MEMORANDUM

Engineering Department

DATE: May 6, 2022

TO: Mayor and Councilmembers

THROUGH: Steve McHarris, City Manager

FROM: Steve Erickson, Engineering Director/City Engineer
Steve Chan, Transportation and Traffic Manager

SUBJECT: **Traffic Signal & Stop Sign Review Process**

At the April 22nd City/School Collaborative Subcommittee meeting and the May 3rd City Council meeting, members of the City Council inquired about the traffic signal and stop sign review process as it relates to three intersections (North Park Victoria Drive/Kennedy Drive, South Park Victoria Drive/Mt. Shasta Avenue, and Kennedy Drive/Fanyon Street).

This memorandum provides details on the process for the installation of new stop signs, traffic signals, and other traffic control devices at any City locations, when warranted and/or requested, and to provide a status of staff review for the three intersections.

Background

The Manual on Uniform Traffic Control Devices (MUTCD) for Streets and Highways, defines the standards used nationwide for installation and maintenance of traffic control devices on all public streets, highways, bikeways, and private roads open to public travel. The purpose of the MUTCD is to provide uniformity of these devices, which include signage, signals, and pavement markings to promote roadway safety and efficiency on the Nation's streets and highways.

Installation of traffic control devices is not discretionary. Traffic control devices when inappropriately installed may lead to excessive violations, increased crashes, diversion of traffic to undesirable routes, unnecessary delays, and increase City liability.

An engineering study of traffic conditions, pedestrian characteristics, and physical characteristics of the location is required by MUTCD to determine whether installation of a traffic control signal is justified at a particular location. This study includes the following eight warrants:

- Warrant 1, Eight-Hour Vehicular Volume
- Warrant 2, Four-Hour Vehicular Volume
- Warrant 3, Peak Hour
- Warrant 4, Pedestrian Volume
- Warrant 5, School Crossing
- Warrant 6, Coordinated Signal System
- Warrant 7, Crash Experience
- Warrant 8, Roadway Network

Traffic Studies Status Update

The City's Engineering Department recently started two new traffic projects: Project No. 4288 Traffic Studies & Minor Improvements; and Project No. 4293 Citywide Traffic Safety Assessment. Project 4288 will provide updated speed surveys, traffic counts and where required, implement minor traffic

improvements throughout the City. Project 4293 will analyze and identify areas of traffic safety concerns and to provide recommended traffic calming mitigation. These two projects are anticipated to be completed by Summer of 2023. The completion of these two Projects will provide valuable traffic data for the review of key intersections and roadway segments in the City. However, as the City receives new traffic related speeding or intersection safety complaints, staff reviews the location and collects current traffic data to validate the concern.

Currently, the installation of new traffic signals is not being planned or underway. The most recent traffic signal installation was completed the Summer of 2020 at McCarthy Boulevard/Sandisk Drive under Project No. 4292. The traffic signal was justified in meeting the warrants for peak vehicular volume, four-hour vehicular volume, and pedestrian volume at this intersection.

Response to Council Inquiries

Council inquired about the traffic signal installation at the intersection of Jacklin and Park Victoria, which is a major intersection of two major arterial streets with five lanes. The traffic signal at North Park Victoria and Jacklin Road was installed over 30 years ago. The traffic signal was determined to be required due to the number of traffic lanes and movements to allow traffic to move in a safe and orderly manner. This is the same reasoning in support of a signal existing at the Park Victoria/Calaveras intersection.

Regarding recent intersections of concern at North Park Victoria Drive/Kennedy Drive, South Park Victoria Drive/Mt. Shasta Avenue, and Kennedy Drive/Fanyon Street, Traffic Engineering staff has completed preliminary field reviews and assessment at each location, considered accident history, and analyzed traffic data obtained using tube counters and the City's new mobile radar speed feedback signs which collects vehicle volume and vehicle speed data.

North Park Victoria Drive/Kennedy Drive

The intersection of North Park Victoria Drive and Kennedy Drive is an existing 4-way stop. Nearby residents have requested the City to assess this intersection for traffic signal installation due to a recent non-injury accident between a bicyclist and a vehicle.

Traffic Engineering recently completed data collection and completed the draft traffic signal warranted (Attached). Preliminary findings indicate this location does not warrant traffic signal installation. However, the installation of new crosswalk warning beacons is an appropriate pedestrian improvement and traffic calming measure for this intersection. Staff is currently undergoing the design process for the installation of warning beacons and once complete will be bid out in the Fall of 2022. The construction of the warning beacons and required ADA improvements are anticipated to take approximately 2 months to complete.

It should also be noted that traffic calming was implemented on North Park Victoria Drive between Jacklin Road and Calaveras Boulevard approximately 15 years ago where the roadway was narrowed to reduce traffic speeds and provided bike lanes.

South Park Victoria Drive/Mt. Shasta Avenue

This intersection is currently under review and the study will be completed this month. At this location, Park Victoria is intersected by a two-lane residential street (Mt. Shasta Avenue). The traffic study will determine whether a traffic control device, such as 4-way stop, traffic signal, or pedestrian crosswalk warning beacons, is warranted and appropriate.

