Draft Corridor Concept Plan

Attachment A: Existing Conditions Technical Memorandum

Michael Baker INTERNATIONAL

Valley Center Road Village Corridor Concept Plan

Existing Conditions Technical Memorandum

TO: Kevin Johnston, County of San Diego

FROM: Dawn Wilson, PE TE

DATE: April 18, 2019

EXECUTIVE SUMMARY

This technical memorandum summarizes the existing conditions for the multimodal facilities, including automobile, pedestrian, bicycle, and transit, along Valley Center Road from Woods Valley Road to Cole Grade Road in the community of Valley Center, San Diego County. The project study area extends for approximately 2.5 miles along Valley Center Road and includes seven (7) roadway segments, three (3) signalized intersections, and four (4) side street stop-controlled intersections. The existing conditions analysis assesses the physical roadway conditions and intersection traffic operations as well as the current pedestrian, bicycle and transit facilities within the study area.

The results of the roadway segment analysis show all seven study segments along Valley Center Road currently operate at acceptable levels of service (D or better). From Woods Valley Road to Lilac Road, the average daily traffic volumes on Valley Center Road are approaching the acceptable to deficient level of service threshold (LOS D to E) which is 28,000 vehicles per day for a four-lane Boulevard. Future development in the North and South Villages and area-wide growth will increase vehicular traffic on Valley Center Road and therefore exceed the LOS D to E threshold.

A total of seven intersections along Valley Center Road were analyzed and two of the unsignalized intersections currently operate at deficient levels of service (LOS E or F) which include:

2.) Valley Center Road / Mirar De Valle Road	LOS E in the PM peak hour
3.) Valley Center Road / Sunday Drive	LOS F in the PM peak hour

The delay at these two unsignalized intersections is reported for the stop-controlled side street, not the intersection overall. Due to the high volume of vehicular traffic along Valley Center Road, motorists find it difficult to find acceptable gaps in traffic to cross all four travel lanes before entering the intersection. Note that at Valley Center Road / Sunday Drive, there is currently one vehicle making a westbound left-turn onto Valley Center Road. At Valley Center Road / Mirar De Valle Road, there are currently fourteen vehicles making an eastbound left-turn onto Valley Center Road. Very few vehicles are affected by this delay at these two locations.

The results of the speed survey showed that all of the 85th percentile speeds along Valley Center Road exceed the posted speed limit of 45 miles per hour. The highest reported 85th percentile (58 miles per hour) occurs between Mirar De Valle Road and Sunday Drive.

Crash data was provided by the County over a five-year time period (July 2013 – June 2018) with a total of 176 crashes reported along Valley Center Road between Vesper Road and Woods Valley Road. One fatal crash occurred at Miller Road, seven crashes involved severe injuries, eighteen crashes involved other visible injuries, forty-two involved complaint of pain, and 108 crashes were property damage only. Of the 176 crashes reported, 76% of the crashes were attributed to unsafe speeds, auto right-of-way violations, and improper turning. During this five-year period, no pedestrian involved collisions and only one bicycle involved collision was reported.

Bus service is currently provided by North County Transit District (NCTD) Route 388, which provides service from the Pala Casino to the Escondido Transit Center. Regional connections to the SPRINTER, Greyhound and other transit services can be made from the Escondido Transit Center. Along Valley Center Road from Cole Grade Road to Woods Valley Road, there are currently eleven bus stops

with service provided Monday through Friday, weekends and holidays. Amenities at each bus stop vary along the corridor; however, the majority of the bus stops provide a bench, sign and are ADA compliant.

The existing pedestrian conditions were evaluated along Valley Center Road within the project study area using the Pedestrian Gap Analysis (PGA) methodology. The PGA assessed the quality of the walking environment along 28 roadway segments (in accordance with the County's Active Transportation Plan (ATP) methodology). Out of the 28 segments analyzed along Valley Center Road, the results of the PGA rated 9 segments (32%) as very good, 9 segments (32%) as good, 7 segments (25%) as average, and 3 segments (11%) as poor. The three segments that were rated "poor" are located on the east side of Valley Center Road and include Charlan Road to Mirar De Valle Road, Indian Creek Road to Old Town Center Plaza Southern Boundary and Old Town Center Plaza Northern Boundary to Cole Grade Road in the eastbound direction.

Existing bicycle facilities were assessed along Valley Center Road from Woods Valley Road to Cole Grade Road using a Level of Traffic Stress (LTS) analysis as outlined in the County ATP. The results of the LTS analysis showed the bicycle facilities on Valley Center Road from Woods Valley Road to Cole Grade Road, bicycle facilities are currently suitable for Strong and Fearless Bicyclists (LTS 4). Based on a field visit, more bicyclists were observed using the sidewalks and Heritage Trail rather than the existing Class II bike lanes on Valley Center Road.

The following sections outline the detailed analysis of the existing conditions. The methodology used to evaluate the existing conditions is described in detail in **Attachment A**.

EXISTING ROADWAY CONDITIONS

The existing conditions along Valley Center Road from Woods Valley Road to Cole Grade Road were evaluated in terms of the physical roadway and intersection operating conditions. A total of seven (7) study roadway segments and seven (7) study intersections along the corridor were analyzed. A detailed field review was conducted to determine the existing intersection geometry, traffic control devices, signal phasing, and other factors that may affect intersection or roadway capacity. The results of the existing roadway conditions analysis for study roadway segments and intersections are provided below.

Roadway Segment Evaluation

Valley Center Road from Woods Valley Road to Cole Grade Road is a four-lane facility with striped bike lanes on both sides of the road and a variety of median types. From Woods Valley Road to Mirar De Valle Road, Valley Center Road has a striped two-way left-turn lane allowing vehicular access to multiple businesses in the South Village, refer to **Figure 1**. Further north on Valley Center Road between Lilac Road and Cole Grade Road, Valley Center Road includes raised landscaped medians with openings at driveways and side streets to accommodate left-turning movements, refer to **Figure 2**. On-street parking is not permitted along the corridor.

Figure 1: Looking northbound near Woods Valley Road

Figure 2: Looking westbound near Cole Grade Road

To determine the existing operations of the study roadway segments along the corridor, average daily traffic (ADT) volumes for a 24-hour period were collected on Tuesday, December 4, 2018 while schools were in session at the following seven locations:

1.) Valley Center Road from Woods Valley Road to Mirar de Valle Road
2.) Valley Center Road from Mirar De Valle Road to Sunday Drive
3.) Valley Center Road from Sunday Drive to Old Road
4.) Valley Center Road from Lilac Road to Canyon Road
5.) Valley Center Road from Canyon Road to Miller Road
6.) Valley Center Road from Miller Road to Indian Creek Road
7.) Valley Center Road from Indian Creek Road to Cole Grade Road

Attachment B contains the daily traffic count worksheets.

Valley Center Road is a four-lane roadway oriented in a north-south direction from Woods Valley Road to Canyon Road and then transitions to an east-west direction from Miller Road to Cole Grade Road. The posted speed limit along the Valley Center Road corridor within the project study area is 45 miles per hour. The following describes the existing and Mobility Element classifications:

- **From Woods Valley Road to Mirar De Valle Road**, Valley Center Road is classified as a four-lane Boulevard with Raised Medians per the San Diego County General Plan Mobility Element. In accordance with the County's Public Road Standards, the maximum daily capacity for a four-lane Boulevard with Raised Median is approximately 30,000 vehicles per day. However, this section does not currently have a raised median. The majority of this segment has a striped two-way left turn lane, resulting in an existing functional classification of Boulevard with Intermittent Turn Lanes (maximum daily capacity of 28,000 vehicles per day).

- **From Mirar De Valle Road to Lilac Road**, Valley Center Road is classified as a four-lane Boulevard with Raised Medians per the San Diego County General Plan Mobility Element. This section of Valley Center Road has raised medians, however there are significant gaps in the median. Therefore, the existing functional classification for this segment is Boulevard with Intermittent Turn Lanes (maximum daily capacity of 28,000 vehicles per day).

- **From Lilac Road to Miller Road,** Valley Center Road is classified as a four-lane Major Road with Raised Medians per the County's Mobility Element Network. The existing condition along this portion of Valley Center Road includes a raised landscaped median with left turn pockets at key locations. The transition from Boulevard to Major Road increases the maximum daily capacity to 37,000 vehicles per day.

- **From Miller Road to Cole Grade Road**, Valley Center Road is classified as a four-lane Boulevard with Raised Medians. Through this section, medians haven been constructed that include left turn pockets at key locations. Therefore, the functional classification is consistent with the General Plan and the maximum daily capacity through this segment is 30,000 vehicles per day.

Levels of service (LOS) for roadway segments were calculated based on the capacity of the roadway determined by the existing functional classification and daily traffic volumes. **Table 1** presents the results of the existing conditions roadway segment level of service analysis. As shown, all of the roadway segments currently operate at acceptable levels of service (LOS D or better) based on daily capacity thresholds.

Table 1: Existing Conditions Roadway Segment LOS

Roadway	Segment	No. Lanes	Median Type	Roadway Classification [1]	LOS E Capacity	ADT	LOS
Valley Center Road	Woods Valley Road to Mirar de Valle Road	4	Undivided	Boulevard - 4.2B (w/ intermittent turn lanes)	28,000	24,550	D
	Mirar De Valle Road to Sunday Drive	4	Divided	Boulevard - 4.2B (w/ intermittent turn lanes)	28,000	24,412	D
	Sunday Drive to Lilac Road	4	Divided	Boulevard - 4.2B (w/ intermittent turn lanes)	28,000	24,384	D
	Lilac Road to Canyon Road	4	Divided	Major Road - 4.1A (w/ raised median)	37,000	26,069	C
	Canyon Road to Miller Road	4	Divided	Major Road - 4.1A (w/ raised median)	37,000	25,883	C
	Miller Road to Indian Creek Road	4	Divided	Boulevard - 4.2A (w/ raised median)	30,000	25,013	D
	Indian Creek Road to Cole Grade Road	4	Divided	Boulevard - 4.2A (w/ raised median)	30,000	25,064	D

Notes:
[1]Based on San Diego County Public Road Standards, 2012. LOS Thresholds are provided in **Attachment A.**
ADT = Average Daily Traffic; LOS = Level of Service

Although the study roadway segments along Valley Center Road are calculated to operate acceptably (LOS D or better) according to San Diego County Public Road Standards for level of service, the current daily volumes are approaching the deficient level of service threshold. The maximum daily volume to maintain LOS D for the segments classified as Boulevards with Intermittent Turn Lanes (4.2 B) is 25,000 vehicles per day. As shown, the segments from Woods Valley Road to Lilac Road are approaching this threshold.

Note that roadway segment level of service is generally used as long-range planning guideline to determine the roadway capacity and classification and are not always an accurate indicator of roadway performance. Typically, the performance and level of service of a roadway segment is heavily influenced by the ability of signalized intersections to accommodate peak hour flow. Therefore, peak hour operating conditions at the signalized and unsignalized intersections along the Valley Center Road corridor were evaluated.

Intersection Evaluation

To determine the existing operations of the study intersections, AM and PM peak hour intersection turning movement counts were collected on Tuesday, December 4, 2018 while schools were in session. AM peak period intersection counts were collected from 7:00 to 9:00 AM and PM peak period counts were collected from 4:00 to 6:00 PM. The vehicular counts used in this analysis reflect the highest one-hour volume of traffic in the peak period counted. **Figure 3** shows peak period traffic counts being collected by a camera system at the intersection of Valley Center Road and Woods Valley Road.

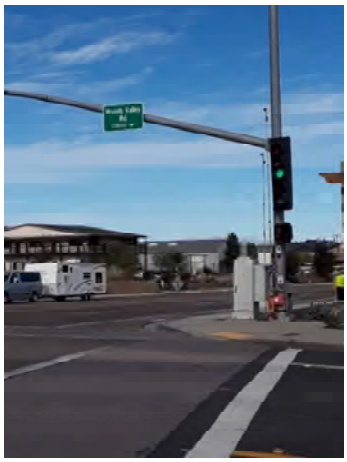


Figure 3 – Intersection Count Location

The following intersections were analyzed in this technical memorandum:

1.) Valley Center Road / Woods Valley Road (Signalized)
2.) Valley Center Road / Mirar De Valle Road (One-Way Stop Controlled)
3.) Valley Center Road / Sunday Drive (One-Way Stop Controlled)
4.) Valley Center Road / Lilac Road (Signalized)
5.) Valley Center Road / Miller Road (One-Way Stop Controlled)
6.) Valley Center Road / Indian Creek Road (One-Way Stop Controlled)
7.) Valley Center Road / Cole Grade Road (Signalized)

Three of the seven study intersections are signalized and four are side-street stop controlled (referred to as one-way stop-controlled intersections in this memorandum). **Figure 4** illustrates the intersection lane configuration and traffic control at the study locations. **Figure 5** shows the AM and PM peak hour volumes at the study intersections and daily traffic volumes along the corridor. **Attachment B** contains the detailed peak hour count data.

Table 2 summarizes the AM and PM peak hour levels of service (LOS) for all study intersections under existing conditions. Detailed analysis worksheets are contained in **Attachment C**. As shown, all study intersections are currently operating at acceptable levels of service (LOS D or better) except for the following two intersections:

2.) Valley Center Road / Mirar De Valle Road — LOS E in the PM peak hour
3.) Valley Center Road / Sunday Drive — LOS F in the PM peak hour

Table 2:Existing Conditions AM/PM Peak Hour Intersection LOS

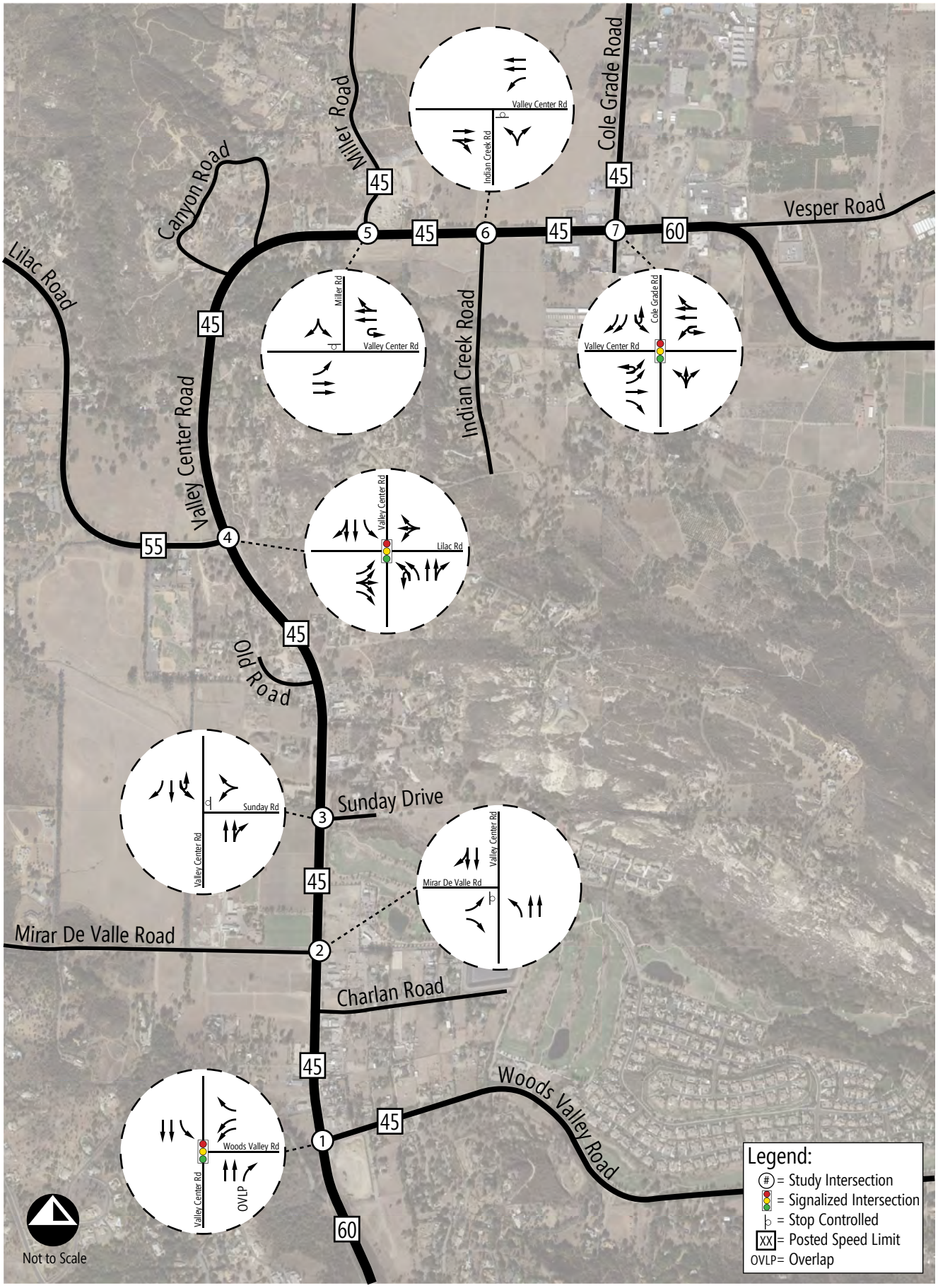
Study Intersection		Traffic Control	Existing Conditions					
			AM			PM		
			Delay[1]	-	LOS	Delay[1]	-	LOS
1 -	Valley Center Road / Woods Valley Road	Signal	7.5	-	A	9.0	-	A
2 -	Valley Center Road / Mirar De Valle Road	OWSC	29.7	-	D	**45.2**	-	**E [2]**
3 -	Valley Center Road / Sunday Drive	OWSC	26.7	-	D	**51.7**	-	**F [3]**
4 -	Valley Center Road / Lilac Road	Signal	17.5	-	B	13.5	-	B
5 -	Valley Center Road / Miller Road	OWSC	27.3	-	D	15.2	-	C
6 -	Valley Center Road / Indian Creek Road	OWSC	16.9	-	C	26.1	-	D
7 -	Valley Center Road / Cole Grade Road	Signal	31.3	-	C	33.5	-	C

Note: Deficient intersection operation indicated in **bold**.
[1] Average seconds of delay per vehicle.
[2] Eastbound left-turns = 14 vehicles during PM peak hour.
[3] Westbound left-turns = 1 vehicle during PM peak hour.
LOS = level of service.
OWSC = One-Way Stop Control, worst approach delay and LOS reported.

At the unsignalized intersection of Valley Center Road / Sunday Drive, one vehicle was observed in the PM peak hour making a westbound left-turn onto Valley Center Road. Due to the high volume of traffic on Valley Center Road during the PM peak hour (1,115 vehicles northbound and 930 vehicles southbound), the one vehicle is estimated to wait approximately 51.7 seconds for an acceptable gap in traffic on Valley Center Road to turn left.

At the unsignalized intersection of Valley Center Road / Mirar De Valle Road, 14 vehicles were observed making the eastbound left onto Valley Center Road during the PM peak hour. The average delay per vehicle is 45.2 seconds due to the high volume of traffic on Valley Center Road and the time required to find acceptable gaps in traffic to enter the intersection.

At both of these two intersections, the raised median on Valley Center Road requires motorist to wait for acceptable gaps in traffic in both directions for the vehicle to cross the four travel lanes. At locations where there are striped medians, the side street stop delays are less as the vehicle can use the center turn lane to cross one direction of traffic at a time.



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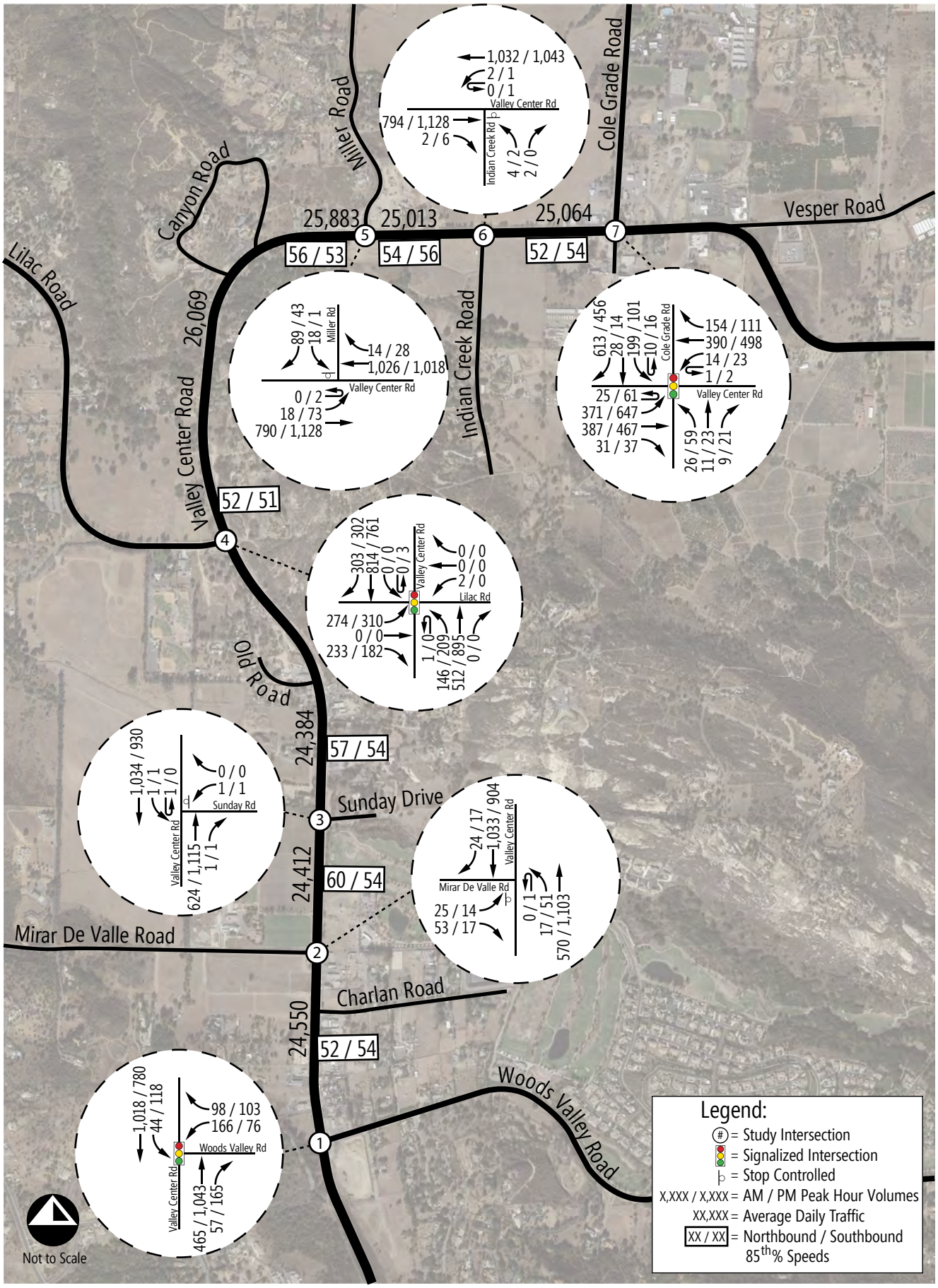
Intersection Lane Configuration, Traffic Control and Posted Speed Limit

Figure 4



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Existing AM/PM Peak Hour Volumes, Daily Traffic Volumes and 85th% Speeds

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Figure 5

Planned Traffic Control Improvements

Several projects have been considered and approved in Valley Center that have not yet been constructed. The conditions of approval for some of these projects include traffic improvements including the construction of a traffic signal. Three locations along the corridor have been conditioned for the construction of a signal:

- Valley Center Road / Mirar De Valle Road
- Valley Center Road / Street A-1 (Park Circle development)
- Valley Center Road / Miller Road

Additional analysis, including the preparation of traffic signal warrants would need to be conducted at these locations. The traffic signal warrant criteria must be met prior to installing the traffic signal.

Travel Speed

The 24-hour speed data was collected along the corridor on Tuesday, December 4, 2018 using tube counts. The 85th percentile speeds collected represent the speed at which 85 percent of all vehicles are observed to travel over a 24-hour period at a specific point. The collected speed data are illustrated in **Figure 5** and reported in **Table 3**. Note that all of the 85th percentile speeds reported along Valley Center Road exceed the posted 45 mph speed limit. The highest 85th percentile speed along the corridor is 58 mph which occurs between Mirar De Valle Road and Sunday Drive. The speed surveys conducted along the corridor are contained in **Attachment D**.

Table 3: Existing Conditions Speed Data Summary

Roadway	Segment	No. Lanes	Median Type	Roadway Classification[1]	Posted Speed Limit (mph)	Direction	85th % Speeds (mph) [2]
Valley Center Road	Woods Valley Road to Mirar De Valle Road	4	Undivided	Boulevard - 4.2B (w/ intermittent turn lanes)	45	Northbound	52
						Southbound	54
	Mirar De Valle Road to Sunday Drive	4	Divided	Boulevard - 4.2B (w/ intermittent turn lanes)	45	Northbound	60
						Southbound	54
	Sunday Drive to Lilac Road	4	Divided	Boulevard - 4.2B (w/ intermittent turn lanes)	45	Northbound	57
						Southbound	54
	Lilac Road to Canyon Road	4	Divided	Major Road - 4.1A (w/ raised median)	45	Northbound	52
						Southbound	51
	Canyon Road to Miller Road	4	Divided	Major Road - 4.1A (w/ raised median)	45	Eastbound	56
						Westbound	53
	Miller Road to Indian Creek Road	4	Divided	Boulevard - 4.2A (w/ raised median)	45	Eastbound	54
						Westbound	56
	Indian Creek Road to Cole Grade Road	4	Divided	Boulevard - 4.2A (w/ raised median)	45	Eastbound	52
						Westbound	54

Notes:

[1] Based on San Diego County General Plan, Valley Center Mobility Element Network Appendix. However, the segments from Woods Valley Road to Lilac Road are not currently built to their Mobility Element classification. Therefore, the existing functional classification is used in this table.

[2] Actual speeds were collected on Tuesday, Dec. 4, 2018.

CRASH ANALYSIS

Crash data was provided by the County for a five-year period from July 2013 through June 2018. During this time period a total of 176 crashes were reported between Woods Valley Road at the southwest end of the corridor to Vesper Road on the northeast end of the corridor.

A common method for evaluating the relative safety along the corridor is the crash rate analysis. The crash rate is calculated as follows:

Crash Rate ® = 100,000,000 * C / (365 * N * V * L)

Where: C = Total number of crashes along the segment
N = Number of years of data
V = Number of vehicles per day (both directions)
L = Length of the roadway segment (in miles)

The crash rate for the segment of Valley Center Road from Woods Valley Road to Cole Grade Road is 1.37 crashes per million vehicle miles (MVM). According to Caltrans 2018 Collision Data on California State Highways, the average crash rate for four-lane divided roadways in rural areas is reported to be 1.49 crashes per MVM and 1.05 crashes per MVM in urban areas. Therefore, the crash rate along Valley Center Road is below the rural area rate for a four-lane divide road.

Figure 6 illustrates the distribution of crashes by crash type and collision factor along the corridor. Raw crash data is provided as **Attachment E.** The following summarizes the findings of the crash analysis.

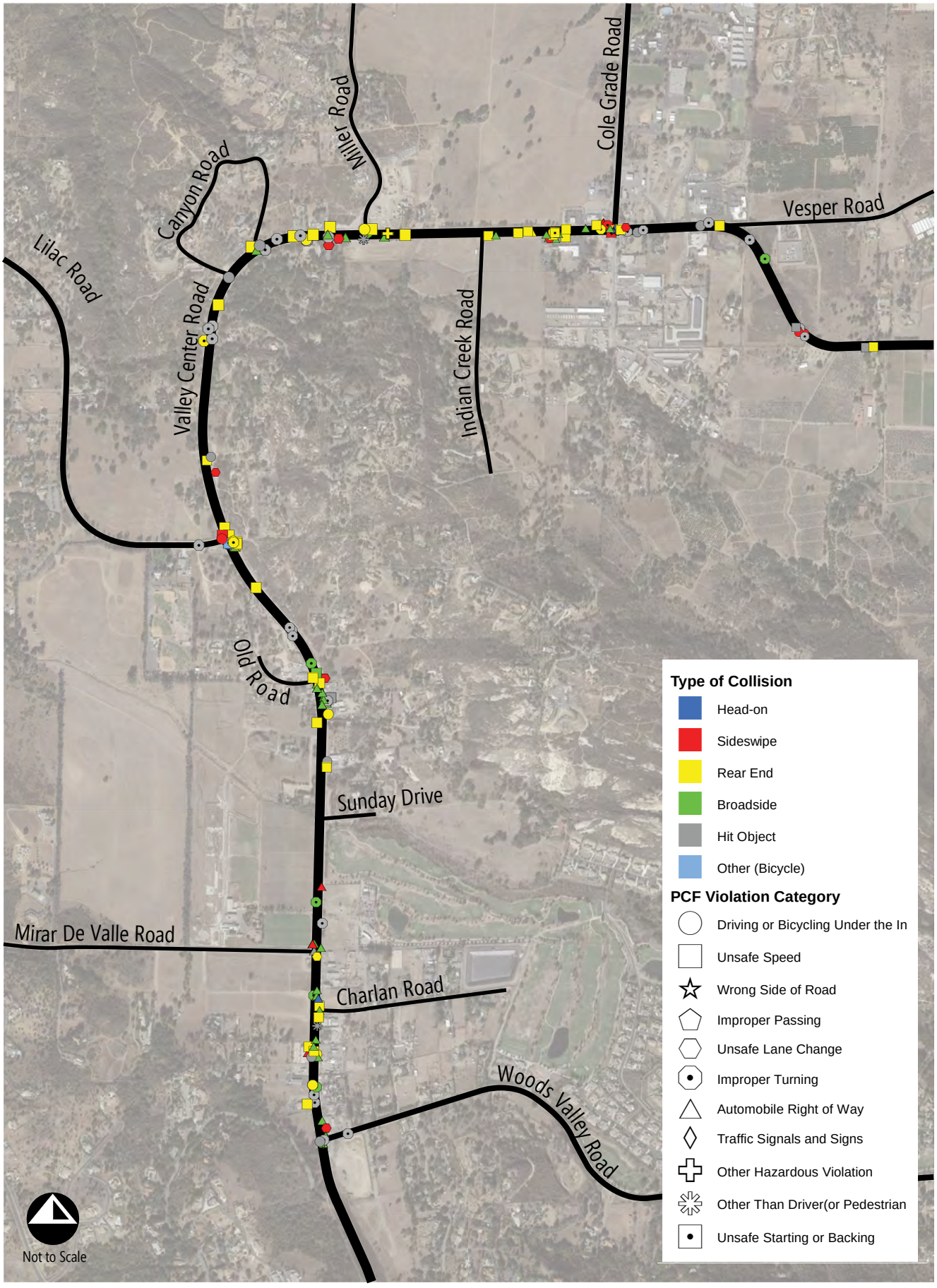
Crash by Location and Severity

Of the 176 crashes, the majority occurred at the three signalized intersections of Cole Grade Road, Lilac Road and Woods Valley Road. Of the unsignalized intersections along the corridor, Miller Road and Vesper Road had the highest number of crashes with 23 crashes and 12 crashes respectively. **Table 4** summarize the crashes by location and severity. As shown in the table, one fatal crash occurred at Miller Road. A total of seven (7) crashes involved severe injuries and 18 involved other visible injuries. The majority of the crashes along the corridor, 108 out of 176 crashes reported, were property damage only.

Table 4: Collision Severity by Location

Crash Locations	Number of Crashes (2013-2018)	Crash Severity				
		Fatal	Severe	Other Visible Injury	Complaint of Pain	Property Damage Only
Woods Valley Road	27	0	1	1	8	17
Rinehart Lane	1	0	0	0	0	1
Charlan Road	4	0	0	1	0	3
Mirar de Valle Road	7	0	0	0	0	7
Old Road	14	0	1	3	1	9
Calle De Vista	4	0	0	0	1	3
Lilac Road	36	0	1	4	9	22
Chaparral Terrace	2	0	0	0	0	2
Canyon Road	1	0	0	1	0	0
Miller Road	23	1	1	5	3	13
Indian Creek Road	1	0	0	0	0	1
Cole Grade Road	44	0	0	2	16	26
Vesper Road	12	0	3	1	4	4
Total	**176**	**1**	**7**	**18**	**42**	**108**

Source: County of San Diego, Crossroads Database (6/2013-6/2018)



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Crash Locations (2013-2018)

Figure 6

Crash by Collision Type

Of the 176 crashes reported, most were rear end (56 crashes), broadside (47 crashes) or hit object (42 crashes). As shown in **Figure 7**, these three collision types account for 83% of all crashes along the corridor. A breakdown of collision type by intersection is provided in **Table 5**.

Figure 7: Collision Type

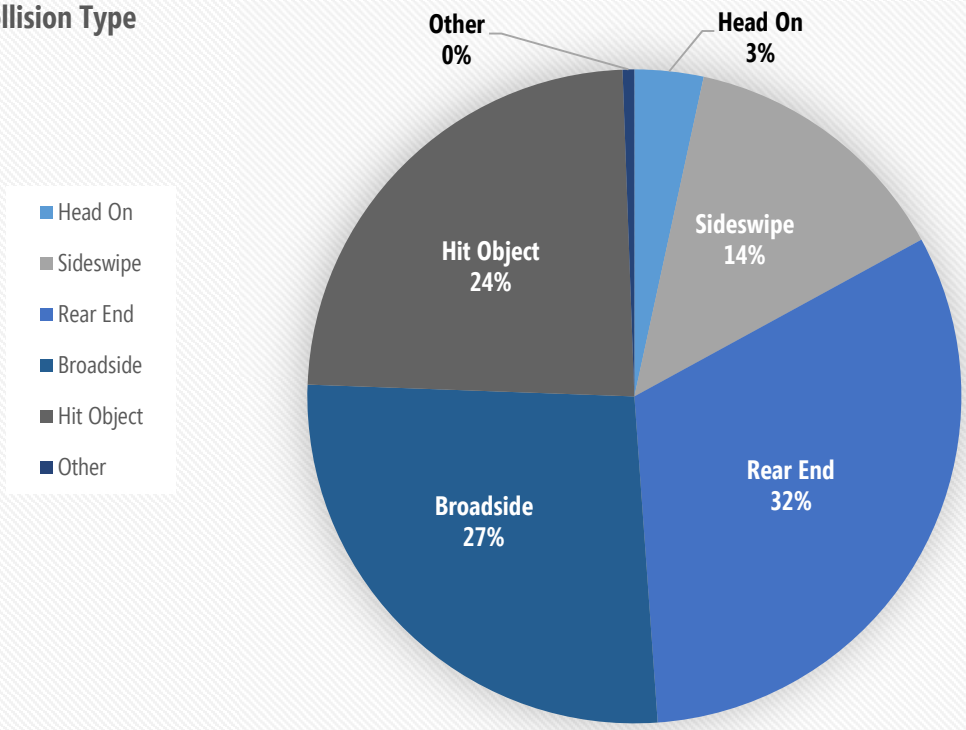


Table 5: Collision Type by Location

Crash Locations	Number of Crashes (2013-2018)	Collision Type					
		Head On	Sideswipe	Rear End	Broadside	Hit Object	Other
Woods Valley Road	27	1	1	8	10	7	0
Rinehart Lane	1	0	1	0	0	0	0
Charlan Road	4	0	0	1	2	1	0
Mirar de Valle Road	7	0	2	0	3	2	0
Old Road	14	0	1	3	7	3	0
Calle De Vista	4	0	1	0	2	1	0
Lilac Road	36	3	6	12	6	8	1
Chaparral Terrace	2	0	0	1	0	1	0
Canyon Road	1	0	0	0	1	0	0
Miller Road	23	1	2	10	4	6	0
Indian Creek Road	1	0	0	0	1	0	0
Cole Grade Road	44	1	8	19	10	6	0
Vesper Road	12	0	2	2	1	7	0
Total	**176**	**6**	**24**	**56**	**47**	**42**	**1**

Source: County of San Diego, Crossroads Database (6/2013-6/2018)

The following is a brief discussion of issues and solutions by collision type:

- Rear End collisions typically occurred at signalized intersections. These commonly occur when a driver stops for a red light or slows for a turn and the following driver does not stop or slow. Additional turn pockets and modified signal timing are common solutions to address rear end collisions.
- Broadside collisions are a result of one vehicle crashing into another at a 90-degree angle. This typically occurs when left-turning vehicles turn in front of a through vehicle. For Valley Center Road, broadsides occurred at both signalized and unsignalized intersections. Possible corrective measures for broadside include adding left turn phasing signal, installing all-way stops or traffic signals, improve lighting and line of sight and modifications to signal timing.
- Hit Object indicates a driver collided with something other than a vehicle, pedestrian or bicyclist. It may include street signs, poles, parked vehicles, etc. For Valley Center Road, objects were hit at signalized and unsignalized intersection. Since there is no parking on Valley Center Road, reasonable improvements include improving line of sight, improving or adding street lights and moving objects further from the road.

Crash by Collision Factor

Of the 176 crashes reported, 76% of the crashes were attributed to unsafe speed (47 crashes), auto right-of-way violations (45 crashes) or improper turning (41 crashes). Driving under the influence (DUI) accounted for 18 of the 176 crashes reported along the corridor in the five-year period. **Figure 8** and **Table 6** summarize the collision factor data. Speed data provided with this report indicates that most drivers exceed the posted speed limit. To reduce speed and reduce crashes associated with speed, traffic calming measures and/or geometric modifications to the road are necessary. Improper Turning and Auto ROW also correspond with the broadside collision type. Adding a raised median and consolidating the number of left turn and cross traffic locations will address the Improper Turning and and Auto ROW collision factor crashes.

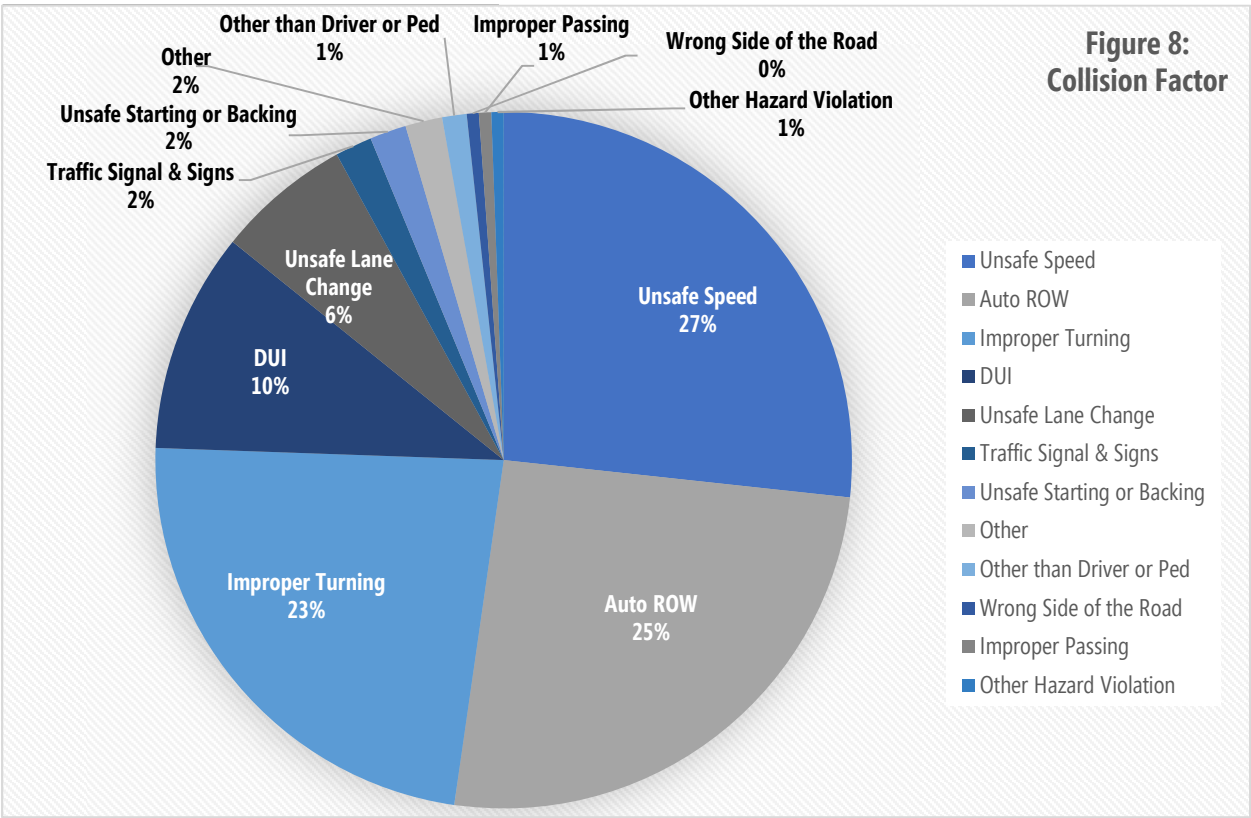


Figure 8: Collision Factor

Pedestrian & Bicycle Involved Collisions

Of the 176 collisions reported, one collision involved a bicycle. No pedestrian involved collisions were reported during the five-year period. The bicycle involved collision occurred at the intersection of Valley Center Road / Lilac Road. The collision resulted in injury and is attributed to a vehicle code violation.

Time of Day Summary of Collisions

Collision reports include a summary of the time of day, based on daylight, when the collision occurred. Based on the five-year data provided, the majority of the crashes reported occurred during daylight hours. A summary of crashes by time of day is provided below:

- Daylight – 106 crashes
- Dusk / Dawn – 5 crashes
- Dark - Street Lights – 31 crashes
- Dark - No Street Lights – 33 crashes
- Dark - Lights not Functioning – 1 crash

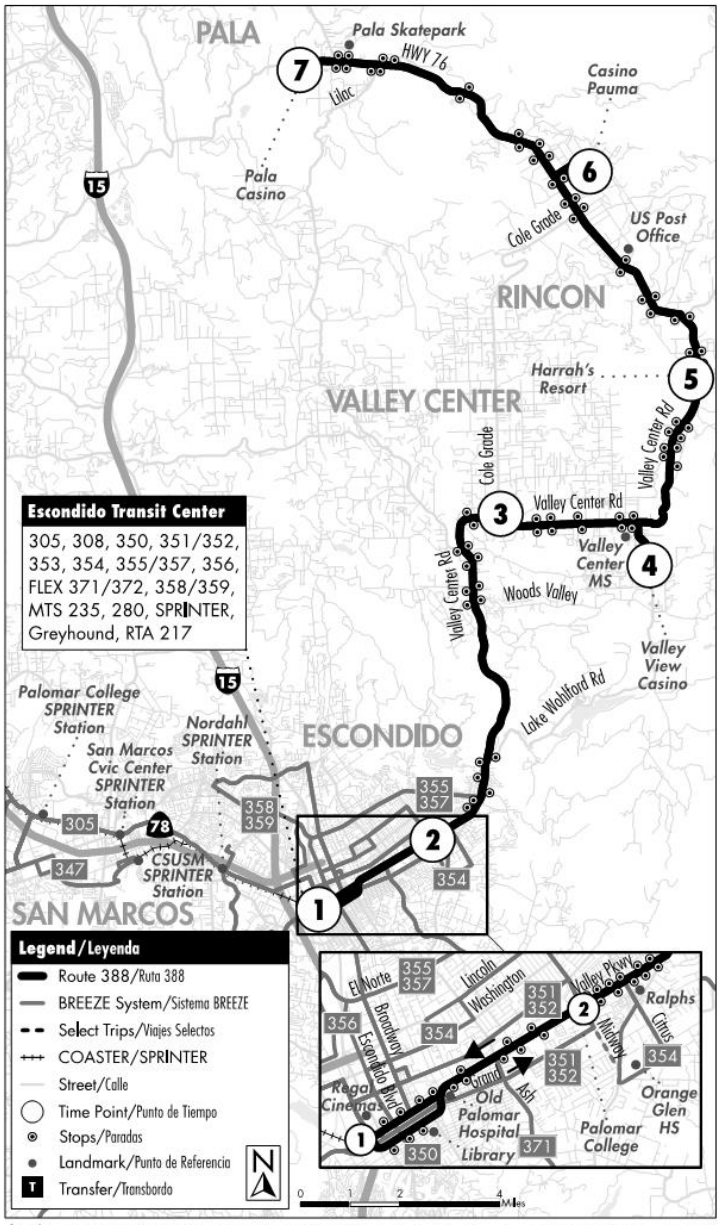
Therefore, lack of street lighting along the corridor does not appear to be a major factor in crashes on Valley Center Road.

Table 6: Collision Factor by Location

Crash Locations	Number of Crashes (2013-2018)	Collision Factor											
		Unsafe Speed	Auto ROW	Improper Turning	DUI	Unsafe Lane Change	Traffic Signal & Signs	Unsafe Starting or Backing	Other	Other than Driver or Ped	Wrong Side of the Road	Improper Passing	Other Hazard Violation
Woods Valley Road	27	5	8	6	4	2	2	0	0	0	0	0	0
Rinehart Lane	1	0	1	0	0	0	0	0	0	0	0	0	0
Charlan Road	4	1	1	1	0	0	0	0	0	1	0	0	0
Mirar de Valle Road	7	0	5	2	0	0	0	0	0	0	0	0	0
Old Road	14	5	6	2	1	0	0	0	0	0	0	0	0
Calle De Vista	4	0	1	3	0	0	0	0	0	0	0	0	0
Lilac Road	36	10	7	8	5	2	0	1	3	0	0	0	0
Chaparral Terrace	2	1	0	1	0	0	0	0	0	0	0	0	0
Canyon Road	1	0	1	0	0	0	0	0	0	0	0	0	0
Miller Road	23	7	3	4	4	2	0	0	0	1	1	0	1
Indian Creek Road	1	0	1	0	0	0	0	0	0	0	0	0	0
Cole Grade Road	44	14	11	7	3	5	1	2	0	0	0	1	0
Vesper Road	12	4	0	7	1	0	0	0	0	0	0	0	0
Total	**176**	**47**	**45**	**41**	**18**	**11**	**3**	**3**	**3**	**2**	**1**	**1**	**1**

Source: County of San Diego, Crossroads Database (6/2013-6/2018)

EXISTING TRANSIT SERVICE



NCTD operates the local bus service along Valley Center Road. NCTD's Route 388 travels along Valley Center Road as shown in **Figure 9**, connecting Pala, Rincon, Valley Center and Escondido. The route travels between the Pala Casino and the Escondido Transit Center. The Escondido Transit Center provides regional connections to ten other transit services, four FLEX routes, two MTS routes, SPRINTER, Greyhound and Riverside Transit Authority (RTA).

Service is provided Monday through Friday, weekends and holidays. According to the NCTD website, the average headway is approximately two hours from 5:06 AM to 7:06 PM originating at Escondido Transit Center in the northbound direction. Originating at Pala Casino and in the southbound direction, service is from 5:59 AM to 9:04 PM.

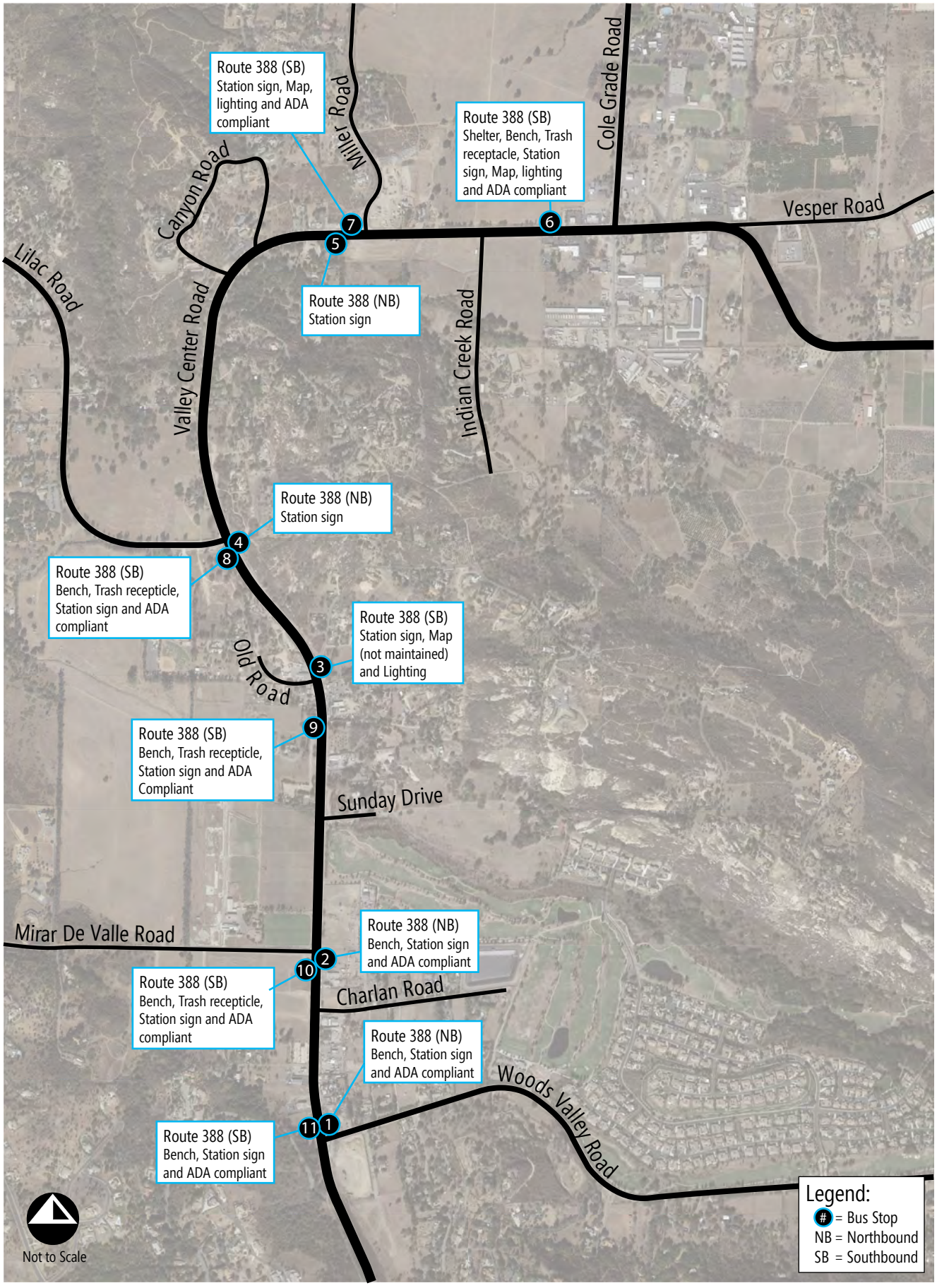
From Woods Valley Road to Cole Grade Road, there are eleven bus stops along Valley Center Road. The existing quality for each bus stop along Valley Center Road from Woods Valley Road to Cole Grade Road was evaluated based on the presence of the following amenities:

- Shelters
- Benches
- Trash receptacles
- Bus Stop Signs
- Maps/Wayfinding
- Lighting
- ADA compliancy

Figure 9: Derived from North County Transit District Rider's Guide
Effective October 7, 2018

The amenities per bus stop locations are described in **Table 7** and included in **Figure 10**. Crash data was obtained from the County of San Diego to determine the pedestrian and bicycle involved collision within 500 feet of a bus stop. This data was geocoded and mapped to display collision locations along the corridor, as shown in **Figure 11**. There was one bicycle and zero pedestrian involved collisions over the five-year period.

Boarding and alighting information was provided by NCTD via email on February 7, 2019. Based on this ridership information, the most active bus stops are adjacent to the Cole Grade Road intersection where the average daily boardings is 22 and alightings is 19. For the corridor as a whole, there are an average of 43 boardings and 44 alightings per day for all stops.



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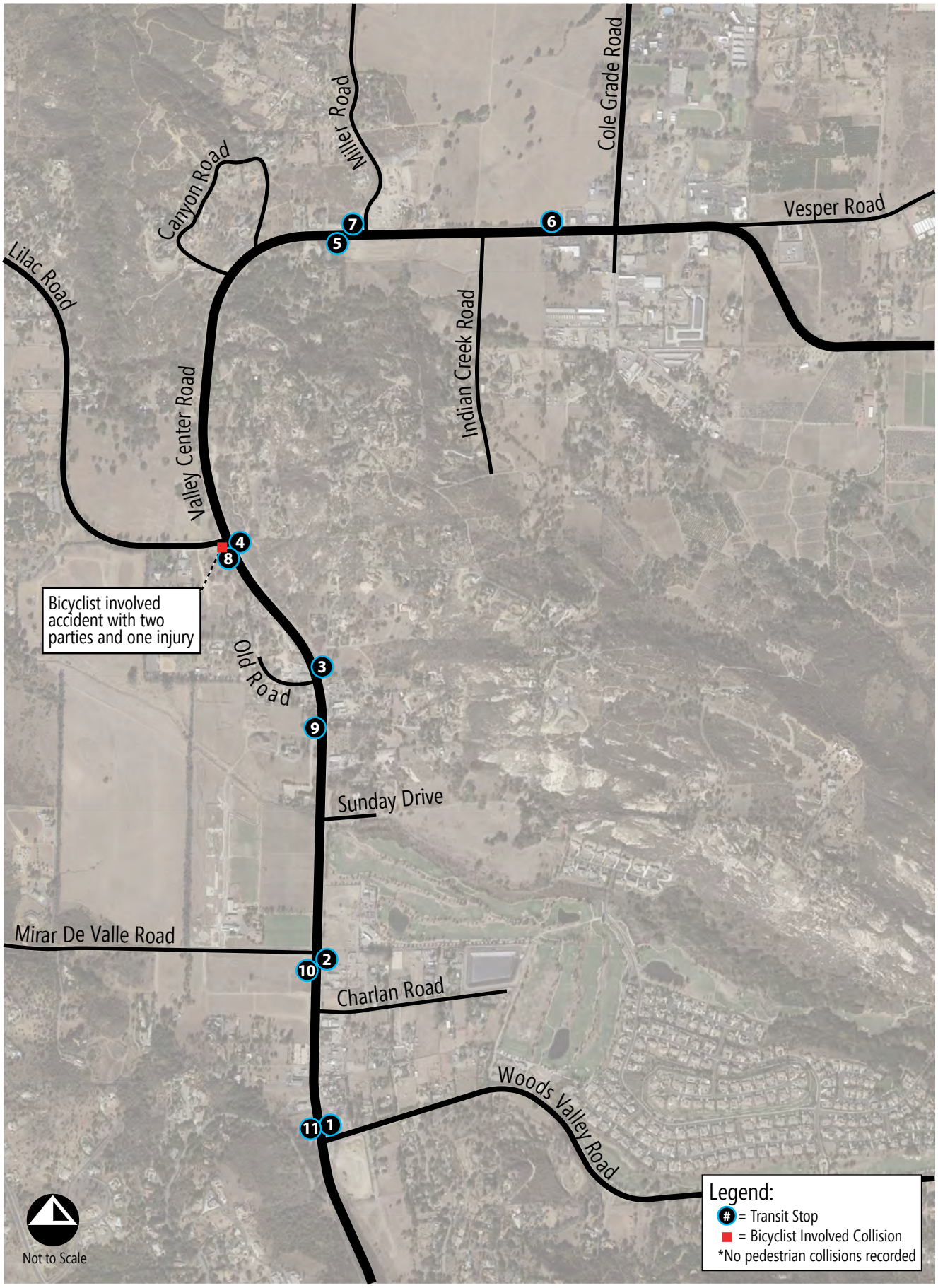
Existing Bus Stops and Amenities

Figure 10



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Collision Data Pedestrian and Bicyclist Involved

Figure 11

Table 7: Bus Stop Amenities along Valley Center Road

Bus Stop (Direction)	Available Amenities						
	Shelter	Bench	Trash Receptacle	Sign	Map	Lighting	ADA Compliant
1 Woods Valley Road (NB)		✓		✓			✓
2 Mirar De Valle Road (NB)		✓		✓			✓
3 Old Road (NB)				✓	*	✓	
4 Lilac Road (NB)				✓			
5 Miller Road (NB)				✓			
6 Cole Grade Road (SB)	✓	✓	✓	✓	✓	✓	✓
7 Miller Road (SB)				✓	✓	✓	✓
8 Lilac Road (SB)		✓	✓	✓			✓
9 Old Road (SB)		✓	✓	✓			✓
10 Mirar De Valle Road (SB)		✓	✓	✓			✓
11 Woods Valley Road (SB)		✓		✓			✓

Note: Bus Stop locations are illustrated in **Figure 10**.
Safety near a bus stop was evaluated within 500 feet of bus stops using collision data involving pedestrians and bicyclists obtained from the County of San Diego.
* Facilities exist but not maintained.

BREEZE buses provide public transportation along Valley Center Road via Route 388 and can carry up to 70 passengers per bus. Currently, most bus stops along the route contain minimal amenities such as a bench and route sign as shown in **Figure 12**. Some of the stops require maintenance such as the bus route map and schedule display shown in **Figure 13**.

Figure 12: Typical Bus Stops with Bench and Sign

Figure 13: Bus route map/schedule display case

EXISTING PEDESTRIAN CONDITIONS

Existing peak hour pedestrian activity was recorded on Tuesday, December 4, 2018. **Figure 14** illustrates the existing activity (See p. 20). As shown, very few pedestrians currently walk along the corridor during the AM and PM peak hours with a maximum of ten pedestrians recorded at Cole Grade Road. Existing pedestrian conditions along Valley Center Road within the study area were analyzed using the County's PGA methodology as established in the County's ATP. A PGA is a qualitative pedestrian survey that assesses the quality of the walking environment along roadway segments. The PGA point system and analysis methodology is described in detail in Attachment A of this memorandum.

Existing pedestrian conditions along the east side/south side of Valley Center Road from Woods Valley Road to Cole Grade Road generally consist of 4-foot wide sidewalks from Woods Valley Road to approximately 370 feet north of Mirar De Valle Road. Outside of this segment, there are no pedestrian facilities on the east side of Valley Center Road. There are goat trails (ie. walking paths resulting from pedestrian activity along the unimproved area behind the curb shown in **Figure 15**) between where the sidewalk ends in the South Village and where it begins in the North Village near the Old Town Center. Although there are no improved pedestrian paths between the sections of concrete sidewalk, the walking surface is relatively free of obstructions and there are few driveways. Therefore, the conditions along the east and south side of Valley Center Road are identified as Good to Very Good using the Gap Analysis methodology outlined in the ATP.

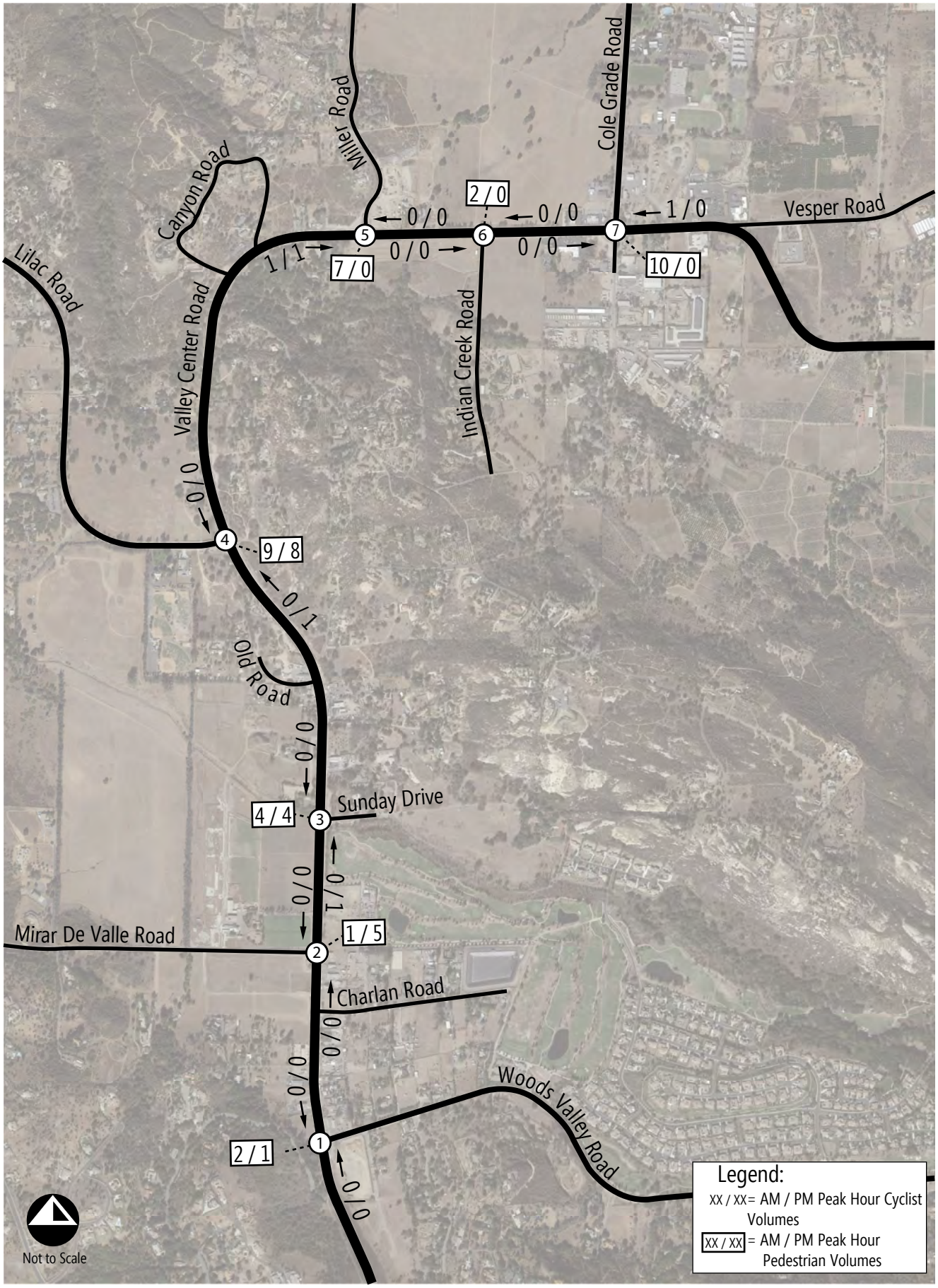
Figure 15: Example of Existing Goat Trail

The pedestrian facilities on the west side and north side of Valley Center Road generally consist of 3- to 7-foot-wide decomposed granite (DG) walking surfaces. The Heritage Trail (shown in **Figure 16**) extends from Woods Valley Road to Cole Grade Road. Portions of the trail are flanked by split rail fencing. Other portions have no physical barrier between the road and the walking trail. Although the trail provides a good walking environment, two key issues resulting in average ratings along the trail are the lack of marked crosswalks on Valley Center Road and tripping hazards due to unmaintained DG pathways and concrete driveways. Erosion has resulted in potential trip hazards (illustrated in **Figure 17**) and therefore contributes to the quality score presented in Table 8.

All existing curb ramps appear to meet County standards. All driveways are paved and concrete. Publicly maintained landscaping along most of the corridor is limited on the eastside with adolescent trees planted along the westside. Most of the limited shade is provided by tree canopies along residential properties. Results of the existing conditions PGA analysis are shown in **Table 8** and illustrated in **Figure 18a-18f.**

Figure 16: Heritage Trail with split rail fencing (looking westbound on Valley Center Rd.)

Figure 17: Example of trail erosion near concrete driveways.



