

Date : 03/11/14

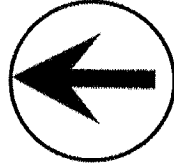
Count Number : TMC1401

Location : CSAH 23 (Lake Dr.)

@ CSAH 17 (Lexington Ave.)

Collection Period : PEAK HOURS

6-9 AM, 4-7 PM



North

5868  
#2  
CSAH 17

3142		
754	D	
1858	FI	
530	T	

2726

CSAH 23

425	G
1594	H
377	J
2396	

#3

4541

2145

2824

#1

4891

2067			
671	C		
1259	B		
137	A		

CSAH 23

	EXISTING LANES OF APPROACH			TOTAL
	RIGHT TURN LANE	LEFT TURN LANE	THRU LANES	
#1	1	1	1	3
#2	1	1	2	4
#3	1	1	1	3
#4	0	1	2	3

CSAH 17

476	M
1630	L
356	K
2462	

2372

#4

4834

Anoka County Highway Department

Traffic Volume and Turning

Movement Study

Date : 03/11/14

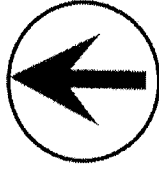
Count Number : TMC1401

Location : CSAH 23 (Lake Dr.)

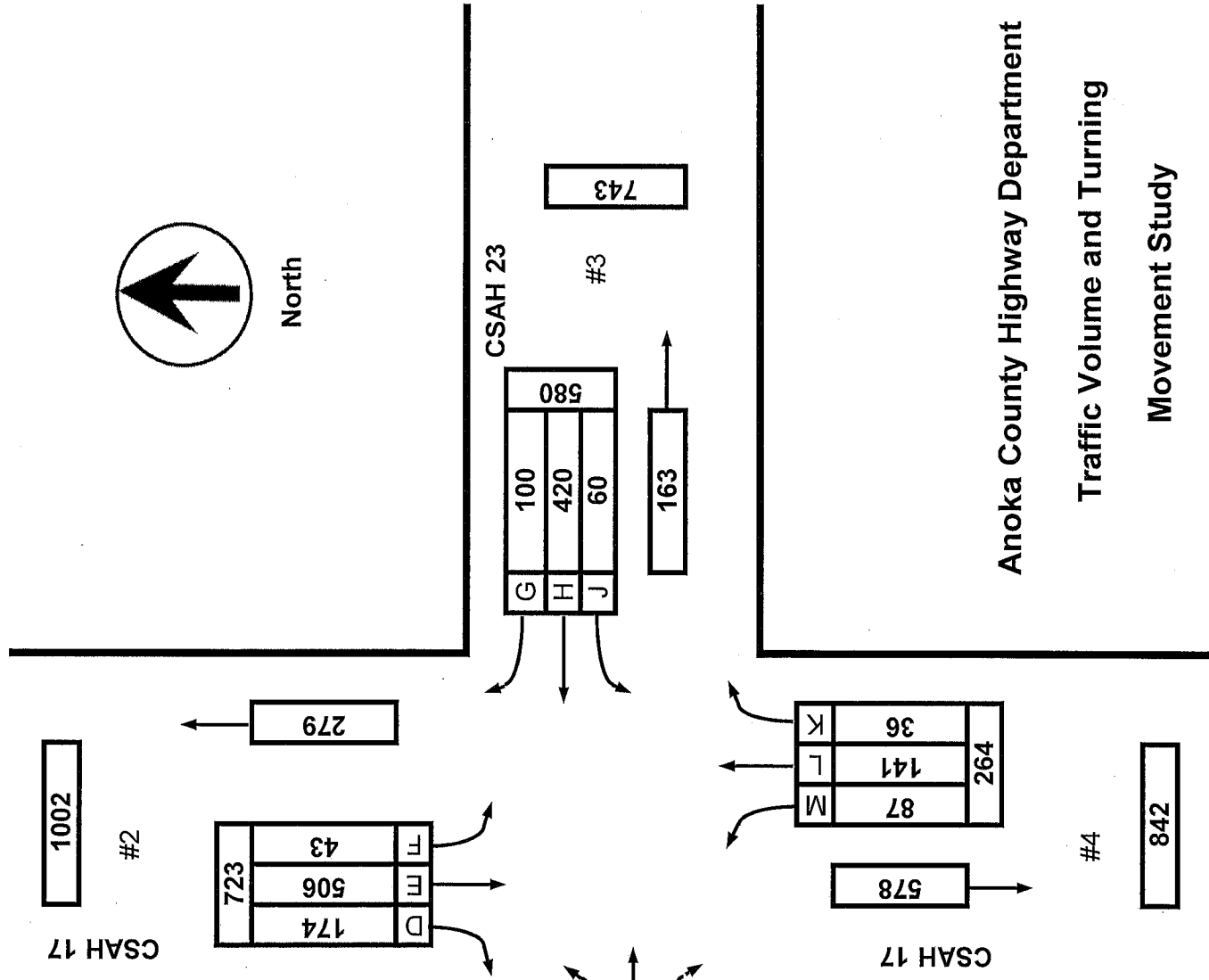
@ CSAH 17 (Lexington Ave.)