Kennedy Drive/Fanyon Street

Following studies at the above intersections staff will complete a formal 4-way stop warrant study. This intersection is a 2-way stop controlled intersection, with stops for the side-streets only (Fanyon Street and Topham Court). A crossing guard is staffed at this intersection to assist school-age pedestrian crossing before and after school hours.

Staff reviewed this location in March 2022 after receiving a complaint from the principal of Burnett Elementary School. The concern was that parents, after leaving Burnett Elementary School have difficulties crossing the intersection due to speeding along Kennedy Drive. Staff completed a field review and provided the following assessment to the principal:

- There are no sight-line obstructions to on-coming traffic from Fanyon Street entering Kennedy Drive.
- Vehicle speeds on Kennedy Drive were slow during student drop-off and pick-up periods as a crossing guard assisted parents and children to cross the intersection.
- The posted speed limit on Kennedy Drive is 30 mph. 85th percentile speed data collected over a 7-day period in March 2022 is 31 mph.
- There were no significant delays for Fanyon Street traffic to turn onto Kennedy Drive during student drop-off and pick-up periods.
- Vehicle queue on Fanyon Street did not extend to Burnett School frontage and student drop-off and pick-up activities were not affected.
- No adverse traffic condition was identified.

Conclusion

Staff understands the concerns of community members regarding certain traffic conditions at the aforementioned intersections. As previously stated, any installation of traffic control devices traffic must be based on the analysis of data and be consistent with national standards.

Staff will inform the Council regarding the outcome of the warrant studies at South Park Victoria Drive/Mt. Shasta Avenue and Kennedy Drive/Fanyon Street once complete in June 2022 prior to the school summer recess.

Attachment:
Traffic Signal Warrant Worksheet

Figure 4C-101 (CA). Traffic Signal Warrants Worksheet (Sheet 1 of 5)

COUNT DATE 04/27/22

DIST ____ CO ____ RTE ____ PM ____

CALC NU DATE 05/05/22

CHK ____ DATE ____

Major St: N Park Victoria Drive — Critical Approach Speed 35 mph

Minor St: Kennedy Drive — Critical Approach Speed 25 mph

Speed limit or critical speed on major street traffic > 40 mph..... ☐

or

In built up area of isolated community of < 10,000 population..... ☐ **RURAL (R)**

☒ **URBAN (U)**

WARRANT 1 - Eight Hour Vehicular Volume **SATISFIED YES ☐ NO ☒**
(Condition A or Condition B or combination of A and B must be satisfied)

Condition A - Minimum Vehicle Volume **100% SATISFIED YES ☐ NO ☒**
80% SATISFIED YES ☐ NO ☒

See Attachment A

	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS)			
	U	R	U	R
APPROACH LANES	1		2 or More	
Both Approaches Major Street	500 (400)	350 (280)	600 (480)	420 (336)
Highest Approach Minor Street	150 (120)	105 (84)	200 (160)	140 (112)

Hour

Condition B - Interruption of Continuous Traffic **100% SATISFIED YES ☐ NO ☒**
80% SATISFIED YES ☐ NO ☒

See Attachment A

	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS)			
	U	R	U	R
APPROACH LANES	1		2 or More	
Both Approaches Major Street	750 (600)	525 (420)	900 (720)	630 (504)
Highest Approach Minor Street	75 (60)	53 (42)	100 (80)	70 (56)

Hour

Combination of Conditions A & B **SATISFIED YES ☐ NO ☒**

REQUIREMENT	CONDITION	✓	FULFILLED
TWO CONDITIONS SATISFIED 80%	A. MINIMUM VEHICULAR VOLUME		Yes ☐ No ☒
	AND, B. INTERRUPTION OF CONTINUOUS TRAFFIC		
AND, AN ADEQUATE TRIAL OF OTHER ALTERNATIVES THAT COULD CAUSE LESS DELAY AND INCONVENIENCE TO TRAFFIC HAS FAILED TO SOLVE THE TRAFFIC PROBLEMS			Yes ☐ No ☒

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-101 (CA). Traffic Signal Warrants Worksheet (Sheet 2 of 5)

WARRANT 2 - Four Hour Vehicular Volume **SATISFIED* YES ☐ NO ☒**

Record hourly vehicular volumes for any four hours of an average day.

APPROACH LANES	One	2 or More	Hour			
Both Approaches - Major Street						
Higher Approach - Minor Street						

See Attachment B

*All plotted points fall above the applicable curve in Figure 4C-1. (URBAN AREAS)	Yes ☐ No ☒
OR, All plotted points fall above the applicable curve in Figure 4C-2. (RURAL AREAS)	Yes ☐ No ☐

WARRANT 3 - Peak Hour **SATISFIED YES ☐ NO ☒**
(Part A or Part B must be satisfied)

PART A **SATISFIED YES ☐ NO ☒**

(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced by traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; AND	Yes ☐ No ☒
2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; AND	Yes ☒ No ☐
3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches.	Yes ☐ No ☒

Intersection is an all-way stop.

