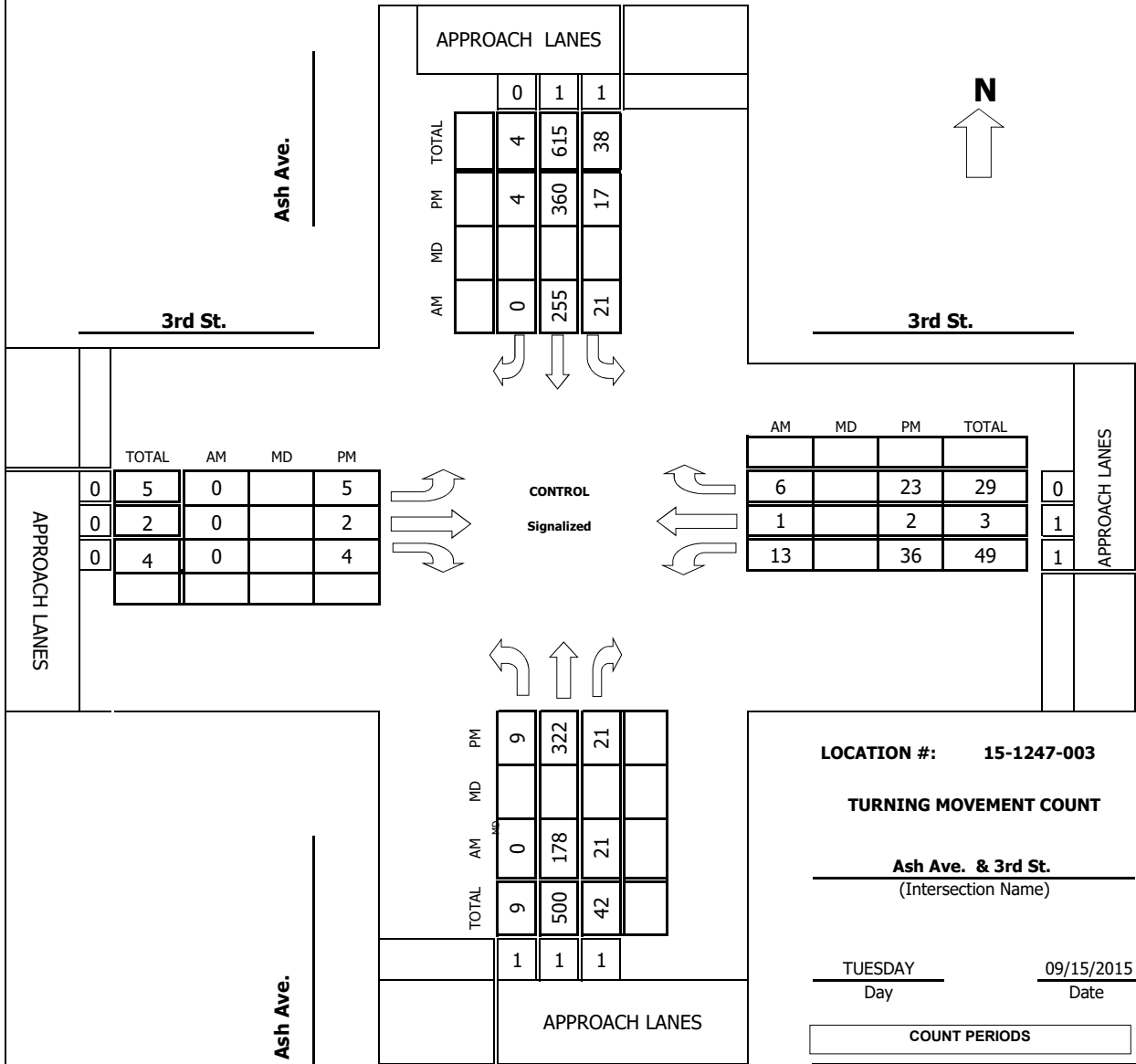
CONTROL: **1-Way Stop (EB)**
 COMMENT 1: **0**
 GPS: **33.429701, -111.943024**

Intersection Turning Movement
Prepared by:



Project #: 15-1247-003

TMC SUMMARY OF Ash Ave. & 3rd St.



LOCATION #: 15-1247-003

TURNING MOVEMENT COUNT

Ash Ave. & 3rd St.
(Intersection Name)

TUESDAY 09/15/2015
Day Date

COUNT PERIODS

AM	700AM - 900AM
NOON	-
PM	400PM - 600PM

AM PEAK HOUR 745 AM

NOON PEAK HOUR _____

PM PEAK HOUR 445 PM

Intersection Turning Movement Prepared by:



FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745



N-S STREET: **Ash Ave.** DATE: **09/15/2015** LOCATION: **Tempe**
 E-W STREET: **3rd St.** DAY: **TUESDAY** PROJECT# **15-1247-003**

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
	1	1	1	1	1	0	0	0	0	1	1	0	
6:00 AM													
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM	0	27	2	3	44	0	0	0	0	3	0	1	80
7:15 AM	0	40	2	0	60	0	0	0	0	2	0	1	105
7:30 AM	0	49	6	3	57	0	0	0	0	3	0	4	122
7:45 AM	0	51	3	4	70	0	0	0	0	5	1	0	134
8:00 AM	0	44	8	7	55	0	0	0	0	1	0	2	117
8:15 AM	0	40	3	1	57	0	0	0	0	4	0	3	108
8:30 AM	0	43	7	9	73	0	0	0	0	3	0	1	136
8:45 AM	1	29	3	3	90	0	0	0	0	1	0	1	128
9:00 AM													
9:15 AM													
9:30 AM													
9:45 AM													
10:00 AM													
10:15 AM													
10:30 AM													
10:45 AM													
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	1	323	34	30	506	0	0	0	0	22	1	13	930
Approach %	0.28	90.22	9.50	5.60	94.40	0.00	####	####	####	61.11	2.78	36.11	
App/Depart	358	/	336	536	/	528	0	/	64	36	/	2	

AM Peak Hr Begins at: 745 AM

PEAK

Volumes	0	178	21	21	255	0	0	0	0	13	1	6	495
Approach %	0.00	89.45	10.55	7.61	92.39	0.00	####	####	####	65.00	5.00	30.00	

PEAK HR.

FACTOR:	0.921	0.841	0.000	0.714	0.910
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CONTROL: **Signalized**
 COMMENT 1:
 GPS: **33.427398, -111.942779**

Intersection Turning Movement



FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745



N-S STREET: **Ash Ave.** DATE: **09/15/2015** LOCATION: **Tempe**
 E-W STREET: **3rd St.** DAY: **TUESDAY** PROJECT#: **15-1247-003**

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
	1	1	1	1	1	0	0	0	0	1	1	0	

1:00 PM													
1:15 PM													
1:30 PM													
1:45 PM													
2:00 PM													
2:15 PM													
2:30 PM													
2:45 PM													
3:00 PM													
3:15 PM													
3:30 PM													
3:45 PM													
4:00 PM	1	106	7	5	73	0	0	0	3	7	0	5	207
4:15 PM	2	72	7	2	67	0	0	0	2	5	1	4	162
4:30 PM	1	74	5	3	102	1	0	0	0	9	0	3	198
4:45 PM	1	80	7	6	80	1	0	0	0	7	0	8	190
5:00 PM	0	84	2	3	94	1	2	0	2	12	0	8	208
5:15 PM	5	80	8	4	91	1	0	0	2	6	1	4	202
5:30 PM	3	78	4	4	95	1	3	2	0	11	1	3	205
5:45 PM	5	66	10	0	76	3	0	0	0	6	0	3	169
6:00 PM													
6:15 PM													
6:30 PM													
6:45 PM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	18	640	50	27	678	8	5	2	9	63	3	38	1541
Approach %	2.54	90.40	7.06	3.79	95.09	1.12	31.25	12.50	56.25	60.58	2.88	36.54	
App/Depart	708	/	683	713	/	750	16	/	79	104	/	29	

PM Peak Hr Begins at: 445 PM

PEAK

Volumes	9	322	21	17	360	4	5	2	4	36	2	23	805
Approach %	2.56	91.48	5.97	4.46	94.49	1.05	45.45	18.18	36.36	59.02	3.28	37.70	

PEAK HR.

FACTOR:	0.946	0.953	0.550	0.763	0.968
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CONTROL: **Signalized**
 COMMENT 1: **0**
 GPS: **33.427398, -111.942779**

AM Peak Hour		Northbound			Southbound			Eastbound			Westbound			TOTAL	
Time	Start	Finish	left	through	right	peds	left	through	right	peds	left	through	right		peds
	7:00 AM	7:15 AM	-	-	2	-	2	-	-	-	5	-	2	-	11
	7:15 AM	7:30 AM	-	-	8	-	1	-	-	-	7	-	3	-	19
	7:30 AM	7:45 AM	-	-	6	-	2	-	-	-	6	-	2	-	16
	7:45 AM	8:00 AM	-	-	6	-	1	-	-	-	2	-	4	-	13
	8:00 AM	8:15 AM	-	-	7	-	4	-	-	-	5	-	1	-	17
	8:15 AM	8:30 AM	-	-	6	-	1	-	-	-	6	-	2	-	15
	8:30 AM	8:45 AM	-	-	12	-	6	-	-	-	3	-	1	-	22
	8:45 AM	9:00 AM	-	-	10	-	4	-	-	-	15	-	2	-	31
	7:00 AM	9:00 AM	-	-	57	-	21	-	-	-	49	-	17	-	144
	8:00 AM	9:00 AM	-	-	35	-	15	-	-	-	29	-	6	-	85

Peak Hour Factor (PHF) 0.6855

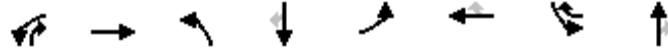
PM Peak Hour		Northbound			Southbound			Eastbound			Westbound			TOTAL	
Time	Start	Finish	left	through	right	peds	left	through	right	peds	left	through	right		peds
	4:00 PM	4:15 PM	-	-	10	-	-	-	-	-	3	-	4	-	17
	4:15 PM	4:30 PM	-	-	8	-	5	-	-	-	2	-	2	-	17
	4:30 PM	4:45 PM	-	-	6	-	-	-	-	-	6	-	2	-	14
	4:45 PM	5:00 PM	-	-	13	-	2	-	-	-	5	-	-	-	20
	5:00 PM	5:15 PM	-	-	17	-	4	-	-	-	5	-	3	-	29
	5:15 PM	5:30 PM	-	-	15	-	5	-	-	-	8	-	3	-	31
	5:30 PM	5:45 PM	-	-	20	-	17	-	-	-	15	-	6	-	58
	5:45 PM	6:00 PM	-	-	19	-	9	-	-	-	9	-	5	-	42
	4:00 PM	6:00 PM	-	-	108	-	42	-	-	-	53	-	25	-	228
	5:00 PM	6:00 PM	-	-	71	-	35	-	-	-	37	-	17	-	160

Peak Hour Factor (PHF) 0.6897

APPENDIX C

2021 EXISTING PEAK HOUR CAPACITY ANALYSIS

Intersection						
Intersection Delay, s/veh	5.0					
Intersection LOS	A					
Approach	EB	WB		NB	SB	
Entry Lanes	1	2		1	2	
Conflicting Circle Lanes	2	2		2	2	
Adj Approach Flow, veh/h	50	509		199	505	
Demand Flow Rate, veh/h	51	519		203	515	
Vehicles Circulating, veh/h	671	64		336	208	
Vehicles Exiting, veh/h	52	475		386	375	
Ped Vol Crossing Leg, #/h	0	0		0	0	
Ped Cap Adj	1.000	1.000		1.000	1.000	
Approach Delay, s/veh	5.2	4.5		5.2	5.3	
Approach LOS	A	A		A	A	
Lane	Left	Left	Right	Left	Left	Right
Designated Moves	LTR	LT	R	LTR	L	LTR
Assumed Moves	LTR	LT	R	LTR	L	LTR
RT Channelized						
Lane Util	1.000	0.383	0.617	1.000	0.530	0.470
Follow-Up Headway, s	2.535	2.667	2.535	2.535	2.667	2.535
Critical Headway, s	4.328	4.645	4.328	4.328	4.645	4.328
Entry Flow, veh/h	51	199	320	203	273	242
Cap Entry Lane, veh/h	803	1273	1345	1067	1115	1190
Entry HV Adj Factor	0.986	0.981	0.981	0.980	0.980	0.980
Flow Entry, veh/h	50	195	314	199	268	237
Cap Entry, veh/h	792	1249	1320	1046	1093	1167
V/C Ratio	0.064	0.156	0.238	0.190	0.245	0.203
Control Delay, s/veh	5.2	4.2	4.8	5.2	5.6	4.9
LOS	A	A	A	A	A	A
95th %tile Queue, veh	0	1	1	1	1	1

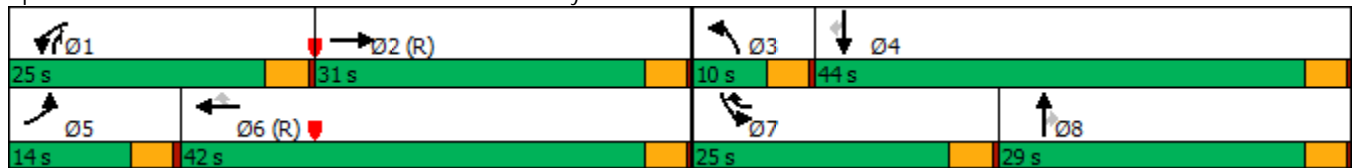


Phase Number	1	2	3	4	5	6	7	8
Movement	WBL	EBT	NBL	SBT	EBL	WBT	SBL	NBT
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	25	31	10	44	14	42	25	29
Maximum Split (%)	22.7%	28.2%	9.1%	40.0%	12.7%	38.2%	22.7%	26.4%
Minimum Split (s)	9	20	9	20	9	20	9	20
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Minimum Initial (s)	5	5	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0	0
Walk Time (s)		5		5		5		5
Flash Dont Walk (s)		11		11		11		11
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	85	0	31	41	85	99	31	56
End Time (s)	0	31	41	85	99	31	56	85
Yield/Force Off (s)	106	27	37	81	95	27	52	81
Yield/Force Off 170(s)	106	16	37	70	95	16	52	70
Local Start Time (s)	85	0	31	41	85	99	31	56
Local Yield (s)	106	27	37	81	95	27	52	81
Local Yield 170(s)	106	16	37	70	95	16	52	70

Intersection Summary
























Cycle Length	110
Control Type	Actuated-Coordinated
Natural Cycle	65
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green	

Splits and Phases: 2: Mill Avenue & Rio Salado Parkway



Existing 2021 AM
250 RIO

2: Mill Avenue & Rio Salado Parkway
HCM 6th Signalized Intersection Summary

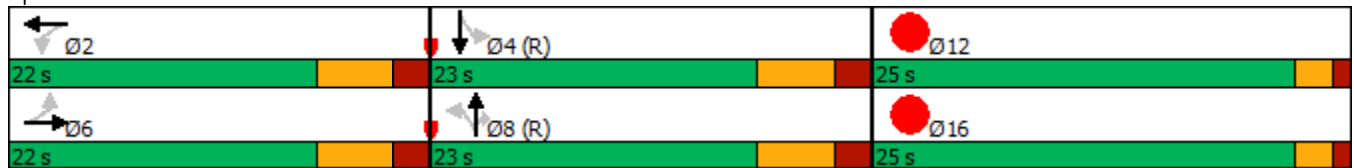
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	356	24	171	383	131	17	220	129	174	297	97
Future Volume (veh/h)	60	356	24	171	383	131	17	220	129	174	297	97
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	65	387	26	186	416	142	18	239	140	189	323	105
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	84	1534	103	219	1881	1036	34	287	438	222	484	410
Arrive On Green	0.05	0.45	0.45	0.12	0.53	0.53	0.02	0.15	0.15	0.12	0.26	0.26
Sat Flow, veh/h	1781	3380	226	1781	3554	1585	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	65	203	210	186	416	142	18	239	140	189	323	105
Grp Sat Flow(s),veh/h/ln	1781	1777	1830	1781	1777	1585	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	4.0	7.7	7.8	11.3	6.9	3.7	1.1	13.6	7.7	11.4	17.0	5.8
Cycle Q Clear(g_c), s	4.0	7.7	7.8	11.3	6.9	3.7	1.1	13.6	7.7	11.4	17.0	5.8
Prop In Lane	1.00		0.12	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	84	806	830	219	1881	1036	34	287	438	222	484	410
V/C Ratio(X)	0.77	0.25	0.25	0.85	0.22	0.14	0.53	0.83	0.32	0.85	0.67	0.26
Avail Cap(c_a), veh/h	162	806	830	340	1881	1036	97	425	555	340	680	576
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.8	18.5	18.5	47.3	13.8	7.2	53.4	45.2	31.6	47.2	36.5	32.4
Incr Delay (d2), s/veh	14.0	0.7	0.7	11.6	0.3	0.3	11.9	8.7	0.4	12.1	1.6	0.3
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(95%),veh/ln	3.8	6.0	6.2	9.6	5.0	2.3	1.1	11.3	5.4	9.7	12.5	4.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.8	19.3	19.3	58.9	14.1	7.5	65.4	53.9	32.0	59.3	38.1	32.7
LnGrp LOS	E	B	B	E	B	A	E	D	C	E	D	C
Approach Vol, veh/h		478			744			397			617	
Approach Delay, s/veh		25.6			24.0			46.7			43.7	
Approach LOS		C			C			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.5	53.9	6.1	32.5	9.2	62.2	17.7	20.9				
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Max Green Setting (Gmax), s	21.0	27.0	6.0	40.0	10.0	38.0	21.0	25.0				
Max Q Clear Time (g_c+I1), s	13.3	9.8	3.1	19.0	6.0	8.9	13.4	15.6				
Green Ext Time (p_c), s	0.3	2.2	0.0	2.2	0.0	3.4	0.3	1.3				
Intersection Summary												
HCM 6th Ctrl Delay				33.8								
HCM 6th LOS				C								

























Phase Number	2	4	6	8	12	16
Movement	WBTL	SBTL	EBTL	NBTL	Hold	Hold
Lead/Lag						
Lead-Lag Optimize						
Recall Mode	None	C-Max	None	C-Max	None	None
Maximum Split (s)	22	23	22	23	25	25
Maximum Split (%)	31.4%	32.9%	31.4%	32.9%	35.7%	35.7%
Minimum Split (s)	23	23	23	23	22	22
Yellow Time (s)	4	4	4	4	2	2
All-Red Time (s)	2	2	2	2	1	1
Minimum Initial (s)	5	5	5	5	5	5
Vehicle Extension (s)	2	0.2	2	0.2	0.2	0.2
Minimum Gap (s)	2	0.2	2	0.2	0.2	0.2
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)	5	5	5	5		
Flash Dont Walk (s)	12	12	12	12		
Dual Entry	Yes	Yes	Yes	Yes	Yes	Yes
Inhibit Max	No	No	No	No	Yes	Yes
Start Time (s)	48	0	48	0	23	23
End Time (s)	0	23	0	23	48	48
Yield/Force Off (s)	64	17	64	17	45	45
Yield/Force Off 170(s)	52	5	52	5	45	45
Local Start Time (s)	48	0	48	0	23	23
Local Yield (s)	64	17	64	17	45	45
Local Yield 170(s)	52	5	52	5	45	45

Intersection Summary	
Cycle Length	70
Control Type	Actuated-Coordinated
Natural Cycle	70
Offset: 0 (0%), Referenced to phase 4:SBTL and 8:NBTL, Start of Green	

