



MINNESOTA DEPARTMENT OF TRANSPORTATION

METRO DIVISION - TRAFFIC ENGINEERING

SIGNAL WARRANTS ANALYSIS

LOCATION: I-35 & CRYSTAL LAKE RD E JCT.

COUNTY: DAKOTA

REF. POINT: 087.823

DATE: 7/30/1996

OPERATOR: DR

Speed	Approach Description	Lanes
40	Major App1: CRYSTAL LAKE RD EB, W OF I-35 E. RAMP	2
40	Major App3: CRYSTAL LAKE RD WB, E OF I-35 E. RAMP	2
40	Minor App2: I-35 NB RAMP TO CRYSTAL LAKE RD	2
40	Minor App4: GRANS AVE. SB, N OF CRYSTAL LAKE RD	2

0.70 FACTOR USED? YES

POPULATION < 10,000? NO

EXISTING SIGNAL ? NO

HOUR	420/630				140/70		140/70		MET SAME HOURS
	MAJOR APP. 1	MAJOR APP. 3	TOTAL 1+3	WARRANT MET	MINOR APP. 2	MINOR APP. 4	WARRANT MET APP. 2	WARRANT MET APP. 4	
0:00 - 1:00	51	20	71	/	6	6	/	/	/
1:00 - 2:00	24	8	32	/	4	4	/	/	/
2:00 - 3:00	13	10	23	/	2	2	/	/	/
3:00 - 4:00	5	5	10	/	1	1	/	/	/
4:00 - 5:00	8	16	24	/	1	3	/	/	/
5:00 - 6:00	30	97	127	/	1	15	/	/	/
6:00 - 7:00	118	228	346	/	7	61	/	/	/
7:00 - 8:00	179	332	511	X/	15	103	/	/X	/
8:00 - 9:00	162	252	414	/	17	101	/	/X	/
9:00 - 10:00	174	230	404	/	20	129	/	/X	/
10:00 - 11:00	211	253	464	X/	28	162	/	X/X	X/
11:00 - 12:00	242	235	477	X/	35	171	/	X/X	X/
12:00 - 13:00	285	272	557	X/	39	171	/	X/X	X/
13:00 - 14:00	274	264	538	X/	40	164	/	X/X	X/
14:00 - 15:00	325	266	591	X/	39	174	/	X/X	X/
15:00 - 16:00	413	290	703	X/X	62	158	/	X/X	X/X
16:00 - 17:00	557	341	898	X/X	75	183	/X	X/X	X/X
17:00 - 18:00	671	370	1041	X/X	100	214	/X	X/X	X/X
18:00 - 19:00	488	359	847	X/X	64	202	/	X/X	X/X
19:00 - 20:00	378	304	682	X/X	47	161	/	X/X	X/X
20:00 - 21:00	405	244	649	X/X	61	113	/	/X	/X
21:00 - 22:00	311	161	472	X/	33	68	/	/	/
22:00 - 23:00	159	90	249	/	23	30	/	/	/
23:00 - 24:00	98	45	143	/	9	20	/	/	/

	Met (Hr)	Required (Hr)	
Warrant 1	10	8	Satisfied
Warrant 2	6	8	Not satisfied
Warrant 6	13	8	Satisfied, check accident record
Warrant 8	9	8	Satisfied
Warrant 9	5	4	Satisfied
Warrant 11	3	1	Satisfied

LOCATION: I-35 & CRYSTAL LAKE RD E JCT.

COUNTY: DAKOTA

REF. POINT: 087.823

DATE: 7/30/1996

OPERATOR: DR

0.70 FACTOR USED? YES
 POPULATION < 10,000? NO
 EXISTING SIGNAL ? NO

Speed	Approach Description	Lanes
40	Major App1: CRYSTAL LAKE RD EB, W OF I-35 E. RAMP	2
40	Major App3: CRYSTAL LAKE RD WB, E OF I-35 E. RAMP	2
40	Minor App2: I-35 NB RAMP TO CRYSTAL LAKE RD	2
40	Minor App4: GRANS AVE. SB, N OF CRYSTAL LAKE RD	2

