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Stantec

August 3, 2009
File: 192510252

Mr. Frank Scarantino, PE, PP
Ocean County Engineer
129 Hooper Avenue
PO Box 2191
Toms River, NJ 08754-2191

**Reference: REVISED LETTER REPORT
On-Call Traffic Engineering Services
Ocean County Contract No. PP2008-144
Operational Review of Cross-Section Reduction
Long Beach Boulevard, Harvey Cedars Borough**

Dear Mr. Scarantino:

Stantec has completed a traffic engineering review of the proposed change in cross-section for Long Beach Boulevard in Harvey Cedars Borough. The proposed cross-section would reduce the existing four-lane roadway to a three-lane roadway, with one travel lane in each direction and a two-way left-turn lane (TWLTL) that would transition to dedicated left-turn lanes at intersections. This type of roadway conversion is typically known as a "road diet". In general, road diets tend to reduce vehicular speeds and improve safety for pedestrians (less travel lanes to cross) and bicycles (wider shoulders). This revised letter report reinvestigates the potential operational impacts of the proposed cross-section.

Traffic Volume Revision

In the previous report performed in April 2009, weekday turning movement counts performed during the Summer of 2008 were increased by 30% as a means of representing the traffic experienced during summer weekend peak hours. In order to determine if the design traffic volumes presented in the previous report accurately represented worst-case summer peak hour conditions, 24-hour Automatic Traffic Recorders (ATRs) were placed at the following locations on Long Beach Boulevard for five days from Thursday, July 9 to Tuesday, July 14, 2009:

ATR Locations on Long Beach Boulevard

1. North of 83rd Street – Southbound Direction Only (Entering Harvey Cedars)
2. North of 80th Street – Northbound and Southbound Directions
3. North of 77th Street – Northbound and Southbound Directions
4. South of Buckingham Avenue / 68th Street – Northbound and Southbound Directions
5. South of Cumberland Avenue – Northbound and Southbound Directions

Even though the exact peak hour period was not the same for all counts performed, the highest peak hour volume for each directional ATR count was utilized, to be conservative. For all ATR counts, the peak hour occurred during the midday count period (10:00 AM to 2:00 PM). In **EXHIBIT 1**, these directional ATR peak hour volumes are compared to the hourly approach volumes, which were used in the previous report. Except for the Southbound peak hour volume counted south of Cumberland Avenue, all ATR volumes are lower than design volumes created in the previous report. The surplus of 24 vehicles for the Southbound ATR volume

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south of Cumberland Avenue has been added to the Southbound through movement at the intersection of Long Beach Boulevard and Cumberland Avenue, as highlighted on the 2009 Design Traffic Volume diagram in **EXHIBIT 2**. The hourly volume for this movement has increased from 749 vehicles to 773 vehicles.

Traffic Impact Analysis

Synchro/SimTraffic (version 7) analyses and simulations, using the summer weekday peak hour volumes in **EXHIBIT 2**, were rerun for both the Existing and Proposed Conditions. The Synchro network included all intersections Ocean County provided data for, as well as the signal timings for the three signalized study intersections: 80th Street, Camden Avenue, and Salem Avenue. Pedestrian volumes were included in the model to account for the impact of vehicles yielding to pedestrians at intersections. Synchro/SimTraffic analyses and simulation outputs are attached in **APPENDIX A**.

A comparison of the capacity analysis results for the Existing and Proposed Conditions are shown in **EXHIBIT 3**. Despite the addition of 24 vehicles to the Southbound through movement at the intersection of Long Beach Boulevard and Cumberland Avenue, Levels of Service (LOS) presented in this report are the same LOS presented in the previous report. From the LOS table, it is clear that the proposed cross-section reduction would continue to maintain a LOS B or better for the Northbound and Southbound Long Beach Boulevard movements. In fact, many of the side-street LOS would improve due to the cross-section reduction, as there would be fewer lanes to cross when making a left turn from the side-street. This is most evident at the unsignalized intersections of 83rd Street, 77th Street, and Burlington Avenue, which are the only intersections that experience a LOS E or LOS F for a side-street approach in the Existing Condition. All of these LOS E or LOS F approaches would improve to LOS D or better in the Proposed Condition.