Splits and Phases: 3: Ash Avenue & 3rd Street



													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	0	0	0	15	0	7	0	200	24	24	287	0	
Future Volume (vph)	0	0	0	15	0	7	0	200	24	24	287	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)				3.0	3.0			3.0	3.0	3.0	3.0		
Lane Util. Factor				1.00	1.00			1.00	1.00	1.00	1.00		
Fr _t				1.00	0.85			1.00	0.85	1.00	1.00		
Fl _t Protected				0.95	1.00			1.00	1.00	0.95	1.00		
Satd. Flow (prot)				1770	1583			1863	1583	1770	1863		
Fl _t Permitted				0.76	1.00			1.00	1.00	0.62	1.00		
Satd. Flow (perm)				1410	1583			1863	1583	1154	1863		
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
Adj. Flow (vph)	0	0	0	17	0	8	0	222	27	27	319	0	
RTOR Reduction (vph)	0	0	0	0	7	0	0	0	4	0	0	0	
Lane Group Flow (vph)	0	0	0	17	1	0	0	222	23	27	319	0	
Turn Type	Perm			Perm	NA		Perm	NA	Perm	Perm	NA		
Protected Phases		6			2			8				4	
Permitted Phases	6			2			8		8	4			
Actuated Green, G (s)				2.6	2.6			55.4	55.4	55.4	55.4		
Effective Green, g (s)				5.6	5.6			58.4	58.4	58.4	58.4		
Actuated g/C Ratio				0.08	0.08			0.83	0.83	0.83	0.83		
Clearance Time (s)				6.0	6.0			6.0	6.0	6.0	6.0		
Vehicle Extension (s)				2.0	2.0			0.2	0.2	0.2	0.2		
Lane Grp Cap (vph)				112	126			1554	1320	962	1554		
v/s Ratio Prot					0.00			0.12				c0.17	
v/s Ratio Perm				c0.01					0.01	0.02			
v/c Ratio				0.15	0.01			0.14	0.02	0.03	0.21		
Uniform Delay, d1				30.0	29.6			1.1	1.0	1.0	1.2		
Progression Factor				1.00	1.00			1.00	1.00	1.00	1.00		
Incremental Delay, d2				0.2	0.0			0.2	0.0	0.1	0.3		
Delay (s)				30.2	29.6			1.3	1.0	1.0	1.5		
Level of Service				C	C			A	A	A	A		
Approach Delay (s)		0.0			30.0			1.3			1.4		
Approach LOS		A			C			A			A		
Intersection Summary													
HCM 2000 Control Delay			2.5									HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.21										
Actuated Cycle Length (s)			70.0									Sum of lost time (s)	9.0
Intersection Capacity Utilization			30.8%									ICU Level of Service	A
Analysis Period (min)			15										

c Critical Lane Group

Intersection						
Int Delay, s/veh	0.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↗	↕↔		↙	↕↕
Traffic Vol, veh/h	35	7	290	42	18	419
Future Vol, veh/h	35	7	290	42	18	419
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	180	-
Veh in Median Storage, #	1	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	38	8	315	46	20	455

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	606	181	0	0	361	0
Stage 1	338	-	-	-	-	-
Stage 2	268	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	429	831	-	-	1194	-
Stage 1	694	-	-	-	-	-
Stage 2	753	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	422	831	-	-	1194	-
Mov Cap-2 Maneuver	519	-	-	-	-	-
Stage 1	694	-	-	-	-	-
Stage 2	740	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBT	NBRWBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	519	831	1194
HCM Lane V/C Ratio	-	-	0.073	0.009	0.016
HCM Control Delay (s)	-	-	12.5	9.4	8.1
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0	0.1

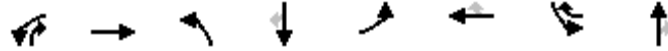
Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕	↗		↕
Traffic Vol, veh/h	0	0	297	0	0	437
Future Vol, veh/h	0	0	297	0	0	437
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	65	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	323	0	0	475

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	-	162	0	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-
Pot Cap-1 Maneuver	0	854	-	-	0
Stage 1	0	-	-	-	0
Stage 2	0	-	-	-	0
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	-	854	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

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

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

Intersection						
Intersection Delay, s/veh	9.0					
Intersection LOS	A					
Approach	EB	WB		NB	SB	
Entry Lanes	1	2		1	2	
Conflicting Circle Lanes	2	2		2	2	
Adj Approach Flow, veh/h	94	812		603	527	
Demand Flow Rate, veh/h	95	828		614	537	
Vehicles Circulating, veh/h	903	302		421	475	
Vehicles Exiting, veh/h	109	733		577	655	
Ped Vol Crossing Leg, #/h	0	0		0	0	
Ped Cap Adj	1.000	1.000		1.000	1.000	
Approach Delay, s/veh	7.2	7.8		12.6	7.3	
Approach LOS	A	A		B	A	
Lane	Left	Left	Right	Left	Left	Right
Designated Moves	LTR	LT	R	LTR	L	LTR
Assumed Moves	LTR	LT	R	LTR	L	LTR
RT Channelized						
Lane Util	1.000	0.547	0.453	1.000	0.531	0.469
Follow-Up Headway, s	2.535	2.667	2.535	2.535	2.667	2.535
Critical Headway, s	4.328	4.645	4.328	4.328	4.645	4.328
Entry Flow, veh/h	95	453	375	614	285	252
Cap Entry Lane, veh/h	659	1022	1099	993	872	948
Entry HV Adj Factor	0.988	0.979	0.981	0.982	0.979	0.982
Flow Entry, veh/h	94	444	368	603	279	248
Cap Entry, veh/h	651	1001	1078	975	854	932
V/C Ratio	0.144	0.443	0.341	0.618	0.327	0.266
Control Delay, s/veh	7.2	8.6	6.8	12.6	7.9	6.6
LOS	A	A	A	B	A	A
95th %tile Queue, veh	1	2	2	4	1	1

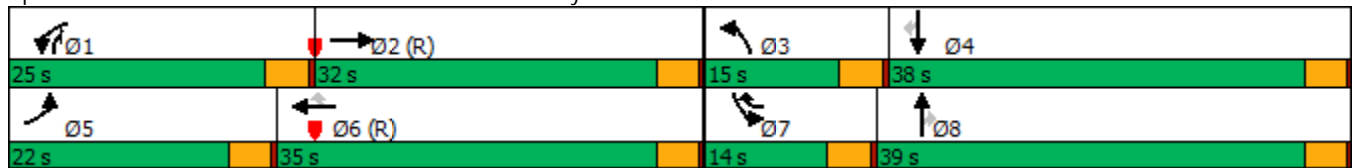


Phase Number	1	2	3	4	5	6	7	8
Movement	WBL	EBT	NBL	SBT	EBL	WBT	SBL	NBT
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	25	32	15	38	22	35	14	39
Maximum Split (%)	22.7%	29.1%	13.6%	34.5%	20.0%	31.8%	12.7%	35.5%
Minimum Split (s)	9	20	14	20	9	20	9	20
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Minimum Initial (s)	5	5	10	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0	0
Walk Time (s)		5		5		5		5
Flash Dont Walk (s)		11		11		11		11
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	85	0	32	47	85	107	32	46
End Time (s)	0	32	47	85	107	32	46	85
Yield/Force Off (s)	106	28	43	81	103	28	42	81
Yield/Force Off 170(s)	106	17	43	70	103	17	42	70
Local Start Time (s)	85	0	32	47	85	107	32	46
Local Yield (s)	106	28	43	81	103	28	42	81
Local Yield 170(s)	106	17	43	70	103	17	42	70

Intersection Summary
























Cycle Length	110
Control Type	Actuated-Coordinated
Natural Cycle	75
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green	

Splits and Phases: 2: Mill Avenue & Rio Salado Parkway



Existing 2021 PM
250 RIO

2: Mill Avenue & Rio Salado Parkway
HCM 6th Signalized Intersection Summary

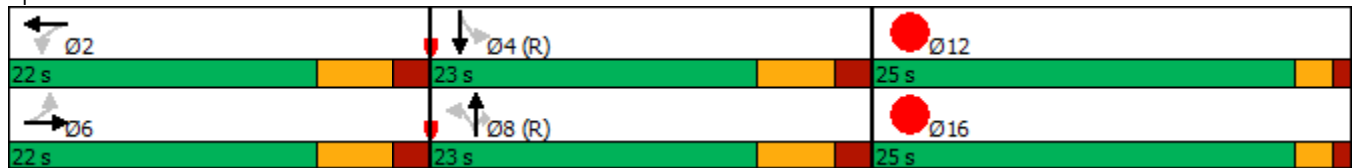
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	222	436	52	224	498	468	21	471	160	144	323	213
Future Volume (veh/h)	222	436	52	224	498	468	21	471	160	144	323	213
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	241	474	57	243	541	509	23	512	174	157	351	232
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	270	1000	120	275	1121	644	82	554	714	162	639	541
Arrive On Green	0.15	0.31	0.31	0.15	0.32	0.32	0.05	0.30	0.30	0.09	0.34	0.34
Sat Flow, veh/h	1781	3196	383	1781	3554	1585	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	241	263	268	243	541	509	23	512	174	157	351	232
Grp Sat Flow(s),veh/h/ln	1781	1777	1801	1781	1777	1585	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	14.6	13.1	13.2	14.7	13.5	30.9	1.4	29.2	7.5	9.7	16.7	12.4
Cycle Q Clear(g_c), s	14.6	13.1	13.2	14.7	13.5	30.9	1.4	29.2	7.5	9.7	16.7	12.4
Prop In Lane	1.00		0.21	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	270	556	564	275	1121	644	82	554	714	162	639	541
V/C Ratio(X)	0.89	0.47	0.48	0.88	0.48	0.79	0.28	0.92	0.24	0.97	0.55	0.43
Avail Cap(c_a), veh/h	291	556	564	340	1121	644	178	595	749	162	639	541
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.8	30.5	30.5	45.6	30.4	28.5	50.7	37.5	18.6	49.8	29.4	27.9
Incr Delay (d2), s/veh	26.0	2.9	2.9	20.0	1.5	9.6	1.9	19.6	0.2	61.4	1.0	0.5
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(95%),veh/ln	13.1	10.0	10.2	12.6	10.0	19.1	1.2	22.7	4.9	11.4	12.2	8.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	71.8	33.3	33.4	65.6	31.9	38.1	52.6	57.0	18.8	111.3	30.4	28.5
LnGrp LOS	E	C	C	E	C	D	D	E	B	F	C	C
Approach Vol, veh/h		772			1293			709			740	
Approach Delay, s/veh		45.3			40.7			47.5			46.9	
Approach LOS		D			D			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	21.0	38.4	9.0	41.6	20.7	38.7	14.0	36.6				
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Max Green Setting (Gmax), s	21.0	28.0	11.0	34.0	18.0	31.0	10.0	35.0				
Max Q Clear Time (g_c+I1), s	16.7	15.2	3.4	18.7	16.6	32.9	11.7	31.2				
Green Ext Time (p_c), s	0.3	2.6	0.0	2.6	0.1	0.0	0.0	1.4				
Intersection Summary												
HCM 6th Ctrl Delay			44.4									
HCM 6th LOS			D									



Phase Number	2	4	6	8	12	16
Movement	WBTL	SBTL	EBTL	NBTL	Hold	Hold
Lead/Lag						
Lead-Lag Optimize						
Recall Mode	None	C-Max	None	C-Max	None	None
Maximum Split (s)	22	23	22	23	25	25
Maximum Split (%)	31.4%	32.9%	31.4%	32.9%	35.7%	35.7%
Minimum Split (s)	23	23	23	23	22	22
Yellow Time (s)	4	4	4	4	2	2
All-Red Time (s)	2	2	2	2	1	1
Minimum Initial (s)	5	5	5	5	5	5
Vehicle Extension (s)	2	0.2	2	0.2	0.2	0.2
Minimum Gap (s)	2	0.2	2	0.2	0.2	0.2
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)	5	5	5	5		
Flash Dont Walk (s)	12	12	12	12		
Dual Entry	Yes	Yes	Yes	Yes	Yes	Yes
Inhibit Max	No	No	No	No	Yes	Yes
Start Time (s)	48	0	48	0	23	23
End Time (s)	0	23	0	23	48	48
Yield/Force Off (s)	64	17	64	17	45	45
Yield/Force Off 170(s)	52	5	52	5	45	45
Local Start Time (s)	48	0	48	0	23	23
Local Yield (s)	64	17	64	17	45	45
Local Yield 170(s)	52	5	52	5	45	45























Intersection Summary	
Cycle Length	70
Control Type	Actuated-Coordinated
Natural Cycle	70
Offset: 0 (0%), Referenced to phase 4:SBTL and 8:NBTL, Start of Green	

Splits and Phases: 3: Ash Avenue & 3rd Street



Existing 2021 PM
250 RIO

3: Ash Avenue & 3rd Street
HCM Signalized Intersection Capacity Analysis

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	41	0	26	0	363	24	19	405	0
Future Volume (vph)	0	0	0	41	0	26	0	363	24	19	405	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				3.0	3.0			3.0	3.0	3.0	3.0	
Lane Util. Factor				1.00	1.00			1.00	1.00	1.00	1.00	
Fr _t				1.00	0.85			1.00	0.85	1.00	1.00	
Fl _t Protected				0.95	1.00			1.00	1.00	0.95	1.00	
Satd. Flow (prot)				1770	1583			1863	1583	1770	1863	
Fl _t Permitted				0.76	1.00			1.00	1.00	0.52	1.00	
Satd. Flow (perm)				1410	1583			1863	1583	960	1863	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	46	0	29	0	403	27	21	450	0
RTOR Reduction (vph)	0	0	0	0	26	0	0	0	5	0	0	0
Lane Group Flow (vph)	0	0	0	46	3	0	0	403	22	21	450	0
Turn Type	Perm			Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		6			2			8				4
Permitted Phases	6			2			8		8	4		
Actuated Green, G (s)				4.9	4.9			53.1	53.1	53.1	53.1	
Effective Green, g (s)				7.9	7.9			56.1	56.1	56.1	56.1	
Actuated g/C Ratio				0.11	0.11			0.80	0.80	0.80	0.80	
Clearance Time (s)				6.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)				2.0	2.0			0.2	0.2	0.2	0.2	
Lane Grp Cap (vph)				159	178			1493	1268	769	1493	
v/s Ratio Prot					0.00			0.22			c0.24	
v/s Ratio Perm				c0.03					0.01	0.02		
v/c Ratio				0.29	0.02			0.27	0.02	0.03	0.30	
Uniform Delay, d1				28.5	27.6			1.8	1.4	1.4	1.8	
Progression Factor				1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2				0.4	0.0			0.4	0.0	0.1	0.5	
Delay (s)				28.8	27.6			2.2	1.4	1.5	2.3	
Level of Service				C	C			A	A	A	A	
Approach Delay (s)		0.0			28.4			2.2			2.3	
Approach LOS		A			C			A			A	
Intersection Summary												
HCM 2000 Control Delay			4.2	HCM 2000 Level of Service					A			
HCM 2000 Volume to Capacity ratio			0.31									
Actuated Cycle Length (s)			70.0	Sum of lost time (s)				9.0				
Intersection Capacity Utilization			32.1%	ICU Level of Service				A				
Analysis Period (min)			15									

c Critical Lane Group

Intersection						
Int Delay, s/veh	1.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	44	20	494	85	42	431
Future Vol, veh/h	44	20	494	85	42	431
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	180	-
Veh in Median Storage, #	1	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	48	22	537	92	46	468

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	909	315	0	0	629
Stage 1	583	-	-	-	-
Stage 2	326	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14
Critical Hdwy Stg 1	5.84	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22
Pot Cap-1 Maneuver	274	681	-	-	949
Stage 1	521	-	-	-	-
Stage 2	704	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	261	681	-	-	949
Mov Cap-2 Maneuver	383	-	-	-	-
Stage 1	521	-	-	-	-
Stage 2	670	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.1	0	0.8
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	383	681	949	-
HCM Lane V/C Ratio	-	-	0.125	0.032	0.048	-
HCM Control Delay (s)	-	-	15.7	10.5	9	-
HCM Lane LOS	-	-	C	B	A	-
HCM 95th %tile Q(veh)	-	-	0.4	0.1	0.2	-

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕	↗		↕
Traffic Vol, veh/h	0	0	514	0	0	473
Future Vol, veh/h	0	0	514	0	0	473
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	-	65	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	559	0	0	514

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	-	280	0	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-
Pot Cap-1 Maneuver	0	717	-	-	0
Stage 1	0	-	-	-	0
Stage 2	0	-	-	-	0
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	-	717	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

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

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

APPENDIX D

TRIP GENERATION CALCULATIONS

Hines 250 Rio

Proposed

Trip Generation

May 2021

Methodology Overview

This form facilitates trip generation estimation using data within the Institute of Transportation Engineer's (ITE) Trip Generation Manual, 10th Edition and methodology described within ITE's Trip Generation Handbook, 3rd Edition. These references will be referred to as Manual and Handbook, respectively. The Manual contains data collected by various transportation professionals for a wide range of different land uses, with each land use category represented by a land use code (LUC). Average rates and equations have been established that correlate the relationship between an independent variable that describes the development size and generated trips for each categorized LUC in various settings and time periods. The Handbook indicates an established methodology for how to use data contained within the Manual when to use the fitted curve instead of the average rate and when to adjustments to the volume of trips are appropriate and how to do so. The methodology steps are represented visually in boxes in Figure 3.1. This worksheet applies calculations for each box if applicable.

Box 1 - Define Study Site Land Use Type & Site Characteristics

The analyst is to pick an appropriate LUC(s) based on the subject's zoning/land use(s)/future land use(s). The size of the land use(s) is described in reference to an independent variable(s) specific to (each) the land use (example: 1,000 square feet of building area is relatively common).

Land Use Types and Size

Proposed Use	Amount Units	ITE LUC	ITE Land Use Name
General Office Building	216,000 1,000 square feet	710	General Office Building
High Turnover (Sit Down) Restaurant	4,500 1,000 square feet	932	High Turnover(Sit Down) Restaurant

Box 2 - Define Site Context

Context assessment is to "simply determine whether the study sites is in a multimodal setting" and "could have persons accessing the site by walking, bicycling, or riding transit." This assessment is used in Box 4. The Manual separates data into 4 setting categories - Rural, General Urban/Suburban, Dense Multi-Urban Use and Center City Core. This worksheet uses the following abbreviations, respectively: R, G, D, and C. The Manual does not have data for all settings of all land use codes. See the table on the next page titled "Site Context and Time Periods" - if this table is not provided, the "General Urban/Suburban" setting is used by default.

Box 3 - Define Analysis Objectives Types of Trips & Time Period

This tool will focus on vehicular trips for a 24-hour period on a typical weekday as well as its AM peak hour and PM peak hour. Other time period(s) may be of interest.

Site Context and Time Periods - Actual Setting, Setting Data Available for LUC, Setting Used in Analyses

Proposed Use	Setting	ADT		AM Peak Hour		PM Peak Hour	
		Available	Used	Available	Used	Available	Used
General Office Building	D	G	G	G	D	G	D
High Turnover (Sit Down) Restaurant	General Urban/Suburban	G	G	G	G	G	G

If the desired setting is not available within the Manual, adjustments may be made in Boxes 6 through 8.



Hines 250 Rio

Proposed

Trip Generation

May 2021

Box 5/Box 9 - Estimate Baseline Trips/Estimate Vehicular Trips (Determine Equation)

Vehicle trips are estimated using rates/equations applicable to each LUC. When the appropriate graph has a fitted curve, the Handbook has a process (Figure 4.2) to determine when to use it versus using the weighted average rate or collecting local data. The methodology requires for engineering judgement in some circumstances and permits engineering judgement to override or make adjustments when appropriate to best project (example 1: study site is expected to operate differently than data in the applicable land use code - such as restaurant that is closed in the morning or in the evening; example 2: LUC data in a localized area fails to be represented by the typically selected fitted curve/weighted average rate - a small shop/LUC 820, AM peak hour is skewed by the high y-intercept).

Equation Type: Equation Used [Equated Rate] (Type Abbreviations: Weighted Average Rate ("WA"), Fitted Curve ("FC"), or Custom ("C"))

Proposed Use	ADT	AM Peak Hour	PM Peak Hour
General Office Building	FC: $\text{LN}(T)=0.97*\text{LN}(X)+2.5$ [10.37]	FC: $T=0.72*X+21.64$ [0.82]	FC: $T=0.83*X+7.99$ [0.87]
High Turnover (Sit Down) Restaurant	WA: $T=X*112.18$ [112.18]	WA: $T=X*9.94$ [9.94]	WA: $T=X*9.77$ [9.77]

Box 5/Box 9 - Estimate Baseline Trips/Estimate Vehicular Trips (Apply Equations and in/out Distributions)

Baseline Vehicular Trips

Proposed Use	ADT			AM Peak Hour			PM Peak Hour					
	% In	In	Out	Total	% In	In	Out	Total				
General Office Building	50%	1,120	1,120	2,240	86%	152	25	177	17%	32	155	187
High Turnover (Sit Down) Restaurant	50%	252	252	504	55%	25	20	45	62%	27	17	44
Totals		1,372	1,372	2,744		177	45	222		59	172	231

If vehicle trip reductions are not applied for internal capture and alternative mode, vehicle trips may be separated into vehicle trip subsets (pass-by trips, diverted trips, truck trips, new passenger vehicle trips) as part of Box 10. If vehicle trip reductions are to be applied, continue to Box 6.