PART B **SATISFIED YES ☐ NO ☒**

APPROACH LANES	One	2 or More	Hour
Both Approaches - Major Street			
Higher Approach - Minor Street			

See Attachment C

The plotted point falls above the applicable curve in Figure 4C-3. (URBAN AREAS)	Yes ☐ No ☒
OR, The plotted point falls above the applicable curve in Figure 4C-4. (RURAL AREAS)	Yes ☐ No ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-101 (CA). Traffic Signal Warrants Worksheet (Sheet 3 of 5)

WARRANT 4 - Pedestrian Volume
(Parts 1 and 2 Must Be Satisfied)

SATISFIED YES ☐ NO ☒

See Attachment D

Part 1 (Parts A or B must be satisfied)

	Hours - - ->				
A.	Vehicles per hour for any 4 hours				
	Pedestrians per hour for any 4 hours				

Figure 4C-5 or Figure 4C-6
SATISFIED YES ☐ NO ☒

	Hours - - ->				
B.	Vehicles per hour for any 1 hour				
	Pedestrians per hour for any 1 hour				

Figure 4C-7 or Figure 4C-8
SATISFIED YES ☐ NO ☒

Part 2 **SATISFIED YES ☐ NO ☒**

AND, The distance to the nearest traffic signal along the major street is greater than 300 ft	Yes ☒	No ☐
OR, The proposed traffic signal will not restrict progressive traffic flow along the major street.	Yes ☐	No ☒

WARRANT 5 - School Crossing
(Parts A and B Must Be Satisfied)

SATISFIED YES ☐ NO ☒

Part A
Gap/Minutes and # of Children

SATISFIED YES ☐ NO ☒

Intersection is all-way stop. No significant gaps present.

Gaps vs Minutes		Hour
	Minutes Children Using Crossing	
	Number of Adequate Gaps	
School Age Pedestrians Crossing Street / hr		

Gaps < Minutes YES ☐ NO ☒
AND Children > 20/hr YES ☒ NO ☐

AND, Consideration has been given to less restrictive remedial measures.	Yes ☐	No ☒

Part B **SATISFIED YES ☐ NO ☒**

The distance to the nearest traffic signal along the major street is greater than 300 ft	Yes ☒	No ☐
OR, The proposed signal will not restrict the progressive movement of traffic.	Yes ☐	No ☒

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-101 (CA). Traffic Signal Warrants Worksheet (Sheet 4 of 5)

WARRANT 6 - Coordinated Signal System **SATISFIED YES ☐ NO ☒**
(All Parts Must Be Satisfied)

MINIMUM REQUIREMENTS	DISTANCE TO NEAREST SIGNAL	
≥ 1000 ft	N _____ ft, S _____ ft, E _____ ft, W _____ ft	Yes ☒ No ☐
On a one-way street or a street that has traffic predominantly in one direction, the adjacent traffic control signals are so far apart that they do not provide the necessary degree of vehicular platooning.		Yes ☐ No ☒
OR, On a two-way street, adjacent traffic control signals do not provide the necessary degree of platooning and the proposed and adjacent traffic control signals will collectively provide a progressive operation.		

WARRANT 7 - Crash Experience Warrant **SATISFIED YES ☐ NO ☒**
(All Parts Must Be Satisfied)

Adequate trial of alternatives with satisfactory observance and enforcement has failed to reduce the crash frequency.			Yes ☐ No ☒
REQUIREMENTS	Number of crashes reported within a 12 month period susceptible to correction by a traffic signal, and involving injury or damage exceeding the requirements for a reportable crash.		Yes ☐ No ☒
5 OR MORE			
REQUIREMENTS	CONDITIONS	✓	
ONE CONDITION SATISFIED 80%	Warrant 1, Condition A - Minimum Vehicular Volume		Yes ☐ No ☒
	OR, Warrant 1, Condition B - Interruption of Continuous Traffic		
	OR, Warrant 4, Pedestrian Volume Condition Ped Vol ≥ 80% of Figure 4C-5 through Figure 4C-8		

See Attachment E

WARRANT 8 - Roadway Network **SATISFIED YES ☐ NO ☐**
(All Parts Must Be Satisfied)

MINIMUM VOLUME REQUIREMENTS	ENTERING VOLUMES - ALL APPROACHES	✓	FULFILLED
1000 Veh/Hr	During Typical Weekday Peak Hour _____ Veh/Hr and has 5-year projected traffic volumes that meet one or more of Warrants 1, 2, and 3 during an average weekday.		Yes ☐ No ☐
	OR During Each of Any 5 Hrs. of a Sat. or Sun _____ Veh/Hr		

CHARACTERISTICS OF MAJOR ROUTES	MAJOR ROUTE A	MAJOR ROUTE B	
Hwy. System Serving as Principal Network for Through Traffic			
Rural or Suburban Highway Outside Of, Entering, or Traversing a City			
Appears as Major Route on an Official Plan			
Any Major Route Characteristics Met, Both Streets			Yes ☐ No ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-101 (CA). Traffic Signal Warrants Worksheet (Sheet 5 of 5)

Not Applicable

WARRANT 9 - Intersection Near a Grade Crossing **SATISFIED YES ☐ NO ☐**
(Both Parts A and B Must Be Satisfied)

