

San Diego County Traffic Advisory Committee



Committee Secretary
5510 Overland Avenue #410, Room 470, M.S. 0-334
San Diego, California 92123-1239
(858) 694-3843

Represented Agencies

County of San Diego Fire Authority
California Department of
Transportation
California Highway Patrol
Independent Insurance Agents
& Brokers of San Diego
San Diego County Bicycle Coalition
San Diego County Department of
Public Works
San Diego County Office of Education
Pacific Safety Center
San Diego County Sheriff's
Department

September 2, 2022

TO: Community Planning/Sponsor Group Chairpersons

FROM: Secretary, Traffic Advisory Committee

MEETING NOTICE

Attached is the preliminary agenda for the September 9, 2022 meeting of the Traffic Advisory Committee (TAC).

This TAC meeting on September 9, 2022, will be conducted with a virtual meeting platform option. Please use this link below to join the meeting:

Join on your computer or mobile app

[Click here to join the meeting](#)

Meeting ID: 217 098 372 301

Passcode: 8AuEQH

Or call in (audio only)

[+1 619-343-2539,,263905251#](#) United States, San Diego

Phone Conference ID: 263 905 251#

[Find a local number](#) | [Learn More](#)

Your community group may have previously provided formal input on these matters and your group's recommendations would be included as part of the Chief Administrative Officer's report to the Board of Supervisors along with TAC recommendations. The Board of Supervisors will make a final decision as to what action will be taken after reviewing TAC recommendations and community group input, when available.

If your community planning/sponsor group representative would like to attend the TAC meeting and participate in the discussion of an item on this agenda, or if you do have any questions or need additional information regarding this procedure, please contact me at (858) 694-3843. TAC staff is available to provide background information on items and to answer questions you may have.

Very truly yours,

Kenton R. Jones, Secretary
San Diego County Traffic Advisory Committee

KRJ:sh

Attachment



SAN DIEGO COUNTY TRAFFIC ADVISORY COMMITTEE

September 9, 2022 ~ 9:00 AM

5510 Overland Ave, Room 271

San Diego CA, 92123

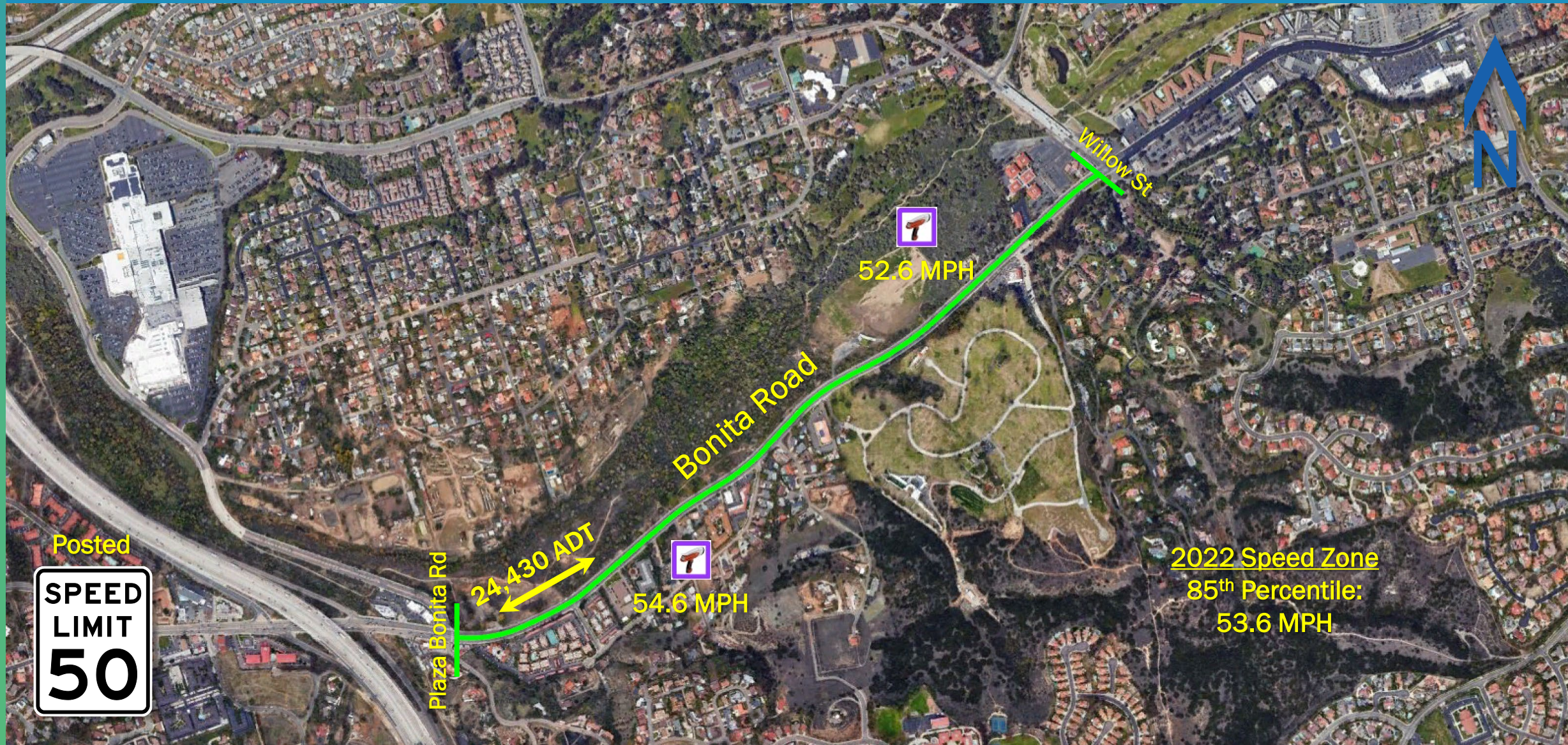
AGENDA

- I. Call to Order / Roll Call**
- II. Pledge of Allegiance**
- III. Approval of Minutes**
- IV. Announcements / Public Forum**
- V. Items for Review**

SUBJECT	LOCATION	AREA/ PLANNING/SPONSOR GROUP
<u>SUPERVISORIAL DISTRICT 1</u>		
1-A. RADAR CERTIFICATION	BONITA ROAD PLAZA BONITA ROAD TO WILLOW STREET	BONITA/ SWEETWATER CPG
1-B. RADAR CERTIFICATION	BONITA ROAD CHULA VISTA CITY LIMIT TO SWEETWATER ROAD	BONITA/ SWEETWATER CPG
1-C. INTERSECTION CONTROLS	JAMACHA ROAD & DARBY STREET	SPRING VALLEY/ SPRING VALLEY CPG
<u>SUPERVISORIAL DISTRICT 2</u>		
2-A. RADAR CERTIFICATION	CHANNEL ROAD JULIAN AVENUE TO LAKESIDE AVENUE	LAKESIDE/ LAKESIDE
2-B. RADAR CERTIFICATION	VIEJAS GRADE VIEJAS BL TO ANDERSON RANCH ROAD	DESCANSO/ ALPINE CPG
<u>SUPERVISORIAL DISTRICT 4</u>		
4-A. RADAR CERTIFICATION	GROSSMONT BOULEVARD LA MESA CITY LIMIT TO LA MESA CITY LIMIT	GROSSMONT/ VALLE DE ORO CPG
<u>SUPERVISORIAL DISTRICT 5</u>		
5-A. RADAR CERTIFICATION	OLD RIVER ROAD GOLF CLUB DRIVE TO CAMINO DEL REY	VALLEY CENTER/ VALLEY CENTER CPG
<u>ALL SUPERVISORIAL DISTRICTS</u>		
A. COUNTY STANDARDS	COUNTY SIGHT DISTANCE STANDARDS	ALL/ ALL CPGs & CSGs

Bonita Road

Plaza Bonita Road to Willow Street (1.22 miles)



SAN DIEGO COUNTY TRAFFIC ADVISORY COMMITTEE

COMMITTEE REPORT OF: September 9, 2022

Item **1-A**

SUPERVISORIAL DISTRICT: 1

SUBJECT: Radar Certification

LOCATION: Bonita Road from Chula Vista city limit (near Plaza Bonita) Road to Chula Vista city limit (near Willow Street) (a distance of 1.22 miles) BONITA (Thos. Bros. 1310-E5)

INITIATED BY: DPW Traffic Engineering

REQUEST: Radar Recertification

PROBLEM AS STATED BY REQUESTER:

Bonita Road from Plaza Bonita Road to Willow Street has a posted speed limit of 50 MPH. A preliminary review of prevailing speeds and roadway conditions could support radar recertification of the existing 50 MPH speed limit on Bonita Road Plaza Bonita Road to Willow Street.

Existing Traffic Devices

Bonita Road is a divided four-lane road with a pavement between 80 and 90 feet. The roadway is striped with bike lanes, lane lines, and two-way left turn lane. Bonita Road is classified as a Major Road on the County General Plan Mobility Element Network. The roadway has a posted speed limit of 50 MPH.

Average Daily Traffic Volumes

	<u>7/22</u>	<u>04/15</u>
Bonita Road:		
200' W/o Andorra Way	24,430	29,500

		<u>85th Percentile</u>	<u>10 MPH Pace</u>	<u>% in Pace</u>
<u>Speed Data</u>				
Bonita Road:				
150' W/o Cordelle Lane	(2022)	54.6 MPH	45-54	75.0%
	(2015)	53.6 MPH	44-53	65.0%
1,450' W/o Willow Street	(2022)	52.6 MPH	45-54	79.0%
	(2015)	52.4 MPH	41-50	65.0%
Speed Zone	(2022)	53.6 MPH	45-54	77.0%
	(2015)	53.0 MPH	43-52	65.0%

Collision Data

There have been 5 reported collisions, 2 of which involved an injury, along this segment

of roadway in a 3-year period (04-01-19 to 03-31-22). These collisions result in a segment accident rate of 0.15 collisions per million vehicle miles. The statewide average is 1.28 collisions per million vehicle miles for similar suburban divided 4 lanes with speeds less than or equal to 55 MPH.

VOLUME

Bonita Rd 200' W/O Andorra Way

Day: Wednesday
Date: 7/6/2022City: Chula Vista
Project #: CA22_040111_003

DAILY TOTALS					NB	SB						EB	WB						Total
					0	0						12,395	12,035						24,430
AM Period	NB	SB	EB	WB	TOTAL		PM Period	NB	SB	EB	WB	TOTAL							TOTAL
0:00			19	7	26		12:00			181	236	417							
0:15			15	12	27		12:15			198	206	404							
0:30			12	11	23		12:30			211	227	438							
0:45			18	64	6	36	12:45			203	793	211	880	414	1673				
1:00			9	4	13		13:00			194	233	427							
1:15			10	3	13		13:15			218	245	463							
1:30			6	10	16		13:30			212	203	415							
1:45			9	34	3	20	13:45			248	872	172	853	420	1725				
2:00			6	3	9		14:00			224	206	430							
2:15			5	2	7		14:15			224	217	441							
2:30			7	9	16		14:30			197	168	365							
2:45			4	22	10	24	14:45			260	905	211	802	471	1707				
3:00			4	4	8		15:00			247	229	476							
3:15			6	14	20		15:15			267	217	484							
3:30			8	8	16		15:30			227	209	436							
3:45			6	24	9	35	15:45			242	983	189	844	431	1827				
4:00			4	13	17		16:00			282	204	486							
4:15			11	12	23		16:15			248	192	440							
4:30			19	19	38		16:30			298	190	488							
4:45			13	47	29	73	16:45			284	1112	192	778	476	1890				
5:00			24	45	69		17:00			237	236	473							
5:15			23	49	72		17:15			255	205	460							
5:30			33	69	102		17:30			236	170	406							
5:45			58	138	58	221	17:45			281	1009	170	781	451	1790				
6:00			57	94	151		18:00			266	202	468							
6:15			63	97	160		18:15			240	199	439							
6:30			73	107	180		18:30			193	187	380							
6:45			111	304	92	390	18:45			186	885	164	752	350	1637				
7:00			94	122	216		19:00			164	182	346							
7:15			114	118	232		19:15			185	157	342							
7:30			124	151	275		19:30			150	165	315							
7:45			176	508	180	571	19:45			166	665	160	664	326	1329				
8:00			160	147	307		20:00			146	184	330							
8:15			172	153	325		20:15			128	140	268							
8:30			187	206	393		20:30			137	114	251							
8:45			198	717	190	696	20:45			105	516	129	567	234	1083				
9:00			164	200	364		21:00			88	100	188							
9:15			179	185	364		21:15			78	66	144							
9:30			168	215	383		21:30			89	64	153							
9:45			216	727	196	796	21:45			63	318	38	268	101	586				
10:00			171	203	374		22:00			53	61	114							
10:15			164	217	381		22:15			62	50	112							
10:30			183	198	381		22:30			52	42	94							
10:45			199	717	214	832	22:45			35	202	34	187	69	389				
11:00			169	229	398		23:00			42	25	67							
11:15			154	208	362		23:15			28	18	46							
11:30			172	222	394		23:30			33	22	55							
11:45			211	706	226	885	23:45			24	127	15	80	39	207				
TOTALS			4008	4579	8587		TOTALS			8387	7456	15843							
SPLIT %			46.7%	53.3%	35.1%		SPLIT %			52.9%	47.1%	64.9%							

DAILY TOTALS					NB	SB						EB	WB						Total
					0	0						12,395	12,035						24,430
AM Peak Hour			11:45	11:45	11:45		PM Peak Hour			16:00	12:30	16:30							
AM Pk Volume			801	895	1696		PM Pk Volume			1112	916	1897							
Pk Hr Factor			0.949	0.948	0.968		Pk Hr Factor			0.933	0.935	0.972							
7 - 9 Volume	0	0	1225	1267	2492		4 - 6 Volume	0	0	2121	1559	3680							
7 - 9 Peak Hour			8:00	8:00	8:00		4 - 6 Peak Hour			16:00	16:30	16:30							
7 - 9 Pk Volume	0	0	717	696	1413		4 - 6 Pk Volume	0	0	1112	823	1897							
Pk Hr Factor	0.000	0.000	0.905	0.845	0.899		Pk Hr Factor	0.000	0.000	0.933	0.872	0.972							



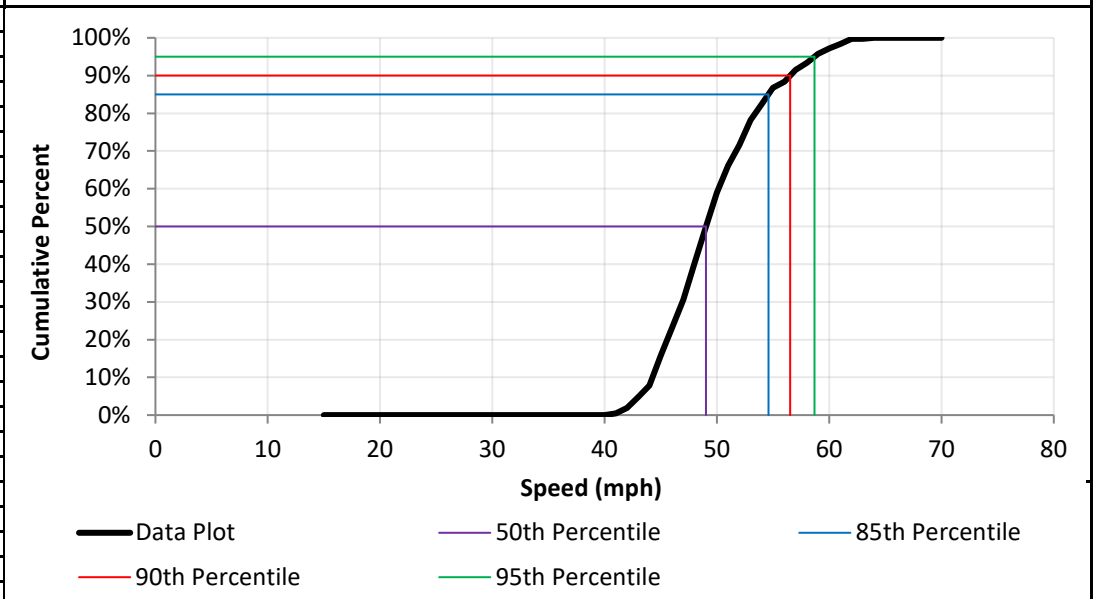
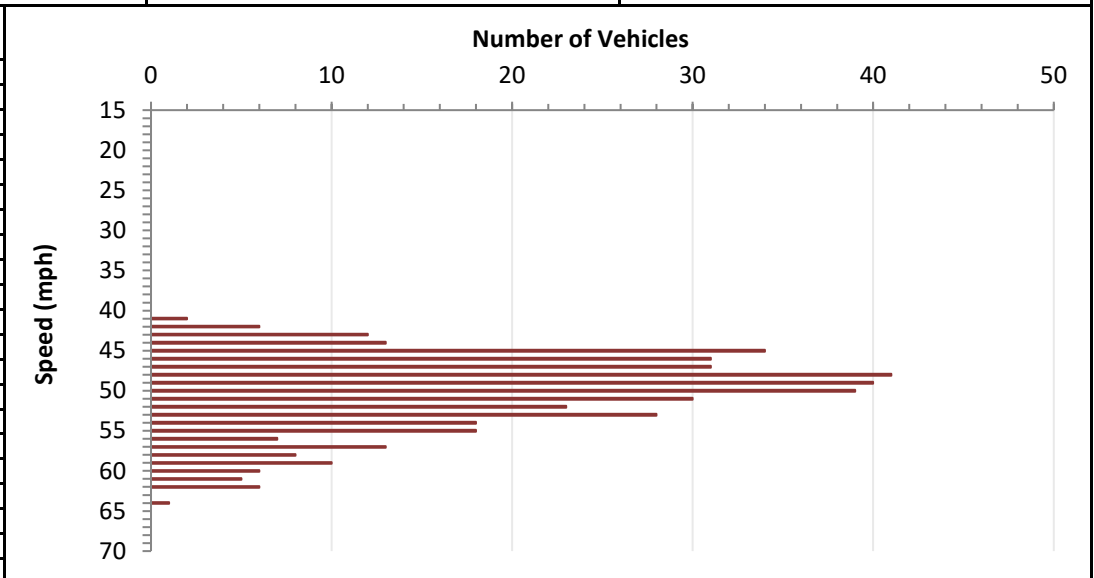
RADAR SPEED SURVEY

SAN DIEGO COUNTY DEPT OF PUBLIC WORKS

Road Name:	Bonita Rd	From:	Plaza Bonita Rd	To:	Willow Rd
Position:	150' E/o Cordelle Ln	Direction:	EB/WB		

Date:	7/6/2022	Weather:	Clear	Project Number:	22-040112-003
Time Start:	11:00 AM	Road Condition:	Dry	Observer:	Contractor
Time End:	1:00 PM	Posted Speed:	50 MPH	Calibration Test:	Y

Speed (mph)	Num. Veh.	Cum. Pct.
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		
31		
32		
33		
34		
35		
36		
37		
38		
39		
40		
41	2	0.5%
42	6	1.9%
43	12	4.7%
44	13	7.8%
45	34	15.9%
46	31	23.2%
47	31	30.6%
48	41	40.3%
49	40	49.8%
50	39	59.0%
51	30	66.1%
52	23	71.6%
53	28	78.2%
54	18	82.5%
55	18	86.7%
56	7	88.4%
57	13	91.5%
58	8	93.4%
59	10	95.7%
60	6	97.2%
61	5	98.3%
62	6	99.8%
63		
64	1	100.0%
65		
66		
67		
68		
69		
70		
Total	422	



DATA ANALYSIS

Average Speed	50.2	Range	41 - 64
50th Percentile	49.0	10 mph Pace	45 - 54
85th Percentile	54.6	Number in Pace	315
90th Percentile	56.5	Percent in Pace	75%
95th Percentile	58.7		



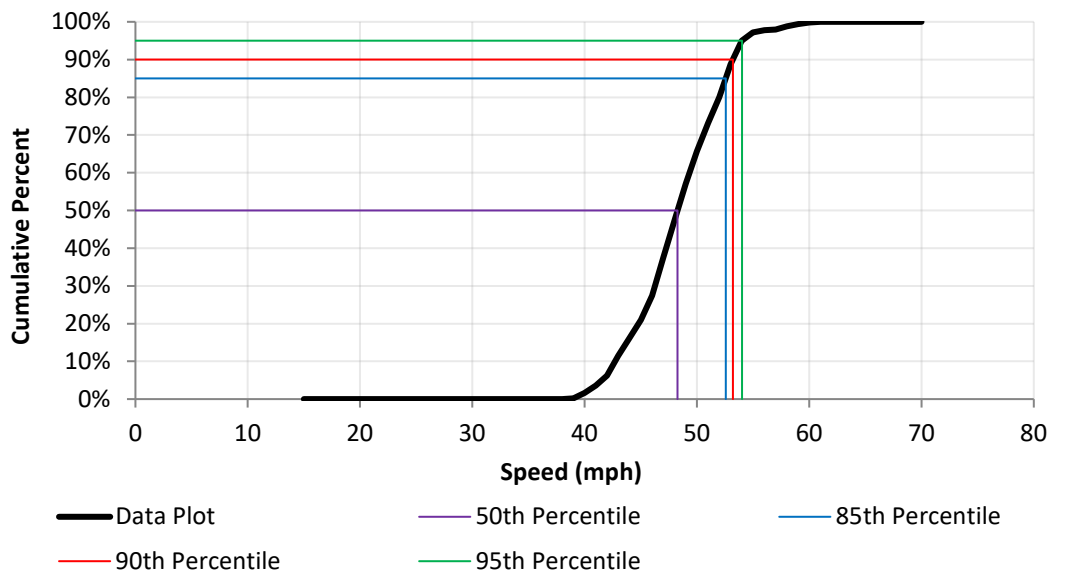
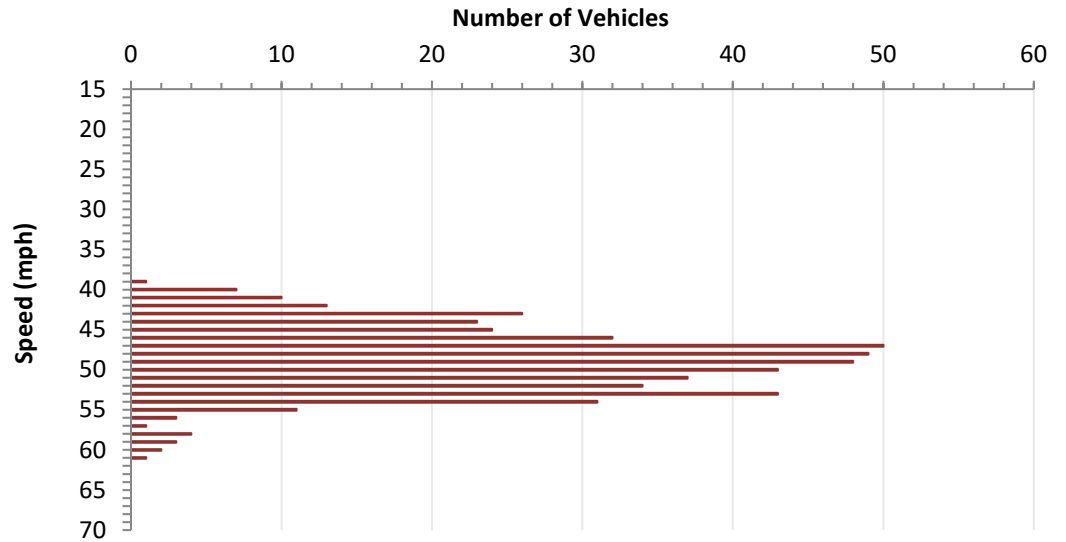
RADAR SPEED SURVEY

SAN DIEGO COUNTY DEPT OF PUBLIC WORKS

Road Name:	Bonita Rd	From:	Plaza Bonita Rd	To:	Willow St
Position:	1,450' W/o Willow St	Direction:	EB/WB		

Date:	7/6/2022	Weather:	Clear	Project Number:	22-040112-002
Time Start:	1:00 PM	Road Condition:	Dry	Observer:	Contractor
Time End:	3:00 PM	Posted Speed:	50 MPH	Calibration Test:	Y

