

Appendix D:
Cordoba Center Project – Supplemental Traffic
Analysis Material

PINNACLE TRAFFIC ENGINEERING

831 C Street
Hollister, California 95023
(831) 638-9260
PinnacleTE.com

November 26, 2018

c/o Kim Tschantz, MSP, CEP
South Valley Islamic Center
P.O. Box 1777
Morgan Hill, CA 95038

RE: Cordoba Center Project; Santa Clara County (San Martin), California
Supplemental Traffic Analysis Material

Dear Mr. Tschantz,

The Supplemental Traffic Analysis Material has been prepared in response to comments received on the Draft Environmental Impact Report (DEIR; May 30, 2018). The DEIR Transportation and Circulation Section (4.6) is based on the traffic analysis prepared by Fehr & Peers (April 28, 2017). The DEIR identified a potentially significant traffic impact related to project access on Monterey Highway (Impact 4.6-3, Substantially increase hazards because of a design feature). The DEIR states that the County's Department of Roads and Airports has determined that options for ingress / egress at the project driveway are limited due to the curvature of Monterey Highway. Therefore, left turns out of the project driveway cannot be made safely and all exiting traffic should turn right. The impact discussion also states that exiting vehicles with a desire to go north on Monterey Highway could turn right (go south) and then potentially make a U-turn at California Avenue. The DEIR indicates there is adequate room to accommodate a U-turn lane at California Avenue (length of this lane was not evaluated). Implementation of the recommended improvement would mitigate the potentially significant impact to a level of "less than significant."

The DEIR Mitigation Measure 4.6-3 states, "the project applicant shall submit a queuing analysis to determine the length of the left turn pocket at California Avenue needed to accommodate the number of northbound vehicles exiting the project site during peak hours." Though the impact discussion suggest the recommended mitigation measure could be developed during the design process the project applicant has elected to provide the supplemental material for incorporation in to the Final EIR (and in response to comments on the DEIR). The queuing analysis scope was developed in consultation with staff at the County's Roads and Airports Department. County staff has also requested that the supplemental analysis material include a conceptual layout of the U-turn pocket on the Monterey Highway (southbound approach) at California Avenue.

Queuing Analysis

The queuing analysis was conducted using the (1) procedures outlined in the Caltrans Highway Design Manual and (2) output from the Synchro 9 intersection analysis software. Both procedures utilize the project traffic volumes to determine the appropriate design volume for the southbound U-turn pocket on Monterey Highway at California Avenue. The project and total cumulative peak hour traffic volumes were referenced from the Fehr & Peers traffic analysis. To document existing conditions at the Monterey Highway and California Avenue intersection, new traffic count data was collected on November 7, 2018 (Wednesday). For consistency with the Fehr & Peers traffic analysis and DEIR, the existing north-south peak hour traffic volumes on Monterey Highway were used for the queuing analysis. The existing peak hour traffic volumes are illustrated on Figure 1.

The total cumulative (with project traffic) were also referenced from the Fehr & Peers analysis. The project trips exiting the driveway on Monterey Highway were re-assigned with all egress vehicles turning right and going south. The project trips that were originally assigned to go north on Monterey Highway were re-assigned to the southbound U-turn pocket (left turn lane) at California Avenue. It's noted that the existing traffic volumes entering and exiting California Avenue were increased by 10% to account for future background traffic growth. The total cumulative (with project traffic) peak hour traffic volumes are illustrated on Figure 2. Figure 1, Figure 2, and a copy of the new count data are included with the attachment material.

- **Caltrans Highway Design Manual (HDM)** - The Caltrans HDM includes Intersection Design Standards (Topic 405), which describe the “Left-Turn Channelization” requirements (405.2). The Caltrans HDM requires a left turn lane to provide adequate vehicle storage. At unsignalized intersections, the “storage length may be based on the number of turning vehicles likely to arrive in an average 2-minute period during the peak hour. At a minimum, space for 2 vehicles should be provided at 25 feet per vehicle.” The total cumulative PM peak hour volumes illustrated on Figure 2 demonstrate that 14 vehicles per hour (vph) are projected to use the southbound U-turn pocket (left turn lane) on Monterey Highway at California Avenue (about 0.5 vehicles in a 2-minute period). Therefore, vehicle storage should be provided for at least 2 vehicles (50’).
- **Synchro 9 Software** - The Synchro 9 software evaluates intersection delays and provides a 95th percentile queue for vehicles on the stop sign controlled approaches and vehicles in the main street left turn lanes. The total cumulative (with project traffic) peak hour traffic volumes shown on Figure 2 were evaluated using the Synchro 9 software. The Synchro 9 software demonstrates that the 95th percentile queue for the southbound left turn lane would not exceed 1-2 vehicles. Therefore, vehicle storage should be provided for at least 1-2 vehicles. Copies of the Synchro 9 software “level of service” (LOS) worksheets are included with the attachment material.