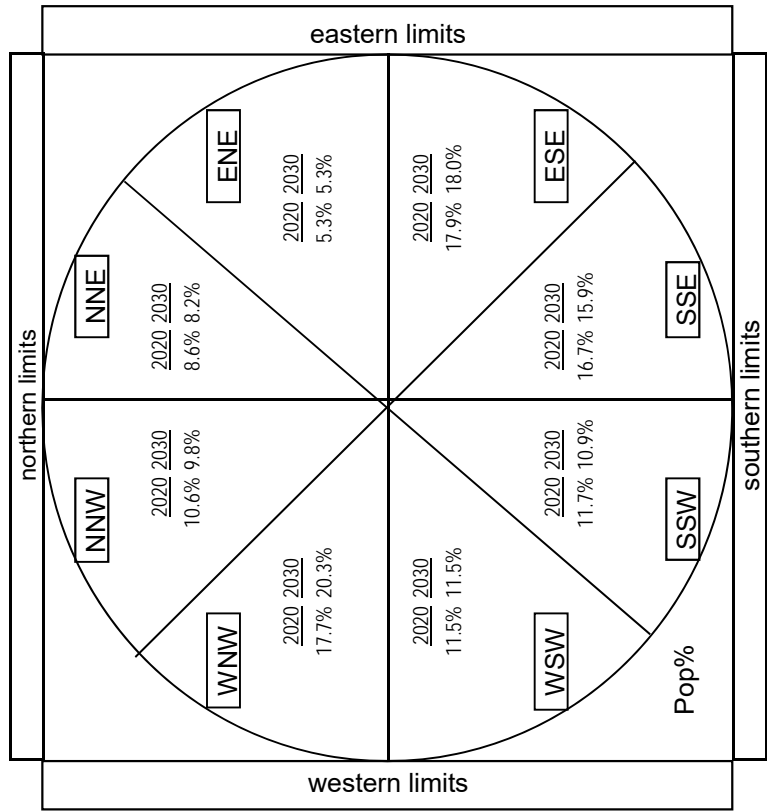
APPENDIX E

TRIP DISTRIBUTION CALCULATIONS

Quadrant	2020		2030	
	Population	Percent	Population	Percent
North Northwest	129,583	10.6%	139,407	9.8%
North Northeast	105,398	8.6%	115,809	8.2%
North	234,980	19.2%	255,216	18.0%
East Northeast	64,326	5.3%	75,694	5.3%
East Southeast	218,147	17.9%	255,523	18.0%
East	282,472	23.2%	331,217	23.3%
South Southeast	204,282	16.7%	225,382	15.9%
South Southwest	142,347	11.7%	153,898	10.9%
South	346,628	28.4%	379,281	26.8%
West Southwest	140,266	11.5%	162,636	11.5%
West Northwest	216,241	17.7%	287,930	20.3%
West	356,507	29.2%	450,566	31.8%
Totals	1,220,588	100.0%	1,416,280	99.9%

Radius

Population radius: 10 miles

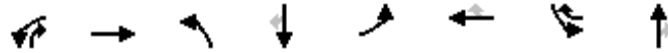


Select Analysis Year (2020, 2030, 2040, 2050)
2020

APPENDIX F

2021 OPENING YEAR ANALYSIS

Intersection						
Intersection Delay, s/veh	5.0					
Intersection LOS	A					
Approach	EB	WB		NB	SB	
Entry Lanes	1	2		1	2	
Conflicting Circle Lanes	2	2		2	2	
Adj Approach Flow, veh/h	50	509		199	505	
Demand Flow Rate, veh/h	51	519		203	515	
Vehicles Circulating, veh/h	671	64		336	208	
Vehicles Exiting, veh/h	52	475		386	375	
Ped Vol Crossing Leg, #/h	0	0		0	0	
Ped Cap Adj	1.000	1.000		1.000	1.000	
Approach Delay, s/veh	5.2	4.5		5.2	5.3	
Approach LOS	A	A		A	A	
Lane	Left	Left	Right	Left	Left	Right
Designated Moves	LTR	LT	R	LTR	L	LTR
Assumed Moves	LTR	LT	R	LTR	L	LTR
RT Channelized						
Lane Util	1.000	0.383	0.617	1.000	0.530	0.470
Follow-Up Headway, s	2.535	2.667	2.535	2.535	2.667	2.535
Critical Headway, s	4.328	4.645	4.328	4.328	4.645	4.328
Entry Flow, veh/h	51	199	320	203	273	242
Cap Entry Lane, veh/h	803	1273	1345	1067	1115	1190
Entry HV Adj Factor	0.986	0.981	0.981	0.980	0.980	0.980
Flow Entry, veh/h	50	195	314	199	268	237
Cap Entry, veh/h	792	1249	1320	1046	1093	1167
V/C Ratio	0.064	0.156	0.238	0.190	0.245	0.203
Control Delay, s/veh	5.2	4.2	4.8	5.2	5.6	4.9
LOS	A	A	A	A	A	A
95th %tile Queue, veh	0	1	1	1	1	1

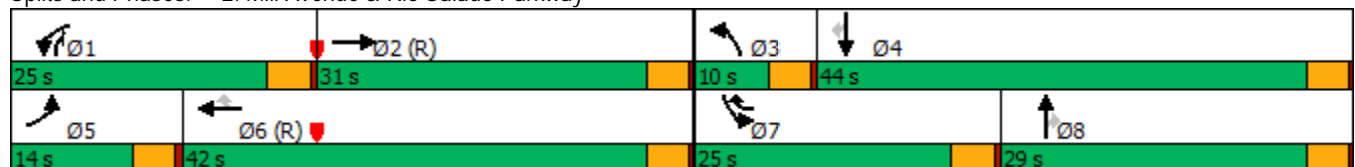


Phase Number	1	2	3	4	5	6	7	8
Movement	WBL	EBT	NBL	SBT	EBL	WBT	SBL	NBT
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	25	31	10	44	14	42	25	29
Maximum Split (%)	22.7%	28.2%	9.1%	40.0%	12.7%	38.2%	22.7%	26.4%
Minimum Split (s)	9	20	9	20	9	20	9	20
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Minimum Initial (s)	5	5	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0	0
Walk Time (s)		5		5		5		5
Flash Dont Walk (s)		11		11		11		11
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	85	0	31	41	85	99	31	56
End Time (s)	0	31	41	85	99	31	56	85
Yield/Force Off (s)	106	27	37	81	95	27	52	81
Yield/Force Off 170(s)	106	16	37	70	95	16	52	70
Local Start Time (s)	85	0	31	41	85	99	31	56
Local Yield (s)	106	27	37	81	95	27	52	81
Local Yield 170(s)	106	16	37	70	95	16	52	70

Intersection Summary

Cycle Length	110
Control Type	Actuated-Coordinated
Natural Cycle	65
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green	

Splits and Phases: 2: Mill Avenue & Rio Salado Parkway



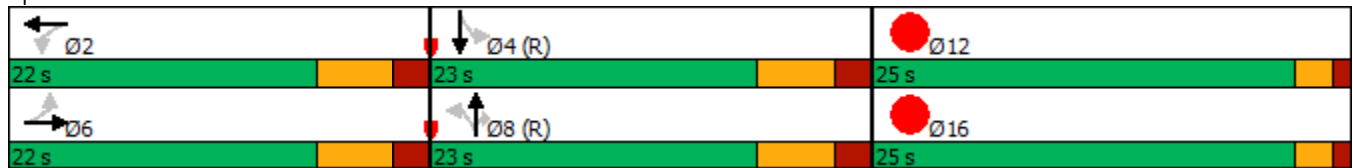
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	356	24	171	383	131	17	220	129	174	297	97
Future Volume (veh/h)	60	356	24	171	383	131	17	220	129	174	297	97
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	65	387	26	186	416	142	18	239	140	189	323	105
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	84	1534	103	219	1881	1036	34	287	438	222	484	410
Arrive On Green	0.05	0.45	0.45	0.12	0.53	0.53	0.02	0.15	0.15	0.12	0.26	0.26
Sat Flow, veh/h	1781	3380	226	1781	3554	1585	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	65	203	210	186	416	142	18	239	140	189	323	105
Grp Sat Flow(s),veh/h/ln	1781	1777	1830	1781	1777	1585	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	4.0	7.7	7.8	11.3	6.9	3.7	1.1	13.6	7.7	11.4	17.0	5.8
Cycle Q Clear(g_c), s	4.0	7.7	7.8	11.3	6.9	3.7	1.1	13.6	7.7	11.4	17.0	5.8
Prop In Lane	1.00		0.12	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	84	806	830	219	1881	1036	34	287	438	222	484	410
V/C Ratio(X)	0.77	0.25	0.25	0.85	0.22	0.14	0.53	0.83	0.32	0.85	0.67	0.26
Avail Cap(c_a), veh/h	162	806	830	340	1881	1036	97	425	555	340	680	576
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.8	18.5	18.5	47.3	13.8	7.2	53.4	45.2	31.6	47.2	36.5	32.4
Incr Delay (d2), s/veh	14.0	0.7	0.7	11.6	0.3	0.3	11.9	8.7	0.4	12.1	1.6	0.3
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(95%),veh/ln	3.8	6.0	6.2	9.6	5.0	2.3	1.1	11.3	5.4	9.7	12.5	4.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.8	19.3	19.3	58.9	14.1	7.5	65.4	53.9	32.0	59.3	38.1	32.7
LnGrp LOS	E	B	B	E	B	A	E	D	C	E	D	C
Approach Vol, veh/h		478			744			397			617	
Approach Delay, s/veh		25.6			24.0			46.7			43.7	
Approach LOS		C			C			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.5	53.9	6.1	32.5	9.2	62.2	17.7	20.9				
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Max Green Setting (Gmax), s	21.0	27.0	6.0	40.0	10.0	38.0	21.0	25.0				
Max Q Clear Time (g_c+I1), s	13.3	9.8	3.1	19.0	6.0	8.9	13.4	15.6				
Green Ext Time (p_c), s	0.3	2.2	0.0	2.2	0.0	3.4	0.3	1.3				
Intersection Summary												
HCM 6th Ctrl Delay				33.8								
HCM 6th LOS				C								



Phase Number	2	4	6	8	12	16
Movement	WBTL	SBTL	EBTL	NBTL	Hold	Hold
Lead/Lag						
Lead-Lag Optimize						
Recall Mode	None	C-Max	None	C-Max	None	None
Maximum Split (s)	22	23	22	23	25	25
Maximum Split (%)	31.4%	32.9%	31.4%	32.9%	35.7%	35.7%
Minimum Split (s)	23	23	23	23	22	22
Yellow Time (s)	4	4	4	4	2	2
All-Red Time (s)	2	2	2	2	1	1
Minimum Initial (s)	5	5	5	5	5	5
Vehicle Extension (s)	2	0.2	2	0.2	0.2	0.2
Minimum Gap (s)	2	0.2	2	0.2	0.2	0.2
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)	5	5	5	5		
Flash Dont Walk (s)	12	12	12	12		
Dual Entry	Yes	Yes	Yes	Yes	Yes	Yes
Inhibit Max	No	No	No	No	Yes	Yes
Start Time (s)	48	0	48	0	23	23
End Time (s)	0	23	0	23	48	48
Yield/Force Off (s)	64	17	64	17	45	45
Yield/Force Off 170(s)	52	5	52	5	45	45
Local Start Time (s)	48	0	48	0	23	23
Local Yield (s)	64	17	64	17	45	45
Local Yield 170(s)	52	5	52	5	45	45























Intersection Summary	
Cycle Length	70
Control Type	Actuated-Coordinated
Natural Cycle	70
Offset: 0 (0%), Referenced to phase 4:SBTL and 8:NBTL, Start of Green	

Splits and Phases: 3: Ash Avenue & 3rd Street



Background 2021 AM
250 RIO

3: Ash Avenue & 3rd Street
HCM Signalized Intersection Capacity Analysis

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	15	0	7	0	200	24	24	287	0
Future Volume (vph)	0	0	0	15	0	7	0	200	24	24	287	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				3.0	3.0			3.0	3.0	3.0	3.0	
Lane Util. Factor				1.00	1.00			1.00	1.00	1.00	1.00	
Frt				1.00	0.85			1.00	0.85	1.00	1.00	
Flt Protected				0.95	1.00			1.00	1.00	0.95	1.00	
Satd. Flow (prot)				1770	1583			1863	1583	1770	1863	
Flt Permitted				0.76	1.00			1.00	1.00	0.62	1.00	
Satd. Flow (perm)				1410	1583			1863	1583	1154	1863	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	17	0	8	0	222	27	27	319	0
RTOR Reduction (vph)	0	0	0	0	7	0	0	0	4	0	0	0
Lane Group Flow (vph)	0	0	0	17	1	0	0	222	23	27	319	0
Turn Type	Perm			Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		6			2			8				4
Permitted Phases	6			2			8		8	4		
Actuated Green, G (s)				2.6	2.6			55.4	55.4	55.4	55.4	
Effective Green, g (s)				5.6	5.6			58.4	58.4	58.4	58.4	
Actuated g/C Ratio				0.08	0.08			0.83	0.83	0.83	0.83	
Clearance Time (s)				6.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)				2.0	2.0			0.2	0.2	0.2	0.2	
Lane Grp Cap (vph)				112	126			1554	1320	962	1554	
v/s Ratio Prot					0.00			0.12			c0.17	
v/s Ratio Perm				c0.01					0.01	0.02		
v/c Ratio				0.15	0.01			0.14	0.02	0.03	0.21	
Uniform Delay, d1				30.0	29.6			1.1	1.0	1.0	1.2	
Progression Factor				1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2				0.2	0.0			0.2	0.0	0.1	0.3	
Delay (s)				30.2	29.6			1.3	1.0	1.0	1.5	
Level of Service				C	C			A	A	A	A	
Approach Delay (s)		0.0			30.0			1.3			1.4	
Approach LOS		A			C			A			A	
Intersection Summary												
HCM 2000 Control Delay			2.5									A
HCM 2000 Volume to Capacity ratio			0.21									
Actuated Cycle Length (s)			70.0									9.0
Intersection Capacity Utilization			30.8%									A
Analysis Period (min)			15									

c Critical Lane Group

Intersection						
Int Delay, s/veh	0.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↗	↕↔		↙	↕↕
Traffic Vol, veh/h	35	5	290	31	18	419
Future Vol, veh/h	35	5	290	31	18	419
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	180	-
Veh in Median Storage, #	1	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	38	5	315	34	20	455

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	600	175	0	0	349
Stage 1	332	-	-	-	-
Stage 2	268	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14
Critical Hdwy Stg 1	5.84	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22
Pot Cap-1 Maneuver	432	838	-	-	1207
Stage 1	699	-	-	-	-
Stage 2	753	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	425	838	-	-	1207
Mov Cap-2 Maneuver	522	-	-	-	-
Stage 1	699	-	-	-	-
Stage 2	740	-	-	-	-

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

Minor Lane/Major Mvmt	NBT	NBRWBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	522	838	1207
HCM Lane V/C Ratio	-	-	0.073	0.006	0.016
HCM Control Delay (s)	-	-	12.4	9.3	8
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0	0

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕	↗		↕
Traffic Vol, veh/h	0	2	284	11	0	435
Future Vol, veh/h	0	2	284	11	0	435
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	-	65	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	2	309	12	0	473

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	-	155	0	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-
Pot Cap-1 Maneuver	0	863	-	-	0
Stage 1	0	-	-	-	0
Stage 2	0	-	-	-	0
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	-	863	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	-	863
HCM Lane V/C Ratio	-	-	0.003
HCM Control Delay (s)	-	-	9.2
HCM Lane LOS	-	-	A
HCM 95th %tile Q(veh)	-	-	0

Intersection						
Intersection Delay, s/veh	9.0					
Intersection LOS	A					
Approach	EB	WB		NB	SB	
Entry Lanes	1	2		1	2	
Conflicting Circle Lanes	2	2		2	2	
Adj Approach Flow, veh/h	94	812		603	527	
Demand Flow Rate, veh/h	95	828		614	537	
Vehicles Circulating, veh/h	903	302		421	475	
Vehicles Exiting, veh/h	109	733		577	655	
Ped Vol Crossing Leg, #/h	0	0		0	0	
Ped Cap Adj	1.000	1.000		1.000	1.000	
Approach Delay, s/veh	7.2	7.8		12.6	7.3	
Approach LOS	A	A		B	A	
Lane	Left	Left	Right	Left	Left	Right
Designated Moves	LTR	LT	R	LTR	L	LTR
Assumed Moves	LTR	LT	R	LTR	L	LTR
RT Channelized						
Lane Util	1.000	0.547	0.453	1.000	0.531	0.469
Follow-Up Headway, s	2.535	2.667	2.535	2.535	2.667	2.535
Critical Headway, s	4.328	4.645	4.328	4.328	4.645	4.328
Entry Flow, veh/h	95	453	375	614	285	252
Cap Entry Lane, veh/h	659	1022	1099	993	872	948
Entry HV Adj Factor	0.988	0.979	0.981	0.982	0.979	0.982
Flow Entry, veh/h	94	444	368	603	279	248
Cap Entry, veh/h	651	1001	1078	975	854	932
V/C Ratio	0.144	0.443	0.341	0.618	0.327	0.266
Control Delay, s/veh	7.2	8.6	6.8	12.6	7.9	6.6
LOS	A	A	A	B	A	A
95th %tile Queue, veh	1	2	2	4	1	1

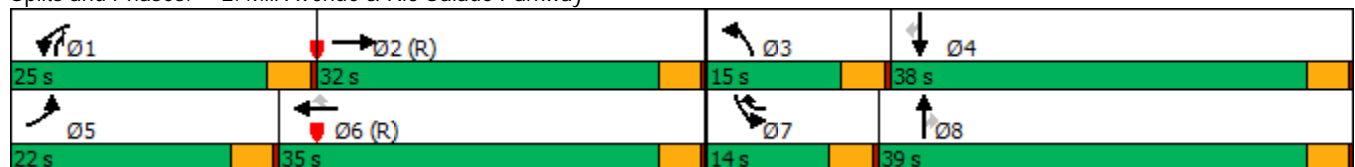


Phase Number	1	2	3	4	5	6	7	8
Movement	WBL	EBT	NBL	SBT	EBL	WBT	SBL	NBT
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	25	32	15	38	22	35	14	39
Maximum Split (%)	22.7%	29.1%	13.6%	34.5%	20.0%	31.8%	12.7%	35.5%
Minimum Split (s)	9	20	14	20	9	20	9	20
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Minimum Initial (s)	5	5	10	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0	0
Walk Time (s)		5		5		5		5
Flash Dont Walk (s)		11		11		11		11
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	85	0	32	47	85	107	32	46
End Time (s)	0	32	47	85	107	32	46	85
Yield/Force Off (s)	106	28	43	81	103	28	42	81
Yield/Force Off 170(s)	106	17	43	70	103	17	42	70
Local Start Time (s)	85	0	32	47	85	107	32	46
Local Yield (s)	106	28	43	81	103	28	42	81
Local Yield 170(s)	106	17	43	70	103	17	42	70

Intersection Summary
























Cycle Length	110
Control Type	Actuated-Coordinated
Natural Cycle	75
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green	

Splits and Phases: 2: Mill Avenue & Rio Salado Parkway



Background 2021 PM
250 RIO

2: Mill Avenue & Rio Salado Parkway
HCM 6th Signalized Intersection Summary

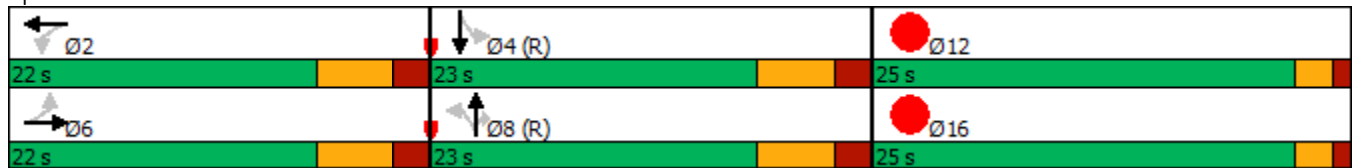
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	222	436	52	224	498	468	21	471	160	144	323	213
Future Volume (veh/h)	222	436	52	224	498	468	21	471	160	144	323	213
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	241	474	57	243	541	509	23	512	174	157	351	232
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	270	1000	120	275	1121	644	82	554	714	162	639	541
Arrive On Green	0.15	0.31	0.31	0.15	0.32	0.32	0.05	0.30	0.30	0.09	0.34	0.34
Sat Flow, veh/h	1781	3196	383	1781	3554	1585	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	241	263	268	243	541	509	23	512	174	157	351	232
Grp Sat Flow(s),veh/h/ln	1781	1777	1801	1781	1777	1585	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	14.6	13.1	13.2	14.7	13.5	30.9	1.4	29.2	7.5	9.7	16.7	12.4
Cycle Q Clear(g_c), s	14.6	13.1	13.2	14.7	13.5	30.9	1.4	29.2	7.5	9.7	16.7	12.4
Prop In Lane	1.00		0.21	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	270	556	564	275	1121	644	82	554	714	162	639	541
V/C Ratio(X)	0.89	0.47	0.48	0.88	0.48	0.79	0.28	0.92	0.24	0.97	0.55	0.43
Avail Cap(c_a), veh/h	291	556	564	340	1121	644	178	595	749	162	639	541
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.8	30.5	30.5	45.6	30.4	28.5	50.7	37.5	18.6	49.8	29.4	27.9
Incr Delay (d2), s/veh	26.0	2.9	2.9	20.0	1.5	9.6	1.9	19.6	0.2	61.4	1.0	0.5
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(95%),veh/ln	13.1	10.0	10.2	12.6	10.0	19.1	1.2	22.7	4.9	11.4	12.2	8.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	71.8	33.3	33.4	65.6	31.9	38.1	52.6	57.0	18.8	111.3	30.4	28.5
LnGrp LOS	E	C	C	E	C	D	D	E	B	F	C	C
Approach Vol, veh/h		772			1293			709			740	
Approach Delay, s/veh		45.3			40.7			47.5			46.9	
Approach LOS		D			D			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	21.0	38.4	9.0	41.6	20.7	38.7	14.0	36.6				
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Max Green Setting (Gmax), s	21.0	28.0	11.0	34.0	18.0	31.0	10.0	35.0				
Max Q Clear Time (g_c+I1), s	16.7	15.2	3.4	18.7	16.6	32.9	11.7	31.2				
Green Ext Time (p_c), s	0.3	2.6	0.0	2.6	0.1	0.0	0.0	1.4				
Intersection Summary												
HCM 6th Ctrl Delay			44.4									
HCM 6th LOS			D									

























