

### 3.7 TRANSPORTATION AND CIRCULATION

This section summarizes the *SR-22/West Orange County Connection Traffic/Circulation Impact Report* and *Traffic/Circulation Impact Report Reduced Build Alternative Addendum* (May 2001), the *Traffic/Circulation Impact Report, Reduced Build Alternative (Revised) Addendum* (June 2002), and Section 3.7 of the August 2001 DEIR/EIS. The traffic and circulation data presented are from Year 2020, which are representative of the future or baseline condition when the SR-22/West Orange County Connection (SR-22/WOCC) would be in place. The 2020 data result in a “worst-case” scenario.

The following sections summarize the corridor’s traffic conditions for the 2020 No Build Alternative, which is the base condition used to compare the other alternatives in Section 4.7.

#### 3.7.1 CORRIDOR CONDITIONS

##### A. CORRIDOR TRAVEL TIME, VKT/VMT AND VHT

Vehicle kilometers traveled (VKT)/vehicle miles traveled (VMT), vehicle hours traveled (VHT), and the ratio between the two (average corridor speed) are throughput indicators of the study area mobility (including the freeway and the arterials). For the baseline No Build 2020 scenario, daily aggregate corridor travel time would be 2,610,240 hours. The annual aggregate travel time of all travelers with at least one trip ending in the SR-22 corridor would be 783,072,000 hours. The 2020 No Build scenario shows 16,155,410 VKT (10,040,650 VMT), with these kilometers (miles) being traveled in approximately 311,360 total vehicle hours. The data reflect an average corridor speed of 51.8 kilometers per hour (km/h) (32.2 miles per hour [mph]).

##### B. CORRIDOR SCREENLINE ANALYSIS

To assess travel demand and average speed, four north/south screenlines were identified, as shown in Figure 3.7-1. They are located:

- West of the SR-22/I-405 interchange
- Between Beach Boulevard and Magnolia Street
- Between Harbor Boulevard and Haster Street
- Between Glassell Street and Tustin Street

The screenline volume is the aggregate of all the vehicles on all the facility types that cross the screenline, not just those vehicles on SR-22. All of the vehicles that are on those roadways are also included in the Screenline No. 4 volume and speed data.

The 2020 No Build scenario screenline information on Table 3.7-1 (SR-22 Corridor No Build Screenline Summary) indicates the mobility on four screenlines.

**Table 3.7-1  
SR-22 CORRIDOR NO BUILD SCREENLINE SUMMARY**

Screenline	Volume*	VKT (VMT)	VHT
1 – West of the SR-22/I-405 Interchange	431,340	521,040 (323,830)	9,190
2 – Between Beach Boulevard and Magnolia Street	283,910	246,690 (153,320)	3,240
3 – Between Harbor Boulevard and Haster Street	381,030	317,170 (197,120)	5,530
4 – Between Glassell Street and Tustin Street	634,888	453,480 (281,840)	7,420

Source: OCTAM 2.8 – SR-22 MIS/EIR/EIS Analysis

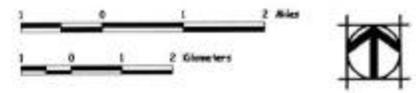
\* ADT volumes were derived from adjusted estimates and daily traffic demand provided by OCTA, December 1999



**LEGEND**

--- Study Area Limits

— Study Area Screenlines



**SR-22 / West Orange County Connection Project**  
**Screenline Locations**

Figure 3.7-1

#### D. CORRIDOR TRAVEL TIME COMPARISON

Travel time within the corridor was compared by selecting several pairs of trip origins (O) and destinations (D). These O-D pairs were selected as representative travel markets. Table 3.7-2 indicates that the selected trips extending beyond the study area are forecasted to take approximately 30 minutes and that a trip within the study area (from Westminster to Orange) is forecasted to take approximately 18 minutes

