



Traffic Impact Study for the Corona Station Project



Prepared for the City of Petaluma

Submitted by
W-Trans

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Executive Summary

The proposed 112-unit residential project would be located on the southeast corner of the intersection of North McDowell Boulevard/Corona Road in the City of Petaluma. Based on standard trip generation rates, the proposed project would be expected to generate an average of 1,004 new daily trips, including 79 during the weekday a.m. peak hour and 105 during the p.m. peak hour, which includes deductions made for access to the future SMART train station.

The study area included eight intersections, all of which are currently operating acceptably at LOS D or better overall. Upon adding trips associated with the proposed project, the study intersections would be expected to continue operating acceptably at LOS D or better overall.

Under Background volumes that include trips associated with other known developments in study area the study intersections are expected to continue operating acceptably except that North McDowell Boulevard/ Corona Road is anticipated to deteriorate to LOS E operation during the morning pm peak hour. The study intersections are all expected to operate at the same service levels without or with project trips added.

Under anticipated Future volumes the study intersections would continue operating acceptably except that North McDowell Boulevard/Corona Road, Petaluma Boulevard North/Corona Road-Skillman Lane, and McDowell Boulevard/East Washington Street are expected to deteriorate to LOS E or LOS F operation during both peak hours. The study intersections would be expected to operate at the same Levels of Service without or with the addition of project-generated trips.

Queue lengths in left-turn pockets would be expected to increase on North McDowell Boulevard/Corona Road, Petaluma Boulevard North/Corona Road-Skillman Avenue and McDowell Street/East Washington Street on two or more legs. The only leg to have a significant impact would be the westbound leg of Petaluma Boulevard North/Corona Road-Skillman Avenue. To mitigate the project's impact on queueing the applicant should restripe the westbound left-turn lane to allow left turn from both lanes.

Additionally, the project would increase the queue length on westbound Corona Road approaching North McDowell Boulevard. Due to the proximity to the SMART tracks, the project would contribute to the future need for railroad pre-emption on this approach and should pay 4.7 percent of the cost of providing this improvement.

Facilities providing access to the site via alternative modes, including pedestrians, bicyclists, and transit riders, are adequate.

Access to the site is proposed to occur on North McDowell Street via four driveways. Adequate sight distance to the south exists at all four of the project driveway locations. However, landscaping in the median restricts sight lines to the north from the southernmost driveway where full access is proposed. The median will need to be removed for a short distance north of the project's southernmost driveway to accommodate a left-turn lane with at least 50 feet of stacking for ingress to the project site.

Introduction

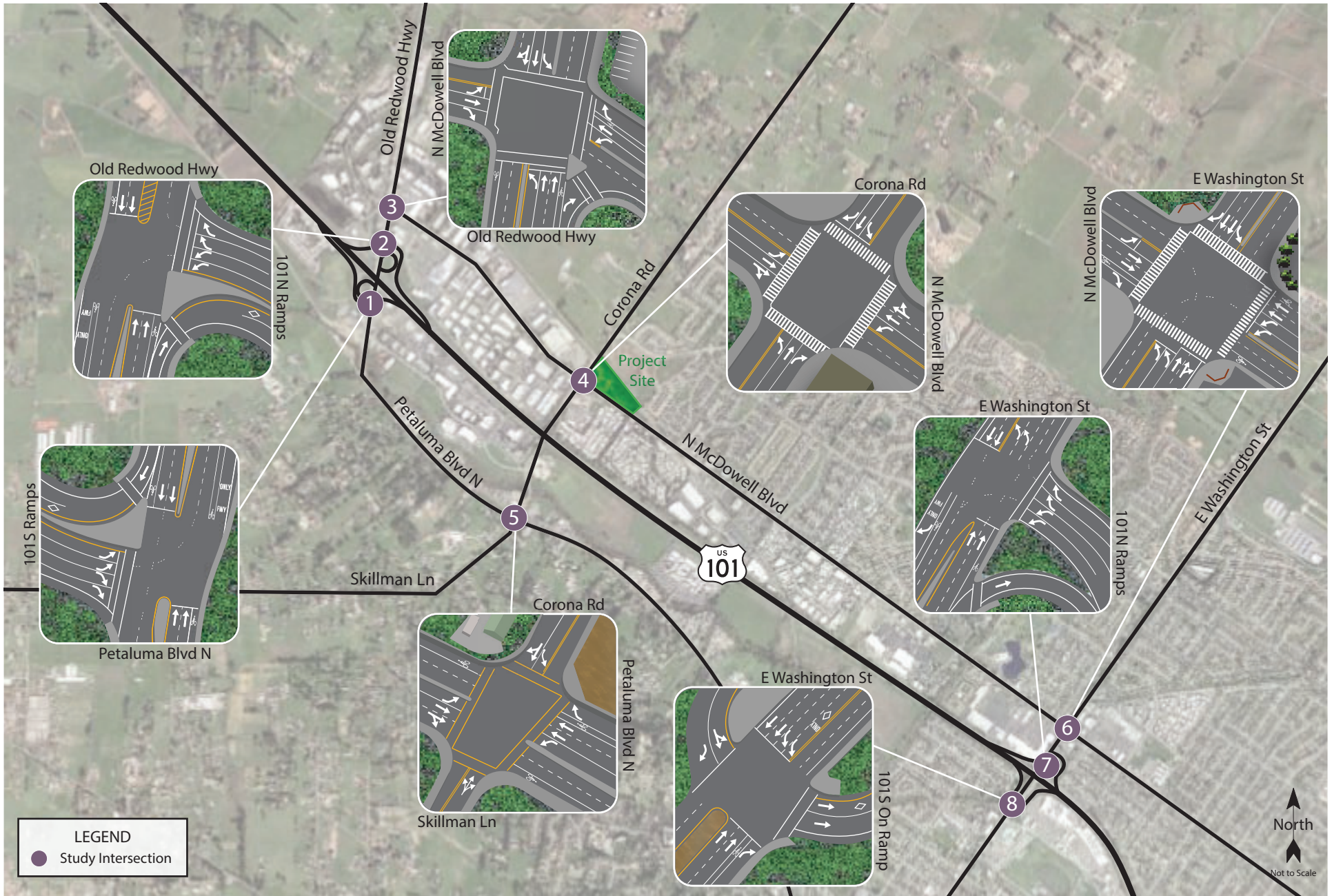
This report presents an analysis of the potential traffic impacts that would be associated with development of a proposed 112-unit residential project to be located at the southeast corner of the intersection of North McDowell Boulevard/Corona Road in the City of Petaluma. The traffic study was completed in accordance with the criteria established by the City of Petaluma and is consistent with standard traffic engineering techniques.

Prelude

The purpose of a traffic impact study is to provide City staff and policy makers with data they can use to make an informed decision regarding the potential traffic impacts of a proposed project, and any associated improvements that would be required to mitigate these impacts to a level of insignificance as defined by Petaluma's General Plan or other policies. Vehicular traffic impacts are typically evaluated by determining the number of new trips that the proposed use would be expected to generate, distributing these trips to the surrounding street system based on existing travel patterns or anticipated travel patterns specific to the proposed project, then analyzing the impact the new traffic would be expected to have on critical intersections or roadway segments. Impacts relative to access for pedestrians, bicyclists, and to transit are also addressed.

Project Profile

The proposed project would include 67 small-lot single family homes and 45 zero lot-line single family homes. The project site is located on the southeast corner of the intersection of North McDowell Boulevard/Corona Road in the City of Petaluma, as shown in Figure 1.



Traffic Impact Study for the Corona Station Project
Figure 1 – Study Area and Existing Lane Configurations

Transportation Setting

Operational Analysis

Study Area and Periods

The study area consists of the following intersections:

1. US 101 South Ramps/Petaluma Boulevard North
2. US 101 North Ramps/Old Redwood Highway
3. North McDowell Boulevard/Old Redwood Highway
4. North McDowell Boulevard/Corona Road
5. Petaluma Boulevard North/Corona Road-Skillman Lane
6. McDowell Boulevard/East Washington Street
7. US 101 North Ramps/East Washington Street
8. US 101 South Ramps/East Washington Street

Consideration was given to including other nearby intersections, such as Corona Road/Sonoma Mountain Parkway and the signalized intersections along North McDowell Boulevard between Corona Road and East Washington Street, in the study area. However, past analyses prepared for other projects in Petaluma have shown that the roundabout at Corona Road/Sonoma Mountain Parkway is expected to operate at LOS A during both peak periods under long-range future volumes, so it is reasonable to assume that the addition of project-generated traffic would not cause operation to deteriorate below an acceptable level. Similarly, previous analyses of various intersections along North McDowell Boulevard have indicated that the signalized intersections are operating at LOS C or better during both peak hours, so the addition of trips almost exclusively to the through movements, which tend to have lower delays than that for the intersection as a whole, can reasonably be expected to have a less-than-significant impact. Similarly, because the added project trips would be predominantly on the through movements that are emphasized in coordinated timing plans, no changes to the signal timing would be needed to accommodate project-generated traffic. Excerpts of these reports are provided in Appendix A. These additional intersections were therefore not included in the study area.

Operating conditions during the a.m. and p.m. peak periods were evaluated to capture the highest potential impacts for the proposed project as well as the highest volumes on the local transportation network. The morning peak hour occurs between 7:00 and 9:00 a.m. and reflects conditions during the home to work or school commute, while the p.m. peak hour occurs between 4:00 and 6:00 p.m. and typically reflects the highest level of congestion during the homeward bound commute.

Study Intersections

Because the City of Petaluma is oriented in such a way that most streets run at an angle to north-south or east-west alignments, for purposes of this study Petaluma Boulevard, US 101 and McDowell Boulevard are considered north-south streets (except that Petaluma Boulevard is considered east-west at US 101) and Corona Road and East Washington Street are considered east-west.

US 101 South Ramps/Petaluma Boulevard North is a three-legged signalized intersection. The on-ramp to US 101 South from eastbound Petaluma Boulevard North is beyond the intersection, so drivers must traverse the intersection before merging right into the on-ramp. Traffic entering the on-ramp from the westbound direction on Petaluma Boulevard North do not reach the intersection, so do not affect its operation. A marked pedestrian crossing is provided on the north leg.

US 101 North Ramps/Old Redwood Highway is a three-legged signalized intersection. Like the US 101 South Ramps, the on-ramps are located such that vehicles move into the on-ramp from the westbound through lane, while on-ramp traffic in the eastbound direction occurs completely outside the influence of the signalized intersection. A marked pedestrian crossing is provided on the south leg.

North McDowell Boulevard/Old Redwood Highway is a signalized, four-legged intersection with split phasing on the northbound and southbound North McDowell Boulevard approaches (in other words, they operate concurrently rather than simultaneously) and protected left-turn phasing on the eastbound and westbound Old Redwood Highway approaches. There are crosswalks on the north and east legs.

North McDowell Boulevard/Corona Road is a signalized, four-legged intersection with protected left-turn phasing on all approaches as well as right-turn overlaps on the eastbound and westbound Corona Road approaches. Crosswalks exist on all legs.

Petaluma Boulevard North/Corona Road-Skillman Lane is a signalized, four-legged intersection with split phasing on the eastbound Skillman Lane and the westbound Corona Road approaches. Petaluma Boulevard has protected left-turn phasing on the northbound and southbound approaches and a right-turn overlap on the northbound approach. Yellow school crosswalks are provided on all four legs.

McDowell Boulevard/East Washington Street is a four-way, signalized intersection with protected left-turn phasing on all approaches and a right-turn overlap on the southbound approach. Marked crosswalks, along with pedestrian crossing phasing, are provided across all legs of the intersection, connecting to sidewalks on all approaches.

US 101 North Ramps/East Washington Street is a three-legged signalized intersection. Like the ramps at Petaluma Boulevard North, on-ramp traffic in the eastbound direction exits the road prior to the signal while in the westbound direction drivers merge over into the on-ramp lane as they cross the intersection. A marked pedestrian crossing is provided on the south leg.

US 101 South Ramps/East Washington Street is a signalized, four-way intersection. Protected left-turn phasing exists on the westbound approach, and the south leg is the on-ramp. Sidewalks and a marked crosswalk are provided along the south side of East Washington Street, with no other pedestrian facilities at this intersection.

The locations of the study intersections and the existing lane configurations and controls are shown in Figure 1.

Collision History

The collision histories for the study intersections were reviewed to determine any trends or patterns that may indicate a safety issue. Collision rates were calculated based on records available from the California Highway Patrol as published in their Statewide Integrated Traffic Records System (SWITRS) reports. The most current five-year period available is June 1, 2013 through May 31, 2018.

As presented in Table 1, the calculated collision rates for the study intersections were compared to average collision rates for similar facilities statewide, as indicated in *2014 Collision Data on California State Highways*, California Department of Transportation (Caltrans). All the study intersections except US 101 South Ramps/Petaluma Boulevard North and Petaluma Boulevard North/Corona Road-Skillman Avenue had calculated collision rates higher than the statewide average. The collision rate calculations are provided in Appendix B.

Table 1 – Collision Rates at the Study Intersections

Study Intersection	Number of Collisions (2013-2018)	Calculated Collision Rate (c/mve)	Statewide Average Collision Rate (c/mve)
1. US 101 SB Ramps/Petaluma Blvd N	8	0.13	0.21
2. US 101 NB Ramps/Old Redwood Hwy	25	0.41	0.21
3. N McDowell Blvd/Old Redwood Hwy	47	0.83	0.27
4. N McDowell Blvd/Corona Rd	27	0.44	0.27
5. Petaluma Blvd N/Corona Rd-Skillman Ln	5	0.08	0.27
6. McDowell Blvd/E Washington St	59	0.70	0.27
7. US 101 NB Ramps/E Washington St	39	1.05	0.21
8. US 101 SB Ramps/E Washington St	21	0.33	0.27

Note: c/mve = collisions per million vehicles entering; **Bold** text indicates rates higher than the Statewide average

For the intersection of US 101 North Ramps/Old Redwood Highway most of the collisions were either broadsides (nine) or rear-ends (seven), with unsafe speed cited as the primary collision factor more than any other. These types of crashes are common at signalized intersections during congested conditions. Consideration could be given to increasing a red-clearance interval to give drivers adequate time to clear the intersection prior to the green indication for the next movement to reduce the incidence of broadside crashes.

The predominant crash type at North McDowell Boulevard/Old Redwood Highway was rear-end crashes, with unsafe speed cited as the primary collision factor. This type of crash is typical of the pattern experienced at signalized intersections, but the below-average incidence of injuries indicates that there is not an associated safety concern.

Like the other signalized intersections, North McDowell Boulevard/Corona Road and McDowell Boulevard/ East Washington Street experienced substantial numbers of rear-end crashes, but with below-average injury rates, have not translated to safety concerns.

Alternative Modes

Pedestrian Facilities

Pedestrian facilities include sidewalks, crosswalks, pedestrian signal phases, curb ramps, curb extensions, and various streetscape amenities such as lighting, benches, etc. In general, a network of sidewalks, crosswalks, pedestrian signals, and curb ramps provide access for pedestrians near the proposed project site; however, sidewalk gaps can be found along Corona Road near the project site. Existing gaps and obstacles along the connecting roadways impact convenient and continuous access for pedestrians and present safety concerns in those locations where appropriate pedestrian infrastructure would address potential conflict points.

Bicycle Facilities

The *Highway Design Manual*, Caltrans, 2017, classifies bikeways into four categories:

- **Class I Multi-Use Path** – a completely separated right-of-way for the exclusive use of bicycles and pedestrians with cross flows of motorized traffic minimized.

- **Class II Bike Lane** – a striped and signed lane for one-way bike travel on a street or highway.
- **Class III Bike Route** – signing only for shared use with motor vehicles within the same travel lane on a street or highway.
- **Class IV Bikeway** – also known as a separated bikeway, a Class IV Bikeway is for the exclusive use of bicycles and includes a separation between the bikeway and the motor vehicle traffic lane. The separation may include, but is not limited to, grade separation, flexible posts, inflexible physical barriers, or on-street parking.

In the project area, Class II bike lanes exist on North McDowell Boulevard between Old Redwood Highway and Southpoint Boulevard. Bicyclists ride in the roadway and/or on sidewalks along all other streets within the project study area. Table 2 summarizes the existing and planned bicycle facilities in the project vicinity, as contained in the *City of Petaluma: General Plan 2025*.

Table 2 – Bicycle Facility Summary				
Status Facility	Class	Length (miles)	Begin Point	End Point
Existing				
Capri Creek Trail	I	0.95	N McDowell Blvd	Lenox Dr
Corona Creek Trail	I	0.79	SMART Trail	Reisling Rd
Lynch Creek Trail	I	2.00	Water St	Sonoma Mountain Pkwy
N McDowell Blvd	II	1.55	Old Redwood Hwy	Southpoint Blvd
Maria Dr	II	1.48	Sonoma Mountain Pkwy	Luchessi Park
Sonoma Mountain Pkwy	II	2.02	Corona Rd	E Maddison St
Planned				
SMART Pathway	I	4.70	City Limits (South)	City Limits (North)
Corona Rd	II	1.45	Petaluma Blvd N	City Limits (North)
Petaluma Blvd N	II	2.80	Lakeville St	US 101
Old Redwood Hwy	II	0.25	US 101	N McDowell Blvd
N McDowell Blvd	II	1.45	E Washington St	Southpoint Blvd
E Washington St	II	3.70	City Limits (West)	City Limits (East)

Source: *City of Petaluma: General Plan 2025*, City of Petaluma, 2008

Transit Facilities

Petaluma Transit provides fixed route bus service in Petaluma. Route 2 provides service along North McDowell Boulevard and stops at Corona Road. It operates Monday through Friday with approximately one-half-hour headways between 6:30 a.m. and 8:00 p.m. Saturday service operates with approximately one-hour headways between 7:30 a.m. and 7:30 p.m. All Petaluma Transit vehicles are equipped with bike racks available on a first-come, first-served basis.

Sonoma County Transit (SCT) provides regional services between Petaluma and surrounding communities. Route 44 stops on North McDowell Boulevard at Corona Road and operates Monday through Sunday with approximately one- to four-hour headways between 5:30 a.m. and 9:00 p.m. All SCT vehicles are equipped with bike racks available on a first-come, first-served basis.

Dial-a-ride, also known as paratransit, or door-to-door service, is available for those who are unable to independently use the transit system due to a physical or mental disability. City of Petaluma Paratransit is designed to serve the needs of individuals with disabilities within Petaluma and the greater Petaluma area.

Sonoma-Marín Area Rapid Transit (SMART)

The project site is located directly adjacent to the SMART Corridor and the planned North Petaluma station. The SMART commuter rail system currently includes 43 miles of rail corridor and ten stations from the Sonoma County Airport to Downtown San Rafael. Upon completion, the passenger rail service will extend 70 miles from Cloverdale, at the north end of Sonoma County, to Larkspur where the Golden Gate Ferry connects Marin County with San Francisco. Along with commuter rail service, a multi-use pathway is planned parallel to the rail corridor.

Capacity Analysis

Intersection Level of Service Methodologies

Level of Service (LOS) is used to rank traffic operation on various types of facilities based on traffic volumes and roadway capacity using a series of letter designations ranging from A to F. Generally, Level of Service A represents free flow conditions and Level of Service F represents forced flow or breakdown conditions. A unit of measure that indicates a level of delay generally accompanies the LOS designation.

The study intersections were analyzed using the signalized methodology published in the *Highway Capacity Manual* (HCM), Transportation Research Board, 2010. This source contains methodologies for various types of intersection control, all of which are related to a measurement of delay in average number of seconds per vehicle. The signalized methodology is based on factors including traffic volumes, green time for each movement, phasing, whether the signals are coordinated or not, truck traffic, and pedestrian activity. Average stopped delay per vehicle in seconds is used as the basis for evaluation in this LOS methodology. For purposes of this study, delays were calculated using signal timing obtained from staff at the City of Petaluma, County of Sonoma and Caltrans. The ranges of delay for the various service levels are shown in Table 3.

Table 3 – Signalized Intersection Level of Service Criteria

LOS A	Delay of 0 to 10 seconds. Most vehicles arrive during the green phase, so do not stop at all.
LOS B	Delay of 10 to 20 seconds. More vehicles stop than with LOS A, but many drivers still do not have to stop.
LOS C	Delay of 20 to 35 seconds. The number of vehicles stopping is significant, although many still pass through without stopping.
LOS D	Delay of 35 to 55 seconds. The influence of congestion is noticeable, and most vehicles have to stop.
LOS E	Delay of 55 to 80 seconds. Most, if not all, vehicles must stop and drivers consider the delay excessive.
LOS F	Delay of more than 80 seconds. Vehicles may wait through more than one cycle to clear the intersection.

Reference: *Highway Capacity Manual*, Transportation Research Board, 2010

Traffic Operation Standards

The *City of Petaluma: General Plan 2025* has an adopted Level of Service (LOS) standard for streets that indicates the minimum acceptable operation is LOS D, with the following standard of significance for motor vehicle circulation:

Policy 5-P-10: *Maintain an intersection level of service (LOS) standard for motor vehicle circulation that ensures efficient traffic flow and supports multi-modal mobility goals. LOS should be maintained at Level D or better for motor vehicles due to traffic from any development project.*

With the current General Plan, the City is shifting toward a multimodal emphasis and LOS standard. “A multimodal analysis that, in addition to motor vehicles, takes into consideration the overall mobility and conditions for non-auto road users (i.e., bicycles and pedestrians) is highly encouraged.” The Community Character Element of the General Plan also contains circulation-related objectives and policies. This element directs that pedestrian and bicycle circulation be integrated into street designs and improvements. It also states that the amount of paving and the apparent width of streets should be reduced where possible.

Per the General Plan, the project would have a significant impact if it causes the average delay at an intersection already operating or expected to operate at LOS D or E to deteriorate to the next lower level of service.

Caltrans

Although located within Petaluma city limits, Caltrans has jurisdiction over four study intersections: Petaluma Boulevard North/US 101 Southbound Ramps, Old Redwood Highway North/US 1-1 Northbound Ramps, East Washington Street/US 101 Northbound Ramps and East Washington Street/US 101 Southbound Ramps. Caltrans indicates that they endeavor to maintain operation at the transition from LOS C to LOS D. Where intersections are integral to a local jurisdictions transportation system, Caltrans often accepts the operational standard applied by the local agency, in this case, the City of Petaluma.

Existing Conditions

The Existing Conditions scenario provides an evaluation of current operation based on existing traffic volumes during the a.m. and p.m. peak periods. This condition does not include project-generated traffic volumes. Volume data was collected when while local schools were in session.

Intersection Levels of Service

Under existing conditions all intersections are operating acceptably. The existing traffic volumes are shown in Figure 2. A summary of the intersection Level of Service calculations is contained in Table 4, and copies of the calculations are provided in Appendix C.

Table 4 – Existing Peak Hour Intersection Levels of Service

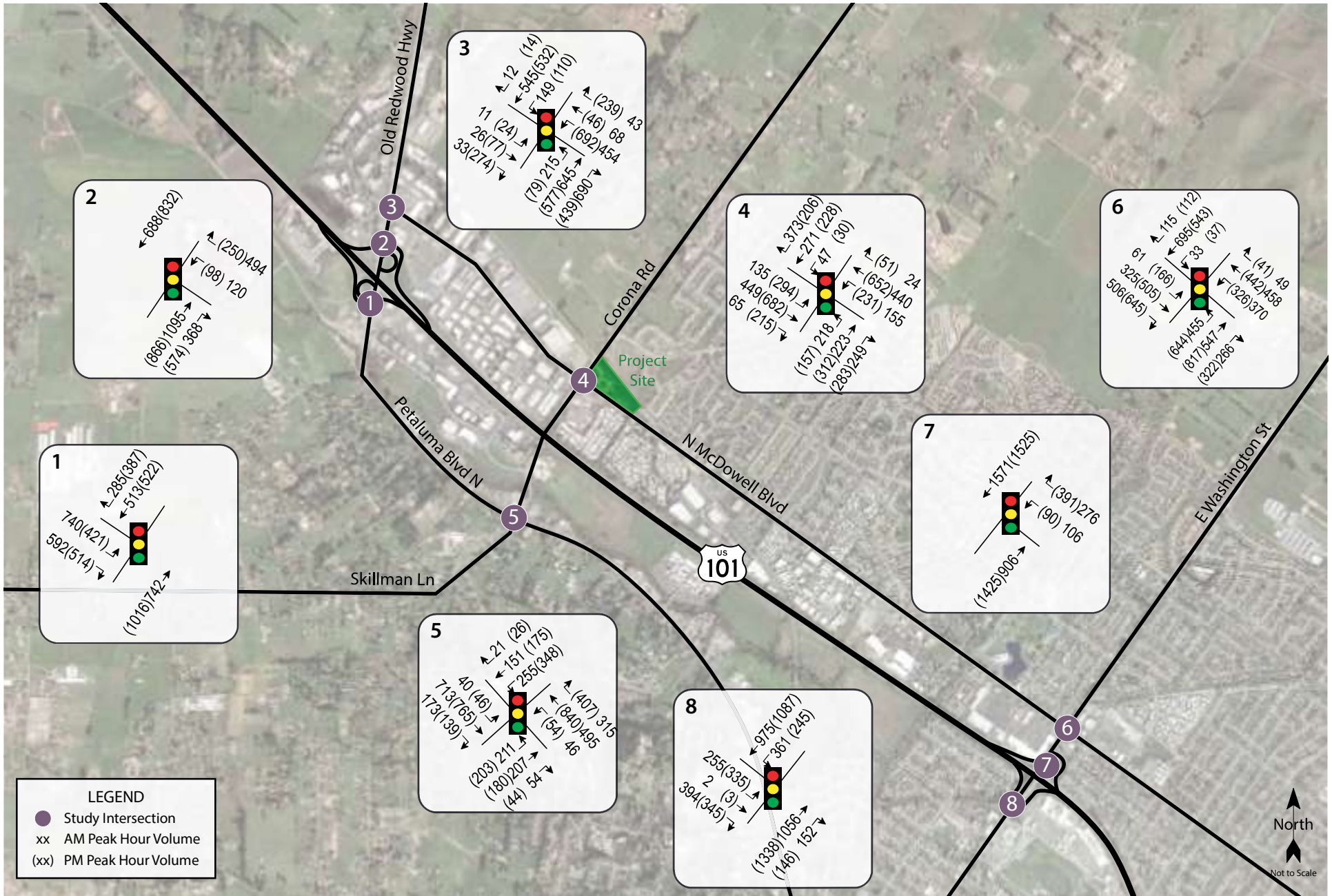
Study Intersection	AM Peak		PM Peak	
	Delay	LOS	Delay	LOS
1. US 101 S Ramps/Petaluma Blvd N	15.3	B	13.9	B
2. US 101 N Ramps/Old Redwood Hwy	9.0	A	6.6	A
3. N McDowell Blvd/Old Redwood Hwy	49.7	D	54.5	D
4. N McDowell Blvd/Corona Rd	39.5	D	54.7	D
5. Petaluma Blvd N/Corona Rd-Skillman Ln	35.5	D	42.4	D
6. McDowell Blvd/E Washington St	44.0	D	47.8	D
7. US 101 N Ramps/E Washington St	6.1	A	11.5	B
8. US 101 S Ramps/E Washington St	19.6	C	28.5	C

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service

Background Conditions

The Background Conditions scenario provides an evaluation of current operation based on existing traffic volumes during the a.m. and p.m. peak periods with the addition of net-new trips related to nearby projects. This condition does not include project-generated traffic volumes. The projects included in the evaluation are as follows:

1. Brody Ranch Subdivision, Corona Road/Sonoma Mountain Parkway – 60 single family dwellings
2. North River Apartments, 368 and 402 Petaluma Boulevard – 184 multifamily apartment units, 3,000 square feet of retail, and 1,700 square feet of office
3. Safeway Fuel Center, 335 South McDowell Boulevard – 16 fuel positions
4. Sid Commons Apartments, northern terminus of Graylawn Avenue – 278 multifamily apartment units



Traffic Impact Study for the Corona Station Project
Figure 2 – Existing Traffic Volumes

Under Background conditions all intersections are expected to operate acceptably, except North McDowell Boulevard/Corona Road, which is projected to operate at LOS E during the p.m. peak hour. These results are summarized in Table 5, and Background volumes are shown in Figure 3.

Table 5 – Background Peak Hour Intersection Levels of Service

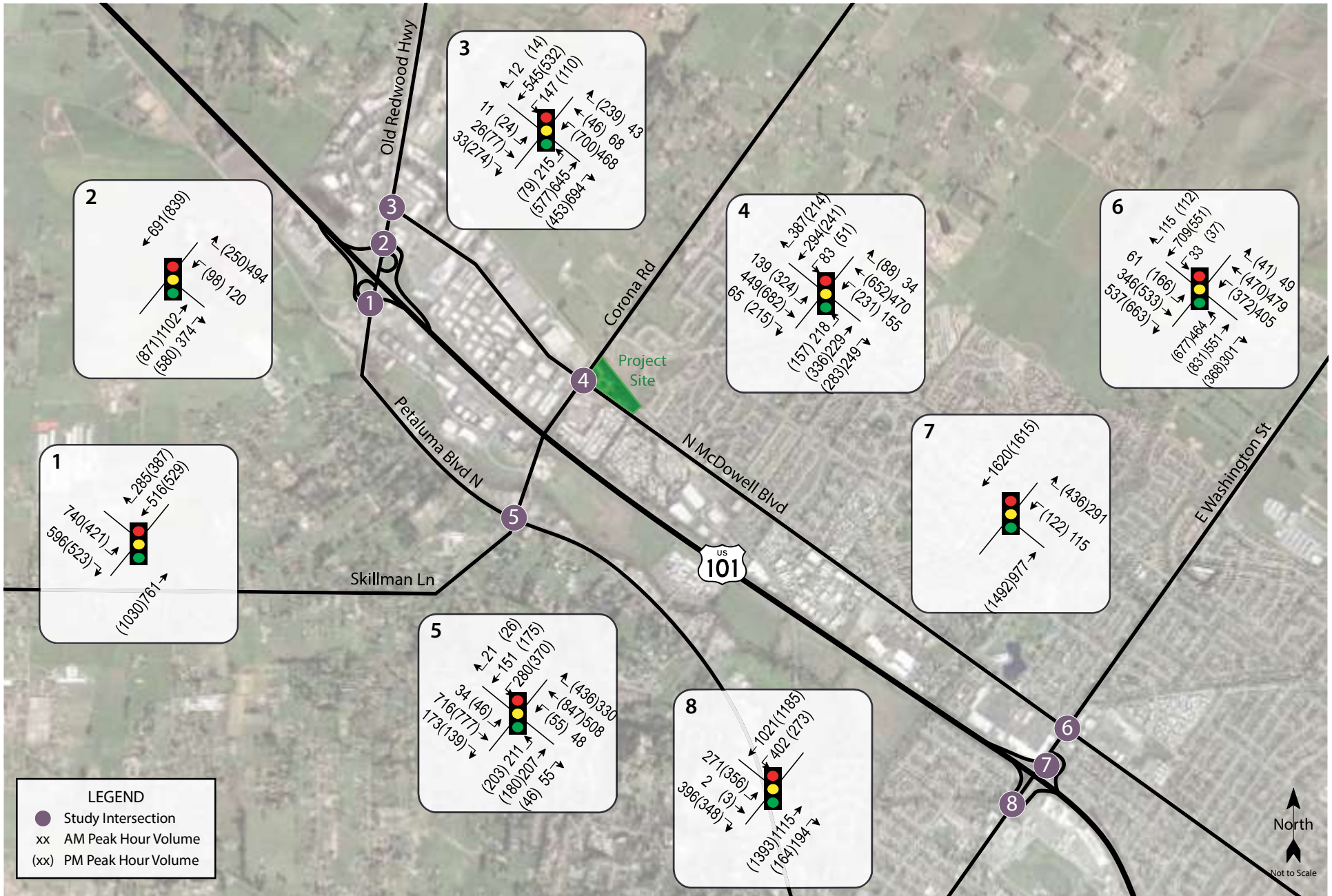
Study Intersection	AM Peak		PM Peak	
	Delay	LOS	Delay	LOS
1. US 101 S Ramps/Petaluma Blvd N	16.7	B	12.8	B
2. US 101 N Ramps/Old Redwood Hwy	9.9	A	5.8	A
3. N McDowell Blvd/Old Redwood Hwy	51.3	D	51.7	D
4. N McDowell Blvd/Corona Rd	41.3	D	56.2	E
5. Petaluma Blvd N/Corona Rd-Skillman Ln	41.8	D	42.1	D
6. McDowell Blvd/E Washington St	53.8	D	47.5	D
7. US 101 N Ramps/E Washington St	6.5	A	12.3	B
8. US 101 S Ramps/E Washington St	21.3	C	29.4	C

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; **Bold** text = deficient operation

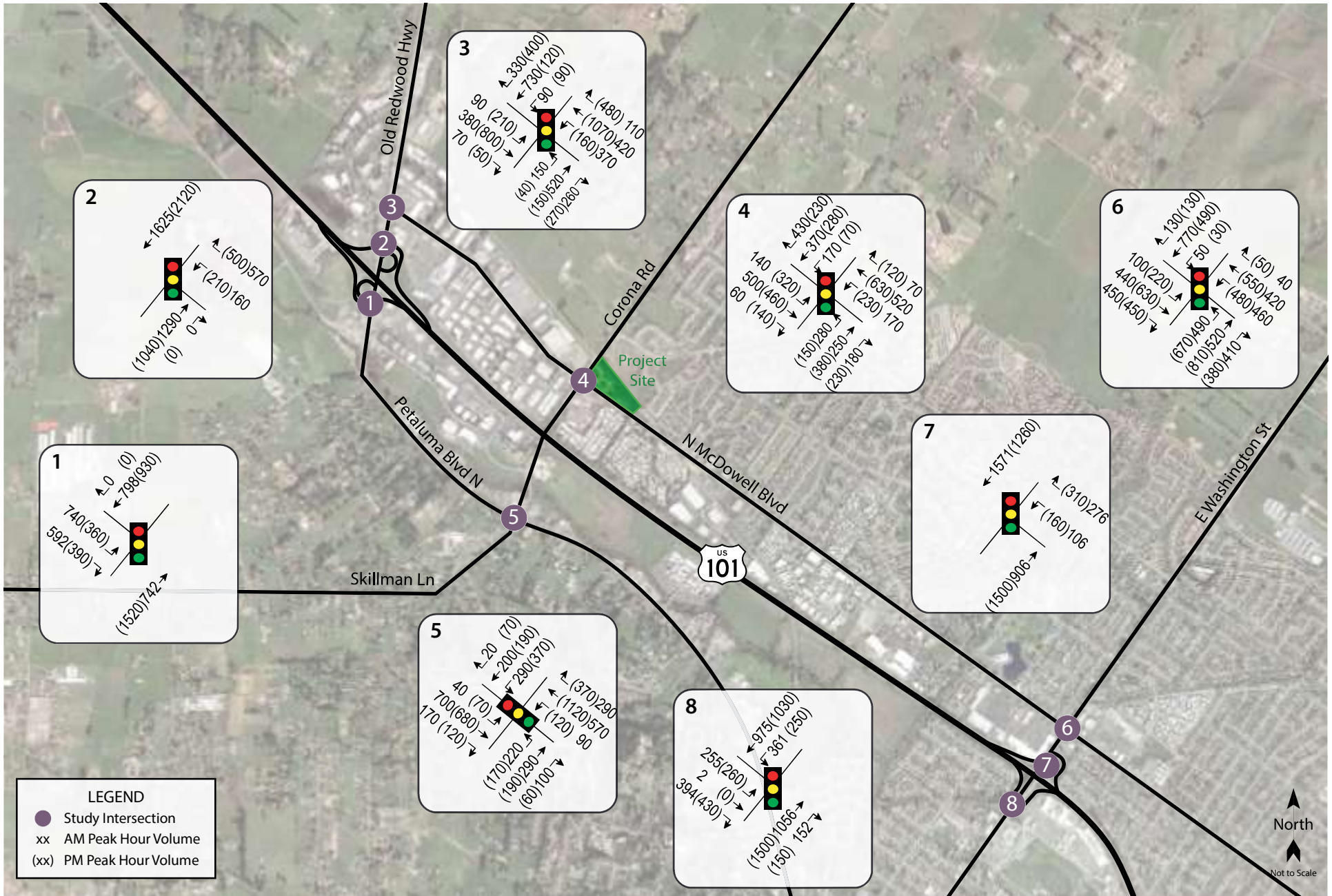
Future Conditions

Buildout of the City's General Plan is not expected to occur by the year 2025 because of economic conditions in the past and would not be exceeded in this timeframe due to the City's adopted urban growth boundary (UGB). The horizon year for the projections can therefore be considered to be *at least* 2035. Future peak hour volumes were taken from Figure 3-2-8 in the *City of Petaluma: General Plan 2025* for all intersections. These projections were developed using the City's traffic model, and with the assumption that the Rainer Interchange would be constructed providing an east-west crossing of US 101 along with a mid-city connection to US 101 as well as based on the anticipated operation of the SMART train and its potential to capture local traffic and transfer trip from passenger vehicles to the transit line at the planned station on Corona Road.

Under the anticipated Future volumes, and with the addition of the planned improvements, four of the study intersections are expected to operate unacceptably during both peak periods analyzed. Future volumes are shown in Figure 4 and operating conditions are summarized in Table 6.



Traffic Impact Study for the Corona Station Project
Figure 3 – Background Traffic Volumes



Traffic Impact Study for the Corona Station Project
Figure 4 – Future Traffic Volumes

Table 6 – Future Peak Hour Intersection Levels of Service

Study Intersection	AM Peak		PM Peak	
	Delay	LOS	Delay	LOS
1. US 101 S Ramps/Petaluma Blvd N	13.4	B	19.0	B
2. US 101 N Ramps/Old Redwood Hwy	14.9	B	18.7	B
3. N McDowell Blvd/Old Redwood Hwy	109.1	E	85.0	F
4. N McDowell Blvd/Corona Rd	57.6	E	60.7	E
5. Petaluma Blvd N/Corona Rd-Skillman Ln	66.4	E	55.7	E
6. McDowell Blvd/E Washington St	70.0	E	59.5	E
7. US 101 N Ramps/E Washington St	6.7	A	11.8	B
8. US 101 S Ramps/E Washington St	36.0	D	40.4	D

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; **Bold** text = deficient operation

Project Description

The project consists of 67 small-lot single family homes and 45 zero lot-line single family homes. The project site is located on the southeast corner of the intersection of North McDowell/Corona Road in the City of Petaluma. The proposed project site plan is shown in Figure 5.

Trip Generation

The anticipated trip generation for the proposed project was estimated using standard rates published by the Institute of Transportation Engineers (ITE) in *Trip Generation Manual*, 10th Edition, 2017. Single Family Detached Housing (ITE LU 210) rates were used for both the zero-lot line and small-lot homes. Because the site is currently unoccupied, no reduction to account for existing trips was taken. The expected trip generation potential for the proposed project is indicated in Table 7. The proposed project is expected to generate an average of 1,004 trips per day, including 79 trips during the a.m. peak hour and 105 during the p.m. peak hour.

Table 7 – Trip Generation Summary

Land Use	Units	Daily		AM Peak Hour				PM Peak Hour			
		Rate	Trips	Rate	Trips	In	Out	Rate	Trips	In	Out
Single Family	112 du	9.44	1,057	0.74	83	21	62	0.99	111	70	41
<i>Transit Deduction</i>		-5%	-53	-5%	-4	-1	-3	-5%	-6	-4	-2
Total			1,004		79	20	59		105	66	39

Note: du = dwelling unit

Trip Distribution

The pattern used to allocate new project trips to the street network was based on data from the 2000 Census for home-to-work trips. The applied distribution assumptions and resulting trips are shown in Figure 6 and Table 8.



May 17, 2019

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CORONA STATION

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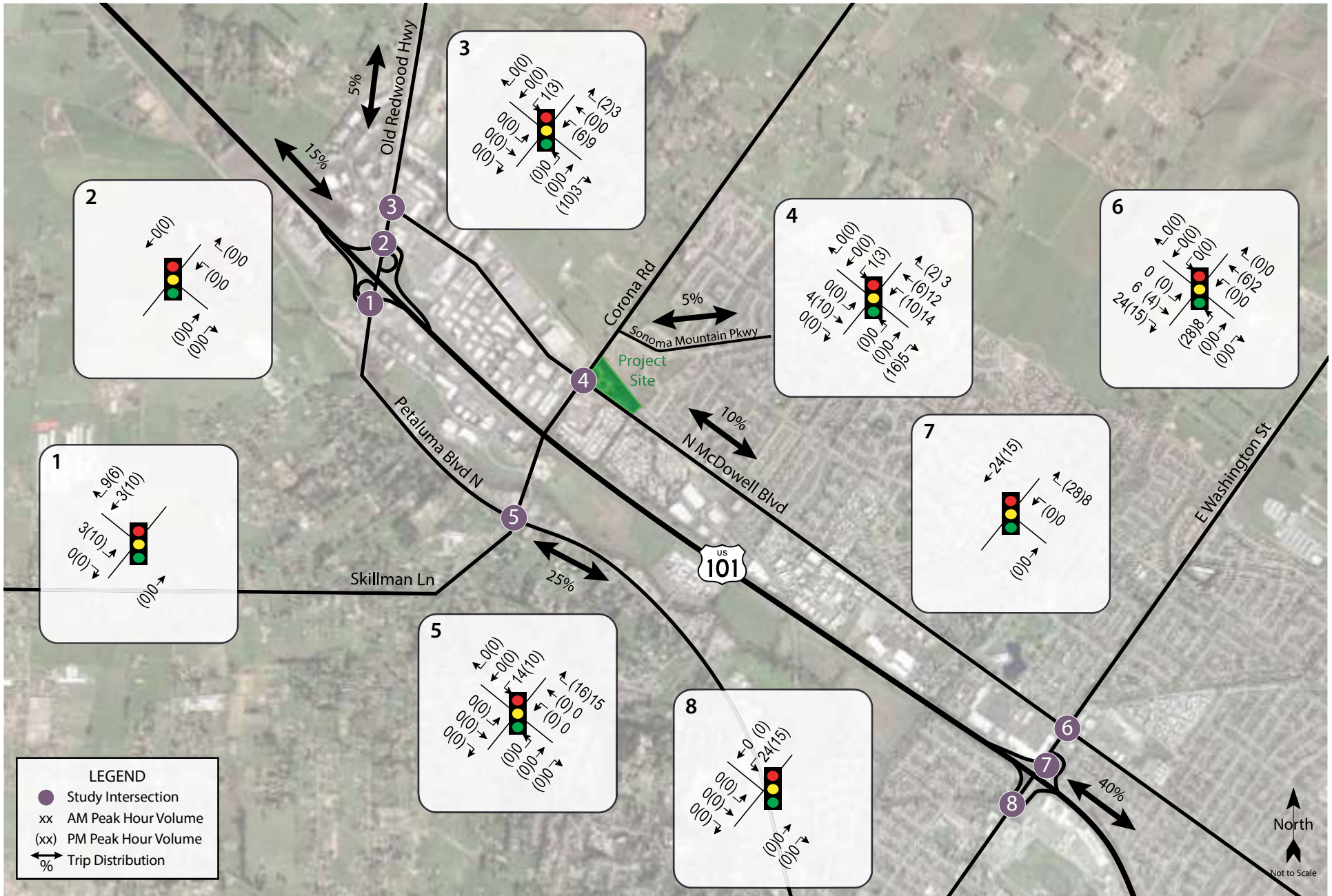
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Traffic Impact Study for the Corona Station Project
Figure 5 – Site Plan





Traffic Impact Study for the Corona Station Project
Figure 6 – Project Traffic Volumes and Trip Distribution

Table 8 – Trip Distribution Assumptions

Route	Percent	Daily Trips	AM Trips	PM Trips
To/From the north on US 101	15%	151	12	16
To/From the east on Old Redwood Hwy	5%	50	4	5
To/From the east on Sonoma Mountain Pkwy	5%	50	4	5
To/From the south on Petaluma Blvd S via Corona Rd	25%	251	19	26
To/From the south on McDowell Blvd	10%	100	8	10
To/From the south on US 101	40%	402	32	43
TOTAL	100%	1,004	79	105

Vehicle Miles Traveled

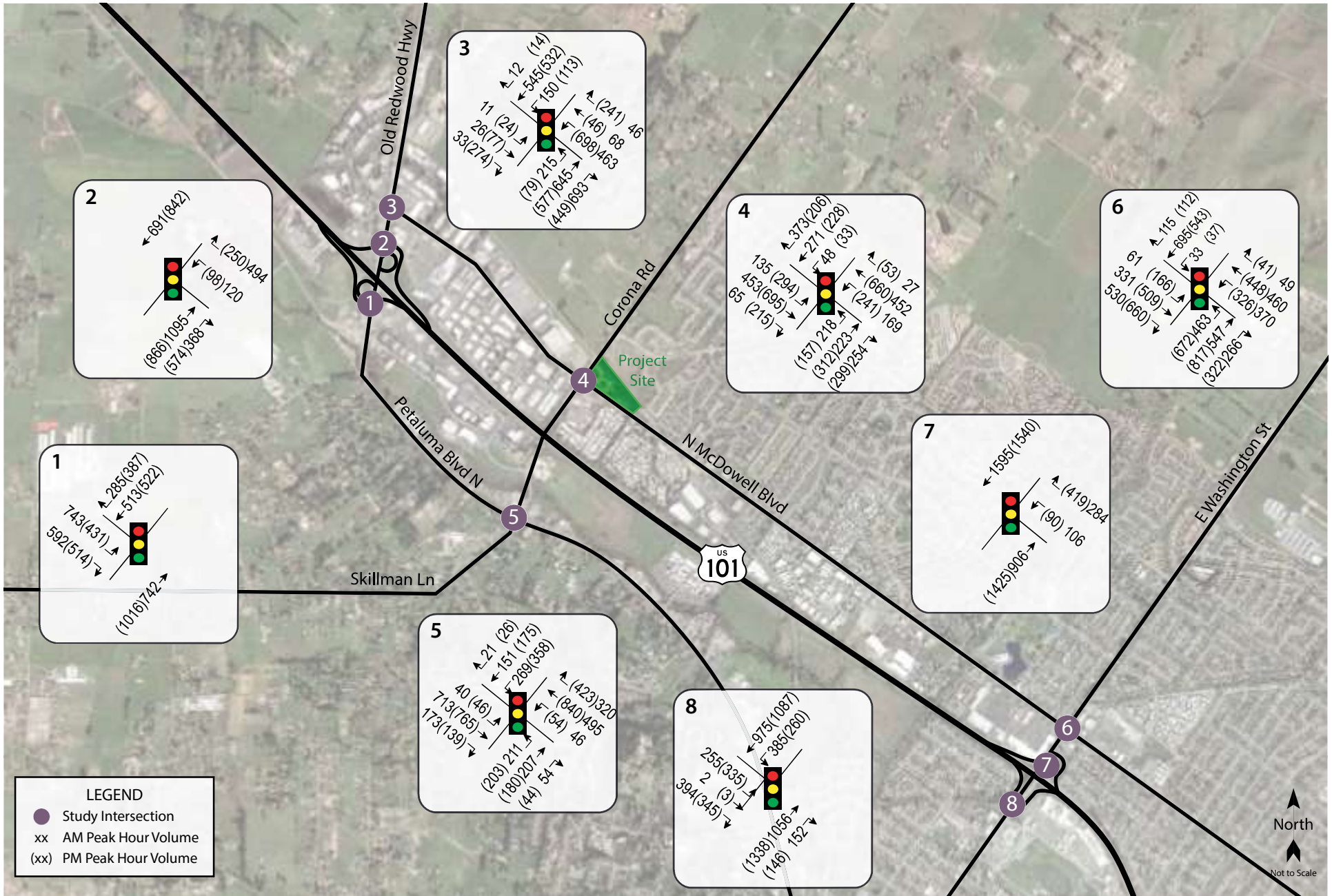
Vehicle miles traveled as a result of the project were calculated by multiplying the estimated number of trips and the average trip distance for the Traffic Analysis Zone (TAZ) in which the project is located. Average trip distances are published by SCTA in the County Model. Based on an average trip length of 4.73 miles, the 1,004 daily trips would translate to a calculated daily VMT for the project of 4,750 miles. As stated in the Proposed CEQA Guideline Section 15064.3, subdivision (b)(1), projects that include a mix of residential, retail, and office that are located within half-a-mile of an existing major transit stop or an existing stop along a high-quality transit corridor will have a less-than-significant impact on VMT. This project site is located directly adjacent to the planned Sonoma-Marín Area Rail Transit (SMART) Petaluma North Station.

Finding – The project site is located directly adjacent to the planned North Petaluma SMART Station and, therefore, presumed to have a less-than-significant impact on vehicle miles traveled.

Intersection Operation

Existing plus Project Conditions

Upon the addition of project-related traffic to the Existing volumes, the study intersections are expected to continue operating acceptably. Existing plus project traffic volumes are shown in Figure 7. These results are summarized in Table 9.



Traffic Impact Study for the Corona Station Project
Figure 7 – Existing plus Project Traffic Volumes

Table 9 – Existing and Existing plus Project Peak Hour Intersection Levels of Service

Study Intersection	Existing Conditions				Existing plus Project			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1. US 101 S Ramps/Petaluma Blvd N	15.3	B	13.9	B	15.3	B	13.9	B
2. US 101 N Ramps/Old Redwood Hwy	9.0	A	6.6	A	9.0	B	6.6	A
3. N McDowell Blvd/Old Redwood Hwy	49.7	D	54.5	D	49.8	D	54.6	D
4. N McDowell Blvd/Corona Rd	39.5	D	54.7	D	39.3	D	53.4	D
5. Petaluma Blvd N/Corona Rd-Skillman Ln	35.5	D	42.4	D	36.7	D	43.6	D
6. McDowell Blvd/E Washington St	44.0	D	47.8	D	44.7	D	47.2	D
7. US 101 N Ramps/E Washington St	6.1	A	11.5	B	6.2	A	12.3	B
8. US 101 S Ramps/E Washington St	19.6	C	28.5	C	20.0	B	28.9	C

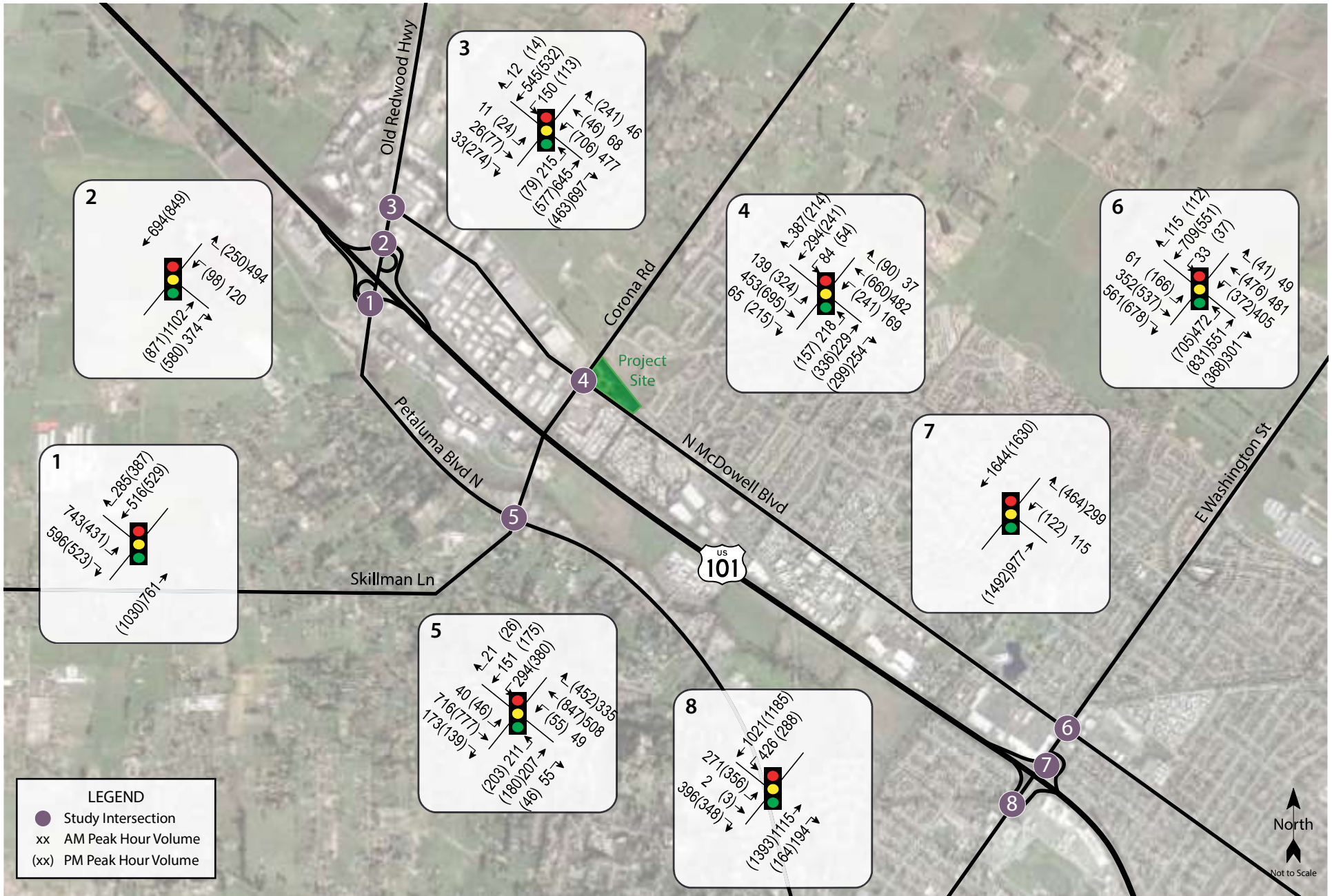
Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service

It should be noted that with the addition of project-related traffic volumes, average delay decreases at the intersection of North McDowell Boulevard/Corona Road during both peak hours and McDowell Boulevard/East Washington Street during the p.m. peak hour. While this is counter-intuitive, this condition occurs when a project adds trips to movements that are currently underutilized or have delays that are below the intersection average, resulting in a better balance between approaches and lower overall average delay. The project adds traffic predominantly to the right-turn and/or through movements, which have average delays lower than the averages for the intersection, resulting in a slight reduction in the overall average delay. The conclusion could incorrectly be drawn that the project improves operation based on this data alone; however, it is more appropriate to conclude that the project trips are expected to make use of excess capacity, so drivers will experience little, if any, change in conditions because of the project.

Finding – The study intersections are expected to continue operating acceptably at the same Levels of Service upon the addition of project-generated traffic to existing volumes.

Background plus Project Conditions

With project-related traffic added to Background volumes, the study intersections are expected to operate at the same LOS as without the added project traffic. Background plus project traffic volumes are shown in Figure 8. These results are summarized in Table 10.



Traffic Impact Study for the Corona Station Project
Figure 8 – Background plus Project Traffic Volumes

Table 10 – Background and Background plus Project Peak Hour Intersection Levels of Service

Study Intersection	Background Conditions				Background plus Project			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1. US 101 S Ramps/Petaluma Blvd N	16.7	B	12.8	B	16.7	B	14.0	B
2. US 101 N Ramps/Old Redwood Hwy	9.9	A	5.8	A	9.9	A	6.6	A
3. N McDowell Blvd/Old Redwood Hwy	51.3	D	51.7	D	51.5	D	54.7	D
4. N McDowell Blvd/Corona Rd	41.3	D	56.2	E	41.1	D	59.7	E
5. Petaluma Blvd N/Corona Rd-Skillman Ln	41.8	D	42.1	D	43.4	D	47.2	D
6. McDowell Blvd/E Washington St	53.8	D	47.5	D	55.0	D	51.0	D
7. US 101 N Ramps/E Washington St	6.5	A	12.3	B	6.7	A	13.7	B
8. US 101 S Ramps/E Washington St	21.3	C	29.4	C	21.7	C	30.8	C

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; **Bold** text = deficient operation

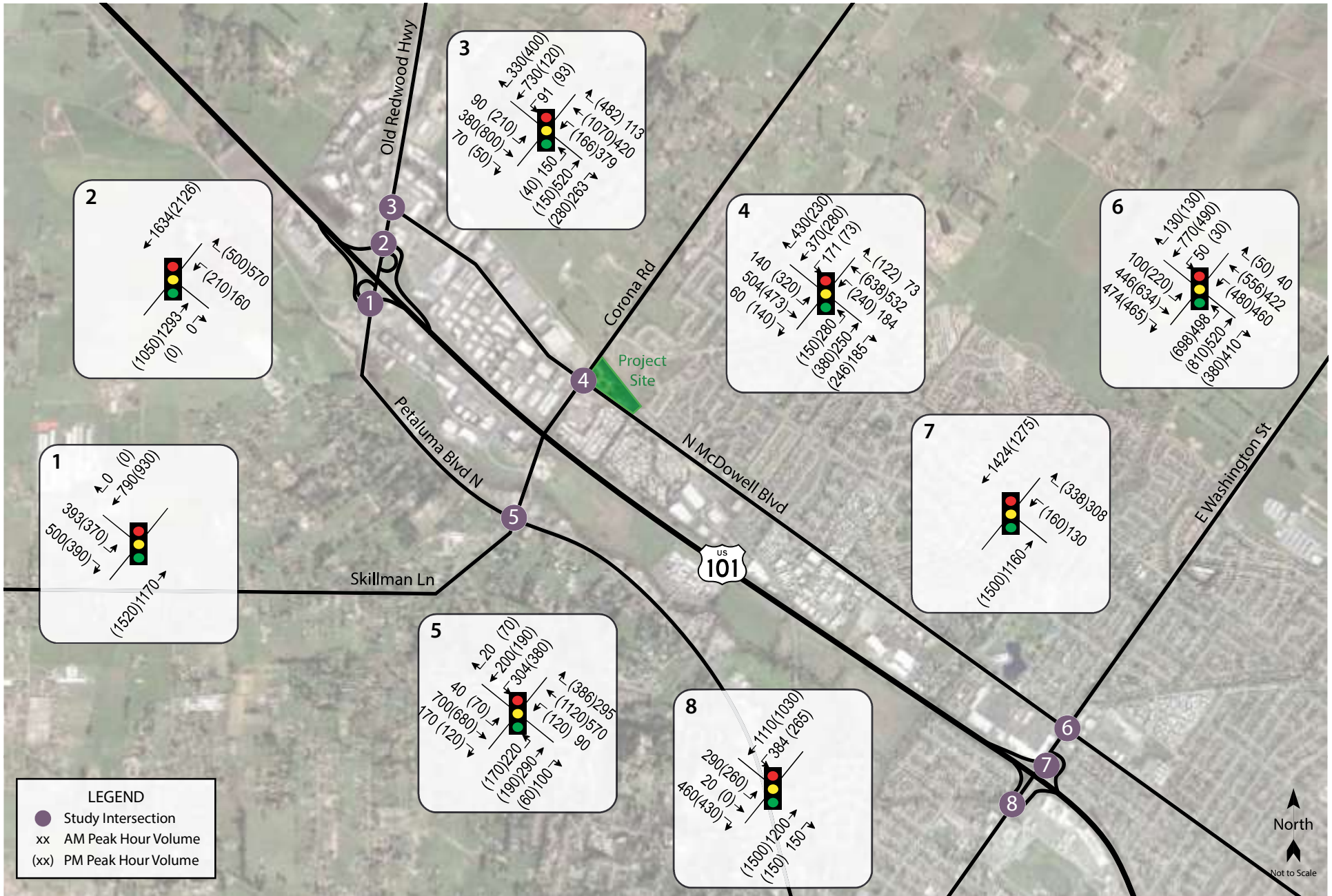
As noted for Existing plus Project Conditions, with the addition of project-related traffic volumes, average delay sometimes decreases because the added trips use available capacity on underutilized movements.

Finding – The study intersections are expected to continue operating at the same levels of service upon the addition of project-generated traffic. The minor increase in delay at North McDowell Boulevard/Corona Road is not significant as the service level does not change and the increase in delay is less than five seconds, a metric used by some other jurisdictions, including Sonoma County, to determine significance.

Future plus Project Conditions

While construction of the Rainier Interchange would likely affect some project-generated traffic, it was assumed that project trips would continue to use the East Washington and Petaluma Boulevard-Old Redwood Highway Interchanges, resulting in a more conservative analysis.

Upon the addition of project-generated traffic to the anticipated Future volumes, the study intersections are expected to operate at the same LOS without or with the project. Future plus project traffic volumes are shown in Figure 9. The Future plus Project operating conditions are summarized in Table 11.



Traffic Impact Study for the Corona Station Project
Figure 9 – Future plus Project Traffic Volumes

Table 11 – Future and Future plus Project Peak Intersection Hour Levels of Service

Study Intersection	Future Conditions				Future plus Project			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1. US 101 S Ramps/Petaluma Blvd N	13.4	B	19.0	B	13.4	B	19.2	B
2. US 101 N Ramps/Old Redwood Hwy	14.9	B	18.7	B	14.9	B	18.7	B
3. N McDowell Blvd/Old Redwood Hwy	109.1	E	76.2	E	109.4	E	79.0	E
4. N McDowell Blvd/Corona Rd	57.6	E	60.7	E	57.3	E	60.7	E
5. Petaluma Blvd N/Corona Rd-Skillman Ln	66.4	E	55.7	E	68.5	E	57.3	E
6. McDowell Blvd/E Washington St	70.0	E	59.5	E	71.1	E	59.5	E
7. US 101 N Ramps/E Washington St	6.7	A	11.8	B	6.9	A	12.6	B
8. US 101 S Ramps/E Washington St	36.0	D	40.4	D	36.1	D	40.5	D

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; **Bold** text = deficient operation

Some intersections again have a projected reduction in delay due to the project, though as noted previously, this occurs due to the use of available capacity on movements that experience delay lower than the intersection average.

Finding – The study intersections will continue operating at the same LOS with or without the project traffic added. Because there are no deteriorations in service level, the minor increase in delay of less than five seconds due to the project is not significant.

Queuing

The City of Petaluma does not have a standard of significance for queue lengths in dedicated turn lanes. The following standard was applied for purposes of this analysis:

Projected 95th percentile queues left-turn pockets at signalized intersections should not exceed the available stacking length. A queuing impact shall be considered significant if:

- a. The 95th percentile queue length can be contained within the available stacking length without the project, and the project causes the queue to exceed the stacking length,
- b. The queue length exceeds the available stacking length without the project and the project increases the 95th percentile queue by more than 25 feet, or approximately one car-length.

Under each scenario, the projected maximum queues in left-turn pockets at the study intersections were determined using the output from Synchro. Due to the proximity of North McDowell Boulevard/Corona Road to the SMART rail line the westbound through queue was reviewed for queueing to ensure that it would not extend onto the tracks. Summarized in Table 12 are the predicted queue lengths for approaches to intersections where queues in left-turn pockets are expected to exceed the existing available storage capacity. Copies of the queue projections are contained in Appendix D.

Table 12 – Maximum Left-Turn Queues Exceeding Available Storage

Study Intersection Approach	Turn Pocket Length	Available Stacking Space	Maximum Queues											
			AM Peak Hour						PM Peak Hour					
			E	E+P	B	B+P	F	F+P	E	E+P	B	B+P	F	F+P
N McDowell Blvd/Corona Rd														
Eastbound	100	n/a	297	297	297	297	412	412	229	229	229	229	183	183
Westbound	145	n/a	66	66	101	104	216	219	52	56	77	79	99	103
Westbound thru	n/a	440	**	301	**	355	561	547	**	**	**	**	**	358
Northbound	170	n/a	157	170	157	170	208	233	298	314	298	314	262	273
Southbound	170	500+	84	143	148	148	151	151	440	440	488	495	487	487
Petaluma Blvd N/Corona Rd-Skillman Ln														
Westbound	120	230	298	316	332	349	388	409	404	418	439	475	439	469
<i>Mitigated</i>	<i>n/a</i>	<i>750</i>	**	**	**	**	**	**	**	**	**	193	**	200
Northbound	145	n/a	84	84	90	90	223	223	94	94	95	95	233	233
McDowell Blvd/E Washington St														
Eastbound	310	n/a	276	283	302	310	343	357	349	364	363	397	348	371
Northbound	220	n/a	217	217	266	266	319	314	209	209	237	254	298	298
Southbound	275	500+	89	89	90	90	153	154	263	263	250	263	315	315

Notes: Maximum Queue based on the output from Synchro; all distances are measured in feet; E = existing conditions; E+P = existing plus project conditions; B= background conditions; B+P = background plus project conditions; F = future conditions; F+P = future plus project conditions; **Bold** text = queue length exceeds available storage; ** = not evaluated; **Shaded Cells** = Project adds more than 25 feet to a queue already exceeding available storage length

Left-turn storage is expected to exceed existing storage capacity at three intersections: North McDowell Boulevard/Corona Road, Petaluma Boulevard/Corona Road-Skillman Avenue, and McDowell Boulevard/ East Washington Street. However, except at Petaluma Boulevard north/Corona Road-Skillman Lane, the increase in queueing is 25 feet or less, indicating a less-than-significant impact under the criterion applied.

The queue on westbound Corona Road approaching North McDowell Boulevard is expected to exceed the available stacking space between the intersection and the SMART railroad tracks under projected future volumes in the a.m. peak hour. Because this represents a very specific and serious safety concern, railroad pre-emption should be installed to ensure that the tracks will be clear when the SMART train arrives at the crossing. The project should contribute a proportional share of the cost of these improvements, which is calculated at 4.7 percent. A copy of the spreadsheet is provided in Appendix D.

The queue in the westbound left-turn lane on Corona Road approaching Petaluma Boulevard North currently exceeds the available storage length and queueing is expected to be at or beyond the limit of the left-turn pocket under all volume scenarios evaluated. Because the project adds more than 25 feet of queue to the p.m. background and future scenarios, measures were considered to reduce the queue length. By converting the lane configuration on the westbound approach to include a shared left-turn/through lane, the queue could be reduced to an acceptable length. Further, the modification to the configuration would be expected to improve operation from LOS E to LOS D under all scenarios evaluated. The queueing under these changed conditions is shown in Table 12.

Finding – The project causes an increase in queues that is greater than one car length on the westbound approach to Petaluma Boulevard North/Corona Road-Skillman Lane for the p.m. peak hour future plus project and background plus project scenarios. Under the criterion applied, this is considered a significant impact.

Additionally, the project will be part of the queuing on the westbound Corona Road approach to North McDowell Boulevard that is expected to exceed the stacking space available between the intersection and the SMART railroad tracks under Future a.m. peak hour volumes. This is a significant safety concern.

Recommendation – The project applicant should restripe the westbound approach to Petaluma Boulevard North/Corona Road-Skillman Lane to convert the existing through/right-turn lane to a shared left-turn/through/right-turn lane. This would reduce project’s impact on queuing to less than significant and achieve acceptable operation at the intersection under projected future volumes.

Further, the project applicant should contribute 4.7 percent of the cost to install railroad pre-emption at North McDowell Boulevard/Corona Road for the City to implement this project in the future.

Alternative Modes

Pedestrian Facilities

Given the proximity of residential and some commercial surrounding the site, it is reasonable to assume that some project residents will want to walk, bicycle, and/or use transit for trips to and from the project site.

Project Site – Sidewalks exist along the project frontage and will be added within the project connecting the residences to each other and the street.

Finding – Pedestrian facilities serving the project site are adequate.

Recommendation – The project should provide a connection from the site to the planned future SMART station, potentially via the adjacent parking lot.

