# **Appendix E**

## **Traffic Study**

## Fehr / Peers

## MEMORANDUM

Date: April 28, 2017

To: Mike Parker, Ascent Environmental, Inc.

From: Sebastian Arias and Jane Bierstedt, Fehr & Peers

Subject: Transportation Analysis for Cordoba Center in San Martin

SJ17-1716

## INTRODUCTION

This memorandum summarizes the results of the transportation analysis for the proposed Cordoba Center (the Project) in San Martin, California. The Cordoba Center is a mosque located on the west side of Monterey Highway, between LLagas creek to the north and California Avenue to the south. The results presented below include a trip generation analysis, a California Environmental Quality Act (CEQA) assessment, site access and circulation analysis including peak-hour signal warrant analysis for the site driveway, and a vehicle miles traveled (VMT) estimate.

## **TRIP GENERATION ANALYSIS**

When looking at traffic volumes, analysts study the time periods when traffic volumes are highest, known as the "peak hours". Two kinds of peak hours were used in this analysis: (1) peak hours of adjacent streets and (2) peak hours of the generator (land use). The weekday peak hours of the adjacent streets generally correspond with the morning and evening commute periods, also called the AM Peak Hour and PM Peak Hour. These peak hours usually fall between 7:00 am to 9:00 am in the morning and 4:00 pm to 6:00 pm in the evening. The second type of peak hour used in the analysis is the Peak Hour of Generator. This corresponds to the hour when the proposed project reaches its highest traffic generation. For a mosque, this time would correspond to right before and after the midday Jummah Prayers on Fridays.

Trip generation estimates were prepared for the weekday daily, AM Peak Hour, PM Peak Hour, and Peak Hour of Generator periods as shown in Table 1. The estimates are based on rates from the Institute of Transportation Engineers *(ITE) Trip Generation Manual (9<sup>th</sup> Edition)* and projected

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attendance levels for the various services and events at the mosque presented in Table 3-2 of the project description provided by Ascent Environmental. Since the Cordoba Center includes a variety of land uses, separate estimates were produced for each use. Some of the uses were assumed to generate no additional trips, including the Community Building and the Playfield and Playground. For example, the Community Building will be used to serve food and hold receptions before and after events at the mosque. Because Muslim tradition restricts food from the worship area, a separate building is needed. Reception attendees will walk from the mosque to the Community Building. Therefore, trips for the Community Building (and Playfield and Playground) are considered internal trips (trips that would occur on site) and would not create additional vehicular trips to the surrounding roadways.

The AM peak hour for a mosque is from 6:00 am to 7:00 am during the dawn Fajr Prayers. This corresponds with the existing AM peak hour on Monterey Highway as determined from the collected traffic counts. The evening peak hour for a mosque is generally from 7:30 pm to 8:30 pm, within the sunset Maghrib Prayer and night Isha Prayer time periods. Although this is later than the PM peak hour for Monterey Highway, trip estimates for this time period were used to reflect the PM peak hour. (Mosque-generated traffic during the Monterey Highway PM peak hour would be lower, and therefore Table 1 represents conservative PM peak hour trip estimates.)



Proposed	ITE Land Use	ITE Land	Size	Unit	AM Peak Hour PM Unit Tring	M Peak Hour		Pea G	Peak Hour of Generator					
Land Use		Use Code			Trips	In	Out	Total	In	Out	Total	In	Out	Total
Mosque	Mosque	562	8,938	Square Feet	1,120 <sup>3</sup>	8	7	15	66	32	98	157	7	164
Cemetery	Cemetery	566	3.5	Acres	17	1	0	1	1	2	3	5	1	6
Maintenance Building	Utilities <sup>4</sup>	170	2,500	Square Feet	4	1	1	2	1	1	2	N/A	N/A	N/A
Caretaker's Dwelling	Single-Family Detached Housing	210	1	Dwelling Units	10	0	1	1	1	0	1	1	0	1
Total Trips					1,151	10	9	19	69	35	104	163	8	171

### TABLE 1: WEEKDAY TRIP GENERATION ESTIMATES<sup>1/2</sup>

Notes:

1. Based on average Institute of Transportation Engineers (ITE) Trip Generation Manual (9th Edition) rates.

2. Trips for the Community Building and playfield and playground are considered as internal trips (trips that would occur on site) and would not create additional vehicular trips to the surrounding roadways. *Youth Camp* considered a special event and not included in this table.

3. Daily trip rate for mosque land use is not included in the *ITE Trip Generation Manual*, and published research is not readily available. 70 percent of the 800 maximum total daily attendees (presented in Table 3-2 of the project description) are assumed to attend the mosque, creating two daily trips per attendee (one inbound one outbound).

4.. ITE 9<sup>th</sup> Edition lacks directional split information for the 'Utilities' land use for the AM peak hour, as well as 'peak hour of generator' and 'daily' trip rates. A 50/50 inbound/outbound split was assumed. Daily trips equals the sum of AM peak hour trips, PM peak hours trips, and Peak Hour of Generator Trips (which occurs in the morning).