PART A A grade crossing exists on an approach controlled by a STOP or YIELD sign and the center of the track nearest to the intersection is within 140 feet of the stop line or yield line on the approach. Track Center Line to Limit Line _____ ft	Yes ☐ No ☐
PART B **There is one minor street approach lane at the track crossing -** During the highest traffic volume hour during which rail traffic uses the crossing, the plotted point falls above the applicable curve in Figure 4C-9. Major Street - Total of both approaches: _____ VPH Minor Street - Crosses the track (one direction only, approaching the intersection): _____ VPH X AF (Use Tables 4C-2, 3, & 4 below to calculate AF) = _____ VPH	Yes ☐ No ☐
OR, There are two or more minor street approach lanes at the track crossing - During the highest traffic volume hour during which rail traffic uses the crossing, the plotted point falls above the applicable curve in Figure 4C-10. Major Street - Total of both approaches : _____ VPH Minor Street - Crosses the track (one direction only, approaching the intersection): _____ VPH X AF (Use Tables 4C-2, 3, & 4 below to calcualte AF) = _____ VPH	

The minor street approach volume may be multiplied by up to three following adjustment factors (AF) as described in Section 4C.10.

1- Number of Rail Traffic per Day_____ Adjustment factor from table 4C-2____

2- Percentage of High-Occupancy Buses on Minor Street Approach_____ Adjustment factor from table 4C-3____

3- Percentage of Tractor-Trailer Trucks on Minor Street Approach_____ Adjustment factor from table 4C-4____

NOTE: If no data is availale or known, then use AF = 1 (no adjustment)

Attachment A

ADT Analysis: Raw Data

Major St	N Park Victoria	Date:	4/27/2022
Minor St	Kennedy	Day:	Wednesday

	N Park Victoria		Kennedy	
	NB	SB	EB	WB
12:00 AM	67	5	2	10
01:00	54	6	2	4
02:00	15	0	2	2
03:00	10	13	3	7
04:00	5	48	6	15
05:00	9	58	18	42
06:00	13	165	31	51
07:00	21	237	69	164
08:00	49	123	38	224
09:00	199	135	42	106
10:00	165	120	23	101
11:00	139	163	37	84
12:00 PM	140	173	34	93
01:00	186	233	36	120
02:00	183	211	48	186
03:00	251	197	44	137
04:00	229	279	55	102
05:00	229	180	44	156
06:00	283	140	34	98
07:00	326	90	25	117
08:00	246	57	25	71
09:00	188	41	14	37
10:00	140	23	12	22
11:00	101	13	3	11
	3248	2710	647	1960

ADT Analysis: Warrant 1 - 8 Hour Volume

Table 4C-1 - Condition A

Number of lanes for moving traffic on each approach:					Major St	Minor St
NB:	1	EB:	1	100%	500	150
SB:	1	SB:	1	80%	400	120

	N Park Victoria				Kennedy			
	NB	SB	Total	>100% or 80%?	EB	>100% or 80%?	WB	>100% or 80%?
12:00 AM	67	5	72		2		10	
01:00	54	6	60		2		4	
02:00	15	0	15		2		2	
03:00	10	13	23		3		7	
04:00	5	48	53		6		15	
05:00	9	58	67		18		42	
06:00	13	165	178		31		51	
07:00	21	237	258		69		164	100%
08:00	49	123	172		38		224	100%
09:00	199	135	334		42		106	
10:00	165	120	285		23		101	
11:00	139	163	302		37		84	
12:00 PM	140	173	313		34		93	
01:00	186	233	419	80%	36		120	80%
02:00	183	211	394		48		186	100%
03:00	251	197	448	80%	44		137	80%
04:00	229	279	508	100%	55		102	
05:00	229	180	409	80%	44		156	100%
06:00	283	140	423	80%	34		98	
07:00	326	90	416	80%	25		117	
08:00	246	57	303		25		71	
09:00	188	41	229		14		37	
10:00	140	23	163		12		22	
11:00	101	13	114		3		11	
	3248	2710	5958		647		1960	

ADT Analysis: Warrant 1 - 8 Hour Volume

Table 4C-1 - Condition B

Number of lanes for moving traffic on each approach:					Major St	Minor St
NB:	1	EB:	1	100%	750	75
SB:	1	SB:	1	80%	600	60

	N Park Victoria				Kennedy			
	NB	SB	Total	>100% or 80%?	EB	>100% or 80%?	WB	>100% or 80%?
12:00 AM	67	5	72		2		10	
01:00	54	6	60		2		4	
02:00	15	0	15		2		2	
03:00	10	13	23		3		7	
04:00	5	48	53		6		15	
05:00	9	58	67		18		42	
06:00	13	165	178		31		51	
07:00	21	237	258		69	80%	164	100%
08:00	49	123	172		38		224	100%
09:00	199	135	334		42		106	100%
10:00	165	120	285		23		101	100%
11:00	139	163	302		37		84	100%
12:00 PM	140	173	313		34		93	100%
01:00	186	233	419		36		120	100%
02:00	183	211	394		48		186	100%
03:00	251	197	448		44		137	100%
04:00	229	279	508		55		102	100%
05:00	229	180	409		44		156	100%
06:00	283	140	423		34		98	100%
07:00	326	90	416		25		117	100%
08:00	246	57	303		25		71	80%
09:00	188	41	229		14		37	
10:00	140	23	163		12		22	
11:00	101	13	114		3		11	
	3248	2710	5958		647		1960	