SimTraffic simulation models of the Existing and Proposed Conditions were used to determine cumulative travel time along Northbound and Southbound Long Beach Boulevard. A comparison of the average travel times, based on ten simulation runs, for the Existing and Proposed Conditions are shown in **EXHIBITS 4-6**. The proposed cross-section reduction would result in an increase in overall travel time of 22.3 seconds (9%) along Northbound Long Beach Boulevard and 28 seconds (11%) along Southbound Long Beach Boulevard.

Conclusion

For this revised report, LOS remains the same as the previous April report for both Existing and Proposed Conditions. In addition, the amount of increase in overall Southbound travel time on Long Beach Boulevard has gone up by only one second. From the SimTraffic simulation, it is shown that the construction of the TWLTL will result in an increase of 22.3 and 28 seconds for Northbound and Southbound travel time, respectively, through the Borough of Harvey Cedars. Therefore, our conclusion remains the same from the previous April report.

Overall, the results of the analysis show that the proposed change in cross-section would not detrimentally impact traffic operations along the Long Beach Boulevard corridor, and, in fact, would improve operations for several locations. LOS would slightly deteriorate for the traffic movements on Long Beach Boulevard. However, all side-street approaches would improve to LOS D or better. The implementation of the center turn lane will require the installation of new steel poles and mast arms at all three signalized intersections, at significant expense. Signal heads must be placed over the center left-turn only lanes in compliance with the requirements of the MUTCD. Although not required, it is recommended that pedestrian indications also be added at all three signalized intersections, thus initiating pedestrian clearance timing only when activated and not during every cycle.

It is not likely that removal of the existing pavement markings can be accomplished without some residual material remaining or damage to the existing pavement. Milling and/or resurfacing is recommended.

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Additionally, Ocean County has reviewed the pavement condition, and this eleven year old overlay has been programmed for resurfacing in 2013.

Please feel free to contact us if you have any questions or require any additional information.

Sincerely,
Louis Luglio, P.E.



Senior Principal
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Attachments: **EXHIBITS 1-6**