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## **CEQA ASSESSMENT**

An assessment was conducted to determine whether the proposed Cordoba Center would have a significant adverse impact on the surrounding transportation system. In Santa Clara County, the applicable criteria are:

- 1. Would the project cause a signalized intersection to operate at LOS E or F during the AM or PM peak hour?
- 2. Would the project substantially increase hazards due to a design feature?
- 3. Would the project conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities?

## ROADWAY AND INTERSECTION ANALYSIS

Monterey Highway is a four-lane highway with left-turn channelization at multiple locations (such as just north of the proposed project site). It can accommodate up to 3,600 vehicles per hour<sup>1</sup> with operations at level of service (LOS) B, a good operating level. (Table A-1 on Attachment A of the appendices displays the LOS criteria for a multi-lane highway for different speed limits. Using this table, the per lane flow rate for a multi-lane highway with speed limit 50 (which is Monterey Road's speed limit at the project site) at LOS B is 900 passenger cars per hour per lane, or 3,600 vehicles per hour for a four lane facility.)

During the weekday peak hour, the volume on Monterey Highway is 1,595 vehicles. The proposed project would add 104 vehicles for a total volume of 1,699 vehicles, much lower than the LOS B capacity. In addition, the added vehicles would be dispersed with some traveling to the north and some to the south. Since the roadway segment operates at LOS B or better and project traffic is dispersed, it can be concluded that the nearby intersections would also operate at acceptable levels.

A more detailed analysis was conducted for the intersection of Project driveway and Monterey Highway. Table 2 shows the LOS and delay under existing, existing plus project, cumulative and cumulative plus project conditions. To estimate the cumulative volumes on Monterey Highway, a 1.2 percent per year vehicular growth rate was applied to the north and southbound volume on Monterey Highway for a span of 18 years (projecting out to year 2035). This growth rate was obtained from the *Morgan Hill 2035 Draft EIR*, Table 4.14-10 which includes average daily traffic

<sup>&</sup>lt;sup>1</sup> Based on the *2010 Highway Capacity Manual* published by the Transportation Research Board of The National Academies in December 2010. Exhibit 14-17.

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projections for Monterey Highway between Starswept Lane and East Middle Avenue. This roadway segment is less than a mile north of the Cordoba Center project site.

Using Synchro software and Highway Capacity Manual 2010 method for delay, the Monterey Highway / Project Driveway intersection's LOS and delay was estimated and is presented in Table 2. Synchro result reports are included on Attachment B of the appendices.

			Scenario											
Intersection	Traffic Control Device	Peak	Existing <sup>3</sup>		Existing Plus P	roject	Cumulative <sup>3</sup>		Cumulative Plus Project					
		Hour	Average Intersection Delay <sup>1</sup>	LOS										
Monterey Highway / Project Driveway	Side Street Stop Control	AM PM	0 (0) 0 (0)	A (A) A (A)	0.1 (18.4) 0.7 (26.1)	A (C) A (D)	0 (0) 0 (0)	A (A) A (A)	0.1 (22.9) 0.7 (36.3)	A (C) A (E)				

#### TABLE 2: DRIVEWAY INTERSECTION LOS RESULTS SUMMARY<sup>2</sup>

Notes:

1. Average intersection delay represents the intersection average delay in units of seconds per vehicle.

2. LOS = Level of Service. Total intersection LOS and delay provided without parenthesis. Values in parenthesis represent worst movement LOS and delay.

3. There is no delay under no project scenarios since there is no control. All vehicles operate at free flow conditions with no delay due to having to stop at intersection traffic controllers such as a signal or stop sign.

With the addition of project traffic, the Monterey Highway / Project Driveway intersection operates at acceptable conditions (LOS D or better) for all scenarios and peak hours. During the PM peak hour, the existing traffic would operate at LOS of D for the existing plus project scenario and LOS E for cumulative plus project scenario. This means that on average, a vehicle under the existing plus project PM peak hour scenario would wait on 26.1 seconds until it can safely exit the project site. Similarly, they would have to wait 36.3 seconds in the cumulative plus project scenario.

Although the traffic exiting the project site would experience delays, queues (lines of stopped vehicles) would not form for vehicles waiting to exit the project site, nor for vehicles waiting to enter the project site going northbound on Monterey Highway (left into the project site). Table 3 shows the queue estimates for the eastbound exiting traffic as well as for the northbound left-turn entering traffic (in parenthesis), for each scenario.



