



MINNESOTA DEPARTMENT OF TRANSPORTATION

METRO DIVISION - TRAFFIC ENGINEERING

SIGNAL WARRANTS ANALYSIS

LOCATION: TH-96 & PORTLAND AVE. (WBL)

COUNTY: RAMSEY

REF. POINT: 010.259

DATE: 7/16/1997

OPERATOR: RE

Speed	Approach Description	Lanes
40	Major App1: TH-96 EB, W OF PORTLAND AVE./CSAH-71	1
40	Major App3: TH-96 WB, E OF PORTLAND AVE./CSAH-71	1
0	Minor App2: N/A	0
30	Minor App4: PORTLAND AVE./CSAH-71 SB, N OF TH-96	1

0.70 FACTOR USED? YES

POPULATION < 10,000? NO

EXISTING SIGNAL ? NO

HOUR	500/750				0/0		150/75		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	53	28	81	/	0	10	/	/	/
1:00 - 2:00	26	15	41	/	0	3	/	/	/
2:00 - 3:00	13	12	25	/	0	2	/	/	/
3:00 - 4:00	12	7	19	/	0	1	/	/	/
4:00 - 5:00	12	14	26	/	0	11	/	/	/
5:00 - 6:00	51	51	102	/	0	43	/	/	/
6:00 - 7:00	123	190	313	/	0	115	/	/X	/
7:00 - 8:00	244	326	570	X/	0	167	/	X/X	X/
8:00 - 9:00	298	304	602	X/	0	127	/	/X	/
9:00 - 10:00	264	255	519	X/	0	102	/	/X	/
10:00 - 11:00	294	246	540	X/	0	84	/	/X	/
11:00 - 12:00	354	285	639	X/	0	92	/	/X	/
12:00 - 13:00	390	313	703	X/	0	103	/	/X	/
13:00 - 14:00	344	308	652	X/	0	96	/	/X	/
14:00 - 15:00	342	306	648	X/	0	84	/	/X	/
15:00 - 16:00	467	363	830	X/X	0	102	/	/X	/X
16:00 - 17:00	525	372	897	X/X	0	100	/	/X	/X
17:00 - 18:00	586	409	995	X/X	0	121	/	/X	/X
18:00 - 19:00	512	356	868	X/X	0	127	/	/X	/X
19:00 - 20:00	343	280	623	X/	0	106	/	/X	/
20:00 - 21:00	371	235	606	X/	0	83	/	/X	/
21:00 - 22:00	323	279	602	X/	0	65	/	/	/
22:00 - 23:00	153	133	286	/	0	38	/	/	/
23:00 - 24:00	95	65	160	/	0	11	/	/	/

	Met (Hr)	Required (Hr)	
Warrant 1	1	8	Not satisfied
Warrant 2	4	8	Not satisfied
Warrant 6	13	8	Satisfied, check accident record
Warrant 8	3	8	Not satisfied
Warrant 9	1	4	Not satisfied
Warrant 11	0	1	Not satisfied

LOCATION: TH-96 & PORTLAND AVE. (WBL)

COUNTY: RAMSEY

REF. POINT: 010.259

DATE: 7/16/1997

OPERATOR: RE

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

Speed	Approach Description	Lanes
40	Major App1: TH-96 EB, W OF PORTLAND AVE./CSAH-71	1
40	Major App3: TH-96 WB, E OF PORTLAND AVE./CSAH-71	1
0	Minor App2: N/A	0
30	Minor App4: PORTLAND AVE./CSAH-71 SB, N OF TH-96	1