Phase Number	2	4	6	8	12	16
Movement	WBTL	SBTL	EBTL	NBTL	Hold	Hold
Lead/Lag						
Lead-Lag Optimize						
Recall Mode	None	C-Max	None	C-Max	None	None
Maximum Split (s)	22	23	22	23	25	25
Maximum Split (%)	31.4%	32.9%	31.4%	32.9%	35.7%	35.7%
Minimum Split (s)	23	23	23	23	22	22
Yellow Time (s)	4	4	4	4	2	2
All-Red Time (s)	2	2	2	2	1	1
Minimum Initial (s)	5	5	5	5	5	5
Vehicle Extension (s)	2	0.2	2	0.2	0.2	0.2
Minimum Gap (s)	2	0.2	2	0.2	0.2	0.2
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)	5	5	5	5		
Flash Dont Walk (s)	12	12	12	12		
Dual Entry	Yes	Yes	Yes	Yes	Yes	Yes
Inhibit Max	No	No	No	No	Yes	Yes
Start Time (s)	48	0	48	0	23	23
End Time (s)	0	23	0	23	48	48
Yield/Force Off (s)	64	17	64	17	45	45
Yield/Force Off 170(s)	52	5	52	5	45	45
Local Start Time (s)	48	0	48	0	23	23
Local Yield (s)	64	17	64	17	45	45
Local Yield 170(s)	52	5	52	5	45	45

Intersection Summary	
Cycle Length	70
Control Type	Actuated-Coordinated
Natural Cycle	70
Offset: 0 (0%), Referenced to phase 4:SBTL and 8:NBTL, Start of Green	

Splits and Phases: 3: Ash Avenue & 3rd Street



												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	41	0	26	0	363	24	19	405	0
Future Volume (vph)	0	0	0	41	0	26	0	363	24	19	405	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				3.0	3.0			3.0	3.0	3.0	3.0	
Lane Util. Factor				1.00	1.00			1.00	1.00	1.00	1.00	
Frt				1.00	0.85			1.00	0.85	1.00	1.00	
Flt Protected				0.95	1.00			1.00	1.00	0.95	1.00	
Satd. Flow (prot)				1770	1583			1863	1583	1770	1863	
Flt Permitted				0.76	1.00			1.00	1.00	0.52	1.00	
Satd. Flow (perm)				1410	1583			1863	1583	960	1863	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	46	0	29	0	403	27	21	450	0
RTOR Reduction (vph)	0	0	0	0	26	0	0	0	5	0	0	0
Lane Group Flow (vph)	0	0	0	46	3	0	0	403	22	21	450	0
Turn Type	Perm			Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		6			2			8				4
Permitted Phases	6			2			8		8	4		
Actuated Green, G (s)				4.9	4.9			53.1	53.1	53.1	53.1	
Effective Green, g (s)				7.9	7.9			56.1	56.1	56.1	56.1	
Actuated g/C Ratio				0.11	0.11			0.80	0.80	0.80	0.80	
Clearance Time (s)				6.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)				2.0	2.0			0.2	0.2	0.2	0.2	
Lane Grp Cap (vph)				159	178			1493	1268	769	1493	
v/s Ratio Prot					0.00			0.22			c0.24	
v/s Ratio Perm				c0.03					0.01	0.02		
v/c Ratio				0.29	0.02			0.27	0.02	0.03	0.30	
Uniform Delay, d1				28.5	27.6			1.8	1.4	1.4	1.8	
Progression Factor				1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2				0.4	0.0			0.4	0.0	0.1	0.5	
Delay (s)				28.8	27.6			2.2	1.4	1.5	2.3	
Level of Service				C	C			A	A	A	A	
Approach Delay (s)		0.0			28.4			2.2			2.3	
Approach LOS		A			C			A			A	
Intersection Summary												
HCM 2000 Control Delay			4.2	HCM 2000 Level of Service					A			
HCM 2000 Volume to Capacity ratio			0.31									
Actuated Cycle Length (s)			70.0	Sum of lost time (s)					9.0			
Intersection Capacity Utilization			32.1%	ICU Level of Service					A			
Analysis Period (min)			15									
c Critical Lane Group												

Intersection						
Int Delay, s/veh	1.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	44	15	494	64	42	431
Future Vol, veh/h	44	15	494	64	42	431
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	180	-
Veh in Median Storage, #	1	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	48	16	537	70	46	468

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	898	304	0	0	607	0
Stage 1	572	-	-	-	-	-
Stage 2	326	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	279	692	-	-	967	-
Stage 1	528	-	-	-	-	-
Stage 2	704	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	266	692	-	-	967	-
Mov Cap-2 Maneuver	388	-	-	-	-	-
Stage 1	528	-	-	-	-	-
Stage 2	670	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.3	0	0.8
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	388	692	967	-
HCM Lane V/C Ratio	-	-	0.123	0.024	0.047	-
HCM Control Delay (s)	-	-	15.6	10.3	8.9	-
HCM Lane LOS	-	-	C	B	A	-
HCM 95th %tile Q(veh)	-	-	0.4	0.1	0.1	-

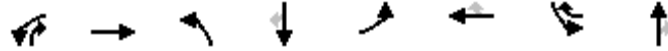
Intersection						
Int Delay, s/veh	0.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕	↗		↕
Traffic Vol, veh/h	0	5	488	21	0	468
Future Vol, veh/h	0	5	488	21	0	468
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	65	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	5	530	23	0	509

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	-	265	0	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-
Pot Cap-1 Maneuver	0	733	-	-	0
Stage 1	0	-	-	-	0
Stage 2	0	-	-	-	0
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	-	733	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	-	733
HCM Lane V/C Ratio	-	-	0.007
HCM Control Delay (s)	-	-	9.9
HCM Lane LOS	-	-	A
HCM 95th %tile Q(veh)	-	-	0

Intersection						
Intersection Delay, s/veh	5.4					
Intersection LOS	A					
Approach	EB	WB		NB	SB	
Entry Lanes	1	2		1	2	
Conflicting Circle Lanes	2	2		2	2	
Adj Approach Flow, veh/h	56	595		226	534	
Demand Flow Rate, veh/h	57	607		231	544	
Vehicles Circulating, veh/h	699	98		363	208	
Vehicles Exiting, veh/h	53	496		393	497	
Ped Vol Crossing Leg, #/h	0	0		0	0	
Ped Cap Adj	1.000	1.000		1.000	1.000	
Approach Delay, s/veh	5.4	5.2		5.6	5.4	
Approach LOS	A	A		A	A	
Lane	Left	Left	Right	Left	Left	Right
Designated Moves	LTR	LT	R	LTR	L	LTR
Assumed Moves	LTR	LT	R	LTR	L	LTR
RT Channelized						
Lane Util	1.000	0.328	0.672	1.000	0.529	0.471
Follow-Up Headway, s	2.535	2.667	2.535	2.535	2.667	2.535
Critical Headway, s	4.328	4.645	4.328	4.328	4.645	4.328
Entry Flow, veh/h	57	199	408	231	288	256
Cap Entry Lane, veh/h	784	1233	1307	1043	1115	1190
Entry HV Adj Factor	0.988	0.981	0.980	0.980	0.982	0.980
Flow Entry, veh/h	56	195	400	226	283	251
Cap Entry, veh/h	774	1211	1281	1023	1095	1166
V/C Ratio	0.073	0.161	0.312	0.221	0.258	0.215
Control Delay, s/veh	5.4	4.4	5.6	5.6	5.7	5.0
LOS	A	A	A	A	A	A
95th %tile Queue, veh	0	1	1	1	1	1

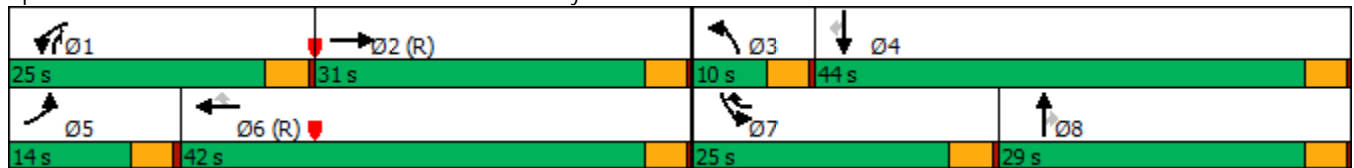


Phase Number	1	2	3	4	5	6	7	8
Movement	WBL	EBT	NBL	SBT	EBL	WBT	SBL	NBT
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	25	31	10	44	14	42	25	29
Maximum Split (%)	22.7%	28.2%	9.1%	40.0%	12.7%	38.2%	22.7%	26.4%
Minimum Split (s)	9	20	9	20	9	20	9	20
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Minimum Initial (s)	5	5	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0	0
Walk Time (s)		5		5		5		5
Flash Dont Walk (s)		11		11		11		11
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	85	0	31	41	85	99	31	56
End Time (s)	0	31	41	85	99	31	56	85
Yield/Force Off (s)	106	27	37	81	95	27	52	81
Yield/Force Off 170(s)	106	16	37	70	95	16	52	70
Local Start Time (s)	85	0	31	41	85	99	31	56
Local Yield (s)	106	27	37	81	95	27	52	81
Local Yield 170(s)	106	16	37	70	95	16	52	70

Intersection Summary

Cycle Length	110
Control Type	Actuated-Coordinated
Natural Cycle	65
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green	

Splits and Phases: 2: Mill Avenue & Rio Salado Parkway



Total 2021 AM
250 RIO

2: Mill Avenue & Rio Salado Parkway
HCM 6th Signalized Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	61	372	27	171	445	131	28	220	129	174	297	101
Future Volume (veh/h)	61	372	27	171	445	131	28	220	129	174	297	101
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	66	404	29	186	484	142	30	239	140	189	323	110
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	85	1526	109	219	1879	1035	49	287	438	222	469	398
Arrive On Green	0.05	0.45	0.45	0.12	0.53	0.53	0.03	0.15	0.15	0.12	0.25	0.25
Sat Flow, veh/h	1781	3363	241	1781	3554	1585	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	66	213	220	186	484	142	30	239	140	189	323	110
Grp Sat Flow(s),veh/h/ln	1781	1777	1827	1781	1777	1585	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	4.0	8.2	8.2	11.3	8.2	3.8	1.8	13.6	7.7	11.4	17.2	6.1
Cycle Q Clear(g_c), s	4.0	8.2	8.2	11.3	8.2	3.8	1.8	13.6	7.7	11.4	17.2	6.1
Prop In Lane	1.00		0.13	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	85	806	829	219	1879	1035	49	287	438	222	469	398
V/C Ratio(X)	0.78	0.26	0.27	0.85	0.26	0.14	0.62	0.83	0.32	0.85	0.69	0.28
Avail Cap(c_a), veh/h	162	806	829	340	1879	1035	97	425	555	340	680	576
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.8	18.6	18.7	47.3	14.1	7.3	52.9	45.2	31.6	47.2	37.3	33.2
Incr Delay (d2), s/veh	13.8	0.8	0.8	11.6	0.3	0.3	12.1	8.7	0.4	12.1	1.8	0.4
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(95%),veh/ln	3.8	6.3	6.5	9.6	6.0	2.3	1.8	11.3	5.4	9.7	12.7	4.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.6	19.4	19.4	58.9	14.5	7.5	65.0	53.9	32.0	59.3	39.1	33.5
LnGrp LOS	E	B	B	E	B	A	E	D	C	E	D	C
Approach Vol, veh/h		499			812			409			622	
Approach Delay, s/veh		25.6			23.4			47.2			44.3	
Approach LOS		C			C			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.5	53.9	7.0	31.6	9.3	62.2	17.7	20.9				
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Max Green Setting (Gmax), s	21.0	27.0	6.0	40.0	10.0	38.0	21.0	25.0				
Max Q Clear Time (g_c+I1), s	13.3	10.2	3.8	19.2	6.0	10.2	13.4	15.6				
Green Ext Time (p_c), s	0.3	2.3	0.0	2.2	0.0	4.0	0.3	1.3				
Intersection Summary												
HCM 6th Ctrl Delay				33.6								
HCM 6th LOS				C								

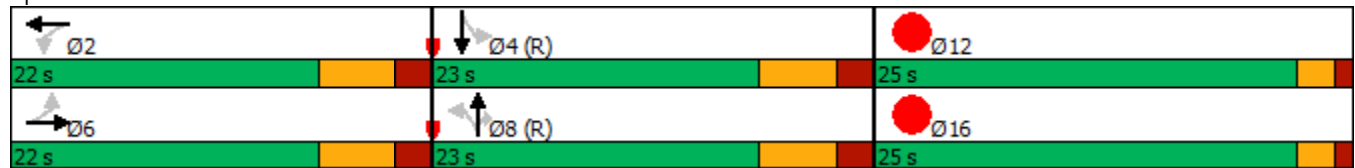


Phase Number	2	4	6	8	12	16
Movement	WBTL	SBTL	EBTL	NBTL	Hold	Hold
Lead/Lag						
Lead-Lag Optimize						
Recall Mode	None	C-Max	None	C-Max	None	None
Maximum Split (s)	22	23	22	23	25	25
Maximum Split (%)	31.4%	32.9%	31.4%	32.9%	35.7%	35.7%
Minimum Split (s)	23	23	23	23	22	22
Yellow Time (s)	4	4	4	4	2	2
All-Red Time (s)	2	2	2	2	1	1
Minimum Initial (s)	5	5	5	5	5	5
Vehicle Extension (s)	2	0.2	2	0.2	0.2	0.2
Minimum Gap (s)	2	0.2	2	0.2	0.2	0.2
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)	5	5	5	5		
Flash Dont Walk (s)	12	12	12	12		
Dual Entry	Yes	Yes	Yes	Yes	Yes	Yes
Inhibit Max	No	No	No	No	Yes	Yes
Start Time (s)	48	0	48	0	23	23
End Time (s)	0	23	0	23	48	48
Yield/Force Off (s)	64	17	64	17	45	45
Yield/Force Off 170(s)	52	5	52	5	45	45
Local Start Time (s)	48	0	48	0	23	23
Local Yield (s)	64	17	64	17	45	45
Local Yield 170(s)	52	5	52	5	45	45

Intersection Summary























Cycle Length	70
Control Type	Actuated-Coordinated
Natural Cycle	70
Offset: 0 (0%), Referenced to phase 4:SBTL and 8:NBTL, Start of Green	

Splits and Phases: 3: Ash Avenue & 3rd Street



Total 2021 AM
250 RIO

3: Ash Avenue & 3rd Street
HCM Signalized Intersection Capacity Analysis

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	15	0	8	0	223	24	24	293	0
Future Volume (vph)	0	0	0	15	0	8	0	223	24	24	293	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				3.0	3.0			3.0	3.0	3.0	3.0	
Lane Util. Factor				1.00	1.00			1.00	1.00	1.00	1.00	
Frt				1.00	0.85			1.00	0.85	1.00	1.00	
Flt Protected				0.95	1.00			1.00	1.00	0.95	1.00	
Satd. Flow (prot)				1770	1583			1863	1583	1770	1863	
Flt Permitted				0.76	1.00			1.00	1.00	0.61	1.00	
Satd. Flow (perm)				1410	1583			1863	1583	1127	1863	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	17	0	9	0	248	27	27	326	0
RTOR Reduction (vph)	0	0	0	0	8	0	0	0	4	0	0	0
Lane Group Flow (vph)	0	0	0	17	1	0	0	248	23	27	326	0
Turn Type	Perm			Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		6			2			8				4
Permitted Phases	6			2			8		8	4		
Actuated Green, G (s)				2.6	2.6			55.4	55.4	55.4	55.4	
Effective Green, g (s)				5.6	5.6			58.4	58.4	58.4	58.4	
Actuated g/C Ratio				0.08	0.08			0.83	0.83	0.83	0.83	
Clearance Time (s)				6.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)				2.0	2.0			0.2	0.2	0.2	0.2	
Lane Grp Cap (vph)				112	126			1554	1320	940	1554	
v/s Ratio Prot					0.00			0.13			c0.18	
v/s Ratio Perm				c0.01					0.01	0.02		
v/c Ratio				0.15	0.01			0.16	0.02	0.03	0.21	
Uniform Delay, d1				30.0	29.6			1.1	1.0	1.0	1.2	
Progression Factor				1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2				0.2	0.0			0.2	0.0	0.1	0.3	
Delay (s)				30.2	29.6			1.3	1.0	1.0	1.5	
Level of Service				C	C			A	A	A	A	
Approach Delay (s)		0.0			30.0			1.3			1.4	
Approach LOS		A			C			A			A	
Intersection Summary												
HCM 2000 Control Delay			2.5									A
HCM 2000 Volume to Capacity ratio			0.21									
Actuated Cycle Length (s)			70.0									9.0
Intersection Capacity Utilization			30.8%									A
Analysis Period (min)			15									
c Critical Lane Group												

Intersection						
Int Delay, s/veh	1.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	62	19	313	115	89	419
Future Vol, veh/h	62	19	313	115	89	419
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	180	-
Veh in Median Storage, #	1	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	67	21	340	125	97	455

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	825	233	0	0	465
Stage 1	403	-	-	-	-
Stage 2	422	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14
Critical Hdwy Stg 1	5.84	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22
Pot Cap-1 Maneuver	311	769	-	-	1093
Stage 1	644	-	-	-	-
Stage 2	629	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	283	769	-	-	1093
Mov Cap-2 Maneuver	405	-	-	-	-
Stage 1	644	-	-	-	-
Stage 2	573	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.3	0	1.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	405	769	1093
HCM Lane V/C Ratio	-	-	0.166	0.027	0.089
HCM Control Delay (s)	-	-	15.7	9.8	8.6
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	0.6	0.1	0.3

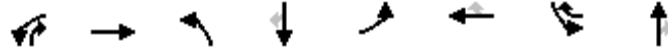
Intersection						
Int Delay, s/veh	0.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕	↗		↕
Traffic Vol, veh/h	0	7	298	34	0	506
Future Vol, veh/h	0	7	298	34	0	506
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	65	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	8	324	37	0	550

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	-	162	0	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-
Pot Cap-1 Maneuver	0	854	-	-	0
Stage 1	0	-	-	-	0
Stage 2	0	-	-	-	0
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	-	854	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.3	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	-	854
HCM Lane V/C Ratio	-	-	0.009
HCM Control Delay (s)	-	-	9.3
HCM Lane LOS	-	-	A
HCM 95th %tile Q(veh)	-	-	0

Intersection						
Intersection Delay, s/veh	10.1					
Intersection LOS	B					
Approach	EB	WB		NB	SB	
Entry Lanes	1	2		1	2	
Conflicting Circle Lanes	2	2		2	2	
Adj Approach Flow, veh/h	96	841		612	642	
Demand Flow Rate, veh/h	97	858		623	655	
Vehicles Circulating, veh/h	1015	313		508	475	
Vehicles Exiting, veh/h	115	818		604	696	
Ped Vol Crossing Leg, #/h	0	0		0	0	
Ped Cap Adj	1.000	1.000		1.000	1.000	
Approach Delay, s/veh	8.1	8.0		15.2	8.2	
Approach LOS	A	A		C	A	
Lane	Left	Left	Right	Left	Left	Right
Designated Moves	LTR	LT	R	LTR	L	LTR
Assumed Moves	LTR	LT	R	LTR	L	LTR
RT Channelized						
Lane Util	1.000	0.528	0.472	1.000	0.530	0.470
Follow-Up Headway, s	2.535	2.667	2.535	2.535	2.667	2.535
Critical Headway, s	4.328	4.645	4.328	4.328	4.645	4.328
Entry Flow, veh/h	97	453	405	623	347	308
Cap Entry Lane, veh/h	599	1012	1088	922	872	948
Entry HV Adj Factor	0.988	0.979	0.980	0.982	0.981	0.980
Flow Entry, veh/h	96	444	397	612	340	302
Cap Entry, veh/h	592	991	1067	905	855	929
V/C Ratio	0.162	0.448	0.372	0.676	0.398	0.325
Control Delay, s/veh	8.1	8.8	7.2	15.2	9.0	7.4
LOS	A	A	A	C	A	A
95th %tile Queue, veh	1	2	2	5	2	1