	Traffic	c ol Peak Hour e	Queue Lengths for eastbound exiting traffic and northbound left turning entering traffic (feet)							
Intersection	Control Device		Existing <sup>3</sup>	Existing Plus Project	Cumulative <sup>3</sup>	Cumulative Plus Project				
1. Monterey Highway / Project Driveway	Side Street Stop Control	AM PM	0 (0) 0 (0)	25 (25) 25 (25)	0 (0) 0 (0)	25 (25) 25 (25)				

#### TABLE 3: DRIVEWAY INTERSECTION QUEUING RESULTS SUMMARY<sup>1/2</sup>

Notes:

1. Queue lengths represent 95% queue length as reported using Synchro software, 2010 Highway Capacity Manual methodology. For comparison purposes, one vehicle can be assumed to equal 25 feet in length. This includes the length of the vehicle as well as the distance between stopped vehicles.

2. Values not in parenthesis represent queue lengths for east bound left turning exiting traffic. Values in parenthesis represent queue lengths for north bound left turning inbound traffic.

3. No project scenarios have zero queues since there is no traffic control device and traffic flows freely with no reason to stop or slow down.

Table 3 shows all queues are less than 25 feet (or one vehicle) for either the eastbound exiting traffic of the northbound traffic turning left to enter the project site.

## HAZARD ANALYSIS AND POTENTIAL CONFLICT WITH PLANS AND POLICIES

The project's access roadway will be designed to County standards so it would not increase hazards. A more detailed site plan review is presented in the next section. The project design does not affect the project frontage on Monterey Highway and therefore does not conflict with transit, bicycle, or pedestrian plans, policies, or facilities.

## SITE ACCESS AND CIRCULATION ANALYSIS

Fehr & Peers conducted a site access and circulation assessment using the site plan received from Ascent Environmental on February 28<sup>th</sup>, 2017. The site would have access to Monterey Highway via one driveway that accommodates right-turn and left-turn movements into and out of the site. The two-way left-turn lane in the median on Monterey Highway accommodates vehicles waiting to turn left into the site. It also allows vehicles turning left out of the site to make a two-stage left turn movement.

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Recommendations to improve site access and on-site circulation are presented in Attachment C and are summarized below. With the following recommendations, the proposed project would not result in a traffic safety hazard associated with site access and circulation.

- 1. Stop signs should be considered where side street traffic enters the travel way of the main street/driveway. These locations include the southbound approach for the exiting traffic at legend items 38 and 13 of the attached site plan. By installing stop signs, there would be a clear right of way to the vehicles traveling on the main entrance street that connects to Monterey Road. This avoids confusion between drivers on this main entrance driveway and drivers at the proposed stop sign locations concerning who has the right of way, which could lead to potential collisions. By including stop signs, drivers exiting the driveways at the proposed stop sign locations should be aware of who was the right of way and should wait until their path has cleared.
- 2. According to the California Department of Transportation *Highway Design Manual*, Table 201.1 *Sight Distance Standards*, the minimum sight distance for a roadway with a design speed of 50 miles per hour is 430 feet. This means that someone traveling at 50 miles per hour should to be able to see an object at least 430 feet away in order to stop. Approximating the location of the project driveway to be just north of the southern parcel boundary, a person can see approximately 500 feet upstream of the road, therefore the stopping sight distance criteria is satisfied. The project applicant should ensure that the proposed orchard does not encroach into the sight distance triangle. As shown on Figure 1, the sight distance triangle is a triangle formed between the location where the driver makes the decision to exit the driveway (decision point), the location of the approaching vehicle on Monterey Highway, and the location where the two vehicles would intersect. The orchard should not obstruct the sight line between the decision point and the oncoming vehicle on Monterey highway.





#### Figure 1: Sight Distance Triangle

Source: National Association of City Transportation Officials, Site Distance Studies

- 3. Project traffic entering the project site from the north on Monterey Highway will need to decelerate in order to turn into the project driveway. Although the current southbound traffic (153 vph in the AM and 1132 vph in the PM) on Monterey Highway is much less than the south bound roadway capacity (1800 vph), there may be operational and safety benefits from adding a south bound right turn deceleration lane. This decelerate in preparation to make the southbound through traffic travel lanes and decelerate in preparation to make the southbound right turn into the project driveway. This reduces the chance of southbound through moving vehicles queueing behind it since they would otherwise need to slow down to match the speed of the southbound right turning vehicle.
- 4. According to Chapter 4.30 (*Off-Street Parking and Loading*) of the Santa Clara County Zoning Ordinance, Nonprofit Institutions should have at least one parking space per 250 square feet of building area. Using the project building size of 29,386 square feet as presented in Table 1, a minimum of 118 parking spaces are required. The proposed site plan includes 125 total parking spaces; therefore, the parking requirement is met.

#### Peak Hour Signal Warrant Analysis

To determine whether a signal is warranted at the Project driveway, a peak hour signal warrant analysis was conducted. This analysis uses the project trips as well as the existing and cumulative volumes on Monterey Highway during the weekday AM and PM peak hours. The results are shown



in Table 4. The peak hour signal warrant is not met for either the existing plus project nor cumulative plus project scenarios, for either peak hour. Therefore, traffic signal installation would not be recommended based on these traffic projections.