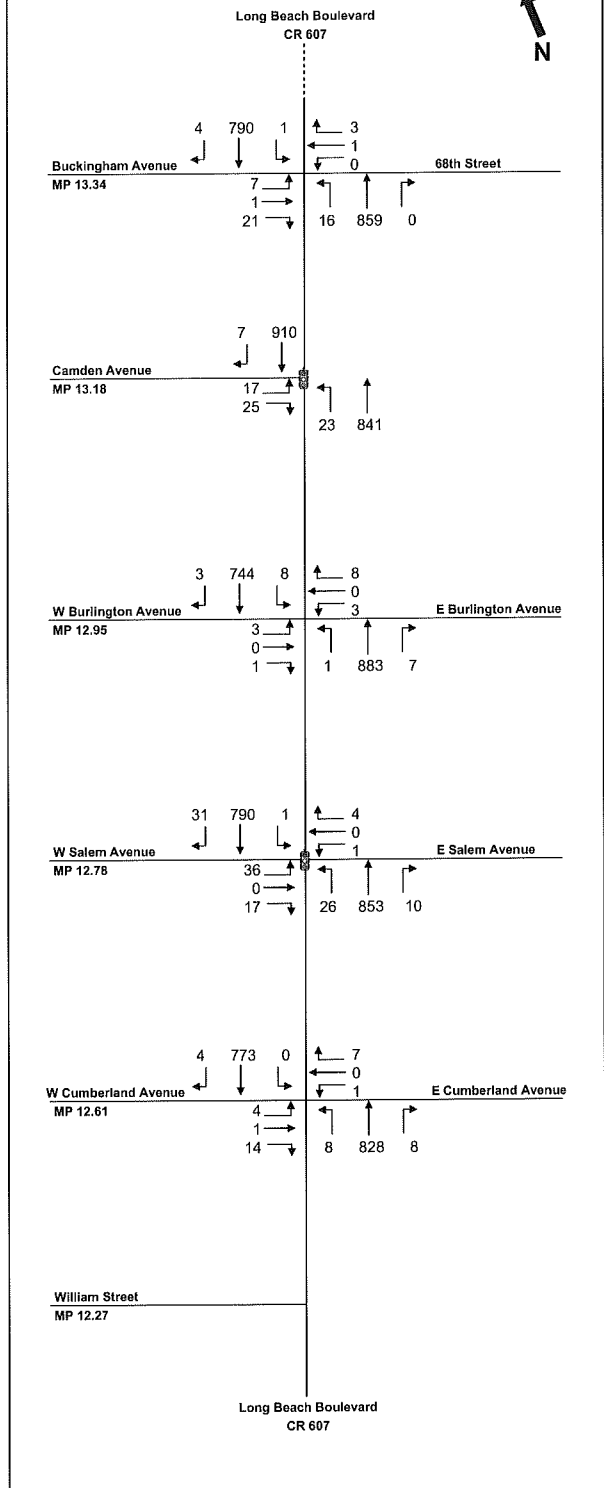
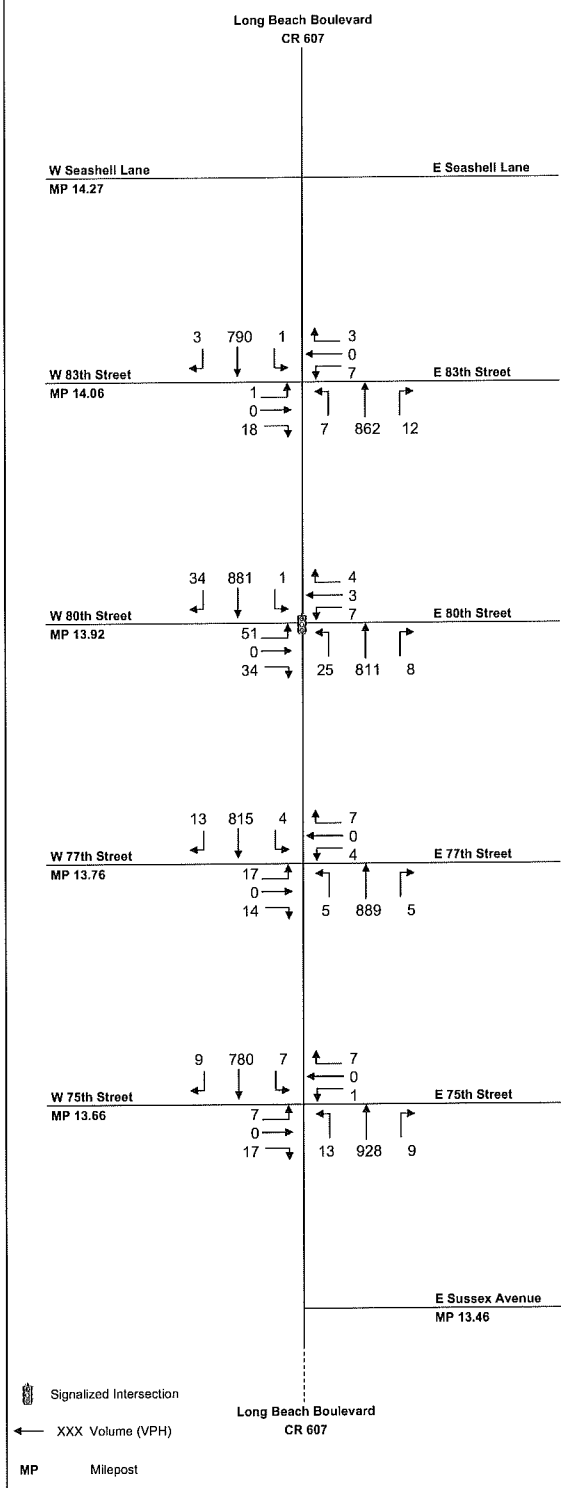
cc: Ron Lotrecchio, Stantec