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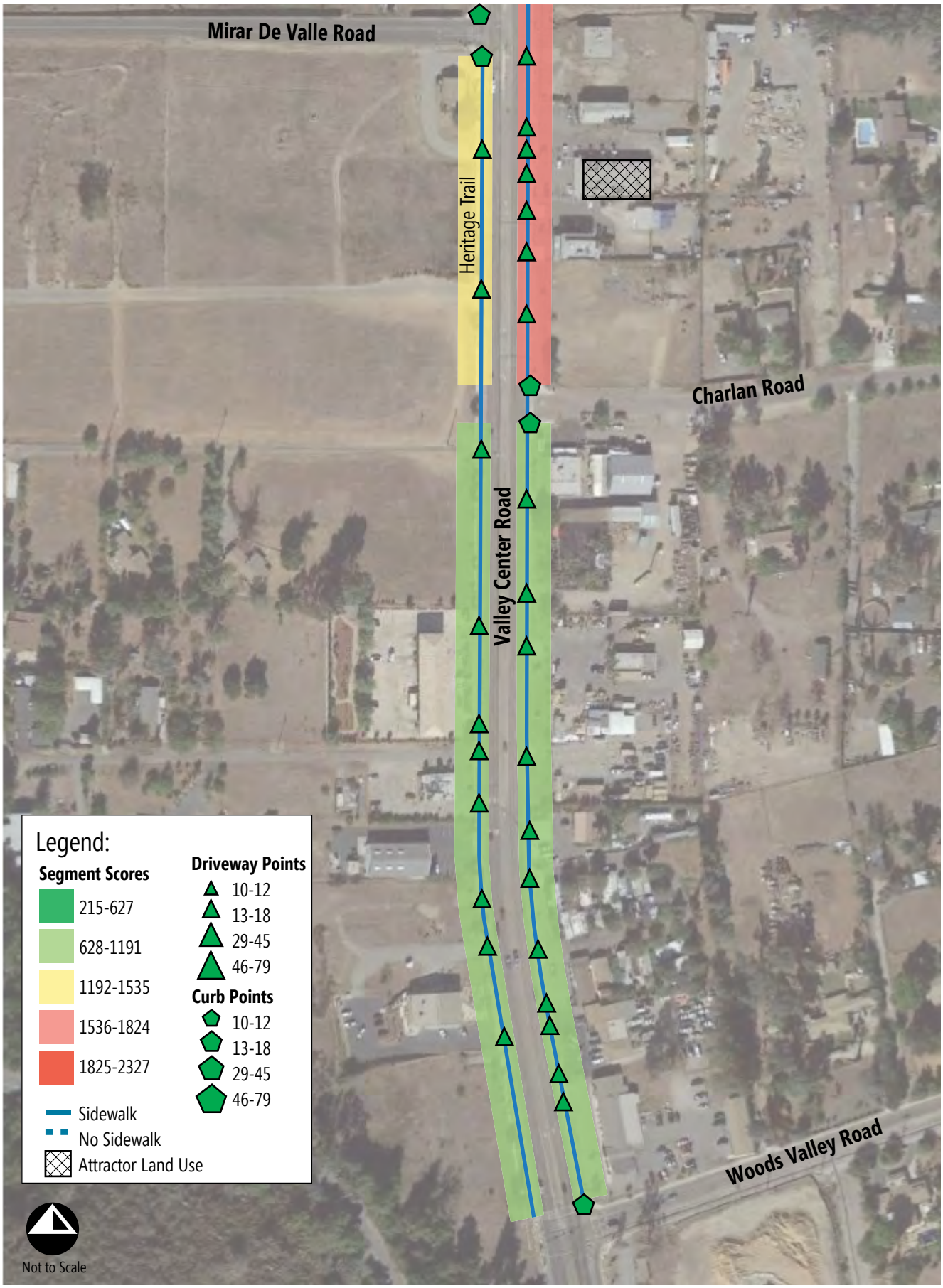
Existing AM/PM Pedestrian and Cyclist Peak Hour Volumes

Figure 14



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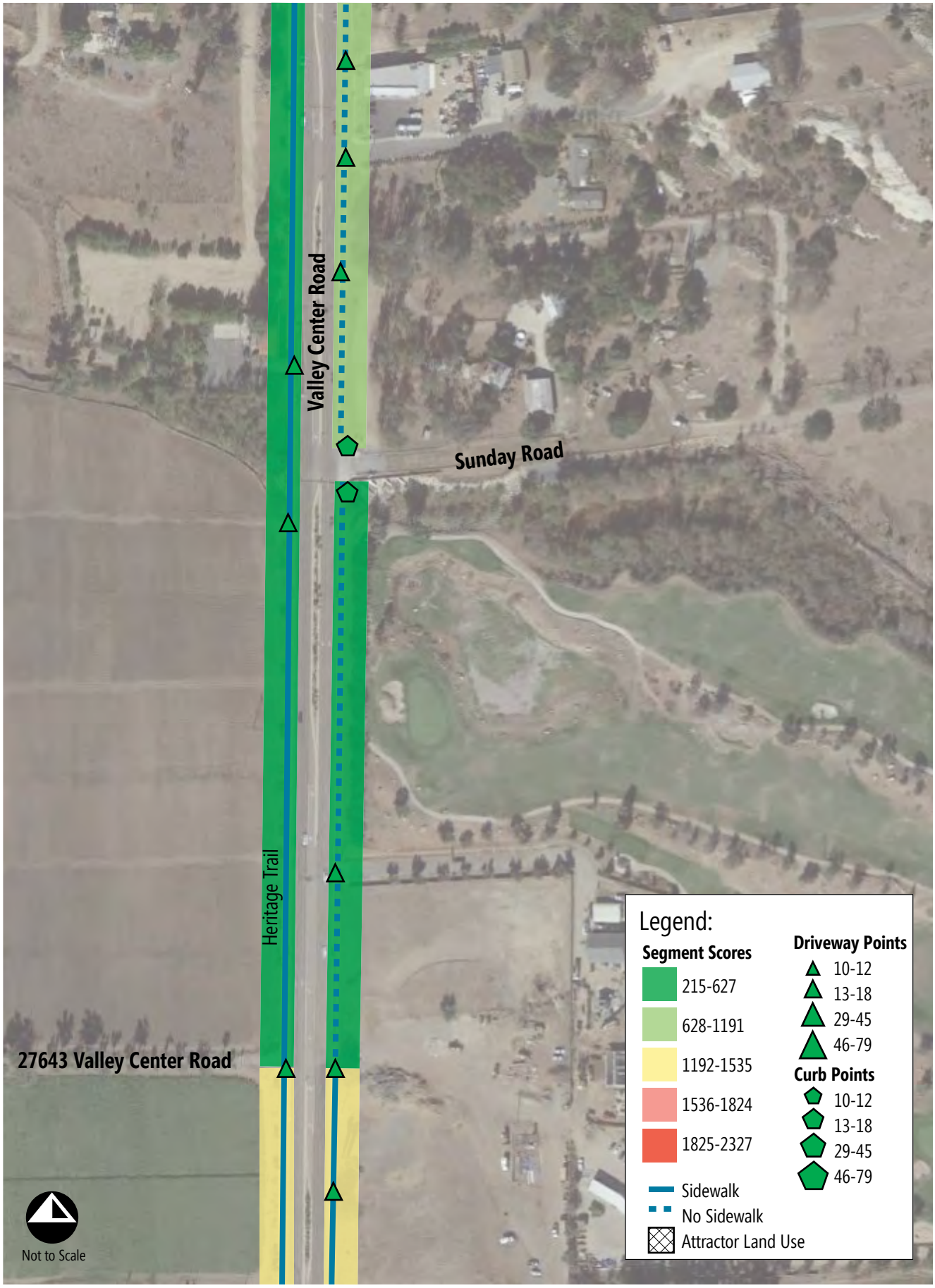
Pedestrian Gap Analysis Map

Figure 18a



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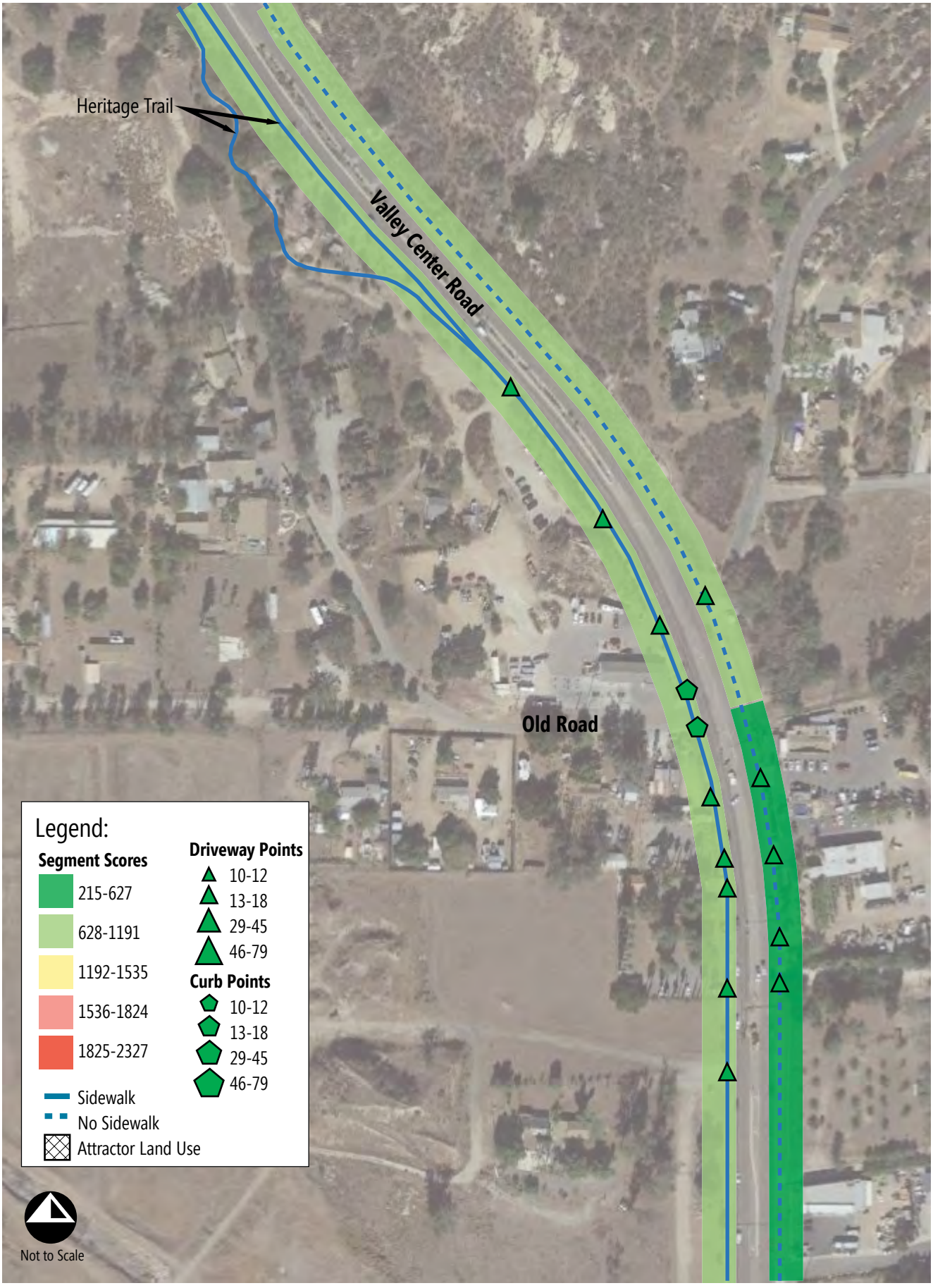
Pedestrian Gap Analysis Map

Figure 18b



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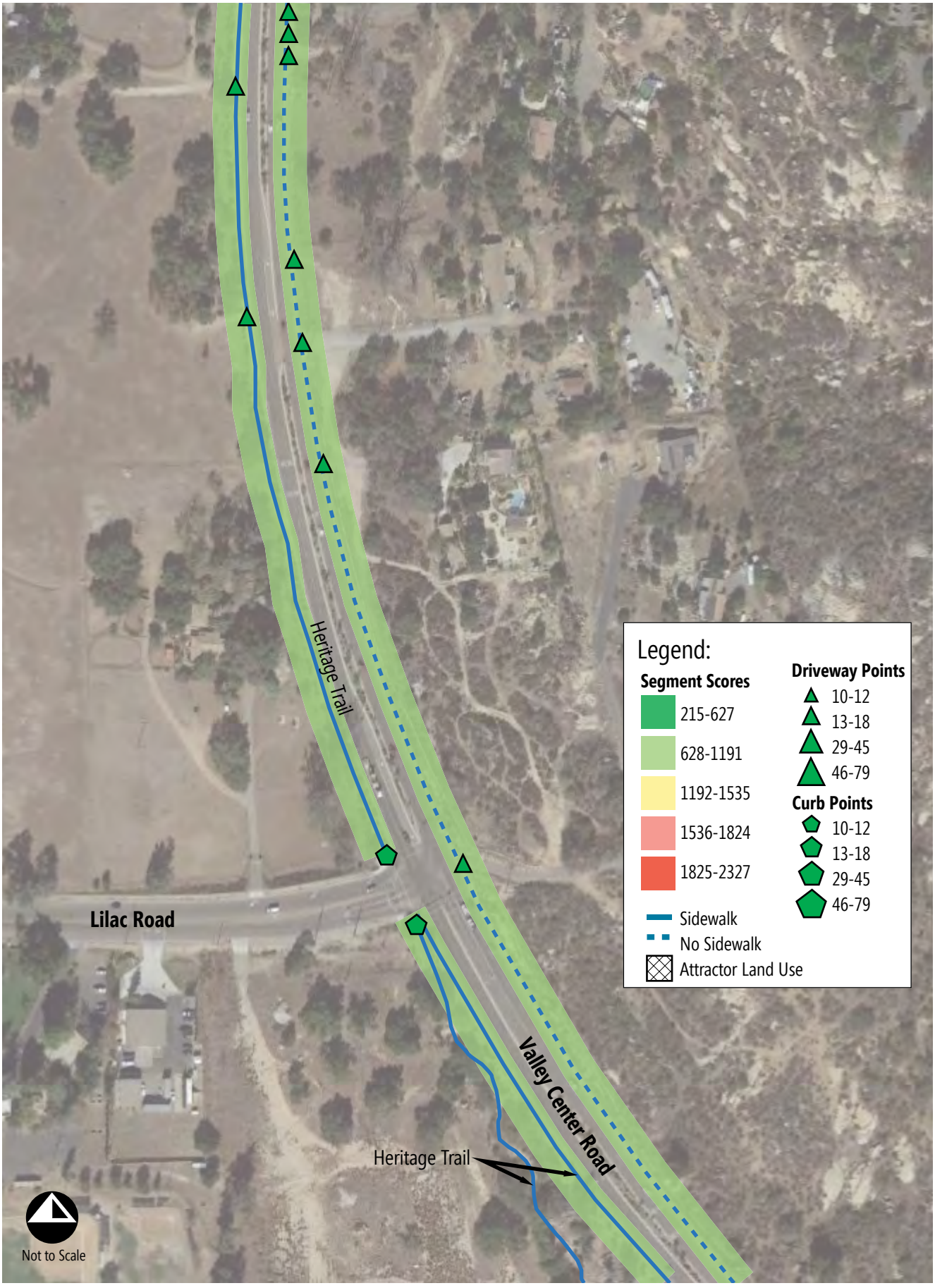
Pedestrian Gap Analysis Map

Figure 18c



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Pedestrian Gap Analysis Map

Figure 18d

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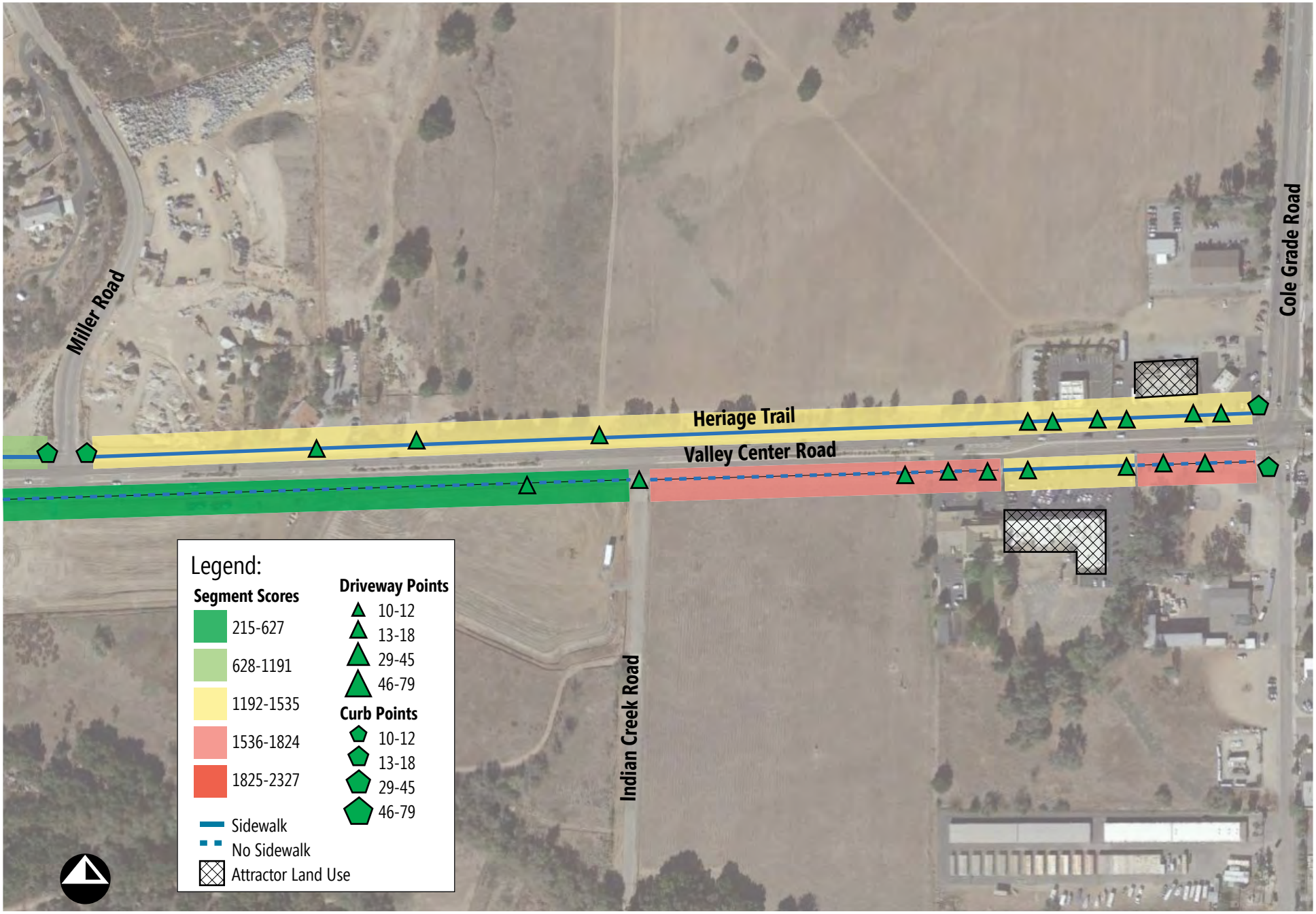
Pedestrian Gap Analysis Map

Figure 18e



Not to Scale

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Pedestrian Gap Analysis Map

Figure 18f

Table 8: Existing Pedestrian Conditions

Segment		East / South Side of Valley Center Rd.		West / North Side of Valley Center Rd.	
		Total Score	Rating	Total Score	Rating
Valley Center Road	Woods Valley Road to Charlan Road	1150	Good	901	Good
	Charlan Road to Mirar De Valle Road	1646	Poor	1286	Average
	Mirar De Valle Road to 27634 Valley Center Road Driveway	1269	Average	1242	Average
	27634 Valley Center Road Driveway to Sunday Drive	608	Very Good	286	Very Good
	Sunday Drive to Old Road	690	Good	375	Very Good
	Old Road to Lilac Road	885	Good	769	Good
	Lilac Road to Valley Center Road Bridge (S)	672	Good	1043	Good
	Valley Center Road Bridge (S) to Valley Center Road Bridge (N)	392	Very Good	177	Very Good
	Valley Center Road Bridge (N) to Canyon Road (N)	470	Very Good	376	Very Good
	Canyon Road (N) to Miller Road	601	Very Good	1127	Good
	Miller Road to Indian Creek Road	557	Very Good	707	Good
	Indian Creek Road to Old Town Center Plaza Southern Boundary	1601	Poor	1375	Average
	Old Town Center Plaza Southern Boundary to Northern Boundary	1338	Average	1398	Average
	Old Town Center Plaza Northern Boundary to Cole Grade Road	1717	Poor	1424	Average

Note: Scores were derived from existing conditions observed on December 2018. Refer to **Attachment A** for point ranges & assignments.

Out of the 28 segments analyzed along Valley Center Road summarized in **Table 8**, the PGA rates seven (7) segments (25%) as very good, eight (8) segments (28%) as good, 10 segments (36%) as average, and three (3) segments (11%) as poor. The three segments that were rated "poor" include the east side of Valley Center Road from Charlan Road to Mirar De Valle Road, from Indian Creek Road to Old Town Center Plaza Southern Boundary, and from Old Town Center Plaza Northern Boundary to Cole Grade Road in the eastbound direction. There are no sidewalks, trails, or pedestrian facilities on these segments.

The quality of the existing marked crossing along and across Valley Center Road was evaluated by reviewing crosswalk amenities, design type and type of markings as shown in **Table 9** per County of San Diego ATP. Marked crosswalks along the corridor are only provided at signalized intersections and at a limited number of side street stop-controlled intersections. As shown, the signalized intersection crosswalk locations are rated "Strong" and the four unsignalized locations are rated "Needs Improvement" due to the lack of crosswalks along side streets. Marked crossings across Valley Center Road are more than half a mile apart, making it difficult for pedestrians to cross Valley Center Road. **Attachment F** contains the Pedestrian Gap Analysis & Intersection Crosswalk Worksheets.

Table 9: Intersection Crosswalk Evaluation

Study Intersection	Traffic Control	Score	Rating
1 - Valley Center Road / Woods Valley Road	Signal	4	Strong
2 - Valley Center Road / Mirar De Valle Road	OWSC	74	Needs Improvement
3 - Valley Center Road / Sunday Drive	OWSC	74	Needs Improvement
4 - Valley Center Road / Lilac Road	Signal	4	Strong
5 - Valley Center Road / Miller Road	OWSC	74	Needs Improvement
6 - Valley Center Road / Indian Creek Road	OWSC	74	Needs Improvement
7 - Valley Center Road / Cole Grade Road	Signal	4	Strong

Note: Scores were derived from existing conditions observed on December 2018.
OWSC = One Way Stop Control

EXISTING BICYCLE CONDITIONS

Existing peak hour bicycle activity was collected on Tuesday, December 4, 2018. Bicycle activity data is provided in **Figure 14** (see p. 20). As shown, only one bicyclist is recorded using the bike lanes along the corridor during the AM and PM peak hours. Class II bicycle lanes are currently provided on both sides of Valley Center Road from Woods Valley Road to Cole Grade Road. There are no buffers separating the bicyclists from the vehicles along Valley Center Road. Portions of the bicycle lanes have loose fragments of asphalt due to the degrading surface of the existing roadway lanes, refer to **Figure 19**. Obstacles such as drainage inlets in the bike lane can be challenging for bicyclists as shown in **Figure 20**.

Figure 19: Class II bike lane with degraded surface.

During the field verification and site observations conducted on December 21, 2018, very few bicyclists were observed using the Class II bike lanes. Those observed bicycling along the corridor rode on the sidewalk or along the Heritage Trail. The ATP recommends a Class IV separated Bikeway along Valley Center Road.

Existing bicycle facilities were assessed along Valley Center Road from Woods Valley Road to Cole Grade Road using a Level of Traffic Stress (LTS) analysis. LTS is a qualitative measure that assesses a bicyclist's level of discomfort or stress based on the quality of the bicycling environment and provided facilities. LTS scores range from LTS 1 (most comfortable, least stressful) to LTS 4 (least comfortable, most stressful). Scoring criteria used in the analysis is consistent with the methodology outlined in the County's ATP and summarized in Attachment A of this memorandum.

Table 10 and **Figure 21** display the results of the LTS analysis conducted for the existing bicycle conditions along Valley Center Road.

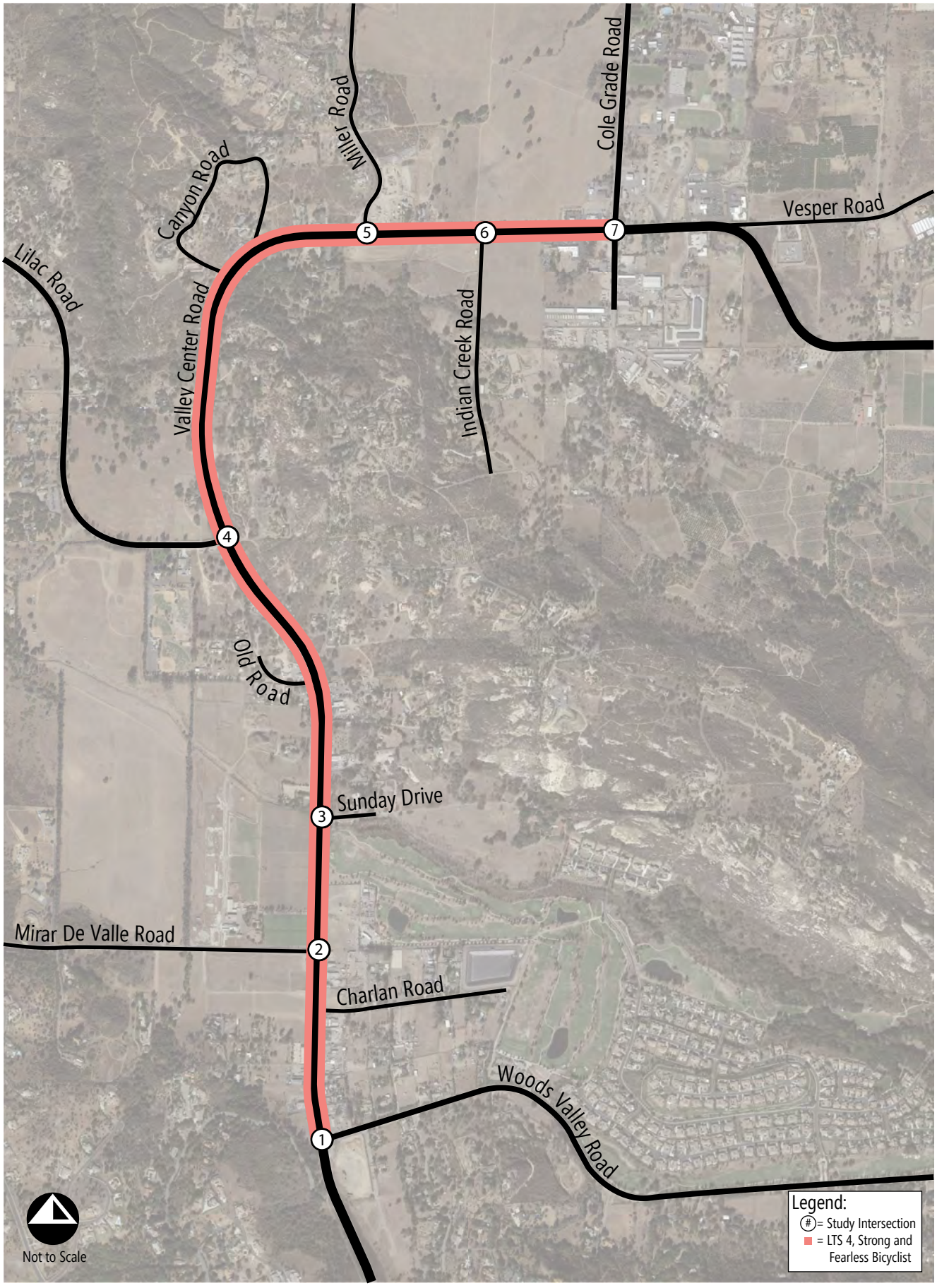
As shown in Table 10, the current bicycle facilities along Valley Center Road result in a high level of bicycle stress (LTS 4) primarily attributed to the high vehicle speeds along the corridor. LTS 4 indicates that the most confident bicyclists (categorized as the "Strong and Fearless") would likely use the facility and those with less capabilities or confidence may not feel comfortable bicycling along Valley Center Road.

Figure 20: Class II bike lane with drainage inlet.

Table 10: Level of Traffic Stress (LTS) Summary

Roadway	Segment	No. Lanes	Facility Type	Roadway Classification[1]	Posted Speed Limit (mph)	Direction	LTS Score	Suitable for
Valley Center Road	Woods Valley Road to Mirar De Valle Road	4	Class II	Boulevard - 4.2B (w/ intermittent turn lanes)	45	Northbound	4	Strong and Fearless Bicyclists
						Southbound	4	Strong and Fearless Bicyclists
	Mirar De Valle Road to Sunday Drive	4	Class II	Boulevard - 4.2B (w/ intermittent turn lanes)	45	Northbound	4	Strong and Fearless Bicyclists
						Southbound	4	Strong and Fearless Bicyclists
	Sunday Drive to Lilac Road	4	Class II	Boulevard - 4.2B (w/ intermittent turn lanes)	45	Northbound	4	Strong and Fearless Bicyclists
						Southbound	4	Strong and Fearless Bicyclists
	Lilac Road to Canyon Road	4	Class II	Major Road - 4.1A (w/ raised median)	45	Northbound	4	Strong and Fearless Bicyclists
						Southbound	4	Strong and Fearless Bicyclists
	Canyon Road to Miller Road	4	Class II	Major Road - 4.1A (w/ raised median)	45	Eastbound	4	Strong and Fearless Bicyclists
						Westbound	4	Strong and Fearless Bicyclists
	Miller Road to Indian Creek Road	4	Class II	Boulevard - 4.2A (w/ raised median)	45	Eastbound	4	Strong and Fearless Bicyclists
						Westbound	4	Strong and Fearless Bicyclists
	Indian Creek Road to Cole Grade Road	4	Class II	Boulevard - 4.2A (w/ raised median)	45	Eastbound	4	Strong and Fearless Bicyclists
						Westbound	4	Strong and Fearless Bicyclists

Note: Scores were derived from existing conditions observed on December 2018.



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Level of Traffic Stress (LTS) Analysis Map

Figure 21

KEY FOCUS AREAS

After reviewing the results of the existing conditions analysis along Valley Center Road, specific issues are grouped into "key focus areas" that should be considered when identifying improvements along Valley Center Road. Key focus areas have been identified and discussed below:

Intersection Safety Improvements:
Three intersections along the corridor were identified as having high crash rates. These three intersections should be evaluated further to address safety and operational concerns. A summary of the issues at these three locations is provided below:

- **Valley Center Road and Miller Road.** According to the crash data, one fatality occurred at this intersection. A total of 23 crashes have been reported which represents 13% of the 176 crashes over the last five years. Seven crashes are related to unsafe speeds and four crashes are related to improper turning. The pedestrian gap analysis indicates the crosswalk across the north leg of the intersection is deficient. Improvements at this location should focus on reducing auto crashes and improving visibility.

- **Valley Center Road and Cole Grade Road.** A total of 44 crashes were reported at this intersection which represents 25% of the 176 crashes reported along the corridor. Nineteen crashes involve rear-end collisions and ten crashes involve broadside collisions. Fourteen collisions are attributed to unsafe speeds which is the highest along the corridor. The pedestrian gap analysis indicates pedestrian facilities are rated "poor" along the south side of Valley Center Road near Cole Grade Road. Improvements at this location should focus on reducing auto crashes and improving visibility.

- **Valley Center Road and Lilac Road**. The crash reports indicate a total of 36 crashes occurred at this location which represents 20% of the 176 crashes reported along the corridor. Ten crashes are attributed to unsafe speeds and twelve are reported as rear-end collisions. The actual 85th percentile speeds at this location is 57 mph in the northbound direction and 54 mph in the southbound direction. Although the signalized intersection is currently operating at LOS B in both the AM and PM peak hours, improvements to reduce crashes and reduce speeds in this area should be considered.

Pedestrian Facility Improvements:
Sidewalks are currently provided on the east side of Valley Center Road from Woods Valley Road to Mirar De Valle Road. However, there are no sidewalks, improved trails or defined pedestrian facilities along the east side of Valley Center Road from Mirar De Valle Road to Cole Grade Road which is approximately 10,500 linear feet. Pedestrian facilities are rated "poor" along the east and south side of Valley Center Road at the following two focus areas.

- **Valley Center Road from Cole Grade Road to the driveway serving the Old Town Center (approximately 275 feet west of Cole Grade Road).** This segment is adjacent to the Old Town Center which is considered an attractor since there is a deli, pharmacy and other small retail shops that people would walk to. However, there is no sidewalk, improved trail, or defined pedestrian facility on this segment. In addition, there are multiple driveways where pedestrian and vehicle conflicts can occur. Pedestrian facility improvements considered for this segment should be consistent with the rural character of the community.

- **Valley Center Road from Mirar De Valle Road to Charlan Road.** A post office and a small Market are located along this side of Valley Center Road that could attract pedestrians. Although a sidewalk is currently provided, the condition of the sidewalk is poor with multiple obstructions and weeds that impact the travel way. In addition, there are multiple driveways that create vehicle-pedestrian conflicts.

Crosswalk Improvements:

Marked pedestrian crosswalks across Valley Center Road are only provided at the signalized intersections at Cole Grade Road, Lilac Road and Woods Valley Road. To improve access for pedestrians and bicyclists along the corridor, additional marked crossings should be considered. Due to the width and speed of the road, additional treatments such as improved light at the marked crossing, control such as a HAWK beacon, pedestrian signal and/or flashing beacons should be installed. There are two key locations that should be considered for pedestrian crossings:

- **Valley Center Road and Mirar De Valle Road.** A bus stop, Valley Center Market and the Post Office are all located within 150 feet of the intersection on the east side of Valley Center Road. A crossing at this location would provide access to these activity centers.

- **Valley Center Road and Miller Road.** The bus stop is located on the south side of Valley Center Road approximately 125 feet from Miller Road with no crosswalk facilities for pedestrians to cross Valley Center Road to reach the retail center or Heritage Trail on the north side of Valley Center Road. In addition, future development is planned on the south side of the intersection that may increase pedestrian activity.

There are a total of 11 NCTD bus stops along the corridor serving both directions of travel. However, there is no controlled access for pedestrians to cross Valley Center Road at many of these locations. When considering additional intersection control and/or new pedestrian crossings, the location of and access to existing bus stops should be considered. Additional coordination with NCTD may be necessary.

Future Development LOS Impacts:

Development is planned along Valley Center Road in both the North and South Villages. As such, traffic generated by these developments may affect the operations of the existing side street stop-controlled intersections. As discussed in this report, the level of service for the side street stop-controlled intersection is based on available gaps in both directions of traffic. As traffic volume along Valley Center Road increases, the delay to vehicles on the side street will continue to increase. When considering alternatives for the corridor, modifications to intersection control at key locations should be considered. When considering medians along the corridor, the impact to the side streets should also be considered, as the median restricts the ability to cross one direction of traffic at a time and can impact side street delay.

Draft Corridor Concept Plan

Attachment B: Toolbox of Options

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VALLEY CENTER ROAD CORRIDOR CONCEPT PLAN

Tradeoffs & Best Practices

MARCH 12, 2019

Intersection Controls | Roundabouts

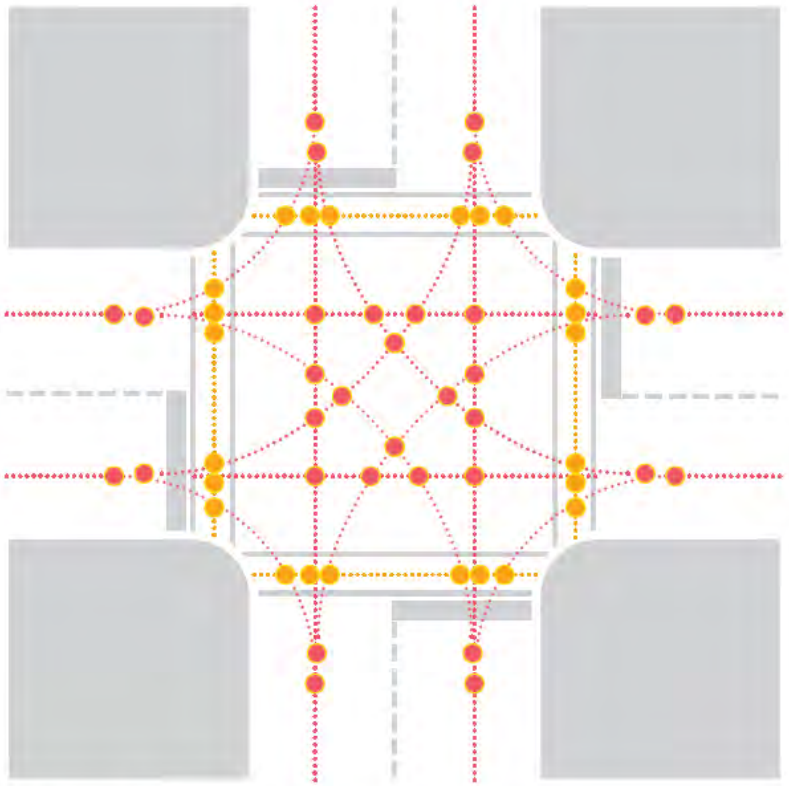
- Vehicles yield to traffic that is already in the roundabout
- Traffic travels counterclockwise around a center island
- Bikes merge with traffic before entering the roundabout, or dismount and use sidewalks

Flickr.com: Grand Canyon National Park (CC BY 2.0)

Intersection Controls | Signalized Intersections

- Vehicles comply with traffic signals, coming to a full stop at a red light
- Traffic travels in opposite directions
- Bike lanes continue through intersection

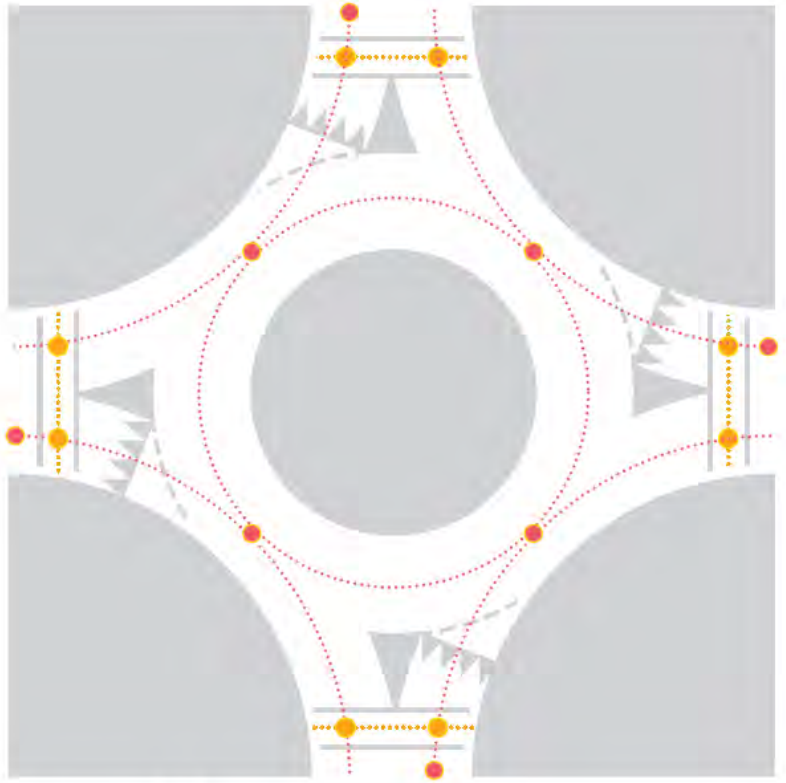
Roundabouts vs. Intersections | Conflict Points



Four Way Stop

32 Vehicle Conflicts

24 Pedestrian Conflicts



Roundabout

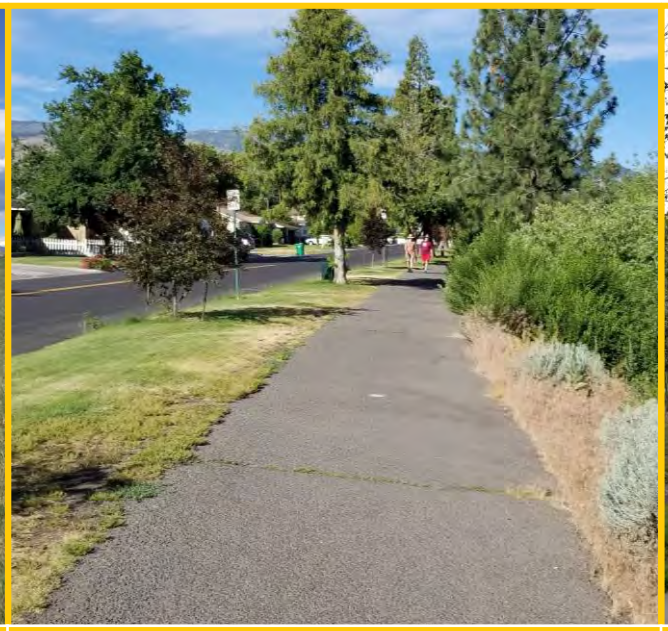
8 Vehicle Conflicts

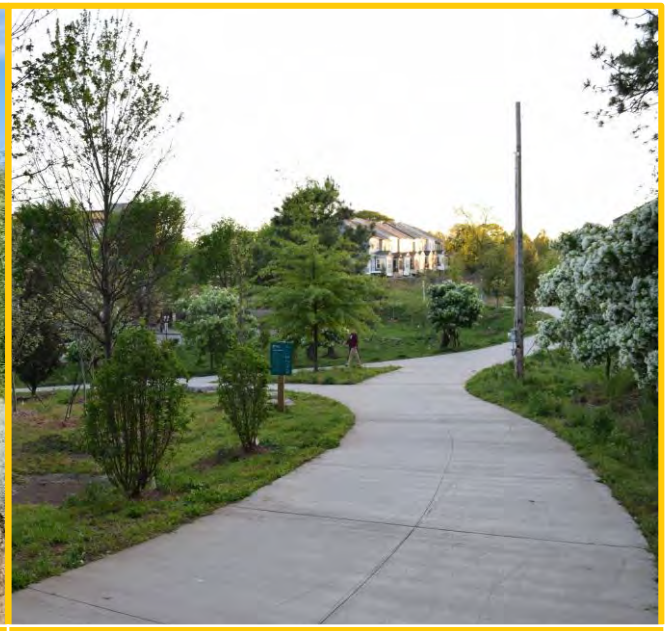
8 Pedestrian Conflicts

Roundabouts vs. Signalized Intersections | Advantages of Each

	ROUNDABOUTS	INTERSECTIONS	WHY?
# of Injury Collisions	✓		Vehicles must slow down to enter roundabouts
Collision Severity	✓		Vehicles in roundabouts travel in the same direction
Roadway Space		✓	Signalized intersections require less space
Traffic Flow	✓		Vehicles yield at roundabouts but are not required to stop
Comfort		✓	People are familiar with how signalized intersections work
Visual Features	✓		Roundabout center islands present opportunities for community entry features/landscaping
Construction Cost		✓	Signalized intersections can be less expensive to construct
Operating Cost	✓		Roundabouts can be less expensive to maintain and operate after construction

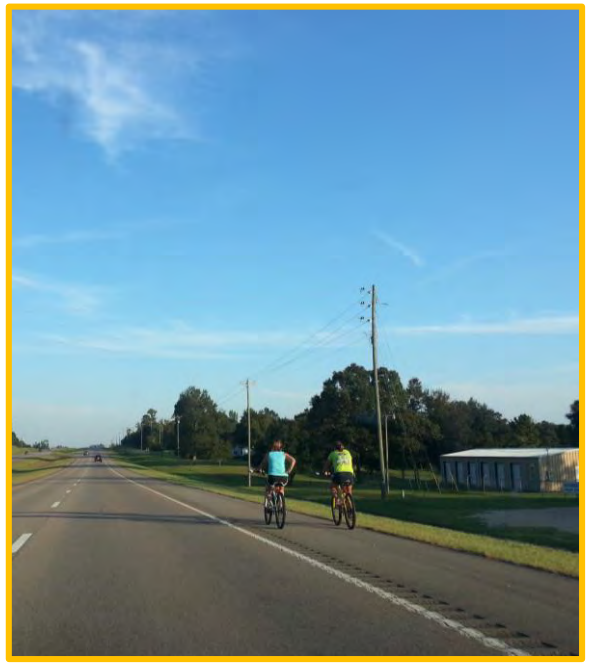
PATHS & TRAILS





	NATURAL SURFACE TRAILS	SIDEPATHS	SHARED USE PATHS
Accessibility		✓	✓
Cost		✓	
Comfort	✓		✓
Safety	✓		✓
Natural Aesthetics	✓		

Bikeways



WIDE SHOULDER

BIKE LANE

CYCLE TRACK

BIKE PATH

Accessibility, cost, comfort, and safety increase

Traffic Calming

RAISED MEDIANS

+

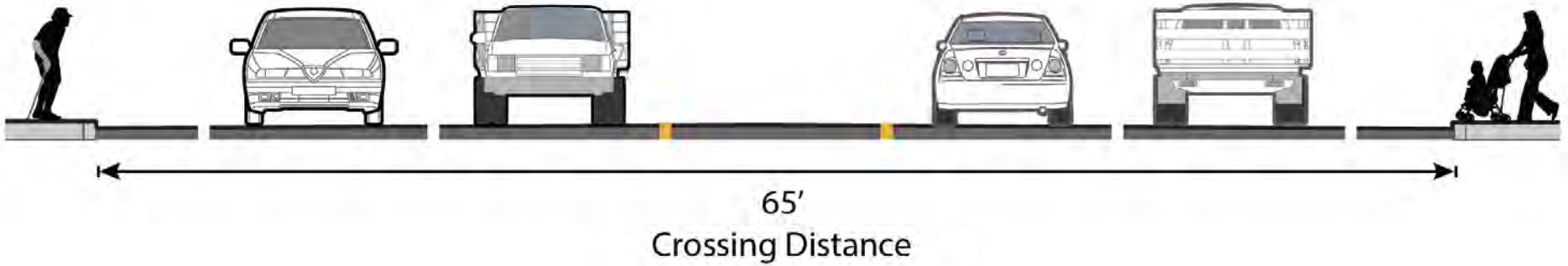
BULB-OUTS

+

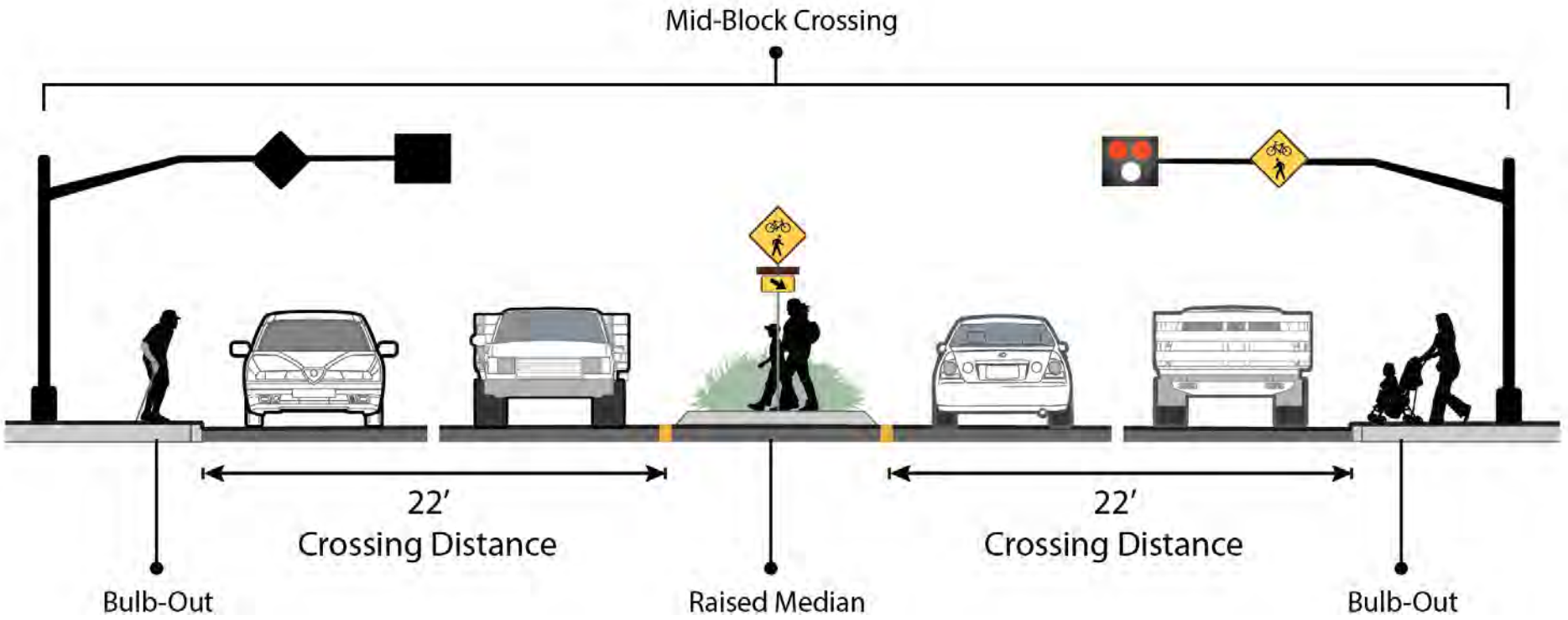
MID-BLOCK CROSSINGS

= Improved accessibility, comfort, and safety for people walking

WITHOUT
TRAFFIC CALMING



WITH
TRAFFIC CALMING



Other Features

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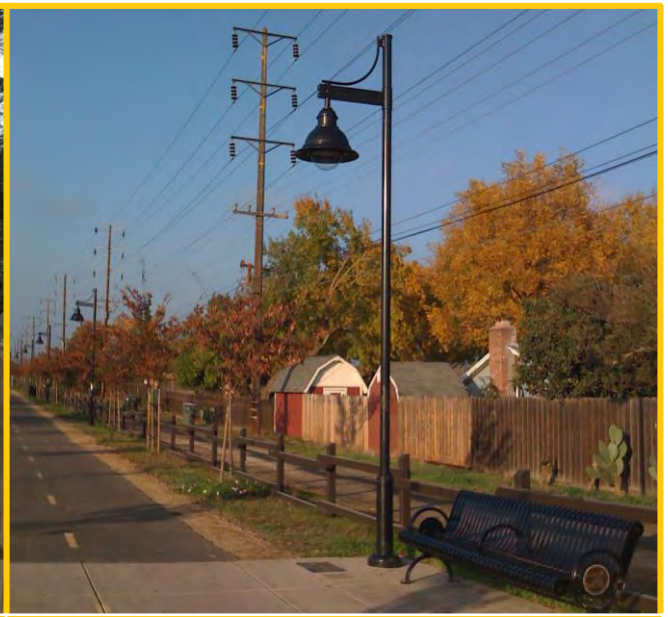


	COMMUNITY ENTRY FEATURES	LANDSCAPING	LIGHTING
Cost		✓	
Comfort		✓	✓
Safety		✓	✓
Air Quality		✓	
Branding	✓		

Draft Corridor Concept Plan

Attachment C:
Conceptual Themes Technical Memorandum

Michael Baker
INTERNATIONAL

TO:	Kevin Johnston, County of San Diego
FROM:	Dawn Wilson, PE TE
DATE:	June 10, 2020

1. OBJECTIVE

The focus of the Valley Center Road Corridor Concept Plan is to formalize recommendations that improve access and mobility for users of all abilities. The corridor study area extends along Valley Center Road from Cole Grade Road to Woods Valley Road. This technical memorandum explores potential solutions that address identified issues and opportunity areas identified in the existing conditions report (April 2019) and from comments received from the community (March 2019 Workshop). Various trade-offs and best practices are presented that will improve overall mobility along the corridor. As shown in Figure 1, there are a variety of travel modes along Valley Center Road that can be further improved. Three themes have been developed that provide for a combination of solutions that will be presented to the community at the second Workshop for their input through a preference survey.

Figure 1: Valley Center Road near Canyon Road at "The Curve" with Raised Medians.

The study area shown in Figure 2 covers the segment of Valley Center Road through the two Villages of Valley Center. The South Village is centered around the Valley Center Road and Mirar De Valle intersection and extends from Banbury Drive in the south to Lilac Road in the north. The North Village is centered around the Valley Center Road and Indian Creek Road intersection and extends just west of Miller Road on the west and to the area of the Valley Center Road and Vesper Road intersection on the east. The Villages are areas where higher intensity development and wider range of land uses are planned.

2. EXISTING CONDITIONS

In 2006, Valley Center Road was widened from two to four lanes, which also included construction of intermittent raised medians between Cole Grade Road and Woods Valley Road. In April 2019, an Existing Conditions Analysis was completed that assessed the physical roadway conditions and intersection traffic operations as well as documented the current pedestrian, bicycle, and transit facilities within the study area.

The results of the roadway segment analysis showed all study segments along Valley Center Road operate at acceptable levels of service (LOS D or better). The intersection analysis showed all the study locations operating at acceptable levels of service in the AM peak hour and two of the 7 study locations operating at deficient levels of service (LOS E or F) during the PM peak hour. These include the unsignalized intersections of Mirar De Valle Road / Valley Center Road and Sunday Drive / Valley Center Road.

The results of the speed survey showed that all the 85th percentile speeds along Valley Center Road exceed the posted speed limit of 45 miles per hour. The 85th percentile speeds collected represent the speed at which 85 percent of all vehicles are observed to travel at or below, measured over a specific period of time for a specific location. The 85th percentile speeds are used by agencies to set speed limits based on free-flowing traffic conditions.

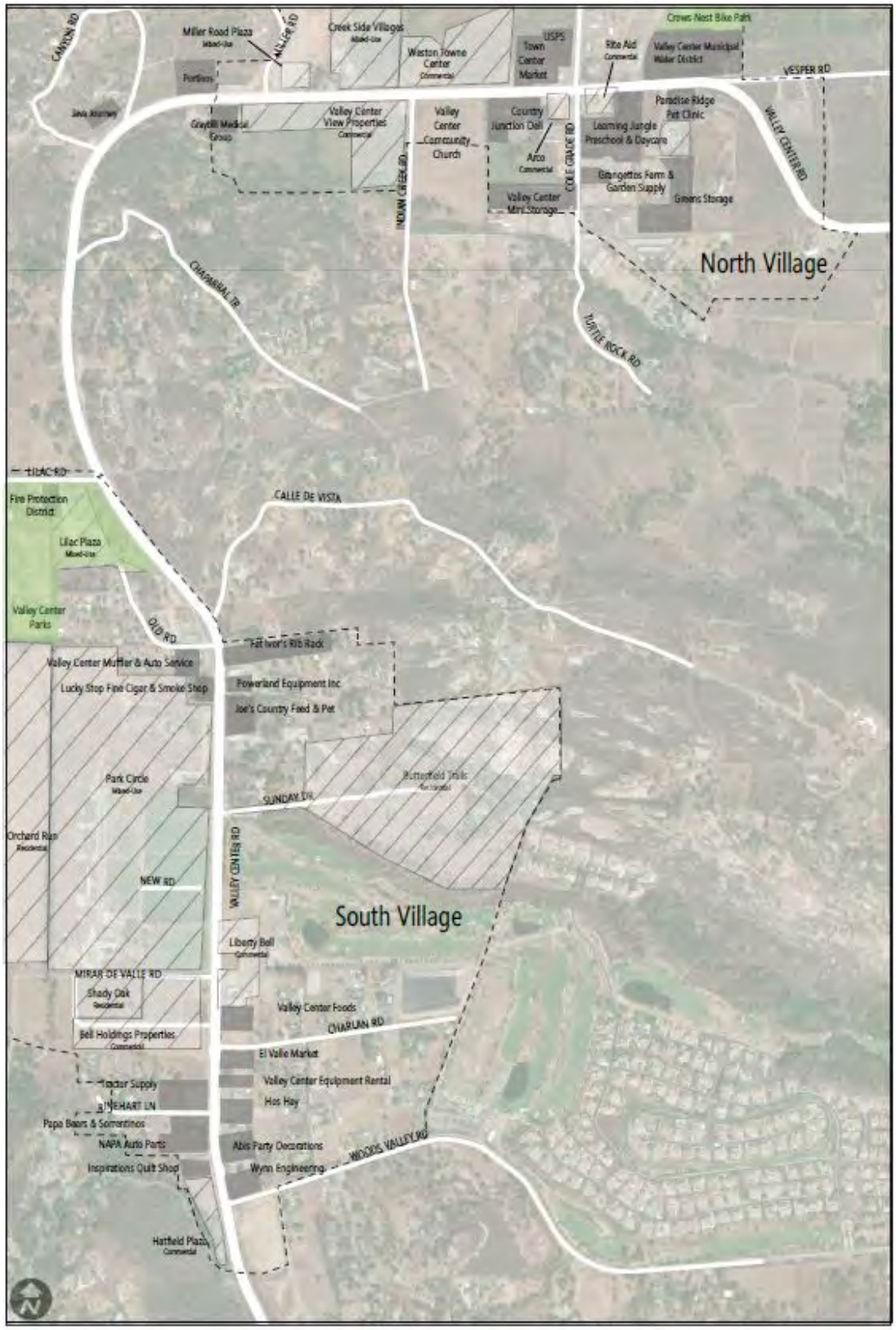


Figure 2: Study Area With North & South Village Boundaries

Crash data for a five-year period included a total of 178 crashes reported along Valley Center Road with one fatality at Miller Road. The majority of crashes were attributed to unsafe speeds, right-of-way violations, and improper turning.

Transit service is proved by North County Transit District (NCTD) Route 388 with 11 bus stops on Valley Center Road within the study area. Amenities at each bus stop vary along the corridor; however, the majority of the bus stops are Americans with Disabilities Act (ADA) compliant and have both a bench and sign.

Figure 3: Heritage Trail with split rail fencing (looking westbound on Valley Center Rd.). The Heritage Trail will remain unchanged with all concepts.

Pedestrian conditions show that out of 28 segments, the walking environment for 9 segments were "very good", 9 segments were "good", 7 segments were "average", and 3 segments were "poor". Most pedestrians utilize the Heritage Trail, which will remain unchanged through the concept development. Existing bicycle facilities along Valley Center Road were evaluated using a Level of Stress (LTS) analysis and show that the bike lanes provided were suitable for "Strong and Fearless Bicyclists" (LTS level 4). This LTS 4 condition is heavily influenced by the lack of buffer and speed of the road.

3. COUNTY PLANS, CODES & POLICIES INFLUENCING THE CONCEPT DEVELOPMENT

The following County documents were consulted as part of the Concept Development.

Valley Center Community Plan (VCCP)

Within San Diego County, diverse communities have distinct and unique settings, history, culture, and character. As part of the County's General Plan, the *Valley Center Community Plan* provides goals, policies, and other guidance for land use within the Valley Center Community Plan Area (CPA), in addition to serving as a reference for important community issues. The County is currently working with stakeholders on a comprehensive update to the Community Plan, which is running parallel to the Valley Center Road Village Corridor Concept Plan.

San Diego County Active Transportation Plan (ATP)

"Active Transportation" is a term used to describe any non-motorized form of travel, including biking, walking, horseback riding, etc. The County of San Diego's *Active Transportation Plan* is a plan that balances environmental, economic, and community interests and identifies goals, objectives and actions related to:

- Improving safety to reduce auto collisions with cyclists and pedestrians;
- Increasing accessibility and connectivity with an active transportation network; and
- Improving public health by encouraging walking and biking.

Figure 4: Illustration from County of San Diego ATP, Class IV Bikeway with Bollards Concept (referred to as flexible delineator posts in the concept development)

The ATP includes recommendations to upgrade the existing Class II bike lanes to Class IV Separated Bikeways the length of the corridor. This recommendation was incorporated into the Mobility Element for this Valley Center Road corridor as part of the adoption of the ATP.

County Light Pollution Code

The *San Diego County Code of Regulatory Ordinances* (Title 5, Chapter 2) defines any area within a 15-mile radius of Palomar Observatory as "Zone A". The project study area is within an approximate 12 to 14-mile radius of Palomar Observatory and is subject to the requirements for Zone A. According to Section 51.204, any street lighting above 4,050 lumens is prohibited and all low-pressure sodium lamps must be fully shielded. Any unshielded luminaires must be less than 2,000 lumens. Street lighting along the corridor must comply with these and other requirements for Zone A.

4. ENGINEERING DESIGN STANDARDS & BEST PRACTICES

In addition to the regulation and guidance documents discussed above, the conceptual designs presented with this report consider the guidance provided in the following documents:

Valley Center Design Guidelines

While design review is administered by the County's Planning & Development Services Department , development projects subject to design review are also evaluated by the Valley Center Design Review Board. Properties subject to design review for development applications include all properties within the Village boundaries and additional properties with commercial or industrial zoning located outside the Villages. This design review process is intended to preserve the rural character and environment of Valley Center while accommodating future growth. Specific design objectives and requirements are outlined in the *Valley Center Design Guidelines* and must be considered when establishing recommendations for the corridor plan as future development may be responsible for frontage improvements and subject to the standards established in these guidelines.

County of San Diego Public Road Standards

The County's *Public Road Standards* serve as guidelines for the design and construction of public road improvement projects within the unincorporated County. These standards apply to both County and developer initiated public road improvement projects. Improvements to public roads are often required as conditions of land development (discretionary permit) approval.

Valley Center Community Right of Way Development Standards (VCCRDS)

The *VCCRDS* is a guide to the streetscape design within the public right-of-way. The purpose is to ensure the community develops in a complimentary and consistent manner that reflects Valley Center's distinctive natural features. These standards only apply to areas outside of the travel way including curb and gutters, sidewalks and pathways, medians, shoulders, etc.

Traffic Control at Intersections

As part of this project, various intersection control options were considered within the study area, including traffic signals, roundabouts, controlled pedestrian crossings, and minor street stop controls. The combinations of traffic control features will determine how traffic will flow along the corridor. Limited traffic control along the corridor has led to 85th percentile speeds above the posted speed limit for the length of the corridor. It has also resulted in challenges for drivers crossing traffic to make a left turn from the corridor and for drivers on side streets to gain access to the corridor.

Traffic signals are an effective traffic control device that clearly defines the right-of-way for vehicles at an intersection. To determine if a signal is appropriate at an isolated location, an analysis of traffic signal warrants can be conducted. These warrants provide a procedure to determine whether installation of a traffic signal is justified at a particular location. A warrant may or may not be satisfied based on conditions outlined in the *California Manual on Uniform Traffic Control Devices* (CA MUTCD), which consider such factors as vehicular volumes, pedestrian volumes, safety concerns, or signal coordination gaps to determine the viability of a traffic signal. Although a warrant provides justification for installation of a traffic signal along the corridor, other factors may also be considered. Other factors such as spacing between signals, access requirements, pedestrian activity, and others may determine a signal is needed that may not meet a CA MUTCD warrant.

Roundabouts are also traffic control devices and define the right-of-way for drivers. All drivers yield when entering the roundabout and should enter when there is a gap in traffic flow. While roundabouts are not subject to specific warrants, each proposed roundabout is justified on its own merits as the most appropriate intersection treatment. Additional details regarding roundabouts are provided in the following section.