			Scenario			
Intersection	Current Traffic Control Device	Peak Hour	Existing Plus Project	Cumulative Plus Project		
1. Monterey Highway / Project Driveway	Side Street Stop Control	AM PM	No No	No No		

#### TABLE 4: PEAK HOUR SIGNAL WARRANT RESULTS<sup>1</sup>

Notes:

1. Peak Hour Signal Warrant Analysis uses the Manual of Uniform Traffic Control Devices (MUTCD) Peak Hour Signal Warrant for rural areas, 2012 edition based on Section 4C.04 Warrant 3B

## **VEHICLE MILES TRAVELED ESTIMATES**

The project's vehicle miles of travel (VMT) is comprised of the trip distance and number of trips generated by attendees, employees and residents, to and from the project on a daily basis.

As noted in the project description, the religious and cultural needs of the South Santa Clara Valley's multi-ethnic community are not being served by existing dedicated facilities. The nearest formal place of worship is the South Bay Islamic Association's mosque in downtown San Jose. Therefore, the attendees of Cordoba Center will primarily come from the South Santa Clara Valley area including Morgan Hill, Gilroy, San Martin, and possibly some areas outside of Santa Clara County such as Watsonville.

The distribution estimates were made considering the population and distance of each city relative to the project site. It is estimated that most of the attendees would come from Gilroy. The next largest origin of trips would be Morgan Hill, followed by San Martin, South San Jose and lastly Watsonville. Figure 2 provides a geographic distribution showing the estimated percentage from each area.



Project Site

2 Miles Radius from Project Site

Portion of Total Users Traveling to/from Neighboring Cities



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The trip length for each of these locations was estimated based on the distance from the centroid of each city/area to the Project site. Table 5 displays each City's population, distance to the project site and the estimated portion of totals users of the project facilities.

City	Population	Distance to Project (miles)	Portion of Total Users
Gilroy	48,821	7.6	50%
Morgan Hill	37,882	3.9	30%
San Martin	7,027	1	10%
San Jose	945,952	17.8	5%
Watsonville	51,199	22	5%

#### **TABLE 5: TRIP LENGTH AND DISTRBUTION**

Source: 2010 US Census Bureau

#### VMT of the Proposed Cordoba Center

As shown on Table 1, Cordoba Center is estimated to generate 1,151 daily trips. Using these vehicle trip estimates, the trip lengths and proportions from each city in Table 5, the VMT is estimated to be 8,150 as shown in Table 6.

City of Origin	Distance to Project <sup>1</sup> (miles)	Portion of Attendees	Number Daily Trips	Daily VMT
Gilroy	7.6	50%	575	4,370
Morgan Hill	3.9	30%	345	1,350
San Martin	1.0	10%	115	120
San Jose <sup>2</sup>	17.8	5%	58	1,030
Watsonville	22	5%	58	1,280
	Total		1,151	8,150

#### TABLE 6: CORDOBA CENTER VEHICLE MILES TRAVELED ESTIMATE

Notes:

1. Distance to project is measured from the centroid of each city to the proposed project's address.

2. Distance to San Jose is measured from South San Jose, specifically the Monterey Road / Blossom Hill Road intersection.

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## CONCLUSIONS

The Cordoba Center would generate approximately 1,151 daily vehicle trips with 19 occurring during the AM peak hour and 104 during the PM peak hour on a typical weekday.

It would have a *less-than-significant impact* to the surrounding roadway system because it would not cause nearby signalized intersections to operate at LOS E or F during weekday peak hours. It would not cause a substantial increase in hazards, and it would not conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities.

The site plan was reviewed and recommendations are provided to improve site access and on-site circulation. The parking supply complies with county standards.

Cordoba Center is projected to generate approximately 8,150 VMT per day.

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## **ATTACHMENT A**

## TABLE A-1

## Table A-1: Maximum Service Flow Rates for Multi-lane HighwaySegments (passenger cars per hour per lane)

FES	The second s		Target LOS		
(mi/h)	A	В	С	D	E
60	660	1,080	1,550	1,980	2,200
55	600	990	1,430	1,850	2,100
50	550	900	1,300	1,710	2,000
45	290	810	1,170	1,550	1,900

Source: 2010 Highway Capacity Manual, Exhibit 14-17

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## ATTACHMENT B

## SYNCHRO RESULT REPORTS

Int Delay, s/veh	0						
Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	7	1	ሻ	- 11	<u>^</u>		
Traffic Vol, veh/h	0	0	0	1787	153	0	
Future Vol, veh/h	0	0	0	1787	153	0	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Stop	Stop	Free	Free	Free	Free	
RT Channelized	-	None	-	None	-	None	
Storage Length	0	0	75	-	-	-	
Veh in Median Storage, #	0	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	92	92	92	92	92	92	
Heavy Vehicles, %	2	2	2	2	2	2	
Mvmt Flow	0	0	0	1942	166	0	

