

Memorandum

Date: January 29, 2026

To: Farid Javandel, City of Napa

From: Saran Chan and Ron Ramos, Fehr & Peers

Subject: Lincoln Avenue Project Morning Peak Hour

WC25-4233

As part of the Lincoln Avenue Traffic Safety and Paving Project (Project) the City of Napa is proposing traffic safety improvements along Lincoln Avenue between California Boulevard and the Silverado Trail (Phase 1: California Avenue to Soscol Avenue and Phase 2: Soscol Avenue to the Silverado Trail). The project includes sidewalk rehabilitation, buffered bike lanes, improved crosswalks, and lane reductions throughout the corridor. Fehr & Peers prepared before-and-after morning peak hour traffic simulation videos for the Phase 1 of the Lincoln Avenue, which includes the segments between California Boulevard and Soscol Avenue. The morning peak hour was selected as it has the highest traffic volumes. The purpose of the simulation videos is to illustrate the before-and-after traffic conditions of the corridor. Four videos were prepared that illustrate morning traffic conditions at the following locations:

- Lincoln Avenue/California Boulevard
- Lincoln Avenue/Kennedy Way
- Lincoln Avenue/Jefferson Street
- Lincoln Avenue/Soscol Avenue

Video locations were determined in coordination with City of Napa staff and include existing and proposed conditions. This technical memorandum summarizes the methodology and analysis approach to preparing the video simulation. Travel time, Level of Service (LOS), and delay calculations are also included for informational purposes.

Summary of Findings

The analysis indicates that, following implementation of the Project, corridor morning peak hour traffic operations continue to operate under capacity and the study intersections continue to operate at LOS D or better. The results are consistent with the Synchro results provided by the City of Napa staff.

Based on the analysis results and microsimulation observations, the Project does not result in queuing spilling over between intersections or gridlock conditions.

Study Area

The study area includes Lincoln Avenue from California Boulevard to Soscol Avenue. The following seven intersections are included in the analysis:

1. Lincoln Avenue/California Boulevard
2. Lincoln Avenue/Marin Street
3. Lincoln Avenue/Kennedy Way
4. Lincoln Avenue/Jefferson Street
5. Lincoln Avenue/Main Street
6. Lincoln Avenue/Yajome Street
7. Lincoln Avenue/Soscol Avenue

Data Collection

City of Napa Staff provided morning peak hour traffic counts for all the study intersections with the exceptions of Lincoln Avenue/Yajome Street intersection. For this intersection, Fehr & Peers estimated traffic volumes using StreetLight Data. In addition, City of Napa staff provided Synchro models, including signal timing data, for all signalized intersections within the study area.

Field Work

Fehr & Peers conducted field observations under typical weather conditions while school was in session December 10, 2026. Lane striping along the corridor was confirmed, and signal timings observed in the field were consistent with the timings provided by City of Napa staff.

Overall, the Lincoln Avenue corridor was observed to be operating under capacity, with queues generally clearing within each signal cycle.

Traffic Conditions

Based on existing lane configurations, peak hour traffic volumes, and observed pedestrian and bicycle activity, traffic operations along Lincoln Avenue were evaluated using the SimTraffic 12.0 microsimulation model.

Lincoln Avenue Travel Times

Morning peak hour travel times along Lincoln Avenue, between California Boulevard and Soscol Avenue in both directions, are summarized in **Table 1**. Detailed travel time worksheets can be found in **Attachment A**.

Table 1: Morning Peak Hour Travel Times

From	To	Existing Time (min)	Project Time (min)	Difference Time (min)
California Boulevard	Soscol Avenue	3.4	3.9	0.5
Soscol Avenue	California Boulevard	3.3	3.7	0.4

Source: Fehr & Peers, 2025

As shown in **Table 1**, implementation of the Lincoln Avenue Project results in an increase in travel times of approximately 30 seconds or less in both directions. Consistent with microsimulation observations, the project does not result in queuing spilling over between intersections or gridlock conditions, and the corridor continues to operate under capacity.

Intersection Level of Service

Average intersection delay and LOS¹ results for the morning peak hour are summarized in **Table 2**. Detailed LOS worksheets can be found in **Attachment A**.

Table 2: Morning Peak Hour Intersection LOS Summary

Intersection	Control ¹	Existing		Project	
		Delay ^{2,3}	LOS	Delay ^{2,3}	LOS
1. Lincoln Avenue/California Boulevard	Signal	33	C	37	D
2. Lincoln Avenue/Marin Street	SSSC	5 (19)	A (C)	5 (46)	A (E)
3. Lincoln Avenue/Kennedy Way	SSSC	4 (12)	A (B)	8 (41)	A (E)
4. Lincoln Avenue/Jefferson Street	Signal	37	D	37	D
5. Lincoln Avenue/Main Street	Signal	19	B	21	C
6. Lincoln Avenue/Yajome Street	SSSC	4 (20)	A (C)	4 (17)	A (C)
7. Lincoln Avenue/Soscol Avenue	Signal	37	D	38	D

Notes: **Bold** text indicates potentially unacceptable intersection operations.

1. SSSC = side-street stop-control
2. Average intersection delay is calculated using SimTraffic simulations, and LOS thresholds are determined based on the HCM 7th Edition.
3. Results are presented as Intersection Delay (Worst Movement Delay).