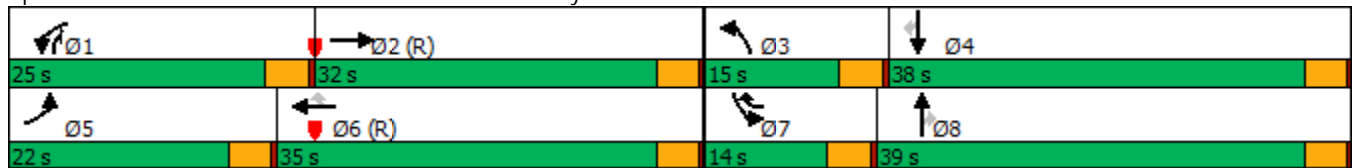


Phase Number	1	2	3	4	5	6	7	8
Movement	WBL	EBT	NBL	SBT	EBL	WBT	SBL	NBT
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	25	32	15	38	22	35	14	39
Maximum Split (%)	22.7%	29.1%	13.6%	34.5%	20.0%	31.8%	12.7%	35.5%
Minimum Split (s)	9	20	14	20	9	20	9	20
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Minimum Initial (s)	5	5	10	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0	0
Walk Time (s)		5		5		5		5
Flash Dont Walk (s)		11		11		11		11
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	85	0	32	47	85	107	32	46
End Time (s)	0	32	47	85	107	32	46	85
Yield/Force Off (s)	106	28	43	81	103	28	42	81
Yield/Force Off 170(s)	106	17	43	70	103	17	42	70
Local Start Time (s)	85	0	32	47	85	107	32	46
Local Yield (s)	106	28	43	81	103	28	42	81
Local Yield 170(s)	106	17	43	70	103	17	42	70

Intersection Summary
























Cycle Length	110
Control Type	Actuated-Coordinated
Natural Cycle	80
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green	

Splits and Phases: 2: Mill Avenue & Rio Salado Parkway



Total 2021 PM
250 RIO

2: Mill Avenue & Rio Salado Parkway
HCM 6th Signalized Intersection Summary

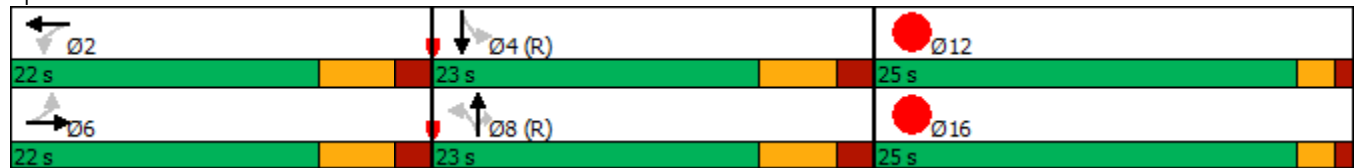
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	225	496	63	224	519	468	25	471	160	144	323	214
Future Volume (veh/h)	225	496	63	224	519	468	25	471	160	144	323	214
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	245	539	68	243	564	509	27	512	174	157	351	233
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	274	994	125	275	1114	641	91	554	714	162	629	533
Arrive On Green	0.15	0.31	0.31	0.15	0.31	0.31	0.05	0.30	0.30	0.09	0.34	0.34
Sat Flow, veh/h	1781	3176	399	1781	3554	1585	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	245	301	306	243	564	509	27	512	174	157	351	233
Grp Sat Flow(s),veh/h/ln	1781	1777	1798	1781	1777	1585	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	14.8	15.4	15.5	14.7	14.2	31.0	1.6	29.2	7.5	9.7	16.9	12.6
Cycle Q Clear(g_c), s	14.8	15.4	15.5	14.7	14.2	31.0	1.6	29.2	7.5	9.7	16.9	12.6
Prop In Lane	1.00		0.22	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	274	556	563	275	1114	641	91	554	714	162	629	533
V/C Ratio(X)	0.89	0.54	0.54	0.88	0.51	0.79	0.30	0.92	0.24	0.97	0.56	0.44
Avail Cap(c_a), veh/h	291	556	563	340	1114	641	178	595	749	162	629	533
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.7	31.2	31.3	45.6	30.8	28.7	50.3	37.5	18.6	49.8	29.8	28.4
Incr Delay (d2), s/veh	26.7	3.7	3.7	20.0	1.6	9.8	1.8	19.6	0.2	61.4	1.1	0.6
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(95%),veh/ln	13.3	11.5	11.7	12.6	10.5	19.2	1.4	22.7	4.9	11.4	12.3	8.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	72.3	35.0	35.0	65.6	32.5	38.5	52.1	57.0	18.8	111.3	30.9	29.0
LnGrp LOS	E	C	D	E	C	D	D	E	B	F	C	C
Approach Vol, veh/h		852			1316			713			741	
Approach Delay, s/veh		45.7			40.9			47.5			47.3	
Approach LOS		D			D			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	21.0	38.4	9.6	41.0	20.9	38.5	14.0	36.6				
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Max Green Setting (Gmax), s	21.0	28.0	11.0	34.0	18.0	31.0	10.0	35.0				
Max Q Clear Time (g_c+I1), s	16.7	17.5	3.6	18.9	16.8	33.0	11.7	31.2				
Green Ext Time (p_c), s	0.3	2.7	0.0	2.6	0.1	0.0	0.0	1.4				
Intersection Summary												
HCM 6th Ctrl Delay			44.7									
HCM 6th LOS			D									



Phase Number	2	4	6	8	12	16
Movement	WBTL	SBTL	EBTL	NBTL	Hold	Hold
Lead/Lag						
Lead-Lag Optimize						
Recall Mode	None	C-Max	None	C-Max	None	None
Maximum Split (s)	22	23	22	23	25	25
Maximum Split (%)	31.4%	32.9%	31.4%	32.9%	35.7%	35.7%
Minimum Split (s)	23	23	23	23	22	22
Yellow Time (s)	4	4	4	4	2	2
All-Red Time (s)	2	2	2	2	1	1
Minimum Initial (s)	5	5	5	5	5	5
Vehicle Extension (s)	2	0.2	2	0.2	0.2	0.2
Minimum Gap (s)	2	0.2	2	0.2	0.2	0.2
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)	5	5	5	5		
Flash Dont Walk (s)	12	12	12	12		
Dual Entry	Yes	Yes	Yes	Yes	Yes	Yes
Inhibit Max	No	No	No	No	Yes	Yes
Start Time (s)	48	0	48	0	23	23
End Time (s)	0	23	0	23	48	48
Yield/Force Off (s)	64	17	64	17	45	45
Yield/Force Off 170(s)	52	5	52	5	45	45
Local Start Time (s)	48	0	48	0	23	23
Local Yield (s)	64	17	64	17	45	45
Local Yield 170(s)	52	5	52	5	45	45























Intersection Summary	
Cycle Length	70
Control Type	Actuated-Coordinated
Natural Cycle	70
Offset: 0 (0%), Referenced to phase 4:SBTL and 8:NBTL, Start of Green	

Splits and Phases: 3: Ash Avenue & 3rd Street



Total 2021 PM
250 RIO

3: Ash Avenue & 3rd Street
HCM Signalized Intersection Capacity Analysis

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	41	0	26	0	371	24	20	427	0
Future Volume (vph)	0	0	0	41	0	26	0	371	24	20	427	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				3.0	3.0			3.0	3.0	3.0	3.0	
Lane Util. Factor				1.00	1.00			1.00	1.00	1.00	1.00	
Frt				1.00	0.85			1.00	0.85	1.00	1.00	
Flt Protected				0.95	1.00			1.00	1.00	0.95	1.00	
Satd. Flow (prot)				1770	1583			1863	1583	1770	1863	
Flt Permitted				0.76	1.00			1.00	1.00	0.51	1.00	
Satd. Flow (perm)				1410	1583			1863	1583	950	1863	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	46	0	29	0	412	27	22	474	0
RTOR Reduction (vph)	0	0	0	0	26	0	0	0	5	0	0	0
Lane Group Flow (vph)	0	0	0	46	3	0	0	412	22	22	474	0
Turn Type	Perm			Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		6			2			8				4
Permitted Phases	6			2			8		8	4		
Actuated Green, G (s)				4.9	4.9			53.1	53.1	53.1	53.1	
Effective Green, g (s)				7.9	7.9			56.1	56.1	56.1	56.1	
Actuated g/C Ratio				0.11	0.11			0.80	0.80	0.80	0.80	
Clearance Time (s)				6.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)				2.0	2.0			0.2	0.2	0.2	0.2	
Lane Grp Cap (vph)				159	178			1493	1268	761	1493	
v/s Ratio Prot					0.00			0.22			c0.25	
v/s Ratio Perm				c0.03					0.01	0.02		
v/c Ratio				0.29	0.02			0.28	0.02	0.03	0.32	
Uniform Delay, d1				28.5	27.6			1.8	1.4	1.4	1.9	
Progression Factor				1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2				0.4	0.0			0.5	0.0	0.1	0.6	
Delay (s)				28.8	27.6			2.2	1.4	1.5	2.4	
Level of Service				C	C			A	A	A	A	
Approach Delay (s)		0.0			28.4			2.2			2.4	
Approach LOS		A			C			A			A	
Intersection Summary												
HCM 2000 Control Delay			4.2	HCM 2000 Level of Service				A				
HCM 2000 Volume to Capacity ratio			0.33									
Actuated Cycle Length (s)			70.0	Sum of lost time (s)				9.0				
Intersection Capacity Utilization			33.3%	ICU Level of Service				A				
Analysis Period (min)			15									

c Critical Lane Group

Intersection						
Int Delay, s/veh	3.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↗	↕↔		↙	↕↕
Traffic Vol, veh/h	147	67	502	92	66	431
Future Vol, veh/h	147	67	502	92	66	431
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	180	-
Veh in Median Storage, #	1	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	160	73	546	100	72	468

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	974	323	0	0	646	0
Stage 1	596	-	-	-	-	-
Stage 2	378	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	249	673	-	-	935	-
Stage 1	513	-	-	-	-	-
Stage 2	663	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	230	673	-	-	935	-
Mov Cap-2 Maneuver	358	-	-	-	-	-
Stage 1	513	-	-	-	-	-
Stage 2	612	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	19.2	0	1.2
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	WBLn2	SBL	SBT	
Capacity (veh/h)	-	-	358	673	935	-
HCM Lane V/C Ratio	-	-	0.446	0.108	0.077	-
HCM Control Delay (s)	-	-	22.9	11	9.2	-
HCM Lane LOS	-	-	C	B	A	-
HCM 95th %tile Q(veh)	-	-	2.2	0.4	0.2	-

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕	↗		↕
Traffic Vol, veh/h	0	22	540	29	0	492
Future Vol, veh/h	0	22	540	29	0	492
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	-	65	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	24	587	32	0	535

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	-	294	0	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-
Pot Cap-1 Maneuver	0	702	-	-	0
Stage 1	0	-	-	-	0
Stage 2	0	-	-	-	0
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	-	702	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

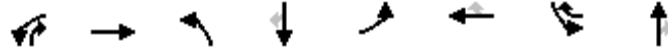
Approach	WB	NB	SB
HCM Control Delay, s	10.3	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	-	702
HCM Lane V/C Ratio	-	-	0.034
HCM Control Delay (s)	-	-	10.3
HCM Lane LOS	-	-	B
HCM 95th %tile Q(veh)	-	-	0.1

APPENDIX G

2026 HORIZON YEAR ANALYSIS

Intersection						
Intersection Delay, s/veh	5.3					
Intersection LOS	A					
Approach	EB	WB		NB	SB	
Entry Lanes	1	2		1	2	
Conflicting Circle Lanes	2	2		2	2	
Adj Approach Flow, veh/h	56	562		220	558	
Demand Flow Rate, veh/h	57	574		224	569	
Vehicles Circulating, veh/h	742	72		371	230	
Vehicles Exiting, veh/h	57	523		428	416	
Ped Vol Crossing Leg, #/h	0	0		0	0	
Ped Cap Adj	1.000	1.000		1.000	1.000	
Approach Delay, s/veh	5.6	4.8		5.6	5.6	
Approach LOS	A	A		A	A	
Lane	Left	Left	Right	Left	Left	Right
Designated Moves	LTR	LT	R	LTR	L	LTR
Assumed Moves	LTR	LT	R	LTR	L	LTR
RT Channelized						
Lane Util	1.000	0.383	0.617	1.000	0.531	0.469
Follow-Up Headway, s	2.535	2.667	2.535	2.535	2.667	2.535
Critical Headway, s	4.328	4.645	4.328	4.328	4.645	4.328
Entry Flow, veh/h	57	220	354	224	302	267
Cap Entry Lane, veh/h	756	1263	1336	1036	1092	1168
Entry HV Adj Factor	0.987	0.978	0.980	0.982	0.980	0.983
Flow Entry, veh/h	56	215	347	220	296	262
Cap Entry, veh/h	746	1236	1309	1017	1071	1148
V/C Ratio	0.075	0.174	0.265	0.216	0.276	0.229
Control Delay, s/veh	5.6	4.4	5.1	5.6	6.0	5.2
LOS	A	A	A	A	A	A
95th %tile Queue, veh	0	1	1	1	1	1

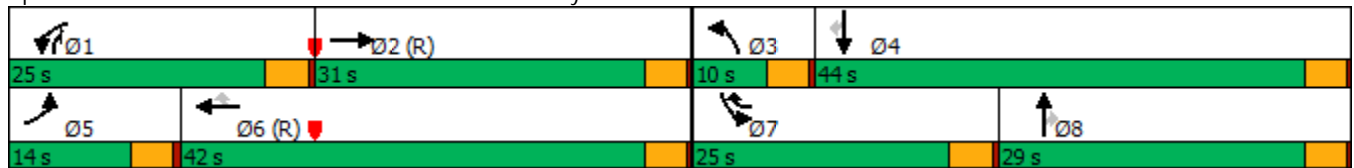



























Phase Number	1	2	3	4	5	6	7	8
Movement	WBL	EBT	NBL	SBT	EBL	WBT	SBL	NBT
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	25	31	10	44	14	42	25	29
Maximum Split (%)	22.7%	28.2%	9.1%	40.0%	12.7%	38.2%	22.7%	26.4%
Minimum Split (s)	9	20	9	20	9	20	9	20
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Minimum Initial (s)	5	5	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0	0
Walk Time (s)		5		5		5		5
Flash Dont Walk (s)		11		11		11		11
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	85	0	31	41	85	99	31	56
End Time (s)	0	31	41	85	99	31	56	85
Yield/Force Off (s)	106	27	37	81	95	27	52	81
Yield/Force Off 170(s)	106	16	37	70	95	16	52	70
Local Start Time (s)	85	0	31	41	85	99	31	56
Local Yield (s)	106	27	37	81	95	27	52	81
Local Yield 170(s)	106	16	37	70	95	16	52	70

Intersection Summary

Cycle Length	110
Control Type	Actuated-Coordinated
Natural Cycle	65
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green	

Splits and Phases: 2: Mill Avenue & Rio Salado Parkway



												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 							
Traffic Volume (veh/h)	66	393	26	189	423	145	19	243	142	192	328	107
Future Volume (veh/h)	66	393	26	189	423	145	19	243	142	192	328	107
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	72	427	28	205	460	158	21	264	154	209	357	116
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	93	1418	93	238	1777	1008	38	312	476	242	525	445
Arrive On Green	0.05	0.42	0.42	0.13	0.50	0.50	0.02	0.17	0.17	0.14	0.28	0.28
Sat Flow, veh/h	1781	3386	221	1781	3554	1585	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	72	223	232	205	460	158	21	264	154	209	357	116
Grp Sat Flow(s),veh/h/ln	1781	1777	1831	1781	1777	1585	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	4.4	9.2	9.3	12.4	8.2	4.4	1.3	15.1	8.3	12.6	18.7	6.2
Cycle Q Clear(g_c), s	4.4	9.2	9.3	12.4	8.2	4.4	1.3	15.1	8.3	12.6	18.7	6.2
Prop In Lane	1.00		0.12	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	93	744	767	238	1777	1008	38	312	476	242	525	445
V/C Ratio(X)	0.78	0.30	0.30	0.86	0.26	0.16	0.55	0.85	0.32	0.87	0.68	0.26
Avail Cap(c_a), veh/h	162	744	767	340	1777	1008	97	425	572	340	680	576
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.5	21.3	21.3	46.7	15.8	8.1	53.3	44.5	29.8	46.6	35.2	30.7
Incr Delay (d2), s/veh	13.0	1.0	1.0	14.6	0.4	0.3	11.6	11.1	0.4	15.2	1.8	0.3
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(95%),veh/ln	4.1	7.2	7.5	10.6	6.0	2.8	1.3	12.5	5.8	10.8	13.5	4.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.5	22.3	22.3	61.2	16.1	8.4	64.9	55.5	30.2	61.7	37.0	31.0
LnGrp LOS	E	C	C	E	B	A	E	E	C	E	D	C
Approach Vol, veh/h		527			823			439			682	
Approach Delay, s/veh		28.1			25.9			47.1			43.5	
Approach LOS		C			C			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	18.7	50.1	6.4	34.9	9.7	59.0	18.9	22.4				
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Max Green Setting (Gmax), s	21.0	27.0	6.0	40.0	10.0	38.0	21.0	25.0				
Max Q Clear Time (g_c+I1), s	14.4	11.3	3.3	20.7	6.4	10.2	14.6	17.1				
Green Ext Time (p_c), s	0.3	2.4	0.0	2.5	0.0	3.8	0.3	1.3				
Intersection Summary												
HCM 6th Ctrl Delay				35.0								
HCM 6th LOS				C								

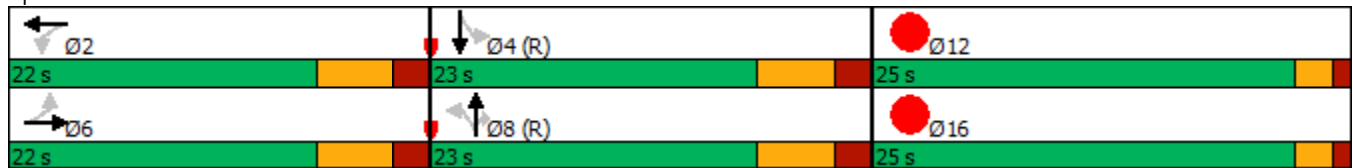
























Phase Number	2	4	6	8	12	16
Movement	WBTL	SBTL	EBTL	NBTL	Hold	Hold
Lead/Lag						
Lead-Lag Optimize						
Recall Mode	None	C-Max	None	C-Max	None	None
Maximum Split (s)	22	23	22	23	25	25
Maximum Split (%)	31.4%	32.9%	31.4%	32.9%	35.7%	35.7%
Minimum Split (s)	23	23	23	23	22	22
Yellow Time (s)	4	4	4	4	2	2
All-Red Time (s)	2	2	2	2	1	1
Minimum Initial (s)	5	5	5	5	5	5
Vehicle Extension (s)	2	0.2	2	0.2	0.2	0.2
Minimum Gap (s)	2	0.2	2	0.2	0.2	0.2
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)	5	5	5	5		
Flash Dont Walk (s)	12	12	12	12		
Dual Entry	Yes	Yes	Yes	Yes	Yes	Yes
Inhibit Max	No	No	No	No	Yes	Yes
Start Time (s)	48	0	48	0	23	23
End Time (s)	0	23	0	23	48	48
Yield/Force Off (s)	64	17	64	17	45	45
Yield/Force Off 170(s)	52	5	52	5	45	45
Local Start Time (s)	48	0	48	0	23	23
Local Yield (s)	64	17	64	17	45	45
Local Yield 170(s)	52	5	52	5	45	45

Intersection Summary

Cycle Length	70
Control Type	Actuated-Coordinated
Natural Cycle	70
Offset: 0 (0%), Referenced to phase 4:SBTL and 8:NBTL, Start of Green	