**Table 3.7-2  
SOV AND 3+ HOV TRAVEL TIMES IN MINUTES  
YEAR 2020 – NO BUILD AM PEAK PERIOD**

Origin	Destination	Mode	Travel Time (min.) <sup>1</sup>
Orange Mall	Leisure World	SOV <sup>2</sup>	31.4
Orange	Seal Beach	3+ HOV	31.4
17 <sup>th</sup> St. at Bristol St.	Belmont Shore Dr.	SOV	30.9
Santa Ana	Long Beach	3+ HOV	30.9
I-405 at Bellflower St.	Chapman Ave.	SOV	29.9
Long Beach	Orange	3+ HOV	28.8
Belmont Shore Dr.	Civic Center	SOV	33.4
Long Beach	Santa Ana	3+ HOV	33.4
I-405 at SR-22	Children's Hospital Orange County	SOV	18.2
Westminster	Orange	3+ HOV	18.2

Source: OCTAM 2.8 – SR-22 MIS/EIR/EIS Analysis

<sup>1</sup> Rounded to nearest 0.1 minute

<sup>2</sup> SOV – single-occupant vehicle, including those with two occupants

#### 3.7.2 FREEWAY MAINLINE CONDITIONS

##### A. FREEWAY AVERAGE DAILY TRIPS

As shown in Table 3.7-3 (Year 1996 and Year 2020 Traffic Demands [No Build]), SR-22 base year (1996) average daily traffic (ADT) volumes range between 135,000 to 206,000 vehicles (California Dept. of Transportation, 1997). Two-way peak-hour volumes range from 10,500 to 15,000 vehicles. Existing ADT on other freeway facilities would include 327,000 vehicles on I-405, 166,000 vehicles on I-605, and 245,000 vehicles on SR-55 (OCTA, 1999). Year 2020 forecast traffic volumes are estimated to range between 158,100 and 222,600 vehicles per day. Peak-hour traffic would increase between 11,390 and 17,160 vehicles

##### B. FREEWAY V/C RATIOS AND LOS

The level of service (LOS) can be used as an indicator of freeway throughput and mobility. For this study, the volume-to-capacity (V/C) ratio criterion shown in Table 3.7-4, Freeway Mainline LOS Criteria, was used to assign the mainline traffic LOS. Table 3.7-6 shows the base-year peak-hour traffic volumes and associated LOS conditions on SR-22, I-405, I-605 and SR-55 for 1996 and baseline 2020 peak-hour conditions.

**Table 3.7-3  
YEAR 1996 AND YEAR 2020 TRAFFIC DEMANDS (NO BUILD)**

Freeway Section	Year 1996			Year 2020			Percent Change	
	ADT	Peak Hour	# of Lanes	ADT*	Peak	# of Lanes	ADT*	Peak Hour
<b>SR-22</b>								
Tustin St. – Glassell St.	146,000	10,900	3	173,600	11,390	3	18.9%	4.5%
Main St. – I-5/SR-57 IC	159,000	11,800	3	190,500	12,880	3	19.8%	9.2%
I-5/SR-57 IC – The City Dr.	206,000	15,000	3	222,600	17,160	3	8.1%	14.4%
Harbor Blvd. – Euclid St.	183,000	13,600	3	204,800	15,980	3	11.9%	17.5%
Beach Blvd. – Knott St.	135,000	10,500	3	158,000	12,490	3	11.7%	19.0%
<b>I-405</b>								
I-605 – Seal Beach Blvd.	327,000	26,000	6	332,700	28,620	6	1.7%	10.1%
<b>SR-55</b>								
SR-22 – Chapman Ave.	245,000	15,400	5	304,700	20,300	5	24.4%	31.8%

Source: California Dept. of Transportation, 1997; OCTAM 2.8 – SR-22 MIS/EIS Analysis

IC = Interchange

\* ADT forecasts were derived from adjusted estimates of daily traffic demand in the SR-22 corridor provided by OCTA, December 1999.

Under the No Build Scenario, the peak-hour SR-22 eastbound forecast traffic demand approaches 4,600 vehicles near SR-55, 8,000 vehicles between The City Drive and Euclid Street, and 6,700 vehicles between Beach Boulevard and Valley View Street. The westbound forecast traffic demand would range between 4,000 and 8,500 vehicles, with traffic peaking near the I-5/SR-57 interchange. The forecast traffic demands would exceed the mainline capacity (three lanes in each direction) at several locations along SR-22 in both directions.

As shown in Table 3.7-5, 15 of the 30 sections studied on SR-22, would operate at LOS F conditions. Six would experience an LOS improvement compared to the 1996 condition. The forecast growth in the corridor and in trips through the corridor account for the 15 sections operating at LOS F. The elements of the No Build Alternative that were not in place in 1996 (such as *Master Plan of Arterial Highways* transportation improvements) account for the reduction of demand and corresponding improvement in LOS at several locations.