Collection Period : AM PEAK

Hour : 7:00 - 8:00 AM



North



	EXISTING LANES OF APPROACH			TOTAL
	RIGHT TURN LANE	LEFT TURN LANE	THRU LANES	
#1	1	1	1	3
#2	1	1	2	4
#3	1	1	1	3
#4	0	1	2	3

Anoka County Highway Department  
 Traffic Volume and Turning  
 Movement Study

1002

#2

723	D	E	T
174	506	43	

279

CSAH 23

G	100	580
H	420	
J	60	

#3

743

163

681

#1

815

134	A	B	C
12	84	38	

CSAH 23

264	M	L	K
87	141	36	

#4

578

842

CSAH 17

Date: 03/10/14

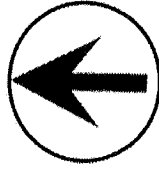
Count Number: TMC1401

Location: CSAH 23 (Lake Dr.)

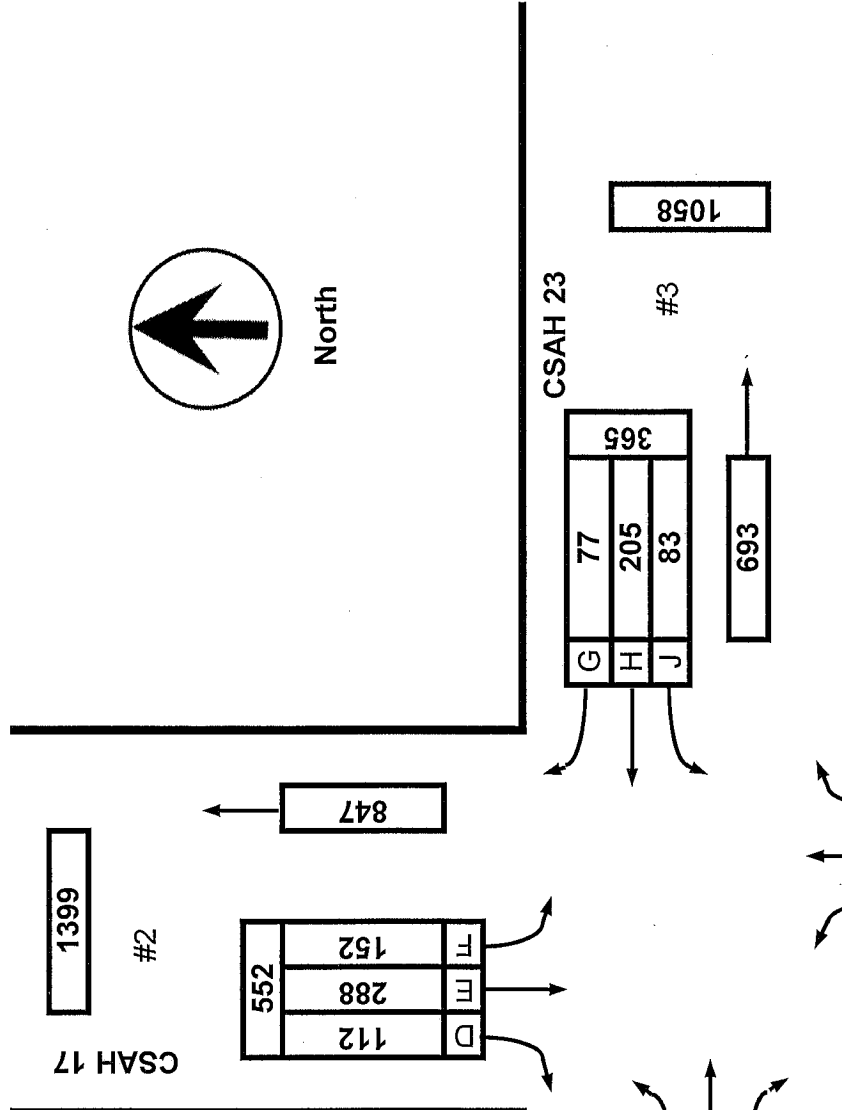
@ CSAH 17 (Lexington Ave.)