Source: Fehr & Peers, 2025

As shown in **Table 2**, all study intersections operate at LOS D or better under both Existing and Project conditions. While minor increases in delay are observed at some intersections under Project conditions, overall operations remain under capacity. At the Lincoln Avenue/ Marin Street and Lincoln Avenue/ Kennedy Way intersections, the worst-movement delay increases to LOS E, which is considered at-capacity operation. If delays increase further and approach LOS F in the future, additional analysis may be warranted to identify potential treatments to address the congestion.

Conclusion

Based on the results of this analysis, the Lincoln Avenue Project is expected to operate similar to existing conditions during the morning peak hour as the corridor and study intersections continue to operate under capacity.

If you have any questions regarding this analysis, please contact Ron Ramos at 925-357-3403.

¹ Intersection Levels of Service are defined based on control delay at an intersection. As defined by the FHWA, control delay is the portion of delay that is attributable to the control device (the signal, its assignment of right-of-way, and the timing used to transition right-of-way in a safe manner) plus the time decelerating to a queue, waiting in queue, and accelerating from a queue.

Attachment A:

Traffic Operations

Worksheets

SimTraffic Report - Lincoln Avenue Project

Arterial Level of Service: EB Lincoln Avenue (Existing Conditions)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
California Boulevard (Approach into the study area)	1	24.4	50.4	0.2	16
Marin Street	2	5.1	19.2	0.1	21
Georgia Street	3	3.7	21.9	0.2	25
Jefferson Street	4	33.5	45.5	0.1	8
Main Street	5	8.9	25.5	0.1	19
Yajome Street	6	3.0	17.0	0.1	26
	10	4.5	16.4	0.1	20
Soscol Avenue	7	32.6	60.4	0.2	14
Total		115.7	256.4	1.2	17
Total for Study Area		91.3	206.0	1.0	17

Arterial Level of Service: EB Lincoln Avenue (Project Conditions)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
California Boulevard (Approach into the study area)	1	31.7	56.9	0.2	14
	27	8.3	14.8	0.0	11
Marin Street	2	5.3	13.2	0.1	19
Georgia Street	3	8.2	29.8	0.2	21
Jefferson Street	4	31.6	44.7	0.1	9
Main Street	5	9.6	26.4	0.1	18
Yajome Street	6	3.6	17.5	0.1	25
	10	6.8	18.6	0.1	18
Soscol Avenue	7	41.0	68.8	0.2	13
Total		146.0	290.8	1.2	15
Total for Study Area		114.3	233.9	1.0	15

SimTraffic Report - Lincoln Avenue Project

Arterial Level of Service: WB Lincoln Avenue (Existing Conditions)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Soscol Avenue (Approach into the study area)	7	40.9	56.8	0.2	10
	10	7.0	36.2	0.2	24
Yajome Street	6	1.6	12.3	0.1	27
Main Street	5	12.0	26.5	0.1	16
Jefferson Street	4	30.7	46.6	0.1	10
Kennedy Street	3	3.3	16.1	0.1	23
Marin Street	2	1.8	20.2	0.2	27
California Boulevard	1	25.6	38.7	0.1	10
Total		123.0	253.4	1.1	16
Total for Study Area		82.1	196.6	0.9	17

Arterial Level of Service: WB Lincoln Avenue (Project Conditions)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Soscol Avenue (Approach into the study area)	7	51.2	67.9	0.2	9
	10	9.7	39.0	0.2	22
Yajome Street	6	2.0	12.6	0.1	26
Main Street	5	15.9	30.1	0.1	14
Jefferson Street	4	38.2	54.1	0.1	9
Kennedy Street	3	4.2	16.8	0.1	23
Marin Street	2	3.5	21.3	0.2	26
	27	8.6	17.2	0.1	14
California Boulevard	1	26.7	31.4	0.0	5
Total		160.0	290.4	1.1	14
Total for Study Area		108.8	222.5	0.9	16

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

Lincoln Avenue Project
Existing Conditions
AM Peak Period

Intersection 1 **California Blvd/Lincoln Ave** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph)		Total Delay (sec/veh)		
			Average	Percent	Average	Std. Dev.	LOS
NB	Left Turn	144	140	97.1%	63.6	6.3	E
	Through	349	344	98.5%	36.4	2.5	D
	Right Turn	168	167	99.5%	26.9	4.3	C
	Subtotal	661	651	98.4%	39.6	3.2	D
SB	Left Turn	41	38	93.2%	57.4	9.1	E
	Through	180	174	96.6%	36.1	4.5	D
	Right Turn	215	212	98.5%	18.9	4.5	B
	Subtotal	436	424	97.2%	29.8	5.1	C
EB	Left Turn	210	210	100.0%	54.5	7.2	D
	Through	654	667	102.0%	27.4	4.3	C
	Right Turn	149	144	96.6%	6.1	0.9	A
	Subtotal	1,013	1,021	100.8%	30.1	3.0	C
WB	Left Turn	140	135	96.6%	63.4	12.0	E
	Through	502	515	102.5%	26.6	5.8	C
	Right Turn	57	59	103.3%	23.8	10.2	C
	Subtotal	699	709	101.4%	33.3	5.5	C
Total		2,809	2,804	99.8%	33.0	2.2	C