Southbound U-Turn Pocket (Left Turn Lane) - Conceptual Layout

As previously stated, the Caltrans HDM includes Intersection Design Standards that describe the “Left-Turn Channelization” requirements. The requirements include providing the appropriate

vehicle storage plus adequate room for vehicle deceleration (Table 405.2B). The queuing analysis demonstrates that vehicle storage should be provided for 2 vehicles (50'). Monterey Highway is posted with a 50 mile-per-hour (MPH) speed limit near the project site and California Avenue. The Caltrans HDM indicates the design speed for deceleration may be reduced by 10-20 MPH for a lower entry design speed. Since the project driveway will be located only about 650' north of California Avenue, it was deemed reasonable to use a 30 MPH entry speed. The southbound left turn lane improvements will need to be a total of 285' (50' storage + 235' deceleration).

A layout of the conceptual improvements for the southbound U-turn pocket (left turn lane) was developed using topographic survey data provided by RI Engineering and aerial photographic images. The Conceptual Plan illustrates the existing and proposed conditions (copy attached). Based on direction from County staff, the AASHTO standard passenger car turning template (R=24') was used to determine if improvements would be required on Monterey Highway to accommodate the southbound U-turn movement. The proposed conditions illustrate that the VTA bus stop would need to be moved approximately 4' east to accommodate the southbound U-turn movement for a standard passenger car. County staff also requested that the turning template be performed for a standard delivery truck (e.g. 30' single unit). However, the turning radius for a 30' single unit truck is 42' which would require a turnaround diameter of 84'. This could not be constructed within the County right-of-way (ROW) and would impact the existing railroad tracks, which would not be physically or economically feasible. It's noted that any project related truck traffic will be able to use California Avenue-Santa Teresa Boulevard (local traffic) and San Martin Avenue-US 101 (regional traffic) for access to points north of the project site. It's also noted that any additional room for vehicle storage or deceleration will be able to be accommodated within the existing striping median north of the proposed southbound U-turn pocket (left turn lane).

Please contact my office with any questions regarding the queuing analysis or conceptual layout.

Pinnacle Traffic Engineering

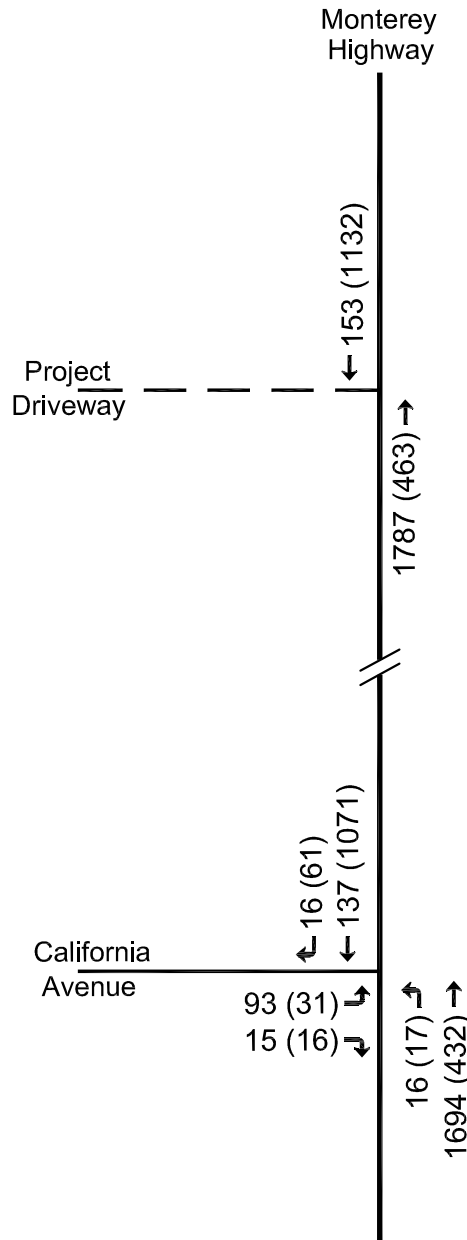


Larry D. Hail, CE, TE, PTOE
President

ldh:msw



- Attachments: Figure 1 - Existing Peak Hour Traffic Volumes
Figure 2 - Total Cumulative (with Project Traffic) Peak Hour Traffic Volumes
New Peak Period Traffic Count Data (November 7, 2018)
Synchro 9 - Total Cumulative Synchro 9 Software LOS Analysis Worksheets
Conceptual Plan - Southbound Left Turn Lane