Collection Period: PM PEAK

Hour: 4:30 PM - 5:30 PM



North



	EXISTING LANES OF APPROACH			TOTAL
	RIGHT TURN LANE	LEFT TURN LANE	THRU LANES	
#1	1	1	1	3
#2	1	1	2	4
#3	1	1	1	3
#4	0	1	2	3

Anoka County Highway Department  
 Traffic Volume and Turning  
 Movement Study



# Anoka County Highway Department

## Traffic Engineering Section

### Traffic Volume and Turning Movement Study

File Name : TMC 1401  
 Site Code : 14010202  
 Start Date : 03/10/2014  
 Page No : 1

Weather: Clear and Mild  
 Counter: DB-400  
 study conducted by: Josie/Terri

Groups Printed- Unshifted

Start Time	CSAH 17 Southbound					CSAH 23 Westbound					CSAH 17 Northbound					CSAH 23 Eastbound					Exclu. Total	Inclu. Total	Int. Total	
	Left	Thru	Right	Heavys	App. Total	Left	Thru	Right	Heavys	App. Total	Left	Thru	Right	Heavys	App. Total	Left	Thru	Right	Heavys	App. Total				
06:00	3	38	32	3	73	10	85	11	2	106	21	13	1	0	35	8	5	3	0	16	5	230	235	
06:15	4	68	47	3	119	15	88	7	2	110	11	23	3	1	37	5	8	1	3	14	9	280	289	
06:30	9	98	48	3	155	12	88	9	0	109	18	14	4	0	36	4	11	2	1	17	4	317	321	
06:45	15	104	47	4	166	9	86	18	1	113	7	29	4	0	40	3	18	3	1	24	6	343	349	
<b>Total</b>	<b>31</b>	<b>308</b>	<b>174</b>	<b>13</b>	<b>513</b>	<b>46</b>	<b>347</b>	<b>45</b>	<b>5</b>	<b>438</b>	<b>57</b>	<b>79</b>	<b>12</b>	<b>1</b>	<b>148</b>	<b>20</b>	<b>42</b>	<b>9</b>	<b>5</b>	<b>71</b>	<b>24</b>	<b>1170</b>	<b>1194</b>	
07:00	7	119	46	2	172	11	110	21	4	142	19	25	3	1	47	6	17	1	3	24	10	385	395	
07:15	10	138	40	1	188	15	111	30	6	156	21	38	4	0	63	5	23	6	2	34	9	441	450	
07:30	10	127	43	2	180	16	99	37	5	152	24	38	11	0	73	9	19	4	2	32	9	437	446	
07:45	16	122	45	4	183	18	100	12	3	130	23	40	18	1	81	18	25	1	6	44	14	438	452	
<b>Total</b>	<b>43</b>	<b>506</b>	<b>174</b>	<b>9</b>	<b>723</b>	<b>60</b>	<b>420</b>	<b>100</b>	<b>18</b>	<b>580</b>	<b>87</b>	<b>141</b>	<b>36</b>	<b>2</b>	<b>264</b>	<b>38</b>	<b>84</b>	<b>12</b>	<b>13</b>	<b>134</b>	<b>42</b>	<b>1701</b>	<b>1743</b>	
08:00	13	77	46	2	136	20	96	20	1	136	20	20	7	1	47	4	11	7	2	22	6	341	347	
08:15	15	67	35	8	117	14	68	10	6	92	21	42	7	1	70	7	14	5	1	26	16	305	321	
08:30	11	46	28	4	85	15	78	7	7	100	23	27	12	4	62	7	24	1	4	32	19	279	298	
08:45	18	68	16	3	102	13	53	9	4	75	30	39	19	1	88	9	29	5	2	43	10	308	318	
<b>Total</b>	<b>57</b>	<b>258</b>	<b>125</b>	<b>17</b>	<b>440</b>	<b>62</b>	<b>295</b>	<b>46</b>	<b>18</b>	<b>403</b>	<b>94</b>	<b>128</b>	<b>45</b>	<b>7</b>	<b>267</b>	<b>27</b>	<b>78</b>	<b>18</b>	<b>9</b>	<b>123</b>	<b>51</b>	<b>1233</b>	<b>1284</b>	