Intersection 2 **Marin St/Lincoln Ave** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph)		Total Delay (sec/veh)		
			Average	Percent	Average	Std. Dev.	LOS
NB	Left Turn	2	2	90.0%	28.9	35.3	D
	Through	9	10	113.3%	11.8	10.5	B
	Right Turn	11	12	109.1%	18.9	13.1	C
	Subtotal	36	38	105.3%	15.8	12.4	C
SB	Left Turn	7	6	87.1%	24.8	23.4	C
	Through	1	1	100.0%	30.3	44.4	D
	Right Turn	28	31	110.0%	11.3	11.1	B
	Subtotal	863	876	101.5%	6.3	1.5	A
EB	Left Turn	55	52	94.0%	11.9	2.2	B
	Through	800	816	102.0%	6.0	1.5	A
	Right Turn	8	8	102.5%	1.8	1.1	A
	Subtotal	701	707	100.9%	2.1	0.6	A
Total		1,611	1,633	101.4%	4.9	1.0	A

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

Lincoln Avenue Project
Existing Conditions
AM Peak Period

Intersection 3 **Kennedy St/Lincoln Ave** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph)		Total Delay (sec/veh)		
			Average	Percent	Average	Std. Dev.	LOS
NB	Left Turn						
	Through	2	2	100.0%	19.3	39.6	C
	Right Turn	7	7	105.7%	3.1	4.4	A
	Subtotal	9	9	104.4%	12.2	13.2	B
SB	Left Turn						
	Through						
	Right Turn	88	91	103.2%	6.0	1.8	A
	Subtotal	88	91	103.2%	6.0	1.8	A
EB	Left Turn	180	185	102.8%	11.9	3.1	B
	Through	630	640	101.6%	3.6	0.5	A
	Right Turn	6	5	88.3%	0.6	0.9	A
	Subtotal	816	831	101.8%	5.4	0.8	A
WB	Left Turn	2	2	95.0%	2.4	3.3	A
	Through	613	614	100.2%	2.7	0.4	A
	Right Turn	74	76	102.0%	2.7	0.7	A
	Subtotal	689	692	100.4%	2.7	0.4	A
Total		1,602	1,623	101.3%	4.3	0.4	A

Intersection 4 **Jefferson St/Lincoln Ave** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph)		Total Delay (sec/veh)		
			Average	Percent	Average	Std. Dev.	LOS
NB	Left Turn	106	106	99.7%	52.7	7.7	D
	Through	319	309	96.8%	35.8	6.0	D
	Right Turn	75	78	104.5%	27.9	8.3	C
	Subtotal	500	493	98.6%	38.0	4.4	D
SB	Left Turn	176	173	98.1%	53.5	4.5	D
	Through	343	352	102.5%	33.2	5.6	C
	Right Turn	153	153	99.7%	10.5	4.5	B
	Subtotal	672	677	100.7%	33.1	4.2	C
EB	Left Turn	120	126	105.0%	78.6	10.3	E
	Through	459	465	101.4%	42.3	8.1	D
	Right Turn	58	56	96.7%	37.9	12.5	D
	Subtotal	637	647	101.6%	48.8	6.4	D
WB	Left Turn	100	100	100.3%	46.6	9.5	D
	Through	430	432	100.6%	31.1	4.8	C
	Right Turn	195	202	103.3%	15.6	3.4	B
	Subtotal	725	734	101.3%	29.1	4.0	C
Total		2,534	2,551	100.7%	36.7	3.3	D

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

Lincoln Avenue Project
Existing Conditions
AM Peak Period

Intersection 5 **Main St/Lincoln Ave** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph)		Total Delay (sec/veh)		
			Average	Percent	Average	Std. Dev.	LOS
NB	Left Turn	105	104	98.7%	46.6	8.1	D
	Through	47	47	100.4%	50.9	14.0	D
	Right Turn	35	33	93.1%	13.2	5.7	B
	Subtotal	187	183	98.1%	41.5	6.4	D
SB	Left Turn	21	20	93.8%	32.9	19.1	C
	Through	78	77	99.0%	39.0	6.3	D
	Right Turn	44	46	104.8%	12.3	6.5	B
	Subtotal	143	143	100.0%	31.7	5.7	C
EB	Left Turn	30	31	104.7%	12.1	3.2	B
	Through	625	629	100.6%	9.2	2.4	A
	Right Turn	55	57	103.1%	6.0	3.8	A
	Subtotal	710	717	101.0%	9.1	2.3	A
WB	Left Turn	25	23	93.6%	22.3	19.6	C
	Through	576	585	101.6%	20.7	11.6	C
	Right Turn	21	25	116.7%	18.0	18.7	B
	Subtotal	622	633	101.8%	20.5	11.5	C
Total		1,662	1,677	100.9%	19.3	4.4	B

Intersection 6 **Yajome St/Lincoln Ave** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph)		Total Delay (sec/veh)		
			Average	Percent	Average	Std. Dev.	LOS
NB	Left Turn	44	47	107.0%	24.6	16.5	C
	Through	10	9	94.0%	19.1	14.7	C
	Right Turn	16	16	98.8%	5.2	2.9	A
	Subtotal	70	72	103.3%	20.4	12.0	C
SB	Left Turn	7	8	110.0%	14.7	12.2	B
	Through	6	6	95.0%	39.4	58.8	E
	Right Turn	33	33	99.4%	11.0	12.7	B
	Subtotal	46	46	100.4%	14.7	14.7	B
EB	Left Turn	36	36	100.0%	10.9	7.2	B
	Through	553	554	100.2%	3.2	1.6	A
	Right Turn	92	93	101.0%	1.9	0.6	A
	Subtotal	681	683	100.3%	3.4	1.7	A
WB	Left Turn	16	15	91.9%	9.5	5.9	A
	Through	545	553	101.4%	1.9	0.9	A
	Right Turn	15	16	106.0%	1.3	1.2	A
	Subtotal	576	583	101.3%	2.1	1.0	A
Total		1,373	1,385	100.8%	4.1	2.1	A