Major/Minor	Minor2		Major1		Major2		
Conflicting Flow All	1137	83	166	0	-	0	
Stage 1	166	-	-	-	-	-	
Stage 2	971	-	-	-	-	-	
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	195	960	1410	-	-	0	
Stage 1	846	-	-	-	-	0	
Stage 2	328	-	-	-	-	0	
Platoon blocked, %				-	-		
Mov Cap-1 Maneuver	195	960	1410	-	-	-	
Mov Cap-2 Maneuver	279	-	-	-	-	-	
Stage 1	846	-	-	-	-	-	
Stage 2	328	-	-	-	-	-	
-							

Approach	EB	NB	SB	
HCM Control Delay, s	0	0	0	
HCM LOS	А			

Minor Lane/Major Mvmt	NBL	NBT EE	BLn1 EE	3Ln2	SBT
Capacity (veh/h)	1410	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	0	-
HCM Lane LOS	А	-	А	А	-
HCM 95th %tile Q(veh)	0	-	-	-	-

#### 03/29/2017

#### Intersection

Int Delay, s/veh	0						
Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	7	1	٦	<b>^</b>	<b>≜</b> †}		
Traffic Vol, veh/h	0	0	0	463	1132	0	
Future Vol, veh/h	0	0	0	463	1132	0	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Stop	Stop	Free	Free	Free	Free	
RT Channelized	-	None	-	None	-	None	
Storage Length	0	0	75	-	-	-	
Veh in Median Storage, #	0	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	92	92	92	92	92	92	
Heavy Vehicles, %	2	2	2	2	2	2	
Mvmt Flow	0	0	0	503	1230	0	

Major/Minor	Minor2		Major1		Major2		
Conflicting Flow All	1482	615	1230	0	-	0	
Stage 1	1230	-	-	-	-	-	
Stage 2	252	-	-	-	-	-	
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	116	434	562	-	-	-	
Stage 1	239	-	-	-	-	-	
Stage 2	767	-	-	-	-	-	
Platoon blocked, %				-	-	-	
Mov Cap-1 Maneuver	116	434	562	-	-	-	
Mov Cap-2 Maneuver	200	-	-	-	-	-	
Stage 1	239	-	-	-	-	-	
Stage 2	767	-	-	-	-	-	

Approach	EB	NB	SB	
HCM Control Delay, s	0	0	0	
HCM LOS	А			

Minor Lane/Major Mvmt	NBL	NBT EB	Ln1 EE	3Ln2	SBT	SBR
Capacity (veh/h)	562	-	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-
HCM Control Delay (s)	0	-	0	0	-	-
HCM Lane LOS	А	-	А	А	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-	-

Int Delay, s/veh	0.1						
Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	7	1	۳	<b>^</b>	<b>≜</b> †}		
Traffic Vol, veh/h	4	5	6	1787	153	4	
Future Vol, veh/h	4	5	6	1787	153	4	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Stop	Stop	Free	Free	Free	Free	
RT Channelized	-	None	-	None	-	None	
Storage Length	0	0	75	-	-	-	
Veh in Median Storage, #	0	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	92	92	92	92	92	92	
Heavy Vehicles, %	2	2	2	2	2	2	
Mvmt Flow	4	5	7	1942	166	4	

Minor2		Major1		Major2		
1152	85	171	0	-	0	
168	-	-	-	-	-	
984	-	-	-	-	-	
6.84	6.94	4.14	-	-	-	
5.84	-	-	-	-	-	
5.84	-	-	-	-	-	
3.52	3.32	2.22	-	-	-	
191	957	1404	-	-	-	
844	-	-	-	-	-	
323	-	-	-	-	-	
			-	-	-	
190	957	1404	-	-	-	
273	-	-	-	-	-	
844	-	-	-	-	-	
321	-	-	-	-	-	
	Minor2 1152 168 984 6.84 5.84 5.84 3.52 191 844 323 190 273 844 321	Minor2           1152         85           168         -           984         -           6.84         6.94           5.84         -           3.52         3.32           191         957           844         -           323         -           190         957           273         -           844         -           321         -	Minor2         Major1           1152         85         171           168         -         -           984         -         -           984         -         -           6.84         6.94         4.14           5.84         -         -           5.84         -         -           3.52         3.32         2.22           191         957         1404           844         -         -           190         957         1404           273         -         -           321         -         -	Minor2         Major1           1152         85         171         0           168         -         -         -           984         -         -         -           6.84         6.94         4.14         -           5.84         -         -         -           5.84         -         -         -           3.52         3.32         2.22         -           191         957         1404         -           323         -         -         -           190         957         1404         -           273         -         -         -           321         -         -         -	Minor2         Major1         Major2           1152         85         171         0         -           168         -         -         -         -           984         -         -         -         -           6.84         6.94         4.14         -         -           5.84         -         -         -         -           5.84         -         -         -         -           5.84         -         -         -         -           3.52         3.32         2.22         -         -           191         957         1404         -         -           323         -         -         -         -           190         957         1404         -         -           273         -         -         -         -           321         -         -         -         -	Minor2         Major1         Major2           1152         85         171         0         -         0           168         -         -         -         -         -         -           984         - </td