Bicycle Facilities

Existing bicycle facilities, including bike lanes on the adjacent street, together with shared use of minor streets provide adequate access for bicyclists.

Finding – Bicycle facilities serving the project site are adequate.

Transit

Existing transit routes are adequate to accommodate project-generated transit trips, especially with the addition of the planned North Petaluma SMART station. Existing bus stops are within acceptable walking distance of the site. Though not included on initial site plans, it is understood that the Transit Division has asked for a bus shelter with two benches and other amenities on the site's North McDowell Boulevard frontage.

Finding – Transit facilities serving the project site are generally adequate, though there is not currently a bus shelter proposed on the site's frontage as required by the Transit Division.

Recommendation – A transit shelter meeting the requirements set forth by the City should be provided on North McDowell Boulevard.

Access and Circulation

Site Access

Site access is proposed from two driveways along the project frontage on North McDowell Boulevard. The north driveway would be restricted to right turns in and out only by the existing median on North McDowell Boulevard.

Sight Distance

Sight distances along North McDowell Boulevard at the project driveways were evaluated based on sight distance criteria contained in the *Highway Design Manual* published by Caltrans. The recommended sight distance for minor street approaches that are either a private road or a driveway are based on stopping sight distance, with approach travel speed used as the basis for determining the recommended sight distance. Additionally, the stopping sight distance needed for a following driver to stop if there is a vehicle waiting to turn into a side street or driveway is evaluated based on stopping sight distance criterion and the approach speed on the major street.

Sight distances at the proposed driveway locations were field measured. Based on a design speed of 40 mph, the minimum stopping sight distance needed is 300 feet. At both driveways there was more than 500 feet of sight distance to the south, which is the only direction in which adequate sight lines are needed for the north driveway, which is restricted to right turns. To the north sight lines are restricted by the trees and mounded landscaping in the median, resulting in inadequate sight lines from the driveway at the southern end of the project site where the proposed plan indicates full access.

Sight distance can be affected by landscaping and reduced by poorly placed signs. Consideration should be given to placement of such items near the driveways during the design phase of the project, and maintenance of landscaping should be included as part of the operation of the project, if appropriate.

Finding – Adequate sight distance to the south exists at both of the project driveway locations. However, landscaping in the median restricts sight lines to the north from the southern driveway where full access is proposed.

Recommendations – Existing landscaping on the median island should be modified as necessary to achieve adequate sight lines from the driveway where left-turn egress would be allowed. This would likely need to include removal of the bushes between the trees as well as some reduction in the height of the berm on the median. Care should be taken to ensure that signing and/or landscaping installed as part of the project will not reduce sight lines to an inadequate distance through both the design phase and future site maintenance.

Left-Turn Lane

The existing center median on North McDowell Boulevard ends about 85 feet north of the location of the proposed full-access driveway. The existing striping creates a “painted median” that extends to the driveway to the mobile home park at 911 North McDowell Boulevard. To create a left-turn pocket for traffic inbound to the project site the existing median island and striping would need to be modified. Given the anticipated queue, a pocket of at least 50 feet would be adequate.

Recommendation – The existing median island and center striping should be modified as necessary to provide a left-turn pocket with at least 50 feet of stacking space for access to the project’s southernmost driveway.

Conclusions and Recommendations

Conclusions

- The proposed project is expected to generate an average of 1,004 trips daily, including 79 trips during the morning peak hour and 105 during the evening peak hour.
- Upon the addition to the project-generated traffic to Existing volumes, the study intersections are expected to continue operating acceptably.
- Under Background volumes, North McDowell Boulevard/Corona Road is expected to operate unacceptably without or with project traffic added during the evening peak hour.
- Under Future volumes, North McDowell Boulevard/Old Redwood Highway, North McDowell Boulevard/Corona Road, Petaluma Boulevard N/Corona Road-Skillman Lane and McDowell Boulevard/East Washington Street are expected to operate unacceptably without or with project traffic added.
- None of the study intersections would experience a change in service level as a result of adding project traffic, indicating a less-than-significant impact from the project.
- The project is expected to cause the queue length to increase by more than one car length on the westbound approach to Petaluma Boulevard North/Corona Road-Skillman Lane during the p.m. peak hour future plus project and background plus project scenarios.
- The project will contribute to queuing on westbound Corona Road at North McDowell Boulevard that is expected to exceed the stacking space between the intersection and the SMART railroad tracks, resulting in a safety concern.
- Access for alternative modes is adequate.
- Sight distance at the project driveways is adequate.

Recommendations

- A pedestrian connection from the site to the future SMART station should be provided.
- Signing and landscaping should be placed and maintained in a way to avoid reducing sight lines from the driveways.
- The project should contribute 4.71 percent of the total cost to install railroad preemption at the signal at North McDowell Boulevard/Corona Road.
- The westbound approach on Corona Road to Petaluma Boulevard North should be restriped to convert the existing through/right-turn lane to accommodate left turns. This improvement would address the project's queuing impact, making it less than significant.
- The existing median island and center striping on North McDowell Boulevard should be modified as necessary to provide a left-turn pocket with at least 50 feet of stacking space for access to the project's southernmost driveway.

Study Participants and References

Study Participants

Principal in Charge	Dalene J. Whitlock, PE, PTOE
Assistant Engineer	Allison Jaromin, EIT
Graphics	Katia Wolfe
Editing/Formatting	Alex Scrobonia
Quality Control	Dalene J. Whitlock, PE, PTOE

References

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PET213



Appendix A

Reference Traffic Impact Studies



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Brody Ranch Subdivision Traffic Impact Study



Prepared for the
City of Petaluma



Submitted by

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Executive Summary

The proposed Brody Ranch Subdivision project would result in construction of 60 single family dwellings and 138 apartments. The project's anticipated trip generation includes 1,489 trips per day, including 115 a.m. peak hour trips and 146 trips during the p.m. peak hour.

The study area was established by the City and includes eight intersections. Analysis indicates that the eight study intersections are operating acceptably under Existing conditions both with and without project.

Under the Baseline scenario, which includes trips from projects that have already been approved and are likely to be occupied within the next few years, the study intersections are projected to continue operating acceptably, except East Washington Street/McDowell Boulevard, which is expected to operate at a deficient LOS E during the p.m. peak hour. With the project, the study intersections are projected to continue operating acceptably, except East Washington Street/McDowell Boulevard, which is expected to continue operating at LOS E during the p.m. peak hour. The project will not result in a change to the level of service, so is expected to have a less-than-significant impact under the applied standards.

Under the Future and Future plus Project scenarios, and with the assumption that the Rainer Interchange would be constructed providing an east-west crossing of US 101 along with a mid-city connection to US 101, the study intersections are expected to operate acceptably.

Vehicles will access the project via a street connection on Wellington Place and on Sonoma Mountain Parkway directly across from Mauro Pietro Drive. It is understood that the project would install a northbound left-turn lane at Sonoma Mountain Parkway/Mauro Pietro Drive-Project Access. Sight distance at the project intersections for both entering and exiting drivers is expected to be adequate.

Facilities for alternative modes will be adequate upon the construction of project's planned facilities, which include a bus turnout and shelter, sidewalks, and bike lane.

Introduction

Introduction

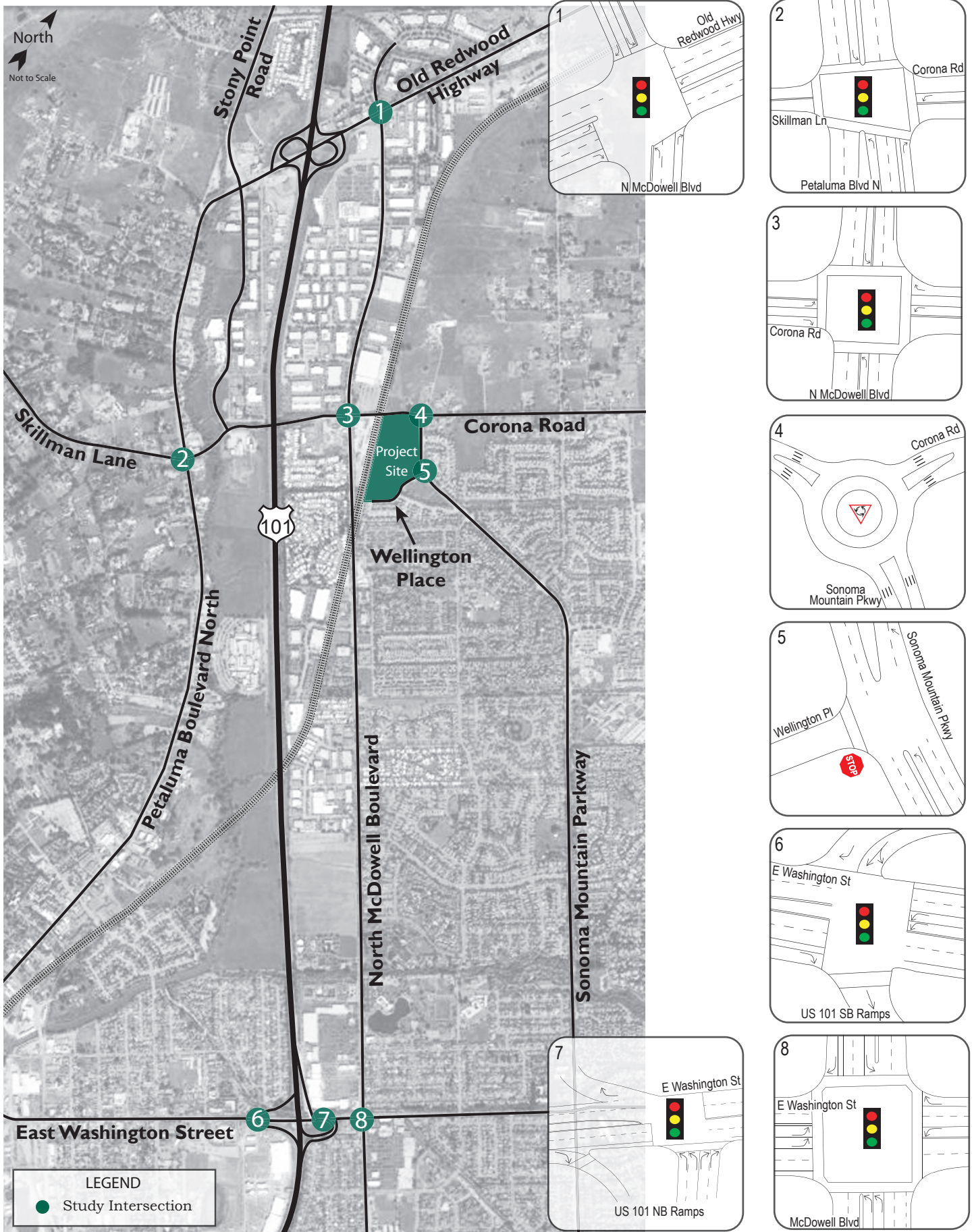
This report presents an analysis of the potential traffic impacts that would be associated with development of a proposed project that includes 198 residential units to be located on Sonoma Mountain Parkway in the City of Petaluma. The traffic study was completed in accordance with the criteria established by the City of Petaluma, and is consistent with standard traffic engineering techniques. Staff concurrence was obtained on the study area; trip generation and distribution assumptions; and derivation of future volumes.

Prelude

The purpose of a traffic impact study is to provide City staff and policy makers with data that they can use to make an informed decision regarding the potential traffic impacts of a proposed project, and any associated improvements that would be required in order to mitigate these impacts to a level of insignificance as defined by the City's General Plan or other policies. Vehicular traffic impacts are typically evaluated by determining the number of new trips that the proposed use would be expected to generate, distributing these trips to the surrounding street system based on existing travel patterns or anticipated travel patterns specific to the proposed project, then analyzing the impact the new traffic would be expected to have on critical intersections or roadway segments. Impacts relative to access for pedestrians, bicyclists, and to transit are also addressed.

Project Profile

The proposed project would develop 60 single family dwellings and 138 apartments on a site that is currently farmed, though it is zoned for residential use. The project site is bound by Corona Road to the west, Sonoma Mountain Parkway to the north, Wellington Place to the east, and the SMART railroad tracks to the south, as shown in Figure 1.



Brody Ranch Subdivision Traffic Impact Study
Figure I – Study Area and Lane Configurations

Transportation Setting

Operational Analysis

Study Area and Periods

The study area consists of the following intersections:

1. Old Redwood Highway/North McDowell Boulevard
2. Petaluma Boulevard North/Skillman Lane-Corona Road
3. North McDowell Boulevard/Corona Road
4. Sonoma Mountain Parkway/Corona Road
5. Sonoma Mountain Parkway/Wellington Place
6. East Washington Street/US 101 Southbound Ramps
7. East Washington Street/US 101 Northbound Ramps
8. East Washington Street/McDowell Boulevard

Operating conditions during the a.m. and p.m. peak periods were evaluated to capture the highest potential impacts for the proposed project as well as the highest volumes on the local transportation network. The morning peak hour occurs between 7:00 and 9:00 a.m. and reflects conditions during the home to work or school commute, while the p.m. peak hour occurs between 4:00 and 6:00 p.m. and typically reflects the highest level of congestion during the homeward bound commute.

Study Intersections

Old Redwood Highway/North McDowell Boulevard is a signalized, four-legged intersection with split phasing on the northbound and southbound North McDowell Boulevard approaches (in other words, they operate concurrently rather than simultaneously) and protected left-turn phasing on the eastbound and westbound Old Redwood Highway approaches. There are crosswalks on the north and east legs.

Petaluma Boulevard North/Skillman Lane-Corona Road is a signalized, four-legged intersection with split phasing on the eastbound Skillman Lane and the westbound Corona Road approaches. Petaluma Boulevard has protected left-turn phasing on the northbound and southbound approaches and a right-turn overlap on the northbound approach. Yellow school crosswalks are provided on all four legs.

North McDowell Boulevard/Corona Road is a signalized, four-legged intersection with protected left-turn phasing on all approaches as well as right-turn overlaps on the eastbound and westbound Corona Road approaches. Crosswalks exist on all legs.

Sonoma Mountain Parkway/Corona Road is a three-legged roundabout with a driveway that also enters directly via the roundabout. There are crosswalks on all approaches.

Sonoma Mountain Parkway/Wellington Place is an unsignalized tee-intersection with stop controls on the terminating eastbound Wellington Place approach and a crosswalk on the west leg.

East Washington Street/US 101 Southbound Ramps is a signalized, four-way intersection. Protected left-turn phasing exists on the westbound approach, and the south leg is the on-ramp. Sidewalks and a marked crosswalk are provided along the south side of East Washington Street, with no other pedestrian facilities at this intersection.

East Washington Street/US 101 Northbound Ramps is a signalized tee-intersection.

East Washington Street/McDowell Boulevard is a four-way, signalized intersection with protected left-turn phasing on all approaches. Marked crosswalks, along with pedestrian crossing phasing are provided across all legs of the intersection, connecting to sidewalks on all approaches.

The locations of the study intersections and the existing lane configurations and controls are shown in Figure I.

Collision History

The collision history for the study area was reviewed to determine any trends or patterns that may indicate a safety issue. Collision rates were calculated based on records available from the California Highway Patrol as published in their Statewide Integrated Traffic Records System (SWITRS) reports. The most current five-year period available is July 1, 2008, through June 30, 2013.

As presented in Table I, the calculated collision rates for the study intersections were compared to average collision rates for similar facilities statewide, as indicated in *2010 Collision Data on California State Highways*, California Department of Transportation (Caltrans). Collision rate calculations are provided in Appendix A.

Table I
Collision Rates at the Study Intersections

Study Intersection	Number of Collisions (2008-2013)	Calculated Collision Rate (c/mve)	Statewide Average Collision Rate (c/mve)
1. Old Redwood Hwy/N McDowell Blvd	27	0.50	0.27
2. Petaluma Blvd N/Skillman Ln-Corona Rd	12	0.20	0.27
3. N McDowell Blvd/Corona Rd	18	0.27	0.27
4. Sonoma Mountain Pkwy/Corona Rd	3	0.13	0.18
5. Sonoma Mountain Pkwy/Wellington Pl	3	0.20	0.18
6. E Washington St/US 101 SB Ramps	13	0.21	0.27
7. E Washington St/US 101 NB Ramps	45	0.68	0.27
8. E Washington St/McDowell Blvd	48	0.56	0.27

Note: c/mve = collisions per million vehicles entering

Sonoma Mountain Parkway/Wellington Place had a calculated collision rate of 0.20 collisions per million vehicles entering the intersection (c/mve), which is approximately equal to the Statewide Average of 0.18 c/mve, and with only three crashes, no clear trend could be determined.

The following three study intersections were found to have collision rates substantially higher than the statewide average for similar facilities.

Old Redwood Highway/North McDowell Boulevard experienced 27 reported collisions during the five-year period, for a calculated collision rate of 0.50 c/mve, which is greater than the statewide average of 0.27 c/mve for similar facilities. The most common collisions were rear-ends with unsafe speeding and unsafe starting or backing as the primary collision factors. There were also several instances of Driving Under the Influence (DUI). Both of these safety issues could be mitigated with increased enforcement.

East Washington Street/US 101 North Ramps experienced 45 reported collisions resulting in a calculated collision rate of 0.68 c/mve, which is greater than the statewide average of 0.27 c/mve for similar facilities. Recently completed improvements that realigned the intersection to eliminate the westbound left-turn movement and alleviate congestion should also improve safety at the intersection.

East Washington Street/McDowell Boulevard had 48 reported collisions, equating to a rate of 0.56 c/mve, greater than the statewide average of 0.27 c/mve. Nearly half of the reported collisions were rear-end collisions, which are common at congested urban intersections. The improvements at the adjacent *East Washington Street/US 101 Northbound Ramps* intersection is expected to help alleviate some of the congestion at this intersection, which may improve intersection safety. Additionally, long term plans for the *Rainier Interchange* would further help alleviate congestion and improve safety at this intersection.

Alternative Modes

Pedestrian Facilities

Pedestrian facilities include sidewalks, crosswalks, pedestrian signal phases, curb ramps, curb extensions, and various streetscape amenities such as lighting, benches, etc. In general, a network of sidewalks, crosswalks, pedestrian signals, and curb ramps provide access for pedestrians in the vicinity of the proposed project site; however, sidewalk gaps and obstacles can be found along all of the roadways connecting to the project site. Existing gaps and obstacles along the connecting roadways impact convenient and continuous access for pedestrians and present safety concerns in those locations where appropriate pedestrian infrastructure would address potential conflict points.

In the vicinity of the project, there are no sidewalks along *Corona Road* to the northwest of the project site, except along the roundabout at *Sonoma Mountain Road/Corona Road*. Continuous sidewalks are provided along both sides of *Sonoma Mountain Parkway* and overhead street lighting is provided. Sidewalks exist along the south side of *Wellington Place*, opposite the project site while no sidewalks are provided on the north side of *Wellington Place*. A multi-use path along *Corona Creek* that starts at *Sonoma Mountain Parkway* terminates at the south end of the project site near the railroad tracks.

Bicycle Facilities

The *Highway Design Manual*, Caltrans, 2012, classifies bikeways into three categories:

- *Class I Multi-Use Path*: a completely separated right-of-way for the exclusive use of bicycles and pedestrians with cross flows of motorized traffic minimized.
- *Class II Bike Lane*: a striped and signed lane for one-way bike travel on a street or highway.
- *Class III Bike Route*: signing only for shared use with motor vehicles within the same travel lane on a street or highway.

In the project area, Class II bike lanes exist on *North McDowell Boulevard* between *Old Redwood Highway* and *Southpoint Boulevard*. There are also Class II bike lanes on *Sonoma Mountain Parkway* and *Old Redwood Highway*. Bicyclists ride in the roadway and/or on sidewalks along all other streets within the project study area. Table 2 summarizes the existing and planned bicycle facilities in the project vicinity, as contained in the *City of Petaluma Proposed and Existing Bicycle & Pedestrian Facilities Map, 2014*.

**Table 2
Bicycle Facility Summary**

Status Facility	Class	Length (miles)	Begin Point	End Point
Existing				
McDowell Meadows	I	0.25	N McDowell Blvd	Sonoma Mountain Pkwy
Fieldstone Trail	I	0.31	Sonoma Mountain Pkwy	Ely Rd
N McDowell Blvd	II	1.53	Old Redwood Hwy	Southpoint Blvd
Old Redwood Hwy	II	0.80	Industrial Ave	City Limits North
Sonoma Mountain Pkwy	II	2.00	Corona Rd	Madison St
Planned				
NWP Trail	I	3.1	City Limits North	Lakeville Street
Corona Rd	II	2.00	Industrial Ave	Adobe Rd

Source: *City of Petaluma Proposed and Existing Bicycle and Pedestrian Facilities Map, 2014*

Transit Facilities

Sonoma County Transit (SCT) provides fixed route bus service in Petaluma. SCT Route 44/48 provides loop service to destinations throughout the City and to Rohnert Park and Santa Rosa with stops on North McDowell Boulevard between Rand Street and Corona Road. Bus stops on Sonoma Mountain Parkway at Maria Drive are within one-quarter mile of the project site. Route 44/48 operates Monday through Friday with approximately one-half hour headways between 5:30 a.m. and 9:30 p.m. Weekend service operates with approximately one-and-a-half hour headways between 7:00 a.m. and 10:00 p.m.

Petaluma Transit operates three routes near the project site. Route 2 provides loop service along McDowell Boulevard Monday thru Friday from 6:00 a.m. to 10:00 p.m. with one-half hour headways and on the weekends from 7:00 a.m. to 10:00 p.m. with one-hour headways. Routes 33 and 3 provide loop service in East Petaluma, and stop approximately one-quarter mile from the project site on Sonoma Mountain Parkway at Maria Drive. Route 3 runs only on school days from 6:00 a.m. to 6:00 p.m. with one-hour headways. Route 33 runs on weekdays from 6:15 a.m. to 10:15 p.m. with one-half to one-hour headways. Route 33 also runs on the weekends from 8:00 a.m. to 10:00 p.m. with one-hour headways.

Two bicycles can be carried on most SCT buses. Bike rack space is on a first come, first served basis. Additional bicycles are allowed on SCT buses at the discretion of the driver.

Dial-a-ride, also known as paratransit, or door-to-door service, is available for those who are unable to independently use the transit system due to a physical or mental disability. Petaluma Paratransit is designed to serve the needs of individuals with disabilities within Petaluma and the greater Petaluma area.

SMART Commuter Rail Service

The project site is immediately adjacent to the Sonoma-Marin Area Rail Transit (SMART) tracks and the potential Corona Road Station as indicated in the City of Petaluma Station Area Plan, February 2013. SMART, at buildout, will provide rail service within Sonoma and Marin counties, extending to Cloverdale to the north and Larkspur to the south, connecting with the Larkspur Ferry Terminal. Along with commuter rail service a multi-use pathway is planned to be installed parallel to the rail corridor. The first phase of construction and initial rail service is expected to begin in late 2016, but does not include Corona Road Station as it has been deferred by SMART to the second phase of construction pending sufficient revenue.

Capacity Analysis

Intersection Level of Service Methodologies

Level of Service (LOS) is used to rank traffic operation on various types of facilities based on traffic volumes and roadway capacity using a series of letter designations ranging from A to F. Generally, Level of Service A represents free flow conditions and Level of Service F represents forced flow or breakdown conditions. A unit of measure that indicates a level of delay generally accompanies the LOS designation.

The study intersections were analyzed using methodologies published in the *Highway Capacity Manual* (HCM), Transportation Research Board, 2000. This source contains methodologies for various types of intersection control, all of which are related to a measurement of delay in average number of seconds per vehicle.

The Level of Service at Sonoma Mountain Parkway/Wellington Place, which is unsignalized and has one stop-controlled approach, was analyzed using the “Two-Way Stop-Controlled” intersection capacity method from the HCM. This methodology determines a level of service for each minor turning movement by estimating the level of average delay in seconds per vehicle. Results are presented for individual movements together with the weighted overall average delay for the intersection.

The study intersections that are controlled by traffic signals were evaluated using the signalized methodology from the HCM. This methodology is based on factors including traffic volumes, green time for each movement, phasing, whether or not the signals are coordinated, truck traffic, and pedestrian activity. Average stopped delay per vehicle in seconds is used as the basis for evaluation in this LOS methodology. For purposes of this study, delays were calculated using optimized signal timing.

Sonoma Mountain Parkway/Corona Road is controlled by a modern roundabout and was evaluated using the FHWA Roundabout Method, also contained within the Unsignalized Methodology section of the HCM. This methodology determines intersection operation using the gap acceptance method using basic geometric and volume data to calculate entering and circulating flows. This information is then translated to an overall average vehicle delay, with LOS break points at the same delays as used in the signalized methodology. Because the HCM roundabout methodology is relatively unsophisticated, the much more advanced SIDRA roundabout analysis software was utilized in any cases where the basic HCM methodology predicts operation worse than LOS B.

The ranges of delay associated with the various levels of service are indicated in Table 3.

**Table 3
Intersection Level of Service Criteria**

LOS	Two-Way Stop-Controlled	Signalized	Roundabout
A	Delay of 0 to 10 seconds. Gaps in traffic are readily available for drivers exiting the minor street.	Delay of 0 to 10 seconds. Most vehicles arrive during the green phase, so do not stop at all.	Delay of 0 to 10 seconds.
B	Delay of 10 to 15 seconds. Gaps in traffic are somewhat less readily available than with LOS A, but no queuing occurs on the minor street.	Delay of 10 to 20 seconds. More vehicles stop than with LOS A, but many drivers still do not have to stop.	Delay of 10 to 20 seconds.
C	Delay of 15 to 25 seconds. Acceptable gaps in traffic are less frequent, and drivers may approach while another vehicle is already waiting to exit the side street.	Delay of 20 to 35 seconds. The number of vehicles stopping is significant, although many still pass through without stopping.	Delay of 20 to 35 seconds.
D	Delay of 25 to 35 seconds. There are fewer acceptable gaps in traffic, and drivers may enter a queue of one or two vehicles on the side street.	Delay of 35 to 55 seconds. The influence of congestion is noticeable, and most vehicles have to stop.	Delay of 35 to 55 seconds.
E	Delay of 35 to 50 seconds. Few acceptable gaps in traffic are available, and longer queues may form on the side street.	Delay of 55 to 80 seconds. Most, if not all, vehicles must stop and drivers consider the delay excessive.	Delay of 55 to 80 seconds.
F	Delay of more than 50 seconds. Drivers may wait for long periods before there is an acceptable gap in traffic for exiting the side streets, creating long queues.	Delay of more than 80 seconds. Vehicles may wait through more than one cycle to clear the intersection.	Delay of more than 80 seconds.

References: *Highway Capacity Manual*, Transportation Research Board, 2000

Traffic Operation Standards

The *Petaluma General Plan 2025* has an adopted Level of Service (LOS) standard for streets that indicates the minimum acceptable operation is LOS D, with the following standard of significance for motor vehicle circulation:

Policy 5-P-10: *Maintain an intersection level of service (LOS) standard for motor vehicle circulation that ensures efficient traffic flow and supports multi-modal mobility goals. LOS should be maintained at Level D or better for motor vehicles due to traffic from any development project.*

With the current General Plan, the City is shifting toward a multimodal emphasis and LOS standard. “A multimodal analysis that, in addition to motor vehicles, takes into consideration the overall mobility and conditions for non-auto road users (i.e., bicycles and pedestrians) is highly encouraged.” The Community Character Element of the General Plan also contains circulation-related objectives and policies. This element directs that pedestrian and bicycle circulation be integrated into street designs and improvements. It also states that the amount of paving and the apparent width of streets should be reduced where possible.

Per the General Plan, the project would have a significant impact if it causes the average delay at an intersection already operating or expected to operate at LOS D or E to deteriorate to the next lower level of service.

Caltrans

Although located within Petaluma city limits, Caltrans has jurisdiction over the two study intersections of East Washington Street/US 101 Northbound Ramps and East Washington Street/US 101 Southbound Ramps. Caltrans indicates that they endeavor to maintain operation at the transition from LOS C to LOS

D. Where intersections are integral to a local jurisdictions transportation system, Caltrans often accepts the operational standard applied by the local agency, in this case, the City of Petaluma.

Existing Conditions

The Existing Conditions scenario provides an evaluation of current operation based on existing traffic volumes during the a.m. and p.m. peak periods. This condition does not include project-generated traffic volumes. Volume data was collected January 21, 2015, while local schools were in session.

Intersection Levels of Service

Under Existing conditions, the eight study intersections are operating acceptably at LOS D or better. The existing traffic volumes are shown in Figure 2. A summary of the intersection level of service calculations is contained in Table 4, and copies of the Level of Service calculations are provided in Appendix B.

**Table 4
Existing Peak Hour Intersection Levels of Service**

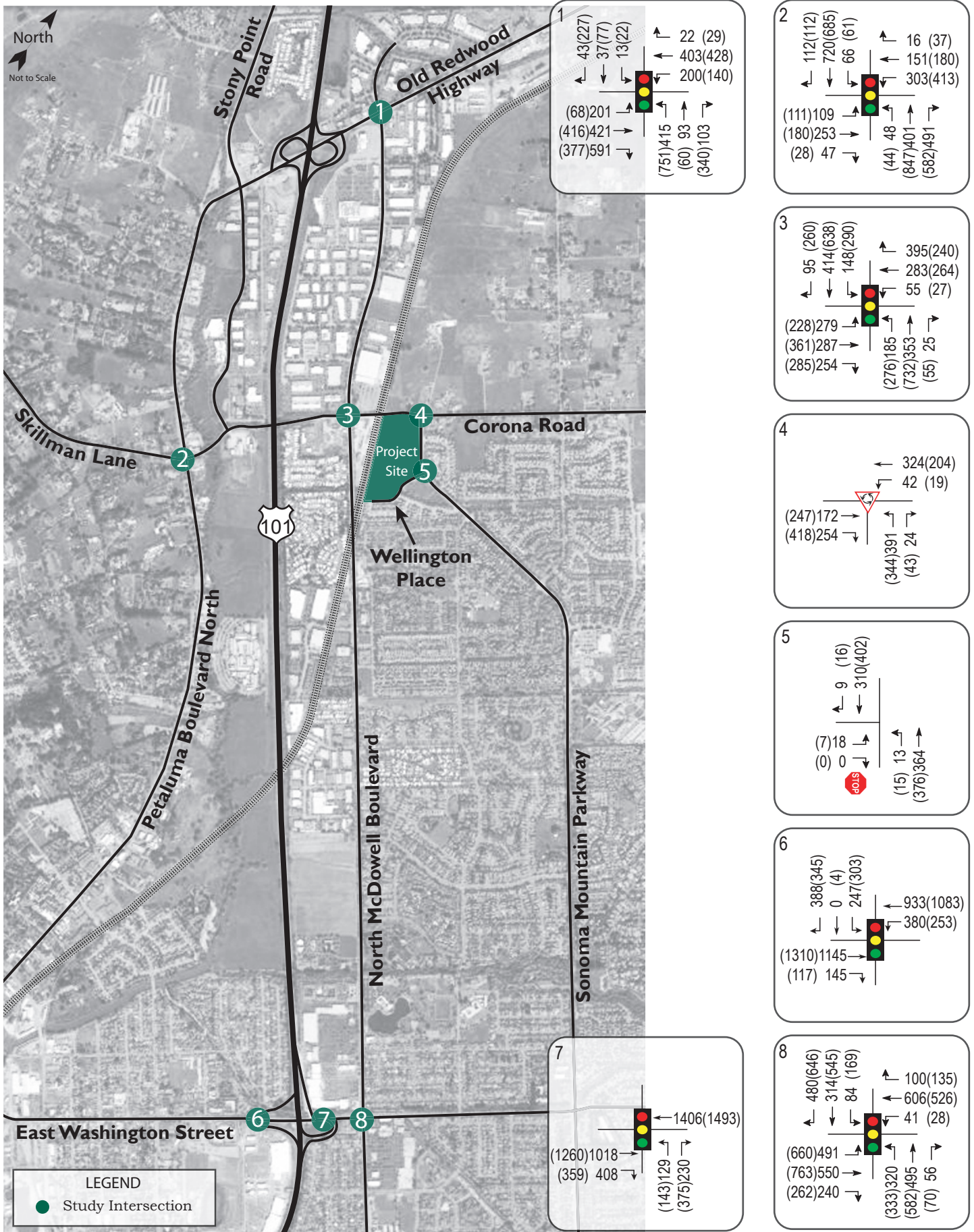
Study Intersection <i>Approach</i>	Existing Conditions			
	AM Peak		PM Peak	
	Delay	LOS	Delay	LOS
1. Old Redwood Hwy/N McDowell Blvd	21.9	C	25.2	C
2. Petaluma Blvd N/Skillman Ln-Corona Rd	39.4	D	37.6	D
3. N McDowell Blvd/Corona Rd	31.8	C	41.4	D
4. Sonoma Mountain Pkwy/Corona Rd	7.6	A	7.7	A
5. Sonoma Mountain Pkwy/Wellington Pl	0.5	A	0.3	A
<i>Eastbound Approach</i>	<i>13.3</i>	<i>B</i>	<i>14.6</i>	<i>B</i>
6. E Washington St/US 101 SB Ramps	26.3	C	30.3	C
7. E Washington St/US 101 NB Ramps	6.9	A	17.4	B
8. E Washington St/McDowell Blvd	30.9	C	38.7	D

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics*

Baseline Conditions

Baseline conditions were assessed to reflect operation upon the addition of traffic associated with known projects that may be constructed and/or become operational and add trips to the study area in the next two to three years. Relevant projects used in the Baseline scenario were selected from the following list of Major Development Projects, March 2015, provided by City staff based on the expected impact to the study area for this analysis.

- *Lynch Creek Plaza* – 22,500 square feet of retail at Lynch Creek Way and North McDowell Boulevard
- *Petaluman Hotel* – 57-room hotel located at 2 Petaluma Boulevard South
- *Deer Creek Village* – Approximately 345,000 square feet of commercial center located on North McDowell Boulevard between Lynch Creek Way and Rainier Avenue
- *Hansel Toyota Expansion* – Expansion and remodel of car dealership at 1125 Auto Center Drive
- *Maria Drive Apartments* – 144 unit apartment complex to be located at 35 Maria Drive



Brody Ranch Subdivision Traffic Impact Study
Figure 2 – Existing Traffic Volumes

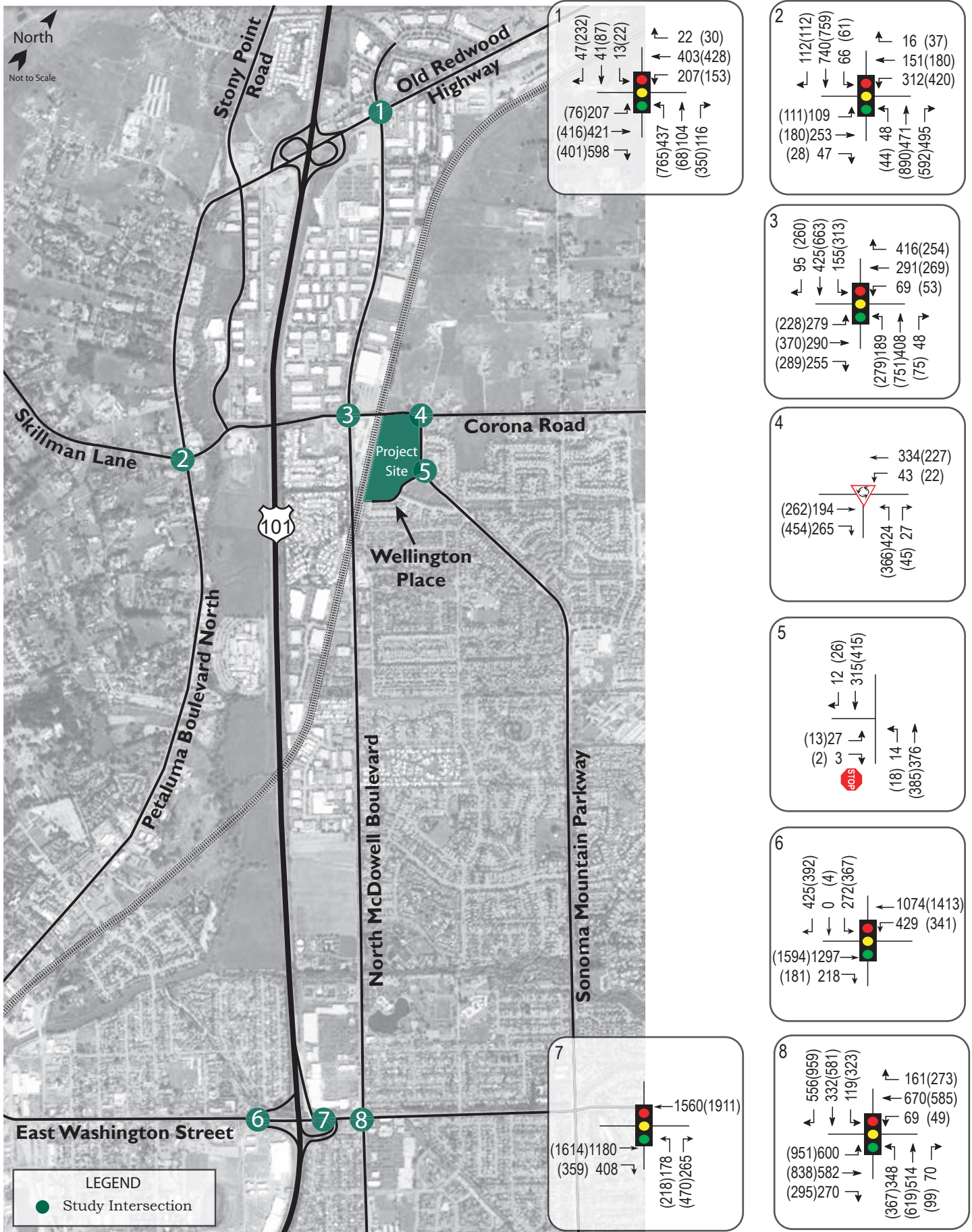
- *Addison Ranch Apartments* – An additional 100 multi-family units in an existing apartment complex located at 200 Greenbriar Circle
- *Keller Court Commons* – 8 single-family homes located on West Street at Keller Street
- *Davidon Homes* – 93 single family residential subdivision on Windsor Drive and D Street
- *N McDowell Commons* – 34 residential units located on North McDowell Boulevard
- *The Birches/Yarberry* – 21-lot single family residential subdivision on Wood Sorrel Drive near North McDowell Boulevard
- *Sid Commons* – 282 unit apartment complex located at the end of Graylawn Avenue at the Petaluma River
- *Avila Ranch Subdivision* – 21 single-family homes located at 511 Sonoma Mountain Parkway
- *Safeway Fuel Center* – Gas station with 8 fueling stations and convenience market at 335 South McDowell Boulevard
- *Baywood Apartments* – 162 unit apartment complex to be located at the northwest corner of Baywood Drive/Perry Lane
- *Corona Road Subdivision* – 30 single-family homes located at 470 and 498 Corona Road
- *River Cardroom* – Add a second cardroom on site at 5151 Montero Way
- *Riverfront 2010* – Mixed-use development consisting of 273 residential units, 60,000 square feet of office space, 30,000 square feet for a community boathouse, and park space
- *Haystack Landing* – Mixed-use development with 21,111 square feet of commercial space, 120 units of apartments units, and 31 units of senior adult housing located between Copeland Street and Weller Street
- *Brewster’s Garden* – 111-seat restaurant with outdoor dining and beer garden

The expected traffic associated with these projects was added to existing volumes in order to determine Baseline volumes. Trips for individual projects were either obtained from the traffic study for that project or developed using standard trip generation rates. Under these conditions, the study intersections are projected to continue operating acceptably, except East Washington Street/McDowell Boulevard, which is expected to operate unacceptably at LOS E during the p.m. peak period. The resulting operating conditions are summarized in Table 5, and Baseline volumes are shown in Figure 3.

Table 5
Baseline Peak Hour Intersection Levels of Service

Study Intersection <i>Approach</i>	Baseline Conditions			
	AM Peak		PM Peak	
	Delay	LOS	Delay	LOS
1. Old Redwood Hwy/N McDowell Blvd	22.7	C	25.9	C
2. Petaluma Blvd N/Skillman Ln-Corona Rd	40.0	D	39.0	D
3. N McDowell Blvd/Corona Rd	32.6	C	44.3	D
4. Sonoma Mountain Pkwy/Corona Rd	8.3	A	8.5	A
5. Sonoma Mountain Pkwy/Wellington Pl	0.7	A	0.4	A
<i>Eastbound Approach</i>	<i>13.4</i>	<i>B</i>	<i>14.6</i>	<i>B</i>
6. E Washington St/US 101 SB Ramps	29.9	C	53.4	D
7. E Washington St/US 101 NB Ramps	6.0	A	11.6	B
8. E Washington St/McDowell Blvd	39.6	D	70.6	E

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics*; **Bold** text = deficient operation



Brody Ranch Subdivision Traffic Impact Study
Figure 3 – Baseline Traffic Volumes

Future Conditions

Buildout of the City's General Plan is not expected to occur by the year 2025 because of economic conditions in the recent past, and would not be exceeded in this timeframe due to the City's adopted urban growth boundary (UGB). The horizon year for the projections can therefore be considered to be at least 2035.

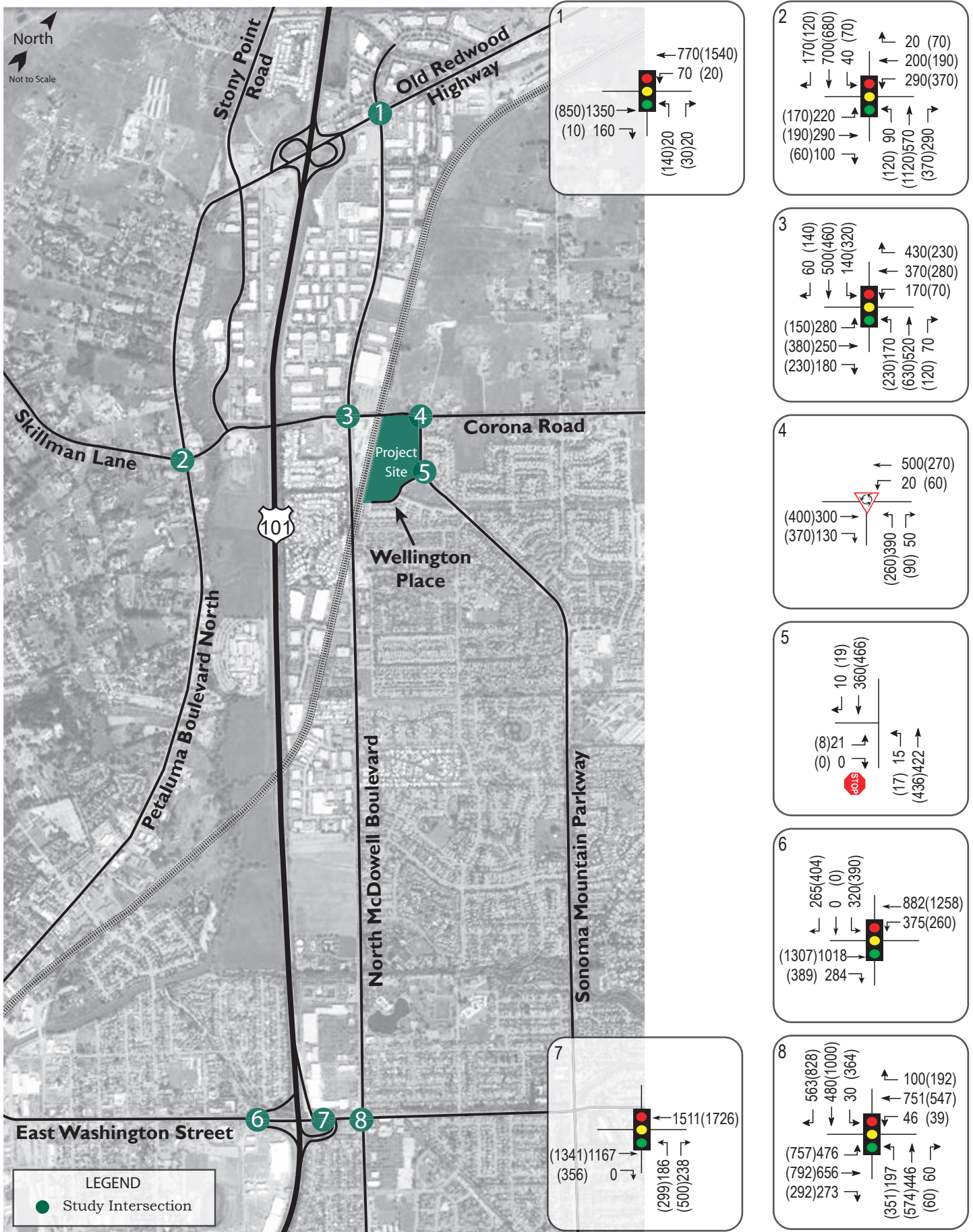
Future peak hour volumes were taken from Figure 3-2-8 in the Petaluma General Plan for all intersections except Sonoma Mountain Parkway/Wellington Place, East Washington Street/US 101 Northbound Ramps, East Washington Street/US 101 Southbound Ramps and East Washington Street/McDowell Boulevard. Segment volumes for the horizon year of 2025 were obtained from the City's gravity demand model and translated to turning movement volumes at Sonoma Mountain Parkway/Wellington Place using factoring. The growth factor used for the intersection was 1.16. Cumulative traffic forecasts for the three study intersections along the East Washington Street corridor (at the two US 101 ramp intersections, and McDowell Boulevard) were obtained from the recently completed and approved *East Washington Place EIR Traffic Study*, March 2011 by Winzler & Kelly. These projections were developed through the use of the City's traffic model, and with the assumption that the Rainier Interchange would be constructed providing an east-west crossing of US 101 along with a mid-city connection to US 101. While construction of the Rainier Interchange would likely affect some project-generated traffic, it was assumed that project trips would continue to use the East Washington Interchange, resulting in a more conservative analysis.

Under the anticipated Future volumes, and with the addition of the planned improvements, the study intersections are expected to operate acceptably at LOS D or better during the two peak periods analyzed. Note that while the intersection of East Washington Street/McDowell Boulevard is expected to operate unacceptably under Baseline conditions, it is projected to operate acceptably in the future upon completion of the above discussed planned improvements. Future volumes are shown in Figure 4 and a summary of the level of service calculations is provided in Table 6.

Table 6
Future Peak Hour Intersection Levels of Service

Study Intersection Approach	Future Conditions			
	AM Peak		PM Peak	
	Delay	LOS	Delay	LOS
1. Old Redwood Hwy/N McDowell Blvd	9.2	A	6.3	A
2. Petaluma Blvd N/Skillman Ln-Corona Rd	51.1	D	47.7	D
3. N McDowell Blvd/Corona Rd	40.3	D	38.5	D
4. Sonoma Mountain Pkwy/Corona Rd	8.4	A	8.3	A
5. Sonoma Mountain Pkwy/Wellington Pl <i>Eastbound Approach</i>	0.5 <i>14.0</i>	A B	0.3 <i>15.4</i>	A C
6. E Washington St/US 101 SB Ramps	28.0	C	29.0	C
7. E Washington St/US 101 NB Ramps	10.6	B	16.8	B
8. E Washington St/McDowell Blvd	34.5	C	44.3	D

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics*



Brody Ranch Subdivision Traffic Impact Study
Figure 4 – Future Traffic Volumes

Project Description

The project would develop 15.4 acres of land that is currently farmed, but is zoned for residential development, into 198 dwelling units consisting of 60 single-family homes and 138 apartments. Access to the site would be provided via a private street connection to Sonoma Mountain Parkway, directly across Mauro Pietro Drive and creating a four-legged intersection, and also one to Wellington Place. The proposed project site plan is shown in Figure 5.

Trip Generation

The anticipated trip generation for the proposed project was estimated using standard rates published by the Institute of Transportation Engineers (ITE) in *Trip Generation Manual*, 9th Edition, 2012, for Single Family Detached Housing (Land Use #210) and Apartments (Land Use #220). As shown in Table 7, the proposed project is expected to generate an average of 1,489 trips per day, including 115 a.m. peak hour trips and 146 trips during the p.m. peak hour.

Table 7
Trip Generation Summary

Land Use	Units	Daily		AM Peak Hour				PM Peak Hour			
		Rate	Trips	Rate	Trips	In	Out	Rate	Trips	In	Out
Single Family Detached Housing (LU#210)	60 du	9.52	571	0.75	45	11	34	1.00	60	38	22
Apartment (LU#220)	138 du	6.65	918	0.51	70	14	56	0.62	86	56	30
Total	198 du		1,489		115	25	90		146	94	52

Notes: du = dwelling units

Trip Distribution

The pattern used to allocate new project trips to the street network was based on data from the 2000 Census for home-to-work or work-to-home trips as well as existing traffic patterns in the city. These assumptions are consistent with those applied to recent traffic impact studies prepared for other projects in the area. The applied distribution assumptions and resulting trips are shown in Table 8.

Table 8
Trip Distribution Assumptions

Route	Percent	Daily Trips	AM Trips	PM Trips
US 101 via Washington Street	40%	596	46	58
US 101 via Petaluma Boulevard North	15%	224	17	22
West Petaluma via Corona Road	25%	372	29	37
West Petaluma via Washington Street	10%	149	11	15
East Petaluma via McDowell	5%	74	6	7
Lakeville Highway to the east	5%	74	6	7
TOTAL	100%	1,489	115	146

Intersection Operation

Existing plus Project Conditions

Upon the addition of project-related traffic to the Existing volumes, the study intersections are expected to continue operating at the same levels of service as without the project during the a.m. and p.m. peak hours. These results are summarized in Table 9. Project traffic volumes are shown in Figure 6.

Table 9
Existing and Existing plus Project Peak Hour Intersection Levels of Service

Study Intersection <i>Approach</i>	Existing Conditions		Existing plus Project	
	AM Peak Delay/LOS	PM Peak Delay/LOS	AM Peak Delay/LOS	PM Peak Delay/LOS
1. Old Redwood Hwy/N McDowell Blvd	21.9/C	25.2/C	22.2/C	25.2/C
2. Petaluma Blvd N/Skillman Ln-Corona Rd	39.4/D	37.6/D	40.6/D	38.2/D
3. N McDowell Blvd/Corona Rd	31.8/C	41.4/D	33.8/C	43.6/D
4. Sonoma Mountain Pkwy/Corona Rd	7.6/A	7.7/A	8.5/A	8.6/A
5. Sonoma Mountain Pkwy/Wellington Pl <i>Eastbound Approach</i>	0.5/A <i>13.3/B</i>	0.3/A <i>14.6/B</i>	0.7/A <i>13.6/B</i>	0.4/A <i>14.9/B</i>
6. E Washington St/US 101 SB Ramps	26.3/C	30.3/C	27.2/C	30.7/C
7. E Washington St/US 101 NB Ramps	6.9/A	17.4/B	7.1/A	18.6/B
8. E Washington St/McDowell Blvd	30.9/C	38.7/D	31.2/C	39.1/D

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics*

Finding: The study intersections are expected to continue operating acceptably at the same levels of service upon the addition of project-generated traffic.

Baseline plus Project Conditions

With project-related traffic added to Baseline volumes, the study intersections are expected to operate acceptably at the same levels of service as without the project, except East Washington Street/McDowell Boulevard, which is expected to continue operating unacceptably at LOS E during the p.m. peak hour. These results are summarized in Table 10.

**Table 10
Baseline and Baseline plus Project Peak Hour Intersection Levels of Service**

Study Intersection <i>Approach</i>	Baseline Conditions		Baseline plus Project	
	AM Peak Delay/LOS	PM Peak Delay/LOS	AM Peak Delay/LOS	PM Peak Delay/LOS
1. Old Redwood Hwy/N McDowell Blvd	22.7/C	25.9/C	22.9/C	25.9/C
2. Petaluma Blvd N/Skillman Ln-Corona Rd	40.0/D	39.0/D	41.2/D	39.7/D
3. N McDowell Blvd/Corona Rd	32.6/C	44.3/D	33.9/C	46.9/D
4. Sonoma Mountain Pkwy/Corona Rd	8.3/A	8.5/A	9.5/A	9.7/A
5. Sonoma Mountain Pkwy/Wellington Pl <i>Eastbound Approach</i>	0.7/A <i>13.4/B</i>	0.4/A <i>14.6/B</i>	0.9/A <i>13.9/B</i>	0.6/A <i>15.3/C</i>
6. E Washington St/US 101 SB Ramps	29.9/C	53.4/D	31.3/C	54.7/D
7. E Washington St/US 101 NB Ramps	6.0/A	11.6/B	6.2/A	12.4/B
8. E Washington St/McDowell Blvd	39.6/D	70.6/E	39.9/D	75.2/E

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics*; **Bold** text = deficient operation

Finding: The study intersections are expected to continue operating acceptably at the same levels of service upon the addition of project-generated traffic, except East Washington Street/McDowell Boulevard, which is expected to continue operating deficiently at LOS E during the p.m. peak hour. Based on an applied standards, the project would have a less-than-significant impact.

Recommendation: The applicant should pay traffic impact fees toward completion of planned future infrastructure improvements including those reducing congestion at the intersection of East Washington Street/McDowell Boulevard.

Future plus Project Conditions

Upon the addition of project-generated traffic to the anticipated Future volumes, and with the planned improvements, all of the study intersections are expected to operate acceptably. The Future plus Project operating conditions are summarized in Table 11.

**Table 11
Future and Future plus Project Peak Hour Intersection Levels of Service**

Study Intersection <i>Approach</i>	Future Conditions		Future plus Project	
	AM Peak Delay/LOS	PM Peak Delay/LOS	AM Peak Delay/LOS	PM Peak Delay/LOS
1. Old Redwood Hwy/N McDowell Blvd	9.2/A	6.3/A	9.3/A	6.4/A
2. Petaluma Blvd N/Skillman Ln-Corona Rd	51.1/D	47.7/D	53.3/D	48.6/D
3. N McDowell Blvd/Corona Rd	40.3/D	38.5/D	48.2/D	43.5/D
4. Sonoma Mountain Pkwy/Corona Rd	8.4/A	8.3/A	9.4/A	9.4/A
5. Sonoma Mountain Pkwy/Wellington Pl <i>Eastbound Approach</i>	0.5/A <i>14.0/B</i>	0.3/A <i>15.4/C</i>	0.7/A <i>14.3/B</i>	0.4/A <i>15.7/C</i>
6. E Washington St/US 101 SB Ramps	28.0/C	29.0/C	28.2/C	29.4/C
7. E Washington St/US 101 NB Ramps	10.6/B	16.8/B	10.8/B	17.9/B
8. E Washington St/McDowell Blvd	34.5/C	44.3/D	34.9/C	45.3/D

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics*

Finding: The study intersections will continue operating acceptably with project traffic added, at the same Levels of Service as without it. The project's impact is therefore less-than-significant.



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Protective-Permissive Left-Turn Signal Evaluation



Prepared for the
City of Petaluma



Submitted by

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Introduction and Preliminary Assessment

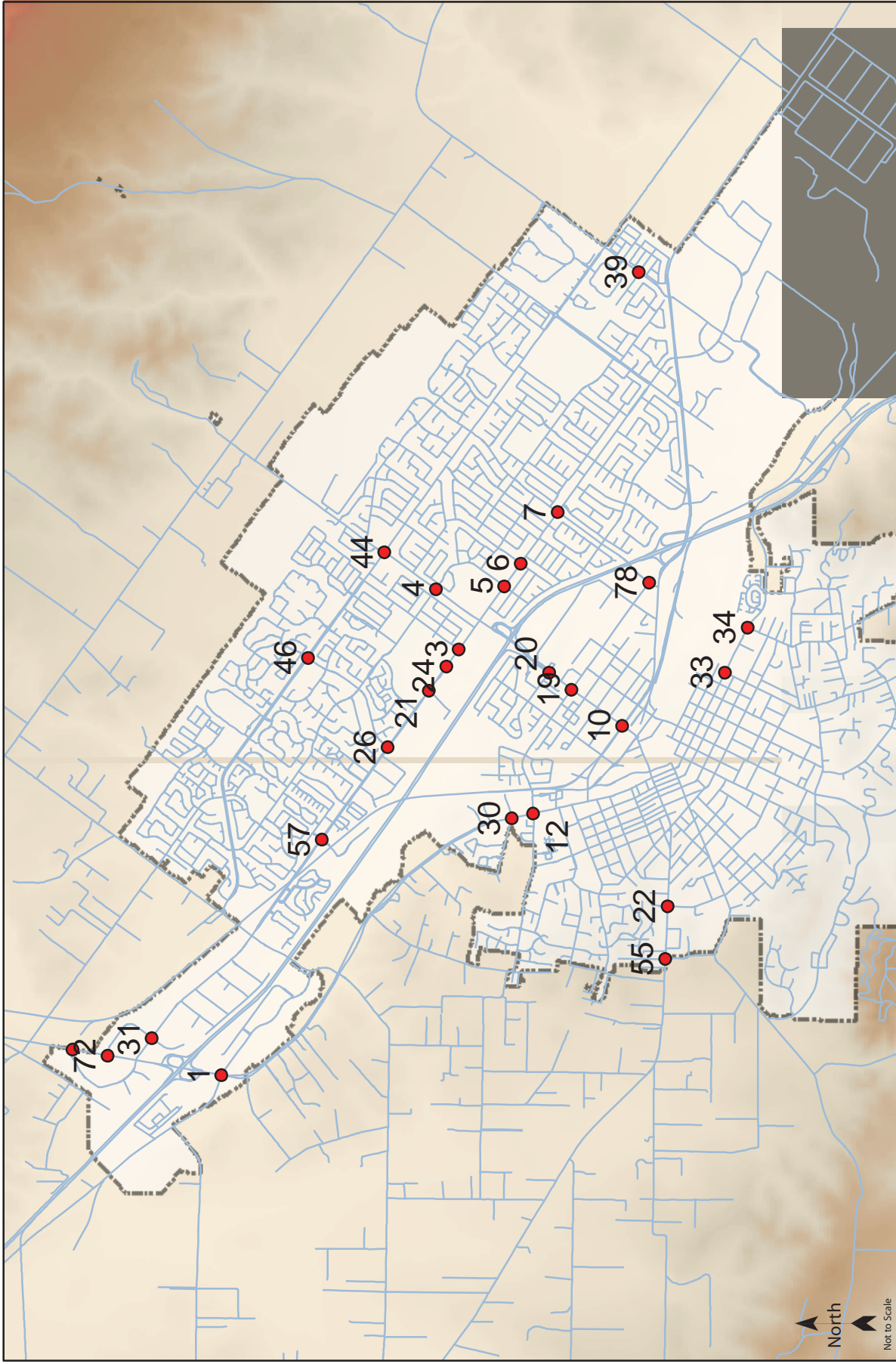
Introduction

A number of intersections in the City of Petaluma were converted from protective left-turn phasing to protective-permissive phasing, and there have been concerns about the need for this conversion at some locations. Though protective-permissive left-turn phasing sometimes can be a useful tool to address congestion, its use where it is not needed may instead result in safety concerns or other operational issues. This report presents an analysis of the need to retain or eliminate protective-permissive left-turn phasing at 26 intersections in the City of Petaluma. Standard traffic engineering techniques were applied in developing the recommendations to retain or modify controls at each intersection.

Study Locations

City staff identified the following 26 intersections where the protective-permissive phasing on one or both streets could potentially be eliminated. Note that the intersections are identified by the numbering system used for all of the City's signalized intersections. Also observed in this evaluation is the convention in Petaluma to consider streets that nearly parallel US 101 as being north/south and those that are nearly perpendicular are east/west. Figure 1 shows the locations of the study intersection as well as the directions that currently have protective-permissive phasing.

1. Stony Point Road/Industrial Avenue/Petaluma Boulevard North
3. McDowell Boulevard/East Madison Street
4. Maria Drive/East Washington Street
5. McDowell Boulevard South/Maria Drive
6. McDowell Boulevard South/McGregor Avenue
7. McDowell Boulevard South/Caulfield Lane
10. Lakeville Street/East Washington Street
12. Petaluma Boulevard North/Magnolia Avenue
19. Payran Street/East Washington Street
20. Ellis Street/East Washington Street
21. McDowell Boulevard North/Lynch Creek Way
22. North Webster Street/Bodega Avenue
24. McDowell Boulevard North/Community Center
26. McDowell Boulevard North/Rainier Avenue
30. Petaluma Boulevard North/Sycamore Lane
31. McDowell Boulevard North/Redwood Way
33. Petaluma Boulevard South/I Street
34. Petaluma Boulevard South/Mountain View Avenue
39. Frates Road/Calle Ranchero
44. Sonoma Mountain Parkway-Ely Boulevard/East Washington Street
46. Sonoma Mountain Parkway/Rainier Avenue
55. Bantam Way/Bodega Avenue
57. McDowell Boulevard North/Southpoint Boulevard
72. Redwood Way/Old Redwood Highway
73. McDowell Boulevard North/Old Redwood Highway
78. Payran Street/Caulfield Lane



Evaluation Approach

Over the past few decades, the use of protective-permissive left-turn phasing at intersections has grown in popularity in the United States. With this increased use, studies have been conducted to evaluate under what conditions permissive, protective-permissive and protective left-turn phasing are most appropriate. Factors considered include approach speeds, number of opposing through lanes, number of left-turning lanes, intersection geometry, and collision experience. Protective-permissive left-turn phasing should be replaced with protective only phasing if any of the following criteria are met.

Collisions

- On one approach, four left-turn crashes in one year or six left-turn crashes in two years
- On two approaches, six left-turn crashes in one year or eight left-turn crashes in two years

Sight Distance

- Left-turning driver has less than 5.5 seconds of sight distance of approaching vehicles

Geometry

- Two or more left-turn lanes
- Four or more opposing through lanes

Other Considerations

- Proximity to railroad crossings
- Signal indications are located outside normal field of left-turning motorists' view

Protective-permissive left-turn phasing should be replaced with permissive only phasing if the following criteria are met.

- If two vehicles or less turn left per signal cycle during the peak hour. Typically, if the volume of left-turning traffic is less than 72 vehicles during a peak hour the average will be less than two vehicles per cycle using an average of 100 seconds per cycle.
- If the product of the left turning volume and the opposing volumes during peak hours is less than 50,000 for one approach lane and 100,000 for two approach lanes.

Collision History

Records available from the California Highway Patrol as published in their *Statewide Integrated Traffic Records System (SWITRS)* reports were used for the analysis. The most current five-year period available is July 2005 through June 2010. The collision history for each of the study intersections was reviewed to determine if there have been any collisions reported involving drivers turning left. This type of collision would typically be correctible through use of protective left-turn phasing rather than permissive.

Six intersections were determined to have met the collision threshold where protective only phasing is most appropriate. These intersections are East Washington Street/Maria Drive, Petaluma Boulevard North/Magnolia Avenue-West Payran Street, East Washington Street/Lakeville Street, East Washington Street/Payran Street, East Washington Street/Sonoma Mountain Parkway-Ely Boulevard and McDowell Boulevard North/Southpoint Boulevard. The collision histories for each of the study intersections are summarized in Table I.

**Table I
Collision History**

North-South Street	East-West Street	Number of Collisions							
		North-South Street				East-West Street			
		1 Approach		2 Approaches		1 Approach		2 Approaches	
in 1 yr	in 2 yrs	in 1 yr	in 2 yrs	in 1 yr	in 2 yrs	in 1 yr	in 2 yrs		
Stony Point Rd-Industrial Ave	Petaluma Blvd N	2	2	2	3	x	x	x	x
McDowell Blvd	East Madison St	1	1	2	2	1	1	1	1
Maria Dr	East Washington St	x	x	x	x	4	5	3	5
McDowell Blvd S	Maria Drive	2	2	3	3	1	1	1	1
McDowell Blvd S	McGregor Ave	1	1	1	1	0	0	0	0
McDowell Blvd S	Caulfield Lane	2	4	4	6	x	x	x	x
Lakeville St	East Washington St	x	x	x	x	6	8	6	10
Petaluma Blvd N	Magnolia Ave	5	6	5	7	1	1	1	1
Payran St	East Washington St	x	x	x	x	4	4	5	7
Ellis St	East Washington St	x	x	x	x	3	4	4	5
McDowell Blvd N	Lynch Creek Way	1	1	1	1	x	x	x	x
North Webster St	Bodega Ave	x	x	x	x	2	3	0	0
McDowell Blvd N	Community Center	1	1	1	1	0	0	0	0
McDowell Blvd N	Rainier Ave	0	0	x	x	x	x	x	x
Petaluma Blvd N	Sycamore Lane	0	0	0	0	0	0	x	x
McDowell Blvd N	Redwood Way	2	3	2	3	0	0	0	0
Petaluma Blvd S	I St	0	0	x	x	x	x	x	x
Petaluma Blvd S	Mountain View Ave	1	2	x	x	x	x	x	x
Frates Rd	Calle Ranchero	0	0	x	x	0	0	0	0
Sonoma Mountain Parkway	East Washington St	4	5	5	7	x	x	x	x
Sonoma Mountain Parkway	Rainier Ave	1	1	2	2	2	2	3	3
Bantam Way	Bodega Ave	x	x	x	x	0	0	0	0
McDowell Blvd N	Southpoint Blvd	4	5	5	6	1	1	1	1
Redwood Way	Old Redwood Hwy	1	1	1	1	2	2	2	2
McDowell Blvd N	Old Redwood Hwy	0	0	x	x	x	x	x	x
Payran St	Caulfield Ln	x	x	x	x	2	2	3	4

Notes: x = approaches that do not have protective-permissive phasing so were not evaluated
 # indicates collisions for the approach or approaches in one or two years, as indicated
Bold text indicates that the applicable threshold is met

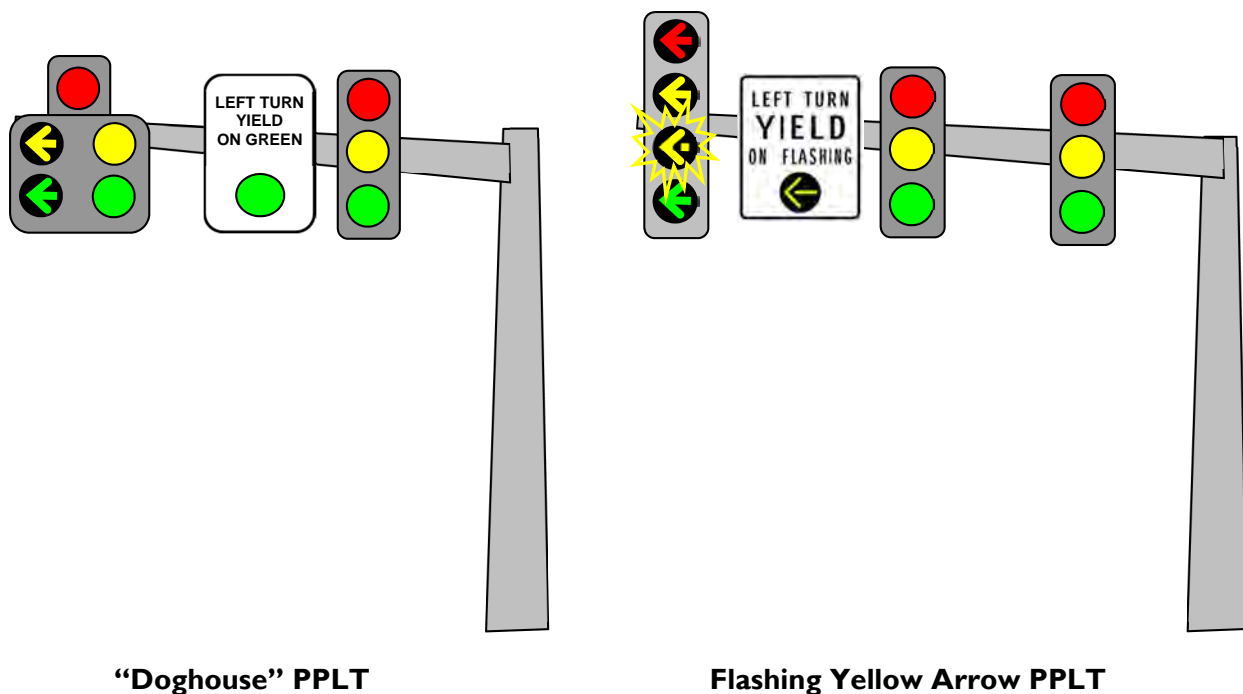
Site Analyses

After reviewing the collision data, operating conditions at each of the 26 study intersections were observed. Factors such as approach street alignment, sight lines, placement of signal equipment and lane configuration were noted. Additionally, observations were made of driver behavior such as aggression or uncertainty when making turns from lanes where protective-permissive phasing is used.