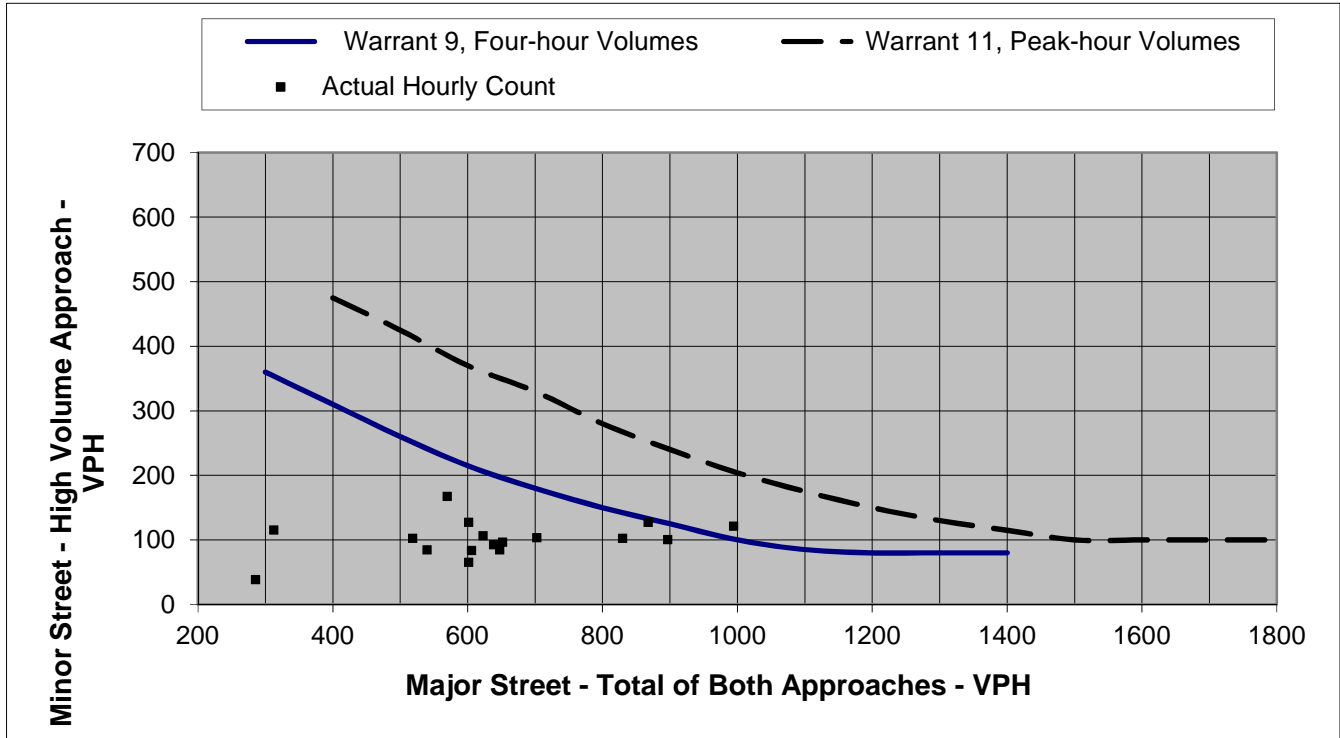


Figure 1. Four Hour and Peak Hour Warrant Analysis

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			81	10
300	360		41	3
400	310	475	25	2
500	260	425	19	1
600	215	370	26	11
700	180	330	102	43
800	150	280	313	115
900	125	240	570	167
1000	100	204	602	127
1100	85	175	519	102
1200	80	150	540	84
1300	80	130	639	92
1400	80	115	703	103
1500		100	652	96
1600		100	648	84
1700		100	830	102
1800		100	897	100
			995	121
			868	127
			623	106
			606	83
			602	65
			286	38
			160	11

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: TH-96 & PORTLAND AVE. (WBL)

COUNTY: RAMSEY

REF. POINT: 010.259

DATE:

OPERATOR: RE

Speed	Approach Description	Lanes
40	Major App1: TH-96 EB, W OF PORTLAND AVE./CSAH-71	1
40	Major App3: TH-96 WB, E OF PORTLAND AVE./CSAH-71	1
0	Minor App2: N/A	0
30	Minor App4: PORTLAND AVE./CSAH-71 SB, N OF TH-96	1