EXHIBIT 1
ATR VOLUME VS. DESIGN VOLUME FROM PREVIOUS REPORT
SUMMER WEEKEND PEAK HOUR

ATR locations	Direction	ATR Volume for Highest Peak Hour Counted	Approach Volumes from April 2009 Report	Surplus (+) / Shortfall (-)
North of 83rd Street	SB	700	794	-94
North of 80th Street	NB	687	866	-179
	SB	706	917	-211
North of 77th Street	NB	702	913	-211
	SB	762	832	-70
South of Buckingham Avenue / 68th Street	NB	714	875	-161
	SB	772	811	-39
South of Cumberland Avenue	NB	761	844	-83
	SB	788	764	+ 24

Northern Corridor

Southern Corridor



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**LONG BEACH BLVD RESTRIPIG
 TRAFFIC IMPACT STUDY
 HARVEY CEDARS, NJ**

**EXHIBIT 2
 2009 Design Traffic Volumes
 Summer Weekend Peak Hour**

EXHIBIT 3
EXISTING CONDITION VS. PROPOSED CONDITION
SUMMER WEEKEND PEAK HOUR
CAPACITY ANALYSIS RESULTS

Intersection with Long Beach Boulevard (CR 607)	Existing Condition (4-Lane)				Proposed Condition (3-Lane)			
	LANE GROUP	V/C Ratio	Delay	Level of Service	LANE GROUP	V/C Ratio	Delay	Level of Service
83rd Street <i>Unsignalized</i>	EB-LTR	0.07	16.1	C	EB-LTR	0.10	20.0	C
	WB-LTR	0.14	49.5	E	WB-LTR	0.07	25.6	D
	NB-LT	0.01	0.3	A	NB-L	0.01	10.6	B
	SB-LT	0.00	0.1	A	SB-L	0.00	11.9	B
80th Street <i>Signalized</i>	EB-LTR	0.52	32.2	C	EB-LTR	0.54	33.1	C
	WB-LTR	0.08	25.1	C	WB-LTR	0.08	25.1	C
					NB-L	0.11	1.9	A
	NB-LTR	0.39	2.3	A	NB-TR	0.65	4.7	A
	SB-LTR	0.41	5.5	A	SB-L	0.00	5.0	A
	Intersection	-	5.7	A	Intersection	-	10.4	B
77th Street <i>Unsignalized</i>	EB-LTR	0.35	51.1	F	EB-LTR	0.21	27.7	D
	WB-LTR	0.11	34.1	D	WB-LTR	0.07	22.9	C
	NB-LT	0.01	0.2	A	NB-L	0.01	11.8	B
	SB-LT	0.01	0.2	A	SB-L	0.01	10.8	B
75th Street <i>Unsignalized</i>	EB-LTR	0.19	31.2	D	EB-LTR	0.13	21.6	C
	WB-LTR	0.05	21.4	C	WB-LTR	0.05	21.6	C
	NB-LT	0.02	0.6	A	NB-L	0.02	10.4	B
	SB-LT	0.01	0.4	A	SB-L	0.01	11.2	B
Buckingham Avenue / 68th Street <i>Unsignalized</i>	EB-LTR	0.21	30.3	D	EB-LTR	0.16	22.3	C
	WB-LTR	0.04	30.2	D	WB-LTR	0.03	22.8	C
	NB-LT	0.03	0.7	A	NB-L	0.03	10.4	B
	SB-LT	0.00	0.1	A	SB-L	0.00	12.2	B
Camden Avenue <i>Signalized</i>	EB-LR	0.21	19.2	B	EB-LR	0.21	19.2	B
	NB-LT	0.38	4.6	A	NB-L	0.08	5.2	A
	SB-TR	0.36	1.8	A	NB-T	0.63	9.0	A
	Intersection	-	3.6	A	SB-TR	0.69	5.4	A
Burlington Avenue <i>Unsignalized</i>	EB-LTR	0.05	39.6	E	EB-LTR	0.02	21.4	C
	WB-LTR	0.07	24.2	C	WB-LTR	0.07	22.3	C
	NB-LT	0.00	0.0	A	NB-L	0.00	10.7	B
	SB-LT	0.01	0.4	A	SB-L	0.02	12.8	B
Salem Avenue <i>Signalized</i>	EB-LTR	0.33	24.5	C	EB-LTR	0.34	24.5	C
	WB-LTR	0.03	17.2	B	WB-LTR	0.03	17.2	B
					NB-L	0.09	5.9	A
	NB-LTR	0.43	5.9	A	NB-TR	0.71	12.4	B
	SB-LTR	0.38	5.4	A	SB-L	0.00	5.0	A
	Intersection	-	6.3	A	SB-TR	0.68	11.4	B
Cumberland Avenue <i>Unsignalized</i>	EB-LTR	0.12	23.9	C	EB-LTR	0.10	20.0	C
	WB-LTR	0.04	18.1	C	WB-LTR	0.04	19.1	C
	NB-LT	0.01	0.4	A	NB-L	0.01	11.1	B
	SB-LT	0.00	0.0	A	SB-L	0.00	0.0	A