Roundabouts and traffic signals were considered for key locations along the corridor based on:

- Controlled intersection spacing (varies by theme)
- Pedestrian and bicycle connections to bus stops
- Planned development and conditions of approval for traffic signals along the corridor
- Collision history
- Potential speed reduction features

5. CONCEPT ELEMENTS AND BEST PRACTICES

The following pages provide descriptions and examples of the concept elements included in the recommendations for the corridor. These concept elements have been applied to the proposed themes as shown in **Table 1**. Details about each theme are provided in Section 6.

Table 1: Proposed Theme Concept Elements

Elements		Theme 1	Theme 2	Theme 3
Roundabout	Single Lane			✓
	Two-Lane	✓	✓	
	Single Lane w/ Taper		✓	✓
Curb-Extension		✓	✓	
Controlled Ped. Crossing (Signal or HAWK)		✓	✓	
Raised Median		✓	✓	✓
Sidewalk		✓	✓	✓
Class IV Separated Bikeway with Bollards		✓	✓	✓
Class II Bike Lane with Buffer				✓
Gateway Feature				✓

Single-Lane Roundabout

A single-lane roundabout is an intersection controlled by road signs where all traffic moves counterclockwise around a central island. Single-lane roundabouts provide vehicles with one entry/exit lane and one travel lane through the roundabout.

BENEFITS & CHALLENGES

Auto:
Access to the roundabout is usually controlled by yield signs which reduces but does not eliminate the need for vehicles to stop prior to entering the intersection. Vehicles yield to traffic that is already in the roundabout and travel counterclockwise around the center island. This continuous flow through the roundabout decreases overall travel time or delays at the intersection. Figure 5 illustrates a conceptual layout of a single-lane roundabout at Valley Center Road and Miller Road under Theme 2.

Safety:
Roundabouts are one of the safest types of intersections since they are designed for lower speed driving, generally 25 to 35 MPH and all traffic is moving in the same direction. In addition, left turn movements across oncoming traffic is eliminated. Most significantly, roundabouts reduce the severity of crashes such as T-bone and head-on collisions. Figure 6 shows an example of an existing three-legged single-lane roundabout at La Jolla Boulevard and Colima Street.

Pedestrians:
Roundabouts can also improve pedestrian safety by offering a short crossing distance of one-way traffic moving at slower speeds. As shown in the figures to the right, the splitter islands or raised medians provide an opportunity for pedestrians to cross one direction of traffic at a time.

Bicycles:
On single-lane roundabouts, bicyclists have the option of either mixing with traffic or using the multi-use path with the pedestrians. The multi-use path accommodates both types of users around the perimeter of the roundabout. Bicyclist who use the path cross the legs of the roundabout by dismounting and crossing with pedestrians in the marked crosswalks.

Design, Operations & Maintenance:
Roundabouts can be more expensive to construct than a traffic signal due to potential right-of-way constraints and the amount of new pavement area, curbs and gutters needed to meet the design standards for emergency vehicles and trucks. However, single-lane roundabouts generally have lower maintenance and operational cost compared to signalized intersections.

Figure 5: Theme 2 – Single Lane Roundabout at Valley Center Road & Miller Road

Figure 6: Single Lane Roundabout at La Jolla Boulevard & Colima Street

Two-Lane Roundabout

A two-lane roundabout is an intersection controlled by signs where all traffic moves counterclockwise around a central island. Two-lane roundabouts provide vehicles with two entry/exit lanes and two travel lanes through the roundabout.

BENEFITS & CHALLENGES

Auto:

At a two-lane roundabout, drivers need to decide which lane to use before approaching the roundabout. Drivers then need to yield to two lanes of traffic circulating within the roundabout. If a left-turn or U-turn is desired, the driver should use the left lane to approach and travel through the roundabout. If a driver wishes to make a right-turn, the right lane should be used to approach and travel through the roundabout. Figure 7 illustrates a conceptual layout of a two-lane roundabout at Valley Center Road and Old Road under Theme 1.

Safety:

In general, two-lane roundabouts have some of the same safety characteristics for drivers and vehicle occupants as a single-lane roundabout. However, due to the presence of two entry lanes and the need to provide wider circulatory and exit roadways, two-lane roundabouts often cannot achieve the same levels of speed reduction as a single-lane roundabout. Figure 8 shows an example of an existing two-lane roundabout at Tremont Street and Pottery Avenue in the state of Washington.

Pedestrians:

Pedestrians crossing two-lane roundabouts are exposed for a longer period and to faster vehicles when compared to a single lane roundabout. Similar to single-lane roundabouts, splitter islands at the entry point of a two-lane roundabout can be used as a refuge for pedestrians.

Bicycles:

Similar to a single-lane roundabout, a multi-use path of sufficient width can accommodate both types of users around the perimeter of the roundabout. However, bicyclist can also choose to navigate through the roundabout with vehicles.

Design, Operations & Maintenance:

Two-lane roundabouts are larger than single lane roundabouts and therefore require more right of way and are more expensive to construct. Similar to a single-lane roundabout, two-lane roundabouts generally have lower maintenance and operational costs compared to a signalized intersection.

Figure 7: Theme 1 - Two-Lane Roundabout at Valley Center Road & Old Road

Figure 8: Two-Lane Roundabout at Tremont Street & Pottery Avenue in Washington

Single-Lane Roundabout with Taper

A single-lane roundabout with a taper generally consists of a four-lane roadway that reduces one travel lane at each approach to the single-lane roundabout and then widens back to two lanes after exiting the roundabout. This configuration allows the necessary roadway capacity along the corridor while also providing the safety and operational benefits of a single-lane roundabout.

BENEFITS & CHALLENGES

Auto:
Drivers are required to merge from two to one travel lane prior to entering the single-lane roundabout. This helps reduce travel speeds approaching and traveling through the roundabout. Figure 9 shows an example of an existing one-lane roundabout with a taper approaching the roundabout at Santa Fe Drive and Devonshire Drive in the City of Encinitas. Figure 10 provides a conceptual layout from Theme 2 of a single-lane roundabout with a taper from 4 lanes to 2 lanes on the west leg of the intersection at Valley Center Road and Lilac Road.

Pedestrians:
Tapering down to one travel lane approaching and through the roundabout minimizes the crossing distance for pedestrians. This reduction in travel lanes produces slower travel speeds to maximize safety and comfort for pedestrians.

Bicycles:
The taper would not affect the bicyclists since the bike lane is maintained in a similar manner to a single-lane roundabout without a taper. A shared bicycle-pedestrian path of sufficient width to accommodate both types of users around the perimeter of the roundabout would still be provided.

Figure 10: Theme 2 - Single-Lane Roundabout with taper at Valley Center Road & Lilac Road

Figure 9: Single-lane Roundabout with taper at Santa Fe Drive & Devonshire Drive in Encinitas

Curb Extensions (Bulb-outs)

A curb extension, also known as a bulb-out, is a traffic calming measure that widens the sidewalk for a short distance and extends the curb space at the corners of an intersection in order to reduce the crossing distance for pedestrians. Curb extensions may be constructed at intersection corners or mid-block crosswalks.

BENEFITS & CHALLENGES

Auto:

Curb extensions increase visibility for pedestrians and drivers by bringing the pedestrian closer to the edge of the travel-way at a marked crossing. Curb extensions also provide visual friction which can result in more cautious driving and can result in slower vehicle speeds. Figure 11 shows a conceptual layout of curb extensions for Theme 2 at the intersection of Valley Center road and Indian Creek Road.

Pedestrians:

Curb extensions improve pedestrian crossings by reducing the pedestrian crossing distance, improving the ability of pedestrians and motorists to see each other, and reducing the time that pedestrians are in the street. Figure 12 shows an example of curb extensions recently installed at the intersection of Camino Del Mar and 12th Street in the City of Del Mar.

Bicycles:

Bicycle lanes shift from the main travel-way and are separated by a raised channelizer. At crosswalks, the bike lane angles into a ramp, so that pedestrians can cross the bike lane at a constant grade. Bicyclist should yield to pedestrians at crossings.

Design, Operations & Maintenance:

Road classification, lane width, road width, sidewalks, curb radii, and on-street parking should all be considered when designing curb extensions. Appropriate signage for vehicles, bicyclists, and pedestrians should be provided at all potential conflict points. Placement of street furniture and landscaping on curb extensions should ensure that sight lines are not obstructed and properly maintained.

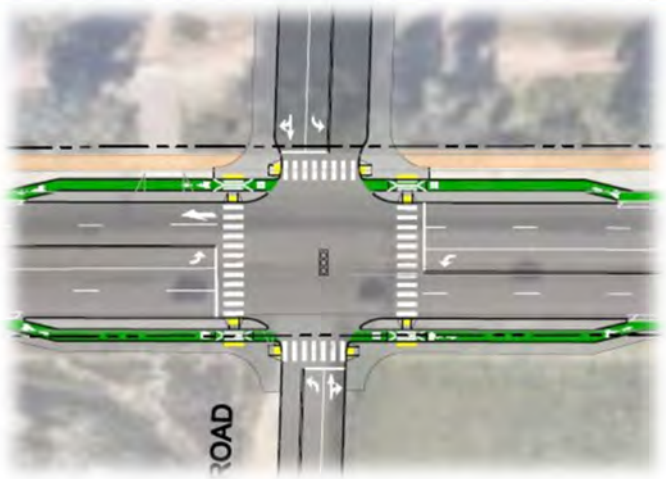


Figure 11: Theme 2 – Curb extensions at Valley Center Road & Indian Creek Road

Figure 12: Curb extensions at Camino Del Mar & 12th Street in Del Mar

Controlled Pedestrian Crossing

Controlled Pedestrian Crossings are used to warn and control vehicle traffic at a marked crosswalk. Controlled Pedestrian Crossing are typically located mid-block or at an intersection where a traffic signal is not warranted for vehicular traffic.

BENEFITS & CHALLENGES

Auto:

Vehicles are required to stop at these controlled crossings when activated by a pedestrian. If the signal is not activated by a pedestrian, motorists are permitted to drive through the crosswalk but are cautioned to slow down and look for the presence of nearby pedestrians. Figure 13 shows a controlled pedestrian crossing at Valley Center Road and Old Road in Theme 2.

Pedestrians & Bicycles:

These crossings provide a clear indication for the assignment of right of way at the marked crosswalk. Both the driver and the pedestrian or bike are provided a clear indication of when to stop or wait and when to proceed. The signal or HAWK is activated by the pedestrian using a push-button. Pedestrians must wait for the WALK sign to proceed. During that time, autos are provided a RED light and are required to stop.

Figure 15: Ped Signal Example

High-Intensity Activated Crosswalk (HAWK) Signal:

HAWK signals are traffic devices used to assist pedestrians and bicyclists crossing a busy street. When a pedestrian activates the system by pressing a button, overhead signal flashing indicates to the motorists a pedestrian wishes to cross the street and vehicles are required to stop and wait for the pedestrian to cross. HAWKs are best in mid-block situations, not intersections where minor streets have no visibility to a signal. Figure 14 shows an existing HAWK signal on Mission Center Road in Mission Valley.

Pedestrian Signal:

Operates as a traditional signal with the green priority given to vehicles until activated by the pedestrian. Utilizes traditional green, yellow and red vehicular indications and traditional pedestrian signal heads (with or without countdown timer). Figure 15 shows an example of a ped signal.

Figure 13: Theme 2 - Controlled Ped Crossing at Valley Center Road & Old Road

Figure 14: HAWK signal on Mission Center Road in Mission Valley

Raised Median

Raised medians are curbed sections that typically occupy the center of the roadway. Raised medians within a roadway such as Valley Center Road can be either landscaped or paved.

BENEFITS & CHALLENGES

Auto:
Continuous raised medians may restrict vehicular access at intersections and driveways. They may be used to concentrate left-turn movements at specific locations and tend to result in an increase of the frequency of U-turns at a signalized intersection or at gaps in the median. However, raised medians can improve safety by providing a physical barrier between opposing directions of traffic thus reducing vehicle conflicts. Figures 16 and 17 show existing raised medians with landscaping along Valley Center Road.

Pedestrians & Bicyclists:
Raised medians tend to serve as a place of refuge for pedestrians and bicyclists who cross a street midblock or at intersections. In addition, raised medians allow pedestrians and bicyclists to cross one direction of traffic at a time.

Safety:
Raised medians may reduce crashes caused by conflicting traffic such as T-bone and head-on collisions.

Landscaping:
Medians with natural landscaping also serve as natural bio-swales for managing stormwater. Figure 18 shows Theme 1 with a raised landscaped median along Valley Center Road within the South Village.

Figure 18: Theme 1 - Raised Landscaped Median on Valley Center Road in South Village

Figure 16: Raised Landscaped Median on Valley Center Road west of Lilac Road

Figure 17: Raised Landscaped Median on Valley Center Road west of Cole Grade Road

Crosswalks

A marked crosswalk is a place designated for pedestrians to cross a road. Crosswalks are typically marked on the roadway with parallel or dashed pavement markings to provide visibility to drivers. Typical crosswalks are striped with white paint. However, in school zones yellow paint should be used to mark the crossings.

BENEFITS & CHALLENGES

Auto:
Marked crosswalks indicate a preferred location for pedestrians to cross a roadway, and alert motorists to anticipate pedestrians. Marked crosswalks are complemented by curb ramps and ADA access signage with improved visibility of the crossing. At signalized intersections, pedestrian countdown signal heads help inform pedestrians of how much time they have left to cross. Marked crosswalks at locations other than signalized intersections or roundabouts should be coupled with either a pedestrian signal or HAWK on Valley Center Road. Due to the high speed and four lanes of traffic, uncontrolled marked crossings are not recommended. Figure 19 shows marked pedestrian crosswalks at the intersection of Valley Center Road and Indian Creek Road for Theme 2.

Pedestrians:
High visibility crosswalks, also known as continental crosswalks, increase awareness in motorists and pedestrians at established pedestrian crossing locations. Some crossing locations include pedestrian refuge islands to shorten a pedestrian's crossing distance and provide pedestrians a refuge. A yellow crosswalk indicates a school crossing, whereas a white crosswalk indicates a standard crosswalk. An example of a marked pedestrian crosswalk is shown in Figure 20.

Bicycles:
Bicyclists should dismount their bicycle and walk in the crosswalks with pedestrians.

Design, Operations & Maintenance:
Pedestrian crosswalks are typically 10 feet in width with white or yellow markings. However, design and installation of marked crosswalks should comply with the County of San Diego Roadway Standards and California Manual on Uniform Traffic Control Devices standards. Crosswalks should remain visible and may require ongoing maintenance to minimize fading.

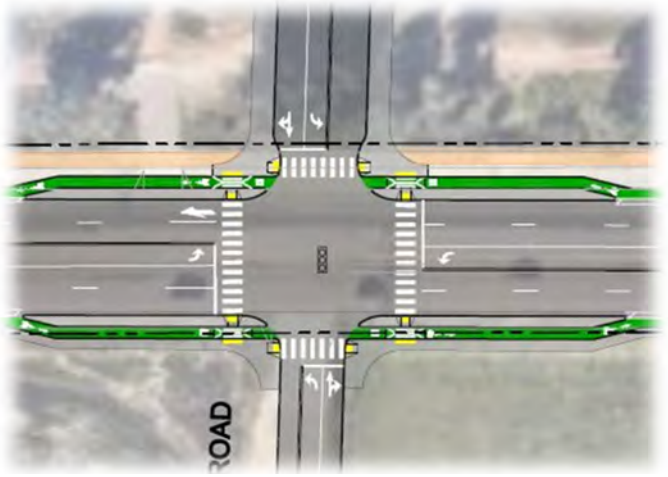


Figure 19: Theme 2 – Marked Crosswalk at Valley Center Road & Indian Creek Road

Figure 20: Marked Crosswalk at La Jolla Hermosa Avenue & Colima Street in La Jolla

Sidewalks and Pathways

A sidewalk is a path with a hard surface by the side of a road. Sidewalks are often constructed of concrete or cement, though occasionally asphalt. Sidewalks must meet the minimum ADA requirements. Pathways, like the Heritage Trail, are typically wider (8 feet) than a sidewalk (4 to 5 feet) and typically consist of decomposed granite base rather than concrete. Pathways can also include physical barriers such as landscaping or fencing between the pathway and roadway, refer to Figure 21.

BENEFITS & CHALLENGES

Auto:

Sidewalks and pathways are designated for pedestrians and bicyclists, not vehicles. Along a roadway, sidewalks provide a dedicated ADA accessible space for users of all ages and abilities.

Pedestrians & Bicyclists:

Sidewalks are primarily used by pedestrians but sometimes used by bicyclists, specifically younger and unexperienced riders. Sidewalks provide pedestrians and bicyclists a connection to parks, schools, restaurants, retail shops, libraries, public transit and other attractions. Figure 22 shows an example of a sidewalk with a clear path of travel for pedestrians.

Pathways create a multi-modal system for pedestrians, bicyclists, equestrians and other non-motorized travelers. However, it can be challenging for pathways to meet the minimum ADA requirements.

Design:

Within the Valley Center Community, San Diego County Policy endeavors to provide a "Type D" pathway, as seen in Figure 8, on one side of Valley Center Road and sidewalks on the other.

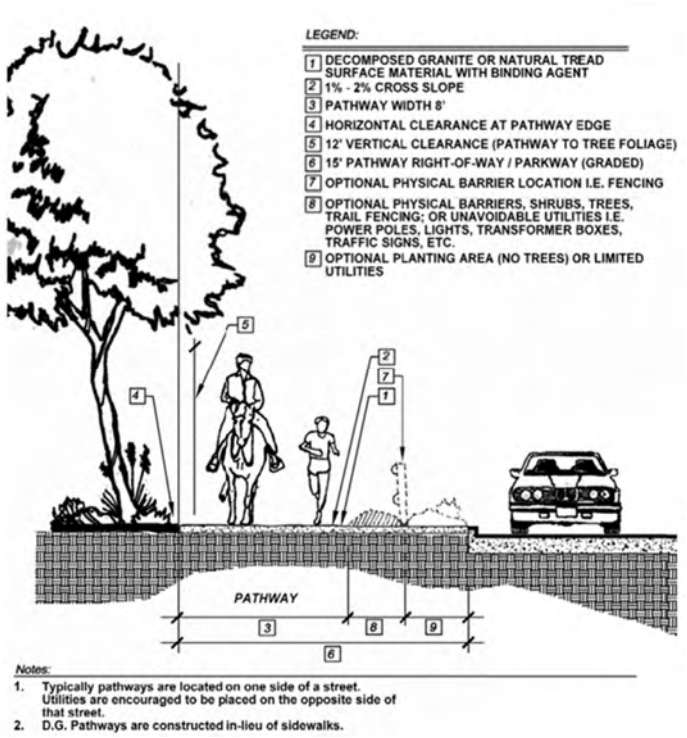


Figure 21: Valley Center Community Right of Way Design Standards. Figure 8 – Type D Pathways

Figure 22: Example of Sidewalk

Class IV Separated Bikeway with Flexible Delineator Posts

Protected bike lanes (Class IV Bikeway), also known as cycle tracks, provide space that is exclusively for bicyclists and separated from vehicular travel lanes, parking and sidewalks. Parked cars, curbs, bollards, or planter boxes may provide physical separation between bicyclists and vehicles.

BENEFITS & CHALLENGES

Auto:
Class IV bikeways are on-street bicycle facilities that include a vertical physical barrier such as flexible bollards (delineators), a raised curb, on-street parking or planter boxes between the bikeway and moving traffic. These physical barriers help increase the level of comfort to both the motorist and bicyclists.

Pedestrians:
Bicycle lanes are not intended for pedestrian use. To prevent pedestrians from using the bicycle lane, a sidewalk or trail should be provided adjacent to the bicycle lane. Pedestrians in the bicycle lane provide a risk to bicycles due to the differential between bicycle and pedestrian travel speeds. Pedestrians in the bicycle lane should be discouraged.

Bicycles:
The added separation provided by separated bikeways creates additional considerations at intersections and driveways when compared to conventional bike lanes. To preserve sightlines and identify potential conflict areas between vehicles and bicyclists, conflict areas may be marked by green dashed stripes near intersections and driveways. At driveways and minor street crossings, bicyclists would not be expected to stop if the auto traffic does not stop. Class IV bikeways with flexible delineator posts (bollards) are proposed along Valley Center Road as shown in Figure 23. Along Leucadia Boulevard in the City of Encinitas, protected bike lanes have been installed in both the eastbound and westbound directions as shown in Figure 24.

Design, Operations & Maintenance:
Along Valley Center Road, 5-foot Class IV bike lanes with 3-foot buffers are proposed. However, design and installation of Class IV bikeways should comply with the County of San Diego Roadway Standards and California Manual on Uniform Traffic Control Devices standards. Specialized street sweeping equipment might be necessary to maintain these bikeways.

Figure 23: Theme 1 – Class IV Bikeway along Valley Center Road near Miller Road

Figure 24: Class IV Bikeway with buffer and flexible delineator posts along Leucadia Boulevard looking westbound

Class II Bike Lanes with Buffer

Bike lanes (Class II) are defined by pavement striping and signage and effectively dedicate a portion of the roadway right-of-way for exclusive bicycle travel. Bike lanes are one-way facilities typically located on the far-right side of the road adjacent to the curb. Class II bike lanes with a buffer are conventional Class II bike lanes paired with a designated buffer space (18 inches to 3 feet) separating the bicycle lane from the adjacent motor vehicle travel lane and/or parking lane.

BENEFITS & CHALLENGES

Auto:
Class II bike lanes with a buffer provide a designated separation (typically 18 inches to 3 feet) between the bike lane and moving traffic. This design does not include any physical barriers so drivers will need to watch for bicyclists when turning right at cross-streets or driveways and when crossing the buffered lane to park. Figure 25 shows Class II bike lanes with buffers along Valley Center Road in Theme 2.

Pedestrians:
Bicycle lanes are not intended for pedestrian use. To prevent pedestrians from using the bicycle lane, a sidewalk or trail should be provided adjacent to the bicycle lane. Pedestrians in the bicycle lane provide a risk to bicycles due to the differential between bicycle and pedestrian travel speeds. Pedestrians in the bicycle lane should be discouraged.

Bicycles:
Class II bike lanes with a striped buffer provide a more comfortable riding environment for bicycle riders who prefer to ride adjacent to traffic as shown in Figure 26. Similar to Class IV Separated Bikeways, conflict areas between vehicles and bicyclists may be marked by green dashed stripes near intersections and driveways.

Design, Operations & Maintenance:
Under Theme 3 in the North Village, 6-foot Class II bike lanes with 3-foot buffers are proposed along Valley Center Road. However, design and construction of Class II bikeways should comply with the County of San Diego Roadway Standards and California Manual on Uniform Traffic Control Devices standards. This design would not restrict street sweeping equipment from maintaining the bike lane or parking along the curb. Class II bike lanes are proposed only in Theme 3 in the North Village because that Theme includes one auto travel lane in each direction with parallel parking along the road, to make use of the additional right-of-way. The flexible delineator posts (bollards) used in Class IV bike lanes would not be possible in this section under this Theme, due to the parked cars needing to cross the buffer to enter the travel lanes.

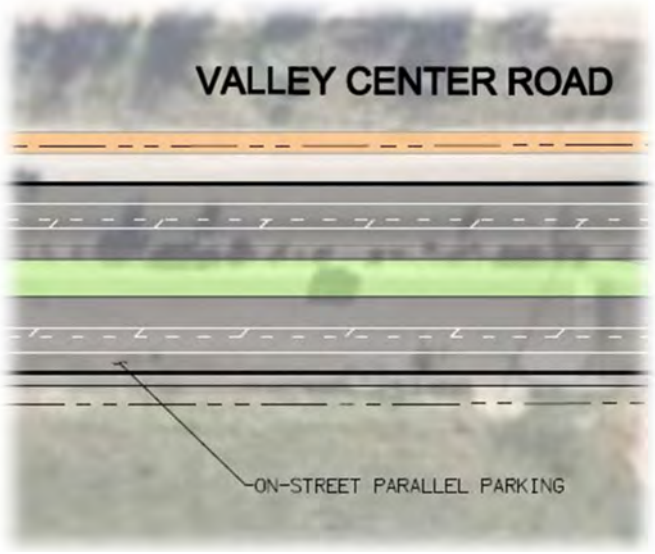


Figure 25: Theme 2 – Class II Bike Lanes along Valley Center Road in North Village.

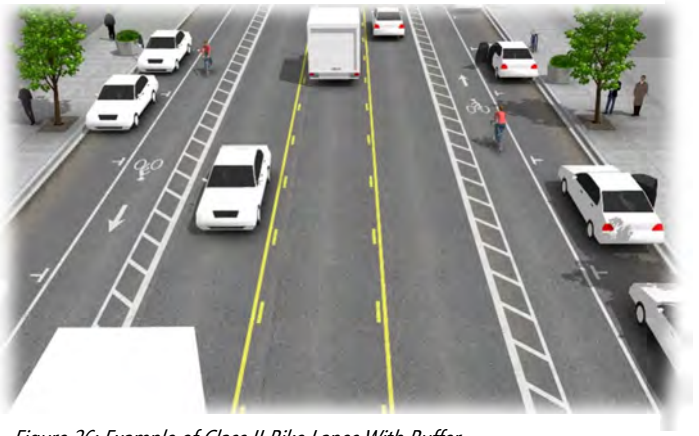


Figure 26: Example of Class II Bike Lanes With Buffer

Gateway Feature

A gateway feature is any type of free-standing monument, archway, statue, sculpture, or sign which identifies the name of a community, city, or town.

Benefits:
Gateway features provide a unique identifier for the community and a sense of ownership for the residents. They also increase aesthetics and comfort while enhancing the overall community. Landscaping may also be integrated into the design of the gateway feature to improve the visual elements of the monument. Figures 27 through 29 provide examples of existing gateway features.

Challenges:
The gateway feature should not obstruct or block the view of motorists. Sightlines should be maintained along the corridor so that movement of all modes are visible.

Design & Maintenance:
The design of the gateway feature should comply with all County guidelines and standards, including the Zoning Ordinance section 6207.b.2 on Community Identification Signs. The design should harmonize the roadway with existing topography and land uses. The gateway feature including any landscaping will need to be maintained to preserve the structural integrity, quality and beautification of the monument.

Figure 27: City of Carlsbad Gateway Feature

Figure 28: City of La Mesa Gateway Feature

Figure 29: City of Escondido Gateway Feature

6. CONCEPT THEMES

Three themes were developed for the corridor and are presented in this section. Each theme integrates combinations of the Concept Elements presented in Section 5.

Theme 1: Pedestrian and Bicycle Focus

Theme 1 aims to maximize pedestrian and bicycle access along the corridor by providing continuous walking and bicycling facilities, providing frequent crossing locations and integrating features that reduce traffic speeds. **Table 2** summarizes the key Concept Elements included in Theme 1. The following describes the theme in greater detail.

Table 2: Theme 1 Concept Elements

Elements of Theme 1		
Roundabout	Single Lane	
	Two-Lane	✓
	Single Lane w/ Taper	
Curb-Extension		✓
Controlled Ped. Crossing (Signal or HAWK)		✓
Raised Median		✓
Sidewalk		✓
Pathways		✓
Class IV Separated Bikeway with Flexible Delineator Posts		✓
Class II Bike Lane with Buffer		
Gateway Feature		

Pedestrian Access and Connectivity

Theme 1 provides a continuous pedestrian path of travel on both sides of Valley Center Road. The Heritage Trail is located on the west and north side of the street and sidewalks are provided on the east and south side of the street from Cole Grade Road to Woods Valley Road. Per the Valley Center Community Right of Way Development Standards, in the Villages, a Type D Pathway is allowed on the west and north side of Valley Center Road and a sidewalk is allowed on the east and south side of Valley Center Road.

In the South Village, marked pedestrian crossings across Valley Center Road are provided a maximum of one quarter mile (0.25 mile) apart and are provided at signalized intersections, roundabouts and controlled pedestrian crossings. Controlled pedestrian crossings could be either include a pedestrian signal or HAWK and are proposed at Rinehart Lane and north of Sunday Drive. At the Rinehart Lane crossing, the median would be closed thereby restricting auto movements to right turns only in order to reduce the potential left turn/pedestrian conflict in the marked crossing. At both controlled pedestrian crossings, the raised median provides for a pedestrian refuge area while crossing the street.

Bicycle Facilities

Class IV Separated Bikeways with flexible delineator posts (bollards) are proposed for the length of the corridor on both sides of Valley Center Road. At or near conflict areas (i.e. unsignalized intersections and driveways) "skip stripe" and solid green pavement markings would replace the striped buffer and bollards where vehicles cross the bicycle path of travel.

At roundabouts, bicyclists may use the multi-use path to bypass riding through the roundabout or they may merge with traffic and travel through the roundabout. For bicyclists who choose to ride through the roundabout, a gap in the buffer and bollards allows them to exit the bicycle lane and to merge into traffic as they approach the roundabout. For bicyclists who choose to use the multi-use path, ramps are provided where the bikeway approaches the multi-use path. The multi-use path is the wider sidewalk around the roundabout that can be used by both pedestrians and bicyclists. The multi-use path is provided around the roundabout only and connects with either sidewalk or the Heritage Trail. If a cyclist chooses to use the multi-use path, they would dismount their bicycles and cross the legs of the roundabout with pedestrians in the marked crosswalks.

At locations with curb extensions, the bike lane shifts from a location adjacent to the travel lanes to being located between the curb and the curb extension. Where the pedestrians cross the bike lane, the bike lane angles into a ramp, allowing pedestrians to cross the bike lane at the grade of the sidewalk. Bicyclists yield to pedestrians at crossings. In accordance with the California Manual on Uniform Control Devices, W11-15 signage shows a black symbol of a left-facing bicycle above a black symbol of a left-facing walking person on a vertical rectangular yellow sign. A fluorescent yellow-green background color may be used for this sign. This could be used to help warn drivers approaching the bulb-outs that pedestrians and bicyclists may be crossing.

Traffic Control

Traffic signals in Theme 1 are located at the following intersections along Valley Center Road: Mirar De Valle, New Road (new road of Park Circle development, just north of Mirar De Valle), Miller Road and Cole Grade Road. The traffic signals at Mirar De Valle and New Road will be constructed by the Park Circle mixed use development, which was under construction at the time this report was prepared. Depending on timing, other development projects may be required to contribute to the construction of the Mirar De Valle traffic signal. An approved discretionary permit has a condition for a traffic signal at Miller Road; however specific intersection control may be reevaluated at the time traffic warrants are met.

Two-lane roundabouts are included at Woods Valley Road and Old Road. These roundabouts aim to reduce traffic speeds entering the South Village from either end. They also provide an opportunity for art and landscape to complement the existing design elements along the corridor.

Traffic signals, roundabout and pedestrian crossings are spaced at 0.25-mile intervals in the South Village order to maximize pedestrian access across the corridor. The traffic control devices were aligned with existing transit stops as well. When necessary, the transit stops were shifted to align with crossings or shifted to outside of a signalized intersection or roundabout. Although some traffic signals may not meet warrants in either the North or South Villages, the devices are recommended to meet the overall goals of providing improved pedestrian and bicycle access along the corridor – specifically in the South Village for this theme.

Traffic Calming

Three features in Theme 1 aim to reduce travel speeds along the corridor: curb extensions, roundabouts, and narrower lanes. Curb extensions are proposed at the signalized intersection of Mirar De Valle Road/Valley Center Road. They reduce the pedestrian crossing distance and help reduce traffic speeds by narrowing the width of pavement between the raised median and the curb. Where the curb extension is proposed along the edge of the travel lane, the bicycle lane shifts from a location adjacent to travel lanes to being located between the sidewalk and the curb extension. A raised pedestrian crossing across the bike lane allows pedestrians to cross at-grade from the sidewalk, across the bike lane, to the curb extension. By moving the pedestrians closer to the travel lanes to the other side of the bike lane, the crossing distance across vehicle travel lanes is reduced by 16 feet compared to the existing condition.

In addition to serving as a traffic control device, roundabouts are effective at reducing speeds of automobiles entering the South Village from either end. The travel speed approaching and through the roundabout is approximately 35 mph. The center island of the roundabout provides an opportunity to integrate art, landscape and other features that complement the rural village design into the corridor. Roundabouts also reduce the crossing distance for pedestrians. The splitter islands at the roundabout provide a refuge area so pedestrians only cross one approach of traffic at a time.

In order to provide the buffer between the bike lanes and the travel lanes, travel lanes are reduced from 12 feet to 11 feet the length of the corridor. The narrower lanes help create friction which in turn results in reduced travel speeds without affecting the capacity of the roadway.

Raised Median

Theme 1 adds new sections of raised median in the South Village where there is currently a striped two-way left turn lane. In this theme, there are gaps in the raised median at the signalized intersections and at the one-way stop-controlled intersection at Charlan Road. Between Old Road and Miller Road, no changes are proposed to the medians. In the North Village, raised medians are proposed between Miller Road and Cole Grade Road with gaps in the median at Indian Creek and at Valley Center Community Church. The raised medians will restrict left-turn movements and vehicles will be required to make U-turns at the nearest available controlled intersection.

Other Key Features

New streetlights would be included along the length of the corridor. Streetlight spacing and type will be determined in final design. The streetlights would adhere to the County Light Pollution Code and Valley Center Design Guidelines.

Theme 2: Traffic Calming Focus

Theme 2 focuses on reducing traffic speeds by modifying the physical conditions along the corridor. Roundabouts are included in both the North and South Villages, which help to reduce traffic speeds, along with an integrated system of narrower lanes and curb extensions. **Table 3** summarizes the key Concept Elements included in Theme 2. The following describes the theme in greater detail.

Table 3: Theme 2 Concept Elements

Elements of Theme 2		
Roundabout	Single Lane	
	Two-Lane	✓
	Single Lane w/ Taper	✓
Curb-Extension		✓
Controlled Ped. Crossing (Signal or HAWK)		✓
Raised Median		✓
Sidewalk		✓
Pathways		✓
Class IV Separated Bikeway with Flexible Delineator Posts		✓
Class II Bike Lanes with Buffer		
Gateway Feature		

Pedestrian Access and Connectivity

Theme 2 provides a continuous pedestrian path of travel on both sides of Valley Center Road from Cole Grade Road to Woods Valley Road. The Heritage Trail is provided on the west and north side of the street and sidewalks are provided on the east and south side of the street. Per the Valley Center Community Right of Way Development Standards, in the Villages, a Type D Pathway is allowed on the west and north side of Valley Center Road and a sidewalk is allowed on the east and south side of Valley Center Road.

Marked pedestrian crossings across Valley Center Road are provided at signalized intersections, roundabouts and controlled pedestrian crossing. The controlled pedestrian crossing could either include a pedestrian signal or HAWK and is proposed at Old Road near existing transit stops. At the Old Road crossing, the median would be closed thereby restricting auto movements to right turns only in order to reduce the potential left turn/pedestrian conflict in the marked crossing. The raised median through this intersection also provides for a pedestrian refuge area while crossing the street.

Bicycle Facilities

Class IV Separated Bikeways with flexible delineator posts (bollards) are proposed for the length of the corridor on both sides of Valley Center Road. At or near conflict areas (i.e. unsignalized intersections and driveway) "skip stripe" and solid green pavement markings would replace the striped buffer and bollards where vehicles cross the bicycle path of travel.

At roundabouts, bicyclists may use the multi-use path to bypass riding through the roundabout or they may merge with traffic and travel through the roundabout. For bicyclists who choose to ride through the roundabout, a gap in the buffer and bollards allows them to exit the bicycle lane and to merge into traffic as they approach the roundabout. For bicyclists who choose to use the multi-use path, ramps are provided where the bikeway approaches the multi-use path. The multi-use path is a wider sidewalk around the roundabout that can be used by both pedestrians and bicyclists. The multi-use path is provided around the roundabout only and connects with either the sidewalk or the Heritage Trail. If a cyclist chooses to use the multi-use path, they would dismount their bicycles and cross the legs of the roundabout with other pedestrians in the marked crosswalks.

At locations with curb extensions, the bike lane shifts from a location adjacent to the travel lanes to being located between the curb and the curb extension. Where the pedestrians cross the bike lane, the bike lane angles into a ramp, allowing pedestrians to cross the bike lane at the grade of the sidewalk. Bicyclists yield to pedestrians at crossings.

Traffic Control

Three roundabouts are included in Theme 2. The roundabout at Woods Valley Road is a two-lane roundabout. Single lane roundabouts with tapers are included at the intersections at Miller Road and at Lilac Road. On the approach to the intersections at Lilac Road and at Miller Road, Valley Center Road will be tapered from two-lanes in each direction (4-lane roadway) to one lane

entering the single-lane roundabout. Single lane roundabouts are smaller than a two-lane roundabout, so reducing the travel lanes from four to two results in a smaller roundabout at the intersections.

Traffic signals are included at Mirar De Valle, New Road, Indian Creek Road and Cole Grade Road. The traffic signals at Mirar De Valle and New Road (new road of Park Circle development, just north of Mirar De Valle) are conditioned as part of the Park Circle mixed use development that was under construction when this report was prepared. Depending on timing, other development projects may be required to contribute to the construction of the Mirar De Valle traffic signal. An approved discretionary permit has a condition for a traffic signal at Miller Road; however specific intersection control may be reevaluated at the time traffic warrants are met.

Although some traffic signals may not meet warrants in either the North or South Villages, the devices are recommended to meet the overall goals of providing slower speeds and improved access along the corridor. The limited disruptions in traffic flow along the corridor under the existing condition has resulted in speeds higher than the posted speed limit. The traffic signals will provide controlled access for left turns along the corridor and will improve driver awareness of intersections and the potential need to stop. These visual cues will help maintain driver awareness and help to reduce speeds in the corridor.

Traffic Calming

Three features in Theme 2 aim to reduce traffic speeds: curb extensions, roundabouts and narrower lanes. Curb extensions are proposed at the signalized intersections along Valley Center Road: Mirar De Valle Road, New Road, and Indian Creek Road. They will reduce the pedestrian crossing distance and help reduce traffic speeds by narrowing the width of pavement between the raised median and the curb extension. Where the curb extension is proposed along the edge of a travel lane, the bicycle lane shifts from a location adjacent to travel lanes to being located between the sidewalk and the curb extension. A raised pedestrian crossing across the bike lane allows pedestrians to cross at-grade from the sidewalk, across the bike lane, to the curb extension. The crossing distance across Valley Center Road is reduced by 16 feet compared to the existing condition.

In addition to serving as a traffic control device, roundabouts are effective at reducing speeds. At Woods Valley Road, the roundabout will help reduce speeds as drivers enter the South Village, and will help establish the rural village environment by integrating landscape and art to help create a sense of place. At Lilac Road and Miller Road, the road tapers from four to two lanes approaching and through the single lane roundabouts, reducing travel speeds along the corridor. Drivers will need to slow down to merge into a single lane and to travel through the roundabouts. The two single lane roundabouts will help to reduce speeds through the existing curve in Valley Center Road, which has some of the highest reported speeds along the Valley Center Road corridor.

In order to provide the buffer between the bike lanes and the travel lanes, travel lanes are reduced from 12 feet to 11 feet the length of the corridor. The narrower lanes help create friction which in turn results in reduced travel speeds without affecting the capacity of the roadway.

Raised Medians

Raised medians are proposed in the South Village between Woods Valley Road and Old Road with gaps in the median at signalized intersections and at the one-way stop-controlled intersection at Sunday Drive. Between Old Road and Miller Road, the median is modified where the four-lane section of roadway narrows to two lanes for the single lane roundabout. As a result, the existing driveway located immediately north of Lilac Road will be restricted to right turns.

In the North Village, raised medians are proposed between Miller Road and Cole Grade Road with gaps at the signalized intersection of Indian Creek Road and at Valley Center Community Church driveway. The raised medians will restrict left-turn movements and vehicles will be required to make U-turns at the nearest intersection where U-turns are permitted.

Other Key Features

New streetlights would be included along the length of the corridor. Streetlight spacing and type will be determined in final design. The streetlights would adhere to the County Light Pollution Code and Valley Center Design Guidelines.

THEME 3: VILLAGE FOCUS

Theme 3 focuses on improvements that create a unique character in each of the two villages. In the North Village, Valley Center Road is narrowed to two lanes (one in each direction) and includes roundabouts at Miller Road and Cole Grade Road. These features aim to slow traffic along the corridor to create a walkable corridor with buffered bicycle lanes and on-street parking. In the South Village, narrower lanes and traffic signals aim to improve access and connectivity within the commercial core. **Table 4** summarizes the key Concept Elements included in Theme 3. The following describes the theme in greater detail.

Table 4: Theme 3 Concept Elements

Elements of Theme 3		
Roundabout	Single Lane	✓
	Two-Lane	
	Single Lane w/ Taper	✓
Curb-Extension		
Controlled Ped. Crossing (Signal or HAWK)		
Raised Median		✓
Sidewalk		✓
Pathways		✓
Travel Lanes Reduced from 4 to 2 in North Village		✓
Class IV Separated Bikeway with Flexible Delineator Posts		✓
Class II Bike Lanes with Buffer		✓
Gateway Feature		✓

Pedestrian Facilities

Theme 3 provides a continuous pedestrian path of travel on both sides of Valley Center Road from Cole Grade Road to Miller Road and from Lilac Road to Woods Valley Road. Between Miller Road and Lilac Road the Heritage Trail is provided on the west side of the street, but there is no sidewalk on the east side. Per the Valley Center Community Right of Way Development Standards, in the Villages, a Type D Pathway is allowed on the west and north side of Valley Center Road and a sidewalk is allowed on the east and south side of Valley Center Road. Marked pedestrian crossings across Valley Center Road are provided at signalized intersections and roundabouts only. There are no controlled pedestrian crossings in this theme, outside of the signalized intersections.

Bicycle Facilities

Class IV Separated Bikeways with flexible delineator posts are provided between Miller Road and Woods Valley Road. At or near conflict areas (i.e. intersections and driveways) green pavement markings would replace the striped buffer and bollards where vehicles cross the bicyclists path of travel.

Between Miller Road and Cole Grade Road, buffered Class II Bike Lanes are provided to allow access to the on-street parallel parking. The buffer is provided between the travel lanes and the bicycle lane. At or near conflict areas (i.e. intersections and driveway) green pavement markings would replace the striped buffer where vehicles cross the bicyclists path of travel.

At the two roundabouts in North Village, bicyclists may use the multi-use path to bypass riding through the roundabout or they may merge with traffic and travel through the roundabout. For bicyclists who choose to ride through the roundabout, a gap in the buffer and bollards allows them to exit the bicycle lane and to merge into traffic. For bicyclists who choose to use the multi-use path, ramps are provided where the bikeway approaches the multi-use path. The multi-use path is the wider sidewalk around the roundabout that can be used by both pedestrians and bicyclists. The multi-use path is provided around the roundabout only and connects with either sidewalk or the Heritage Trail. If a cyclist chooses to use the multi-use path, they would dismount their bicycles and cross the legs of the roundabout with pedestrians in the marked crosswalks.

Traffic Control

Traffic signals are included at Woods Valley, Mirar De Valle, New Road (new road of Park Circle development, just north of Mirar De Valle), Old Road and Lilac Road. The traffic signals at Mirar De Valle and New Road will be constructed by the Park Circle mixed use development, which was under construction at the time this report was prepared. Depending on timing, other development projects may be required to contribute to the construction of the Mirar De Valle traffic signal. The series of traffic signals in the South Village aim to improve access to existing commercial and planned mixed use developments in the commercial corridor. These signals will improve pedestrian access between businesses along the corridor and improve access to existing transit stops.

Single lane roundabouts are included at Miller Road and at Cole Grade Road. Valley Center Road narrows from two-lanes in each direction (4-lane roadway) north of Lilac Road to one-lane entering the proposed single-lane roundabout at Miller Road and remains one-lane in each direction (2-lane roadway) between Miller Road and the Cole Grade Road.

Traffic Calming

Three features in Theme 3 will help reduce travel speeds along Valley Center Road: road diet, roundabouts and narrower lanes. The road diet occurs in the North Village where the corridor narrows from four lanes to two lanes. This narrowing will effectively reduce the travel speeds through the corridor. The section from Cole Grade Road to Miller Road is also flanked by single lane roundabouts, which will help establish the slower speeds entering the North Village as the speed entering and through the roundabout will be about 35 mph. The combination of lane reduction and roundabouts will help maintain the slower speed along the corridor.

Between Miller Road and Woods Valley Road, narrow lanes and the raised median aim to reduce traffic speed. The existing 12-foot lanes are narrowed to 11 feet and a continuous median is provided from Miller Road to Lilac Road. The friction caused by narrowing the lanes will help reduce traffic speeds.

Raised Medians

The existing two-way left turn lane through the South Village remains unchanged in this section. The existing raised medians between Mirar De Valle and Lilac Road remain unchanged in this theme. A continuous raised median is proposed between Lilac Road and Miller Road with no gaps at any driveways or intersections. As such, the intersections at Chaparral Terrace and at Canyon Road will be restricted to right turns only. The median closures at these intersections under this theme would prevent head-on or broadside collisions. Stakeholders have expressed concerns about high speeds along the curve and dangerous left turns at these intersections. In the North Village, a continuous raised median extends from Cole Grade Road to Miller Road except at Indian Creek Road. Access at driveways would be restricted to right turn only through this section. By restricting left-turn movements at driveways and intersections, vehicles will be required to make U-turns at the nearest intersection. The roundabouts at either end of the North Village section of the corridor would provide an opportunity for drivers to U-turn.

Other Key Features

New streetlights would be included along the length of the corridor with pedestrian scale lighting along the Heritage Trail. Streetlight spacing and type will be determined in final design. The streetlights would adhere to the County Light Pollution Code and Valley Center Design Guidelines.

On-street parallel parking will be provided along Valley Center Road in the North Village. The additional parking is not only a benefit to the nearby retail shops and restaurants, but also acts as a traffic calming measure along Valley Center Road.

A gateway treatment is included in Theme 3, south of Woods Valley Road in the form of a monument or sign to serve as a welcome to the community.

7. CONCEPT DRAWINGS

The attached figures illustrate the elements included in each of the themes and cross-sections for selected locations along the corridor. The figures are labeled as follows:

Figure EX-1	Existing Conditions
Figure 1-1	Theme 1, Concept Plan
Figure 1-2	Theme 1, Cross Sections
Figure 2-1	Theme 2, Concept Plan
Figure 2-2	Theme 2, Cross Sections
Figure 3-1	Theme 3, Concept Plan
Figure 3-2	Theme 3, Cross Sections

In addition, figures are provided that illustrate the conceptual design of the corridor in three sections:

- Section A: Woods Valley Road to south of Sunday Drive
- Section B: Sunday Drive to north of Lilac Road
- Section C: Canyon Road to Cole Grade Road

The key map below illustrates the extent of each of the sections. For each of the sections, the key elements of Existing Conditions, Theme 1, Theme 2 and Theme 3 are shown in Figure 30.

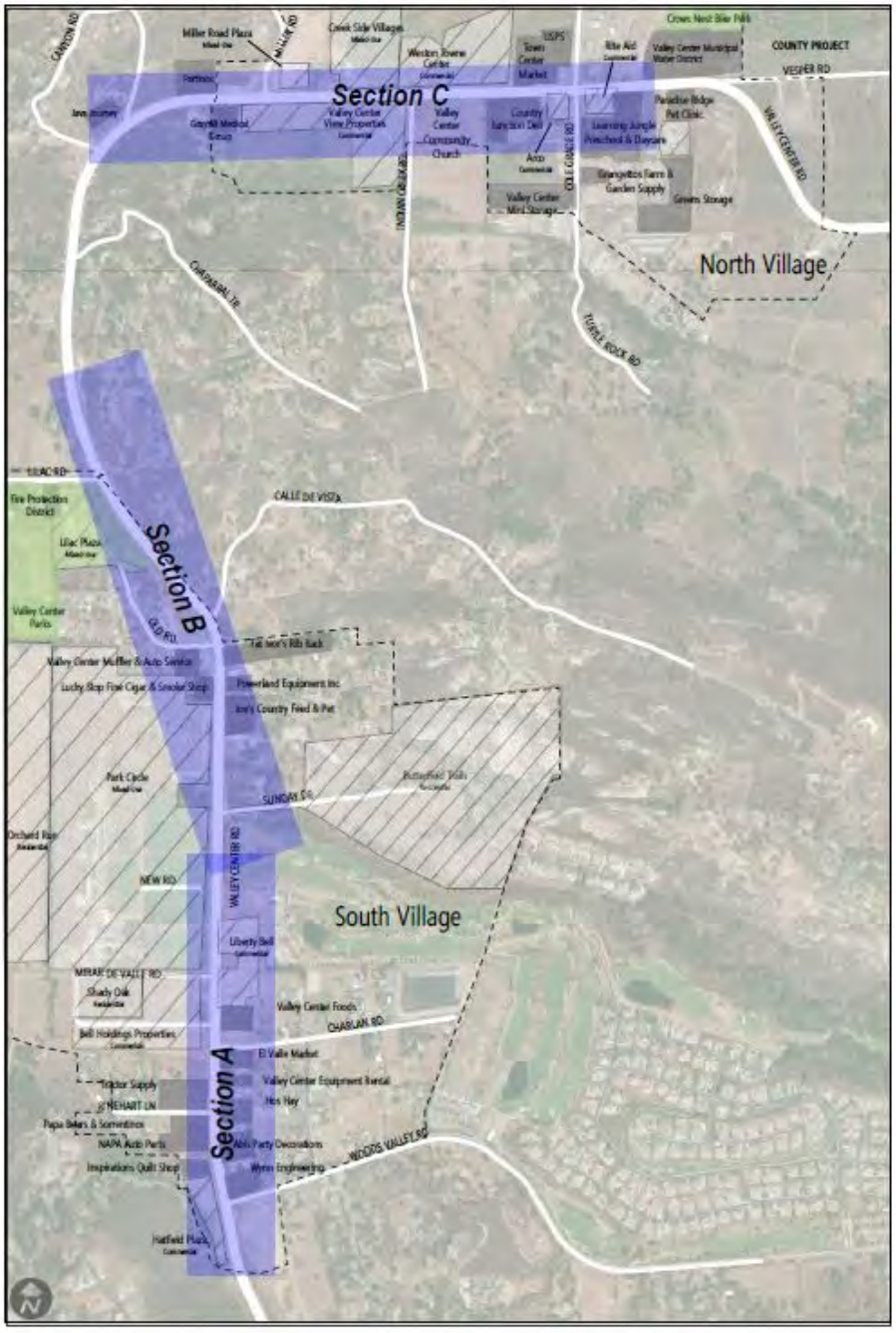


Figure 30: Theme Key Map

Draft Corridor Concept Plan

Attachment D: Workshop #1 Summary

Michael Baker INTERNATIONAL

Valley Center Road Corridor Concept Plan

Community Kickoff Workshop Summary

Workshop Date:
March 12, 2019

Michael Baker INTERNATIONAL

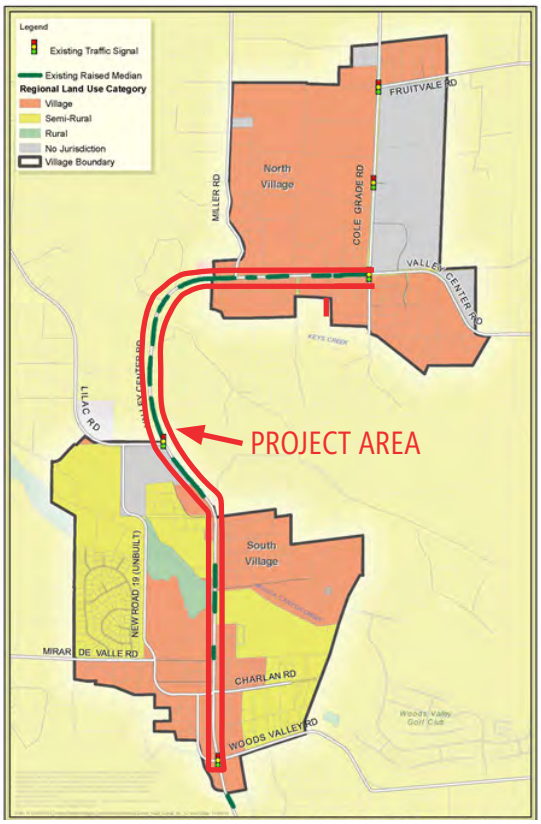
alta PLANNING + DESIGN

Executive Summary

The County of San Diego is currently developing the Valley Center Road Corridor Concept Plan (Corridor Concept Plan) to enhance the safety and accessibility of Valley Center Road approximately from Cole Grade Road in the North Village to Woods Valley Road in the South Village. The plan will identify a range of recommendations to address the needs of all users, including pedestrians, bicyclists, equestrians, transit riders, and drivers.

The project kicked-off in December 2018 and is anticipated to run through February 2021. This project will coordinate with the Valley Center Community Plan Update, which is also underway and will be informed by the results of the Corridor Concept Plan.

The first of the three workshops was the Community Kickoff Workshop and was held on March 12, 2019 from 6:00 – 8:30 pm at Valley Center Middle School and was attended by approximately 80 people. This document summarizes the engagement process and key findings of the Community Kickoff Workshop.



Valley Center Road & Community Villages
Access Management Study Area

Timeline

Plan Kickoff

- Existing Conditions Evaluation
- Community Kickoff Workshop *March 12, 2019*
- Alternatives Analysis
- Community Workshop #2
- Preferred Concept Plan Technical Analysis
- Community Workshop #3
- Technical Analysis of Preferred Alternative
- Preferred Alternative Conceptual Design
- Final Report
- Draft Report
- Funding and Implementation Analysis

Plan Completion

Workshop Process

The Community Kickoff Workshop consisted of a combination of presentations and interactive exercises organized around four major components:

- Welcome, polling exercise, and project overview
- Existing conditions analysis and input
- Design treatment best practices and priorities
- Questions and answers, next steps, and concluding remarks

Workshop participants listening to the Existing Conditions Presentation

The goals of the Community Kickoff Workshop were to:

UNDERSTAND your ideas and concerns by identifying challenges and opportunities.

SHARE existing conditions analysis findings about Valley Center Road.

DISCUSS the study area boundaries.

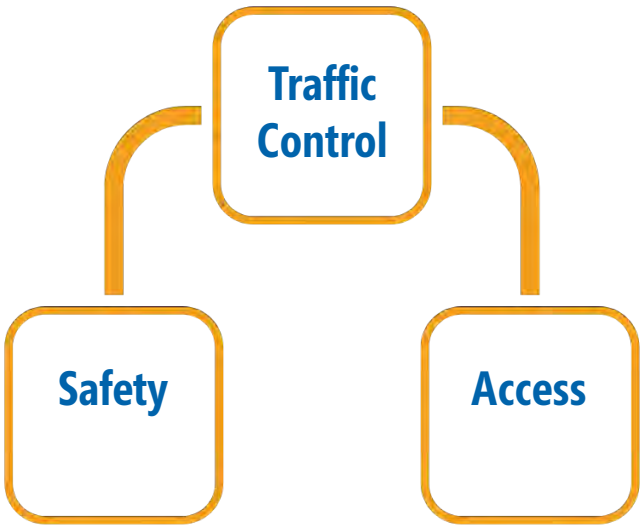
ESTABLISH community priorities.

EXPLORE design treatments for increased safety.

PRESENT trade-offs and best practices for different design treatments.

Workshop participants looking over display boards showing the number of collisions and the goals and outcomes

During the workshop, participants shared their mobility concerns and priorities using comment cards and by participating in the two interactive exercises. Most comments were associated with the following three themes:



Workshop participants during the first interactive exercise and sharing their experiences on Valley Center Road

Workshop Activities & Input Received

The workshop began in an open house format, allowing participants to view and discuss several exhibits displayed around the room. These exhibits presented the goals and intended outcomes of the workshop and summarized key findings from the existing conditions analysis. After this short viewing period, participants sat at one of eight tables where they remained for the rest of the workshop. Discussions at each table were lead by one to two facilitators. Each portion of the workshop included a presentation by the project team and an interactive exercise.

Quick Questions - Polling Exercise

At the beginning of the workshop, participants were asked five questions in a live polling exercise. Using a cell phone or wifi-enabled device, participants answered questions about how they experience and use the corridor. The polling results were displayed in real time so that the group understood the various perspectives represented. Workshop participants were able to complete the poll on paper, if preferred.

Out of the 48 local residents who participated in the polling exercise, the following results showed:

100% of survey participants said they drove to the workshop

54% of survey participants said they are a member of a community organization

91% of survey participants said they haven't ridden the bus in Valley Center

15% of survey participants said they typically carpool to work or school

59% of survey participants said they have walked, run, or biked along Valley Center Road's pedestrian or bike facilities

14% of survey participants said they have ridden horses on the Heritage Trail adjacent to Valley Center Road

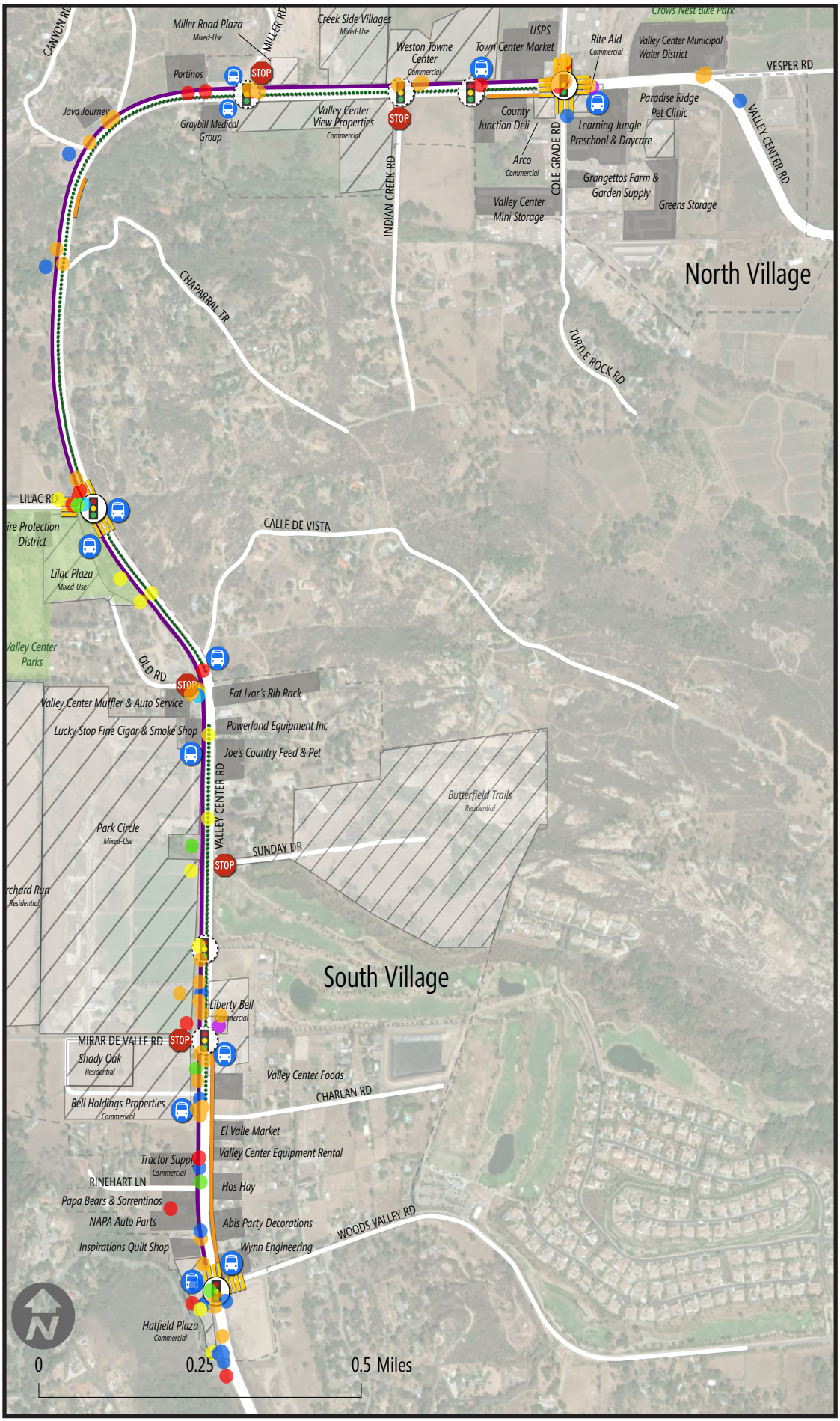
Existing Conditions: Where are the Issues?

The project team provided a summary of existing conditions, including analyses of intersection operations, roadway segments, crash data, speeds, as well as pedestrian, bicycle, and transit conditions.

After the presentation, each group engaged in an interactive exercise to share their thoughts on the locations with the most pressing challenges and greatest opportunities. Led by a facilitator, each group was equipped with a table-sized map, markers, pens, and post-it notes: red post-its to note negative characteristics, and green post-its to note positive characteristics. Participants were asked to write down their thoughts on the post-it notes or write on the map and discuss with the group.

Workshop participants noted the Heritage Trail as a positive characteristic and ultimately would like to see more trails and walking paths along Valley Center Road. Most participants noted challenges throughout the study area. A map is provided on the following page displaying the common themes participants noted on each map. The map is then broken into four segments displaying the positive characteristics and corridor challenges along with common comments participants noted on each map.

What Did We Hear?



Comment Types

- 48 Vehicle access comments
- 47 Overall safety comments
- 35 Streetscaping comments
- 22 Pedestrian access comments
- 6 Land use and surrounding development comments
- 5 Bicycle access comments
- 4 Equestrian use comments

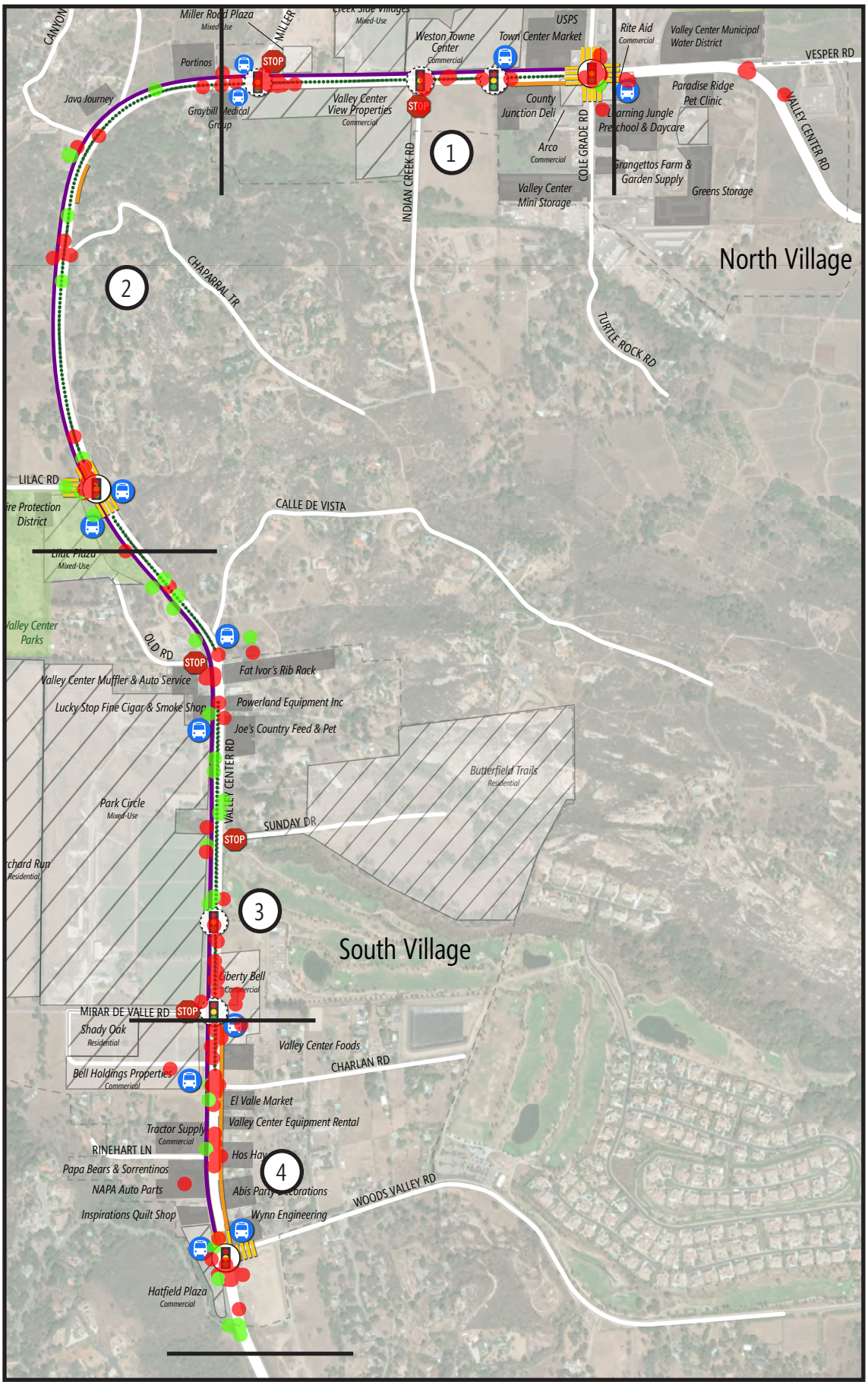
EXISTING STREET FEATURES

- Bus Stop
- Stop Sign
- Traffic Signal
- Crosswalk
- Median
- Heritage Trail
- Sidewalk
- Village Boundaries
- Commercial Areas
- Parks

PLANNED DEVELOPMENT

- Potential Traffic Signal
- Planned Development

What Did We Hear?