Speed (mph)	Num. Veh.	Cum. Pct.
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		
31		
32		
33		
34		
35		
36		
37		
38		
39	1	0.2%
40	7	1.6%
41	10	3.6%
42	13	6.3%
43	26	11.5%
44	23	16.1%
45	24	21.0%
46	32	27.4%
47	50	37.5%
48	49	47.4%
49	48	57.1%
50	43	65.7%
51	37	73.2%
52	34	80.0%
53	43	88.7%
54	31	95.0%
55	11	97.2%
56	3	97.8%
57	1	98.0%
58	4	98.8%
59	3	99.4%
60	2	99.8%
61	1	100.0%
62		
63		
64		
65		
66		
67		
68		
69		
70		
Total	496	

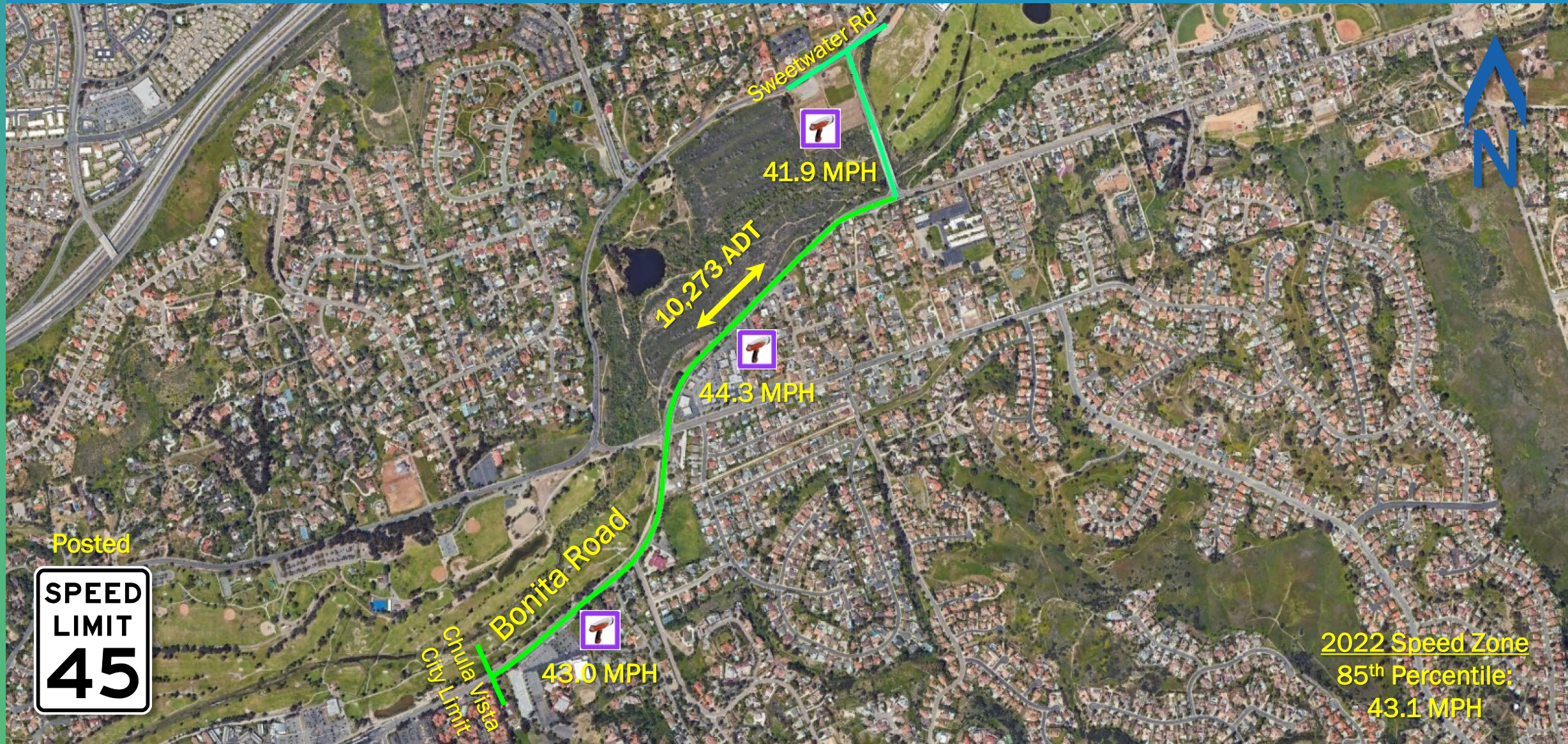


DATA ANALYSIS

Average Speed	48.8	Range	39 - 61
50th Percentile	48.3	10 mph Pace	45 - 54
85th Percentile	52.6	Number in Pace	391
90th Percentile	53.2	Percent in Pace	79%
95th Percentile	54.0		

Bonita Road

Chula Vista City Limit (east of Bonita Christian Center) to Sweetwater Road
(1.39 miles)



SAN DIEGO COUNTY TRAFFIC ADVISORY COMMITTEE

COMMITTEE REPORT OF: September 9, 2022

Item 1-B

SUPERVISORIAL DISTRICT: 1

SUBJECT: Radar Certification

LOCATION: Bonita Road from Chula Vista city limit (near Bonita Christian Center Drive) to Sweetwater Road (a distance of 1.39 miles) BONITA (Thos. Bros. 1310-H3)

INITIATED BY: DPW Traffic Engineering

REQUEST: Radar Recertification

PROBLEM AS STATED BY REQUESTER:

Bonita Road from Chula Vista city limit (near Bonita Christian Center Drive) to Sweetwater has a posted speed limit of 45 MPH. A preliminary review of prevailing speeds and roadway conditions could support radar certification of a 40 MPH speed limit on Bonita Road from Chula Vista city limits (near Bonita Christian Center Drive) to Sweetwater Road.

Existing Traffic Devices

Bonita Road is a divided two-lane road between with a pavement width between 40 and 65 feet. Bonita Road is striped with a two-way left turn lane and bike lanes on both sides of the roadway. There are portions of Bonita Road that are striped with divided three and four lane roadway. The roadway has an intersection advisory sign, fire station advisory sign and a 20 MPH advisory turn. Bonita Road is classified as a Major Road on the County General Plan Mobility Element Network between Chula Vista city limit to Central Avenue. Bonita Road is classified as a Community Collector Road on the County General Plan Mobility Element Network from Central Avenue to Sweetwater Road. The roadway has a posted speed limit of 45 MPH Radar Enforced.

Average Daily Traffic Volumes

	<u>07/22</u>	<u>04/14</u>
Bonita Road:		
200' N/o Central Avenue	8,730	9,970
200' S/o Sweetwater Road	11,815	

<u>Speed Data</u>		<u>85th Percentile</u>	<u>10 MPH Pace</u>	<u>% in Pace</u>
Bonita Road:				
300' W/o Palm Drive	(2022)	43.0 MPH	35-44	88.0%
500' W/o Frisbie Street	(2022)	44.3 MPH	34-43	68.0%
	(2015)	46.7 MPH	35-44	71.0%
700' S/o Sweetwater Road	(2022)	41.9 MPH	33-42	72.0%

Speed Zone	(2022)	43.1 MPH	34-43	76.0%
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Collision Data

There have been 15 reported collisions, 8 of which involved an injury, along this segment of roadway in a 3-year period (04-01-19 to 03-31-22). These collisions result in a segment accident rate of 0.96 collisions per million vehicle miles. The statewide average is 0.93 collisions per million vehicle miles for similar suburban undivided 4 lanes with speeds less than or equal to 55 MPH. There is an additional accident which misses the cut off

VOLUME

Bonita Rd 200' N/O Central Ave

Day: Wednesday
Date: 7/6/2022City: Bonita
Project #: CA22_040111_002

DAILY TOTALS					NB	SB	EB					WB	Total
					4,795	3,935	0					0	8,730
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL		
0:00	10	7			17	12:00	68	69			137		
0:15	6	1			7	12:15	70	67			137		
0:30	7	3			10	12:30	82	50			132		
0:45	3	26	3	14	6	12:45	81	301	59	245	140	546	
1:00	2	2			4	13:00	81	54			135		
1:15	3	1			4	13:15	79	56			135		
1:30	2	1			3	13:30	68	47			115		
1:45	5	12	2	6	7	13:45	86	314	58	215	144	529	
2:00	1	0			1	14:00	83	74			157		
2:15	2	1			3	14:15	107	65			172		
2:30	2	3			5	14:30	101	60			161		
2:45	0	5	0	4	0	14:45	88	379	100	299	188	678	
3:00	1	1			2	15:00	95	65			160		
3:15	2	2			4	15:15	93	67			160		
3:30	2	1			3	15:30	83	89			172		
3:45	7	12	4	8	11	15:45	104	375	67	288	171	663	
4:00	6	3			9	16:00	84	72			156		
4:15	3	2			5	16:15	132	65			197		
4:30	1	4			5	16:30	97	97			194		
4:45	2	12	9	18	11	16:45	107	420	85	319	192	739	
5:00	10	5			15	17:00	145	97			242		
5:15	10	11			21	17:15	105	71			176		
5:30	13	8			21	17:30	105	69			174		
5:45	19	52	15	39	34	17:45	97	452	76	313	173	765	
6:00	16	14			30	18:00	85	63			148		
6:15	35	25			60	18:15	109	74			183		
6:30	30	30			60	18:30	107	62			169		
6:45	40	121	37	106	77	18:45	66	367	72	271	138	638	
7:00	40	34			74	19:00	67	89			156		
7:15	40	44			84	19:15	65	83			148		
7:30	42	53			95	19:30	69	73			142		
7:45	55	177	53	184	108	19:45	68	269	67	312	135	581	
8:00	51	41			92	20:00	55	57			112		
8:15	76	65			141	20:15	57	57			114		
8:30	73	72			145	20:30	69	54			123		
8:45	88	288	56	234	144	20:45	41	222	30	198	71	420	
9:00	67	72			139	21:00	40	29			69		
9:15	55	56			111	21:15	35	35			70		
9:30	62	63			125	21:30	26	18			44		
9:45	52	236	57	248	109	21:45	37	138	18	100	55	238	
10:00	56	44			100	22:00	20	16			36		
10:15	64	52			116	22:15	22	19			41		
10:30	68	46			114	22:30	24	13			37		
10:45	62	250	54	196	116	22:45	16	82	12	60	28	142	
11:00	51	52			103	23:00	12	15			27		
11:15	57	55			112	23:15	8	11			19		
11:30	67	48			115	23:30	6	8			14		
11:45	72	247	64	219	136	23:45	12	38	5	39	17	77	
TOTALS	1438	1276			2714	TOTALS	3357	2659			6016		
SPLIT %	53.0%	47.0%			31.1%	SPLIT %	55.8%	44.2%			68.9%		

DAILY TOTALS					NB	SB						EB	WB	Total
					4,795	3,935						0	0	8,730
AM Peak Hour	8:15	8:15			8:15	PM Peak Hour	16:15	16:30			16:15			
AM Pk Volume	304	265			569	PM Pk Volume	481	350			825			
Pk Hr Factor	0.864	0.920			0.981	Pk Hr Factor	0.829	0.902			0.852			
7 - 9 Volume	465	418	0	0	883	4 - 6 Volume	872	632	0	0	1504			
7 - 9 Peak Hour	8:00	8:00			8:00	4 - 6 Peak Hour	16:15	16:30			16:15			
7 - 9 Pk Volume	288	234	0	0	522	4 - 6 Pk Volume	481	350	0	0	825			
Pk Hr Factor	0.818	0.813	0.000	0.000	0.900	Pk Hr Factor	0.829	0.902	0.000	0.000	0.852			

VOLUME

Bonita Rd 200' S/O Sweetwater Rd

Day: Wednesday
Date: 7/6/2022City: Bonita
Project #: CA22_040111_001

DAILY TOTALS					NB	SB						EB	WB	Total
					6,139	5,676						0	0	11,815
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL			
0:00	16	15			31	12:00	95	91			186			
0:15	13	10			23	12:15	90	70			160			
0:30	15	16			31	12:30	114	63			177			
0:45	6	50	6	47	12	12:45	97	396	72	296	169	692		
1:00	6	6			12	13:00	116	75			191			
1:15	5	9			14	13:15	86	90			176			
1:30	5	3			8	13:30	104	70			174			
1:45	7	23	3	21	10	13:45	93	399	106	341	199	740		
2:00	4	2			6	14:00	96	86			182			
2:15	3	1			4	14:15	97	113			210			
2:30	2	7			9	14:30	104	100			204			
2:45	4	13	1	11	5	14:45	121	418	106	405	227	823		
3:00	11	1			12	15:00	112	123			235			
3:15	1	4			5	15:15	126	105			231			
3:30	2	4			6	15:30	91	119			210			
3:45	1	15	4	13	5	15:45	106	435	113	460	219	895		
4:00	11	5			16	16:00	97	126			223			
4:15	10	8			18	16:15	112	127			239			
4:30	12	12			24	16:30	137	137			274			
4:45	14	47	12	37	26	16:45	101	447	146	536	247	983		
5:00	18	5			23	17:00	130	143			273			
5:15	37	15			52	17:15	132	116			248			
5:30	37	12			49	17:30	108	138			246			
5:45	42	134	28	60	70	17:45	109	479	133	530	242	1009		
6:00	55	23			78	18:00	107	106			213			
6:15	57	37			94	18:15	101	140			241			
6:30	73	38			111	18:30	104	113			217			
6:45	62	247	62	160	124	18:45	87	399	88	447	175	846		
7:00	79	46			125	19:00	95	84			179			
7:15	72	67			139	19:15	92	97			189			
7:30	71	74			145	19:30	102	50			152			
7:45	62	284	74	261	136	19:45	88	377	65	296	153	673		
8:00	72	63			135	20:00	66	65			131			
8:15	79	82			161	20:15	82	60			142			
8:30	82	93			175	20:30	67	75			142			
8:45	93	326	112	350	205	20:45	67	282	44	244	111	526		
9:00	88	65			153	21:00	61	38			99			
9:15	91	67			158	21:15	51	45			96			
9:30	73	76			149	21:30	40	30			70			
9:45	84	336	67	275	151	21:45	45	197	23	136	68	333		
10:00	97	60			157	22:00	44	23			67			
10:15	65	64			129	22:15	35	30			65			
10:30	86	64			150	22:30	30	22			52			
10:45	81	329	80	268	161	22:45	17	126	25	100	42	226		
11:00	77	74			151	23:00	18	25			43			
11:15	73	71			144	23:15	22	15			37			
11:30	84	79			163	23:30	14	17			31			
11:45	81	315	86	310	167	23:45	11	65	15	72	26	137		
TOTALS	2119	1813			3932	TOTALS	4020	3863			7883			
SPLIT %	53.9%	46.1%			33.3%	SPLIT %	51.0%	49.0%			66.7%			

DAILY TOTALS				NB	SB	EBWB				Total	
				6,139	5,676					0	0
AM Peak Hour	11:45	8:15			8:15	PM Peak Hour	16:30	16:15			16:30
AM Pk Volume	380	352			694	PM Pk Volume	500	553			1042
Pk Hr Factor	0.833	0.786			0.846	Pk Hr Factor	0.912	0.947			0.951
7 - 9 Volume	610	611	0	0	1221	4 - 6 Volume	926	1066	0	0	1992
7 - 9 Peak Hour	8:00	8:00			8:00	4 - 6 Peak Hour	16:30	16:15			16:30
7 - 9 Pk Volume	326	350	0	0	676	4 - 6 Pk Volume	500	553	0	0	1042
Pk Hr Factor	0.876	0.781	0.000	0.000	0.824	Pk Hr Factor	0.912	0.947	0.000	0.000	0.951



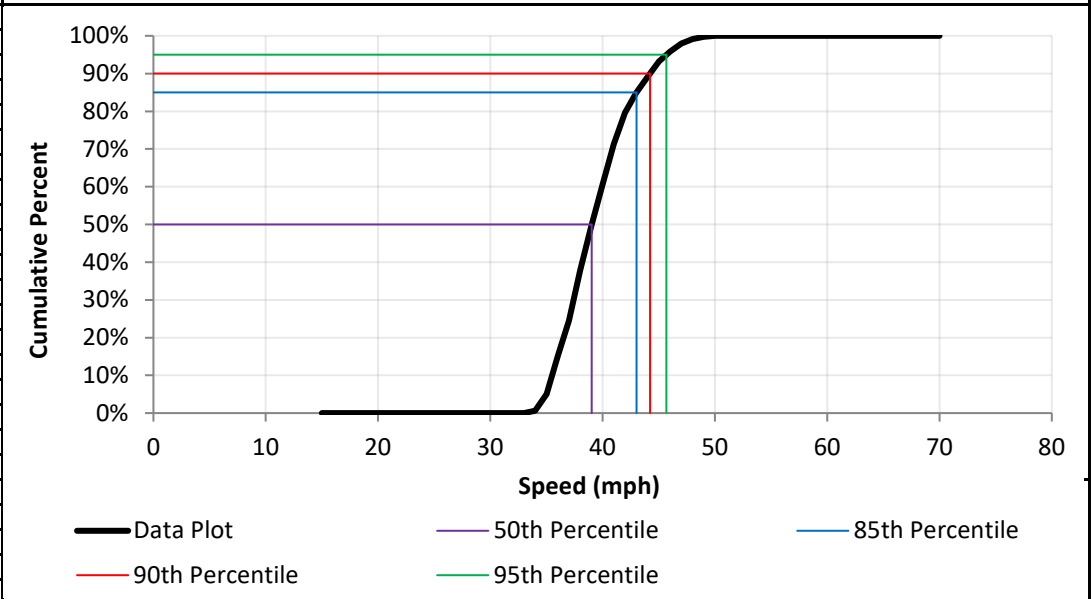
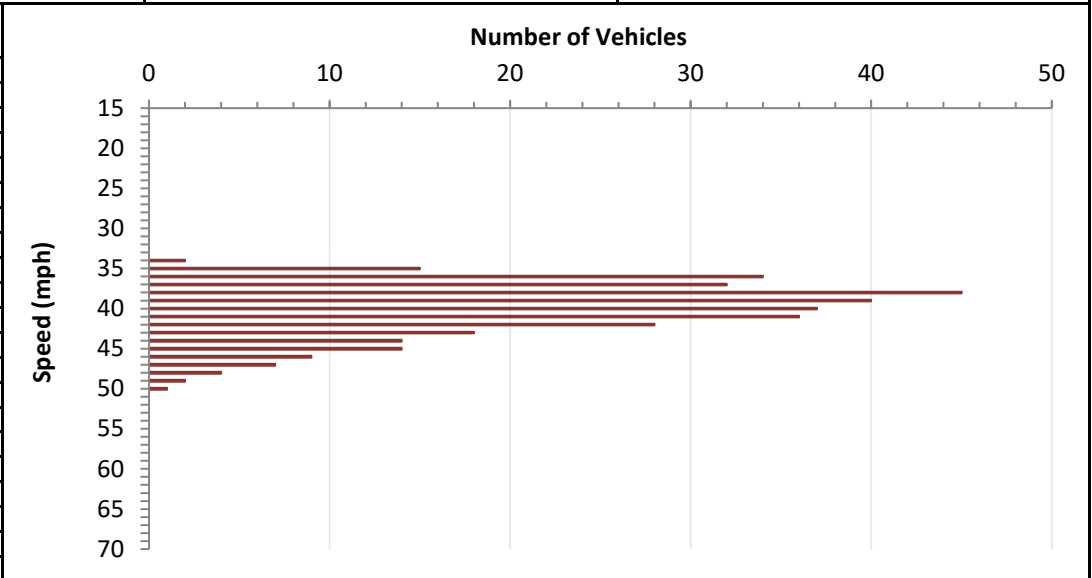
RADAR SPEED SURVEY

SAN DIEGO COUNTY DEPT OF PUBLIC WORKS

Road Name:	Bonita Rd	From:	Chula Vista city limit	To:	Sweetwater Rd
Position:	300' W/o Palm Dr	Direction:	EB/WB		

Date:	7/6/2022	Weather:	Clear	Project Number:	22-040112-001
Time Start:	9:00 AM	Road Condition:	Dry	Observer:	Contractor
Time End:	11:00 AM	Posted Speed:	45 MPH	Calibration Test:	Y

Speed (mph)	Num. Veh.	Cum. Pct.
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		
31		
32		
33		
34	2	0.6%
35	15	5.0%
36	34	15.1%
37	32	24.6%
38	45	37.9%
39	40	49.7%
40	37	60.7%
41	36	71.3%
42	28	79.6%
43	18	84.9%
44	14	89.1%
45	14	93.2%
46	9	95.9%
47	7	97.9%
48	4	99.1%
49	2	99.7%
50	1	100.0%
51		
52		
53		
54		
55		
56		
57		
58		
59		
60		
61		
62		
63		
64		
65		
66		
67		
68		
69		
70		
Total	338	



DATA ANALYSIS

Average Speed	40.0	Range	34 - 50
50th Percentile	39.0	10 mph Pace	35 - 44
85th Percentile	43.0	Number in Pace	299
90th Percentile	44.2	Percent in Pace	88%
95th Percentile	45.7		



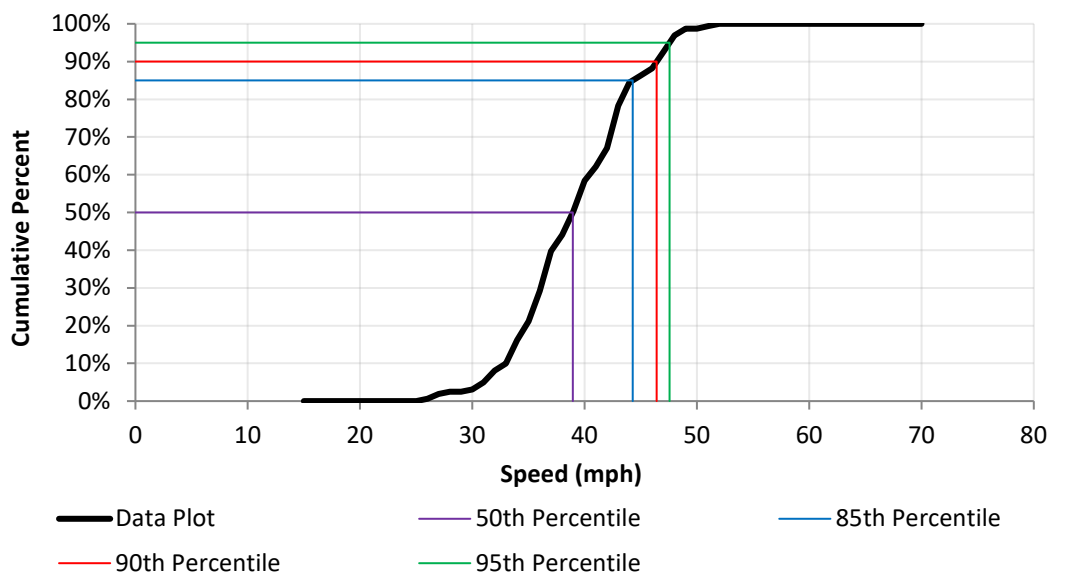
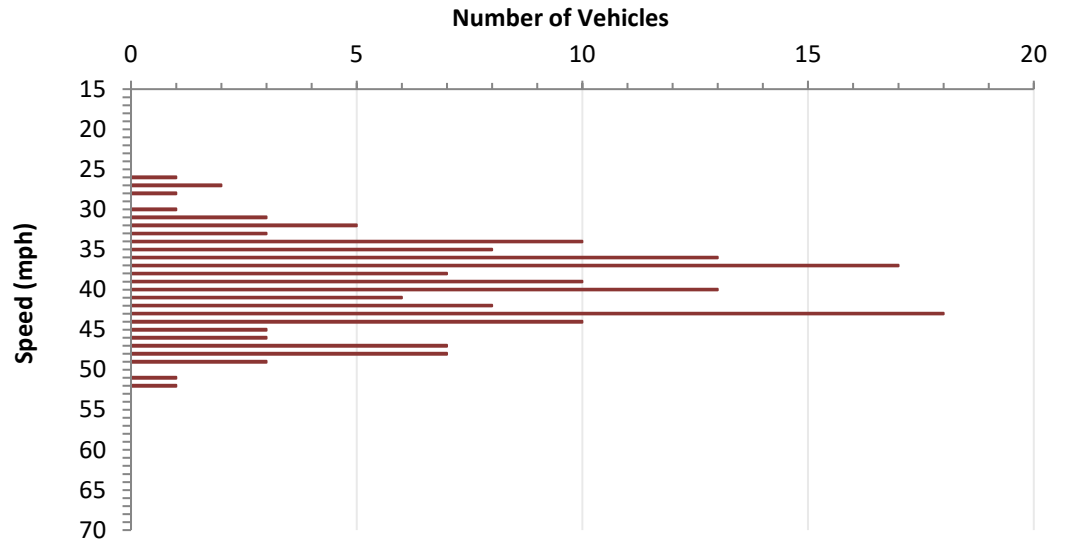
RADAR SPEED SURVEY