Approach	EB	NB	SB	
HCM Control Delay, s	13.1	0	0	
HCM LOS	В			

Minor Lane/Major Mvmt	NBL	NBT E	EBLn1	EBLn2	SBT	SBR	
Capacity (veh/h)	1404	-	273	957	-	-	
HCM Lane V/C Ratio	0.005	-	0.016	0.006	-	-	
HCM Control Delay (s)	7.6	-	18.4	8.8	-	-	
HCM Lane LOS	А	-	С	А	-	-	
HCM 95th %tile Q(veh)	0	-	0	0	-	-	

Int Delay, s/veh	0.7						
Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	۲	1	ሻ	<b>^</b>	<b>≜</b> †}		
Traffic Vol, veh/h	14	21	41	463	1132	28	
Future Vol, veh/h	14	21	41	463	1132	28	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Stop	Stop	Free	Free	Free	Free	
RT Channelized	-	None	-	None	-	None	
Storage Length	0	0	75	-	-	-	
Veh in Median Storage, #	¢ 0	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	92	92	92	92	92	92	
Heavy Vehicles, %	2	2	2	2	2	2	
Mvmt Flow	15	23	45	503	1230	30	

Major/Minor	Minor2		Major1		Major2		
Conflicting Flow All	1587	630	1261	0	-	0	
Stage 1	1246	-	-	-	-	-	
Stage 2	341	-	-	-	-	-	
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	99	424	547	-	-	-	
Stage 1	234	-	-	-	-	-	
Stage 2	692	-	-	-	-	-	
Platoon blocked, %				-	-	-	
Mov Cap-1 Maneuver	91	424	547	-	-	-	
Mov Cap-2 Maneuver	186	-	-	-	-	-	
Stage 1	234	-	-	-	-	-	
Stage 2	635	-	-	-	-	-	

Approach	EB	NB	SB	
HCM Control Delay, s	18.8	1	0	
HCM LOS	С			

Minor Lane/Major Mvmt	NBL	NBT EBLn1	EBLn2	SBT	SBR	
Capacity (veh/h)	547	- 186	424	-	-	
HCM Lane V/C Ratio	0.081	- 0.082	0.054	-	-	
HCM Control Delay (s)	12.2	- 26.1	14	-	-	
HCM Lane LOS	В	- D	В	-	-	
HCM 95th %tile Q(veh)	0.3	- 0.3	0.2	-	-	

Int Delay, s/veh	0						
Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	7	1	1	<b>^</b>	<u>^</u>		
Traffic Vol, veh/h	0	0	0	2218	190	0	
Future Vol, veh/h	0	0	0	2218	190	0	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Stop	Stop	Free	Free	Free	Free	
RT Channelized	-	None	-	None	-	None	
Storage Length	0	0	75	-	-	-	
Veh in Median Storage, #	0	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	92	92	92	92	92	92	
Heavy Vehicles, %	2	2	2	2	2	2	
Mvmt Flow	0	0	0	2411	207	0	

Major/Minor	Minor2		Major1		Major2		
Conflicting Flow All	1412	103	207	0	-	0	
Stage 1	207	-	-	-	-	-	
Stage 2	1205	-	-	-	-	-	
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	129	932	1361	-	-	0	
Stage 1	807	-	-	-	-	0	
Stage 2	247	-	-	-	-	0	
Platoon blocked, %				-	-		
Mov Cap-1 Maneuver	129	932	1361	-	-	-	
Mov Cap-2 Maneuver	209	-	-	-	-	-	
Stage 1	807	-	-	-	-	-	
Stage 2	247	-	-	-	-	-	
-							

Approach	EB	NB	SB	
HCM Control Delay, s	0	0	0	
HCM LOS	А			

Minor Lane/Major Mvmt	NBL	NBT EE	BLn1 EE	3Ln2	SBT
Capacity (veh/h)	1361	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	0	-
HCM Lane LOS	А	-	А	А	-
HCM 95th %tile Q(veh)	0	-	-	-	-

Int Delay, s/veh	0						
Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	7	1	٦	<b>^</b>	<b>≜</b> †}-		
Traffic Vol, veh/h	0	0	0	575	1405	0	
Future Vol, veh/h	0	0	0	575	1405	0	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Stop	Stop	Free	Free	Free	Free	
RT Channelized	-	None	-	None	-	None	
Storage Length	0	0	75	-	-	-	
Veh in Median Storage, #	0	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	92	92	92	92	92	92	
Heavy Vehicles, %	2	2	2	2	2	2	
Mvmt Flow	0	0	0	625	1527	0	