**Table 3.7-4  
FREEWAY MAINLINE LOS CRITERIA**

LOS	Maximum V/C Ratio	Speed
A	0.283	105 km/h (65 mph)
B	0.452	105 km/h (65 mph)
C	0.673	104 km/h (64.5 mph)
D	0.849	98 km/h (65 mph)
E	1.000	85 km/h (53 mph)
F	*	less than 85 km/h (53 mph)

Source: Transportation Research Board, 1997

\* Demand flows exceed capacity limits

### 3.7.3 HOV Conditions

Freeway-to-freeway HOV connectors can be evaluated based on the throughput level of service. The need for HOV connectors can be also determined from the congestion level on the existing general-purpose connectors that handle the movements that would be augmented by HOV freeway-to-freeway direct connectors.

The currently accepted HOV lane capacity range is from 800 vehicles per hour per lane [vphpl] to 1,500 vphpl. Capacity of the I-405/I-605 connectors and the SR-22/I-405 connectors is assumed to be 1,500 vphpl because of their higher-speed design. Capacity of the I-5/SR-22 and SR-22/SR-55 connectors is assumed to be less (1,200 vphpl) because of their geometry. Table 3.7-6 (Freeway Connector V/C Ratio and Level of Service, Year 2020 AM and PM Peak Hour [No build]) illustrates the vehicles and the LOS on the eight general-purpose connectors.

The baseline 2020 No Build scenario contains no HOV connectors in the study area, nor is there an HOV lane on SR-22 that would indicate the volumes anticipated to benefit from such connectors.

### 3.7.4 Arterial Conditions

The following arterials provide the baseline for analysis of a new arterial in Section 4.7: Newhope Street, Harbor Boulevard, Fairview Street, Westminster Boulevard, Fifth Street and First Street. The County of Orange arterial LOS criteria as shown in Table 3.7-7, Arterial LOS Criteria, were compared to the baseline conditions on the arterials.

The adjacent arterial system within the SR-22 corridor is burdened by heavy travel activity, and lacks sufficient mobility measures such as adequate capacity on arterials and intersections, HOV lanes and express transit services, continuity in arterial roadways, and TSM-related strategies. The 2020 No Build volumes on the parallel arterials in Table 3.7-8 (Arterial and Freeway Connector Level of Service, Year 2020 [No Build]) illustrate the congestion level that currently serves arterial traffic from the area around the SR-22/Euclid Street interchange (near the proposed Pacific Electric Arterial's northwest terminus) to central Santa Ana (near the proposed arterial's southeastern terminus). The table also includes the eastbound SR-22 to southbound I-5 connector and the northbound I-5 to westbound SR-22 connector that would carry some traffic from the Euclid Street area to central Santa Ana on the freeways.