SAN DIEGO COUNTY DEPT OF PUBLIC WORKS

Road Name:	Bonita Road	From:	Frisbie St	To:	End of County Maintenance
Position:	500' W/o Frisbie St	Direction:	WB/EB		

Date:	8/16/2022	Weather:	Clear, Sunny	Project Number:	N/A
Time Start:	10:43am	Road Condition:	Dry	Observer:	County
Time End:	11:30am	Posted Speed:	45 MPH	Calibration Test:	Y

Speed (mph)	Num. Veh.	Cum. Pct.
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26	1	0.6%
27	2	1.9%
28	1	2.5%
29		
30	1	3.1%
31	3	5.0%
32	5	8.1%
33	3	9.9%
34	10	16.1%
35	8	21.1%
36	13	29.2%
37	17	39.8%
38	7	44.1%
39	10	50.3%
40	13	58.4%
41	6	62.1%
42	8	67.1%
43	18	78.3%
44	10	84.5%
45	3	86.3%
46	3	88.2%
47	7	92.5%
48	7	96.9%
49	3	98.8%
50		
51	1	99.4%
52	1	100.0%
53		
54		
55		
56		
57		
58		
59		
60		
61		
62		
63		
64		
65		
66		
67		
68		
69		
70		
Total	161	



DATA ANALYSIS

Average Speed	39.5	Range	26 - 52
50th Percentile	39.0	10 mph Pace	34 - 43
85th Percentile	44.3	Number in Pace	110
90th Percentile	46.4	Percent in Pace	68%
95th Percentile	47.6		



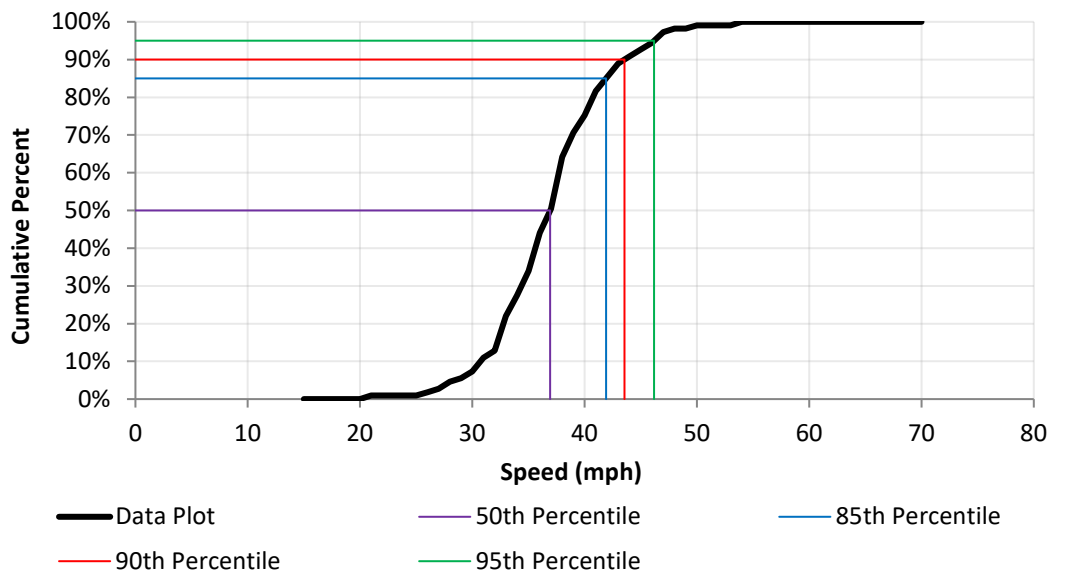
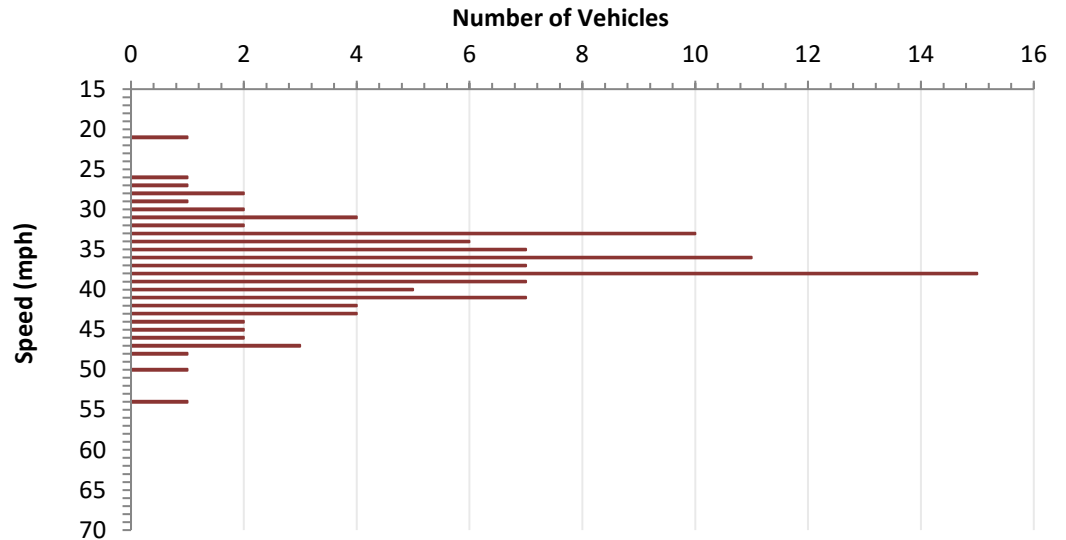
RADAR SPEED SURVEY

SAN DIEGO COUNTY DEPT OF PUBLIC WORKS

Road Name:	Bonita Road	From:	Sweetwater Road	To:	End of County Maintenance
Position:	700' S/o Sweetwater Rd	Direction:	NB/SB		

Date:	8/18/2022	Weather:	Clear, Sunny	Project Number:	N/A
Time Start:	11:00am	Road Condition:	Dry	Observer:	County
Time End:	11:40am	Posted Speed:	45 MPH	Calibration Test:	Y

Speed (mph)	Num. Veh.	Cum. Pct.
15		
16		
17		
18		
19		
20		
21	1	0.9%
22		
23		
24		
25		
26	1	1.8%
27	1	2.8%
28	2	4.6%
29	1	5.5%
30	2	7.3%
31	4	11.0%
32	2	12.8%
33	10	22.0%
34	6	27.5%
35	7	33.9%
36	11	44.0%
37	7	50.5%
38	15	64.2%
39	7	70.6%
40	5	75.2%
41	7	81.7%
42	4	85.3%
43	4	89.0%
44	2	90.8%
45	2	92.7%
46	2	94.5%
47	3	97.2%
48	1	98.2%
49		
50	1	99.1%
51		
52		
53		
54	1	100.0%
55		
56		
57		
58		
59		
60		
61		
62		
63		
64		
65		
66		
67		
68		
69		
70		
Total	109	



DATA ANALYSIS

Average Speed	37.4	Range	21 - 54
50th Percentile	36.9	10 mph Pace	33 - 42
85th Percentile	41.9	Number in Pace	79
90th Percentile	43.6	Percent in Pace	72%
95th Percentile	46.2		

Jamacha Road & Darby Street

1-C. Intersection Controls



SAN DIEGO COUNTY TRAFFIC ADVISORY COMMITTEE

COMMITTEE REPORT OF: September 9, 2022 **Item 1-C**

SUPERVISORIAL DISTRICT: 1

SUBJECT: Intersection Control

LOCATION: Jamacha Road and Darby Street, LA PRESA/SPRING VALLEY (Thos. Bros. 1290-J2)

INITIATED BY: DPW Traffic Engineering

REQUEST: Traffic Control Signal

PROBLEM AS STATED BY REQUESTER:

The intersection of Jamacha Road and Darby Street has been identified by Traffic Engineering as meeting Warrant 7, crash experience warrant, of the traffic signal warrants as described in the California Manual on Uniform Traffic Control Devices (CA MUTCD), Chapter 4C, therefore a traffic control signal should be considered.

Existing Traffic Devices

Jamacha Road is a striped four-lane divided road with two roadbeds each with 30-foot pavement width. The roadway is striped with lane lines and left yellow edgeline in both directions. The road has a left turn lane in both directions at the intersection with Darby Street. Jamacha Road is classified as a Major Road on the County General Plan Mobility Element Network. The road has a posted 45 MPH Radar Enforced speed limit.

Darby Street is a striped two-lane road with a 36-foot pavement width. The roadway is striped with a no passing centerline. The road is stop controlled in the northeast-bound and southwest-bound directions at Jamacha Road. It is unclassified on the County General Plan Mobility Element Network. The road is a posted 25 MPH residence district.

<u>Average Daily Traffic Volumes</u>	<u>07/22</u>
Jamacha Road:	
W/o Darby Street	9,156 EB
E/o Darby Street	10,469 WB
Darby Street:	
N/o Jamacha Rd	495 SB
S/o Jamacha Rd	849 SB

Collision Data

There have been 18 reported collisions, 8 of which involved injury, 1 of which involved a fatality at this intersection, within a past 5-year period (01-01-2017 to 12-31-2021). These collisions produced an intersection accident rate of 0.47 collisions per million vehicles entering the intersection. The statewide average of similar four-legged intersections with

stop & yield signs (excluding all-way) is 0.24 collision per million vehicles entering the intersection.



County of San Diego

DEPARTMENT OF PUBLIC WORKS
5510 OVERLAND AVE, SUITE 410
SAN DIEGO, CALIFORNIA 92123-1237
(858) 694-2212 FAX: (858) 694-3597
Web Site: www.sdcountry.ca.gov/dpw/

COUNTY TRAFFIC ENGINEER RECOMMENDATION

Date: August 25, 2022

Item Title: Traffic Control Signal

Location: Jamacha Road and Darby Street – Spring Valley

CTE Recommendation: **Install a Traffic Control Signal**

Conditions:

- Section 21351 of the California Vehicle Code (CVC) authorizes a local agency to place and maintain or cause to be placed and maintained traffic signs, signals and other traffic control devices upon streets and highways within their jurisdiction as may be necessary to warn and guide traffic.
- Chapter 4C "Traffic Control Signal Needs Studies" of the California Manual on Uniform Traffic Control Devices (MUTCD), provides guidance for the preparation of an engineering study of traffic conditions to determine whether a traffic control signal is justified.
- The posted speed limit on Jamacha Road is 50 MPH and 25 MPH unposted residential speed on Darby Street. The intersection total entering traffic volume (ADT) collected on March 28, 2019, is 20,970 vehicles/day.
- An engineering study (warrant analysis) following Chapter 4C of the California MUTCD guidelines, documents that the subject intersection meets warrant 7 – Crash Experience Warrant, based on the intersection Broadside collisions and a fatality during the year of 2019 as well as condition B – Interruption of Continuous Traffic for an 8-hour traffic volume.

- It is my recommendation, as the County Traffic Engineer to consider a traffic control signal at the intersection of Jamacha Road and Darby Street pursuant to Section 21351 of the CVC and the noted engineering study (warrant analysis) dated March 28, 2022 (attached).



Zoubir A. Ouadah

Zoubir A. Ouadah, PE. TE.
County Traffic Engineer

08/25/2022

Date

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

COUNT DATE 03/28/2019
 CALC JAC DATE 8/23/22
 CHK SD DATE 8/24/22

DIST S.D. CO RTE PM
 Major St: JANACHA RD
 Minor St: DARBY ST

Critical Approach Speed 50 mph
 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 N/A **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 ☐

MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS)					80% SATISFIED YES <input type="checkbox"/> NO <input type="checkbox"/>									
	U	R	U	R										
APPROACH LANES	1		2 or More		/ /									

Condition B - Interruption of Continuous Traffic **100% SATISFIED** YES ☐ NO ☐
80% SATISFIED YES ☐ NO ☐
(56%) YES ✓

MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS)				80% SATISFIED YES <input type="checkbox"/> NO <input type="checkbox"/>									
				(56%) YES <input checked="" type="checkbox"/>									
		U	R	U	R								
APPROACH LANES	1		2 or More										
Both Approaches Major Street	750 (600)	525 (420)	900 (720)	630 (504)	603	989	958	732	1068	1112	1297	1434	Hour
Highest Approach Minor Street	75 (60)	53 (42)	100 (80)	70 (56)	72	100	51	49	50	52	69	55	

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

REQUIREMENT	CONDITION	✓	FULFILLED
TWO CONDITIONS SATISFIED 80%	A. MINIMUM VEHICULAR VOLUME		Yes <input type="checkbox"/> No <input type="checkbox"/>
	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 <input type="checkbox"/> No <input type="checkbox"/>

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 *N/A* **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						

*All plotted points fall above the applicable curve in Figure 4C-1. (URBAN AREAS)	Yes <input type="checkbox"/>	No <input type="checkbox"/>
<u>OR</u> , All plotted points fall above the applicable curve in Figure 4C-2. (RURAL AREAS)	Yes <input type="checkbox"/>	No <input type="checkbox"/>

WARRANT 3 - Peak Hour *N/A* **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; <u>AND</u>	Yes <input type="checkbox"/>	No <input type="checkbox"/>
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; <u>AND</u>	Yes <input type="checkbox"/>	No <input type="checkbox"/>
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 <input type="checkbox"/>	No <input type="checkbox"/>

PART B **SATISFIED YES ☐ NO ☐**

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

The plotted point falls above the applicable curve in Figure 4C-3. (URBAN AREAS)	Yes <input type="checkbox"/>	No <input type="checkbox"/>
<u>OR</u> , The plotted point falls above the applicable curve in Figure 4C-4. (RURAL AREAS)	Yes <input type="checkbox"/>	No <input type="checkbox"/>

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)

N/A

SATISFIED YES ☐ NO ☐

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 ☐

<u>AND</u> , The distance to the nearest traffic signal along the major street is greater than 300 ft	Yes <input type="checkbox"/>	No <input type="checkbox"/>
<u>OR</u> , The proposed traffic signal will not restrict progressive traffic flow along the major street.	Yes <input type="checkbox"/>	No <input type="checkbox"/>

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

N/A

SATISFIED YES ☐ NO ☐

Part A

Gap/Minutes and # of Children

SATISFIED YES ☐ NO ☐

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

Gaps < Minutes YES ☐ NO ☐

AND Children > 20/hr YES ☐ NO ☐

<u>AND</u> , Consideration has been given to less restrictive remedial measures.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
--	------------------------------	-----------------------------

Part B

SATISFIED YES ☐ NO ☐

The distance to the nearest traffic signal along the major street is greater than 300 ft	Yes <input type="checkbox"/>	No <input type="checkbox"/>
<u>OR</u> , The proposed signal will not restrict the progressive movement of traffic.	Yes <input type="checkbox"/>	No <input type="checkbox"/>

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
(All Parts Must Be Satisfied)

N/A

SATISFIED YES ☐ NO ☐

MINIMUM REQUIREMENTS	DISTANCE TO NEAREST SIGNAL	
≥ 1000 ft	N _____ ft, S _____ ft, E _____ ft, W _____ ft	Yes <input type="checkbox"/> No <input type="checkbox"/>
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 <input type="checkbox"/> No <input type="checkbox"/>
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
(All Parts Must Be Satisfied)

SATISFIED YES ☒ NO ☐

Adequate trial of alternatives with satisfactory observance and enforcement has failed to reduce the crash frequency.		Yes <input type="checkbox"/> No <input type="checkbox"/>	
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 <input checked="" type="checkbox"/> No <input type="checkbox"/>	
5 OR MORE			
REQUIREMENTS	CONDITIONS	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
ONE CONDITION SATISFIED 80%	Warrant 1, Condition A - Minimum Vehicular Volume		✓
	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		

WARRANT 8 - Roadway Network
(All Parts Must Be Satisfied)

N/A

SATISFIED YES ☐ NO ☐

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 <input type="checkbox"/> No <input type="checkbox"/>
	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 <input type="checkbox"/> No <input type="checkbox"/>

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)

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

<p>PART A</p> <p>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</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/></p>
<p>PART B</p> <p>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.</p> <p>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</p> <hr/> <p>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.</p> <p>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</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/></p>

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 available or known, then use AF = 1 (no adjustment)

Guidance:

03 The Coordinated Signal System signal warrant should not be applied where the resultant spacing of traffic control signals would be less than 1,000 feet.

Section 4C.08 Warrant 7, Crash Experience

Support:

01 The Crash Experience signal warrant conditions are intended for application where the severity and frequency of crashes are the principal reasons to consider installing a traffic control signal.

Standard:

02 The need for a traffic control signal shall be considered if an engineering study finds that all of the following criteria are met:

- A. Adequate trial of alternatives with satisfactory observance and enforcement has failed to reduce the crash frequency; and
- B. Five or more reported crashes, of types susceptible to correction by a traffic control signal, have occurred within a 12-month period, each crash involving personal injury or property damage apparently exceeding the applicable requirements for a reportable crash; and
- C. For each of any 8 hours of an average day, the vehicles per hour (vph) given in both of the 80 percent columns of Condition A in Table 4C-1 (see Section 4C.02), or the vph in both of the 80 percent columns of Condition B in Table 4C-1 exists on the major-street and the higher-volume minor-street approach, respectively, to the intersection, or the volume of pedestrian traffic is not less than 80 percent of the requirements specified in the Pedestrian Volume warrant. These major-street and minor-street volumes shall be for the same 8 hours. On the minor street, the higher volume shall not be required to be on the same approach during each of the 8 hours.

Option:

03 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the traffic volumes in the 56 percent columns in Table 4C-1 may be used in place of the 80 percent columns.

Section 4C.09 Warrant 8, Roadway Network

Support:

01 Installing a traffic control signal at some intersections might be justified to encourage concentration and organization of traffic flow on a roadway network.

Standard:

02 The need for a traffic control signal shall be considered if an engineering study finds that the common intersection of two or more major routes meets one or both of the following criteria:

- A. The intersection has a total existing, or immediately projected, entering volume of at least 1,000 vehicles per hour during the peak hour of a typical weekday and has 5-year projected traffic volumes, based on an engineering study, that meet one or more of Warrants 1, 2, and 3 during an average weekday; or
- B. The intersection has a total existing or immediately projected entering volume of at least 1,000 vehicles per hour for each of any 5 hours of a non-normal business day (Saturday or Sunday).

03 A major route as used in this signal warrant shall have at least one of the following characteristics:

- A. It is part of the street or highway system that serves as the principal roadway network for through traffic flow.
- B. It includes rural or suburban highways outside, entering, or traversing a city.
- C. It appears as a major route on an official plan, such as a major street plan in an urban area traffic and transportation study.

Section 4C.10 Warrant 9, Intersection Near a Grade Crossing

Support:

01 The Intersection Near a Grade Crossing signal warrant is intended for use at a location where none of the conditions described in the other eight traffic signal warrants are met, but the proximity to the intersection of a



U.S. Department
of Transportation
Federal Highway
Administration

Memorandum

Subject: **INFORMATION:** MUTCD – Interim
Approval for Optional Use of an
Alternative Signal Warrant 7 – Crash
Experience (IA-19)

Date: FEB 24 2017

From: Martin C. Knopp *Mart. CK*
Associate Administrator for Operations

In Reply Refer To:
HOTO-1

To: Federal Lands Highway Division Engineers
Division Administrators

Purpose: The purpose of this memorandum is to issue an Interim Approval for the optional use of an alternative Warrant 7, Crash Experience, when performing a traffic control signal needs study. Interim Approval allows interim use, pending official rulemaking, of a new traffic control device, a revision to the application or manner of use of an existing traffic control device, or a provision not specifically described in the *Manual on Uniform Traffic Control Devices for Streets and Highways* (MUTCD).

Background: Section 4C.08 of the 2009 edition of the MUTCD contains the provisions for a traffic control signal Warrant 7 based on past crash experience at the location being studied. At the current time in order to satisfy the criteria for Warrant 7, Item B of Paragraph 2 in Section 4C.08 requires the engineer performing the traffic control signal needs study to document that “five or more reported crashes, of types susceptible to correction by a traffic control signal, have occurred within a 12-month period, each crash involving personal injury or property damage apparently exceeding the applicable requirements for a reportable crash.”

This threshold of five or more crashes has been in use for a long time. It can be found in Section 307 of the earliest (1935) edition of the MUTCD. Because the basis of this threshold of five or more crashes is not known¹, a National Cooperative Highway Research Program (NCHRP) research project, which is described in the next section of this memorandum, was developed and performed with its purpose being either to validate the accuracy and relevance of the “five or more crashes” threshold or to recommend an improved crash experience traffic signal warrant.

¹ Crash Experience Warrant for Traffic Signals; NCHRP Web-Only Document 204; Page 1; July 5, 2014; which can be accessed at <http://www.trb.org/Main/Blurbs/171359.aspx>.

Research on Warrant 7: A research project was performed under NCHRP Project 07-18, "Crash Experience Warrant for Traffic Signals". The research resulted in updated criteria, which is based on either one year or three years of recent crash experience, for the number of crashes portion of Warrant 7.

The National Committee on Uniform Traffic Control Devices (NCUTCD) has requested that the FHWA revise the crash warrant in the next edition of the MUTCD based on research documented in the Final Report² for NCHRP Project No. 07-18. This change request has been designated by the FHWA as Official Ruling 4(09)-42 (C).

FHWA Evaluation of Results: The Office of Transportation Operations has reviewed the research findings and the NCUTCD's change request and concurs with the conclusions of the research and the request from the NCUTCD.

The primary advantage of allowing the optional use of an alternative Item B in Paragraph 2 of Section 4C.08 of the 2009 edition of the MUTCD is that practitioners will be able to use a research-based method of analyzing reported crashes that takes into consideration (1) the number of crashes occurring over a three-year period in addition to a one-year period and (2) the number of legs at the location.

Conditions of Interim Approval: This Interim Approval does not create a new mandate compelling the alternative Item B in Paragraph 2 of Section 4C.08, but will allow agencies to use the alternative Item B, pending official MUTCD rulemaking, when performing a traffic control signal needs study.

The FHWA will grant permission for the optional use of an alternative Item B in Paragraph 2 of Section 4C.08 of the 2009 edition of the MUTCD under this Interim Approval to any jurisdiction that submits a written request to the Office of Transportation Operations. A State may request Interim Approval for all jurisdictions in that State. Jurisdictions seeking permission to use an alternative Item B in Paragraph 2 of Section 4C.08 under this Interim Approval must agree to:

- Comply with the technical conditions detailed below, and
- Maintain an inventory list of all locations where the alternative Item B in Paragraph 2 of Section 4C.08 was used to justify the installation of a traffic control signal, and
- Comply with Item D in Paragraph 18 of Section 1A.10.

Technical Conditions:

The use of an alternative Item B in Paragraph 2 of Section 4C.08 is optional. However, if an agency opts to use the alternative Item B, such use shall be in accordance with the same provisions that currently exist in the 2009 edition of the MUTCD for Warrant 7, Crash Experience, except that the existing Item B in Paragraph 2 may be replaced by the following provisions:

² Crash Experience Warrant for Traffic Signals; NCHRP Web-Only Document 204; July 5, 2014; which can be accessed at <http://www.trb.org/Main/Blurbs/171359.aspx>.