v/c ratio = volume/capacity ratio

Source: Synchro 7

**EXHIBIT 4
EXISTING CONDITION VS. PROPOSED CONDITION
SUMMER WEEKEND PEAK HOUR
LONG BEACH BOULEVARD TRAVEL TIME**

Intersection with Long Beach Boulevard NB (CR 607)	Distance (miles)	Cumulative Travel Time		
		Existing 4-Lane (sec)	Proposed 3-Lane (sec)	Difference (sec)
Borough Line (William Street)	0.00	0.0	0.0	0.0
Cumberland Avenue	0.34	36.5	38.7	2.2
Salem Avenue	0.51	57.4	63.2	5.8
Burlington Avenue	0.68	79.9	87.2	7.3
Camden Avenue	0.91	112.0	122.7	10.7
Buckingham Avenue / 68th Street	1.07	133.8	145.7	11.9
75th Street	1.39	175.2	190.0	14.8
77th Street	1.49	188.3	204.4	16.1
80th Street	1.65	212.0	232.2	20.2
83rd Street	1.79	231.7	253.3	21.6
Borough Line (Seashell Lane)	2.00	252.7	275.0	22.3
TOTAL	2.00	252.7	275.0	22.3

Intersection with Long Beach Boulevard SB (CR 607)	Distance (miles)	Cumulative Travel Time		
		Existing 4-Lane (sec)	Proposed 3-Lane (sec)	Difference (sec)
Borough Line (Seashell Lane)	0.00	0.0	0.0	0.0
83rd Street	0.21	28.8	30.8	2.0
80th Street	0.35	52.4	62.7	10.3
77th Street	0.51	72.0	84.1	12.1
75th Street	0.61	84.8	97.6	12.8
Buckingham Avenue / 68th Street	0.93	126.4	141.4	15.0
Camden Avenue	1.09	148.4	168.0	19.6
Burlington Avenue	1.32	175.5	196.6	21.1
Salem Avenue	1.49	199.6	224.6	25.0
Cumberland Avenue	1.66	218.4	244.9	26.5
Borough Line (William Street)	2.00	247.6	275.6	28.0
TOTAL	2.00	247.6	275.6	28.0

Source: SimTraffic 7 (average of 10 runs)