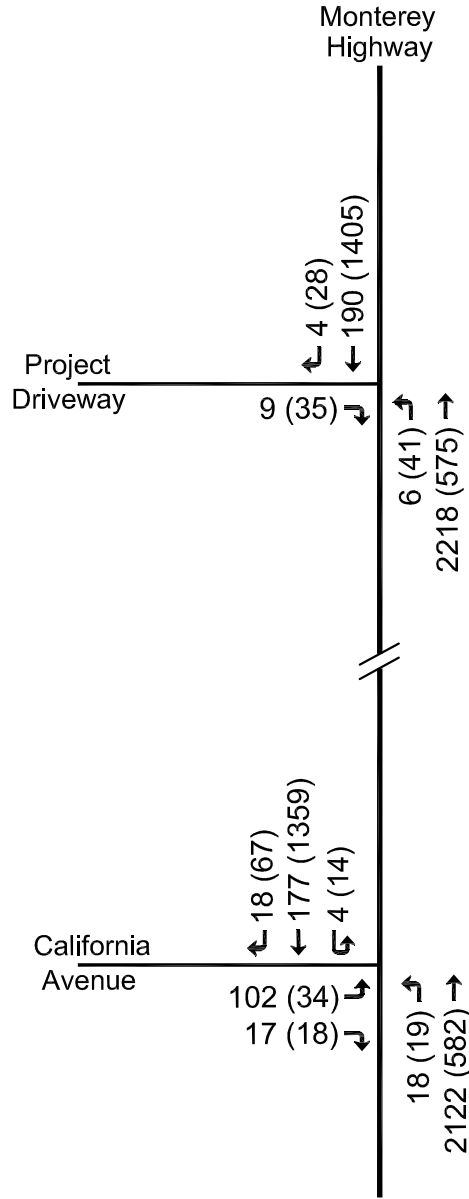


LEGEND

← 00 (00) = AM (PM) Peak Hour Volume

Morning Peak Hour (7:00 - 8:00 AM)
 Afternoon Peak Hour (4:30 - 5:30 PM)





LEGEND

← 00 (00) = AM (PM) Peak Hour Volume



National Data & Surveying Services

Intersection Turning Movement Count

Location: Monterey Hwy & California Ave
City: San Martin
Control:

