



MINNESOTA DEPARTMENT OF TRANSPORTATION

METRO DIVISION - TRAFFIC ENGINEERING

SIGNAL WARRANTS ANALYSIS

LOCATION: TH-95 at 70th St S / CSAH-20

COUNTY: Washington

REF. POINT: 122.456

DATE: 9/20/2011

OPERATOR: RE

Speed	Approach Description	Lanes
55	Major App1: TH-95 NB, south of 70th St S / CSAH-20	2
55	Major App3: TH-95 SB, north of 70th St S / CSAH-20	2
55	Minor App2: 70th St S/CSAH-20 EB, west of TH-95	2
55	Minor App4: 70th St S/CSAH-20 WB, east of TH-95	2

0.70 FACTOR USED?

YES

POPULATION < 10,000?

NO

EXISTING SIGNAL ?

NO

THRESHOLDS 1A/1B:

420/630

140/70

140/70

HOUR	MAJOR APP. 1	MAJOR APP. 3	TOTAL 1+3	MAJOR 1A/1B	MINOR APP. 2	MINOR 2 1A/1B	MINOR APP. 4	MINOR 4 1A/1B	MET SAME 1A/1B
0:00 - 1:00	14	7	21	/	5	/	2	/	/
1:00 - 2:00	11	8	19	/	2	/	3	/	/
2:00 - 3:00	7	5	12	/	3	/	0	/	/
3:00 - 4:00	7	5	12	/	2	/	1	/	/
4:00 - 5:00	15	15	30	/	7	/	7	/	/
5:00 - 6:00	40	55	95	/	31	/	24	/	/
6:00 - 7:00	113	120	233	/	89	/X	63	/	/
7:00 - 8:00	178	189	367	/	119	/X	78	/X	/
8:00 - 9:00	156	160	316	/	84	/X	57	/	/
9:00 - 10:00	100	116	216	/	57	/	53	/	/
10:00 - 11:00	98	127	225	/	67	/	40	/	/
11:00 - 12:00	111	112	223	/	54	/	59	/	/
12:00 - 13:00	112	123	235	/	56	/	56	/	/
13:00 - 14:00	114	156	270	/	67	/	52	/	/
14:00 - 15:00	110	158	268	/	89	/X	68	/	/
15:00 - 16:00	142	228	370	/	140	X/X	60	/	/
16:00 - 17:00	173	260	433	X/	155	X/X	76	/X	X/
17:00 - 18:00	189	253	442	X/	162	X/X	54	/	X/
18:00 - 19:00	128	165	293	/	98	/X	56	/	/
19:00 - 20:00	76	111	187	/	61	/	40	/	/
20:00 - 21:00	67	91	158	/	40	/	22	/	/
21:00 - 22:00	38	72	110	/	35	/	13	/	/
22:00 - 23:00	25	40	65	/	22	/	4	/	/
23:00 - 24:00	17	15	32	/	10	/	2	/	/

Met (Hr) Required (Hr)

Warrant 1A	2	8	Not satisfied
Warrant 1B	0	8	Not satisfied
Warrant 2	0	4	Not satisfied
Warrant 3	0	1	Not satisfied
Warrant 7	4	8	Not satisfied

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	115
1400	80	80	115
1500	80	80	115
1600	80	80	115
1700	80	80	115
1800	80	80	115

Peak Hour Warrant		
Major App	Minor App	
	1 & 1	2 & 1
400	475	570
500	425	520
600	370	465
700	330	420
800	280	370
900	240	330
1000	204	285
1100	175	250
1200	150	220
1300	130	190
1400	115	160
1500	100	140
1600	100	115
1700	100	100
1800	100	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
1100	60	60	80
1200	60	60	80
1300	60	60	80
1400	60	60	80
1500	60	60	80
1600	60	60	80
1700	60	60	80
1800	60	60	80

Peak Hour Warrant Factored		
Major App	Minor App	
	1 & 1	2 & 1
300	320	380
400	270	335
500	225	285
600	180	240
700	145	200
800	115	160
900	90	135
1000	75	110
1100	75	95
1200	75	75
1300	75	75
1400	75	75
1500	75	75
1600	75	75
1700	75	75
1800	75	75

2 & 2
725
665
600
540
480
425
375
330
285
250
220
187
165
150
150

ctored

2 & 2
500
435
370
315
260
215
175
140
115
100
100
100
100
100
100
100

LOCATION: TH-95 at 70th St S / CSAH-20

COUNTY: Washington

REF. POINT: 122.456

DATE: 9/20/2011

OPERATOR: RE

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

Speed	Approach Description	Lanes
55	Major App1: TH-95 NB, south of 70th St S / CSAH-20	2
55	Major App3: TH-95 SB, north of 70th St S / CSAH-20	2
55	Minor App2: 70th St S/CSAH-20 EB, west of TH-95	2
55	Minor App4: 70th St S/CSAH-20 WB, east of TH-95	2