General Description

Protective-Permissive left-turn (PPLT) phasing combines the protection of a separate left-turn green arrow with a permissive left-turn during the opposing through movement green phase. The advantage of PPLT phasing is that it increases intersection capacity by allowing left-turning motorists greater opportunity to complete their maneuver. Approaches with PPLT phasing typically have five indications, including a green arrow during the protective operation, a yellow arrow during left-turn clearance, a green ball indication during the opposing green movement, a yellow ball during the phase clearance and a red ball indication. These five-section PPLT indications are generally configured in one of two ways: doghouse or stacked. The doghouse configuration has the red ball indication on top with the left-turn green and yellow arrows on the left side and the through movement green and yellow ball indications on the right. This configuration creates a five-sided shape that has the appearance of a doghouse, which is where it gets the name. The stacked configuration has the through movement red, yellow and green ball indications above the yellow and green left-turn arrows. The doghouse configuration is shown at the left below.



“Doghouse” PPLT

Flashing Yellow Arrow PPLT

There is a variation of the five-section stacked head that combines the green and yellow left-turn arrows into a single head by changing the shape of the indication. This results in a four-section configuration and is used at Bodega Avenue/North Webster Street, Bodega Avenue/Bantam Street and McDowell Boulevard North/Community Center.

More recently, PPLT phasing has been indicated through use of a flashing yellow arrow (FYA). The sequencing starts with a green arrow (if there are vehicles to be served), followed by a yellow arrow indicating the end of the protective portion of the phasing. The next indication is a flashing yellow arrow, which continues as long as permissive left-turn phasing is allowed. The general layout of the signal heads for this condition is shown in the graphic on the right above.

Several other signal phasing options are referred to in this report and include “permissive only,” “protective only” and “split phasing.” A brief description of these terms is presented below:

"Permissive-only" (also known as "permitted-only") phasing allows two opposing approaches to have a green ball indication concurrently, with left turns allowed after yielding to conflicting traffic and pedestrians. Minor side street movements can function acceptably using "permissive-only" left-turn phasing, provided that traffic volumes are low enough to operate adequately and safely without additional left-turn protection.

"Protected-only" phasing consists of providing a separate phase for left-turning traffic and allowing left turns to be made only on a green left arrow signal indication, with no pedestrian movement or vehicular traffic conflicting with the left turn.

"Split phasing" consists of having two opposing approaches time consecutively rather than concurrently (i.e., all movements originating from the west followed by all movements from the east). Split phasing is used appropriate at signalized intersections under the following conditions:

- A pair of opposing approaches is physically offset such that the opposing left turns could not proceed simultaneously or a permissive left turn could not be expected to yield to the opposing through movement.
- The angle of the intersection is such that the paths of opposing left turns would not be forgiving of errant behavior by turning motorists.

Capacity Analysis

Purpose

To evaluate the potential impact of the recommended changes to the operational performance of the study intersections during peak hours the level of service was calculated under current conditions and with the proposed changes to the signal operation. For the purposes of this analysis the Citywide Synchro a.m. and p.m. peak hour signal simulation models were used. Protective-permissive phasing typically improves intersection capacity as it allows left-turning motorists to share the green of the opposing through movement. However, protective-permissive phasing can reduce capacity where there is an insufficient volume of left-turning and opposing through traffic to justify its use.

Intersection Level of Service Methodologies

Level of Service (LOS) is used to rank traffic operation on various types of facilities based on traffic volumes and roadway capacity using a series of letter designations ranging from A to F. Generally, Level of Service A represents free flow conditions and Level of Service F represents forced flow or breakdown conditions. A unit of measure that indicates a level of delay generally accompanies the LOS designation.

The study intersections were analyzed using the signalized methodology published in the *Highway Capacity Manual (HCM)*, Transportation Research Board, 2000. This source contains methodologies for various types of intersection control, all of which are related to a measurement of delay in average number of seconds per vehicle. The signalized methodology is based on factors including traffic volumes, green time for each movement, phasing, whether or not the signals are coordinated, truck traffic, and pedestrian activity. Average stopped delay per vehicle in seconds is used as the basis for evaluation in this LOS methodology. For purposes of this study, delays were calculated using optimized signal timing.

The ranges of delay associated with the various levels of service are indicated in Table 2.

Table 2
Signalized Intersection Level of Service Criteria

LOS A	Delay of 0 to 10 seconds. Most vehicles arrive during the green phase, so do not stop at all.
LOS B	Delay of 10 to 20 seconds. More vehicles stop than with LOS A, but many drivers still do not have to stop.
LOS C	Delay of 20 to 35 seconds. The number of vehicles stopping is significant, although many still pass through without stopping.
LOS D	Delay of 35 to 55 seconds. The influence of congestion is noticeable, and most vehicles have to stop.
LOS E	Delay of 55 to 80 seconds. Most, if not all, vehicles must stop and drivers consider the delay excessive.
LOS F	Delay of more than 80 seconds. Vehicles may wait through more than one cycle to clear the intersection.

Reference: *Highway Capacity Manual*, Transportation Research Board, 2000

Traffic Operation Standards

The City of Petaluma General Plan Policy 5-P-10 establishes the following criteria for level of service for motor vehicle travel.

Maintain an intersection level of service (LOS) standard for motor vehicle circulation that Petaluma General Plan 2025 ensures efficient traffic flow and supports multi-modal mobility goals. LOS should be maintained at Level D or better for motor vehicles due to traffic from any development project.

To evaluate the potential impact of conversion of protective-permissive left-turn phasing to either protective or permissive only operation service levels were calculated under current operating conditions and with the changes recommended in this evaluation. Where the changes would be expected to reduce service levels below LOS D during peak hours additional enhancement measures were considered.

Existing Conditions

Operating conditions during the a.m. and p.m. peak periods were evaluated to determine the conditions against which the changes would be measured. The morning peak hour occurs between 7:00 and 9:00 a.m. and reflects conditions during the home to work or school commute, while the p.m. peak hour occurs between 4:00 and 6:00 p.m. and typically reflects the highest level of congestion during the homeward bound commute.

Intersection Levels of Service

Under current operating conditions, all intersections are operating acceptably at LOS D or better. Conditions with the proposed changes to phasing were also evaluated, as discussed below. Copies of the Level of Service calculations are provided in Appendix A.

Intersection Evaluations

Field observations were made at each of the study intersections and included an assessment of sight lines, equipment placement and configurations, signal operation during peak hours and driver behavior. Typically the observations were conducted during the p.m. peak hour with the exception of locations that are near schools where the peak occurs during the afternoon dismissal times.

Presented in the following pages are the individual assessments of each of the 26 intersections evaluated as part of this project. Included in the assessments are photos of each intersection; a graphic depicting the existing left-turn signal phasing; and recommendations to retain the protective-permissive phasing, replace with protective only phasing, replace with permissive only phasing, or convert to split-phasing. Further, analysis and experience anticipating driver behavior highlighted the need to retain protected phasing of some sort where there is a separate signal head on a mastarm in front of a dedicated left-turn pocket. One of the three types of phasing that provide protection was recommended in lieu of permissive left-turn phasing for this condition. Operating conditions with the recommended change in phasing was evaluated and compared to current operation to confirm that acceptable levels of service could be retained at each intersection.

Stony Point Road/Industrial Avenue/Petaluma Boulevard North

Existing Conditions: Petaluma Boulevard North has protective left-turn phasing and Stony Point Road and Industrial Avenue have PPLT phasing as shown in the aerial-based graphic below. There are two protective-permissive indications for left turns, a five-section “Doghouse” mounted on the end of the signal mast arm and a five-section stacked head top-mounted on a 1B pole.

Field Observations: Stony Point Road and Industrial Avenue intersect Petaluma Boulevard North at angles other than 90 degrees. Of the two streets the angle of Industrial Avenue is more acute. This restricts the lines of sight in both directions to a less than desirable level.

Recommendations: It is recommended that the PPLT phasing on Stony Point Road and Industrial Avenue be replaced with protective left-turn phasing because of misalignment of these streets and limited sight lines. This change will be constructed as part of the Old Redwood Highway Interchange project, which is currently under construction.

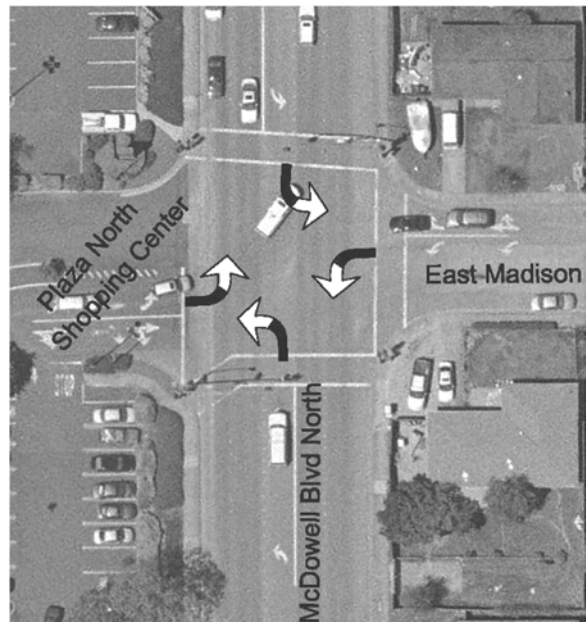
Operational Analysis: This intersection currently operates at LOS C during both the a.m. and p.m. peak hours with 28.6 and 29.2 seconds of delay respectively. Operation with the conversion to PPLT for Stony Point Road-Industrial Avenue will remain at LOS C. There will be a slight improvement in performance during the a.m. peak hour with 26.7 seconds of delay and a slight increase in delay to 30.4 seconds during the p.m. peak hour.

McDowell Boulevard/East Madison Street

Existing Conditions: As shown on the aerial, McDowell Boulevard and East Madison Street both have protective-permissive left-turn phasing. McDowell Boulevard has a single left-turn lane, a through lane and a shared through-right turn lane for both the northbound and southbound approaches. East Madison Street has a left-turn and shared through/right-turn lanes in both directions. There are two protective-permissive indications for the left-turns, a five-section “Doghouse” mounted on the end of the signal mast arm and a five-section stacked head top-mounted on a IB pole. There are two stacked five-section heads mounted on IB poles as there are no mast arm mounted indications for the East Madison Street approaches.



Field Observations: A review of collisions at this intersection showed that the number of collisions involving left-turning vehicles on McDowell Boulevard North and East Madison Street are below the threshold that indicates a concentration of left-turn crashes.



Based upon an assessment of the potential conflicting movements during both the morning and evening peak hours using 2005 traffic volumes data, it appears that the East Madison Street approaches should be operated as permissive only. There are too few potential conflicts to justify protective-permissive operation or protective only operation.

Recommendations: It is recommended, therefore, that the PPLT phasing on East Madison Street be replaced with permissive only phasing, but the PPLT phasing should be retained on McDowell Boulevard North using FYA indications.

LEGEND

-  Protective Left-Turn
-  Protective-Permissive Left-Turn
-  Permissive Left-Turn



It is also recommended that a mast arm signal pole be installed on the northwesterly corner facing East Madison Street as the current signal locations are outside the motorist's normal 20-degree cone of vision.

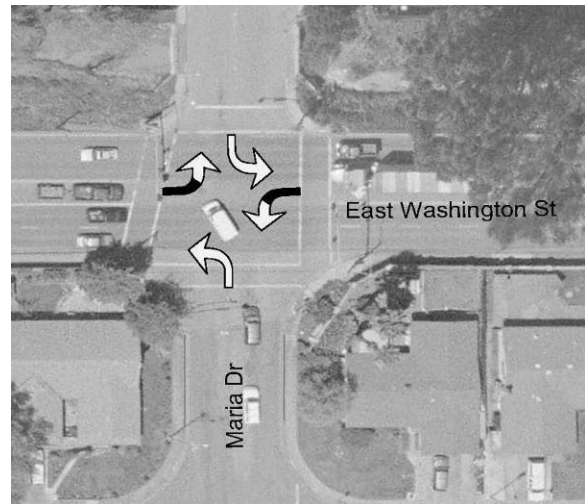
Operational Analysis: This intersection currently operates at LOS B during both the a.m. and p.m. peak hours with an average of 12.0 and 16.7 seconds of delay respectively. There will be no change in the level of service with the conversion to permissive left-turn phasing on East Madison Street. There will be a slight decrease in performance during both peak hours as average delay will increase to 12.2 seconds during the a.m. peak hour and 17.7 seconds during the p.m. peak hour.

Maria Drive/East Washington Street

Existing Conditions: East Washington Street has protective-permissive left-turn phasing while Maria Drive has permissive only (see graphic below for existing left-turn phasing). There are two protective-permissive indications for both the eastbound and westbound left-turns, a five-section "Doghouse" mounted on the end of the signal mast arm and a five-section stacked head top-mounted on a 1B pole.



Field Observations: The posted speed limit on East Washington Street is 35 mph. For the purposes of this review 5 mph over the posted limit was used as the design speed to determine desired sight distance. Sight lines exceed 320 feet, so the sight distance criterion is met.



This intersection has a higher than expected collision experience involving left-turning vehicles on the eastbound and westbound approaches.

Recommendations: It is recommended that the PPLT phasing on East Washington Street be replaced with protective left-turn phasing because of the number of left-turn related collisions.

Operational Analysis: This intersection currently operates at LOS B during both the a.m. and p.m. peak hours with 10.7 and 14.0 seconds of delay respectively, and will remain at LOS B with the recommended change in phasing. Average delay will increase during the a.m. peak hour to 12.4 seconds; no change in delay is projected during the p.m. peak hour.



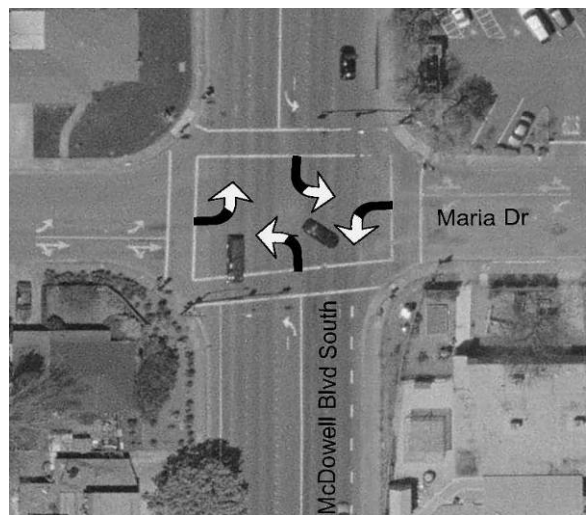
McDowell Boulevard South/Maria Drive

Existing Conditions: As shown on the diagram below, McDowell Boulevard South and Maria Drive both have protective-permissive left-turn phasing. McDowell Boulevard South has a single left-turn lane, a through lane and a shared through/right-turn lane on both approaches. Maria Drive has a left-turn lane and a shared through/right-turn lane in both directions. There are two protective-permissive indications for the left-turns, a five-section “Doghouse” mounted on the end of the signal mast arm and a five-section stacked head top-mounted on a IB pole. There are two stacked five-section heads mounted on IB poles for the Maria Drive approaches where there are no mast arm mounted indications.




Field Observations: The posted speed limit on East Washington Street is 35 mph. Sight lines exceed 320 feet, so are adequate for a design speed of 40 mph. A review of collisions at this intersection showed that the number of collisions involving left-turning vehicles on McDowell Boulevard South and Maria Drive are below the threshold that indicates a concentration of left-turn crashes.

Recommendations: It is recommended that the PPLT phasing be retained on McDowell Boulevard South, though FYA heads should be used in lieu of the current doghouse style. Based upon an assessment of the potential conflicting movements during both the morning and evening peak hours, the Maria Drive approaches should be operated as permissive only. There are too few potential conflicts to justify protective-permissive operation or protective only operation. It is recommended, therefore, that the PPLT phasing be replaced with permissive only phasing.

Operational Analysis: This intersection currently operates at LOS C during both the a.m. and p.m. peak hours with 26.0 and 20.7 seconds of delay respectively. There will be a slight increase in average delay during the a.m. peak hour to 34.1 seconds and 21.5 seconds during the p.m. peak hour, but operation will remain at LOS C.



LEGEND

-  Protective Left-Turn
-  Protective-Permissive Left-Turn
-  Permissive Left -Turn

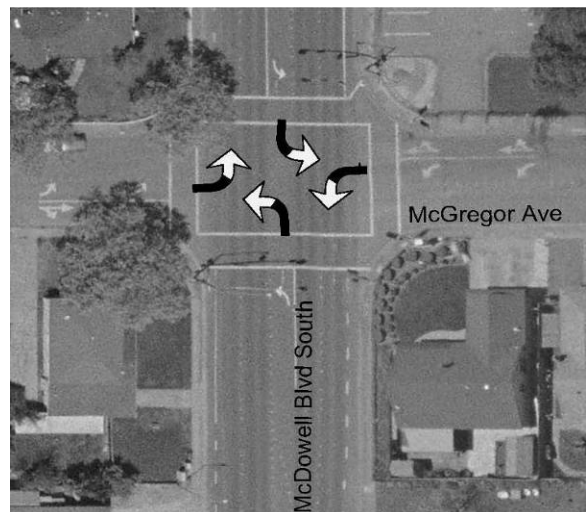
McDowell Boulevard South/McGregor Avenue

Existing Conditions: Both McDowell Boulevard South and MacGregor Avenue have protective-permissive left-turn phasing, as indicated on the diagram below. McDowell Boulevard South has a single left-turn lane, a through lane and a shared through/right-turn lane on each approach. McGregor Avenue has a left-turn lane and a shared through/right-turn lane in both directions. There are two protective-permissive indications for the left-turns, a five-section “Doghouse” mounted on the end of the signal mast arm and a five-section stacked head top-mounted on a 1B pole. There are two stacked five-section heads mounted on 1B poles for both McGregor Avenue approaches as there are no mast arm mounted indications.




Field Observations: The posted speed limit on East Washington Street is 35 mph. Based on a 40-mph design speed, sight lines of at least 320 feet are needed, and this criterion is met. A review of collisions at this intersection showed that the number of collisions involving left-turning vehicles on McDowell Boulevard South and McGregor Avenue are below the threshold that indicates a concentration of left-turn crashes.

Recommendations: It is recommended that the PPLT phasing be retained on McDowell Boulevard South using FYA indications. Based upon an assessment of the potential conflicting movements during both the morning and evening peak hours, it is recommended that the McGregor Avenue approaches be converted from PPLT phasing to permissive only. There are too few potential conflicts to justify protective-permissive operation or protective only operation.

Operational Analysis: This intersection currently operates at LOS C during both the a.m. and p.m. peak hours with an average of 31.2 and 30.9 seconds of delay respectively. The level of service with the conversion to permissive left-turn phasing on McGregor Avenue will remain at LOS C, with a slight reduction in delay during the a.m. peak hour to 25.5 seconds and a slight increase in delay to 29.6 seconds during the p.m. peak hour.



LEGEND

-  Protective Left-Turn
-  Protective-Permissive Left-Turn
-  Permissive Left -Turn

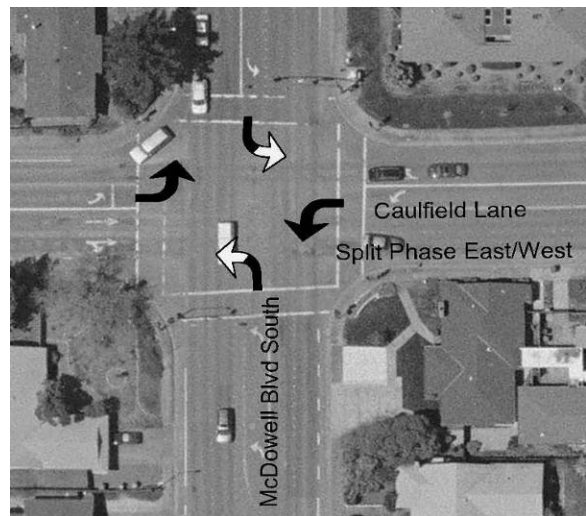
McDowell Boulevard South/Caulfield Lane

Existing Conditions: McDowell Boulevard South has recently been reconfigured as part of the Road Diet project. It has a single left-turn lane, a through lane and a right-turn lane on each approach. There are two protective-permissive indications for the left-turns; a five-section “Doghouse” mounted on the end of the signal mast arm and a five-section stacked head top-mounted on a IB pole.




Field Observations: Caulfield Lane is split-phased. Sight lines from the left-turn lanes on McDowell Boulevard South exceed the distance needed for the 5.5-second criterion. A review of collisions at this intersection showed that the number of collisions involving left-turning vehicles on McDowell Boulevard South is below the threshold that indicates a concentration of left-turn crashes. The number of collisions involving northbound-southbound left-turns has dropped since the road diet project reduced the number of through lanes on McDowell Boulevard.

Recommendations: It is recommended that the PPLT phasing be retained on McDowell Boulevard South using FYA heads in lieu of the existing doghouse style.

Operational Analysis: This intersection will continue to operate at LOS D during both the a.m. and p.m. peak hours with 54.3 and 45.2 seconds of delay respectively.



LEGEND

-  Protective Left-Turn
-  Protective-Permissive Left-Turn
-  Permissive Left -Turn

Lakeville Street/East Washington Street

Existing Conditions: East Washington Street has protective-permissive left-turn phasing while Lakeville Street is split-phased, as indicated on the aerial below. There are two protective-permissive indications for both the eastbound and westbound left-turns, a five-section “Doghouse” mounted on the end of the signal mast arm and a five-section stacked head side-mounted.

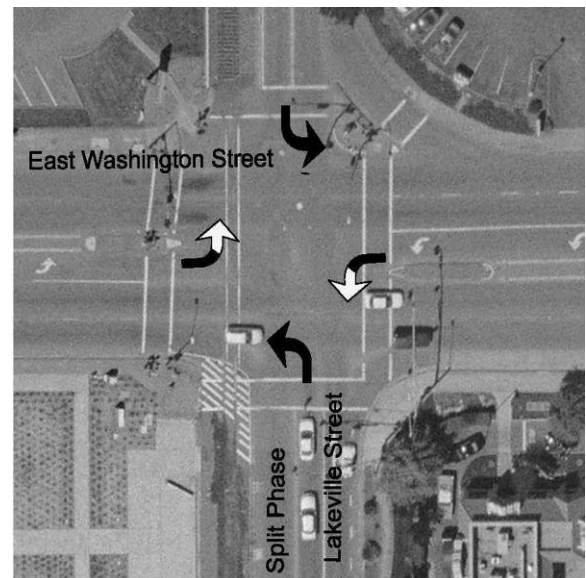
Field Observations: The posted speed limit on East Washington Street is 30 mph. Sight lines exceed 285 feet, so the 5.5-second sight distance criterion is met for a design speed of 40 mph.

This intersection is unique as the Northwest Pacific Railroad tracks pass through its western leg. Protective-permissive left turn phasing can complicate motorist decision making when railroad pre-emption is initiated and track clearance intervals commence.




This intersection has a higher than expected collision experience involving left-turning vehicles on the eastbound and westbound approaches.

Recommendations: It is recommended that East Washington Street be converted from PPLT to protective only left-turn phasing.

Operational Analysis: This intersection currently operates at LOS C during the a.m. peak hour and LOS D during p.m. peak hour with average delays of 32.0 and 39.0 seconds respectively. The level of service with the conversion to protective left-turn phasing on East Washington Street will remain at LOS C during the a.m. peak hour and LOS D during the p.m. peak hour. There will be a slight increase in delay, going to 34.3 seconds on average during the a.m. peak hour and 42.4 seconds during the p.m. peak hour.



LEGEND

-  Protective Left-Turn
-  Protective-Permissive Left-Turn
-  Permissive Left -Turn

Petaluma Boulevard North/Magnolia Avenue

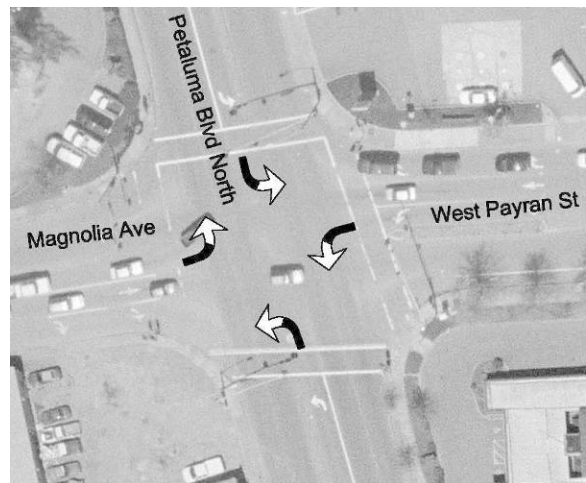
Existing Conditions: Petaluma Boulevard North has protective-permissive left turn phasing, as do the Payran Street and Magnolia Avenue approaches. There are two protective-permissive indications for all four left-turns, a five-section “Doghouse” mounted on the end of the signal mast arm and a five-section stacked head top mounted on a 1B pole. Both Magnolia Avenue and Payran Street have dedicated right-turn lanes with overlap phasing.

Field Observations: Petaluma Boulevard North has a straight horizontal alignment while Magnolia Avenue and Payran Street have curves within 500 feet of the intersection. Both Magnolia Avenue and Payran Street transition from a single lane to a left-turn lane, through lane and right-turn lane at the intersection. Taking the curvature and the flaring of the lanes into account adds a level of uncertainty when anticipating the intentions of approaching motorists.

This intersection has a higher than expected collision experience involving left-turning vehicles.

Recommendations: Based upon the high number of collisions involving left-turning vehicles together with the alignment and flared lane conditions on Magnolia Avenue and Payran Street, it is recommended that the PPLT phasing be replaced with protective only left-turn phasing on all four intersection approaches.

Operational Analysis: This intersection currently operates at LOS C during the a.m. and p.m. peak hours with an average of 29.9 and 31.2 seconds of delay respectively. The level of service with the conversion to protective left turn phasing will decrease to LOS D during the a.m. and p.m. peak hours with delays of 44.1 seconds and 44.5 seconds respectively. Although the service level decreases to LOS D it remains within the acceptable standards set by the City.



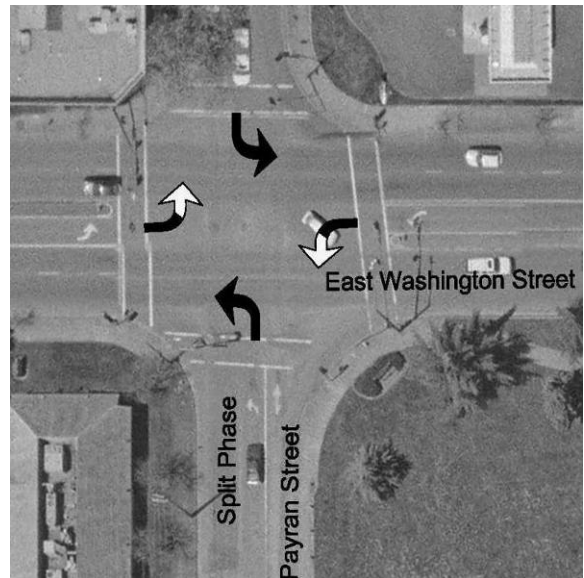
Payran Street/East Washington Street

Existing Conditions: The diagram below shows graphically that East Washington Street has protective-permissive left turn phasing while Payran Street is split-phased. There are two protective-permissive indications for both the eastbound and westbound left-turns, a five-section “Doghouse” mounted on the end of the signal mast arm and a five-section stacked head top-mounted on a 1B pole.

Field Observations: The posted speed limit on East Washington Street is 30 mph. Sight lines exceed 285 feet, so the 5.5-second sight distance criterion is met for a design speed of 35 mph. A review of collisions at this intersection showed that the number of collisions involving left-turning vehicles on East Washington Street is above the threshold that indicates a concentration of left-turn crashes.

Recommendations: It is recommended that the PPLT phasing be replaced with protective only phasing on East Washington Street at this location.

Operational Analysis: This intersection currently operates at LOS D during both the a.m. and p.m. peak hours with averages of 36.3 and 38.5 seconds of delay respectively. With the recommended conversion the intersection will continue to operate at LOS D with 39.4 and 42.1 seconds of delay during the a.m. and p.m. peak hours.



Ellis Street/East Washington Street

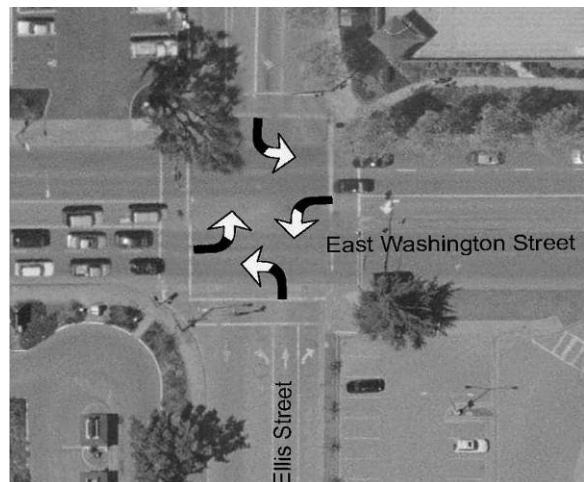
Existing Conditions: East Washington Street has protective-permissive left turn phasing while Ellis Street-Fair Grounds is permissive only. The protective-permissive indications for both the eastbound and westbound left-turns include a five-section “Doghouse” mounted on the end of the signal mast arm and a five-section stacked head top-mounted on a 1B pole.

Field Observations: Based on a design speed of 35 mph, which is 5 mph above the posted speed limit, the available sight lines which exceed 285 feet are adequate to meet the sight distance criterion.




A review of collisions at this intersection showed that the number of collisions involving left-turning vehicles on East Washington Street is below the threshold that indicates a concentration of left-turn crashes. This intersection does have a lower but similar collision pattern to the adjacent intersection of East Washington Street/Payran Street.

Recommendations: It is recommended that the PPLT phasing be replaced with protective only phasing at this location to be consistent with the other intersections along the East Washington Street corridor. This change will be constructed as part of the Regency Shopping Center project.

Operational Analysis: This intersection currently operates at LOS B during both the a.m. and p.m. peak hours with an average of 18.9 and 15.4 seconds of delay respectively. With the recommended conversion the intersection will continue to operate at LOS C with an average of 23.0 seconds of delay during the a.m. peak hour and LOS B with 19.5 seconds of delay during the p.m. peak hour.



LEGEND

-  Protective Left-Turn
-  Protective-Permissive Left-Turn
-  Permissive Left -Turn

McDowell Boulevard North/Lynch Creek Way

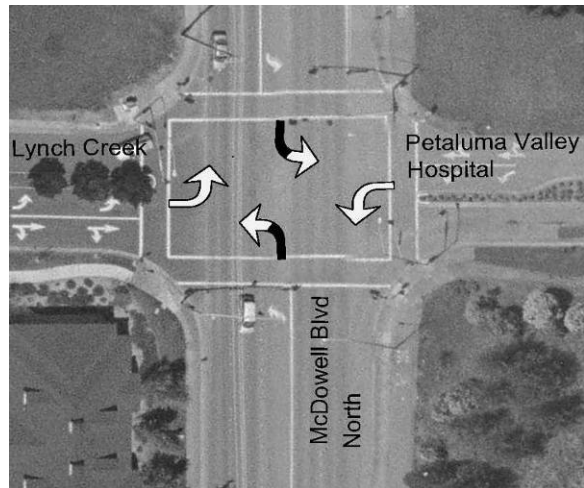
Existing Conditions: McDowell Boulevard North has protective-permissive left-turn phasing while Lynch Creek has permissive left-turn phasing, as shown on the diagram below. There are two protective-permissive indications for both the northbound and southbound left-turns, a five-section “Doghouse” mounted on the end of the signal mast arm and a five-section stacked head top-mounted on a 1B pole.

Field Observations: The posted speed limit on McDowell Boulevard is 40 mph to the north and 30mph to the south. Using a design speed 5 mph higher than the posted speed limits, sight lines of 360 feet and 280 feet are needed, and available, so the sight distance criteria are met.




A review of collisions at this intersection showed that the number of collisions involving left-turning vehicles on McDowell Boulevard North is below the threshold that indicates a concentration of left-turn crashes.

Recommendations: Because the southbound approach speeds on McDowell Boulevard North exceed the 45 mph threshold, it is recommended that the PPLT phasing be replaced with protective only left-turn phasing for McDowell Boulevard North.

Operational Analysis: This intersection currently operates at LOS A during both the a.m. and p.m. peak hours with averages of 7.7 and 9.2 seconds of delay respectively. The level of service with the conversion to protected phasing for McDowell Boulevard North will result in LOS B operation and 12.2 seconds of delay on average during the a.m. peak hour, but LOS A will be retained during the p.m. peak hour with 9.3 seconds of delay.



LEGEND

-  Protective Left-Turn
-  Protective-Permissive Left-Turn
-  Permissive Left -Turn

North Webster Street/Bodega Avenue

Existing Conditions: Bodega Avenue has protective-permissive left-turn phasing while North Webster Street is permissive only. The protective-permissive indications on Bodega Avenue are four-section Bi-Modal (Green/Yellow Arrow) heads.

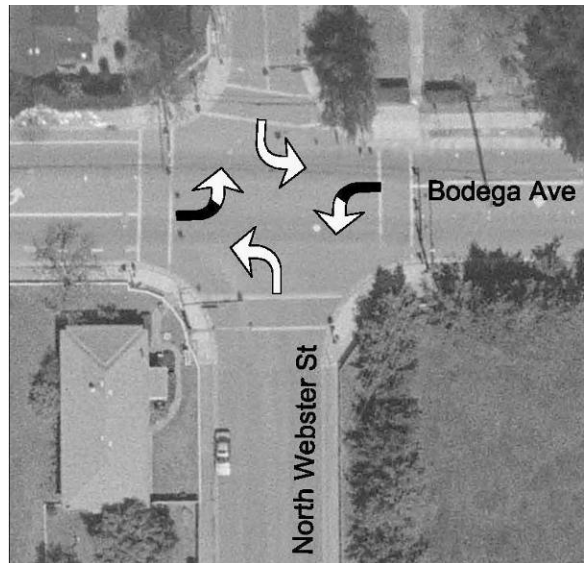
Field Observations: This intersection is adjacent to Valley Vista Elementary School and peak traffic occurs during pick-up and drop-off times.

Sight lines exceed 280 feet, so the sight distance criterion is met for the design speed of 35 mph.

A review of collisions at this intersection showed that the number of collisions involving left-turning vehicles on Bodega Avenue is below the threshold that indicates a concentration of left-turn crashes.

Recommendations: It is recommended that the PPLT phasing be retained at this location, though the heads should be swapped out to switch to FYA operation.

Operational Analysis: This intersection will continue to operate at LOS C during the a.m. peak hour with 33.7 seconds of delay on average and LOS B during the p.m. peak hour with 10.4 seconds of delay.



McDowell Boulevard North/Community Center

Existing Conditions: McDowell Boulevard North as well as Community Center have protective-permissive left turn phasing (see diagram below). The northbound and southbound left turns each have a five-section “Doghouse” mounted on the end of the signal mast arm and a five-section stacked head mounted atop a 1B pole. The indications for the Community Center and Shopping center access are four-section Bi-Modal (Green/ Yellow Arrow) heads.

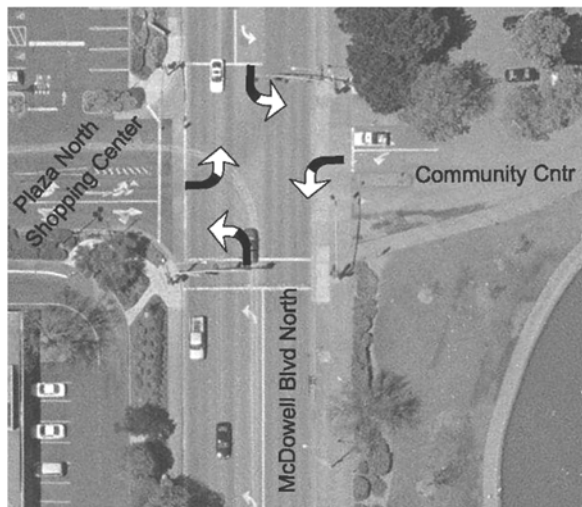
Field Observations: The posted speed limit on McDowell Boulevard is 30 mph, but for a design speed of 35 mph the required sight distance is 280 feet. Sight lines exceed 280 feet so the sight distance criterion is met.

A review of collisions at this intersection showed that the number of collisions involving left-turning vehicles on McDowell Boulevard North and the Community Center driveway are below the threshold that indicates a concentration of left-turn crashes.




Recommendations: It is recommended that the PPLT phasing on be retained on both McDowell Boulevard and Community Center, though the indications should be changed to the FYA type.

Based upon an assessment of the potential conflicting movements during both the morning and evening peak hours, the Community Center-Plaza North Shopping Center approaches should be operated as permissive only. There are too few potential conflicts to justify protective-permissive operation or protective only operation. It is recommended, therefore, that the PPLT phasing be replaced with permissive only phasing for Community Center-Plaza North Shopping Center.

Operational Analysis: This intersection currently operates at LOS A during the a.m. and LOS C during the p.m. peak hours with 1.8 and 20.4 seconds of delay respectively. The level of service with the conversion to PPLT to permissive operation for the Community Center will remain at LOS A during the a.m. peak hour and will improve to LOS B during the p.m. peak hour. There will be a slight change in performance during the a.m. peak hour with 2.6 seconds of delay and 15.9 seconds during the p.m. peak hour.



LEGEND

-  Protective Left-Turn
-  Protective-Permissive Left-Turn
-  Permissive Left -Turn

McDowell Boulevard North/Rainier Avenue

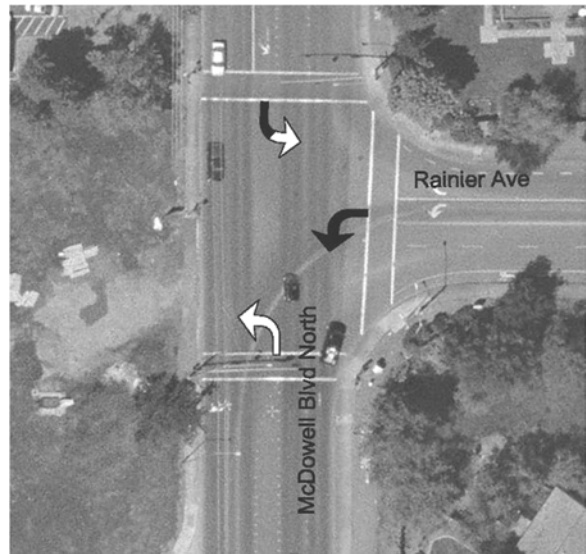
Existing Conditions: McDowell Boulevard North has protective-permissive left-turn phasing while Rainier Avenue has only a single approach, so operates as if split-phased. There are five-section “Doghouse” heads mounted on the end of the signal mast arms and five-section stacked heads mounted on a 1B poles for both the northbound and southbound left turns.

Field Observations: The posted speed limit on McDowell Boulevard North is 40 mph, and sight lines exceed the 360 feet needed for a 45-mph design speed.




The number of collisions involving left-turning vehicles on McDowell Boulevard North was found to be below the threshold that indicates a concentration of left-turn crashes.

Recommendations: Because the southbound approach speeds on McDowell Boulevard North exceed the 45 mph threshold it is recommended that the PPLT phasing be replaced with protective only left-turn phasing. This change will be completed as part of the off-site improvements for a nearby development project.

Operational Analysis: This intersection currently operates at LOS A during the a.m. peak hour and LOS B during the p.m. peak hour with 9.1 and 10.0 seconds of delay on average respectively. With the recommended change to protective left-turn phasing on McDowell Boulevard North, LOS B operation is expected during both peaks with average delays of 10.0 and 11.8 seconds respectively.



LEGEND

-  Protective Left-Turn
-  Protective-Permissive Left-Turn
-  Permissive Left -Turn

Petaluma Boulevard North/Sycamore Lane

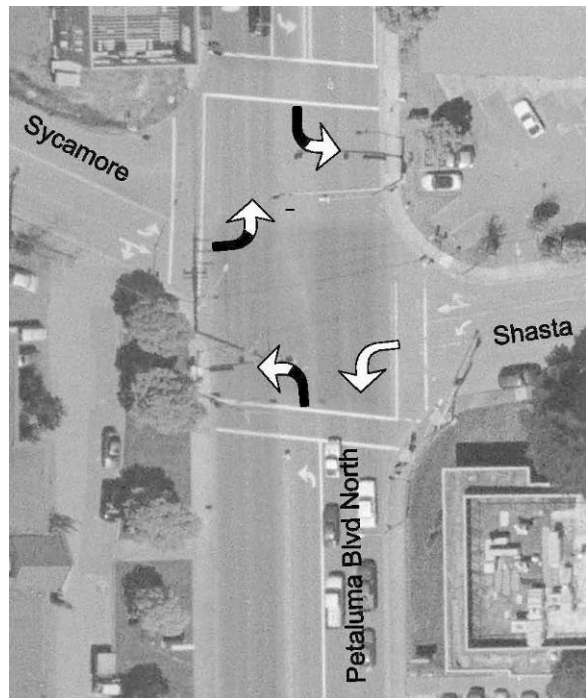
Existing Conditions: As shown in the diagram below, both Petaluma Boulevard North and Sycamore Lane have protective-permissive left-turn phasing, while Shasta Avenue has permissive only phasing. There are two protective-permissive indications for the left-turns, including a five-section “Doghouse” mounted on the end of the signal mast arm and a five-section stacked head top-mounted on a 1B pole.

Field Observations: The number of collisions involving left-turning vehicles on Petaluma Boulevard North is below the threshold that indicates a concentration of left-turn crashes.

Shasta Avenue and Sycamore Lane intersect at Petaluma Boulevard North at angles less than 90 degrees. Of the two streets the angle of Sycamore Lane is more acute. This restricts the lines of sight in both directions to a less than desirable level. The sight lines along Petaluma Boulevard North from both side streets exceed the desired amount to provide 5.5-second sight lines.

Recommendations: It is recommended that the PPLT phasing on Sycamore Lane and permissive phasing on Shasta Avenue be replaced with split-phase operation, while the PPLT on Petaluma Boulevard North should be retained, though the indications should be changed to use the FYA heads.

Operational Analysis: This intersection currently operates at LOS A during both the a.m. p.m. peak hours with 8.6 and 7.6 seconds of average delay respectively. With the conversion to split phasing the intersection will continue to operate at LOS A during the a.m. and p.m. peak hours with 9.4 and 7.8 seconds of delay during the a.m. and p.m. peak hours respectively.



McDowell Boulevard North/Redwood Way

Existing Conditions: All approaches to the intersection at McDowell Boulevard North/Redwood Way have protective-permissive left-turn phasing controlled by a five-section “Doghouse” mounted on the end of the signal mast arm and a five-section stacked head top mounted on a IB pole.

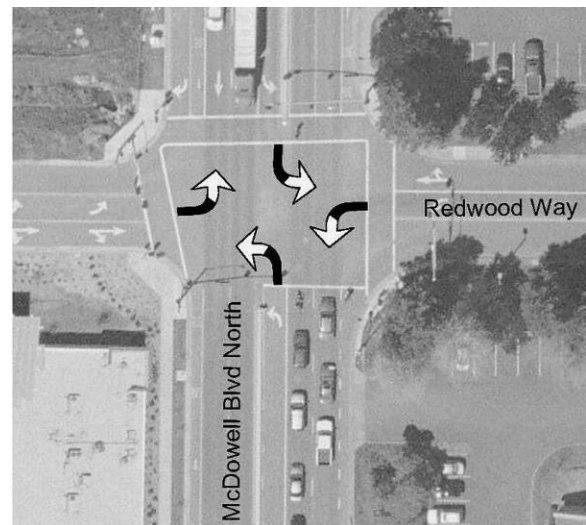
Field Observations: Sight lines exceed 360 feet, which meets the sight distance criterion based on a posted speed limit of 40 mph and a design speed of 45 mph. Speeds on the McDowell Boulevard North approaches generally exceed 45 mph.

There were an insufficient number of collisions involving left-turning vehicles on McDowell Boulevard North and Redwood Way to indicate a concentration of left-turn crashes.




The Redwood Way approach does not meet the minimum volume of left-turn and opposing traffic to justify protective-permissive or protective only phasing.

Recommendations: It is recommended that the PPLT on the McDowell Boulevard approaches be replaced with protective phasing, while the Redwood Way approaches should have retain the PPLT phasing, but with FYA indications in lieu of the stacked five-section heads.

Operational Analysis: This intersection currently operates at LOS B during both the a.m. p.m. peak hours with averages of 14.0 and 13.2 seconds of delay respectively. The levels of service with the conversion will be unchanged, though average delay will increase slightly during the morning peak hour to 17.3 seconds and decrease slightly to 11.8 seconds during the p.m. peak hour.



LEGEND

-  Protective Left-Turn
-  Protective-Permissive Left-Turn
-  Permissive Left -Turn

Petaluma Boulevard South/I Street

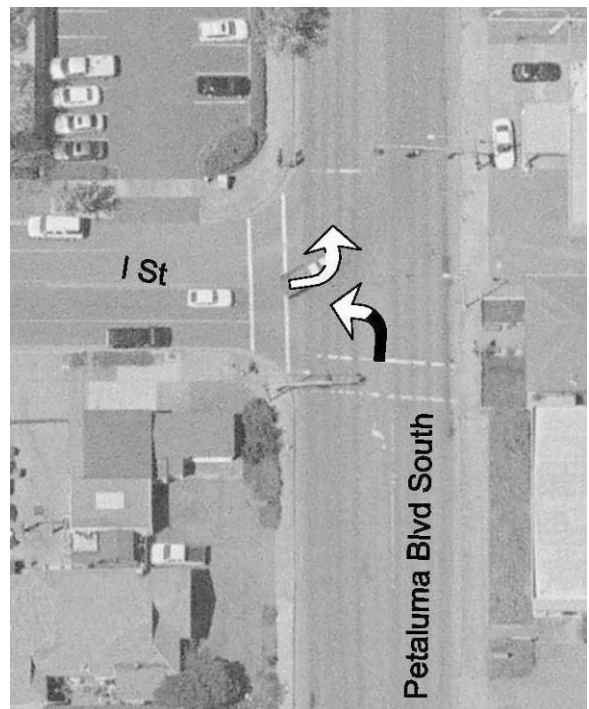
Existing Conditions: Petaluma Boulevard South at I Street is a “Tee” intersection with protective-permissive phasing in the northbound direction on Petaluma Boulevard South indicated by a five-section “Doghouse” mounted on the end of the signal mast arm and a five-section stacked head top-mounted on a 1B pole.

Field Observations: Sight lines along Petaluma Boulevard South are adequate to provide more than the 280 feet needed to meet the 5.5-second criterion.

There were an insufficient number of collisions involving left-turning vehicles on Petaluma Boulevard South to indicate a concentration of left-turn crashes.

Recommendations: It is recommended that the PPLT phasing be retained at this location, though the signal indication should be changed to use a FYA.

Operational Analysis: This intersection will continue to operate at LOS A during both the a.m. and p.m. peak hours with averages of 7.6 and 6.9 seconds of delay respectively.



Petaluma Boulevard South/Mountain View Avenue

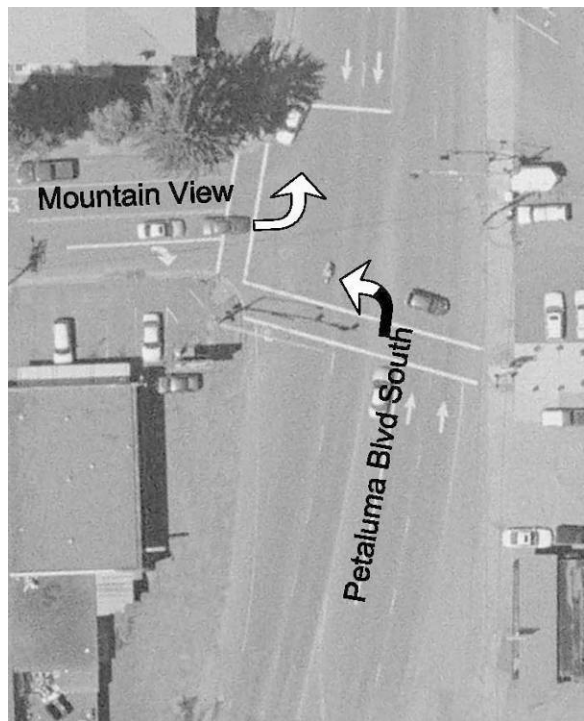
Existing Conditions: Petaluma Boulevard South at Mountain View Avenue is a “Tee” intersection with protective-permissive phasing in the northbound direction on Petaluma Boulevard South. The northbound left-turn has a five-section “Doghouse” indication mounted on the end of the signal mast arm and a five-section stacked head mounted atop a IB pole.

Field Observations: Sight lines along Petaluma Boulevard South are adequate to provide more than the 280 feet needed to meet the 5.5-second criterion.




A review of collisions at this intersection showed that the number of collisions involving left-turning vehicles on Petaluma Boulevard South is below the threshold that indicates a concentration of left-turn crashes.

Recommendations: It is recommended that the PPLT phasing be retained at this location through use of a FYA indication in lieu of the existing doghouse head.

Operational Analysis: This intersection will continue to operate at LOS B during the a.m. peak hour and LOS A during the p.m. peak hour with 10.3 and 5.9 seconds of average delay respectively.



LEGEND

-  Protective Left-Turn
-  Protective-Permissive Left-Turn
-  Permissive Left-Turn

Frates Road/Calle Rancho

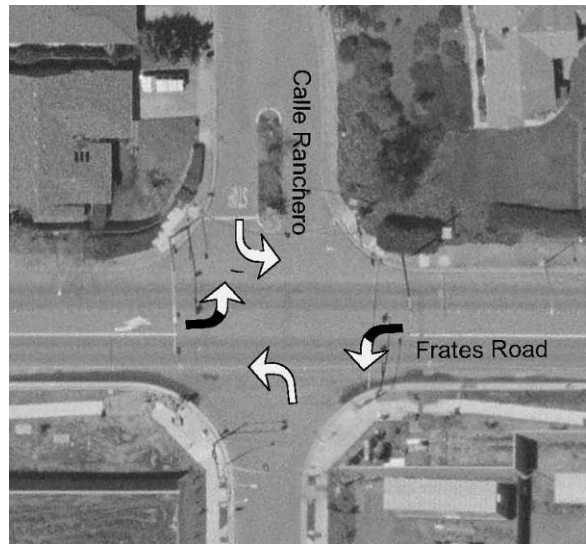
Existing Conditions: Frates Road has protective-permissive left turn phasing while Calle Rancho has permissive only phasing (see diagram below). There are two protective-permissive indications for both the northbound and southbound left-turns, a five-section “Doghouse” mounted on the end of the signal mast arm and a five-section stacked head mounted on a IB pole.

Field Observations: Based on the posted speed limit of 40 mph on Frates Road and a design speed of 45 mph, sight lines of 360 feet are needed. Field measurements indicate that the sight distance is adequate to meet this criterion.

A review of collisions at this intersection showed that the number of collisions involving left-turning vehicles on Frates Road is below the threshold that indicates a concentration of left-turn crashes.

Recommendations: It is recommended that the PPLT phasing be retained on Frates Road, but the existing five-section heads should be replaced by four-section FYA heads.

Operational Analysis: This intersection will continue to operate at LOS B during both the a.m. and p.m. peak hours with averages of 18.0 and 19.4 seconds of delay respectively.



Sonoma Mountain Parkway-Ely Boulevard/East Washington Street

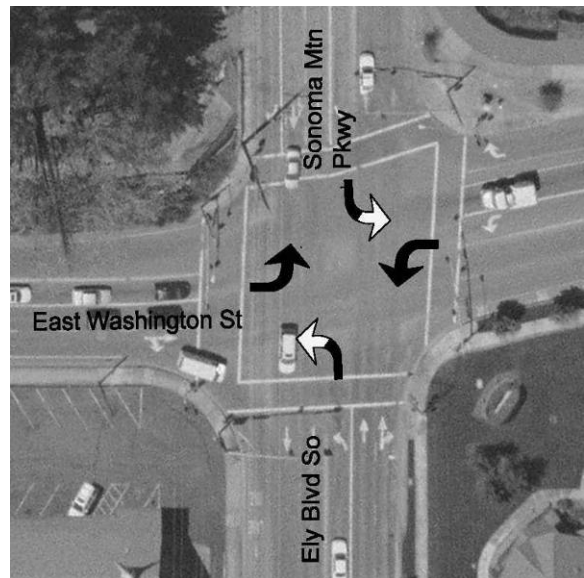
Existing Conditions: Sonoma Mountain Parkway-Ely Boulevard has protective-permissive left-turn phasing while East Washington Street has protective only phasing. A five-section “Doghouse” mounted on the end of the signal mast arm and a five-section stacked head top mounted on a 1B pole provide indications for each approach.

Field Observations: The posted speed limit on Sonoma Mountain Parkway and Ely Boulevard is 35 mph. Sight distance requirements were based on 40 mph, and actual sight lines exceed the 320 feet recommended for this speed.




A review of collisions at this intersection showed that the number of collisions involving left-turning vehicles on Sonoma Mountain Parkway-Ely Boulevard is above the threshold that indicates a concentration of left-turn crashes.

Recommendations: It is recommended that the PPLT phasing be replaced with protective only phasing on Sonoma Mountain Parkway-Ely Boulevard at East Washington Street.

Operational Analysis: This intersection currently operates at LOS D during both the a.m. and p.m. peak hours with averages of 42.7 and 40.1 seconds of delay respectively. With the recommended conversion the intersection will continue to operate at LOS D with 49.2 and 49.8 seconds of delay during the a.m. and p.m. peak hours.



LEGEND

-  Protective Left-Turn
-  Protective-Permissive Left-Turn
-  Permissive Left -Turn

Sonoma Mountain Parkway/Rainier Avenue

Existing Conditions: Both Sonoma Mountain Parkway and Rainier Avenue have protective-permissive left-turn phasing, as shown on the diagram below. These movements are controlled by five-section “Doghouse” heads mounted on the end of the signal mast arms and five-section stacked heads top mounted on IB poles.

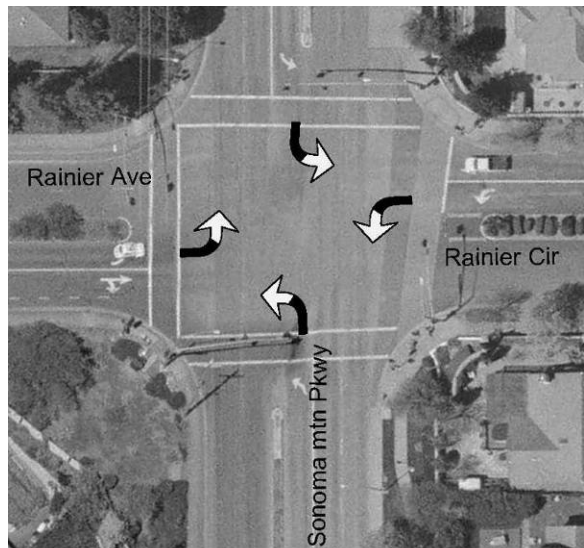
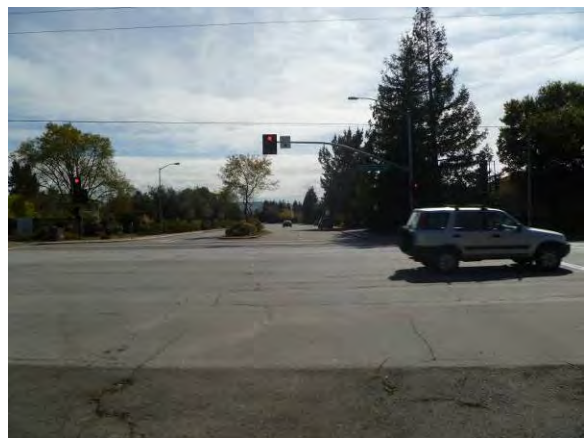
Field Observations: The posted speed limit on Sonoma Mountain Parkway is 40 mph while Rainier Avenue is posted at 35 mph. Sight lines exceed the 320 and 360 feet needed for 45 and 40 mph approach speeds respectively, so sight distances are adequate.

A review of collisions at this intersection showed that the numbers of collisions involving left-turning vehicles on Sonoma Mountain Parkway and Rainier Avenue are below the threshold that indicates a concentration of left-turn crashes.




The Sonoma Mountain Parkway approach speeds exceed the 45-mph threshold. The Rainier Avenue approaches do not meet the minimum volume of left-turn and opposing traffic to justify protective-permissive phasing.

Recommendations: It is recommended that the PPLT phasing be replaced on the Sonoma Mountain Parkway approaches, which should be converted to protective phasing while the Rainier Avenue approaches should retain the protective-permissive phasing with new FYA signal heads.

Operational Analysis: This intersection currently operates at LOS B during both the a.m. and p.m. peak hours with 12.9 and 14.0 seconds of average delay respectively. With the recommended conversion the intersection will continue to operate at LOS B with 12.4 and 12.6 seconds of delay during the a.m. and p.m. peak hours.



LEGEND

-  Protective Left-Turn
-  Protective-Permissive Left-Turn
-  Permissive Left -Turn

Bantam Way/Bodega Avenue

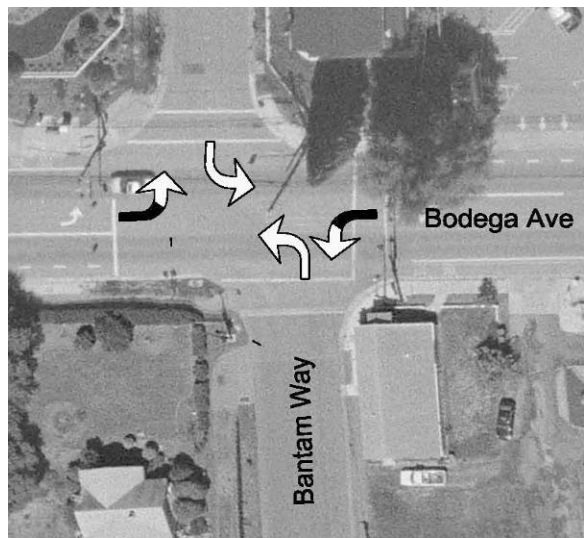
Existing Conditions: As indicated on the diagram below, Bodega Avenue has protective-permissive left-turn phasing while Bantam Way has permissive only. The protective-permissive indications on Bodega Avenue are four-section Bi-Modal (Green/Yellow Arrow) heads.

Field Observations: This intersection is adjacent to Petaluma Junior High School and peak traffic occurs during pick-up and drop-off times. Sight lines exceed 280 feet, so are adequate for a design speed of 40 mph (the posted speed limit is 35 mph).

A review of collisions at this intersection showed that the number of collisions involving left-turning vehicles on Bodega Avenue is below the threshold that indicates a concentration of left-turn crashes.

Recommendations: It is recommended that the PPLT phasing be retained at this location using FYA signal indications.

Operational Analysis: This intersection will continue to operate at LOS C during both peak hours with 29.5 and 24.2 seconds of delay during the a.m. and p.m. peak hours respectively.



McDowell Boulevard North/Southpoint Boulevard

Existing Conditions: McDowell Boulevard North and Southpoint Boulevard both have protective-permissive left-turn phasing as indicated on the diagram below. Each of the four left-turns has two indications; a five-section “Doghouse” mounted on the end of the signal mast arm and a five-section stacked head top-mounted on a 1B pole.

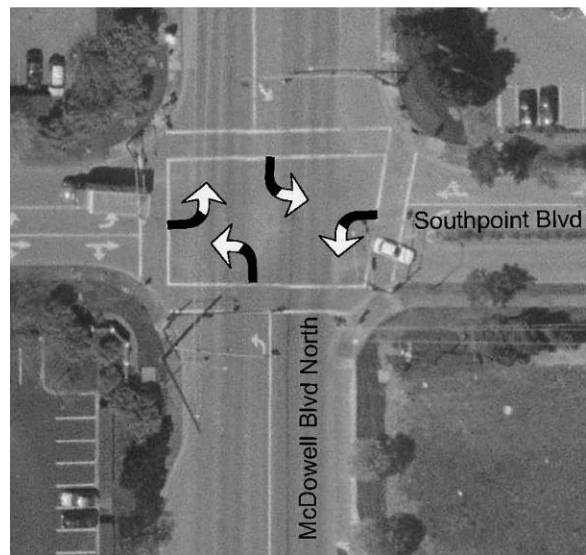
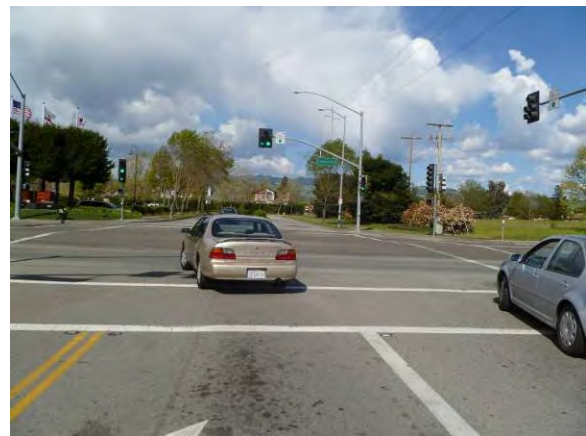
Field Observations: McDowell Boulevard North has a straight horizontal alignment while to the west Southpoint Boulevard has curves within 500 feet of the intersection. Southpoint Boulevard transitions from a single lane to three lanes at the intersection. Taking the curvature and the flaring of the lanes into account adds a level of uncertainty when anticipating the intentions of approaching motorists.

This intersection has a high collision experience involving left-turning vehicles on the northbound and southbound approaches.




Based upon an assessment of the potential conflicting movements during both the morning and evening peak hours the Southpoint Boulevard approaches should be operated as permissive only. There are too few potential conflicts to justify protective-permissive operation or protective only operation.

Recommendations: It is recommended that the PPLT phasing be replaced with protective only left-turn phasing on the McDowell Boulevard North approaches. It is also recommended that the PPLT phasing be replaced with permissive only phasing on the Southpoint Boulevard approaches.

Operational Analysis: This intersection currently operates at LOS B during the a.m. and LOS A during the p.m. peak hours with 13.4 and 8.7 seconds of delay respectively. With the recommended changes in phasing the intersection will operate at LOS B during both peak hours, with 11.2 seconds of average delay during the morning peak and 16.0 seconds during the p.m. peak hour.



LEGEND

-  Protective Left-Turn
-  Protective-Permissive Left-Turn
-  Permissive Left -Turn

Redwood Way/Old Redwood Highway

Existing Conditions: Old Redwood Highway has protective-permissive left turn phasing, as does Redwood Way. All approaches have the five-section “Doghouse” indication mounted on the end of the signal mast arms and a five-section stacked head mounted on a 1B pole.

Field Observations: Given the posted speed limit on Old Redwood Highway of 40mph and design speed of 45 mph, the minimum sight distance needed is 360 feet. Sight lines exceed 360 feet so the sight distance criterion is met; however, the 45 mph approach speeds exceed the threshold for PPLT phasing.

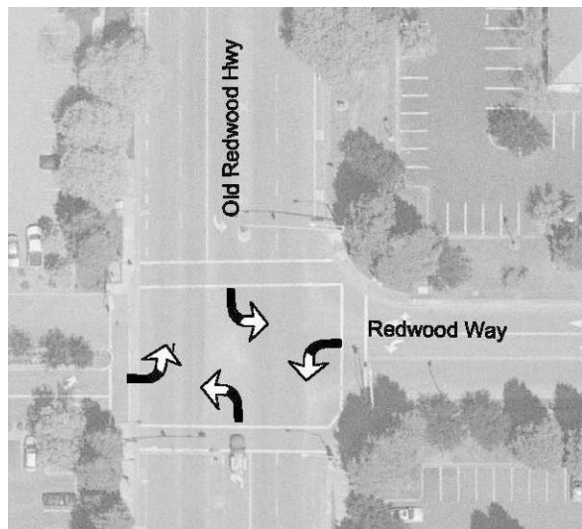
The numbers of collisions involving left-turning vehicles on Old Redwood Highway and Redwood Way are below the threshold that indicates a concentration of left-turn crashes.

It was observed that a high percentage of motorists using the left-turn lane in the eastbound direction made U-turns. This may be due in part to the shopping center on the northeasterly corner of McDowell Boulevard North/Old Redwood Highway and presence of medians that restrict left-turns onto McDowell Boulevard North and Old Redwood Highway.




Based upon an assessment of the potential conflicting movements during both the morning and evening peak hours, the Redwood Way approaches should be operated as permissive only. There are too few potential conflicts to justify protective-permissive operation or protective only operation.

Recommendations: It is recommended that the PPLT phasing be replaced with protective only left-turn phasing on the Old Redwood Highway approaches. It is also recommended that the PPLT phasing be replaced with permissive only phasing on the Redwood Way approaches.

Operational Analysis: This intersection currently operates at LOS A during the a.m. peak hour with 7.9 seconds of delay on average and LOS B during the p.m. peak hour with 14.5 seconds of delay. With the proposed change in phasing there will be no change to levels of service, though delay will change to 8.4 seconds during the a.m. peak hour and 11.1 seconds during the p.m. peak hour.



LEGEND

-  Protective Left-Turn
-  Protective-Permissive Left-Turn
-  Permissive Left -Turn

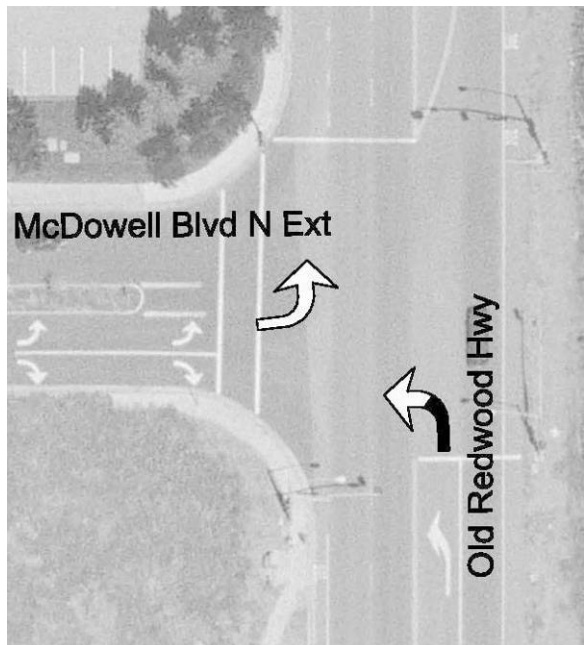
McDowell Boulevard North Extension/Old Redwood Highway

Existing Conditions: Old Redwood Highway has protective-permissive left-turn phasing in the northbound direction with indications consisting of a five-section “Doghouse” mounted on the end of the signal mast arm and a five-section stacked head mounted on a IB pole.