Project ID: 18-08542-001
Date: 11/7/2018

Total

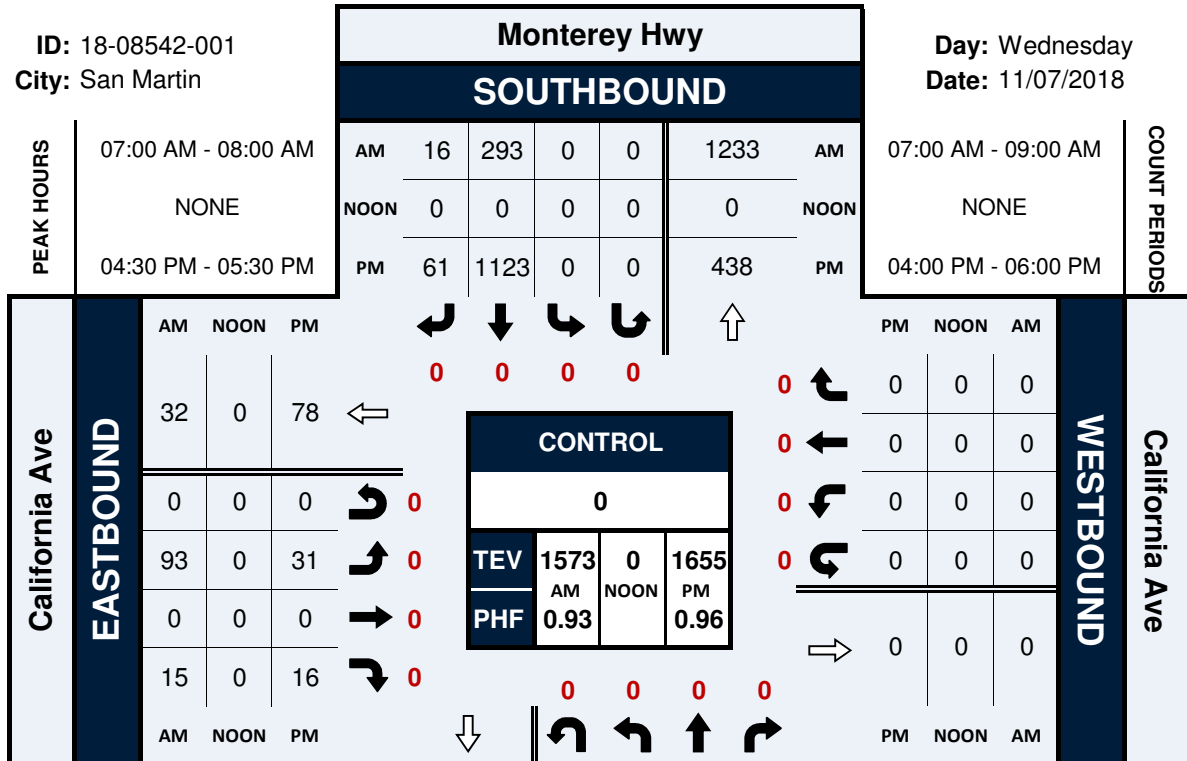
NS/EW Streets:	Monterey Hwy				Monterey Hwy				California Ave				California Ave				TOTAL
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
7:00 AM	0	271	0	0	0	55	1	0	26	0	5	0	0	0	0	0	358
7:15 AM	3	330	0	0	0	60	1	0	25	0	2	0	0	0	0	0	421
7:30 AM	2	280	0	0	0	92	4	0	22	0	6	0	0	0	0	0	406
7:45 AM	11	259	0	0	0	86	10	0	20	0	2	0	0	0	0	0	388
8:00 AM	3	199	0	0	0	63	4	0	19	0	1	0	0	0	0	0	289
8:15 AM	2	204	0	0	0	75	1	0	10	0	2	0	0	0	0	0	294
8:30 AM	4	127	0	0	0	73	3	0	17	0	1	0	0	0	0	0	225
8:45 AM	2	115	0	1	0	85	4	0	9	0	2	0	0	0	0	0	218
TOTAL VOLUMES :	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
APPROACH %'s :	27	1785	0	1	0	589	28	0	148	0	21	0	0	0	0	0	2599
	1.49%	98.46%	0.00%	0.06%	0.00%	95.46%	4.54%	0.00%	87.57%	0.00%	12.43%	0.00%					
PEAK HR :	07:00 AM - 08:00 AM																TOTAL
PEAK HR VOL :	16	1140	0	0	0	293	16	0	93	0	15	0	0	0	0	0	1573
PEAK HR FACTOR :	0.364	0.864	0.000	0.000	0.000	0.796	0.400	0.000	0.894	0.000	0.625	0.000	0.000	0.000	0.000	0.000	0.934
	0.868				0.805				0.871								
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
4:00 PM	2	91	0	0	0	232	4	0	7	0	5	0	0	0	0	0	341
4:15 PM	5	105	0	0	0	232	13	0	6	0	4	0	0	0	0	0	365
4:30 PM	4	112	0	0	0	287	17	0	10	0	2	0	0	0	0	0	432
4:45 PM	4	100	0	0	0	285	15	0	8	0	5	0	0	0	0	0	417
5:00 PM	2	95	0	0	0	282	15	0	6	0	6	0	0	0	0	0	406
5:15 PM	7	100	0	0	0	269	14	0	7	0	3	0	0	0	0	0	400
5:30 PM	4	79	0	0	0	269	8	0	6	0	2	0	0	0	0	0	368
5:45 PM	3	72	0	0	0	232	4	0	5	0	3	0	0	0	0	0	319
TOTAL VOLUMES :	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
APPROACH %'s :	31	754	0	0	0	2088	90	0	55	0	30	0	0	0	0	0	3048
	3.95%	96.05%	0.00%	0.00%	0.00%	95.87%	4.13%	0.00%	64.71%	0.00%	35.29%	0.00%					
PEAK HR :	04:30 PM - 05:30 PM																TOTAL
PEAK HR VOL :	17	407	0	0	0	1123	61	0	31	0	16	0	0	0	0	0	1655
PEAK HR FACTOR :	0.607	0.908	0.000	0.000	0.000	0.978	0.897	0.000	0.775	0.000	0.667	0.000	0.000	0.000	0.000	0.000	0.958
	0.914				0.974				0.904								