Comment Types

- Positive Characteristics
- Corridor Challenges

EXISTING STREET FEATURES

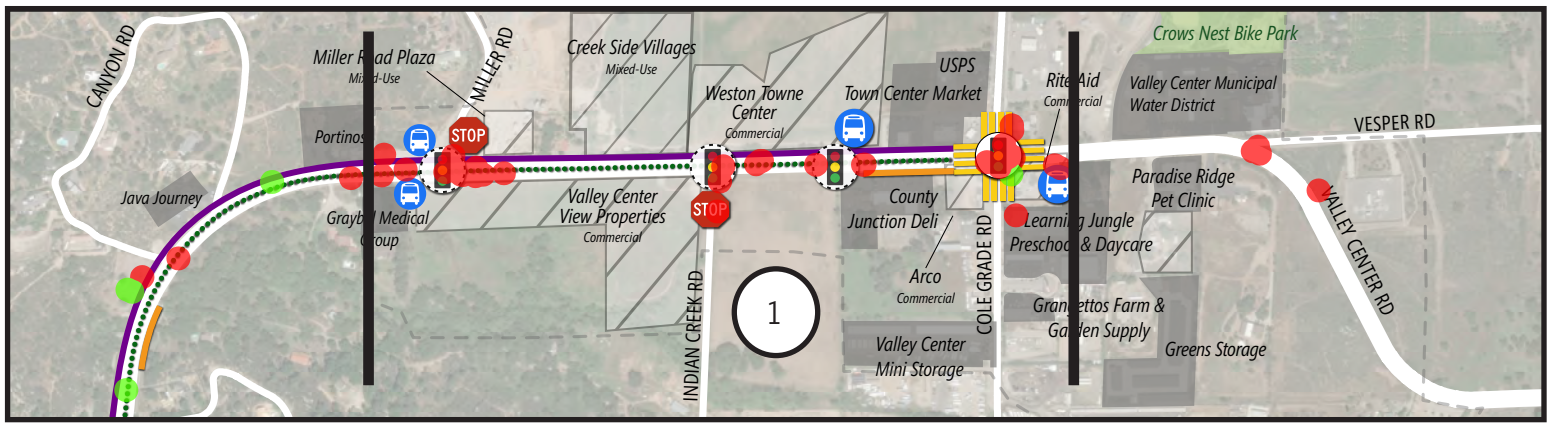
- Bus Stop
- Stop Sign
- Traffic Signal
- Crosswalk
- Median
- Heritage Trail
- Sidewalk
- Village Boundaries
- Commercial Areas
- Parks

PLANNED DEVELOPMENT

- Potential Traffic Signal
- Planned Development

What Did We Hear?

A sampling of comments received during this first interactive exercise is provided below, grouped by corridor segments. To access all of the comments received during this exercise and the other interactive exercises for this workshop, see to project web page at: **https://www.sandiegocounty.gov/pds/CommunityGroups/vcroadstudy/**



Positive Characteristics:

Equestrian use comments:

- Heritage Trail and equestrian crossing button are very nice for people with horses

Streetscaping comments:

- Landscaped median
- Heritage Trail is a delightful addition to the community

Corridor Challenges:

Vehicle access comments:

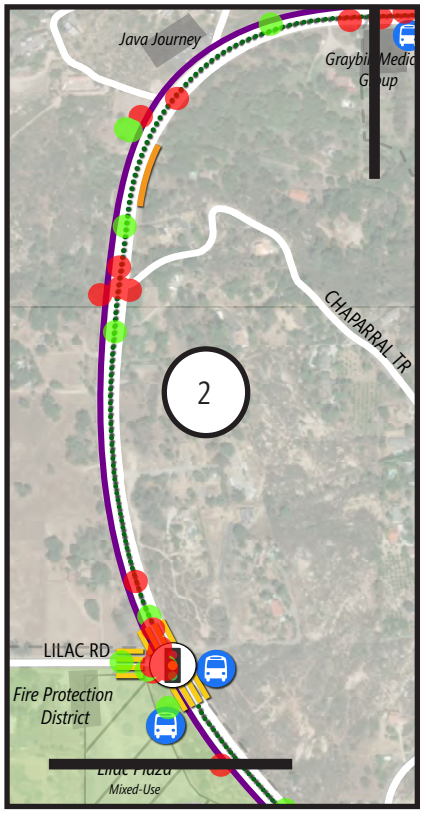
- Planned signals are too close together, there are too many signals
- The curve at Vesper Road and Valley Center Road is very dangerous
- Exiting and entering the gas station is very dangerous
- People drive too fast along this road
- U-turns by the Church, Pala Vista Market, County Junction Deli, and the medical center are very challenging
- The intersection at Valley Center Road and Cole Grade Road is very confusing, too many lanes

Pedestrian access comments:

- This area is not pedestrian friendly

Streetscaping comments:

- Maintain vegetation



Positive Characteristics:

Vehicle access comments:

- The signal at Lilac Road and Valley Center Road

Streetscaping comments:

- Heritage Trail is really nice, especially when it departs from the road
- The trees and native plants along the Heritage Trail and the median

Corridor Challenges:

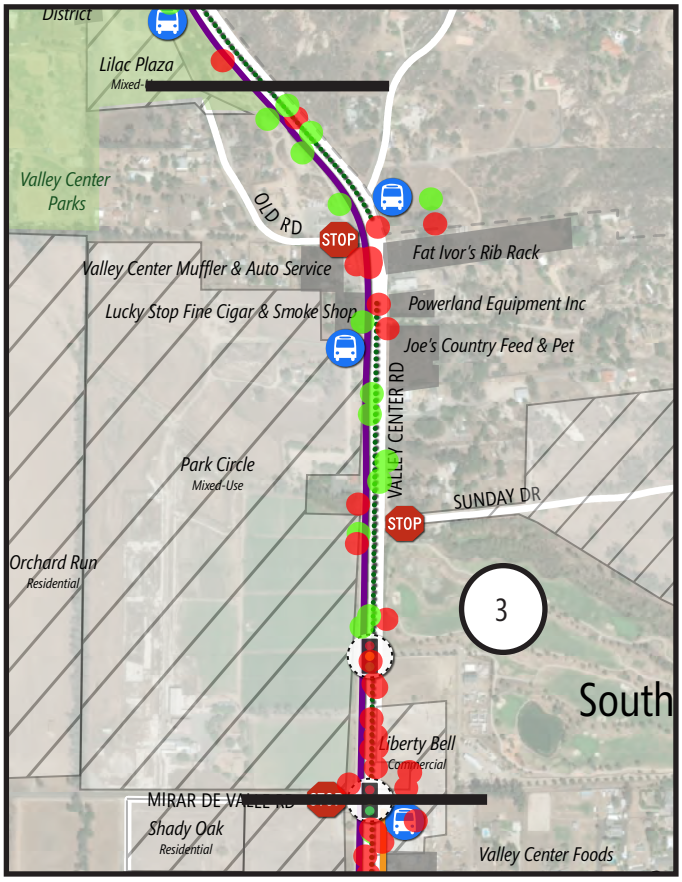
Vehicle access comments:

- Poor line of sight turning left on Valley Center Road from Old Road
- There is too much stop and go traffic
- Vehicles go way too fast along Valley Center Road
- Very unsafe turning onto Valley Center Road, hard to see speeding cars
- Need more dedicated right turn lanes to help flow of traffic
- More crosswalks
- Very unsafe turning from Chaparral Terrace to Valley Center Road

Streetscaping comments:

- Erosion on the Heritage Trail and dead vegetation

What Did We Hear?



Positive Characteristics:

Streetscaping comments:

- Heritage Trail is great for the community, would love to see it expand
- Vegetation along the median

Land use/development comments:

- We love Park Circle

Corridor Challenges:

Vehicle access comments:

- Mixed traffic along the Heritage Trail can be difficult
- Poor line of sight trying to get on Valley Center Road
- No more signals along Valley Center Road
- Speed is too high along Valley Center Road, can't turn into businesses

Bicycle access comments:

- More bicycle facilities are needed
- Need wider bike lanes along Valley Center Road

Pedestrian access comments:

- More pedestrian facilities are needed
- Pedestrians have been killed trying to cross Valley Center Road

Equestrian use comments:

- Equestrian trails should have some separation from roadway like a rail fence

Streetscaping comments:

- Dead vegetation along Heritage Trail
- Noise makes the Heritage Trail not as peaceful

Positive Characteristics:

Streetscaping comments:

- Heritage Trail, would like to see it connect to other trails
- Future Valley Center Gateway would be a great addition

Corridor Challenges:

Vehicle access comments:

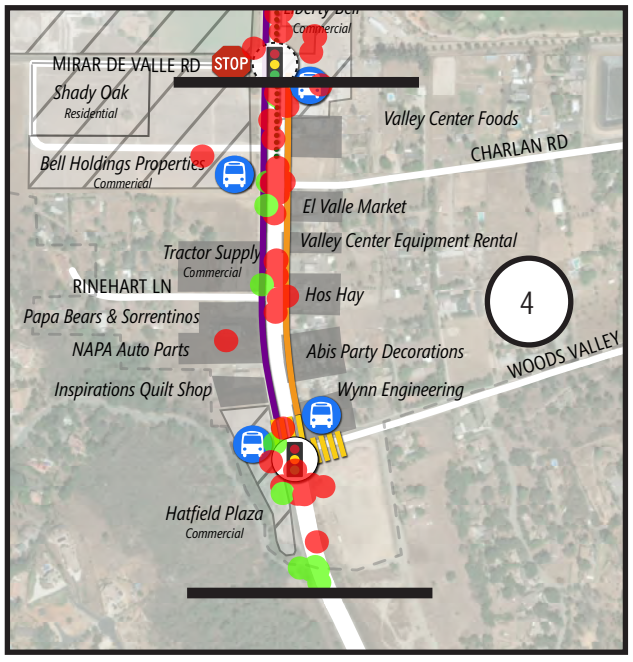
- Accidents at Woods Valley Road and Valley Center Road
- There is a lot of traffic, have to wait a long time to get through Valley Center Road
- No more planned signals at intersections
- High speeds make Valley Center Road very dangerous
- Very dangerous turning left onto Valley Center Road from Mirar de Valle Road and Banbury Drive
- Would love to see more roundabouts instead of signals

Bicycle access comments:

- Bicycling is dangerous, there is no separation for bike riders
- Bus stop and bike lane conflicts

Streetscaping comments:

- No median in the South Village
- Vegetation along Heritage Trail needs to be maintained



Workshop Activities & Input Received

A sampling of comments received during this second interactive exercise is provided below, grouped by corridor segments. To access all of the comments received during this exercise and the other interactive exercises for this workshop, see to project web page at: **https://www.sandiegocounty.gov/pds/CommunityGroups/vcroadstudy/**

CORRIDOR PRIORITIES

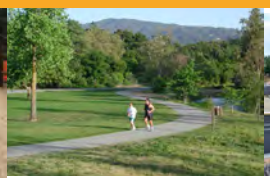
Participants were asked to identify their top three priorities they would like to see on Valley Center Road during the corridor priorities interactive exercise. Participants were given numbered stickers that were placed on two large boards displaying various roadway treatments. Below, are the top three preferred treatments workshop participants would like to see within the study area.

TOP 3 PREFERRED TREATMENTS

Out of 139 numbered stickers placed, the top three preferred treatments are:

Raised Medians

Trails



Roundabouts

OTHER REFERENCED TREATMENTS RECEIVING VOTES

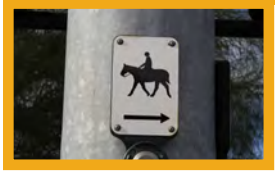
Signalized Intersections

Bulb-Outs

Mid-Block Crossings

Commercial Areas

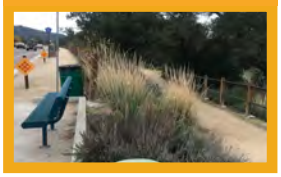
Equestrian Access



Bicycle Facilities

Gateways

Streetscaping



ROUNDABOUTS VS. SIGNALS

The project team presented on the tradeoffs and best practices associated with potential design solutions for the corridor. After the presentation, participants were asked to fill out a worksheet listing the pros and cons associated with roundabouts and signalized intersections. Below, are the common themes participants noted for roundabouts and signalized intersections.

ROUNDABOUTS

PROS 45

Slows traffic speeds, reducing collision frequency and severity
Improves traffic flow
Provides landscaping opportunities
Aesthetically appealing
Lower maintenance costs

CONS 46

Unfamiliar to many drivers
Large footprint required, especially to accommodate larger vehicles
Expensive construction
Slower speeds may impact mass evacuation
May be more difficult for pedestrians to cross

SIGNALIZED INTERSECTIONS

PROS 41

Familiar to drivers (especially non-locals)
Smaller footprint
May be less expensive to construct
May enable faster evacuation in an emergency
Potentially easier/safer for pedestrians to cross

CONS 36

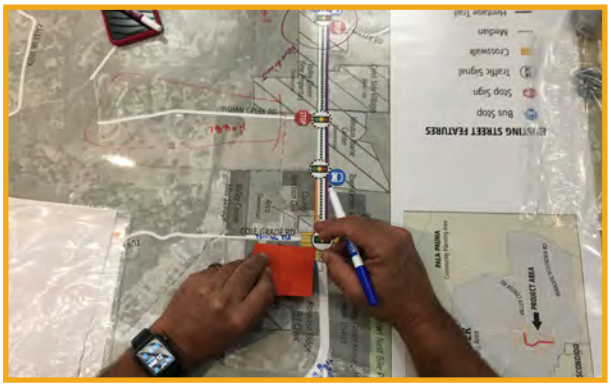
Congestion and long wait times - more emissions
Seem prone to collisions; greater collision severity
Not aesthetically appealing
Ongoing maintenance costs
Operations are impacted during power outages

Overall Takeaways & Next Steps

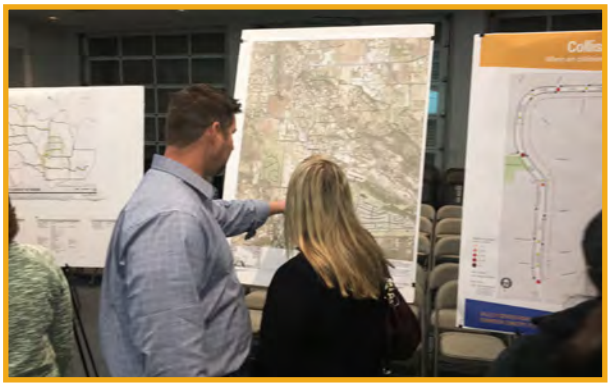
Below is a list of key takeaways from the workshop:

- Many attendees expressed safety concerns related to the high speeds drivers are traveling along the corridor.
- Some attendees brought up concerns about difficult turning movements along the corridor, in particular:
- U-turns from Valley Center Road westbound, into the Old Town Center parking lot just west of Cole Grade Road
- Right turns onto Lilac Road from southbound Valley Center Road and the need for a turn lane
- Ingress/egress turns to and from the small commercial center at Canyon Road and Valley Center Road, near the curve in Valley Center Road
- Additional comments noting safety issues with ingress/egress at other businesses along the corridor
- Left turns onto Valley Center Road northbound from Old Road, with high speeds and low visibility
- Some attendees were concerned about the potential for signalized intersections being too close together, which excessively disrupts the flow of traffic and travel times.
- Some attendees noted the difficulties in riding a bike along Valley Center Road, due to the high speeds and not enough separation from cars.
- Some attendees felt that Valley Center Road and the additional road network in the Villages would not be able to handle additional future traffic volumes coming from planned development along the corridor.
- Some attendees highlighted the aesthetic improvements associated with landscaped medians.
- Some attendees pointed out the improved pedestrian atmosphere associated with the Heritage Trail along portions of Valley Center Road, while also pointing out the need to fill in the gaps along the corridor where there is currently no trail or sidewalk.
- Some attendees expressed support for a community gateway feature near Woods Valley Road.

Workshop participants introducing each other before the workshop



A workshop participant writing down a challenge during the first interactive exercise



Workshop participants discussing the project area being shown on the display boards

To access all of the input received for the interactive exercises, see the project web page at: **https://www.sandiegocounty.gov/pds/CommunityGroups/vcroadstudy/**

The next steps of this project is the development of roadway concept alternatives and supporting information to inform the development of preferred alternatives.

Draft Corridor Concept Plan

Attachment E: Workshop #2 Presentation Materials

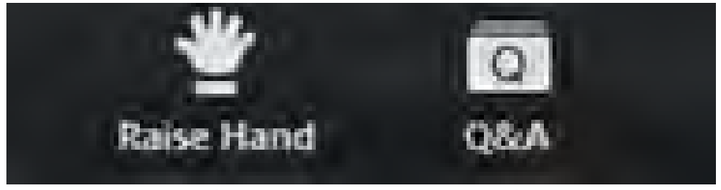
Michael Baker INTERNATIONAL

VALLEY CENTER ROAD CORRIDOR CONCEPT PLAN

Workshop 2: Exploring Treatments by Theme

AUGUST 25, 2020

Logistics



If you're experiencing any difficulties, please raise your hand

Type questions at any time during the presentation. Referencing a slide number will help

Agenda

- Background & Workshop 1 Summary
- Toolbox: Considerations for Corridor Improvements
- Corridor Themes
- Project Implementation
- Q&A
- Online Activity

Introduction: Workshop Objectives

- Understand the types of treatments that calm traffic
- Present treatments that target community concerns
- Obtain feedback on treatments of the plan the community would like the County to explore further

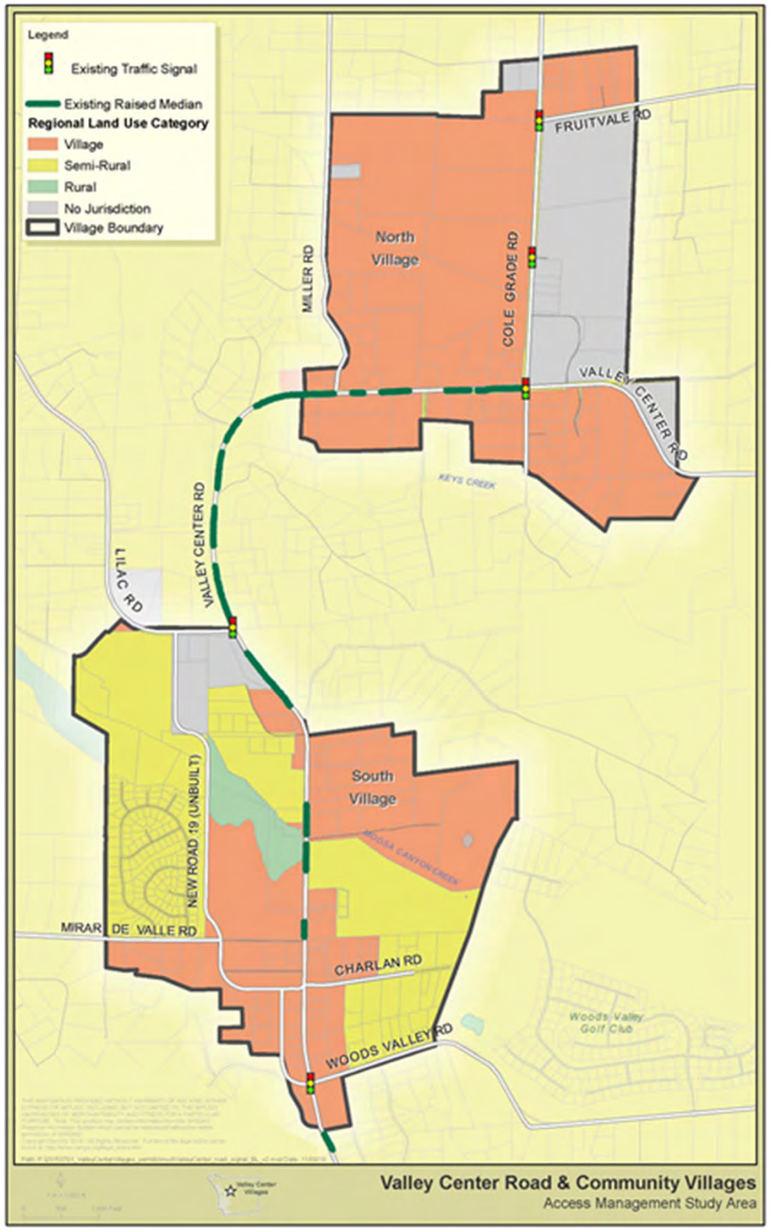
Concepts presented represent options that may become part of a plan for the corridor and may be considered for implementation in the long term

Background: Project Focus & Grant

- Study area encompasses Valley Center Road from Cole Grade Road to Woods Valley Road

- Project focus:
  - Formalize a corridor access management strategy
  - Safe ingress and egress from adjacent streets and driveways
  - Address operations from the perspective of all users

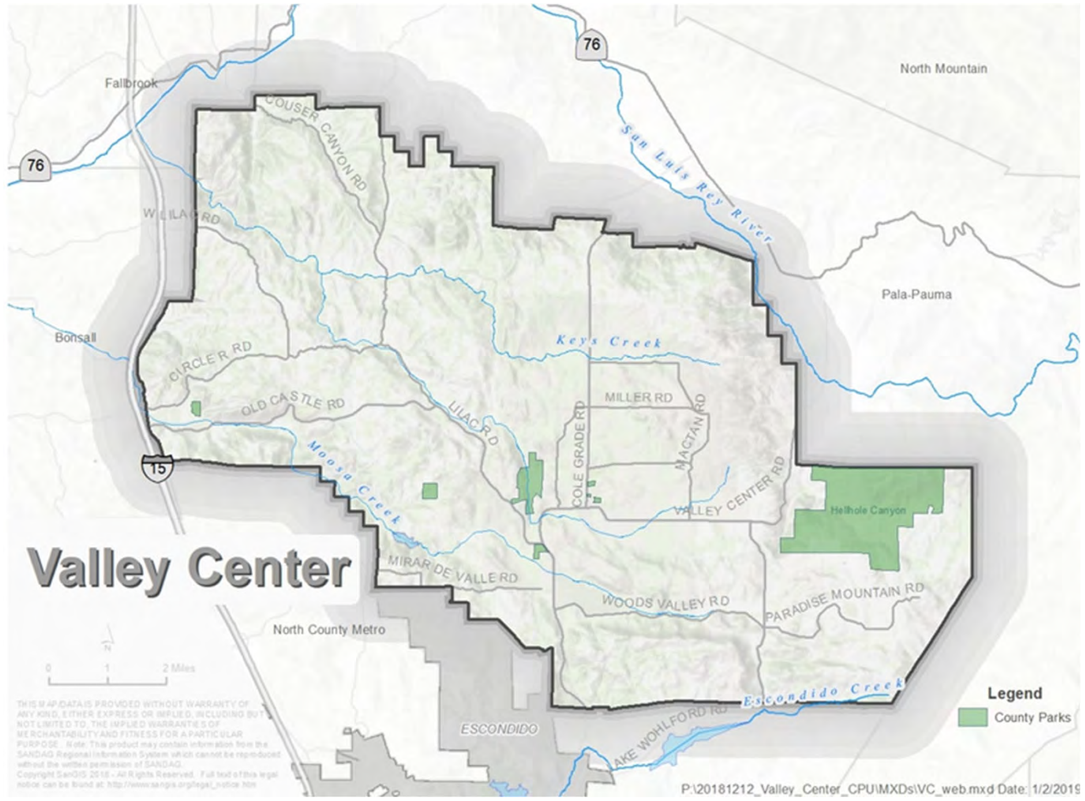
- Caltrans Sustainable Communities Grant (Senate Bill 1)



Background: Related Project
Valley Center Community Plan Update

- Comprehensive update of the Community Plan

- Address Land Use, Mobility, Conservation and Open Space, Housing, Safety, Design Guidelines, and other topics



Background: Existing Conditions

South Village

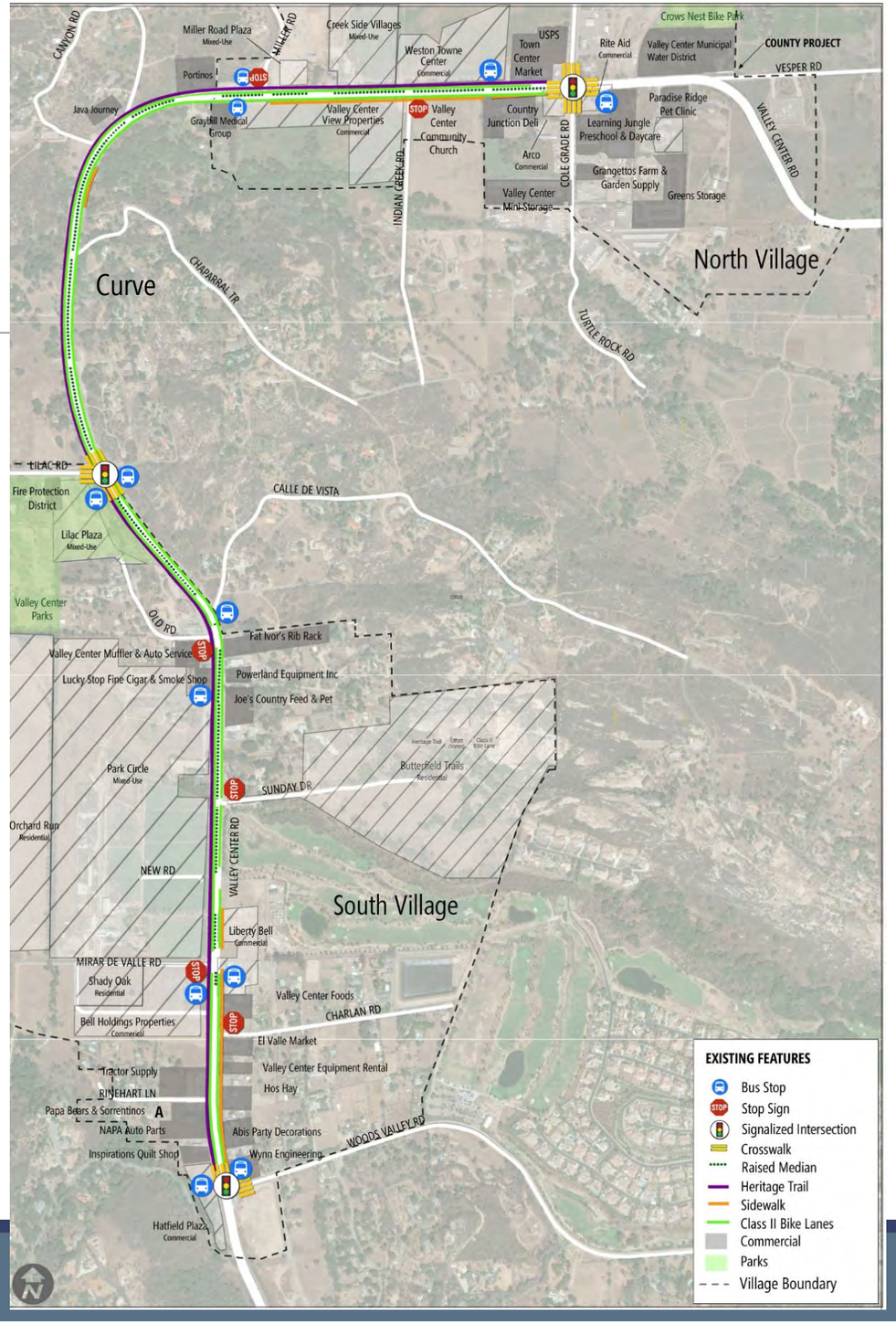
- Divided median and intermittent turn lanes

Curve

- Major Road with raised median

North Village

- Boulevard with raised median

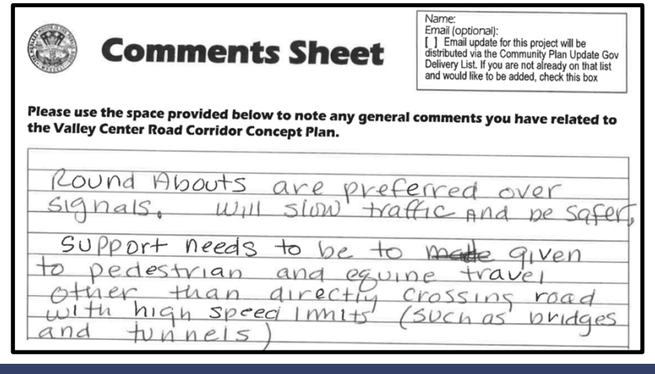


Background:
Existing Conditions Analysis

- Roadway Segments
- Intersections
- Speed
- Crash Data
- Pedestrians
- Bicycles
- Transit

Background: Workshop 1

Working in Groups for Mapping Activity



Comments Sheet

Name:
Email (optional):
[ ] Email update for this project will be distributed via the Community Plan Update Gov Delivery List. If you are not already on that list and would like to be added, check this box

Please use the space provided below to note any general comments you have related to the Valley Center Road Corridor Concept Plan.

Round Abouts are preferred over signals. Will slow traffic and be safer,

Support needs to be to ~~made~~ given to pedestrian and equine travel other than directly crossing road with high speed limits (such as bridges and tunnels)

- Three interactive exercises were conducted to solicit feedback
  - Polling Exercise – Who's in the Room
  - Mapping Exercise – Identify Existing Issues
  - Best Practices Discussion – Pros and Cons of Treatment Options
- Comment Cards Provided for General Input

"Need to accommodate future traffic without increasing time to travel the corridor"

"Slower traffic speeds while improving vehicle flow"

"Make it visually attractive"

"Address access to businesses"

"Reduce frequency and severity of collisions"

"Increase pedestrian and bicycle connections"

140+
comments received

Background: Forming Themes

- Three themes
- Based on types of comments received in the first workshop
- Unique emphases, but are not exclusive from one another
- Composed of design treatments from our toolbox

Pedestrian & Bicycle

Traffic Calming

Village

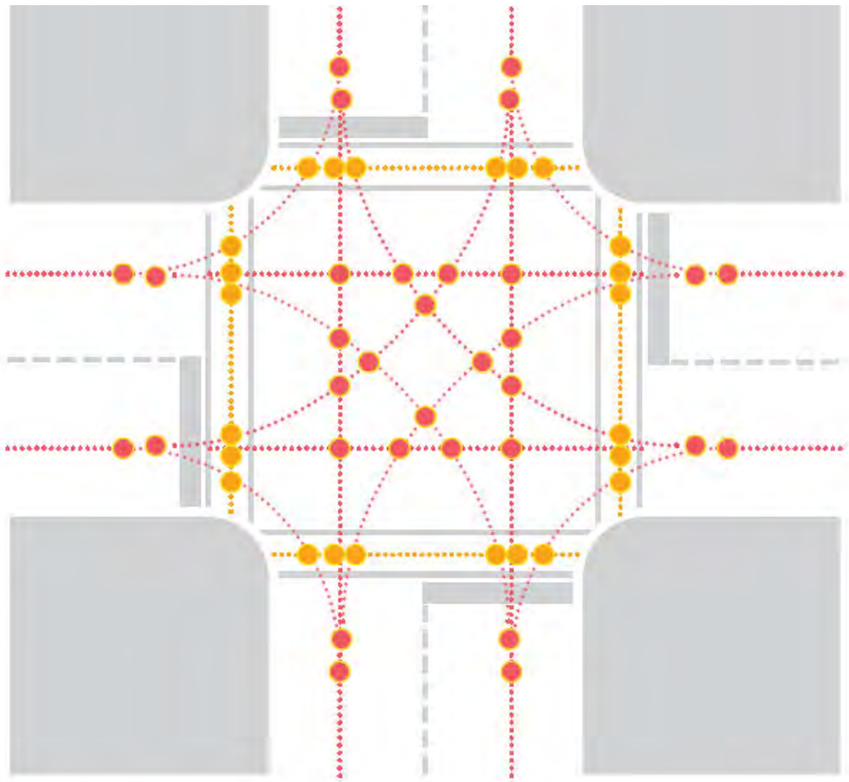
Toolbox

CONSIDERATIONS FOR CORRIDOR IMPROVEMENTS

Intersection Control: Roundabouts

Sedona Arizona – source: IPTC Metadata

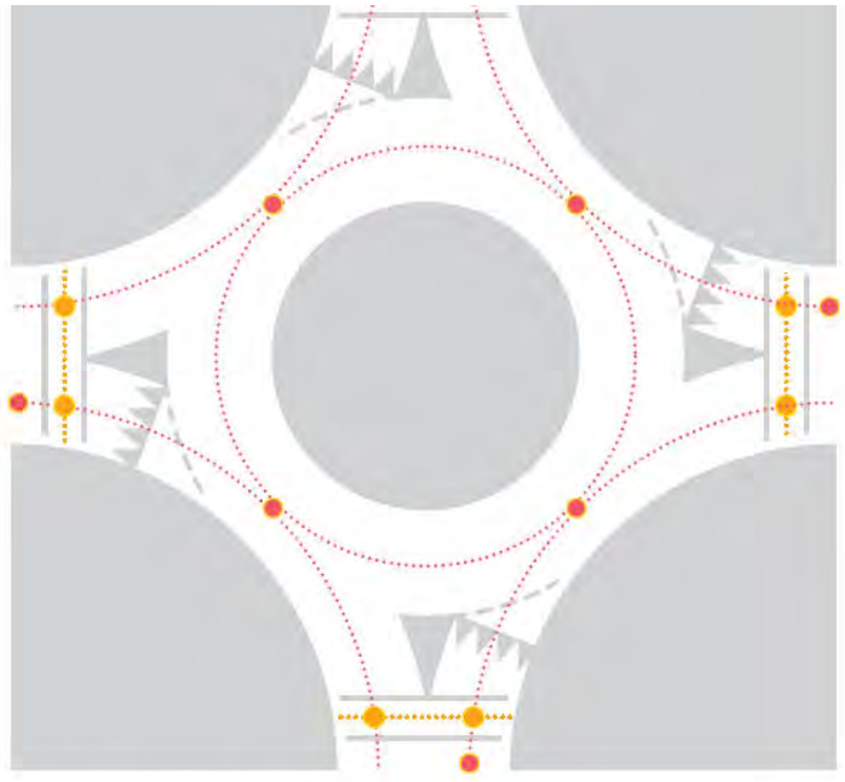
- Vehicles yield to traffic that is already in the roundabout
- Traffic travels counterclockwise around a center island
- Bikes merge with traffic before entering the roundabout, or dismount and use sidewalks



Four Way Stop

32 Vehicle Conflicts

24 Pedestrian Conflicts



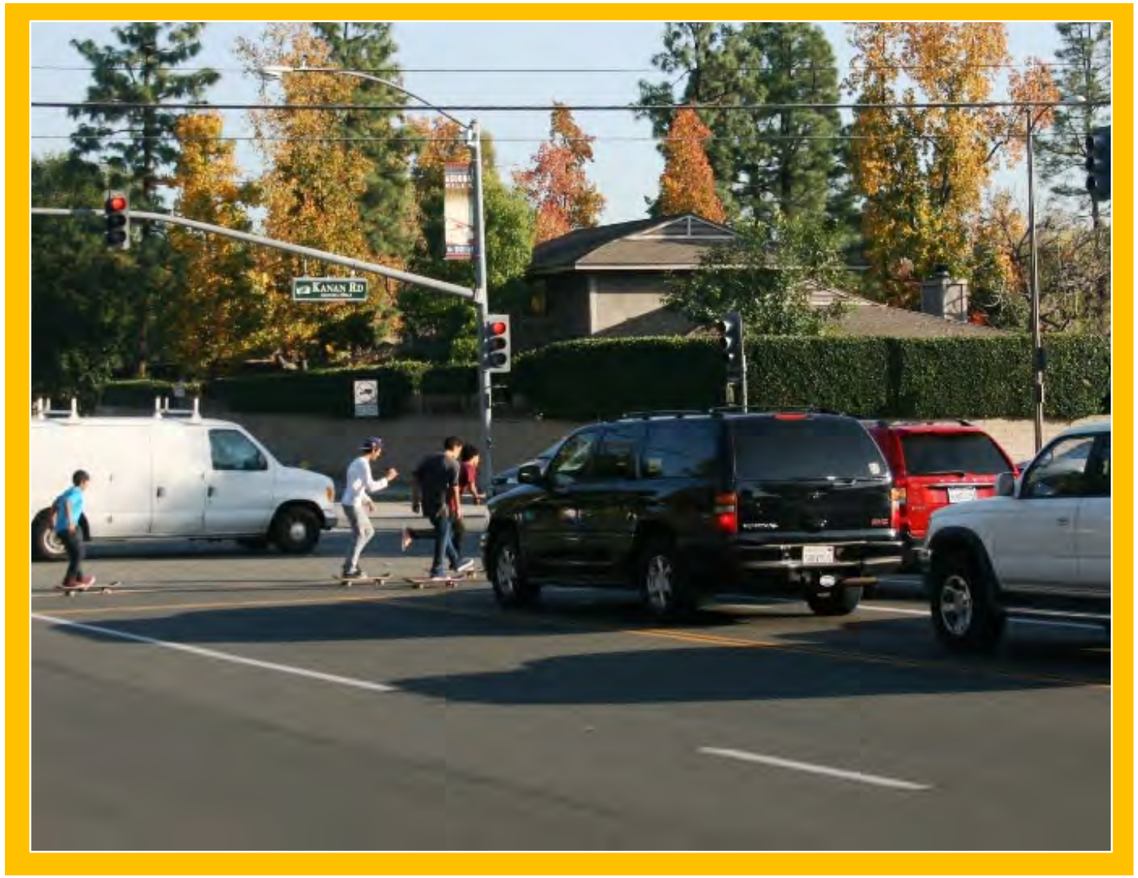
Roundabout

8 Vehicle Conflicts

8 Pedestrian Conflicts

Roundabouts vs. Intersections | Conflict Points

Intersection Control: Signalized Intersection



- Vehicles comply with traffic signals, coming to a full stop at a red light
- Traffic travels in opposite directions
- Bike lanes continue through intersection

Intersection Control:
Controlled Pedestrian Crossing

Pedestrian Hybrid Beacon (HAWK)

Pedestrian Signal

- Vehicles stop when activated by pedestrian
- Both provide a clear right-of-way for pedestrians
- Both support improved safety for pedestrians crossing at mid-block locations
- HAWK has special head for lights, where a pedestrian signal looks like a traditional traffic signal

Intersection Control:
Rectangular Rapid Flashing Beacon

Rectangular Rapid Flashing Beacon (RRFB)

- Flashing lights when activated by pedestrian
- Increase awareness for drivers of pedestrians crossing street

Traffic Calming: Curb Extensions

Midblock Curb-Extensions

Curb-Extensions at Intersection

- Midblock – narrows roadway to reduce speeds
- Curb Extensions at Intersection – tightens curve so turning vehicles slow down
- Both shorten crossing distance for pedestrians
- Both help make pedestrians and drivers more visible to each other

Traffic Calming & Access: Raised Median

- Physical barrier between traffic
- Pedestrians only have to cross one direction of travel at a time
- Can serve as a place of refuge for pedestrians and bicyclists who cross the street
- May reduce head-on and T-bone crashes

Bicycle Facilities:
Bike Lane with Buffer

- Provides a designated separation between bikes and moving traffic
- More comfortable than regular bike lanes, but still next to moving traffic
- Can narrow travel lanes and help slow traffic

Gateway Feature

- Creates a unique identifier for community (sense of place)
- Improved aesthetics and comfort
- Typically accompanied by landscaping

Questions?

Corridor Concept Development:
Exploring the Themes

Theme 1:
Pedestrian & Bicycle Focus

Theme 2:
Traffic Calming Focus

Theme 3:
Village Focus

Corridor Sections A, B & C

South Village (Section A)

Woods Valley Road to just south of Sunday Drive

Curve (Section B)

Sunday Drive to just south of Canyon Road

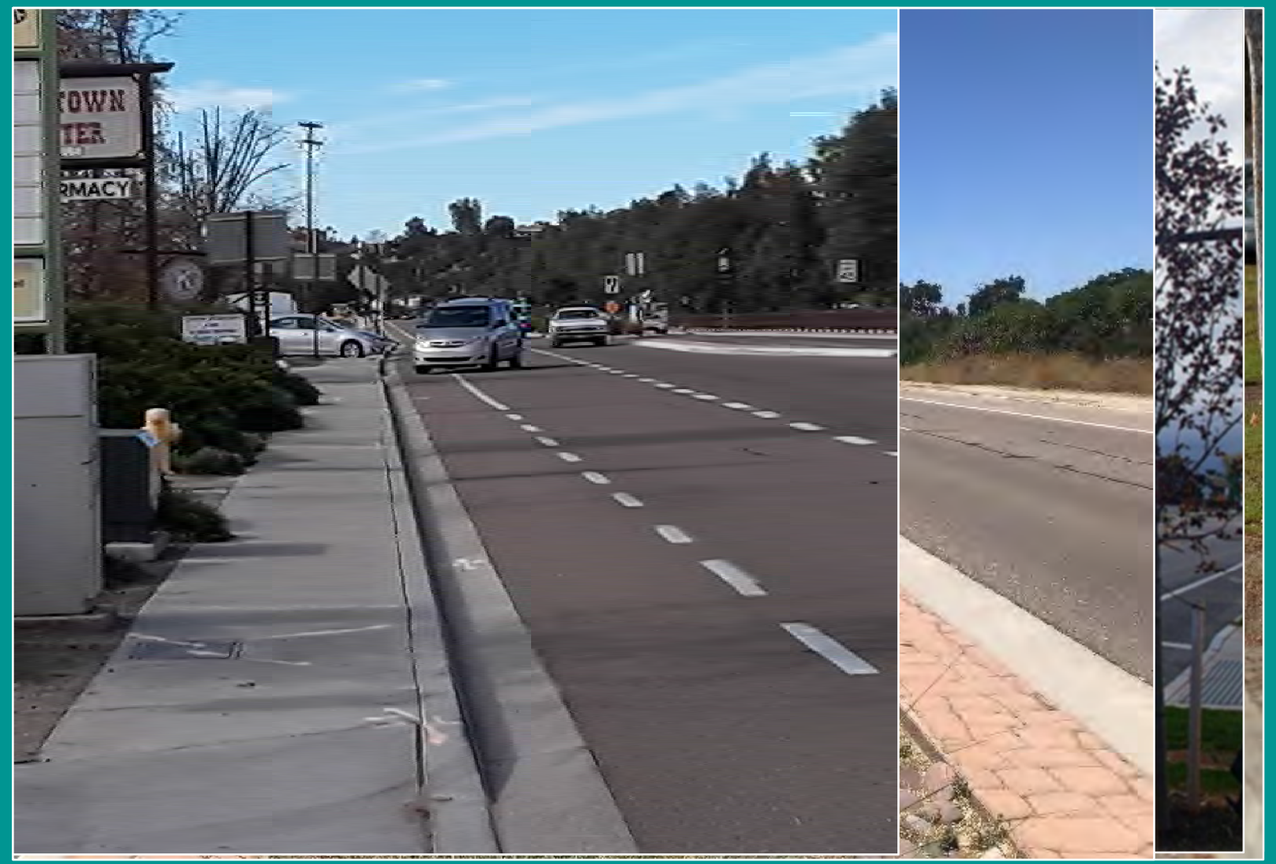
North Village (Section C)

Canyon Road to Cole Grade Road

Theme 1
Pedestrian & Bicycle Focus

Treatments of Theme 1

- Two-lane Roundabouts
- Curb Extensions
- Controlled Pedestrian Crossings
- Raised Medians
- Sidewalks
- Separated Bikeway with Flexible Delineator Posts



Theme 1
South Village (Section A)

WOODS VALLEY ROAD TO JUST SOUTH OF SUNDAY DRIVE

Theme 1
Curve (Section B)

SUNDAY DRIVE TO JUST SOUTH OF CANYON ROAD

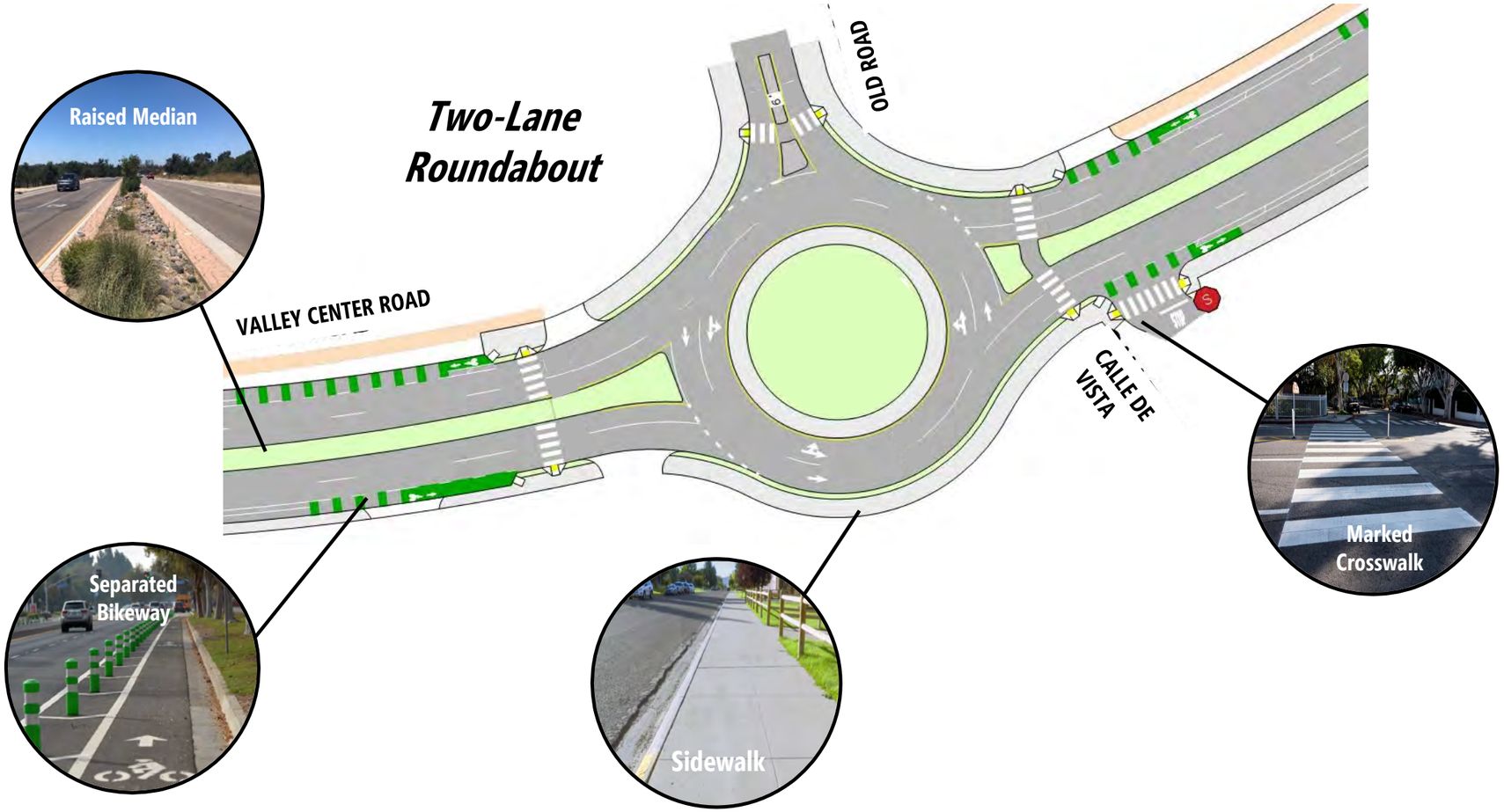

Pedestrian Signal (HAWK)


Two Lane Roundabout


Separated Bikeway

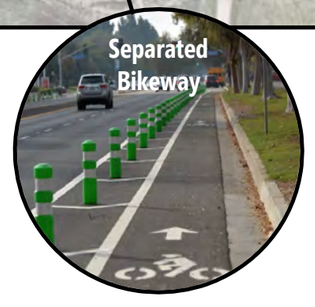

Sidewalk

Theme 1
Two Lane Roundabout



Theme 1
North Village (Section C)

CANYON ROAD TO COLE GRADE ROAD



Project Implementation Considerations

- Long term plan for the corridor
- Not included in existing capital budgets
- Will require a combination of financing mechanisms, including:
  - Frontage improvements associated with discretionary project applications
  - Grants – federal, state, and other
  - Potential options for local contributions (assessment districts)
- Additional details on implementation options will be presented at Workshop 3 this fall

Theme 1 – Rough Order Magnitude (ROM) Cost

ROM costs Theme 1: $57 million, includes:

- $25.4M - Construction (including contingency)
- $17.0M - Project delivery (environmental, engineering, ROW)
- $14.6M - Escalation (3% per year to 2030)

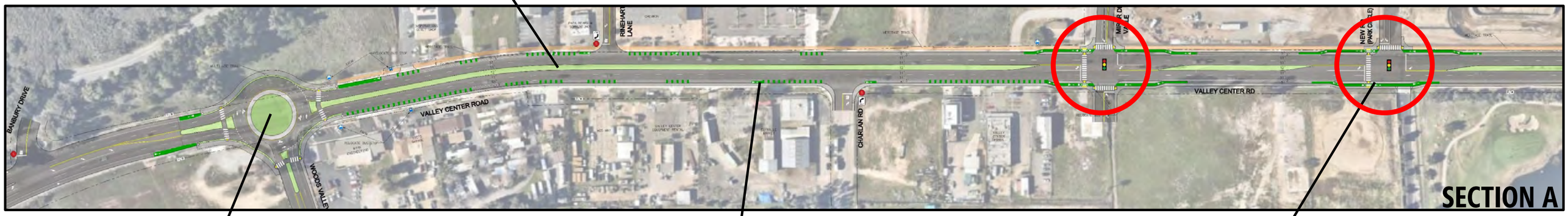
Theme 2 | Traffic Calming Focus

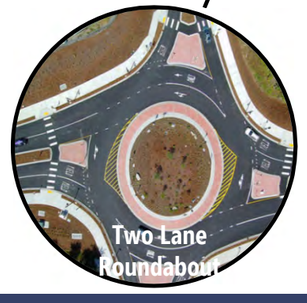
Treatments of Theme 2

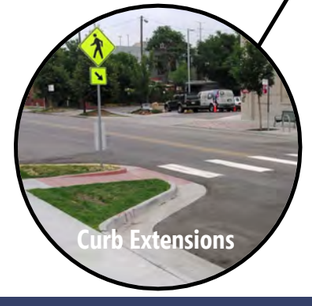
- One-lane Roundabouts with Taper
- Two-lane Roundabout
- Curb Extensions
- Controlled Pedestrian Crossing (Signal or HAWK)
- Raised Medians
- Sidewalks
- Separated Bikeway with Flexible Delineator Posts

Theme 2
South Village (Section A)

WOODS VALLEY ROAD TO JUST SOUTH OF SUNDAY DRIVE







Theme 2
Curve (Section B)

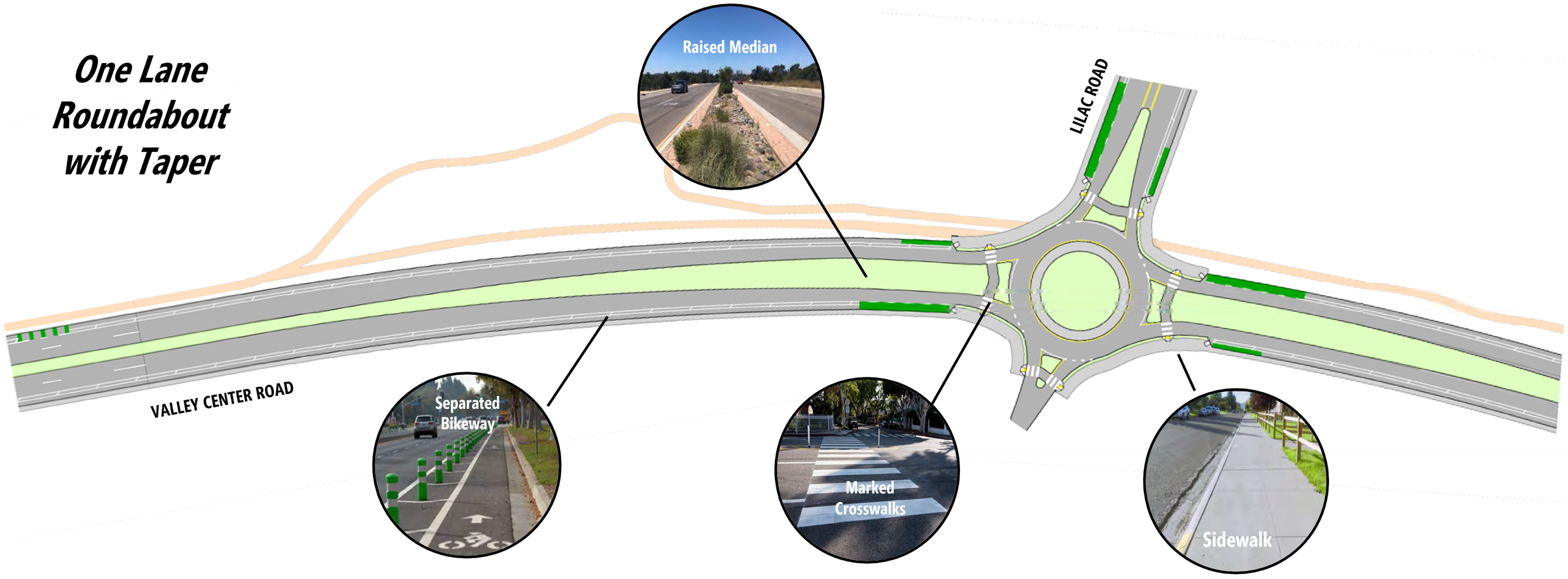
SUNDAY DRIVE TO JUST SOUTH OF CANYON ROAD

SECTION B

Theme 2

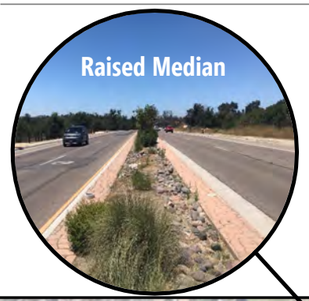
One Lane Roundabout with Taper

One Lane Roundabout with Taper



Theme 2
North Village (Section C)

CANYON ROAD TO COLE GRADE ROAD



Theme 2 – Rough Order Magnitude (ROM) Cost

ROM costs Theme 2: $60.8 million, includes:

- $27.1M - Construction (including contingency)
- $18.1M - Project delivery (environmental, engineering, ROW)
- $15.6M - Escalation (3% per year to 2030)

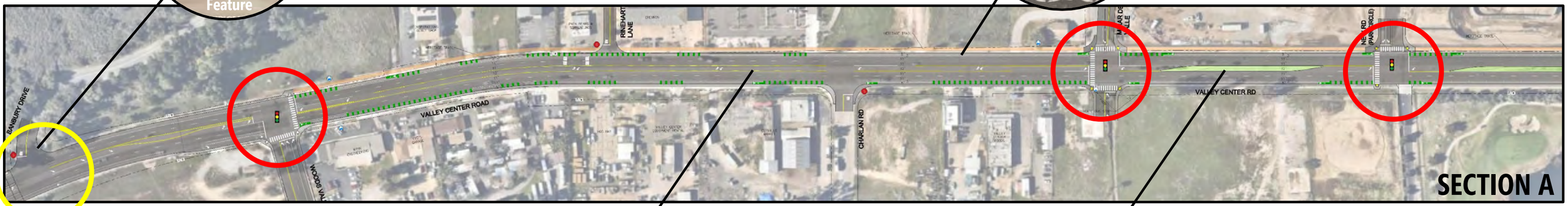
Theme 3 | Village Focus

Treatments of Theme 3

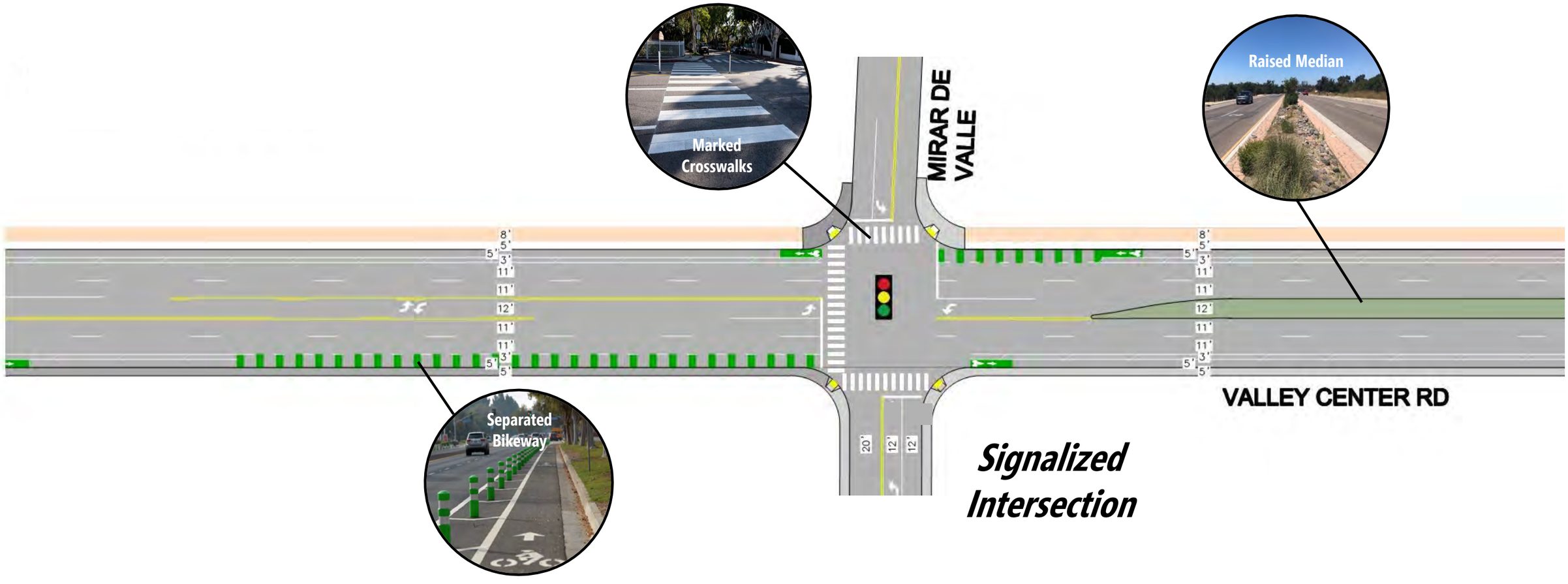
- One-lane Roundabouts with 2-lane Valley Center Road
- Raised Medians
- Sidewalks
- Separated Bikeway with Flexible Delineator Posts
- Bike Lanes with Buffer
- Rectangular Rapid Flashing Beacons
- Gateway Feature

Theme 3
South Village (Section A)

WOODS VALLEY ROAD TO JUST SOUTH OF SUNDAY DRIVE



Theme 3
Signals & Medians



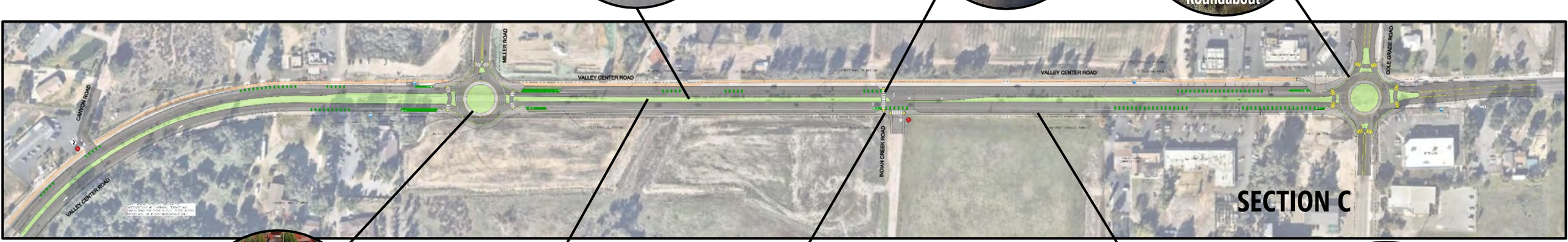
Signalized Intersection

Theme 3
Curve (Section B)