Field Observations: The posted speed limit on Old Redwood Highway is 45 mph. The 45-mph approach speeds exceed the threshold for PPLT phasing, though the number of collisions involving left-turning vehicles on Old Redwood Highway is below the threshold that indicates a concentration of left-turn crashes.

Recommendations: It is recommended that the PPLT phasing be replaced with protective only phasing on Old Redwood Highway.

Operational Analysis: This intersection currently operates at LOS A during the a.m. peak hour with 5.4 seconds of delay on average, and LOS B during the p.m. peak hour with 16.3 seconds of delay. The intersection is expected to operate at LOS A during both the a.m. and p.m. peak hours with the recommended phasing change, with average delays of 8.0 seconds and 3.7 seconds during the p.m. peak hours respectively.



Payran Street/Caulfield Lane

Existing Conditions: Caulfield Lane has protective-permissive phasing while Payran Street has permissive only (see diagram below). The protective-permissive indications include a five-section “Doghouse” mounted on the end of the signal mast arm and a five-section stacked head atop a 1B pole.

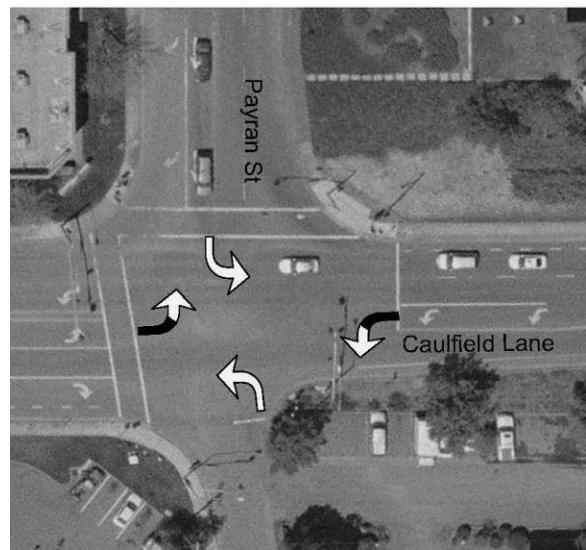
Field Observations: Sight line requirements were based on design speeds 5 mph over the posted speed limit, or 40 and 35 mph for the northbound and southbound approaches respectively. Available sight distance exceeds 360 feet to the south and 280 feet to the north, so the sight distance criterion is met.

There were an insufficient number of collisions involving left-turning vehicles on Caulfield Lane to indicate a concentration of left-turn crashes.




The segment of Caulfield Lane between Lakeville Street and Payran Street is less than 200 feet long. The short distance and lane changes by eastbound motorists can make it difficult for motorists in the westbound left-turn lane to anticipate the approaching vehicle’s movement.

Recommendations: It is recommended that the PPLT phasing on Caulfield Lane be replaced with protective only phasing.

Operational Analysis: This intersection currently operates at LOS B during both the a.m. and p.m. peak hours with averages of 17.0 and 18.4 seconds of delay respectively. There will be a slight change in performance with the recommended phasing change, resulting in LOS C operation and 20.6 seconds of delay during the a.m. peak hour and 22.3 seconds during the p.m. peak hour.



LEGEND

-  Protective Left-Turn
-  Protective-Permissive Left-Turn
-  Permissive Left -Turn

Summary

Summarized in Table 3 are the recommendations for each of the study intersections. Of the 26 intersections studied it is recommended that that protective-permissive left-turn phasing be retained at six. Replacement of the protective-permissive left-turn phasing with protective only phasing is recommended for eleven intersections. The recommendation for four intersections is to retain the protective-permissive left-turn phasing on the major approaches while replacing the protective-permissive left-turn phasing with permissive only phasing on the minor street approaches. Additionally, at four intersections the recommendation is to replace the protective-permissive left-turn phasing on the major approaches with protective only phasing together with replacing the protective-permissive left-turn phasing with permissive only phasing on the minor street approaches. Finally, for one intersection it is

recommended that the protective-permissive left-turn phasing on the major approach be retained while replacing the protective-permissive left-turn phasing with split-phasing on the minor street approaches.

The level of service and delay during the a.m. and p.m. peak hours for each of the 26 study intersections is summarized in Table 4. As can be seen in Table 4, little change would be experienced at most of the study intersections due to the proposed changes in phasing. However, Petaluma Boulevard North/Magnolia Avenue-West Payran Street is projected to drop from LOS C to LOS D during both the a.m. and p.m. peak hours with the removal of the protective-permissive left-turn phasing. Level of Service D is considered acceptable and no additional enhancements are proposed.

An improvement in overall performance at several intersections was noted. This is generally minor and is the result of removal of protective-permissive left-turn phasing that is not necessary and actually increases overall average delay.

**Table 3
Summary of Evaluation and Recommended Action**

Study Intersection	North/South						East/West							
	Collisions	Speed 45 or >	Sight Distance	Other	<2 veh/Cycle	Vo times Vlt	Recommended Action	Collisions	Speed 45 or >	Sight Distance	Other	<2 veh/Cycle	Vo times Vlt	Recommended Action
1. Stony Pt-Industrial/Petaluma Blvd		✓	✓				Prot	-	-	-	-	-	-	-
3. McDowell Blvd/E Madison St							Retain					✓	✓	Perm
4. Maria Dr/E Washington St	✓						Prot	-	-	-	-	-	-	-
5. McDowell Blvd S/Maria Dr							Retain					✓	✓	Perm
6. McDowell Blvd S/McGregor Ave							Retain					✓	✓	Perm
7. McDowell Blvd S/Caulfield Ln							Retain	-	-	-	-	-	-	-
10. Lakeville St/E Washington St	-	-	-	-	-	-	-	✓			✓			Prot
12. Petaluma Blvd N/Magnolia Ave	✓						Prot			✓	✓			Prot
19. Payran St/E Washington St	-	-	-	-	-	-	-	✓						Prot
20. Ellis St/E Washington St	-	-	-	-	-	-	-				✓			Prot
21. McDowell Blvd N/Lynch Creek		✓					Prot	-	-	-	-	-	-	-
22. N Webster St/Bodega Ave	-	-	-	-	-	-	-							Retain
24. McDowell/Community Ctr							Retain					✓	✓	Perm
26. McDowell Blvd N/Ranier Ave		✓					Prot	-	-	-	-	-	-	-
30. Petaluma Blvd N/Sycamore Ln							Retain							Split
31. McDowell Blvd N/Redwood		✓					Prot					✓	✓	Perm
33. Petaluma Blvd S/I St							Retain	-	-	-	-	-	-	-
34. Petaluma Blvd S/Mountain View							Retain	-	-	-	-	-	-	-
39. Frates Rd/Calle Ranchero							Retain	-	-	-	-	-	-	-
44. Sonoma Mtn Pkwy/Washington	✓						Prot	-	-	-	-	-	-	-
46. Sonoma Mtn Pkwy/Rainier Ave		✓					Prot					✓	✓	Perm
55. Bantam Wy/Bodega Ave	-	-	-	-	-	-	-							Retain
57. McDowell Blvd N/Southpoint	✓	✓					Prot					✓	✓	Perm
72. Redwood Wy/Old Redwood		✓					Prot					✓	✓	Perm
73. McDowell/Old Redwood Hwy		✓					Prot							
78. Payran St/Caulfield Ln											✓			Prot

Notes: Criteria Met = ✓; Retain = Retain Protective-Permissive Left-Turn; Prot = Replace with Protective Left-Turn; Perm = Replace with Permissive Left-Turn; Split = Replace with Split-phasing

Table 4
Summary of Existing Peak Hour Intersection Level of Service Calculations

Study Intersection	With PPLT				Without PPLT			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1. Stony Pt-Industrial/Petaluma Blvd N	28.6	C	29.2	C	28.7	C	30.4	C
3. McDowell Blvd/E Madison St	12.0	B	16.7	B	12.2	B	17.7	B
4. Maria Dr/E Washington St	10.7	B	14.0	B	12.4	B	14.0	B
5. McDowell Blvd S/Maria Dr	26.0	C	20.7	C	34.1	C	21.5	C
6. McDowell Blvd S/McGregor Ave	31.2	C	30.9	C	25.5	C	29.6	C
7. McDowell Blvd S/Caulfield Ln	54.3	D	45.2	D	-	-	-	-
10. Lakeville St/E Washington St	32.0	C	39.0	D	34.3	C	42.4	D
12. Petaluma Blvd N/Magnolia Ave	29.9	C	31.2	C	44.1	D	44.5	D
19. Payran St/E Washington St	36.3	D	38.5	D	39.4	D	42.1	D
20. Ellis St/E Washington St	18.9	B	15.4	B	23.0	C	19.5	B
21. McDowell Blvd N/Lynch Creek Way	7.7	A	9.2	A	12.2	B	9.3	A
22. N Webster St/Bodega Ave	33.7	C	10.4	B	-	-	-	-
24. McDowell Blvd N/Community Ctr	1.8	A	20.4	C	2.6	A	15.9	B
26. McDowell Blvd N/Rainier Ave	9.1	A	10.0	B	10.0	B	11.8	B
30. Petaluma Blvd N/Sycamore Ln	8.6	A	7.6	A	9.4	A	7.8	A
31. McDowell Blvd N/Redwood Way	14.0	B	13.2	B	17.3	B	11.8	B
33. Petaluma Blvd S/I St	7.6	A	6.9	A	-	-	-	-
34. Petaluma Blvd S/Mtn View Ave	10.3	B	5.9	A	-	-	-	-
39. Frates Rd/Calle Rancho	18.4	B	15.9	B	-	-	-	-
44. Sonoma Mtn Pkwy/E Washington	42.7	D	40.1	D	49.2	D	49.8	D
46. Sonoma Mtn Pkwy/Rainier Ave	12.9	B	14.0	B	12.4	B	12.6	B
55. Bantam Wy/Bodega Ave	29.5	C	24.2	C	-	-	-	-
57. McDowell Blvd N/Southpoint Blvd	13.4	B	8.7	A	11.2	B	16.0	B
72. Redwood Wy/Old Redwood Hwy	7.9	A	14.5	B	8.4	A	11.1	B
73. McDowell Blvd N/Old Redwood Hwy	5.4	A	16.3	B	8.0	A	3.7	A
78. Payran St/Caulfield Ln	17.0	B	18.4	B	20.6	C	22.3	C

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; PPLT = Protective/Permissive Left-turn phasing

Appendix B

Collision Rate Calculations



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Intersection Collision Rate Calculations

PET213

Intersection # 1: US 101 SB Ramp & Petaluma Blvd North
Date of Count: Thursday, February 23, 2017

Number of Collisions: 7
Number of Injuries: 4
Number of Fatalities: 0
ADT: 29600
Start Date: June 1, 2013
End Date: May 31, 2018
Number of Years: 5

Intersection Type: Tee
Control Type: Signals
Area: Urban

$$\text{collision rate} = \frac{\text{Number of Collisions} \times 1 \text{ Million}}{\text{ADT} \times 365 \text{ Days per Year} \times \text{Number of Years}}$$

$$\text{collision rate} = \frac{7}{29,600} \times \frac{1,000,000}{365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.13 c/mve	0.0%	57.1%
Statewide Average*	0.21 c/mve	0.3%	42.4%

ADT = average daily total vehicles entering intersection
 c/mve = collisions per million vehicles entering intersection
 * 2013 Collision Data on California State Highways, Caltrans

Intersection # 2: US 101 NB Ramp & Old Redwood Hwy
Date of Count: Thursday, February 23, 2017

Number of Collisions: 25
Number of Injuries: 13
Number of Fatalities: 1
ADT: 33200
Start Date: June 1, 2013
End Date: May 31, 2018
Number of Years: 5

Intersection Type: Tee
Control Type: Signals
Area: Urban

$$\text{collision rate} = \frac{\text{Number of Collisions} \times 1 \text{ Million}}{\text{ADT} \times 365 \text{ Days per Year} \times \text{Number of Years}}$$

$$\text{collision rate} = \frac{25}{33,200} \times \frac{1,000,000}{365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.41 c/mve	4.0%	52.0%
Statewide Average*	0.21 c/mve	0.3%	42.4%

ADT = average daily total vehicles entering intersection
 c/mve = collisions per million vehicles entering intersection
 * 2013 Collision Data on California State Highways, Caltrans

Intersection Collision Rate Calculaions

PET213

Intersection # 3: North McDowell Blvd & Old Redwood Hwy
Date of Count: Thursday, February 23, 2017

Number of Collisions: 47
Number of Injuries: 14
Number of Fatalities: 0
ADT: 31000
Start Date: June 1, 2013
End Date: May 31, 2018
Number of Years: 5

Intersection Type: Four-Legged
Control Type: Signals
Area: Urban

$$\text{collision rate} = \frac{\text{Number of Collisions} \times 1 \text{ Million}}{\text{ADT} \times 365 \text{ Days per Year} \times \text{Number of Years}}$$

$$\text{collision rate} = \frac{47}{31,000} \times \frac{1,000,000}{365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.83 c/mve	0.0%	29.8%
Statewide Average*	0.27 c/mve	0.4%	41.9%

ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2013 Collision Data on California State Highways, Caltrans

Intersection # 4: North McDowell Blvd & Corona Road
Date of Count: Wednesday, September 26, 2018

Number of Collisions: 27
Number of Injuries: 10
Number of Fatalities: 0
ADT: 33400
Start Date: June 1, 2013
End Date: May 31, 2018
Number of Years: 5

Intersection Type: Four-Legged
Control Type: Signals
Area: Urban

$$\text{collision rate} = \frac{\text{Number of Collisions} \times 1 \text{ Million}}{\text{ADT} \times 365 \text{ Days per Year} \times \text{Number of Years}}$$

$$\text{collision rate} = \frac{27}{33,400} \times \frac{1,000,000}{365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.44 c/mve	0.0%	37.0%
Statewide Average*	0.27 c/mve	0.4%	41.9%

ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2013 Collision Data on California State Highways, Caltrans

Intersection Collision Rate Calculaions

PET213

Intersection # 5: Petaluma Blvd North & Corona Road-Skillman Lane
Date of Count: Wednesday, September 26, 2018

Number of Collisions: 5
Number of Injuries: 2
Number of Fatalities: 0
ADT: 32300
Start Date: June 1, 2013
End Date: May 31, 2018
Number of Years: 5

Intersection Type: Four-Legged
Control Type: Signals
Area: Urban

$$\text{collision rate} = \frac{\text{Number of Collisions} \times 1 \text{ Million}}{\text{ADT} \times 365 \text{ Days per Year} \times \text{Number of Years}}$$

$$\text{collision rate} = \frac{5}{32,300} \times \frac{1,000,000}{365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.08 c/mve	0.0%	40.0%
Statewide Average*	0.27 c/mve	0.4%	41.9%

ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2013 Collision Data on California State Highways, Caltrans

Intersection # 6: McDowell Blvd & East Washington St
Date of Count: Wednesday, September 26, 2018

Number of Collisions: 59
Number of Injuries: 21
Number of Fatalities: 0
ADT: 46000
Start Date: June 1, 2013
End Date: May 31, 2018
Number of Years: 5

Intersection Type: Four-Legged
Control Type: Signals
Area: Urban

$$\text{collision rate} = \frac{\text{Number of Collisions} \times 1 \text{ Million}}{\text{ADT} \times 365 \text{ Days per Year} \times \text{Number of Years}}$$

$$\text{collision rate} = \frac{59}{46,000} \times \frac{1,000,000}{365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.70 c/mve	0.0%	35.6%
Statewide Average*	0.27 c/mve	0.4%	41.9%

ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2013 Collision Data on California State Highways, Caltrans

Intersection Collision Rate Calculaions

PET213

Intersection # 7: US 101 NB Ramp & East Washington St

Date of Count: Wednesday, September 26, 2018

Number of Collisions: 39

Number of Injuries: 21

Number of Fatalities: 0

ADT: 20300

Start Date: June 1, 2013

End Date: May 31, 2018

Number of Years: 5

Intersection Type: Tee

Control Type: Signals

Area: Urban

$$\text{collision rate} = \frac{\text{Number of Collisions} \times 1 \text{ Million}}{\text{ADT} \times 365 \text{ Days per Year} \times \text{Number of Years}}$$

$$\text{collision rate} = \frac{39 \times 1,000,000}{20,300 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	1.05 c/mve	0.0%	53.8%
Statewide Average*	0.21 c/mve	0.3%	42.4%

ADT = average daily total vehicles entering intersection
 c/mve = collisions per million vehicles entering intersection
 * 2013 Collision Data on California State Highways, Caltrans

Intersection # 8: US 101 SB Ramp & East Washington St

Date of Count: Wednesday, September 26, 2018

Number of Collisions: 21

Number of Injuries: 8

Number of Fatalities: 0

ADT: 35000

Start Date: June 1, 2013

End Date: May 31, 2018

Number of Years: 5

Intersection Type: Four-Legged

Control Type: Signals

Area: Urban

$$\text{collision rate} = \frac{\text{Number of Collisions} \times 1 \text{ Million}}{\text{ADT} \times 365 \text{ Days per Year} \times \text{Number of Years}}$$

$$\text{collision rate} = \frac{21 \times 1,000,000}{35,000 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.33 c/mve	0.0%	38.1%
Statewide Average*	0.27 c/mve	0.4%	41.9%

ADT = average daily total vehicles entering intersection
 c/mve = collisions per million vehicles entering intersection
 * 2013 Collision Data on California State Highways, Caltrans

Appendix C

Intersection Level of Service Calculations





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HCM 2010 Signalized Intersection Summary
 2: US 101 N & Old Redwood Hwy N

10/24/2018



Movement	EBT	WBT	WBL	EBR	WBR	NBL	NBR
Lane Configurations	↑↑	↑↑		↑	↑	↑↑	↑↑
Traffic Volume (veh/h)	1095	0	0	688	120	494	494
Future Volume (veh/h)	1095	0	0	688	120	494	494
Number	2	12	1	6	3	18	18
Initial Q (Ob), veh	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
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	1153	0	0	724	126	520	520
Adj No. of Lanes	2	1	0	2	2	2	2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	0	2	2	2	2
Cap. veh/h	1917	858	0	1917	972	787	787
Arrive On Green	0.54	0.00	0.00	0.54	0.28	0.28	0.28
Sat Flow, veh/h	3632	1583	0	3725	3442	2787	2787
Grp Volume(v), veh/h	1153	0	0	724	126	520	520
Grp Sat Flow(s), veh/h/ln	1770	1583	0	1770	1721	1393	1393
Q Serve(g, s), s	10.1	0.0	0.0	5.4	1.2	7.5	7.5
Cycle Q Clear(g, c), s	10.1	0.0	0.0	5.4	1.2	7.5	7.5
Prop In Lane	1.00	0.00	0.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	1917	858	0	1917	972	787	787
V/C Ratio(X)	0.60	0.00	0.00	0.38	0.13	0.66	0.66
Avail Cap(c, a), veh/h	2731	1222	0	2731	2625	2126	2126
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	7.1	0.0	0.0	6.0	12.2	14.4	14.4
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.2	0.1	1.0	1.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back(Q)(50%), veh/ln	4.9	0.0	0.0	2.7	0.6	2.9	2.9
LnGrp Delay(d), s/veh	7.5	0.0	0.0	6.2	12.2	15.4	15.4
LnGrp LOS	A	A	A	B	B	B	B
Approach Vol, veh/h	1153			724	646		
Approach Delay, s/veh	7.5			6.2	14.7		
Approach LOS	A			A	B		
Timer	1	2	3	4	5	6	7
Assigned Phs		2				6	8
Phs Duration (G+Y+Rc), s		28.6				28.6	16.8
Change Period (Y+Rc), s		5.1				5.1	4.7
Max Green Setting (Gmax), s		34.0				34.0	34.0
Max Q Clear Time (g_c+H), s		12.1				7.4	9.5
Green Ext Time (p_c), s		11.5				7.6	2.7
Intersection Summary							
HCM 2010 Ctrl Delay	9.0						
HCM 2010 LOS	A						

Corona Station T/A
 AM Existing
 Synchro 10 Report
 W-Trans

HCM 2010 Signalized Intersection Summary
 1: Old Redwood Hwy N & US 101 S

10/24/2018



Movement	EBL	WBL	WBR	EBR	SBL	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Traffic Volume (veh/h)	0	742	798	0	740	592
Future Volume (veh/h)	0	742	798	0	740	592
Number	5	2	6	16	7	14
Initial Q (Ob), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	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
Adj Sat Flow, veh/h/ln	0	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	0	789	849	0	787	630
Adj No. of Lanes	0	2	2	1	2	2
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	2	2	2	2	2
Cap. veh/h	0	2037	2043	914	1032	835
Arrive On Green	0.00	0.58	0.58	0.00	0.30	0.30
Sat Flow, veh/h	0	3725	3632	1583	3442	2787
Grp Volume(v), veh/h	0	789	849	0	787	630
Grp Sat Flow(s), veh/h/ln	0	1770	1770	1583	1721	1393
Q Serve(g, s), s	0.0	7.9	8.7	0.0	13.5	13.3
Cycle Q Clear(g, c), s	0.0	7.9	8.7	0.0	13.5	13.3
Prop In Lane	0.00	1.00	1.00	0.00	1.00	1.00
Lane Grp Cap(c), veh/h	0	2037	2043	914	1032	835
V/C Ratio(X)	0.00	0.39	0.42	0.00	0.76	0.75
Avail Cap(c, a), veh/h	0	2037	2043	914	1165	943
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.95	0.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	7.5	7.6	0.0	20.7	20.6
Incr Delay (d2), s/veh	0.0	0.6	0.6	0.0	2.7	3.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back(Q)(50%), veh/ln	0.0	4.0	4.3	0.0	6.7	5.4
LnGrp Delay(d), s/veh	0.0	8.1	8.2	0.0	23.3	23.7
LnGrp LOS	A	A	A	C	C	C
Approach Vol, veh/h		789	849		1417	
Approach Delay, s/veh		8.1	8.2		23.5	
Approach LOS		A	A		C	
Timer	1	2	3	4	5	6
Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		41.5		23.5		41.5
Change Period (Y+Rc), s		* 5.2		5.1		* 5.2
Max Green Setting (Gmax), s		* 34		20.9		* 34
Max Q Clear Time (g_c+H), s		9.9		15.5		10.7
Green Ext Time (p_c), s		7.8		2.9		8.6
Intersection Summary						
HCM 2010 Ctrl Delay	15.3					
HCM 2010 LOS	B					

Corona Station T/A
 AM Existing
 Synchro 10 Report
 W-Trans

3: N McDowell Blvd & Old Redwood Hwy N

10/24/2018

4: N McDowell Rd/N McDowell Blvd & Corona Rd

10/24/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	215	645	690	149	545	12	454	68	43	11	26	33
Future Volume (veh/h)	215	645	690	149	545	12	454	68	43	11	26	33
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Ob), 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	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
Adj Sat Flow, veh/h	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	222	665	0	154	562	12	518	0	44	11	27	34
Adj No. of Lanes	1	2	1	1	2	0	2	0	1	1	1	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	218	795	356	696	1778	38	620	0	277	137	144	122
Arrive On Green	0.12	0.22	0.00	0.39	0.50	0.49	0.17	0.00	0.17	0.08	0.08	0.08
Sat Flow, veh/h	1774	3539	1583	1774	3543	76	3548	0	1583	1774	1863	1583
Grp Volume(V), veh/h	222	665	0	154	280	294	518	0	44	11	27	34
Grp Sat Flow(S), veh/h	1774	1770	1583	1774	1770	1849	1774	0	1583	1774	1863	1583
Q Serve(g, s)	16.0	23.3	0.0	7.5	12.2	12.2	18.3	0.0	3.1	0.7	1.8	2.6
Cycle Q Clear(g, c), s	16.0	23.3	0.0	7.5	12.2	12.2	18.3	0.0	3.1	0.7	1.8	2.6
Prop In Lane	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	218	795	356	696	888	928	620	0	277	137	144	122
V/C Ratio(X)	1.02	0.84	0.00	0.22	0.32	0.32	0.84	0.00	0.16	0.08	0.19	0.28
Avail Cap(c, a), veh/h	218	871	390	696	888	928	1037	0	463	423	444	378
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)	0.76	0.76	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.0	48.1	0.0	26.3	19.2	19.2	51.8	0.0	45.5	55.7	56.1	56.5
Incr Delay (d2), s/veh	57.5	7.9	0.0	0.1	0.9	0.9	1.2	0.0	0.1	0.1	0.2	0.5
Initial Q Delay(d3), s/veh	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/h	11.3	12.2	0.0	3.7	6.2	6.4	9.1	0.0	1.4	0.4	0.9	1.2
LnGrp Delay(d), s/veh	114.6	56.0	0.0	26.3	20.1	20.1	53.0	0.0	45.6	55.8	56.4	57.0
LnGrp LOS	F	E	E	C	C	C	D	D	D	E	E	E
Approach Vol, veh/h	887			728			562				72	
Approach Delay, s/veh	70.7			21.4			52.4				56.6	
Approach LOS	E			C			D				E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6						
Phs Duration (G+Y+Rc), s	56.0	33.2		14.1	20.0	69.2		26.7				
Change Period (Y+Rc), s	5.0	* 5.1		* 4.8	4.0	5.0		5.4				
Max Green Setting (Gmax), s	13.0	* 31		* 30	16.0	28.0		36.6				
Max Q Clear Time (g_c+H), s	9.5	25.3		4.6	18.0	14.2		20.3				
Green Ext Time (p_c), s	0.1	2.8		0.1	0.0	4.5		1.0				
Intersection Summary	49.7											
HCM 2010 Ctrl Delay	D											
HCM 2010 LOS	D											
Notes												

Corona Station T/A
AM Existing

Synchro 10 Report
W-Trans

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	218	223	249	47	271	373	155	440	24	135	449	65
Future Volume (veh/h)	218	223	249	47	271	373	155	440	24	135	449	65
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Ob), 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	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
Adj Sat Flow, veh/h	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	227	232	115	49	282	311	161	458	17	141	468	51
Adj No. of Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	231	475	404	145	368	478	524	1383	51	188	628	68
Arrive On Green	0.13	0.25	0.25	0.08	0.20	0.20	0.30	0.40	0.38	0.11	0.19	0.19
Sat Flow, veh/h	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Grp Volume(V), veh/h	227	232	115	49	282	311	161	232	243	141	256	263
Grp Sat Flow(S), veh/h	1774	1863	1583	1774	1863	1583	1774	1770	1840	1774	1770	1801
Q Serve(g, s)	12.8	10.6	2.7	2.6	14.3	10.5	7.0	9.1	9.2	7.7	13.6	13.8
Cycle Q Clear(g, c), s	12.8	10.6	2.7	2.6	14.3	10.5	7.0	9.1	9.2	7.7	13.6	13.8
Prop In Lane	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	231	475	404	145	368	478	524	703	731	188	345	351
V/C Ratio(X)	0.98	0.49	0.28	0.34	0.77	0.65	0.31	0.33	0.33	0.75	0.74	0.75
Avail Cap(c, a), veh/h	231	522	443	195	484	576	524	703	731	302	460	468
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	0.79	0.79	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.4	31.7	6.2	43.4	37.9	13.4	27.3	20.9	21.0	43.4	37.9	38.0
Incr Delay (d2), s/veh	54.6	1.1	0.5	1.4	6.3	2.5	0.3	1.0	1.0	8.2	13.5	13.6
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(50%), veh/h	9.7	5.6	1.2	1.3	8.0	4.9	3.5	4.7	4.8	4.2	8.0	8.2
LnGrp Delay(d), s/veh	98.0	32.8	6.7	44.7	44.3	15.9	27.6	21.9	21.9	51.6	51.4	51.7
LnGrp LOS	F	C	A	D	D	B	C	C	C	D	D	D
Approach Vol, veh/h	574			642			636				660	
Approach Delay, s/veh	53.4			30.6			23.3				51.6	
Approach LOS	D			C			C				D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		3	4	5	6					
Phs Duration (G+Y+Rc), s	12.2	29.5	34.8	23.5	17.9	23.8	14.6	43.7				
Change Period (Y+Rc), s	4.0	4.9	5.3	* 4.9	* 4.9	* 4.8	4.6	5.3				
Max Green Setting (Gmax), s	11.0	27.1	19.0	* 25	* 13	* 25	16.4	26.7				
Max Q Clear Time (g_c+H), s	4.6	12.6	9.0	15.8	14.8	16.3	9.7	11.2				
Green Ext Time (p_c), s	0.0	2.1	0.3	2.8	0.0	2.7	0.3	3.4				
Intersection Summary	39.5											
HCM 2010 Ctrl Delay	D											
HCM 2010 LOS	D											
Notes												

Corona Station T/A
AM Existing

Synchro 10 Report
W-Trans

5: Petaluma Blvd N & Skillman Lane/Corona Rd

6: S McDowell Blvd/N McDowell Rd & E Washington St

10/24/2018

10/24/2018

HCM 2010 Signalized Intersection Summary

HCM 2010 Signalized Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	211	207	54	255	151	21	46	495	315	40	713
Traffic Volume (veh/h)	211	207	54	255	151	21	46	495	315	40	713
Future Volume (veh/h)	7	4	14	3	8	18	1	6	16	5	2
Number	0	0	0	0	0	0	0	0	0	0	0
Initial Q (Ob), veh	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1900	1863	1900	1863	1863	1900	1863	1863	1863	1863	1900
Adj Sat Flow, veh/h	222	218	56	268	159	8	48	521	176	42	751
Adj Flow Rate, veh/h	0	1	0	1	1	0	1	2	1	1	2
Adj No. of Lanes	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak Hour Factor	2	2	2	2	2	2	2	2	2	2	2
Percent Heavy Veh, %	244	240	62	323	321	16	86	964	431	116	904
Cap, veh/h	0.31	0.31	0.30	0.18	0.18	0.18	0.05	0.27	0.27	0.07	0.29
Arrive On Green	800	785	202	1774	1759	88	1774	3539	1583	1774	3124
Sat Flow, veh/h	496	0	0	268	0	167	48	521	176	42	425
Grp Volume(V), veh/h	1787	0	0	1774	0	1847	1774	1770	1583	1774	1770
Grp Sat Flow(s),veh/h	24.5	0.0	0.0	13.3	0.0	7.4	2.4	11.5	8.3	2.1	20.6
Q Serve(g, s)	24.5	0.0	0.0	13.3	0.0	7.4	2.4	11.5	8.3	2.1	20.6
Cycle Q Clear(g, c), s	0.45	0.0	0.11	1.00	0.0	0.05	1.00	1.00	1.00	1.00	0.24
Prop In Lane	545	0	0	323	0	337	86	964	431	116	512
Lane Grp Cap(c), veh/h	0.91	0.00	0.00	0.83	0.00	0.50	0.56	0.54	0.41	0.36	0.83
V/C Ratio(X)	654	0	0	591	0	615	194	1410	631	194	705
Avail Cap(c, a), veh/h	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
HCM Platoon Ratio	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	30.6	0.0	0.0	36.1	0.0	33.7	42.6	28.4	27.3	41.0	30.4
Uniform Delay (d), s/veh	13.8	0.0	0.0	2.1	0.0	0.4	2.1	0.2	0.2	0.7	4.4
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	14.1	0.0	0.0	6.7	0.0	3.8	1.2	5.7	3.6	1.0	10.7
%ile BackOfQ(50%),veh/h	44.4	0.0	0.0	38.2	0.0	34.1	44.7	28.6	27.5	41.7	34.8
LnGrp Delay(d),s/veh	D	D	D	D	D	D	D	D	D	D	D
LnGrp LOS	D	D	D	D	D	D	D	D	D	D	D
Approach Vol, veh/h	496			435			745				897
Approach Delay, s/veh	44.4			36.6			29.4				35.2
Approach LOS	D			D			C				D
Timer	1	2	3	4	5	6	7	8			
Assigned Phs	1	2	3	4	5	6	7	8			
Phs Duration (G+Y+Rc), s	8.4	30.5	31.9	10.0	28.9	20.7					
Change Period (Y+Rc), s	4.0	5.5	4.5	4.0	5.5	4.5					
Max Green Setting (Gmax), s	10.0	35.0	33.0	10.0	35.0	30.0					
Max Q Clear Time (g_c+H), s	4.4	22.6	26.5	4.1	13.5	15.3					
Green Ext Time (p_c), s	0.0	2.4	1.0	0.0	2.0	0.9					
Intersection Summary	35.5										
HCM 2010 Ctrl Delay	D										
HCM 2010 LOS	D										
Notes											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	455	547	266	33	695	115	370	458	49	61	325
Traffic Volume (veh/h)	455	547	266	33	695	115	370	458	49	61	325
Future Volume (veh/h)	5	2	12	1	6	16	3	8	18	7	4
Number	0	0	0	0	0	0	0	0	0	0	0
Initial Q (Ob), veh	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863
Adj Sat Flow, veh/h	474	570	253	34	724	52	385	477	41	64	339
Adj Flow Rate, veh/h	2	2	0	1	2	1	2	2	0	1	2
Adj No. of Lanes	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Peak Hour Factor	2	2	2	2	2	2	2	2	2	2	2
Percent Heavy Veh, %	482	998	442	60	1097	491	461	1146	98	99	957
Cap, veh/h	0.05	0.14	0.13	0.03	0.31	0.31	0.13	0.35	0.34	0.06	0.27
Arrive On Green	3442	2388	1058	1774	3539	1583	3442	3300	283	1774	3539
Sat Flow, veh/h	474	422	401	34	724	52	385	265	263	64	339
Grp Volume(V), veh/h	1721	1770	1676	1774	1770	1583	1721	1770	1813	1774	1770
Grp Sat Flow(s),veh/h	15.4	25.0	25.1	2.1	19.9	2.6	12.2	12.3	12.4	4.0	8.7
Q Serve(g, s)	15.4	25.0	25.1	2.1	19.9	2.6	12.2	12.3	12.4	4.0	8.7
Cycle Q Clear(g, c), s	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop In Lane	482	740	701	60	1097	491	461	615	630	99	957
Lane Grp Cap(c), veh/h	0.96	0.57	0.57	0.57	0.86	0.11	0.84	0.42	0.42	0.64	0.35
V/C Ratio(X)	492	740	701	111	1097	491	461	616	631	174	1106
Avail Cap(c, a), veh/h	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
HCM Platoon Ratio	0.83	0.93	0.93	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.88
Upstream Filter(I)	53.1	38.9	39.0	53.3	33.5	27.6	47.3	27.9	28.0	51.8	33.0
Uniform Delay (d), s/veh	30.1	3.0	3.1	8.1	3.1	0.4	12.6	0.6	0.6	6.0	0.3
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	9.4	12.9	12.3	1.2	10.1	1.2	6.6	6.1	6.3	2.1	4.3
%ile BackOfQ(50%),veh/h	83.2	41.8	42.1	61.4	36.6	28.0	59.9	28.5	28.6	57.8	33.3
LnGrp Delay(d),s/veh	F	D	D	E	D	C	E	C	C	E	C
LnGrp LOS	F	D	D	E	D	C	E	C	C	E	C
Approach Vol, veh/h	1297			810			903				825
Approach Delay, s/veh	57.1			37.1			41.9				32.4
Approach LOS	E			D			D				C
Timer	1	2	3	4	5	6	7	8			
Assigned Phs	1	2	3	4	5	6	7	8			
Phs Duration (G+Y+Rc), s	7.8	50.9	19.0	34.3	20.0	38.7	10.3	43.0			
Change Period (Y+Rc), s	5.1	* 5.2	5.4	* 5.2	5.4	* 5.2	5.1	* 5.2			
Max Green Setting (Gmax), s	5.9	* 38	13.6	* 34	14.6	* 29	9.9	* 38			
Max Q Clear Time (g_c+H), s	4.1	27.1	14.2	25.8	17.4	21.9	6.0	14.4			
Green Ext Time (p_c), s	0.0	5.1	0.0	3.3	0.0	3.5	0.0	4.5			
Intersection Summary	44.0										
HCM 2010 Ctrl Delay	D										
HCM 2010 LOS	D										
Notes											

Corona Station T/A
AM Existing

Corona Station T/A
AM Existing

Synchro 10 Report
W-Trans

Synchro 10 Report
W-Trans

HCM 2010 Signalized Intersection Summary
7: US 101 NB Off-Ramp & E Washington St

10/24/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Traffic Volume (veh/h)	906	0	0	1571	106	276	906	0	0	1571	106	276
Future Volume (veh/h)	906	0	0	1571	106	276	906	0	0	1571	106	276
Number	2	12	1	6	3	18	2	12	1	6	3	18
Initial Q (Ob), 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	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
Adj Sat Flow, veh/hln	1863	0	0	1863	1863	1863	1863	0	0	1863	1863	1863
Adj Flow Rate, veh/h	964	0	0	1671	113	104	964	0	0	1671	113	104
Adj No. of Lanes	2	0	0	2	2	2	2	0	0	2	2	2
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	0	0	2	2	2	2	0	0	2	2	2
Cap. veh/h	3043	0	0	3043	237	192	3043	0	0	3043	237	192
Arrive On Green	0.86	0.00	0.00	0.86	0.07	0.07	0.86	0.00	0.00	0.86	0.07	0.07
Sat Flow, veh/h	3725	0	0	3725	3442	2787	3725	0	0	3725	3442	2787
Grp Volume(V), veh/h	964	0	0	1671	113	104	964	0	0	1671	113	104
Grp Sat Flow(s),veh/hln	1770	0	0	1770	1721	1393	1770	0	0	1770	1721	1393
Q Serve(g, s), s	5.9	0.0	0.0	14.1	3.5	4.0	5.9	0.0	0.0	14.1	3.5	4.0
Cycle Q Clear(g, c), s	5.9	0.0	0.0	14.1	3.5	4.0	5.9	0.0	0.0	14.1	3.5	4.0
Prop In Lane	0.00	0.00	0.00	1.00	1.00	1.00	0.00	0.00	0.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	3043	0	0	3043	237	192	3043	0	0	3043	237	192
V/C Ratio(X)	0.32	0.00	0.00	0.55	0.48	0.54	0.32	0.00	0.00	0.55	0.48	0.54
Avail Cap(c, a), veh/h	3043	0	0	3043	799	647	3043	0	0	3043	799	647
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)	0.71	0.00	0.00	0.64	1.00	1.00	0.71	0.00	0.00	0.64	1.00	1.00
Uniform Delay (d), s/veh	1.5	0.0	0.0	2.1	50.2	50.4	1.5	0.0	0.0	2.1	50.2	50.4
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.5	1.8	2.9	0.2	0.0	0.0	0.5	1.8	2.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	0.0	0.0	6.9	1.7	1.6	2.9	0.0	0.0	6.9	1.7	1.6
LnGrp Delay(d),s/veh	1.7	0.0	0.0	2.6	52.0	53.3	1.7	0.0	0.0	2.6	52.0	53.3
LnGrp LOS	A	A	A	D	D	D	A	A	A	D	D	D
Approach Vol, veh/h	964			1671	217		964			1671	217	
Approach Delay, s/veh	1.7			2.6	52.6		1.7			2.6	52.6	
Approach LOS	A			A	D		A			A	D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	2					6						
Phs Duration (G+Y+Rc), s	100.3					100.3						
Change Period (Y+Rc), s	* 4.8					* 4.8						
Max Green Setting (Gmax), s	* 7.7					* 7.7						
Max Q Clear Time (g_c+H), s	7.9					16.1						
Green Ext Time (p_c), s	19.6					42.8						
Intersection Summary												
HCM 2010 Ctrl Delay	6.1											
HCM 2010 LOS	A											
Notes												

Corona Station T/A
AM Existing
Synchro 10 Report
W-Trans

HCM 2010 Signalized Intersection Summary
8: US 101 SB On-Ramp/US 101 SB Off-Ramp & E Washington St

10/24/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Traffic Volume (veh/h)	0	1056	152	361	975	0	0	0	0	0	255	2
Future Volume (veh/h)	0	1056	152	361	975	0	0	0	0	0	255	2
Number	5	2	12	1	6	16	5	2	12	1	6	16
Initial Q (Ob), 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	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
Adj Sat Flow, veh/hln	0	1863	1863	1863	1863	0	0	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	0	1123	123	384	1037	0	0	1123	123	384	1037	271
Adj No. of Lanes	0	2	1	2	2	0	0	2	1	2	2	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	2	2	2	2	0	0	2	2	2	2	2
Cap. veh/h	0	1988	889	483	2611	0	0	1988	889	483	2611	336
Arrive On Green	0.00	0.56	0.56	0.28	1.00	0.00	0.00	0.56	0.56	0.28	1.00	0.19
Sat Flow, veh/h	0	3632	1583	3442	3632	0	0	3632	1583	3442	3632	1762
Grp Volume(V), veh/h	0	1123	123	384	1037	0	0	1123	123	384	1037	273
Grp Sat Flow(s),veh/hln	0	1770	1583	1721	1770	0	0	1770	1583	1721	1770	1775
Q Serve(g, s), s	0.0	22.8	4.1	11.6	0.0	0.0	0.0	22.8	4.1	11.6	0.0	16.5
Cycle Q Clear(g, c), s	0.0	22.8	4.1	11.6	0.0	0.0	0.0	22.8	4.1	11.6	0.0	16.5
Prop In Lane	0.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	0.99
Lane Grp Cap(c), veh/h	0	1988	889	483	2611	0	0	1988	889	483	2611	339
V/C Ratio(X)	0.00	0.56	0.14	0.80	0.40	0.00	0.00	0.56	0.14	0.80	0.40	0.81
Avail Cap(c, a), veh/h	0	1988	889	707	2611	0	0	1988	889	707	2611	475
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.82	0.82	0.00	0.00	1.00	1.00	0.82	0.82	1.00
Uniform Delay (d), s/veh	0.0	15.8	11.7	38.8	0.0	0.0	0.0	15.8	11.7	38.8	0.0	43.3
Incr Delay (d2), s/veh	0.0	1.2	0.3	5.7	0.4	0.0	0.0	1.2	0.3	5.7	0.4	6.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	11.4	1.9	5.8	0.1	0.0	0.0	11.4	1.9	5.8	0.1	8.8
LnGrp Delay(d),s/veh	0.0	16.9	12.0	44.5	0.4	0.0	0.0	16.9	12.0	44.5	0.4	50.1
LnGrp LOS	D	B	B	D	A	D	D	B	B	D	A	D
Approach Vol, veh/h	1246			1421			1246			1421		494
Approach Delay, s/veh	16.4			12.3			16.4			12.3		48.5
Approach LOS	B			B			B			B		D
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2										
Phs Duration (G+Y+Rc), s	19.7	66.9										
Change Period (Y+Rc), s	* 4.2	4.6										
Max Green Setting (Gmax), s	* 23	46.4										
Max Q Clear Time (g_c+H), s	13.6	24.8										
Green Ext Time (p_c), s	1.9	13.3										
Intersection Summary												
HCM 2010 Ctrl Delay	19.6											
HCM 2010 LOS	B											
Notes												

Corona Station T/A
AM Existing
Synchro 10 Report
W-Trans

HCM 2010 Signalized Intersection Summary
 1: Old Redwood Hwy N & US 101 S

10/24/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Traffic Volume (veh/h)	0	1016	909	0	421	514
Future Volume (veh/h)	0	1016	909	0	421	514
Number	5	2	6	16	7	14
Initial Q (Ob), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	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
Adj Sat Flow, veh/h/in	0	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	0	1092	977	0	453	553
Adj No. of Lanes	0	2	2	1	2	2
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	2104	2104	941	850	688
Cap. veh/h	0	0.99	0.89	0.00	0.25	0.25
Arrive On Green	0	3725	3632	1563	3442	2787
Sat Flow, veh/h	0	1092	977	0	453	553
Grp Volume(v), veh/h	0	1770	1770	1583	1721	1393
Grp Sat Flow(s), veh/h/in	0	11.8	10.0	0.0	7.4	12.1
Q Serve(g, s), s	0.00	11.8	10.0	0.0	7.4	12.1
Cycle Q Clear(g, c), s	0.00	11.8	10.0	0.0	7.4	12.1
Prop In Lane	0.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	0	2104	2104	941	850	688
V/C Ratio(X)	0.00	0.52	0.46	0.00	0.53	0.80
Avail Cap(c, a), veh/h	0	2104	2104	941	1001	810
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(i)	0.00	1.00	0.89	0.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	7.7	7.4	0.0	21.2	23.0
Incr Delay (d2), s/veh	0.0	0.9	0.7	0.0	0.5	5.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back(Q)(50%), veh/in	0.0	5.9	5.1	0.0	3.6	5.1
LnGrp Delay(d), s/veh	0.0	8.6	8.0	0.0	21.7	28.1
LnGrp LOS	A	A	A	C	C	C
Approach Vol, veh/h	1092	977	1006			
Approach Delay, s/veh	8.6	8.0	25.2			
Approach LOS	A	A	C			
Timer	1	2	3	4	5	6
Assigned Phs	2	4	4	5	6	7
Phs Duration (G+Y+Rc), s	43.9	21.1	21.1	43.9	43.9	8
Change Period (Y+Rc), s	* 5.2	5.1	5.1	* 5.2	* 5.2	6
Max Green Setting (Gmax), s	* 36	18.9	18.9	* 36	* 36	8
Max Q Clear Time (g_c+H), s	13.8	14.1	14.1	12.0	10.3	8
Green Ext Time (p_c), s	10.9	1.9	1.9	10.3	10.3	8
Intersection Summary						
HCM 2010 Ctrl Delay	13.9					
HCM 2010 LOS	B					
Notes						

Corona Station T/A
 PM Existing
 Synchro 10 Report
 W-Trans

HCM 2010 Signalized Intersection Summary
 2: US 101 N & Old Redwood Hwy N

10/24/2018

Movement	EBT	EBR	WBT	WBR	NBT	NBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Traffic Volume (veh/h)	866	0	832	98	250	250
Future Volume (veh/h)	866	0	832	98	250	250
Number	2	12	1	6	3	18
Initial Q (Ob), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	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
Adj Sat Flow, veh/h/in	1863	1863	0	1863	1863	1863
Adj Flow Rate, veh/h	912	0	0	876	103	263
Adj No. of Lanes	2	1	0	2	2	2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	0	2	2	2
Cap. veh/h	1840	823	0	1840	628	509
Arrive On Green	0.52	0.00	0.00	0.52	0.18	0.18
Sat Flow, veh/h	3632	1583	0	3725	3442	2787
Grp Volume(v), veh/h	912	0	0	876	103	263
Grp Sat Flow(s), veh/h/in	1770	1583	0	1770	1721	1393
Q Serve(g, s), s	5.5	0.0	0.0	5.2	0.8	2.8
Cycle Q Clear(g, c), s	5.5	0.0	0.0	5.2	0.8	2.8
Prop In Lane	1.00	0.00	0.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	1840	823	0	1840	628	509
V/C Ratio(X)	0.50	0.00	0.00	0.48	0.16	0.52
Avail Cap(c, a), veh/h	3653	1634	0	3653	3553	2876
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(i)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	5.1	0.0	0.0	5.0	11.3	12.2
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.3	0.1	0.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back(Q)(50%), veh/in	2.7	0.0	0.0	2.5	0.4	1.1
LnGrp Delay(d), s/veh	5.4	0.0	0.0	5.3	11.5	13.0
LnGrp LOS	A	A	A	B	B	B
Approach Vol, veh/h	912	876	366			
Approach Delay, s/veh	5.4	5.3	12.5			
Approach LOS	A	A	B			
Timer	1	2	3	4	5	6
Assigned Phs	2	2	3	4	5	7
Phs Duration (G+Y+Rc), s	22.2	22.2	22.2	22.2	22.2	8
Change Period (Y+Rc), s	5.1	5.1	5.1	5.1	4.7	8
Max Green Setting (Gmax), s	34.0	34.0	34.0	34.0	34.0	8
Max Q Clear Time (g_c+H), s	7.5	7.5	7.5	7.2	4.8	8
Green Ext Time (p_c), s	9.6	9.6	9.6	9.6	1.4	8
Intersection Summary						
HCM 2010 Ctrl Delay	6.6					
HCM 2010 LOS	A					
Notes						

Corona Station T/A
 PM Existing
 Synchro 10 Report
 W-Trans

3: N McDowell Blvd & Old Redwood Hwy N

10/24/2018

4: N McDowell Rd/N McDowell Blvd & Corona Rd

10/24/2018

HCM 2010 Signalized Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	79	577	439	110	532	14	692	46	239	24	77	274
Future Volume (veh/h)	79	577	439	110	532	14	692	46	239	24	77	274
Number	5	2	12	1	6	16	3	8	18	7	4	14
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	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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	87	634	0	121	585	15	796	0	263	26	85	301
Adj No. of Lanes	1	2	1	1	2	0	2	0	1	1	1	1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	131	746	334	325	1160	30	868	0	387	364	382	325
Arrive On Green	0.07	0.21	0.00	0.18	0.33	0.33	0.24	0.00	0.24	0.20	0.20	0.20
Sat Flow, veh/h	1774	3539	1583	1774	3526	90	3548	0	1583	1774	1863	1583
Grp Volume(V), veh/h	87	634	0	121	293	307	796	0	263	26	85	301
Grp Sat Flow(S), veh/h/ln	1774	1770	1583	1774	1770	1847	1774	0	1583	1774	1863	1583
Q Serve(g, s)	6.2	22.4	0.0	7.8	17.3	17.4	28.4	0.0	19.6	1.5	4.9	24.3
Cycle Q Clear(g, c), s	6.2	22.4	0.0	7.8	17.3	17.4	28.4	0.0	19.6	1.5	4.9	24.3
Prop In Lane	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	131	746	334	325	582	608	868	0	387	364	382	325
V/C Ratio(X)	0.67	0.85	0.00	0.37	0.50	0.50	0.92	0.00	0.68	0.07	0.22	0.93
Avail Cap(c, a), veh/h	218	841	376	325	582	608	999	0	446	412	433	368
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)	0.87	0.87	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.7	49.3	0.0	46.5	35.1	35.1	47.8	0.0	44.5	41.7	43.0	50.7
Incr Delay (d2), s/veh	1.9	10.3	0.0	0.3	3.1	3.0	11.1	0.0	2.4	0.0	0.1	26.2
Initial Q Delay(Q3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	3.1	12.0	0.0	3.8	9.0	9.4	15.3	0.0	8.8	0.8	2.6	13.0
LnGrp Delay(d), s/veh	60.6	59.6	0.0	46.8	38.2	38.1	58.9	0.0	46.8	41.7	43.2	76.9
LnGrp LOS	E	E	D	D	D	D	E	D	D	D	D	E
Approach Vol, veh/h	721	1059						1059				412
Approach Delay, s/veh	59.7	39.6						59.9				67.7
Approach LOS	E	E	D	D	D	D	D	E	D	D	D	E
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	28.8	32.5		31.4	13.6	47.8	37.2					
Change Period (Y+Rc), s	5.0	* 5.1		* 4.8	4.0	5.0	5.4					
Max Green Setting (Gmax), s	13.0	* 31		* 30	16.0	28.0	36.6					
Max Q Clear Time (g_c+H), s	9.8	24.4		26.3	8.2	19.4	30.4					
Green Ext Time (p_c), s	0.0	3.0		0.4	0.0	3.5	1.4					
Intersection Summary	54.5											
HCM 2010 Ctrl Delay	D											
HCM 2010 LOS	D											
Notes												

Corona Station T/A
PM Existing

Synchro 10 Report
W-Trans

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	157	312	283	30	228	206	231	652	51	294	682	215
Future Volume (veh/h)	157	312	283	30	228	206	231	652	51	294	682	215
Number	5	2	12	1	6	16	3	8	18	7	4	14
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	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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	167	332	164	32	243	96	246	694	50	313	726	185
Adj No. of Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	196	399	339	111	296	488	449	1352	97	264	830	211
Arrive On Green	0.11	0.21	0.21	0.06	0.16	0.16	0.25	0.40	0.40	0.15	0.30	0.30
Sat Flow, veh/h	1774	1863	1583	1774	1863	1583	1774	3349	241	1774	2795	712
Grp Volume(V), veh/h	167	332	164	32	243	96	246	367	377	313	460	451
Grp Sat Flow(S), veh/h/ln	1774	1863	1583	1774	1863	1583	1774	1770	1820	1774	1770	1737
Q Serve(g, s)	10.2	18.8	5.6	1.9	13.9	3.2	13.2	17.1	17.2	16.4	27.1	27.1
Cycle Q Clear(g, c), s	10.2	18.8	5.6	1.9	13.9	3.2	13.2	17.1	17.2	16.4	27.1	27.1
Prop In Lane	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	196	399	339	111	296	488	449	714	735	264	526	516
V/C Ratio(X)	0.85	0.83	0.48	0.29	0.82	0.20	0.55	0.51	0.51	1.18	0.87	0.87
Avail Cap(c, a), veh/h	210	459	390	177	427	599	449	714	735	264	565	554
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	0.74	0.74	0.74	1.00	1.00
Uniform Delay (d), s/veh	48.1	41.3	11.9	49.2	44.8	13.4	35.6	24.7	24.7	48.8	36.7	36.7
Incr Delay (d2), s/veh	26.1	12.0	1.5	1.4	10.0	0.3	1.0	1.9	1.9	114.2	18.1	18.4
Initial Q Delay(Q3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	6.4	11.0	2.6	1.0	8.0	1.4	6.6	8.7	9.0	16.4	15.9	15.7
LnGrp Delay(d), s/veh	74.2	53.3	13.4	50.7	54.8	13.6	36.7	26.6	26.6	161.0	54.8	55.1
LnGrp LOS	E	D	B	D	D	D	B	D	C	C	F	D
Approach Vol, veh/h	663	990						990				1224
Approach Delay, s/veh	48.7	43.8						43.8				82.1
Approach LOS	D	D	D	D	D	D	D	C	C	C	F	F
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.9	28.4	33.1	37.6	17.0	22.3	21.0	49.7				
Change Period (Y+Rc), s	4.0	4.9	5.3	* 4.9	* 4.9	* 4.8	4.6	5.3				
Max Green Setting (Gmax), s	11.0	27.1	19.0	* 35	* 13	* 25	16.4	36.7				
Max Q Clear Time (g_c+H), s	3.9	20.8	15.2	29.1	12.2	15.9	18.4	19.2				
Green Ext Time (p_c), s	0.0	1.9	0.3	3.5	0.0	1.6	0.0	6.0				
Intersection Summary	54.7											
HCM 2010 Ctrl Delay	D											
HCM 2010 LOS	D											
Notes												

Corona Station T/A
PM Existing

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10/24/2018
 HCM 2010 Signalized Intersection Summary
 6. S McDowell Blvd/N McDowell Rd & E Washington St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Traffic Volume (veh/h)	644	817	322	37	543	112	326	442	41	166	505	645
Future Volume (veh/h)	644	817	322	37	543	112	326	442	41	166	505	645
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Ob), 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	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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	657	834	296	38	554	35	333	451	34	169	515	358
Adj No. of Lanes	2	2	0	1	2	1	2	2	0	1	2	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	801	1251	443	49	998	447	386	591	44	248	716	689
Arrive On Green	0.08	0.16	0.16	0.03	0.28	0.28	0.11	0.18	0.18	0.14	0.20	0.20
Sat Flow, veh/h	3442	2564	908	1774	3539	1583	3442	3337	251	1774	3539	4583
Grp Volume(V), veh/h	657	575	555	38	554	35	333	238	247	169	515	358
Grp Sat Flow(S), veh/h/ln	1721	1770	1702	1774	1770	1583	1721	1770	1818	1774	1770	1583
Q Serve(g, s)	23.3	37.9	38.0	2.6	16.5	2.0	11.8	15.9	16.0	11.2	16.8	5.8
Cycle Q Clear(g, c), s	23.3	37.9	38.0	2.6	16.5	2.0	11.8	15.9	16.0	11.2	16.8	5.6
Prop In Lane	1.00	0.53	1.00	1.00	1.00	1.00	1.00	1.00	0.14	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	801	864	831	49	998	447	386	313	322	248	716	689
V/C Ratio(X)	0.82	0.67	0.67	0.78	0.86	0.08	0.86	0.76	0.77	0.68	0.72	0.82
Avail Cap(c, a), veh/h	822	864	831	99	998	447	405	541	556	248	1022	825
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.79	0.79	0.79	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	54.7	42.5	42.6	59.9	37.9	32.7	54.1	48.5	48.6	50.7	46.2	10.3
Incr Delay (d2), s/veh	5.2	3.2	3.4	23.3	0.9	0.1	16.7	5.4	5.4	4.9	1.3	0.6
Initial Q Delay(Q3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	11.7	19.4	18.7	1.6	8.2	0.9	6.5	8.2	8.5	5.8	8.4	5.1
LnGrp Delay(d), s/veh	59.9	45.7	45.9	83.3	38.8	32.8	70.8	53.9	53.9	55.6	47.5	10.9
LnGrp LOS	E	D	D	F	D	C	E	D	D	D	E	B
Approach Vol, veh/h	1787											
Approach Delay, s/veh	51.0											
Approach LOS	D											
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.5	65.9	19.3	30.3	34.2	40.2	22.5	27.0				
Change Period (Y+Rc), s	5.1	* 5.4	5.4	* 5.2	* 5.4	5.2	5.2	* 5.1				
Max Green Setting (Gmax), s	6.9	* 4.6	14.6	* 3.6	* 3.0	22.8	12.9	* 3.8				
Max Q Clear Time (g_c+H), s	4.6	40.0	13.8	18.8	25.3	18.5	13.2	18.0				
Green Ext Time (p_c), s	0.0	4.2	0.1	6.2	1.1	1.8	0.0	3.9				
Intersection Summary	47.8											
HCM 2010 Ctrl Delay	D											
HCM 2010 LOS	D											
Notes												

Corona Station T/A
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10/24/2018
 HCM 2010 Signalized Intersection Summary
 5. Petaluma Blvd N & Skillman Lane/Corona Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Traffic Volume (veh/h)	203	180	44	348	175	26	54	840	407	46	765	139
Future Volume (veh/h)	203	180	44	348	175	26	54	840	407	46	765	139
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Ob), 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	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
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	205	182	38	352	177	15	55	848	275	46	773	94
Adj No. of Lanes	0	1	0	1	1	0	1	2	1	1	2	0
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	224	199	42	393	375	32	89	976	436	106	905	110
Arrive On Green	0.26	0.26	0.26	0.22	0.22	0.22	0.05	0.28	0.28	0.06	0.28	0.28
Sat Flow, veh/h	864	767	160	1774	1694	144	1774	3539	1583	1774	3178	386
Grp Volume(V), veh/h	425	0	0	352	0	192	55	848	275	46	430	437
Grp Sat Flow(S), veh/h/ln	1791	0	0	1774	0	1837	1774	1770	1583	1774	1770	1795
Q Serve(g, s)	23.2	0.0	0.0	19.4	0.0	9.1	3.1	23.0	15.3	2.5	23.1	23.1
Cycle Q Clear(g, c), s	23.2	0.0	0.0	19.4	0.0	9.1	3.1	23.0	15.3	2.5	23.1	23.1
Prop In Lane	0.48	0.09	1.00	1.00	0.08	1.00	1.00	1.00	1.00	1.00	1.00	0.22
Lane Grp Cap(c), veh/h	464	0	0	393	0	407	89	976	436	106	504	511
V/C Ratio(X)	0.92	0.00	0.00	0.90	0.00	0.47	0.62	0.87	0.63	0.43	0.85	0.85
Avail Cap(c, a), veh/h	587	0	0	529	0	548	176	1231	551	176	616	624
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.2	0.0	0.0	38.0	0.0	34.0	46.8	34.7	31.9	45.7	34.0	34.0
Incr Delay (d2), s/veh	14.8	0.0	0.0	12.0	0.0	0.3	2.5	4.8	0.6	1.0	8.3	8.2
Initial Q Delay(Q3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	13.4	0.0	0.0	10.8	0.0	4.7	1.6	11.8	6.8	1.3	12.4	12.6
LnGrp Delay(d), s/veh	51.0	0.0	0.0	50.0	0.0	34.4	49.4	39.6	32.5	46.7	42.2	42.2
LnGrp LOS	D			D		C	D	D	C	D	D	D
Approach Vol, veh/h	425											
Approach Delay, s/veh	51.0											
Approach LOS	D											
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.1	34.2	30.6	10.0	33.2	26.8						
Change Period (Y+Rc), s	4.0	5.5	4.5	4.0	5.5	4.5						
Max Green Setting (Gmax), s	10.0	35.0	33.0	10.0	35.0	30.0						
Max Q Clear Time (g_c+H), s	5.1	23.1	25.2	4.5	25.0	21.4						
Green Ext Time (p_c), s	0.0	2.2	0.9	0.9	0.0	2.8						
Intersection Summary	42.4											
HCM 2010 Ctrl Delay	D											
HCM 2010 LOS	D											
Notes												

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HCM 2010 Signalized Intersection Summary
7: US 101 NB Off-Ramp & E Washington St

10/24/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR	Diagram
Lane Configurations	↑↑	↑↑		↑↑	↑↑	↑↑	↔
Traffic Volume (veh/h)	1425	0	0	1525	90	391	
Future Volume (veh/h)	1425	0	0	1525	90	391	
Number	2	12	1	6	3	18	
Initial Q (Ob), veh	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	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	
Adj Sat Flow, veh/h	1863	0	0	1863	1863	1863	
Adj Flow Rate, veh/h	1439	0	0	1540	91	321	
Adj No. of Lanes	2	0	0	2	2	2	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	
Percent Heavy Veh, %	2	0	0	2	2	2	
Cap. veh/h	2766	0	0	2766	485	393	
Arrive On Green	0.78	0.00	0.00	0.78	0.14	0.14	
Sat Flow, veh/h	3725	0	0	3725	3442	2787	
Grp Volume(v), veh/h	1439	0	0	1540	91	321	
Grp Sat Flow(s), veh/h	1770	0	0	1770	1721	1393	
Q Serve(g, s)	18.6	0.0	0.0	20.9	2.9	13.9	
Cycle Q Clear(g, c), s	18.6	0.0	0.0	20.9	2.9	13.9	
Prop In Lane	0.00	0.00	0.00	1.00	1.00	1.00	
Lane Grp Cap(c), veh/h	2766	0	0	2766	485	393	
V/C Ratio(X)	0.52	0.00	0.00	0.56	0.19	0.82	
Avail Cap(c, a), veh/h	2766	0	0	2766	783	634	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	0.58	0.00	0.00	0.52	1.00	1.00	
Uniform Delay (d), s/veh	5.0	0.0	0.0	5.2	47.0	51.7	
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.4	0.2	5.2	
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	
%ile Back(Q)(50%), veh/m	9.0	0.0	0.0	10.2	1.4	5.6	
LnGrp Delay(d), s/veh	5.4	0.0	0.0	5.7	47.2	56.9	
LnGrp LOS	A			A	D	E	
Approach Vol, veh/h	1439			1540	412		
Approach Delay, s/veh	5.4			5.7	54.8		
Approach LOS	A			A	D		
Timer	1	2	3	4	5	6	7
Assigned Phs	2						8
Phs Duration (G+Y+Rc), s	101.7						22.3
Change Period (Y+Rc), s	* 4.8						4.8
Max Green Setting (Gmax), s	* 86						28.2
Max Q Clear Time (g_c+H), s	20.6						15.9
Green Ext Time (p_c), s	36.5						1.6
Intersection Summary	11.5						
HCM 2010 Ctrl Delay	B						
HCM 2010 LOS	B						
Notes							

Corona Station T/A
PM Existing
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HCM 2010 Signalized Intersection Summary
8: US 101 SB On-Ramp/US 101 SB Off-Ramp & E Washington St

10/24/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR	Diagram
Lane Configurations	↑↑	↑↑	↑↑	↑↑			↔
Traffic Volume (veh/h)	0	1338	146	245	1087	0	
Future Volume (veh/h)	0	1338	146	245	1087	0	
Number	5	2	12	1	6	16	
Initial Q (Ob), veh	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	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	
Adj Sat Flow, veh/h	0	1863	1863	1863	1863	0	
Adj Flow Rate, veh/h	0	1394	99	255	1132	0	
Adj No. of Lanes	0	2	1	2	2	0	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	
Percent Heavy Veh, %	0	2	2	2	2	2	
Cap. veh/h	0	2009	899	327	2464	0	
Arrive On Green	0.00	0.57	0.57	0.06	0.47	0.00	
Sat Flow, veh/h	0	3632	1583	3442	3632	0	
Grp Volume(v), veh/h	0	1394	99	255	1132	0	
Grp Sat Flow(s), veh/h	0	1770	1583	1721	1770	0	
Q Serve(g, s)	0.0	34.8	3.6	9.1	26.9	0.0	
Cycle Q Clear(g, c), s	0.0	34.8	3.6	9.1	26.9	0.0	
Prop In Lane	0.00	1.00	1.00	1.00	1.00	0.00	
Lane Grp Cap(c), veh/h	0	2009	899	327	2464	0	
V/C Ratio(X)	0.00	0.69	0.11	0.78	0.46	0.00	
Avail Cap(c, a), veh/h	0	2009	899	439	2464	0	
HCM Platoon Ratio	1.00	1.00	1.00	0.67	1.00	1.00	
Upstream Filter(I)	0.00	1.00	1.00	0.82	0.82	0.00	
Uniform Delay (d), s/veh	0.0	19.1	12.4	56.8	17.2	0.0	
Incr Delay (d2), s/veh	0.0	2.0	0.2	8.2	0.5	0.0	
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	
%ile Back(Q)(50%), veh/m	0.0	17.4	1.6	4.7	13.4	0.0	
LnGrp Delay(d), s/veh	0.0	21.1	12.6	65.0	17.7	0.0	
LnGrp LOS	C	B	E	B	B	E	
Approach Vol, veh/h	1493			1387			
Approach Delay, s/veh	20.6			26.4			
Approach LOS	C			C			
Timer	1	2	3	4	5	6	7
Assigned Phs	1	2					8
Phs Duration (G+Y+Rc), s	16.0	75.0					6
Change Period (Y+Rc), s	* 4.2	4.6					4.6
Max Green Setting (Gmax), s	* 16	58.4					78.4
Max Q Clear Time (g_c+H), s	11.1	36.8					28.9
Green Ext Time (p_c), s	0.7	15.8					22.4
Intersection Summary	28.5						
HCM 2010 Ctrl Delay	C						
HCM 2010 LOS	C						
Notes							

Corona Station T/A
PM Existing
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HCM 2010 Signalized Intersection Summary
 2: US 101 N & Old Redwood Hwy N