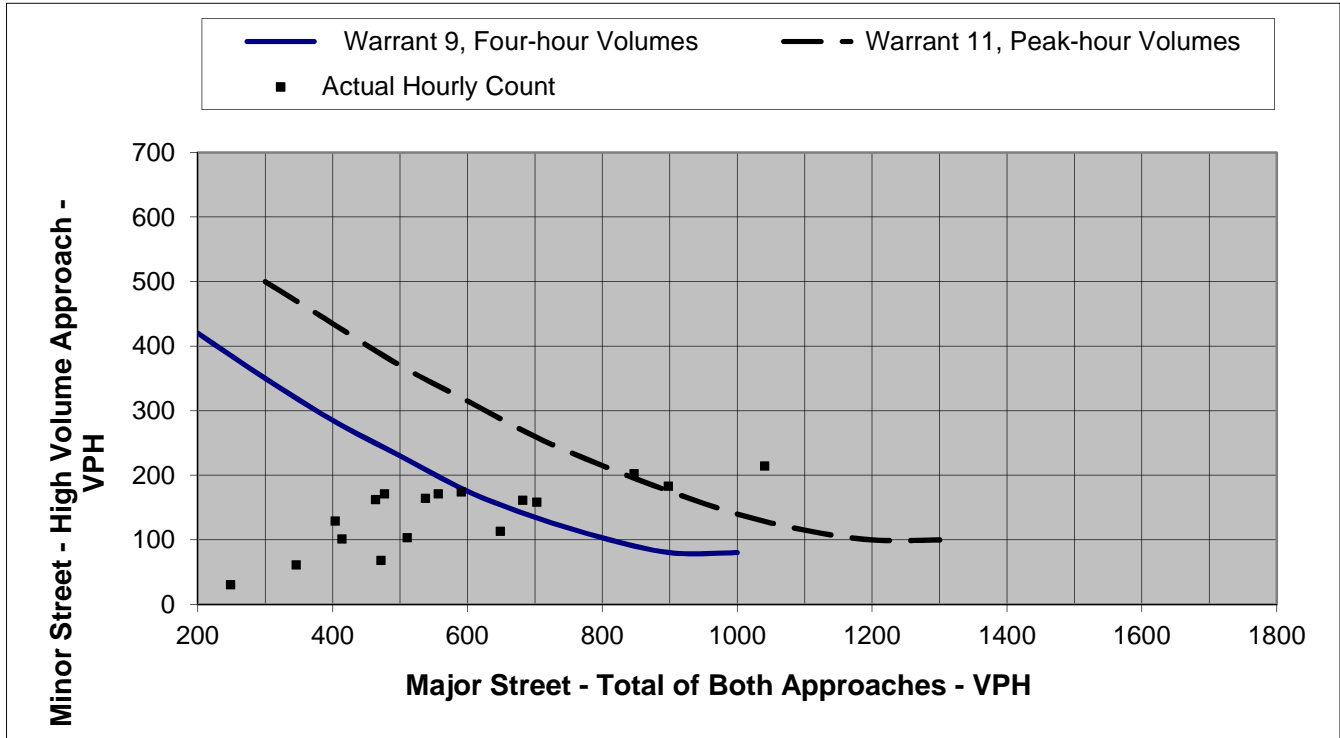


Figure 1. Four Hour and Peak Hour Warrant Analysis

Note: For data points outside the graph range, check the minor street volume against the lower thresholds

Major	Warrant Criteria		Actual Hourly Count	
	Warrant 9, F	Warrant 11, P	Major	Actual Hourly Count
200	420		71	6
300	350	500	32	4
400	285	435	23	2
500	230	370	10	1
600	175	315	24	3
700	135	260	127	15
800	103	215	346	61
900	80	175	511	103
1000	80	140	414	101
1100		115	404	129
1200		100	464	162
1300		100	477	171
1400			557	171
1500			538	164
1600			591	174
1700			703	158
1800			898	183
			1041	214
			847	202
			682	161
			649	113
			472	68
			249	30
			143	20