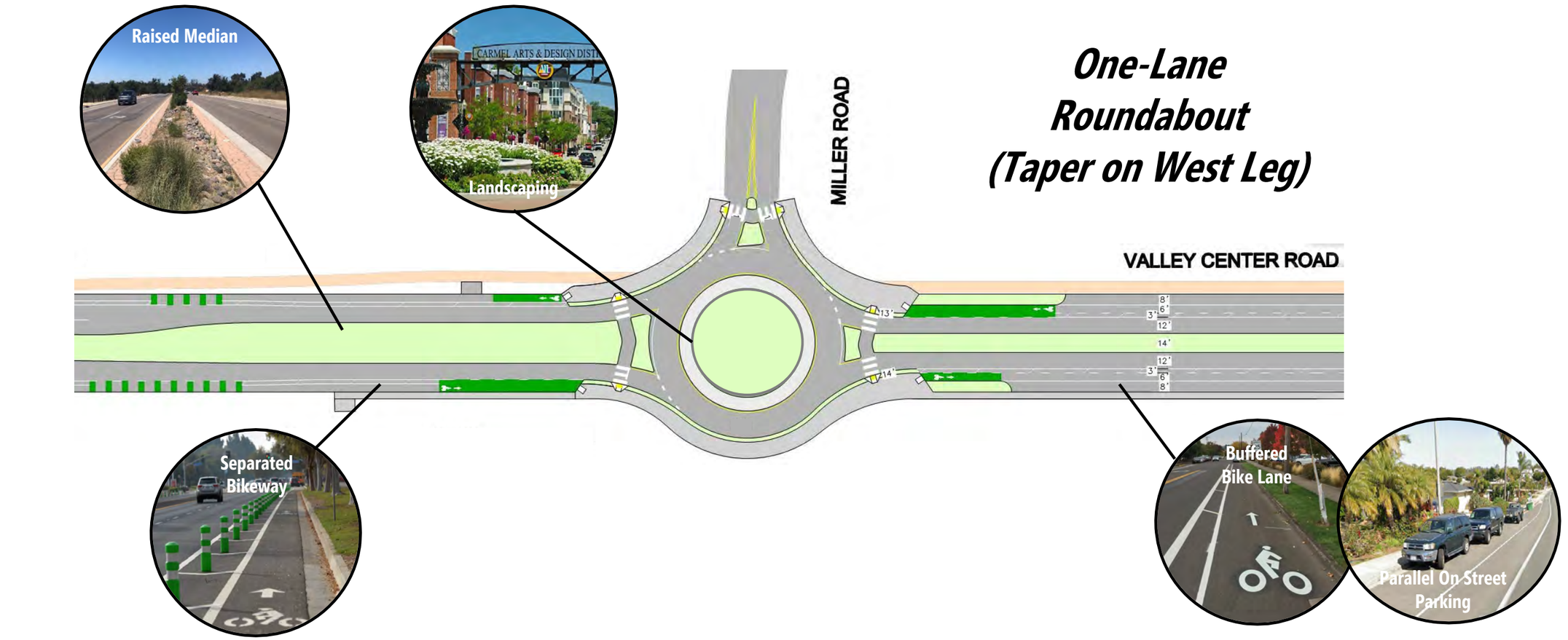
SUNDAY DRIVE TO JUST SOUTH OF CANYON ROAD

Theme 3
North Village (Section C)

CANYON ROAD TO COLE GRADE ROAD



Theme 3
Roundabout & Lane Reduction



One-Lane Roundabout (Taper on West Leg)

Theme 3 – Rough Order Magnitude Cost

ROM costs Theme 3: $55.3 million, includes:

- $24.7M - Construction
- $16.5M - Project delivery (environmental, engineering, ROW)
- $14.1M - Escalation (3% per year to 2030)

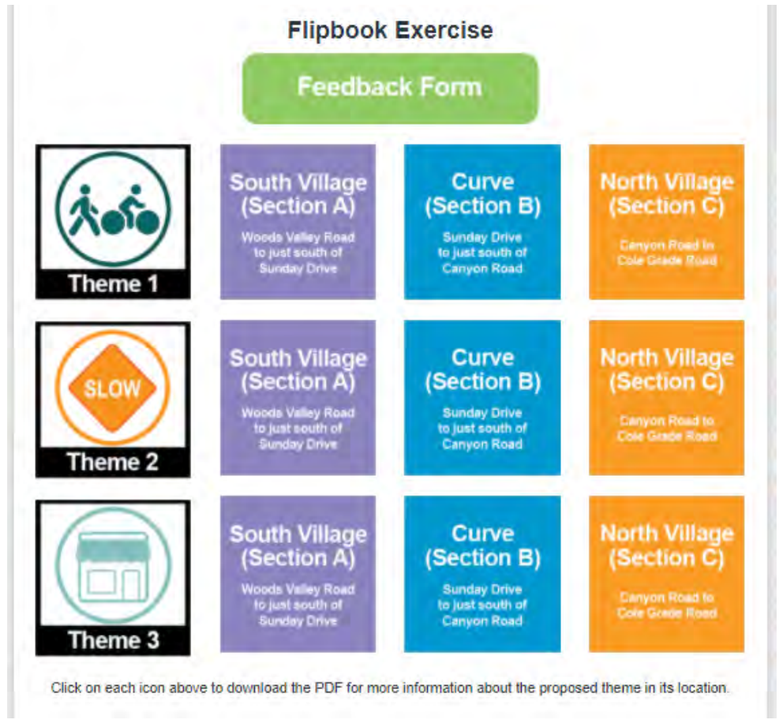
Q&A

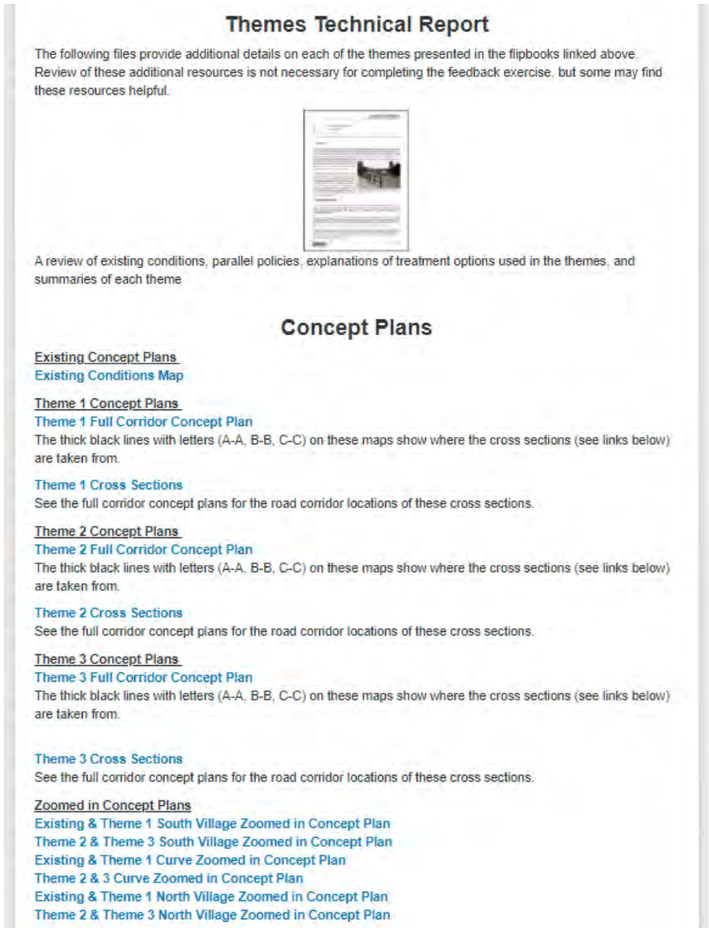
If you're experiencing any difficulties, please raise your hand

Type questions at any time during the presentation. Referencing a slide number will help

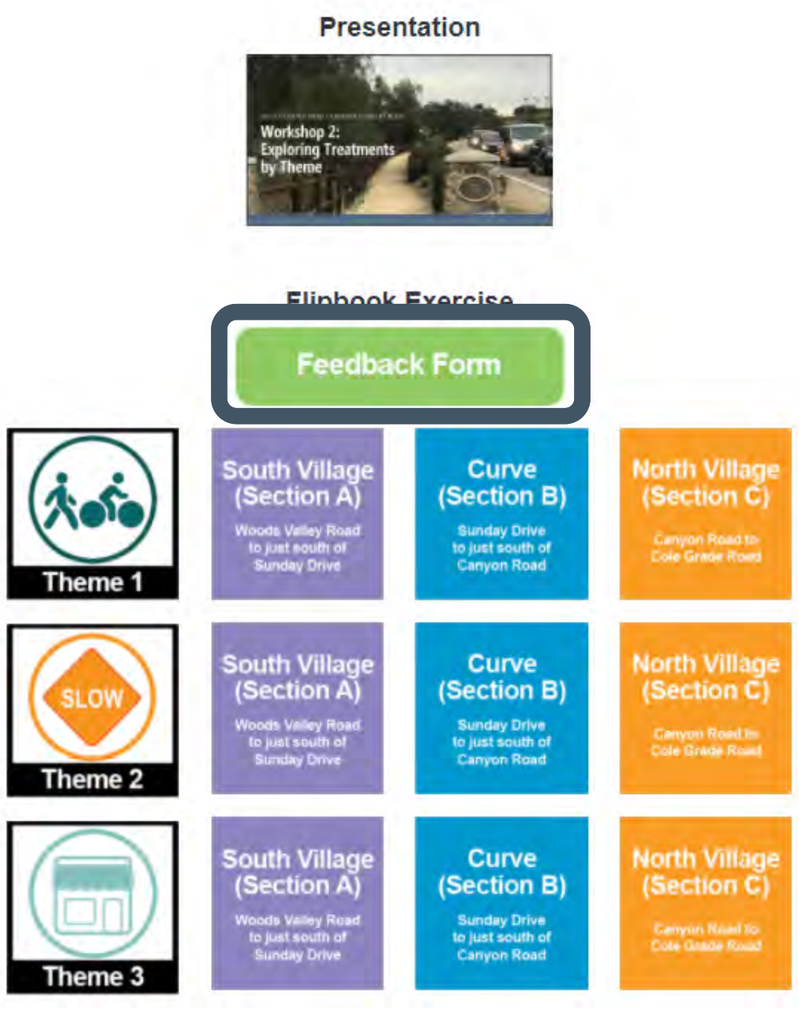
How to Provide Input / Feedback: Online Activity Demonstration

Online Resources



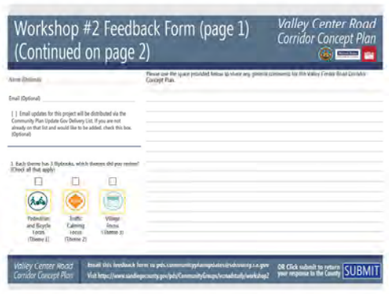


How to Provide Feedback from the Project Website



Step 1 → Step 2 → Step 3

Download the fillable feedback form (PDF)



This will guide you through the Themes

How to Provide Feedback from the Project Website

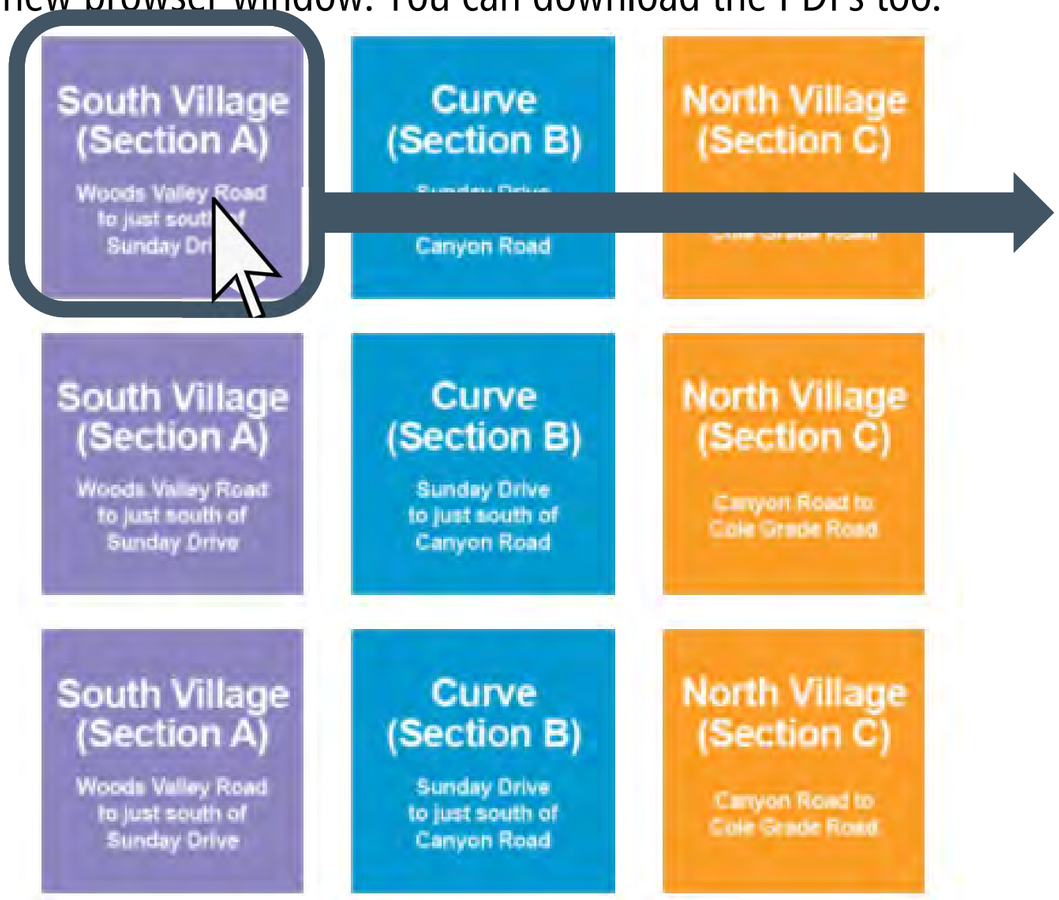
Step 1 → Step 2 → Step 3

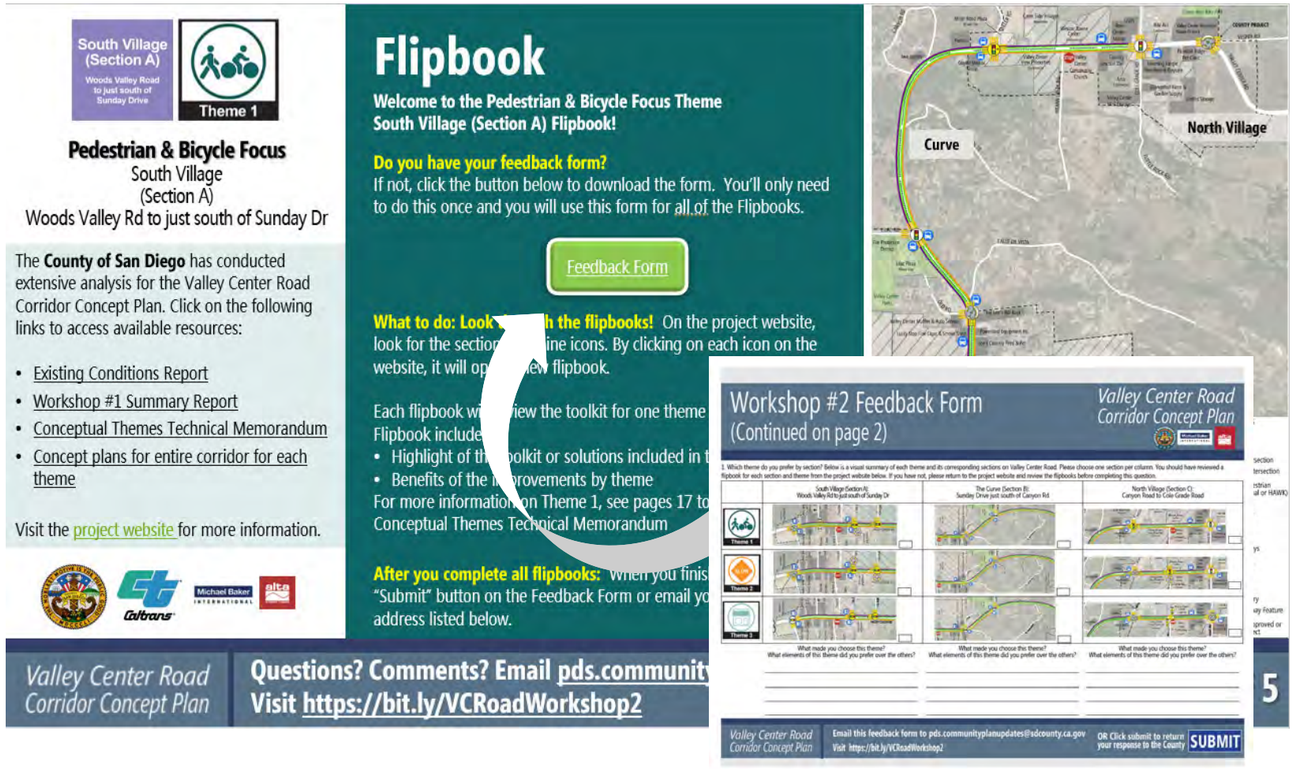
Click on each Section by Theme
There are 9 Flipbooks

Go Back to the Website
Click on another flipbook!

How to Provide Feedback from the Project Website

When you click on each icon, it will take you to a PDF in a new browser window. You can download the PDFs too.





Don't forget to fill out the feedback form as you go!

South Village (Section A)
Woods Valley Road to just south of Sunday Drive

Theme 1

Pedestrian & Bicycle Focus Theme | South Village (Section A) From Woods Valley Rd to just south of Sunday Dr

This theme aims to provide a continuous path of travel for pedestrians and provide continuous Class IV directional bikeways for bicyclists.

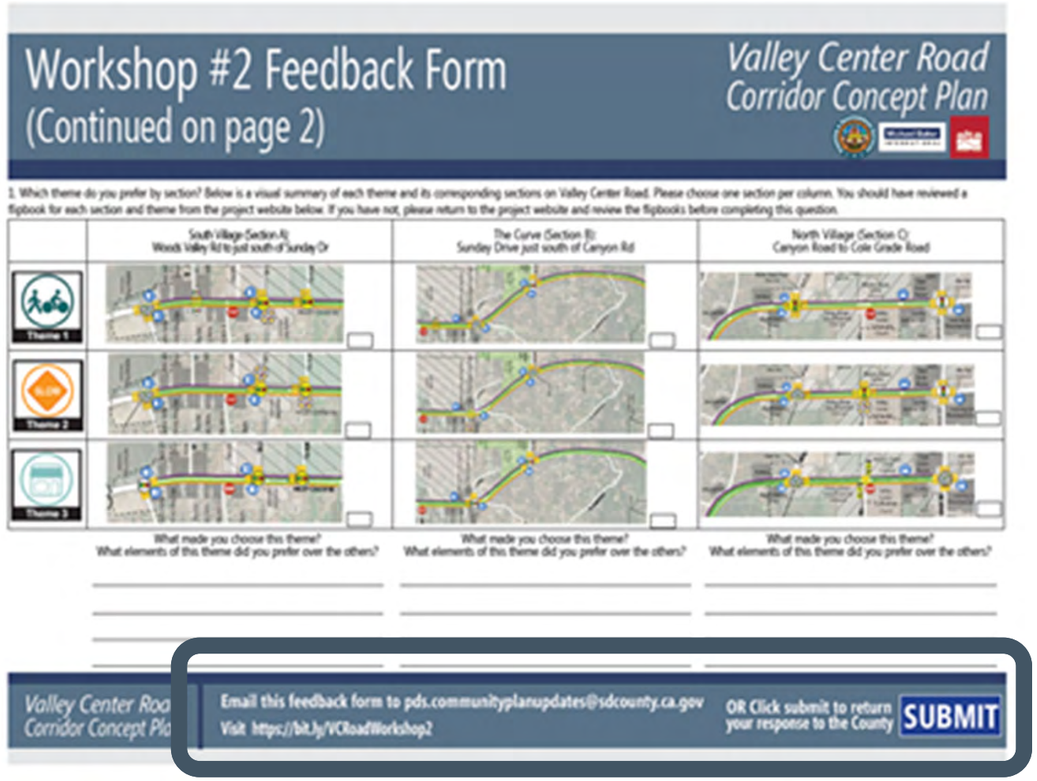
- Controlled pedestrian and bicycle crossings are provided maximum of 0.25 miles apart.
- Controlled crossings are provided at signalized intersections, controlled pedestrian crossings (signal or HAWK) and roundabouts.
- A curb extension is provided to help reduce pedestrian crossing distance and slow speeds at Mirar De Valle.
- A raised median is included the length of the corridor with gaps provided at intersections and key driveways.
- Lanes are narrowed to 11′ to help manage speeds and access.
- Roundabouts are placed at the north and south ends of the South Village to serve as a gateway feature and to reduce speeds.

1. Roundabout - reduces delay and improves operations at intersection
2. Green bike lane striping through conflict zones - alerts drivers to look for bicyclists
3. Raised medians with turn lanes – allow for more controlled access when turning into businesses
4. Crosswalks, curb ramps, ADA access signage - highlight a preferred location for pedestrians to cross
5. Pedestrian Signal or HAWK - clearly communicates when vehicles should stop and sets a specific time for pedestrians and bicyclists to cross
6. Sidewalks - provide ADA accessible space and could potentially reduce conflict areas on Heritage Trail
7. Class IV separated bikeway with flexible delineator posts – provides physical separation for bicyclists
8. Curb extensions - create visual friction which can create traffic calming effects and result in slower speeds
9. New signal - aims to improve access to existing commercial and planned mixed-use development along Valley Center Road

For information on the benefits of the tools selected, see pages 6 through 16 of the Conceptual Themes Technical Memorandum

How to Provide Feedback from the Project Website

Step 1 → Step 2 → Step 3


Workshop #2 Feedback Form
(Continued on page 2)

Valley Center Road Corridor Concept Plan

1. Which theme do you prefer by section? Below is a visual summary of each theme and its corresponding sections on Valley Center Road. Please choose one section per column. You should have reviewed a flipbook for each section and theme from the project website below. If you have not, please return to the project website and review the flipbooks before completing this question.

	South Village (Section A): Woods Valley Rd to just south of Sunday Dr	The Curve (Section B): Sunday Drive just south of Canyon Rd	North Village (Section C): Canyon Road to Cole Grade Road
Theme 1	☐	☐	☐
Theme 2	☐	☐	☐
Theme 3	☐	☐	☐
What made you choose this theme? What elements of this theme did you prefer over the others?			

Valley Center Road Corridor Concept Plan

Email this feedback form to pds.communityplanupdates@sdcounty.ca.gov
Visit https://bit.ly/VCRoadWorkshop2

OR Click submit to return your response to the County SUBMIT

Click submit on the Feedback Form

SUBMIT

It will open auto email back to the County

Email this feedback form to: pds.communityplan updates@ sdcounty.ca.gov

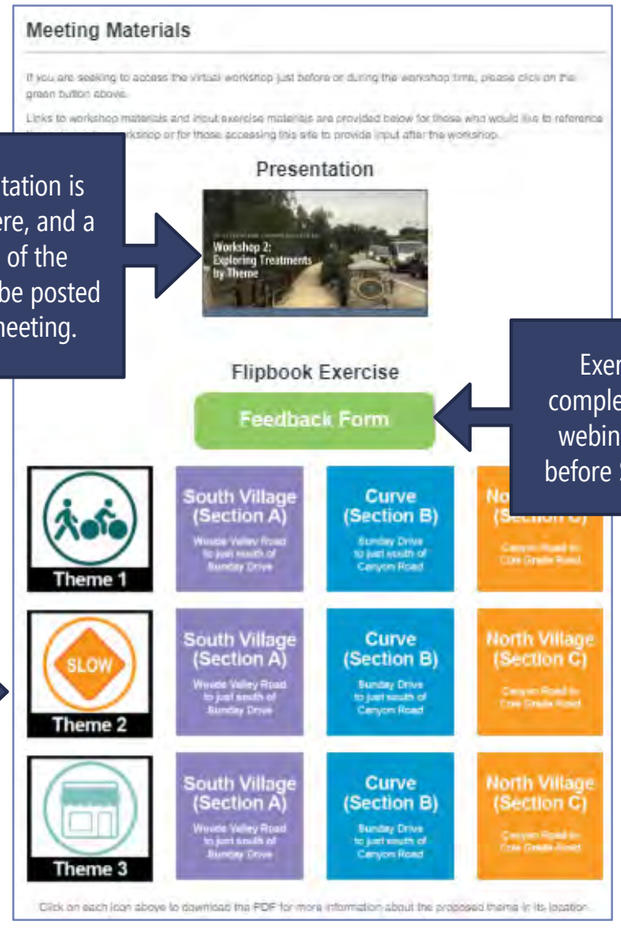
Website Materials

Workshop 2: bit.ly/VCRoadWorkshop

Before Workshop

PDF outlining how to join the Zoom meeting and provide feedback.

Workshop Exercise

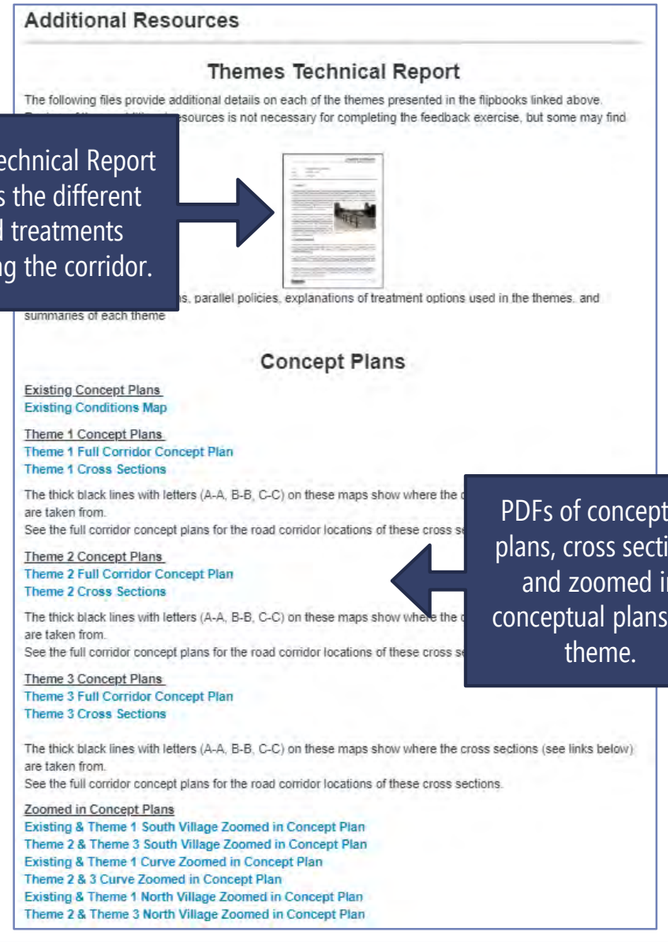


This presentation is uploaded here, and a recording of the webinar will be posted after the meeting.

Flipbooks PDFs of each section of the corridor (South Village, Curve and North Village) by Theme.

Exercise to be completed after the webinar and send before September 2.

Further Review



The Themes Technical Report Memo details the different themes and treatments proposed along the corridor.

PDFs of conceptual plans, cross sections and zoomed in conceptual plans per theme.

Additional Questions?

If you have questions about the Valley Center Road Corridor Concept Plan

Please email pds.communityplanupdates@sdcounty.ca.gov

Call (858) 505-6677

THANK YOU FOR PARTICIPATING

Draft Corridor Concept Plan

Attachment F: Workshop #2 Summary Report

Michael Baker INTERNATIONAL

Valley Center Road Corridor Concept Plan

Workshop 2- Themes, Input, Compilation and Summary

Workshop Date:
August 25, 2020

Michael Baker INTERNATIONAL

alta PLANNING + DESIGN

Workshop Summary

Workshop #2, "Exploring Treatments by Themes," was held August 25, 2020 from 6pm-8pm via Zoom Webinar. The workshop's webinar format allowed for attendees to submit questions to the panelists throughout the presentation. The panel then reviewed each question, and verbally read and responded to each question asked during one of the three question and answer sessions.

The first section of the webinar focused on the background of the project, reviewed material and input from Workshop 1, and explained a toolbox of features considered for the corridor including roundabouts, signalized intersections, and raised medians.

- During the first question and answer session attendees expressed concern about the roundabouts handling large traffic volumes, and large vehicles, particularly during emergency periods such as evacuations. Project staff answered these questions, assuring attendees of a roundabout's capacity to fit large vehicles, and emergency personnel's ability to control traffic flow during evacuations.

The second portion of the webinar focused on the different themes and showed maps and visuals of each Section along Valley Center Road.

- In the second question and answer session, attendees asked about the safety of roundabouts compared to signalized intersections. Panelists described how roundabouts reduce conflict points, particularly points that result in severe crashes, when compared to signalized intersections. Even though roundabouts require vehicles to merge lanes, the possibility of a severe crash is reduced. Attendees also asked about greenhouse gas emissions when a vehicle uses a roundabout compared to a signalized intersections. Panelists explained that roundabouts reduce the time vehicles are stopped at a traffic light, which is when vehicles emit the most greenhouse gases. Questions were also asked about treatments along Old Road. The panelists explained that although Old Road is not a vehicle heavy road, new treatments would make pedestrian and bicycle access easier.

The final third of the webinar showed attendees how to leave feedback on the project website and how to contact project staff.

- No questions were asked specific to the process for providing feedback in this session.

Sample of Questions Asked:

"This area is known for large recreation vehicles and horse trailers. I'm told these recreation vehicles have trouble passing the roundabouts on 76. Have you factored in the space necessary for those vehicles?"

"Can you quantify the improvements in safety with roundabouts compared with stop lights?"

"Can you quantify the improvement in greenhouse gas emissions with roundabouts compared with stop lights?"

"Will the Heritage Trail remain through all the sections as it is today?"

"How much time will it take for traffic to pass through the 2.5 mile stretch with roundabouts vs traffic signals?"

"Won't reducing from 4 lanes to 2 lanes approaching the 2-lane roundabouts increase accidents due to merging traffic?"

Feedback Forms

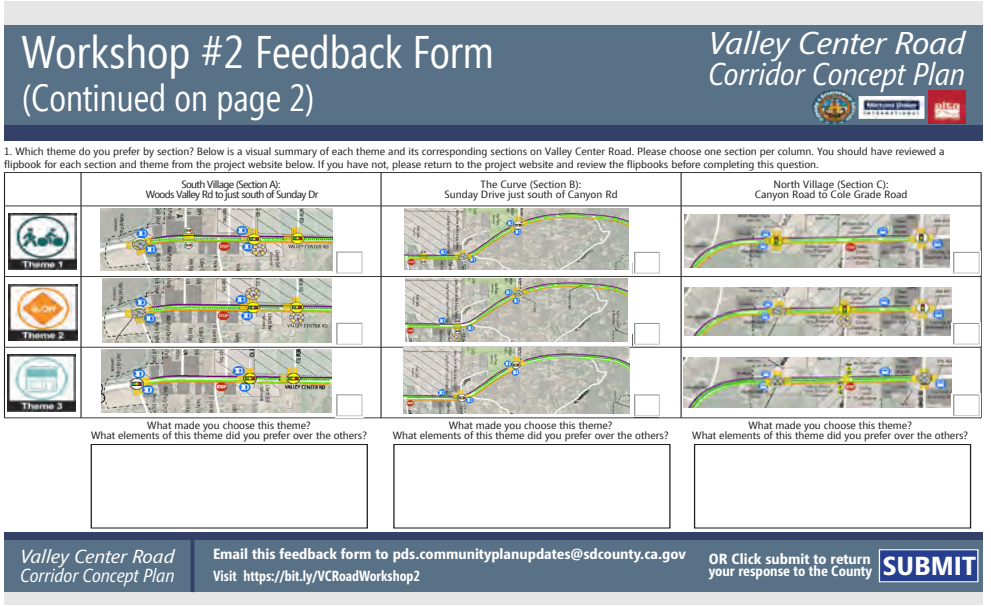
Stakeholders and community members were given instructions on how to complete a feedback form during the presentation, on the project website and over an informational email. They were asked to give feedback on their preferred theme for each section along the Valley Center Road corridor.

- For purposes of analysis, the Valley Center Road Corridor has been split into three sections. Section A covers the corridor segment from Woods Valley Road to just south of Sunday Drive. Section B covers Sunday Drive to just south of Canyon Road. Section C covers Canyon Road to Cole Grade Road. Three themes were developed with a unique focus for each, and each theme covers all three sections of the corridor.

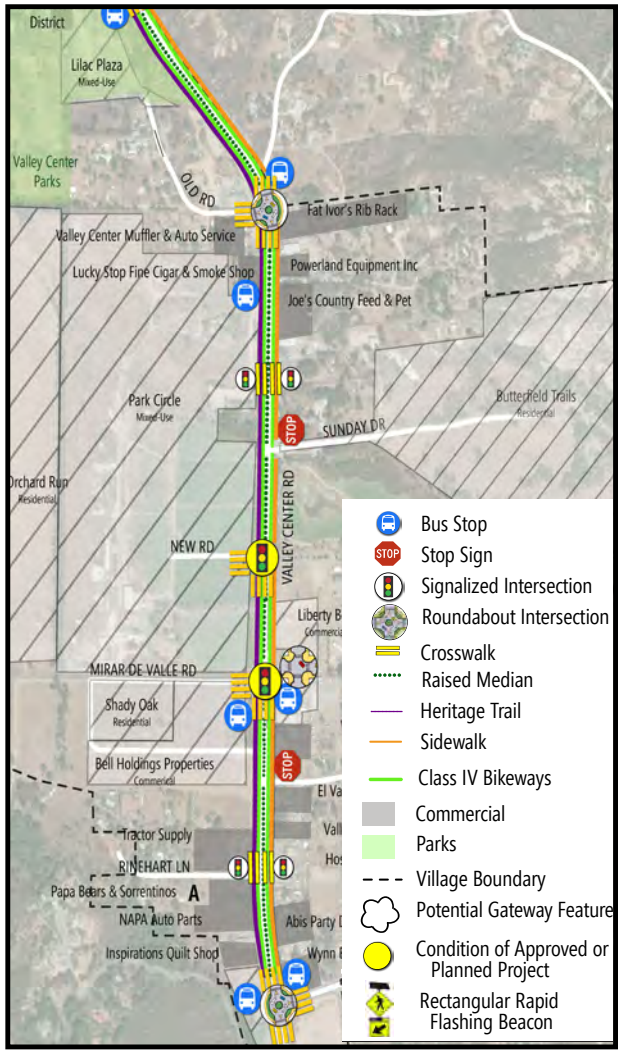
- Community members could explore nine **flipbooks**, which detailed the proposed elements of each theme and the potential benefits of the roadway treatments. After reviewing the flipbooks, respondents could complete a feedback form which asked them to choose their preferred theme for each section, and leave comments on the elements preferred for the chosen theme. Additionally, respondents were given space on the **feedback form** to leave general comments about the Corridor Concept Plan. Respondents then could submit their forms to the project team.

- The following pages summarize the comments left for each theme in each section. The pie charts on each page show the percentage of respondents who preferred a certain theme within a section.

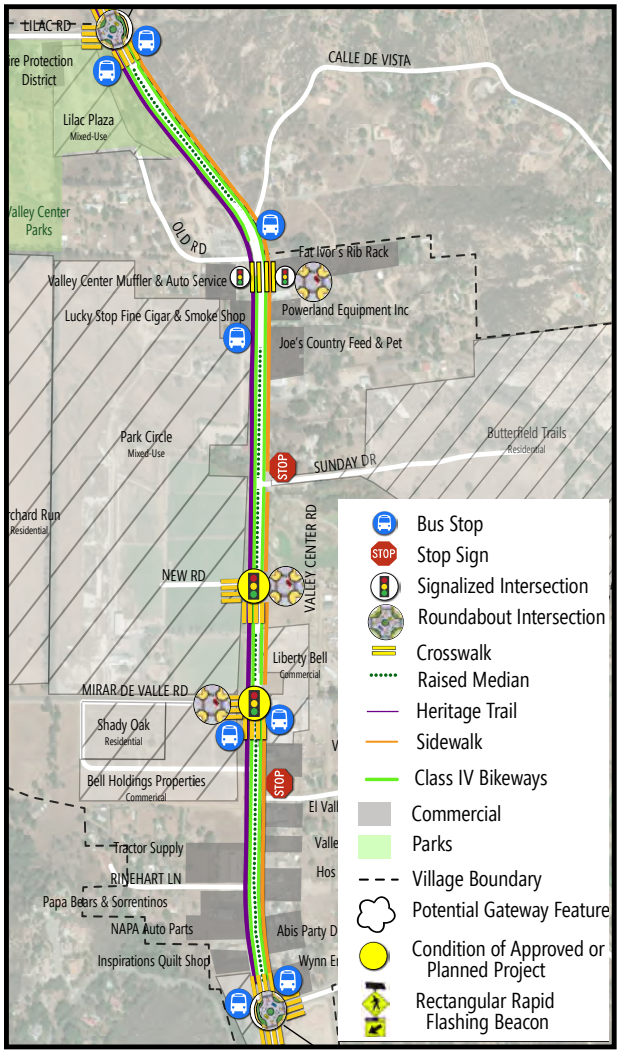
Above: Page from South Village, Section A, Flipbook
Below: Feedback Form



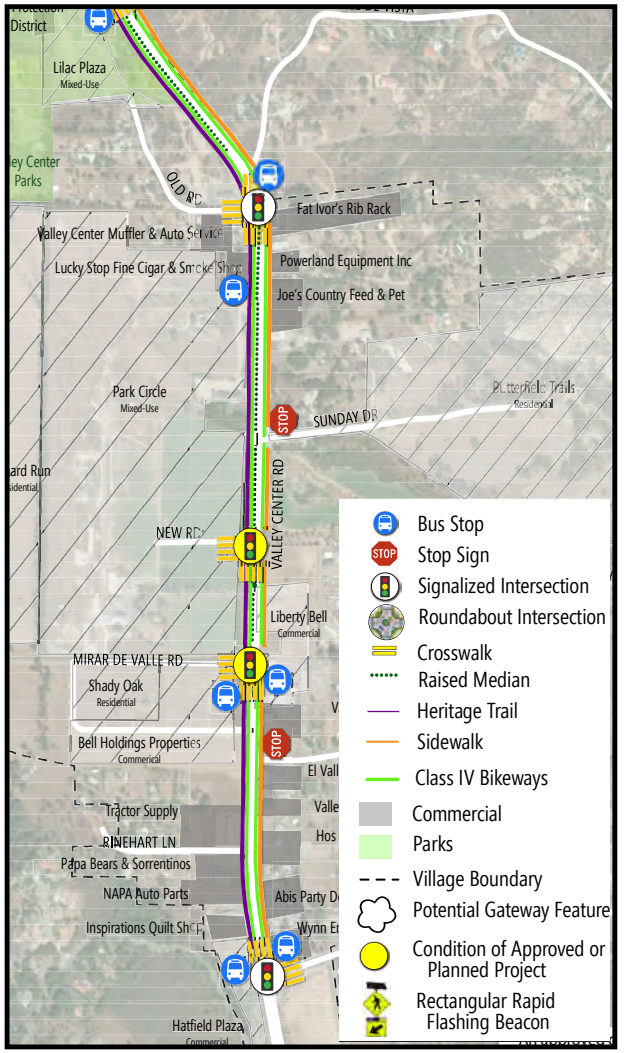
South Village (Section A)



Theme 1

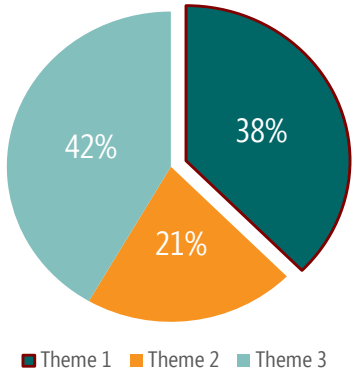


Theme 2



Theme 3

South Village (Section A) Theme 1



Theme 1 was preferred by 9 of 24 (38%) of workshop respondents for Section A.

Respondents preferred Theme 1 for its traffic calming elements. Respondents who prefer this option tend to support the roundabout at Woods Valley Road. Some respondents would like to have seen additional roundabouts at Mirar de Valle Road and Park Circle ("New Road" on the map) as both of these roads lead to new, residential communities. Respondents raised concerns that with new development, traffic may be heavy turning onto Valley Center Road, particularly during school days. Those who preferred Theme 1 also favored the increased protection for bicyclists and pedestrians reflected in the separated bike lane, crosswalks, and pedestrian signal. Most of the comments that did not prefer Theme 1 mentioned concerns about roundabouts.

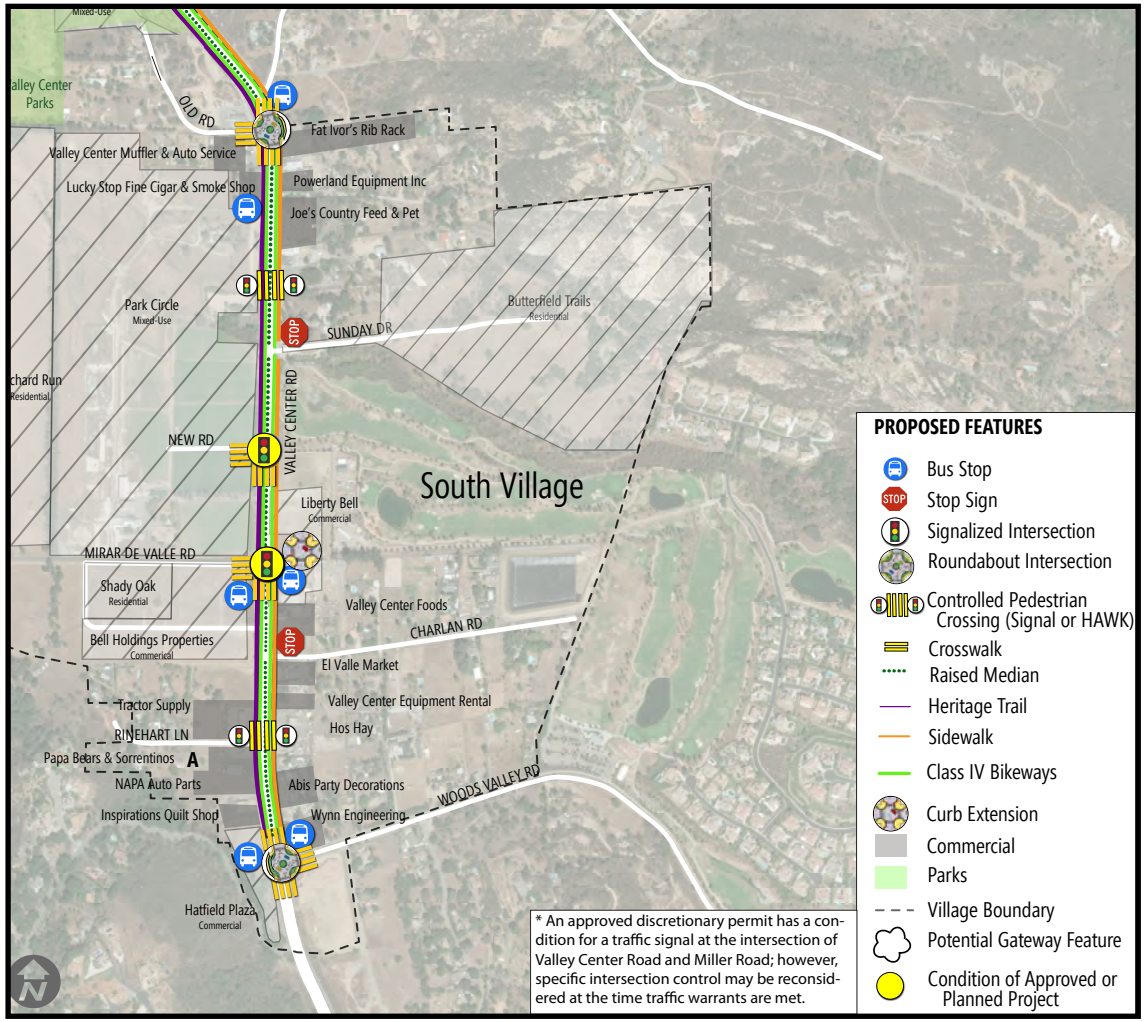
Key Comments:

"I chose Theme 1 because of the two-lane roundabout at Woods Valley and greatest protection of bicyclists"

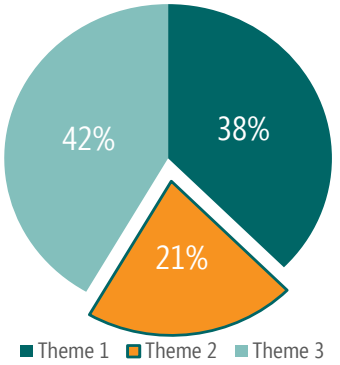
"I prefer roundabouts and safer bike paths"

"The traffic circle at Woods Valley is good idea. Why no traffic circle at Mirar de Valle Road or at the very least Park Circle Road if you have to have a light at Mirar de Valle Road?"

"I don't like the roundabout. There are hay trucks, horse trailers, and big rigs going through our town."



South Village (Section A) Theme 2



Theme 2 was preferred by 5 of 24 (21%) of workshop respondents for Section A.

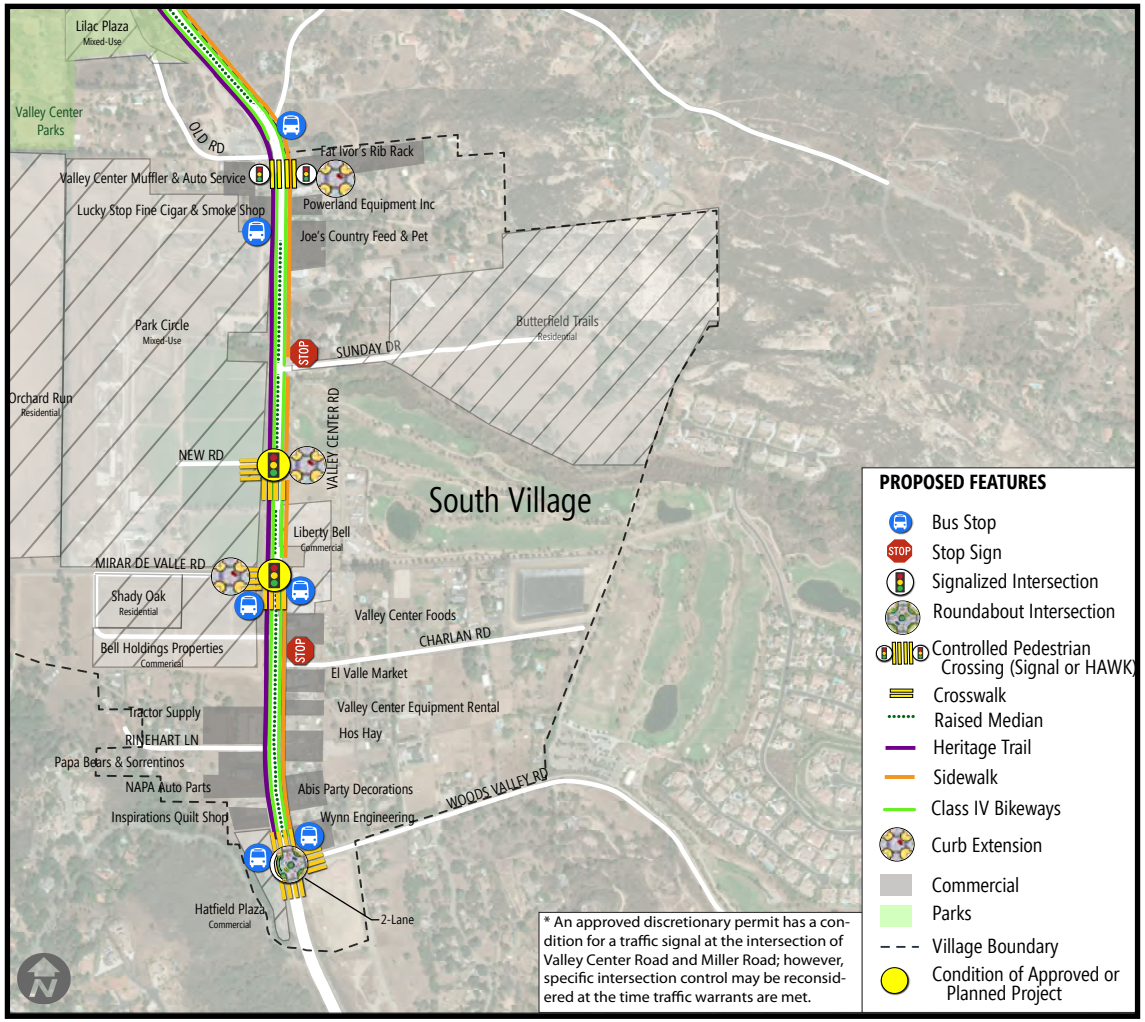
Similar to Theme 1, respondents who preferred Theme 2 would like to see roundabouts at Mirar de Valle Road or Park Circle ("New Road" on the map) in addition to the proposed roundabout at Woods Valley Road. Based on certain comments it was apparent that concerns remain about a roundabout's capacity to accommodate large trucks and trailers. Respondents wrote that they prefer roundabouts because they calm traffic, while reducing stopping which would occur at traffic signals. Comments also suggest that roundabouts could be landscaped and artistically designed to reflect the community.

Key Comments:

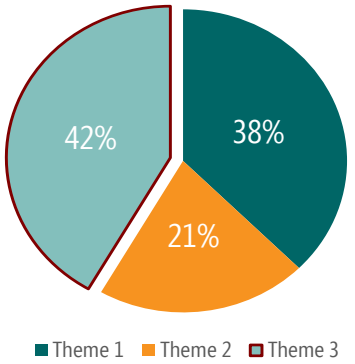
"I prefer Theme 2 because it has less stopping"

"Community and local tribes will support roundabout maintenance, local artists will help design art features for centers of circles"

"Roundabouts slow down traffic, cause fewer serious accidents, and allow more cars to get out in case of fire. I wish we could have a roundabout on Mirar de Valle Road"



South Village (Section A) Theme 3



Theme 3 was preferred by 10 of 24 (42%) of workshop respondents for Section A.

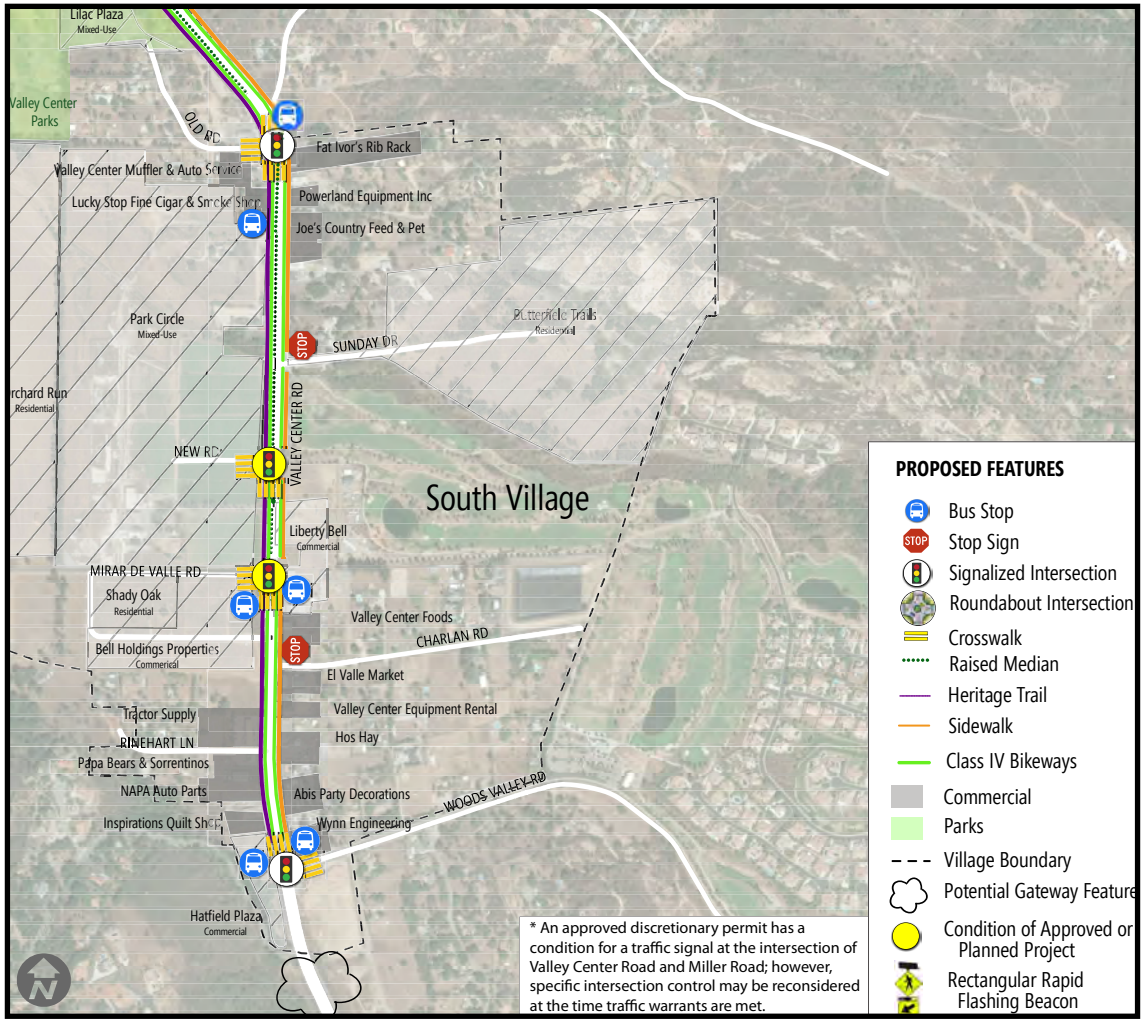
Respondents who preferred Theme 3 commented that this would be the most efficient option for vehicular travel. Some respondents felt the traffic signals would allow for easier navigation during evacuations. Respondents raised concerns that roundabouts included in other themes for South Village (Section A) will slow traffic, especially for drivers who are unfamiliar with the area, and for large vehicles like trailers and trucks. Signalized intersections, like is being proposed in Theme 3 are their preferred method in controlling traffic. Respondents also noted that Americans with Disabilities Act accessibility improvements are welcomed.

Key Comments:

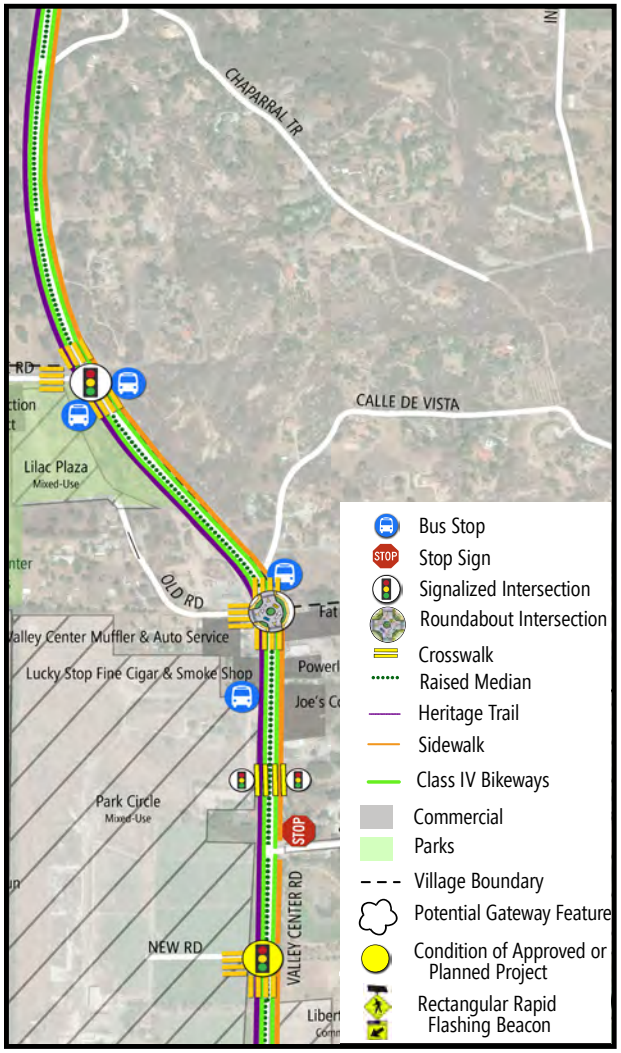
"This is the best option for Valley Center. It provides safe passage for everyone. If the lights are synchronized, in the event of another fire, traffic will keep moving, as this is 1 of only 2 exit routes out of VC"

"Traffic lights over roundabouts, I'm concerned about evacuating times with roundabouts."

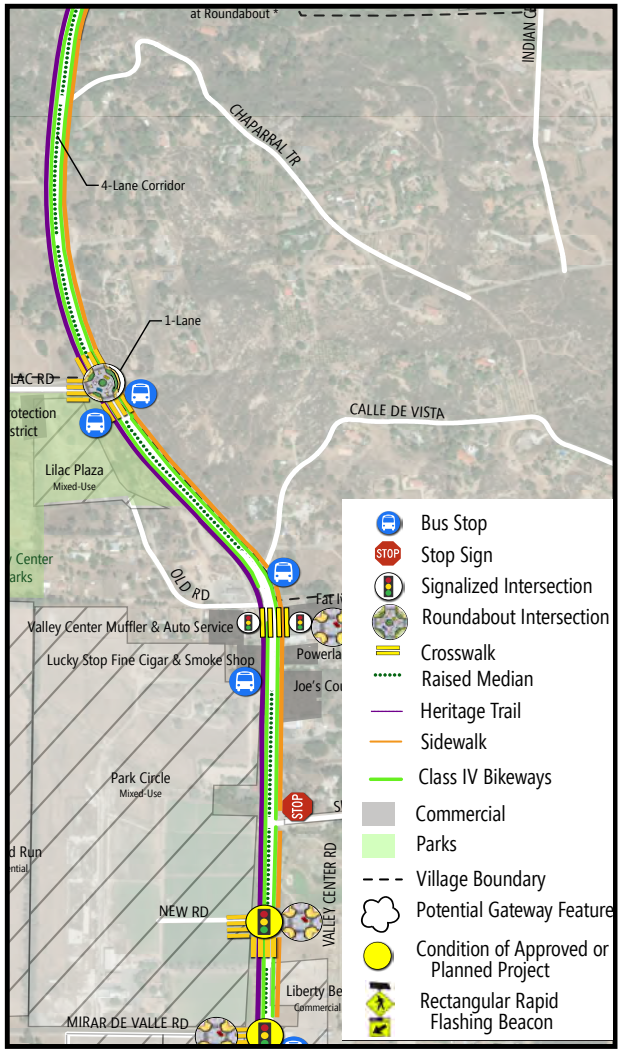
"Lights are more efficient."



The Curve (Section B)



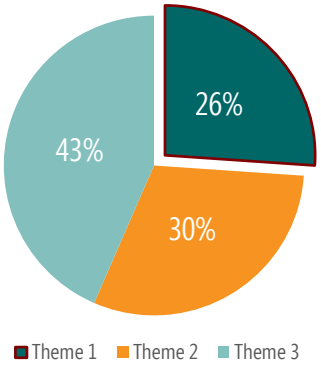
Theme 1



Theme 2

Theme 3

The Curve (Section B) Theme 1



Theme 1 was preferred by 6 of 23 (26%) of workshop respondents for Section B.

For Section B, Theme 1 was primarily selected by respondents because of the roundabout at Old Road rather than Lilac Road. Respondents noted that they'd prefer to retain the existing traffic signal at Lilac Road, and that they'd prefer adding a roundabout at Old Road to encourage walking and biking because of the surrounding scenic views. Some suggest that a roundabout at Lilac Road may make it difficult for firefighters to exit their station on Lilac Road. The proposed Class IV bike lanes (consistent with the current General Plan Mobility Element for this segment) are also a welcomed element of this theme.

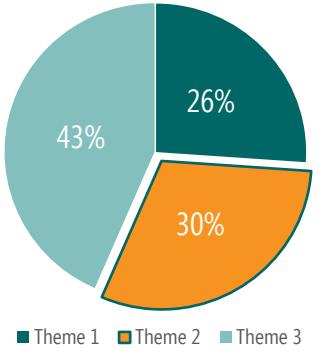
Key Comments:

"I like the wider roundabout. It seems to take the most beautiful part of Valley Center Road and make it easier to walk on. "

"I prefer roundabouts and safer bike paths."

"There is already a light at Lilac Road which seems to be working fine so why go to the cost of removing it"

The Curve (Section B) Theme 2



Theme 2 was preferred by 7 of 23 (30%) of workshop respondents for Section B.

Theme 2 was preferred by certain respondents due to the location of the roundabout. Respondents said the proposed roundabout at Old Road in Theme 1 is unnecessary as the road is not heavily traveled, and the proposed pedestrian signal of Theme 2 provides an alternative at this intersection to enhance pedestrian access to the transit stop. Additionally, there were concerns about left turns onto Valley Center Road from Calle de Vista with the Old Road roundabout in Theme 1. Respondents consider the proposed roundabout at Lilac Road an effective way to keep traffic moving, rather than a traffic light.

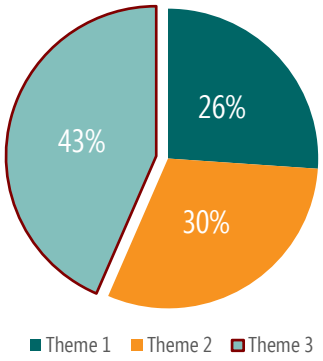
Key Comments:

"The idea of a traffic circle or light at Old Road is over-kill"

"The traffic circle at Lilac Road is a good idea as it will also allow for better transition to VC Rd"

"Must have roundabout at Lilac Road to keep traffic moving."

The Curve (Section B) Theme 3



Theme 3 was preferred by 10 of 23 (43%) of workshop respondents for Section B.

Respondents wrote that this was their preferred theme for the Curve because it includes a traffic signal, rather than a roundabout at Old Road. Respondents consider a roundabout unnecessary at Old Road because there is not enough turning traffic. Respondents also suggest that it does not seem like there is enough space to accommodate a roundabout at Old Road, and they are concerned that roundabouts will slow down evacuations. Respondents stated that this theme includes fewer bicycle and pedestrian improvements which they note may not be necessary as few people walk or bike in the area.

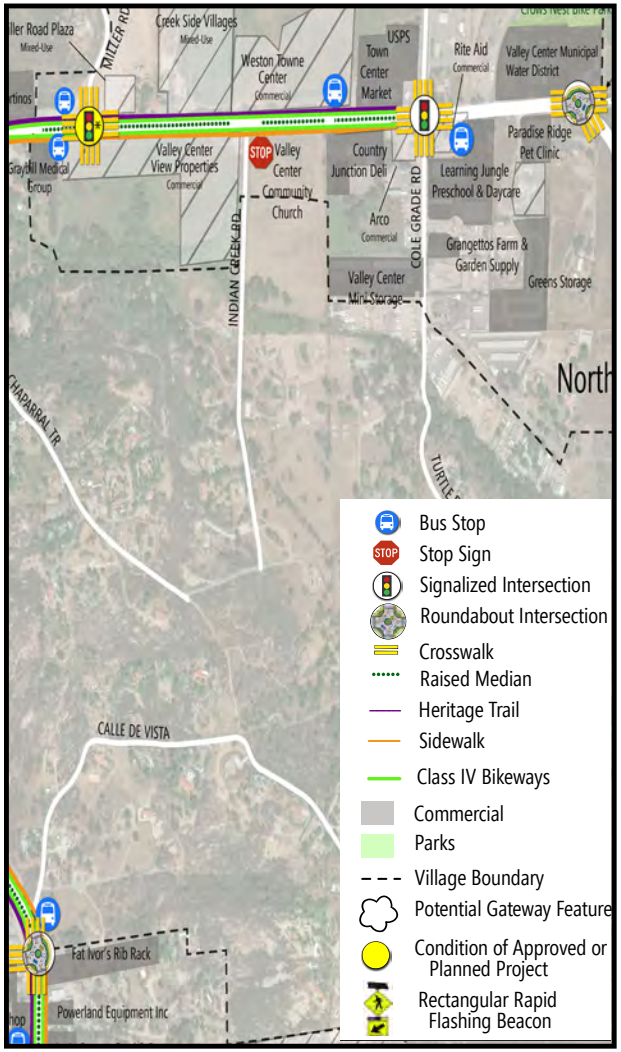
Key Comments:

"No roundabouts! Lights are a better option"

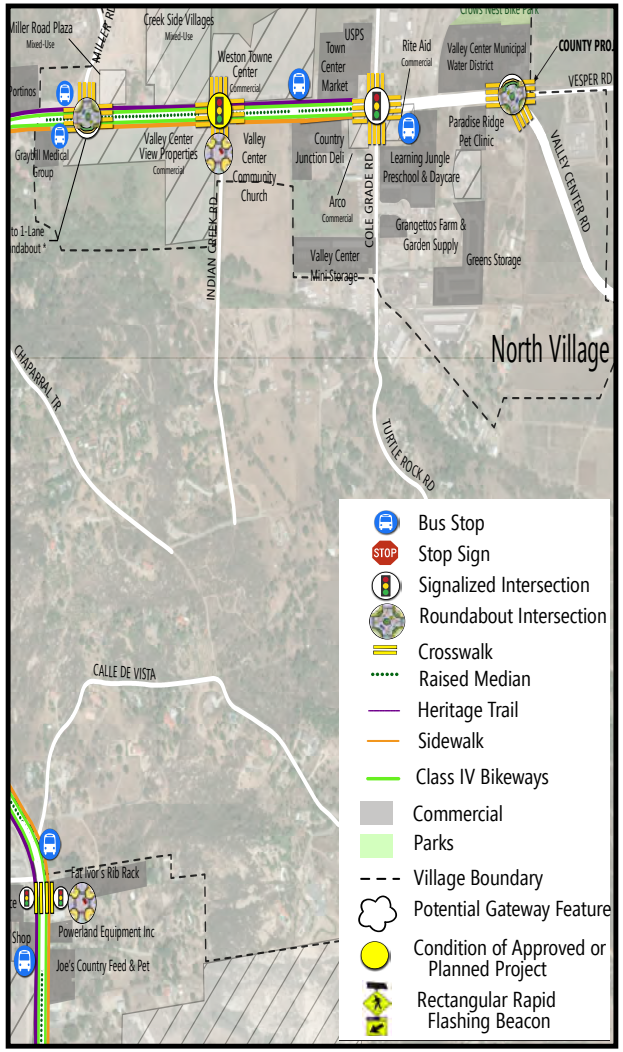
"Valley Centerites aren't here for bike lanes and pedestrian crossings. Most of us go to other towns for the things that we need"

"No roundabout at Old Road. Little turning at this point. No reason for it. Medians are a good idea."