- B. At least one of the following conditions applies to the reported crash history (where each reported crash considered is related to the intersection and apparently exceeds the applicable requirements for a reportable crash):
1. The number of reported angle crashes and pedestrian crashes within a one-year period equals or exceeds the threshold number in Table IA-19-1 for total angle crashes and pedestrian crashes (all severities); or
 2. The number of reported fatal-and-injury angle crashes and pedestrian crashes within a one-year period equals or exceeds the threshold number in Table IA-19-1 for total fatal-and-injury angle crashes and pedestrian crashes ; or
 3. The number of reported angle crashes and pedestrian crashes within a three-year period equals or exceeds the threshold number in Table IA-19-2 for total angle crashes and pedestrian crashes (all severities); or
 4. The number of reported fatal-and-injury angle crashes and pedestrian crashes within a three-year period equals or exceeds the threshold number in Table IA-19-2 for total fatal-and-injury angle crashes and pedestrian crashes; and

Table IA-19-1. Minimum Number of Reported Crashes in a One-Year Period

Urban Area

Number of through lanes on each approach		Total of Angle and Pedestrian Crashes (all severities) ^a		Total of Fatal-and-Injury Angle and Pedestrian Crashes ^a	
Major Street	Minor Street	Four Legs	Three Legs	Four Legs	Three Legs
1	1	5	4	3	3
2 or more	1	5	4	3	3
2 or more	2 or more	5	4	3	3
1	2 or more	5	4	3	3

Rural Area^b

Posted Speed > 40 MPH

Number of through lanes on each approach		Total of Angle and Pedestrian Crashes (all severities) ^a		Total of Fatal-and-Injury Angle and Pedestrian Crashes ^a	
Major Street	Minor Street	Four Legs	Three Legs	Four Legs	Three Legs
1	1	4	3	3	3
✓ 2 or more	1	10	9	6	6
2 or more	2 or more	10	9	6	6
1	2 or more	4	3	3	3

^a Angle crashes include all crashes that occur at an angle and involve one or more vehicles on the major street and one or more vehicles on the minor street

^b "Rural Area" values apply to intersections where the major-street speed exceeds 40 mph or intersections located in an isolated community with a population of less than 10,000

Table IA-19-2. Minimum Number of Reported Crashes in a Three-Year Period**Urban Area**

Number of through lanes on each approach		Total of Angle and Pedestrian Crashes (all severities) ^a		Total of Fatal-and-Injury Angle and Pedestrian Crashes ^a	
Major Street	Minor Street	Four Legs	Three Legs	Four Legs	Three Legs
1	1	6	5	4	4
2 or more	1	6	5	4	4
2 or more	2 or more	6	5	4	4
1	2 or more	6	5	4	4

Rural Area^b*Posted Speed > 40 MPH*

Number of through lanes on each approach		Total of Angle and Pedestrian Crashes (all severities) ^a		Total of Fatal-and-Injury Angle and Pedestrian Crashes ^a	
Major Street	Minor Street	Four Legs	Three Legs	Four Legs	Three Legs
1	1	6	5	4	4
✓ 2 or more	1	16	13	9	9
2 or more	2 or more	16	13	9	9
1	2 or more	6	5	4	4

^a Angle crashes include all crashes that occur at an angle and involve one or more vehicles on the major street and one or more vehicles on the minor street

^b "Rural Area" values apply to intersections where the major-street speed exceeds 40 mph or intersections located in an isolated community with a population of less than 10,000

Any questions concerning this Interim Approval should be directed to Mr. Bruce Friedman at bruce.friedman@dot.gov.

cc:

Associate Administrators
Acting Chief Counsel
Chief Financial Officer
Directors of Field Services
Director of Technical Services

Channel Road

Julian Avenue to Lakeside Avenue (0.82 miles)



SAN DIEGO COUNTY TRAFFIC ADVISORY COMMITTEE

COMMITTEE REPORT OF: September 9, 2022

Item 2-A

SUPERVISORIAL DISTRICT: 2

SUBJECT: Radar Certification

LOCATION: Channel Road from Julian Avenue to Lakeside Avenue
(a distance of 0.82 miles) LAKESIDE (Thos. Bros.
1232-A4)

INITIATED BY: DPW Traffic Engineering

REQUEST: Radar Certification

PROBLEM AS STATED BY REQUESTER:

Channel Road from Julian Avenue to Woodside Avenue has a posted speed limit of 35 MPH. Channel Road from Woodside Avenue to Lakeside Avenue has a posted speed limit of 40 MPH. A preliminary review of prevailing speeds and roadway conditions could support radar certification of a 35 MPH speed limit on Channel Road from Julian Avenue to Lakeside Avenue.

Existing Traffic Devices

Channel Road is an undivided two-lane road from Julian Avenue to Maplevue Street with a pavement between 38 and 60 feet. The roadway is striped with a center line and has parking and bike lanes on both sides of the street between Julian Avenue and Woodside Avenue. Channel Road is a divided two-lane road from Maplevue Street and Lakeside Avenue with a pavement of 75 feet with bike lanes on both sides of the street. Channel Road is classified as a Major Road from Lakeside Avenue to Maplevue Street on the County General Plan Mobility Element Network. Channel Road is classified as a Light Collector Road from Maplevue Street to Woodside Avenue on the County General Plan Mobility Element Network. Channel Road is classified as a light collector from Woodside Avenue to Julian Avenue on the County General Plan Mobility Element Network.

Average Daily Traffic Volumes

	<u>07/22</u>	<u>09/15</u>	<u>09/13</u>
Channel Road:			
150' S/o Woodside Avenue	4,469		
200' N/o Woodside Avenue	7,249		4,066
200' S/o Lakeside Avenue	9,480	9,782	

<u>Speed Data</u>		<u>85th Percentile</u>	<u>10 MPH Pace</u>	<u>% in Pace</u>
Channel Road:				
450' S/o Woodside Avenue	(2022)	34.3 MPH	26-35	84.0%
150' N/o Parkside Street	(2022)	35.1 MPH	26-35	81.0%

600' S/o Lakeside Avenue	(2022)	41.1 MPH	34-43	84.0%
Speed Zone	(2022)	36.8 MPH	29-38	83.0%

Collision Data

There have been 18 reported collisions, 9 of which involved an injury, along this segment of roadway in a 3-year period (04-01-19 to 03-31-22). These collisions result in a segment accident rate of 2.84 collisions per million vehicle miles. The statewide average is 1.60 collisions per million vehicle miles for similar suburban conventional 2 lanes or less with speeds less than 45 MPH.

City: Lakeside
Project #: CA22_040109_002

DAILY TOTALS			NB	SB	EB			WB	Total	
			3,320	3,929				0		
AM Peak Hour	11:45	11:30			11:45	PM Peak Hour	12:00	16:00		
AM Pk Volume	237	297			534	PM Pk Volume	255	400		632
Pk Hr Factor	0.835	0.853			0.884	Pk Hr Factor	0.898	0.917		0.946
7 - 9 Volume	383	353	0	0	736	4 - 6 Volume	457	755	0	1212
7 - 9 Peak Hour	7:30	8:00			8:00	4 - 6 Peak Hour	16:15	16:00		16:15
7 - 9 Pk Volume	196	199	0	0	395	4 - 6 Pk Volume	242	400	0	632
Pk Hr Factor	0.875	0.905	0.000	0.000	0.890	Pk Hr Factor	0.864	0.917	0.000	0.000

VOLUME

Channel Rd 200' S/O Lakeside Ave

Day: Thursday
Date: 7/7/2022City: Lakeside
Project #: CA22_040109_001

DAILY TOTALS					NB	SB						EB	WB						Total
					4,691	4,789						0	0						9,480
AM Period	NB	SB	EB	WB	TOTAL		PM Period	NB	SB	EB	WB	TOTAL							
0:00	9	5			14		12:00	87	78			165							
0:15	2	4			6		12:15	91	78			169							
0:30	8	4			12		12:30	87	74			161							
0:45	12	31	5	18	17	49	12:45	74	339	75	305	149	644						
1:00	0	1			1		13:00	81	69			150							
1:15	0	1			1		13:15	76	59			135							
1:30	4	3			7		13:30	74	62			136							
1:45	6	10	3	8	9	18	13:45	72	303	66	256	138	559						
2:00	3	2			5		14:00	73	71			144							
2:15	2	3			5		14:15	95	81			176							
2:30	3	4			7		14:30	82	70			152							
2:45	7	15	3	12	10	27	14:45	87	337	91	313	178	650						
3:00	2	1			3		15:00	93	92			185							
3:15	4	2			6		15:15	82	93			175							
3:30	10	4			14		15:30	87	114			201							
3:45	6	22	5	12	11	34	15:45	79	341	93	392	172	733						
4:00	9	14			23		16:00	78	110			188							
4:15	10	3			13		16:15	79	114			193							
4:30	15	10			25		16:30	102	121			223							
4:45	10	44	9	36	19	80	16:45	79	338	108	453	187	791						
5:00	25	27			52		17:00	80	105			185							
5:15	26	22			48		17:15	83	94			177							
5:30	32	21			53		17:30	104	103			207							
5:45	38	121	36	106	74	227	17:45	80	347	79	381	159	728						
6:00	36	34			70		18:00	74	85			159							
6:15	42	39			81		18:15	52	71			123							
6:30	65	67			132		18:30	70	72			142							
6:45	63	206	54	194	117	400	18:45	60	256	58	286	118	542						
7:00	80	78			158		19:00	56	41			97							
7:15	71	68			139		19:15	63	47			110							
7:30	79	83			162		19:30	53	60			113							
7:45	83	313	88	317	171	630	19:45	50	222	61	209	111	431						
8:00	70	91			161		20:00	48	44			92							
8:15	52	88			140		20:15	42	37			79							
8:30	66	75			141		20:30	51	43			94							
8:45	57	245	79	333	136	578	20:45	42	183	26	150	68	333						
9:00	63	75			138		21:00	45	27			72							
9:15	65	96			161		21:15	41	21			62							
9:30	59	58			117		21:30	17	42			59							
9:45	59	246	70	299	129	545	21:45	18	121	16	106	34	227						
10:00	60	70			130		22:00	26	16			42							
10:15	61	78			139		22:15	27	27			54							
10:30	54	48			102		22:30	17	9			26							
10:45	60	235	60	256	120	491	22:45	13	83	6	58	19	141						
11:00	75	58			133		23:00	10	9			19							
11:15	68	57			125		23:15	9	10			19							
11:30	87	69			156		23:30	12	5			17							
11:45	68	298	75	259	143	557	23:45	4	35	6	30	10	65						
TOTALS	1786	1850			3636		TOTALS	2905	2939			5844							
SPLIT %	49.1%	50.9%			38.4%		SPLIT %	49.7%	50.3%			61.6%							

DAILY TOTALS					NB	SB						EB	WB						Total
					4,691	4,789						0	0						9,480
AM Peak Hour	11:30	7:30			11:45		PM Peak Hour	14:15	16:00			16:00							
AM Pk Volume	333	350			638		PM Pk Volume	357	453			791							
Pk Hr Factor	0.915	0.962			0.944		Pk Hr Factor	0.939	0.936			0.887							
7 - 9 Volume	558	650	0	0	1208		4 - 6 Volume	685	834	0	0	1519							
7 - 9 Peak Hour	7:00	7:30			7:30		4 - 6 Peak Hour	17:00	16:00			16:00							
7 - 9 Pk Volume	313	350	0	0	634		4 - 6 Pk Volume	347	453	0	0	791							
Pk Hr Factor	0.943	0.962	0.000	0.000	0.927		Pk Hr Factor	0.834	0.936	0.000	0.000	0.887							

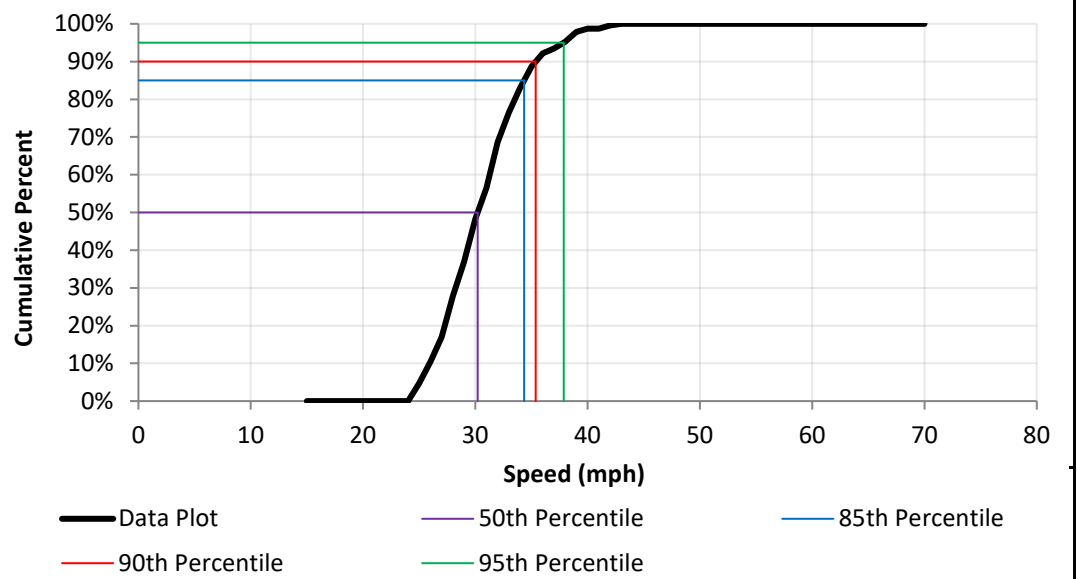
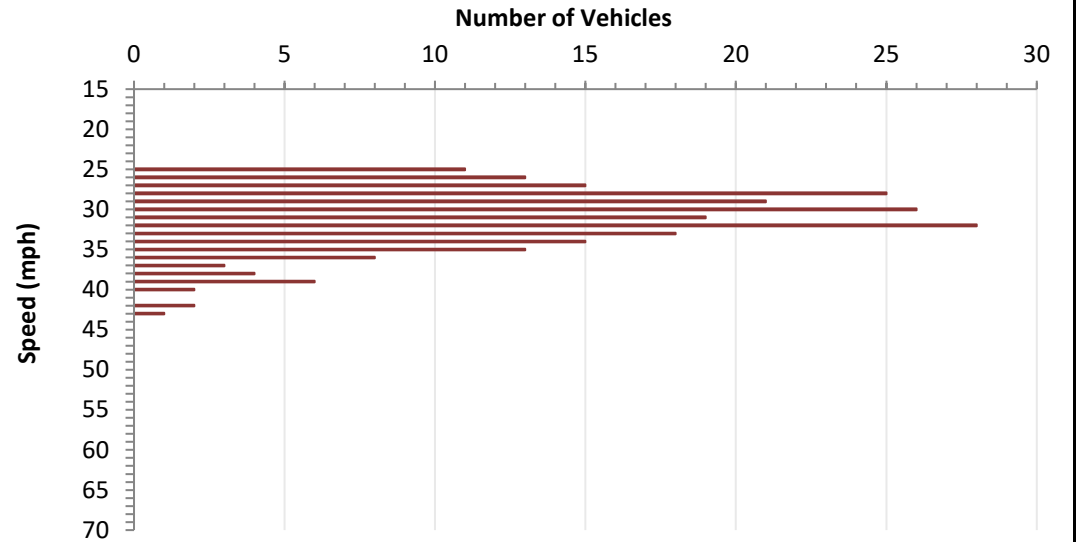


RADAR SPEED SURVEY

SAN DIEGO COUNTY DEPT OF PUBLIC WORKS

Road Name:	Channel Rd	From:	Julian Av	To:	Woodside Av
Position:	450' S/o Woodside Av	Direction:	EB/WB		
Date:	7/7/2022	Weather:	Clear	Project Number:	22-040110-003
Time Start:	11:10 AM	Road Condition:	Dry	Observer:	Contractor
Time End:	1:10 PM	Posted Speed:	35 MPH	Calibration Test:	Y

Speed (mph)	Num. Veh.	Cum. Pct.
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25	11	4.8%
26	13	10.4%
27	15	17.0%
28	25	27.8%
29	21	37.0%
30	26	48.3%
31	19	56.5%
32	28	68.7%
33	18	76.5%
34	15	83.0%
35	13	88.7%
36	8	92.2%
37	3	93.5%
38	4	95.2%
39	6	97.8%
40	2	98.7%
41		
42	2	99.6%
43	1	100.0%
44		
45		
46		
47		
48		
49		
50		
51		
52		
53		
54		
55		
56		
57		
58		
59		
60		
61		
62		
63		
64		
65		
66		
67		
68		
69		
70		
Total	230	



DATA ANALYSIS

Average Speed	31.1	Range	25 - 43
50th Percentile	30.2	10 mph Pace	26 - 35
85th Percentile	34.3	Number in Pace	193
90th Percentile	35.4	Percent in Pace	84%
95th Percentile	37.9		



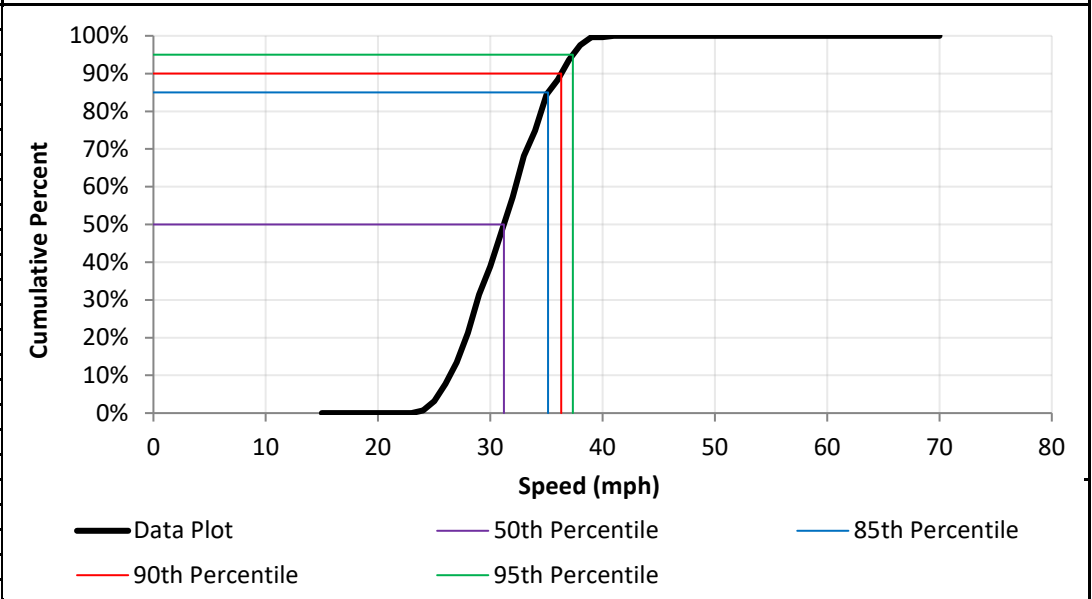
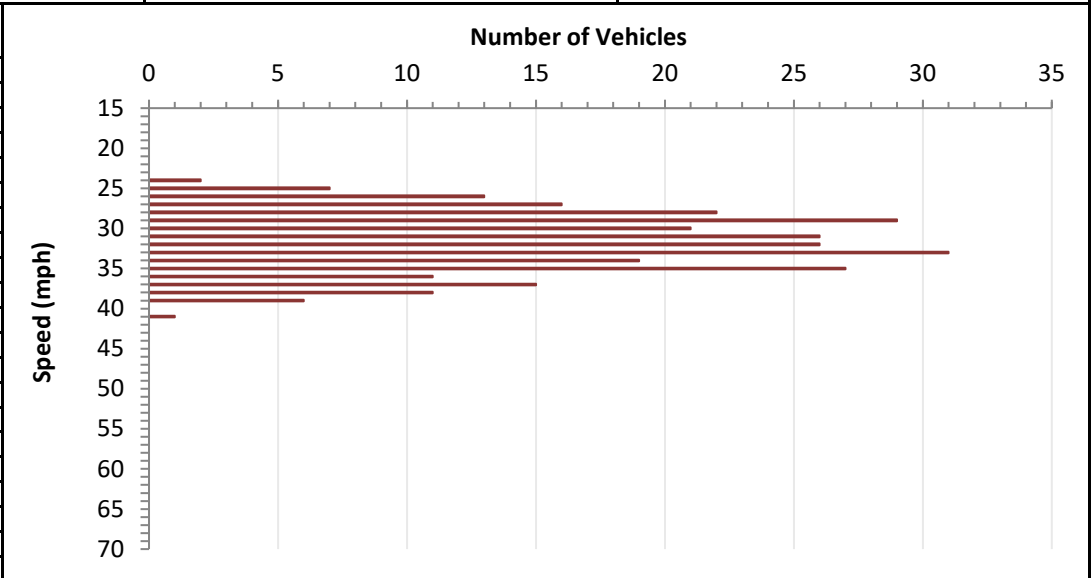
RADAR SPEED SURVEY

SAN DIEGO COUNTY DEPT OF PUBLIC WORKS

Road Name:	Channel Rd	From:	Woodside Av	To:	Lakeside Av
Position:	150' N/o Parkside St	Direction:	EB/WB		

Date:	7/7/2022	Weather:	Clear	Project Number:	22-040110-002
Time Start:	9:00 AM	Road Condition:	Dry	Observer:	Contractor
Time End:	11:00 AM	Posted Speed:	40 MPH	Calibration Test:	Y

Speed (mph)	Num. Veh.	Cum. Pct.
15		
16		
17		
18		
19		
20		
21		
22		
23		
24	2	0.7%
25	7	3.2%
26	13	7.8%
27	16	13.4%
28	22	21.2%
29	29	31.4%
30	21	38.9%
31	26	48.1%
32	26	57.2%
33	31	68.2%
34	19	74.9%
35	27	84.5%
36	11	88.3%
37	15	93.6%
38	11	97.5%
39	6	99.6%
40		
41	1	100.0%
42		
43		
44		
45		
46		
47		
48		
49		
50		
51		
52		
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54		
55		
56		
57		
58		
59		
60		
61		
62		
63		
64		
65		
66		
67		
68		
69		
70		
Total	283	



DATA ANALYSIS			
Average Speed	31.7	Range	24 - 41
50th Percentile	31.2	10 mph Pace	26 - 35
85th Percentile	35.1	Number in Pace	230
90th Percentile	36.3	Percent in Pace	81%
95th Percentile	37.4		



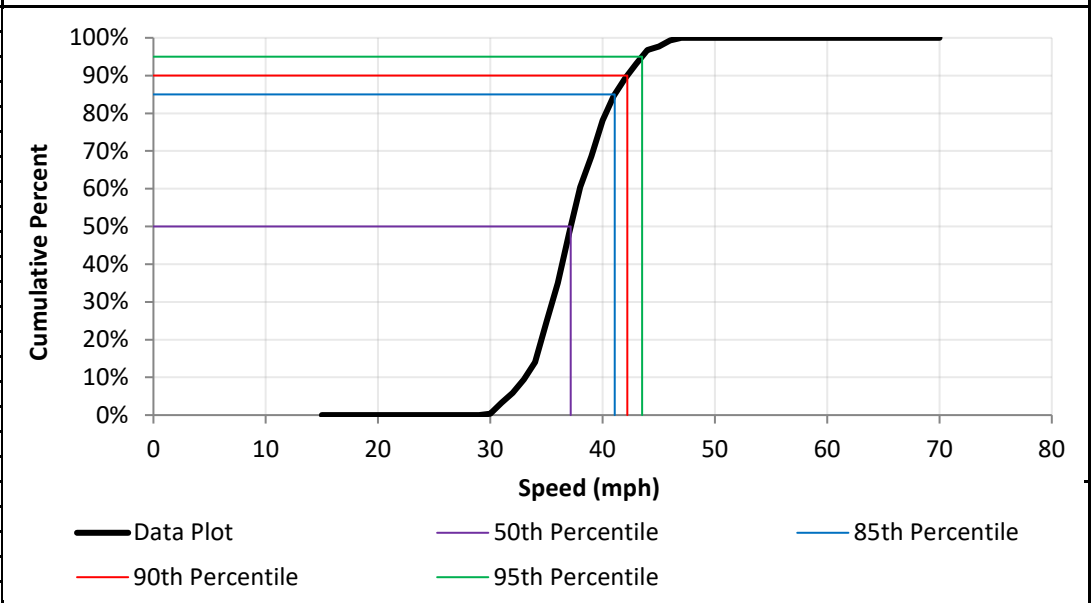
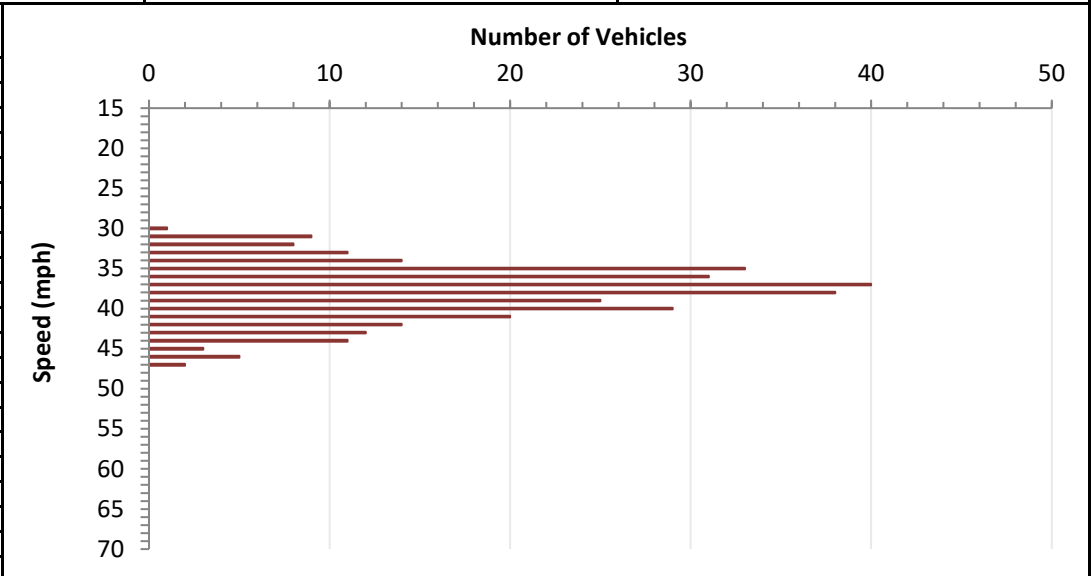
RADAR SPEED SURVEY