Table 4C-1. Warrant 1, Eight-Hour Vehicular Volume

Condition A—Minimum Vehicular Volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100%[a]	80%[b]	70%[c]	56%[d]	100%[a]	80%[b]	70%[c]	56%[d]
1	1	500	400	350	280	150	120	105	84
2 or more	1	600	480	420	336	150	120	105	84
2 or more	2 or more	600	480	420	336	200	160	140	112
1	2 or more	500	400	350	280	200	160	140	112

Condition B—Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100%[a]	80%[b]	70%[c]	56%[d]	100%[a]	80%[b]	70%[c]	56%[d]
1	1	750	600	525	420	75	60	53	42
2 or more	1	900	720	630	504	75	60	53	42
2 or more	2 or more	900	720	630	504	100	80	70	56
1	2 or more	750	600	525	420	100	80	70	56

[a] Basic minimum hourly volume

[b] Used for combination of Conditions A and B after adequate trial of other remedial measures

[c] May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

[d] May be used for combination of Conditions A and B after adequate trial of other remedial measures when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

Attachment B

ADT Analysis: Raw Data

Major St	N Park Victoria	Date:	4/27/2022
Minor St	Kennedy	Day:	Wednesday

	N Park Victoria		Kennedy	
	NB	SB	EB	WB
12:00 AM	67	5	2	10
01:00	54	6	2	4
02:00	15	0	2	2
03:00	10	13	3	7
04:00	5	48	6	15
05:00	9	58	18	42
06:00	13	165	31	51
07:00	21	237	69	164
08:00	49	123	38	224
09:00	199	135	42	106
10:00	165	120	23	101
11:00	139	163	37	84
12:00 PM	140	173	34	93
01:00	186	233	36	120
02:00	183	211	48	186
03:00	251	197	44	137
04:00	229	279	55	102
05:00	229	180	44	156
06:00	283	140	34	98
07:00	326	90	25	117
08:00	246	57	25	71
09:00	188	41	14	37
10:00	140	23	12	22
11:00	101	13	3	11
	3248	2710	647	1960

ADT Analysis: Warrant 2 - 4 Hour Volume

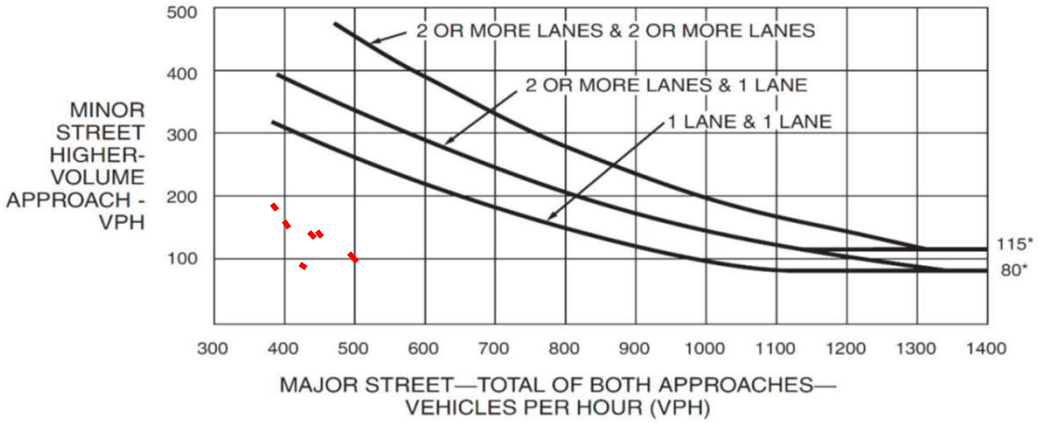
Figure 4C-1 & 4C-2

Number of lanes for moving traffic on each approach:

NB:	1	EB:	1
SB:	1	SB:	1

	N Park Victoria				Kennedy			
	NB	SB	Total	Applicable?	EB	Applicable?	WB	Applicable?
12:00 AM	67	5	72		2		10	
01:00	54	6	60		2		4	
02:00	15	0	15		2		2	
03:00	10	13	23		3		7	
04:00	5	48	53		6		15	
05:00	9	58	67		18		42	
06:00	13	165	178		31		51	
07:00	21	237	258		69		164	
08:00	49	123	172		38		224	
09:00	199	135	334		42		106	
10:00	165	120	285		23		101	
11:00	139	163	302		37		84	
12:00 PM	140	173	313		34		93	
01:00	186	233	419		36		120	
02:00	183	211	394		48		186	
03:00	251	197	448		44		137	
04:00	229	279	508		55		102	
05:00	229	180	409		44		156	
06:00	283	140	423		34		98	
07:00	326	90	416		25		117	
08:00	246	57	303		25		71	
09:00	188	41	229		14		37	
10:00	140	23	163		12		22	
11:00	101	13	114		3		11	
	3248	2710	5958		647		1960	