Four Hour Warrant

Major App	Minor App		
	1 & 1	2 & 1	2 & 2
300	360	440	590
400	310	390	530
500	260	340	460
600	215	290	390
700	180	245	330
800	150	205	280
900	125	170	235
1000	100	145	195
1100	85	120	165
1200	80	100	135
1300	80	83	110
1400	80	80	110

Peak Hour

Major App	1 & 1
400	475
500	425
600	370
700	330
800	280
900	240
1000	204
1100	175
1200	150
1300	130
1400	115
1500	100
1600	100
1700	100
1800	100

Four Hour Warrant Factored

Major App	Minor App		
	1 & 1	2 & 1	2 & 2
200	250	320	420
300	210	265	350
400	170	215	285
500	130	170	230
600	93	130	175
700	70	100	135
800	60	80	103
900	60	65	80
1000	60	60	80

Peak Hour

Major App	1 & 1
300	320
400	270
500	225
600	180
700	145
800	115
900	90
1000	75
1100	75
1200	75
1300	75

Warrant

Minor App

2 & 1	2 & 2
570	725
520	665
465	600
420	540
370	480
330	425
285	375
250	330
220	285
190	250
160	220
140	187
115	165
100	150
100	150

Warrant Factored

Minor App

2 & 1	2 & 2
380	500
335	435
285	370
240	315
200	260
160	215
135	175
110	140
95	115
75	100
75	100



MINNESOTA DEPARTMENT OF TRANSPORTATION

METRO DIVISION - TRAFFIC ENGINEERING

ALL WAY STOP WARRANT

LOCATION: I-35 & CRYSTAL LAKE RD E JCT.

COUNTY: DAKOTA

REF. POINT: 087.823

DATE: 7/30/1996

OPERATOR: DR

Speed	Approach Description	Lanes
40	Major App1: CRYSTAL LAKE RD EB, W OF I-35 E. RAMP	2
40	Major App3: CRYSTAL LAKE RD WB, E OF I-35 E. RAMP	2
40	Minor App2: I-35 NB RAMP TO CRYSTAL LAKE RD	2
40	Minor App4: GRANS AVE. SB, N OF CRYSTAL LAKE RD	2

0.70 FACTOR USED? Yes

HOUR	MAJOR APP. 1	MAJOR APP. 3	MINOR APP. 2	MINOR APP. 4	350	140	WARRANT MET
					TOTAL Σ (APP.1 to APP. 4)	MINOR TOTAL APP. 2 + APP. 4	
0:00 - 1:00	51	20	6	6	83	12	/
1:00 - 2:00	24	8	4	4	40	8	/
2:00 - 3:00	13	10	2	2	27	4	/
3:00 - 4:00	5	5	1	1	12	2	/
4:00 - 5:00	8	16	1	3	28	4	/
5:00 - 6:00	30	97	1	15	143	16	/
6:00 - 7:00	118	228	7	61	414	68	X/
7:00 - 8:00	179	332	15	103	629	118	X/
8:00 - 9:00	162	252	17	101	532	118	X/
9:00 - 10:00	174	230	20	129	553	149	X/X
10:00 - 11:00	211	253	28	162	654	190	X/X
11:00 - 12:00	242	235	35	171	683	206	X/X
12:00 - 13:00	285	272	39	171	767	210	X/X
13:00 - 14:00	274	264	40	164	742	204	X/X
14:00 - 15:00	325	266	39	174	804	213	X/X
15:00 - 16:00	413	290	62	158	923	220	X/X
16:00 - 17:00	557	341	75	183	1156	258	X/X
17:00 - 18:00	671	370	100	214	1355	314	X/X
18:00 - 19:00	488	359	64	202	1113	266	X/X
19:00 - 20:00	378	304	47	161	890	208	X/X
20:00 - 21:00	405	244	61	113	823	174	X/X
21:00 - 22:00	311	161	33	68	573	101	X/
22:00 - 23:00	159	90	23	30	302	53	/
23:00 - 24:00	98	45	9	20	172	29	/

Met (Hr) Required (Hr)

Allway Stop Warrant: **12** 8 **Satisfied**

REMARKS: _____