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	53	28	0	10	91	10	/
1:00 - 2:00	26	15	0	3	44	3	/
2:00 - 3:00	13	12	0	2	27	2	/
3:00 - 4:00	12	7	0	1	20	1	/
4:00 - 5:00	12	14	0	11	37	11	/
5:00 - 6:00	51	51	0	43	145	43	/
6:00 - 7:00	123	190	0	115	428	115	X/
7:00 - 8:00	244	326	0	167	737	167	X/X
8:00 - 9:00	298	304	0	127	729	127	X/
9:00 - 10:00	264	255	0	102	621	102	X/
10:00 - 11:00	294	246	0	84	624	84	X/
11:00 - 12:00	354	285	0	92	731	92	X/
12:00 - 13:00	390	313	0	103	806	103	X/
13:00 - 14:00	344	308	0	96	748	96	X/
14:00 - 15:00	342	306	0	84	732	84	X/
15:00 - 16:00	467	363	0	102	932	102	X/
16:00 - 17:00	525	372	0	100	997	100	X/
17:00 - 18:00	586	409	0	121	1116	121	X/
18:00 - 19:00	512	356	0	127	995	127	X/
19:00 - 20:00	343	280	0	106	729	106	X/
20:00 - 21:00	371	235	0	83	689	83	X/
21:00 - 22:00	323	279	0	65	667	65	X/
22:00 - 23:00	153	133	0	38	324	38	/
23:00 - 24:00	95	65	0	11	171	11	/

Allway Stop Warrant: Met (Hr) 1 Required (Hr) 8 Not satisfied

REMARKS: _____



MINNESOTA DEPARTMENT OF TRANSPORTATION

METRO DIVISION - TRAFFIC ENGINEERING

TRAFFIC COUNT DATA

ROUTE #: TH-96 EB, W OF PORTLAND AVE./CSAH-71

COUNTY: RAMSEY

REF. PT.: 010.259

SITE CODE: APPROACH

OPERATOR: RE

FOR COUNTS BEGINNING: **July 16, 1997**

DATE HOUR \ DAY	14 MON.	15 TUE.	16 WED.	17 THU.	18 FRI.	19 SAT.	20 SUN.	AVE. WK.DAY	AVE. WKEND
0:00 - 1:00				51	56			53	
1:00 - 2:00				24	29			26	
2:00 - 3:00				12	15			13	
3:00 - 4:00				9	16			12	
4:00 - 5:00				11	14			12	
5:00 - 6:00				45	57			51	
6:00 - 7:00				121	126			123	
7:00 - 8:00				260	228			244	
8:00 - 9:00				309	288			298	
9:00 - 10:00				255	274			264	
10:00 - 11:00				278	311			294	
11:00 - 12:00				352	356			354	
12:00 - 13:00			382	399				390	
13:00 - 14:00			357	331				344	
14:00 - 15:00			349	335				342	
15:00 - 16:00			457	478				467	
16:00 - 17:00			506	545				525	
17:00 - 18:00			609	564				586	
18:00 - 19:00			467	558				512	
19:00 - 20:00			318	368				343	
20:00 - 21:00			339	404				371	
21:00 - 22:00			282	364				323	
22:00 - 23:00			145	161				153	
23:00 - 24:00			92	99				95	
TOTAL			4303	6333	1770			6195	

24 HOURS FACTOR:

FACTORED ADT:

REMARKS:

CORRECTED AADT:

DATA FILE --> A:\96PORTLD.da1



MINNESOTA DEPARTMENT OF TRANSPORTATION

METRO DIVISION - TRAFFIC ENGINEERING

TRAFFIC COUNT DATA

ROUTE #: N/A
COUNTY: RAMSEY
REF. PT.: 010.259

SITE CODE: APPROACH

OPERATOR: RE

FOR COUNTS BEGINNING:

DATE HOUR \ DAY	MON.	TUE.	WED.	THU.	FRI.	SAT.	SUN.	AVE. WK.DAY	AVE. WKEND
0:00 - 1:00									
1:00 - 2:00									
2:00 - 3:00									
3:00 - 4:00									
4:00 - 5:00									
5:00 - 6:00									
6:00 - 7:00									
7:00 - 8:00									
8:00 - 9:00									
9:00 - 10:00									
10:00 - 11:00									
11:00 - 12:00									
12:00 - 13:00									
13:00 - 14:00									
14:00 - 15:00									
15:00 - 16:00									
16:00 - 17:00									
17:00 - 18:00									
18:00 - 19:00									
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									