SAN DIEGO COUNTY DEPT OF PUBLIC WORKS

Road Name:	Channel Rd	From:	Woodside Av	To:	Lakeside Av
Position:	600' S/o Lakeside Av	Direction:	EB/WB		

Date:	7/7/2022	Weather:	Clear	Project Number:	22-040110-001
Time Start:	1:15 PM	Road Condition:	Dry	Observer:	Contractor
Time End:	3:15 PM	Posted Speed:	40 MPH	Calibration Test:	Y

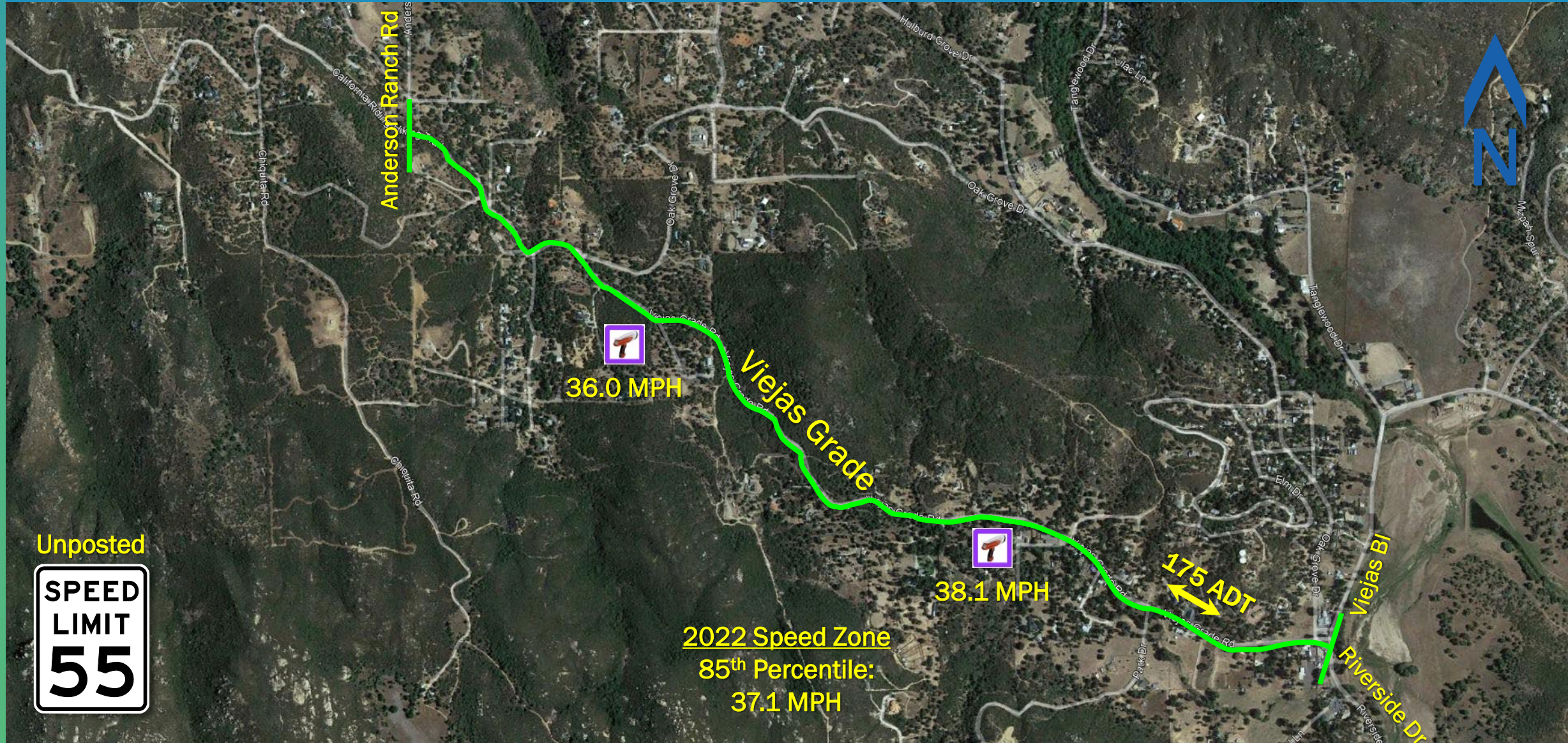
Speed (mph)	Num. Veh.	Cum. Pct.
15		
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18		
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21		
22		
23		
24		
25		
26		
27		
28		
29		
30	1	0.3%
31	9	3.3%
32	8	5.9%
33	11	9.5%
34	14	14.1%
35	33	24.8%
36	31	35.0%
37	40	48.0%
38	38	60.5%
39	25	68.6%
40	29	78.1%
41	20	84.6%
42	14	89.2%
43	12	93.1%
44	11	96.7%
45	3	97.7%
46	5	99.3%
47	2	100.0%
48		
49		
50		
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69		
70		
Total	306	



DATA ANALYSIS			
Average Speed	37.9	Range	30 - 47
50th Percentile	37.2	10 mph Pace	34 - 43
85th Percentile	41.1	Number in Pace	256
90th Percentile	42.2	Percent in Pace	84%
95th Percentile	43.5		

Viejas Grade

Anderson Ranch Road to Viejas Boulevard (1.93 miles)



Unposted



2022 Speed Zone
85th Percentile:
37.1 MPH

SAN DIEGO COUNTY TRAFFIC ADVISORY COMMITTEE

COMMITTEE REPORT OF: September 9, 2022

Item 2-C

SUPERVISORIAL DISTRICT: 2

SUBJECT: Radar Certification

LOCATION: Viejas Grade from Viejas Boulevard/Riverside Drive to Anderson Ranch Road (a distance of 1.93 miles)
DESCANSO/THE WILLOWS (Thos. Bros. 1236-A3)

INITIATED BY: DPW Traffic Engineering

REQUEST: Radar Certification

PROBLEM AS STATED BY REQUESTER:

Viejas Grade from Viejas Boulevard/Riverside Drive to Anderson Ranch Road has no posted speed limit and is subject to the 55 MPH state maximum speed limit. A preliminary review of prevailing speeds and roadway conditions could support radar certification of a 35 MPH speed limit on Viejas Grade from Viejas Boulevard/Riverside Drive to Anderson Ranch Road.

Existing Traffic Devices

Viejas Grade is a striped 2-lane roadway with a pavement width of 21 to 28 feet. The roadway is striped with a no passing centerline and white edge line. Viejas Grade has multiple speed advised reverse turns and school bus stops along the road. Viejas Grade is unclassified in the County General Plan Mobility Element Network. The road is has no posted speed limit.

Average Daily Traffic Volumes

	<u>04/22</u>	<u>10/16</u>
Viejas Grade:		
500' W/o Oak Grove Drive		833
1,550' W/o Oak Grove Drive	175	

<u>Speed Data</u>		<u>85th Percentile</u>	<u>10 MPH Pace</u>	<u>% in Pace</u>
Viejas Grade:				
630' W/o Central Avenue	(2022)	38.1 MPH	28-37	69.0%
200' W/o Old Viejas Grade Road	(2022)	36.0 MPH	26-35	76.0%
Speed Zone	(2022)	37.1 MPH	27-36	72.5%

Collision Data

There has been 1 reported collision, along this segment of roadway in a 3-year period (06-01-19 to 06-31-22). This collision results in a segment accident rate of 2.70 collisions per million vehicle miles. The statewide average is 3.98 collisions per million vehicle miles.

VOLUME

Viejas Grade Rd 1,550' W/O Oak Grove Dr

Day: Thursday
Date: 4/14/2022

City: Descanso
Project #: CA22_040055_023

DAILY TOTALS					NB	SB	EB					WB	Total		
					0	0	84					91	175		
AM Period	NB	SB	EB	WB	TOTAL		PM Period	NB	SB	EB	WB	TOTAL			
00:00	0	0	0	0			12:00	0	0	2	2	4			
00:15	0	0	0	0			12:15	0	0	1	1	2			
00:30	0	0	0	0			12:30	0	0	1	0	1			
00:45	0	0	0	0			12:45	0	0	2	6	2	5	4	11
01:00	0	0	0	0			13:00	0	0	4	4	8			
01:15	0	0	0	0			13:15	0	0	0	1	1			
01:30	0	0	0	0			13:30	0	0	2	0	2			
01:45	0	0	0	0			13:45	0	0	1	7	0	5	1	12
02:00	0	0	0	0			14:00	0	0	1	5	6			
02:15	0	0	0	0			14:15	0	0	0	1	1			
02:30	0	0	0	0			14:30	0	0	1	1	2			
02:45	0	0	0	0			14:45	0	0	3	5	0	7	3	12
03:00	0	0	0	0			15:00	0	0	2	0	2			
03:15	0	0	0	0			15:15	0	0	0	3	3			
03:30	0	0	0	0			15:30	0	0	1	1	2			
03:45	0	0	0	0			15:45	0	0	1	4	1	5	2	9
04:00	0	0	1	0	1		16:00	0	0	0	0	2			
04:15	0	0	1	0	1		16:15	0	0	0	2	6			
04:30	0	0	0	0			16:30	0	0	3	3	3			
04:45	0	0	0	2	2		16:45	0	0	0	3	3	8	3	11
05:00	0	0	0	1	1		17:00	0	0	3	1	4			
05:15	0	0	0	0			17:15	0	0	0	1	1			
05:30	0	0	0	0			17:30	0	0	2	5	7			
05:45	0	0	1	1	0	1	17:45	0	0	1	6	2	9	3	15
06:00	0	0	1	0	1		18:00	0	0	0	1	1			
06:15	0	0	1	0	1		18:15	0	0	0	4	4			
06:30	0	0	4	1	5		18:30	0	0	0	0	0			
06:45	0	0	1	7	0	1	18:45	0	0	1	1	2	7	3	8
07:00	0	0	3	0	3		19:00	0	0	0	4	4			
07:15	0	0	3	0	3		19:15	0	0	2	4	6			
07:30	0	0	2	1	3		19:30	0	0	0	2	2			
07:45	0	0	1	9	1	2	19:45	0	0	0	2	0	10	2	12
08:00	0	0	0	1	1		20:00	0	0	0	1	1			
08:15	0	0	1	0	1		20:15	0	0	0	3	3			
08:30	0	0	1	1	2		20:30	0	0	0	1	1			
08:45	0	0	2	4	0	2	20:45	0	0	0	0	5		5	
09:00	0	0	0	0			21:00	0	0	0	1	1			
09:15	0	0	4	0	4		21:15	0	0	0	2	2			
09:30	0	0	2	2	4		21:30	0	0	1	1	2			
09:45	0	0	5	11	2	4	21:45	0	0	0	1	0	4	5	
10:00	0	0	2	0	2		22:00	0	0	0	0				
10:15	0	0	5	1	6		22:15	0	0	0	0				
10:30	0	0	0	2	2		22:30	0	0	0	0				
10:45	0	0	0	7	2	5	22:45	0	0	0	0				
11:00	0	0	1	1	2		23:00	0	0	0	0				
11:15	0	0	3	2	5		23:15	0	0	0	0				
11:30	0	0	3	1	4		23:30	0	0	0	0				
11:45	0	0	1	8	7	11	23:45	0	0	0	0				
TOTALS					49	26	TOTALS					35	65	100	
SPLIT %					65.3%	34.7%	SPLIT %					35.0%	65.0%	57.1%	

DAILY TOTALS				NB	SB	EB				WB				Total
				0	0									84
AM Peak Hour				09:30	11:15	11:15	PM Peak Hour				12:15	17:30	12:15	
AM Pk Volume				14	12	21	PM Pk Volume				8	12	15	
Pk Hr Factor				0.700	0.429	0.656	Pk Hr Factor				0.500	0.600	0.469	
7 - 9 Volume	0	0		13	4	17	4 - 6 Volume	0	0		9	17	26	
7 - 9 Peak Hour				07:00	07:15	07:00	4 - 6 Peak Hour				16:15	16:45	16:15	
7 - 9 Pk Volume	0	0		9	3	11	4 - 6 Pk Volume	0	0		6	10	15	
Pk Hr Factor	0.000	0.000		0.750	0.750	0.917	Pk Hr Factor	0.000	0.000		0.500	0.500	0.625	



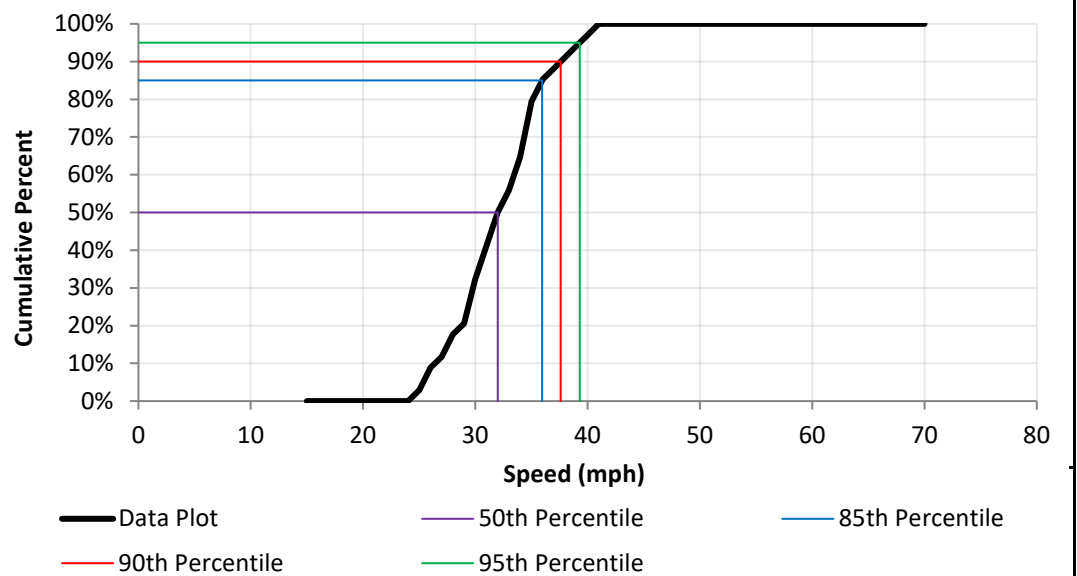
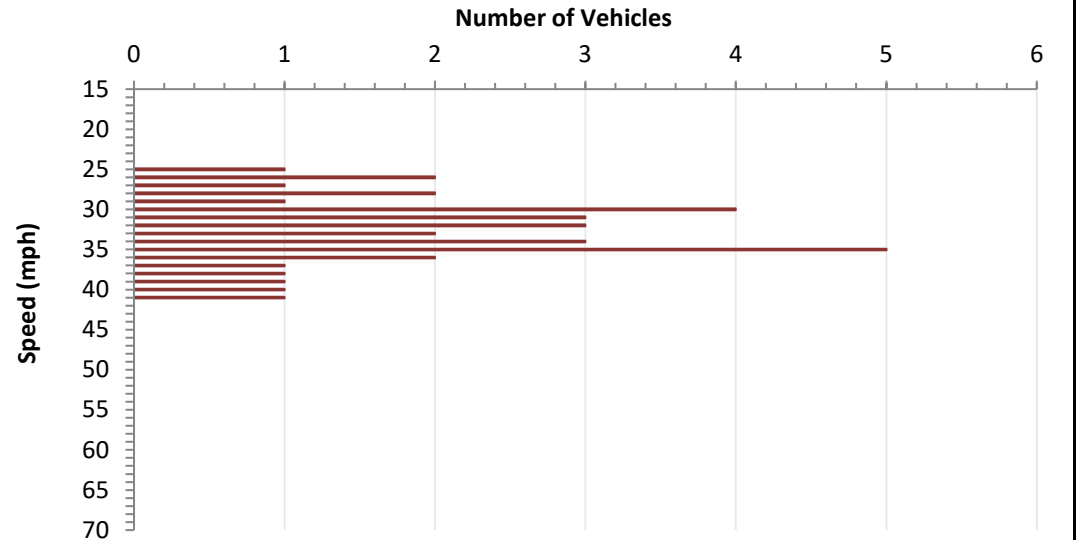
RADAR SPEED SURVEY

SAN DIEGO COUNTY DEPT OF PUBLIC WORKS

Road Name:	Viejas Grade Rd	From:	Oak Grove Dr	To:	Old Viejas Grade Rd
Position:	200' W/O Old Viejas Grade Rd	Direction:	EB/WB		

Date:	4/20/2022	Weather:	Clear	Project Number:	0
Time Start:	10:40AM	Road Condition:	Dry	Observer:	Samuel Cecere
Time End:	12:40PM	Posted Speed:	N/A	Calibration Test:	Y

Speed (mph)	Num. Veh.	Cum. Pct.
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25	1	2.9%
26	2	8.8%
27	1	11.8%
28	2	17.6%
29	1	20.6%
30	4	32.4%
31	3	41.2%
32	3	50.0%
33	2	55.9%
34	3	64.7%
35	5	79.4%
36	2	85.3%
37	1	88.2%
38	1	91.2%
39	1	94.1%
40	1	97.1%
41	1	100.0%
42		
43		
44		
45		
46		
47		
48		
49		
50		
51		
52		
53		
54		
55		
56		
57		
58		
59		
60		
61		
62		
63		
64		
65		
66		
67		
68		
69		
70		
Total	34	



DATA ANALYSIS

Average Speed	32.6	Range	25 - 41
50th Percentile	32.0	10 mph Pace	26 - 35
85th Percentile	36.0	Number in Pace	26
90th Percentile	37.6	Percent in Pace	76%
95th Percentile	39.3		



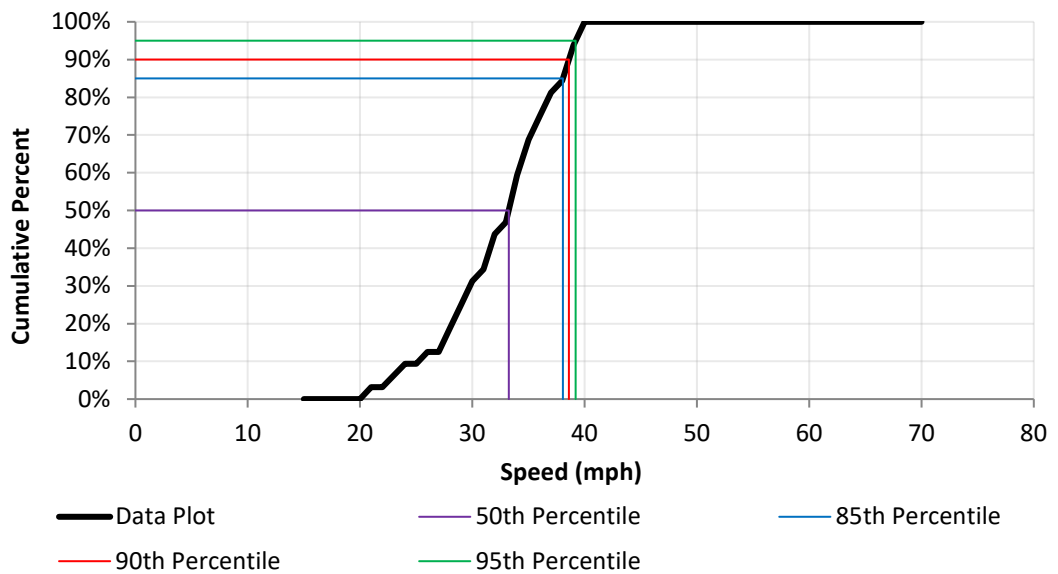
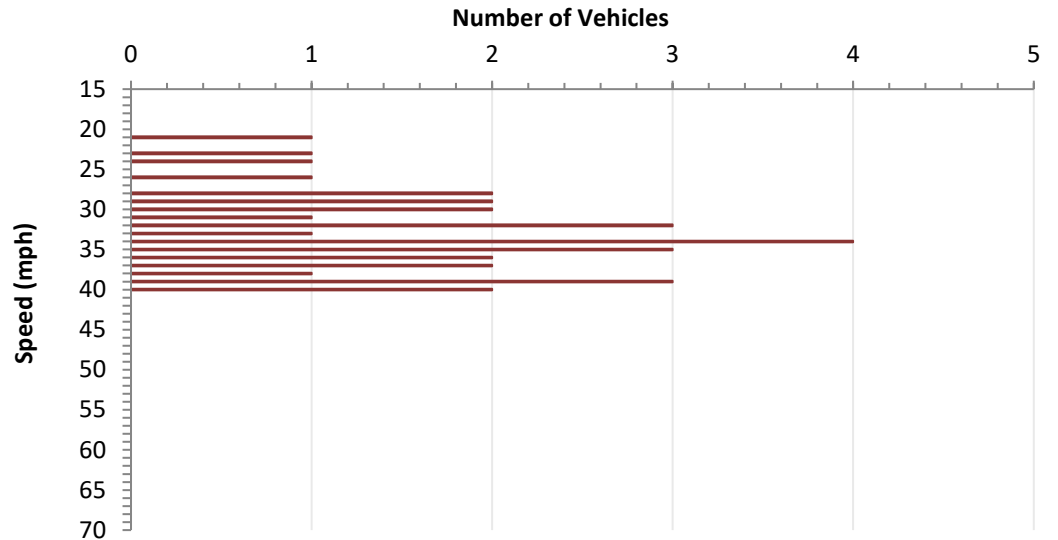
RADAR SPEED SURVEY

SAN DIEGO COUNTY DEPT OF PUBLIC WORKS

Road Name:	Viejas Grade Rd	From:	Old Viejas Grade Rd	To:	Central Ave
Position:	630' W/O Central Ave	Direction:	EB/WB		

Date:	4/20/2022	Weather:	Clear	Project Number:	0
Time Start:	1:00PM	Road Condition:	Dry	Observer:	Samuel Cecere
Time End:	3:00PM	Posted Speed:	N/A	Calibration Test:	Y

Speed (mph)	Num. Veh.	Cum. Pct.
15		
16		
17		
18		
19		
20		
21	1	3.1%
22		
23	1	6.3%
24	1	9.4%
25		
26	1	12.5%
27		
28	2	18.8%
29	2	25.0%
30	2	31.3%
31	1	34.4%
32	3	43.8%
33	1	46.9%
34	4	59.4%
35	3	68.8%
36	2	75.0%
37	2	81.3%
38	1	84.4%
39	3	93.8%
40	2	100.0%
41		
42		
43		
44		
45		
46		
47		
48		
49		
50		
51		
52		
53		
54		
55		
56		
57		
58		
59		
60		
61		
62		
63		
64		
65		
66		
67		
68		
69		
70		
Total	32	



DATA ANALYSIS

Average Speed	32.8	Range	21 - 40
50th Percentile	33.3	10 mph Pace	28 - 37
85th Percentile	38.1	Number in Pace	22
90th Percentile	38.6	Percent in Pace	69%
95th Percentile	39.2		



County of San Diego

JEFF MONEDA
DIRECTOR

DEPARTMENT OF PUBLIC WORKS
5510 OVERLAND AVENUE, SUITE 410
SAN DIEGO, CA 92123-1237
(619) 684-2212
www.sdcountry.ca.gov/dpw/

COUNTY TRAFFIC ENGINEER RECOMMENDATION

Date: August 30, 2022

Item Title: Speed Limit and Radar Certification

Location: Viejas Grade Road from Anderson Ranch Road PVT to Viejas Boulevard

CTE Recommendation: **Establish 35 MPH Radar Enforced Speed Limit**

Conditions:

- Section 22358 of the California Vehicle Code (CVC) authorizes a local agency to determine upon the basis of an Engineering and Traffic Survey (E&TS) that the speed limit of 65 miles per hour (mph) is more than is reasonable or safe, the agency may declare a prima facie speed limit of 60, 55, 50, 45, 40, 35, 30, 25, 20, or 15 mph, whichever is found most appropriate and is reasonable and safe.
- Section 2B.13 "Speed Limit Sign (R2-1)" of the California MUTCD, states that a speed zones, other than statutory speed limits, shall only be established on the basis of an engineering and traffic survey that has been performed in accordance with traffic engineering practices. The engineering study shall include an analysis of the current speed distribution of free-flowing vehicles.
- Section 2B.13 also states that when a speed limit is to be posted, it shall be established at the nearest 5 mph increment of the 85th-percentile (prevailing) speed of free-flowing traffic, except in the following two options,
 - The posted speed maybe reduced by 5 mph from the nearest 5 mph increment of the 85th-percentile speed for conditions which are not apparent to the driver, in compliance with CVC Section 22358.5.
 - For cases in which the nearest 5 mph increment of the 85th-percentile speed would require rounding up, then the speed limit may be rounded

down to the nearest 5 mph increment below the 85th-percentile speed, if nor further reduction is used.