**Table 3.7-5  
FREEWAY V/C RATIO AND LEVEL OF SERVICE  
YEAR 1996 and YEAR 2020 PEAK HOUR**

Study Freeway	Study Segment Between	Year 1996				Year 2020 No Build			
		General-Purpose		2+ HOV		General-Purpose		3+ HOV	
		V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
Eastbound SR-22	SR-22/I-405 – Valley View Blvd.	NA	NA	--	--	0.94	E	--	--
	Valley View Blvd. – Knott St.	NA	NA	--	--	0.97	E	--	--
	Knott St. – Beach Blvd.	0.68	D	--	--	0.98	E	--	--
	Beach Blvd. – Magnolia St.	0.87	E	--	--	1.05	F	--	--
	Magnolia St. – Brookhurst St.	0.87	E	--	--	1.09	F	--	--
	Brookhurst. – Euclid St.	0.88	E	--	--	1.12	F	--	--
	Euclid St. – Harbor Blvd.	0.89	E	--	--	1.15	F	--	--
	Harbor Blvd. – Haster St.	0.88	E	--	--	1.14	F	--	--
	Haster St. – The City Dr.	0.91	E	--	--	1.20	F	--	--
	The City Dr. – Bristol St.	NA	NA	--	--	1.26	F	--	--
	Bristol St. – I-5/SR-57 Interchange	NA	NA	--	--	1.03	F	--	--
	I-5/SR-57 Interchange – Main St.	NA	NA	--	--	1.02	F	--	--
	Main St. – Glassell St.	NA	NA	--	--	1.01	F	--	--
	Glassell St. – Tustin St.	0.87	E	--	--	0.92	E	--	--
Tustin St. – SR-55	0.71	D	--	--	0.67	C	--	--	
Westbound SR-22	SR-55 – Tustin St.	0.58	C	--	--	0.55	C	--	--
	Tustin St. – Glassell St.	0.71	D	--	--	0.73	D	--	--
	Glassell St. – Main St.	NA	NA	--	--	0.77	D	--	--
	Main St. – I-5/SR-57 Interchange	NA	NA	--	--	0.84	D	--	--
	I-5/SR-57 Interchange – Bristol St.	NA	NA	--	--	0.82	D	--	--
	Bristol St. – The City Dr.	NA	NA	--	--	1.23	F	--	--
	The City Dr. – Haster St.	1.11	F	--	--	0.88	E	--	--
	Haster St. – Harbor Blvd.	NA	NA	--	--	1.18	F	--	--
	Harbor Blvd. – Euclid St.	NA	NA	--	--	1.16	F	--	--
	Euclid St. – Brookhurst St.	NA	NA	--	--	1.10	F	--	--
	Brookhurst St. – Magnolia St.	1.07	F	--	--	1.03	F	--	--
	Magnolia St. – Beach Blvd.	1.07	F	--	--	0.94	E	--	--
	Beach Blvd. – Knott St.	0.84	D	--	--	0.83	D	--	--
	Knott St. – Valley View St.	NA	NA	--	--	0.73	D	--	--
	Valley View St. – SR-22/I-405	NA	NA	--	--	0.75	D	--	--
	Northbound I-405	SR-22/I-405 – Seal Beach Blvd.	0.85	E	NA	NA	0.86	E	0.47
Seal Beach Blvd. – I-605		0.79	D	NA	NA	0.84	D	0.63	C
SR-55	SR-22 – Chapman Ave.	NA	NA	NA	NA	0.79	D	1.12	F
I-605	I-405 – Katella Ave	NA	NA	--	--	0.63	C	--	--
Southbound I-405	I-605 – Seal Beach Blvd.	0.79	D	NA	NA	1.08	F	0.95	E
	Seal Beach Blvd. – SR-22/I-405	NA	NA	NA	NA	1.06	F	0.71	D
SR-55	Chapman Ave – SR-22	NA	NA	NA	NA	0.68	D	1.13	F
I-605	Katella Ave – I-405	0.78	D	--	--	0.70	D	--	--

Source: OCTAM 2.8 – SR-22 MIS/EIR/EIS Analysis

NA = Not available; -- = No HOV lane

Capacity of the freeway mainline is assumed to be 2,300 vphpl per the California Dept. of Transportation, *Highway Capacity Manual*.

Capacity of the HOV lane is assumed to be 1,500 vphpl.

**Table 3.7-6  
FREEWAY CONNECTOR V/C RATIO AND LEVEL OF SERVICE  
YEAR 2020 AM AND PM PEAK HOUR (NO BUILD)**

Connector	# of Lanes	AM			PM		
		Volume	V/C	LOS	Volume	V/C	LOS
Southbound I-605 to Southbound I-405	2	2,320	0.50	C	2,600	0.57	C
Northbound I-405 to Northbound I-605	2	3,470	0.75	D	3,010	0.65	C
Southbound I-405 to Eastbound SR-22	3	4,190	0.61	C	6,510	0.94	E
Westbound SR-22 to Northbound I-405	3	6,540	0.95	E	5,160	0.75	D
Eastbound SR-22 to Southbound I-5	2	2,060	0.52	C	2,140	0.54	C
Northbound I-5 to Westbound SR-22	1	2,390	1.20	F	2,020	1.01	F
Eastbound SR-22 to Northbound SR-55	2	2,070	0.52	C	2,770	0.69	D
Southbound SR-55 to Westbound SR-22	2	2,120	0.53	C	1,880	0.47	C