Major/Minor	Minor2		Major1		Major2		
Conflicting Flow All	1840	764	1527	0	-	0	
Stage 1	1527	-	-	-	-	-	
Stage 2	313	-	-	-	-	-	
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	67	346	432	-	-	-	
Stage 1	165	-	-	-	-	-	
Stage 2	715	-	-	-	-	-	
Platoon blocked, %				-	-	-	
Mov Cap-1 Maneuver	67	346	432	-	-	-	
Mov Cap-2 Maneuver	139	-	-	-	-	-	
Stage 1	165	-	-	-	-	-	
Stage 2	715	-	-	-	-	-	

Approach	EB	NB	SB	
HCM Control Delay, s	0	0	0	
HCM LOS	А			

Minor Lane/Major Mvmt	NBL	NBT EB	Ln1 EE	3Ln2	SBT	SBR
Capacity (veh/h)	432	-	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-
HCM Control Delay (s)	0	-	0	0	-	-
HCM Lane LOS	А	-	А	А	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-	-

Int Delay, s/veh	0.1						
Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	۲	1	<u>۲</u>	<b>^</b>	<b>≜</b> †}		
Traffic Vol, veh/h	4	5	6	2218	190	4	
Future Vol, veh/h	4	5	6	2218	190	4	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Stop	Stop	Free	Free	Free	Free	
RT Channelized	-	None	-	None	-	None	
Storage Length	0	0	75	-	-	-	
Veh in Median Storage, #	± 0	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	92	92	92	92	92	92	
Heavy Vehicles, %	2	2	2	2	2	2	
Mvmt Flow	4	5	7	2411	207	4	

Minor2		Major1		Major2		
1427	105	211	0	-	0	
209	-	-	-	-	-	
1218	-	-	-	-	-	
6.84	6.94	4.14	-	-	-	
5.84	-	-	-	-	-	
5.84	-	-	-	-	-	
3.52	3.32	2.22	-	-	-	
126	929	1357	-	-	-	
806	-	-	-	-	-	
243	-	-	-	-	-	
			-	-	-	
125	929	1357	-	-	-	
205	-	-	-	-	-	
806	-	-	-	-	-	
242	-	-	-	-	-	
	Minor2 1427 209 1218 6.84 5.84 5.84 3.52 126 806 243 125 205 806 242	Minor2           1427         105           209         -           1218         -           6.84         6.94           5.84         -           5.84         -           3.52         3.32           126         929           806         -           243         -           125         929           205         -           806         -           242         -	Minor2         Major1           1427         105         211           209         -         -           1218         -         -           6.84         6.94         4.14           5.84         -         -           5.84         -         -           3.52         3.32         2.22           126         929         1357           806         -         -           243         -         -           125         929         1357           205         -         -           806         -         -           242         -         -	Minor2         Major1           1427         105         211         0           209         -         -         -           1218         -         -         -           6.84         6.94         4.14         -           5.84         -         -         -           5.84         -         -         -           3.52         3.32         2.22         -           126         929         1357         -           806         -         -         -           125         929         1357         -           125         929         1357         -           205         -         -         -           205         -         -         -           242         -         -         -	Minor2         Major1         Major2           1427         105         211         0         -           209         -         -         -         -           1218         -         -         -         -           6.84         6.94         4.14         -         -           5.84         -         -         -         -           5.84         -         -         -         -           3.52         3.32         2.22         -         -           126         929         1357         -         -           806         -         -         -         -           243         -         -         -         -           125         929         1357         -         -           205         -         -         -         -           205         -         -         -         -           242         -         -         -         -	Minor2         Major1         Major2           1427         105         211         0         -         0           209         -         -         -         -         -         -           1218         -

Approach	EB	NB	SB	
HCM Control Delay, s	15.1	0	0	
HCM LOS	С			

Minor Lane/Major Mvmt	NBL	NBT EBLn1	EBLn2	SBT	SBR	
Capacity (veh/h)	1357	- 205	929	-	-	
HCM Lane V/C Ratio	0.005	- 0.021	0.006	-	-	
HCM Control Delay (s)	7.7	- 22.9	8.9	-	-	
HCM Lane LOS	А	- C	А	-	-	
HCM 95th %tile Q(veh)	0	- 0.1	0	-	-	

Int Delay, s/veh	0.7						
Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	٦	1	ሻ	- <b>†</b> †	<b>≜</b> †}		
Traffic Vol, veh/h	14	21	41	575	1405	28	
Future Vol, veh/h	14	21	41	575	1405	28	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Stop	Stop	Free	Free	Free	Free	
RT Channelized	-	None	-	None	-	None	
Storage Length	0	0	75	-	-	-	
Veh in Median Storage, #	<b>#</b> 0	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	92	92	92	92	92	92	
Heavy Vehicles, %	2	2	2	2	2	2	
Mvmt Flow	15	23	45	625	1527	30	