*** BREAK ***																								
16:00	29	64	32	5	125	19	48	16	1	83	33	125	30	2	188	47	78	8	4	133	12	529	541	
16:15	35	67	26	1	128	17	52	15	3	84	15	109	22	1	146	47	112	10	2	169	7	527	534	
16:30	45	67	27	2	139	14	41	18	2	73	21	112	35	0	168	72	91	6	1	169	5	549	554	
16:45	34	65	29	2	128	21	50	21	4	92	24	142	21	0	187	59	126	9	1	194	7	601	608	
<b>Total</b>	<b>143</b>	<b>263</b>	<b>114</b>	<b>10</b>	<b>520</b>	<b>71</b>	<b>191</b>	<b>70</b>	<b>10</b>	<b>332</b>	<b>93</b>	<b>488</b>	<b>108</b>	<b>3</b>	<b>689</b>	<b>225</b>	<b>407</b>	<b>33</b>	<b>8</b>	<b>665</b>	<b>31</b>	<b>2206</b>	<b>2237</b>	
17:00	35	73	28	0	136	25	50	23	1	98	20	127	22	0	169	51	111	11	1	173	2	576	578	
17:15	38	83	28	4	149	23	64	15	2	102	18	159	25	1	202	48	110	9	0	167	7	620	627	
17:30	35	62	20	1	117	18	36	13	1	67	28	123	17	0	168	62	89	6	1	157	3	509	512	
17:45	38	71	25	0	134	12	38	22	1	72	13	111	24	1	148	46	80	5	1	131	3	485	488	
<b>Total</b>	<b>146</b>	<b>289</b>	<b>101</b>	<b>5</b>	<b>536</b>	<b>78</b>	<b>188</b>	<b>73</b>	<b>5</b>	<b>339</b>	<b>79</b>	<b>520</b>	<b>88</b>	<b>2</b>	<b>687</b>	<b>207</b>	<b>390</b>	<b>31</b>	<b>3</b>	<b>628</b>	<b>15</b>	<b>2190</b>	<b>2205</b>	
18:00	32	61	19	0	112	6	47	29	0	82	17	80	20	0	117	36	75	3	0	114	0	425	425	
18:15	25	62	13	0	100	18	37	15	2	70	14	76	19	0	109	49	65	13	1	127	3	406	409	
18:30	25	62	17	1	104	16	31	15	1	62	18	73	12	0	103	31	65	6	3	102	5	371	376	
18:45	28	49	17	0	94	20	38	32	0	90	17	45	16	1	78	38	53	12	0	103	1	365	366	
<b>Total</b>	<b>110</b>	<b>234</b>	<b>66</b>	<b>1</b>	<b>410</b>	<b>60</b>	<b>153</b>	<b>91</b>	<b>3</b>	<b>304</b>	<b>66</b>	<b>274</b>	<b>67</b>	<b>1</b>	<b>407</b>	<b>154</b>	<b>258</b>	<b>34</b>	<b>4</b>	<b>446</b>	<b>9</b>	<b>1567</b>	<b>1576</b>	
<b>Grand Total</b>	<b>530</b>	<b>1858</b>	<b>754</b>	<b>55</b>	<b>3142</b>	<b>377</b>	<b>1594</b>	<b>425</b>	<b>59</b>	<b>2396</b>	<b>476</b>	<b>1630</b>	<b>356</b>	<b>16</b>	<b>2462</b>	<b>671</b>	<b>1259</b>	<b>137</b>	<b>42</b>	<b>2067</b>	<b>172</b>	<b>10067</b>	<b>10239</b>	
<b>Apprch %</b>	<b>16.9</b>	<b>59.1</b>	<b>24</b>			<b>15.7</b>	<b>66.5</b>	<b>17.7</b>			<b>19.3</b>	<b>66.2</b>	<b>14.5</b>			<b>32.5</b>	<b>60.9</b>	<b>6.6</b>						
<b>Total %</b>	<b>5.3</b>	<b>18.5</b>	<b>7.5</b>		<b>31.2</b>	<b>3.7</b>	<b>15.8</b>	<b>4.2</b>		<b>23.8</b>	<b>4.7</b>	<b>16.2</b>	<b>3.5</b>		<b>24.5</b>	<b>6.7</b>	<b>12.5</b>	<b>1.4</b>		<b>20.5</b>	<b>1.7</b>	<b>98.3</b>		