Monterey Hwy & California Ave

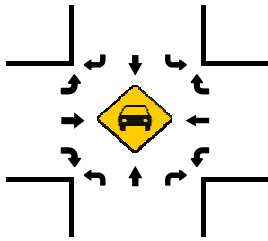
Peak Hour Turning Movement Count

ID: 18-08542-001
City: San Martin

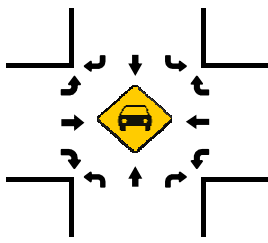
Day: Wednesday
Date: 11/07/2018



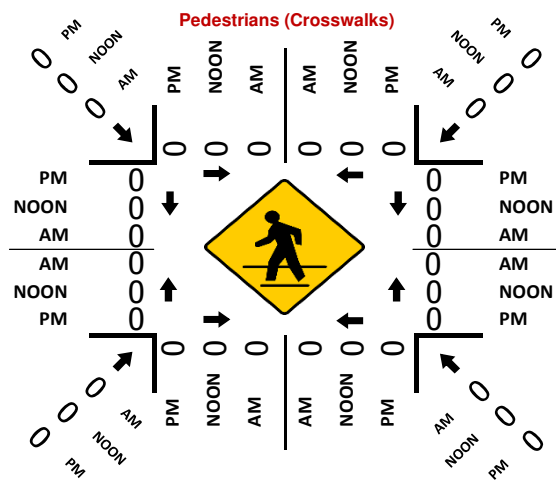
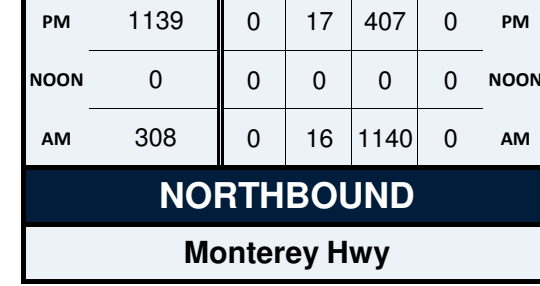
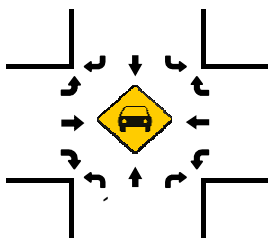
Total Vehicles (AM)



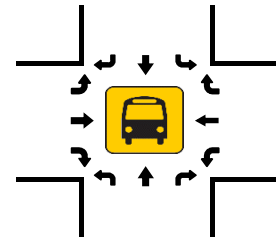
Total Vehicles (NOON)



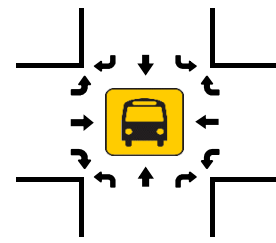
Total Vehicles (PM)



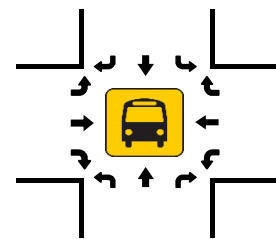
Total Vehicles (AM)



Total Vehicles (NOON)



Total Vehicles (PM)



Intersection							
Int Delay, s/veh	5.8						
Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations	↔		↔	↕↕	↕	↕↔	
Traffic Vol, veh/h	102	17	18	2122	4	177	18
Future Vol, veh/h	102	17	18	2122	4	177	18
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	-	165	-	100	-	-
Veh in Median Storage, #	0	-	-	0	-	0	-
Grade, %	0	-	-	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	2	2	2	0
Mvmt Flow	110	18	19	2282	4	190	19

Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	1387	105	209	0	2282	-
Stage 1	208	-	-	-	-	-
Stage 2	1179	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.1	-	6.44	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	2.52	-
Pot Cap-1 Maneuver	136	936	1374	-	48	-
Stage 1	813	-	-	-	-	-
Stage 2	259	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	123	936	1374	-	48	-
Mov Cap-2 Maneuver	123	-	-	-	-	-
Stage 1	802	-	-	-	-	-
Stage 2	238	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	116	0.1	1.8
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBU	SBT	SBR
Capacity (veh/h)	1374	-	140	48	-	-
HCM Lane V/C Ratio	0.014	-	0.914	0.09	-	-
HCM Control Delay (s)	7.7	-	116	87.3	-	-
HCM Lane LOS	A	-	F	F	-	-
HCM 95th %tile Q(veh)	0	-	6.2	0.3	-	-

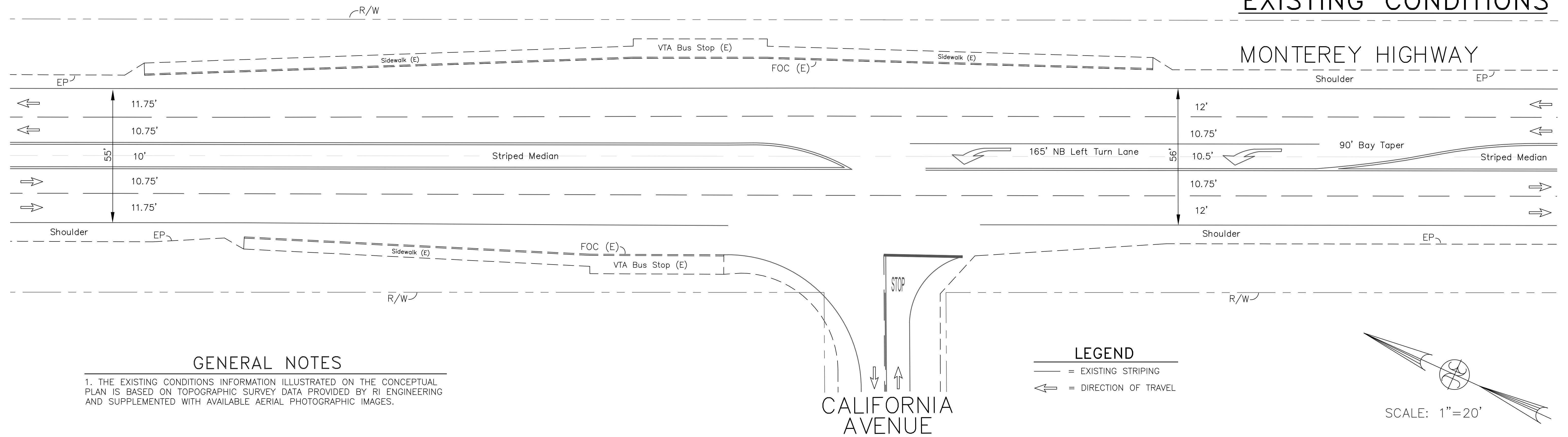
Intersection							
Int Delay, s/veh	2.4						
Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations	↔		↔	↕	↔	↕	
Traffic Vol, veh/h	34	18	19	582	14	1359	67
Future Vol, veh/h	34	18	19	582	14	1359	67
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	-	None
Storage Length	0	-	165	-	100	-	-
Veh in Median Storage, #	0	-	-	0	-	0	-
Grade, %	0	-	-	0	-	0	-
Peak Hour Factor	96	96	96	96	92	96	96
Heavy Vehicles, %	0	0	0	2	2	2	0
Mvmt Flow	35	19	20	606	15	1416	70

Major/Minor	Minor2	Major1	Major2				
Conflicting Flow All	1824	743	1486	0	606	-	0
Stage 1	1481	-	-	-	-	-	-
Stage 2	343	-	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.1	-	6.44	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	2.52	-	-
Pot Cap-1 Maneuver	70	362	458	-	593	-	-
Stage 1	179	-	-	-	-	-	-
Stage 2	696	-	-	-	-	-	-
Platoon blocked, %				-	-	-	-
Mov Cap-1 Maneuver	65	362	458	-	593	-	-
Mov Cap-2 Maneuver	65	-	-	-	-	-	-
Stage 1	171	-	-	-	-	-	-
Stage 2	679	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	90.9	0.4	0.1
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBU	SBT	SBR
Capacity (veh/h)	458	-	91	593	-	-
HCM Lane V/C Ratio	0.043	-	0.595	0.026	-	-
HCM Control Delay (s)	13.2	-	90.9	11.2	-	-
HCM Lane LOS	B	-	F	B	-	-
HCM 95th %tile Q(veh)	0.1	-	2.8	0.1	-	-