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

Lincoln Avenue Project
Existing Conditions
AM Peak Period

Intersection 7 **Soscol Ave/Lincoln Ave** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph)		Total Delay (sec/veh)		
			Average	Percent	Average	Std. Dev.	LOS
NB	Left Turn	140	141	100.4%	68.0	9.8	E
	Through	537	536	99.8%	37.3	4.1	D
	Right Turn	35	35	99.7%	25.6	10.0	C
	Subtotal	712	712	99.9%	42.5	4.3	D
SB	Left Turn	197	193	98.0%	54.5	9.5	D
	Through	464	463	99.7%	30.3	3.2	C
	Right Turn	89	90	100.6%	7.0	1.1	A
	Subtotal	750	745	99.4%	34.2	3.5	C
EB	Left Turn	120	120	99.6%	50.1	11.6	D
	Through	305	303	99.2%	30.3	3.4	C
	Right Turn	151	156	103.4%	10.1	2.0	B
	Subtotal	576	578	100.4%	29.2	3.0	C
WB	Left Turn	82	81	98.8%	56.5	6.8	E
	Through	347	350	100.7%	44.1	4.9	D
	Right Turn	195	195	100.2%	33.7	7.5	C
	Subtotal	624	626	100.3%	42.7	5.7	D
Total		2,662	2,661	100.0%	37.3	2.9	D

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

Lincoln Avenue Project
Project Conditions
AM Peak Period

Intersection 1 **California Blvd/Lincoln Ave** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph)		Total Delay (sec/veh)		
			Average	Percent	Average	Std. Dev.	LOS
NB	Left Turn	144	146	101.4%	60.7	11.5	E
	Through	349	355	101.7%	39.4	3.8	D
	Right Turn	168	168	100.1%	33.6	10.6	C
	Subtotal	661	669	101.2%	42.5	6.1	D
SB	Left Turn	41	41	98.8%	54.0	13.2	D
	Through	180	176	97.9%	37.9	6.3	D
	Right Turn	215	222	103.2%	14.4	3.4	B
	Subtotal	436	439	100.6%	28.2	4.5	C
EB	Left Turn	210	213	101.4%	53.6	8.6	D
	Through	654	652	99.6%	45.5	19.4	D
	Right Turn	149	147	98.8%	7.6	4.7	A
	Subtotal	1,013	1,012	99.9%	41.6	14.2	D
WB	Left Turn	140	133	95.1%	42.1	4.8	D
	Through	502	511	101.8%	28.7	2.8	C
	Right Turn	57	57	99.1%	11.5	3.3	B
	Subtotal	699	701	100.2%	29.7	2.3	C
Total		2,809	2,820	100.4%	36.9	5.9	D

Intersection 2 **Marin St/Lincoln Ave** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph)		Total Delay (sec/veh)		
			Average	Percent	Average	Std. Dev.	LOS
NB	Left Turn	2	2	90.0%	45.0	79.5	E
	Through	9	9	96.7%	19.6	18.2	C
	Right Turn	11	11	95.5%	46.2	61.0	E
	Subtotal						
SB	Left Turn	7	5	77.1%	49.5	34.7	E
	Through	1	1	90.0%	3.4	4.9	A
	Right Turn	28	28	100.0%	14.3	17.3	B
	Subtotal	36	34	95.3%	26.0	26.4	D
EB	Left Turn	55	54	98.0%	10.4	3.6	B
	Through	800	800	100.0%	4.7	1.5	A
	Right Turn	8	7	81.3%	2.1	3.0	A
	Subtotal	863	860	99.7%	5.0	1.5	A
WB	Left Turn	5	5	108.0%	8.6	9.4	A
	Through	669	698	104.3%	2.8	0.6	A
	Right Turn	27	28	104.4%	2.0	1.3	A
	Subtotal	701	731	104.3%	2.8	0.6	A
Total		1,611	1,636	101.6%	4.7	1.1	A

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

Lincoln Avenue Project
Project Conditions
AM Peak Period

Intersection 3 **Kennedy St/Lincoln Ave** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph)		Total Delay (sec/veh)		
			Average	Percent	Average	Std. Dev.	LOS
NB	Left Turn						
	Through	2	2	80.0%	59.9	75.4	F
	Right Turn	7	8	108.6%	10.3	11.7	B
	Subtotal	9	9	102.2%	41.3	74.5	E
SB	Left Turn						
	Through						
	Right Turn	88	90	102.6%	12.1	3.8	B
	Subtotal	88	90	102.6%	12.1	3.8	B
EB	Left Turn	180	182	101.3%	23.4	4.1	C
	Through	630	664	105.4%	8.4	3.5	A
	Right Turn	6	6	103.3%	6.0	7.8	A
	Subtotal	816	853	104.5%	11.7	2.9	B
WB	Left Turn	2	2	85.0%	6.9	10.9	A
	Through	613	638	104.1%	3.6	0.5	A
	Right Turn	74	71	96.5%	2.9	0.9	A
	Subtotal	689	711	103.2%	3.6	0.5	A
Total		1,602	1,663	103.8%	8.3	1.6	A