10/24/2018

HCM 2010 Signalized Intersection Summary
 1: Old Redwood Hwy N & US 101 S

10/24/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑↑	↑↑
Traffic Volume (veh/h)	1102	0	0	691	120	494
Future Volume (veh/h)	1102	0	0	691	120	494
Number	2	12	1	6	3	18
Initial Q (Ob), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	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
Adj Sat Flow, veh/h/ln	1863	1863	0	1863	1863	1863
Adj Flow Rate, veh/h	1160	0	0	727	126	520
Adj No. of Lanes	2	1	0	2	2	2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	0	2	2	2
Cap. veh/h	1842	824	0	1842	923	748
Arrive On Green	0.52	0.00	0.00	0.52	0.27	0.27
Sat Flow, veh/h	3632	1583	0	3725	3442	2787
Grp Volume(v), veh/h	1160	0	0	727	126	520
Grp Sat Flow(s), veh/h/ln	1770	1583	0	1770	1721	1393
Q Serve(g, s), s	10.8	0.0	0.0	5.7	1.3	7.8
Cycle Q Clear(g, c), s	10.8	0.0	0.0	5.7	1.3	7.8
Prop In Lane	1.00	0.00	0.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	1842	824	0	1842	923	748
V/C Ratio(X)	0.63	0.00	0.00	0.39	0.14	0.70
Avail Cap(c, a), veh/h	2594	1161	0	2594	2523	2043
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(i)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	7.9	0.0	0.0	6.7	12.9	15.3
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.2	0.1	1.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back(Q)(50%), veh/ln	5.3	0.0	0.0	2.8	0.6	3.1
LnGrp Delay(d), s/veh	8.4	0.0	0.0	6.9	13.0	16.4
LnGrp LOS	A			A	B	B
Approach Vol, veh/h	1160			727	646	
Approach Delay, s/veh	8.4			6.9	15.8	
Approach LOS	A			A	B	
Timer	1	2	3	4	5	6
Assigned Phs		2				6
Phs Duration (G+Y+Rc), s		29.2				17.1
Change Period (Y+Rc), s		5.1				4.7
Max Green Setting (Gmax), s		34.0				34.0
Max Q Clear Time (g_c+H), s		12.8				9.8
Green Ext Time (p_c), s		11.3				7.6
Intersection Summary	HCM 2010 Ctrl Delay					
	9.9					
HCM 2010 LOS	A					

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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Traffic Volume (veh/h)	0	761	801	0	740	596
Future Volume (veh/h)	0	761	801	0	740	596
Number	5	2	6	16	7	14
Initial Q (Ob), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	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
Adj Sat Flow, veh/h/ln	0	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	0	810	852	0	787	634
Adj No. of Lanes	0	2	2	1	2	2
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	1968	1968	880	983	796
Cap. veh/h	0.00	0.96	0.96	0.00	0.29	0.29
Arrive On Green	0	3725	3632	1583	3442	2787
Sat Flow, veh/h	0	810	852	0	787	634
Grp Volume(v), veh/h	0	1770	1770	1583	1721	1393
Grp Sat Flow(s), veh/h/ln	0.0	8.6	9.1	0.0	13.8	13.7
Q Serve(g, s), s	0.0	8.6	9.1	0.0	13.8	13.7
Cycle Q Clear(g, c), s	0.0	8.6	9.1	0.0	13.8	13.7
Prop In Lane	0.00	1.00	1.00	0.00	1.00	1.00
Lane Grp Cap(c), veh/h	0	1968	1968	880	983	796
V/C Ratio(X)	0.00	0.41	0.43	0.00	0.80	0.80
Avail Cap(c, a), veh/h	0	1968	1968	880	1107	896
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(i)	0.00	1.00	0.94	0.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	8.3	8.4	0.0	21.5	21.5
Incr Delay (d2), s/veh	0.0	0.6	0.7	0.0	3.9	4.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back(Q)(50%), veh/ln	0.0	4.3	4.6	0.0	7.0	5.7
LnGrp Delay(d), s/veh	0.0	8.9	9.1	0.0	25.4	26.1
LnGrp LOS	A	A	A		C	C
Approach Vol, veh/h	810	852			1421	
Approach Delay, s/veh	8.9	9.1			25.7	
Approach LOS	A	A			C	
Timer	1	2	3	4	5	6
Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		41.3		23.7		41.3
Change Period (Y+Rc), s		* 5.2		20.9		* 5.2
Max Green Setting (Gmax), s		* 34		50.8		* 34
Max Q Clear Time (g_c+H), s		10.6		15.8		11.1
Green Ext Time (p_c), s		7.9		2.8		8.6
Intersection Summary	HCM 2010 Ctrl Delay					
	16.7					
HCM 2010 LOS	B					

Corona Station T/A
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3: N McDowell Blvd & Old Redwood Hwy N

10/24/2018

4: N McDowell Rd/N McDowell Blvd & Corona Rd

10/24/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	215	645	694	149	545	12	468	68	43	11	26
Future Volume (veh/h)	215	645	694	149	545	12	468	68	43	11	26
Number	5	2	12	1	6	16	3	8	18	7	4
Initial Q (Ob), veh	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	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
Adj Sat Flow, veh/hln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	222	665	0	154	562	12	532	0	44	11	27
Adj No. of Lanes	1	2	1	1	2	0	2	0	1	1	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	218	769	344	685	1731	37	601	0	268	126	133
Arrive On Green	0.12	0.22	0.00	0.39	0.49	0.49	0.17	0.00	0.17	0.07	0.07
Sat Flow, veh/h	1774	3539	1583	1774	3543	76	3548	0	1583	1774	1863
Grp Volume(V), veh/h	222	665	0	154	280	294	532	0	44	11	27
Grp Sat Flow(s), veh/hln	1774	1770	1583	1774	1770	1849	1774	0	1583	1774	1863
Q Serve(g, s)	16.0	23.5	0.0	7.6	12.5	12.5	19.0	0.0	3.1	0.8	1.8
Cycle Q Clear(g, c), s	16.0	23.5	0.0	7.6	12.5	12.5	19.0	0.0	3.1	0.8	1.8
Prop In Lane	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	218	769	344	685	864	903	601	0	268	126	133
V/C Ratio(X)	1.02	0.86	0.00	0.22	0.32	0.32	0.88	0.00	0.16	0.09	0.20
Avail Cap(c, a), veh/h	218	841	376	685	864	903	999	0	446	412	433
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
Upstream Filter(I)	0.73	0.73	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.0	49.0	0.0	26.8	20.2	20.2	52.7	0.0	46.1	56.4	56.9
Incr Delay (d2), s/veh	56.2	9.4	0.0	0.1	1.0	1.0	3.0	0.0	0.1	0.1	0.3
Initial Q Delay(d3), s/veh	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	11.2	12.6	0.0	3.7	6.3	6.6	9.6	0.0	1.4	0.4	0.9
LnGrp Delay(d), s/veh	113.4	58.5	0.0	26.9	21.2	21.2	55.8	0.0	46.2	56.5	57.2
LnGrp LOS	F	E	E	C	C	C	E	E	D	E	E
Approach Vol, veh/h	887			728			576				72
Approach Delay, s/veh	72.2			22.4			55.0				57.4
Approach LOS	E			C			E				E
Timer	1	2	3	4	5	6	7	8			
Assigned Phs	1	2		4	5	6					
Phs Duration (G+Y+Rc), s	55.2	33.3		14.1	20.0	68.5					
Change Period (Y+Rc), s	5.0	* 5.1		* 4.8	4.0	5.0					
Max Green Setting (Gmax), s	13.0	* 31		* 30	16.0	28.0					
Max Q Clear Time (g_c+H), s	9.6	25.5		4.6	18.0	14.5					
Green Ext Time (p_c), s	0.1	2.7		0.1	0.0	4.4					
Intersection Summary	51.3										
HCM 2010 Ctrl Delay	D										
HCM 2010 LOS	D										
Notes											

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	218	229	249	83	294	387	155	470	34	139	449
Future Volume (veh/h)	218	229	249	83	294	387	155	470	34	139	449
Number	5	2	12	1	6	16	3	8	18	7	4
Initial Q (Ob), veh	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	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
Adj Sat Flow, veh/hln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	227	239	115	86	306	323	161	490	24	145	468
Adj No. of Lanes	1	1	1	1	1	1	1	1	2	0	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	231	448	381	177	377	483	500	1268	62	182	602
Arrive On Green	0.13	0.24	0.24	0.10	0.20	0.20	0.28	0.37	0.37	0.10	0.19
Sat Flow, veh/h	1774	1863	1583	1774	1863	1583	1774	3435	168	1774	3221
Grp Volume(V), veh/h	227	239	115	86	306	323	161	252	262	145	256
Grp Sat Flow(s), veh/hln	1774	1863	1583	1774	1863	1583	1774	1770	1833	1774	1770
Q Serve(g, s)	12.8	11.2	2.9	4.6	15.7	10.8	7.2	10.5	10.5	8.0	13.8
Cycle Q Clear(g, c), s	12.8	11.2	2.9	4.6	15.7	10.8	7.2	10.5	10.5	8.0	13.8
Prop In Lane	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	231	448	381	177	377	483	500	663	676	182	331
V/C Ratio(X)	0.98	0.53	0.30	0.49	0.81	0.67	0.32	0.39	0.39	0.80	0.78
Avail Cap(c, a), veh/h	231	505	429	195	469	562	500	653	676	291	444
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
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.79	0.79	0.79	1.00	1.00
Uniform Delay (d), s/veh	43.4	33.1	7.6	42.6	38.1	13.2	28.4	23.2	23.2	43.8	38.7
Incr Delay (d2), s/veh	54.6	1.4	0.6	2.0	9.6	3.0	0.3	1.4	1.3	10.6	16.2
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
%ile BackOfQ(50%), veh/ln	9.7	6.0	1.3	2.3	9.1	5.1	3.5	5.4	5.6	4.4	8.2
LnGrp Delay(d), s/veh	98.0	34.5	8.2	44.6	47.7	16.2	28.6	24.6	24.5	54.5	54.8
LnGrp LOS	F	C	A	D	D	B	C	C	C	D	D
Approach Vol, veh/h	581			715			675				664
Approach Delay, s/veh	54.1			33.1			25.5				54.8
Approach LOS	D			C			C				D
Timer	1	2	3	4	5	6	7	8			
Assigned Phs	1	2		3	4	5	6	7	8		
Phs Duration (G+Y+Rc), s	14.0	28.9	33.5	23.6	17.9	25.0	14.9	42.2			
Change Period (Y+Rc), s	4.0	4.9	5.3	* 4.9	* 4.9	* 4.8	4.6	5.3			
Max Green Setting (Gmax), s	11.0	27.1	19.0	* 25	* 13	* 25	16.4	26.7			
Max Q Clear Time (g_c+H), s	6.6	13.2	9.2	15.9	14.8	17.7	10.0	12.5			
Green Ext Time (p_c), s	0.1	2.1	0.3	2.8	0.0	2.5	0.3	3.6			
Intersection Summary	41.3										
HCM 2010 Ctrl Delay	D										
HCM 2010 LOS	D										
Notes											

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HCM 2010 Signalized Intersection Summary

5: Petaluma Blvd N & Skillman Lane/Corona Rd

10/24/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	1	1	1	1	1	1	1	1	1
Traffic Volume (veh/h)	211	207	55	280	151	21	49	508	330	40	716	173
Future Volume (veh/h)	211	207	55	280	151	21	49	508	330	40	716	173
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Ob), 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	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
Adj Sat Flow, veh/h	1900	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	222	218	57	295	159	8	52	535	184	42	754	104
Adj No. of Lanes	0	1	0	1	1	1	0	1	2	1	1	2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	238	234	61	338	335	17	87	927	415	108	856	118
Arrive On Green	0.30	0.30	0.30	0.19	0.19	0.19	0.05	0.26	0.26	0.06	0.27	0.27
Sat Flow, veh/h	798	784	205	1774	1759	88	1774	3539	1583	1774	3125	431
Grp Volume(V), veh/h	497	0	0	295	0	167	52	535	184	42	427	431
Grp Sat Flow(s), veh/h	1787	0	0	1774	0	1847	1774	1770	1583	1774	1770	1787
Q Serve(g, s)	26.6	0.0	0.0	15.9	0.0	7.9	2.8	12.9	9.5	2.2	22.7	22.7
Cycle Q Clear(g, c), s	26.6	0.0	0.0	15.9	0.0	7.9	2.8	12.9	9.5	2.2	22.7	22.7
Prop In Lane	0.45	0.0	0.11	1.00	0.0	0.05	1.00	1.00	1.00	1.00	1.00	0.24
Lane Grp Cap(c), veh/h	533	0	0	338	0	352	87	927	415	108	485	489
V/C Ratio(X)	0.93	0.00	0.00	0.87	0.00	0.47	0.60	0.58	0.44	0.39	0.88	0.88
Avail Cap(c, a), veh/h	599	0	0	541	0	563	180	1259	563	180	630	636
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.5	0.0	0.0	38.7	0.0	35.4	45.8	31.6	30.3	44.4	34.2	34.2
Incr Delay (d2), s/veh	19.4	0.0	0.0	5.4	0.0	0.4	2.4	0.2	0.3	0.8	9.5	9.5
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 BackOf(50%), veh/h	16.0	0.0	0.0	8.3	0.0	4.1	1.4	6.3	4.2	1.1	12.3	12.4
LnGrp Delay(d), s/veh	53.0	0.0	0.0	44.1	0.0	35.8	48.2	31.8	30.6	45.3	43.7	43.7
LnGrp LOS	D	D	D	D	D	D	D	C	C	D	D	D
Approach Vol, veh/h	497			462			771			900		
Approach Delay, s/veh	53.0			41.1			32.6			43.7		
Approach LOS	D			D			C			D		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.8	32.4	33.9	10.0	31.3	25.2						
Change Period (Y+Rc), s	4.0	5.5	4.5	4.0	5.5	4.5						
Max Green Setting (Gmax), s	10.0	35.0	33.0	10.0	35.0	30.0						
Max Q Clear Time (g_c+H), s	4.8	24.7	28.6	4.2	14.9	17.9						
Green Ext Time (p_c), s	0.0	2.2	0.8	0.0	2.0	0.9						
Intersection Summary	41.8											
HCM 2010 Ctrl Delay	D											
HCM 2010 LOS	D											
Notes												

Corona Station T/A
AM Background
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HCM 2010 Signalized Intersection Summary

6: S McDowell Blvd/N McDowell Rd & E Washington St

10/24/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	1	1	1	1	1	1	1	1	1
Traffic Volume (veh/h)	464	551	301	33	709	115	405	479	49	61	346	537
Future Volume (veh/h)	464	551	301	33	709	115	405	479	49	61	346	537
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Ob), 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	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
Adj Sat Flow, veh/h	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	483	574	287	34	739	52	422	499	41	64	360	448
Adj No. of Lanes	2	2	0	1	2	1	2	2	0	1	2	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	449	897	448	43	1002	448	418	1171	96	82	976	643
Arrive On Green	0.04	0.13	0.13	0.02	0.28	0.28	0.12	0.35	0.35	0.05	0.28	0.28
Sat Flow, veh/h	3442	2288	1143	1774	3539	1583	3442	3313	271	1774	3539	1583
Grp Volume(V), veh/h	483	444	417	34	739	52	422	266	274	64	360	448
Grp Sat Flow(s), veh/h	1721	1770	1661	1774	1770	1583	1721	1770	1815	1774	1770	1583
Q Serve(g, s)	14.6	26.7	26.7	2.1	21.2	2.1	13.6	12.8	12.9	4.0	9.2	26.2
Cycle Q Clear(g, c), s	14.6	26.7	26.7	2.1	21.2	2.1	13.6	12.8	12.9	4.0	9.2	26.2
Prop In Lane	1.00	0.69	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	449	694	661	43	1002	448	418	625	641	82	976	643
V/C Ratio(X)	1.08	0.64	0.64	0.79	0.74	0.12	1.01	0.43	0.43	0.78	0.37	0.70
Avail Cap(c, a), veh/h	449	694	661	93	1002	448	418	625	641	157	1068	684
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.85	0.85
Uniform Delay (d), s/veh	53.6	41.2	41.3	54.4	36.4	29.7	49.2	27.6	27.6	52.8	32.7	27.6
Incr Delay (d2), s/veh	62.7	4.1	4.4	27.1	4.8	0.5	46.5	0.7	0.6	12.3	0.3	2.8
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 BackOf(50%), veh/h	10.9	13.9	13.1	1.4	11.0	1.3	9.1	6.4	6.6	2.2	4.5	11.9
LnGrp Delay(d), s/veh	116.3	45.3	45.6	81.5	41.2	30.3	95.7	28.2	28.2	65.2	33.0	30.3
LnGrp LOS	F	D	D	F	D	C	F	C	C	E	C	C
Approach Vol, veh/h	1344			825			962			872		
Approach Delay, s/veh	70.9			42.2			57.8			34.0		
Approach LOS	E			D			E			C		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.8	49.1	19.0	36.1	20.0	36.9	10.3	44.8				
Change Period (Y+Rc), s	5.1	* 5.2	5.4	* 5.2	5.4	* 5.2	5.1	* 5.2				
Max Green Setting (Gmax), s	5.9	* 3.8	13.6	* 3.4	14.6	* 2.9	9.9	* 3.8				
Max Q Clear Time (g_c+H), s	4.1	28.7	15.6	28.2	16.6	23.2	6.0	14.9				
Green Ext Time (p_c), s	0.0	4.8	0.0	2.6	0.0	3.0	0.0	4.7				
Intersection Summary	53.8											
HCM 2010 Ctrl Delay	D											
HCM 2010 LOS	D											
Notes												

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HCM 2010 Signalized Intersection Summary
 2: US 101 N & Old Redwood Hwy N

10/24/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Traffic Volume (veh/h)	0	1030	916	0	421	523
Future Volume (veh/h)	0	1030	916	0	421	523
Number	5	2	6	16	7	14
Initial Q (Ob), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	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
Adj Sat Flow, veh/h/ln	0	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	0	1108	985	0	453	562
Adj No. of Lanes	0	2	2	1	2	2
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	2	2	2	2	2
Cap. veh/h	0	2165	2170	971	908	735
Arrive On Green	0.00	0.61	0.61	0.00	0.26	0.26
Sat Flow, veh/h	0	3725	3632	1563	3442	2787
Grp Volume(v), veh/h	0	1108	985	0	453	562
Grp Sat Flow(s), veh/h/ln	0	1770	1770	1563	1721	1393
Q Serve(g, s), s	0.0	11.5	9.7	0.0	7.3	12.1
Cycle Q Clear(g, c), s	0.0	11.5	9.7	0.0	7.3	12.1
Prop In Lane	0.00	1.00	0.91	0.00	1.00	1.00
Lane Grp Cap(c), veh/h	0	2165	2170	971	908	735
V/C Ratio(X)	0.00	0.51	0.45	0.00	0.50	0.76
Avail Cap(c, a), veh/h	0	2165	2170	971	1059	857
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(i)	0.00	1.00	0.91	0.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	7.1	6.7	0.0	20.3	22.1
Incr Delay (d2), s/veh	0.0	0.9	0.6	0.0	0.4	3.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	0.0	5.8	4.8	0.0	3.5	5.0
LnGrp Delay(d), s/veh	0.0	8.0	7.4	0.0	20.7	25.6
LnGrp LOS	A	A	A	C	C	C
Approach Vol, veh/h	1108	985	1015			
Approach Delay, s/veh	8.0	7.4	23.4			
Approach LOS	A	A	C			
Timer	1	2	3	4	5	6
Assigned Phs	2	4	4	5	6	7
Phs Duration (G+Y+Rc), s	43.9	21.1	21.1	4	6	8
Change Period (Y+Rc), s	* 5.2	5.1	5.1		43.9	
Max Green Setting (Gmax), s	* 36	18.9	18.9		* 36	
Max Q Clear Time (g_c+H), s	13.5	14.1	14.1		11.7	
Green Ext Time (p_c), s	11.1	2.0	2.0		10.4	
Intersection Summary						
HCM 2010 Ctrl Delay	12.8					
HCM 2010 LOS	B					
Notes						

Corona Station T/A
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HCM 2010 Signalized Intersection Summary
 1: Old Redwood Hwy N & US 101 S

10/24/2018

Movement	EBT	EBL	WBT	WBL	SBL	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Traffic Volume (veh/h)	871	0	839	98	250	
Future Volume (veh/h)	871	0	839	98	250	
Number	2	12	1	6	3	18
Initial Q (Ob), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	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
Adj Sat Flow, veh/h/ln	1863	1863	0	1863	1863	1863
Adj Flow Rate, veh/h	917	0	0	883	103	263
Adj No. of Lanes	2	1	0	2	2	2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	0	2	2	2
Cap. veh/h	1952	873	0	1952	698	565
Arrive On Green	0.95	0.00	0.00	0.55	0.20	0.20
Sat Flow, veh/h	3632	1563	0	3725	3442	2787
Grp Volume(v), veh/h	917	0	0	883	103	263
Grp Sat Flow(s), veh/h/ln	1770	1563	0	1770	1721	1393
Q Serve(g, s), s	5.1	0.0	0.0	4.9	0.8	2.7
Cycle Q Clear(g, c), s	5.1	0.0	0.0	4.9	0.8	2.7
Prop In Lane	1.00	0.00	0.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	1952	873	0	1952	698	565
V/C Ratio(X)	0.47	0.00	0.00	0.45	0.15	0.47
Avail Cap(c, a), veh/h	3813	1706	0	3813	3666	2968
HCM Platoon Ratio	1.00	1.00	0.00	1.00	1.00	1.00
Upstream Filter(i)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	4.4	0.0	0.0	4.4	10.7	11.4
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.2	0.1	0.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	2.5	0.0	0.0	2.4	0.4	1.1
LnGrp Delay(d), s/veh	4.7	0.0	0.0	4.6	10.8	12.0
LnGrp LOS	A	A	A	B	B	B
Approach Vol, veh/h	917	883	366			
Approach Delay, s/veh	4.7	4.6	11.7			
Approach LOS	A	A	B			
Timer	1	2	3	4	5	6
Assigned Phs	2	3	4	5	6	7
Phs Duration (G+Y+Rc), s	22.0	22.0	22.0	6	8	8
Change Period (Y+Rc), s	5.1	5.1	5.1		22.0	
Max Green Setting (Gmax), s	34.0	34.0	34.0		34.0	
Max Q Clear Time (g_c+H), s	7.1	7.1	7.1		6.9	
Green Ext Time (p_c), s	9.8	9.8	9.8		9.7	
Intersection Summary						
HCM 2010 Ctrl Delay	5.8					
HCM 2010 LOS	A					
Notes						

Corona Station T/A
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HCM 2010 Signalized Intersection Summary
 2: US 101 N & Old Redwood Hwy N

10/24/2018

Movement	EBT	EBL	WBT	WBL	SBL	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Traffic Volume (veh/h)	871	0	839	98	250	
Future Volume (veh/h)	871	0	839	98	250	
Number	2	12	1	6	3	18
Initial Q (Ob), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	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
Adj Sat Flow, veh/h/ln	1863	1863	0	1863	1863	1863
Adj Flow Rate, veh/h	917	0	0	883	103	263
Adj No. of Lanes	2	1	0	2	2	2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	0	2	2	2
Cap. veh/h	1952	873	0	1952	698	565
Arrive On Green	0.95	0.00	0.00	0.55	0.20	0.20
Sat Flow, veh/h	3632	1563	0	3725	3442	2787
Grp Volume(v), veh/h	917	0	0	883	103	263
Grp Sat Flow(s), veh/h/ln	1770	1563	0	1770	1721	1393
Q Serve(g, s), s	5.1	0.0	0.0	4.9	0.8	2.7
Cycle Q Clear(g, c), s	5.1	0.0	0.0	4.9	0.8	2.7
Prop In Lane	1.00	0.00	0.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	1952	873	0	1952	698	565
V/C Ratio(X)	0.47	0.00	0.00	0.45	0.15	0.47
Avail Cap(c, a), veh/h	3813	1706	0	3813	3666	2968
HCM Platoon Ratio	1.00	1.00	0.00	1.00	1.00	1.00
Upstream Filter(i)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	4.4	0.0	0.0	4.4	10.7	11.4
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.2	0.1	0.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	2.5	0.0	0.0	2.4	0.4	1.1
LnGrp Delay(d), s/veh	4.7	0.0	0.0	4.6	10.8	12.0
LnGrp LOS	A	A	A	B	B	B
Approach Vol, veh/h	917	883	366			
Approach Delay, s/veh	4.7	4.6	11.7			
Approach LOS	A	A	B			
Timer	1	2	3	4	5	6
Assigned Phs	2	3	4	5	6	7
Phs Duration (G+Y+Rc), s	22.0	22.0	22.0	6	8	8
Change Period (Y+Rc), s	5.1	5.1	5.1		22.0	
Max Green Setting (Gmax), s	34.0	34.0	34.0		34.0	
Max Q Clear Time (g_c+H), s	7.1	7.1	7.1		6.9	
Green Ext Time (p_c), s	9.8	9.8	9.8		9.7	
Intersection Summary						
HCM 2010 Ctrl Delay	5.8					
HCM 2010 LOS	A					
Notes						

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3: N McDowell Blvd & Old Redwood Hwy N

10/24/2018

4: N McDowell Rd/N McDowell Blvd & Corona Rd

10/24/2018

HCM 2010 Signalized Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	79	577	453	110	532	14	700	46	239	24	77	274
Traffic Volume (veh/h)	79	577	453	110	532	14	700	46	239	24	77	274
Future Volume (veh/h)	5	2	12	1	6	16	3	8	18	7	4	14
Number	0	0	0	0	0	0	0	0	0	0	0	0
Initial Q (Qb), veh	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	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
Adj Sat Flow, veh/hln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	87	634	0	121	585	15	805	0	263	26	85	301
Adj No. of Lanes	1	2	1	1	2	0	2	0	1	1	1	1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	131	773	346	329	1191	31	907	0	405	373	391	333
Arrive On Green	0.07	0.22	0.00	0.19	0.34	0.33	0.26	0.00	0.26	0.21	0.21	0.21
Sat Flow, veh/h	1774	3539	1583	1774	3526	90	3548	0	1583	1774	1863	1583
Grp Volume(V), veh/h	87	634	0	121	293	307	805	0	263	26	85	301
Grp Sat Flow(S), veh/hln	1774	1770	1583	1774	1770	1847	1774	0	1583	1774	1863	1583
Q Serve(g, s)	6.2	22.2	0.0	7.8	17.1	17.1	28.4	0.0	19.3	1.5	4.9	24.1
Cycle Q Clear(g, c), s	6.2	22.2	0.0	7.8	17.1	17.1	28.4	0.0	19.3	1.5	4.9	24.1
Prop In Lane	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	131	773	346	329	598	624	907	0	405	373	391	333
V/C Ratio(X)	0.67	0.82	0.00	0.37	0.49	0.49	0.89	0.00	0.65	0.07	0.22	0.91
Avail Cap(c, a), veh/h	218	871	390	329	598	624	1037	0	463	423	444	378
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)	0.89	0.89	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.7	48.4	0.0	46.3	34.2	34.2	46.6	0.0	43.2	41.2	42.5	50.1
Incr Delay (d2), s/veh	1.9	8.6	0.0	0.3	2.9	2.8	8.0	0.0	1.7	0.0	0.1	21.5
Initial Q Delay(Q3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	3.1	11.8	0.0	3.8	8.9	9.3	14.9	0.0	8.6	0.8	2.5	12.5
LnGrp Delay(d), s/veh	60.6	57.0	0.0	46.6	37.0	37.0	54.6	0.0	44.9	41.2	42.6	71.6
LnGrp LOS	E	E	D	D	D	D	D	D	D	D	D	E
Approach Vol, veh/h	721			721			1068					412
Approach Delay, s/veh	57.4			38.6			52.2					63.7
Approach LOS	E			D			D					E
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	29.1	32.4		31.3	13.6	47.9	37.2					
Change Period (Y+Rc), s	5.0	* 5.1		* 4.8	4.0	5.0	5.4					
Max Green Setting (Gmax), s	13.0	* 31		* 30	16.0	28.0	36.6					
Max Q Clear Time (g_c+H), s	9.8	24.2		26.1	8.2	19.1	30.4					
Green Ext Time (p_c), s	0.0	3.1		0.4	0.0	3.5	1.4					
Intersection Summary	51.7											
HCM 2010 Ctrl Delay	D											
HCM 2010 LOS	E											
Notes												

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	157	336	283	51	241	214	231	652	88	324	682	215
Traffic Volume (veh/h)	157	336	283	51	241	214	231	652	88	324	682	215
Future Volume (veh/h)	5	2	12	1	6	16	3	8	18	7	4	14
Number	0	0	0	0	0	0	0	0	0	0	0	0
Initial Q (Qb), veh	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	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
Adj Sat Flow, veh/hln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	167	357	164	54	256	182	246	694	87	345	726	185
Adj No. of Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	218	419	356	143	325	518	414	1249	156	274	850	216
Arrive On Green	0.12	0.22	0.22	0.08	0.17	0.17	0.23	0.39	0.38	0.15	0.30	0.30
Sat Flow, veh/h	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Grp Volume(V), veh/h	167	357	164	54	256	182	246	694	87	345	726	185
Grp Sat Flow(S), veh/hln	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Q Serve(g, s)	10.0	20.2	5.6	3.2	14.5	6.1	13.6	18.7	18.8	17.0	26.9	26.9
Cycle Q Clear(g, c), s	10.0	20.2	5.6	3.2	14.5	6.1	13.6	18.7	18.8	17.0	26.9	26.9
Prop In Lane	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	218	419	356	143	325	518	414	1249	156	274	850	216
V/C Ratio(X)	0.77	0.85	0.46	0.38	0.79	0.35	0.59	0.56	0.56	0.26	0.85	0.85
Avail Cap(c, a), veh/h	218	474	403	177	440	616	414	698	707	274	579	589
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	0.73	0.73	0.73	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.7	40.9	11.9	47.9	43.4	12.9	37.6	25.8	26.0	45.5	36.0	36.2
Incr Delay (d2), s/veh	15.1	13.6	1.3	1.6	7.9	0.6	1.7	2.3	2.3	14.2	15.8	16.1
Initial Q Delay(Q3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	5.8	12.0	2.6	1.6	8.2	2.7	6.8	9.6	9.8	19.1	15.5	15.3
LnGrp Delay(d), s/veh	61.8	54.5	13.3	49.6	51.4	13.4	39.2	28.1	28.3	188.9	51.8	52.2
LnGrp LOS	E	D	B	D	D	B	D	C	C	F	D	D
Approach Vol, veh/h	688			492			1027					1256
Approach Delay, s/veh	46.4			37.1			30.8					89.6
Approach LOS	D			D			C					F
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.9	28.7	30.9	37.4	16.4	23.2	21.0	47.4				
Change Period (Y+Rc), s	4.0	4.9	5.3	* 4.9	* 4.9	* 4.8	4.6	5.3				
Max Green Setting (Gmax), s	11.0	27.1	19.0	* 35	* 13	* 25	16.4	36.7				
Max Q Clear Time (g_c+H), s	5.2	22.2	15.6	28.9	12.0	16.5	19.0	20.8				
Green Ext Time (p_c), s	0.0	1.6	0.2	3.6	0.0	2.0	0.0	6.1				
Intersection Summary	56.2											
HCM 2010 Ctrl Delay	E											
HCM 2010 LOS	E											
Notes												

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5: Petaluma Blvd N & Skillman Lane/Corona Rd

10/24/2018

6: S McDowell Blvd/N McDowell Rd & E Washington St

10/24/2018

5: Petaluma Blvd N & Skillman Lane/Corona Rd

10/24/2018

6: S McDowell Blvd/N McDowell Rd & E Washington St

10/24/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4
Traffic Volume (veh/h)	203	180	46	370	175	26	55	847	436	46	777
Future Volume (veh/h)	203	180	46	370	175	26	55	847	436	46	777
Number	7	4	14	3	8	18	1	6	16	5	2
Initial Q (Ob), veh	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	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
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1900	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	205	182	40	374	177	15	56	856	294	46	785
Adj No. of Lanes	0	1	0	1	1	0	1	2	1	1	2
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	226	201	44	419	400	34	89	1018	455	103	940
Arrive On Green	0.26	0.26	0.26	0.24	0.24	0.23	0.05	0.29	0.29	0.06	0.30
Sat Flow, veh/h	859	763	168	1774	1694	144	1774	3539	1583	1774	3184
Grp Volume(V), veh/h	427	0	0	374	0	192	56	856	294	46	436
Grp Sat Flow(S), veh/h/ln	1790	0	0	1774	0	1837	1774	1770	1583	1774	1770
Q Serve(g, s)	23.9	0.0	0.0	21.1	0.0	9.2	3.2	23.5	16.8	2.6	23.8
Cycle Q Clear(g, c), s	23.9	0.0	0.0	21.1	0.0	9.2	3.2	23.5	16.8	2.6	23.8
Prop In Lane	0.48	0.09	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	471	0	0	419	0	434	89	1018	455	103	523
V/C Ratio(X)	0.91	0.00	0.00	0.89	0.00	0.44	0.63	0.84	0.65	0.45	0.83
Avail Cap(c, a), veh/h	580	0	0	523	0	542	172	1249	559	172	625
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
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.9	0.0	0.0	38.2	0.0	33.7	48.1	34.6	32.2	47.1	34.1
Incr Delay (d2), s/veh	14.2	0.0	0.0	13.2	0.0	0.3	2.7	3.7	0.9	1.1	7.1
Initial Q Delay(Q3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	13.6	0.0	0.0	11.8	0.0	4.7	1.6	11.9	7.5	1.3	12.7
LnGrp Delay(d), s/veh	51.1	0.0	0.0	51.4	0.0	34.0	50.8	38.3	33.1	48.2	41.2
LnGrp LOS	D	D	D	C	D	C	D	D	C	D	D
Approach Vol, veh/h	427			566			1206				925
Approach Delay, s/veh	51.1			45.5			37.7				41.6
Approach LOS	D			D			D				D
Timer	1	2	3	4	5	6	7	8			
Assigned Phs	1	2	3	4	5	6	7	8			
Phs Duration (G+Y+Rc), s	9.2	34.5		31.2	10.0	33.7	28.4				
Change Period (Y+Rc), s	4.0	5.5		4.5	4.0	5.5	4.5				
Max Green Setting (Gmax), s	10.0	35.0		33.0	10.0	35.0	30.0				
Max Q Clear Time (g_c+H), s	5.2	23.9		25.9	4.6	25.5	23.1				
Green Ext Time (p_c), s	0.0	2.2		0.9	0.0	2.7	0.8				
Intersection Summary											
HCM 2010 Ctrl Delay	42.1										
HCM 2010 LOS	D										
Notes											

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4
Traffic Volume (veh/h)	677	831	368	37	551	112	372	470	41	166	533
Future Volume (veh/h)	677	831	368	37	551	112	372	470	41	166	533
Number	5	2	12	1	6	16	3	8	18	7	4
Initial Q (Ob), veh	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	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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863
Adj Flow Rate, veh/h	691	848	338	38	562	35	380	480	34	169	544
Adj No. of Lanes	2	2	0	1	2	1	2	2	0	1	2
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	833	1198	476	64	993	444	444	649	46	273	776
Arrive On Green	0.08	0.16	0.16	0.04	0.28	0.28	0.13	0.19	0.18	0.15	0.22
Sat Flow, veh/h	3442	2475	983	1774	3539	1583	3442	3354	237	1774	3539
Grp Volume(V), veh/h	691	605	581	38	562	35	360	253	261	169	544
Grp Sat Flow(S), veh/h/ln	1721	1770	1689	1774	1770	1583	1721	1770	1821	1774	1770
Q Serve(g, s)	24.5	40.2	40.4	2.6	16.8	2.0	13.4	16.7	16.8	11.0	17.6
Cycle Q Clear(g, c), s	24.5	40.2	40.4	2.6	16.8	2.0	13.4	16.7	16.8	11.0	17.6
Prop In Lane	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	833	857	818	64	993	444	444	343	352	273	776
V/C Ratio(X)	0.83	0.71	0.71	0.59	0.57	0.08	0.86	0.74	0.74	0.62	0.70
Avail Cap(c, a), veh/h	860	857	818	114	993	444	444	557	573	273	1056
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.76	0.76	0.76	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	54.5	43.8	43.9	58.9	38.1	32.8	52.9	47.0	47.1	48.1	44.7
Incr Delay (d2), s/veh	5.2	3.8	4.0	8.5	0.9	0.1	15.1	4.4	4.3	2.8	1.2
Initial Q Delay(Q3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	12.3	20.6	19.9	1.4	8.3	0.9	7.3	8.6	8.8	5.6	8.7
LnGrp Delay(d), s/veh	59.7	47.5	47.9	67.3	39.1	32.9	68.0	51.4	51.5	51.8	45.8
LnGrp LOS	E	D	D	E	D	C	E	D	D	D	D
Approach Vol, veh/h	1877			635			894				1082
Approach Delay, s/veh	52.1			40.4			58.5				34.4
Approach LOS	D			D			E				C
Timer	1	2	3	4	5	6	7	8			
Assigned Phs	1	2	3	4	5	6	7	8			
Phs Duration (G+Y+Rc), s	8.5	64.3	20.0	31.2	34.0	38.8	23.2	28.0			
Change Period (Y+Rc), s	5.1	* 5.4	5.4	* 5.2	* 5.4	5.2	* 5.1				
Max Green Setting (Gmax), s	6.9	* 4.6	14.6	* 3.6	* 3.0	22.8	12.9	* 3.8			
Max Q Clear Time (g_c+H), s	4.6	42.4	15.4	19.6	26.5	18.8	13.0	18.8			
Green Ext Time (p_c), s	0.0	2.7	0.0	6.4	0.9	1.7	0.0	4.1			
Intersection Summary											
HCM 2010 Ctrl Delay	47.5										
HCM 2010 LOS	D										
Notes											

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HCM 2010 Signalized Intersection Summary
7: US 101 NB Off-Ramp & E Washington St

10/24/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR	Diagram
Lane Configurations	↑↑	↑↑		↑↑	↑↑	↑↑	↔ ↗ ↘
Traffic Volume (veh/h)	1492	0	0	1615	122	436	
Future Volume (veh/h)	1492	0	0	1615	122	436	
Number	2	12	1	6	3	18	
Initial Q (Ob), veh	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	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	
Adj Sat Flow, veh/h	1863	0	0	1863	1863	1863	
Adj Flow Rate, veh/h	1507	0	0	1631	123	358	
Adj No. of Lanes	2	0	0	2	2	2	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	
Percent Heavy Veh, %	2	0	0	2	2	2	
Cap. veh/h	2742	0	0	2742	553	448	
Arrive On Green	0.77	0.00	0.00	0.77	0.16	0.16	
Sat Flow, veh/h	3725	0	0	3725	3442	2787	
Grp Volume(V), veh/h	1507	0	0	1631	123	358	
Grp Sat Flow(s),veh/h	1770	0	0	1770	1721	1393	
Q Serve(g, s), s	20.7	0.0	0.0	23.9	3.9	15.3	
Cycle Q Clear(g, c), s	20.7	0.0	0.0	23.9	3.9	15.3	
Prop In Lane	0.00	0.00	0.00	1.00	1.00	1.00	
Lane Grp Cap(c), veh/h	2742	0	0	2742	553	448	
V/C Ratio(X)	0.55	0.00	0.00	0.59	0.22	0.80	
Avail Cap(c, a), veh/h	2742	0	0	2742	805	652	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	0.52	0.00	0.00	0.53	1.00	1.00	
Uniform Delay (d), s/veh	5.5	0.0	0.0	5.8	45.3	50.1	
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.5	0.2	5.1	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh/ln	10.2	0.0	0.0	11.7	1.8	6.2	
LnGrp Delay(d),s/veh	5.9	0.0	0.0	6.3	45.5	55.2	
LnGrp LOS	A			A	D	E	
Approach Vol, veh/h	1507			1631	481		
Approach Delay, s/veh	5.9			6.3	52.7		
Approach LOS	A			A	D		
Timer	1	2	3	4	5	6	7
Assigned Phs	2						
Phs Duration (G+Y+Rc), s	100.1						
Change Period (Y+Rc), s	* 4.8						
Max Green Setting (Gmax), s	* 86						
Max Q Clear Time (g_c+H), s	22.7						
Green Ext Time (p_c), s	38.3						
Intersection Summary							
HCM 2010 Ctrl Delay	12.3						
HCM 2010 LOS	B						
Notes							

Corona Station T/A
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HCM 2010 Signalized Intersection Summary
8: US 101 SB On-Ramp/US 101 SB Off-Ramp & E Washington St

10/24/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR	Diagram
Lane Configurations	↑↑	↑↑	↑↑	↑↑			↔ ↗ ↘
Traffic Volume (veh/h)	0	1393	164	273	1185	0	
Future Volume (veh/h)	0	1393	164	273	1185	0	
Number	5	2	12	1	6	16	
Initial Q (Ob), veh	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	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	
Adj Sat Flow, veh/h	0	1863	1863	1863	1863	0	
Adj Flow Rate, veh/h	0	1451	112	284	1234	0	
Adj No. of Lanes	0	2	1	2	2	0	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	
Percent Heavy Veh, %	0	2	2	2	2	2	
Cap. veh/h	0	1963	878	359	2447	0	
Arrive On Green	0.00	0.55	0.55	0.07	0.46	0.00	
Sat Flow, veh/h	0	3632	1583	3442	3632	0	
Grp Volume(V), veh/h	0	1451	112	284	1234	0	
Grp Sat Flow(s),veh/h	0	1770	1583	1721	1770	0	
Q Serve(g, s), s	0.0	38.4	4.2	10.1	30.3	0.0	
Cycle Q Clear(g, c), s	0.0	38.4	4.2	10.1	30.3	0.0	
Prop In Lane	0.00	1.00	1.00	1.00	1.00	0.00	
Lane Grp Cap(c), veh/h	0	1963	878	359	2447	0	
V/C Ratio(X)	0.00	0.74	0.13	0.79	0.50	0.00	
Avail Cap(c, a), veh/h	0	1963	878	444	2447	0	
HCM Platoon Ratio	1.00	1.00	1.00	0.67	1.00	1.00	
Upstream Filter(I)	0.00	1.00	1.00	0.79	0.00	1.00	
Uniform Delay (d), s/veh	0.0	20.8	13.2	56.3	18.4	0.0	
Incr Delay (d2), s/veh	0.0	2.5	0.3	8.4	0.6	0.0	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh/ln	0.0	19.4	1.9	5.2	15.0	0.0	
LnGrp Delay(d),s/veh	0.0	23.4	13.5	64.7	19.0	0.0	
LnGrp LOS		C	B	E	B		
Approach Vol, veh/h	1563			1518			
Approach Delay, s/veh	22.7			27.6			
Approach LOS	C			C			
Timer	1	2	3	4	5	6	7
Assigned Phs	1	2					
Phs Duration (G+Y+Rc), s	16.9	72.8					
Change Period (Y+Rc), s	* 4.2	4.6					
Max Green Setting (Gmax), s	* 16	58.4					
Max Q Clear Time (g_c+H), s	12.1	40.4					
Green Ext Time (p_c), s	0.7	14.1					
Intersection Summary							
HCM 2010 Ctrl Delay	29.4						
HCM 2010 LOS	C						
Notes							

Corona Station T/A
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HCM 2010 Signalized Intersection Summary
 2: US 101 N & Old Redwood Hwy N

11/01/2018

Movement	EBT	WBT	WBR	NBT	EBR	WBR	WBL	NBL	NBR
Lane Configurations	↑↑	↑↑	↑	↑	↑	↑	↑	↑	↑
Traffic Volume (veh/h)	1290	0	1625	160	0	1625	160	570	0
Future Volume (veh/h)	1290	0	1625	160	0	1625	160	570	0
Number	2	12	1	6	3	18	0	0	0
Initial Q (Ob), veh	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	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	0	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	1358	0	0	1711	168	600	0	0	0
Adj No. of Lanes	2	1	0	2	2	2	2	2	2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	0	2	2	2	2	2	2
Cap. veh/h	2141	958	0	2141	849	687	0	0	0
Arrive On Green	0.60	0.00	0.00	0.60	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	3632	1583	0	3725	3442	2787	0	0	0
Grp Volume(v), veh/h	1358	0	0	1711	168	600	0	0	0
Grp Sat Flow(s), veh/h/ln	1770	1583	0	1770	1721	1393	0	0	0
Q Serve(g, s), s	16.2	0.0	0.0	24.4	2.6	13.6	0.0	0.0	0.0
Cycle Q Clear(g, c), s	16.2	0.0	0.0	24.4	2.6	13.6	0.0	0.0	0.0
Prop In Lane	1.00	0.00	0.00	1.00	1.00	1.00	0.00	0.00	0.00
Lane Grp Cap(c), veh/h	2141	958	0	2141	849	687	0	0	0
V/C Ratio(X)	0.63	0.00	0.00	0.80	0.20	0.87	0.00	0.00	0.00
Avail Cap(c, a), veh/h	2302	1030	0	2302	903	731	0	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	8.4	0.0	0.0	10.0	19.7	23.9	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.6	0.0	0.0	2.1	0.1	10.9	0.0	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back(Q)(50%), veh/ln	7.9	0.0	0.0	12.3	1.2	6.3	0.0	0.0	0.0
LnGrp Delay(d), s/veh	9.0	0.0	0.0	12.1	19.8	34.8	0.0	0.0	0.0
LnGrp LOS	A	B	B	B	C	C	A	B	C
Approach Vol, veh/h	1358	1711	768	0	0	0	0	0	0
Approach Delay, s/veh	9.0	12.1	31.5	0	0	0	0	0	0
Approach LOS	A	B	C	A	B	C	A	B	C
Timer	1	2	3	4	5	6	7	8	
Assigned Phs	2	2	2	2	2	2	2	2	2
Phs Duration (G+Y+Rc), s	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0
Change Period (Y+Rc), s	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1
Max Green Setting (Gmax), s	42.9	42.9	42.9	42.9	42.9	42.9	42.9	42.9	42.9
Max Q Clear Time (g_c+H), s	18.2	18.2	18.2	18.2	18.2	18.2	18.2	18.2	18.2
Green Ext Time (p_c), s	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7
Intersection Summary									
HCM 2010 Ctrl Delay	14.9								
HCM 2010 LOS	B								

Corona Station T/A
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HCM 2010 Signalized Intersection Summary
 1: Old Redwood Hwy N & US 101 S

11/01/2018

Movement	EBL	WBL	WBR	NBL	EBR	WBR	WBL	NBL	NBR
Lane Configurations	↑↑	↑↑	↑	↑	↑	↑	↑	↑	↑
Traffic Volume (veh/h)	0	1170	790	0	390	500	0	390	500
Future Volume (veh/h)	0	1170	790	0	390	500	0	390	500
Number	5	2	6	16	7	14	0	7	14
Initial Q (Ob), veh	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	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1863	1863	1863	1863	1863	0	1863	1863
Adj Flow Rate, veh/h	0	1245	840	0	415	532	0	415	532
Adj No. of Lanes	0	2	2	1	2	2	0	2	2
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	2	2	2	2	2	0	2	2
Cap. veh/h	0	2107	2107	943	847	686	0	847	686
Arrive On Green	0.00	0.60	0.60	0.00	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	0	3725	3632	1583	3442	2787	0	3442	2787
Grp Volume(v), veh/h	0	1245	840	0	415	532	0	415	532
Grp Sat Flow(s), veh/h/ln	0	1770	1770	1583	1721	1393	0	1721	1393
Q Serve(g, s), s	0.0	14.3	8.2	0.0	6.7	11.6	0.0	6.7	11.6
Cycle Q Clear(g, c), s	0.0	14.3	8.2	0.0	6.7	11.6	0.0	6.7	11.6
Prop In Lane	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00
Lane Grp Cap(c), veh/h	0	2107	2107	943	847	686	0	847	686
V/C Ratio(X)	0.00	0.59	0.40	0.00	0.49	0.78	0.00	0.49	0.78
Avail Cap(c, a), veh/h	0	2107	2107	943	1107	896	0	1107	896
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.59	0.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	8.2	7.0	0.0	21.0	22.8	0.0	21.0	22.8
Incr Delay (d2), s/veh	0.0	1.2	0.3	0.0	0.4	3.2	0.0	0.4	3.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back(Q)(50%), veh/ln	0.0	7.3	4.1	0.0	3.2	4.7	0.0	3.2	4.7
LnGrp Delay(d), s/veh	0.0	9.4	7.3	0.0	21.4	26.0	0.0	21.4	26.0
LnGrp LOS	A	A	A	A	C	C	A	C	C
Approach Vol, veh/h	1245	840	947	0	0	0	0	0	0
Approach Delay, s/veh	9.4	7.3	24.0	0	0	0	0	0	0
Approach LOS	A	A	C	A	B	C	A	B	C
Timer	1	2	3	4	5	6	7	8	
Assigned Phs	2	2	2	2	2	2	2	2	2
Phs Duration (G+Y+Rc), s	43.9	43.9	43.9	43.9	43.9	43.9	43.9	43.9	43.9
Change Period (Y+Rc), s	* 5.2	* 5.2	* 5.2	* 5.2	* 5.2	* 5.2	* 5.2	* 5.2	* 5.2
Max Green Setting (Gmax), s	* 34	* 34	* 34	* 34	* 34	* 34	* 34	* 34	* 34
Max Q Clear Time (g_c+H), s	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3
Green Ext Time (p_c), s	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8
Intersection Summary									
HCM 2010 Ctrl Delay	13.4								
HCM 2010 LOS	B								

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3: N McDowell Blvd & Old Redwood Hwy N

02/26/2019

3: N McDowell Blvd & Old Redwood Hwy N

02/26/2019

4: N McDowell Rd/N McDowell Blvd & Corona Rd

11/01/2018

4: N McDowell Rd/N McDowell Blvd & Corona Rd

11/01/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	370	420	110	90	330	70	330	730	90	260	520	150
Traffic Volume (veh/h)	370	420	110	90	330	70	330	730	90	260	520	150
Future Volume (veh/h)	5	2	12	1	6	16	3	8	18	7	4	14
Number	0	0	0	0	0	0	0	0	0	0	0	0
Initial Q (Ob), veh	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Sat Flow, veh/h	370	420	0	90	380	70	330	730	90	260	520	150
Adj Flow Rate, veh/h	1	2	1	1	2	1	1	1	1	1	1	1
Adj No. of Lanes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Peak Hour Factor	2	2	2	2	2	2	2	2	2	2	2	2
Percent Heavy Veh, %	249	545	244	207	488	609	604	635	539	438	460	391
Cap. veh/h	0.14	0.15	0.00	0.12	0.14	0.14	0.34	0.34	0.34	0.25	0.25	0.25
Arrive On Green	1774	3539	1583	1774	3539	1583	1774	1863	1583	1774	1863	1583
Sat Flow, veh/h	370	420	0	90	380	70	330	730	90	260	520	150
Grp Volume(V), veh/h	1774	1770	1583	1774	1770	1583	1774	1863	1583	1774	1863	1583
Grp Sat Flow(s),veh/h	20.0	16.3	0.0	6.7	14.8	4.1	21.5	48.6	5.7	18.5	35.2	11.2
Q Serve(g, s)	20.0	16.3	0.0	6.7	14.8	4.1	21.5	48.6	5.7	18.5	35.2	11.2
Cycle Q Clear(g, c), s	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop In Lane	249	545	244	207	488	609	604	635	539	438	460	391
Lane Grp Cap(c), veh/h	1.49	0.77	0.00	0.44	0.78	0.11	0.35	1.15	0.17	0.59	1.13	0.38
V/C Ratio(X)	249	866	387	207	670	690	604	635	539	438	460	391
Avail Cap(c, a), veh/h	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
HCM Platoon Ratio	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	61.3	57.9	0.0	58.7	59.4	28.3	38.1	47.0	32.9	47.4	53.7	44.7
Uniform Delay (d), s/veh	239.7	4.0	0.0	0.5	5.6	0.1	0.6	85.0	0.1	1.5	83.2	0.2
Incr Delay (d2), 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
Initial Q Delay(d3),s/veh	26.3	8.2	0.0	3.3	7.6	2.5	10.6	39.8	2.5	9.2	28.6	5.0
%ile BackOfQ(50%),veh/m	301.1	61.9	0.0	59.2	65.0	28.4	38.7	132.0	32.9	48.9	136.9	44.9
LnGrp Delay(d),s/veh	F	E	E	E	C	D	F	C	D	F	D	F
LnGrp LOS	F	E	E	E	C	D	F	C	D	F	D	F
Approach Vol, veh/h	790			540			1150			930		
Approach Delay, s/veh	173.9			59.3			97.5			97.5		
Approach LOS	F			E			F			F		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6						
Phs Duration (G+Y+Rc), s	21.6	27.1		40.0	24.0	24.7						
Change Period (Y+Rc), s	5.0	* 5.1		* 4.8	4.0	5.0						
Max Green Setting (Gmax), s	12.0	* 35		* 35	20.0	27.0						
Max Q Clear Time (g_c+H), s	8.7	18.3		37.2	22.0	16.8						
Green Ext Time (p_c), s	0.0	3.7		0.0	0.0	2.9						
Intersection Summary	109.1											
HCM 2010 Ctrl Delay	F											
HCM 2010 LOS	F											
Notes												

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	280	250	180	170	370	430	170	520	70	140	500	60
Traffic Volume (veh/h)	280	250	180	170	370	430	170	520	70	140	500	60
Future Volume (veh/h)	5	2	12	1	6	16	3	8	18	7	4	14
Number	0	0	0	0	0	0	0	0	0	0	0	0
Initial Q (Ob), veh	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Sat Flow, veh/h	282	260	85	177	385	358	177	542	49	146	521	46
Adj Flow Rate, veh/h	1	1	1	1	1	1	1	1	1	1	1	1
Adj No. of Lanes	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Peak Hour Factor	2	2	2	2	2	2	2	2	2	2	2	2
Percent Heavy Veh, %	213	474	403	208	454	549	411	1107	100	183	677	60
Cap. veh/h	0.12	0.25	0.25	0.12	0.24	0.24	0.23	0.34	0.34	0.10	0.21	0.21
Arrive On Green	1774	1863	1583	1774	1863	1583	1774	3284	296	1774	3291	290
Sat Flow, veh/h	292	260	85	177	385	358	177	291	300	146	279	288
Grp Volume(V), veh/h	1774	1863	1583	1774	1863	1583	1774	1770	1810	1774	1770	1812
Grp Sat Flow(s),veh/h	12.0	12.1	2.3	9.8	19.7	11.4	8.5	13.1	13.1	8.0	14.9	15.0
Q Serve(g, s)	12.0	12.1	2.3	9.8	19.7	11.4	8.5	13.1	13.1	8.0	14.9	15.0
Cycle Q Clear(g, c), s	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop In Lane	213	474	403	208	454	549	411	597	611	183	364	372
Lane Grp Cap(c), veh/h	1.37	0.55	0.21	0.85	0.85	0.65	0.43	0.49	0.49	0.80	0.77	0.77
V/C Ratio(X)	213	501	426	231	522	606	411	597	611	273	506	518
Avail Cap(c, a), veh/h	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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)	44.0	32.3	9.0	43.3	36.0	11.7	32.8	26.3	26.3	43.8	37.5	37.5
Uniform Delay (d), s/veh	194.1	1.5	0.4	23.0	12.0	2.6	0.6	2.3	2.2	12.3	14.4	14.4
Incr Delay (d2), 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
Initial Q Delay(d3),s/veh	17.3	6.4	1.1	6.1	11.7	5.4	4.2	6.8	7.0	4.6	8.8	9.0
%ile BackOfQ(50%),veh/m	238.1	33.8	9.3	66.3	48.0	14.3	33.4	28.6	28.6	56.2	51.9	51.9
LnGrp Delay(d),s/veh	F	C	A	E	D	B	C	C	C	E	D	D
LnGrp LOS	F	C	A	E	D	B	C	C	C	E	D	D
Approach Vol, veh/h	637			920			768			713		
Approach Delay, s/veh	124.2			38.4			29.7			52.8		
Approach LOS	F			D			C			D		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6						
Phs Duration (G+Y+Rc), s	15.8	30.3	28.5	25.5	16.9	29.2	14.9	39.0				
Change Period (Y+Rc), s	4.0	4.9	5.3	* 4.9	* 4.9	* 4.8	4.6	5.3				
Max Green Setting (Gmax), s	13.0	26.9	13.7	* 29	* 12	* 28	15.4	23.9				
Max Q Clear Time (g_c+H), s	11.8	14.1	10.5	17.0	14.0	21.7	10.0	15.1				
Green Ext Time (p_c), s	0.1	2.0	0.1	3.6	0.0	2.7	0.2	3.6				
Intersection Summary	57.6											
HCM 2010 Ctrl Delay	E											
HCM 2010 LOS	E											
Notes												

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5: Petaluma Blvd N & Skillman Lane/Corona Rd

11/01/2018

6: S McDowell Blvd/N McDowell Rd & E Washington St

11/01/2018

HCM 2010 Signalized Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	1	1	1	1	1	1	1	1	1
Traffic Volume (veh/h)	220	290	100	290	200	20	90	570	290	40	700	170
Future Volume (veh/h)	220	290	100	290	200	20	90	570	290	40	700	170
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Ob), 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	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
Adj Sat Flow, veh/h/in	1900	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	232	305	103	305	211	8	95	600	162	42	737	102
Adj No. of Lanes	0	1	0	1	1	0	1	2	1	1	2	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	237	311	105	337	339	13	103	942	421	77	786	109
Arrive On Green	0.37	0.37	0.37	0.19	0.19	0.19	0.06	0.27	0.27	0.04	0.25	0.25
Sat Flow, veh/h	645	848	286	1774	1783	68	1774	3539	1583	1774	3124	432
Grp Volume(V), veh/h	640	0	0	305	0	219	95	600	162	42	417	422
Grp Sat Flow(s),veh/h/in	1780	0	0	1774	0	1851	1774	1770	1583	1774	1770	1786
Q Serve(g, s)	49.2	0.0	0.0	23.3	0.0	15.0	7.4	20.7	11.6	3.2	31.9	32.0
Cycle Q Clear(g, c), s	49.2	0.0	0.0	23.3	0.0	15.0	7.4	20.7	11.6	3.2	31.9	32.0
Prop In Lane	0.36	0.16	0.16	1.00	1.00	0.04	1.00	1.00	1.00	1.00	1.00	0.24
Lane Grp Cap(c), veh/h	653	0	0	337	0	352	103	942	421	77	445	450
V/C Ratio(X)	0.98	0.00	0.00	0.90	0.00	0.62	0.93	0.64	0.38	0.55	0.94	0.94
Avail Cap(c, a), veh/h	653	0	0	466	0	486	103	942	421	115	467	472
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.3	0.0	0.0	54.8	0.0	51.5	64.9	44.8	41.5	64.8	50.7	50.7
Incr Delay (d2), s/veh	30.2	0.0	0.0	14.0	0.0	0.7	64.4	1.1	0.2	2.2	25.4	25.4
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 BackOf(50%),veh/ln	29.7	0.0	0.0	12.7	0.0	7.8	5.5	10.3	5.1	1.6	18.8	19.0
LnGrp Delay(d),s/veh	73.5	0.0	0.0	68.8	0.0	52.1	129.3	45.9	41.7	67.0	76.1	76.1
LnGrp LOS	E	E	E	D	D	F	D	D	D	E	E	E
Approach Vol, veh/h	640			524			857			881		
Approach Delay, s/veh	73.5			61.8			54.4			75.7		
Approach LOS	E			E			D			E		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.0	40.3	55.2	10.0	42.3	30.8						
Change Period (Y+Rc), s	4.0	5.5	4.5	4.0	5.5	4.5						
Max Green Setting (Gmax), s	8.0	36.5	50.7	9.0	35.5	36.3						
Max Q Clear Time (g_c+H), s	9.4	34.0	51.2	5.2	22.7	25.3						
Green Ext Time (p_c), s	0.0	0.8	0.0	0.0	0.0	2.0						
Intersection Summary	66.4											
HCM 2010 Ctrl Delay	E											
HCM 2010 LOS	E											
Notes												

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	1	1	1	1	1	1	1	1	1
Traffic Volume (veh/h)	490	520	410	50	770	130	460	420	40	100	440	450
Future Volume (veh/h)	490	520	410	50	770	130	460	420	40	100	440	450
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Ob), 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	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
Adj Sat Flow, veh/h/in	1863	1863	1900	1863	1863	1863	1863	1863	1863	1900	1863	1863
Adj Flow Rate, veh/h	510	542	391	52	802	59	479	438	34	104	458	375
Adj No. of Lanes	2	2	0	1	2	1	2	2	0	1	2	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	418	625	451	218	1120	501	418	1007	78	129	889	590
Arrive On Green	0.04	0.10	0.10	0.12	0.32	0.32	0.12	0.30	0.30	0.07	0.25	0.25
Sat Flow, veh/h	3442	1965	1417	1774	3539	1583	3442	3329	258	1774	3539	1583
Grp Volume(V), veh/h	510	488	445	52	802	59	479	232	240	104	458	375
Grp Sat Flow(s),veh/h/in	1721	1770	1613	1774	1770	1583	1721	1770	1817	1774	1770	1583
Q Serve(g, s)	13.6	30.4	30.4	3.0	22.4	3.0	13.6	11.8	11.9	6.5	12.5	21.8
Cycle Q Clear(g, c), s	13.6	30.4	30.4	3.0	22.4	3.0	13.6	11.8	11.9	6.5	12.5	21.8
Prop In Lane	1.00	1.00	0.88	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	418	563	513	218	1120	501	418	535	550	129	889	590
V/C Ratio(X)	1.22	0.87	0.87	0.24	0.72	0.12	1.15	0.43	0.44	0.80	0.51	0.64
Avail Cap(c, a), veh/h	418	593	540	218	1120	501	418	605	621	154	1074	673
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.87	0.87	0.87	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	53.8	47.8	47.8	44.4	33.8	27.2	49.2	31.3	31.4	51.1	36.1	28.9
Incr Delay (d2), s/veh	116.8	14.7	15.9	0.6	3.9	0.5	90.4	0.8	0.8	17.1	0.5	1.5
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 BackOf(50%),veh/ln	13.3	17.2	15.9	1.5	11.5	1.4	11.7	5.9	6.0	3.8	6.2	9.7
LnGrp Delay(d),s/veh	170.5	62.5	63.7	45.0	37.8	27.6	139.6	32.1	32.2	68.3	36.5	30.3
LnGrp LOS	F	E	E	D	D	C	F	C	C	E	D	C
Approach Vol, veh/h	1443			913			951			937		
Approach Delay, s/veh	101.0			37.5			86.2			37.6		
Approach LOS	F			D			F			D		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	18.9	40.7	19.0	33.3	19.0	40.7	13.3	39.1				
Change Period (Y+Rc), s	* 5.1	5.4	5.4	* 5.2	5.4	* 5.2	5.1	* 5.2				
Max Green Setting (Gmax), s	6.1	* 38	13.6	* 34	13.6	* 30	9.7	* 38				
Max Q Clear Time (g_c+H), s	5.0	32.4	15.6	23.8	15.6	24.4	8.5	13.9				
Green Ext Time (p_c), s	0.0	3.2	0.0	4.3	0.0	3.0	0.0	4.1				
Intersection Summary	70.0											
HCM 2010 Ctrl Delay	E											
HCM 2010 LOS	E											
Notes												

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HCM 2010 Signalized Intersection Summary
7: US 101 NB Off-Ramp & E Washington St

11/01/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑		
Traffic Volume (veh/h)	1160	0	0	1400	130	300		
Future Volume (veh/h)	1160	0	0	1400	130	300		
Number	2	12	1	6	3	18		
Initial Q (Ob), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	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		
Adj Sat Flow, veh/h	1863	0	0	1863	1863	1863		
Adj Flow Rate, veh/h	1234	0	0	1489	138	112		
Adj No. of Lanes	2	0	0	2	2	2		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94		
Percent Heavy Veh, %	2	0	0	2	2	2		
Cap. veh/h	3004	0	0	3004	226	183		
Arrive On Green	0.85	0.00	0.00	0.85	0.07	0.07		
Sat Flow, veh/h	3725	0	0	3725	3442	2787		
Grp Volume(v), veh/h	1234	0	0	1489	138	112		
Grp Sat Flow(s), veh/h	1770	0	0	1770	1721	1393		
Q Serve(g, s), s	9.1	0.0	0.0	12.3	4.4	4.4		
Cycle Q Clear(g, c), s	9.1	0.0	0.0	12.3	4.4	4.4		
Prop In Lane	0.00	0.00	0.00	0.39	1.00	1.00		
Lane Grp Cap(c), veh/h	3004	0	0	3004	226	183		
V/C Ratio(X)	0.41	0.00	0.00	0.50	0.61	0.61		
Avail Cap(c, a), veh/h	3004	0	0	3004	682	552		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.47	0.00	0.00	0.39	1.00	1.00		
Uniform Delay (d), s/veh	2.0	0.0	0.0	2.2	50.9	50.9		
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.2	3.2	4.0		
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile Back(Q)(50%), veh/m	4.4	0.0	0.0	5.9	2.2	1.8		
LnGrp Delay(d), s/veh	2.2	0.0	0.0	2.4	54.2	54.9		
LnGrp LOS	A	D	A	A	D	D		
Approach Vol, veh/h	1234		1489	250				
Approach Delay, s/veh	2.2		2.4	54.5				
Approach LOS	A		A	D				
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		99.9				99.9		12.1
Change Period (Y+Rc), s		* 4.8				* 80		4.8
Max Green Setting (Gmax), s		* 80				* 80		22.2
Max Q Clear Time (g_c+H), s		11.1				14.3		6.4
Green Ext Time (p_c), s		29.3				38.4		1.0
Intersection Summary								
HCM 2010 Ctrl Delay	6.7							
HCM 2010 LOS	A							
Notes								

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HCM 2010 Signalized Intersection Summary
8: US 101 SB On-Ramp/US 101 SB Off-Ramp & E Washington St

11/01/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑		
Traffic Volume (veh/h)	0	1200	150	360	1110	0		
Future Volume (veh/h)	0	1200	150	360	1110	0		
Number	5	2	12	1	6	16		
Initial Q (Ob), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	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		
Adj Sat Flow, veh/h	0	1863	1863	1863	1863	0		
Adj Flow Rate, veh/h	0	1277	121	383	1181	0		
Adj No. of Lanes	0	2	1	2	2	0		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94		
Percent Heavy Veh, %	0	2	2	2	2	2		
Cap. veh/h	0	1450	649	840	2459	0		
Arrive On Green	0.00	0.41	0.41	0.08	0.23	0.00		
Sat Flow, veh/h	0	3632	1583	3442	3632	0		
Grp Volume(v), veh/h	0	1277	121	383	1181	0		
Grp Sat Flow(s), veh/h	0	1770	1583	1721	1770	0		
Q Serve(g, s), s	0.0	37.3	5.5	11.9	32.4	0.0		
Cycle Q Clear(g, c), s	0.0	37.3	5.5	11.9	32.4	0.0		
Prop In Lane	0.00	1.00	1.00	1.00	1.00	0.00		
Lane Grp Cap(c), veh/h	0	1450	649	840	2459	0		
V/C Ratio(X)	0.00	0.88	0.19	0.46	0.48	0.00		
Avail Cap(c, a), veh/h	0	1498	670	840	2459	0		
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	1.00		
Upstream Filter(I)	0.00	1.00	1.00	0.85	0.85	0.00		
Uniform Delay (d), s/veh	0.0	30.5	21.1	44.4	25.6	0.0		
Incr Delay (d2), s/veh	0.0	8.0	0.6	0.7	0.6	0.0		
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile Back(Q)(50%), veh/m	0.0	19.9	2.5	5.8	16.1	0.0		
LnGrp Delay(d), s/veh	0.0	38.5	21.8	45.1	26.2	0.0		
LnGrp LOS	D	C	C	D	C	D		
Approach Vol, veh/h	1398		1564			588		
Approach Delay, s/veh	37.1		30.8			47.4		
Approach LOS	D		C			D		
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	31.9	50.5		29.6		82.4		
Change Period (Y+Rc), s	4.6	* 4.6		5.1		4.6		
Max Green Setting (Gmax), s	14.8	* 4.7		35.9		66.4		
Max Q Clear Time (g_c+H), s	13.9	39.3		21.9		34.4		
Green Ext Time (p_c), s	0.3	6.6		2.6		18.8		
Intersection Summary								
HCM 2010 Ctrl Delay	36.0							
HCM 2010 LOS	D							
Notes								