Splits and Phases: 3: Ash Avenue & 3rd Street



												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	17	0	8	0	221	26	26	317	0
Future Volume (vph)	0	0	0	17	0	8	0	221	26	26	317	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				3.0	3.0			3.0	3.0	3.0	3.0	
Lane Util. Factor				1.00	1.00			1.00	1.00	1.00	1.00	
Frt				1.00	0.85			1.00	0.85	1.00	1.00	
Flt Protected				0.95	1.00			1.00	1.00	0.95	1.00	
Satd. Flow (prot)				1770	1583			1863	1583	1770	1863	
Flt Permitted				0.76	1.00			1.00	1.00	0.61	1.00	
Satd. Flow (perm)				1410	1583			1863	1583	1129	1863	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	19	0	9	0	246	29	29	352	0
RTOR Reduction (vph)	0	0	0	0	8	0	0	0	5	0	0	0
Lane Group Flow (vph)	0	0	0	19	1	0	0	246	24	29	352	0
Turn Type	Perm			Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		6			2			8				4
Permitted Phases	6			2			8		8	4		
Actuated Green, G (s)				2.7	2.7			55.3	55.3	55.3	55.3	
Effective Green, g (s)				5.7	5.7			58.3	58.3	58.3	58.3	
Actuated g/C Ratio				0.08	0.08			0.83	0.83	0.83	0.83	
Clearance Time (s)				6.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)				2.0	2.0			0.2	0.2	0.2	0.2	
Lane Grp Cap (vph)				114	128			1551	1318	940	1551	
v/s Ratio Prot					0.00			0.13			c0.19	
v/s Ratio Perm				c0.01					0.02	0.03		
v/c Ratio				0.17	0.01			0.16	0.02	0.03	0.23	
Uniform Delay, d1				29.9	29.5			1.1	1.0	1.0	1.2	
Progression Factor				1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2				0.3	0.0			0.2	0.0	0.1	0.3	
Delay (s)				30.2	29.6			1.3	1.0	1.1	1.5	
Level of Service				C	C			A	A	A	A	
Approach Delay (s)		0.0			30.0			1.3			1.5	
Approach LOS		A			C			A			A	
Intersection Summary												
HCM 2000 Control Delay			2.6		HCM 2000 Level of Service					A		
HCM 2000 Volume to Capacity ratio			0.23									
Actuated Cycle Length (s)			70.0		Sum of lost time (s)					9.0		
Intersection Capacity Utilization			32.4%		ICU Level of Service					A		
Analysis Period (min)			15									
c Critical Lane Group												

Intersection						
Int Delay, s/veh	0.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↗	↑↓		↙	↑↑
Traffic Vol, veh/h	39	6	320	34	20	463
Future Vol, veh/h	39	6	320	34	20	463
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	180	-
Veh in Median Storage, #	1	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	42	7	348	37	22	503

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	663	193	0	0	385	0
Stage 1	367	-	-	-	-	-
Stage 2	296	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	394	816	-	-	1170	-
Stage 1	671	-	-	-	-	-
Stage 2	729	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	387	816	-	-	1170	-
Mov Cap-2 Maneuver	492	-	-	-	-	-
Stage 1	671	-	-	-	-	-
Stage 2	715	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.5	0	0.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	492	816	1170	-
HCM Lane V/C Ratio	-	-	0.086	0.008	0.019	-
HCM Control Delay (s)	-	-	13	9.4	8.1	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0.3	0	0.1	-

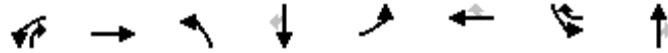
Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕	↗		↕
Traffic Vol, veh/h	0	2	314	12	0	481
Future Vol, veh/h	0	2	314	12	0	481
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	65	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	2	341	13	0	523

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	-	171	0	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-
Pot Cap-1 Maneuver	0	843	-	-	0
Stage 1	0	-	-	-	0
Stage 2	0	-	-	-	0
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	-	843	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.3	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	-	843
HCM Lane V/C Ratio	-	-	0.003
HCM Control Delay (s)	-	-	9.3
HCM Lane LOS	-	-	A
HCM 95th %tile Q(veh)	-	-	0

Intersection						
Intersection Delay, s/veh	10.8					
Intersection LOS	B					
Approach	EB	WB		NB	SB	
Entry Lanes	1	2		1	2	
Conflicting Circle Lanes	2	2		2	2	
Adj Approach Flow, veh/h	103	896		666	582	
Demand Flow Rate, veh/h	105	914		679	594	
Vehicles Circulating, veh/h	995	334		465	524	
Vehicles Exiting, veh/h	123	810		635	724	
Ped Vol Crossing Leg, #/h	0	0		0	0	
Ped Cap Adj	1.000	1.000		1.000	1.000	
Approach Delay, s/veh	8.2	8.8		16.2	8.2	
Approach LOS	A	A		C	A	
Lane	Left	Left	Right	Left	Left	Right
Designated Moves	LTR	LT	R	LTR	L	LTR
Assumed Moves	LTR	LT	R	LTR	L	LTR
RT Channelized						
Lane Util	1.000	0.547	0.453	1.000	0.530	0.470
Follow-Up Headway, s	2.535	2.667	2.535	2.535	2.667	2.535
Critical Headway, s	4.328	4.645	4.328	4.328	4.645	4.328
Entry Flow, veh/h	105	500	414	679	315	279
Cap Entry Lane, veh/h	609	993	1069	956	834	910
Entry HV Adj Factor	0.978	0.981	0.981	0.981	0.980	0.981
Flow Entry, veh/h	103	490	406	666	309	274
Cap Entry, veh/h	596	974	1048	938	817	892
V/C Ratio	0.172	0.504	0.387	0.710	0.378	0.307
Control Delay, s/veh	8.2	9.9	7.5	16.2	8.9	7.3
LOS	A	A	A	C	A	A
95th %tile Queue, veh	1	3	2	6	2	1

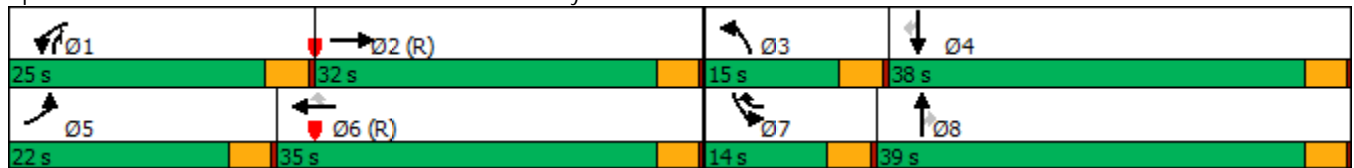

























Phase Number	1	2	3	4	5	6	7	8
Movement	WBL	EBT	NBL	SBT	EBL	WBT	SBL	NBT
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	25	32	15	38	22	35	14	39
Maximum Split (%)	22.7%	29.1%	13.6%	34.5%	20.0%	31.8%	12.7%	35.5%
Minimum Split (s)	9	20	14	20	9	20	9	20
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Minimum Initial (s)	5	5	10	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0	0
Walk Time (s)		5		5		5		5
Flash Dont Walk (s)		11		11		11		11
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	85	0	32	47	85	107	32	46
End Time (s)	0	32	47	85	107	32	46	85
Yield/Force Off (s)	106	28	43	81	103	28	42	81
Yield/Force Off 170(s)	106	17	43	70	103	17	42	70
Local Start Time (s)	85	0	32	47	85	107	32	46
Local Yield (s)	106	28	43	81	103	28	42	81
Local Yield 170(s)	106	17	43	70	103	17	42	70

Intersection Summary

Cycle Length	110
Control Type	Actuated-Coordinated
Natural Cycle	90
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green	

Splits and Phases: 2: Mill Avenue & Rio Salado Parkway



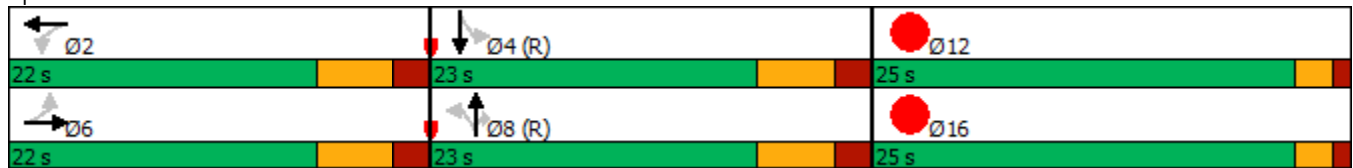
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	245	481	57	247	550	517	23	520	177	159	357	235
Future Volume (veh/h)	245	481	57	247	550	517	23	520	177	159	357	235
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	266	523	62	268	598	562	25	565	192	173	388	255
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	291	896	106	299	1009	594	86	591	767	162	670	568
Arrive On Green	0.16	0.28	0.28	0.17	0.28	0.28	0.05	0.32	0.32	0.09	0.36	0.36
Sat Flow, veh/h	1781	3201	378	1781	3554	1585	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	266	290	295	268	598	562	25	565	192	173	388	255
Grp Sat Flow(s),veh/h/ln	1781	1777	1802	1781	1777	1585	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	16.1	15.4	15.5	16.2	15.9	31.2	1.5	32.6	7.8	10.0	18.5	13.5
Cycle Q Clear(g_c), s	16.1	15.4	15.5	16.2	15.9	31.2	1.5	32.6	7.8	10.0	18.5	13.5
Prop In Lane	1.00		0.21	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	291	497	504	299	1009	594	86	591	767	162	670	568
V/C Ratio(X)	0.91	0.58	0.59	0.90	0.59	0.95	0.29	0.96	0.25	1.07	0.58	0.45
Avail Cap(c_a), veh/h	291	497	504	340	1009	594	178	595	770	162	670	568
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.2	34.1	34.1	44.9	33.9	33.3	50.5	36.9	16.7	50.0	28.6	27.0
Incr Delay (d2), s/veh	31.1	4.9	4.9	23.4	2.6	25.8	1.8	26.1	0.2	90.1	1.2	0.6
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(95%),veh/ln	14.7	11.7	11.9	14.0	11.6	25.4	1.3	26.0	5.1	13.6	13.2	8.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	76.3	39.0	39.0	68.3	36.5	59.1	52.3	63.0	16.9	140.1	29.8	27.5
LnGrp LOS	E	D	D	E	D	E	D	E	B	F	C	C
Approach Vol, veh/h		851			1428			782				816
Approach Delay, s/veh		50.7			51.3			51.3				52.5
Approach LOS		D			D			D				D
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	22.4	34.8	9.3	43.4	22.0	35.2	14.0	38.8				
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Max Green Setting (Gmax), s	21.0	28.0	11.0	34.0	18.0	31.0	10.0	35.0				
Max Q Clear Time (g_c+I1), s	18.2	17.5	3.5	20.5	18.1	33.2	12.0	34.6				
Green Ext Time (p_c), s	0.2	2.6	0.0	2.8	0.0	0.0	0.0	0.2				
Intersection Summary												
HCM 6th Ctrl Delay			51.4									
HCM 6th LOS			D									

























Phase Number	2	4	6	8	12	16
Movement	WBTL	SBTL	EBTL	NBTL	Hold	Hold
Lead/Lag						
Lead-Lag Optimize						
Recall Mode	None	C-Max	None	C-Max	None	None
Maximum Split (s)	22	23	22	23	25	25
Maximum Split (%)	31.4%	32.9%	31.4%	32.9%	35.7%	35.7%
Minimum Split (s)	23	23	23	23	22	22
Yellow Time (s)	4	4	4	4	2	2
All-Red Time (s)	2	2	2	2	1	1
Minimum Initial (s)	5	5	5	5	5	5
Vehicle Extension (s)	2	0.2	2	0.2	0.2	0.2
Minimum Gap (s)	2	0.2	2	0.2	0.2	0.2
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)	5	5	5	5		
Flash Dont Walk (s)	12	12	12	12		
Dual Entry	Yes	Yes	Yes	Yes	Yes	Yes
Inhibit Max	No	No	No	No	Yes	Yes
Start Time (s)	48	0	48	0	23	23
End Time (s)	0	23	0	23	48	48
Yield/Force Off (s)	64	17	64	17	45	45
Yield/Force Off 170(s)	52	5	52	5	45	45
Local Start Time (s)	48	0	48	0	23	23
Local Yield (s)	64	17	64	17	45	45
Local Yield 170(s)	52	5	52	5	45	45

Intersection Summary	
Cycle Length	70
Control Type	Actuated-Coordinated
Natural Cycle	70
Offset: 0 (0%), Referenced to phase 4:SBTL and 8:NBTL, Start of Green	

Splits and Phases: 3: Ash Avenue & 3rd Street



												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	45	0	29	0	401	26	21	447	0
Future Volume (vph)	0	0	0	45	0	29	0	401	26	21	447	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				3.0	3.0			3.0	3.0	3.0	3.0	
Lane Util. Factor				1.00	1.00			1.00	1.00	1.00	1.00	
Frt				1.00	0.85			1.00	0.85	1.00	1.00	
Flt Protected				0.95	1.00			1.00	1.00	0.95	1.00	
Satd. Flow (prot)				1770	1583			1863	1583	1770	1863	
Flt Permitted				0.76	1.00			1.00	1.00	0.49	1.00	
Satd. Flow (perm)				1410	1583			1863	1583	913	1863	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	50	0	32	0	446	29	23	497	0
RTOR Reduction (vph)	0	0	0	0	28	0	0	0	6	0	0	0
Lane Group Flow (vph)	0	0	0	50	4	0	0	446	23	23	497	0
Turn Type	Perm			Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		6			2			8				4
Permitted Phases	6			2			8		8	4		
Actuated Green, G (s)				5.0	5.0			53.0	53.0	53.0	53.0	
Effective Green, g (s)				8.0	8.0			56.0	56.0	56.0	56.0	
Actuated g/C Ratio				0.11	0.11			0.80	0.80	0.80	0.80	
Clearance Time (s)				6.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)				2.0	2.0			0.2	0.2	0.2	0.2	
Lane Grp Cap (vph)				161	180			1490	1266	730	1490	
v/s Ratio Prot					0.00			0.24				c0.27
v/s Ratio Perm				c0.04					0.01	0.03		
v/c Ratio				0.31	0.02			0.30	0.02	0.03	0.33	
Uniform Delay, d1				28.5	27.5			1.8	1.4	1.4	1.9	
Progression Factor				1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2				0.4	0.0			0.5	0.0	0.1	0.6	
Delay (s)				28.9	27.5			2.4	1.4	1.5	2.5	
Level of Service				C	C			A	A	A	A	
Approach Delay (s)		0.0			28.3			2.3			2.5	
Approach LOS		A			C			A			A	
Intersection Summary												
HCM 2000 Control Delay			4.4		HCM 2000 Level of Service					A		
HCM 2000 Volume to Capacity ratio			0.35									
Actuated Cycle Length (s)			70.0		Sum of lost time (s)					9.0		
Intersection Capacity Utilization			34.4%		ICU Level of Service					A		
Analysis Period (min)			15									

c Critical Lane Group

Intersection						
Int Delay, s/veh	1.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↗	↑↓		↙	↑↑
Traffic Vol, veh/h	49	16	545	71	46	476
Future Vol, veh/h	49	16	545	71	46	476
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	180	-
Veh in Median Storage, #	1	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	53	17	592	77	50	517

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	990	335	0	0	669	0
Stage 1	631	-	-	-	-	-
Stage 2	359	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	243	661	-	-	917	-
Stage 1	492	-	-	-	-	-
Stage 2	677	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	230	661	-	-	917	-
Mov Cap-2 Maneuver	356	-	-	-	-	-
Stage 1	492	-	-	-	-	-
Stage 2	640	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15.3	0	0.8
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	356	661	917
HCM Lane V/C Ratio	-	-	0.15	0.026	0.055
HCM Control Delay (s)	-	-	16.9	10.6	9.2
HCM Lane LOS	-	-	C	B	A
HCM 95th %tile Q(veh)	-	-	0.5	0.1	0.2

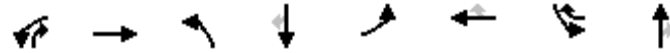
Intersection						
Int Delay, s/veh	0.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕	↗		↕
Traffic Vol, veh/h	0	6	538	23	0	516
Future Vol, veh/h	0	6	538	23	0	516
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	65	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	7	585	25	0	561

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	-	293	0	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-
Pot Cap-1 Maneuver	0	703	-	-	0
Stage 1	0	-	-	-	0
Stage 2	0	-	-	-	0
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	-	703	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.2	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	-	703
HCM Lane V/C Ratio	-	-	0.009
HCM Control Delay (s)	-	-	10.2
HCM Lane LOS	-	-	B
HCM 95th %tile Q(veh)	-	-	0

Intersection						
Intersection Delay, s/veh	5.7					
Intersection LOS	A					
Approach	EB	WB		NB	SB	
Entry Lanes	1	2		1	2	
Conflicting Circle Lanes	2	2		2	2	
Adj Approach Flow, veh/h	61	647		247	587	
Demand Flow Rate, veh/h	62	661		252	599	
Vehicles Circulating, veh/h	771	105		398	230	
Vehicles Exiting, veh/h	58	545		435	536	
Ped Vol Crossing Leg, #/h	0	0		0	0	
Ped Cap Adj	1.000	1.000		1.000	1.000	
Approach Delay, s/veh	5.8	5.5		6.1	5.8	
Approach LOS	A	A		A	A	
Lane	Left	Left	Right	Left	Left	Right
Designated Moves	LTR	LT	R	LTR	L	LTR
Assumed Moves	LTR	LT	R	LTR	L	LTR
RT Channelized						
Lane Util	1.000	0.333	0.667	1.000	0.529	0.471
Follow-Up Headway, s	2.535	2.667	2.535	2.535	2.667	2.535
Critical Headway, s	4.328	4.645	4.328	4.328	4.645	4.328
Entry Flow, veh/h	62	220	441	252	317	282
Cap Entry Lane, veh/h	737	1226	1299	1012	1092	1168
Entry HV Adj Factor	0.988	0.978	0.980	0.982	0.982	0.979
Flow Entry, veh/h	61	215	432	247	311	276
Cap Entry, veh/h	728	1199	1272	994	1073	1143
V/C Ratio	0.084	0.180	0.340	0.249	0.290	0.241
Control Delay, s/veh	5.8	4.6	6.0	6.1	6.2	5.4
LOS	A	A	A	A	A	A
95th %tile Queue, veh	0	1	2	1	1	1

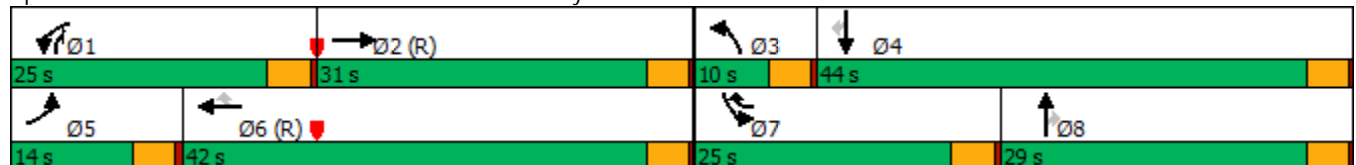


Phase Number	1	2	3	4	5	6	7	8
Movement	WBL	EBT	NBL	SBT	EBL	WBT	SBL	NBT
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	25	31	10	44	14	42	25	29
Maximum Split (%)	22.7%	28.2%	9.1%	40.0%	12.7%	38.2%	22.7%	26.4%
Minimum Split (s)	9	20	9	20	9	20	9	20
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Minimum Initial (s)	5	5	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0	0
Walk Time (s)		5		5		5		5
Flash Dont Walk (s)		11		11		11		11
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	85	0	31	41	85	99	31	56
End Time (s)	0	31	41	85	99	31	56	85
Yield/Force Off (s)	106	27	37	81	95	27	52	81
Yield/Force Off 170(s)	106	16	37	70	95	16	52	70
Local Start Time (s)	85	0	31	41	85	99	31	56
Local Yield (s)	106	27	37	81	95	27	52	81
Local Yield 170(s)	106	16	37	70	95	16	52	70

Intersection Summary

Cycle Length	110
Control Type	Actuated-Coordinated
Natural Cycle	65
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green	