Intersection 4 **Jefferson St/Lincoln Ave** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph)		Total Delay (sec/veh)		
			Average	Percent	Average	Std. Dev.	LOS
NB	Left Turn	106	106	100.2%	46.6	8.0	D
	Through	319	326	102.2%	39.2	3.3	D
	Right Turn	75	73	97.9%	29.4	6.9	C
	Subtotal	500	506	101.1%	39.5	2.9	D
SB	Left Turn	176	166	94.4%	55.3	12.9	E
	Through	343	338	98.5%	40.7	4.4	D
	Right Turn	153	153	99.9%	13.6	3.7	B
	Subtotal	672	657	97.8%	38.3	5.0	D
EB	Left Turn	120	120	100.3%	57.6	13.1	E
	Through	459	481	104.8%	30.3	6.2	C
	Right Turn	58	62	106.2%	13.2	5.8	B
	Subtotal	637	663	104.1%	33.5	6.7	C
WB	Left Turn	100	99	99.2%	68.6	8.8	E
	Through	430	422	98.1%	37.0	10.0	D
	Right Turn	195	200	102.7%	24.0	11.2	C
	Subtotal	725	721	99.5%	37.7	9.7	D
Total		2,534	2,547	100.5%	37.1	2.9	D

SimTraffic Post-Processor

Average Results from 10 Runs

Volume and Delay by Movement

Lincoln Avenue Project Project Conditions AM Peak Period

Intersection 5 Main St/Lincoln Ave Signal

Direction	Movement	Demand Volume (vph)	Served Volume (vph)		Total Delay (sec/veh)		
			Average	Percent	Average	Std. Dev.	LOS
NB	Left Turn	105	109	103.4%	53.0	10.7	D
	Through	47	48	102.3%	50.2	14.2	D
	Right Turn	35	35	100.9%	21.2	12.5	C
	Subtotal	187	192	102.7%	46.5	11.2	D
SB	Left Turn	21	20	92.9%	35.4	20.5	D
	Through	78	77	99.0%	40.6	8.4	D
	Right Turn	44	48	109.1%	14.5	9.5	B
	Subtotal	143	145	101.2%	32.4	6.3	C
EB	Left Turn	30	27	89.7%	24.8	12.3	C
	Through	625	612	97.9%	10.5	1.2	B
	Right Turn	55	54	98.5%	5.2	2.4	A
	Subtotal	710	693	97.6%	10.7	1.1	B
WB	Left Turn	25	26	102.0%	22.4	12.1	C
	Through	576	569	98.8%	19.6	6.6	B
	Right Turn	21	20	97.1%	10.7	4.0	B
	Subtotal	622	615	98.8%	19.4	6.6	B
Total		1,662	1,644	98.9%	20.8	3.9	C

Intersection 6 Yajome St/Lincoln Ave Side-street Stop

Direction	Movement	Demand Volume (vph)	Served Volume (vph)		Total Delay (sec/veh)		
			Average	Percent	Average	Std. Dev.	LOS
NB	Left Turn	44	43	98.6%	17.6	6.0	C
	Through	10	12	117.0%	26.3	13.8	D
	Right Turn	16	18	109.4%	6.7	4.7	A
	Subtotal	70	73	103.7%	16.7	5.4	C
SB	Left Turn	7	6	84.3%	13.1	15.5	B
	Through	6	7	110.0%	17.2	12.4	C
	Right Turn	33	36	108.5%	7.1	5.0	A
	Subtotal	46	48	105.0%	11.0	5.6	B
EB	Left Turn	36	36	99.7%	7.5	2.3	A
	Through	553	541	97.8%	3.2	0.3	A
	Right Turn	92	89	96.2%	2.2	0.6	A
	Subtotal	681	665	97.7%	3.3	0.3	A
WB	Left Turn	16	16	97.5%	8.4	5.3	A
	Through	545	531	97.4%	1.6	0.4	A
	Right Turn	15	17	111.3%	0.9	0.7	A
	Subtotal	576	563	97.8%	1.7	0.4	A
Total		1,373	1,350	98.3%	3.8	0.5	A

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

Lincoln Avenue Project
Project Conditions
AM Peak Period

Intersection 7 **Soscol Ave/Lincoln Ave** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph)		Total Delay (sec/veh)		
			Average	Percent	Average	Std. Dev.	LOS
NB	Left Turn	140	130	92.7%	51.6	4.2	D
	Through	537	542	100.9%	35.5	3.1	D
	Right Turn	35	37	106.3%	23.8	4.4	C
	Subtotal	712	709	99.5%	37.9	2.7	D
SB	Left Turn	197	200	101.3%	49.7	4.4	D
	Through	464	466	100.4%	31.3	3.8	C
	Right Turn	89	93	104.4%	11.5	2.2	B
	Subtotal	750	758	101.1%	33.7	3.2	C
EB	Left Turn	120	114	95.2%	64.2	8.4	E
	Through	305	304	99.7%	35.4	6.7	D
	Right Turn	151	146	96.5%	12.0	2.6	B
	Subtotal	576	564	97.9%	35.3	5.7	D
WB	Left Turn	82	76	92.3%	65.4	26.3	E
	Through	347	341	98.1%	49.6	13.6	D
	Right Turn	195	196	100.7%	31.6	13.7	C
	Subtotal	624	613	98.2%	46.2	14.2	D
Total		2,662	2,644	99.3%	38.4	4.3	D

Average and 95th Percentile Queues

The average queues represent the typical queue a driver is expected to encounter. The 95th percentile queue, also referred to as the design queue, is used to determine the recommended storage length so that queues are accommodated approximately 95 percent of the time.

Average and 95th percentile queues for Lincoln Avenue/California Boulevard, Lincoln Avenue/Jefferson Street, Lincoln Avenue/Soscol Avenue are summarized in the morning peak hour queue summary table below. Detailed queue worksheets can be found in the next tables.