EXHIBIT 5 LONG BEACH BOULEVARD NB TRAVEL TIME COMPARISON

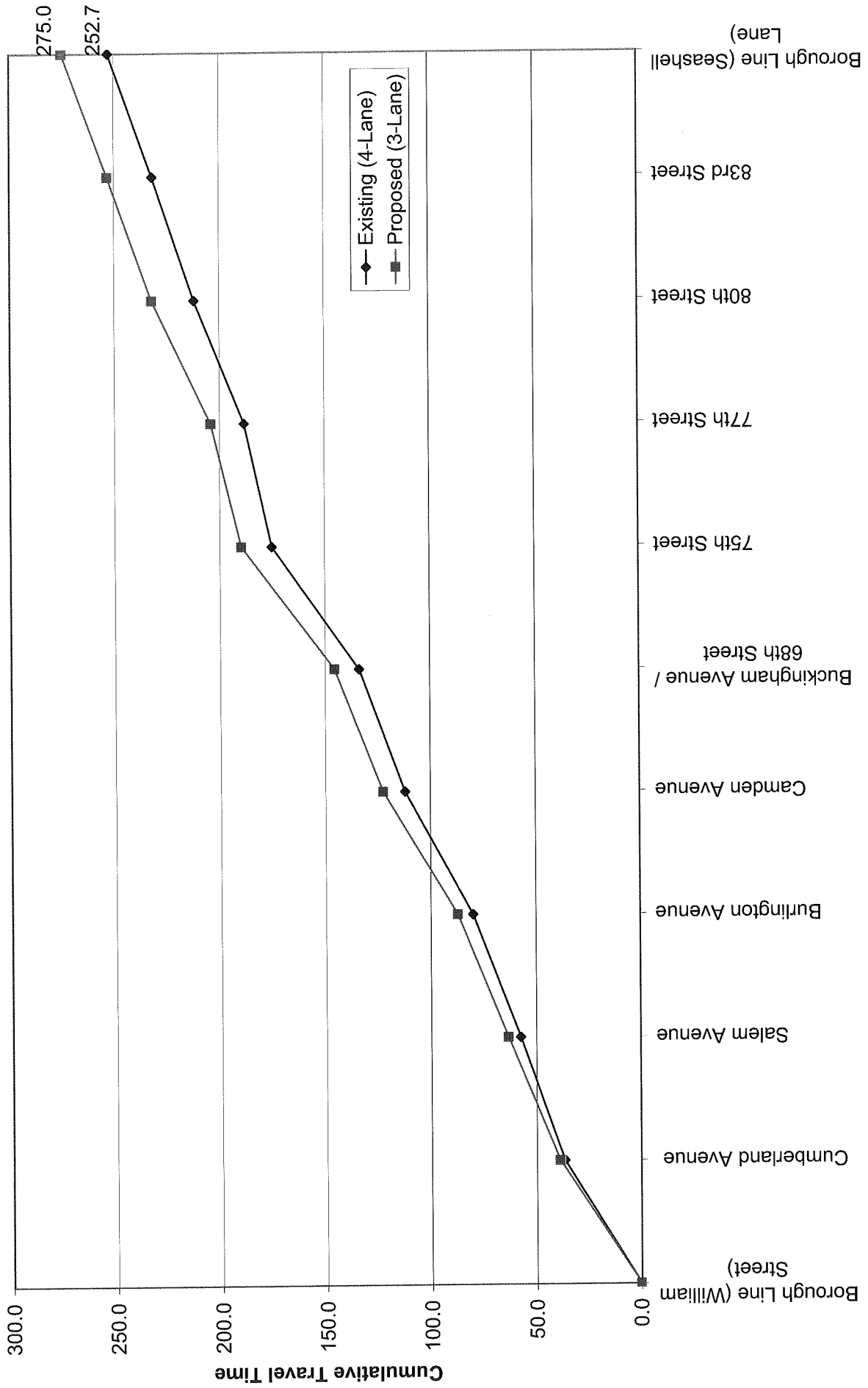


EXHIBIT 6 LONG BEACH BOULEVARD SB TRAVEL TIME COMPARISON