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HCM 2010 Signalized Intersection Summary
 2: US 101 N & Old Redwood Hwy N

11/01/2018

Movement	EBT	EBR	WBT	WBR	NBT	NBR
Lane Configurations	↑↑	↑	↑↑	↑	↑↑	↑↑
Traffic Volume (veh/h)	1040	0	2120	210	500	500
Future Volume (veh/h)	1040	0	2120	210	500	500
Number	2	12	1	6	3	18
Initial Q (Ob), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	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
Adj Sat Flow, veh/h/ln	1863	1863	0	1863	1863	1863
Adj Flow Rate, veh/h	1085	0	0	2322	221	526
Adj No. of Lanes	2	1	0	2	2	2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	0	2	2	2
Cap. veh/h	2706	1211	0	2706	626	507
Arrive On Green	1.00	0.00	0.00	1.00	0.18	0.18
Sat Flow, veh/h	3632	1583	0	3725	3442	2787
Grp Volume(v), veh/h	1085	0	0	2232	221	526
Grp Sat Flow(s), veh/h/ln	1770	1583	0	1770	1721	1393
Q Serve(g, s), s	0.0	0.0	0.0	0.0	8.4	27.3
Cycle Q Clear(g, c), s	0.0	0.0	0.0	0.0	8.4	27.3
Prop In Lane	1.00	0.00	0.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	2706	1211	0	2706	626	507
V/C Ratio(X)	0.40	0.00	0.00	0.82	0.35	1.04
Avail Cap(c, a), veh/h	2706	1211	0	2706	626	507
HCM Platoon Ratio	2.00	2.00	1.00	1.33	1.00	1.00
Upstream Filter(I)	0.76	0.00	0.00	0.81	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	0.0	53.6	61.4
Incr Delay (d2), s/veh	0.3	0.0	0.0	2.5	0.3	49.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back(Q50%), veh/ln	0.1	0.0	0.0	0.9	4.1	14.0
LnGrp Delay(d), s/veh	0.3	0.0	0.0	2.5	54.0	111.2
LnGrp LOS	A	A	A	D	D	F
Approach Vol, veh/h	1085		2232	747		
Approach Delay, s/veh	0.3		2.5	94.3		
Approach LOS	A	A	A	F	F	F
Timer	1	2	3	4	5	6
Assigned Phs	2	2	3	4	5	6
Phs Duration (G+Y+Rc), s	118.7	118.7	118.7	118.7	118.7	118.7
Change Period (Y+Rc), s	5.1	5.1	5.1	5.1	5.1	5.1
Max Green Setting (Gmax), s	113.6	113.6	113.6	113.6	113.6	113.6
Max Q Clear Time (g_c+H), s	2.0	2.0	2.0	2.0	2.0	2.0
Green Ext Time (p_c), s	16.7	16.7	16.7	16.7	16.7	16.7
Intersection Summary						
HCM 2010 Ctrl Delay	18.7					
HCM 2010 LOS	B					

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HCM 2010 Signalized Intersection Summary
 1: Old Redwood Hwy N & US 101 S

11/01/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Traffic Volume (veh/h)	0	1520	930	0	360	390
Future Volume (veh/h)	0	1520	930	0	360	390
Number	5	2	6	16	7	14
Initial Q (Ob), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	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
Adj Sat Flow, veh/h/ln	0	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	0	1634	1000	0	387	419
Adj No. of Lanes	0	2	2	1	2	2
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	2	2	2	2	2
Cap. veh/h	0	2714	2716	1215	617	500
Arrive On Green	0.00	0.77	1.00	0.00	0.18	0.18
Sat Flow, veh/h	0	3725	3632	1583	3442	2787
Grp Volume(v), veh/h	0	1634	1000	0	387	419
Grp Sat Flow(s), veh/h/ln	0	1770	1770	1583	1721	1393
Q Serve(g, s), s	0.0	30.0	0.0	0.0	15.6	21.8
Cycle Q Clear(g, c), s	0.0	30.0	0.0	0.0	15.6	21.8
Prop In Lane	0.00	1.00	0.58	0.00	1.00	1.00
Lane Grp Cap(c), veh/h	0	2714	2716	1215	617	500
V/C Ratio(X)	0.00	0.60	0.37	0.00	0.63	0.84
Avail Cap(c, a), veh/h	0	2714	2716	1215	734	594
HCM Platoon Ratio	1.00	1.00	1.33	1.33	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.58	0.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	7.6	0.0	0.0	56.9	59.5
Incr Delay (d2), s/veh	0.0	1.0	0.2	0.0	1.3	9.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back(Q50%), veh/ln	0.0	14.9	0.1	0.0	7.5	9.0
LnGrp Delay(d), s/veh	0.0	8.6	0.2	0.0	58.2	68.4
LnGrp LOS	A	A	A	E	E	E
Approach Vol, veh/h	1634	1000		806		
Approach Delay, s/veh	8.6	0.2		63.5		
Approach LOS	A	A	A	E	E	E
Timer	1	2	3	4	5	6
Assigned Phs	2	2	3	4	5	6
Phs Duration (G+Y+Rc), s	119.1	119.1	119.1	119.1	119.1	119.1
Change Period (Y+Rc), s	* 5.2	* 5.2	* 5.1	* 5.1	* 5.2	* 5.2
Max Green Setting (Gmax), s	* 1.1E2	* 1.1E2	30.9	30.9	* 1.1E2	* 1.1E2
Max Q Clear Time (g_c+H), s	32.0	32.0	23.8	23.8	2.0	2.0
Green Ext Time (p_c), s	34.6	34.6	2.0	2.0	15.0	15.0
Intersection Summary						
HCM 2010 Ctrl Delay	19.0					
HCM 2010 LOS	B					

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3: N McDowell Blvd & Old Redwood Hwy N

02/26/2019

4: N McDowell Rd/N McDowell Blvd & Corona Rd

11/01/2018

HCM 2010 Signalized Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	2	2	1	2	2	1	2	1	1	1	1
Traffic Volume (veh/h)	160	1070	480	210	800	50	900	120	400	40	150	270
Future Volume (veh/h)	160	1070	480	210	800	50	900	120	400	40	150	270
Number	5	2	12	1	6	16	3	8	18	7	4	14
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	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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	160	1070	0	210	800	50	996	0	400	40	150	270
Adj No. of Lanes	1	2	1	1	2	1	2	0	1	1	1	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	182	996	445	219	1093	769	1041	0	464	335	351	299
Arrive On Green	0.10	0.28	0.00	0.12	0.31	0.30	0.29	0.00	0.29	0.19	0.19	0.19
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	3548	0	1583	1774	1863	1583
Grp Volume(V), veh/h	160	1070	0	210	800	50	996	0	400	40	150	270
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1774	0	1583	1774	1863	1583
Q Serve(g, s)	13.3	42.2	0.0	17.7	30.3	2.5	40.8	0.0	35.8	2.8	10.7	25.0
Cycle Q Clear(g, c), s	13.3	42.2	0.0	17.7	30.3	2.5	40.8	0.0	35.8	2.8	10.7	25.0
Prop In Lane	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	182	996	445	219	1093	769	1041	0	464	335	351	299
V/C Ratio(X)	0.88	1.07	0.00	0.96	0.73	0.07	0.95	0.00	0.86	0.12	0.43	0.39
Avail Cap(c, a), veh/h	201	996	445	219	1093	769	1041	0	464	376	395	336
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)	0.80	0.80	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	66.4	53.9	0.0	65.4	46.3	20.5	51.9	0.0	50.1	50.5	53.7	59.5
Incr Delay (d2), s/veh	25.0	48.2	0.0	49.1	4.3	0.2	16.6	0.0	14.5	0.1	0.3	23.5
Initial Q Delay(Q3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.8	27.3	0.0	11.7	15.4	1.5	22.4	0.0	17.5	1.4	5.5	12.9
LnGrp Delay(d),s/veh	91.4	102.1	0.0	114.5	50.6	20.7	68.4	0.0	64.6	50.6	54.0	83.0
LnGrp LOS	F	F	F	F	D	C	E	E	E	D	D	F
Approach Vol, veh/h	1230			1060			1386					460
Approach Delay, s/veh	100.7			61.9			67.3					70.7
Approach LOS	F			E			E					E
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6						
Phs Duration (G+Y+Rc), s	23.5	46.2		32.3	19.4	50.3						
Change Period (Y+Rc), s	5.0	* 5.1		* 4.8	4.0	5.0						
Max Green Setting (Gmax), s	16.0	* 4.1		* 3.1	17.0	40.2						
Max Q Clear Time (g_c+H), s	19.7	44.2		27.0	15.3	32.3						
Green Ext Time (p_c), s	0.0	0.0		0.5	0.0	4.6						
Intersection Summary	76.2											
HCM 2010 Ctrl Delay	E											
HCM 2010 LOS	E											
Notes												

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	2	2	1	2	2	1	2	1	1	1	1
Traffic Volume (veh/h)	150	380	230	70	280	230	230	630	120	320	460	140
Future Volume (veh/h)	150	380	230	70	280	230	230	630	120	320	460	140
Number	5	2	12	1	6	16	3	8	18	7	4	14
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	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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	160	404	133	74	298	196	245	670	117	340	489	120
Adj No. of Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	242	459	390	149	361	555	578	1140	199	281	563	137
Arrive On Green	0.14	0.25	0.25	0.08	0.19	0.19	0.33	0.38	0.37	0.16	0.20	0.19
Sat Flow, veh/h	1774	1863	1583	1774	1863	1583	1774	3014	526	1774	2822	689
Grp Volume(V), veh/h	160	404	133	74	298	196	245	393	394	340	306	303
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1774	1770	1770	1774	1770	1741
Q Serve(g, s)	10.3	25.0	8.3	4.8	18.4	6.9	13.0	21.3	21.4	19.0	20.0	20.3
Cycle Q Clear(g, c), s	10.3	25.0	8.3	4.8	18.4	6.9	13.0	21.3	21.4	19.0	20.0	20.3
Prop In Lane	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	242	459	390	149	361	555	578	669	669	281	553	348
V/C Ratio(X)	0.66	0.88	0.34	0.50	0.83	0.35	0.42	0.59	0.59	0.21	0.87	0.87
Avail Cap(c, a), veh/h	350	504	429	296	447	628	578	669	669	281	366	360
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	0.68	0.68	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.2	43.5	37.2	52.5	46.4	13.2	31.6	29.8	30.0	50.5	46.5	46.7
Incr Delay (d2), s/veh	3.1	16.1	0.7	2.6	11.1	0.5	0.3	2.6	2.6	123.1	23.6	24.8
Initial Q Delay(Q3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.2	15.0	3.7	2.4	10.6	3.1	6.4	10.9	10.9	18.9	12.1	12.2
LnGrp Delay(d),s/veh	52.3	59.6	37.9	55.1	57.5	13.7	32.0	32.4	32.6	173.6	70.0	71.6
LnGrp LOS	D	E	D	E	E	B	C	C	C	F	E	E
Approach Vol, veh/h	697			568			1032					949
Approach Delay, s/veh	53.8			42.1			32.4					107.6
Approach LOS	D			D			C					F
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		3	4	5	6	7	8			
Phs Duration (G+Y+Rc), s	14.1	33.6	44.4	28.0	20.4	27.3	23.0	49.4				
Change Period (Y+Rc), s	4.0	4.9	5.3	* 4.9	* 4	4.8	4.6	5.3				
Max Green Setting (Gmax), s	20.0	31.6	26.7	* 24	* 24	28.0	18.4	31.2				
Max Q Clear Time (g_c+H), s	6.8	27.0	15.0	22.3	12.3	20.4	21.0	23.4				
Green Ext Time (p_c), s	0.1	1.6	0.5	0.8	0.3	2.0	0.0	3.8				
Intersection Summary	60.7											
HCM 2010 Ctrl Delay	E											
HCM 2010 LOS	E											
Notes												

Corona Station T/A
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Synchro 10 Report
W-Trans

5: Petaluma Blvd N & Skillman Lane/Corona Rd

6: S McDowell Blvd/N McDowell Rd & E Washington St

11/01/2018

11/01/2018

5: Petaluma Blvd N & Skillman Lane/Corona Rd

6: S McDowell Blvd/N McDowell Rd & E Washington St

11/01/2018

11/01/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	170	190	60	370	190	70	120	1120	370	70	680
Traffic Volume (veh/h)	170	190	60	370	190	70	120	1120	370	70	680
Future Volume (veh/h)	7	4	14	3	8	18	1	6	16	5	2
Number	0	0	0	0	0	0	0	0	0	0	0
Initial Q (Qb), veh	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1900	1863	1900	1863	1900	1863	1863	1863	1863	1863	1900
Adj Sat Flow, veh/h/ln	172	192	53	374	192	41	121	1131	251	71	687
Adj Flow Rate, veh/h	0	1	0	1	1	0	1	2	1	1	2
Adj No. of Lanes	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Peak Hour Factor	2	2	2	2	2	2	2	2	2	2	2
Percent Heavy Veh, %	187	209	58	413	347	74	150	1122	502	101	923
Cap. veh/h	0.25	0.25	0.25	0.23	0.23	0.23	0.08	0.32	0.32	0.06	0.29
Arrive On Green	737	822	227	1774	1489	318	1774	3539	1583	1774	3190
Sat Flow, veh/h	417	0	0	374	0	233	121	1131	251	71	381
Grp Volume(v), veh/h	1786	0	0	1774	0	1807	1774	1770	1583	1774	1770
Grp Sat Flow(s),veh/h/ln	26.2	0.0	0.0	23.6	0.0	13.1	7.7	36.5	14.8	4.5	22.4
Q Serve(g, s)	26.2	0.0	0.0	23.6	0.0	13.1	7.7	36.5	14.8	4.5	22.4
Cycle Q Clear(g, c), s	0.41	0.13	1.00	0.18	1.00	1.00	1.00	1.00	1.00	1.00	0.21
Prop In Lane	454	0	0	413	0	421	150	1122	502	101	512
Lane Grp Cap(c), veh/h	0.92	0.00	0.00	0.91	0.00	0.55	0.81	1.01	0.50	0.70	0.74
V/C Ratio(X)	519	0	0	470	0	478	154	1122	502	154	561
Avail Cap(c, a), veh/h	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
HCM Platoon Ratio	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(i)	41.8	0.0	0.0	42.9	0.0	38.9	51.8	39.3	31.9	53.4	37.1
Uniform Delay (d), s/veh	18.7	0.0	0.0	18.2	0.0	0.4	24.0	28.9	0.3	3.3	4.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	15.2	0.0	0.0	13.6	0.0	6.6	4.8	22.3	6.5	2.3	11.6
%ile BackOfQ(50%),veh/ln	60.5	0.0	0.0	61.1	0.0	39.4	75.8	68.3	32.2	56.7	41.1
LnGrp Delay(d),s/veh	E	E	E	E	D	D	E	F	C	E	D
LnGrp LOS	E	E	E	E	D	D	E	F	C	E	D
Approach Vol, veh/h	417			607			1503			839	
Approach Delay, s/veh	60.5			52.8			62.9			42.5	
Approach LOS	E			D			E			D	
Timer	1	2	3	4	5	6	7	8			
Assigned Phs	1	2	3	4	5	6	7	8			
Phs Duration (G+Y+Rc), s	13.7	37.3	33.3	10.5	40.5	30.8					
Change Period (Y+Rc), s	4.0	5.5	4.5	4.0	5.5	4.5					
Max Green Setting (Gmax), s	10.0	35.0	33.0	10.0	35.0	30.0					
Max Q Clear Time (g_c+H), s	9.7	24.5	28.2	6.5	38.5	25.6					
Green Ext Time (p_c), s	0.0	2.0	0.6	0.0	0.0	0.7					
Intersection Summary											
HCM 2010 Ctrl Delay	55.7										
HCM 2010 LOS	E										
Notes											

Corona Station T/A
PM Future

Synchro 10 Report
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	670	810	380	30	490	130	480	550	50	220	630
Traffic Volume (veh/h)	670	810	380	30	490	130	480	550	50	220	630
Future Volume (veh/h)	670	810	380	30	490	130	480	550	50	220	630
Number	5	2	12	1	6	16	3	8	18	7	4
Initial Q (Qb), veh	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	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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863
Adj Flow Rate, veh/h	684	827	349	31	500	42	490	561	41	224	643
Adj No. of Lanes	2	2	0	1	2	1	2	2	0	1	2
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	981	1027	432	135	763	342	569	694	51	322	794
Arrive On Green	0.09	0.14	0.14	0.08	0.22	0.22	0.17	0.21	0.20	0.18	0.22
Sat Flow, veh/h	3442	2430	1022	1774	3539	1583	3442	3442	244	1774	3539
Grp Volume(v), veh/h	684	602	574	31	500	42	490	296	306	224	643
Grp Sat Flow(s),veh/h/ln	1721	1770	1682	1774	1770	1583	1721	1770	1820	1774	1770
Q Serve(g, s)	28.1	48.1	48.4	2.4	18.8	3.1	20.2	23.3	23.4	17.3	25.1
Cycle Q Clear(g, c), s	28.1	48.1	48.4	2.4	18.8	3.1	20.2	23.3	23.4	17.3	25.1
Prop In Lane	1.00	1.00	0.61	1.00	1.00	1.00	1.00	1.00	0.13	1.00	1.00
Lane Grp Cap(c), veh/h	981	748	711	135	763	342	569	367	377	322	794
V/C Ratio(X)	0.70	0.80	0.81	0.23	0.85	0.12	0.86	0.81	0.81	0.70	0.81
Avail Cap(c, a), veh/h	981	748	711	135	763	342	613	462	475	322	899
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(i)	0.82	0.82	0.82	1.00	1.00	1.00	1.00	1.00	1.00	0.80	0.80
Uniform Delay (d), s/veh	60.0	57.0	57.2	63.4	52.3	46.1	59.3	55.1	55.2	56.0	53.7
Incr Delay (d2), s/veh	1.8	7.4	8.0	0.9	2.3	0.2	11.4	9.3	9.3	5.1	4.4
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
%ile BackOfQ(50%),veh/ln	13.7	25.2	24.1	1.2	9.5	1.4	10.5	12.3	12.7	8.9	12.8
LnGrp Delay(d),s/veh	61.8	64.4	65.1	64.3	54.6	46.4	70.7	64.4	64.5	61.1	58.1
LnGrp LOS	E	E	E	E	D	D	E	E	E	E	A
Approach Vol, veh/h	1860			573			1092			1117	
Approach Delay, s/veh	63.7			54.5			67.3			47.5	
Approach LOS	E			D			E			D	
Timer	1	2	3	4	5	6	7	8			
Assigned Phs	1	2	3	4	5	6	7	8			
Phs Duration (G+Y+Rc), s	15.4	65.7	28.1	36.8	45.6	35.5	30.6	34.3			
Change Period (Y+Rc), s	5.4	* 5.1	5.4	* 5.2	* 5.4	5.2	* 5.1				
Max Green Setting (Gmax), s	4.1	* 6.1	24.6	* 3.6	* 3.6	28.2	23.9	* 3.7			
Max Q Clear Time (g_c+H), s	4.4	50.4	22.2	27.1	30.1	20.8	19.3	25.4			
Green Ext Time (p_c), s	0.0	6.8	0.5	4.4	1.5	2.6	0.3	3.8			
Intersection Summary											
HCM 2010 Ctrl Delay	59.5										
HCM 2010 LOS	E										
Notes											

Corona Station T/A
PM Future

Synchro 10 Report
W-Trans

HCM 2010 Signalized Intersection Summary
7: US 101 NB Off-Ramp & E Washington St

11/01/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR	←	↖	↗	→
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↖	↗	↖	↗
Traffic Volume (veh/h)	1500	0	0	1260	160	310				
Future Volume (veh/h)	1500	0	0	1260	160	310				
Number	2	12	1	6	3	18				
Initial Q (Ob), veh	0	0	0	0	0	0				
Ped-Bike Adj(A_pbT)	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				
Adj Sat Flow, veh/hln	1863	0	0	1863	1863	1863				
Adj Flow Rate, veh/h	1515	0	0	1273	162	255				
Adj No. of Lanes	2	0	0	2	2	2				
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99				
Percent Heavy Veh, %	2	0	0	2	2	2				
Cap. veh/h	2924	0	0	2924	410	332				
Arrive On Green	0.83	0.00	0.00	0.83	0.12	0.12				
Sat Flow, veh/h	3725	0	0	3725	3442	2787				
Grp Volume(v), veh/h	1515	0	0	1273	162	255				
Grp Sat Flow(s), veh/hln	1770	0	0	1770	1721	1393				
Q Serve(g, s), s	19.0	0.0	0.0	14.3	6.4	13.0				
Cycle Q Clear(g, c), s	19.0	0.0	0.0	14.3	6.4	13.0				
Prop In Lane	0.00	0.00	0.00	0.64	1.00	1.00				
Lane Grp Cap(c), veh/h	2924	0	0	2924	410	332				
V/C Ratio(X)	0.52	0.00	0.00	0.44	0.39	0.77				
Avail Cap(c, a), veh/h	2924	0	0	2924	684	554				
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				
Upstream Filter(I)	0.52	0.00	0.00	0.64	1.00	1.00				
Uniform Delay (d), s/veh	3.9	0.0	0.0	3.5	59.4	62.3				
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.3	0.7	4.5				
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				
%ile Back(Q)(50%), veh/ln	92	0.0	0.0	7.0	3.1	5.2				
LnGrp Delay(d), s/veh	4.2	0.0	0.0	3.8	60.2	66.8				
LnGrp LOS	A			A	E	E				
Approach Vol, veh/h	1515			1273	417					
Approach Delay, s/veh	4.2			3.8	64.2					
Approach LOS	A			A	E					
Timer	1	2	3	4	5	6	7	8		
Assigned Phs	2					6		8		
Phs Duration (G+Y+Rc), s	124.6					124.6		21.4		
Change Period (Y+Rc), s	* 4.8					* 4.8		* 4.8		
Max Green Setting (Gmax), s	* 1.1E2					* 1.1E2		28.2		
Max Q Clear Time (g_c+H), s	21.0					16.3		15.0		
Green Ext Time (p_c), s	45.8					33.9		1.6		
Intersection Summary										
HCM 2010 Ctrl Delay	11.8									
HCM 2010 LOS	B									
Notes										

Corona Station T/A
PM Future
Synchro 10 Report
W-Trans

HCM 2010 Signalized Intersection Summary
8: US 101 SB On-Ramp/US 101 SB Off-Ramp & E Washington St

11/01/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR	←	↖	↗	→
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↖	↗	↖	↗
Traffic Volume (veh/h)	0	1500	150	250	1030	0				
Future Volume (veh/h)	0	1500	150	250	1030	0				
Number	5	2	12	1	6	16				
Initial Q (Ob), veh	0	0	0	0	0	0				
Ped-Bike Adj(A_pbT)	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				
Adj Sat Flow, veh/hln	0	1863	1863	1863	1863	0				
Adj Flow Rate, veh/h	0	1562	102	260	1073	0				
Adj No. of Lanes	0	2	1	2	2	0				
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96				
Percent Heavy Veh, %	0	1778	795	708	2613	0				
Cap. veh/h	0.00	0.50	0.50	0.07	0.24	0.00				
Arrive On Green	0.00	0.50	0.50	0.07	0.24	0.00				
Sat Flow, veh/h	0	3632	1583	3442	3632	0				
Grp Volume(v), veh/h	0	1562	102	260	1073	0				
Grp Sat Flow(s), veh/hln	0	1770	1583	1721	1770	0				
Q Serve(g, s), s	0.0	57.4	5.0	10.5	37.2	0.0				
Cycle Q Clear(g, c), s	0.0	57.4	5.0	10.5	37.2	0.0				
Prop In Lane	0.00	1.00	1.00	1.00	0.00	0.00				
Lane Grp Cap(c), veh/h	0	1778	795	708	2613	0				
V/C Ratio(X)	0.00	0.88	0.13	0.37	0.41	0.00				
Avail Cap(c, a), veh/h	0	1842	824	708	2613	0				
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	1.00				
Upstream Filter(I)	0.00	1.00	1.00	0.90	0.90	0.00				
Uniform Delay (d), s/veh	0.0	32.4	19.3	58.9	28.5	0.0				
Incr Delay (d2), s/veh	0.0	6.5	0.3	0.6	0.4	0.0				
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				
%ile Back(Q)(50%), veh/ln	0.0	29.6	2.3	5.1	18.5	0.0				
LnGrp Delay(d), s/veh	0.0	38.9	19.7	59.6	29.0	0.0				
LnGrp LOS	D	B	E	C	C	E				
Approach Vol, veh/h	1664			1333						
Approach Delay, s/veh	37.7			34.9						
Approach LOS	D			C						
Timer	1	2	3	4	5	6	7	8		
Assigned Phs	1	2								
Phs Duration (G+Y+Rc), s	34.5	77.3				34.2		111.8		
Change Period (Y+Rc), s	4.6	* 4.6				5.1		4.6		
Max Green Setting (Gmax), s	14.8	* 7.5				41.9		94.4		
Max Q Clear Time (g_c+H), s	12.5	59.4				26.8		39.2		
Green Ext Time (p_c), s	0.4	13.3				2.3		21.7		
Intersection Summary										
HCM 2010 Ctrl Delay	40.4									
HCM 2010 LOS	D									
Notes										

Corona Station T/A
PM Future
Synchro 10 Report
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HCM 2010 Signalized Intersection Summary
 2: US 101 N & Old Redwood Hwy N

10/24/2018

Movement	EBT	WBT	WBR	NBR	EBT	WBT	WBR	NBR
Lane Configurations	↑↑	↑↑	↑	↑	↑↑	↑↑	↑	↑
Traffic Volume (veh/h)	1098	0	0	697	120	494		
Future Volume (veh/h)	1098	0	0	697	120	494		
Number	2	12	1	6	3	18		
Initial Q (Ob), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	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		
Adj Sat Flow, veh/h/ln	1863	1863	0	1863	1863	1863		
Adj Flow Rate, veh/h	1156	0	0	734	126	520		
Adj No. of Lanes	2	1	0	2	2	2		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95		
Percent Heavy Veh, %	2	2	0	2	2	2		
Cap. veh/h	1919	858	0	1919	972	787		
Arrive On Green	0.54	0.00	0.00	0.54	0.28	0.28		
Sat Flow, veh/h	3632	1583	0	3725	3442	2787		
Grp Volume(v), veh/h	1156	0	0	734	126	520		
Grp Sat Flow(s),veh/h/ln	1770	1583	0	1770	1721	1393		
Q Serve(g, s), s	10.1	0.0	0.0	5.5	1.2	7.5		
Cycle Q Clear(g, c), s	10.1	0.0	0.0	5.5	1.2	7.5		
Prop In Lane	1.00	0.00	0.00	1.00	1.00	1.00		
Lane Grp Cap(c), veh/h	1919	858	0	1919	972	787		
V/C Ratio(X)	0.60	0.00	0.00	0.38	0.13	0.66		
Avail Cap(c, a), veh/h	2726	1220	0	2726	2621	2122		
HCM Platoon Ratio	1.00	1.00	0.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	7.1	0.0	0.0	6.0	12.2	14.4		
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.2	0.1	1.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile Back(Q)(50%),veh/ln	4.9	0.0	0.0	2.7	0.6	3.0		
LnGrp Delay(d),s/veh	7.5	0.0	0.0	6.2	12.2	15.4		
LnGrp LOS	A	A	A	B	B	B		
Approach Vol, veh/h	1156		734	646				
Approach Delay, s/veh	7.5		6.2	14.8				
Approach LOS	A		A	B				
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		28.7				28.7		16.9
Change Period (Y+Rc), s		5.1				5.1		4.7
Max Green Setting (Gmax), s		34.0				34.0		34.0
Max Q Clear Time (g_c+H), s		12.1				7.5		9.5
Green Ext Time (p_c), s		11.5				7.7		2.7
Intersection Summary								
HCM 2010 Ctrl Delay	9.0							
HCM 2010 LOS	A							

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HCM 2010 Signalized Intersection Summary
 1: Old Redwood Hwy N & US 101 S

10/24/2018

Movement	EBL	WBL	WBR	SBR	EBL	WBL	WBR	SBR
Lane Configurations	↑↑	↑↑	↑	↑	↑↑	↑↑	↑	↑
Traffic Volume (veh/h)	0	742	798	0	743	592		
Future Volume (veh/h)	0	742	798	0	743	592		
Number	5	2	6	16	7	14		
Initial Q (Ob), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	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		
Adj Sat Flow, veh/h/ln	0	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	0	789	849	0	790	630		
Adj No. of Lanes	0	2	2	1	2	2		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94		
Percent Heavy Veh, %	0	2	2	2	2	2		
Cap. veh/h	0	2035	2040	913	1034	837		
Arrive On Green	0.00	0.57	0.58	0.00	0.30	0.30		
Sat Flow, veh/h	0	3725	3632	1583	3442	2787		
Grp Volume(v), veh/h	0	789	849	0	790	630		
Grp Sat Flow(s),veh/h/ln	0	1770	1770	1583	1721	1393		
Q Serve(g, s), s	0.0	7.9	8.7	0.0	13.5	13.3		
Cycle Q Clear(g, c), s	0.0	7.9	8.7	0.0	13.5	13.3		
Prop In Lane	0.00	1.00	1.00	0.00	1.00	1.00		
Lane Grp Cap(c), veh/h	0	2035	2040	913	1034	837		
V/C Ratio(X)	0.00	0.39	0.42	0.00	0.76	0.75		
Avail Cap(c, a), veh/h	0	2035	2040	913	1165	943		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.00	1.00	0.94	0.00	1.00	1.00		
Uniform Delay (d), s/veh	0.0	7.6	7.7	0.0	20.6	20.6		
Incr Delay (d2), s/veh	0.0	0.6	0.6	0.0	2.7	3.1		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile Back(Q)(50%),veh/ln	0.0	4.0	4.3	0.0	6.8	5.4		
LnGrp Delay(d),s/veh	0.0	8.1	8.3	0.0	23.4	23.6		
LnGrp LOS	A	A	A	C	C	C		
Approach Vol, veh/h	789	849		1420				
Approach Delay, s/veh	8.1	8.3		23.5				
Approach LOS	A	A		C				
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		41.5		23.5		41.5		
Change Period (Y+Rc), s		* 5.2		5.1		* 5.2		
Max Green Setting (Gmax), s		* 34		20.9		* 34		
Max Q Clear Time (g_c+H), s		9.9		15.5		10.7		
Green Ext Time (p_c), s		7.8		2.9		8.6		
Intersection Summary								
HCM 2010 Ctrl Delay	15.3							
HCM 2010 LOS	B							

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3: N McDowell Blvd & Old Redwood Hwy N

10/24/2018

3: N McDowell Blvd & Old Redwood Hwy N

10/24/2018

4: N McDowell Rd/N McDowell Blvd & Corona Rd

10/24/2018

4: N McDowell Rd/N McDowell Blvd & Corona Rd

10/24/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	215	645	683	150	545	12	463	68	46	11	26	33
Future Volume (veh/h)	215	645	683	150	545	12	463	68	46	11	26	33
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Ob), 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	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
Adj Sat Flow, veh/h	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	222	665	0	155	562	12	527	0	47	11	27	34
Adj No. of Lanes	1	2	1	1	2	0	2	0	1	1	1	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	218	795	356	692	1769	38	629	0	281	137	144	122
Arrive On Green	0.12	0.22	0.00	0.39	0.50	0.49	0.18	0.00	0.18	0.08	0.08	0.08
Sat Flow, veh/h	1774	3539	1583	1774	3543	76	3548	0	1583	1774	1863	1583
Grp Volume(V), veh/h	222	665	0	155	280	294	527	0	47	11	27	34
Grp Sat Flow(s),veh/h	1774	1770	1583	1774	1770	1849	1774	0	1583	1774	1863	1583
Q Serve(g, s)	16.0	23.3	0.0	7.6	12.3	12.3	18.7	0.0	3.3	0.7	1.8	2.6
Cycle Q Clear(g, c), s	16.0	23.3	0.0	7.6	12.3	12.3	18.7	0.0	3.3	0.7	1.8	2.6
Prop In Lane	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	218	795	356	692	883	923	629	0	281	137	144	122
V/C Ratio(X)	1.02	0.84	0.00	0.22	0.32	0.32	0.84	0.00	0.17	0.08	0.19	0.28
Avail Cap(c, a), veh/h	218	871	390	692	883	923	1037	0	463	423	444	378
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)	0.76	0.76	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.0	48.1	0.0	26.5	19.4	19.4	51.7	0.0	45.3	55.7	56.1	56.5
Incr Delay (d2), s/veh	57.4	7.9	0.0	0.1	0.9	0.9	1.4	0.0	0.1	0.1	0.2	0.5
Initial Q Delay(d3),s/veh	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.3	12.2	0.0	3.7	6.2	6.5	9.3	0.0	1.4	0.4	0.9	1.2
LnGrp Delay(d),s/veh	114.5	56.0	0.0	26.6	20.3	20.3	53.0	0.0	45.4	55.8	56.4	57.0
LnGrp LOS	F	E	E	C	C	C	D	D	D	E	E	E
Approach Vol, veh/h	887			729			574				72	
Approach Delay, s/veh	70.7			21.6			52.4				56.6	
Approach LOS	E			C			D				E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6						
Phs Duration (G+Y+Rc), s	55.7	33.2		14.1	20.0	68.9		27.0				
Change Period (Y+Rc), s	5.0	* 5.1		* 4.8	4.0	5.0		5.4				
Max Green Setting (Gmax), s	13.0	* 31		* 30	16.0	28.0		36.6				
Max Q Clear Time (g_c+H), s	9.6	25.3		4.6	18.0	14.3		20.7				
Green Ext Time (p_c), s	0.1	2.8		0.1	0.0	4.5		1.0				
Intersection Summary	49.8											
HCM 2010 Ctrl Delay	D											
HCM 2010 LOS	D											
Notes												

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	218	223	254	48	271	373	169	452	27	135	453	65
Future Volume (veh/h)	218	223	254	48	271	373	169	452	27	135	453	65
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Ob), 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	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
Adj Sat Flow, veh/h	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	227	232	121	50	282	311	176	471	20	141	472	51
Adj No. of Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	231	474	402	146	368	478	522	1374	58	188	632	68
Arrive On Green	0.13	0.25	0.25	0.08	0.20	0.20	0.29	0.40	0.38	0.11	0.20	0.19
Sat Flow, veh/h	1774	1863	1583	1774	1863	1583	1774	1774	1774	1774	1774	1774
Grp Volume(V), veh/h	227	232	121	50	282	311	176	241	250	141	258	265
Grp Sat Flow(s),veh/h	1774	1863	1583	1774	1863	1583	1774	1770	1837	1774	1770	1802
Q Serve(g, s)	12.8	10.6	2.8	2.7	14.3	10.5	7.8	9.5	9.5	7.7	13.7	13.9
Cycle Q Clear(g, c), s	12.8	10.6	2.8	2.7	14.3	10.5	7.8	9.5	9.5	7.7	13.7	13.9
Prop In Lane	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	231	474	402	146	368	478	522	703	730	188	347	353
V/C Ratio(X)	0.98	0.49	0.30	0.34	0.77	0.65	0.34	0.34	0.34	0.75	0.75	0.75
Avail Cap(c, a), veh/h	231	522	443	195	484	576	522	703	730	302	460	468
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	0.79	0.79	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.4	31.8	6.3	43.3	37.9	13.4	27.6	21.0	21.1	43.4	37.9	38.0
Incr Delay (d2), s/veh	54.6	1.1	0.6	1.4	6.3	2.5	0.3	1.1	1.0	8.2	13.6	13.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.7	5.6	1.3	1.4	8.0	4.9	3.9	4.8	5.0	4.2	8.0	8.3
LnGrp Delay(d),s/veh	98.0	32.9	6.9	44.7	44.3	15.9	27.9	22.1	22.1	51.6	51.4	51.7
LnGrp LOS	F	C	A	D	D	B	C	C	C	D	D	D
Approach Vol, veh/h	580			643			667				664	
Approach Delay, s/veh	53.0			30.6			23.6				51.6	
Approach LOS	D			C			C				D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6						
Phs Duration (G+Y+Rc), s	12.3	29.4	34.7	23.6	17.9	23.8		14.6	43.7			
Change Period (Y+Rc), s	4.0	* 4.9	5.3	* 4.9	* 4.9	* 4.8		4.6	5.3			
Max Green Setting (Gmax), s	11.0	27.1	19.0	* 25	* 13	* 25		16.4	26.7			
Max Q Clear Time (g_c+H), s	4.7	12.6	9.8	15.9	14.8	16.3		9.7	11.5			
Green Ext Time (p_c), s	0.0	2.1	0.3	2.8	0.0	2.7		0.3	3.5			
Intersection Summary	39.3											
HCM 2010 Ctrl Delay	D											
HCM 2010 LOS	D											
Notes												

Corona Station TIA
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HCM 2010 Signalized Intersection Summary

5: Petaluma Blvd N & Skillman Lane/Corona Rd

10/24/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	1	1	1	1	1	1	1	1	1
Traffic Volume (veh/h)	211	207	54	269	151	21	46	495	320	40	713	173
Future Volume (veh/h)	211	207	54	269	151	21	46	495	320	40	713	173
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Ob), 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	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
Adj Sat Flow, veh/hln	1900	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	222	218	56	283	159	8	48	521	181	42	751	104
Adj No. of Lanes	0	1	0	1	1	0	1	2	1	1	2	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	243	239	61	337	334	17	85	962	431	113	899	125
Arrive On Green	0.30	0.30	0.30	0.19	0.19	0.18	0.05	0.27	0.27	0.06	0.29	0.27
Sat Flow, veh/h	800	785	202	1774	1759	88	1774	3539	1583	1774	3124	432
Grp Volume(V), veh/h	496	0	0	283	0	167	48	521	181	42	425	430
Grp Sat Flow(s),veh/hln	1787	0	0	1774	0	1847	1774	1770	1583	1774	1770	1786
Q Serve(g, s)	25.1	0.0	0.0	14.4	0.0	7.6	2.5	11.8	8.8	2.1	21.1	21.2
Cycle Q Clear(g, c), s	25.1	0.0	0.0	14.4	0.0	7.6	2.5	11.8	8.8	2.1	21.1	21.2
Prop In Lane	0.45	0.0	0.11	1.00	0.0	0.05	1.00	1.00	1.00	1.00	1.00	0.24
Lane Grp Cap(c), veh/h	543	0	0	337	0	351	85	962	431	113	510	514
V/C Ratio(X)	0.91	0.0	0.00	0.84	0.00	0.48	0.57	0.54	0.42	0.37	0.83	0.84
Avail Cap(c, a), veh/h	638	0	0	576	0	600	189	1376	616	189	688	695
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.5	0.0	0.0	36.7	0.0	33.9	43.7	29.2	28.1	42.1	31.3	31.5
Incr Delay (d2), s/veh	14.9	0.0	0.0	2.2	0.0	0.4	2.2	0.2	0.2	0.7	5.0	5.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	14.6	0.0	0.0	7.3	0.0	3.9	1.3	5.8	3.9	1.1	11.0	11.1
LnGrp Delay(d),s/veh	46.4	0.0	0.0	38.9	0.0	34.3	45.9	29.4	28.3	42.9	36.3	36.5
LnGrp LOS	D	D	D	C	C	C	D	C	C	C	D	D
Approach Vol, veh/h	496			450			750				897	
Approach Delay, s/veh	46.4			37.1			30.2				36.7	
Approach LOS	D			D			C				D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.5	31.0		32.5	10.0	29.5	21.8					
Change Period (Y+Rc), s	4.0	5.5		4.5	4.0	5.5	4.5					
Max Green Setting (Gmax), s	10.0	35.0		33.0	10.0	35.0	30.0					
Max Q Clear Time (g_c+H), s	4.5	23.2		27.1	4.1	13.8	16.4					
Green Ext Time (p_c), s	0.0	2.3		0.9	0.0	2.0	0.9					
Intersection Summary	36.7											
HCM 2010 Ctrl Delay	D											
HCM 2010 LOS	D											
Notes												

Corona Station TIA
AM Existing plus Project

Synchro 10 Report
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HCM 2010 Signalized Intersection Summary

6: S McDowell Blvd/N McDowell Rd & E Washington St

10/24/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	1	1	1	1	1	1	1	1	1
Traffic Volume (veh/h)	463	547	266	33	695	115	370	460	49	61	331	530
Future Volume (veh/h)	463	547	266	33	695	115	370	460	49	61	331	530
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Ob), 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	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
Adj Sat Flow, veh/hln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	482	570	253	34	724	52	385	479	41	64	345	447
Adj No. of Lanes	2	2	0	1	2	1	2	2	0	1	2	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	482	974	432	60	1061	475	461	1180	101	99	993	673
Arrive On Green	0.05	0.13	0.13	0.03	0.30	0.30	0.13	0.36	0.35	0.06	0.28	0.28
Sat Flow, veh/h	3442	2388	1058	1774	3539	1583	3442	3301	282	1774	3539	1583
Grp Volume(V), veh/h	482	422	401	34	724	52	385	256	264	64	345	447
Grp Sat Flow(s),veh/hln	1721	1770	1676	1774	1770	1583	1721	1770	1813	1774	1770	1583
Q Serve(g, s)	15.7	25.1	25.2	2.1	20.2	2.1	12.2	12.2	12.3	4.0	8.7	25.3
Cycle Q Clear(g, c), s	15.7	25.1	25.2	2.1	20.2	2.1	12.2	12.2	12.3	4.0	8.7	25.3
Prop In Lane	1.00	1.00	0.63	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	482	722	684	60	1061	475	461	633	648	99	993	673
V/C Ratio(X)	0.98	0.58	0.59	0.57	0.88	0.11	0.84	0.40	0.41	0.64	0.35	0.66
Avail Cap(c, a), veh/h	492	722	684	111	1061	475	461	633	648	174	1106	724
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.83	0.93	0.93	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.87	0.87
Uniform Delay (d), s/veh	53.2	39.6	39.7	53.3	34.5	28.4	47.3	27.0	27.1	51.8	32.1	25.8
Incr Delay (d2), s/veh	34.0	3.2	3.4	8.1	3.6	0.5	12.6	0.6	0.6	5.9	0.3	2.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.8	13.0	12.4	1.2	10.4	1.2	6.6	6.1	6.3	2.1	4.3	11.4
LnGrp Delay(d),s/veh	87.2	42.8	43.1	61.4	38.1	28.9	59.9	27.6	27.7	57.7	32.4	27.9
LnGrp LOS	F	D	D	E	D	C	E	C	C	E	C	C
Approach Vol, veh/h	1305			810			905				856	
Approach Delay, s/veh	59.3			38.5			41.4				31.9	
Approach LOS	E			D			D				C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.8	49.8	19.0	35.4	20.0	37.6	10.3	44.2				
Change Period (Y+Rc), s	5.1	* 5.2	5.4	* 5.2	5.4	* 5.2	5.1	* 5.2				
Max Green Setting (Gmax), s	5.9	* 3.8	13.6	* 3.4	14.6	* 2.9	9.9	* 3.8				
Max Q Clear Time (g_c+H), s	4.1	27.2	14.2	27.3	17.7	22.2	6.0	14.3				
Green Ext Time (p_c), s	0.0	5.1	0.0	2.9	0.0	3.4	0.0	4.6				
Intersection Summary	44.7											
HCM 2010 Ctrl Delay	D											
HCM 2010 LOS	D											
Notes												

Corona Station TIA
AM Existing plus Project

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HCM 2010 Signalized Intersection Summary
7: US 101 NB Off-Ramp & E Washington St

10/24/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Traffic Volume (veh/h)	906	0	0	1595	106	284
Future Volume (veh/h)	906	0	0	1595	106	284
Number	2	12	1	6	3	18
Initial Q (Ob), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	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
Adj Sat Flow, veh/h	1863	0	0	1863	1863	1863
Adj Flow Rate, veh/h	964	0	0	1697	113	112
Adj No. of Lanes	2	0	0	2	2	2
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	0	0	2	2	2
Cap. veh/h	3032	0	0	3032	248	201
Arrive On Green	0.86	0.00	0.00	0.86	0.07	0.07
Sat Flow, veh/h	3725	0	0	3725	3442	2787
Grp Volume(v), veh/h	964	0	0	1697	113	112
Grp Sat Flow(s), veh/h	1770	0	0	1770	1721	1393
Q Serve(g, s), s	6.0	0.0	0.0	14.8	3.5	4.4
Cycle Q Clear(g, c), s	6.0	0.0	0.0	14.8	3.5	4.4
Prop In Lane	0.00	0.00	0.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	3032	0	0	3032	248	201
V/C Ratio(X)	0.32	0.00	0.00	0.56	0.46	0.56
Avail Cap(c, a), veh/h	3032	0	0	3032	799	647
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.70	0.00	0.00	0.62	1.00	1.00
Uniform Delay (d), s/veh	1.6	0.0	0.0	2.2	49.9	50.2
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.5	1.6	2.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/h	2.9	0.0	0.0	7.3	1.7	1.8
LnGrp Delay(d), s/veh	1.8	0.0	0.0	2.7	51.4	53.2
LnGrp LOS	A			A	D	D
Approach Vol, veh/h	964			1697	225	
Approach Delay, s/veh	1.8			2.7	52.3	
Approach LOS	A			A	D	
Timer	1	2	3	4	5	6
Assigned Phs		2				6
Phs Duration (G+Y+Rc), s		99.9				12.1
Change Period (Y+Rc), s		* 4.8				4.8
Max Green Setting (Gmax), s		* 7.7				* 7.7
Max Q Clear Time (g_c+H), s		8.0				16.8
Green Ext Time (p_c), s		19.6				43.2
Intersection Summary						
HCM 2010 Ctrl Delay	6.2					
HCM 2010 LOS	A					
Notes						

Corona Station TIA
AM Existing plus Project
Synchro 10 Report
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HCM 2010 Signalized Intersection Summary
8: US 101 SB On-Ramp/US 101 SB Off-Ramp & E Washington St

10/24/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Traffic Volume (veh/h)	0	1056	152	385	975	0
Future Volume (veh/h)	0	1056	152	385	975	0
Number	5	2	12	1	6	16
Initial Q (Ob), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	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
Adj Sat Flow, veh/h	0	1863	1863	1863	1863	0
Adj Flow Rate, veh/h	0	1123	123	410	1037	0
Adj No. of Lanes	0	2	1	2	2	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	2	2	2	2	0
Cap. veh/h	0	1963	878	507	2611	0
Arrive On Green	0.00	0.55	0.55	0.29	1.00	0.00
Sat Flow, veh/h	0	3632	1583	3442	3632	0
Grp Volume(v), veh/h	0	1123	123	410	1037	0
Grp Sat Flow(s), veh/h	0	1770	1583	1721	1770	0
Q Serve(g, s), s	0.0	23.2	4.2	12.4	0.0	0.0
Cycle Q Clear(g, c), s	0.0	23.2	4.2	12.4	0.0	0.0
Prop In Lane	0.00	1.00	1.00	1.00	0.00	0.00
Lane Grp Cap(c), veh/h	0	1963	878	507	2611	0
V/C Ratio(X)	0.00	0.57	0.14	0.81	0.40	0.00
Avail Cap(c, a), veh/h	0	1963	878	707	2611	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.81	0.81	0.00
Uniform Delay (d), s/veh	0.0	16.3	12.0	38.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.2	0.3	6.2	0.4	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/h	0.0	11.6	1.9	6.2	0.1	0.0
LnGrp Delay(d), s/veh	0.0	17.5	12.4	44.2	0.4	0.0
LnGrp LOS	B	B	D	D	A	D
Approach Vol, veh/h	1246			1447		494
Approach Delay, s/veh	17.0			12.8		48.5
Approach LOS	B			B		D
Timer	1	2	3	4	5	6
Assigned Phs		1				7
Phs Duration (G+Y+Rc), s		20.5				66.6
Change Period (Y+Rc), s		* 4.2				4.6
Max Green Setting (Gmax), s		* 23				28.9
Max Q Clear Time (g_c+H), s		14.4				25.2
Green Ext Time (p_c), s		2.0				1.8
Intersection Summary						
HCM 2010 Ctrl Delay	20.0					
HCM 2010 LOS	B					
Notes						

Corona Station TIA
AM Existing plus Project
Synchro 10 Report
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HCM 2010 Signalized Intersection Summary
 2: US 101 N & Old Redwood Hwy N

10/24/2018

Movement	EBT	WBT	WBR	WBL	EBR	WBR	NBL	NBR
Lane Configurations	↑↑	↑↑	↑	↑	↑	↑	↑	↑
Traffic Volume (veh/h)	876	0	838	98	250	0	838	98
Future Volume (veh/h)	876	0	838	98	250	0	838	98
Number	2	12	1	6	3	18	0	0
Initial Q (Ob), veh	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
Adj Sat Flow, veh/h/ln	1863	1863	0	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	922	0	0	882	103	263	0	0
Adj No. of Lanes	2	1	0	2	2	2	2	2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	0	2	2	2	2	2
Cap. veh/h	1849	827	0	1849	627	507	0	0
Arrive On Green	0.52	0.00	0.00	0.52	0.18	0.18	0.18	0.18
Sat Flow, veh/h	3632	1583	0	3725	3442	2787	0	0
Grp Volume(v), veh/h	922	0	0	882	103	263	0	0
Grp Sat Flow(s), veh/h/ln	1770	1583	0	1770	1721	1393	0	0
Q Serve(g, s), s	5.6	0.0	0.0	5.3	0.8	2.8	0.0	0.0
Cycle Q Clear(g, c), s	5.6	0.0	0.0	5.3	0.8	2.8	0.0	0.0
Prop In Lane	1.00	1.00	0.00	1.00	1.00	1.00	0.00	0.00
Lane Grp Cap(c), veh/h	1849	827	0	1849	627	507	0	0
V/C Ratio(X)	0.50	0.00	0.00	0.48	0.16	0.52	0.00	0.00
Avail Cap(c, a), veh/h	3628	1623	0	3628	3528	2857	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.1	0.0	0.0	5.0	11.4	12.3	0.0	0.0
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.3	0.1	0.8	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back(Q)(50%), veh/ln	2.8	0.0	0.0	2.5	0.4	1.1	0.0	0.0
LnGrp Delay(d), s/veh	5.4	0.0	0.0	5.3	11.6	13.1	0.0	0.0
LnGrp LOS	A	A	A	B	B	B	A	A
Approach Vol, veh/h	922	882	366	366	0	0	0	0
Approach Delay, s/veh	5.4	5.3	12.6	12.6	0	0	0	0
Approach LOS	A	A	B	B	0	0	0	0
Timer	1	2	3	4	5	6	7	8
Assigned Phs	2	2	2	2	2	2	2	2
Phs Duration (G+Y+Rc), s	22.4	22.4	22.4	22.4	22.4	22.4	22.4	22.4
Change Period (Y+Rc), s	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1
Max Green Setting (Gmax), s	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0
Max Q Clear Time (g_c+H), s	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6
Green Ext Time (p_c), s	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7
Intersection Summary								
HCM 2010 Ctrl Delay	6.6							
HCM 2010 LOS	A							

Corona Station TIA
 PM Existing plus Project
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HCM 2010 Signalized Intersection Summary
 1: Old Redwood Hwy N & US 101 S

10/24/2018

Movement	EBL	WBL	WBR	SBL	SBR
Lane Configurations	↑↑	↑↑	↑	↑	↑
Traffic Volume (veh/h)	0	1016	909	0	431
Future Volume (veh/h)	0	1016	909	0	431
Number	5	2	6	16	7
Initial Q (Ob), veh	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1863	1863	1863	1863
Adj Flow Rate, veh/h	0	1092	977	0	463
Adj No. of Lanes	0	2	2	1	2
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	2	2	2	2
Cap. veh/h	0	2104	2104	941	851
Arrive On Green	0.00	0.59	0.59	0.00	0.25
Sat Flow, veh/h	0	3725	3632	1583	3442
Grp Volume(v), veh/h	0	1092	977	0	463
Grp Sat Flow(s), veh/h/ln	0	1770	1770	1583	1721
Q Serve(g, s), s	0.0	11.8	10.1	0.0	7.6
Cycle Q Clear(g, c), s	0.0	11.8	10.1	0.0	7.6
Prop In Lane	0.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	0	2104	2104	941	851
V/C Ratio(X)	0.00	0.52	0.46	0.00	0.54
Avail Cap(c, a), veh/h	0	2104	2104	941	1001
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.89	0.00	1.00
Uniform Delay (d), s/veh	0.0	7.7	7.4	0.0	21.3
Incr Delay (d2), s/veh	0.0	0.9	0.7	0.0	0.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0
%ile Back(Q)(50%), veh/ln	0.0	5.9	5.1	0.0	3.7
LnGrp Delay(d), s/veh	0.0	8.7	8.0	0.0	21.8
LnGrp LOS	A	A	A	C	C
Approach Vol, veh/h	1092	977	1016	0	0
Approach Delay, s/veh	8.7	8.0	25.2	0	0
Approach LOS	A	A	C	0	0
Timer	1	2	3	4	5
Assigned Phs	2	2	2	2	2
Phs Duration (G+Y+Rc), s	43.8	43.8	43.8	43.8	43.8
Change Period (Y+Rc), s	* 5.2	* 5.1	* 5.2	* 5.2	* 5.2
Max Green Setting (Gmax), s	* 36	* 36	* 36	* 36	* 36
Max Q Clear Time (g_c+H), s	13.8	14.1	14.1	12.1	12.1
Green Ext Time (p_c), s	10.9	10.9	10.9	1.9	10.3
Intersection Summary					
HCM 2010 Ctrl Delay	13.9				
HCM 2010 LOS	B				

Corona Station TIA
 PM Existing plus Project
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3: N McDowell Blvd & Old Redwood Hwy N

10/24/2018

4: N McDowell Rd/N McDowell Blvd & Corona Rd

10/24/2018

HCM 2010 Signalized Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	79	577	449	113	532	14	698	46	241	24	77	274
Future Volume (veh/h)	79	577	449	113	532	14	698	46	241	24	77	274
Number	5	2	12	1	6	16	3	8	18	7	4	14
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	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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	87	634	0	124	585	15	803	0	265	26	85	301
Adj No. of Lanes	1	2	1	1	2	0	2	0	1	1	1	1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	131	746	334	322	1154	30	875	0	390	364	382	325
Arrive On Green	0.07	0.21	0.00	0.18	0.33	0.33	0.25	0.00	0.25	0.20	0.20	0.20
Sat Flow, veh/h	1774	3539	1583	1774	3526	90	3548	0	1583	1774	1863	1583
Grp Volume(V), veh/h	87	634	0	124	293	307	803	0	265	26	85	301
Grp Sat Flow(S), veh/h/ln	1774	1770	1583	1774	1770	1847	1774	0	1583	1774	1863	1583
Q Serve(g, s)	6.2	22.4	0.0	8.0	17.4	17.4	28.7	0.0	19.7	1.5	4.9	24.3
Cycle Q Clear(g, c), s	6.2	22.4	0.0	8.0	17.4	17.4	28.7	0.0	19.7	1.5	4.9	24.3
Prop In Lane	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	131	746	334	322	579	604	875	0	390	364	382	325
V/C Ratio(X)	0.67	0.85	0.00	0.39	0.51	0.51	0.82	0.00	0.68	0.07	0.22	0.83
Avail Cap(c, a), veh/h	218	841	376	322	579	604	999	0	446	412	433	368
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)	0.87	0.87	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.7	49.3	0.0	46.8	35.3	35.3	47.7	0.0	44.3	41.7	43.0	50.7
Incr Delay (d2), s/veh	1.9	10.3	0.0	0.3	3.1	3.0	11.3	0.0	2.4	0.0	0.1	26.2
Initial Q Delay(Q3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	3.1	12.0	0.0	4.0	9.0	9.4	15.4	0.0	8.9	0.8	2.6	13.0
LnGrp Delay(d), s/veh	60.6	59.6	0.0	47.1	38.4	38.3	59.0	0.0	46.8	41.7	43.2	76.9
LnGrp LOS	E	E	E	D	D	D	E	D	D	D	D	E
Approach Vol, veh/h	721			724			1068				412	
Approach Delay, s/veh	59.7			39.9			56.0				67.7	
Approach LOS	E			D			E				E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	28.6	32.5		31.4	13.6	47.5	37.4					
Change Period (Y+Rc), s	5.0	* 5.1		* 4.8	4.0	5.0	5.4					
Max Green Setting (Gmax), s	13.0	* 31		* 30	16.0	28.0	36.6					
Max Q Clear Time (g_c+H), s	10.0	24.4		26.3	8.2	19.4	30.7					
Green Ext Time (p_c), s	0.0	3.0		0.4	0.0	3.4	1.4					
Intersection Summary	54.6											
HCM 2010 Ctrl Delay	D											
HCM 2010 LOS	D											
Notes												

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	157	312	299	33	228	206	241	660	53	284	695	215
Future Volume (veh/h)	157	312	299	33	228	206	241	660	53	284	695	215
Number	5	2	12	1	6	16	3	8	18	7	4	14
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	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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	167	332	181	35	243	175	256	702	52	313	739	157
Adj No. of Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	196	398	338	117	301	492	450	1340	99	264	853	181
Arrive On Green	0.11	0.21	0.21	0.07	0.16	0.16	0.25	0.40	0.40	0.15	0.29	0.29
Sat Flow, veh/h	1774	1863	1583	1774	1863	1583	1774	3341	247	1774	2906	617
Grp Volume(V), veh/h	167	332	181	35	243	175	256	372	382	313	450	446
Grp Sat Flow(S), veh/h/ln	1774	1863	1583	1774	1863	1583	1774	1770	1819	1774	1770	1754
Q Serve(g, s)	10.2	18.8	6.2	2.1	13.8	6.1	13.8	17.5	17.5	16.4	26.5	26.5
Cycle Q Clear(g, c), s	10.2	18.8	6.2	2.1	13.8	6.1	13.8	17.5	17.5	16.4	26.5	26.5
Prop In Lane	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	196	398	338	117	301	492	450	709	729	264	519	515
V/C Ratio(X)	0.85	0.84	0.54	0.30	0.81	0.36	0.57	0.52	0.52	0.18	0.87	0.87
Avail Cap(c, a), veh/h	210	459	390	177	427	599	450	709	729	264	565	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	0.71	0.71	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.1	41.4	12.0	49.0	44.5	14.0	35.8	25.0	25.0	48.8	36.8	36.8
Incr Delay (d2), s/veh	26.1	12.2	1.9	1.4	9.2	0.6	1.2	2.0	1.9	114.2	17.4	17.6
Initial Q Delay(Q3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	6.4	11.0	2.9	1.1	7.9	2.8	6.9	9.0	9.2	16.4	15.4	15.3
LnGrp Delay(d), s/veh	74.2	53.6	13.9	50.4	53.6	14.6	37.0	27.0	26.9	161.0	54.2	54.4
LnGrp LOS	E	D	B	D	D	B	D	C	C	F	D	D
Approach Vol, veh/h	660			453			1010				1209	
Approach Delay, s/veh	48.1			38.3			29.5				81.9	
Approach LOS	D			D			C				F	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.2	28.4	33.2	37.2	17.0	22.6	21.0	49.4				
Change Period (Y+Rc), s	4.0	4.9	5.3	* 4.9	* 4.9	* 4.8	4.6	5.3				
Max Green Setting (Gmax), s	11.0	27.1	19.0	* 35	* 13	* 25	16.4	36.7				
Max Q Clear Time (g_c+H), s	4.1	20.8	15.8	28.5	12.2	15.8	18.4	19.5				
Green Ext Time (p_c), s	0.0	1.9	0.2	3.8	0.0	1.9	0.0	6.1				
Intersection Summary	53.4											
HCM 2010 Ctrl Delay	D											
HCM 2010 LOS	D											
Notes												

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5: Petaluma Blvd N & Skillman Lane/Corona Rd

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6: S McDowell Blvd/N McDowell Rd & E Washington St

10/24/2018

HCM 2010 Signalized Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	4	4	4	1	1	1	1	1	1	1	1
Traffic Volume (veh/h)	203	180	44	358	175	26	54	840	423	46	765
Future Volume (veh/h)	203	180	44	358	175	26	54	840	423	46	765
Number	7	4	14	3	8	18	1	6	16	5	2
Initial Q (Ob), veh	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	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
Adj Sat Flow, veh/h	1900	1863	1900	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	205	182	38	362	177	15	55	848	291	46	773
Adj No. of Lanes	0	1	0	1	1	0	1	2	1	1	2
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	224	198	41	402	384	33	89	973	435	104	901
Arrive On Green	0.26	0.26	0.26	0.23	0.23	0.23	0.05	0.27	0.27	0.06	0.28
Sat Flow, veh/h	864	767	160	1774	1694	144	1774	3539	1583	1774	3178
Grp Volume(v), veh/h	425	0	0	362	0	192	55	848	291	46	430
Grp Sat Flow(s), veh/h	1791	0	0	1774	0	1837	1774	1770	1583	1774	1770
Q Serve(g, s)	23.6	0.0	0.0	20.3	0.0	9.2	3.1	23.3	16.7	2.6	23.5
Cycle Q Clear(g, c), s	23.6	0.0	0.0	20.3	0.0	9.2	3.1	23.3	16.7	2.6	23.5
Prop In Lane	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	463	0	0	402	0	416	89	973	435	104	502
V/C Ratio(X)	0.92	0.00	0.00	0.90	0.00	0.46	0.62	0.87	0.67	0.44	0.86
Avail Cap(c, a), veh/h	579	0	0	521	0	540	174	1213	543	174	606
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
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.8	0.0	0.0	38.4	0.0	34.1	47.6	35.3	32.9	46.4	34.6
Incr Delay (d2), s/veh	15.5	0.0	0.0	13.7	0.0	0.3	2.6	5.1	1.2	1.1	8.8
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
%ile BackOfQ(50%), veh/h	13.7	0.0	0.0	11.5	0.0	4.7	1.6	12.1	7.4	1.3	12.7
LnGrp Delay(d), s/veh	52.3	0.0	0.0	52.0	0.0	34.4	50.2	40.5	34.1	47.5	43.4
LnGrp LOS	D	D	D	C	D	C	D	C	D	D	D
Approach Vol, veh/h	425			554			1194				913
Approach Delay, s/veh	52.3			45.9			39.4				43.7
Approach LOS	D			D			D				D
Timer	1	2	3	4	5	6	7	8			
Assigned Phs	1	2	3	4	5	6	7	8			
Phs Duration (G+Y+Rc), s	9.1	34.5		30.9	10.0	33.6		27.6			
Change Period (Y+Rc), s	4.0	5.5		4.5	4.0	5.5		4.5			
Max Green Setting (Gmax), s	10.0	35.0		33.0	10.0	35.0		30.0			
Max Q Clear Time (g_c+H), s	5.1	25.5		25.6	4.6	25.3		22.3			
Green Ext Time (p_c), s	0.0	2.2		0.9	0.0	2.7		0.9			
Intersection Summary	43.6										
HCM 2010 Ctrl Delay	D										
HCM 2010 LOS	D										
Notes											

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	4	4	4	1	1	1	1	1	1	1	1
Traffic Volume (veh/h)	672	817	322	37	543	112	326	448	41	166	509
Future Volume (veh/h)	672	817	322	37	543	112	326	448	41	166	509
Number	5	2	12	1	6	16	3	8	18	7	4
Initial Q (Ob), veh	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	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
Adj Sat Flow, veh/h	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863
Adj Flow Rate, veh/h	686	834	264	38	554	0	333	457	34	169	519
Adj No. of Lanes	2	2	0	1	2	1	2	2	0	1	2
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	799	1267	401	49	966	432	386	597	44	262	750
Arrive On Green	0.08	0.16	0.16	0.03	0.27	0.00	0.11	0.18	0.18	0.15	0.21
Sat Flow, veh/h	3442	2647	837	1774	3539	1583	3442	3341	248	1774	3539
Grp Volume(v), veh/h	686	557	541	38	554	0	333	241	250	169	519
Grp Sat Flow(s), veh/h	1721	1770	1715	1774	1770	1583	1721	1770	1819	1774	1770
Q Serve(g, s)	24.4	36.7	36.7	2.6	16.7	0.0	11.8	16.1	16.2	11.1	16.8
Cycle Q Clear(g, c), s	24.4	36.7	36.7	2.6	16.7	0.0	11.8	16.1	16.2	11.1	16.8
Prop In Lane	1.00	1.00	0.49	1.00	1.00	1.00	1.00	1.00	0.14	1.00	1.00
Lane Grp Cap(c), veh/h	799	847	821	49	966	432	386	316	325	262	750
V/C Ratio(X)	0.86	0.66	0.66	0.78	0.57	0.00	0.86	0.76	0.77	0.65	0.69
Avail Cap(c, a), veh/h	822	847	821	99	966	432	405	541	556	282	1022
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.78	0.78	0.78	1.00	1.00	1.00	1.00	1.00	1.00	0.64	0.64
Uniform Delay (d), s/veh	55.2	42.7	42.7	59.9	38.8	0.0	54.1	48.4	48.5	49.8	45.1
Incr Delay (d2), s/veh	7.1	3.1	3.2	23.3	1.0	0.0	16.7	5.4	5.3	3.5	1.1
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
%ile BackOfQ(50%), veh/h	12.5	18.8	18.2	1.6	8.3	0.0	6.5	8.3	8.6	5.7	8.3
LnGrp Delay(d), s/veh	62.4	45.8	45.9	83.3	39.9	0.0	70.8	53.8	53.8	53.3	46.2
LnGrp LOS	E	D	D	F	D	D	E	D	D	D	D
Approach Vol, veh/h	1784			592			824				1229
Approach Delay, s/veh	52.2			42.6			60.7				33.2
Approach LOS	D			D			E				C
Timer	1	2	3	4	5	6	7	8			
Assigned Phs	1	2	3	4	5	6	7	8			
Phs Duration (G+Y+Rc), s	8.5	64.7	19.3	31.5	34.2	39.1	23.5	27.3			
Change Period (Y+Rc), s	5.1	* 5.4	5.4	* 5.2	* 5.4	5.2	* 5.1				
Max Green Setting (Gmax), s	6.9	* 4.6	14.6	* 3.6	* 3.0	22.8	12.9	* 3.8			
Max Q Clear Time (g_c+H), s	4.6	38.7	13.8	18.8	26.4	18.7	13.1	18.2			
Green Ext Time (p_c), s	0.0	4.8	0.1	7.5	0.9	1.7	0.0	4.0			
Intersection Summary	47.2										
HCM 2010 Ctrl Delay	D										
HCM 2010 LOS	D										
Notes											

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HCM 2010 Signalized Intersection Summary
7: US 101 NB Off-Ramp & E Washington St