Table: Morning Peak Hour Queue Summary

Intersection	Lane	Storage Length (ft)	Existing Conditions		Project Conditions	
			Average Queue Length (ft)	95th Percentile Queue Length (ft)	Average Queue Length (ft)	95th Percentile Queue Length (ft)
Lincoln Avenue/California Boulevard	EBL	200	200	300	200	325
	EBT	1125	225	325	250	375
	EBR	100	75	150	75	175
	WBL	100	125	225	125	250
	WBT	1275	175	350	350	625
	WBR	1275	175	350	50	125
	NBL	175	125	200	125	200
	NBT	775	150	250	175	275
	NBR	775	150	250	175	275
	SBL	175	50	100	50	100
	SBT	625	100	200	125	200
	SBR	625	100	200	100	200
Lincoln Avenue/Jefferson Street	EBL	125	125	200	125	200
	EBT	1225	175	375	325	575
	EBR	1225	175	350	75	175
	WBL	225	100	200	125	250
	WBT	1150	275	625	575	1025
	WBR	100	100	150	100	150
	NBL	150	100	175	100	175
	NBT	775	150	225	150	250
	NBR	775	125	200	125	200
	SBL	175	150	225	150	225
	SBT	600	150	250	175	250
	SBR	100	50	100	75	150

Intersection	Lane	Storage Length (ft)	Existing Conditions		Project Conditions	
			Average Queue Length (ft)	95th Percentile Queue Length (ft)	Average Queue Length (ft)	95th Percentile Queue Length (ft)
Lincoln Avenue/ Soscol Avenue	EBL	175	100	200	125	225
	EBT	1200	125	200	250	550
	EBR	175	75	150	100	225
	WBL	175	100	175	100	225
	WBT	825	200	300	375	625
	WBR	825	200	300	100	175
	NBL	200	125	225	125	225
	NBT	550	200	325	200	300
	NBR	550	150	275	150	250
	SBL	275	175	275	150	250
	SBT	525	175	275	175	250
	SBR	125	50	100	50	100

Notes: **Bold** text indicates queue exceeding storage length.

Source: Fehr & Peers, 2025

As shown in the morning peak hour queue summary table, the project increases average queues by approximately 50 to 100 feet at most intersection movements. No through-movement queues extend beyond their available storage lengths, indicating that queue spillback between intersections is not expected.

SimTraffic Post-Processor
 Average Results from 10 Runs
 Queue Length By Lane Group

Lincoln Avenue Project
 Existing Conditions
 AM Peak Period

Intersection 1		California Blvd/Lincoln Ave						Signal		
Direction	Lane Group	Storage (ft)	Average Queue (ft)		95th Queue (ft)		Maximum Queue (ft)		Block Time	
			Average	Std. Dev.	Average	Std. Dev.	Average	Std. Dev.	Pocket	Upstream
EB	Left Turn	200	200	14	300	24	325	6	11%	0%
	Through	1,125	225	13	325	37	400	72	14%	0%
	Right Turn	100	75	11	150	44	225	62	0%	0%
WB	Left Turn	100	125	14	225	22	250	19	26%	0%
	Through	1,275	150	21	325	47	425	73	15%	0%
	Through/Right	1,275	175	19	350	35	450	56	0%	0%
NB	Left Turn	175	125	14	200	31	250	29	1%	0%
	Through	775	150	11	250	21	275	43	5%	0%
	Through/Right	775	150	9	250	21	300	39	0%	0%
SB	Left Turn	175	50	6	100	14	125	41	0%	0%
	Through	625	100	8	175	12	200	25	2%	0%
	Through/Right	625	100	13	200	27	250	36	0%	0%

Intersection 2		Marin St/Lincoln Ave						Side-street Stop		
Direction	Lane Group	Storage (ft)	Average Queue (ft)		95th Queue (ft)		Maximum Queue (ft)		Block Time	
			Average	Std. Dev.	Average	Std. Dev.	Average	Std. Dev.	Pocket	Upstream
EB	Left/Through	1,650	300	19	525	48	700	103	14%	0%
	Through/Right	1,650	200	15	425	42	600	90	0%	0%
WB	Left/Through	1,225	50	9	125	21	225	38	0%	0%
	Through/Right	1,225	50	8	125	18	225	36	0%	0%
NB	Shared	450	25	3	50	6	50	7	0%	0%
SB	Shared	625	50	5	75	13	75	30	0%	0%

Intersection 3		Kennedy St/Lincoln Ave					Side-street Stop			
Direction	Lane Group	Storage (ft)	Average Queue (ft)		95th Queue (ft)		Maximum Queue (ft)		Block Time	
			Average	Std. Dev.	Average	Std. Dev.	Average	Std. Dev.	Pocket	Upstream
EB	Left Turn	75	75	3	125	8	125	2	9%	0%
	Through	1,275	100	17	325	48	500	85	0%	0%
	Through/Right	1,275	75	13	200	29	375	50	0%	0%
WB	Left/Through	1,100	175	18	350	40	500	69	4%	0%
	Through/Right	1,100	200	16	400	35	550	61	4%	0%
NB	Shared	450	25	2	50	4	50	0	0%	0%
SB	Right Turn	525	50	5	75	10	100	18	0%	0%