Source: OCTAM 2.8 – SR-22 MIS/EIR/EIS Analysis

**Table 3.7-7  
ARTERIAL LOS CRITERIA**

Type of Arterial	Level of Service					
	A	B	C	D	E	F
8 Lanes Divided	45,000	52,500	60,000	67,500	75,000	-
6 Lanes Divided	33,900	39,400	45,000	50,600	56,300	-
4 Lanes Divided	22,500	26,300	30,000	33,800	37,500	-
4 Lanes Undivided	15,000	17,500	20,000	22,500	25,000	-
2 Lanes Undivided	7,500	8,800	10,000	11,300	12,500	-

Source: OCTA, 1995

**Table 3.7-8  
ARTERIAL AND FREEWAY CONNECTOR LEVEL OF SERVICE  
YEAR 2020 (NO BUILD)**

Arterial		Type	ADT Volume*		LOS			
Newhope Street at Westminster Boulevard		4 lanes divided	29,100		C			
Harbor Boulevard at Westminster Boulevard		8 lanes divided	60,000		C			
Fairview Street at Westminster Boulevard		4 lanes divided	45,800		F			
Westminster Boulevard/17 <sup>th</sup> Street at Fairview Avenue		6 lanes divided	38,700		B			
Fifth Street at Fairview Avenue		2 lanes undivided	12,000		E			
First Street at Fairview Avenue		6 lanes divided	44,100		C			
Connector		# of Lanes	AM			PM		
			Volume	V/C	LOS	Volume	V/C	LOS
Eastbound SR-22 to Southbound I-5		2	2,060	0.52	C	2,140	0.54	C
Northbound I-5 to Westbound SR-22		1	2,390	1.20	F	2,020	1.01	F

Source: OCTAM 2.8 – SR-22 MIS/EIR/EIS Analysis

\* ADT forecasts were derived from adjusted estimates of daily traffic demand provided by OCTA, December 1999

One of the arterials shown in Table 3.7-8 is forecast to experience congestion (LOS F) in 2020. Also, the demand on the connector from northbound I-5 to westbound SR-22 is forecast to exceed the capacity in the morning and evening peak periods. The data indicate that some transportation enhancement could improve flow on this arterial and these connectors.

The capacity of the I-405/I-605 and SR-22/I-405 connectors is assumed to be the same as the freeway mainline (2,300 vphpl) because of their higher-speed design. The I-5/SR-22 and SR-22/SR-55 connectors capacity is assumed to be less (2,000 vphpl) because of their geometry.

### 3.7.5 INTERSECTION CONDITIONS

The Intersection Capacity Utilization (ICU) methodology uses the peak-hour turning movements in association with the intersection lane geometry to calculate the intersection V/C ratio. As shown in Table 3.7-9, the V/C ratio measures how well an intersection operates by comparing the volume of cars within the intersection with the estimated intersection vehicle processing capacity. Table 3.7-9 shows the intersection LOS classification based on V/C ratios.

**Table 3.7-9  
INTERSECTION LOS CRITERIA**

<b>LOS</b>	<b>V/C Ratio</b>
A	0.01 - 0.60
B	0.61 - 0.70
C	0.71 - 0.80
D	0.81 - 0.90
E	0.91 - 1.00
F	> 1.00

Source: OCTA, 1996

Table 3.7-10 summarizes ICU ratios and LOS for the baseline 2020 No Build scenario. Of the 37 intersections studied, 17 of them (approximately 46 percent) are projected to operate below LOS E thresholds (LOS F conditions) in the evening peak period.