- Section 2B.13, also states that an E&T Survey shall include, in accordance with the CVC Section 627 a) prevailing speeds as determined by traffic engineering measurements, b) collision records, and c) highway, traffic and roadside conditions that are not apparent to the driver.
- Viejas Grade Road is a two-lane roadway, mountainous and curvilinear with tight horizontal and vertical curves and limited shoulder throughout its length of 2.15 miles. Its pavement width varies between 21' and 28' feet with a double yellow center lines and edge lines on both sides of the roadway.
- Recent speed data of the free-flowing traffic on Viejas Grade Road taken on April 20, 2022, at two locations along the subject segment of Viejas Grade Road resulted in a combined 85th-percentile (prevailing) speed of 37.1 mph.
- A review of the roadway collision data for a three-year period (July 2019 to June 2022) shows a total of 1 collision on Viejas Grade Road and a collision rate of 2.43 collisions per million-vehicle-mile (C/MVM), which is lower than the state average of 3.98 C/MVM for similar roadway, adjusted for the traffic volumes.
- Pursuant to CVC sections 627, 22358, and 22358.5, the CA MUTCD Section 2B.13 guidelines, and the existing conditions and safety records of the subject Viejas Grade Road segment, a **recommended 35 MPH radar enforced speed limit** is reasonable and safe on Viejas Grade Road from Anderson Ranch Road - PVT to Viejas Boulevard.



Zoubir A. Ouadah

Zoubir A. Ouadah, PE. TE.
County Traffic Engineer

08/30/2022

Date

SEGMENT ACCIDENT RATE (ACC/MVM):

$$\text{Segment Accident Rate} = \frac{(\text{Number of Accidents}) (10^6)}{(\text{Volume}) (\text{Number of Years}) (365)(\text{Segment Length})}$$

Segment Accident Rate = ACC/MVM
= number of accidents per million vehicle-miles

Number of Accidents = the number of recorded accidents within the segment
excluding the number of accidents in the intersections at both
ends of the road segment for the time period being studied

Segment Length = miles

Volume = ADT or 24 hour volume from the Traffic Census Listing

Number of Years = time period of accident history in years

INPUT:

Road Segment: Viejas Grade Rd from Anderson Ranch Road PVT to Viejas Boulevard
Accident Data Period: 06/30/2019-06/30/2022
ADT Record Date: 4/14/2022

Number of Accidents 1

Segment Length 2.15

Volume 175

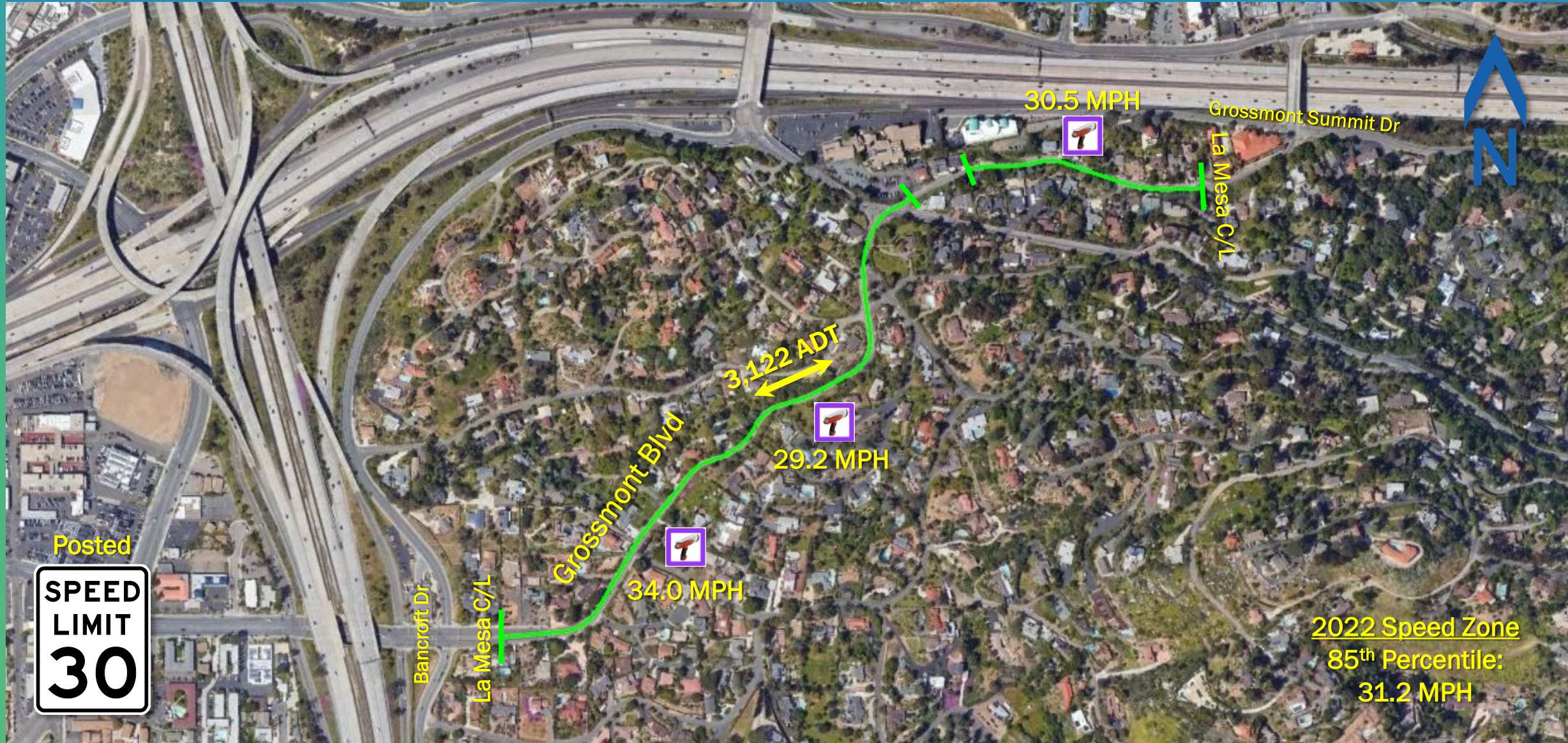
Number of Years 3

SAR = **2.43** < 3.98 statewide average for a conventional 2 lanes
or less highway (Rural, <=55 mph posted speed)

Date of calculation: 8/17/2022
Completed by: Barra M

Grossmont Boulevard

County maintained portions from La Mesa City Limit (east of Bancroft Dr) to La Mesa City Limit (south of Grossmont Summit Dr) (0.66 miles)



SAN DIEGO COUNTY TRAFFIC ADVISORY COMMITTEE

COMMITTEE REPORT OF: September 9, 2022

Item 4-A

SUPERVISORIAL DISTRICT: 4

SUBJECT: Radar Certification

LOCATION: Grossmont Boulevard from La Mesa city limit (east of Bancroft Drive) to La Mesa city limit (east of Fuerte Drive) and from La Mesa city limit (east of Fuerte Drive) to La Mesa city limit (west of Grossmont Summit Drive) (County maintained portions) (a distance of 0.66 miles)
GROSSMONT (Thos. Bros. 1271-B1)

INITIATED BY: DPW Traffic Engineering

REQUEST: Radar Certification

PROBLEM AS STATED BY REQUESTER:

Grossmont Boulevard from La Mesa city limit (east of Bancroft Drive) to La Mesa city limit (east of Fuerte Drive) and from La Mesa city limit (east of Fuerte Drive) to La Mesa city limit (west of Grossmont Summit Drive) is currently posted with a 30 MPH speed limit. A preliminary review of prevailing speeds and roadway conditions could support radar certification of the existing 30 MPH speed limit on Grossmont Boulevard from La Mesa city limit (east of Bancroft Drive) to La Mesa city limit (east of Fuerte Drive) and from La Mesa city limit (east of Fuerte Drive) to La Mesa city limit (west of Grossmont Summit Drive) (County maintained portions).

Existing Traffic Devices

Grossmont Boulevard is a striped 2-lane road with a pavement of 24-foot width. The roadway has an intersection advisory sign, 25 MPH turn advisory, and bus stop advisory sign. Grossmont Boulevard is unclassified on the County General Plan Mobility Element Network. The roadway has a posted speed limit of 30 MPH.

Average Daily Traffic Volumes

7/22

Grossmont Boulevard:

250' E/o Bancroft Drive	3,551
200' S/o Fuerte Drive	3,263
500' S/o Grossmont Summit Drive	2,551

Speed Data

Grossmont Boulevard:

		<u>85th Percentile</u>	<u>10 MPH Pace</u>	<u>% in Pace</u>
125' S/o Mesa Vista Avenue	(2022)	34.0 MPH	26-35	83.0%
400' S/o Sierra Vista Avenue	(2022)	29.2 MPH	21-30	83.0%

780' E/o Fuerte Drive	(2022)	30.5 MPH	23-32	84.0%
Speed Zone	(2022)	31.2 MPH	23-32	83.3%

Collision Data

There have been 6 reported collisions, 2 of which involved an injury, along this segment of roadway in a 3-year period (04-01-19 to 03-31-22). These collisions result in a segment accident rate of 2.66 collisions per million vehicle miles. The statewide average is 1.60 collisions per million vehicle miles for similar suburban 2 lanes or less with speeds less than 45 MPH.

VOLUME

Grossmont Blvd 250' E/O Bancroft Dr

Day: Thursday
Date: 7/7/2022City: Grossmont
Project #: CA22_040107_001

DAILY TOTALS					NB	SB						EB	WB	Total	
					0	0						1,987	1,564	3,551	
AM Period	NB	SB	EB	WB	TOTAL		PM Period	NB	SB	EB	WB	TOTAL			
0:00			5	2	7		12:00			31	29	60			
0:15			2	0	2		12:15			42	32	74			
0:30			1	3	4		12:30			31	21	52			
0:45			2	10	12	15	12:45			27	131	158	246		
1:00			1	0	1		13:00			42	21	63			
1:15			1	1	2		13:15			38	34	72			
1:30			2	0	2		13:30			36	23	59			
1:45			0	4	3	8	13:45			23	139	162	234		
2:00			3	0	3		14:00			26	21	47			
2:15			3	1	4		14:15			38	30	68			
2:30			0	0	0		14:30			39	23	62			
2:45			0	6	1	8	14:45			27	130	157	241		
3:00			2	1	3		15:00			42	36	78			
3:15			0	1	1		15:15			32	28	60			
3:30			0	1	1		15:30			41	26	67			
3:45			0	2	0	5	15:45			36	151	187	271		
4:00			0	2	2		16:00			35	21	56			
4:15			1	0	1		16:15			39	37	76			
4:30			2	2	4		16:30			48	32	80			
4:45			2	5	6	13	16:45			44	166	210	277		
5:00			2	6	8		17:00			37	21	58			
5:15			3	8	11		17:15			50	24	74			
5:30			7	7	14		17:30			45	32	77			
5:45			6	18	15	48	17:45			48	180	228	281		
6:00			6	9	15		18:00			38	33	71			
6:15			6	12	18		18:15			50	20	70			
6:30			8	13	21		18:30			42	15	57			
6:45			24	44	37	91	18:45			28	158	186	238		
7:00			22	15	37		19:00			22	22	44			
7:15			26	17	43		19:15			30	18	48			
7:30			32	26	58		19:30			24	10	34			
7:45			33	113	73	211	19:45			34	110	144	181		
8:00			20	26	46		20:00			22	12	34			
8:15			16	27	43		20:15			25	14	39			
8:30			19	21	40		20:30			22	11	33			
8:45			21	76	56	185	20:45			17	86	103	133		
9:00			20	22	42		21:00			23	13	36			
9:15			21	21	42		21:15			17	17	34			
9:30			24	18	42		21:30			14	12	26			
9:45			25	90	59	185	21:45			15	69	84	122		
10:00			25	27	52		22:00			7	6	13			
10:15			31	18	49		22:15			16	11	27			
10:30			29	23	52		22:30			5	7	12			
10:45			30	115	60	213	22:45			7	35	42	63		
11:00			30	31	61		23:00			6	10	16			
11:15			31	28	59		23:15			6	2	8			
11:30			32	27	59		23:30			5	3	8			
11:45			32	125	57	236	23:45			7	24	31	46		
TOTALS			608	610	1218		TOTALS			1379	954	2333			
SPLIT %			49.9%	50.1%	34.3%		SPLIT %			59.1%	40.9%	65.7%			

DAILY TOTALS					NB	SB						EB	WB	Total	
					0	0						1,987	1,564	3,551	
AM Peak Hour			11:30	7:30	11:30		PM Peak Hour			17:15	14:45	17:15			
AM Pk Volume			137	119	250		PM Pk Volume			181	127	294			
Pk Hr Factor			0.815	0.744	0.845		Pk Hr Factor			0.905	0.858	0.955			
7 - 9 Volume	0	0	189	207	396		4 - 6 Volume	0	0	346	212	558			
7 - 9 Peak Hour			7:00	7:30	7:15		4 - 6 Peak Hour			17:00	16:00	17:00			
7 - 9 Pk Volume	0	0	113	119	220		4 - 6 Pk Volume	0	0	180	111	281			
Pk Hr Factor	0.000	0.000	0.856	0.744	0.753		Pk Hr Factor	0.000	0.000	0.900	0.750	0.912			

VOLUME

Grossmont Blvd 500' S/O Grossmont Summit Dr

Day: Thursday
Date: 7/7/2022City: Grossmont
Project #: CA22_040107_003

DAILY TOTALS					NB	SB						EB	WB						Total
					1,339	1,212						0	0						2,551
AM Period	NB	SB	EB	WB	TOTAL		PM Period	NB	SB	EB	WB	TOTAL							
0:00	1	3			4		12:00	26	15			41							
0:15	0	4			4		12:15	18	31			49							
0:30	1	1			2		12:30	14	23			37							
0:45	0	2	1	9	1	11	12:45	17	75	26	95	43	170						
1:00	0	0			0		13:00	12	21			33							
1:15	0	1			1		13:15	19	20			39							
1:30	1	0			1		13:30	15	18			33							
1:45	1	2	2	3	3	5	13:45	20	66	11	70	31	136						
2:00	0	1			1		14:00	24	10			34							
2:15	4	1			5		14:15	13	22			35							
2:30	0	1			1		14:30	27	26			53							
2:45	0	4	0	3	0	7	14:45	31	95	19	77	50	172						
3:00	0	0			0		15:00	29	21			50							
3:15	1	1			2		15:15	26	14			40							
3:30	1	2			3		15:30	27	17			44							
3:45	0	2	0	3	0	5	15:45	25	107	17	69	42	176						
4:00	0	0			0		16:00	30	18			48							
4:15	0	2			2		16:15	45	18			63							
4:30	0	2			2		16:30	40	19			59							
4:45	0	3	7		3	7	16:45	31	146	18	73	49	219						
5:00	4	1			5		17:00	46	25			71							
5:15	4	1			5		17:15	19	15			34							
5:30	7	6			13		17:30	30	25			55							
5:45	4	19	7	15	11	34	17:45	36	131	20	85	56	216						
6:00	5	5			10		18:00	30	22			52							
6:15	4	3			7		18:15	24	16			40							
6:30	4	7			11		18:30	18	19			37							
6:45	6	19	19	34	25	53	18:45	25	97	21	78	46	175						
7:00	16	20			36		19:00	29	11			40							
7:15	19	28			47		19:15	16	18			34							
7:30	17	34			51		19:30	14	11			25							
7:45	20	72	36	118	56	190	19:45	21	80	17	57	38	137						
8:00	19	20			39		20:00	11	10			21							
8:15	15	18			33		20:15	13	17			30							
8:30	18	14			32		20:30	15	18			33							
8:45	18	70	15	67	33	137	20:45	13	52	10	55	23	107						
9:00	19	21			40		21:00	15	10			25							
9:15	17	16			33		21:15	15	13			28							
9:30	13	16			29		21:30	8	6			14							
9:45	27	76	12	65	39	141	21:45	5	43	11	40	16	83						
10:00	10	15			25		22:00	6	3			9							
10:15	18	19			37		22:15	9	4			13							
10:30	10	18			28		22:30	7	2			9							
10:45	15	53	26	78	41	131	22:45	3	25	3	12	6	37						
11:00	20	20			40		23:00	12	4			16							
11:15	21	28			49		23:15	3	1			4							
11:30	27	13			40		23:30	3	3			6							
11:45	13	81	26	87	39	168	23:45	4	22	4	12	8	34						
TOTALS	400	489			889		TOTALS	939	723			1662							
SPLIT %	45.0%	55.0%			34.8%		SPLIT %	56.5%	43.5%			65.2%							

DAILY TOTALS					NB	SB						EB	WB						Total
					1,339	1,212						0	0						2,551
AM Peak Hour	11:15	7:00			7:15		PM Peak Hour	16:15	12:15			16:15							
AM Pk Volume	87	118			193		PM Pk Volume	162	101			242							
Pk Hr Factor	0.806	0.819			0.862		Pk Hr Factor	0.880	0.815			0.852							
7 - 9 Volume	142	185	0	0	327		4 - 6 Volume	277	158	0	0	435							
7 - 9 Peak Hour	7:15	7:00			7:15		4 - 6 Peak Hour	16:15	17:00			16:15							
7 - 9 Pk Volume	75	118	0	0	193		4 - 6 Pk Volume	162	85	0	0	242							
Pk Hr Factor	0.938	0.819	0.000	0.000	0.862		Pk Hr Factor	0.880	0.850	0.000	0.000	0.852							



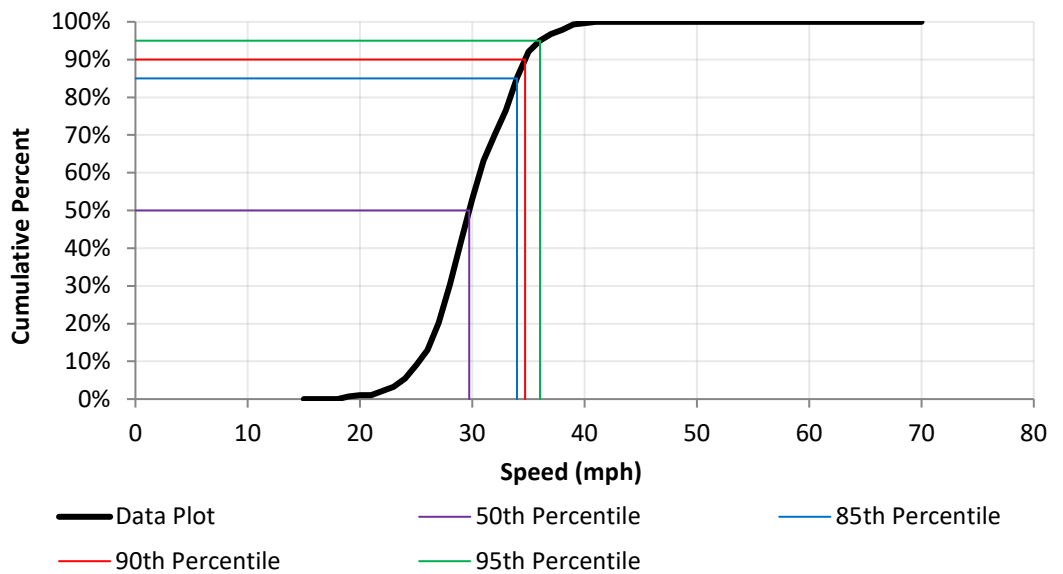
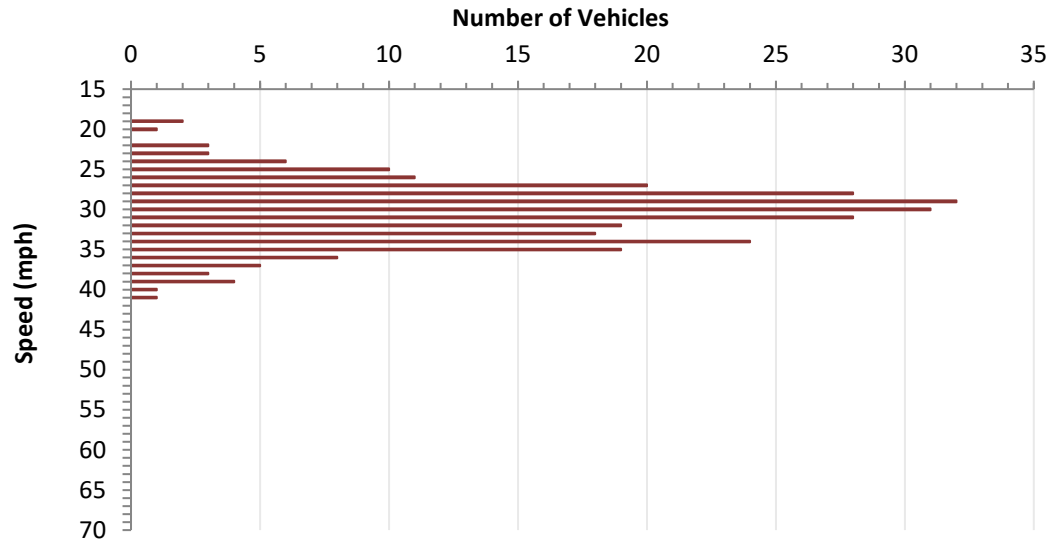
RADAR SPEED SURVEY

SAN DIEGO COUNTY DEPT OF PUBLIC WORKS

Road Name:	Grossmont Bl	From:	La Mesa city limit (near Bancroft D	To:	La Mesa city limit (near Grossm
Position:	125' S/o Mesa Vista Av	Direction:	NB/SB		

Date:	7/7/2022	Weather:	Clear	Project Number:	22-040108-002
Time Start:	12:00 PM	Road Condition:	Dry	Observer:	Contractor
Time End:	2:00 PM	Posted Speed:	30 MPH	Calibration Test:	Y