Intersection 4		Jefferson St/Lincoln Ave					Signal			
Direction	Lane Group	Storage (ft)	Average Queue (ft)		95th Queue (ft)		Maximum Queue (ft)		Block Time	
			Average	Std. Dev.	Average	Std. Dev.	Average	Std. Dev.	Pocket	Upstream
EB	Left Turn	125	125	11	200	10	175	0	16%	0%
	Through	1,225	175	18	375	38	525	68	14%	0%
	Through/Right	1,225	175	18	350	34	450	73	0%	0%
WB	Left Turn	225	100	10	200	30	250	37	1%	0%
	Through	1,150	275	36	625	78	825	133	18%	0%
	Right Turn	100	100	7	150	4	125	0	2%	0%
NB	Left Turn	150	100	10	175	22	225	35	4%	0%
	Through	775	150	9	225	11	275	28	10%	0%
	Through/Right	775	125	15	200	19	225	38	0%	0%
SB	Left Turn	175	150	8	225	19	250	2	7%	0%
	Through	600	150	11	250	29	350	89	9%	0%
	Right Turn	100	50	7	100	19	150	21	1%	0%

Intersection 5		Main St/Lincoln Ave						Signal		
Direction	Lane Group	Storage (ft)	Average Queue (ft)		95th Queue (ft)		Maximum Queue (ft)		Block Time	
			Average	Std. Dev.	Average	Std. Dev.	Average	Std. Dev.	Pocket	Upstream
EB	Left Turn	75	25	2	50	7	75	19	0%	0%
	Through	1,100	225	21	425	43	550	63	5%	0%
	Through/Right	1,100	250	23	450	38	550	56	0%	0%
WB	Left Turn	75	25	3	50	14	75	35	0%	0%
	Through	975	125	32	350	94	525	144	12%	0%
	Through/Right	975	125	33	350	96	500	132	0%	0%
NB	Left/Through	600	125	18	250	60	300	119	38%	0%
	Right Turn	75	50	6	100	9	100	0	0%	0%
	Left/Through	600	100	10	175	22	225	43	27%	0%
SB	Right Turn	75	50	6	100	9	100	2	1%	0%

Intersection 6		Yajome St/Lincoln Ave						Side-street Stop		
Direction	Lane Group	Storage (ft)	Average Queue (ft)		95th Queue (ft)		Maximum Queue (ft)		Block Time	
			Average	Std. Dev.	Average	Std. Dev.	Average	Std. Dev.	Pocket	Upstream
EB	Left/Through	1,150	100	16	275	37	375	82	5%	0%
	Through/Right	1,150	100	18	250	43	375	79	0%	0%
	Left/Through	450	25	10	100	30	150	54	0%	0%
WB	Through/Right	450	25	4	50	21	100	42	0%	0%
	Left Turn	75	50	3	75	8	75	9	6%	0%
	Through/Right	900	25	4	50	18	75	41	0%	0%
NB	Left Turn	75	25	2	50	5	50	18	0%	0%
	Through/Right	625	25	3	50	6	75	12	1%	0%
	Left Turn	75	25	2	50	5	50	18	0%	0%
SB	Through/Right	625	25	3	50	6	75	12	1%	0%

Intersection 7		Soscol Ave/Lincoln Ave						Signal		
Direction	Lane Group	Storage (ft)	Average Queue (ft)		95th Queue (ft)		Maximum Queue (ft)		Block Time	
			Average	Std. Dev.	Average	Std. Dev.	Average	Std. Dev.	Pocket	Upstream
EB	Left Turn	175	100	9	200	22	200	30	3%	0%
	Through	1,200	125	6	200	33	300	103	2%	0%
	Right Turn	175	75	6	150	16	225	28	0%	0%
WB	Left Turn	175	100	10	175	20	225	17	1%	0%
	Through	825	175	16	275	32	350	53	8%	0%
	Through/Right	825	200	19	300	28	350	41	0%	0%
NB	Left Turn	200	125	15	225	21	250	1	4%	0%
	Through	550	200	15	325	33	425	51	7%	0%
	Through/Right	550	150	15	275	36	325	57	0%	0%
SB	Left Turn	275	175	12	275	27	300	31	1%	0%
	Through	525	175	11	275	25	325	79	6%	0%
	Right Turn	125	50	4	100	20	150	34	0%	0%

Intersection 1		California Blvd/Lincoln Ave						Signal		
Direction	Lane Group	Storage (ft)	Average Queue (ft)		95th Queue (ft)		Maximum Queue (ft)		Block Time	
			Average	Std. Dev.	Average	Std. Dev.	Average	Std. Dev.	Pocket	Upstream
EB	Left Turn	275	200	17	325	35	375	46	3%	0%
	Through	1,125	250	24	375	78	450	121	14%	0%
	Right Turn	175	75	13	175	58	275	89	0%	0%
WB	Left Turn	225	125	10	250	20	275	21	0%	0%
	Through	1,275	350	27	625	42	700	50	42%	0%
	Right Turn	125	50	8	125	17	150	0	0%	0%
NB	Left Turn	225	125	15	200	34	225	51	0%	0%
	Through	775	175	10	275	22	300	41	4%	0%
	Through/Right	775	175	12	275	28	300	41	0%	0%
SB	Left Turn	200	50	5	100	14	125	27	0%	0%
	Through	625	125	11	175	12	200	12	1%	0%
	Through/Right	625	100	10	200	16	250	20	0%	0%