**Table 3.7-10  
INTERSECTION ICU RATIO AND LEVEL OF SERVICE  
YEAR 2020 PEAK HOUR (NO BUILD)**

Study Intersection	No Build			
	ICU		LOS	
	AM	PM	AM	PM
I-605/Katella Ave. Northbound On-/Off-Ramps	1.25	1.34	F	F
I-605/Katella Ave. Southbound On-/Off-Ramps	0.86	1.11	D	F
I-405/Seal Beach Northbound On-/Off-Ramps	0.60	0.68	A	B
I-405/Seal Beach Southbound On-/Off-Ramps	0.75	0.75	C	C
SR-22/Valley View St. Westbound On-/Off-Ramps	0.96	1.10	E	F
SR-22/Valley View St./Garden Grove Blvd. Eastbound On-/Off-Ramps	0.75	0.83	C	D
SR-22/Knott St. Westbound On-Ramp	0.73	0.95	C	E
SR-22/Goldenwest St. Eastbound Off-Ramp	0.64	0.82	B	D
SR-22/Goldenwest St. Westbound Off-Ramp	0.96	0.89	E	D
SR-22/Beach Blvd. Westbound On-/Off-Ramps	0.53	0.65	A	B
SR-22/Beach Blvd. Eastbound On-/Off-Ramps	0.57	0.61	A	B
SR-22/Magnolia St. Eastbound On-/Off-Ramps	0.97	1.03	E	F
SR-22/Magnolia St. Westbound Off-Ramp	0.59	0.81	A	D
SR-22/Brookhurst St. Westbound On-/Off-Ramps	0.82	0.91	D	E
SR-22/Brookhurst St. Eastbound On-/Off-Ramps	0.77	0.93	C	E
SR-22/Euclid St. Eastbound On-/Off-Ramps	0.68	0.98	B	E
SR-22/Euclid St. Westbound On-/Off-Ramps	1.11	1.17	F	F
SR-22/Harbor Blvd. Westbound Off-Ramp	0.75	0.89	C	D
SR-22/Harbor Blvd. Eastbound On-Ramp	0.52	0.65	A	B
SR-22/Haster St. Westbound Off-Ramp	0.82	0.94	D	E
SR-22/Haster St. Westbound On-Ramp	0.84	1.28	D	F
SR-22/Fairview St. Eastbound On-Ramp	1.32	1.21	F	F
SR-22/Fairview St. Eastbound Off-Ramp	0.81	0.71	D	C
SR-22/The City-Metropolitan Dr. Westbound On-/Off-Ramps	1.04	1.16	F	F
SR-22/The City Dr. Eastbound On-/Off-Ramps	1.05	0.92	F	E
SR-22/Bristol St. Eastbound On-/Off-Ramps	1.29	1.39	F	F
SR-22/Bristol St./La Veta Ave. Westbound On-/Off-Ramps	0.75	0.88	C	D
SR-22/Main St. Westbound On-/Off-Ramps	0.78	1.14	C	F
SR-22/Main St. Eastbound On-/Off-Ramps*	---	---	F	F
SR-22/Glassell St. Westbound On-/Off-Ramps	1.07	1.29	F	F
SR-22/Glassell St. Eastbound On-/Off-Ramps	0.80	1.07	C	F
SR-22/Tustin St. Westbound On-Ramp	1.12	0.78	F	C
SR-22/Tustin St. Eastbound Off-Ramp	0.84	1.39	D	F
SR-55/Chapman Ave. Southbound On-/Off-Ramps	0.68	0.65	B	B
SR-55/Chapman Ave. Northbound On-/Off-Ramps	0.50	0.65	A	B
Fairview St./Civic Center Dr.	0.90	1.04	D	F
Raitt St./Santa Ana Blvd.	0.59	0.65	A	B

Source: OCTAM 2.8 – SR-22 MIS/EIR/EIS Analysis

\*The intersection is not signalized. The LOS was obtained using the HCM method.

### 3.7.6 PEARCE STREET PEDESTRIAN OVERCROSSING

Refined engineering plans and the availability of more detailed design level surveys have identified that the Pearce Pedestrian overcrossing is in need of replacement since it would conflict with the proposed widening of the SR-22/WOCC project. The original Preliminary Engineering plans for the SR-22/WOCC pedestrian overcrossing assumed it would be replacement in kind. The Pearce Street pedestrian overcrossing is located between the Fairview Street and Harbor Boulevard exits on SR-22, just east of Harbor Boulevard. The Pearce Street pedestrian overcrossing is an existing pedestrian overcrossing that is not compliant with the Americans with Disabilities Act (ADA). The replacement of the pedestrian overcrossing would have to comply ADA standards. ADA requires a minimum of 8.3% grade, and an eight-foot width for the walkway of the pedestrian overcrossing. The existing Pearce Street pedestrian overcrossing is approximately at a 15% grade and it is approximately eight feet wide. The August 2001 DEIR/EIS assumed the Pearce Street pedestrian overcrossing would be replaced in-kind at the same location as the existing facility. The replacement Pearce Street pedestrian overcrossing proposed in this FEIS/EIR is ADA compliant, and would be approximately 110 meters east of the existing overcrossing. Please refer to Figure 2.2b for a schematic of the replacement proposal.