TOTAL

24 HOURS FACTOR:

FACTORED ADT:

REMARKS: _____

CORRECTED AADT: _____

DATA FILE --> A:\96PORTLD.da2



MINNESOTA DEPARTMENT OF TRANSPORTATION

METRO DIVISION - TRAFFIC ENGINEERING

TRAFFIC COUNT DATA

ROUTE #: TH-96 WB, E OF PORTLAND AVE./CSAH-71

COUNTY: RAMSEY

REF. PT.: 010.259

SITE CODE: APPROACH

OPERATOR: RE

FOR COUNTS BEGINNING: **July 16, 1997**

DATE HOUR \ DAY	14 MON.	15 TUE.	16 WED.	17 THU.	18 FRI.	19 SAT.	20 SUN.	AVE. WK.DAY	AVE. WKEND
0:00 - 1:00				23	33			28	
1:00 - 2:00				16	15			15	
2:00 - 3:00				10	15			12	
3:00 - 4:00				4	11			7	
4:00 - 5:00				15	13			14	
5:00 - 6:00				49	53			51	
6:00 - 7:00				197	184			190	
7:00 - 8:00				329	324			326	
8:00 - 9:00				308	300			304	
9:00 - 10:00				235	276			255	
10:00 - 11:00				209	283			246	
11:00 - 12:00				261	310			285	
12:00 - 13:00			318	309				313	
13:00 - 14:00			292	324				308	
14:00 - 15:00			278	335				306	
15:00 - 16:00			369	357				363	
16:00 - 17:00			356	388				372	
17:00 - 18:00			386	433				409	
18:00 - 19:00			324	388				356	
19:00 - 20:00			258	302				280	
20:00 - 21:00			221	250				235	
21:00 - 22:00			268	291				279	
22:00 - 23:00			133	133				133	
23:00 - 24:00			64	67				65	
TOTAL			3267	5233	1817			5152	

24 HOURS FACTOR:

FACTORED ADT:

REMARKS: _____

CORRECTED AADT: _____

DATA FILE --> A:\96PORTLD.da3



MINNESOTA DEPARTMENT OF TRANSPORTATION

METRO DIVISION - TRAFFIC ENGINEERING

TRAFFIC COUNT DATA

ROUTE #: PORTLAND AVE./CSAH-71 SB, N OF TH-96

COUNTY: RAMSEY

REF. PT.: 010.259

SITE CODE: APPROACH

OPERATOR: RE

FOR COUNTS BEGINNING: **July 16, 1997**

DATE HOUR \ DAY	14 MON.	15 TUE.	16 WED.	17 THU.	18 FRI.	19 SAT.	20 SUN.	AVE. WK.DAY	AVE. WKEND
0:00 - 1:00				12	8			10	
1:00 - 2:00				4	3			3	
2:00 - 3:00				2	2			2	
3:00 - 4:00				1	2			1	
4:00 - 5:00				9	14			11	
5:00 - 6:00				40	46			43	
6:00 - 7:00				125	105			115	
7:00 - 8:00				171	164			167	
8:00 - 9:00				138	116			127	
9:00 - 10:00				100	104			102	
10:00 - 11:00				89	80			84	
11:00 - 12:00				90	95			92	
12:00 - 13:00			107	99				103	
13:00 - 14:00			94	98				96	
14:00 - 15:00			82	87				84	
15:00 - 16:00			96	108				102	
16:00 - 17:00			96	105				100	
17:00 - 18:00			119	124				121	
18:00 - 19:00			111	144				127	
19:00 - 20:00			102	111				106	
20:00 - 21:00			86	81				83	
21:00 - 22:00			58	73				65	
22:00 - 23:00			34	43				38	
23:00 - 24:00			11	11				11	
TOTAL			996	1865	739			1793	

24 HOURS FACTOR:

FACTORED ADT:

REMARKS:

CORRECTED AADT:

DATA FILE --> A:\96PORTLD.da4