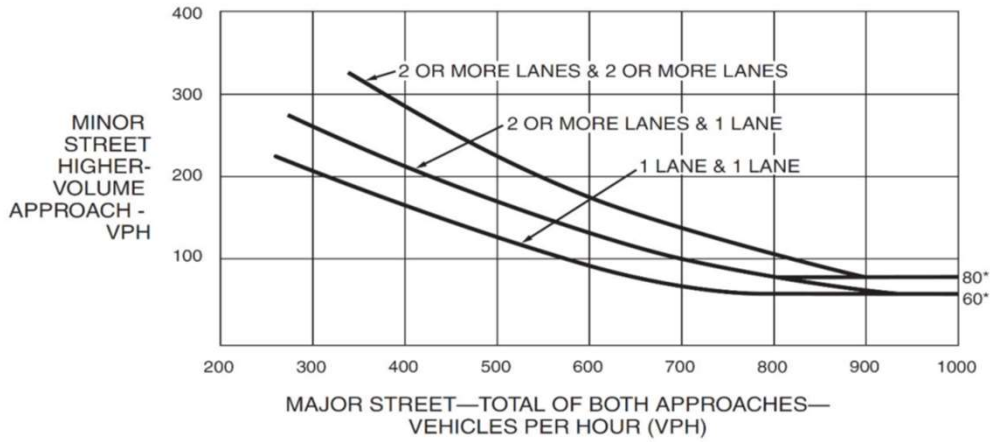
Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume



*Note: 115 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-2. Warrant 2, Four-Hour Vehicular Volume (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 80 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 60 vph applies as the lower threshold volume for a minor-street approach with one lane.

Attachment C

ADT Analysis: Raw Data

Major St	N Park Victoria	Date:	4/27/2022
Minor St	Kennedy	Day:	Wednesday

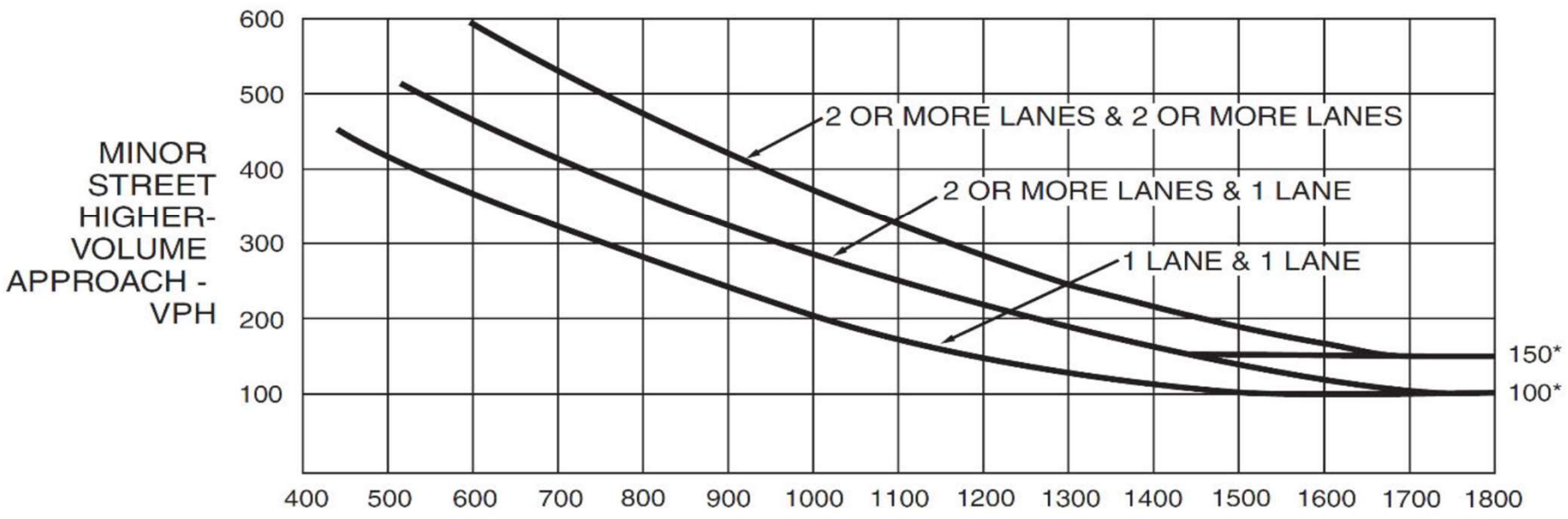
Peak Hours AM 7:00AM - 9:00AM
PM 2:00PM - 4:00PM

	N Park Victoria		Kennedy	
	NB	SB	EB	WB
		AM		
07:00	6	68	13	21
07:15	6	76	7	29
07:30	6	64	22	39
07:45	3	29	27	75
08:00	3	37	14	115
08:15	13	36	9	59
08:30	15	27	11	24
08:45	18	23	4	26
		PM		
02:00	49	76	17	27
02:15	37	56	15	92
02:30	45	40	6	38
02:45	52	39	10	29
03:00	46	46	16	33
03:15	77	43	13	26
03:30	53	52	9	33
03:45	75	56	6	45