Major/Minor	Minor2		Major1		Major2		
Conflicting Flow All	1944	779	1558	0	-	0	
Stage 1	1542	-	-	-	-	-	
Stage 2	402	-	-	-	-	-	
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	57	339	421	-	-	-	
Stage 1	162	-	-	-	-	-	
Stage 2	644	-	-	-	-	-	
Platoon blocked, %				-	-	-	
Mov Cap-1 Maneuver	51	339	421	-	-	-	
Mov Cap-2 Maneuver	130	-	-	-	-	-	
Stage 1	162	-	-	-	-	-	
Stage 2	575	-	-	-	-	-	

Approach	EB	NB	SB	
HCM Control Delay, s	24.4	1	0	
HCM LOS	С			

Minor Lane/Major Mvmt	NBL	NBT EBLn1	EBLn2	SBT	SBR	
Capacity (veh/h)	421	- 130	339	-	-	
HCM Lane V/C Ratio	0.106	- 0.117	0.067	-	-	
HCM Control Delay (s)	14.6	- 36.3	16.4	-	-	
HCM Lane LOS	В	- E	С	-	-	
HCM 95th %tile Q(veh)	0.4	- 0.4	0.2	-	-	

Mike Parker April 28, 2017 Page 23 of 23



## ATTACHMENT C

## SITE PLAN MARK-UP



From:	Sebastian Arias			
To:	Mike Parker			
Cc:	Jane Bierstedt			
Subject:	Roadway LOS Clarification			
Date:	Thursday, June 29, 2017 1:50:41 PM			
Attachments:	image002.png			
	image003.png			
	image004.png			
	Cordoba Center Memorandum CEQA 4.28.2017.pdf			

Hi Mike,

The cumulative plus project volumes shown on the Synchro output sheets of our memorandum dated April 28, 2017 (page 21 for the morning peak hour and page 22 for the evening peak hour) show that we have a total roadway volume of 2,427 vehicles in the morning peak hour and 2,084 vehicles in the evening peak hour.

Following the same approach as for the roadway level of service on page 4 of 23 in the Memorandum, the Roadway LOS for a multi-lane highway segment with a speed of 50 mph and 2,427 vehicles per hour is LOS B or better (less than 3,600 vehicles per hour for a four lane facility) during the morning peak hour under cumulative plus project conditions. Similarly, the LOS for the same roadway with 2,084 vehicles per hour during the evening peak hour under cumulative plus project conditions is also LOS B or better (less than 3,600 vehicles per hour for a four lane facility).

Please let me know if you have any questions.

## **County of Santa Clara**

Roads and Airports Department Planning, Land Development and Survey

101 Skyport Drive San Jose, California 95110-1302 (408) 573-2400 FAX (408) 441-0276



## MEMORANDUM

**DATE:** March 14, 2018

**TO:** David Rader, Senior Planner, Department of Planning & Development

FROM: Rocelia Kmak, Senior Civil Engineer, Land Development Division, Department of Roads & Airports

SUBJECT: Cordoba Center

**FILE NO**.: 2145

On May 4, 2017, the Department of Roads & Airports (RDA) provided initial comments on the Cordoba Center project and the Fehr & Peers Transportation Analysis Memo (April 12, 2017). Following additional review of the proposed project and discussions between RDA Land Development Engineering, RDA Traffic Engineering, the Department of Planning & Development and Fehr & Peers, we offer the following additional comments:

#### **Driveway Operation**

RDA reiterates that left turns in and out of the proposed project driveway would not be allowed, unless the project applicant were to provide signalization at the driveway. Left turns out of the project driveway onto Monterey Road cannot be safely made due to existing traffic volumes and roadway speed. For the same reasons and because the median is too narrow at the project driveway to create a left turn pocket, left turns into the project driveway are not feasible.

The driveway can operate safely with right-in-right out only with some improvements to Monterey Road. A deceleration lane is needed to allow vehicles turning right to slow down without impeding traffic in the travel lanes. In addition, an acceleration lane is needed to allow vehicles turning right out of the project driveway to safely accelerate before merging with traffic on Monterey Road.

Right turns from project driveway could potentially make a U-turn at California Avenue as there is adequate median to create a left-turn pocket. However, a queuing analysis would be needed to determine the length of the left turn pocket based on project trips during the peak hours.

#### Level of Service Analysis

Although in its original comments RDA asked that LOS analysis should be done with TRAFFIX software consistent with VTA's TIA guidelines, we have since determined that Synchro software is acceptable for analyzing un-signalized intersections, which is the case with the project driveway intersection with Monterey Road. With project access being right-in and right out only configuration (as discussed above), there is no need for signal warrant study at the project site.

RDA also notes that Fehr and Peers did in fact analyze the peak hour of the generator, which is the Friday "Jummah Prayers" from 12:30 p.m. -2:30 p.m. In addition, although there could be peak hours for occasional weekend events and other special events, RDA understands that these would not coincide with the peak hour for Monterey Road and therefore such analysis is not needed to evaluate level of service. Based on project traffic circulation, turn pocket length must be evaluated and should be addressed with this project.