Speed (mph)	Num. Veh.	Cum. Pct.
15		
16		
17		
18		
19	2	0.7%
20	1	1.1%
21		
22	3	2.2%
23	3	3.2%
24	6	5.4%
25	10	9.0%
26	11	13.0%
27	20	20.2%
28	28	30.3%
29	32	41.9%
30	31	53.1%
31	28	63.2%
32	19	70.0%
33	18	76.5%
34	24	85.2%
35	19	92.1%
36	8	94.9%
37	5	96.8%
38	3	97.8%
39	4	99.3%
40	1	99.6%
41	1	100.0%



DATA ANALYSIS

62	Average Speed	30.4	Range	19 - 41
63	50th Percentile	29.7	10 mph Pace	26 - 35
64	85th Percentile	34.0	Number in Pace	230
65	90th Percentile	34.7	Percent in Pace	83%
66	95th Percentile	36.0		
67	Total	277		



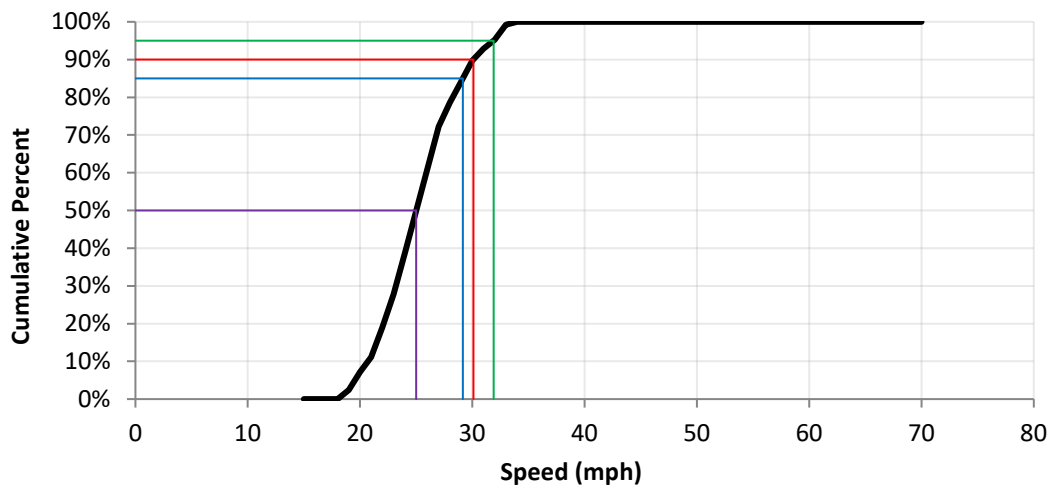
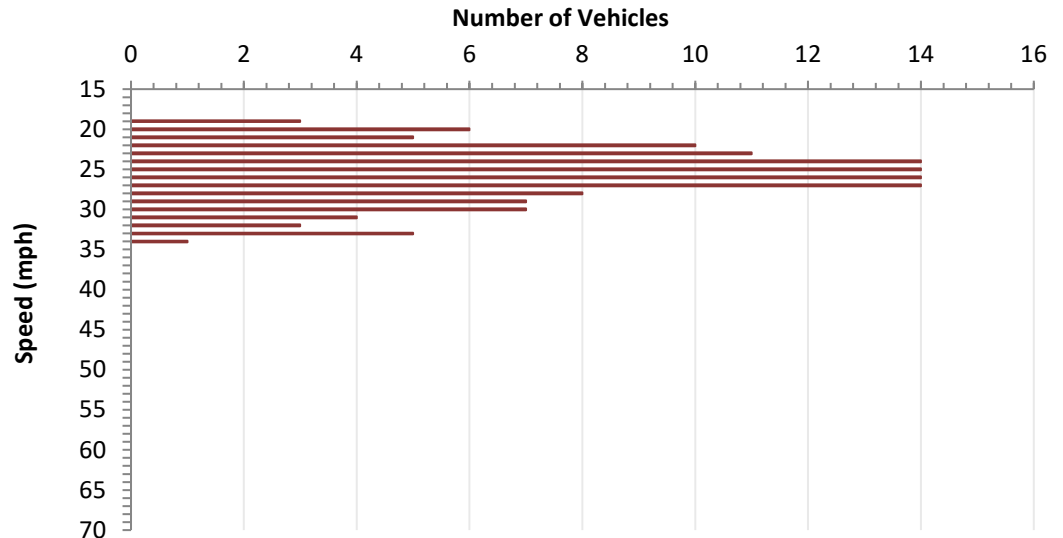
RADAR SPEED SURVEY

SAN DIEGO COUNTY DEPT OF PUBLIC WORKS

Road Name:	Grossmont Bl	From:	La Mesa CL LEAVE (near Bancroft)	To:	La Mesa CL ENTER (near Gross
Position:	400' S/o Sierra Vista Av	Direction:	EB/WB		

Date:	8/25/2022	Weather:	Clear	Project Number:	N/A
Time Start:	12:00 PM	Road Condition:	Dry	Observer:	County
Time End:	1:00 PM	Posted Speed:	30 MPH	Calibration Test:	Y

Speed (mph)	Num. Veh.	Cum. Pct.
15		
16		
17		
18		
19	3	2.4%
20	6	7.1%
21	5	11.1%
22	10	19.0%
23	11	27.8%
24	14	38.9%
25	14	50.0%
26	14	61.1%
27	14	72.2%
28	8	78.6%
29	7	84.1%
30	7	89.7%
31	4	92.9%
32	3	95.2%
33	5	99.2%
34	1	100.0%



— Data Plot — 50th Percentile — 85th Percentile
— 90th Percentile — 95th Percentile

DATA ANALYSIS

62	Average Speed	25.7	Range	19 - 34
63	50th Percentile	25.0	10 mph Pace	21 - 30
64	85th Percentile	29.2	Number in Pace	104
65	90th Percentile	30.1	Percent in Pace	83%
66	95th Percentile	31.9		
67	Total	126		



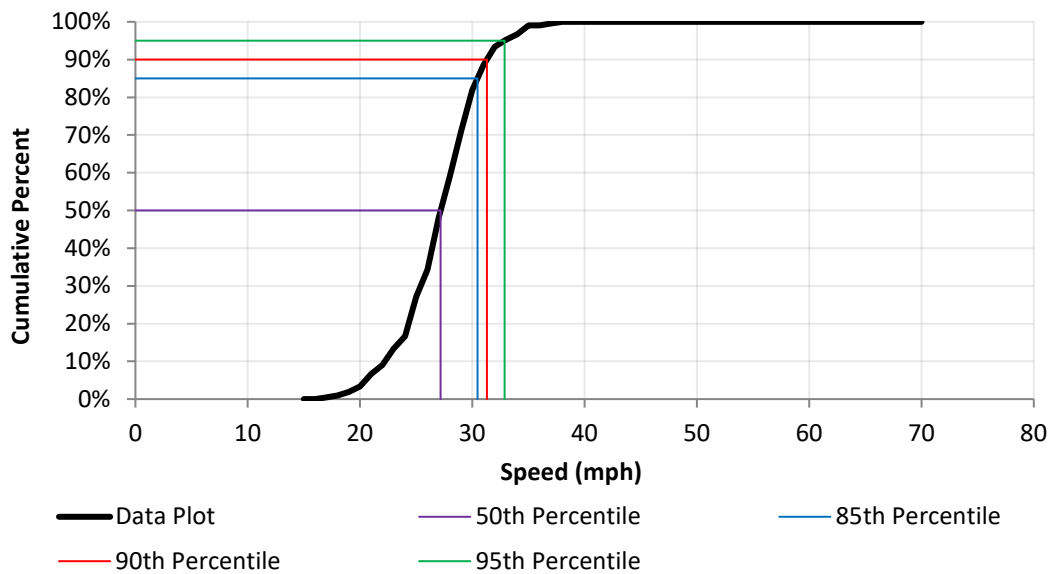
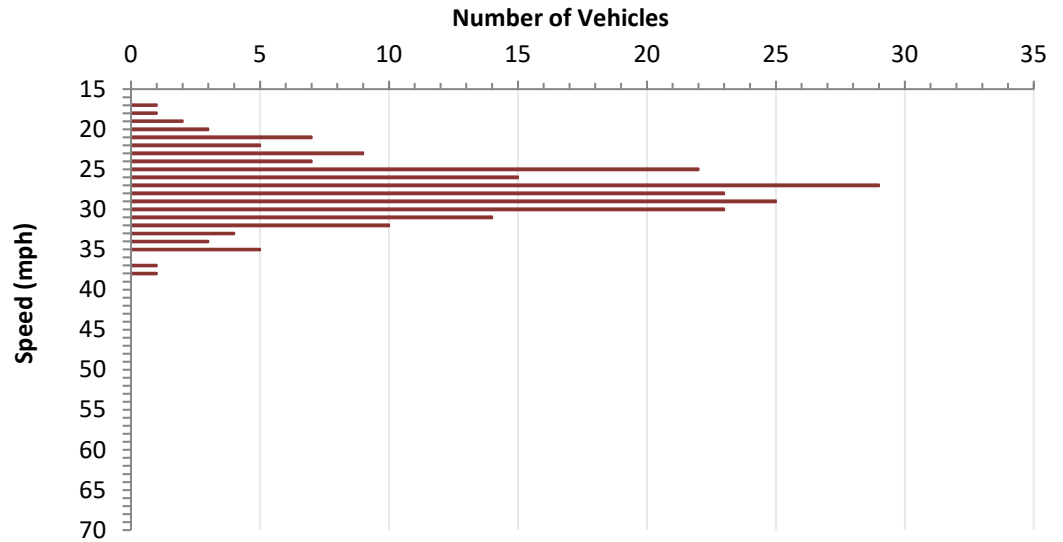
RADAR SPEED SURVEY

SAN DIEGO COUNTY DEPT OF PUBLIC WORKS

Road Name:	Grossmont Bl	From:	La Mesa city limit (near Bancroft D	To:	La Mesa city limit (near Grossm
Position:	780' E/o Fuerte Dr	Direction:	EB/WB		

Date:	7/7/2022	Weather:	Clear	Project Number:	22-040108-001
Time Start:	9:45 AM	Road Condition:	Dry	Observer:	Contractor
Time End:	11:45 AM	Posted Speed:	30 MPH	Calibration Test:	Y

Speed (mph)	Num. Veh.	Cum. Pct.
15		
16		
17	1	0.5%
18	1	1.0%
19	2	1.9%
20	3	3.3%
21	7	6.7%
22	5	9.0%
23	9	13.3%
24	7	16.7%
25	22	27.1%
26	15	34.3%
27	29	48.1%
28	23	59.0%
29	25	71.0%
30	23	81.9%
31	14	88.6%
32	10	93.3%
33	4	95.2%
34	3	96.7%
35	5	99.0%
36		
37	1	99.5%
38	1	100.0%
39		
40		
41		
42		
43		
44		
45		
46		
47		
48		
49		
50		
51		
52		
53		
54		
55		
56		
57		
58		
59		
60		
61		
62		
63		
64		
65		
66		
67		
68		
69		
70		
Total	210	



DATA ANALYSIS

Average Speed	27.5	Range	17 - 38
50th Percentile	27.2	10 mph Pace	23 - 32
85th Percentile	30.5	Number in Pace	177
90th Percentile	31.3	Percent in Pace	84%
95th Percentile	32.9		

Old River Road

Camino Del Rey to Golf Club Drive (0.39 miles)



SAN DIEGO COUNTY TRAFFIC ADVISORY COMMITTEE

COMMITTEE REPORT OF: September 9, 2022

Item 5-A

SUPERVISORIAL DISTRICT: 5

SUBJECT: Radar Certification

LOCATION: Old River Road from Golf Club Drive to Camino Del Rey (a distance of 0.39 miles) BONSALL (Thos. Bros. 1068-A2)

INITIATED BY: DPW Traffic Engineering

REQUEST: Radar Certification

PROBLEM AS STATED BY REQUESTER:

Old River Road from Golf Club Drive to Camino Del Rey has no posted speed limit and is subject to the 55 MPH state maximum speed limit. A preliminary review of prevailing speeds and roadway conditions could support radar certification of a 35 MPH speed limit on Old River Road from Golf Club Drive to Camino Del Rey.

Existing Traffic Devices

Old River Road is a two-lane road from with a 26-foot pavement width. The roadway is striped with a no passing center line with white edge lines on both sides. Old River Road is classified as a Light Collector on the County General Plan Mobility Element Network.

Average Daily Traffic Volumes

02/22

Old River Road:

Calle De Las Estrellas 2,967

<u>Speed Data</u>	<u>85th Percentile</u>	<u>10 MPH Pace</u>	<u>% in Pace</u>
Old River Road:			
130' S/o Avenida Del Las Vida (2022)	40.8 MPH	34-43	68.0%

Collision Data

There have been 3 reported collisions, none of which involved an injury, along this segment of roadway in a 3-year period (06-01-19 to 05-31-22). These collisions result in a segment accident rate of 2.37 collisions per million vehicle miles. The statewide average is 1.60 collisions per million vehicle miles for similar suburban conventional 2 lanes or less with speeds less than 45 MPH.

DAILY TOTALS			NB	SB	EB			WB	Total		
			1,476	1,491				0			
AM Peak Hour	7:15	7:00		7:15	PM Peak Hour	14:30	14:00			14:30	
AM Pk Volume	215	280		480	PM Pk Volume	204	131			327	
Pk Hr Factor	0.698	0.805		0.741	Pk Hr Factor	0.593	0.840			0.654	
7 - 9 Volume	275	363	0	0	638	4 - 6 Volume	256	201	0	0	457
7 - 9 Peak Hour	7:15	7:00		7:15	4 - 6 Peak Hour	16:00	16:30			16:00	
7 - 9 Pk Volume	215	280	0	0	480	4 - 6 Pk Volume	141	109	0	0	245
Pk Hr Factor	0.698	0.805	0.000	0.000	0.741	Pk Hr Factor	0.783	0.801	0.000	0.000	0.863



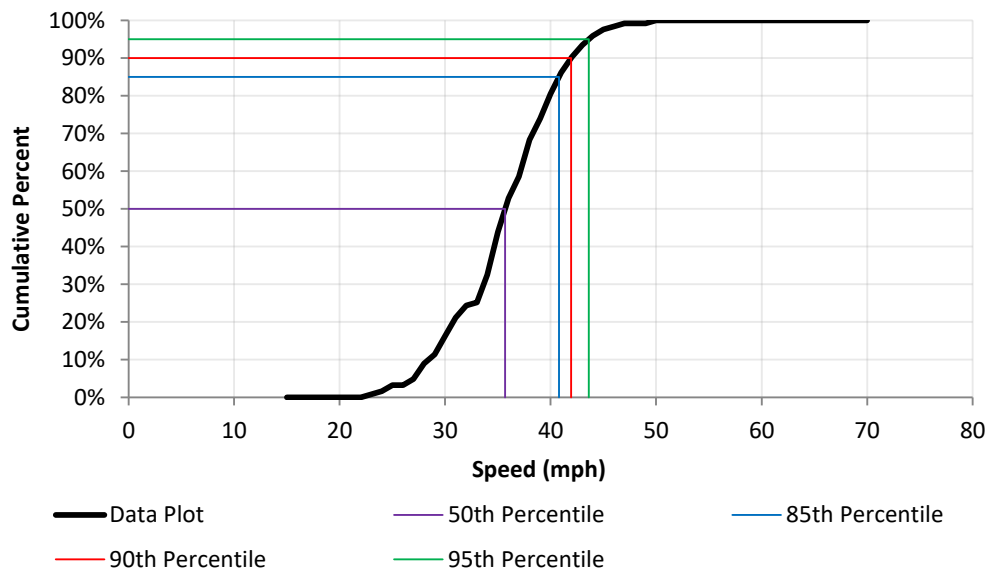
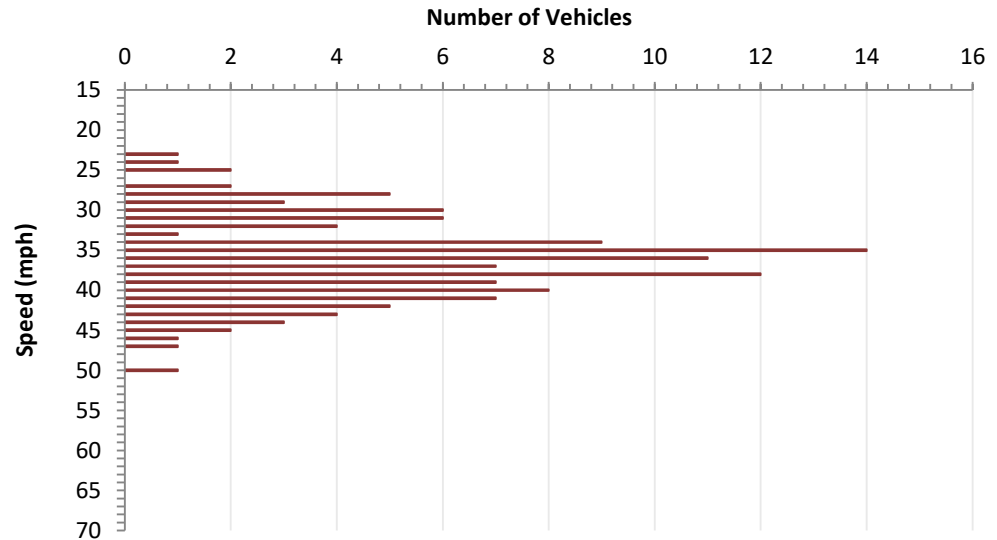
RADAR SPEED SURVEY

SAN DIEGO COUNTY DEPT OF PUBLIC WORKS

Road Name:	Old River Rd	From:	Golf Club Dr	To:	Camino Del Rey
Position:	130' S/O Avenida Del Las Vida			Direction:	NB/SB

Date:	2/9/2022	Weather:	Clear	Project Number:	0
Time Start:	11:05AM	Road Condition:	Dry	Observer:	Samuel Cecere
Time End:	12:05PM	Posted Speed:	N/A	Calibration Test:	Y

Speed (mph)	Num. Veh.	Cum. Pct.
15		
16		
17		
18		
19		
20		
21		
22		
23	1	0.8%
24	1	1.6%
25	2	3.3%
26		
27	2	4.9%
28	5	8.9%
29	3	11.4%
30	6	16.3%
31	6	21.1%
32	4	24.4%
33	1	25.2%
34	9	32.5%
35	14	43.9%
36	11	52.8%
37	7	58.5%
38	12	68.3%
39	7	74.0%
40	8	80.5%
41	7	86.2%
42	5	90.2%
43	4	93.5%
44	3	95.9%
45	2	97.6%
46	1	98.4%
47	1	99.2%
48		
49		
50	1	100.0%
51		
52		
53		
54		
55		
56		
57		
58		
59		
60		
61		
62		
63		
64		
65		
66		
67		
68		
69		
70		
Total	123	



DATA ANALYSIS

Average Speed	36.1	Range	23 - 50
50th Percentile	35.7	10 mph Pace	34 - 43
85th Percentile	40.8	Number in Pace	84
90th Percentile	41.9	Percent in Pace	68%
95th Percentile	43.6		



County of San Diego

JEFF MONEDA
DIRECTOR

DEPARTMENT OF PUBLIC WORKS
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COUNTY TRAFFIC ENGINEER RECOMMENDATION

Date: August 30, 2022

Item Title: Speed Limit and Radar Certification

Location: Old River Road from Camino Del Rey to Golf Club Dr

CTE Recommendation: **Establish 35 MPH Radar Enforced Speed Limit**

Conditions:

- Section 22358 of the California Vehicle Code (CVC) authorizes a local agency to determine upon the basis of an Engineering and Traffic Survey (E&TS) that the speed limit of 65 miles per hour (mph) is more than is reasonable or safe, the agency may declare a prima facie speed limit of 60, 55, 50, 45, 40, 35, 30, 25, 20, or 15 mph, whichever is found most appropriate and is reasonable and safe.
- Section 2B.13 "Speed Limit Sign (R2-1)" of the California MUTCD, states that a speed zones, other than statutory speed limits, shall only be established on the basis of an engineering and traffic survey that has been performed in accordance with traffic engineering practices. The engineering study shall include an analysis of the current speed distribution of free-flowing vehicles.
- Section 2B.13 also states that when a speed limit is to be posted, it shall be established at the nearest 5 mph increment of the 85th-percentile (prevailing) speed of free-flowing traffic, except in the following two options,
 1. The posted speed maybe reduced by 5 mph from the nearest 5 mph increment of the 85th-percentile speed for conditions which are not apparent to the driver, in compliance with CVC Section 22358.5.
 2. For cases in which the nearest 5 mph increment of the 85th-percentile speed would require rounding up, then the speed limit may be rounded

down to the nearest 5 mph increment below the 85th-percentile speed, if nor further reduction is used.

- Section 2B.13, also states that an E&T Survey shall include, in accordance with the CVC Section 627 a) prevailing speeds as determined by traffic engineering measurements, b) collision records, and c) highway, traffic and roadside conditions that are not apparent to the driver.
- Old River Road is a two-lane roadway with limited shoulders throughout its length of 0.39 miles. Its pavement width varies between 28' and 33' feet with double yellow center lines and edge lines on both sides of the roadway.
- Old River Road is located within Bonsall Elementary School zone.
- Recent speed data of the free-flowing traffic on Old River Road taken on February 09, 2022, resulted in an 85th-percentile (prevailing) speed of 40.8 mph.
- A review of the roadway collision data for a three-year period (July 2019 to June 2022) shows a total of 3 collisions on Old River Road and a collision rate of 2.37 collisions per million-vehicle-mile (C/MVM), which is higher than the state average of 1.60 C/MVM for similar roadway.
- Pursuant to CVC sections 627, 22358, and 22358.5, the CA MUTCD Section 2B.13 guidelines, and the existing conditions and safety records of the subject Old River Road segment, **a recommended 35 MPH radar enforced speed limit** is reasonable and safe on Old River Road from Camino Del Rey to Golf Club Dr.



Zoubir A. Ouadah

Zoubir A. Ouadah, PE. TE.
County Traffic Engineer

08/30/2022

Date

SEGMENT ACCIDENT RATE (ACC/MVM):

$$\text{Segment Accident Rate} = \frac{(\text{Number of Accidents}) (10^6)}{(\text{Volume}) (\text{Number of Years}) (365)(\text{Segment Length})}$$

Segment Accident Rate = ACC/MVM
= number of accidents per million vehicle-miles

Number of Accidents = the number of recorded accidents within the segment
excluding the number of accidents in the intersections at both
ends of the road segment for the time period being studied

Segment Length = miles

Volume = ADT or 24 hour volume from the Traffic Census Listing

Number of Years = time period of accident history in years

INPUT:	
Road Segment:	Old River Rd (Golf Club Dr To Camino Del Rey)
Accident Data Period:	06/30/2019-06/30/2022
ADT Record Date:	4/19/2022
Number of Accidents	3
Segment Length	0.39
Volume	2967
Number of Years	3
SAR	= 2.37
> 1.60 statewide average for a conventional 2 lanes or less highway (Suburban, <45 mph posted speed)	

Date of calculation: 8/17/2022
Completed by: Cesar Cudal

SAN DIEGO COUNTY TRAFFIC ADVISORY COMMITTEE

COMMITTEE REPORT OF: September 9, 2022
Item A

SUPERVISORIAL DISTRICT: All

SUBJECT: County Standards

LOCATION: All unincorporated County roads

INITIATED BY: DPW Traffic Engineering

REQUEST: County Sight Distance Standards

PROBLEM AS STATED BY REQUESTER:

The County Public Road Standards requires that all intersections involving a public road conform intersectional sight distance based on roadway design speed, Table 5 of said standards. Table 5 further notes that deviations from the County Public Road Standards shall follow the American Association of State Highway Transportation Officials manual, A Policy on Design of Highways and Streets (AASHTO design manual or “Green Book”). The AASHTO design manual provides an in-depth analysis of stopping sight distance, the sum of driver perception-reaction distance and deceleration distance. The manual provides for adjustment factors for differing grades (uphill and downhill) as well as reasoning and research behind formulae used for calculation, including the determination of driver reaction times. Utilizing the reasoning and formulae, the County Traffic Engineering Section developed an exhibit illustrating operational and emergency sight distances to set a minimum standard for existing operating intersections (see CTE Recommendation Exhibit).

Section 830.6 of the California Government Code notes that one of the factors for a public agency’s design immunity is the adoption of a standard, as the County Traffic Engineering Section’s developed sight distance standard exhibit. The County Traffic Engineering Section recommends adoption of the included exhibit as the County standard for operational and emergency sight distances for existing intersections in the jurisdiction of the County of San Diego.