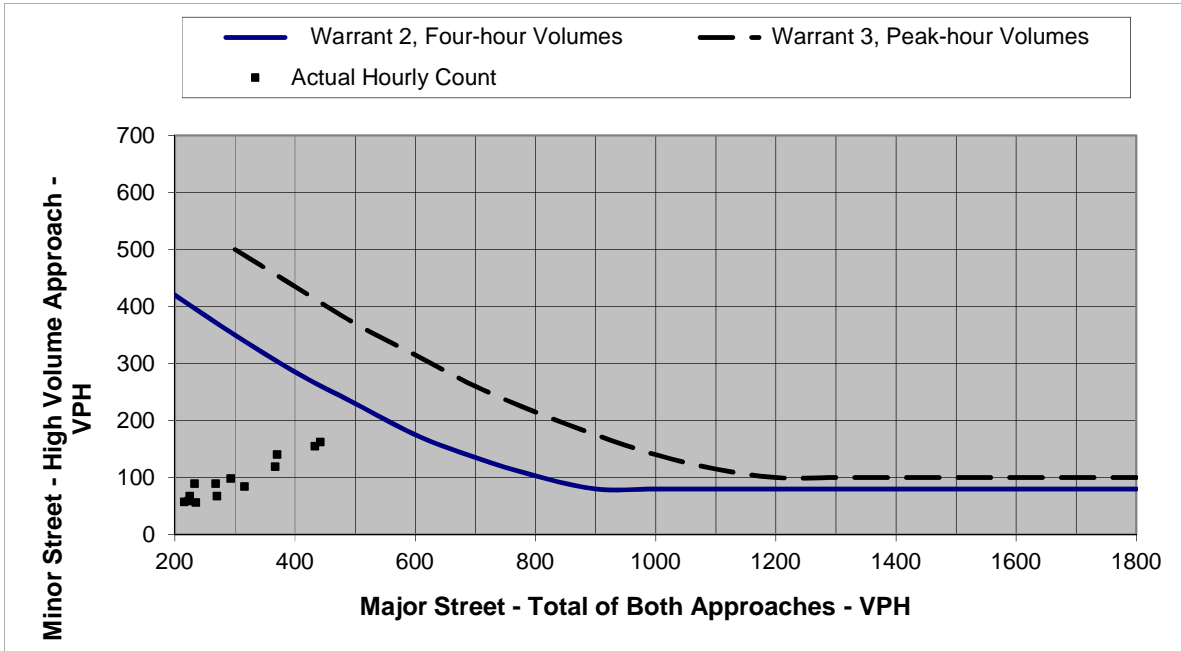


Figure 1. Four Hour and Peak Hour Warrant Analysis

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

Major	Warrant Criteria		Actual Hourly Count	
	Warrant 2, F	Warrant 3, Pe	Major	Actual Hourly Count
200	420		21	5
300	350	500	19	3
400	285	435	12	3
500	230	370	12	2
600	175	315	30	7
700	135	260	95	31
800	103	215	233	89
900	80	175	367	119
1000	80	140	316	84
1100	80	115	216	57
1200	80	100	225	67
1300	80	100	223	59
1400	80	100	235	56
1500	80	100	270	67
1600	80	100	268	89
1700	80	100	370	140
1800	80	100	433	155
			442	162
			293	98
			187	61
			158	40
			110	35
			65	22
			32	10



MINNESOTA DEPARTMENT OF TRANSPORTATION

METRO DIVISION - TRAFFIC ENGINEERING

ALL WAY STOP WARRANT

LOCATION: TH-95 at 70th St S / CSAH-20

COUNTY: Washington

REF. POINT: 122.456

DATE: 9/20/2011

OPERATOR: RE

Speed	Approach Description	Lanes
55	Major App1: TH-95 NB, south of 70th St S / CSAH-20	2
55	Major App3: TH-95 SB, north of 70th St S / CSAH-20	2
55	Minor App2: 70th St S/CSAH-20 EB, west of TH-95	2
55	Minor App4: 70th St S/CSAH-20 WB, east of TH-95	2

0.70 FACTOR USED? Yes

HOUR					210	140	WARRANT MET
	MAJOR APP. 1	MAJOR APP. 3	MINOR APP. 2	MINOR APP. 4	MAJOR TOTAL Σ (APP. 1 & APP. 3)	MINOR TOTAL APP. 2 + APP. 4	
0:00 - 1:00	14	7	5	2	21	7	/
1:00 - 2:00	11	8	2	3	19	5	/
2:00 - 3:00	7	5	3	0	12	3	/
3:00 - 4:00	7	5	2	1	12	3	/
4:00 - 5:00	15	15	7	7	30	14	/
5:00 - 6:00	40	55	31	24	95	55	/
6:00 - 7:00	113	120	89	63	233	152	X/X
7:00 - 8:00	178	189	119	78	367	197	X/X
8:00 - 9:00	156	160	84	57	316	141	X/X
9:00 - 10:00	100	116	57	53	216	110	X/
10:00 - 11:00	98	127	67	40	225	107	X/
11:00 - 12:00	111	112	54	59	223	113	X/
12:00 - 13:00	112	123	56	56	235	112	X/
13:00 - 14:00	114	156	67	52	270	119	X/
14:00 - 15:00	110	158	89	68	268	157	X/X
15:00 - 16:00	142	228	140	60	370	200	X/X
16:00 - 17:00	173	260	155	76	433	231	X/X
17:00 - 18:00	189	253	162	54	442	216	X/X
18:00 - 19:00	128	165	98	56	293	154	X/X
19:00 - 20:00	76	111	61	40	187	101	/
20:00 - 21:00	67	91	40	22	158	62	/
21:00 - 22:00	38	72	35	13	110	48	/
22:00 - 23:00	25	40	22	4	65	26	/
23:00 - 24:00	17	15	10	2	32	12	/

Met (Hr) Required (Hr)

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

REMARKS: _____