Splits and Phases: 2: Mill Avenue & Rio Salado Parkway



Total 2026 AM
250 RIO

2: Mill Avenue & Rio Salado Parkway
HCM 6th Signalized Intersection Summary

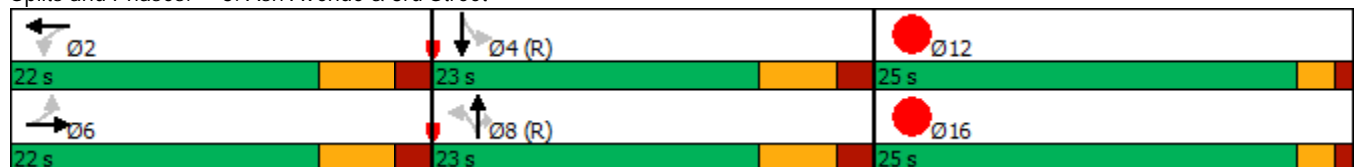
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	67	409	29	189	485	145	30	243	142	192	328	111
Future Volume (veh/h)	67	409	29	189	485	145	30	243	142	192	328	111
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	73	445	32	205	527	158	33	264	154	209	357	121
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	94	1408	101	238	1775	1007	51	312	476	242	512	434
Arrive On Green	0.05	0.42	0.42	0.13	0.50	0.50	0.03	0.17	0.17	0.14	0.27	0.27
Sat Flow, veh/h	1781	3363	241	1781	3554	1585	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	73	234	243	205	527	158	33	264	154	209	357	121
Grp Sat Flow(s),veh/h/ln	1781	1777	1827	1781	1777	1585	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	4.5	9.7	9.8	12.4	9.6	4.4	2.0	15.1	8.3	12.6	18.9	6.6
Cycle Q Clear(g_c), s	4.5	9.7	9.8	12.4	9.6	4.4	2.0	15.1	8.3	12.6	18.9	6.6
Prop In Lane	1.00		0.13	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	94	744	765	238	1775	1007	51	312	476	242	512	434
V/C Ratio(X)	0.78	0.32	0.32	0.86	0.30	0.16	0.64	0.85	0.32	0.87	0.70	0.28
Avail Cap(c_a), veh/h	162	744	765	340	1775	1007	97	425	572	340	680	576
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.5	21.4	21.4	46.7	16.2	8.1	52.8	44.5	29.8	46.6	35.9	31.4
Incr Delay (d2), s/veh	12.9	1.1	1.1	14.6	0.4	0.3	12.6	11.1	0.4	15.2	2.0	0.3
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(95%),veh/ln	4.2	7.6	7.8	10.6	7.1	2.8	1.9	12.5	5.8	10.8	13.7	4.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.3	22.5	22.5	61.2	16.6	8.5	65.4	55.5	30.2	61.7	37.9	31.8
LnGrp LOS	E	C	C	E	B	A	E	E	C	E	D	C
Approach Vol, veh/h		550			890			451			687	
Approach Delay, s/veh		28.1			25.4			47.6			44.1	
Approach LOS		C			C			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	18.7	50.1	7.2	34.1	9.8	58.9	18.9	22.4				
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Max Green Setting (Gmax), s	21.0	27.0	6.0	40.0	10.0	38.0	21.0	25.0				
Max Q Clear Time (g_c+I1), s	14.4	11.8	4.0	20.9	6.5	11.6	14.6	17.1				
Green Ext Time (p_c), s	0.3	2.5	0.0	2.5	0.0	4.3	0.3	1.3				
Intersection Summary												
HCM 6th Ctrl Delay				34.8								
HCM 6th LOS				C								



Phase Number	2	4	6	8	12	16
Movement	WBTL	SBTL	EBTL	NBTL	Hold	Hold
Lead/Lag						
Lead-Lag Optimize						
Recall Mode	None	C-Max	None	C-Max	None	None
Maximum Split (s)	22	23	22	23	25	25
Maximum Split (%)	31.4%	32.9%	31.4%	32.9%	35.7%	35.7%
Minimum Split (s)	23	23	23	23	22	22
Yellow Time (s)	4	4	4	4	2	2
All-Red Time (s)	2	2	2	2	1	1
Minimum Initial (s)	5	5	5	5	5	5
Vehicle Extension (s)	2	0.2	2	0.2	0.2	0.2
Minimum Gap (s)	2	0.2	2	0.2	0.2	0.2
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)	5	5	5	5		
Flash Dont Walk (s)	12	12	12	12		
Dual Entry	Yes	Yes	Yes	Yes	Yes	Yes
Inhibit Max	No	No	No	No	Yes	Yes
Start Time (s)	48	0	48	0	23	23
End Time (s)	0	23	0	23	48	48
Yield/Force Off (s)	64	17	64	17	45	45
Yield/Force Off 170(s)	52	5	52	5	45	45
Local Start Time (s)	48	0	48	0	23	23
Local Yield (s)	64	17	64	17	45	45
Local Yield 170(s)	52	5	52	5	45	45























Intersection Summary	
Cycle Length	70
Control Type	Actuated-Coordinated
Natural Cycle	70
Offset: 0 (0%), Referenced to phase 4:SBTL and 8:NBTL, Start of Green	

Splits and Phases: 3: Ash Avenue & 3rd Street



Total 2026 AM
250 RIO

3: Ash Avenue & 3rd Street
HCM Signalized Intersection Capacity Analysis

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	0	0	0	17	0	9	0	244	26	26	323	0	
Future Volume (vph)	0	0	0	17	0	9	0	244	26	26	323	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)				3.0	3.0			3.0	3.0	3.0	3.0		
Lane Util. Factor				1.00	1.00			1.00	1.00	1.00	1.00		
Frt				1.00	0.85			1.00	0.85	1.00	1.00		
Flt Protected				0.95	1.00			1.00	1.00	0.95	1.00		
Satd. Flow (prot)				1770	1583			1863	1583	1770	1863		
Flt Permitted				0.76	1.00			1.00	1.00	0.59	1.00		
Satd. Flow (perm)				1410	1583			1863	1583	1104	1863		
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
Adj. Flow (vph)	0	0	0	19	0	10	0	271	29	29	359	0	
RTOR Reduction (vph)	0	0	0	0	9	0	0	0	5	0	0	0	
Lane Group Flow (vph)	0	0	0	19	1	0	0	271	24	29	359	0	
Turn Type	Perm			Perm	NA		Perm	NA	Perm	Perm	NA		
Protected Phases		6			2			8				4	
Permitted Phases	6			2			8		8	4			
Actuated Green, G (s)				2.7	2.7			55.3	55.3	55.3	55.3		
Effective Green, g (s)				5.7	5.7			58.3	58.3	58.3	58.3		
Actuated g/C Ratio				0.08	0.08			0.83	0.83	0.83	0.83		
Clearance Time (s)				6.0	6.0			6.0	6.0	6.0	6.0		
Vehicle Extension (s)				2.0	2.0			0.2	0.2	0.2	0.2		
Lane Grp Cap (vph)				114	128			1551	1318	919	1551		
v/s Ratio Prot					0.00			0.15			c0.19		
v/s Ratio Perm				c0.01					0.02	0.03			
v/c Ratio				0.17	0.01			0.17	0.02	0.03	0.23		
Uniform Delay, d1				29.9	29.5			1.1	1.0	1.0	1.2		
Progression Factor				1.00	1.00			1.00	1.00	1.00	1.00		
Incremental Delay, d2				0.3	0.0			0.2	0.0	0.1	0.3		
Delay (s)				30.2	29.6			1.4	1.0	1.1	1.6		
Level of Service				C	C			A	A	A	A		
Approach Delay (s)		0.0			30.0			1.4			1.5		
Approach LOS		A			C			A			A		
Intersection Summary													
HCM 2000 Control Delay			2.6		HCM 2000 Level of Service					A			
HCM 2000 Volume to Capacity ratio			0.24										
Actuated Cycle Length (s)			70.0		Sum of lost time (s)					9.0			
Intersection Capacity Utilization			32.4%		ICU Level of Service					A			
Analysis Period (min)			15										
c Critical Lane Group													

Intersection						
Int Delay, s/veh	1.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↗	↕		↙	↕
Traffic Vol, veh/h	66	20	343	118	91	463
Future Vol, veh/h	66	20	343	118	91	463
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	180	-
Veh in Median Storage, #	1	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	72	22	373	128	99	503

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	887	251	0	0	501	0
Stage 1	437	-	-	-	-	-
Stage 2	450	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	284	749	-	-	1059	-
Stage 1	619	-	-	-	-	-
Stage 2	609	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	258	749	-	-	1059	-
Mov Cap-2 Maneuver	383	-	-	-	-	-
Stage 1	619	-	-	-	-	-
Stage 2	552	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15.1	0	1.4
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	383	749	1059
HCM Lane V/C Ratio	-	-	0.187	0.029	0.093
HCM Control Delay (s)	-	-	16.6	10	8.7
HCM Lane LOS	-	-	C	B	A
HCM 95th %tile Q(veh)	-	-	0.7	0.1	0.3

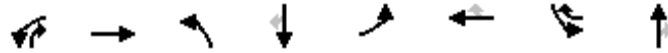
Intersection						
Int Delay, s/veh	0.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕	↗		↕
Traffic Vol, veh/h	0	7	328	35	0	552
Future Vol, veh/h	0	7	328	35	0	552
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	65	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	8	357	38	0	600

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	-	179	0	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-
Pot Cap-1 Maneuver	0	833	-	-	0
Stage 1	0	-	-	-	0
Stage 2	0	-	-	-	0
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	-	833	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.4	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	-	833
HCM Lane V/C Ratio	-	-	0.009
HCM Control Delay (s)	-	-	9.4
HCM Lane LOS	-	-	A
HCM 95th %tile Q(veh)	-	-	0

Intersection						
Intersection Delay, s/veh	12.4					
Intersection LOS	B					
Approach	EB	WB		NB	SB	
Entry Lanes	1	2		1	2	
Conflicting Circle Lanes	2	2		2	2	
Adj Approach Flow, veh/h	105	924		675	696	
Demand Flow Rate, veh/h	107	943		688	710	
Vehicles Circulating, veh/h	1105	345		550	524	
Vehicles Exiting, veh/h	129	893		662	764	
Ped Vol Crossing Leg, #/h	0	0		0	0	
Ped Cap Adj	1.000	1.000		1.000	1.000	
Approach Delay, s/veh	9.2	9.1		20.5	9.3	
Approach LOS	A	A		C	A	
Lane	Left	Left	Right	Left	Left	Right
Designated Moves	LTR	LT	R	LTR	L	LTR
Assumed Moves	LTR	LT	R	LTR	L	LTR
RT Channelized						
Lane Util	1.000	0.530	0.470	1.000	0.530	0.470
Follow-Up Headway, s	2.535	2.667	2.535	2.535	2.667	2.535
Critical Headway, s	4.328	4.645	4.328	4.328	4.645	4.328
Entry Flow, veh/h	107	500	443	688	376	334
Cap Entry Lane, veh/h	555	983	1059	890	834	910
Entry HV Adj Factor	0.979	0.981	0.980	0.981	0.981	0.979
Flow Entry, veh/h	105	490	434	675	369	327
Cap Entry, veh/h	543	964	1038	873	818	891
V/C Ratio	0.193	0.509	0.418	0.773	0.451	0.367
Control Delay, s/veh	9.2	10.1	8.0	20.5	10.2	8.2
LOS	A	B	A	C	B	A
95th %tile Queue, veh	1	3	2	8	2	2

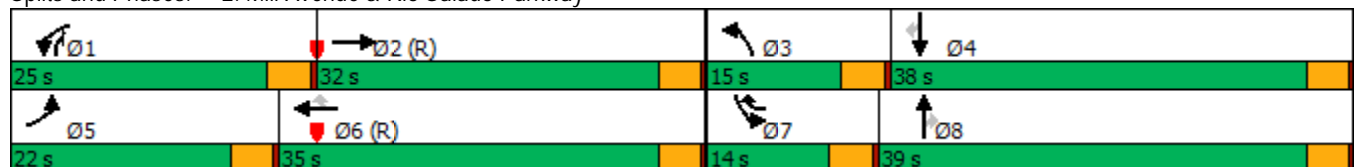


Phase Number	1	2	3	4	5	6	7	8
Movement	WBL	EBT	NBL	SBT	EBL	WBT	SBL	NBT
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	25	32	15	38	22	35	14	39
Maximum Split (%)	22.7%	29.1%	13.6%	34.5%	20.0%	31.8%	12.7%	35.5%
Minimum Split (s)	9	20	14	20	9	20	9	20
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Minimum Initial (s)	5	5	10	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0	0
Walk Time (s)		5		5		5		5
Flash Dont Walk (s)		11		11		11		11
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	85	0	32	47	85	107	32	46
End Time (s)	0	32	47	85	107	32	46	85
Yield/Force Off (s)	106	28	43	81	103	28	42	81
Yield/Force Off 170(s)	106	17	43	70	103	17	42	70
Local Start Time (s)	85	0	32	47	85	107	32	46
Local Yield (s)	106	28	43	81	103	28	42	81
Local Yield 170(s)	106	17	43	70	103	17	42	70

Intersection Summary
























Cycle Length	110
Control Type	Actuated-Coordinated
Natural Cycle	90
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green	

Splits and Phases: 2: Mill Avenue & Rio Salado Parkway



Total 2026 PM
250 RIO

2: Mill Avenue & Rio Salado Parkway
HCM 6th Signalized Intersection Summary

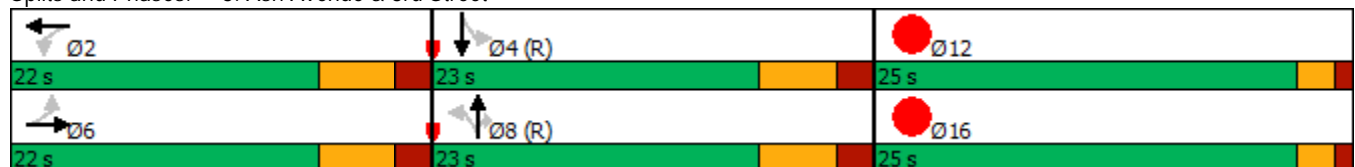
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	248	541	68	247	571	517	27	520	177	159	357	236
Future Volume (veh/h)	248	541	68	247	571	517	27	520	177	159	357	236
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	270	588	74	268	621	562	29	565	192	173	388	257
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	291	889	112	299	1009	594	95	591	767	162	661	560
Arrive On Green	0.16	0.28	0.28	0.17	0.28	0.28	0.05	0.32	0.32	0.09	0.35	0.35
Sat Flow, veh/h	1781	3177	399	1781	3554	1585	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	270	328	334	268	621	562	29	565	192	173	388	257
Grp Sat Flow(s),veh/h/ln	1781	1777	1799	1781	1777	1585	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	16.4	18.0	18.0	16.2	16.7	31.2	1.7	32.6	7.8	10.0	18.6	13.8
Cycle Q Clear(g_c), s	16.4	18.0	18.0	16.2	16.7	31.2	1.7	32.6	7.8	10.0	18.6	13.8
Prop In Lane	1.00		0.22	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	291	497	503	299	1009	594	95	591	767	162	661	560
V/C Ratio(X)	0.93	0.66	0.66	0.90	0.62	0.95	0.30	0.96	0.25	1.07	0.59	0.46
Avail Cap(c_a), veh/h	291	497	503	340	1009	594	178	595	770	162	661	560
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.3	35.0	35.0	44.9	34.2	33.3	50.1	36.9	16.7	50.0	29.0	27.4
Incr Delay (d2), s/veh	33.9	6.7	6.7	23.4	2.8	25.8	1.8	26.1	0.2	90.1	1.3	0.6
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(95%),veh/ln	15.1	13.5	13.6	14.0	12.0	25.4	1.5	26.0	5.1	13.6	13.3	9.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	79.3	41.7	41.7	68.3	37.0	59.1	51.9	63.0	16.9	140.1	30.3	28.0
LnGrp LOS	E	D	D	E	D	E	D	E	B	F	C	C
Approach Vol, veh/h		932			1451			786			818	
Approach Delay, s/veh		52.6			51.3			51.3			52.8	
Approach LOS		D			D			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	22.4	34.8	9.9	42.9	22.0	35.2	14.0	38.8				
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Max Green Setting (Gmax), s	21.0	28.0	11.0	34.0	18.0	31.0	10.0	35.0				
Max Q Clear Time (g_c+I1), s	18.2	20.0	3.7	20.6	18.4	33.2	12.0	34.6				
Green Ext Time (p_c), s	0.2	2.5	0.0	2.8	0.0	0.0	0.0	0.2				
Intersection Summary												
HCM 6th Ctrl Delay			51.9									
HCM 6th LOS			D									



Phase Number	2	4	6	8	12	16
Movement	WBTL	SBTL	EBTL	NBTL	Hold	Hold
Lead/Lag						
Lead-Lag Optimize						
Recall Mode	None	C-Max	None	C-Max	None	None
Maximum Split (s)	22	23	22	23	25	25
Maximum Split (%)	31.4%	32.9%	31.4%	32.9%	35.7%	35.7%
Minimum Split (s)	23	23	23	23	22	22
Yellow Time (s)	4	4	4	4	2	2
All-Red Time (s)	2	2	2	2	1	1
Minimum Initial (s)	5	5	5	5	5	5
Vehicle Extension (s)	2	0.2	2	0.2	0.2	0.2
Minimum Gap (s)	2	0.2	2	0.2	0.2	0.2
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)	5	5	5	5		
Flash Dont Walk (s)	12	12	12	12		
Dual Entry	Yes	Yes	Yes	Yes	Yes	Yes
Inhibit Max	No	No	No	No	Yes	Yes
Start Time (s)	48	0	48	0	23	23
End Time (s)	0	23	0	23	48	48
Yield/Force Off (s)	64	17	64	17	45	45
Yield/Force Off 170(s)	52	5	52	5	45	45
Local Start Time (s)	48	0	48	0	23	23
Local Yield (s)	64	17	64	17	45	45
Local Yield 170(s)	52	5	52	5	45	45























Intersection Summary	
Cycle Length	70
Control Type	Actuated-Coordinated
Natural Cycle	70
Offset: 0 (0%), Referenced to phase 4:SBTL and 8:NBTL, Start of Green	

Splits and Phases: 3: Ash Avenue & 3rd Street



Total 2026 PM
250 RIO

3: Ash Avenue & 3rd Street
HCM Signalized Intersection Capacity Analysis

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	45	0	29	0	409	26	22	469	0
Future Volume (vph)	0	0	0	45	0	29	0	409	26	22	469	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				3.0	3.0			3.0	3.0	3.0	3.0	
Lane Util. Factor				1.00	1.00			1.00	1.00	1.00	1.00	
Frt				1.00	0.85			1.00	0.85	1.00	1.00	
Flt Protected				0.95	1.00			1.00	1.00	0.95	1.00	
Satd. Flow (prot)				1770	1583			1863	1583	1770	1863	
Flt Permitted				0.76	1.00			1.00	1.00	0.49	1.00	
Satd. Flow (perm)				1410	1583			1863	1583	904	1863	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	50	0	32	0	454	29	24	521	0
RTOR Reduction (vph)	0	0	0	0	28	0	0	0	6	0	0	0
Lane Group Flow (vph)	0	0	0	50	4	0	0	454	23	24	521	0
Turn Type	Perm			Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		6			2			8				4
Permitted Phases	6			2			8		8	4		
Actuated Green, G (s)				5.0	5.0			53.0	53.0	53.0	53.0	
Effective Green, g (s)				8.0	8.0			56.0	56.0	56.0	56.0	
Actuated g/C Ratio				0.11	0.11			0.80	0.80	0.80	0.80	
Clearance Time (s)				6.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)				2.0	2.0			0.2	0.2	0.2	0.2	
Lane Grp Cap (vph)				161	180			1490	1266	723	1490	
v/s Ratio Prot					0.00			0.24				c0.28
v/s Ratio Perm				c0.04					0.01	0.03		
v/c Ratio				0.31	0.02			0.30	0.02	0.03	0.35	
Uniform Delay, d1				28.5	27.5			1.9	1.4	1.4	1.9	
Progression Factor				1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2				0.4	0.0			0.5	0.0	0.1	0.6	
Delay (s)				28.9	27.5			2.4	1.4	1.5	2.6	
Level of Service				C	C			A	A	A	A	
Approach Delay (s)		0.0			28.3			2.3			2.5	
Approach LOS		A			C			A			A	
Intersection Summary												
HCM 2000 Control Delay			4.4		HCM 2000 Level of Service					A		
HCM 2000 Volume to Capacity ratio			0.36									
Actuated Cycle Length (s)			70.0		Sum of lost time (s)					9.0		
Intersection Capacity Utilization			35.5%		ICU Level of Service					A		
Analysis Period (min)			15									
c Critical Lane Group												

Intersection						
Int Delay, s/veh	3.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↗	↕		↙	↕
Traffic Vol, veh/h	152	68	553	99	70	476
Future Vol, veh/h	152	68	553	99	70	476
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	180	-
Veh in Median Storage, #	1	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	165	74	601	108	76	517

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1066	355	0	0	709	0
Stage 1	655	-	-	-	-	-
Stage 2	411	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	217	641	-	-	886	-
Stage 1	479	-	-	-	-	-
Stage 2	638	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	198	641	-	-	886	-
Mov Cap-2 Maneuver	329	-	-	-	-	-
Stage 1	479	-	-	-	-	-
Stage 2	583	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	21.8	0	1.2
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	329	641	886	-
HCM Lane V/C Ratio	-	-	0.502	0.115	0.086	-
HCM Control Delay (s)	-	-	26.5	11.3	9.4	-
HCM Lane LOS	-	-	D	B	A	-
HCM 95th %tile Q(veh)	-	-	2.7	0.4	0.3	-

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕	↗		↕
Traffic Vol, veh/h	0	23	590	31	0	540
Future Vol, veh/h	0	23	590	31	0	540
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	-	65	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	25	641	34	0	587

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	-	321	0	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-
Pot Cap-1 Maneuver	0	675	-	-	0
Stage 1	0	-	-	-	0
Stage 2	0	-	-	-	0
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	-	675	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	-	675
HCM Lane V/C Ratio	-	-	0.037
HCM Control Delay (s)	-	-	10.5
HCM Lane LOS	-	-	B
HCM 95th %tile Q(veh)	-	-	0.1

APPENDIX H

SIGNAL WARRANT ANALYSIS

250 RIO

Warrants 1, 2 & 3

Rio Salado Parkway and Access A

Signal Warrant Analysis

Appendix H

ADOT Traffic Engineering Guidelines and Policies section 611 includes methodology to consider signal warrants for future intersections using projected ADT. The methodology includes multiplying factors to the projected ADT to provide high hour, 4th high hour and 8th high hour volumes to compare with threshold volumes of the peak hour warrant, the 4-hour warrant and the 8-hour warrants. The factors are as follows:

High Hour	Hourly Adjustment Factor
1	0.0771
4	0.0656
8	0.0572

Right-turn factor applied

	NB	SB	EB	WB
2021 Total AM	0%	0%	0%	0%
2021 Total PM	0%	0%	0%	0%
2026 Total AM	0%	0%	0%	0%
2026 Total PM	0%	0%	0%	0%

Determine approach PM peak hour volumes	NB	SB	EB	WB
2021 Total AM	428	508	0	81
2021 Total PM	594	497	0	214
2026 Total AM	461	554	0	86
2026 Total PM	652	546	0	220

Approximate approach ADT volumes by dividing by the high hour adjustment factor (0.0771)

	NB	SB	EB	WB	NB+SB	EB+WB
2021 Total AM	5,551	6,589	-	1,051	12,140	1,051
2021 Total PM	7,704	6,446	-	2,776	14,150	2,776
2026 Total AM	5,979	7,185	-	1,115	13,165	1,115
2026 Total PM	8,457	7,082	-	2,853	15,538	2,853

Apply adjustment factors

	8th high hour		4th high hour		High hour	
	Major, both approaches	Minor, larger approach	Major, both approaches	Minor, larger approach	Major, both approaches	Minor, larger approach
2021 Total AM	694	60	796	69	936	81
2021 Total PM	809	159	928	182	1,091	214
2026 Total AM	753	64	864	73	1,015	86
2026 Total PM	889	163	1,019	187	1,198	220

250 RIO

Warrants 1, 2 & 3

Rio Salado Parkway and Access A

Signal Warrant Analysis

Appendix H

Thresholds are dependent on the number of lanes on each street approaching the intersection (prior to auxiliary lanes) and the speed limit on the major roadway.