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Movement	EBT	EBR	WBL	WBT	NBL	NBR	←	↖	↗	→
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↖	↗	↖	↗
Traffic Volume (veh/h)	1425	0	0	1540	90	419				
Future Volume (veh/h)	1425	0	0	1540	90	419				
Number	2	12	1	6	3	18				
Initial Q (Ob), veh	0	0	0	0	0	0				
Ped-Bike Adj(A_pbT)	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				
Adj Sat Flow, veh/hln	1863	0	0	1863	1863	1863				
Adj Flow Rate, veh/h	1439	0	0	1556	91	349				
Adj No. of Lanes	2	0	0	2	2	2				
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99				
Percent Heavy Veh, %	2	0	0	2	2	2				
Cap. veh/h	2731	0	0	2731	520	421				
Arrive On Green	0.77	0.00	0.00	0.77	0.15	0.15				
Sat Flow, veh/h	3725	0	0	3725	3442	2787				
Grp Volume(v), veh/h	1439	0	0	1556	91	349				
Grp Sat Flow(s), veh/hln	1770	0	0	1770	1721	1393				
Q Serve(g, s), s	19.4	0.0	0.0	22.2	2.9	15.1				
Cycle Q Clear(g, c), s	19.4	0.0	0.0	22.2	2.9	15.1				
Prop In Lane	0.00	0.00	0.00	1.00	1.00	1.00				
Lane Grp Cap(c), veh/h	2731	0	0	2731	520	421				
V/C Ratio(X)	0.53	0.00	0.00	0.57	0.18	0.83				
Avail Cap(c, a), veh/h	2731	0	0	2731	783	634				
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				
Upstream Filter(I)	0.58	0.00	0.00	0.51	1.00	1.00				
Uniform Delay (d), s/veh	5.5	0.0	0.0	5.8	45.9	51.1				
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.4	0.2	6.4				
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				
%ile BackOfQ(50%), veh/ln	9.6	0.0	0.0	10.8	1.4	6.2				
LnGrp Delay(d), s/veh	5.9	0.0	0.0	6.2	46.1	57.5				
LnGrp LOS	A			A	D	E				
Approach Vol, veh/h	1439			1556	440					
Approach Delay, s/veh	5.9			6.2	55.2					
Approach LOS	A			A	E					
Timer	1	2	3	4	5	6	7	8		
Assigned Phs	2					6		8		
Phs Duration (G+Y+Rc), s	100.5					100.5		23.5		
Change Period (Y+Rc), s	* 4.8					* 4.8		4.8		
Max Green Setting (Gmax), s	* 86					* 86		28.2		
Max Q Clear Time (g_c+H), s	21.4					24.2		17.1		
Green Ext Time (p_c), s	36.2					39.4		1.6		
Intersection Summary										
HCM 2010 Ctrl Delay	12.3									
HCM 2010 LOS	B									
Notes										

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HCM 2010 Signalized Intersection Summary
8: US 101 SB On-Ramp/US 101 SB Off-Ramp & E Washington St

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Movement	EBT	EBR	WBL	WBT	NBL	NBR	←	↖	↗	→
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↖	↗	↖	↗
Traffic Volume (veh/h)	0	1338	146	260	1087	0				
Future Volume (veh/h)	0	1338	146	260	1087	0				
Number	5	2	12	1	6	16				
Initial Q (Ob), veh	0	0	0	0	0	0				
Ped-Bike Adj(A_pbT)	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				
Adj Sat Flow, veh/hln	0	1863	1863	1863	1863	0				
Adj Flow Rate, veh/h	0	1394	99	271	1132	0				
Adj No. of Lanes	0	2	1	2	2	0				
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96				
Percent Heavy Veh, %	0	2	2	2	2	2				
Cap. veh/h	0	1993	892	342	2464	0				
Arrive On Green	0.00	0.56	0.56	0.07	0.47	0.00				
Sat Flow, veh/h	0	3632	1583	3442	3632	0				
Grp Volume(v), veh/h	0	1394	99	271	1132	0				
Grp Sat Flow(s), veh/hln	0	1770	1583	1721	1770	0				
Q Serve(g, s), s	0.0	35.2	3.6	9.6	26.9	0.0				
Cycle Q Clear(g, c), s	0.0	35.2	3.6	9.6	26.9	0.0				
Prop In Lane	0.00	1.00	1.00	1.00	1.00	0.00				
Lane Grp Cap(c), veh/h	0	1993	892	342	2464	0				
V/C Ratio(X)	0.00	0.70	0.11	0.79	0.46	0.00				
Avail Cap(c, a), veh/h	0	1993	892	439	2464	0				
HCM Platoon Ratio	1.00	1.00	1.00	0.67	1.00	1.00				
Upstream Filter(I)	0.00	1.00	1.00	0.81	0.81	0.00				
Uniform Delay (d), s/veh	0.0	19.5	12.6	56.6	17.2	0.0				
Incr Delay (d2), s/veh	0.0	2.1	0.3	8.8	0.5	0.0				
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				
%ile BackOfQ(50%), veh/ln	0.0	17.6	1.6	5.0	13.4	0.0				
LnGrp Delay(d), s/veh	0.0	21.6	12.9	65.4	17.7	0.0				
LnGrp LOS	C	B	E	B	B	E				
Approach Vol, veh/h	1493			1403						
Approach Delay, s/veh	21.0			26.9						
Approach LOS	C			C						
Timer	1	2	3	4	5	6	7	8		
Assigned Phs	1	2								
Phs Duration (G+Y+Rc), s	16.5	74.4				33.1		90.9		
Change Period (Y+Rc), s	* 4.2	4.6				5.1		4.6		
Max Green Setting (Gmax), s	* 16	58.4				35.9		78.4		
Max Q Clear Time (g_c+H), s	11.6	37.2				25.8		28.9		
Green Ext Time (p_c), s	0.7	15.6				2.2		22.4		
Intersection Summary										
HCM 2010 Ctrl Delay	28.9									
HCM 2010 LOS	C									
Notes										

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HCM 2010 Signalized Intersection Summary
 1: Old Redwood Hwy N & US 101 S

10/24/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations	0	761	801	0	743	596		
Traffic Volume (veh/h)	0	761	801	0	743	596		
Future Volume (veh/h)	0	761	801	0	743	596		
Number	5	2	6	16	7	14		
Initial Q (Ob), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	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		
Adj Sat Flow, veh/h/ln	0	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	0	810	852	0	790	634		
Adj No. of Lanes	0	2	2	1	2	2		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94		
Percent Heavy Veh, %	0	2	2	2	2	2		
Cap. veh/h	0	1966	1966	879	985	797		
Arrive On Green	0.00	0.96	0.96	0.00	0.29	0.29		
Sat Flow, veh/h	0	3725	3632	1563	3442	2787		
Grp Volume(v), veh/h	0	810	852	0	790	634		
Grp Sat Flow(s), veh/h/ln	0	1770	1770	1563	1721	1393		
Q Serve(g, s), s	0.0	8.6	9.2	0.0	13.8	13.7		
Cycle Q Clear(g, c), s	0.0	8.6	9.2	0.0	13.8	13.7		
Prop In Lane	0.00	1.00	1.00	1.00	1.00	1.00		
Lane Grp Cap(c), veh/h	0	1966	1966	879	985	797		
V/C Ratio(X)	0.00	0.41	0.43	0.00	0.80	0.80		
Avail Cap(c, a), veh/h	0	1966	1966	879	1107	896		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(i)	0.00	1.00	0.94	0.00	1.00	1.00		
Uniform Delay (d), s/veh	0.0	8.3	8.5	0.0	21.5	21.4		
Incr Delay (d2), s/veh	0.0	0.6	0.7	0.0	3.9	4.5		
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile Back(Q50%), veh/ln	0.0	4.3	4.6	0.0	7.1	5.7		
LnGrp Delay(d), s/veh	0.0	9.0	9.1	0.0	25.4	26.0		
LnGrp LOS	A	A	A	C	C	C		
Approach Vol, veh/h	810	852	1424					
Approach Delay, s/veh	9.0	9.1	25.7					
Approach LOS	A	A	C					
Timer	1	2	3	4	5	6	7	8
Assigned Phs	2	4	4	4	5	6	6	6
Phs Duration (G+Y+Rc), s	41.3	23.7	23.7	41.3	41.3	41.3	41.3	41.3
Change Period (Y+Rc), s	* 5.2	5.1	5.1	* 5.2	5.1	* 5.2	5.1	* 5.2
Max Green Setting (Gmax), s	* 34	20.9	20.9	* 34	20.9	* 34	20.9	* 34
Max Q Clear Time (g_c+H), s	10.6	15.8	15.8	10.6	11.2	11.2	10.6	11.2
Green Ext Time (p_c), s	7.9	2.8	2.8	7.9	2.8	2.8	7.9	2.8
Intersection Summary								
HCM 2010 Ctrl Delay	16.7							
HCM 2010 LOS	B							
Notes								

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HCM 2010 Signalized Intersection Summary
 2: US 101 N & Old Redwood Hwy N

10/24/2018

Movement	EBT	EBR	WBR	WBL	NBL	NBR		
Lane Configurations	↑↑	↑	↑↑	↑↑	↑↑	↑↑		
Traffic Volume (veh/h)	1105	0	0	0	700	120		
Future Volume (veh/h)	1105	0	0	0	700	120		
Number	2	12	1	6	3	18		
Initial Q (Ob), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	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		
Adj Sat Flow, veh/h/ln	1863	1863	0	1863	1863	1863		
Adj Flow Rate, veh/h	1163	0	0	737	126	520		
Adj No. of Lanes	2	1	0	2	2	2		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95		
Percent Heavy Veh, %	2	2	0	2	2	2		
Cap. veh/h	1844	825	0	1844	923	747		
Arrive On Green	0.52	0.00	0.00	0.52	0.27	0.27		
Sat Flow, veh/h	3632	1563	0	3725	3442	2787		
Grp Volume(v), veh/h	1163	0	0	737	126	520		
Grp Sat Flow(s), veh/h/ln	1770	1563	0	1770	1721	1393		
Q Serve(g, s), s	10.9	0.0	0.0	5.9	1.3	7.8		
Cycle Q Clear(g, c), s	10.9	0.0	0.0	5.9	1.3	7.8		
Prop In Lane	1.00	1.00	0.00	1.00	1.00	1.00		
Lane Grp Cap(c), veh/h	1844	825	0	1844	923	747		
V/C Ratio(X)	0.63	0.00	0.00	0.40	0.14	0.70		
Avail Cap(c, a), veh/h	2590	1159	0	2590	2519	2039		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(i)	1.00	0.00	0.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	7.9	0.0	0.0	6.7	12.9	15.3		
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.2	0.1	1.2		
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile Back(Q50%), veh/ln	5.3	0.0	0.0	2.8	0.6	3.1		
LnGrp Delay(d), s/veh	8.5	0.0	0.0	6.9	13.0	16.5		
LnGrp LOS	A	A	A	B	B	B		
Approach Vol, veh/h	1163	825	737	646	1563	1563		
Approach Delay, s/veh	8.5	6.9	6.9	15.8	15.8	15.8		
Approach LOS	A	A	A	B	B	B		
Timer	1	2	3	4	5	6	7	8
Assigned Phs	2	2	2	2	2	2	2	2
Phs Duration (G+Y+Rc), s	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3
Change Period (Y+Rc), s	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1
Max Green Setting (Gmax), s	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0
Max Q Clear Time (g_c+H), s	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9
Green Ext Time (p_c), s	11.3	11.3	11.3	11.3	11.3	11.3	11.3	11.3
Intersection Summary								
HCM 2010 Ctrl Delay	9.9							
HCM 2010 LOS	A							
Notes								

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3: N McDowell Blvd & Old Redwood Hwy N

10/24/2018

4: N McDowell Rd/N McDowell Blvd & Corona Rd

10/24/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	215	645	697	150	545	12	477	68	46	11	26	33
Future Volume (veh/h)	215	645	697	150	545	12	477	68	46	11	26	33
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Ob), 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	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
Adj Sat Flow, veh/hln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	222	665	0	155	562	12	542	0	47	11	27	34
Adj No. of Lanes	1	2	1	1	2	2	0	2	0	1	1	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	218	769	344	679	1721	37	612	0	273	126	133	113
Arrive On Green	0.12	0.22	0.00	0.38	0.49	0.49	0.17	0.00	0.17	0.07	0.07	0.07
Sat Flow, veh/h	1774	3539	1583	1774	3543	76	3548	0	1583	1774	1863	1583
Grp Volume(V), veh/h	222	665	0	155	280	294	542	0	47	11	27	34
Grp Sat Flow(s), veh/hln	1774	1770	1583	1774	1770	1849	1774	0	1583	1774	1863	1583
Q Serve(g, s)	16.0	23.5	0.0	7.7	12.6	12.6	19.4	0.0	3.3	0.8	1.8	2.6
Cycle Q Clear(g, c), s	16.0	23.5	0.0	7.7	12.6	12.6	19.4	0.0	3.3	0.8	1.8	2.6
Prop In Lane	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	218	769	344	679	859	898	612	0	273	126	133	113
V/C Ratio(X)	1.02	0.86	0.00	0.23	0.33	0.33	0.89	0.00	0.17	0.09	0.20	0.30
Avail Cap(c, a), veh/h	218	841	376	679	859	898	999	0	446	412	433	368
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)	0.72	0.72	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.0	49.0	0.0	27.1	20.4	20.4	52.5	0.0	45.9	56.4	56.9	57.3
Incr Delay (d2), s/veh	56.2	9.4	0.0	0.1	1.0	1.0	3.4	0.0	0.1	0.1	0.3	0.6
Initial Q Delay(d3), s/veh	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	112	12.5	0.0	3.8	6.4	6.7	9.8	0.0	1.5	0.4	0.9	1.2
LnGrp Delay(d), s/veh	113.3	58.4	0.0	27.2	21.4	21.4	56.0	0.0	46.0	56.5	57.2	57.9
LnGrp LOS	F	E	E	C	C	C	E	D	D	E	E	E
Approach Vol, veh/h	887			729			589				72	
Approach Delay, s/veh	72.2			22.7			55.2				57.4	
Approach LOS	E			C			E				E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6						
Phs Duration (G+Y+Rc), s	54.8	33.3		14.1	20.0	68.1						
Change Period (Y+Rc), s	5.0	* 5.1		* 4.8	4.0	5.0						
Max Green Setting (Gmax), s	13.0	* 31		* 30	16.0	28.0						
Max Q Clear Time (g_c+H), s	9.7	25.5		4.6	18.0	14.6						
Green Ext Time (p_c), s	0.1	2.7		0.1	0.0	4.4						
Intersection Summary	51.5											
HCM 2010 Ctrl Delay	D											
HCM 2010 LOS	D											
Notes												

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	218	229	254	84	294	387	169	482	37	139	453	65
Future Volume (veh/h)	218	229	254	84	294	387	169	482	37	139	453	65
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Ob), 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	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
Adj Sat Flow, veh/hln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	227	239	121	88	306	323	176	502	28	145	472	51
Adj No. of Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	231	447	380	178	377	483	498	1258	70	182	606	65
Arrive On Green	0.13	0.24	0.24	0.10	0.20	0.20	0.28	0.37	0.37	0.10	0.19	0.19
Sat Flow, veh/h	1774	1863	1583	1774	1863	1583	1774	3409	190	1774	3224	347
Grp Volume(V), veh/h	227	239	121	88	306	323	176	260	270	145	258	265
Grp Sat Flow(s), veh/hln	1774	1863	1583	1774	1863	1583	1774	1770	1829	1774	1770	1802
Q Serve(g, s)	12.8	11.2	3.1	4.7	15.7	10.8	7.9	10.9	10.9	8.0	13.9	14.0
Cycle Q Clear(g, c), s	12.8	11.2	3.1	4.7	15.7	10.8	7.9	10.9	10.9	8.0	13.9	14.0
Prop In Lane	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	231	447	380	178	377	483	498	663	675	182	332	338
V/C Ratio(X)	0.98	0.54	0.32	0.49	0.81	0.67	0.35	0.40	0.40	0.80	0.78	0.78
Avail Cap(c, a), veh/h	231	505	429	195	469	562	498	663	675	291	444	452
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	43.4	33.1	7.7	42.6	38.1	13.2	28.7	23.3	23.4	43.8	38.6	38.7
Incr Delay (d2), s/veh	54.6	1.4	0.7	2.1	9.6	3.0	0.3	1.4	1.4	10.6	16.2	16.4
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(50%), veh/ln	97	6.0	1.4	2.4	9.1	5.1	3.9	5.5	5.7	4.4	8.3	8.5
LnGrp Delay(d), s/veh	98.0	34.6	8.4	44.7	47.7	16.2	29.0	24.8	24.7	54.5	54.8	55.0
LnGrp LOS	F	C	A	D	D	B	C	C	C	D	D	E
Approach Vol, veh/h	587			717			706				668	
Approach Delay, s/veh	53.7			33.1			25.8				54.8	
Approach LOS	D			C			C				D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		3	4	5	6	7	8			
Phs Duration (G+Y+Rc), s	14.0	28.9	33.4	23.7	17.9	25.0	14.9	42.2				
Change Period (Y+Rc), s	4.0	4.9	5.3	* 4.9	* 4.9	* 4.8	4.6	5.3				
Max Green Setting (Gmax), s	11.0	27.1	19.0	* 25	* 13	* 25	16.4	26.7				
Max Q Clear Time (g_c+H), s	6.7	13.2	9.9	16.0	14.8	17.7	10.0	12.9				
Green Ext Time (p_c), s	0.1	2.1	0.3	2.8	0.0	2.5	0.3	3.7				
Intersection Summary	41.1											
HCM 2010 Ctrl Delay	D											
HCM 2010 LOS	D											
Notes												

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5: Petaluma Blvd N & Skillman Lane/Corona Rd

6: S McDowell Blvd/N McDowell Rd & E Washington St

10/24/2018

10/24/2018

5: Petaluma Blvd N & Skillman Lane/Corona Rd

6: S McDowell Blvd/N McDowell Rd & E Washington St

10/24/2018

10/24/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	211	207	55	294	151	21	49	508	335	40	716	173
Traffic Volume (veh/h)	211	207	55	294	151	21	49	508	335	40	716	173
Future Volume (veh/h)	7	4	14	3	8	18	1	6	16	5	2	12
Number	0	0	0	0	0	0	0	0	0	0	0	0
Initial Q (Ob), veh	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1900	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Sat Flow, veh/h/ln	222	218	57	309	159	8	52	535	190	42	754	104
Adj Flow Rate, veh/h	0	1	0	1	1	0	1	2	1	1	2	0
Adj No. of Lanes	0.95	0.95	0.85	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak Hour Factor	2	2	2	2	2	2	2	2	2	2	2	2
Percent Heavy Veh, %	237	233	61	351	348	17	86	926	414	106	852	118
Cap. veh/h	0.30	0.30	0.30	0.20	0.20	0.20	0.05	0.26	0.26	0.06	0.27	0.27
Arrive On Green	798	784	205	1774	1759	88	1774	3539	1583	1774	3125	431
Sat Flow, veh/h	497	0	0	309	0	167	52	535	190	42	427	431
Grp Volume(V), veh/h	1787	0	0	1774	0	1847	1774	1770	1583	1774	1770	1787
Grp Sat Flow(s),veh/h/ln	27.3	0.0	0.0	17.0	0.0	8.0	2.9	13.2	10.1	2.3	23.3	23.3
Q Serve(g, s)	27.3	0.0	0.0	17.0	0.0	8.0	2.9	13.2	10.1	2.3	23.3	23.3
Cycle Q Clear(g, c), s	0.45	0.0	0.11	1.00	0.0	0.05	1.00	1.00	1.00	1.00	1.00	0.24
Prop In Lane	531	0	0	351	0	365	86	926	414	106	483	487
Lane Grp Cap(c), veh/h	0.94	0.0	0.00	0.88	0.00	0.46	0.60	0.58	0.46	0.40	0.88	0.89
V/C Ratio(X)	586	0	0	529	0	550	176	1230	550	176	615	621
Avail Cap(c, a), veh/h	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
HCM Platoon Ratio	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(i)	34.4	0.0	0.0	39.3	0.0	35.6	46.9	32.3	31.2	45.6	35.1	35.1
Uniform Delay (d), s/veh	20.7	0.0	0.0	7.8	0.0	0.3	2.5	0.2	0.3	0.9	10.4	10.4
Incr Delay (d2), 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
Initial Q Delay(d3),s/veh	16.4	0.0	0.0	9.1	0.0	4.1	1.5	6.5	4.5	1.1	12.8	12.9
%ile BackOfQ(50%),veh/ln	55.2	0.0	0.0	47.1	0.0	36.0	49.4	32.5	31.5	46.5	45.5	45.5
LnGrp Delay(d),s/veh	E	D	D	D	D	D	D	C	C	D	D	D
LnGrp LOS	E	D	D	D	D	D	D	C	C	D	D	D
Approach Vol, veh/h	497			476			777				900	
Approach Delay, s/veh	55.2			43.2			33.4				45.5	
Approach LOS	E			D			C				D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.9	33.0	34.4	10.0	31.9	24.4						
Change Period (Y+Rc), s	4.0	5.5	4.5	4.0	5.5	4.5						
Max Green Setting (Gmax), s	10.0	35.0	33.0	10.0	35.0	30.0						
Max Q Clear Time (g_c+H), s	4.9	25.3	29.3	4.3	15.2	19.0						
Green Ext Time (p_c), s	0.0	2.2	0.7	0.0	2.0	0.9						
Intersection Summary												
HCM 2010 Ctrl Delay	43.4											
HCM 2010 LOS	D											
Notes												

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	472	551	301	33	709	115	405	481	49	61	352	561
Traffic Volume (veh/h)	472	551	301	33	709	115	405	481	49	61	352	561
Future Volume (veh/h)	5	2	12	1	6	16	3	8	18	7	4	14
Number	0	0	0	0	0	0	0	0	0	0	0	0
Initial Q (Ob), veh	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863	1863
Adj Sat Flow, veh/h/ln	482	574	287	34	739	52	422	501	41	64	367	473
Adj Flow Rate, veh/h	2	2	0	1	2	1	2	2	0	1	2	1
Adj No. of Lanes	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Peak Hour Factor	2	2	2	2	2	2	2	2	2	2	2	2
Percent Heavy Veh, %	449	876	437	43	969	434	418	1202	98	82	1009	658
Cap. veh/h	0.04	0.13	0.13	0.02	0.27	0.27	0.12	0.36	0.36	0.05	0.29	0.29
Arrive On Green	3442	2288	1143	1774	3539	1583	3442	3314	270	1774	3539	1583
Sat Flow, veh/h	492	444	417	34	739	52	422	267	275	64	367	473
Grp Volume(V), veh/h	1721	1770	1661	1774	1770	1583	1721	1770	1815	1774	1770	1583
Grp Sat Flow(s),veh/h/ln	14.6	26.8	26.8	2.1	21.5	2.8	13.6	12.7	12.8	4.0	9.3	27.9
Q Serve(g, s)	14.6	26.8	26.8	2.1	21.5	2.8	13.6	12.7	12.8	4.0	9.3	27.9
Cycle Q Clear(g, c), s	1.00	1.00	0.69	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop In Lane	449	677	636	43	969	434	418	642	658	82	1009	658
Lane Grp Cap(c), veh/h	1.10	0.66	0.66	0.79	0.78	0.12	1.01	0.42	0.42	0.78	0.36	0.72
V/C Ratio(X)	449	677	636	93	969	434	418	642	658	157	1068	684
Avail Cap(c, a), veh/h	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
HCM Platoon Ratio	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(i)	53.6	41.9	41.9	54.4	37.3	30.5	49.2	28.8	26.8	52.8	31.9	27.3
Uniform Delay (d), s/veh	69.4	4.5	4.8	27.1	5.7	0.6	46.5	0.6	0.6	12.3	0.3	3.3
Incr Delay (d2), 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
Initial Q Delay(d3),s/veh	11.3	14.0	13.2	1.4	11.2	1.3	9.1	6.3	6.5	2.2	4.6	12.8
%ile BackOfQ(50%),veh/ln	123.0	46.3	46.7	81.5	43.0	31.1	95.7	27.4	27.4	65.1	32.2	30.6
LnGrp Delay(d),s/veh	F	D	D	F	D	C	F	C	C	E	C	C
LnGrp LOS	F	D	D	F	D	C	F	C	C	E	C	C
Approach Vol, veh/h	1353			825			964				904	
Approach Delay, s/veh	74.3			43.8			57.3				33.7	
Approach LOS	E			D			E				C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.8	48.1	19.0	37.1	20.0	35.9	10.3	45.8				
Change Period (Y+Rc), s	5.1	* 5.2	5.4	* 5.2	5.4	* 5.2	5.1	* 5.2				
Max Green Setting (Gmax), s	5.9	* 3.8	13.6	* 3.4	14.6	* 2.9	9.9	* 3.8				
Max Q Clear Time (g_c+H), s	4.1	28.8	15.6	29.9	16.6	23.5	6.0	14.8				
Green Ext Time (p_c), s	0.0	4.7	0.0	2.0	0.0	2.9	0.0	4.7				
Intersection Summary												
HCM 2010 Ctrl Delay	55.0											
HCM 2010 LOS	D											
Notes												

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HCM 2010 Signalized Intersection Summary
7: US 101 NB Off-Ramp & E Washington St

10/24/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR	Diagram
Lane Configurations	↑↑	↑↑		↑↑	↑↑	↑↑	↔
Traffic Volume (veh/h)	977	0	0	1644	115	299	
Future Volume (veh/h)	977	0	0	1644	115	299	
Number	2	12	1	6	3	18	
Initial Q (Ob), veh	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	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	
Adj Sat Flow, veh/hln	1863	0	0	1863	1863	1863	
Adj Flow Rate, veh/h	1039	0	0	1749	122	117	
Adj No. of Lanes	2	0	0	2	2	2	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	
Percent Heavy Veh, %	2	0	0	2	2	2	
Cap. veh/h	2997	0	0	2997	232	188	
Arrive On Green	0.85	0.00	0.00	0.85	0.07	0.07	
Sat Flow, veh/h	3725	0	0	3725	3442	2787	
Grp Volume(v), veh/h	1039	0	0	1749	122	117	
Grp Sat Flow(s),veh/hln	1770	0	0	1770	1721	1393	
Q Serve(g, s), s	7.1	0.0	0.0	16.8	3.8	4.6	
Cycle Q Clear(g, c), s	7.1	0.0	0.0	16.8	3.8	4.6	
Prop In Lane	0.00	0.00	0.00	1.00	1.00	1.00	
Lane Grp Cap(c), veh/h	2997	0	0	2997	232	188	
V/C Ratio(X)	0.35	0.00	0.00	0.58	0.53	0.62	
Avail Cap(c, a), veh/h	2997	0	0	2997	774	627	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	0.61	0.00	0.00	0.48	1.00	1.00	
Uniform Delay (d), s/veh	1.9	0.0	0.0	2.6	50.5	50.8	
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.4	2.2	4.0	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	
%ile Back(Q)(50%),veh/ln	3.4	0.0	0.0	8.2	1.9	1.9	
LnGrp Delay(d),s/veh	2.1	0.0	0.0	3.0	52.7	54.9	
LnGrp LOS	A			A	D	D	
Approach Vol, veh/h	1039			1749	239		
Approach Delay, s/veh	2.1			3.0	53.8		
Approach LOS	A			A	D		
Timer	1	2	3	4	5	6	7
Assigned Phs		2				6	8
Phs Duration (G+Y+Rc), s		99.6				99.6	12.4
Change Period (Y+Rc), s		* 4.8				* 4.8	4.8
Max Green Setting (Gmax), s		* 77				* 77	25.2
Max Q Clear Time (g_c+H), s		9.1				18.8	6.6
Green Ext Time (p_c), s		22.0				43.6	1.0
Intersection Summary	6.7						
HCM 2010 Ctrl Delay	A						
HCM 2010 LOS	A						
Notes							

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HCM 2010 Signalized Intersection Summary
8: US 101 SB On-Ramp/US 101 SB Off-Ramp & E Washington St

10/24/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR	Diagram
Lane Configurations	↑↑	↑↑	↑↑	↑↑			↔
Traffic Volume (veh/h)	0	1115	194	426	1021	0	
Future Volume (veh/h)	0	1115	194	426	1021	0	
Number	5	2	12	1	6	16	
Initial Q (Ob), veh	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	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	
Adj Sat Flow, veh/hln	0	1863	1863	1863	1863	0	
Adj Flow Rate, veh/h	0	1186	156	453	1086	0	
Adj No. of Lanes	0	2	1	2	2	0	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	
Percent Heavy Veh, %	0	2	2	2	2	0	
Cap. veh/h	0	1864	834	542	2555	0	
Arrive On Green	0.00	0.53	0.53	0.32	1.00	0.00	
Sat Flow, veh/h	0	3632	1583	3442	3632	0	
Grp Volume(v), veh/h	0	1186	156	453	1086	0	
Grp Sat Flow(s),veh/hln	0	1770	1583	1721	1770	0	
Q Serve(g, s), s	0.0	26.7	5.8	13.7	0.0	0.0	
Cycle Q Clear(g, c), s	0.0	26.7	5.8	13.7	0.0	0.0	
Prop In Lane	0.00	1.00	1.00	1.00	0.00	0.00	
Lane Grp Cap(c), veh/h	0	1864	834	542	2555	0	
V/C Ratio(X)	0.00	0.64	0.19	0.84	0.43	0.00	
Avail Cap(c, a), veh/h	0	1864	834	701	2555	0	
HCM Platoon Ratio	1.00	1.00	1.00	2.00	1.00	1.00	
Upstream Filter(I)	0.00	1.00	1.00	0.78	0.78	0.00	
Uniform Delay (d), s/veh	0.0	18.9	13.9	37.0	0.0	0.0	
Incr Delay (d2), s/veh	0.0	1.7	0.5	7.4	0.4	0.0	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	
%ile Back(Q)(50%),veh/ln	0.0	13.4	2.6	7.0	0.1	0.0	
LnGrp Delay(d),s/veh	0.0	20.5	14.4	44.4	0.4	0.0	
LnGrp LOS		C	B	D	A		
Approach Vol, veh/h	1342			1539			
Approach Delay, s/veh	19.8			13.4			
Approach LOS	B			B			
Timer	1	2	3	4	5	6	7
Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	21.8	63.6				26.6	85.4
Change Period (Y+Rc), s	* 4.2	4.6				5.1	4.6
Max Green Setting (Gmax), s	* 23	46.4				28.9	73.4
Max Q Clear Time (g_c+H), s	15.7	28.7				19.7	2.0
Green Ext Time (p_c), s	1.9	12.2				1.8	23.9
Intersection Summary	21.7						
HCM 2010 Ctrl Delay	C						
HCM 2010 LOS	D						
Notes							

Corona Station T/A
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HCM 2010 Signalized Intersection Summary
 2: US 101 N & Old Redwood Hwy N

10/24/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Traffic Volume (veh/h)	0	1030	916	0	431	523
Future Volume (veh/h)	0	1030	916	0	431	523
Number	5	2	6	16	7	14
Initial Q (Ob), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	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
Adj Sat Flow, veh/h/ln	0	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	0	1108	985	0	463	562
Adj No. of Lanes	0	2	2	1	2	2
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	2	2	2	2	2
Cap. veh/h	0	2095	2095	937	859	696
Arrive On Green	0.00	0.59	0.59	0.00	0.25	0.25
Sat Flow, veh/h	0	3725	3632	1563	3442	2787
Grp Volume(v), veh/h	0	1108	985	0	463	562
Grp Sat Flow(s), veh/h/ln	0	1770	1770	1563	1721	1393
Q Serve(g, s), s	0.0	12.1	10.2	0.0	7.6	12.3
Cycle Q Clear(g, c), s	0.0	12.1	10.2	0.0	7.6	12.3
Prop In Lane	0.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	0	2095	2095	937	859	696
V/C Ratio(X)	0.00	0.53	0.47	0.00	0.54	0.81
Avail Cap(c, a), veh/h	0	2095	2095	937	1001	810
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(i)	0.00	1.00	0.89	0.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	7.9	7.5	0.0	21.1	22.9
Incr Delay (d2), s/veh	0.0	0.0	0.7	0.0	0.5	5.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back(Q50%), veh/ln	0.0	6.1	5.1	0.0	3.7	5.2
LnGrp Delay(d), s/veh	0.0	8.8	8.2	0.0	21.7	28.3
LnGrp LOS	A	A	A	C	C	C
Approach Vol, veh/h	1108	985	1025			
Approach Delay, s/veh	8.8	8.2	25.3			
Approach LOS	A	A	C			
Timer	1	2	3	4	5	6
Assigned Phs	2	4	4	5	6	8
Phs Duration (G+Y+Rc), s	43.7	21.3	21.3	43.7	43.7	43.7
Change Period (Y+Rc), s	* 5.2	5.1	5.1	* 5.2	* 5.2	* 5.2
Max Green Setting (Gmax), s	* 36	18.9	18.9	* 36	* 36	* 36
Max Q Clear Time (g_c+H), s	14.1	14.3	14.3	12.2	12.2	10.3
Green Ext Time (p_c), s	10.9	1.9	1.9	10.3	10.3	10.3
Intersection Summary						
HCM 2010 Ctrl Delay	14.0					
HCM 2010 LOS	B					
Notes						

Corona Station T/A
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HCM 2010 Signalized Intersection Summary
 1: Old Redwood Hwy N & US 101 S

10/24/2018

Movement	EBT	EBL	WBT	WBL	NBT	NBL
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Traffic Volume (veh/h)	881	0	845	0	98	250
Future Volume (veh/h)	881	0	845	0	98	250
Number	2	12	1	6	3	18
Initial Q (Ob), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	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
Adj Sat Flow, veh/h/ln	1863	1863	0	1863	1863	1863
Adj Flow Rate, veh/h	927	0	0	889	103	263
Adj No. of Lanes	2	1	0	2	2	2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	0	2	2	2
Cap. veh/h	1854	829	0	1854	626	507
Arrive On Green	0.52	0.00	0.00	0.52	0.18	0.18
Sat Flow, veh/h	3632	1563	0	3725	3442	2787
Grp Volume(v), veh/h	927	0	0	889	103	263
Grp Sat Flow(s), veh/h/ln	1770	1563	0	1770	1721	1393
Q Serve(g, s), s	5.6	0.0	0.0	5.3	0.8	2.8
Cycle Q Clear(g, c), s	5.6	0.0	0.0	5.3	0.8	2.8
Prop In Lane	1.00	0.00	0.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	1854	829	0	1854	626	507
V/C Ratio(X)	0.50	0.00	0.00	0.48	0.16	0.52
Avail Cap(c, a), veh/h	3616	1617	0	3616	3516	2847
HCM Platoon Ratio	1.00	1.00	0.00	1.00	1.00	1.00
Upstream Filter(i)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	5.1	0.0	0.0	5.0	11.5	12.3
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.3	0.1	0.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back(Q50%), veh/ln	2.8	0.0	0.0	2.5	0.4	1.2
LnGrp Delay(d), s/veh	5.4	0.0	0.0	5.3	11.6	13.1
LnGrp LOS	A	A	A	B	B	B
Approach Vol, veh/h	927	889	366			
Approach Delay, s/veh	5.4	5.3	12.7			
Approach LOS	A	A	B			
Timer	1	2	3	4	5	6
Assigned Phs	2	2	3	4	5	7
Phs Duration (G+Y+Rc), s	22.5	22.5	10.8	22.5	10.8	8
Change Period (Y+Rc), s	5.1	5.1	4.7	5.1	4.7	4.7
Max Green Setting (Gmax), s	34.0	34.0	34.0	34.0	34.0	34.0
Max Q Clear Time (g_c+H), s	7.6	7.6	4.8	7.3	4.8	4.8
Green Ext Time (p_c), s	9.8	9.8	1.4	9.7	1.4	1.4
Intersection Summary						
HCM 2010 Ctrl Delay	6.6					
HCM 2010 LOS	A					
Notes						

Corona Station T/A
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3: N McDowell Blvd & Old Redwood Hwy N

10/24/2018

4: N McDowell Rd/N McDowell Blvd & Corona Rd

10/24/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	79	577	463	113	532	14	706	46	241	24	77	274
Traffic Volume (veh/h)	79	577	463	113	532	14	706	46	241	24	77	274
Future Volume (veh/h)	5	2	12	1	6	16	3	8	18	7	4	14
Number	0	0	0	0	0	0	0	0	0	0	0	0
Initial Q (Qb), veh	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	87	634	0	124	585	15	812	0	265	26	85	301
Adj No. of Lanes	1	2	1	1	2	0	2	0	1	1	1	1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	131	746	334	318	1146	29	883	0	394	364	382	325
Arrive On Green	0.07	0.21	0.00	0.18	0.32	0.32	0.25	0.00	0.25	0.20	0.20	0.20
Sat Flow, veh/h	1774	3539	1583	1774	3526	90	3548	0	1583	1774	1863	1583
Grp Volume(V), veh/h	87	634	0	124	293	307	812	0	265	26	85	301
Grp Sat Flow(S), veh/h/ln	1774	1770	1583	1774	1770	1847	1774	0	1583	1774	1863	1583
Q Serve(g, s)	6.2	22.4	0.0	8.0	17.4	17.5	29.0	0.0	19.6	1.5	4.9	24.3
Cycle Q Clear(g, c), s	6.2	22.4	0.0	8.0	17.4	17.5	29.0	0.0	19.6	1.5	4.9	24.3
Prop In Lane	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	131	746	334	318	575	600	883	0	394	364	382	325
V/C Ratio(X)	0.67	0.85	0.00	0.39	0.51	0.51	0.92	0.00	0.67	0.07	0.22	0.93
Avail Cap(c, a), veh/h	218	841	376	318	575	600	999	0	446	412	433	368
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)	0.87	0.87	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.7	49.3	0.0	47.1	35.5	35.5	47.6	0.0	44.1	41.7	43.0	50.7
Incr Delay (d2), s/veh	1.9	10.3	0.0	0.3	3.2	3.1	11.6	0.0	2.3	0.0	0.1	26.2
Initial Q Delay(Q3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	3.1	12.0	0.0	4.0	9.1	9.5	15.6	0.0	8.8	0.8	2.6	13.0
LnGrp Delay(d), s/veh	60.6	59.6	0.0	47.4	38.7	38.6	59.2	0.0	46.4	41.7	43.2	76.9
LnGrp LOS	E	E	E	D	D	D	E	E	D	D	D	E
Approach Vol, veh/h	721			724			1077					412
Approach Delay, s/veh	59.7			40.2			56.0					67.7
Approach LOS	E			D			E					E
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	28.3	32.5		31.4	13.6	47.2	37.7					
Change Period (Y+Rc), s	5.0	* 5.1		* 4.8	4.0	5.0	5.4					
Max Green Setting (Gmax), s	13.0	* 31		* 30	16.0	28.0	36.6					
Max Q Clear Time (g_c+H), s	10.0	24.4		26.3	8.2	19.5	31.0					
Green Ext Time (p_c), s	0.0	3.0		0.4	0.0	3.4	1.4					
Intersection Summary	54.7											
HCM 2010 Ctrl Delay	D											
HCM 2010 LOS	E											
Notes												

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	157	336	299	54	241	214	241	241	660	90	324	695
Traffic Volume (veh/h)	157	336	299	54	241	214	241	241	660	90	324	695
Future Volume (veh/h)	5	2	12	1	6	16	3	8	18	7	4	14
Number	0	0	0	0	0	0	0	0	0	0	0	0
Initial Q (Qb), veh	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	167	357	181	57	256	182	256	702	89	345	739	185
Adj No. of Lanes	1	1	1	1	1	1	1	1	2	0	1	2
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	222	406	345	146	313	503	402	1199	152	264	840	210
Arrive On Green	0.13	0.22	0.22	0.08	0.17	0.17	0.23	0.38	0.38	0.15	0.30	0.30
Sat Flow, veh/h	1774	1863	1583	1774	1863	1583	1774	1774	1774	1774	2806	702
Grp Volume(V), veh/h	167	357	181	57	256	182	256	393	398	345	466	458
Grp Sat Flow(S), veh/h/ln	1774	1863	1583	1774	1863	1583	1774	1770	1792	1774	1770	1739
Q Serve(g, s)	10.0	20.4	6.6	3.4	14.6	6.1	14.3	19.5	19.5	16.4	27.6	27.6
Cycle Q Clear(g, c), s	10.0	20.4	6.6	3.4	14.6	6.1	14.3	19.5	19.5	16.4	27.6	27.6
Prop In Lane	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	222	406	345	146	313	503	402	671	680	264	530	520
V/C Ratio(X)	0.75	0.88	0.52	0.39	0.82	0.36	0.64	0.59	0.59	0.30	0.88	0.88
Avail Cap(c, a), veh/h	222	459	390	177	427	599	402	671	680	264	565	555
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	0.67	0.67	0.67	1.00	1.00
Uniform Delay (d), s/veh	46.5	41.6	13.3	47.8	44.1	13.1	38.5	27.2	27.2	46.8	36.7	36.7
Incr Delay (d2), s/veh	13.5	16.9	1.8	1.7	10.2	0.6	2.2	2.5	2.5	16.1	18.6	18.8
Initial Q Delay(Q3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	5.7	12.4	3.0	1.7	8.4	2.7	7.3	10.0	10.1	19.9	16.2	16.0
LnGrp Delay(d), s/veh	60.0	58.5	15.0	49.5	54.3	13.8	40.7	29.7	29.7	208.5	55.2	55.5
LnGrp LOS	E	E	B	D	D	B	D	C	C	F	E	E
Approach Vol, veh/h	705			495			1047					1269
Approach Delay, s/veh	47.7			38.8			32.4					97.0
Approach LOS	D			D			C					F
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.1	28.9	30.2	37.8	16.7	23.3	21.0	47.0				
Change Period (Y+Rc), s	4.0	4.9	5.3	* 4.9	* 4.9	* 4.8	4.6	5.3				
Max Green Setting (Gmax), s	11.0	27.1	19.0	* 35	* 13	* 25	16.4	36.7				
Max Q Clear Time (g_c+H), s	5.4	22.4	16.3	29.6	12.0	16.6	18.4	21.5				
Green Ext Time (p_c), s	0.0	1.6	0.2	3.4	0.0	1.9	0.0	6.0				
Intersection Summary	59.7											
HCM 2010 Ctrl Delay	E											
HCM 2010 LOS	E											
Notes												

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5. Petaluma Blvd N & Skillman Lane/Corona Rd

6. S McDowell Blvd/N McDowell Rd & E Washington St

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5. Petaluma Blvd N & Skillman Lane/Corona Rd

6. S McDowell Blvd/N McDowell Rd & E Washington St

10/24/2018

10/24/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	4	4	4	1	1	1	1	1	1	1	1
Traffic Volume (veh/h)	203	180	46	380	175	26	55	847	452	46	777
Future Volume (veh/h)	203	180	46	380	175	26	55	847	452	46	777
Number	7	4	14	3	8	18	1	6	16	5	2
Initial Q (Ob), veh	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	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
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	205	182	40	384	177	15	56	856	311	46	785
Adj No. of Lanes	0	1	0	1	1	0	1	2	1	1	2
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	222	197	43	420	401	34	88	972	435	100	895
Arrive On Green	0.26	0.26	0.26	0.24	0.24	0.24	0.05	0.27	0.27	0.06	0.28
Sat Flow, veh/h	859	763	168	1774	1694	144	1774	3539	1583	1774	3184
Grp Volume(v), veh/h	427	0	0	384	0	192	56	856	311	46	436
Grp Sat Flow(s), veh/h/ln	1790	0	0	1774	0	1837	1774	1770	1583	1774	1770
Q Serve(g, s)	24.7	0.0	0.0	22.4	0.0	9.5	3.3	24.6	18.9	2.7	25.0
Cycle Q Clear(g, c), s	24.7	0.0	0.0	22.4	0.0	9.5	3.3	24.6	18.9	2.7	25.0
Prop In Lane	0.48	0.09	1.00	1.00	1.00	0.08	1.00	1.00	1.00	1.00	0.21
Lane Grp Cap(c), veh/h	463	0	0	420	0	435	88	972	435	100	497
V/C Ratio(X)	0.92	0.00	0.00	0.91	0.00	0.44	0.63	0.88	0.72	0.46	0.88
Avail Cap(c, a), veh/h	555	0	0	500	0	518	167	1164	521	167	582
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
Upstream Filter(i)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.4	0.0	0.0	39.6	0.0	34.6	49.6	36.9	34.9	48.7	36.5
Incr Delay (d2), s/veh	17.7	0.0	0.0	17.9	0.0	0.3	2.8	6.3	2.6	1.2	11.5
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
%ile BackOfQ(50%), veh/ln	14.5	0.0	0.0	13.1	0.0	4.8	1.7	12.9	8.5	1.4	13.8
LnGrp Delay(d), s/veh	56.2	0.0	0.0	57.5	0.0	34.9	52.4	43.2	37.5	49.9	48.0
LnGrp LOS	E	D	D	E	C	D	D	D	D	D	D
Approach Vol, veh/h	427	0	0	576	0	576	1223	0	0	0	925
Approach Delay, s/veh	56.2	0	0	49.9	0	49.9	42.2	0	0	0	48.1
Approach LOS	E	D	D	D	D	D	D	D	D	D	D
Timer	1	2	3	4	5	6	7	8			
Assigned Phs	1	2	3	4	5	6	7	8			
Phs Duration (G+Y+Rc), s	9.3	35.4	32.0	10.0	34.7	29.7					
Change Period (Y+Rc), s	4.0	5.5	4.5	4.0	5.5	4.5					
Max Green Setting (Gmax), s	10.0	35.0	33.0	10.0	35.0	30.0					
Max Q Clear Time (g_c+H), s	5.3	27.0	26.7	4.7	26.6	24.4					
Green Ext Time (p_c), s	0.0	2.0	0.8	0.0	2.6	0.8					
Intersection Summary	47.2										
HCM 2010 Ctrl Delay	D										
HCM 2010 LOS	D										
Notes											

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (veh/h)	705	831	368	37	551	112	372	476	41	166	537
Future Volume (veh/h)	705	831	368	37	551	112	372	476	41	166	537
Number	5	2	12	1	6	16	3	8	18	7	4
Initial Q (Ob), veh	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	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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863
Adj Flow Rate, veh/h	719	848	338	38	562	35	380	486	34	169	548
Adj No. of Lanes	2	2	0	1	2	1	2	2	0	1	2
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	790	1169	464	49	953	426	405	630	44	257	752
Arrive On Green	0.08	0.16	0.16	0.03	0.27	0.27	0.12	0.19	0.19	0.15	0.21
Sat Flow, veh/h	3442	2475	983	1774	3539	1583	3357	234	1774	3539	1583
Grp Volume(v), veh/h	719	605	581	38	562	35	360	256	264	169	548
Grp Sat Flow(s), veh/h/ln	1721	1770	1689	1774	1770	1583	1721	1770	1821	1774	1770
Q Serve(g, s)	25.7	40.4	40.6	2.6	17.1	2.0	13.6	17.0	17.1	11.2	17.9
Cycle Q Clear(g, c), s	25.7	40.4	40.6	2.6	17.1	2.0	13.6	17.0	17.1	11.2	17.9
Prop In Lane	1.00	1.00	0.58	1.00	1.00	1.00	1.00	1.00	0.13	1.00	1.00
Lane Grp Cap(c), veh/h	790	836	798	49	953	426	405	332	342	257	752
V/C Ratio(X)	0.91	0.72	0.73	0.78	0.89	0.08	0.94	0.77	0.77	0.66	0.73
Avail Cap(c, a), veh/h	822	836	798	99	953	426	405	541	557	257	1022
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(i)	0.74	0.74	0.74	1.00	1.00	1.00	1.00	1.00	1.00	0.61	0.61
Uniform Delay (d), s/veh	56.0	44.7	44.8	59.9	39.4	33.9	54.2	47.8	47.9	50.1	45.5
Incr Delay (d2), s/veh	10.9	4.1	4.3	23.3	1.2	0.1	29.4	5.3	5.3	3.7	1.4
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
%ile BackOfQ(50%), veh/ln	13.5	20.8	20.0	1.6	8.5	0.9	8.1	8.8	9.1	5.8	8.9
LnGrp Delay(d), s/veh	66.9	48.7	49.1	83.3	40.5	34.0	83.7	53.1	53.1	53.8	46.9
LnGrp LOS	E	D	D	F	D	C	F	D	D	D	D
Approach Vol, veh/h	1905	0	0	635	0	900	0	0	0	0	1101
Approach Delay, s/veh	55.7	0	0	42.7	0	66.0	0	0	0	0	35.3
Approach LOS	E	E	E	D	D	E	D	D	D	D	D
Timer	1	2	3	4	5	6	7	8			
Assigned Phs	1	2	3	4	5	6	7	8			
Phs Duration (G+Y+Rc), s	8.5	64.0	20.0	31.6	33.9	38.6	23.2	28.4			
Change Period (Y+Rc), s	5.1	* 5.4	5.4	* 5.2	* 5.4	5.2	* 5.1				
Max Green Setting (Gmax), s	6.9	* 4.6	14.6	* 3.6	* 3.0	22.8	12.9	* 3.8			
Max Q Clear Time (g_c+H), s	4.6	42.6	15.6	19.9	27.7	19.1	13.2	19.1			
Green Ext Time (p_c), s	0.0	2.6	0.0	6.5	0.6	1.6	0.0	4.2			
Intersection Summary	51.0										
HCM 2010 Ctrl Delay	D										
HCM 2010 LOS	D										
Notes											

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HCM 2010 Signalized Intersection Summary
 7: US 101 NB Off-Ramp & E Washington St

10/24/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Traffic Volume (veh/h)	1492	0	0	1630	122	464
Future Volume (veh/h)	1492	0	0	1630	122	464
Number	2	12	1	6	3	18
Initial Q (Ob), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	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
Adj Sat Flow, veh/h	1863	0	0	1863	1863	1863
Adj Flow Rate, veh/h	1507	0	0	1646	123	387
Adj No. of Lanes	2	0	0	2	2	2
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	2	0	0	2	2	2
Cap. veh/h	2681	0	0	2681	568	460
Arrive On Green	0.76	0.00	0.00	0.76	0.17	0.17
Sat Flow, veh/h	3725	0	0	3725	3442	2787
Grp Volume(v), veh/h	1507	0	0	1646	123	387
Grp Sat Flow(s), veh/h	1770	0	0	1770	1721	1393
Q Serve(g, s), s	22.3	0.0	0.0	26.2	3.8	16.7
Cycle Q Clear(g, c), s	22.3	0.0	0.0	26.2	3.8	16.7
Prop In Lane	0.00	0.00	0.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	2681	0	0	2681	568	460
V/C Ratio(X)	0.56	0.00	0.00	0.61	0.22	0.84
Avail Cap(c, a), veh/h	2681	0	0	2681	783	634
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.50	0.00	0.00	0.44	1.00	1.00
Uniform Delay (d), s/veh	6.4	0.0	0.0	6.8	44.8	50.2
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.5	0.2	7.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back(Q50%), veh/h	10.8	0.0	0.0	12.7	1.8	7.0
LnGrp Delay(d), s/veh	6.8	0.0	0.0	7.3	45.0	58.1
LnGrp LOS	A			A	D	E
Approach Vol, veh/h	1507			1646	510	
Approach Delay, s/veh	6.8			7.3	54.9	
Approach LOS	A			A	D	
Timer	1	2	3	4	5	6
Assigned Phs		2				6
Phs Duration (G+Y+Rc), s		98.7				25.3
Change Period (Y+Rc), s		* 4.8				* 4.8
Max Green Setting (Gmax), s		* 86				* 86
Max Q Clear Time (g_c+H), s		24.3				28.2
Green Ext Time (p_c), s		37.7				40.5
Intersection Summary						
HCM 2010 Ctrl Delay	13.7					
HCM 2010 LOS	B					
Notes						

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HCM 2010 Signalized Intersection Summary
 8: US 101 SB On-Ramp/US 101 SB Off-Ramp & E Washington St

10/24/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Traffic Volume (veh/h)	0	1393	164	288	1185	0
Future Volume (veh/h)	0	1393	164	288	1185	0
Number	5	2	12	1	6	16
Initial Q (Ob), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	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
Adj Sat Flow, veh/h	0	1863	1863	1863	1863	0
Adj Flow Rate, veh/h	0	1451	112	300	1234	0
Adj No. of Lanes	0	2	1	2	2	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	2	2	2	2	2
Cap. veh/h	0	1925	861	368	2424	0
Arrive On Green	0.00	0.54	0.54	0.07	0.46	0.00
Sat Flow, veh/h	0	3632	1583	3442	3632	0
Grp Volume(v), veh/h	0	1451	112	300	1234	0
Grp Sat Flow(s), veh/h	0	1770	1583	1721	1770	0
Q Serve(g, s), s	0.0	39.3	4.3	10.7	30.5	0.0
Cycle Q Clear(g, c), s	0.0	39.3	4.3	10.7	30.5	0.0
Prop In Lane	0.00	1.00	1.00	1.00	1.00	0.00
Lane Grp Cap(c), veh/h	0	1925	861	368	2424	0
V/C Ratio(X)	0.00	0.75	0.13	0.81	0.51	0.00
Avail Cap(c, a), veh/h	0	1925	861	439	2424	0
HCM Platoon Ratio	1.00	1.00	1.00	0.67	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.77	0.00	1.00
Uniform Delay (d), s/veh	0.0	21.9	13.9	56.3	18.8	0.0
Incr Delay (d2), s/veh	0.0	2.8	0.3	9.8	0.6	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back(Q50%), veh/h	0.0	19.9	1.9	5.6	15.1	0.0
LnGrp Delay(d), s/veh	0.0	24.6	14.2	66.1	19.4	0.0
LnGrp LOS		C	B	E	B	
Approach Vol, veh/h	1563			1534	600	
Approach Delay, s/veh	23.9			28.6	54.4	
Approach LOS	C			C	D	
Timer	1	2	3	4	5	6
Assigned Phs		1	2			7
Phs Duration (G+Y+Rc), s		17.5	72.0			89.5
Change Period (Y+Rc), s		* 4.2	4.6			* 4.6
Max Green Setting (Gmax), s		* 16	58.4			* 16
Max Q Clear Time (g_c+H), s		12.7	41.3			27.3
Green Ext Time (p_c), s		0.6	13.5			24.3
Intersection Summary						
HCM 2010 Ctrl Delay	30.8					
HCM 2010 LOS	C					
Notes						

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HCM 2010 Signalized Intersection Summary
 2: US 101 N & Old Redwood Hwy N

11/01/2018

Movement	EBT	EBR	WBT	WBR	NBT	NBR
Lane Configurations	↑↑	↑	↑↑	↑	↑↑	↑↑
Traffic Volume (veh/h)	1293	0	1634	0	160	570
Future Volume (veh/h)	1293	0	1634	0	160	570
Number	2	12	1	6	3	18
Initial Q (Ob), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	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
Adj Sat Flow, veh/h/ln	1863	1863	0	1863	1863	1863
Adj Flow Rate, veh/h	1361	0	0	1720	168	600
Adj No. of Lanes	2	1	0	2	2	2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	0	2	2	2
Cap. veh/h	2143	959	0	2143	848	687
Arrive On Green	0.61	0.00	0.00	0.61	0.25	0.25
Sat Flow, veh/h	3632	1583	0	3725	3442	2787
Grp Volume(v), veh/h	1361	0	0	1720	168	600
Grp Sat Flow(s), veh/h/ln	1770	1583	0	1770	1721	1393
Q Serve(g, s), s	16.3	0.0	0.0	24.7	2.6	13.7
Cycle Q Clear(g, c), s	16.3	0.0	0.0	24.7	2.6	13.7
Prop In Lane	1.00	0.00	0.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	2143	959	0	2143	848	687
V/C Ratio(X)	0.64	0.00	0.00	0.80	0.20	0.87
Avail Cap(c, a), veh/h	2297	1028	0	2297	901	729
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(i)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	8.4	0.0	0.0	10.0	19.7	23.9
Incr Delay (d2), s/veh	0.6	0.0	0.0	2.2	0.1	11.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back(Q)(50%), veh/ln	7.9	0.0	0.0	12.4	1.2	6.3
LnGrp Delay(d), s/veh	9.0	0.0	0.0	12.2	19.8	34.9
LnGrp LOS	A			B	B	C
Approach Vol, veh/h	1361		1720	768		
Approach Delay, s/veh	9.0		12.2	31.6		
Approach LOS	A		B	C		
Timer	1	2	3	4	5	6
Assigned Phs		2				8
Phs Duration (G+Y+Rc), s		45.1				21.0
Change Period (Y+Rc), s		5.1				4.7
Max Green Setting (Gmax), s		42.9				17.3
Max Q Clear Time (g_c+H), s		18.3				26.7
Green Ext Time (p_c), s		14.7				0.6
Intersection Summary						
HCM 2010 Ctrl Delay	14.9					
HCM 2010 LOS	B					

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HCM 2010 Signalized Intersection Summary
 1: Old Redwood Hwy N & US 101 S

11/01/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Traffic Volume (veh/h)	0	1170	790	0	393	500
Future Volume (veh/h)	0	1170	790	0	393	500
Number	5	2	6	16	7	14
Initial Q (Ob), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	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
Adj Sat Flow, veh/h/ln	0	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	0	1245	840	0	418	532
Adj No. of Lanes	0	2	2	1	2	2
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	2	2	2	2	2
Cap. veh/h	0	2107	2107	942	848	686
Arrive On Green	0.00	0.60	0.60	0.00	0.25	0.25
Sat Flow, veh/h	0	3725	3632	1583	3442	2787
Grp Volume(v), veh/h	0	1245	840	0	418	532
Grp Sat Flow(s), veh/h/ln	0	1770	1770	1583	1721	1393
Q Serve(g, s), s	0.0	14.3	8.2	0.0	6.8	11.6
Cycle Q Clear(g, c), s	0.0	14.3	8.2	0.0	6.8	11.6
Prop In Lane	0.00	1.00	1.00	0.00	1.00	1.00
Lane Grp Cap(c), veh/h	0	2107	2107	942	848	686
V/C Ratio(X)	0.00	0.59	0.40	0.00	0.49	0.78
Avail Cap(c, a), veh/h	0	2107	2107	942	1107	896
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(i)	0.00	1.00	0.59	0.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	8.2	7.0	0.0	21.0	22.8
Incr Delay (d2), s/veh	0.0	1.2	0.3	0.0	0.4	3.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back(Q)(50%), veh/ln	0.0	7.3	4.1	0.0	3.2	4.7
LnGrp Delay(d), s/veh	0.0	9.4	7.3	0.0	21.5	26.0
LnGrp LOS	A	A	A		C	C
Approach Vol, veh/h	1245	840		950		
Approach Delay, s/veh	9.4	7.3		24.0		
Approach LOS	A	A		C		
Timer	1	2	3	4	5	6
Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		43.9		21.1		43.9
Change Period (Y+Rc), s		* 5.2		5.1		* 5.2
Max Green Setting (Gmax), s		* 34		20.9		* 34
Max Q Clear Time (g_c+H), s		16.3		13.6		10.2
Green Ext Time (p_c), s		10.8		2.4		8.6
Intersection Summary						
HCM 2010 Ctrl Delay	13.4					
HCM 2010 LOS	B					

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3: N McDowell Blvd & Old Redwood Hwy N

02/26/2019

4: N McDowell Rd/N McDowell Blvd & Corona Rd

11/01/2018

3: N McDowell Blvd & Old Redwood Hwy N

02/26/2019

4: N McDowell Rd/N McDowell Blvd & Corona Rd

11/01/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	370	420	110	91	380	70	339	730	93	260	524	150
Traffic Volume (veh/h)	370	420	110	91	380	70	339	730	93	260	524	150
Future Volume (veh/h)	5	2	12	1	6	16	3	8	18	7	4	14
Number	0	0	0	0	0	0	0	0	0	0	0	0
Initial Q (Qb), veh	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	370	420	0	91	380	70	339	730	93	260	524	150
Adj No. of Lanes	1	2	1	1	2	1	1	1	1	1	1	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	249	545	244	207	488	609	604	635	539	438	460	391
Arrive On Green	0.14	0.15	0.00	0.12	0.14	0.14	0.34	0.34	0.34	0.25	0.25	0.25
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	1774	1863	1583	1774	1863	1583
Grp Volume(V), veh/h	370	420	0	91	380	70	339	730	93	260	524	150
Grp Sat Flow(S), veh/h/ln	1774	1770	1583	1774	1770	1583	1774	1863	1583	1774	1863	1583
Q Serve(g, s)	20.0	16.3	0.0	6.8	14.8	4.1	22.2	48.6	5.9	18.5	35.2	11.2
Cycle Q Clear(g, c), s	20.0	16.3	0.0	6.8	14.8	4.1	22.2	48.6	5.9	18.5	35.2	11.2
Prop In Lane	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	249	545	244	207	488	609	604	635	539	438	460	391
V/C Ratio(X)	1.49	0.77	0.00	0.44	0.78	0.11	0.36	1.15	0.17	0.59	1.14	0.38
Avail Cap(c, a), veh/h	249	866	387	207	670	690	604	635	539	438	460	391
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	61.3	57.9	0.0	58.7	59.4	28.3	38.3	47.0	33.0	47.4	53.7	44.7
Incr Delay (d2), s/veh	239.7	4.0	0.0	0.5	5.6	0.1	0.7	85.0	0.1	1.5	86.4	0.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	26.3	8.2	0.0	3.4	7.6	2.5	11.0	39.8	2.6	9.2	29.0	5.0
LnGrp Delay(d), s/veh	301.1	61.9	0.0	59.2	65.0	28.4	39.1	132.0	33.0	48.9	140.1	44.9
LnGrp LOS	F	E	E	E	C	D	F	C	D	F	D	F
Approach Vol, veh/h	790			541			1162			934		
Approach Delay, s/veh	173.9			59.3			97.0			99.4		
Approach LOS	F			E			F			F		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6						
Phs Duration (G+Y+Rc), s	21.6	27.1		40.0	24.0	24.7						
Change Period (Y+Rc), s	5.0	* 5.1		* 4.8	4.0	5.0						
Max Green Setting (Gmax), s	12.0	* 35		* 35	20.0	27.0						
Max Q Clear Time (g_c+H), s	8.8	18.3		37.2	22.0	16.8						
Green Ext Time (p_c), s	0.0	3.7		0.0	0.0	2.9						
Intersection Summary	109.4											
HCM 2010 Ctrl Delay	F											
HCM 2010 LOS	F											
Notes												

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	280	250	185	171	370	430	184	532	73	140	504	60
Traffic Volume (veh/h)	280	250	185	171	370	430	184	532	73	140	504	60
Future Volume (veh/h)	5	2	12	1	6	16	3	8	18	7	4	14
Number	0	0	0	0	0	0	0	0	0	0	0	0
Initial Q (Qb), veh	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	282	260	90	178	385	358	192	554	52	146	525	46
Adj No. of Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	213	473	402	209	454	549	409	1103	103	183	681	59
Arrive On Green	0.12	0.25	0.25	0.12	0.24	0.24	0.23	0.34	0.34	0.10	0.21	0.21
Sat Flow, veh/h	1774	1863	1583	1774	1863	1583	1774	3272	306	1774	3294	288
Grp Volume(V), veh/h	292	260	90	178	385	358	192	299	307	146	281	290
Grp Sat Flow(S), veh/h/ln	1774	1863	1583	1774	1863	1583	1774	1770	1809	1774	1770	1812
Q Serve(g, s)	12.0	12.1	2.5	9.8	19.7	11.4	9.3	13.5	13.5	8.0	15.0	15.1
Cycle Q Clear(g, c), s	12.0	12.1	2.5	9.8	19.7	11.4	9.3	13.5	13.5	8.0	15.0	15.1
Prop In Lane	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	213	473	402	209	454	549	409	597	610	183	366	374
V/C Ratio(X)	1.37	0.55	0.22	0.85	0.85	0.65	0.47	0.50	0.50	0.80	0.77	0.77
Avail Cap(c, a), veh/h	213	501	426	231	522	606	409	597	610	273	506	518
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	0.79	0.79	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.0	32.4	9.1	43.2	36.0	11.7	33.2	28.4	26.5	43.8	37.4	37.5
Incr Delay (d2), s/veh	194.1	1.5	0.4	23.2	12.0	2.6	0.7	2.4	2.3	12.3	14.4	14.4
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(50%), veh/ln	17.3	6.4	1.1	6.1	11.7	5.4	4.7	7.0	7.1	4.6	8.8	9.1
LnGrp Delay(d), s/veh	238.1	33.9	9.5	66.5	48.0	14.3	33.9	28.8	28.8	56.2	51.9	51.8
LnGrp LOS	F	E	A	E	D	B	C	C	C	E	D	D
Approach Vol, veh/h	642			921			798			717		
Approach Delay, s/veh	123.4			38.5			30.0			52.7		
Approach LOS	F			D			C			D		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6						
Phs Duration (G+Y+Rc), s	15.8	30.3	28.3	25.6	16.9	29.2	14.9	39.0				
Change Period (Y+Rc), s	4.0	4.9	5.3	* 4.9	* 4.9	* 4.8	4.6	5.3				
Max Green Setting (Gmax), s	13.0	26.9	13.7	* 29	* 12	* 28	15.4	25.9				
Max Q Clear Time (g_c+H), s	11.8	14.1	11.3	17.1	14.0	21.7	10.0	15.9				
Green Ext Time (p_c), s	0.1	2.0	0.1	3.6	0.0	2.7	0.2	3.6				
Intersection Summary	57.3											
HCM 2010 Ctrl Delay	E											
HCM 2010 LOS	E											
Notes												

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5: Petaluma Blvd N & Skillman Lane/Corona Rd

11/01/2018

6: S McDowell Blvd/N McDowell Rd & E Washington St

11/01/2018

HCM 2010 Signalized Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	1	1	1	1	1	1	1	1	1
Traffic Volume (veh/h)	220	290	100	304	200	20	90	570	295	40	700	170
Future Volume (veh/h)	220	290	100	304	200	20	90	570	295	40	700	170
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Cb), 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	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
Adj Sat Flow, veh/h	1900	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	232	305	103	320	211	8	95	600	168	42	737	102
Adj No. of Lanes	0	1	0	1	1	0	1	2	1	1	2	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	234	307	104	351	353	13	101	938	420	76	784	108
Arrive On Green	0.36	0.36	0.36	0.20	0.20	0.20	0.06	0.27	0.27	0.04	0.25	0.25
Sat Flow, veh/h	645	848	286	1774	1783	68	1774	3539	1583	1774	3124	432
Grp Volume(V), veh/h	640	0	0	320	0	0	219	95	600	168	42	417
Grp Sat Flow(s), veh/h	1780	0	0	1774	0	0	1851	1774	1770	1583	1774	1770
Q Serve(g, s)	50.2	0.0	0.0	24.7	0.0	0.0	15.1	7.5	21.0	12.2	3.3	32.4
Cycle Q Clear(g, c), s	50.2	0.0	0.0	24.7	0.0	0.0	15.1	7.5	21.0	12.2	3.3	32.4
Prop In Lane	0.36	0.0	0.16	1.00	0.00	0.00	0.04	1.00	1.00	1.00	1.00	0.24
Lane Grp Cap(c), veh/h	644	0	0	351	0	0	366	101	938	420	76	444
V/C Ratio(X)	0.99	0.00	0.00	0.91	0.00	0.00	0.60	0.94	0.64	0.40	0.55	0.94
Avg Cap(c, a), veh/h	644	0	0	460	0	0	480	101	938	420	114	461
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.5	0.0	0.0	55.0	0.0	0.0	51.1	65.8	45.5	42.3	65.7	51.4
Incr Delay (d2), s/veh	33.6	0.0	0.0	16.5	0.0	0.0	68.5	1.1	0.2	2.3	26.5	26.5
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(50%), veh/h	30.7	0.0	0.0	13.7	0.0	0.0	7.8	5.6	10.4	5.4	1.6	19.1
LnGrp Delay(d), s/veh	78.1	0.0	0.0	71.4	0.0	0.0	51.7	134.3	46.7	42.5	68.0	77.9
LnGrp LOS	E	E	E	D	D	D	F	D	D	D	E	E
Approach Vol, veh/h	640			539			863					881
Approach Delay, s/veh	78.1			63.4			55.5					77.4
Approach LOS	E			E			E					E
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.0	40.6		55.2	10.0	42.6	32.2					
Change Period (Y+Rc), s	4.0	5.5		4.5	4.0	5.5	4.5					
Max Green Setting (Gmax), s	8.0	36.5		50.7	9.0	35.5	36.3					
Max Q Clear Time (g_c+H), s	9.5	34.4		52.2	5.3	23.0	26.7					
Green Ext Time (p_c), s	0.0	0.7		0.0	0.0	2.0	1.0					
Intersection Summary	66.5											
HCM 2010 Ctrl Delay	E											
HCM 2010 LOS	E											
Notes												