	N Park Victoria			Kennedy	
	NB	SB	Total	EB	WB
			AM		
07:00	6	68	74	13	21
07:15	6	76	82	7	29
07:30	6	64	70	22	39
07:45	3	29	32	27	75
08:00	3	37	40	14	115
08:15	13	36	49	9	59
08:30	15	27	42	11	24
08:45	18	23	41	4	26
			PM		
02:00	49	76	125	17	27
02:15	37	56	93	15	92
02:30	45	40	85	6	38
02:45	52	39	91	10	29
03:00	46	46	92	16	33
03:15	77	43	120	13	26
03:30	53	52	105	9	33
03:45	75	56	131	6	45

Peak Hours				
	Hours	NB / SB	EB	WB
		AM		
07:00	08:00	258	69	164
07:15	08:15	224	70	258
07:30	08:30	191	72	288
07:45	08:45	163	61	273
08:00	09:00	172	38	224
		PM		
02:00	03:00	394	48	186
02:15	03:15	361	47	192
02:30	03:30	388	45	126
02:45	03:45	408	48	121
03:00	04:00	448	44	137

Figure 4C-3. Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Attachment D

Milpitas - Traffic Data Collection Sheet

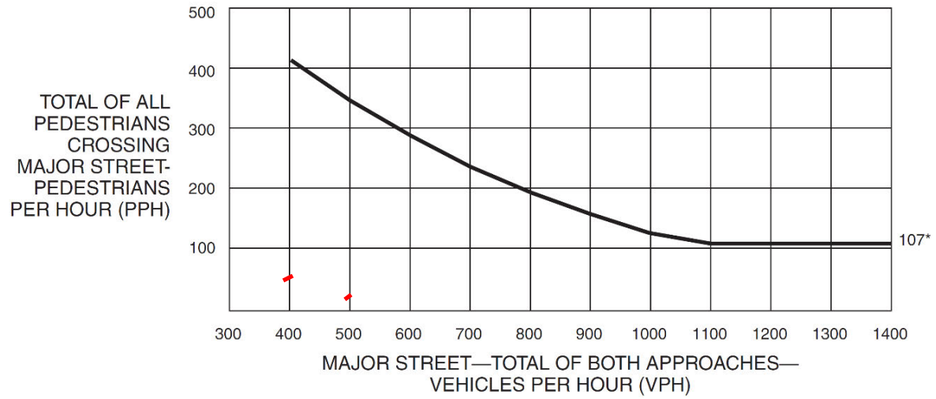
Pedestrian and Turning Movement Counts

Street (N - S) N Park Victoria Date Wednesday Weather Clear / Sunny

Street (E - W) Kennedy Day 4/27/2022 Road Condition Dry

	(1) Northbound				(2) Westbound				(3) Southbound				(4) Eastbound			
Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
0730 - 0745	1	20	19	0	19	1	24	0	19	32	2	1	3	6	7	4
0745 - 0800	2	26	53	5	46	11	18	1	33	50	3	5	4	16	7	13
0800 - 0815	1	56	9	4	26	3	37	4	13	51	1	2	2	0	14	6
0815 - 0830	2	31	15	1	25	0	27	0	16	58	0	3	4	0	6	2
0915 - 0930	4	25	9	1	18	1	7	1	5	34	0	1	1	1	9	0
0930 - 0945	6	17	9	1	30	1	9	1	7	17	0	1	1	0	9	0
945 - 1000	5	9	8	4	10	0	4	1	1	17	1	0	1	0	7	0
1000 - 1015	3	16	8	4	17	1	12	2	10	24	0	1	1	0	6	1
1115 - 1130	7	28	10	3	14	1	2	1	2	18	1	0	1	2	10	1
1130 - 1145	2	19	18	7	22	2	3	0	9	22	0	1	0	1	6	0
1145 - 1200	7	18	13	0	19	0	8	0	6	27	3	0	5	1	10	0
1200 - 1215	9	25	14	4	14	1	10	0	1	39	1	0	0	0	7	3
1315 - 1330	4	17	34	1	17	0	6	0	15	23	3	1	0	1	8	3
1330 - 1345	10	31	28	3	40	4	13	0	16	27	1	2	3	2	4	1
1345 - 1400	4	12	29	2	24	0	5	0	15	36	1	3	1	1	3	3
1400 - 1415	3	27	35	0	24	4	10	0	19	27	0	0	1	6	6	14
1415 - 1430	4	34	11	3	33	7	23	1	11	25	2	5	0	3	7	25
1430 - 1445	5	31	14	5	18	2	15	0	15	39	2	1	5	1	8	7

Figure 4C-5. Warrant 4, Pedestrian Four-Hour Volume

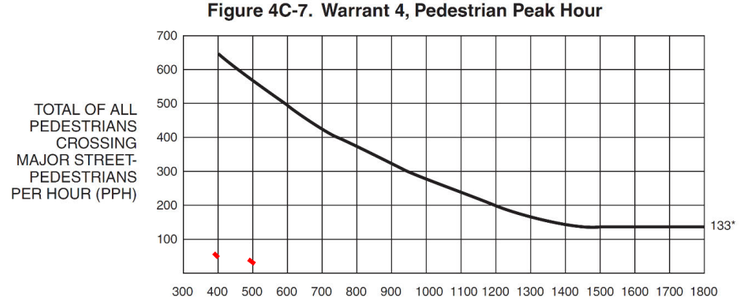


*Note: 107 pph applies as the lower threshold volume.