Intersection 2		Marin St/Lincoln Ave						Side-street Stop		
Direction	Lane Group	Storage (ft)	Average Queue (ft)		95th Queue (ft)		Maximum Queue (ft)		Block Time	
			Average	Std. Dev.	Average	Std. Dev.	Average	Std. Dev.	Pocket	Upstream
EB	Left Turn	100	50	5	75	13	100	26	0%	0%
	Through/Right	1,625	425	27	750	63	925	77	3%	0%
WB	Left Turn	100	25	3	25	7	50	10	0%	0%
	Through/Right	1,225	75	11	200	36	325	82	1%	0%
NB	Shared	475	25	4	50	9	50	16	0%	0%
	Shared	650	50	6	75	9	75	14	0%	0%
SB	Shared	650	50	6	75	9	75	14	0%	0%

Intersection 3		Kennedy St/Lincoln Ave						Side-street Stop		
Direction	Lane Group	Storage (ft)	Average Queue (ft)		95th Queue (ft)		Maximum Queue (ft)		Block Time	
			Average	Std. Dev.	Average	Std. Dev.	Average	Std. Dev.	Pocket	Upstream
EB	Left Turn	150	75	12	150	20	175	18	2%	0%
	Through/Right	1,075	100	24	300	73	500	136	0%	0%
WB	Left Turn	100	25	1	25	7	25	16	0%	0%
	Through/Right	1,075	375	42	700	60	750	78	1%	0%
NB	Shared	475	25	3	50	5	50	10	0%	0%
SB	Right Turn	550	50	5	75	10	100	16	0%	0%

Intersection 4		Jefferson St/Lincoln Ave						Signal		
Direction	Lane Group	Storage (ft)	Average Queue (ft)		95th Queue (ft)		Maximum Queue (ft)		Block Time	
			Average	Std. Dev.	Average	Std. Dev.	Average	Std. Dev.	Pocket	Upstream
EB	Left Turn	150	125	15	200	12	175	0	7%	0%
	Through	1,225	325	37	575	51	650	51	36%	0%
	Right Turn	125	75	16	175	30	175	0	0%	0%
WB	Left Turn	225	125	15	250	23	250	0	0%	0%
	Through	1,175	575	47	1,025	75	1,100	55	34%	0%
	Right Turn	100	100	5	150	6	125	0	1%	0%
NB	Left Turn	150	100	11	175	26	250	9	3%	0%
	Through	775	150	7	250	23	300	50	13%	0%
	Through/Right	775	125	10	200	21	225	34	0%	0%
SB	Left Turn	175	150	16	225	22	250	16	8%	0%
	Through	625	175	16	250	52	325	104	16%	0%
	Right Turn	100	75	3	150	12	150	4	3%	0%

SimTraffic Post-Processor
Average Results from 10 Runs
Queue Length By Lane Group

Lincoln Avenue Project
Project Conditions
AM Peak Period

Intersection 5		Main St/Lincoln Ave						Signal		
Direction	Lane Group	Storage (ft)	Average Queue (ft)		95th Queue (ft)		Maximum Queue (ft)		Block Time	
			Average	Std. Dev.	Average	Std. Dev.	Average	Std. Dev.	Pocket	Upstream
EB	Left Turn	75	25	5	50	11	100	11	0%	0%
	Through	1,075	450	40	775	51	825	65	16%	0%
	Right Turn	125	25	15	75	45	125	29	0%	0%
WB	Left Turn	75	25	4	75	13	125	19	0%	0%
	Through	975	250	24	450	44	525	71	22%	0%
	Right Turn	125	25	3	75	12	125	4	0%	0%
NB	Left/Through	625	150	18	250	35	275	49	40%	0%
	Right Turn	75	50	4	100	6	100	0	1%	0%
	Left/Through	600	100	7	175	14	200	37	15%	0%
SB	Right Turn	75	50	6	100	9	100	0	1%	0%

Intersection 6		Yajome St/Lincoln Ave						Side-street Stop		
Direction	Lane Group	Storage (ft)	Average Queue (ft)		95th Queue (ft)		Maximum Queue (ft)		Block Time	
			Average	Std. Dev.	Average	Std. Dev.	Average	Std. Dev.	Pocket	Upstream
EB	Left Turn	100	25	3	50	8	75	17	0%	0%
	Through/Right	1,175	175	23	325	30	375	39	0%	0%
WB	Left Turn	100	25	2	50	5	50	11	0%	0%
	Through/Right	1,650	50	26	175	48	275	58	0%	0%
NB	Left Turn	75	50	5	75	8	75	11	4%	0%
	Through/Right	925	25	2	50	5	50	8	0%	0%
SB	Left Turn	75	25	3	25	7	50	9	0%	0%
	Through/Right	625	25	2	75	5	75	14	1%	0%

Intersection 7		Soscol Ave/Lincoln Ave						Signal		
Direction	Lane Group	Storage (ft)	Average Queue (ft)		95th Queue (ft)		Maximum Queue (ft)		Block Time	
			Average	Std. Dev.	Average	Std. Dev.	Average	Std. Dev.	Pocket	Upstream
EB	Left Turn	175	125	14	225	25	225	0	2%	0%
	Through	1,650	250	31	550	78	775	140	14%	0%
	Right Turn	175	100	11	225	20	225	0	0%	0%
WB	Left Turn	175	100	13	225	29	225	1	1%	0%
	Through	825	375	51	625	104	725	111	44%	1%
	Right Turn	125	100	8	175	3	150	0	2%	0%
NB	Left Turn	200	125	13	225	19	250	1	1%	0%
	Through	575	200	13	300	20	325	47	8%	0%
	Through/Right	575	150	7	250	6	300	24	0%	0%
SB	Left Turn	275	150	14	250	25	300	37	0%	0%
	Through	525	175	10	250	19	325	58	7%	0%
	Right Turn	125	50	4	100	15	175	22	0%	0%