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	1	1	1	1	1	1	1	1	1
Traffic Volume (veh/h)	498	520	410	50	770	130	460	422	40	100	446	474
Future Volume (veh/h)	498	520	410	50	770	130	460	422	40	100	446	474
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Cb), 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	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
Adj Sat Flow, veh/h	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	519	542	391	52	802	59	479	440	34	104	465	400
Adj No. of Lanes	2	2	0	1	2	1	2	2	0	1	2	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	418	625	451	199	1082	484	418	1044	80	129	928	607
Arrive On Green	0.04	0.10	0.10	0.11	0.31	0.31	0.12	0.31	0.31	0.07	0.26	0.26
Sat Flow, veh/h	3442	1965	1417	1774	3539	1583	3442	3331	256	1774	3539	1583
Grp Volume(V), veh/h	519	488	445	52	802	59	479	233	241	104	465	400
Grp Sat Flow(s), veh/h	1721	1770	1613	1774	1770	1583	1721	1770	1817	1774	1770	1583
Q Serve(g, s)	13.6	30.4	30.4	3.0	22.8	3.0	13.6	11.7	11.8	6.5	12.5	23.3
Cycle Q Clear(g, c), s	13.6	30.4	30.4	3.0	22.8	3.0	13.6	11.7	11.8	6.5	12.5	23.3
Prop In Lane	1.00	0.88	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	418	563	513	199	1082	484	418	565	570	129	928	607
V/C Ratio(X)	1.24	0.87	0.87	0.26	0.74	0.12	1.15	0.42	0.42	0.80	0.90	0.86
Avg Cap(c, a), veh/h	418	593	540	199	1082	484	418	605	622	154	1074	673
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.87	0.87	0.87	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	53.8	47.8	47.8	45.5	34.9	28.0	49.2	30.4	30.4	51.1	35.1	28.5
Incr Delay (d2), s/veh	12.5	14.6	15.8	0.7	4.6	0.5	90.4	0.7	0.7	17.1	0.4	1.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/h	13.8	17.2	15.8	1.5	11.8	1.4	11.7	5.8	6.0	3.8	6.2	10.5
LnGrp Delay(d), s/veh	179.2	62.4	63.6	46.2	39.5	28.5	139.6	31.1	31.2	68.2	35.5	30.3
LnGrp LOS	F	E	E	D	D	C	F	C	C	E	D	C
Approach Vol, veh/h	1452			913			963					969
Approach Delay, s/veh	104.5			39.2			85.6					36.9
Approach LOS	F			D			F					D
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.7	40.7	19.0	34.6	19.0	39.4	13.3	40.3				
Change Period (Y+Rc), s	5.2	5.1	5.4	5.2	5.4	5.2	5.1	5.2				
Max Green Setting (Gmax), s	6.1	38	13.6	34	13.6	30	9.7	38				
Max Q Clear Time (g_c+H), s	5.0	32.4	15.6	25.3	15.6	24.8	8.5	13.8				
Green Ext Time (p_c), s	0.0	3.2	0.0	4.0	0.0	2.8	0.0	4.1				
Intersection Summary	71.1											
HCM 2010 Ctrl Delay	E											
HCM 2010 LOS	E											
Notes												

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HCM 2010 Signalized Intersection Summary
7: US 101 NB Off-Ramp & E Washington St

11/01/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Traffic Volume (veh/h)	1160	0	0	1424	130	308
Future Volume (veh/h)	1160	0	0	1424	130	308
Number	2	12	1	6	3	18
Initial Q (Ob), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	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
Adj Sat Flow, veh/h	1863	0	0	1863	1863	1863
Adj Flow Rate, veh/h	1234	0	0	1515	138	121
Adj No. of Lanes	2	0	0	2	2	2
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	0	0	2	2	2
Cap. veh/h	2992	0	0	2992	237	192
Arrive On Green	0.85	0.00	0.00	0.85	0.07	0.07
Sat Flow, veh/h	3725	0	0	3725	3442	2787
Grp Volume(V), veh/h	1234	0	0	1515	138	121
Grp Sat Flow(s), veh/h	1770	0	0	1770	1721	1393
Q Serve(g, s), s	9.3	0.0	0.0	13.0	4.4	4.7
Cycle Q Clear(g, c), s	9.3	0.0	0.0	13.0	4.4	4.7
Prop In Lane	0.00	0.00	0.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	2992	0	0	2992	237	192
V/C Ratio(X)	0.41	0.00	0.00	0.51	0.68	0.63
Avail Cap(c, a), veh/h	2992	0	0	2992	682	552
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.46	0.00	0.00	0.38	1.00	1.00
Uniform Delay (d), s/veh	2.1	0.0	0.0	2.3	50.6	50.7
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.2	2.7	4.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/h	4.5	0.0	0.0	6.2	2.2	1.9
LnGrp Delay(d), s/veh	2.3	0.0	0.0	2.6	53.3	54.8
LnGrp LOS	A			A	D	D
Approach Vol, veh/h	1234			1515	259	
Approach Delay, s/veh	2.3			2.6	54.0	
Approach LOS	A			A	D	
Timer	1	2	3	4	5	6
Assigned Phs	1	2	3	4	5	6
Phs Duration (G+Y+Rc), s	2	2	2	2	2	2
Change Period (Y+Rc), s	99.5			99.5	12.5	12.5
Max Green Setting (Gmax), s	* 4.8			* 4.8	4.8	4.8
Max Q Clear Time (g_c+H), s	* 80			* 80	* 80	* 80
Green Ext Time (p_c), s	11.3			11.3	15.0	6.7
Green Ext Time (p_c), s	29.2			29.2	39.2	1.0
Intersection Summary						
HCM 2010 Ctrl Delay	6.9					
HCM 2010 LOS	A					
Notes						

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HCM 2010 Signalized Intersection Summary
8: US 101 SB On-Ramp/US 101 SB Off-Ramp & E Washington St

11/01/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Traffic Volume (veh/h)	0	1200	150	384	1110	0
Future Volume (veh/h)	0	1200	150	384	1110	0
Number	5	2	12	1	6	16
Initial Q (Ob), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	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
Adj Sat Flow, veh/h	0	1863	1863	1863	1863	0
Adj Flow Rate, veh/h	0	1277	121	409	1181	0
Adj No. of Lanes	0	2	1	2	2	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	2	2	2	2	2
Cap. veh/h	0	1450	649	840	2459	0
Arrive On Green	0.00	0.41	0.41	0.08	0.23	0.00
Sat Flow, veh/h	0	3632	1583	3442	3632	0
Grp Volume(V), veh/h	0	1277	121	409	1181	0
Grp Sat Flow(s), veh/h	0	1770	1583	1721	1770	0
Q Serve(g, s), s	0.0	37.3	5.5	12.7	32.4	0.0
Cycle Q Clear(g, c), s	0.0	37.3	5.5	12.7	32.4	0.0
Prop In Lane	0.00	1.00	1.00	1.00	1.00	0.00
Lane Grp Cap(c), veh/h	0	1450	649	840	2459	0
V/C Ratio(X)	0.00	0.88	0.19	0.49	0.48	0.00
Avail Cap(c, a), veh/h	0	1498	670	840	2459	0
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.84	0.84	0.00
Uniform Delay (d), s/veh	0.0	30.5	21.1	44.8	25.6	0.0
Incr Delay (d2), s/veh	0.0	8.0	0.6	0.8	0.6	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/h	0.0	19.9	2.5	6.2	16.1	0.0
LnGrp Delay(d), s/veh	0.0	38.5	21.8	45.6	26.2	0.0
LnGrp LOS	D	C	C	D	C	D
Approach Vol, veh/h	1398			1590		
Approach Delay, s/veh	37.1			31.2		
Approach LOS	D			C		
Timer	1	2	3	4	5	6
Assigned Phs	1	2	3	4	5	6
Phs Duration (G+Y+Rc), s	31.9	50.5	29.6	29.6	82.4	82.4
Change Period (Y+Rc), s	4.6	* 4.6	5.1	4.6	4.6	4.6
Max Green Setting (Gmax), s	14.8	* 4.7	35.9	66.4	66.4	66.4
Max Q Clear Time (g_c+H), s	14.7	39.3	21.9	34.4	34.4	34.4
Green Ext Time (p_c), s	0.0	6.6	2.6	2.6	18.8	18.8
Intersection Summary						
HCM 2010 Ctrl Delay	36.1					
HCM 2010 LOS	D					
Notes						

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HCM 2010 Signalized Intersection Summary

1: Old Redwood Hwy N & US 101 S

11/01/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Traffic Volume (veh/h)	0	1520	930	0	370	390
Future Volume (veh/h)	0	1520	930	0	370	390
Number	5	2	6	16	7	14
Initial Q (Ob), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	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
Adj Sat Flow, veh/h/ln	0	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	0	1634	1000	0	388	419
Adj No. of Lanes	0	2	2	1	2	2
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	2	2	2	2	2
Cap. veh/h	0	2713	2715	1215	618	500
Arrive On Green	0.00	0.77	1.00	0.00	0.18	0.18
Sat Flow, veh/h	0	3725	3632	1563	3442	2787
Grp Volume(v), veh/h	0	1634	1000	0	398	419
Grp Sat Flow(s), veh/h/ln	0	1770	1770	1563	1721	1393
Q Serve(g, s), s	0.0	30.0	0.0	0.0	16.1	21.8
Cycle Q Clear(g, c), s	0.0	30.0	0.0	0.0	16.1	21.8
Prop In Lane	0.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	0	2713	2715	1215	618	500
V/C Ratio(X)	0.00	0.60	0.37	0.00	0.64	0.84
Avail Cap(c, a), veh/h	0	2713	2715	1215	734	594
HCM Platoon Ratio	1.00	1.00	1.33	1.33	1.00	1.00
Upstream Filter(i)	0.00	1.00	0.68	0.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	7.6	0.0	0.0	57.1	59.4
Incr Delay (d2), s/veh	0.0	1.0	0.2	0.0	1.5	8.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back(Q)(50%), veh/ln	0.0	14.9	0.1	0.0	7.8	9.0
LnGrp Delay(d), s/veh	0.0	8.6	0.2	0.0	58.6	68.3
LnGrp LOS	A	A	A	E	E	E
Approach Vol, veh/h	1634	1000		817		
Approach Delay, s/veh	8.6	0.2		63.6		
Approach LOS	A	A		E		
Timer	1	2	3	4	5	6
Assigned Phs	2	4	4	4	5	6
Phs Duration (G+Y+Rc), s	119.1	30.9	30.9	30.9	119.1	119.1
Change Period (Y+Rc), s	* 5.2	5.1	5.1	5.1	* 5.2	* 5.2
Max Green Setting (Gmax), s	* 1.1E2	30.9	30.9	30.9	* 1.1E2	* 1.1E2
Max Q Clear Time (g_c+H), s	32.0	23.8	23.8	23.8	2.0	2.0
Green Ext Time (p_c), s	34.6	2.0	2.0	2.0	15.0	15.0
Intersection Summary						
HCM 2010 Ctrl Delay	19.2					
HCM 2010 LOS	B					
Notes						

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HCM 2010 Signalized Intersection Summary

2: US 101 N & Old Redwood Hwy N

11/01/2018

Movement	EBT	EBR	WBR	WBT	NBR	NBT
Lane Configurations	↑↑	↑	↑	↑↑	↑↑	↑↑
Traffic Volume (veh/h)	1050	0	0	2126	210	500
Future Volume (veh/h)	1050	0	0	2126	210	500
Number	2	12	1	6	3	18
Initial Q (Ob), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	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
Adj Sat Flow, veh/h/ln	1863	1863	0	1863	1863	1863
Adj Flow Rate, veh/h	1105	0	0	2238	221	526
Adj No. of Lanes	2	1	0	2	2	2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	0	2	2	2
Cap. veh/h	2706	1211	0	2706	626	507
Arrive On Green	1.00	0.00	0.00	1.00	0.18	0.18
Sat Flow, veh/h	3632	1563	0	3725	3442	2787
Grp Volume(v), veh/h	1105	0	0	2238	221	526
Grp Sat Flow(s), veh/h/ln	1770	1563	0	1770	1721	1393
Q Serve(g, s), s	0.0	0.0	0.0	0.0	8.4	27.3
Cycle Q Clear(g, c), s	0.0	0.0	0.0	0.0	8.4	27.3
Prop In Lane	1.00	0.00	0.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	2706	1211	0	2706	626	507
V/C Ratio(X)	0.41	0.00	0.00	0.83	0.35	1.04
Avail Cap(c, a), veh/h	2706	1211	0	2706	626	507
HCM Platoon Ratio	2.00	2.00	1.00	1.33	1.00	1.00
Upstream Filter(i)	0.75	0.00	0.00	0.81	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	0.0	53.6	61.4
Incr Delay (d2), s/veh	0.3	0.0	0.0	2.5	0.3	49.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back(Q)(50%), veh/ln	0.1	0.0	0.0	0.9	4.1	14.0
LnGrp Delay(d), s/veh	0.3	0.0	0.0	2.5	54.0	111.2
LnGrp LOS	A	A	A	D	D	F
Approach Vol, veh/h	1105		2238	747		
Approach Delay, s/veh	0.3		2.5	94.3		
Approach LOS	A	A	A	F	F	F
Timer	1	2	3	4	5	6
Assigned Phs	2	2	3	4	5	6
Phs Duration (G+Y+Rc), s	118.7	118.7	118.7	118.7	118.7	31.3
Change Period (Y+Rc), s	5.1	5.1	5.1	5.1	5.1	4.7
Max Green Setting (Gmax), s	113.6	113.6	113.6	113.6	113.6	26.6
Max Q Clear Time (g_c+H), s	2.0	2.0	2.0	2.0	2.0	29.3
Green Ext Time (p_c), s	17.0	17.0	17.0	17.0	17.0	0.0
Intersection Summary						
HCM 2010 Ctrl Delay	18.7					
HCM 2010 LOS	B					
Notes						

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3: N McDowell Blvd & Old Redwood Hwy N

02/26/2019

4: N McDowell Rd/N McDowell Blvd & Corona Rd

11/01/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	2	1	2	1	2	1	2	0	1	1	1
Traffic Volume (veh/h)	160	1070	490	213	800	50	906	120	402	40	150	270
Future Volume (veh/h)	160	1070	490	213	800	50	906	120	402	40	150	270
Number	5	2	12	1	6	16	3	8	18	7	4	14
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	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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	160	1070	0	213	800	50	992	0	402	40	150	270
Adj No. of Lanes	1	2	1	2	1	2	1	2	0	1	1	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	182	991	443	219	1087	766	1046	0	467	335	351	299
Arrive On Green	0.07	0.19	0.00	0.12	0.31	0.30	0.29	0.00	0.29	0.19	0.19	0.19
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	3548	0	1583	1774	1863	1583
Grp Volume(V), veh/h	160	1070	0	213	800	50	992	0	402	40	150	270
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1774	0	1583	1774	1863	1583
Q Serve(g, s)	13.4	42.0	0.0	17.9	30.4	2.5	41.1	0.0	36.0	2.8	10.7	25.0
Cycle Q Clear(g, c), s	13.4	42.0	0.0	17.9	30.4	2.5	41.1	0.0	36.0	2.8	10.7	25.0
Prop In Lane	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	182	991	443	219	1087	766	1046	0	467	335	351	299
V/C Ratio(X)	0.88	1.08	0.00	0.97	0.74	0.07	0.95	0.00	0.86	0.12	0.43	0.39
Avail Cap(c, a), veh/h	201	991	443	219	1087	766	1046	0	467	376	395	336
HCM Platoon Ratio	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.83	0.83	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	68.9	60.9	0.0	65.5	46.5	20.6	51.8	0.0	50.0	50.5	53.7	59.5
Incr Delay (d2), s/veh	25.1	50.4	0.0	53.0	4.4	0.2	16.7	0.0	14.5	0.1	0.3	23.5
Initial Q Delay(Q3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.9	27.5	0.0	12.0	15.6	1.5	22.5	0.0	17.6	1.4	5.5	12.9
LnGrp Delay(d),s/veh	94.0	111.4	0.0	118.5	51.0	20.8	68.5	0.0	64.5	50.6	54.0	83.0
LnGrp LOS	F	F	F	F	D	C	E	E	E	D	D	F
Approach Vol, veh/h	1230			1063			1394					460
Approach Delay, s/veh	109.1			63.1			67.4					70.7
Approach LOS	F			E			E					E
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6						
Phs Duration (G+Y+Rc), s	23.5	46.0		32.3	19.4	50.1		46.2				
Change Period (Y+Rc), s	5.0	* 5.1		* 4.8	4.0	5.0		5.4				
Max Green Setting (Gmax), s	16.0	* 4.1		* 3.1	17.0	40.0		42.8				
Max Q Clear Time (g_c+H), s	19.9	44.0		27.0	15.4	32.4		43.1				
Green Ext Time (p_c), s	0.0	0.0		0.5	0.0	4.5		0.0				
Intersection Summary	79.0											
HCM 2010 Ctrl Delay	E											
HCM 2010 LOS	E											
Notes												

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	2	1	2	1	2	1	2	0	1	1	1
Traffic Volume (veh/h)	150	380	246	73	280	230	240	638	122	320	473	140
Future Volume (veh/h)	150	380	246	73	280	230	240	638	122	320	473	140
Number	5	2	12	1	6	16	3	8	18	7	4	14
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	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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	160	404	150	78	288	196	255	679	119	340	503	120
Adj No. of Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	244	459	390	151	361	555	572	1135	199	281	573	136
Arrive On Green	0.14	0.25	0.25	0.08	0.19	0.19	0.32	0.38	0.37	0.16	0.20	0.19
Sat Flow, veh/h	1774	1863	1583	1774	1863	1583	1774	3012	527	1774	2839	674
Grp Volume(V), veh/h	160	404	150	78	298	196	255	399	399	340	312	311
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1774	1770	1770	1774	1770	1744
Q Serve(g, s)	10.3	25.0	9.5	5.1	18.4	6.9	13.6	21.7	21.8	19.0	20.5	20.8
Cycle Q Clear(g, c), s	10.3	25.0	9.5	5.1	18.4	6.9	13.6	21.7	21.8	19.0	20.5	20.8
Prop In Lane	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	244	459	390	151	361	555	572	667	667	281	357	352
V/C Ratio(X)	0.66	0.88	0.38	0.52	0.83	0.35	0.45	0.60	0.60	0.21	0.87	0.88
Avail Cap(c, a), veh/h	350	504	429	296	447	628	572	667	667	281	366	360
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	0.66	0.66	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.1	43.5	37.6	52.6	46.4	13.1	32.2	30.1	30.3	50.5	46.4	46.7
Incr Delay (d2), s/veh	3.0	16.0	0.9	2.7	11.1	0.5	0.4	2.6	2.6	123.1	24.5	25.8
Initial Q Delay(Q3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.2	14.9	4.2	2.6	10.6	3.1	6.7	11.1	11.2	18.9	12.5	12.5
LnGrp Delay(d),s/veh	52.0	59.5	38.5	55.3	57.5	13.7	32.5	32.7	32.9	173.6	71.0	72.4
LnGrp LOS	D	E	D	E	E	B	C	C	C	F	E	E
Approach Vol, veh/h	714			572			1063					963
Approach Delay, s/veh	53.4			42.2			32.7					107.7
Approach LOS	D			D			C					F
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		3	4	5	6	7	8			
Phs Duration (G+Y+Rc), s	14.2	33.6	44.0	28.2	20.5	27.3	23.0	49.2				
Change Period (Y+Rc), s	4.0	4.9	5.3	* 4.9	* 4	4.8	4.6	5.3				
Max Green Setting (Gmax), s	20.0	31.6	26.7	* 24	* 24	28.0	18.4	31.2				
Max Q Clear Time (g_c+H), s	7.1	27.0	15.6	22.8	12.3	20.4	21.0	23.8				
Green Ext Time (p_c), s	0.1	1.7	0.6	0.6	0.3	2.0	0.0	3.7				
Intersection Summary	60.7											
HCM 2010 Ctrl Delay	E											
HCM 2010 LOS	E											
Notes												

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5: Petaluma Blvd N & Skillman Lane/Corona Rd

HCM 2010 Signalized Intersection Summary

11/01/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Traffic Volume (veh/h)	170	190	60	380	190	70	120	1120	386	70	680	120
Future Volume (veh/h)	170	190	60	380	190	70	120	1120	386	70	680	120
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Ob), 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	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
Adj Sat Flow, veh/hln	1900	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	172	192	53	384	192	41	121	1131	267	71	687	81
Adj No. of Lanes	0	1	0	1	1	0	1	2	1	1	2	0
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	187	209	58	421	354	76	149	1112	497	100	914	108
Arrive On Green	0.25	0.25	0.25	0.24	0.24	0.23	0.08	0.31	0.31	0.06	0.29	0.27
Sat Flow, veh/h	737	822	227	1774	1489	318	1774	3539	1583	1774	3190	376
Grp Volume(v), veh/h	417	0	0	384	0	233	121	1131	267	71	381	387
Grp Sat Flow(s), veh/hln	1786	0	0	1774	0	1807	1774	1770	1583	1774	1770	1796
Q Serve(g, s)	26.4	0.0	0.0	24.5	0.0	13.1	7.8	36.5	16.2	4.6	22.7	22.8
Cycle Q Clear(g, c), s	26.4	0.0	0.0	24.5	0.0	13.1	7.8	36.5	16.2	4.6	22.7	22.8
Prop In Lane	0.41	0.00	0.13	1.00	0.00	0.18	1.00	1.00	1.00	1.00	1.00	0.21
Lane Grp Cap(c), veh/h	454	0	0	421	0	429	149	1112	497	100	507	515
V/C Ratio(X)	0.92	0.00	0.00	0.91	0.00	0.94	0.81	1.02	0.54	0.71	0.75	0.75
Avail Cap(c, a), veh/h	515	0	0	466	0	474	153	1112	497	153	556	564
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.2	0.0	0.0	43.1	0.0	38.8	52.3	39.9	32.9	53.9	37.7	37.9
Incr Delay (d2), s/veh	19.2	0.0	0.0	19.8	0.0	0.4	24.6	31.5	0.6	3.4	4.3	4.3
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(50%), veh/ln	15.4	0.0	0.0	14.3	0.0	6.6	4.9	22.6	7.1	2.3	11.7	11.9
LnGrp Delay(d), s/veh	61.4	0.0	0.0	63.0	0.0	39.2	76.9	71.3	33.5	57.2	42.0	42.2
LnGrp LOS	E	E	E	D	D	D	E	F	C	E	D	D
Approach Vol, veh/h	417	617	1519	839								
Approach Delay, s/veh	61.4	64.0	64.0	67.3								
Approach LOS	E	E	E	D								
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.8	37.3	33.5	10.6	40.5	31.6						
Change Period (Y+Rc), s	4.0	5.5	4.5	4.0	5.5	4.5						
Max Green Setting (Gmax), s	10.0	35.0	33.0	10.0	35.0	30.0						
Max Q Clear Time (g_c+H), s	9.8	24.8	28.4	6.6	38.5	28.5						
Green Ext Time (p_c), s	0.0	1.9	0.6	0.0	0.0	0.6						
Intersection Summary	57.3											
HCM 2010 Ctrl Delay	E											
HCM 2010 LOS	E											
Notes												

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6: S McDowell Blvd/N McDowell Rd & E Washington St

HCM 2010 Signalized Intersection Summary

11/01/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Traffic Volume (veh/h)	698	810	380	30	490	130	480	556	50	220	634	465
Future Volume (veh/h)	698	810	380	30	490	130	480	556	50	220	634	465
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Ob), 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	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
Adj Sat Flow, veh/hln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	712	827	349	31	500	42	490	567	41	224	647	265
Adj No. of Lanes	2	2	0	1	2	1	2	2	0	1	2	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	981	1027	432	133	760	340	569	699	50	321	798	810
Arrive On Green	0.09	0.14	0.14	0.08	0.21	0.21	0.17	0.21	0.20	0.18	0.23	0.23
Sat Flow, veh/h	3442	2430	1022	1774	3539	1583	3442	3442	242	1774	3539	1583
Grp Volume(v), veh/h	712	602	574	31	500	42	490	299	309	224	647	265
Grp Sat Flow(s), veh/hln	1721	1770	1682	1774	1770	1583	1721	1770	1820	1774	1770	1583
Q Serve(g, s)	29.4	48.1	48.4	2.4	18.9	3.1	20.2	23.5	23.6	17.3	25.3	5.4
Cycle Q Clear(g, c), s	29.4	48.1	48.4	2.4	18.9	3.1	20.2	23.5	23.6	17.3	25.3	5.4
Prop In Lane	1.00	1.00	0.61	1.00	1.00	1.00	1.00	1.00	0.13	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	981	748	711	133	760	340	569	370	380	321	798	810
V/C Ratio(X)	0.73	0.80	0.81	0.23	0.66	0.12	0.86	0.81	0.81	0.70	0.81	0.33
Avail Cap(c, a), veh/h	981	748	711	133	760	340	613	462	475	321	899	856
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.81	0.81	0.81	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	60.6	57.0	57.2	63.6	52.4	46.2	59.3	55.0	55.1	56.0	53.6	7.7
Incr Delay (d2), s/veh	2.2	7.4	7.9	0.9	2.4	0.2	11.4	9.5	9.5	5.1	4.4	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(50%), veh/ln	14.3	25.2	24.1	1.2	9.5	1.4	10.5	12.5	12.8	8.9	12.9	2.9
LnGrp Delay(d), s/veh	62.8	64.3	65.0	64.4	54.8	46.5	70.7	64.5	64.6	61.1	58.0	7.9
LnGrp LOS	E	E	E	D	D	D	E	E	E	E	E	A
Approach Vol, veh/h	1888	573	1098	67.3								
Approach Delay, s/veh	64.0	64.0	64.0	67.3								
Approach LOS	E	E	E	D								
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.3	65.7	28.1	36.9	45.6	35.3	30.5	34.5				
Change Period (Y+Rc), s	5.4	* 5.1	5.4	* 5.2	* 5.4	5.2	* 5.1					
Max Green Setting (Gmax), s	4.1	* 6.1	24.6	* 3.6	* 3.6	28.2	23.9	* 3.7				
Max Q Clear Time (g_c+H), s	4.4	50.4	22.2	27.3	31.4	20.9	19.3	25.6				
Green Ext Time (p_c), s	0.0	6.8	0.5	4.4	1.3	2.6	0.3	3.8				
Intersection Summary	59.5											
HCM 2010 Ctrl Delay	E											
HCM 2010 LOS	E											
Notes												

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HCM 2010 Signalized Intersection Summary
7: US 101 NB Off-Ramp & E Washington St

11/01/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR	Diagram
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↔ ↗ ↘
Traffic Volume (veh/h)	1500	0	0	1275	160	338	
Future Volume (veh/h)	1500	0	0	1275	160	338	
Number	2	12	1	6	3	18	
Initial Q (Ob), veh	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	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	
Adj Sat Flow, veh/h/ln	1863	0	0	1863	1863	1863	
Adj Flow Rate, veh/h	1515	0	0	1288	162	283	
Adj No. of Lanes	2	0	0	2	2	2	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	
Percent Heavy Veh, %	2	0	0	2	2	2	
Cap. veh/h	2888	0	0	2888	445	360	
Arrive On Green	0.82	0.00	0.00	0.82	0.13	0.13	
Sat Flow, veh/h	3725	0	0	3725	3442	2787	
Grp Volume(v), veh/h	1515	0	0	1288	162	283	
Grp Sat Flow(s), veh/h/ln	1770	0	0	1770	1721	1393	
Q Serve(g, s), s	20.1	0.0	0.0	15.4	6.3	14.4	
Cycle Q Clear(g, c), s	20.1	0.0	0.0	15.4	6.3	14.4	
Prop In Lane	0.00	0.00	0.00	1.00	1.00	1.00	
Lane Grp Cap(c), veh/h	2888	0	0	2888	445	360	
V/C Ratio(X)	0.52	0.00	0.00	0.45	0.36	0.79	
Avail Cap(c, a), veh/h	2888	0	0	2888	684	554	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	0.51	0.00	0.00	0.63	1.00	1.00	
Uniform Delay (d), s/veh	4.3	0.0	0.0	3.9	58.1	61.6	
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.3	0.6	4.9	
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	
%ile Back(Q)(50%), veh/ln	9.8	0.0	0.0	7.5	3.0	5.8	
LnGrp Delay(d), s/veh	4.7	0.0	0.0	4.2	58.7	66.5	
LnGrp LOS	A			A	E	E	
Approach Vol, veh/h	1515			1288	445		
Approach Delay, s/veh	4.7			4.2	63.6		
Approach LOS	A			A	E		
Timer	1	2	3	4	5	6	7
Assigned Phs	2						
Phs Duration (G+Y+Rc), s	123.1						
Change Period (Y+Rc), s	* 4.8						
Max Green Setting (Gmax), s	* 1.1E2						
Max Q Clear Time (g_c+H), s	22.1						
Green Ext Time (p_c), s	45.5						
Intersection Summary							
HCM 2010 Ctrl Delay	12.6						
HCM 2010 LOS	B						
Notes							

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HCM 2010 Signalized Intersection Summary
8: US 101 SB On-Ramp/US 101 SB Off-Ramp & E Washington St

11/01/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR	Diagram
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↔ ↗ ↘
Traffic Volume (veh/h)	0	1500	265	1030	0	0	
Future Volume (veh/h)	0	1500	265	1030	0	0	
Number	5	2	12	1	6	16	
Initial Q (Ob), veh	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	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	
Adj Sat Flow, veh/h/ln	0	1863	1863	1863	1863	0	
Adj Flow Rate, veh/h	0	1562	102	276	1073	0	
Adj No. of Lanes	0	2	1	2	2	0	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	
Percent Heavy Veh, %	0	1778	795	708	2613	0	
Cap. veh/h	0.00	0.50	0.50	0.07	0.24	0.00	
Arrive On Green	0.00	0.50	0.50	0.07	0.24	0.00	
Sat Flow, veh/h	0	3632	1583	3442	3632	0	
Grp Volume(v), veh/h	0	1562	102	276	1073	0	
Grp Sat Flow(s), veh/h/ln	0	1770	1583	1721	1770	0	
Q Serve(g, s), s	0.0	57.4	5.0	11.2	37.2	0.0	
Cycle Q Clear(g, c), s	0.0	57.4	5.0	11.2	37.2	0.0	
Prop In Lane	0.00	1.00	1.00	1.00	1.00	0.00	
Lane Grp Cap(c), veh/h	0	1778	795	708	2613	0	
V/C Ratio(X)	0.00	0.88	0.13	0.39	0.41	0.00	
Avail Cap(c, a), veh/h	0	1842	824	708	2613	0	
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	1.00	
Upstream Filter(I)	0.00	1.00	1.00	0.90	0.90	0.00	
Uniform Delay (d), s/veh	0.0	32.4	19.3	59.3	28.5	0.0	
Incr Delay (d2), s/veh	0.0	6.5	0.3	0.7	0.4	0.0	
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	
%ile Back(Q)(50%), veh/ln	0.0	29.6	2.3	5.4	18.5	0.0	
LnGrp Delay(d), s/veh	0.0	38.9	19.7	59.9	29.0	0.0	
LnGrp LOS	D	B	E	C	C	E	
Approach Vol, veh/h	1664			1349			
Approach Delay, s/veh	37.7			35.3			
Approach LOS	D			D			
Timer	1	2	3	4	5	6	7
Assigned Phs	1	2					
Phs Duration (G+Y+Rc), s	34.5	77.3					
Change Period (Y+Rc), s	4.6	* 4.6					
Max Green Setting (Gmax), s	14.8	* 7.5					
Max Q Clear Time (g_c+H), s	13.2	59.4					
Green Ext Time (p_c), s	0.3	13.3					
Intersection Summary							
HCM 2010 Ctrl Delay	40.5						
HCM 2010 LOS	D						
Notes							

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Appendix D

Queuing Calculations





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Queues

4: N McDowell Rd/N McDowell Blvd & Corona Rd

10/30/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	227	232	259	49	282	389	161	483	141	536
v/c Ratio	0.72	0.36	0.36	0.25	0.71	0.60	0.55	0.45	0.56	0.54
Control Delay	54.3	28.1	5.1	44.4	46.2	12.3	45.7	30.5	48.1	32.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.3	28.1	5.1	44.4	46.2	12.3	45.7	30.5	48.1	32.7
Queue Length 50th (ft)	133	115	0	29	166	61	96	136	84	153
Queue Length 95th (ft)	#297	194	58	65	243	115	157	183	143	208
Internal Link Dist (ft)	1274			899			10858			3764
Turn Bay Length (ft)	100	125	100	125	200	170	100	125	100	125
Base Capacity (vph)	314	636	711	194	484	688	336	1107	300	1002
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.72	0.36	0.36	0.25	0.58	0.57	0.48	0.44	0.47	0.53

Intersection Summary
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Corona Station T/A
 AM Existing

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Queues

5: Petaluma Blvd N & Skillman Lane/Corona Rd

10/30/2018

Lane Group	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	497	268	181	48	521	332	42	933
v/c Ratio	0.89	0.76	0.49	0.44	0.49	0.48	0.37	0.89
Control Delay	58.8	57.3	44.2	68.8	35.6	8.4	64.8	49.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.8	57.3	44.2	68.8	35.6	8.4	64.8	49.1
Queue Length 50th (ft)	357	191	118	35	161	16	31	330
Queue Length 95th (ft)	#683	298	197	84	267	105	76	#571
Internal Link Dist (ft)	516		563	1205				1011
Turn Bay Length (ft)	125	125	508	161	1183	729	161	1160
Base Capacity (vph)	559	508	529	161	1183	729	161	1160
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.89	0.53	0.34	0.30	0.44	0.46	0.26	0.80

Intersection Summary
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Corona Station T/A
 AM Existing

Synchro 10 Report
 W-Trans

Queues
6: S McDowell Blvd/N McDowell Rd & E Washington St

10/30/2018

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBR
Lane Group Flow (vph)	474	847	34	724	120	385	528	64	339
v/c Ratio	0.70	0.50	0.27	0.63	0.19	0.81	0.56	0.42	0.49
Control Delay	53.7	17.3	55.1	36.6	2.1	61.0	36.9	56.6	41.2
Queue Delay	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.7	17.5	55.1	36.6	2.1	61.0	36.9	56.6	41.2
Queue Length 50th (ft)	160	103	23	235	0	141	180	44	117
Queue Length 95th (ft)	#276	325	57	324	15	#217	198	89	137
Internal Link Dist (ft)	393			1440		1150		10858	
Turn Bay Length (ft)	320	175		135	220		225		175
Base Capacity (vph)	681	1694	126	1144	628	477	1222	173	1105
Starvation Cap Reductn	0	238	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	1	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.58	0.27	0.63	0.19	0.81	0.43	0.37	0.31

Intersection Summary
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Corona Station T/A
AM Existing

Synchro 10 Report
W-Trans

Queues
4: N McDowell Rd/N McDowell Blvd & Corona Rd

10/30/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	227	232	285	50	282	389	176	499	141	540
v/c Ratio	0.73	0.40	0.39	0.26	0.71	0.60	0.59	0.46	0.56	0.55
Control Delay	55.2	30.5	5.4	44.5	46.2	12.3	46.9	30.4	48.1	32.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.2	30.5	5.4	44.5	46.2	12.3	46.9	30.4	48.1	32.9
Queue Length 50th (ft)	133	115	0	30	166	61	106	141	84	155
Queue Length 95th (ft)	#297	194	59	66	243	115	170	189	143	210
Internal Link Dist (ft)	1274			100	125	200	170	10858		3764
Turn Bay Length (ft)	310	576	673	194	484	688	336	1108	300	1000
Base Capacity (vph)	0	0	0	0	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.40	0.39	0.26	0.58	0.57	0.52	0.45	0.47	0.54

Intersection Summary
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Corona Station T/A
AM Existing plus Project

Synchro 10 Report
W-Trans

Queues
5: Petaluma Blvd N & Skillman Lane/Corona Rd

10/30/2018

Lane Group	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	497	283	181	48	521	337	42	933
v/c Ratio	0.90	0.78	0.48	0.45	0.49	0.49	0.37	0.89
Control Delay	60.3	58.3	43.6	69.3	36.1	8.4	65.4	50.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.3	58.3	43.6	69.3	36.1	8.4	65.4	50.0
Queue Length 50th (ft)	363	204	118	35	164	17	31	336
Queue Length 95th (ft)	#683	316	197	84	267	107	76	#571
Internal Link Dist (ft)	516		563		1205			1011
Turn Bay Length (ft)	125		150		150		130	125
Base Capacity (vph)	554	503	524	160	1173	728	160	1150
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.90	0.56	0.35	0.30	0.44	0.46	0.26	0.81

Intersection Summary
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
6: S McDowell Blvd/N McDowell Rd & E Washington St

10/30/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	482	847	34	724	120	385	64	345
v/c Ratio	0.69	0.50	0.27	0.65	0.19	0.81	0.56	0.42
Control Delay	52.7	18.1	55.1	37.3	2.1	61.2	36.7	56.6
Queue Delay	0.0	0.2	0.0	0.0	0.0	1.1	0.0	0.0
Total Delay	52.7	18.3	55.1	37.3	2.1	62.4	36.7	56.6
Queue Length 50th (ft)	161	101	23	240	0	141	178	44
Queue Length 95th (ft)	#283	336	57	324	15	#217	200	89
Internal Link Dist (ft)		393		1440		1150		10858
Turn Bay Length (ft)	320		175		135	220	225	175
Base Capacity (vph)	698	1688	126	1121	619	476	1222	173
Starvation Cap Reductn	0	239	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	17	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.58	0.27	0.65	0.19	0.84	0.43	0.31

Intersection Summary
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues

4: N McDowell Rd/N McDowell Blvd & Corona Rd

10/30/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	227	239	259	86	306	403	161	525	145	536
v/c Ratio	0.74	0.42	0.39	0.44	0.77	0.62	0.53	0.52	0.59	0.68
Control Delay	56.1	31.3	5.6	49.0	49.6	13.1	44.5	32.9	50.1	34.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.1	31.3	5.6	49.0	49.6	13.1	44.5	32.9	50.1	34.9
Queue Length 50th (ft)	133	118	0	52	182	63	95	155	87	160
Queue Length 95th (ft)	#297	202	59	101	268	124	157	203	148	211
Internal Link Dist (ft)	1274			899			10858			3764
Turn Bay Length (ft)	100	125	100	125	200	170	200	170	125	125
Base Capacity (vph)	307	570	664	197	469	684	336	1045	290	946
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.74	0.42	0.39	0.44	0.65	0.59	0.48	0.50	0.50	0.57

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues

5: Petaluma Blvd N & Skillman Lane/Corona Rd

10/30/2018

Lane Group	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	498	295	181	52	535	347	42	936
v/c Ratio	0.93	0.81	0.48	0.48	0.52	0.51	0.38	0.92
Control Delay	67.2	62.1	44.2	71.1	37.8	9.9	66.3	54.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.2	62.1	44.2	71.1	37.8	9.9	66.3	54.9
Queue Length 50th (ft)	373	216	119	39	175	26	31	351
Queue Length 95th (ft)	#691	332	198	90	278	125	76	#593
Internal Link Dist (ft)	516			563		1205		1011
Turn Bay Length (ft)	125	485	505	156	1104	700	156	1080
Base Capacity (vph)	534	485	505	156	1104	700	156	1080
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.93	0.61	0.36	0.33	0.48	0.50	0.27	0.87

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
6: S McDowell Blvd/N McDowell Rd & E Washington St

10/30/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBR
Lane Group Flow (vph)	483	888	34	739	120	422	550	64
v/c Ratio	0.68	0.55	0.32	0.74	0.21	0.94	0.58	0.47
Control Delay	55.4	19.9	56.5	42.6	2.3	78.1	37.7	60.9
Queue Delay	0.0	0.2	0.0	0.0	0.0	45.1	0.0	0.0
Total Delay	55.4	20.1	56.5	42.6	2.3	123.2	37.7	60.9
Queue Length 50th (ft)	173	82	24	255	0	-161	188	45
Queue Length 95th (ft)	#302	355	57	337	15	#266	211	90
Internal Link Dist (ft)	393		1440		1150		10858	
Turn Bay Length (ft)	320	175	135	220			225	175
Base Capacity (vph)	712	1629	108	992	568	451	1187	156
Starvation Cap Reductn	0	188	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	74	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.62	0.31	0.74	0.21	1.12	0.46	0.34

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

Queues
4: N McDowell Rd/N McDowell Blvd & Corona Rd

10/30/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	227	239	265	88	306	403	176	541
v/c Ratio	0.74	0.42	0.40	0.45	0.77	0.62	0.57	0.59
Control Delay	56.5	31.4	5.6	49.3	49.6	13.1	45.7	33.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.5	31.4	5.6	49.3	49.6	13.1	45.7	33.0
Queue Length 50th (ft)	133	118	0	53	182	63	104	161
Queue Length 95th (ft)	#297	202	59	104	268	124	170	210
Internal Link Dist (ft)	1274		100	125	899		10858	
Turn Bay Length (ft)	100	100	125	200	170		125	
Base Capacity (vph)	305	568	667	197	469	684	336	1045
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.74	0.42	0.40	0.45	0.65	0.59	0.52	0.50

Intersection Summary
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Queues
5: Petaluma Blvd N & Skillman Lane/Corona Rd

10/30/2018

Lane Group	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	498	309	181	52	535	353	42	936
v/c Ratio	0.94	0.82	0.46	0.48	0.52	0.52	0.38	0.93
Control Delay	69.2	62.7	43.6	71.8	38.3	10.0	66.7	56.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.2	62.7	43.6	71.8	38.3	10.0	66.7	56.3
Queue Length 50th (ft)	379	229	119	39	178	27	32	357
Queue Length 95th (ft)	#691	349	198	90	278	127	76	#593
Internal Link Dist (ft)	516		563		1205			1011
Turn Bay Length (ft)	125			150		130		125
Base Capacity (vph)	530	480	500	154	1093	700	154	1070
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.94	0.64	0.36	0.34	0.49	0.50	0.27	0.87

Intersection Summary
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
6: S McDowell Blvd/N McDowell Rd & E Washington St

10/30/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	492	888	34	739	120	422	552	64
v/c Ratio	0.68	0.55	0.32	0.76	0.21	0.94	0.58	0.47
Control Delay	55.1	19.2	58.5	43.4	2.3	79.5	37.7	60.9
Queue Delay	0.0	0.2	0.0	0.0	0.0	45.2	0.0	0.0
Total Delay	55.1	19.4	58.5	43.4	2.3	124.7	37.7	60.9
Queue Length 50th (ft)	177	88	24	257	0	~161	189	45
Queue Length 95th (ft)	#310	354	57	337	15	#266	212	90
Internal Link Dist (ft)		393		1440		1150		10858
Turn Bay Length (ft)	320		175		135	220		225
Base Capacity (vph)	727	1629	108	975	561	448	1187	156
Starvation Cap Reductn	0	187	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	101	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.62	0.31	0.76	0.21	1.22	0.47	0.34

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

Queues

4: N McDowell Rd/N McDowell Blvd & Corona Rd

11/01/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	292	260	188	177	385	448	177	615	146	584
v/c Ratio	0.92	0.47	0.32	0.76	0.83	0.64	0.63	0.71	0.60	0.71
Control Delay	77.1	33.2	6.8	63.8	50.9	13.1	50.9	38.8	51.1	39.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	77.1	33.2	6.8	63.8	50.9	13.1	50.9	38.8	51.1	39.2
Queue Length 50th (ft)	~207	141	5	108	227	80	105	184	88	176
Queue Length 95th (ft)	#412	220	57	#216	332	143	#208	243	151	220
Internal Link Dist (ft)	1274			899			10858			3764
Turn Bay Length (ft)	100	125	100	125	200	170	282	910	272	1005
Base Capacity (vph)	319	555	596	239	521	721	282	910	272	1005
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.92	0.47	0.32	0.74	0.74	0.62	0.63	0.68	0.54	0.58

Intersection Summary

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

Corona Station T/A
AM Future

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Queues

5: Petaluma Blvd N & Skillman Lane/Corona Rd

11/01/2018

Lane Group	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	642	305	232	95	600	305	42	916
v/c Ratio	1.00	0.87	0.63	0.96	0.61	0.53	0.46	1.02
Control Delay	80.2	79.2	59.3	145.5	49.9	21.5	83.2	85.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	80.2	79.2	59.3	145.5	49.9	21.5	83.2	85.8
Queue Length 50th (ft)	~589	276	196	90	261	90	39	~466
Queue Length 95th (ft)	#925	388	287	#223	356	205	84	#665
Internal Link Dist (ft)	516		563		1205			1011
Turn Bay Length (ft)	125	125	472	150	979	130	125	898
Base Capacity (vph)	643	452	472	99	979	574	112	898
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.00	0.67	0.49	0.96	0.61	0.53	0.38	1.02

Intersection Summary

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

Corona Station T/A
AM Future

Synchro 10 Report
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Queues
6: S McDowell Blvd/N McDowell Rd & E Washington St

11/01/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBR
Lane Group Flow (vph)	510	969	52	802	135	479	480	104
v/c Ratio	0.68	0.63	0.39	0.86	0.26	1.18	0.56	0.71
Control Delay	38.8	19.4	56.3	48.7	8.0	145.0	37.6	75.4
Queue Delay	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.8	19.7	56.3	48.7	8.0	145.0	37.6	75.4
Queue Length 50th (ft)	162	257	35	282	5	-214	157	72
Queue Length 95th (ft)	#343	350	#87	#364	52	#319	178	#153
Internal Link Dist (ft)	393			1440		1150		10858
Turn Bay Length (ft)	320		175		135	220		225
Base Capacity (vph)	750	1536	135	952	518	407	1197	152
Starvation Cap Reductn	0	133	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.69	0.39	0.84	0.26	1.18	0.40	0.68

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

Queues
4: N McDowell Rd/N McDowell Blvd & Corona Rd

11/01/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	292	260	193	178	385	448	192	630	146	588
v/c Ratio	0.93	0.47	0.32	0.77	0.83	0.64	0.68	0.72	0.60	0.71
Control Delay	79.5	33.3	6.8	64.6	50.9	13.2	53.4	39.0	51.2	39.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	79.5	33.3	6.8	64.6	50.9	13.2	53.4	39.0	51.2	39.2
Queue Length 50th (ft)	-211	141	5	109	227	82	115	188	88	178
Queue Length 95th (ft)	#412	220	57	#219	332	143	#233	250	151	222
Internal Link Dist (ft)	1274			899			10858			3764
Turn Bay Length (ft)	100		100	125		200	170		125	
Base Capacity (vph)	315	552	598	238	521	721	284	910	272	1005
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.93	0.47	0.32	0.75	0.74	0.62	0.68	0.69	0.54	0.59

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

Queues

5: Petaluma Blvd N & Skillman Lane/Corona Rd

11/01/2018

Lane Group	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	642	320	232	95	600	311	42	916
v/c Ratio	1.01	0.88	0.61	0.97	0.62	0.54	0.46	1.03
Control Delay	82.7	80.5	58.1	148.3	50.6	21.8	83.9	88.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	82.7	80.5	58.1	148.3	50.6	21.8	83.9	88.3
Queue Length 50th (ft)	-611	292	196	91	265	94	39	-476
Queue Length 95th (ft)	#925	409	287	#223	356	209	84	#655
Internal Link Dist (ft)	516		563		1205			1011
Turn Bay Length (ft)	125		150		130		125	
Base Capacity (vph)	638	449	468	98	970	573	111	891
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.01	0.71	0.50	0.97	0.62	0.54	0.38	1.03

Intersection Summary

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

Queues

6: S McDowell Blvd/N McDowell Rd & E Washington St

11/01/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	519	969	52	802	135	479	104	465
v/c Ratio	0.70	0.64	0.39	0.87	0.27	1.12	0.54	0.71
Control Delay	39.1	22.1	59.4	50.8	8.5	126.0	37.2	43.8
Queue Delay	0.0	0.4	0.0	0.0	0.0	0.6	0.0	0.0
Total Delay	39.1	22.5	59.4	50.8	8.5	126.6	37.2	43.8
Queue Length 50th (ft)	165	283	36	290	6	~209	159	74
Queue Length 95th (ft)	#350	357	#88	#387	54	#314	#154	189
Internal Link Dist (ft)		393		1440		1150		10858
Turn Bay Length (ft)	320		175		135	220	225	
Base Capacity (vph)	746	1519	134	935	509	427	1201	153
Starvation Cap Reductn	0	160	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	28	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.71	0.39	0.86	0.27	1.20	0.40	0.68

Intersection Summary

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

Queues

4: N McDowell Rd/N McDowell Blvd & Corona Rd

10/30/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	167	332	301	32	243	219	246	748	313	955
v/c Ratio	0.74	0.68	0.54	0.18	0.72	0.32	0.83	0.68	0.86	0.76
Control Delay	66.2	44.8	16.3	48.2	54.0	7.5	68.3	35.8	67.8	35.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.2	44.8	16.3	48.2	54.0	7.5	68.3	35.8	67.8	35.5
Queue Length 50th (ft)	111	218	60	21	162	30	169	231	~257	315
Queue Length 95th (ft)	#229	320	149	52	237	65	#298	297	#440	#407
Internal Link Dist (ft)	1274			899			10858			3764
Turn Bay Length (ft)	100	125		200	170		125			125
Base Capacity (vph)	233	493	564	177	426	690	305	1173	364	1259
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.72	0.67	0.53	0.18	0.57	0.32	0.81	0.64	0.86	0.76

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Corona Station T/A
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Queues

5: Petaluma Blvd N & Skillman Lane/Corona Rd

10/30/2018

Lane Group	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	431	352	203	55	848	411	46	913
v/c Ratio	0.90	0.84	0.47	0.49	0.83	0.67	0.39	0.91
Control Delay	65.1	62.3	42.6	72.1	48.2	23.5	67.7	54.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.1	62.3	42.6	72.1	48.2	23.5	67.7	54.6
Queue Length 50th (ft)	332	270	136	44	336	131	36	370
Queue Length 95th (ft)	#569	404	222	94	#508	281	82	#572
Internal Link Dist (ft)	516		563		1205			1011
Turn Bay Length (ft)	125		150		130		125	
Base Capacity (vph)	548	498	517	160	1133	660	160	1110
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.79	0.71	0.39	0.34	0.75	0.62	0.29	0.82

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Corona Station T/A
 PM Existing

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Queues
6: S McDowell Blvd/N McDowell Rd & E Washington St

10/30/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	657	1163	38	554	114	333	493	169	515
v/c Ratio	0.66	0.72	0.37	0.79	0.26	0.84	0.67	0.70	0.64
Control Delay	50.7	37.5	66.0	56.3	3.6	72.8	48.5	66.6	46.5
Queue Delay	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.7
Total Delay	50.7	38.0	66.0	56.3	3.6	72.8	48.5	66.6	47.6
Queue Length 50th (ft)	265	462	30	215	0	136	193	128	196
Queue Length 95th (ft)	349	#689	68	#317	20	#209	220	#263	236
Internal Link Dist (ft)	393			1440		1150		10858	
Turn Bay Length (ft)	320	175		135	220		225		175
Base Capacity (vph)	989	1613	108	710	444	404	1073	243	1021
Starvation Cap Reductn	0	155	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	49
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.66	0.80	0.35	0.78	0.26	0.82	0.46	0.70	0.50

Intersection Summary
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
4: N McDowell Rd/N McDowell Blvd & Corona Rd

10/30/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	167	332	318	35	243	219	256	758
v/c Ratio	0.74	0.68	0.56	0.20	0.72	0.32	0.86	0.87
Control Delay	66.2	44.8	16.6	48.5	54.0	7.5	71.7	35.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.2	44.8	16.6	48.5	54.0	7.5	71.7	35.6
Queue Length 50th (ft)	111	218	64	23	162	30	177	235
Queue Length 95th (ft)	#229	320	157	56	237	65	#314	302
Internal Link Dist (ft)	1274			899		10858		3764
Turn Bay Length (ft)	100	100	125		200	170		125
Base Capacity (vph)	233	493	572	177	426	685	307	1173
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.72	0.67	0.56	0.20	0.57	0.32	0.83	0.87

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

Queues
5: Petaluma Blvd N & Skillman Lane/Corona Rd

10/30/2018

Lane Group	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	431	362	203	55	848	427	46	913
v/c Ratio	0.90	0.85	0.46	0.49	0.83	0.69	0.40	0.91
Control Delay	65.7	63.5	42.4	72.6	48.6	24.1	68.1	55.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.7	63.5	42.4	72.6	48.6	24.1	68.1	55.2
Queue Length 50th (ft)	333	279	136	44	336	138	36	370
Queue Length 95th (ft)	#559	#418	222	94	#508	293	82	#572
Internal Link Dist (ft)	516		563		1205			1011
Turn Bay Length (ft)	125		493		150		130	125
Base Capacity (vph)	543	493	512	159	1124	662	159	1099
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.79	0.73	0.40	0.35	0.75	0.65	0.29	0.83

Intersection Summary
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
6: S McDowell Blvd/N McDowell Rd & E Washington St

10/30/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	686	1163	38	554	114	333	499	169
v/c Ratio	0.70	0.72	0.37	0.79	0.26	0.84	0.68	0.70
Control Delay	50.9	37.1	66.0	56.5	3.6	72.8	48.5	66.7
Queue Delay	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.9	37.9	66.0	56.5	3.6	72.8	48.5	66.7
Queue Length 50th (ft)	280	467	30	215	0	136	195	128
Queue Length 95th (ft)	#364	#587	68	#317	20	#209	223	#263
Internal Link Dist (ft)	393		1440			1150		10858
Turn Bay Length (ft)	320		175		135	220	225	175
Base Capacity (vph)	986	1609	108	709	444	404	1073	243
Starvation Cap Reductn	0	186	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.82	0.35	0.78	0.26	0.82	0.47	0.70

Intersection Summary
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues

4: N McDowell Rd/N McDowell Blvd & Corona Rd

10/30/2018

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	167	357	301	54	256	228	246	788	345	955
v/c Ratio	0.72	0.76	0.56	0.31	0.71	0.32	0.82	0.70	0.93	0.76
Control Delay	64.2	49.8	18.0	51.0	52.0	7.5	66.2	35.7	78.1	35.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.2	49.8	18.0	51.0	52.0	7.5	66.2	35.7	78.1	35.6
Queue Length 50th (ft)	111	233	66	36	169	32	169	241	~307	314
Queue Length 95th (ft)	#229	#351	157	77	247	69	#298	308	#488	398
Internal Link Dist (ft)	1274			899			10858			3764
Turn Bay Length (ft)	100	125		200	170		305	1210	371	1250
Base Capacity (vph)	238	481	546	177	440	711	305	1210	371	1250
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.74	0.55	0.31	0.58	0.32	0.81	0.65	0.93	0.76

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

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Queues

5: Petaluma Blvd N & Skillman Lane/Corona Rd

10/30/2018

	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	433	374	203	56	856	440	46	925
v/c Ratio	0.89	0.85	0.44	0.50	0.81	0.68	0.40	0.89
Control Delay	64.0	62.7	41.4	72.9	46.3	23.4	68.2	51.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.0	62.7	41.4	72.9	46.3	23.4	68.2	51.9
Queue Length 50th (ft)	332	289	135	44	334	140	36	370
Queue Length 95th (ft)	#555	#439	220	95	#497	297	82	#566
Internal Link Dist (ft)	516		563		1205			1011
Turn Bay Length (ft)	125		150		130		125	
Base Capacity (vph)	550	500	520	158	1169	684	158	1143
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.79	0.75	0.39	0.35	0.73	0.64	0.29	0.81

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

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Queues
6: S McDowell Blvd/N McDowell Rd & E Washington St

10/30/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	691	1224	38	562	114	380	522	169	544
v/c Ratio	0.68	0.75	0.32	0.77	0.25	0.86	0.66	0.64	0.75
Control Delay	50.9	38.1	62.4	54.3	3.4	72.3	46.9	63.2	45.4
Queue Delay	0.1	1.3	0.0	0.0	0.0	7.2	0.0	0.0	0.9
Total Delay	50.9	39.4	62.4	54.3	3.4	79.5	46.9	63.2	45.4
Queue Length 50th (ft)	285	498	29	216	0	156	202	128	206
Queue Length 95th (ft)	363	#526	67	#302	19	#237	231	#250	247
Internal Link Dist (ft)	393			1440		1150		10858	
Turn Bay Length (ft)	320		175		135	220		225	175
Base Capacity (vph)	1015	1628	122	740	457	442	1105	257	1055
Starvation Cap Reductn	11	208	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	38	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.86	0.31	0.76	0.25	0.94	0.47	0.66	0.52

Intersection Summary
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
4: N McDowell Rd/N McDowell Blvd & Corona Rd

10/30/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	167	357	318	256	228	256	798	345
v/c Ratio	0.72	0.78	0.60	0.32	0.74	0.33	0.85	0.73
Control Delay	64.0	52.4	19.3	51.4	54.6	7.9	70.3	37.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.0	52.4	19.3	51.4	54.6	7.9	70.3	37.2
Queue Length 50th (ft)	111	236	73	38	171	33	177	249
Queue Length 95th (ft)	#229	#372	169	79	249	70	#314	319
Internal Link Dist (ft)	1274			889		10858		3764
Turn Bay Length (ft)	100		100	125		200	170	125
Base Capacity (vph)	239	466	541	177	426	688	307	1169
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.77	0.59	0.32	0.60	0.33	0.83	0.98

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

Queues

5: Petaluma Blvd N & Skillman Lane/Corona Rd

10/30/2018

Lane Group	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	433	384	203	56	856	457	46	925
v/c Ratio	0.91	0.88	0.45	0.50	0.84	0.73	0.41	0.93
Control Delay	67.5	66.0	42.1	73.9	50.0	25.9	69.0	58.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.5	66.0	42.1	73.9	50.0	25.9	69.0	58.3
Queue Length 50th (ft)	334	301	136	44	341	155	36	377
Queue Length 95th (ft)	#561	#475	222	95	#516	321	82	#585
Internal Link Dist (ft)	516		563		1205			1011
Turn Bay Length (ft)	125			150		130	125	
Base Capacity (vph)	528	479	499	154	1093	659	154	1069
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.82	0.80	0.41	0.36	0.78	0.69	0.30	0.87

Intersection Summary
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Corona Station T/A
 PM Background plus Project

Synchro 10 Report
 W-Trans

Queues

5: Petaluma Blvd N & Skillman Lane/Corona Rd

02/20/2019

Lane Group	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	433	384	203	56	856	457	46	925
v/c Ratio	0.85	0.62	0.61	0.47	0.78	0.69	0.37	0.86
Control Delay	54.1	46.1	49.3	66.9	41.4	22.6	62.6	45.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.1	46.1	49.3	66.9	41.4	22.6	62.6	45.3
Queue Length 50th (ft)	284	136	136	39	288	129	32	319
Queue Length 95th (ft)	#561	193	222	95	#516	321	82	#585
Internal Link Dist (ft)	516		563		1205			1011
Turn Bay Length (ft)	125			150		130	125	
Base Capacity (vph)	602	1059	567	176	1245	717	176	1219
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.72	0.36	0.36	0.32	0.69	0.64	0.26	0.76

Intersection Summary
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Corona Station T/A
 PM Background plus Project - Mitigated

Synchro 10 Report
 W-Trans

Queues
6: S McDowell Blvd/N McDowell Rd & E Washington St

10/30/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBR
Lane Group Flow (vph)	719	1224	38	562	114	380	169	548
v/c Ratio	0.75	0.77	0.38	0.80	0.26	0.94	0.68	0.66
Control Delay	52.9	38.4	66.9	57.3	3.6	86.5	48.7	46.4
Queue Delay	0.0	1.4	0.0	0.0	0.0	45.2	0.0	0.0
Total Delay	52.9	39.8	66.9	57.3	3.6	131.6	48.7	46.4
Queue Length 50th (ft)	305	510	30	218	0	158	206	208
Queue Length 95th (ft)	#397	#525	68	#324	20	#254	237	#263
Internal Link Dist (ft)	393			1440		1150		10858
Turn Bay Length (ft)	320		175		135	220		225
Base Capacity (vph)	957	1584	105	707	443	404	1073	247
Starvation Cap Reductn	0	181	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	83	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.75	0.87	0.36	0.79	0.26	1.18	0.49	0.68

Intersection Summary
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
4: N McDowell Rd/N McDowell Blvd & Corona Rd

11/01/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBR
Lane Group Flow (vph)	160	404	245	74	298	245	798	340
v/c Ratio	0.62	0.81	0.46	0.38	0.77	0.30	0.61	0.86
Control Delay	58.7	55.2	18.0	54.5	58.3	4.0	49.4	51.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.7	55.2	18.0	54.5	58.3	4.0	49.4	51.5
Queue Length 50th (ft)	118	292	61	55	217	14	172	301
Queue Length 95th (ft)	183	#443	139	99	310	43	262	381
Internal Link Dist (ft)	1274			889		10858		3764
Turn Bay Length (ft)	100		100	125		200	170	125
Base Capacity (vph)	349	507	535	295	447	824	400	948
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.80	0.46	0.25	0.67	0.30	0.61	0.84

Intersection Summary
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
5: Petaluma Blvd N & Skillman Lane/Corona Rd

11/01/2018

	→	←	↔	↖	↗	↘	↙	↕
Lane Group	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	425	374	263	121	1131	374	71	808
v/c Ratio	0.91	0.87	0.69	0.83	1.02	0.62	0.57	0.83
Control Delay	67.6	66.2	45.0	98.1	74.2	27.3	76.2	48.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.6	66.2	45.0	98.1	74.2	27.3	76.2	48.7
Queue Length 50th (ft)	327	293	180	99	-546	156	57	316
Queue Length 95th (ft)	#539	#439	280	#233	#766	296	114	#433
Internal Link Dist (ft)	516	125	479	563	1205	130	125	1011
Turn Bay Length (ft)	125	479	494	151	1109	603	151	1095
Base Capacity (vph)	0	0	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.78	0.53	0.80	1.02	0.62	0.47	0.74

Intersection Summary
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Queues
6: S McDowell Blvd/N McDowell Rd & E Washington St

11/01/2018

	→	←	↔	↖	↗	↘	↙	↕		
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	684	1215	31	500	133	490	612	224	643	459
v/c Ratio	0.67	0.74	0.49	0.75	0.30	0.83	0.76	0.73	0.78	0.53
Control Delay	37.6	23.4	94.5	63.2	4.1	71.8	58.1	71.5	59.5	12.5
Queue Delay	0.6	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.3	24.5	94.5	63.2	4.1	71.8	58.1	71.5	59.5	12.5
Queue Length 50th (ft)	304	343	30	235	0	232	284	201	301	120
Queue Length 95th (ft)	348	421	#72	301	24	298	342	#315	367	172
Internal Link Dist (ft)	393	1440	175	1440	135	220	225	225	10858	175
Turn Bay Length (ft)	320	175	175	175	135	220	225	225	10858	175
Base Capacity (vph)	1018	1637	63	712	456	611	915	313	889	865
Starvation Cap Reductn	103	204	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.75	0.85	0.49	0.70	0.29	0.80	0.67	0.72	0.72	0.53

Intersection Summary
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Queues

4: N McDowell Rd/N McDowell Blvd & Corona Rd

11/01/2018

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group	160	404	262	78	298	245	255	809	340	652
Lane Group Flow (vph)	0.62	0.81	0.50	0.40	0.77	0.30	0.54	0.87	0.77	0.65
v/c Ratio	58.7	55.2	19.7	55.1	58.3	4.1	50.8	52.4	57.2	40.6
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	58.7	55.2	19.7	55.1	58.3	4.1	50.8	52.4	57.2	40.6
Total Delay	118	292	73	58	217	15	181	307	251	225
Queue Length 50th (ft)	183	#443	157	103	310	43	273	#394	#487	#334
Queue Length 95th (ft)	1274				899		10858			3764
Internal Link Dist (ft)										
Turn Bay Length (ft)	100	125	100	125	200	170	397	948	439	1009
Base Capacity (vph)	349	507	535	295	447	823	397	948	439	1009
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.80	0.49	0.26	0.67	0.30	0.64	0.85	0.77	0.65

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Queues

5: Petaluma Blvd N & Skillman Lane/Corona Rd

11/01/2018

	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group	425	384	263	121	1131	390	71	808
Lane Group Flow (vph)	0.91	0.88	0.59	0.84	1.03	0.64	0.58	0.83
v/c Ratio	68.0	67.3	44.7	99.2	76.2	28.0	76.6	49.2
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	68.0	67.3	44.7	99.2	76.2	28.0	76.6	49.2
Total Delay	327	303	180	99	-546	164	57	316
Queue Length 50th (ft)	#539	#469	280	#233	#766	310	114	#433
Queue Length 95th (ft)	516		563	1205				1011
Internal Link Dist (ft)								
Turn Bay Length (ft)	523	476	491	150	1102	605	150	1088
Base Capacity (vph)	0	0	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.81	0.54	0.81	1.03	0.64	0.47	0.74

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Queues
5: Petaluma Blvd N & Skillman Lane/Corona Rd

02/20/2019

	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	425	384	263	121	1131	390	71	808
v/c Ratio	0.89	0.59	0.75	0.74	0.88	0.58	0.82	0.72
Control Delay	65.5	49.4	59.0	83.1	46.7	24.0	116.4	42.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.5	49.4	59.0	83.1	46.7	24.0	116.4	42.7
Queue Length 50th (ft)	322	151	188	97	460	156	59	313
Queue Length 95th (ft)	#567	200	291	#208	#698	303	#168	446
Internal Link Dist (ft)	516		563		1205			1011
Turn Bay Length (ft)	125			150		130		125
Base Capacity (vph)	542	1031	545	189	1310	683	87	1125
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.78	0.37	0.48	0.64	0.86	0.57	0.82	0.72

Intersection Summary
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
6: S McDowell Blvd/N McDowell Rd & E Washington St

11/01/2018

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	712	1215	31	500	133	490	618	224
v/c Ratio	0.70	0.74	0.49	0.75	0.30	0.83	0.76	0.72
Control Delay	39.5	24.0	94.5	63.2	4.1	71.8	58.2	71.3
Queue Delay	0.7	1.2	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.2	25.2	94.5	63.2	4.1	71.8	58.2	71.3
Queue Length 50th (ft)	330	371	30	235	0	232	286	200
Queue Length 95th (ft)	371	434	#72	301	24	298	345	#315
Internal Link Dist (ft)		393		1440		1150		10858
Turn Bay Length (ft)	320		175		135	220		225
Base Capacity (vph)	1013	1632	63	712	456	611	917	314
Starvation Cap Reductn	92	207	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.77	0.85	0.49	0.70	0.29	0.80	0.67	0.71

Intersection Summary
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.