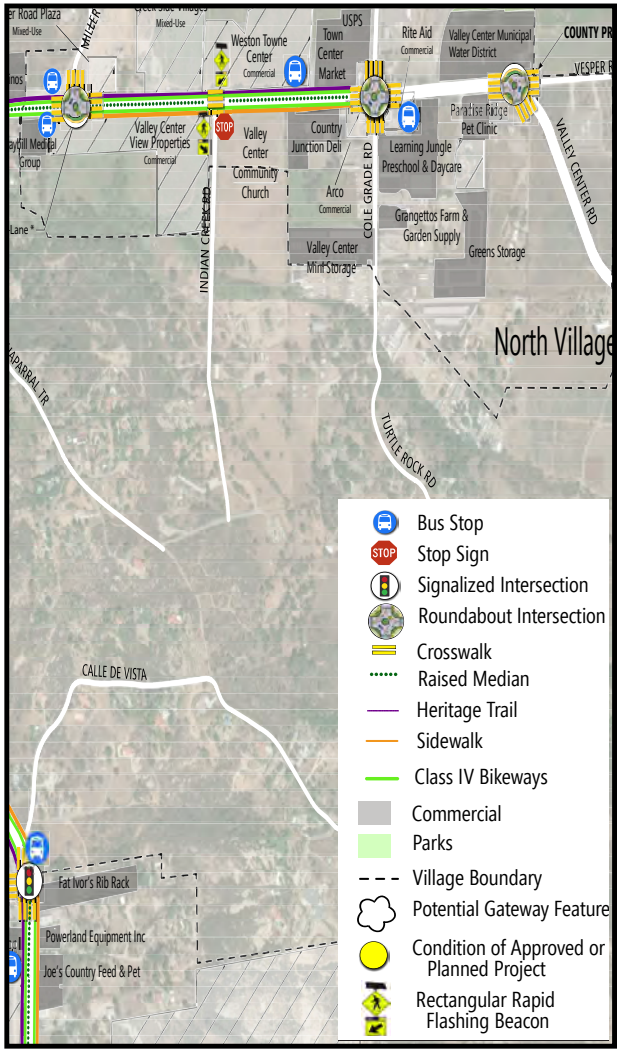
North Village (Section C)



Theme 1

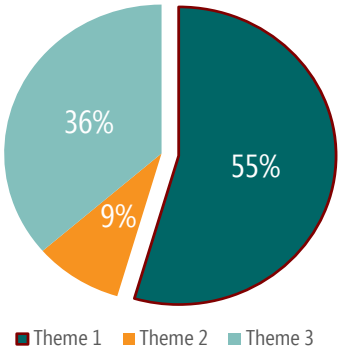


Theme 2



Theme 3

North Village (Section C) Theme 1



Theme 1 was preferred by 12 of 22 (55%) of workshop respondents for Section C.

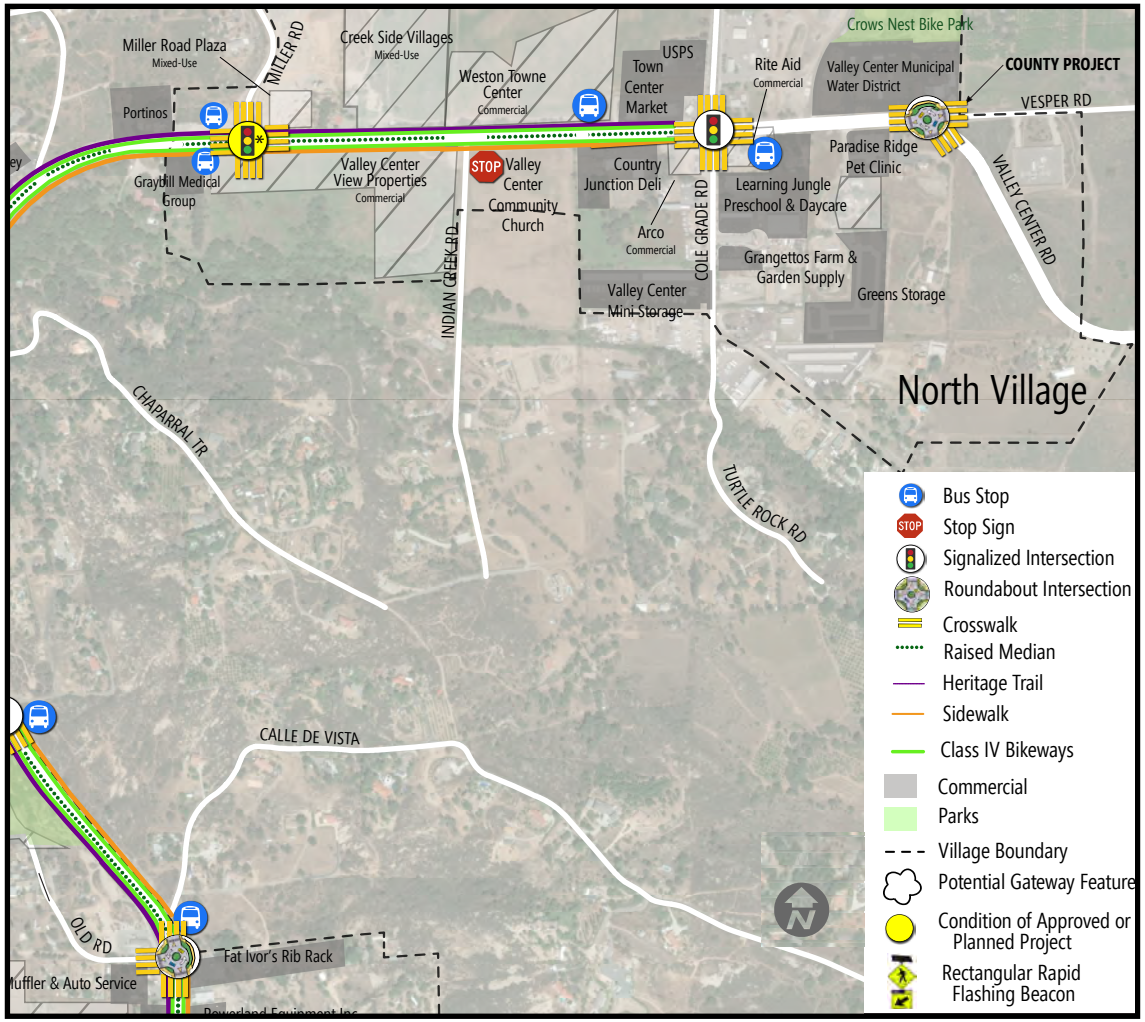
Respondents that preferred this theme did so because it does not propose eliminating travel lanes. Respondents wrote that the intersection of Valley Center Road and Cole Grade Road is very busy, and eliminating travel lanes will only increase traffic problems. Not having a traffic light at Indian Creek Road is also preferred. Theme 1 for Section C was chosen by respondents because it did not include any newly proposed roundabouts, and as respondents mentioned in other sections, some believe that roundabouts may slow down evacuations and emergency vehicles.

Key Comments:

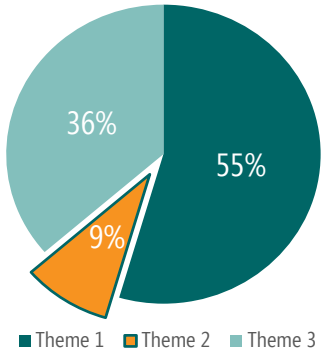
"I think a light at Cole Grade Road with multiple lanes is important at this intersection. Valley Center Road and Cole Grade Road are heavy traveled, and the main route in and out of Valley Center"

"No roundabout. Cars back up in the morning and the afternoon where many of us are turning to go down Cole Grade Road"

"I choose this because I worry about Valley Center Road being cut down to 1 lane in each direction. It also doesn't add a signal at Indian Creek Road. I would prefer 2 lane roundabouts."



North Village (Section C) Theme 2



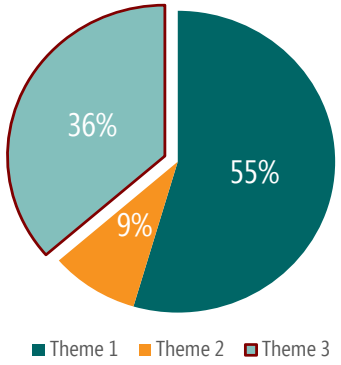
Theme 2 was preferred by 2 of 22 (9%) of workshop respondents for Section C.

Respondents who preferred Theme 2 for Section C support the roundabouts, but are concerned with the road diet proposed in Theme 3. Some respondents did not prefer this theme because of the roundabouts. Others commented that they did not like the recommended traffic signal at Indian Creek Road, because the road is not busy enough, and too many traffic signals will eliminate the flow of traffic created by roundabouts.

Key Comments:

"I prefer the roundabouts at both Miller Road & Cole Grade Road but do not think that having a single lane of travel in both directions of the North Village would be accepted."

North Village (Section C) Theme 3



Theme 3 was preferred by 8 of 22 (36%) of workshop respondents for Section C.

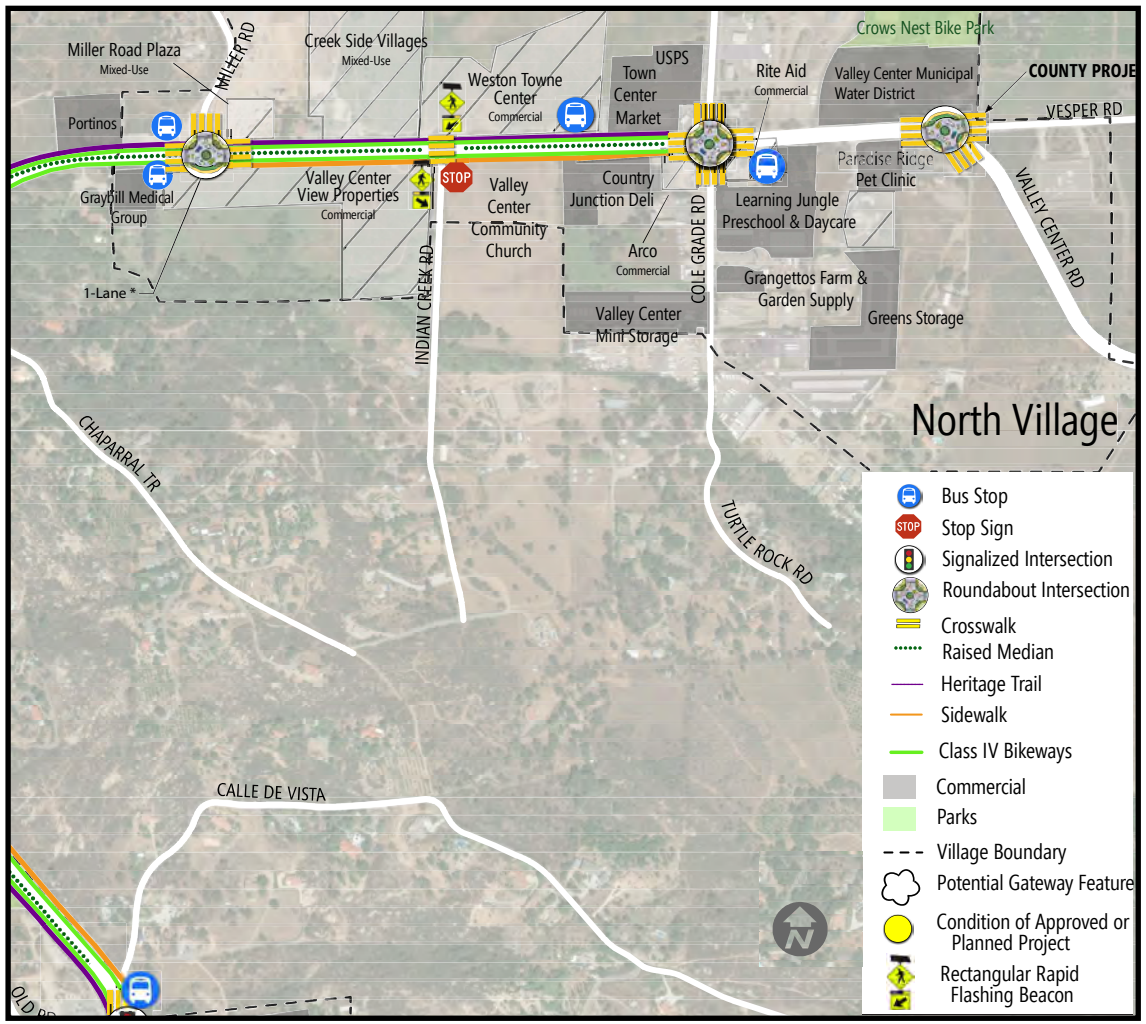
Respondents that chose Theme 3 for the North Village section noted that they like the two proposed roundabouts at Miller Road and Cole Grade Road. Respondents noted that at the existing traffic signal at Cole Grade, many drivers make dangerous right turns without stopping on red, or make illegal U-turns to enter the gas station, and believe that roundabouts could help limit this behavior. Respondents also preferred Theme 3 because it includes a Rectangular Rapid Flashing Beacon at Indian Creek Road, and not a traffic signal. Respondents stated that multiple roundabouts down Valley Center Road could also create a consistent traffic theme for those traveling to the casino.

Key Comments:

"I chose Theme 3 because it incorporates a roundabout at the Cole Grade Road intersection rather than a traffic signal"

"3 roundabouts will keep this area safer but I think they should be 2-lane because of high traffic back & forth to the casinos."

"A traffic circle at Miller Road will make people think, pay more attention and make the corner safer for everyone."



General Comments

Theme 1

Pedestrian & Bicycle Focus

Theme 2

Traffic Calming

Theme 3

Village Focus

General Comments

After reviewing the nine flipbooks (3 for each theme) that provide a detailed summary of the features proposed for the three sections of Valley Center Road, respondents were asked to leave general comments about the plan. Below is a list of general comments and key takeways from the workshop:

Key Takeaways:

- Those who would like to see roundabouts on Valley Center Road prefer the roundabout's ability to:
  - Reduce serious accidents
  - Improve traffic flow
  - Reduce stopping which leads to greenhouse gas emissions
  - Make biking and walking safer
  - Create a more uniform driving experience

- Other respondents have concerns about the practicality of roundabouts on Valley Center Road including:
  - Traffic being slowed too much, particularly for larger trucks, trailers, and buses
  - Emergency vehicles effectively navigating a roundabout
  - The efficiency of fire evacuations

- Respondents also left comments regarding the proposed bicycle and pedestrian improvements. Those that would like to see these improvements stated:
  - They would like to see separated or buffered sidewalks for safer walking down Valley Center Road.
  - Better pedestrian facilities will improve the village feel of the corridor.
  - Bicycle lanes should be prioritized no matter the theme chosen.

- Respondents also left comments concerned about the proposed bicycle and pedestrian improvements.
  - Some are concerned with creating separated bike lanes with flexible delineator posts, as they believe these lanes may trap bicyclists to the far right of the road, making it difficult for bicyclists to turn left, and potentially making bicycling more dangerous as debris could collect in the lane.
  - Other respondents said Valley Center Road should be better improved for drivers rather than bicyclists and pedestrians.
  - Respondents suggest that many residents drive in order to purchase ranch supplies, and live on large plots of land, making biking and walking impractical for daily errands.

General Comments:

"I think roundabouts work well in cities with multiple roads to choose from. This is not the case in Valley Center."

"Roundabouts are difficult to traverse with long trailers (such as horse trailers)."

"Roundabouts are safer for vehicles, pedestrians and bicyclists."

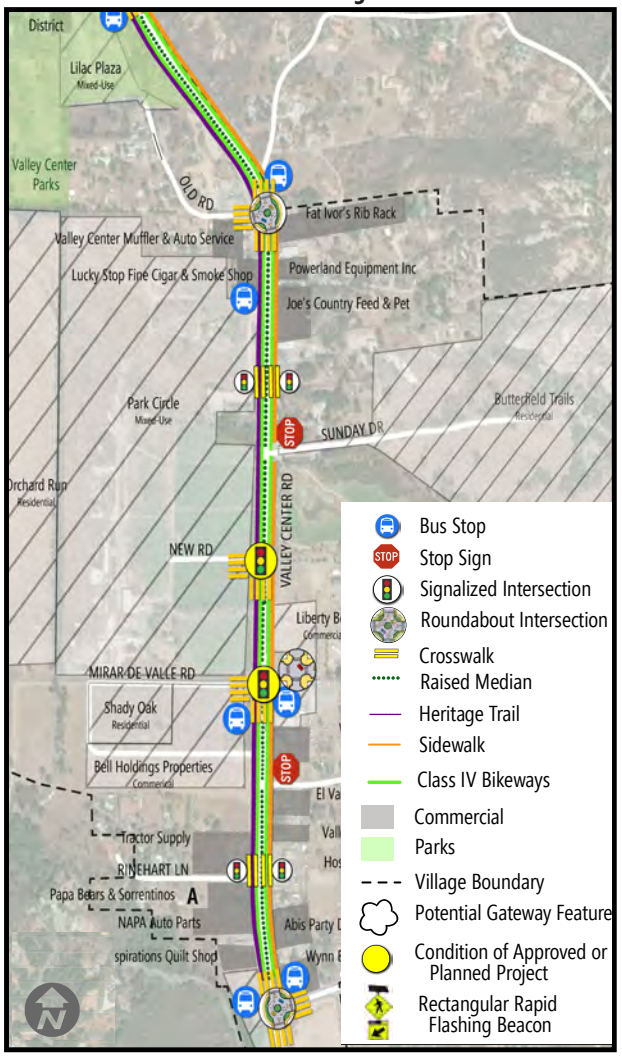
"In all cases, I prefer roundabouts and safer bike paths"

"We are more worried about getting hay than walking or riding bikes to get places here."

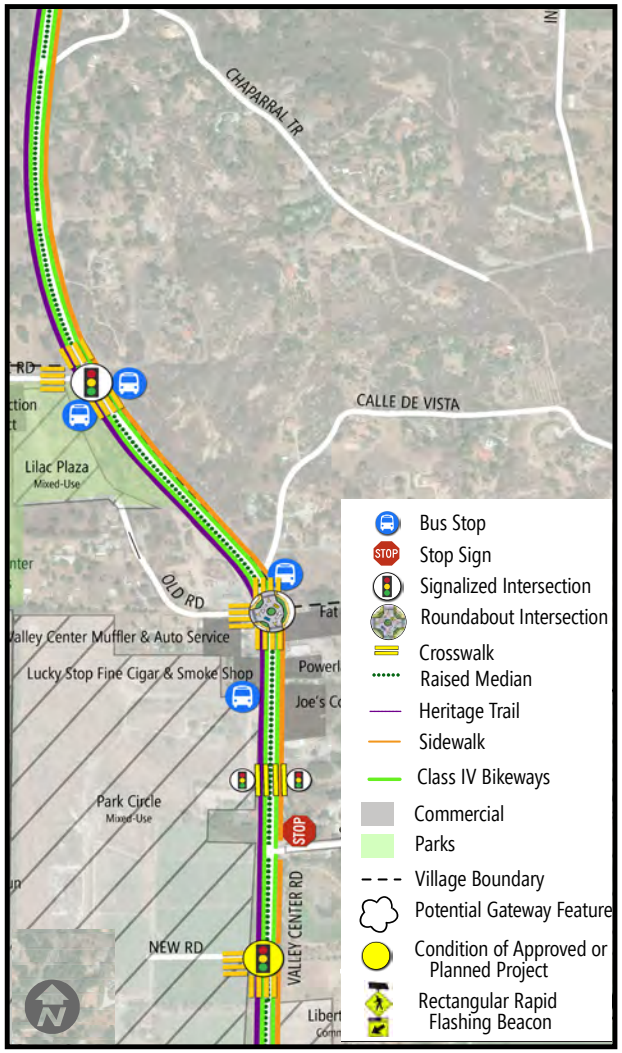
"The consistent roundabouts through the Villages and at Lilac have so many advantages! Greater safety for pedestrians and bicyclists (and even horses, if they continue to use Heritage Trail because the slower traffic is not so upsetting for the horses!)"

Theme 1

South Village



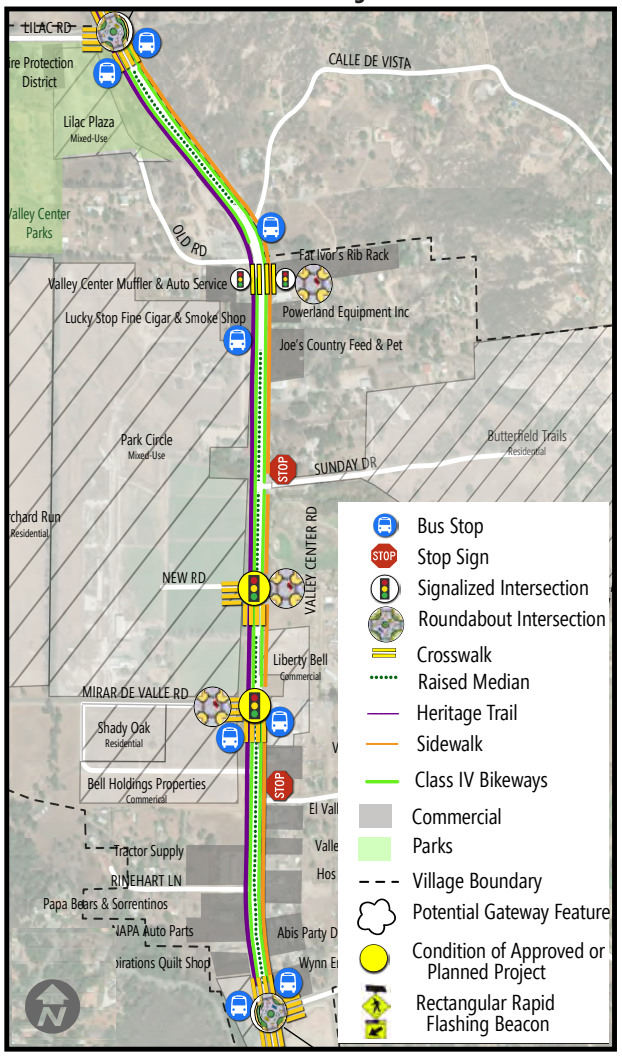
The Curve



North Village

Theme 2

South Village



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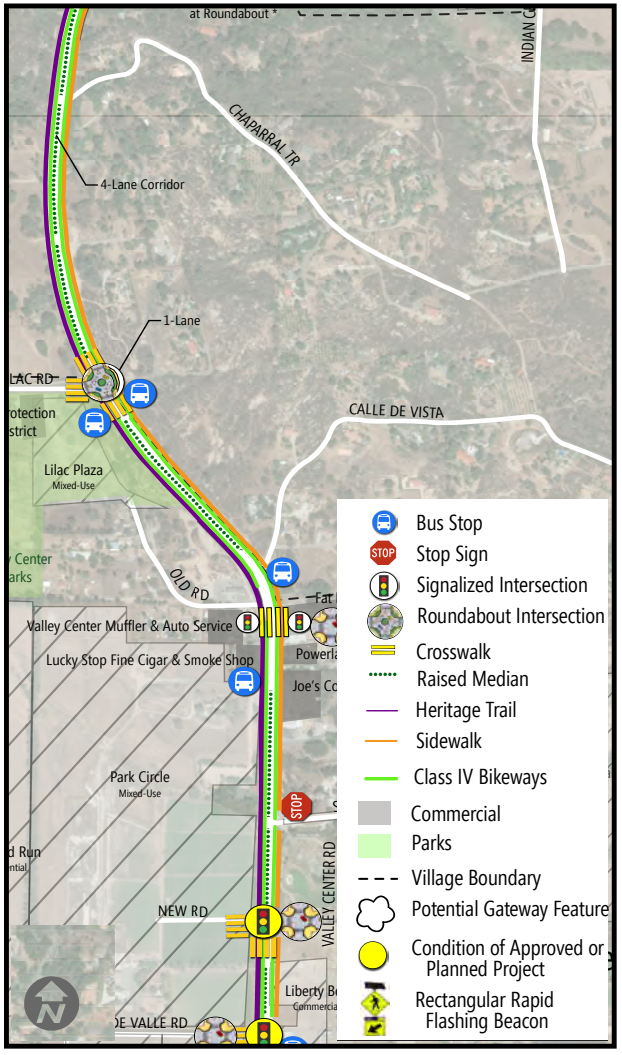
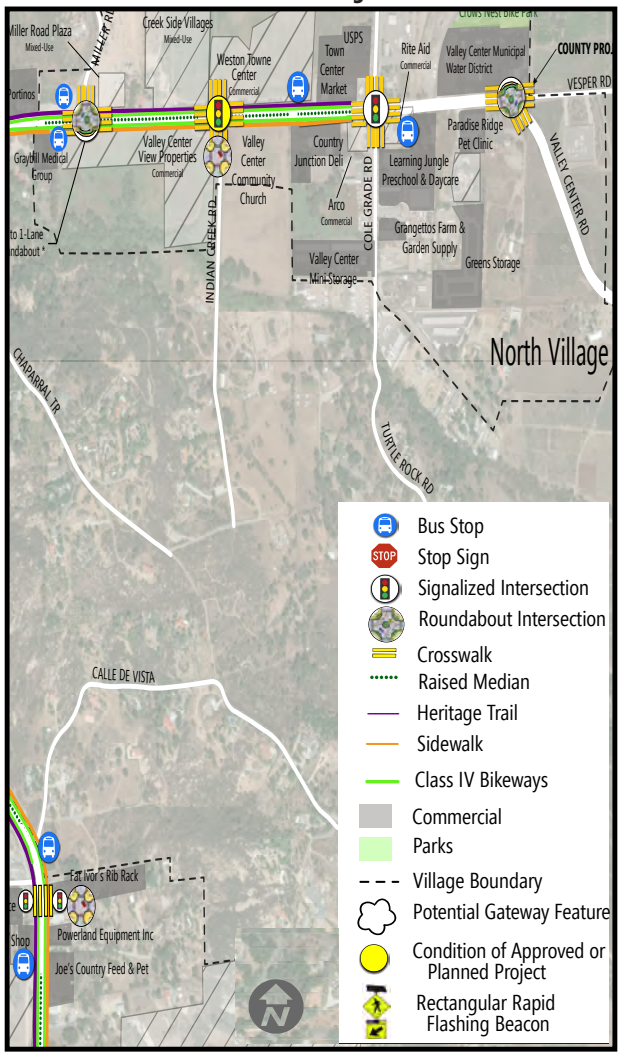
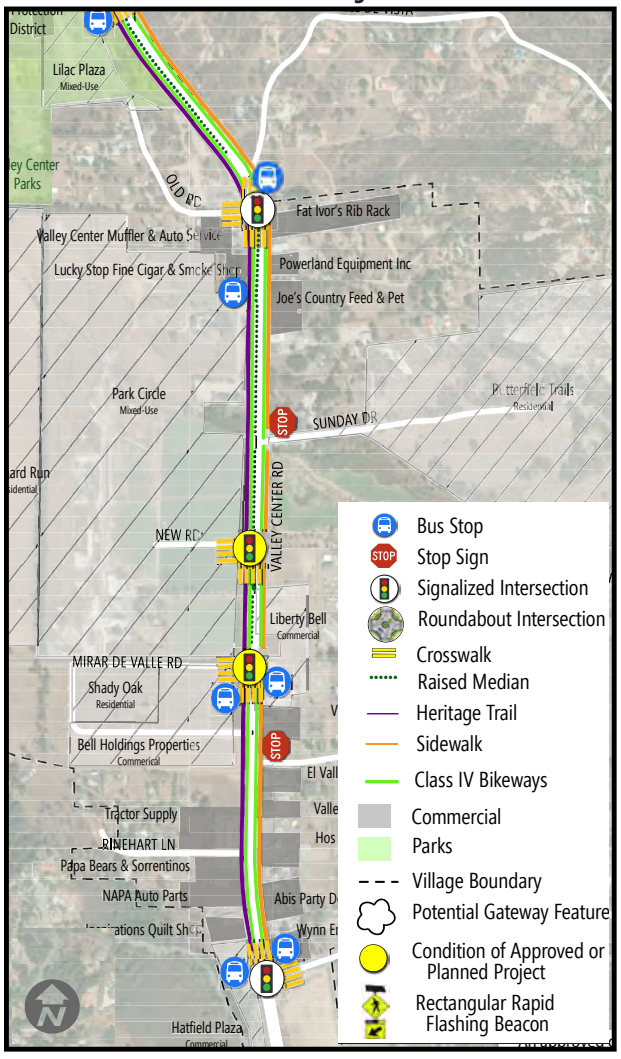


North Village

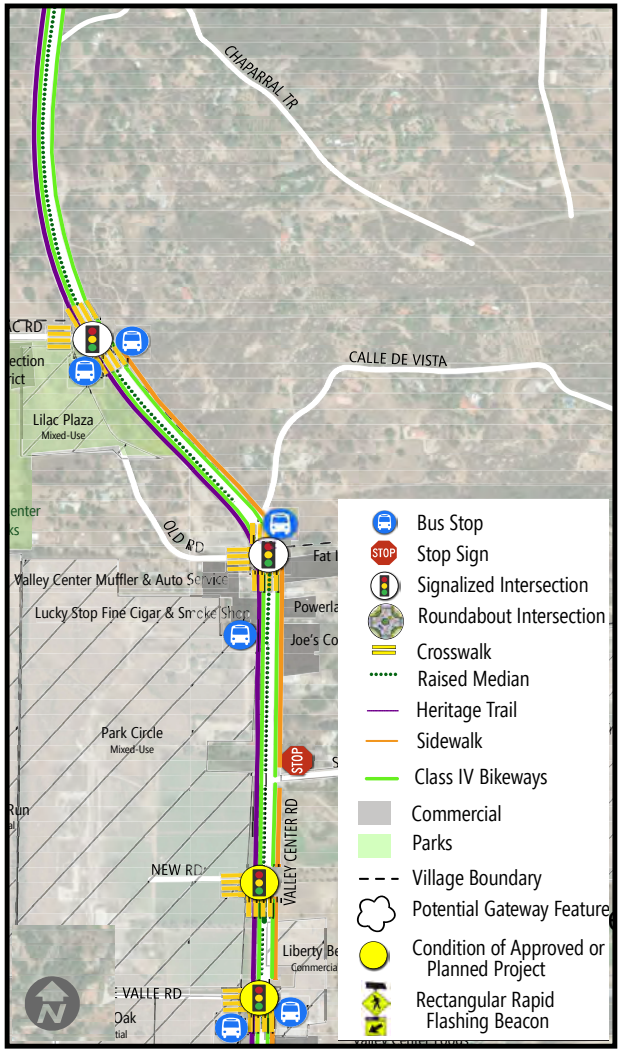


Theme 3

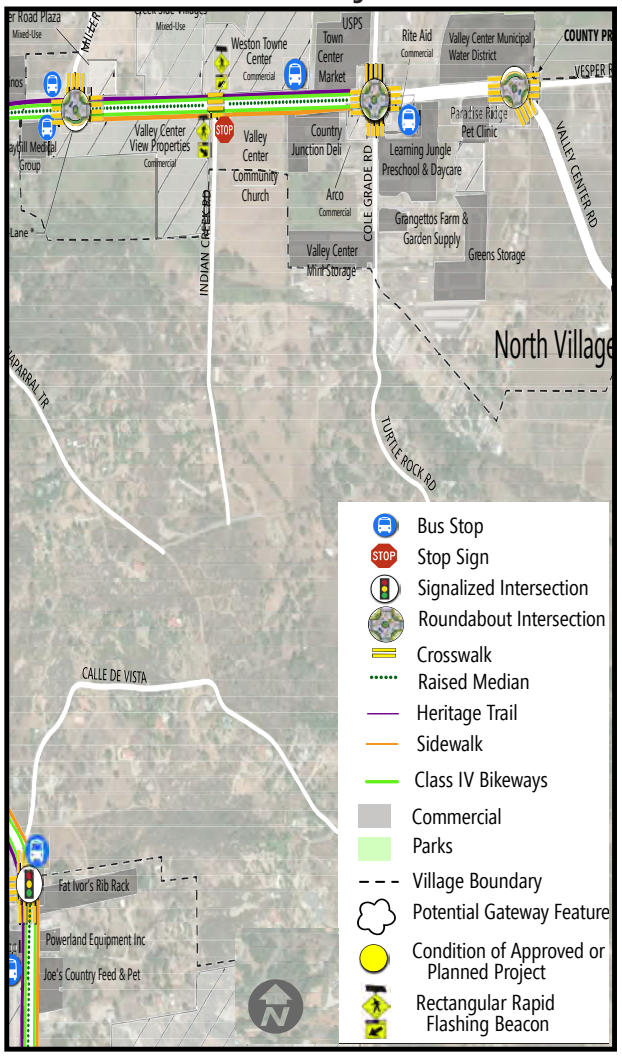
South Village



The Curve



North Village



Draft Corridor Concept Plan

Attachment G:
Roundabouts & First Responders, Saving Lives Together Pamphlet (FHWA)

Michael Baker
INTERNATIONAL

What is a Roundabout?

A roundabout is a type of circular intersection, but is quite unlike a neighborhood traffic circle or large rotary. Roundabouts have been proven safer and more efficient than other types of circular intersections.

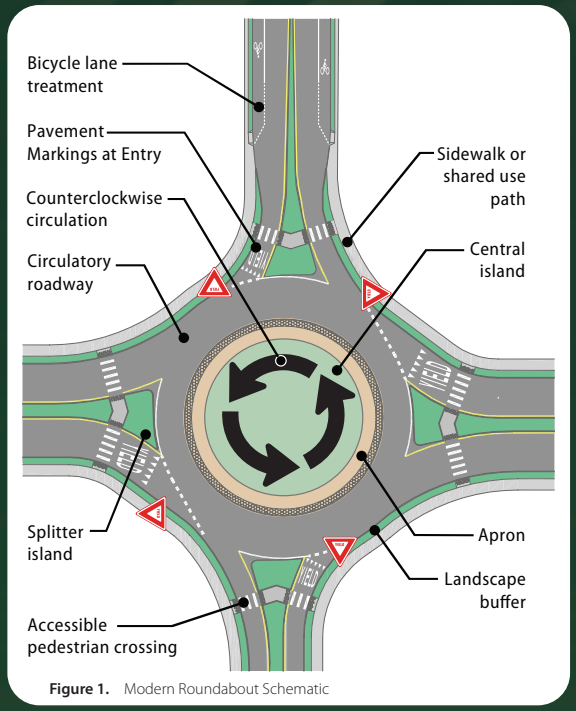


Figure 1. Modern Roundabout Schematic

Roundabouts have certain essential distinguishing features:

- **Counterclockwise Flow.** Traffic travels counterclockwise around a center island.
- **Entry Yield Control.** Vehicles entering the roundabout yield to traffic already circulating.
- **Low Speed.** Curvature that results in lower vehicle speeds (15-25 mph) throughout the roundabout.

FHWA identified roundabouts as a **Proven Safety Countermeasure** because of their ability to substantially reduce the types of crashes that result in injury or loss of life. Roundabouts are designed to improve safety for all users, including pedestrians and bicycles. They also provide significant operational benefits compared to conventional intersections.

On average, roundabouts reduce severe crashes – those resulting in injury or loss of life – by 78-82%[1]

[1] *Highway Safety Manual*, American Association of State Highway and Transportation Officials, Washington, DC, 2010.

Educational Resources

Wisconsin Guidance on Reacting to Emergency Vehicles in Roundabouts
https://wisconsindot.gov/Documents/safety/safety-eng/roundabouts/br-emergencyveh.pdf

Minnesota DOT Roundabout Animation
www.dot.state.mn.us/roundabouts/emergency.html

Washington State DOT Videos on Roundabouts and How to Drive Them
https://www.youtube.com/watch?v=P3k65uS5-EE
http://www.youtube.com/watch?v=MywmtskFiiI

British Columbia MOT Video on Navigating a Roundabout with Emergency Vehicles
https://www.youtube.com/watch?v=Tk9n1uVa8LE

Strengthening Partnerships

Incorporating EMS into Strategic Highway Safety Plans
http://safety.fhwa.dot.gov/hsip/shsp/ems/connection/

For More Information

Jeffrey Shaw, P.E., PTOE, PTP
FHWA Office of Safety
202.738.7793 or jeffrey.shaw@dot.gov

Hillary Isebrands, P.E., PhD
FHWA Resource Center
720.545.4367 or hillary.isebrands@dot.gov

To learn more about roundabouts, please visit:
safety.fhwa.dot.gov

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Safe Roads for a Safer Future
Investment in roadway safety saves lives

Cover photo sources, top to bottom: Jeff Shaw, FHWA; Brad Estochen, MnDOT; Jeff Young, McHenry County Highway Department

U.S. Department of Transportation
Federal Highway Administration

ROUNDABOUTS
& First Responders
Saving Lives Together

Shared Mission – Shared Benefits

Saving lives and preventing serious injuries are the highest priority of both first responders and highway agencies. Roundabouts are safer intersections that result in fewer severe crashes requiring emergency response.

Safer intersections are important for first responder occupational safety and health, too. Studies show that most fatalities resulting from a crash involving a fire truck occur at, or are related to, an intersection. Further, angle crashes are the most common fatal crash type involving fire trucks.[2] The International Association of Fire Fighters (IAFF) and others cite intersections as high risk locations for all emergency response disciplines.[3]

Source: Howard McCulloch, NYSDOT

Roundabouts are also a very efficient type of intersection. They do not have the same stop-and-go conditions as traditional intersections.

- Roundabouts keep people moving, but at speeds where injury risk is greatly reduced.
- Roundabouts can reduce or eliminate lines of stopped traffic typical of stop signs and traffic signals, making them easier to navigate throughout the day and night.
- Unlike traffic signals, roundabouts don't depend on electricity to function, so they are not susceptible to power outages.

[1] *Highway Safety Manual*, American Association of State Highway and Transportation Officials, Washington, DC, 2010.

[2] Campbell, K.L., *Traffic Collisions Involving Fire Trucks in the United States*, UMTRI-99-26, Ann Arbor, MI: University of Michigan Transportation Research Institute, Ann Arbor, MI, 1999

[3] International Association of Fire Fighters (IAFF), *Best Practices for Emergency Vehicle and Roadway Operations Safety in the Emergency Services*, Washington, DC 2010

[4] Bailey, E.D., Sweeney, T., Considerations in Establishing Emergency Medical Services Response Time Goals, National Association of EMS Physicians, Lenexa, KS, 2003

Designing for First Responders

Source: Jeff Young, McHenry County Highway Department

Roundabouts are not designed to inhibit traffic. Rather, they are optimized for the safety and efficiency of all users. Roundabouts can be designed for large trucks, including a special purpose apparatus such as a ladder truck. This is accomplished by using features such as:

- Wider entry and exit lanes for efficient movement of traffic through the roundabout.
- Mountable aprons and curbs intended for use by vehicles with a wide and/or long wheelbase.
- Curvature and radii that allow for easy turning movements, including u-turns.

Source: Brad Estochen - MnDOT

"Before the first roundabout was constructed in our city, our station arranged to visit one nearby so that we could experience it firsthand. That answered a lot of questions and helped build confidence in roundabouts."

- **Brad Estochen**
  Minnesota DOT Safety Engineer &
  Firefighter and EMT for the City of Woodbury

Frequently Asked Questions

When the first roundabout in a community is proposed, it is natural for first responders to have questions and concerns. Several of the most common questions are addressed below:

Q: Will all our vehicles be able to maneuver through a roundabout?
A: Roundabouts work for many types of large vehicles. Partnering with the road agency to conduct a "test drive" (laying out the roundabout in a large open area using cones and temporary devices) can help evaluate and influence the design.

Q: What about emergency response times?
A: At any intersection, traffic conditions vary throughout the day. Roundabouts can actually improve travel times by eliminating unnecessary stops and delays. Furthermore, the IAFF and other public health and safety organizations recognize that small differences in travel times rarely, if ever, impact incident or patient outcomes.[3,4]

Q: How will drivers in our community know how to react to approaching emergency vehicles?
A: In this way, roundabouts are no different from other intersections – drivers must clear the intersection, pull off to the right, and let the emergency vehicle pass. To help educate drivers, there are many excellent resources available from states and cities where roundabouts are common. First responders can contribute to general roundabout education and outreach in a community by helping explain to the public how to react when an emergency vehicle approaches.

Q: Why consider roundabouts when we have traffic signal preemption in our city?
A: The use of preemption devices at signalized intersections remains a worthwhile option. However, in addition to being safer, roundabouts are viable in many places where traffic signals are not. Furthermore, even where signal preemption is used, first responders must obey state laws and department policies, and proceed cautiously – likely at speeds comparable to a roundabout.

Draft Corridor Concept Plan

Attachment H: Operational Analysis Worksheets

Michael Baker INTERNATIONAL

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	166	98	465	57	44	1018
Future Volume (veh/h)	166	98	465	57	44	1018
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1841	1841	1841	1841	1841	1841
Adj Flow Rate, veh/h	184	109	479	59	47	1083
Peak Hour Factor	0.90	0.90	0.97	0.97	0.94	0.94
Percent Heavy Veh, %	4	4	4	4	4	4
Cap, veh/h	467	214	919	624	77	1687
Arrive On Green	0.14	0.14	0.26	0.26	0.04	0.48
Sat Flow, veh/h	3401	1560	3589	1560	1753	3589
Grp Volume(v), veh/h	184	109	479	59	47	1083
Grp Sat Flow(s),veh/h/ln	1700	1560	1749	1560	1753	1749
Q Serve(g_s), s	1.4	1.8	3.3	0.7	0.7	6.5
Cycle Q Clear(g_c), s	1.4	1.8	3.3	0.7	0.7	6.5
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	467	214	919	624	77	1687
V/C Ratio(X)	0.39	0.51	0.52	0.09	0.61	0.64
Avail Cap(c_a), veh/h	3196	1466	2722	1429	415	4165
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	11.0	11.1	8.8	5.2	13.1	5.4
Incr Delay (d2), s/veh	0.2	0.7	0.2	0.0	2.9	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	1.6	0.6	0.1	0.2	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	11.2	11.8	8.9	5.2	16.0	5.6
LnGrp LOS	B	B	A	A	B	A
Approach Vol, veh/h	293		538			1130
Approach Delay, s/veh	11.4		8.5			6.0
Approach LOS	B		A			A

Timer - Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				18.7		9.1	6.1	12.6
Change Period (Y+Rc), s				5.3		5.3	4.9	5.3
Max Green Setting (Gmax), s				33.2		26.2	6.6	21.7
Max Q Clear Time (g_c+I1), s				8.5		3.8	2.7	5.3
Green Ext Time (p_c), s				5.0		0.5	0.0	1.8

Intersection Summary			
HCM 6th Ctrl Delay		7.5	
HCM 6th LOS		A	

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	25	53	17	570	1033	24
Future Vol, veh/h	25	53	17	570	1033	24
Conflicting Peds, #/hr	0	0	1	0	0	1
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	67	67	88	88	88	88
Heavy Vehicles, %	2	2	4	4	4	4
Mvmt Flow	37	79	19	648	1174	27

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1551	602	1202	0	-	0
Stage 1	1189	-	-	-	-	-
Stage 2	362	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.18	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.24	-	-	-
Pot Cap-1 Maneuver	104	443	565	-	-	-
Stage 1	251	-	-	-	-	-
Stage 2	675	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	100	443	564	-	-	-
Mov Cap-2 Maneuver	100	-	-	-	-	-
Stage 1	242	-	-	-	-	-
Stage 2	674	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	29.7	0.3	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	564	-	100	443	-	-
HCM Lane V/C Ratio	0.034	-	0.373	0.179	-	-
HCM Control Delay (s)	11.6	-	61	14.9	-	-
HCM Lane LOS	B	-	F	B	-	-
HCM 95th %tile Q(veh)	0.1	-	1.5	0.6	-	-

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBU	SBL	SBT
Lane Configurations							
Traffic Vol, veh/h	1	0	624	1	1	1	1034
Future Vol, veh/h	1	0	624	1	1	1	1034
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	-	None
Storage Length	0	-	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	-	0
Grade, %	0	-	0	-	-	-	2
Peak Hour Factor	25	25	90	90	92	98	98
Heavy Vehicles, %	2	2	4	4	4	4	4
Mvmt Flow	4	0	693	1	1	1	1055

Major/Minor	Minor1		Major1		Major2		
Conflicting Flow All	1226	347	0	0	694	694	0
Stage 1	694	-	-	-	-	-	-
Stage 2	532	-	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	6.48	4.18	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.54	2.24	-
Pot Cap-1 Maneuver	171	649	-	-	514	884	-
Stage 1	457	-	-	-	-	-	-
Stage 2	553	-	-	-	-	-	-
Platoon blocked, %			-	-			-
Mov Cap-1 Maneuver	170	649	-	-	645	645	-
Mov Cap-2 Maneuver	170	-	-	-	-	-	-
Stage 1	456	-	-	-	-	-	-
Stage 2	553	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	26.7	0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	170	645	-
HCM Lane V/C Ratio	-	-	0.024	0.003	-
HCM Control Delay (s)	-	-	26.7	10.6	-
HCM Lane LOS	-	-	D	B	-
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	274	0	233	2	0	0	1	146	512	0	0	814
Future Volume (veh/h)	274	0	233	2	0	0	1	146	512	0	0	814
Initial Q (Qb), veh	0	0	0	0	0	0		0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	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
Work Zone On Approach		No			No				No			No
Adj Sat Flow, veh/h/ln	1841	1841	1914	1870	1870	1870		1841	1841	1914	1841	1841
Adj Flow Rate, veh/h	364	0	163	8	0	0		164	575	0	0	885
Peak Hour Factor	0.95	0.95	0.95	0.25	0.25	0.25		0.89	0.89	0.89	0.92	0.92
Percent Heavy Veh, %	4	4	4	2	2	2		4	4	4	4	4
Cap, veh/h	584	0	266	22	0	0		255	2031	0	3	1072
Arrive On Green	0.17	0.00	0.17	0.01	0.00	0.00		0.07	0.58	0.00	0.00	0.43
Sat Flow, veh/h	3506	0	1596	1781	0	0		3401	3589	0	1753	2493
Grp Volume(v), veh/h	364	0	163	8	0	0		164	575	0	0	620
Grp Sat Flow(s),veh/h/ln	1753	0	1596	1781	0	0		1700	1749	0	1753	1749
Q Serve(g_s), s	6.2	0.0	6.1	0.3	0.0	0.0		3.0	5.3	0.0	0.0	20.2
Cycle Q Clear(g_c), s	6.2	0.0	6.1	0.3	0.0	0.0		3.0	5.3	0.0	0.0	20.2
Prop In Lane	1.00		1.00	1.00		0.00		1.00		0.00	1.00	
Lane Grp Cap(c), veh/h	584	0	266	22	0	0		255	2031	0	3	752
V/C Ratio(X)	0.62	0.00	0.61	0.36	0.00	0.00		0.64	0.28	0.00	0.00	0.82
Avail Cap(c_a), veh/h	1664	0	757	856	0	0		438	2842	0	152	1348
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	1.00	1.00	0.00	0.00		1.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	25.0	0.0	24.9	31.6	0.0	0.0		29.0	6.8	0.0	0.0	16.2
Incr Delay (d2), s/veh	0.4	0.0	0.9	7.2	0.0	0.0		1.0	0.0	0.0	0.0	0.9
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
%ile BackOfQ(50%),veh/ln	2.2	0.0	2.1	0.2	0.0	0.0		1.2	1.4	0.0	0.0	6.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.4	0.0	25.8	38.8	0.0	0.0		30.0	6.8	0.0	0.0	17.1
LnGrp LOS	C	A	C	D	A	A		C	A	A	A	B
Approach Vol, veh/h		527			8				739			1214
Approach Delay, s/veh		25.5			38.8				12.0			17.2
Approach LOS		C			D				B			B

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		16.7	9.7	33.0		5.0	0.0	42.7				
Change Period (Y+Rc), s		6.0	4.9	5.3		4.2	4.9	5.3				
Max Green Setting (Gmax), s		30.6	8.3	49.7		31.0	5.6	52.4				
Max Q Clear Time (g_c+I1), s		8.2	5.0	22.4		2.3	0.0	7.3				
Green Ext Time (p_c), s		0.9	0.1	5.2		0.0	0.0	2.4				

Intersection Summary												
HCM 6th Ctrl Delay			17.5									
HCM 6th LOS			B									

Notes
User approved volume balancing among the lanes for turning movement.
User approved ignoring U-Turning movement.

Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	303
Future Volume (veh/h)	303
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	0.99
Parking Bus, Adj	1.00
Work Zone On Approach	
Adj Sat Flow, veh/h/ln	1914
Adj Flow Rate, veh/h	329
Peak Hour Factor	0.92
Percent Heavy Veh, %	4
Cap, veh/h	397
Arrive On Green	0.43
Sat Flow, veh/h	923
Grp Volume(v), veh/h	594
Grp Sat Flow(s),veh/h/ln	1668
Q Serve(g_s), s	20.4
Cycle Q Clear(g_c), s	20.4
Prop In Lane	0.55
Lane Grp Cap(c), veh/h	717
V/C Ratio(X)	0.83
Avail Cap(c_a), veh/h	1285
HCM Platoon Ratio	1.00
Upstream Filter(I)	1.00
Uniform Delay (d), s/veh	16.3
Incr Delay (d2), s/veh	1.0
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(50%),veh/ln	6.3
Unsig. Movement Delay, s/veh	
LnGrp Delay(d),s/veh	17.3
LnGrp LOS	B
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer - Assigned Phs	

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	WBU	WBT	WBR	SBL	SBR
Lane Configurations							
Traffic Vol, veh/h	18	790	0	1026	14	18	89
Future Vol, veh/h	18	790	0	1026	14	18	89
Conflicting Peds, #/hr	7	0	0	0	7	0	0
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	-	None	-	None
Storage Length	100	-	100	-	-	0	-
Veh in Median Storage, #	-	0	-	0	-	0	-
Grade, %	-	2	-	0	-	0	-
Peak Hour Factor	89	89	95	95	95	86	86
Heavy Vehicles, %	4	4	4	4	4	2	2
Mvmt Flow	20	888	0	1080	15	21	103

Major/Minor	Major1		Major2			Minor2	
Conflicting Flow All	1102	0	888	-	0	1579	555
Stage 1	-	-	-	-	-	1095	-
Stage 2	-	-	-	-	-	484	-
Critical Hdwy	4.18	-	6.48	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	-	5.84	-
Follow-up Hdwy	2.24	-	2.54	-	-	3.52	3.32
Pot Cap-1 Maneuver	618	-	386	-	-	100	475
Stage 1	-	-	-	-	-	282	-
Stage 2	-	-	-	-	-	585	-
Platoon blocked, %		-		-	-		
Mov Cap-1 Maneuver	613	-	386	-	-	95	471
Mov Cap-2 Maneuver	-	-	-	-	-	95	-
Stage 1	-	-	-	-	-	270	-
Stage 2	-	-	-	-	-	580	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	27.3
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBU	WBT	WBR	SBLn1
Capacity (veh/h)	613	-	386	-	-	283
HCM Lane V/C Ratio	0.033	-	-	-	-	0.44
HCM Control Delay (s)	11.1	-	0	-	-	27.3
HCM Lane LOS	B	-	A	-	-	D
HCM 95th %tile Q(veh)	0.1	-	0	-	-	2.1

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	794	2	2	1032	4	2
Future Vol, veh/h	794	2	2	1032	4	2
Conflicting Peds, #/hr	0	1	1	0	1	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	96	96	75	75
Heavy Vehicles, %	4	4	4	4	2	2
Mvmt Flow	882	2	2	1075	5	3

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	885	0	1427	443
Stage 1	-	-	-	-	884	-
Stage 2	-	-	-	-	543	-
Critical Hdwy	-	-	4.18	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.24	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	748	-	126	562
Stage 1	-	-	-	-	364	-
Stage 2	-	-	-	-	546	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	747	-	125	561
Mov Cap-2 Maneuver	-	-	-	-	253	-
Stage 1	-	-	-	-	363	-
Stage 2	-	-	-	-	545	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	16.9
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	310	-	-	747	-
HCM Lane V/C Ratio	0.026	-	-	0.003	-
HCM Control Delay (s)	16.9	-	-	9.8	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBU
Lane Configurations												
Traffic Volume (veh/h)	25	371	387	31	1	14	390	154	26	11	9	10
Future Volume (veh/h)	25	371	387	31	1	14	390	154	26	11	9	10
Initial Q (Qb), veh		0	0	0		0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)		1.00		0.99		1.00		0.99	1.00		1.00	
Parking Bus, Adj		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	
Work Zone On Approach			No				No			No		
Adj Sat Flow, veh/h/ln		1841	1841	1841		1841	1841	1914	1841	1841	1841	
Adj Flow Rate, veh/h		391	407	33		16	443	175	30	12	10	
Peak Hour Factor		0.95	0.95	0.95		0.88	0.88	0.88	0.88	0.88	0.88	
Percent Heavy Veh, %		4	4	4		4	4	4	4	4	4	
Cap, veh/h		398	612	516		27	564	221	60	24	20	
Arrive On Green		0.12	0.33	0.33		0.02	0.23	0.23	0.06	0.06	0.06	
Sat Flow, veh/h		3401	1841	1551		1753	2445	956	999	399	333	
Grp Volume(v), veh/h		391	407	33		16	316	302	52	0	0	
Grp Sat Flow(s),veh/h/ln		1700	1841	1551		1753	1749	1652	1731	0	0	
Q Serve(g_s), s		7.9	13.1	1.0		0.6	11.7	11.9	2.0	0.0	0.0	
Cycle Q Clear(g_c), s		7.9	13.1	1.0		0.6	11.7	11.9	2.0	0.0	0.0	
Prop In Lane		1.00		1.00		1.00		0.58	0.58		0.19	
Lane Grp Cap(c), veh/h		398	612	516		27	404	381	105	0	0	
V/C Ratio(X)		0.98	0.66	0.06		0.60	0.78	0.79	0.50	0.00	0.00	
Avail Cap(c_a), veh/h		398	826	696		142	722	682	725	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	1.00	1.00		1.00	1.00	1.00	1.00	0.00	0.00	
Uniform Delay (d), s/veh		30.5	19.8	15.8		33.9	25.0	25.1	31.5	0.0	0.0	
Incr Delay (d2), s/veh		40.5	0.5	0.0		7.6	1.3	1.4	2.7	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 BackOfQ(50%),veh/ln		5.2	4.9	0.3		0.3	4.5	4.3	0.9	0.0	0.0	
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh		71.0	20.3	15.8		41.5	26.3	26.5	34.2	0.0	0.0	
LnGrp LOS		E	C	B		D	C	C	C	A	A	
Approach Vol, veh/h			831				634			52		
Approach Delay, s/veh			44.0				26.8			34.2		
Approach LOS			D				C			C		

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.0	28.3		26.2	13.0	21.3		8.8
Change Period (Y+Rc), s	4.9	5.3		5.3	4.9	5.3		4.6
Max Green Setting (Gmax), s	5.6	31.1		34.2	8.1	28.6		29.0
Max Q Clear Time (g_c+I1), s	2.6	15.1		17.2	9.9	13.9		4.0
Green Ext Time (p_c), s	0.0	1.3		3.0	0.0	1.9		0.2

Intersection Summary	
HCM 6th Ctrl Delay	31.3
HCM 6th LOS	C

Notes

User approved ignoring U-Turning movement.

Movement	SBL	SBT	SBR
Lane Configurations			
Traffic Volume (veh/h)	199	28	613
Future Volume (veh/h)	199	28	613
Initial Q (Qb), veh	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00
Work Zone On Approach		No	
Adj Sat Flow, veh/h/ln	1841	1841	1841
Adj Flow Rate, veh/h	212	30	652
Peak Hour Factor	0.94	0.94	0.94
Percent Heavy Veh, %	4	4	4
Cap, veh/h	466	66	821
Arrive On Green	0.30	0.30	0.30
Sat Flow, veh/h	1545	219	2723
Grp Volume(v), veh/h	242	0	652
Grp Sat Flow(s),veh/h/ln	1763	0	1361
Q Serve(g_s), s	7.7	0.0	15.2
Cycle Q Clear(g_c), s	7.7	0.0	15.2
Prop In Lane	0.88		1.00
Lane Grp Cap(c), veh/h	532	0	821
V/C Ratio(X)	0.46	0.00	0.79
Avail Cap(c_a), veh/h	871	0	1344
HCM Platoon Ratio	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.6	0.0	22.2
Incr Delay (d2), s/veh	0.5	0.0	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	0.0	4.8
Unsig. Movement Delay, s/veh			
LnGrp Delay(d),s/veh	20.0	0.0	23.6
LnGrp LOS	C	A	C
Approach Vol, veh/h		894	
Approach Delay, s/veh		22.6	
Approach LOS		C	
Timer - Assigned Phs			

Intersection	
Int Delay, s/veh	-

Movement	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	0	0	0
Future Vol, veh/h	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	22350	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	0

Major/Minor	Major1		Minor2	
Conflicting Flow All	0	0	0	0
Stage 1	-	-	0	0
Stage 2	-	-	0	0
Critical Hdwy	-	-	6.42	6.52
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	5.42	5.52
Follow-up Hdwy	-	-	3.518	4.018
Pot Cap-1 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %	-	-		
Mov Cap-1 Maneuver	-	-	-	0
Mov Cap-2 Maneuver	-	-	-	0
Stage 1	-	-	-	0
Stage 2	-	-	-	0

Approach	EB	WB
HCM Control Delay, s	0	0
HCM LOS		A

Minor Lane/Major Mvmt	EBT	EBR	WBLn1
Capacity (veh/h)	-	-	-
HCM Lane V/C Ratio	-	-	-
HCM Control Delay (s)	-	-	0
HCM Lane LOS	-	-	A
HCM 95th %tile Q(veh)	-	-	-

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	76	103	1043	165	118	780
Future Volume (veh/h)	76	103	1043	165	118	780
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	84	114	1075	170	126	830
Peak Hour Factor	0.90	0.90	0.97	0.97	0.94	0.94
Percent Heavy Veh, %	6	6	6	6	6	6
Cap, veh/h	379	174	1456	823	160	2178
Arrive On Green	0.11	0.11	0.42	0.42	0.09	0.63
Sat Flow, veh/h	3346	1535	3532	1535	1725	3532
Grp Volume(v), veh/h	84	114	1075	170	126	830
Grp Sat Flow(s),veh/h/ln	1673	1535	1721	1535	1725	1721
Q Serve(g_s), s	1.0	3.0	11.0	2.4	3.0	4.9
Cycle Q Clear(g_c), s	1.0	3.0	11.0	2.4	3.0	4.9
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	379	174	1456	823	160	2178
V/C Ratio(X)	0.22	0.66	0.74	0.21	0.79	0.38
Avail Cap(c_a), veh/h	2057	944	2445	1265	376	3598
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	16.9	17.7	10.1	5.0	18.6	3.7
Incr Delay (d2), s/veh	0.1	1.6	0.3	0.0	3.3	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	0.3	2.6	2.5	0.6	1.1	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	17.0	19.3	10.4	5.1	21.8	3.8
LnGrp LOS	B	B	B	A	C	A
Approach Vol, veh/h	198		1245			956
Approach Delay, s/veh	18.3		9.7			6.1
Approach LOS	B		A			A

Timer - Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				31.8		10.0	8.8	23.0
Change Period (Y+Rc), s				5.3		5.3	4.9	5.3
Max Green Setting (Gmax), s				43.7		25.7	9.1	29.7
Max Q Clear Time (g_c+I1), s				6.9		5.0	5.0	13.0
Green Ext Time (p_c), s				3.7		0.3	0.1	4.7

Intersection Summary			
HCM 6th Ctrl Delay		9.0	
HCM 6th LOS		A	

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBR	NBU	NBL	NBT	SBT	SBR
Lane Configurations							
Traffic Vol, veh/h	14	17	1	51	1103	904	17
Future Vol, veh/h	14	17	1	51	1103	904	17
Conflicting Peds, #/hr	0	0	5	5	0	0	5
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	-	None	-	None
Storage Length	100	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	-	0	0	-
Grade, %	0	-	-	-	0	0	-
Peak Hour Factor	67	67	92	88	88	88	88
Heavy Vehicles, %	2	2	6	6	6	6	6
Mvmt Flow	21	25	1	58	1253	1027	19

Major/Minor	Minor2		Major1			Major2	
Conflicting Flow All	1787	528	1047	1051	0	-	0
Stage 1	1042	-	-	-	-	-	-
Stage 2	745	-	-	-	-	-	-
Critical Hdwy	6.84	6.94	6.52	4.22	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.56	2.26	-	-	-
Pot Cap-1 Maneuver	73	495	299	635	-	-	-
Stage 1	301	-	-	-	-	-	-
Stage 2	430	-	-	-	-	-	-
Platoon blocked, %					-	-	-
Mov Cap-1 Maneuver	65	493	618	618	-	-	-
Mov Cap-2 Maneuver	65	-	-	-	-	-	-
Stage 1	271	-	-	-	-	-	-
Stage 2	428	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	45.2	0.5	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	618	-	65	493	-	-
HCM Lane V/C Ratio	0.096	-	0.321	0.051	-	-
HCM Control Delay (s)	11.4	-	84.7	12.7	-	-
HCM Lane LOS	B	-	F	B	-	-
HCM 95th %tile Q(veh)	0.3	-	1.2	0.2	-	-

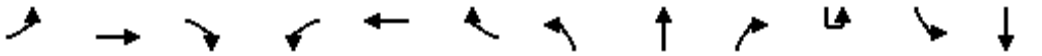
Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	0	1115	1	1	930
Future Vol, veh/h	1	0	1115	1	1	930
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	2
Peak Hour Factor	25	25	90	90	98	98
Heavy Vehicles, %	2	2	6	6	6	6
Mvmt Flow	4	0	1239	1	1	949

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1717	620	0	0	1240	0
Stage 1	1240	-	-	-	-	-
Stage 2	477	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.22	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.26	-
Pot Cap-1 Maneuver	81	431	-	-	536	-
Stage 1	236	-	-	-	-	-
Stage 2	590	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	81	431	-	-	536	-
Mov Cap-2 Maneuver	81	-	-	-	-	-
Stage 1	236	-	-	-	-	-
Stage 2	590	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	51.7	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	81	536	-
HCM Lane V/C Ratio	-	-	0.049	0.002	-
HCM Control Delay (s)	-	-	51.7	11.7	-
HCM Lane LOS	-	-	F	B	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	310	0	182	0	0	0	209	895	0	3	0	761
Future Volume (veh/h)	310	0	182	0	0	0	209	895	0	3	0	761
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0		0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	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
Work Zone On Approach		No			No			No				No
Adj Sat Flow, veh/h/ln	1811	1811	1884	1870	1870	1870	1811	1811	1884		1811	1811
Adj Flow Rate, veh/h	386	0	128	0	0	0	235	1006	0		0	827
Peak Hour Factor	0.95	0.95	0.95	0.25	0.25	0.25	0.89	0.89	0.89		0.92	0.92
Percent Heavy Veh, %	6	6	6	2	2	2	6	6	6		6	6
Cap, veh/h	599	0	274	0	3	0	350	2138	0		3	1030
Arrive On Green	0.17	0.00	0.17	0.00	0.00	0.00	0.10	0.62	0.00		0.00	0.43
Sat Flow, veh/h	3450	0	1580	0	1870	0	3346	3532	0		1725	2406
Grp Volume(v), veh/h	386	0	128	0	0	0	235	1006	0		0	591
Grp Sat Flow(s),veh/h/ln	1725	0	1580	0	1870	0	1673	1721	0		1725	1721
Q Serve(g_s), s	5.7	0.0	4.0	0.0	0.0	0.0	3.7	8.6	0.0		0.0	16.5
Cycle Q Clear(g_c), s	5.7	0.0	4.0	0.0	0.0	0.0	3.7	8.6	0.0		0.0	16.5
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.00		1.00	
Lane Grp Cap(c), veh/h	599	0	274	0	3	0	350	2138	0		3	736
V/C Ratio(X)	0.64	0.00	0.47	0.00	0.00	0.00	0.67	0.47	0.00		0.00	0.80
Avail Cap(c_a), veh/h	1929	0	883	0	1053	0	674	3261	0		175	1459
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	1.00	0.00	0.00	0.00	1.00	1.00	0.00		0.00	1.00
Uniform Delay (d), s/veh	21.2	0.0	20.5	0.0	0.0	0.0	23.8	5.6	0.0		0.0	13.7
Incr Delay (d2), s/veh	0.4	0.0	0.5	0.0	0.0	0.0	0.8	0.1	0.0		0.0	0.8
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/ln	1.9	0.0	1.3	0.0	0.0	0.0	1.3	1.6	0.0		0.0	4.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.6	0.0	20.9	0.0	0.0	0.0	24.6	5.6	0.0		0.0	14.5
LnGrp LOS	C	A	C	A	A	A	C	A	A		A	B
Approach Vol, veh/h		514			0			1241				1155
Approach Delay, s/veh		21.5			0.0			9.2				14.6
Approach LOS		C						A				B

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		15.6	10.7	28.9		0.0	0.0	39.5				
Change Period (Y+Rc), s		6.0	4.9	5.3		4.2	4.9	5.3				
Max Green Setting (Gmax), s		30.8	11.1	46.7		31.0	5.6	52.2				
Max Q Clear Time (g_c+I1), s		7.7	5.7	18.6		0.0	0.0	10.6				
Green Ext Time (p_c), s		0.8	0.2	4.9		0.0	0.0	4.8				

Intersection Summary												
HCM 6th Ctrl Delay			13.5									
HCM 6th LOS			B									

Notes

User approved volume balancing among the lanes for turning movement.
User approved ignoring U-Turning movement.

Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	302
Future Volume (veh/h)	302
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	1.00
Parking Bus, Adj	1.00
Work Zone On Approach	
Adj Sat Flow, veh/h/ln	1884
Adj Flow Rate, veh/h	328
Peak Hour Factor	0.92
Percent Heavy Veh, %	6
Cap, veh/h	407
Arrive On Green	0.43
Sat Flow, veh/h	952
Grp Volume(v), veh/h	564
Grp Sat Flow(s),veh/h/ln	1638
Q Serve(g_s), s	16.6
Cycle Q Clear(g_c), s	16.6
Prop In Lane	0.58
Lane Grp Cap(c), veh/h	701
V/C Ratio(X)	0.81
Avail Cap(c_a), veh/h	1389
HCM Platoon Ratio	1.00
Upstream Filter(I)	1.00
Uniform Delay (d), s/veh	13.8
Incr Delay (d2), s/veh	0.8
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(50%),veh/ln	4.6
Unsig. Movement Delay, s/veh	
LnGrp Delay(d),s/veh	14.6
LnGrp LOS	B
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer - Assigned Phs	

Intersection	
Int Delay, s/veh	0.7

Movement	EBU	EBL	EBT	WBU	WBT	WBR	SBL	SBR
Lane Configurations								
Traffic Vol, veh/h	2	73	1128	0	1018	28	1	43
Future Vol, veh/h	2	73	1128	0	1018	28	1	43
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	None
Storage Length	-	100	-	100	-	-	0	-
Veh in Median Storage, #	-	-	0	-	0	-	0	-
Grade, %	-	-	2	-	0	-	0	-
Peak Hour Factor	92	89	89	95	95	95	86	86
Heavy Vehicles, %	6	6	6	6	6	6	2	2
Mvmt Flow	2	82	1267	0	1072	29	1	50

Major/Minor	Major1			Major2			Minor2	
Conflicting Flow All	1101	1101	0	1267	-	0	1889	551
Stage 1	-	-	-	-	-	-	1087	-
Stage 2	-	-	-	-	-	-	802	-
Critical Hdwy	6.52	4.22	-	6.52	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.84	-
Follow-up Hdwy	2.56	2.26	-	2.56	-	-	3.52	3.32
Pot Cap-1 Maneuver	276	607	-	215	-	-	62	478
Stage 1	-	-	-	-	-	-	285	-
Stage 2	-	-	-	-	-	-	402	-
Platoon blocked, %			-		-	-		
Mov Cap-1 Maneuver	586	586	-	215	-	-	53	478
Mov Cap-2 Maneuver	-	-	-	-	-	-	53	-
Stage 1	-	-	-	-	-	-	244	-
Stage 2	-	-	-	-	-	-	402	-

Approach	EB	WB	SB
HCM Control Delay, s	0.8	0	15.2
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBU	WBT	WBR	SBLn1
Capacity (veh/h)	586	-	215	-	-	404
HCM Lane V/C Ratio	0.144	-	-	-	-	0.127
HCM Control Delay (s)	12.2	-	0	-	-	15.2
HCM Lane LOS	B	-	A	-	-	C
HCM 95th %tile Q(veh)	0.5	-	0	-	-	0.4

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Vol, veh/h	1128	6	1	1	1043	2	0
Future Vol, veh/h	1128	6	1	1	1043	2	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	-	None	-	None
Storage Length	-	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	-	0	0	-
Grade, %	0	-	-	-	0	0	-
Peak Hour Factor	90	90	92	96	96	75	75
Heavy Vehicles, %	6	6	6	6	6	2	2
Mvmt Flow	1253	7	1	1	1086	3	0

Major/Minor	Major1		Major2			Minor1	
Conflicting Flow All	0	0	1260	1260	0	1804	630
Stage 1	-	-	-	-	-	1257	-
Stage 2	-	-	-	-	-	547	-
Critical Hdwy	-	-	6.52	4.22	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.56	2.26	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	217	526	-	71	424
Stage 1	-	-	-	-	-	231	-
Stage 2	-	-	-	-	-	544	-
Platoon blocked, %	-	-			-		
Mov Cap-1 Maneuver	-	-	305	305	-	71	424
Mov Cap-2 Maneuver	-	-	-	-	-	173	-
Stage 1	-	-	-	-	-	229	-
Stage 2	-	-	-	-	-	544	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	26.1
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	173	-	-	305	-
HCM Lane V/C Ratio	0.015	-	-	0.007	-
HCM Control Delay (s)	26.1	-	-	16.9	-
HCM Lane LOS	D	-	-	C	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBU
Lane Configurations												
Traffic Volume (veh/h)	61	647	467	37	2	23	498	111	59	23	21	16
Future Volume (veh/h)	61	647	467	37	2	23	498	111	59	23	21	16
Initial Q (Qb), 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	
Parking Bus, Adj		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	
Work Zone On Approach			No				No			No		
Adj Sat Flow, veh/h/ln		1811	1811	1811		1811	1811	1884	1811	1811	1811	
Adj Flow Rate, veh/h		681	492	39		26	566	126	67	26	24	
Peak Hour Factor		0.95	0.95	0.95		0.88	0.88	0.88	0.88	0.88	0.88	
Percent Heavy Veh, %		6	6	6		6	6	6	6	6	6	
Cap, veh/h		775	813	689		37	667	148	92	36	33	
Arrive On Green		0.23	0.45	0.45		0.02	0.24	0.24	0.09	0.09	0.09	
Sat Flow, veh/h		3346	1811	1535		1725	2799	621	973	378	349	
Grp Volume(v), veh/h		681	492	39		26	347	345	117	0	0	
Grp Sat Flow(s),veh/h/ln		1673	1811	1535		1725	1721	1699	1700	0	0	
Q Serve(g_s), s		17.8	18.7	1.3		1.4	17.5	17.6	6.1	0.0	0.0	
Cycle Q Clear(g_c), s		17.8	18.7	1.3		1.4	17.5	17.6	6.1	0.0	0.0	
Prop In Lane		1.00		1.00		1.00		0.37	0.57		0.21	
Lane Grp Cap(c), veh/h		775	813	689		37	410	405	160	0	0	
V/C Ratio(X)		0.88	0.61	0.06		0.71	0.85	0.85	0.73	0.00	0.00	
Avail Cap(c_a), veh/h		1293	1221	1034		108	602	595	543	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	1.00	1.00		1.00	1.00	1.00	1.00	0.00	0.00	
Uniform Delay (d), s/veh		33.7	18.9	14.2		44.2	33.0	33.0	40.0	0.0	0.0	
Incr Delay (d2), s/veh		2.1	0.3	0.0		9.1	5.0	5.3	4.7	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 BackOfQ(50%),veh/ln		7.0	7.0	0.4		0.6	7.4	7.4	2.7	0.0	0.0	
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh		35.7	19.2	14.2		53.3	38.0	38.4	44.7	0.0	0.0	
LnGrp LOS		D	B	B		D	D	D	D	A	A	
Approach Vol, veh/h			1212				718			117		
Approach Delay, s/veh			28.3				38.7			44.7		
Approach LOS			C				D			D		

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.8	46.1		24.8	25.9	26.9		13.2
Change Period (Y+Rc), s	4.9	5.3		5.3	4.9	5.3		4.6
Max Green Setting (Gmax), s	5.7	61.2		34.0	35.1	31.8		29.0
Max Q Clear Time (g_c+I1), s	3.4	20.7		17.6	19.8	19.6		8.1
Green Ext Time (p_c), s	0.0	1.8		1.8	1.2	2.0		0.5

Intersection Summary		
HCM 6th Ctrl Delay		33.5
HCM 6th LOS		C

Notes

User approved ignoring U-Turning movement.

Movement	SBL	SBT	SBR
Lane Configurations			
Traffic Volume (veh/h)	101	14	456
Future Volume (veh/h)	101	14	456
Initial Q (Qb), veh	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00
Work Zone On Approach		No	
Adj Sat Flow, veh/h/ln	1811	1811	1811
Adj Flow Rate, veh/h	107	15	485
Peak Hour Factor	0.94	0.94	0.94
Percent Heavy Veh, %	6	6	6
Cap, veh/h	326	46	579
Arrive On Green	0.21	0.21	0.21
Sat Flow, veh/h	1522	213	2701
Grp Volume(v), veh/h	122	0	485
Grp Sat Flow(s),veh/h/ln	1735	0	1351
Q Serve(g_s), s	5.4	0.0	15.6
Cycle Q Clear(g_c), s	5.4	0.0	15.6
Prop In Lane	0.88		1.00
Lane Grp Cap(c), veh/h	372	0	579
V/C Ratio(X)	0.33	0.00	0.84
Avail Cap(c_a), veh/h	650	0	1011
HCM Platoon Ratio	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00
Uniform Delay (d), s/veh	30.1	0.0	34.2
Incr Delay (d2), s/veh	0.4	0.0	2.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	0.0	5.3
Unsig. Movement Delay, s/veh			
LnGrp Delay(d),s/veh	30.5	0.0	36.7
LnGrp LOS	C	A	D
Approach Vol, veh/h		607	
Approach Delay, s/veh		35.4	
Approach LOS		D	
Timer - Assigned Phs			

Intersection	
Int Delay, s/veh	-

Movement	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	0	0	0
Future Vol, veh/h	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	22350	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	0

Major/Minor	Major1		Minor2	
Conflicting Flow All	0	0	0	0
Stage 1	-	-	0	0
Stage 2	-	-	0	0
Critical Hdwy	-	-	6.42	6.52
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	5.42	5.52
Follow-up Hdwy	-	-	3.518	4.018
Pot Cap-1 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %	-	-		
Mov Cap-1 Maneuver	-	-	-	0
Mov Cap-2 Maneuver	-	-	-	0
Stage 1	-	-	-	0
Stage 2	-	-	-	0

Approach	EB	WB
HCM Control Delay, s	0	0
HCM LOS		A

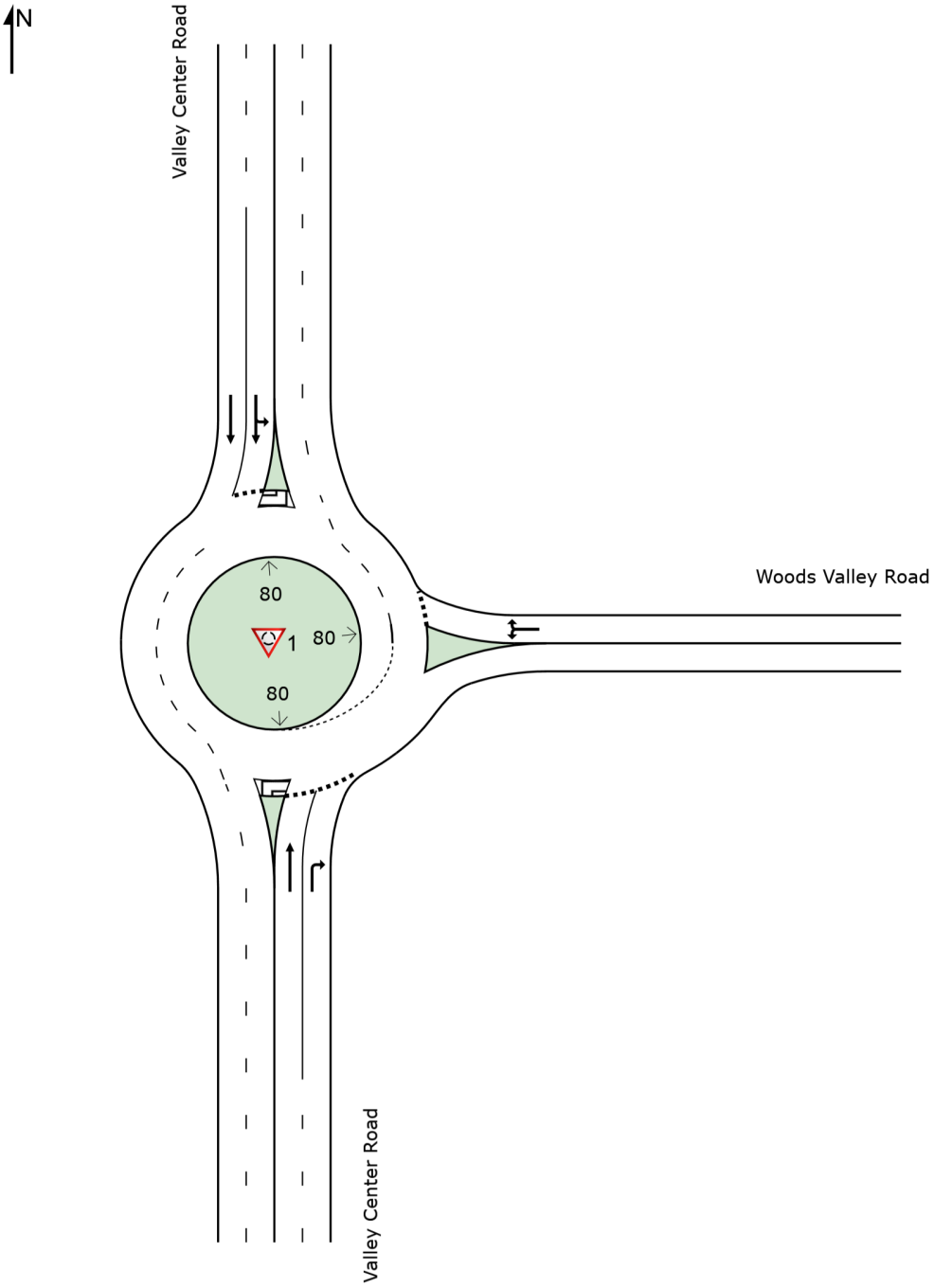
Minor Lane/Major Mvmt	EBT	EBR	WBLn1
Capacity (veh/h)	-	-	-
HCM Lane V/C Ratio	-	-	-
HCM Control Delay (s)	-	-	0
HCM Lane LOS	-	-	A
HCM 95th %tile Q(veh)	-	-	-

SITE LAYOUT

Site: 1 [Woods Valley Road (Site Folder: Valley Center Road)]

AM
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 1 [Woods Valley Road (Site Folder: Valley Center Road)]

AM
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Valley Center Road														
8	T1	465	6.0	479	6.0	0.374	6.4	LOS A	2.0	53.6	0.20	0.08	0.20	34.0
18	R2	57	6.0	59	6.0	0.046	3.2	LOS A	0.2	4.5	0.14	0.05	0.14	34.5
Approach		522	6.0	538	6.0	0.374	6.0	LOS A	2.0	53.6	0.19	0.08	0.19	34.0
East: Woods Valley Road														
1	L2	166	6.0	184	6.0	0.337	7.9	LOS A	1.4	36.2	0.56	0.53	0.56	31.7
16	R2	98	6.0	109	6.0	0.337	7.9	LOS A	1.4	36.2	0.56	0.53	0.56	31.0
Approach		264	6.0	293	6.0	0.337	7.9	LOS A	1.4	36.2	0.56	0.53	0.56	31.4
North: Valley Center Road														
7	L2	44	6.0	47	6.0	0.378	7.0	LOS A	1.9	50.3	0.41	0.28	0.41	33.3
4	T1	1018	6.0	1083	6.0	0.378	2.5	LOS A	1.9	50.3	0.14	0.10	0.14	35.9
Approach		1062	6.0	1130	6.0	0.378	2.7	LOS A	1.9	50.3	0.15	0.11	0.15	35.8
All Vehicles		1848	6.0	1961	6.0	0.378	4.4	LOS A	2.0	53.6	0.23	0.16	0.23	34.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	5	53	25	5	25	17	570	25	25	1033	24
Future Volume (veh/h)	25	5	53	25	5	25	17	570	25	25	1033	24
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		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1945	1870	1870	1870	1811	1811	1870	1870	1811	1811
Adj Flow Rate, veh/h	37	5	79	27	5	27	19	648	27	27	1174	27
Peak Hour Factor	0.67	0.92	0.67	0.92	0.92	0.92	0.88	0.88	0.92	0.92	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	6	6	2	2	6	6
Cap, veh/h	175	15	245	57	25	133	268	1153	48	57	1659	38
Arrive On Green	0.10	0.16	0.16	0.03	0.10	0.10	0.34	0.34	0.34	0.03	0.48	0.48
Sat Flow, veh/h	1781	95	1504	1781	254	1370	450	3365	140	1781	3438	79
Grp Volume(v), veh/h	37	0	84	27	0	32	19	331	344	27	587	614
Grp Sat Flow(s),veh/h/ln	1781	0	1600	1781	0	1624	450	1721	1785	1781	1721	1796
Q Serve(g_s), s	0.8	0.0	1.9	0.6	0.0	0.8	1.4	6.6	6.6	0.6	11.2	11.2
Cycle Q Clear(g_c), s	0.8	0.0	1.9	0.6	0.0	0.8	6.8	6.6	6.6	0.6	11.2	11.2
Prop In Lane	1.00		0.94	1.00		0.84	1.00		0.08	1.00		0.04
Lane Grp Cap(c), veh/h	175	0	260	57	0	157	268	590	612	57	830	867
V/C Ratio(X)	0.21	0.00	0.32	0.47	0.00	0.20	0.07	0.56	0.56	0.47	0.71	0.71
Avail Cap(c_a), veh/h	766	0	1166	234	0	699	339	859	891	217	1254	1309
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	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.4	0.0	15.5	19.9	0.0	17.4	13.5	11.2	11.2	19.9	8.5	8.5
Incr Delay (d2), s/veh	0.6	0.0	0.7	5.9	0.0	0.6	0.1	0.8	0.8	5.9	1.1	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	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.7	0.3	0.0	0.3	0.1	1.8	1.9	0.3	2.4	2.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.0	0.0	16.2	25.8	0.0	18.0	13.6	12.0	12.0	25.8	9.6	9.6
LnGrp LOS	B	A	B	C	A	B	B	B	B	C	A	A
Approach Vol, veh/h		121			59			694			1228	
Approach Delay, s/veh		16.7			21.6			12.1			10.0	
Approach LOS		B			C			B			A	

Timer - Assigned Phs	1	2	3	4		6	7	8
Phs Duration (G+Y+Rc), s	5.8	18.8	5.8	11.3		24.7	8.6	8.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s	5.1	20.9	5.5	30.5		30.5	18.0	18.0
Max Q Clear Time (g_c+I1), s	2.6	8.8	2.6	3.9		13.2	2.8	2.8
Green Ext Time (p_c), s	0.0	3.2	0.0	0.4		7.0	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	11.4
HCM 6th LOS	B

Notes

User approved ignoring U-Turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	0	25	0	0	0	10	620	0	0	1008	25
Future Volume (veh/h)	10	0	25	0	0	0	10	620	0	0	1008	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	0	1870	1870	1870
Adj Flow Rate, veh/h	11	0	27	0	0	0	11	674	0	0	1096	27
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	0	2	2	2
Cap, veh/h	295	0	71	0	83	0	489	2438	0	216	2431	60
Arrive On Green	0.04	0.00	0.04	0.00	0.00	0.00	0.69	0.69	0.00	0.00	0.69	0.69
Sat Flow, veh/h	1781	0	1585	0	1870	0	502	3647	0	764	3544	87
Grp Volume(v), veh/h	11	0	27	0	0	0	11	674	0	0	549	574
Grp Sat Flow(s),veh/h/ln	1781	0	1585	0	1870	0	502	1777	0	764	1777	1855
Q Serve(g_s), s	0.2	0.0	0.6	0.0	0.0	0.0	0.3	2.5	0.0	0.0	4.7	4.7
Cycle Q Clear(g_c), s	0.2	0.0	0.6	0.0	0.0	0.0	5.0	2.5	0.0	0.0	4.7	4.7
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.00	1.00		0.05
Lane Grp Cap(c), veh/h	295	0	71	0	83	0	489	2438	0	216	1219	1272
V/C Ratio(X)	0.04	0.00	0.38	0.00	0.00	0.00	0.02	0.28	0.00	0.00	0.45	0.45
Avail Cap(c_a), veh/h	1181	0	859	0	1014	0	489	2438	0	216	1219	1272
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	1.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	15.3	0.0	15.5	0.0	0.0	0.0	3.5	2.0	0.0	0.0	2.4	2.4
Incr Delay (d2), s/veh	0.1	0.0	3.4	0.0	0.0	0.0	0.1	0.3	0.0	0.0	1.2	1.2
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	0.1	0.0	0.2	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.4	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.4	0.0	18.9	0.0	0.0	0.0	3.6	2.3	0.0	0.0	3.6	3.5
LnGrp LOS	B	A	B	A	A	A	A	A	A	A	A	A
Approach Vol, veh/h		38			0			685			1123	
Approach Delay, s/veh		17.9			0.0			2.3			3.6	
Approach LOS		B						A			A	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	27.4	6.0	27.4	6.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	22.9	18.1	22.9	18.1
Max Q Clear Time (g_c+I1), s	7.0	2.6	6.7	0.0
Green Ext Time (p_c), s	3.9	0.1	6.2	0.0

Intersection Summary	
HCM 6th Ctrl Delay	3.4
HCM 6th LOS	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	0	624	1	2	1034
Future Volume (veh/h)	1	0	624	1	2	1034
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		0.98	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1945	1945	1811	1811	1788	1788
Adj Flow Rate, veh/h	4	0	514	368	693	1	2	1055
Peak Hour Factor	0.25	0.25	0.90	0.90	0.98	0.98
Percent Heavy Veh, %	2	2	6	6	6	6
Cap, veh/h	9999	9999	1784	3	530	1718
Arrive On Green	0.18	0.18	0.51	0.51	0.51	0.51
Sat Flow, veh/h	2763	1585	3470	380544	3616	5	717	3486
Grp Volume(v), veh/h	4	0	514	368	338	356	2	1055
Grp Sat Flow(s),veh/h/ln	1853	1648	1721	1810	717	1698
Q Serve(g_s), s	0.0	0.0	3.4	3.4	0.0	6.3
Cycle Q Clear(g_c), s	0.0	0.0	3.4	3.4	3.5	6.3
Prop In Lane	1.00	1.00		0.00	1.00	
Lane Grp Cap(c), veh/h	4	0	1784	1732032	870	916	530	1718
V/C Ratio(X)	0.00	0.01	0.39	0.39	0.00	0.61
Avail Cap(c_a), veh/h	1755	1561	3470	422208	1397	1469	749	2757
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	9.6	9.6	4.3	4.3	5.4	5.0
Incr Delay (d2), s/veh	0.0	0.0	0.3	0.3	0.0	0.4
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	0.0	0.2	0.2	0.0	0.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	9.6	9.6	4.6	4.6	5.4	5.4
LnGrp LOS	A	A	A	A	A	A
Approach Vol, veh/h	107	9	424	512	694	1057
Approach Delay, s/veh	9.6		4.6		5.4
Approach LOS	A		A		A

Timer - Assigned Phs	2	6	8
Phs Duration (G+Y+Rc), s	18.8	18.8	9.5
Change Period (Y+Rc), s	4.5	4.5	4.5
Max Green Setting (Gmax), s	23.0	23.0	18.0
Max Q Clear Time (g_c+I1), s	5.4	8.3	2.0
Green Ext Time (p_c), s	3.6	6.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	9.6
HCM 6th LOS	A

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	5	5	695	1047	5
Future Volume (veh/h)	5	5	5	695	1047	5
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	0.91	1.00			0.94
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1847	1847	1847	1847
Adj Flow Rate, veh/h	5	5	5	755	1138	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	62	62	12	2242	1769	8
Arrive On Green	0.08	0.08	0.01	0.64	0.49	0.49
Sat Flow, veh/h	735	735	1759	3601	3674	16
Grp Volume(v), veh/h	11	0	5	755	557	586
Grp Sat Flow(s),veh/h/ln	1617	0	1759	1754	1754	1843
Q Serve(g_s), s	0.2	0.0	0.1	3.2	7.7	7.7
Cycle Q Clear(g_c), s	0.2	0.0	0.1	3.2	7.7	7.7
Prop In Lane	0.45	0.45	1.00			0.01
Lane Grp Cap(c), veh/h	136	0	12	2242	866	910
V/C Ratio(X)	0.08	0.00	0.42	0.34	0.64	0.64
Avail Cap(c_a), veh/h	895	0	276	3562	1263	1326
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.7	0.0	16.1	2.7	6.1	6.1
Incr Delay (d2), s/veh	0.3	0.0	21.7	0.1	0.8	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.1	0.0	1.0	1.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	14.0	0.0	37.7	2.8	6.9	6.9
LnGrp LOS	B	A	D	A	A	A
Approach Vol, veh/h	11			760	1143	
Approach Delay, s/veh	14.0			3.0	6.9	
Approach LOS	B			A	A	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		25.3		7.2	4.7	20.6
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		33.0		18.0	5.1	23.4
Max Q Clear Time (g_c+I1), s		5.2		2.2	2.1	9.7
Green Ext Time (p_c), s		5.1		0.0	0.0	5.8

Intersection Summary	
HCM 6th Ctrl Delay	5.4
HCM 6th LOS	A

Notes

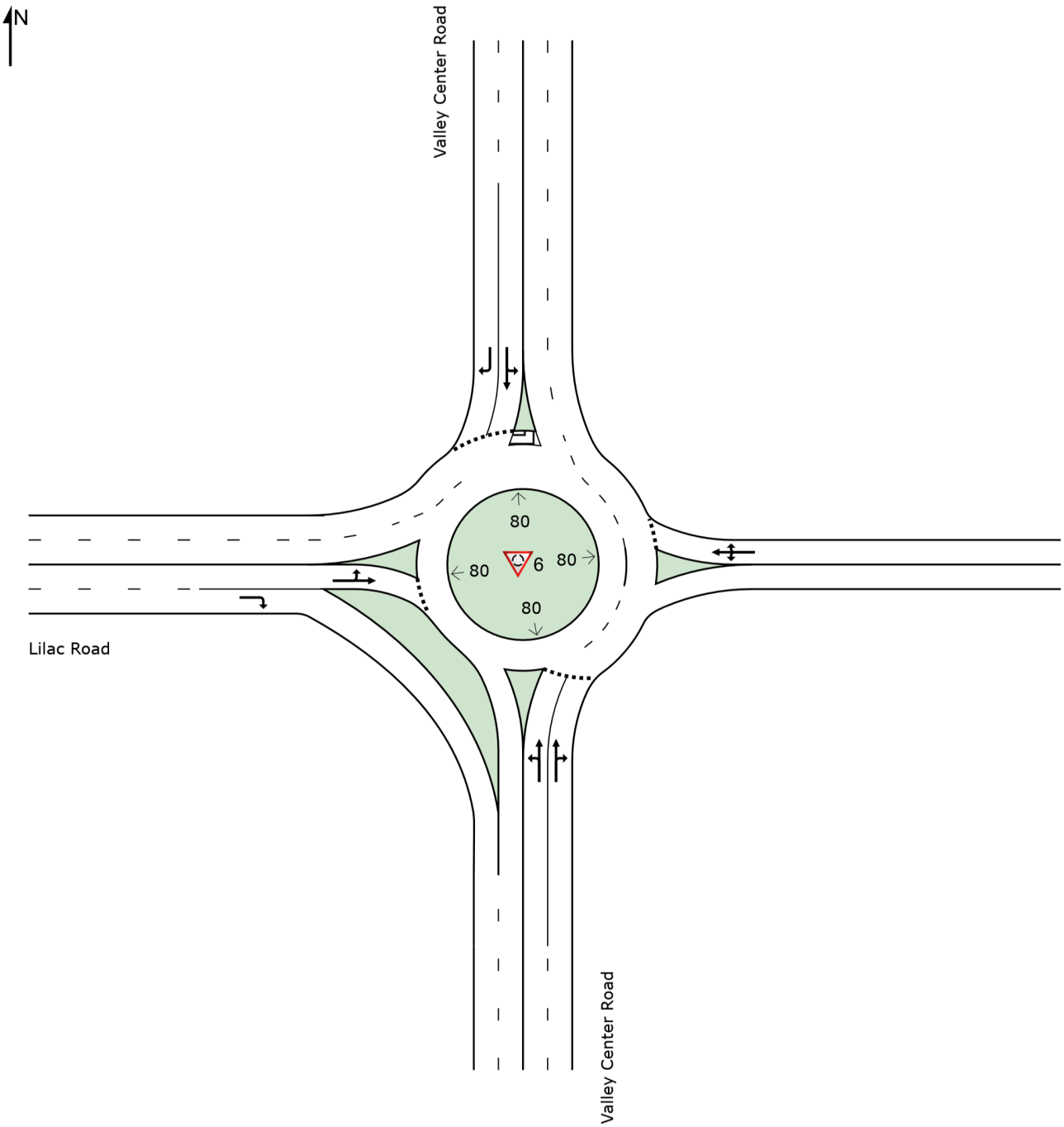
User approved volume balancing among the lanes for turning movement.

SITE LAYOUT

Site: 6 [Lilac Road (Site Folder: Valley Center Road)]

AM
Site Category: Existing Design
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 6 [Lilac Road (Site Folder: Valley Center Road)]

AM
Site Category: Existing Design
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Valley Center Road														
3	L2	209	4.0	235	4.0	0.599	11.5	LOS B	5.8	150.7	0.64	0.66	0.90	30.6
8	T1	895	4.0	1006	4.0	0.599	11.5	LOS B	5.8	150.7	0.64	0.66	0.90	31.2
18	R2	1	4.0	1	4.0	0.599	11.5	LOS B	5.8	150.7	0.64	0.66	0.90	30.7
Approach		1105	4.0	1242	4.0	0.599	11.5	LOS B	5.8	150.7	0.64	0.66	0.90	31.1
East:														
1	L2	2	2.0	8	2.0	0.044	10.7	LOS B	0.1	3.4	0.75	0.75	0.75	30.8
6	T1	1	2.0	4	2.0	0.044	10.7	LOS B	0.1	3.4	0.75	0.75	0.75	30.8
16	R2	1	2.0	4	2.0	0.044	10.7	LOS B	0.1	3.4	0.75	0.75	0.75	30.1
Approach		4	2.0	16	2.0	0.044	10.7	LOS B	0.1	3.4	0.75	0.75	0.75	30.6
North: Valley Center Road														
7	L2	1	4.0	1	4.0	0.820	20.5	LOS C	21.3	550.3	0.89	1.17	1.80	27.9
4	T1	814	4.0	885	4.0	0.820	20.5	LOS C	21.3	550.3	0.89	1.17	1.80	28.0
14	R2	303	4.0	329	4.0	0.305	6.3	LOS A	1.4	36.9	0.43	0.32	0.43	32.8
Approach		1118	4.0	1215	4.0	0.820	16.7	LOS C	21.3	550.3	0.76	0.94	1.43	29.1
West: Lilac Road														
5	L2	274	4.0	288	4.0	0.494	14.5	LOS B	2.7	68.8	0.74	0.87	1.14	28.4
2	T1	1	4.0	1	4.0	0.494	14.5	LOS B	2.7	68.8	0.74	0.87	1.14	28.5
12	R2	233	4.0	245	4.0	0.152	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	36.8
Approach		508	4.0	535	4.0	0.494	7.8	LOS A	2.7	68.8	0.40	0.47	0.62	31.6
All Vehicles		2735	4.0	3008	4.0	0.820	12.9	LOS B	21.3	550.3	0.65	0.74	1.06	30.4

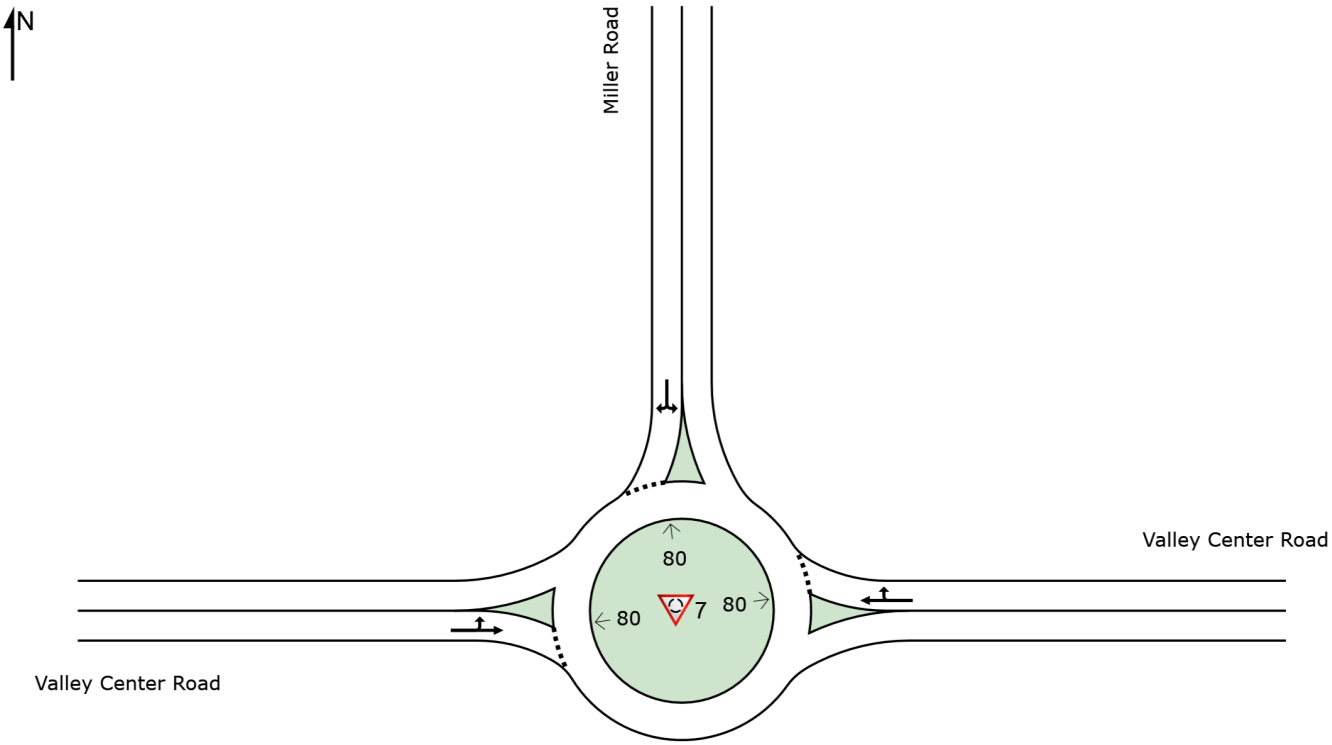
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

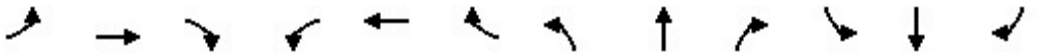
SITE LAYOUT

Site: 7 [Miller Road (Site Folder: Valley Center Road)]

AM
Site Category: Existing Design
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	19	794	21	2	1032	0	4	0	2	0	0	0
Future Volume (veh/h)	19	794	21	2	1032	0	4	0	2	0	0	0
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		0.94	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1811	1811	1811	1811	1870	1945	1870	1945	1870	1870	1870
Adj Flow Rate, veh/h	21	882	23	2	1075	0	5	0	3	0	0	0
Peak Hour Factor	0.92	0.90	0.90	0.96	0.96	0.92	0.75	0.92	0.75	0.92	0.92	0.92
Percent Heavy Veh, %	2	6	6	6	6	2	2	2	2	2	2	2
Cap, veh/h	357	1699	44	409	1707	0	431	0	345	5	6	0
Arrive On Green	0.50	0.50	0.50	0.50	0.50	0.00	0.23	0.00	0.23	0.00	0.00	0.00
Sat Flow, veh/h	525	3426	89	596	3532	0	1853	0	1483	1781	1870	0
Grp Volume(v), veh/h	21	443	462	2	1075	0	5	0	3	0	0	0
Grp Sat Flow(s),veh/h/ln	525	1721	1795	596	1721	0	1853	0	1483	1781	1870	0
Q Serve(g_s), s	1.0	5.8	5.8	0.1	7.6	0.0	0.1	0.0	0.1	0.0	0.0	0.0
Cycle Q Clear(g_c), s	8.6	5.8	5.8	5.9	7.6	0.0	0.1	0.0	0.1	0.0	0.0	0.0
Prop In Lane	1.00		0.05	1.00		0.00	1.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	357	853	890	409	1707	0	431	0	345	5	6	0
V/C Ratio(X)	0.06	0.52	0.52	0.00	0.63	0.00	0.01	0.00	0.01	0.00	0.00	0.00
Avail Cap(c_a), veh/h	500	1322	1380	571	2645	0	1005	0	805	966	1015	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	9.3	5.7	5.7	7.7	6.1	0.0	9.8	0.0	9.8	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.5	0.5	0.0	0.4	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	1.0	1.1	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.4	6.2	6.1	7.7	6.5	0.0	9.8	0.0	9.8	0.0	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	A	A	A	A	A	A
Approach Vol, veh/h		926			1077			8			0	
Approach Delay, s/veh		6.2			6.5			9.8			0.0	
Approach LOS		A			A			A				
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		12.2		21.0		0.0		21.0				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		18.0		25.5		18.0		25.5				
Max Q Clear Time (g_c+I1), s		2.1		10.6		0.0		9.6				
Green Ext Time (p_c), s		0.0		5.2		0.0		6.9				
Intersection Summary												
HCM 6th Ctrl Delay			6.4									
HCM 6th LOS			A									

MOVEMENT SUMMARY

Site: 7 [Miller Road (Site Folder: Valley Center Road)]

AM
Site Category: Existing Design
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: Valley Center Road														
6	T1	1026	4.0	1080	4.0	0.843	19.6	LOS C	16.4	423.3	0.43	0.14	0.43	28.3
16	R2	14	4.0	15	4.0	0.843	19.6	LOS C	16.4	423.3	0.43	0.14	0.43	27.7
Approach		1040	4.0	1095	4.0	0.843	19.6	LOS C	16.4	423.3	0.43	0.14	0.43	28.3
North: Miller Road														
7	L2	18	2.0	21	2.0	0.289	13.2	LOS B	1.1	29.0	0.75	0.77	0.83	30.4
14	R2	89	2.0	103	2.0	0.289	13.2	LOS B	1.1	29.0	0.75	0.77	0.83	29.7
Approach		107	2.0	124	2.0	0.289	13.2	LOS B	1.1	29.0	0.75	0.77	0.83	29.8
West: Valley Center Road														
5	L2	18	4.0	20	4.0	0.699	12.4	LOS B	8.2	212.2	0.26	0.08	0.26	31.0
2	T1	790	4.0	888	4.0	0.699	12.4	LOS B	8.2	212.2	0.26	0.08	0.26	31.0
Approach		808	4.0	908	4.0	0.699	12.4	LOS B	8.2	212.2	0.26	0.08	0.26	31.0
All Vehicles		1955	3.9	2127	3.9	0.843	16.2	LOS C	16.4	423.3	0.38	0.15	0.38	29.5

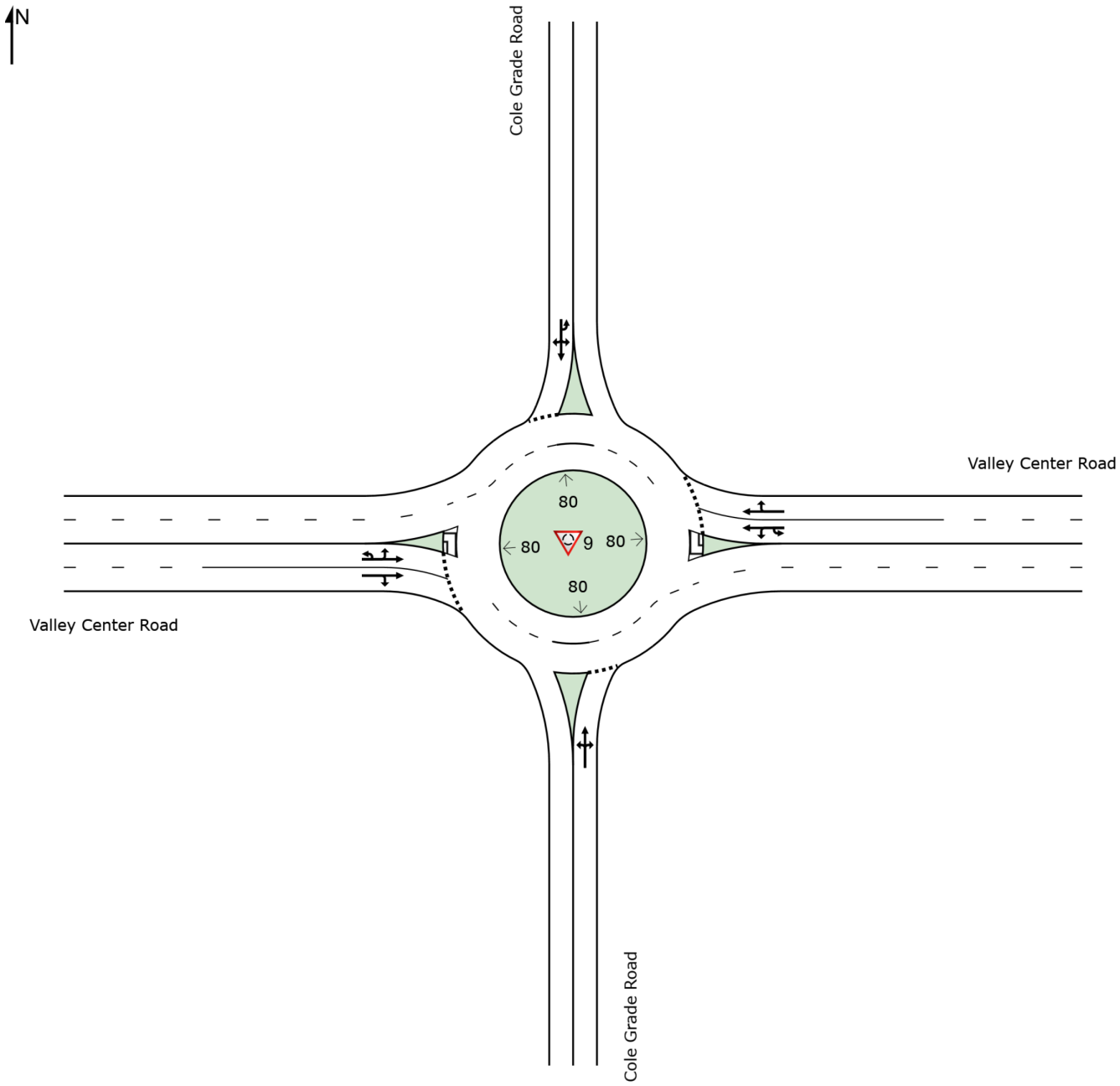
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 9 [Cole Grade Road (Site Folder: Valley Center Road)]

AM
Site Category: Existing Design
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 9 [Cole Grade Road (Site Folder: Valley Center Road)]

AM
Site Category: Existing Design
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Cole Grade Road														
3	L2	26	4.0	30	4.0	0.097	7.9	LOS A	0.3	8.1	0.63	0.63	0.63	31.8
8	T1	11	4.0	13	4.0	0.097	7.9	LOS A	0.3	8.1	0.63	0.63	0.63	31.9
18	R2	9	4.0	10	4.0	0.097	7.9	LOS A	0.3	8.1	0.63	0.63	0.63	31.1
Approach		46	4.0	52	4.0	0.097	7.9	LOS A	0.3	8.1	0.63	0.63	0.63	31.7
East: Valley Center Road														
1u	U	1	4.0	1	4.0	0.366	8.3	LOS A	1.6	42.5	0.59	0.57	0.59	33.4
1	L2	14	4.0	16	4.0	0.366	8.3	LOS A	1.6	42.5	0.59	0.57	0.59	32.8
6	T1	390	4.0	443	4.0	0.366	8.3	LOS A	1.6	42.5	0.59	0.57	0.59	32.8
16	R2	154	4.0	175	4.0	0.366	8.3	LOS A	1.6	42.5	0.59	0.57	0.59	32.0
Approach		559	4.0	635	4.0	0.366	8.3	LOS A	1.6	42.5	0.59	0.57	0.59	32.6
North: Cole Grade Road														
7u	U	10	4.0	11	4.0	1.053	67.1	LOS F	44.8	1155.0	1.00	2.61	5.36	17.6
7	L2	199	4.0	212	4.0	1.053	67.1	LOS F	44.8	1155.0	1.00	2.61	5.36	17.5
4	T1	28	4.0	30	4.0	1.053	67.1	LOS F	44.8	1155.0	1.00	2.61	5.36	17.5
14	R2	613	4.0	652	4.0	1.053	67.1	LOS F	44.8	1155.0	1.00	2.61	5.36	17.3
Approach		850	4.0	904	4.0	1.053	67.1	LOS F	44.8	1155.0	1.00	2.61	5.36	17.3
West: Valley Center Road														
5u	U	25	34.0	26	34.0	0.408	8.8	LOS A	2.0	53.3	0.49	0.38	0.49	30.6
5	L2	371	4.0	391	4.0	0.408	7.8	LOS A	2.0	53.3	0.49	0.38	0.49	30.9
2	T1	387	4.0	407	4.0	0.408	7.8	LOS A	2.1	53.9	0.49	0.38	0.49	33.2
12	R2	31	4.0	33	4.0	0.408	7.8	LOS A	2.1	53.9	0.49	0.38	0.49	32.3
Approach		814	4.9	857	4.9	0.408	7.8	LOS A	2.1	53.9	0.49	0.38	0.49	32.0
All Vehicles		2269	4.3	2449	4.3	1.053	29.9	LOS D	44.8	1155.0	0.71	1.26	2.32	24.5

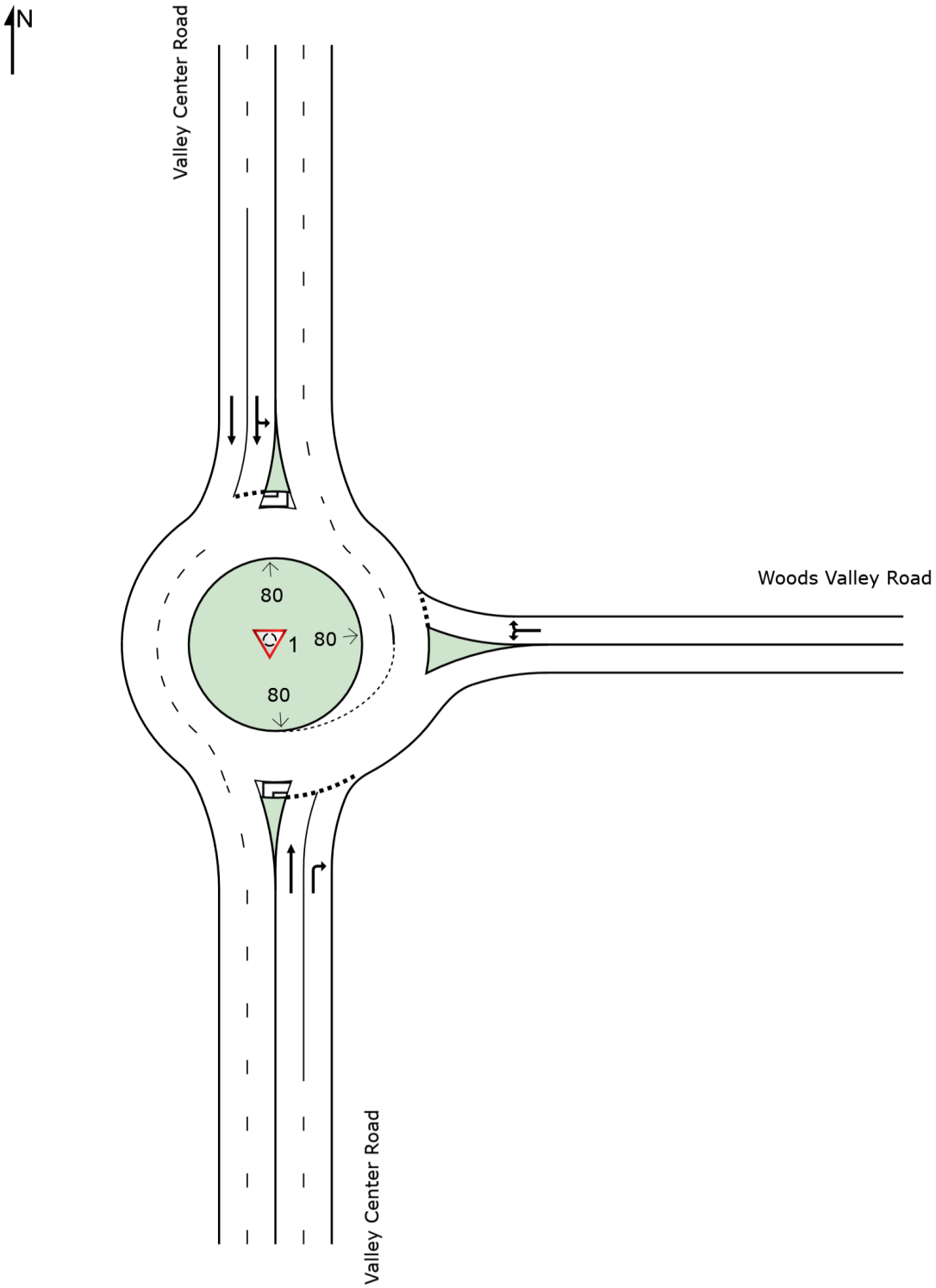
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 1 [Woods Valley Road (Site Folder: Valley Center Road)]

PM
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 1 [Woods Valley Road (Site Folder: Valley Center Road)]

PM
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Valley Center Road														
8	T1	1043	6.0	1075	6.0	0.906	27.4	LOS D	36.6	960.1	0.96	1.05	1.64	25.8
18	R2	165	6.0	170	6.0	0.143	4.3	LOS A	0.6	15.3	0.27	0.14	0.27	33.9
Approach		1208	6.0	1245	6.0	0.906	24.3	LOS C	36.6	960.1	0.87	0.93	1.46	26.7
East: Woods Valley Road														
1	L2	76	6.0	84	6.0	0.391	13.5	LOS B	1.6	42.3	0.72	0.80	0.99	29.8
16	R2	103	6.0	114	6.0	0.391	13.5	LOS B	1.6	42.3	0.72	0.80	0.99	29.1
Approach		179	6.0	199	6.0	0.391	13.5	LOS B	1.6	42.3	0.72	0.80	0.99	29.4
North: Valley Center Road														
7	L2	118	6.0	126	6.0	0.308	5.8	LOS A	1.5	39.7	0.25	0.13	0.25	33.4
4	T1	780	6.0	830	6.0	0.308	1.8	LOS A	1.5	39.7	0.08	0.04	0.08	36.1
Approach		898	6.0	955	6.0	0.308	2.3	LOS A	1.5	39.7	0.10	0.05	0.10	35.7
All Vehicles		2285	6.0	2400	6.0	0.906	14.6	LOS B	36.6	960.1	0.55	0.57	0.88	29.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
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LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
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Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Traffic Volume (veh/h)	14	5	17	50	5	50	1	51	1103	50	50	904	17
Future Volume (veh/h)	14	5	17	50	5	50	1	51	1103	50	50	904	17
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		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No				No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1945	1870	1870	1870		1811	1811	1870	1870	1811	1811
Adj Flow Rate, veh/h	21	5	25	54	5	54		58	1253	54	54	1027	19
Peak Hour Factor	0.67	0.92	0.67	0.92	0.92	0.92		0.88	0.88	0.92	0.92	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2		6	6	2	2	6	6
Cap, veh/h	129	28	138	91	11	118		357	1578	68	91	2082	39
Arrive On Green	0.07	0.10	0.10	0.05	0.08	0.08		0.47	0.47	0.47	0.05	0.60	0.60
Sat Flow, veh/h	1781	271	1355	1781	136	1470		522	3360	145	1781	3456	64
Grp Volume(v), veh/h	21	0	30	54	0	59		58	641	666	54	511	535
Grp Sat Flow(s),veh/h/ln	1781	0	1626	1781	0	1606		522	1721	1784	1781	1721	1799
Q Serve(g_s), s	0.6	0.0	0.9	1.6	0.0	1.9		3.9	17.4	17.4	1.6	9.3	9.3
Cycle Q Clear(g_c), s	0.6	0.0	0.9	1.6	0.0	1.9		5.9	17.4	17.4	1.6	9.3	9.3
Prop In Lane	1.00		0.83	1.00		0.92		1.00		0.08	1.00		0.04
Lane Grp Cap(c), veh/h	129	0	166	91	0	129		357	808	838	91	1036	1084
V/C Ratio(X)	0.16	0.00	0.18	0.59	0.00	0.46		0.16	0.79	0.79	0.59	0.49	0.49
Avail Cap(c_a), veh/h	581	0	855	226	0	524		405	967	1002	161	1036	1084
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	1.00	1.00	0.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.0	0.0	22.7	25.6	0.0	24.2		9.9	12.4	12.4	25.6	6.2	6.2
Incr Delay (d2), s/veh	0.6	0.0	0.5	6.1	0.0	2.5		0.2	3.9	3.8	6.1	0.4	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	0.3	0.0	0.4	0.8	0.0	0.8		0.4	5.5	5.7	0.8	1.9	2.0
Unsig. Movement Delay, s/veh													
LnGrp Delay(d),s/veh	24.6	0.0	23.2	31.7	0.0	26.7		10.1	16.2	16.2	31.7	6.6	6.6
LnGrp LOS	C	A	C	C	A	C		B	B	B	C	A	A
Approach Vol, veh/h		51			113				1365			1100	
Approach Delay, s/veh		23.8			29.1				15.9			7.8	
Approach LOS		C			C				B			A	

Timer - Assigned Phs	1	2	3	4	6	7	8
Phs Duration (G+Y+Rc), s	7.3	30.4	7.3	10.1	37.7	8.5	8.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.8	31.0	7.0	29.0	31.0	18.0	18.0
Max Q Clear Time (g_c+I1), s	3.6	19.4	3.6	2.9	11.3	2.6	3.9
Green Ext Time (p_c), s	0.0	6.5	0.0	0.1	6.2	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	13.2
HCM 6th LOS	B

Notes

User approved ignoring U-Turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	53	0	5	0	0	0	84	1218	0	0	1019	52
Future Volume (veh/h)	53	0	5	0	0	0	84	1218	0	0	1019	52
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	0	1870	1870	1870
Adj Flow Rate, veh/h	58	0	5	0	0	0	91	1324	0	0	1108	57
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	0	2	2	2
Cap, veh/h	269	0	96	0	114	0	457	2623	0	161	2538	131
Arrive On Green	0.06	0.00	0.06	0.00	0.00	0.00	0.74	0.74	0.00	0.00	0.74	0.74
Sat Flow, veh/h	1781	0	1585	0	1870	0	482	3647	0	414	3439	177
Grp Volume(v), veh/h	58	0	5	0	0	0	91	1324	0	0	572	593
Grp Sat Flow(s),veh/h/ln	1781	0	1585	0	1870	0	482	1777	0	414	1777	1839
Q Serve(g_s), s	1.4	0.0	0.1	0.0	0.0	0.0	4.0	7.0	0.0	0.0	5.6	5.6
Cycle Q Clear(g_c), s	1.4	0.0	0.1	0.0	0.0	0.0	9.6	7.0	0.0	0.0	5.6	5.6
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.00	1.00		0.10
Lane Grp Cap(c), veh/h	269	0	96	0	114	0	457	2623	0	161	1311	1357
V/C Ratio(X)	0.22	0.00	0.05	0.00	0.00	0.00	0.20	0.50	0.00	0.00	0.44	0.44
Avail Cap(c_a), veh/h	878	0	638	0	753	0	457	2623	0	161	1311	1357
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	1.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	20.4	0.0	19.8	0.0	0.0	0.0	4.1	2.4	0.0	0.0	2.3	2.3
Incr Delay (d2), s/veh	0.4	0.0	0.2	0.0	0.0	0.0	1.0	0.7	0.0	0.0	1.1	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.4	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.8	0.0	20.0	0.0	0.0	0.0	5.1	3.1	0.0	0.0	3.3	3.3
LnGrp LOS	C	A	C	A	A	A	A	A	A	A	A	A
Approach Vol, veh/h		63			0			1415			1165	
Approach Delay, s/veh		20.7			0.0			3.3			3.3	
Approach LOS		C						A			A	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	37.5	7.2	37.5	7.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	33.0	18.0	33.0	18.0
Max Q Clear Time (g_c+I1), s	11.6	3.4	7.6	0.0
Green Ext Time (p_c), s	10.7	0.1	7.8	0.0

Intersection Summary	
HCM 6th Ctrl Delay	3.7
HCM 6th LOS	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	0	1115	1	1	930
Future Volume (veh/h)	1	0	1115	1	1	930
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		0.98	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1945	1945	1811	1811	1788	1788
Adj Flow Rate, veh/h	4	0	1239	1	1	949
Peak Hour Factor	0.25	0.25	0.90	0.90	0.98	0.98
Percent Heavy Veh, %	2	2	6	6	6	6
Cap, veh/h	9999	9999	1776	1	356	1709
Arrive On Green	0.18	0.18	0.50	0.50	0.50	0.50
Sat Flow, veh/h	27637	9574	3554	3619	3	429	3486
Grp Volume(v), veh/h	4	0	1239	604	636	1	949
Grp Sat Flow(s),veh/h/ln	1853	1648	1721	1810	429	1698
Q Serve(g_s), s	0.0	0.0	7.6	7.6	0.1	5.4
Cycle Q Clear(g_c), s	0.0	0.0	7.6	7.6	7.6	5.4
Prop In Lane	1.00	1.00		0.00	1.00	
Lane Grp Cap(c), veh/h	4	0	1776	1024	866	911	356	1709
V/C Ratio(X)	0.00	0.01	0.70	0.70	0.00	0.56
Avail Cap(c_a), veh/h	1764	1574	1776	1099	1156	414	2169
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	9.5	9.5	5.4	5.4	8.3	4.8
Incr Delay (d2), s/veh	0.0	0.0	1.4	1.3	0.0	0.3
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	0.0	0.6	0.7	0.0	0.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	9.5	9.5	6.8	6.7	8.3	5.1
LnGrp LOS	A	A	A	A	A	A
Approach Vol, veh/h	4		1240			950
Approach Delay, s/veh	9.5		6.7			5.1
Approach LOS	A		A			A

Timer - Assigned Phs	2			6	8
Phs Duration (G+Y+Rc), s	18.7			18.7	9.5
Change Period (Y+Rc), s	4.5			4.5	4.5
Max Green Setting (Gmax), s	18.0			18.0	18.0
Max Q Clear Time (g_c+I1), s	9.6			9.6	2.0
Green Ext Time (p_c), s	4.6			3.8	0.0

Intersection Summary	
HCM 6th Ctrl Delay	9.5
HCM 6th LOS	A

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	8	8	12	1225	1072	12
Future Volume (veh/h)	8	8	12	1225	1072	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	0.91	1.00			0.94
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1847	1847	1847	1847
Adj Flow Rate, veh/h	9	9	13	1332	1165	13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	70	70	30	2253	1748	20
Arrive On Green	0.09	0.09	0.02	0.64	0.49	0.49
Sat Flow, veh/h	760	760	1759	3601	3644	40
Grp Volume(v), veh/h	19	0	13	1332	575	603
Grp Sat Flow(s),veh/h/ln	1605	0	1759	1754	1754	1837
Q Serve(g_s), s	0.4	0.0	0.2	7.4	8.4	8.4
Cycle Q Clear(g_c), s	0.4	0.0	0.2	7.4	8.4	8.4
Prop In Lane	0.47	0.47	1.00			0.02
Lane Grp Cap(c), veh/h	148	0	30	2253	863	904
V/C Ratio(X)	0.13	0.00	0.43	0.59	0.67	0.67
Avail Cap(c_a), veh/h	853	0	260	3419	1218	1275
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.1	0.0	16.5	3.5	6.5	6.5
Incr Delay (d2), s/veh	0.4	0.0	9.6	0.2	0.9	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.2	0.1	1.2	1.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	14.5	0.0	26.1	3.7	7.4	7.4
LnGrp LOS	B	A	C	A	A	A
Approach Vol, veh/h	19			1345	1178	
Approach Delay, s/veh	14.5			4.0	7.4	
Approach LOS	B			A	A	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		26.2		7.6	5.1	21.2
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		33.0		18.0	5.0	23.5
Max Q Clear Time (g_c+I1), s		9.4		2.4	2.2	10.4
Green Ext Time (p_c), s		10.0		0.0	0.0	5.8

Intersection Summary		
HCM 6th Ctrl Delay		5.6
HCM 6th LOS		A

Notes

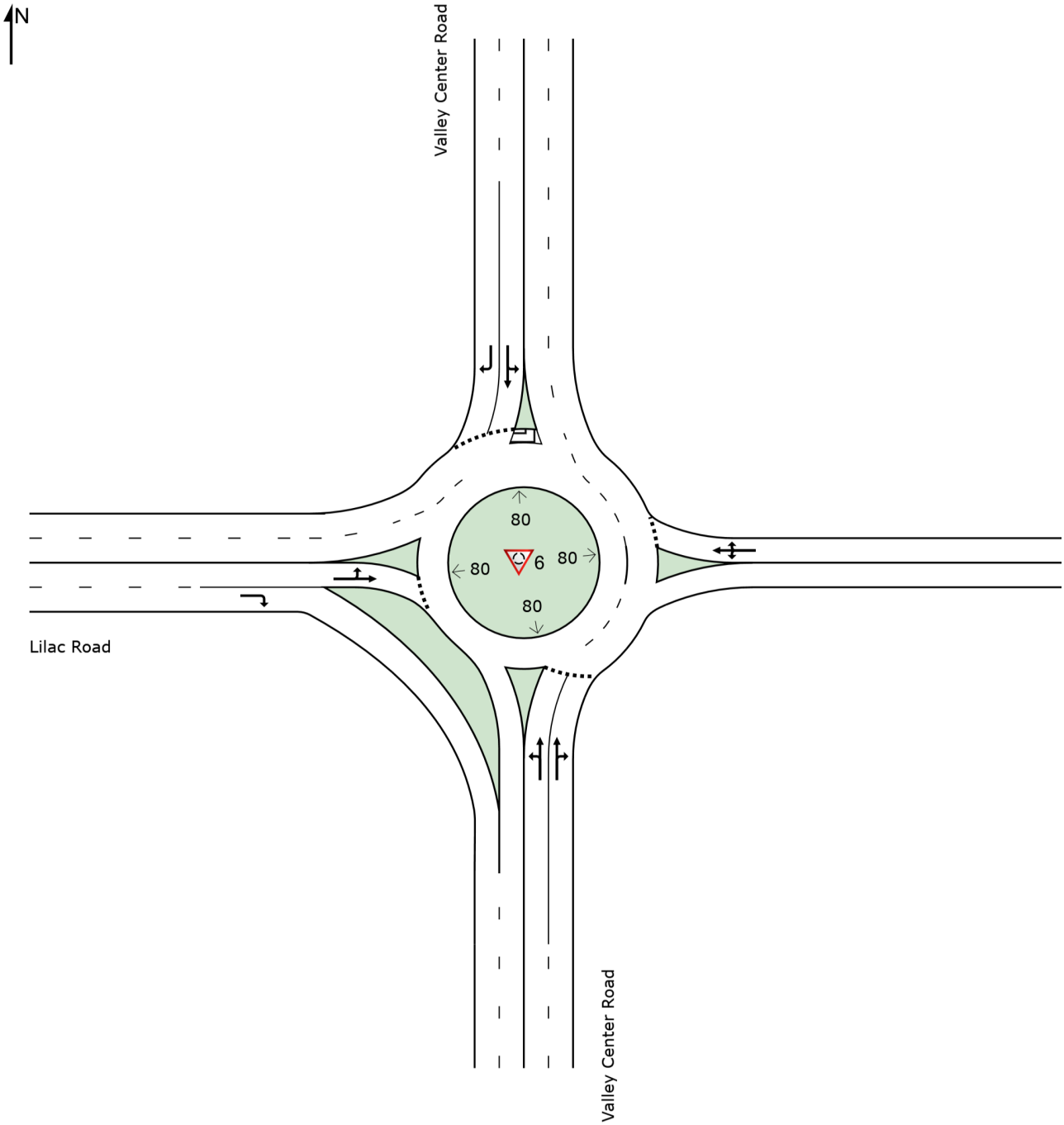
User approved volume balancing among the lanes for turning movement.