Number of lanes moving traffic on major street?
 Number of lanes moving traffic on major approach of minor street?
 Posted or 85 percentile speed over 40 mph?

2
 1
 yes

Now compare to applicable signal warrant criteria of MUTCD

Warrant 1 (Eight-Hour Vehicular Volume)

Thresholds to pass

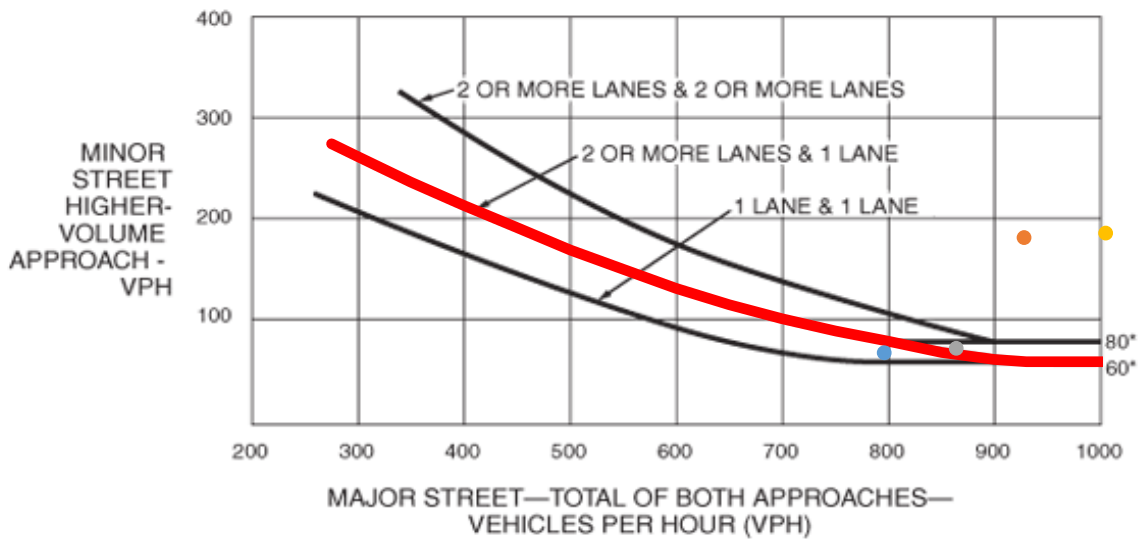
Condition	Major	Minor
Condition A	420	105
Condition B	630	53
Combo (A)	336	84
Combo (B)	504	42

Volumes to compare	Major, both approaches	Minor, larger approach
2021 Total AM	694	60
2021 Total PM	809	159
2026 Total AM	753	64
2026 Total PM	889	163

Compare criteria for each scenario	Condition A	Condition B	Combination	Signal Warrant met?
2021 Total AM	No	Yes	No	<u>Yes</u>
2021 Total PM	Yes	Yes	Yes	<u>Yes</u>
2026 Total AM	No	Yes	No	<u>Yes</u>
2026 Total PM	Yes	Yes	Yes	<u>Yes</u>

Signal Warrant 2 (Four-Hour Vehicular Volume)

Figure 4C-2. Warrant 2, Four-Hour Vehicular Volume (70% Factor)
 (COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 80 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 60 vph applies as the lower threshold volume for a minor-street approach with one lane.

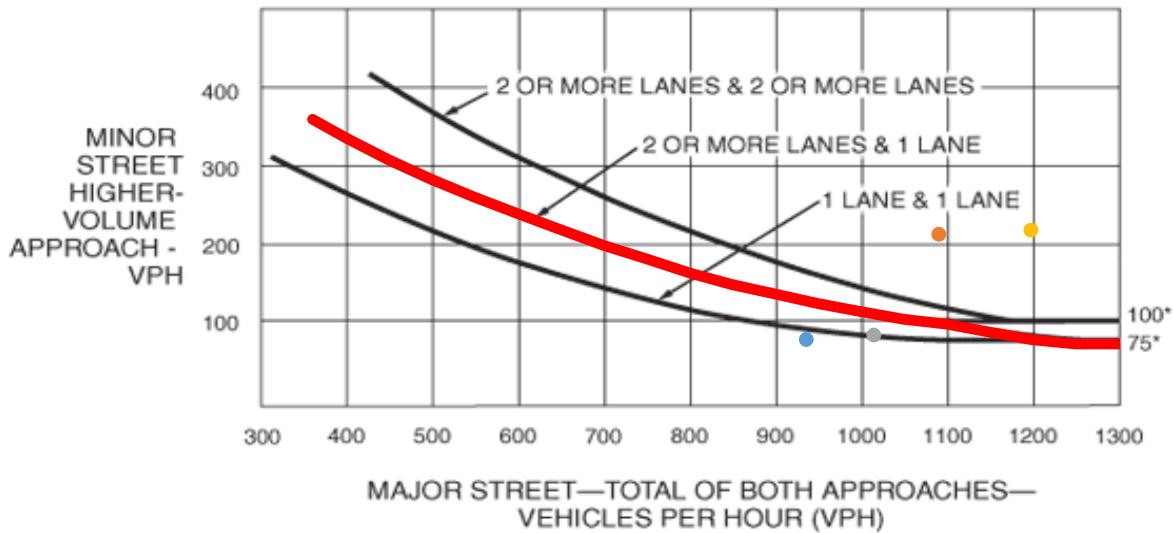
Legend	Major, both approaches	Minor, larger approach	Approximate Threshold for Minor
● 2021 Total AM	796	69	81
● 2021 Total PM	928	182	60
● 2026 Total AM	864	73	67
● 2026 Total PM	1,019	187	60

Signal Warrant 2 is met?

2021 Total AM	<u>No</u>
2021 Total PM	<u>Yes</u>
2026 Total AM	<u>Yes</u>
2026 Total PM	<u>Yes</u>

Signal Warrant 3 (Peak Hour)

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)
 (COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Legend	Major, both approaches	Minor, larger approach	Approximate Threshold for Minor
● 2021 Total AM	936	81	129
● 2021 Total PM	1,091	214	101
● 2026 Total AM	1,015	86	113
● 2026 Total PM	1,198	220	80

Signal Warrant 3 is met?	
2021 Total AM	No
2021 Total PM	Yes
2026 Total AM	No
2026 Total PM	Yes

APPENDIX I

QUEUE STORAGE CALCULATIONS

Signalized Intersections

2026

Average Vehicle Length, VL (Per Table 9-23, AASHTO "Green Book" 2018, p 9-99)

Intersection Cycle Length (sec): 110

Cycles per Hour: 33 Queuing Cycles: 2

Jurisdiction		Major road direction	
Major ()	Minor ()		
		Minimum Left Turn Storage (ft)	
		Minimum Right Turn Storage (ft)	

Truck%	VL (ft)
0%	25
5%	28
10%	32
15%	35
20%	38
25%	41

Truck % = 0%

VL (ft) = 25 Average Vehicle Length

Equation Used Storage Length, SL, = 2 x (vehicles/hour)/(cycles/hour) x Average Vehicle Length

Intersection	Move-ment	AM Peak (veh/hr)	Midday Peak (veh/hr)	PM Peak (veh/hr)	Max vehs per 2 cycles	Max Trucks per 2 cycles	AASHTO Storage Length (ft)	Synchro 95th %-ile Q (ft)
Mill Avenue & Rio Salado Parkway	NB Left	30	0	27	2	0	50	50'
	SB Left	192	0	159	12	0	300	340'
	EB Left	67	0	248	16	0	400	380'
	WB Left	189	0	247	16	0	400	350'
	NB Right	142	0	177	11	0	275	145'
	SB Right	111	0	236	15	0	375	225'
	EB Right	29	0	68	5	0	125	340'
	WB Right	145	0	517	32	0	800	635'

*Note: Truck/Passenger Vehicle split is projected based on percentage and not reflective of actual vehicle classification counts.

"Yield" for turns indicates that, while movement may or may not be subject to a Yield sign, vehicles must yield to oncoming traffic and may experience delays.

Signalized Intersections

2026

Average Vehicle Length, VL (Per Table 9-23, AASHTO "Green Book" 2018, p 9-99)

Intersection Cycle Length (sec): 70

Cycles per Hour: 51 Queuing Cycles: 2

Jurisdiction		Major road direction	
Major ()	Minor ()		
		Minimum Left Turn Storage (ft)	
		Minimum Right Turn Storage (ft)	

Truck%	VL (ft)
0%	25
5%	28
10%	32
15%	35
20%	38
25%	41

Truck % = 0%

VL (ft) = 25 Average Vehicle Length

Equation Used Storage Length, SL, = 2 x (vehicles/hour)/(cycles/hour) x Average Vehicle Length

Intersection	Move-ment	AM Peak (veh/hr)	Midday Peak (veh/hr)	PM Peak (veh/hr)	Max vehs per 2 cycles	Max Trucks per 2 cycles	AASHTO Storage Length (ft)	Synchro 95th %ile Q (ft)
Ash Avenue and 3rd Street	NB Left	0	0	0	0	0	0	0'
	SB Left	26	0	22	2	0	50	10'
	EB Left	0	0	0	0	0	0	0'
	WB Left	17	0	45	2	0	50	50'
	NB Right	26	0	26	2	0	50	0'
	SB Right	0	0	0	0	0	0	0'
	EB Right	0	0	0	0	0	0	0'
	WB Right	9	0	29	2	0	50	0'

*Note: Truck/Passenger Vehicle split is projected based on percentage and not reflective of actual vehicle classification counts.

"Yield" for turns indicates that, while movement may or may not be subject to a Yield sign, vehicles must yield to oncoming traffic and may experience delays.

Unsignalized Intersections

2026

Left Turns (Per AASHTO "Green Book" 2018, pp 9-96 to 9-99)

Equation 9-3	Equation 9-4
U.S. Customary	U.S. Customary
$c = \frac{V_o e^{-V_o t_c / 3600}}{1 - e^{-V_o t_f / 3600}}$ <p>where: c = left-turn capacity, veh/h V_o = major-road volume conflicting with the minor movement, assumed to be equal to one-half of the two-way major-road volume, veh/h t_c = critical gap, s t_f = follow-up gap, s</p>	$SL = \left\{ \frac{\ln [P(n > N)]}{\ln \left[\frac{v}{c} \right]} - 1 \right\} \times VL$ <p>where: SL = storage length, ft P(n>N) = probability of turn-lane overflow v = left-turn vehicle volume, veh/h c = left-turn capacity, veh/h VL = average length per vehicle, ft</p>

Truck%	VL (ft)
0%	25
5%	28
10%	32
15%	35
20%	38
25%	41

Truck % = 0%
 VL (ft) = 25 Average Vehicle Length
Per Section 9.7.2.2 Storage Length
 c (veh/hr) = *calculated* Left-Turn Capacity
 V_o (veh/hr) = Opposing Major Road Volume
 t_c (sec) = 6.25 85th %-ile Critical Gap
 t_f (sec) = 2.50 Follow-Up Gap
 SL (ft) = *calculated* Storage Length
 P(n>N) = 0.005 (a probability, no units)
 v (veh/hr) = *enter below* Left-Turn Vehicle Volume

Jurisdiction		Major road direction	
Major ()	Minor ()		
Minimum Left Turn Storage (ft)		Minimum Right Turn Storage (ft)	

Right Turns: Equation Used: storage length = 2 x (vehicles/hour)/(60 minutes/hour) x average vehicle length

Intersection	Move-ment	AM Peak (veh/hr)	Midday Peak (veh/hr)	PM Peak (veh/hr)	Veh per 2 minutes	Opposing V _o (veh/hr)	AASHTO Storage Length (ft)	Synchro 95th %-ile Q (ft)
Ash Avenue & Rio Salado Parkway/1st Street	NB Left	9	0	22	1	188	25'	200'
	SB Left	306	0	415	14	270	125'	50'
	EB Left	11	0	14	1	70	25'	25'
	WB Left	159	0	373	13	59	75'	75'
	NB Right	140	0	316	11	0	275'	200'
	SB Right	8	0	24	1	0	25'	50'
	EB Right	10	0	24	1	0	25'	25'
	WB Right	389	0	391	14	0	350'	50'
Rio Salado Parkway & Access A	NB Left	0	0	0	0	463	0'	0'
	SB Left	91	0	70	4	343	25'	25'
	EB Left	0	0	0	0	0	0'	0'
	WB Left	66	0	152	6	0	150'	70'
	NB Right	118	0	99	4	0	100'	0'
	SB Right	0	0	0	0	0	0'	0'
	EB Right	0	0	0	0	0	0'	0'
	WB Right	20	0	68	3	0	75'	25'
Rio Salado Parkway & Access B	NB Left	0	0	0	0	552	0'	0'
	SB Left	0	0	0	0	328	0'	0'
	EB Left	0	0	0	0	0	0'	0'
	WB Left	0	0	0	0	0	0'	0'
	NB Right	35	0	31	2	0	50'	0'
	SB Right	0	0	0	0	0	0'	0'
	EB Right	0	0	0	0	0	0'	0'
	WB Right	7	0	23	1	0	25'	25'

*Note: Truck/Passenger Vehicle split is projected based on percentage and not reflective of actual vehicle classification counts.

"Yield" for turns indicates that, while movement may or may not be subject to a Yield sign, vehicles must yield to oncoming traffic and may experience delays.



Lane Group	WBL	WBT	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	19	10	271	29	29	359
v/c Ratio	0.11	0.01	0.16	0.02	0.03	0.21
Control Delay	28.1	0.0	1.4	0.0	1.5	1.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.1	0.0	1.4	0.0	1.5	1.6
Queue Length 50th (ft)	7	0	0	0	0	0
Queue Length 95th (ft)	25	0	39	0	7	52
Internal Link Dist (ft)		136	715			575
Turn Bay Length (ft)	105			45	100	
Base Capacity (vph)	382	979	1696	1449	1006	1696
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.01	0.16	0.02	0.03	0.21
Intersection Summary						

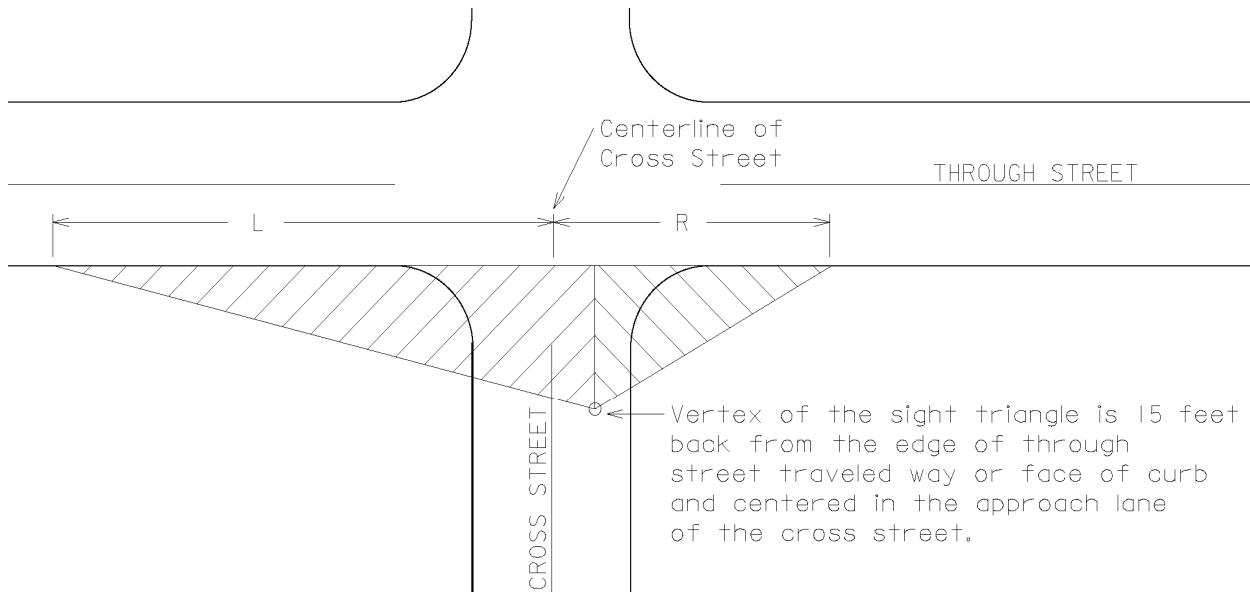


Lane Group	WBL	WBT	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	50	32	454	29	24	521
v/c Ratio	0.25	0.04	0.29	0.02	0.03	0.33
Control Delay	28.8	0.1	2.8	0.0	2.4	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.8	0.1	2.8	0.0	2.4	3.0
Queue Length 50th (ft)	20	0	41	0	2	50
Queue Length 95th (ft)	46	0	87	0	7	104
Internal Link Dist (ft)		136	715			575
Turn Bay Length (ft)	105			45	100	
Base Capacity (vph)	382	920	1585	1361	770	1585
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.03	0.29	0.02	0.03	0.33
Intersection Summary						

APPENDIX J

SIGHT DISTANCE REQUIREMENTS

City of Tempe Intersection Sight Distance



Speed Limit on Through Street	Through Street Cross Section	L (feet)	R (feet)
25 MPH	Collector Street (41 feet back of curb)	195	125
	Collector Street (49 feet back of curb)	180	110
30 MPH	Collector Street (41 feet back of curb)	225	140
	Collector Street (49 feet back of curb)	210	125
35 MPH	Collector Street (41 feet back of curb)	260	160
	Collector Street (49 feet back of curb)	240	140
	Arterial with 2 lanes to the left of cross street	330	140
	Arterial with 3 lanes to the left of cross street	350	125
40 MPH	Arterial with 2 lanes to the left of cross street	370	155
	Arterial with 3 lanes to the left of cross street	395	140
45 MPH	Arterial with 2 lanes to the left of cross street	415	175
	Arterial with 3 lanes to the left of cross street	440	155

These requirements apply to all streets, alleys or driveways that intersect a public collector or arterial street.

Values of "L" and "R" are measured from the centerline of the cross street along the face of curb or edge of traveled way of the through street and are based on AASHTO Geometric Design of Highways and Street 2004 Intersection Sight Distance for Left Turn Maneuvers from a Stop, Level Grade, Passenger Car and design speed of 5 mph over the posted speed limit.

Hatched areas must be clear of obstructions that might block a driver's view of potentially conflicting vehicles. Landscaping should be 2 feet or less in height. Multi-trunk trees should be eliminated from this area and any trees planted must be trimmed up to at least 8 feet. The spacing of trees in this area could create a picket fence effect if planted to closely together.