County of San Diego

JEFF MONEDA
DIRECTOR

DEPARTMENT OF PUBLIC WORKS
5510 OVERLAND AVENUE, SUITE 410
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COUNTY TRAFFIC ENGINEER RECOMMENDATION

Date: August 31, 2022

Item Title: County Corner Sight Distance Standards

Location: Countywide within the County Jurisdiction

CTE Recommendation: **Adopt Operational Sight Distance Standards**

- Section 830.6 of the California Government Code provides that design immunity maybe based on standards adopted by a public entity.
- San Diego County Board of Supervisors adopted the County Public Road standards on March 03, 2010, by Ordinance 10040. Section 6B.E "Sight distance Requirements at an Intersection" of these standards require that all intersectional sight distance criteria shall conform to Table 5 of these standards.
- The County Public Road Standards were not intended for existing roadways or intersections but rather for the purpose of roadway and intersection design when determining intersectional sight distance criteria.
- It is the intent of the County of San Diego to adopt the attached tables as its operational sight distance standards for existing roadways and intersections. These tables have been used by the County for many years but were never formally adopted by the Board of Supervisors as the County standards.
- The attached tables, which are based on the 6th edition (2011) of the AASHTO design manual "A Policy on Geometric Design of Highways and Streets" are intended for determining intersectional sight distances for existing roadways and intersections. Section 3.2 of the AASHTO manual provides an in-depth discussion and analysis of the stopping sight distance when used in the intersectional sight distance. The discussion notes that over 90 percent of

motorists in the research had a reaction time closer to 1.5 seconds and a deceleration rate of 14.8 feet / (second square). The manual also notes that the reaction time of 2.5 seconds and the deceleration rate of 11.2 feet / (second square) should be used for design conditions.

- Therefore, pursuant to Section 830.6 of the California Government Code and the guidance of the AASHTO manual, it is my recommendation as County Traffic Engineer that the attached tables be adopted by the Board of Supervisors as the County standards for intersectional sight distance and be identified as the County Operational Sight Distance standards to be used for existing roadways and intersections.



Zoubir A. Ouadah

Zoubir A. Ouadah, PE. TE.
County Traffic Engineer

08/30/2022

Date

DESIGN CORNER AND STOPPING SIGHT DISTANCE

"CORNER" SIGHT DISTANCE ON LEVEL ROADWAYS	
Speed (mph)	Min. Corner Intersection SSD(feet)
60	600
50	500
40	400
30	300
20	200

NOTE: Corner sight distance measured from a point on the minor road at least 10 feet from the edge of the major road pavement and measured from a height of eye of 3.5 feet on the minor road to a height of object of 4.25 feet on the major road (See Count of San Diego Public Road Standards Drawings DS-20A and DS-20B). Design speed used to determine the minimum sight distance requirement shall be the greater of the current prevailing speed (if known) and the minimum design speed of the respective road classification. Additional corner intersection sight distance may be required for left turns at divided highways or left turns onto two-way highways with more than two lanes as per County Public Road Standards.

DESIGN STOPPING SIGHT DISTANCE ON LEVEL ROADWAYS			
PR=2.5sec, g = 0.35g, a=11.2 ft/sec ²			
Speed(mph)	Reaction(feet)	Breaking(feet)	Total SSD(feet)
15	55.1	21.6	77
20	73.5	38.4	112
25	91.9	60.0	152
30	110.3	86.4	197
35	128.6	117.6	246
40	147.0	153.6	301
45	165.4	194.4	360
50	183.8	240.0	424
55	202.1	290.3	492

NOTE: Design stopping sight distance is for new construction. This calculation assumes a conservative 2.5 second perception-reaction time that exceeds the 90th percentile of reaction time for all drivers and 11.2 ft/s² deceleration rate threshold for design stopping sight distance, per AASHTO 2018 Section 3.2 Sight Distance.

OPERATIONAL STOPPING SIGHT DISTANCE

"OPERATIONAL" STOPPING SIGHT DISTANCE ON LEVEL ROADWAYS			
PR=1.5sec, f=0.45g, a=14.8 ft/sec ²			
Speed(mph)	Reaction(feet)	Breaking(feet)	Total SSD(feet)
15	33.08	16.34	49
20	44.10	29.05	73
25	55.13	45.40	101
30	66.15	65.37	132
35	77.18	88.98	166
40	88.20	116.22	204
45	99.23	147.09	246
50	110.25	181.59	292
55	121.28	219.72	341

Speed(mph)
15
20
25
30
35
40
45
50
55

"OPERATIONAL" STOPPING SIGHT DISTANCE UPGRADES			"OPERATIONAL" STOPPING SIGHT DISTANCE DOWNGRADES		
3%	6%	9%	-3%	-6%	-9%
15	48	47	51	52	53
20	71	70	75	77	80
25	98	95	104	107	111
30	127	124	136	141	147
35	161	156	172	179	188
40	197	191	212	222	232
45	237	229	256	268	282
50	280	271	304	319	336
55	327	315	356	374	394

Speed(mph)
15
20
25
30
35
40
45
50
55

NOTE: Operational Sight Distance measured from a point on the minor road 8 feet from the edge of pavement (Distance from the front of the vehicles to the driver's eye is nearly always 8ft per AASHTO 9.5) measured from a height of eye of 3.5 feet on the minor road to a height of object of 3.5 feet on the major road (AASHTO Section 9.5). This calculation assumes a 1.5 second perception-reaction time that encompasses 90th percentile of drivers and a 14.8 ft/s² deceleration rate based on studies that show most drivers decelerate at a greater rate than 14.8ft/s² (AASHTO Section 3.2).

EMERGENCY STOPPING SIGHT DISTANCE

"EMERGENCY" STOPPING SIGHT DISTANCE ON LEVEL ROADWAYS			
PR=1.5sec, f=0.5g, a=16.1 ft/sec ²			
Speed(mph)	Reaction(feet)	Breaking(feet)	Total SSD(feet)
15	33.08	15.02	48
20	44.10	26.71	71
25	55.13	41.73	97
30	66.15	60.09	126
35	77.18	81.79	159
40	88.20	106.83	195
45	99.23	135.21	234
50	110.25	166.93	277
55	121.28	201.98	323

Speed(mph)
15
20
25
30
35
40
45
50
55

"EMERGENCY" STOPPING SIGHT DISTANCE UPGRADES			"EMERGENCY" STOPPING SIGHT DISTANCE DOWNGRADES		
3%	6%	9%	-3%	-6%	-9%
15	47	46	49	50	51
20	69	68	72	74	77
25	94	92	99	102	106
30	123	120	130	134	139
35	154	150	164	170	177
40	189	183	202	209	218
45	227	220	243	253	264
50	267	259	288	300	314
55	312	301	336	350	367

Speed(mph)
15
20
25
30
35
40
45
50
55

NOTE: Emergency Stopping sight distance is based on a greater deceleration rate of 16.1 ft/s². Multiple studies completed on County maintained roads indicated the ability for motorists to decelerate with a gravitational force of 0.5g based on road conditions.

Values are based on AASHTO 2018 Stopping Sight Distance equations (AASHTO Section 3.2)

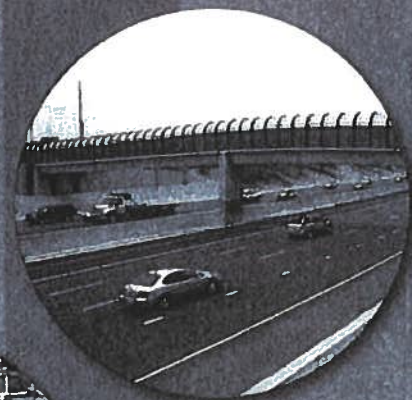
$$d = 1.47Vt + 1.075V^2/a$$

$$d = \frac{V^2}{30((a/32.2) + -G)}$$

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A Policy on Geometric Design of Highways and Streets

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and the desired level of service. Design criteria and guidance applicable to specific functional classifications of highways and streets are presented in Chapters 5 through 8.

Four aspects of sight distance are discussed below: (1) the sight distances needed for stopping, which are applicable on all highways; (2) the sight distances needed for the passing of overtaken vehicles, applicable only on two-lane highways; (3) the sight distances needed for decisions at complex locations; and (4) the criteria for measuring these sight distances for use in design. The design of alignment and profile to provide sight distances and to satisfy the applicable design criteria are described later in this chapter. The special conditions related to sight distances at intersections are discussed in Section 9.5.

3.2.2 Stopping Sight Distance

Sight distance is the length of the roadway ahead that is visible to the driver. The available sight distance on a roadway should be sufficiently long to enable a vehicle traveling at or near the design speed to stop before reaching a stationary object in its path. Although greater lengths of visible roadway are desirable, the sight distance at every point along a roadway should be at least that needed for a below-average driver or vehicle to stop.

Stopping sight distance is the sum of two distances: (1) the distance traversed by the vehicle from the instant the driver sights an object necessitating a stop to the instant the brakes are applied, and (2) the distance needed to stop the vehicle from the instant brake application begins. These are referred to as brake reaction distance and braking distance, respectively.

Brake Reaction Time

Brake reaction time is the interval from the instant that the driver recognizes the existence of an obstacle on the roadway ahead that necessitates braking until the instant that the driver actually applies the brakes. Under certain conditions, such as emergency situations denoted by flares or flashing lights, drivers accomplish these tasks almost instantly. Under most other conditions, the driver needs not only to see the object but also to recognize it as a stationary or slowly moving object against the background of the roadway and other objects, such as walls, fences, trees, poles, or bridges. Such determinations take time, and the amount of time needed varies considerably with the distance to the object, the visual acuity of the driver, the natural rapidity with which the driver reacts, the atmospheric visibility, the type and the condition of the roadway, and nature of the obstacle. Vehicle speed and roadway environment probably also influence reaction time. Normally, a driver traveling at or near the design speed is more alert than one traveling at a lesser speed. A driver on an urban street confronted by innumerable potential conflicts with parked vehicles, driveways, and cross streets is also likely to be more alert than the same driver on a limited-access facility where such conditions should be almost nonexistent.

The study of reaction times by Johansson and Rumar (39) referred to in Section 2.2.6 was based on data from 321 drivers who expected to apply their brakes. The median reaction-time value for these drivers was 0.66 s, with 10 percent using 1.5 s or longer. These findings correlate with those of earlier studies in which alerted drivers were also evaluated. Another study (44) found 0.64 s as the average reaction time, while 5 percent of the drivers needed over 1 s. In a third study (48), the values of brake reaction time ranged from 0.4 to 1.7 s. In the Johansson and Rumar study (39), when the event that prompted application of the brakes was unexpected, the drivers' response times were found to increase by approximately 1 s or more; some reaction times were greater than 1.5 s. This increase in reaction time substantiated earlier

laboratory and road tests in which the conclusion was drawn that a driver who needed 0.2 to 0.3 s of reaction time under alerted conditions would need 1.5 s of reaction time under normal conditions.

Minimum brake reaction times for drivers could thus be at least 1.64 s, 0.64 s for alerted drivers plus 1 s for the unexpected event. Because the studies discussed above used simple prearranged signals, they represent the least complex of roadway conditions. Even under these simple conditions, it was found that some drivers took over 3.5 s to respond. Because actual conditions on the highway are generally more complex than those of the studies, and because there is wide variation in driver reaction times, it is evident that the criterion adopted for use should be greater than 1.64 s. The brake reaction time used in design should be long enough to include the reaction times needed by nearly all drivers under most highway conditions. Both recent research (17) and the studies documented in the literature (39, 44, 48) show that a 2.5-s brake reaction time for stopping sight situations encompasses the capabilities of most drivers, including those of older drivers. The recommended design criterion of 2.5 s for brake reaction time exceeds the 90th percentile of reaction time for all drivers and was used in the development of Table 3-1.

A brake reaction time of 2.5 s is considered adequate for conditions that are more complex than the simple conditions used in laboratory and road tests, but it is not adequate for the most complex conditions encountered in actual driving. The need for greater reaction time in the most complex conditions encountered on the roadway, such as those found at multiphase at-grade intersections and at ramp terminals on through roadways, can be found in Section 3.2.3 on "Decision Sight Distance."

Braking Distance

The approximate braking distance of a vehicle on a level roadway traveling at the design speed of the roadway may be determined from the following equation:

Metric	U.S. Customary	(3-1)
$d_b = 0.039 \frac{V^2}{a}$	$d_b = 1.075 \frac{V^2}{a}$	
where:	where:	
d_b = braking distance, m	d_b = braking distance, ft	
V = design speed, km/h	V = design speed, mph	
a = deceleration rate, m/s ²	a = deceleration rate, ft/s ²	

Studies documented in the literature (17) show that most drivers decelerate at a rate greater than 4.5 m/s² [14.8 ft/s²] when confronted with the need to stop for an unexpected object in the roadway. Approximately 90 percent of all drivers decelerate at rates greater than 3.4 m/s² [11.2 ft/s²]. Such decelerations are within the driver's capability to stay within his or her lane and maintain steering control during the braking maneuver on wet surfaces. Therefore, 3.4 m/s² [11.2 ft/s²] (a comfortable deceleration for most drivers) is recommended as the deceleration threshold for determining stopping sight distance. Implicit in the choice of this deceleration threshold is the assessment that most vehicle braking systems and the tire-pavement friction levels of most roadways are capable of providing a deceleration rate of at least 3.4 m/s² [11.2 ft/s²]. The friction available on most wet pavement surfaces and the capabilities of most vehicle braking systems can provide braking friction that exceeds this deceleration rate.

Table 3-1. Stopping Sight Distance on Level Roadways

Metric					U.S. Customary				
Design Speed (km/h)	Brake Reaction Distance (m)	Braking Distance on Level (m)	Stopping Sight Distance		Design Speed (mph)	Brake Reaction Distance (ft)	Braking Distance on Level (ft)	Stopping Sight Distance	
			Calculated (m)	Design (m)				Calculated (ft)	Design (ft)
20	13.9	4.6	18.5	20	15	55.1	21.6	76.7	80
30	20.9	10.3	31.2	35	20	73.5	38.4	111.9	115
40	27.8	18.4	46.2	50	25	91.9	60.0	151.9	155
50	34.8	28.7	63.5	65	30	110.3	86.4	196.7	200
60	41.7	41.3	83.0	85	35	128.6	117.6	246.2	250
70	48.7	56.2	104.9	105	40	147.0	153.6	300.6	305
80	55.6	73.4	129.0	130	45	165.4	194.4	359.8	360
90	62.6	92.9	155.5	160	50	183.8	240.0	423.8	425
100	69.5	114.7	184.2	185	55	202.1	290.3	492.4	495
110	76.5	138.8	215.3	220	60	220.5	345.5	566.0	570
120	83.4	165.2	248.6	250	65	238.9	405.5	644.4	645
130	90.4	193.8	284.2	285	70	257.3	470.3	727.6	730
					75	275.6	539.9	815.5	820
					80	294.0	614.3	908.3	910

Note: Brake reaction distance predicated on a time of 2.5 s; deceleration rate of 3.4 m/s² [11.2 ft/s²] used to determine calculated sight distance.

Design Values

The stopping sight distance is the sum of the distance traversed during the brake reaction time and the distance to brake the vehicle to a stop. The computed distances for various speeds at the assumed conditions on level roadways are shown in Table 3-1 and were developed from the following equation:

Metric	U.S. Customary
$SSD = 0.278Vt + 0.039 \frac{V^2}{a}$ <p>where: SSD = stopping sight distance, m V = design speed, km/h t = brake reaction time, 2.5 s a = deceleration rate, m/s²</p>	$SSD = 1.47Vt + 1.075 \frac{V^2}{a}$ <p>where: SSD = stopping sight distance, ft V = design speed, mph t = brake reaction time, 2.5 s a = deceleration rate, ft/s²</p>

(3-2)

Stopping sight distances exceeding those shown in Table 3-1 should be used as the basis for design wherever practical. Use of longer stopping sight distances increases the margin for error for all drivers and, in particular, for those who operate at or near the design speed during wet pavement conditions. New pavements should have initially, and should retain, friction coefficients consistent with the deceleration rates used to develop Table 3-1.

Effect of Grade on Stopping

When a highway is on a grade, Equation 3-1 for braking distance is modified as follows:

Metric	U.S. Customary
$d_B = \frac{V^2}{254 \left[\left(\frac{a}{9.81} \right) \pm G \right]}$ <p>where:</p> <p>d_B = braking distance on grade, m</p> <p>V = design speed, km/h</p> <p>a = deceleration, m/s²</p> <p>G = grade, rise/run, m/m</p>	$d_B = \frac{V^2}{30 \left[\left(\frac{a}{32.2} \right) \pm G \right]}$ <p>where:</p> <p>d_B = braking distance on grade, ft</p> <p>V = design speed, mph</p> <p>a = deceleration, ft/s²</p> <p>G = grade, rise/run, ft/ft</p>

(3-3)

In this equation, G is the rise in elevation divided by the distance of the run and the percent of grade divided by 100, and the other terms are as previously stated. The stopping distances needed on upgrades are shorter than on level roadways; those on downgrades are longer. The stopping sight distances for various grades shown in Table 3-2 are the values determined by using Equation 3-3 in place of the second term in Equation 3-2. These adjusted sight distance values are computed for wet-pavement conditions using the same design speeds and brake reaction times used for level roadways in Table 3-1.

Table 3-2. Stopping Sight Distance on Grades

Metric							U.S. Customary						
Design Speed (km/h)	Stopping Sight Distance (m)						Design Speed (mph)	Stopping Sight Distance (ft)					
	Downgrades			Upgrades				Downgrades			Upgrades		
	3 %	6 %	9 %	3 %	6 %	9 %		3 %	6 %	9 %	3 %	6 %	9 %
20	20	20	20	19	18	18	15	80	82	85	75	74	73
30	32	35	35	31	30	29	20	116	120	126	109	107	104
40	50	50	53	45	44	43	25	158	165	173	147	143	140
50	66	70	74	61	59	58	30	205	215	227	200	184	179
60	87	92	97	80	77	75	35	257	271	287	237	229	222
70	110	116	124	100	97	93	40	315	333	354	289	278	269
80	136	144	154	123	118	114	45	378	400	427	344	331	320
90	164	174	187	148	141	136	50	446	474	507	405	388	375
100	194	207	223	174	167	160	55	520	553	593	469	450	433
110	227	243	262	203	194	186	60	598	638	686	538	515	495
120	263	281	304	234	223	214	65	682	728	785	612	584	561
130	302	323	350	267	254	243	70	771	825	891	690	658	631
							75	866	927	1003	772	736	704
							80	965	1035	1121	859	817	782

Although desirable at higher volume intersections, approach sight triangles like those shown in Figure 9-15A are not needed for intersection approaches controlled by stop signs or traffic signals. In that case, the need for approaching vehicles to stop at the intersection is determined by the traffic control devices and not by the presence or absence of vehicles on the intersecting approaches.

Departure Sight Triangles

A second type of clear sight triangle provides sight distance sufficient for a stopped driver on a minor-road approach to depart from the intersection and enter or cross the major road. Figure 9-15B shows typical departure sight triangles to the left and to the right of the location of a stopped vehicle on the minor road. Departure sight triangles should be provided in each quadrant of each intersection approach controlled by stop or yield signs. Departure sight triangles should also be provided for some signalized intersection approaches (see Case D in Section 9.5.3 on “Intersection Control”). Distance a_2 in Figure 9-15B is equal to distance a_1 plus the width of the lane(s) departing from the intersection on the major road to the right. Distance a_2 should also include the width of any median present on the major road unless the median is wide enough to permit a vehicle to stop before entering or crossing the roadway beyond the median. The appropriate measurement of distances a_1 and a_2 for departure sight triangles depends on the placement of any marked stop line that may be present and, thus, may vary with site-specific conditions.

The recommended dimensions of the clear sight triangle for desirable traffic operations where stopped vehicles enter or cross a major road are based on assumptions derived from field observations of driver gap-acceptance behavior (12). The provision of clear sight triangles like those shown in Figure 9-15B also allows the drivers of vehicles on the major road to see any vehicles stopped on the minor-road approach and to be prepared to slow or stop, if needed.

Identification of Sight Obstructions within Sight Triangles

The profiles of the intersecting roadways should be designed to provide the recommended sight distances for drivers on the intersection approaches. Within a sight triangle, any object at a height above the elevation of the adjacent roadways that would obstruct the driver's view should be removed or lowered, if practical. Such objects may include buildings, parked vehicles, highway structures, roadside hardware, hedges, trees, bushes, unmowed grass, tall crops, walls, fences, and the terrain itself. Particular attention should be given to the evaluation of clear sight triangles at interchange ramp/crossroad intersections where features such as bridge railings, piers, and abutments are potential sight obstructions.

The determination of whether an object constitutes a sight obstruction should consider both the horizontal and vertical alignment of both intersecting roadways, as well as the height and position of the object. In making this determination, it should be assumed that the driver's eye is 1.08 m [3.50 ft] above the roadway surface and that the object to be seen is 1.08 m [3.50 ft] above the surface of the intersecting road.

This object height is based on a vehicle height of 1.33 m [4.35 ft], which represents the 15th percentile of vehicle heights in the current passenger car population less an allowance of 250 mm [10 in.]. This allowance represents a near-maximum value for the portion of a passenger car height that needs to be visible for another driver to recognize it as the object. The use of an object height equal to the driver eye height makes intersection sight distances reciprocal (i.e., if one driver can see another vehicle, then the driver of that vehicle can also see the first vehicle).

very unlikely another potentially conflicting vehicle will be encountered as the first vehicle departs the intersection.

Case B—Intersections with Stop Control on the Minor Road

Departure sight triangles for intersections with stop control on the minor road should be considered for three situations:

- Case B1—Left turns from the minor road;
- Case B2—Right turns from the minor road; and
- Case B3—Crossing the major road from a minor-road approach.

Intersection sight distance criteria for stop-controlled intersections are longer than stopping sight distance to allow the intersection to operate smoothly. Minor-road vehicle operators can wait until they can proceed safely without forcing a major-road vehicle to stop.

Case B1—Left Turn from the Minor Road

Departure sight triangles for traffic approaching from either the right or the left, like those shown in Figure 9-15B, should be provided for left turns from the minor road onto the major road for all stop-controlled approaches. The length of the leg of the departure sight triangle along the major road in both directions, shown as distance *b* in Figure 9-15B, is the recommended intersection sight distance for Case B1.

The vertex (decision point) of the departure sight triangle on the minor road should be 4.4 m [14.5 ft] from the edge of the major-road traveled way. This represents the typical position of the minor-road driver's eye when a vehicle is stopped relatively close to the major road. Field observations of vehicle stopping positions found that, where needed, drivers will stop with the front of their vehicle 2.0 m [6.5 ft] or less from the edge of the major-road traveled way. Measurements of passenger cars indicate that the distance from the front of the vehicle to the driver's eye for the current U.S. passenger car population is nearly always 2.4 m [8 ft] or less (12). Where practical, it is desirable to increase the distance from the edge of the major-road traveled way to the vertex of the clear sight triangle from 4.4 m to 5.4 m [14.5 to 18 ft]. This increase allows 3.0 m [10 ft] from the edge of the major-road traveled way to the front of the stopped vehicle, providing a larger sight triangle. The length of the sight triangle along the minor road (distance *a* in Figure 9-15B) is the sum of the distance from the major road plus $\frac{1}{2}$ lane width for vehicles approaching from the left, or $1\frac{1}{2}$ lane widths for vehicles approaching from the right.

Field observations of the gaps in major-road traffic actually accepted by drivers turning onto the major road have shown that the values in Table 9-5 provide sufficient time for the minor-road vehicle to accelerate from a stop and complete a left turn without unduly interfering with major-road traffic operations. The time gap acceptance time does not vary with approach speed on the major road. Studies have indicated that a constant value of time gap, independent of approach speed, can be used as a basis for intersection sight distance determinations. Observations have also shown that major-road drivers will reduce their speed to some extent when minor-road vehicles turn onto the major road. Where the time gap acceptance values in Table 9-5 are used to determine the length of the leg of the departure sight triangle, most major-road drivers should not need to reduce speed to less than 70 percent of their initial speed (12).