EXISTING CONDITIONS



GENERAL NOTES

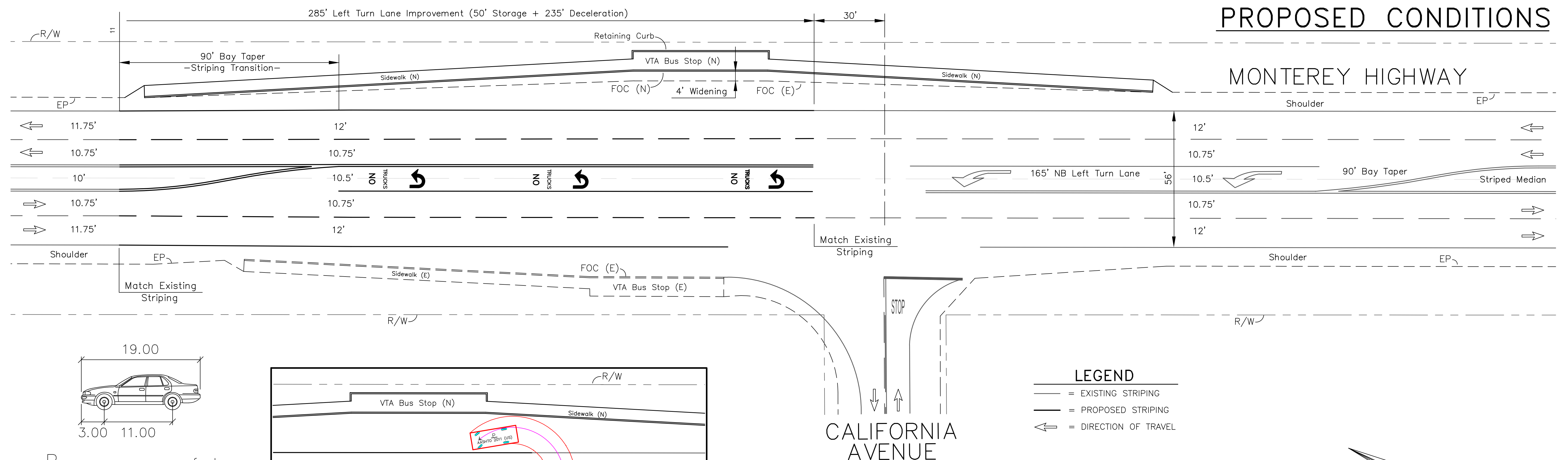
1. THE EXISTING CONDITIONS INFORMATION ILLUSTRATED ON THE CONCEPTUAL PLAN IS BASED ON TOPOGRAPHIC SURVEY DATA PROVIDED BY RI ENGINEERING AND SUPPLEMENTED WITH AVAILABLE AERIAL PHOTOGRAPHIC IMAGES.

LEGEND

- = EXISTING STRIPING
- ← = DIRECTION OF TRAVEL

SCALE: 1"=20'