SITE LAYOUT

Site: 6 [Lilac Road (Site Folder: Valley Center Road)]

PM
Site Category: Existing Design
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 6 [Lilac Road (Site Folder: Valley Center Road)]

PM
Site Category: Existing Design
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Valley Center Road														
3	L2	209	4.0	235	4.0	0.622	12.5	LOS B	6.6	171.2	0.69	0.77	1.06	30.3
8	T1	895	4.0	1006	4.0	0.622	12.5	LOS B	6.6	171.2	0.69	0.77	1.06	30.8
18	R2	1	4.0	1	4.0	0.622	12.5	LOS B	6.6	171.2	0.69	0.77	1.06	30.3
Approach		1105	4.0	1242	4.0	0.622	12.5	LOS B	6.6	171.2	0.69	0.77	1.06	30.7
East:														
1	L2	1	2.0	4	2.0	0.034	10.9	LOS B	0.1	2.7	0.76	0.76	0.76	31.0
6	T1	1	2.0	4	2.0	0.034	10.9	LOS B	0.1	2.7	0.76	0.76	0.76	31.1
16	R2	1	2.0	4	2.0	0.034	10.9	LOS B	0.1	2.7	0.76	0.76	0.76	30.4
Approach		3	2.0	12	2.0	0.034	10.9	LOS B	0.1	2.7	0.76	0.76	0.76	30.8
North: Valley Center Road														
7	L2	3	4.0	3	4.0	0.766	17.1	LOS C	15.7	404.2	0.80	0.96	1.44	29.2
4	T1	761	4.0	827	4.0	0.766	17.1	LOS C	15.7	404.2	0.80	0.96	1.44	29.2
14	R2	302	4.0	328	4.0	0.303	6.3	LOS A	1.4	36.6	0.43	0.32	0.43	32.9
Approach		1066	4.0	1159	4.0	0.766	14.0	LOS B	15.7	404.2	0.69	0.78	1.16	30.2
West: Lilac Road														
5	L2	310	4.0	326	4.0	0.529	14.8	LOS B	3.1	80.5	0.75	0.89	1.20	28.3
2	T1	1	4.0	1	4.0	0.529	14.8	LOS B	3.1	80.5	0.75	0.89	1.20	28.3
12	R2	182	4.0	192	4.0	0.119	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	36.8
Approach		493	4.0	519	4.0	0.529	9.3	LOS A	3.1	80.5	0.47	0.56	0.76	30.9
All Vehicles		2667	4.0	2931	4.0	0.766	12.5	LOS B	15.7	404.2	0.65	0.74	1.04	30.5

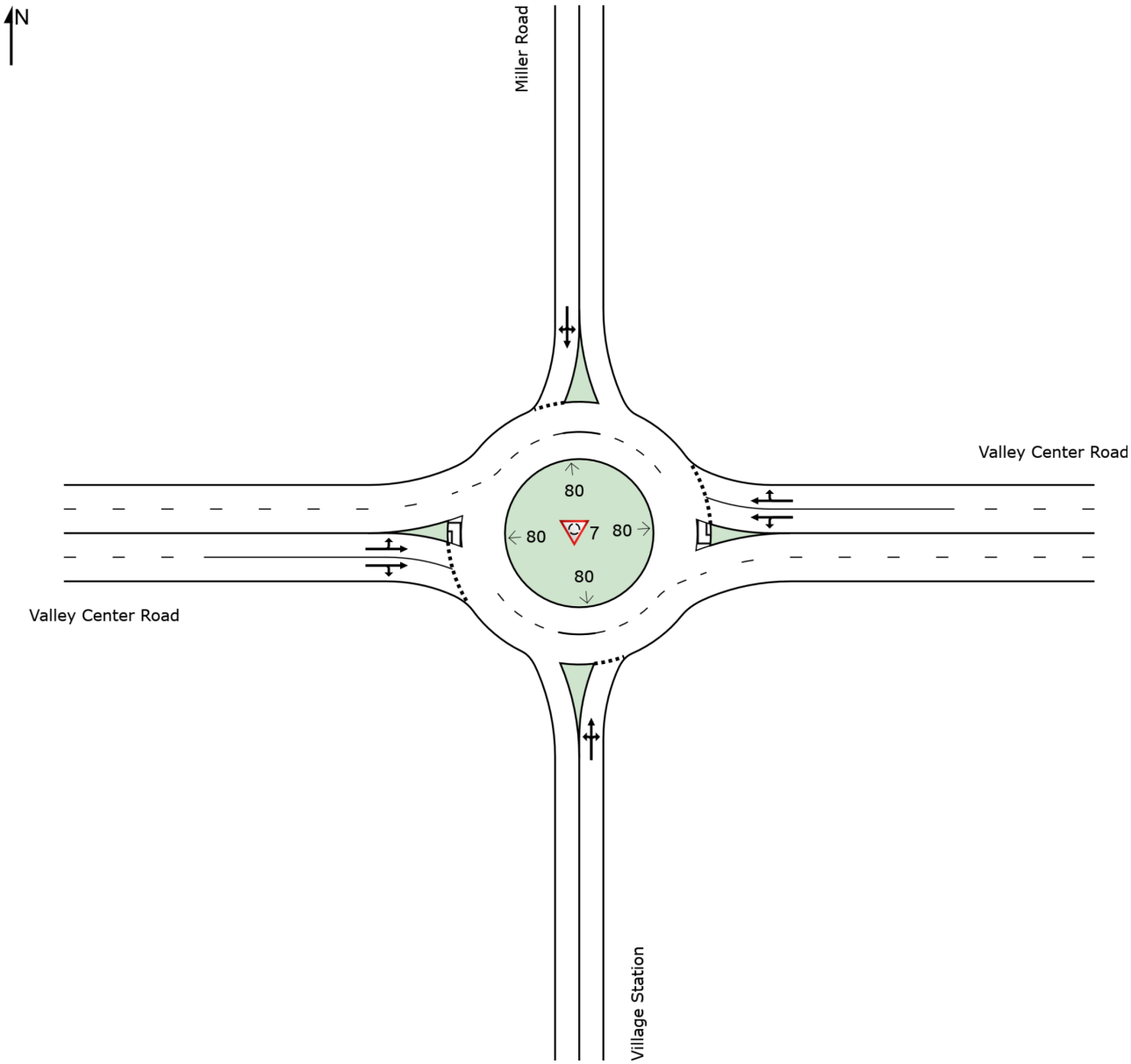
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 7 [Miller Road (Site Folder: Valley Center Road)]

PM
Site Category: Existing Design
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	38	1147	23	1	43	1043	10	63	0	18	38	0
Future Volume (veh/h)	38	1147	23	1	43	1043	10	63	0	18	38	0
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		0.91	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
Work Zone On Approach		No				No			No			No
Adj Sat Flow, veh/h/ln	1870	1811	1811		1811	1811	1870	1945	1870	1945	1870	1870
Adj Flow Rate, veh/h	41	1274	26		45	1086	11	84	0	24	41	0
Peak Hour Factor	0.92	0.90	0.90		0.96	0.96	0.92	0.75	0.92	0.75	0.92	0.92
Percent Heavy Veh, %	2	6	6		6	6	2	2	2	2	2	2
Cap, veh/h	270	1721	35		214	1742	18	309	0	240	161	0
Arrive On Green	0.50	0.50	0.50		0.50	0.50	0.50	0.17	0.00	0.17	0.09	0.00
Sat Flow, veh/h	514	3449	70		410	3490	35	1853	0	1442	1781	0
Grp Volume(v), veh/h	41	635	665		45	535	562	84	0	24	41	0
Grp Sat Flow(s),veh/h/ln	514	1721	1798		410	1721	1805	1853	0	1442	1781	0
Q Serve(g_s), s	3.5	16.2	16.2		5.4	12.5	12.5	2.2	0.0	0.8	1.2	0.0
Cycle Q Clear(g_c), s	16.0	16.2	16.2		21.7	12.5	12.5	2.2	0.0	0.8	1.2	0.0
Prop In Lane	1.00		0.04		1.00		0.02	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	270	859	898		214	859	901	309	0	240	161	0
V/C Ratio(X)	0.15	0.74	0.74		0.21	0.62	0.62	0.27	0.00	0.10	0.25	0.00
Avail Cap(c_a), veh/h	297	948	991		236	948	995	603	0	469	580	0
HCM Platoon Ratio	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00		1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	15.9	11.0	11.0		19.6	10.1	10.1	20.1	0.0	19.5	23.4	0.0
Incr Delay (d2), s/veh	0.3	2.8	2.7		0.5	1.1	1.0	0.5	0.0	0.2	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	5.3	5.5		0.5	3.8	4.0	0.9	0.0	0.3	0.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.2	13.8	13.7		20.1	11.2	11.1	20.6	0.0	19.7	24.3	0.0
LnGrp LOS	B	B	B		C	B	B	C	A	B	C	A
Approach Vol, veh/h		1341				1142			108			52
Approach Delay, s/veh		13.8				11.5			20.4			24.0
Approach LOS		B				B			C			C

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		13.7		32.1		9.5		32.1				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		18.0		30.5		18.0		30.5				
Max Q Clear Time (g_c+I1), s		4.2		18.2		3.2		23.7				
Green Ext Time (p_c), s		0.3		7.0		0.1		4.0				

Intersection Summary												
HCM 6th Ctrl Delay			13.3									
HCM 6th LOS			B									

Notes

User approved ignoring U-Turning movement.

MOVEMENT SUMMARY

Site: 7 [Miller Road (Site Folder: Valley Center Road)]

PM
Site Category: Existing Design
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Village Station														
3	L2	92	3.0	100	3.0	0.363	16.9	LOS C	1.3	34.4	0.81	0.88	1.07	28.0
8	T1	1	3.0	1	3.0	0.363	16.9	LOS C	1.3	34.4	0.81	0.88	1.07	28.0
18	R2	31	3.0	34	3.0	0.363	16.9	LOS C	1.3	34.4	0.81	0.88	1.07	27.4
Approach		124	3.0	135	3.0	0.363	16.9	LOS C	1.3	34.4	0.81	0.88	1.07	27.8
East: Valley Center Road														
1	L2	64	3.0	70	3.0	0.524	9.1	LOS A	3.3	85.1	0.50	0.35	0.50	32.3
6	T1	1048	4.0	1103	4.0	0.524	9.2	LOS A	3.3	85.1	0.50	0.35	0.50	32.4
16	R2	28	4.0	29	4.0	0.524	9.2	LOS A	3.3	85.0	0.49	0.35	0.49	31.7
Approach		1140	3.9	1202	3.9	0.524	9.2	LOS A	3.3	85.1	0.50	0.35	0.50	32.4
North: Miller Road														
7	L2	1	2.0	1	2.0	0.115	9.6	LOS A	0.4	9.5	0.70	0.70	0.70	32.3
4	T1	1	3.0	1	3.0	0.115	9.6	LOS A	0.4	9.5	0.70	0.70	0.70	32.3
14	R2	43	2.0	50	2.0	0.115	9.6	LOS A	0.4	9.5	0.70	0.70	0.70	31.5
Approach		45	2.0	52	2.0	0.115	9.6	LOS A	0.4	9.5	0.70	0.70	0.70	31.5
West: Valley Center Road														
5	L2	75	4.0	84	4.0	0.605	10.1	LOS B	4.9	125.4	0.37	0.18	0.37	31.8
2	T1	1244	4.0	1398	4.0	0.605	10.1	LOS B	4.9	125.6	0.37	0.18	0.37	32.0
12	R2	56	3.0	61	3.0	0.605	10.0	LOS B	4.9	125.6	0.37	0.18	0.37	31.3
Approach		1375	4.0	1543	4.0	0.605	10.1	LOS B	4.9	125.6	0.37	0.18	0.37	32.0
All Vehicles		2684	3.9	2932	3.9	0.605	10.0	LOS B	4.9	125.6	0.45	0.29	0.46	31.9

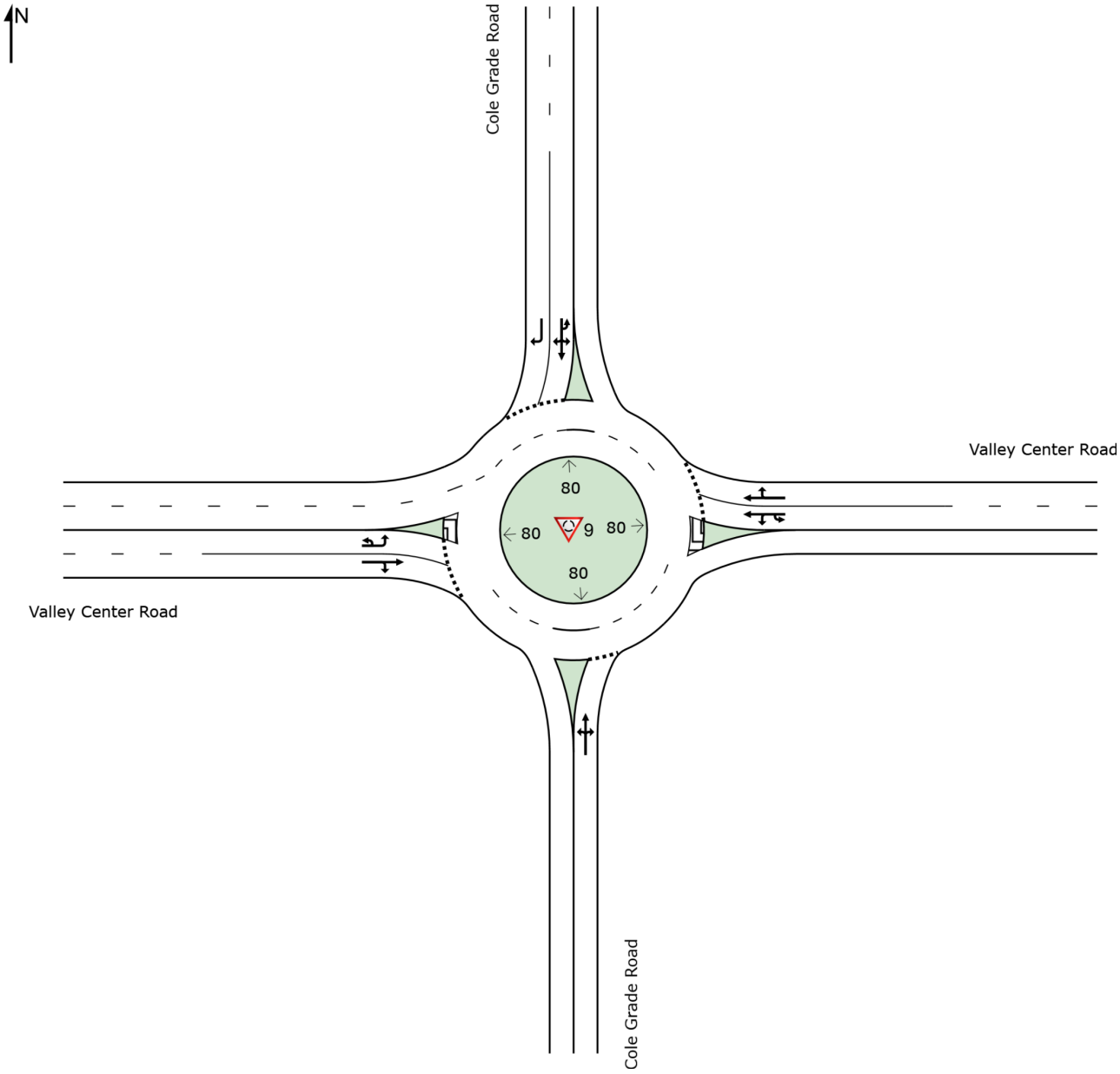
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 9 [Cole Grade Road (Site Folder: Valley Center Road)]

PM
Site Category: Existing Design
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 9 [Cole Grade Road (Site Folder: Valley Center Road)]

PM
Site Category: Existing Design
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Cole Grade Road														
3	L2	59	4.0	67	4.0	0.291	14.0	LOS B	1.0	26.1	0.77	0.80	0.90	29.3
8	T1	23	4.0	26	4.0	0.291	14.0	LOS B	1.0	26.1	0.77	0.80	0.90	29.3
18	R2	21	4.0	24	4.0	0.291	14.0	LOS B	1.0	26.1	0.77	0.80	0.90	28.7
Approach		103	4.0	117	4.0	0.291	14.0	LOS B	1.0	26.1	0.77	0.80	0.90	29.2
East: Valley Center Road														
1u	U	2	4.0	2	4.0	0.604	17.8	LOS C	4.0	102.4	0.79	0.98	1.40	29.2
1	L2	23	4.0	26	4.0	0.604	17.8	LOS C	4.0	102.4	0.79	0.98	1.40	28.8
6	T1	498	4.0	566	4.0	0.604	17.8	LOS C	4.0	102.4	0.79	0.98	1.40	28.8
16	R2	111	4.0	126	4.0	0.604	17.8	LOS C	4.0	102.4	0.79	0.98	1.40	28.2
Approach		634	4.0	720	4.0	0.604	17.8	LOS C	4.0	102.4	0.79	0.98	1.40	28.7
North: Cole Grade Road														
7u	U	16	4.0	17	4.0	0.465	12.8	LOS B	2.5	64.3	0.70	0.81	1.03	30.4
7	L2	101	4.0	107	4.0	0.465	12.8	LOS B	2.5	64.3	0.70	0.81	1.03	29.9
4	T1	14	4.0	15	4.0	0.465	12.8	LOS B	2.5	64.3	0.70	0.81	1.03	30.0
14	R2	456	4.0	485	4.0	0.465	12.1	LOS B	2.5	64.8	0.69	0.79	1.01	30.0
Approach		587	4.0	625	4.0	0.465	12.3	LOS B	2.5	64.8	0.69	0.80	1.01	30.0
West: Valley Center Road														
5u	U	61	34.0	64	34.0	0.659	13.2	LOS B	5.1	133.6	0.57	0.40	0.58	28.8
5	L2	647	4.0	681	4.0	0.659	12.3	LOS B	5.1	133.6	0.57	0.40	0.58	29.1
2	T1	467	4.0	492	4.0	0.458	8.0	LOS A	2.6	68.2	0.43	0.29	0.43	33.1
12	R2	37	4.0	39	4.0	0.458	8.0	LOS A	2.6	68.2	0.43	0.29	0.43	32.2
Approach		1212	5.5	1276	5.5	0.659	10.6	LOS B	5.1	133.6	0.51	0.36	0.52	30.6
All Vehicles		2536	4.7	2738	4.7	0.659	13.0	LOS B	5.1	133.6	0.64	0.64	0.88	29.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	182	109	517	57	44	1117
Future Volume (veh/h)	182	109	517	57	44	1117
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1841	1841	1746	1746	1841	1841
Adj Flow Rate, veh/h	202	121	533	59	47	1188
Peak Hour Factor	0.90	0.90	0.97	0.97	0.94	0.94
Percent Heavy Veh, %	4	4	4	4	4	4
Cap, veh/h	493	226	995	658	76	1766
Arrive On Green	0.14	0.14	0.30	0.30	0.04	0.50
Sat Flow, veh/h	3401	1560	3406	1480	1753	3589
Grp Volume(v), veh/h	202	121	533	59	47	1188
Grp Sat Flow(s),veh/h/ln	1700	1560	1659	1480	1753	1749
Q Serve(g_s), s	1.6	2.2	4.1	0.7	0.8	7.7
Cycle Q Clear(g_c), s	1.6	2.2	4.1	0.7	0.8	7.7
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	493	226	995	658	76	1766
V/C Ratio(X)	0.41	0.54	0.54	0.09	0.62	0.67
Avail Cap(c_a), veh/h	2944	1351	2379	1276	382	3837
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	11.8	12.0	8.8	4.9	14.2	5.6
Incr Delay (d2), s/veh	0.2	0.7	0.2	0.0	3.1	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	1.9	0.8	0.1	0.3	0.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	12.0	12.7	9.0	4.9	17.3	5.8
LnGrp LOS	B	B	A	A	B	A
Approach Vol, veh/h	323		592			1235
Approach Delay, s/veh	12.3		8.6			6.2
Approach LOS	B		A			A

Timer - Assigned Phs		4		6	7	8
Phs Duration (G+Y+Rc), s		20.6		9.7	6.2	14.4
Change Period (Y+Rc), s		5.3		5.3	4.9	5.3
Max Green Setting (Gmax), s		33.2		26.2	6.6	21.7
Max Q Clear Time (g_c+I1), s		9.7		4.2	2.8	6.1
Green Ext Time (p_c), s		5.6		0.5	0.0	2.0

Intersection Summary	
HCM 6th Ctrl Delay	7.8
HCM 6th LOS	A

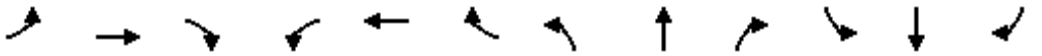
Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	28	59	17	637	1149	24
Future Vol, veh/h	28	59	17	637	1149	24
Conflicting Peds, #/hr	0	0	1	0	0	1
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	67	67	88	88	88	88
Heavy Vehicles, %	2	2	4	4	4	4
Mvmt Flow	42	88	19	724	1306	27

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1721	668	1334	0	-	0
Stage 1	1321	-	-	-	-	-
Stage 2	400	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.18	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.24	-	-	-
Pot Cap-1 Maneuver	80	401	503	-	-	-
Stage 1	214	-	-	-	-	-
Stage 2	646	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	77	401	503	-	-	-
Mov Cap-2 Maneuver	77	-	-	-	-	-
Stage 1	206	-	-	-	-	-
Stage 2	645	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	42.5	0.3	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	503	-	77	401	-	-
HCM Lane V/C Ratio	0.038	-	0.543	0.22	-	-
HCM Control Delay (s)	12.4	-	97.2	16.5	-	-
HCM Lane LOS	B	-	F	C	-	-
HCM 95th %tile Q(veh)	0.1	-	2.3	0.8	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	57	0	88	1	0	1	52	820	1	1	1297	55
Future Volume (veh/h)	57	0	88	1	0	1	52	820	1	1	1297	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	62	0	96	1	0	1	57	891	1	1	1410	60
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	161	0	143	2	0	2	86	2337	3	3	2065	88
Arrive On Green	0.09	0.00	0.09	0.00	0.00	0.00	0.05	0.64	0.64	0.00	0.59	0.59
Sat Flow, veh/h	1781	0	1585	839	0	839	1781	3642	4	1781	3473	148
Grp Volume(v), veh/h	62	0	96	2	0	0	57	435	457	1	720	750
Grp Sat Flow(s),veh/h/ln	1781	0	1585	1677	0	0	1781	1777	1870	1781	1777	1844
Q Serve(g_s), s	2.2	0.0	4.0	0.1	0.0	0.0	2.1	7.9	7.9	0.0	18.9	19.0
Cycle Q Clear(g_c), s	2.2	0.0	4.0	0.1	0.0	0.0	2.1	7.9	7.9	0.0	18.9	19.0
Prop In Lane	1.00		1.00	0.50		0.50	1.00		0.00	1.00		0.08
Lane Grp Cap(c), veh/h	161	0	143	5	0	0	86	1140	1200	3	1057	1097
V/C Ratio(X)	0.38	0.00	0.67	0.44	0.00	0.00	0.66	0.38	0.38	0.38	0.68	0.68
Avail Cap(c_a), veh/h	472	0	420	442	0	0	138	1140	1200	133	1057	1097
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	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.3	0.0	30.1	34.0	0.0	0.0	31.9	5.8	5.8	34.1	9.4	9.5
Incr Delay (d2), s/veh	1.5	0.0	5.3	54.4	0.0	0.0	8.4	1.0	0.9	73.3	3.6	3.5
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/ln	1.0	0.0	1.7	0.1	0.0	0.0	1.1	2.2	2.3	0.1	6.0	6.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.8	0.0	35.3	88.4	0.0	0.0	40.3	6.8	6.7	107.3	13.0	12.9
LnGrp LOS	C	A	D	F	A	A	D	A	A	F	B	B
Approach Vol, veh/h		158			2			949			1471	
Approach Delay, s/veh		33.5			88.4			8.8			13.0	
Approach LOS		C			F			A			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.6	48.3		10.7	7.8	45.1		4.7				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.1	40.8		18.1	5.3	40.6		18.0				
Max Q Clear Time (g_c+I1), s	2.0	9.9		6.0	4.1	21.0		2.1				
Green Ext Time (p_c), s	0.0	5.6		0.5	0.0	9.6		0.0				

Intersection Summary			
HCM 6th Ctrl Delay		12.8	
HCM 6th LOS		B	

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBU	SBL	SBT
Lane Configurations							
Traffic Vol, veh/h	1	0	708	1	1	1	1163
Future Vol, veh/h	1	0	708	1	1	1	1163
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	-	None
Storage Length	0	-	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	-	0
Grade, %	0	-	0	-	-	-	2
Peak Hour Factor	25	25	90	90	92	98	98
Heavy Vehicles, %	2	2	4	4	4	4	4
Mvmt Flow	4	0	787	1	1	1	1187

Major/Minor	Minor1		Major1		Major2		
Conflicting Flow All	1386	394	0	0	788	788	0
Stage 1	788	-	-	-	-	-	-
Stage 2	598	-	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	6.48	4.18	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.54	2.24	-
Pot Cap-1 Maneuver	134	605	-	-	447	814	-
Stage 1	409	-	-	-	-	-	-
Stage 2	512	-	-	-	-	-	-
Platoon blocked, %			-	-			-
Mov Cap-1 Maneuver	134	605	-	-	572	572	-
Mov Cap-2 Maneuver	134	-	-	-	-	-	-
Stage 1	409	-	-	-	-	-	-
Stage 2	510	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	32.7	0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	134	572	-
HCM Lane V/C Ratio	-	-	0.03	0.004	-
HCM Control Delay (s)	-	-	32.7	11.3	-
HCM Lane LOS	-	-	D	B	-
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Int Delay, s/veh	1148.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	34	17	2	12	1300	27
Future Vol, veh/h	34	17	2	12	1300	27
Conflicting Peds, #/hr	0	0	872	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	60	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	2	2	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	37	18	2	13	1413	29

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2311	1593	2314	0	-	0
Stage 1	2300	-	-	-	-	-
Stage 2	11	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	~ 32	96	213	-	-	-
Stage 1	62	-	-	-	-	-
Stage 2	1010	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 1	~ 16	36	-	-	-
Mov Cap-2 Maneuver	~ 1	-	-	-	-	-
Stage 1	~ 10	-	-	-	-	-
Stage 2	172	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	$ 31338.7	15.9	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	36	-	1	-	-
HCM Lane V/C Ratio	0.06	-	55.435	-	-
HCM Control Delay (s)	111.3	-	$ 31338.7	-	-
HCM Lane LOS	F	-	F	-	-
HCM 95th %tile Q(veh)	0.2	-	9.1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	304	0	264	2	0	0	1	193	568	0	0	921
Future Volume (veh/h)	304	0	264	2	0	0	1	193	568	0	0	921
Initial Q (Qb), veh	0	0	0	0	0	0		0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	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
Work Zone On Approach		No			No				No			No
Adj Sat Flow, veh/h/ln	1841	1841	1914	1870	1870	1870		1746	1746	1816	1746	1746
Adj Flow Rate, veh/h	406	0	185	8	0	0		217	638	0	0	1001
Peak Hour Factor	0.95	0.95	0.95	0.25	0.25	0.25		0.89	0.89	0.89	0.92	0.92
Percent Heavy Veh, %	4	4	4	2	2	2		4	4	4	4	4
Cap, veh/h	580	0	264	22	0	0		286	2130	0	2	1121
Arrive On Green	0.17	0.00	0.17	0.01	0.00	0.00		0.09	0.64	0.00	0.00	0.50
Sat Flow, veh/h	3506	0	1596	1781	0	0		3227	3406	0	1663	2260
Grp Volume(v), veh/h	406	0	185	8	0	0		217	638	0	0	730
Grp Sat Flow(s),veh/h/ln	1753	0	1596	1781	0	0		1613	1659	0	1663	1659
Q Serve(g_s), s	9.4	0.0	9.4	0.4	0.0	0.0		5.6	7.3	0.0	0.0	34.0
Cycle Q Clear(g_c), s	9.4	0.0	9.4	0.4	0.0	0.0		5.6	7.3	0.0	0.0	34.0
Prop In Lane	1.00		1.00	1.00		0.00		1.00		0.00	1.00	
Lane Grp Cap(c), veh/h	580	0	264	22	0	0		286	2130	0	2	823
V/C Ratio(X)	0.70	0.00	0.70	0.37	0.00	0.00		0.76	0.30	0.00	0.00	0.89
Avail Cap(c_a), veh/h	1259	0	573	644	0	0		305	2130	0	109	962
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	1.00	1.00	0.00	0.00		1.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	33.8	0.0	33.8	42.0	0.0	0.0		38.2	6.8	0.0	0.0	19.5
Incr Delay (d2), s/veh	0.6	0.0	1.3	7.6	0.0	0.0		8.6	0.0	0.0	0.0	8.3
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
%ile BackOfQ(50%),veh/ln	3.7	0.0	3.5	0.2	0.0	0.0		2.5	2.0	0.0	0.0	12.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.4	0.0	35.1	49.7	0.0	0.0		46.7	6.8	0.0	0.0	27.7
LnGrp LOS	C	A	D	D	A	A		D	A	A	A	C
Approach Vol, veh/h		591			8				855			1436
Approach Delay, s/veh		34.6			49.7				17.0			29.1
Approach LOS		C			D				B			C

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		20.2	12.5	47.8		5.2	0.0	60.3				
Change Period (Y+Rc), s		6.0	4.9	5.3		4.2	4.9	5.3				
Max Green Setting (Gmax), s		30.8	8.1	49.7		31.0	5.6	52.2				
Max Q Clear Time (g_c+I1), s		11.4	7.6	37.5		2.4	0.0	9.3				
Green Ext Time (p_c), s		1.0	0.0	5.1		0.0	0.0	2.7				

Intersection Summary	
HCM 6th Ctrl Delay	26.7
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.
User approved ignoring U-Turning movement.

Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	400
Future Volume (veh/h)	400
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	0.99
Parking Bus, Adj	1.00
Work Zone On Approach	
Adj Sat Flow, veh/h/ln	1816
Adj Flow Rate, veh/h	435
Peak Hour Factor	0.92
Percent Heavy Veh, %	4
Cap, veh/h	479
Arrive On Green	0.50
Sat Flow, veh/h	965
Grp Volume(v), veh/h	706
Grp Sat Flow(s),veh/h/ln	1566
Q Serve(g_s), s	35.5
Cycle Q Clear(g_c), s	35.5
Prop In Lane	0.62
Lane Grp Cap(c), veh/h	777
V/C Ratio(X)	0.91
Avail Cap(c_a), veh/h	908
HCM Platoon Ratio	1.00
Upstream Filter(I)	1.00
Uniform Delay (d), s/veh	19.8
Incr Delay (d2), s/veh	10.8
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(50%),veh/ln	13.2
Unsig. Movement Delay, s/veh	
LnGrp Delay(d),s/veh	30.6
LnGrp LOS	C
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer - Assigned Phs	

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	WBU	WBT	WBR	SBL	SBR
Lane Configurations							
Traffic Vol, veh/h	18	883	0	1186	14	20	103
Future Vol, veh/h	18	883	0	1186	14	20	103
Conflicting Peds, #/hr	7	0	0	0	7	0	0
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	-	None	-	None
Storage Length	100	-	100	-	-	0	-
Veh in Median Storage, #	-	0	-	0	-	0	-
Grade, %	-	2	-	0	-	0	-
Peak Hour Factor	89	89	95	95	95	86	86
Heavy Vehicles, %	4	4	4	4	4	2	2
Mvmt Flow	20	992	0	1248	15	23	120

Major/Minor	Major1		Major2			Minor2	
Conflicting Flow All	1270	0	992	-	0	1799	639
Stage 1	-	-	-	-	-	1263	-
Stage 2	-	-	-	-	-	536	-
Critical Hdwy	4.18	-	6.48	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	-	5.84	-
Follow-up Hdwy	2.24	-	2.54	-	-	3.52	3.32
Pot Cap-1 Maneuver	532	-	330	-	-	71	419
Stage 1	-	-	-	-	-	230	-
Stage 2	-	-	-	-	-	551	-
Platoon blocked, %		-		-	-		
Mov Cap-1 Maneuver	527	-	330	-	-	67	415
Mov Cap-2 Maneuver	-	-	-	-	-	67	-
Stage 1	-	-	-	-	-	219	-
Stage 2	-	-	-	-	-	546	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	45.3
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBU	WBT	WBR	SBLn1
Capacity (veh/h)	527	-	330	-	-	225
HCM Lane V/C Ratio	0.038	-	-	-	-	0.636
HCM Control Delay (s)	12.1	-	0	-	-	45.3
HCM Lane LOS	B	-	A	-	-	E
HCM 95th %tile Q(veh)	0.1	-	0	-	-	3.8

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	918	2	2	1193	5	2
Future Vol, veh/h	918	2	2	1193	5	2
Conflicting Peds, #/hr	0	1	1	0	1	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	96	96	75	75
Heavy Vehicles, %	4	4	4	4	2	2
Mvmt Flow	1020	2	2	1243	7	3

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1023	0	1649	512
Stage 1	-	-	-	-	1022	-
Stage 2	-	-	-	-	627	-
Critical Hdwy	-	-	4.18	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.24	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	662	-	90	507
Stage 1	-	-	-	-	308	-
Stage 2	-	-	-	-	495	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	661	-	90	506
Mov Cap-2 Maneuver	-	-	-	-	211	-
Stage 1	-	-	-	-	308	-
Stage 2	-	-	-	-	493	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	19.8
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	253	-	-	661	-
HCM Lane V/C Ratio	0.037	-	-	0.003	-
HCM Control Delay (s)	19.8	-	-	10.5	-
HCM Lane LOS	C	-	-	B	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBU
Lane Configurations												
Traffic Volume (veh/h)	25	380	492	31	1	14	451	158	30	11	11	10
Future Volume (veh/h)	25	380	492	31	1	14	451	158	30	11	11	10
Initial Q (Qb), veh		0	0	0		0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)		1.00		0.99		1.00		0.99	1.00		1.00	
Parking Bus, Adj		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	
Work Zone On Approach			No				No			No		
Adj Sat Flow, veh/h/ln		1841	1841	1841		1841	1841	1914	1841	1841	1841	
Adj Flow Rate, veh/h		400	518	33		16	512	180	34	12	12	
Peak Hour Factor		0.95	0.95	0.95		0.88	0.88	0.88	0.88	0.88	0.88	
Percent Heavy Veh, %		4	4	4		4	4	4	4	4	4	
Cap, veh/h		489	685	578		26	616	215	59	21	21	
Arrive On Green		0.14	0.37	0.37		0.01	0.24	0.24	0.06	0.06	0.06	
Sat Flow, veh/h		3401	1841	1552		1753	2530	885	1012	357	357	
Grp Volume(v), veh/h		400	518	33		16	353	339	58	0	0	
Grp Sat Flow(s),veh/h/ln		1700	1841	1552		1753	1749	1667	1726	0	0	
Q Serve(g_s), s		9.9	21.2	1.2		0.8	16.5	16.7	2.8	0.0	0.0	
Cycle Q Clear(g_c), s		9.9	21.2	1.2		0.8	16.5	16.7	2.8	0.0	0.0	
Prop In Lane		1.00		1.00		1.00		0.53	0.59		0.21	
Lane Grp Cap(c), veh/h		489	685	578		26	425	405	101	0	0	
V/C Ratio(X)		0.82	0.76	0.06		0.62	0.83	0.84	0.58	0.00	0.00	
Avail Cap(c_a), veh/h		882	1078	909		114	684	652	579	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	1.00	1.00		1.00	1.00	1.00	1.00	0.00	0.00	
Uniform Delay (d), s/veh		35.9	23.7	17.4		42.3	31.0	31.1	39.6	0.0	0.0	
Incr Delay (d2), s/veh		1.3	0.6	0.0		8.6	2.2	2.6	3.8	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	0.0	
%ile BackOfQ(50%),veh/ln		3.9	8.4	0.4		0.4	6.7	6.5	1.3	0.0	0.0	
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh		37.2	24.3	17.4		50.9	33.2	33.6	43.5	0.0	0.0	
LnGrp LOS		D	C	B		D	C	C	D	A	A	
Approach Vol, veh/h			951				708			58		
Approach Delay, s/veh			29.5				33.8			43.5		
Approach LOS			C				C			D		

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.2	37.5		33.1	17.3	26.3		9.6
Change Period (Y+Rc), s	4.9	5.3		5.3	4.9	5.3		4.6
Max Green Setting (Gmax), s	5.6	50.6		34.7	22.4	33.8		29.0
Max Q Clear Time (g_c+I1), s	2.8	23.2		24.4	11.9	18.7		4.8
Green Ext Time (p_c), s	0.0	1.9		3.0	0.6	2.2		0.2

Intersection Summary	
HCM 6th Ctrl Delay	31.3
HCM 6th LOS	C

Notes

User approved ignoring U-Turning movement.

Movement	SBL	SBT	SBR
Lane Configurations			
Traffic Volume (veh/h)	253	28	709
Future Volume (veh/h)	253	28	709
Initial Q (Qb), veh	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00
Work Zone On Approach		No	
Adj Sat Flow, veh/h/ln	1841	1841	1841
Adj Flow Rate, veh/h	269	30	754
Peak Hour Factor	0.94	0.94	0.94
Percent Heavy Veh, %	4	4	4
Cap, veh/h	510	57	877
Arrive On Green	0.32	0.32	0.32
Sat Flow, veh/h	1585	177	2724
Grp Volume(v), veh/h	299	0	754
Grp Sat Flow(s),veh/h/ln	1761	0	1362
Q Serve(g_s), s	12.0	0.0	22.4
Cycle Q Clear(g_c), s	12.0	0.0	22.4
Prop In Lane	0.90		1.00
Lane Grp Cap(c), veh/h	567	0	877
V/C Ratio(X)	0.53	0.00	0.86
Avail Cap(c_a), veh/h	707	0	1094
HCM Platoon Ratio	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.9	0.0	27.5
Incr Delay (d2), s/veh	0.6	0.0	5.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.7	0.0	7.8
Unsig. Movement Delay, s/veh			
LnGrp Delay(d),s/veh	24.5	0.0	33.0
LnGrp LOS	C	A	C
Approach Vol, veh/h		1053	
Approach Delay, s/veh		30.6	
Approach LOS		C	
Timer - Assigned Phs			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	83	115	1160	165	118	856
Future Volume (veh/h)	83	115	1160	165	118	856
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1811	1811	1717	1717	1811	1811
Adj Flow Rate, veh/h	92	128	1196	170	126	911
Peak Hour Factor	0.90	0.90	0.97	0.97	0.94	0.94
Percent Heavy Veh, %	6	6	6	6	6	6
Cap, veh/h	408	187	1499	846	160	2254
Arrive On Green	0.12	0.12	0.46	0.46	0.09	0.66
Sat Flow, veh/h	3346	1535	3348	1455	1725	3532
Grp Volume(v), veh/h	92	128	1196	170	126	911
Grp Sat Flow(s),veh/h/ln	1673	1535	1631	1455	1725	1721
Q Serve(g_s), s	1.2	3.8	14.9	2.6	3.4	5.9
Cycle Q Clear(g_c), s	1.2	3.8	14.9	2.6	3.4	5.9
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	408	187	1499	846	160	2254
V/C Ratio(X)	0.23	0.68	0.80	0.20	0.79	0.40
Avail Cap(c_a), veh/h	1866	856	2108	1117	265	3107
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	18.8	20.0	11.0	4.7	21.1	3.8
Incr Delay (d2), s/veh	0.1	1.7	1.0	0.0	3.3	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	0.4	0.1	3.6	0.7	1.3	0.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	18.9	21.6	11.9	4.8	24.4	3.9
LnGrp LOS	B	C	B	A	C	A
Approach Vol, veh/h	220		1366			1037
Approach Delay, s/veh	20.5		11.0			6.4
Approach LOS	C		B			A

Timer - Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				36.4		11.1	9.3	27.1
Change Period (Y+Rc), s				5.3		5.3	4.9	5.3
Max Green Setting (Gmax), s				42.9		26.5	7.3	30.7
Max Q Clear Time (g_c+I1), s				7.9		5.8	5.4	16.9
Green Ext Time (p_c), s				4.1		0.3	0.0	5.0

Intersection Summary								
HCM 6th Ctrl Delay			10.0					
HCM 6th LOS			A					

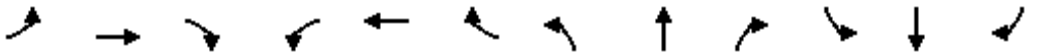
Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBR	NBU	NBL	NBT	SBT	SBR
Lane Configurations							
Traffic Vol, veh/h	16	19	1	51	1233	1006	17
Future Vol, veh/h	16	19	1	51	1233	1006	17
Conflicting Peds, #/hr	0	0	5	5	0	0	5
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	-	None	-	None
Storage Length	100	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	-	0	0	-
Grade, %	0	-	-	-	0	0	-
Peak Hour Factor	67	67	92	88	88	88	88
Heavy Vehicles, %	2	2	6	6	6	6	6
Mvmt Flow	24	28	1	58	1401	1143	19

Major/Minor	Minor2		Major1			Major2	
Conflicting Flow All	1977	586	1163	1167	0	-	0
Stage 1	1158	-	-	-	-	-	-
Stage 2	819	-	-	-	-	-	-
Critical Hdwy	6.84	6.94	6.52	4.22	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.56	2.26	-	-	-
Pot Cap-1 Maneuver	54	454	252	572	-	-	-
Stage 1	261	-	-	-	-	-	-
Stage 2	394	-	-	-	-	-	-
Platoon blocked, %					-	-	-
Mov Cap-1 Maneuver	48	452	555	555	-	-	-
Mov Cap-2 Maneuver	48	-	-	-	-	-	-
Stage 1	232	-	-	-	-	-	-
Stage 2	392	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	70.8	0.5	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	555	-	48	452	-	-
HCM Lane V/C Ratio	0.106	-	0.498	0.063	-	-
HCM Control Delay (s)	12.3	-	138.9	13.5	-	-
HCM Lane LOS	B	-	F	B	-	-
HCM 95th %tile Q(veh)	0.4	-	1.8	0.2	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	108	0	59	1	0	1	168	1610	1	1	1383	106
Future Volume (veh/h)	108	0	59	1	0	1	168	1610	1	1	1383	106
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	117	0	64	1	0	1	183	1750	1	1	1503	115
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	160	0	143	2	0	2	218	2577	1	2	1962	149
Arrive On Green	0.09	0.00	0.09	0.00	0.00	0.00	0.12	0.71	0.71	0.00	0.59	0.59
Sat Flow, veh/h	1781	0	1585	839	0	839	1781	3645	2	1781	3347	255
Grp Volume(v), veh/h	117	0	64	2	0	0	183	853	898	1	794	824
Grp Sat Flow(s),veh/h/ln	1781	0	1585	1677	0	0	1781	1777	1870	1781	1777	1825
Q Serve(g_s), s	5.8	0.0	3.5	0.1	0.0	0.0	9.1	24.5	24.5	0.1	30.3	30.9
Cycle Q Clear(g_c), s	5.8	0.0	3.5	0.1	0.0	0.0	9.1	24.5	24.5	0.1	30.3	30.9
Prop In Lane	1.00		1.00	0.50		0.50	1.00		0.00	1.00		0.14
Lane Grp Cap(c), veh/h	160	0	143	5	0	0	218	1256	1322	2	1042	1070
V/C Ratio(X)	0.73	0.00	0.45	0.44	0.00	0.00	0.84	0.68	0.68	0.41	0.76	0.77
Avail Cap(c_a), veh/h	354	0	315	333	0	0	254	1256	1322	98	1042	1070
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	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.1	0.0	39.1	45.1	0.0	0.0	38.9	7.5	7.5	45.2	14.0	14.1
Incr Delay (d2), s/veh	6.2	0.0	2.2	55.2	0.0	0.0	19.3	3.0	2.8	83.8	5.3	5.4
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	2.8	0.0	1.4	0.1	0.0	0.0	4.9	7.3	7.6	0.1	11.4	11.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.4	0.0	41.3	100.3	0.0	0.0	58.2	10.4	10.3	129.0	19.3	19.5
LnGrp LOS	D	A	D	F	A	A	E	B	B	F	B	B
Approach Vol, veh/h		181			2			1934			1619	
Approach Delay, s/veh		44.6			100.3			14.9			19.5	
Approach LOS		D			F			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.6	68.5		12.7	15.6	57.6		4.7				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	61.0		18.0	12.9	53.1		18.0				
Max Q Clear Time (g_c+I1), s	2.1	26.5		7.8	11.1	32.9		2.1				
Green Ext Time (p_c), s	0.0	16.5		0.4	0.1	11.1		0.0				

Intersection Summary			
HCM 6th Ctrl Delay		18.4	
HCM 6th LOS		B	

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	0	1265	1	1	1046
Future Vol, veh/h	1	0	1265	1	1	1046
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	2
Peak Hour Factor	25	25	90	90	98	98
Heavy Vehicles, %	2	2	6	6	6	6
Mvmt Flow	4	0	1406	1	1	1067

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1943	704	0	0	1407	0
Stage 1	1407	-	-	-	-	-
Stage 2	536	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.22	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.26	-
Pot Cap-1 Maneuver	57	379	-	-	461	-
Stage 1	192	-	-	-	-	-
Stage 2	551	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	57	379	-	-	461	-
Mov Cap-2 Maneuver	57	-	-	-	-	-
Stage 1	192	-	-	-	-	-
Stage 2	550	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	72.9	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	57	461	-
HCM Lane V/C Ratio	-	-	0.07	0.002	-
HCM Control Delay (s)	-	-	72.9	12.8	-
HCM Lane LOS	-	-	F	B	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-

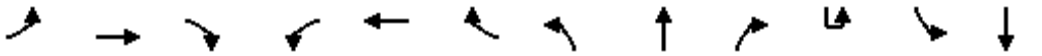
Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	12	12	19	1633	1503	19
Future Vol, veh/h	12	12	19	1633	1503	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	60	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	2	2	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	13	21	1775	1634	21

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2575	828	1655	0	-	0
Stage 1	1645	-	-	-	-	-
Stage 2	930	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	21	314	386	-	-	-
Stage 1	143	-	-	-	-	-
Stage 2	344	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	20	314	386	-	-	-
Mov Cap-2 Maneuver	20	-	-	-	-	-
Stage 1	135	-	-	-	-	-
Stage 2	344	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	214.2	0.2	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	386	-	38	-	-
HCM Lane V/C Ratio	0.054	-	0.686	-	-
HCM Control Delay (s)	14.9	-	214.2	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	0.2	-	2.5	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	344	0	206	0	0	0	276	992	0	3	0	861
Future Volume (veh/h)	344	0	206	0	0	0	276	992	0	3	0	861
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0		0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	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
Work Zone On Approach		No			No			No				No
Adj Sat Flow, veh/h/ln	1811	1811	1884	1870	1870	1870	1717	1717	1786		1717	1717
Adj Flow Rate, veh/h	430	0	145	0	0	0	310	1115	0		0	936
Peak Hour Factor	0.95	0.95	0.95	0.25	0.25	0.25	0.89	0.89	0.89		0.92	0.92
Percent Heavy Veh, %	6	6	6	2	2	2	6	6	6		6	6
Cap, veh/h	593	0	271	0	2	0	390	2213	0		2	1066
Arrive On Green	0.17	0.00	0.17	0.00	0.00	0.00	0.12	0.68	0.00		0.00	0.49
Sat Flow, veh/h	3450	0	1579	0	1870	0	3172	3348	0		1635	2173
Grp Volume(v), veh/h	430	0	145	0	0	0	310	1115	0		0	699
Grp Sat Flow(s),veh/h/ln	1725	0	1579	0	1870	0	1586	1631	0		1635	1631
Q Serve(g_s), s	8.9	0.0	6.3	0.0	0.0	0.0	7.2	12.6	0.0		0.0	28.9
Cycle Q Clear(g_c), s	8.9	0.0	6.3	0.0	0.0	0.0	7.2	12.6	0.0		0.0	28.9
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.00		1.00	
Lane Grp Cap(c), veh/h	593	0	271	0	2	0	390	2213	0		2	800
V/C Ratio(X)	0.73	0.00	0.53	0.00	0.00	0.00	0.79	0.50	0.00		0.00	0.87
Avail Cap(c_a), veh/h	1407	0	644	0	768	0	466	2254	0		121	1008
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	1.00	0.00	0.00	0.00	1.00	1.00	0.00		0.00	1.00
Uniform Delay (d), s/veh	29.6	0.0	28.5	0.0	0.0	0.0	32.2	5.9	0.0		0.0	17.2
Incr Delay (d2), s/veh	0.6	0.0	0.6	0.0	0.0	0.0	6.4	0.1	0.0		0.0	6.1
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/ln	3.3	0.0	2.2	0.0	0.0	0.0	2.9	2.7	0.0		0.0	10.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.2	0.0	29.1	0.0	0.0	0.0	38.6	6.0	0.0		0.0	23.3
LnGrp LOS	C	A	C	A	A	A	D	A	A		A	C
Approach Vol, veh/h		575			0			1425				1370
Approach Delay, s/veh		30.0			0.0			13.1				24.1
Approach LOS		C						B				C

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		19.0	14.2	42.4		0.0	0.0	56.6				
Change Period (Y+Rc), s		6.0	4.9	5.3		4.2	4.9	5.3				
Max Green Setting (Gmax), s		30.8	11.1	46.7		31.0	5.6	52.2				
Max Q Clear Time (g_c+I1), s		10.9	9.2	31.8		0.0	0.0	14.6				
Green Ext Time (p_c), s		0.9	0.1	5.3		0.0	0.0	5.5				

Intersection Summary	
HCM 6th Ctrl Delay	20.5
HCM 6th LOS	C

Notes
User approved volume balancing among the lanes for turning movement.
User approved ignoring U-Turning movement.

Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	399
Future Volume (veh/h)	399
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	1.00
Parking Bus, Adj	1.00
Work Zone On Approach	
Adj Sat Flow, veh/h/ln	1786
Adj Flow Rate, veh/h	434
Peak Hour Factor	0.92
Percent Heavy Veh, %	6
Cap, veh/h	488
Arrive On Green	0.49
Sat Flow, veh/h	994
Grp Volume(v), veh/h	671
Grp Sat Flow(s),veh/h/ln	1536
Q Serve(g_s), s	29.8
Cycle Q Clear(g_c), s	29.8
Prop In Lane	0.65
Lane Grp Cap(c), veh/h	754
V/C Ratio(X)	0.89
Avail Cap(c_a), veh/h	950
HCM Platoon Ratio	1.00
Upstream Filter(I)	1.00
Uniform Delay (d), s/veh	17.4
Incr Delay (d2), s/veh	7.6
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(50%),veh/ln	10.1
Unsig. Movement Delay, s/veh	
LnGrp Delay(d),s/veh	25.0
LnGrp LOS	C
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer - Assigned Phs	

Intersection	
Int Delay, s/veh	0.7

Movement	EBU	EBL	EBT	WBU	WBT	WBR	SBL	SBR
Lane Configurations								
Traffic Vol, veh/h	1	72	1261	0	1177	28	1	50
Future Vol, veh/h	1	72	1261	0	1177	28	1	50
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	None
Storage Length	-	100	-	100	-	-	0	-
Veh in Median Storage, #	-	-	0	-	0	-	0	-
Grade, %	-	-	2	-	0	-	0	-
Peak Hour Factor	92	89	89	95	95	95	86	86
Heavy Vehicles, %	6	6	6	6	6	6	2	2
Mvmt Flow	1	81	1417	0	1239	29	1	58

Major/Minor	Major1			Major2			Minor2	
Conflicting Flow All	1268	1268	0	1417	-	0	2127	634
Stage 1	-	-	-	-	-	-	1254	-
Stage 2	-	-	-	-	-	-	873	-
Critical Hdwy	6.52	4.22	-	6.52	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.84	-
Follow-up Hdwy	2.56	2.26	-	2.56	-	-	3.52	3.32
Pot Cap-1 Maneuver	215	523	-	171	-	-	43	422
Stage 1	-	-	-	-	-	-	232	-
Stage 2	-	-	-	-	-	-	369	-
Platoon blocked, %			-		-	-		
Mov Cap-1 Maneuver	511	511	-	171	-	-	36	422
Mov Cap-2 Maneuver	-	-	-	-	-	-	36	-
Stage 1	-	-	-	-	-	-	195	-
Stage 2	-	-	-	-	-	-	369	-

Approach	EB	WB	SB
HCM Control Delay, s	0.7	0	17.4
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBU	WBT	WBR	SBLn1
Capacity (veh/h)	511	-	171	-	-	349
HCM Lane V/C Ratio	0.16	-	-	-	-	0.17
HCM Control Delay (s)	13.4	-	0	-	-	17.4
HCM Lane LOS	B	-	A	-	-	C
HCM 95th %tile Q(veh)	0.6	-	0	-	-	0.6

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Vol, veh/h	1304	6	1	1	1206	2	0
Future Vol, veh/h	1304	6	1	1	1206	2	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	-	None	-	None
Storage Length	-	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	-	0	0	-
Grade, %	0	-	-	-	0	0	-
Peak Hour Factor	90	90	92	96	96	75	75
Heavy Vehicles, %	6	6	6	6	6	2	2
Mvmt Flow	1449	7	1	1	1256	3	0

Major/Minor	Major1		Major2			Minor1	
Conflicting Flow All	0	0	1456	1456	0	2085	728
Stage 1	-	-	-	-	-	1453	-
Stage 2	-	-	-	-	-	632	-
Critical Hdwy	-	-	6.52	4.22	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.56	2.26	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	162	441	-	46	366
Stage 1	-	-	-	-	-	181	-
Stage 2	-	-	-	-	-	492	-
Platoon blocked, %	-	-			-		
Mov Cap-1 Maneuver	-	-	235	235	-	46	366
Mov Cap-2 Maneuver	-	-	-	-	-	136	-
Stage 1	-	-	-	-	-	181	-
Stage 2	-	-	-	-	-	488	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	32
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	136	-	-	235	-
HCM Lane V/C Ratio	0.02	-	-	0.009	-
HCM Control Delay (s)	32	-	-	20.5	-
HCM Lane LOS	D	-	-	C	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBU
Lane Configurations												
Traffic Volume (veh/h)	61	663	594	37	2	23	576	114	68	24	27	16
Future Volume (veh/h)	61	663	594	37	2	23	576	114	68	24	27	16
Initial Q (Qb), 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	
Parking Bus, Adj		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	
Work Zone On Approach			No				No			No		
Adj Sat Flow, veh/h/ln		1811	1811	1811		1811	1811	1884	1811	1811	1811	
Adj Flow Rate, veh/h		698	625	39		26	655	130	77	27	31	
Peak Hour Factor		0.95	0.95	0.95		0.88	0.88	0.88	0.88	0.88	0.88	
Percent Heavy Veh, %		6	6	6		6	6	6	6	6	6	
Cap, veh/h		756	831	704		34	723	143	98	34	39	
Arrive On Green		0.23	0.46	0.46		0.02	0.25	0.25	0.10	0.10	0.10	
Sat Flow, veh/h		3346	1811	1535		1725	2862	567	966	339	389	
Grp Volume(v), veh/h		698	625	39		26	393	392	135	0	0	
Grp Sat Flow(s),veh/h/ln		1673	1811	1535		1725	1721	1709	1693	0	0	
Q Serve(g_s), s		22.3	31.1	1.5		1.6	24.2	24.2	8.5	0.0	0.0	
Cycle Q Clear(g_c), s		22.3	31.1	1.5		1.6	24.2	24.2	8.5	0.0	0.0	
Prop In Lane		1.00		1.00		1.00		0.33	0.57		0.23	
Lane Grp Cap(c), veh/h		756	831	704		34	435	432	172	0	0	
V/C Ratio(X)		0.92	0.75	0.06		0.75	0.90	0.91	0.79	0.00	0.00	
Avail Cap(c_a), veh/h		801	852	722		89	486	483	450	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	1.00	1.00		1.00	1.00	1.00	1.00	0.00	0.00	
Uniform Delay (d), s/veh		41.3	24.4	16.4		53.2	39.5	39.5	47.9	0.0	0.0	
Incr Delay (d2), s/veh		15.3	3.3	0.0		11.6	18.0	18.4	5.9	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 BackOfQ(50%),veh/ln		10.4	13.0	0.5		0.8	11.9	11.9	3.9	0.0	0.0	
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh		56.6	27.7	16.4		64.8	57.5	57.9	53.7	0.0	0.0	
LnGrp LOS		E	C	B		E	E	E	D	A	A	
Approach Vol, veh/h			1362				811			135		
Approach Delay, s/veh			42.2				57.9			53.7		
Approach LOS			D				E			D		

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	7.1	55.3		31.0	29.5	32.9		15.7
Change Period (Y+Rc), s	4.9	5.3		5.3	4.9	5.3		4.6
Max Green Setting (Gmax), s	5.6	51.3		34.0	26.1	30.8		29.0
Max Q Clear Time (g_c+I1), s	3.6	33.1		23.8	24.3	26.2		10.5
Green Ext Time (p_c), s	0.0	2.3		1.9	0.4	1.3		0.6

Intersection Summary		
HCM 6th Ctrl Delay		47.7
HCM 6th LOS		D

Notes

User approved ignoring U-Turning movement.

Movement	SBL	SBT	SBR
Lane Configurations			
Traffic Volume (veh/h)	128	14	527
Future Volume (veh/h)	128	14	527
Initial Q (Qb), veh	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00
Work Zone On Approach		No	
Adj Sat Flow, veh/h/ln	1811	1811	1811
Adj Flow Rate, veh/h	136	15	561
Peak Hour Factor	0.94	0.94	0.94
Percent Heavy Veh, %	6	6	6
Cap, veh/h	368	41	637
Arrive On Green	0.24	0.24	0.24
Sat Flow, veh/h	1561	172	2701
Grp Volume(v), veh/h	151	0	561
Grp Sat Flow(s),veh/h/ln	1733	0	1351
Q Serve(g_s), s	8.0	0.0	21.8
Cycle Q Clear(g_c), s	8.0	0.0	21.8
Prop In Lane	0.90		1.00
Lane Grp Cap(c), veh/h	409	0	637
V/C Ratio(X)	0.37	0.00	0.88
Avail Cap(c_a), veh/h	540	0	842
HCM Platoon Ratio	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00
Uniform Delay (d), s/veh	34.9	0.0	40.2
Incr Delay (d2), s/veh	0.4	0.0	8.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.3	0.0	8.0
Unsig. Movement Delay, s/veh			
LnGrp Delay(d),s/veh	35.3	0.0	48.2
LnGrp LOS	D	A	D
Approach Vol, veh/h		712	
Approach Delay, s/veh		45.4	
Approach LOS		D	
Timer - Assigned Phs			