	Totals Entering Intersection per 15 Minute											
	Major Street			Minor Street			Peds Crossing Major Street			Peds Crossing Minor Street		
Time	NB	SB	**Total**	WB	EB	**Total**	WB	EB	**Total**	NB	SB	**Total**
0730 - 0745	40	53	**93**	44	16	**60**	0	4	**4**	0	1	**1**
0745 - 0800	81	86	**167**	75	27	**102**	1	13	**14**	5	5	**10**
0800 - 0815	66	65	**131**	66	16	**82**	4	6	**10**	4	2	**6**
0815 - 0830	48	74	**122**	52	10	**62**	0	2	**2**	1	3	**4**
0915 - 0930	38	39	**77**	26	11	**37**	1	0	**1**	1	1	**2**
0930 - 0945	32	24	**56**	40	10	**50**	1	0	**1**	1	1	**2**
945 - 1000	22	19	**41**	14	8	**22**	1	0	**1**	4	0	**4**
1000 - 1015	27	34	**61**	30	7	**37**	2	1	**3**	4	1	**5**
1115 - 1130	45	21	**66**	17	13	**30**	1	1	**2**	3	0	**3**
1130 - 1145	39	31	**70**	27	7	**34**	0	0	**0**	7	1	**8**
1145 - 1200	38	36	**74**	27	16	**43**	0	0	**0**	0	0	**0**
1200 - 1215	48	41	**89**	25	7	**32**	0	3	**3**	4	0	**4**
1315 - 1330	55	41	**96**	23	9	**32**	0	3	**3**	1	1	**2**
1330 - 1345	69	44	**113**	57	9	**66**	0	1	**1**	3	2	**5**
1345 - 1400	45	52	**97**	29	5	**34**	0	3	**3**	2	3	**5**
1400 - 1415	65	46	**111**	38	13	**51**	0	14	**14**	0	0	**0**
1415 - 1430	49	38	**87**	63	10	**73**	1	25	**26**	3	5	**8**
1430 - 1445	50	56	**106**	35	14	**49**	0	7	**7**	5	1	**6**

	Totals Entering Intersection per Hour											
	Major Street			Minor Street			Peds Crossing Major Street			Peds Crossing Minor Street		
Time	NB	SB	**Total**	WB	EB	**Total**	WB	EB	**Total**	NB	SB	**Total**
0730 - 0830	235	278	**513**	237	69	**306**	5	25	**30**	10	11	**21**
0915 - 1015	119	116	**235**	110	36	**146**	5	1	**6**	10	3	**13**
1115 - 1215	170	129	**299**	96	43	**139**	1	4	**5**	14	1	**15**
1315 - 1415	234	183	**417**	147	36	**183**	0	21	**21**	6	6	**12**
1330 - 1430	228	180	**408**	187	37	**224**	1	43	**44**	8	10	**18**
1345 - 1435	209	192	**401**	165	42	**207**	1	49	**50**	10	9	**19**

Figure 4C-7. Warrant 4, Pedestrian Peak Hour



*Note: 133 pph applies as the lower threshold volume.

Attachment E

SWITERS DATA 2019-2021

Collision Date	Collision Time	Primary Road	Secondary Road	Distance	Direction	Intersection	Weather 1	Primary Collision Factor	PCF Violation Category
20191105	1944	N PARK VICTORIA DR	KENNEDY DR	0		Y	A	A	5
20200524	2346	N PARK VICTORIA DR	KENNEDY DR	0		Y	A	A	7
20200625	1854	N PARK VICTORIA DR	KENNEDY DR	0		Y	A	A	12
20210118	1517	N PARK VICTORIA DR	KENNEDY DR	0		Y	A	A	3

Weather 1
A - Clear
B - Cloudy
C - Raining
D - Snowing
E - Fog
F - Other
G - Wind
- - Not Stated

Primary Collision Factor
A - (Vehicle) Code Violation
B - Other Improper Driving
C - Other Than Driver
D - Unknown
E - Fell Asleep
- - Not Stated

PCF Violation Category
01 - Driving or Bicycling Under the Influence of Alcohol or Drug
02 - Impeding Traffic
03 - Unsafe Speed
04 - Following Too Closely
05 - Wrong Side of Road
06 - Improper Passing
07 - Unsafe Lane Change
08 - Improper Turning
09 - Automobile Right of Way
10 - Pedestrian Right of Way
11 - Pedestrian Violation
12 - Traffic Signals and Signs
13 - Hazardous Parking
14 - Lights
15 - Brakes
16 - Other Equipment
17 - Other Hazardous Violation
18 - Other Than Driver (or Pedestrian)
19 -
20 -
21 - Unsafe Starting or Backing
22 - Other Improper Driving
23 - Pedestrian or "Other" Under the Influence of Alcohol or Drug
24 - Fell Asleep
00 - Unknown
- - Not Stated

Not correctable by a Traffic Signal