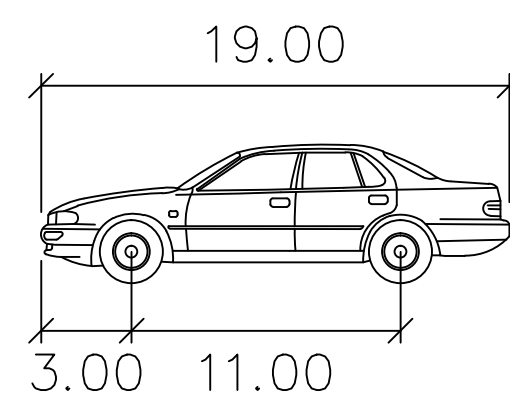
PROPOSED CONDITIONS



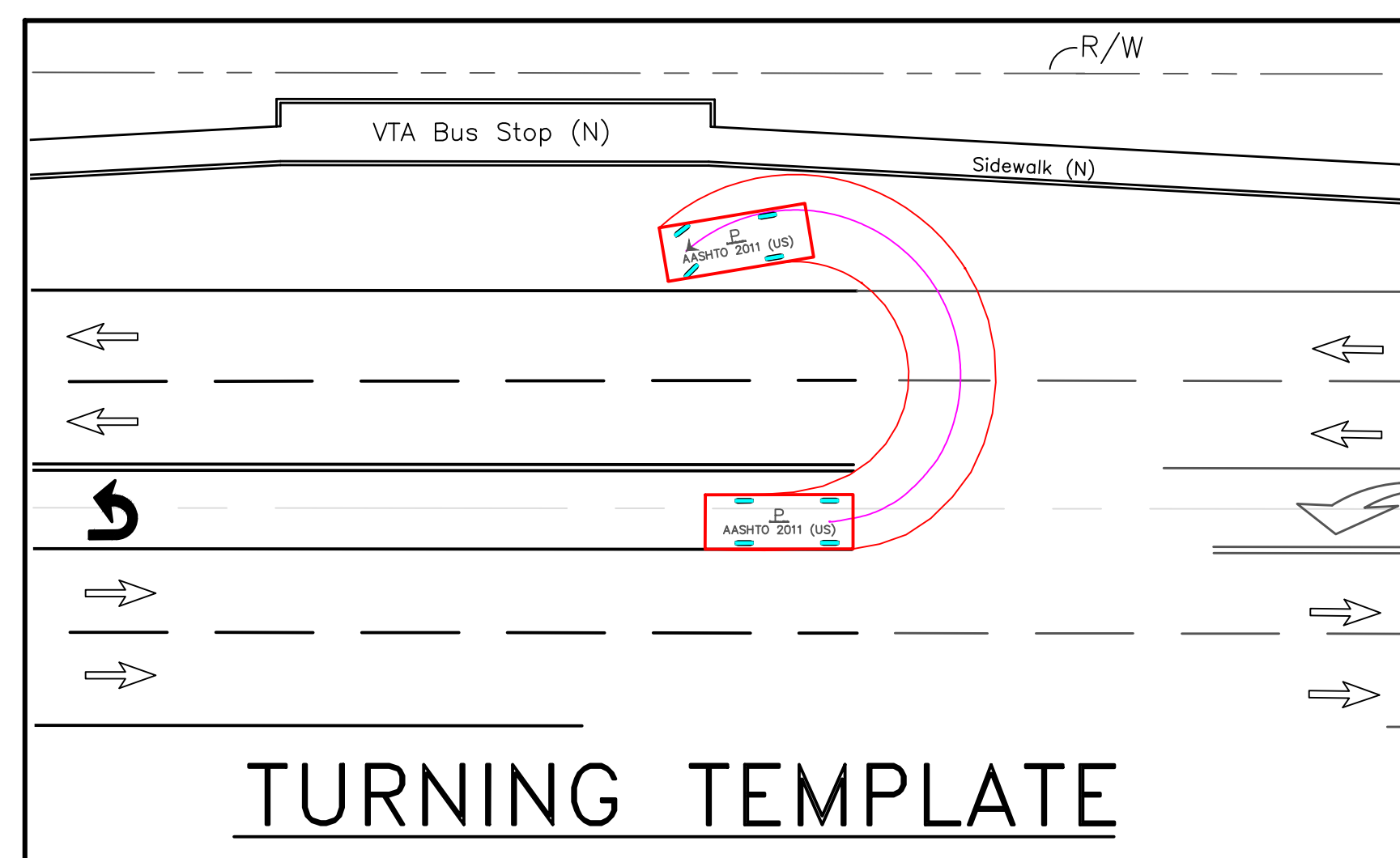
LEGEND

- = EXISTING STRIPING
- = PROPOSED STRIPING
- ← = DIRECTION OF TRAVEL

SCALE: 1"=20'



P	feet
Width	: 7.00
Track	: 6.00
Lock to Lock Time	: 6.0
Steering Angle	: 31.6



TURNING TEMPLATE

Underground Service Alert

Call: TOLL FREE "811" OR 1-800-227-2600
TWO WORKING DAYS BEFORE YOU DIG

#	DESC.	REVISIONS	DATE

Pinnacle Traffic Engineering
831 C STREET
HOLLISTER, CA 95023
Pinnacle.com
(831) 638-9260 / (805) 644-9260

THE CORDOBA CENTER
14045 Monterey Highway
Santa Clara County, CA 95046-9548

CONCEPTUAL PLAN
SOUTHBOUND LEFT TURN LANE

DATE: 11-26-2018
SCALE: 1"=20'
DESIGN BY: LH
JOB: PTE-232A
C-1.0
SHEET: 1 OF 1