Start Time	CSAH 17 Southbound				App. Total	CSAH 23 Westbound				App. Total	CSAH 17 Northbound				App. Total	CSAH 23 Eastbound				Int. Total	
	Left	Thru	Right	App. Total		Left	Thru	Right	App. Total		Left	Thru	Right	App. Total		Left	Thru	Right	App. Total		
Peak Hour Analysis From 06:00 to 11:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00																					
07:00	7	119	46	172	11	110	21	142	19	25	3	47	6	17	1	24	385				
07:15	10	138	40	188	15	111	30	156	21	38	4	63	5	23	6	34	441				
07:30	10	127	43	180	16	99	37	152	24	38	11	73	9	19	4	32	437				
07:45	16	122	45	183	18	100	12	130	23	40	18	81	18	25	1	44	438				
<b>Total Volume</b>	<b>43</b>	<b>506</b>	<b>174</b>	<b>723</b>	<b>60</b>	<b>420</b>	<b>100</b>	<b>580</b>	<b>87</b>	<b>141</b>	<b>36</b>	<b>264</b>	<b>38</b>	<b>84</b>	<b>12</b>	<b>134</b>	<b>1701</b>				
<b>% App. Total</b>	<b>5.9</b>	<b>70</b>	<b>24.1</b>		<b>10.3</b>	<b>72.4</b>	<b>17.2</b>		<b>33</b>	<b>53.4</b>	<b>13.6</b>		<b>28.4</b>	<b>62.7</b>	<b>9</b>						
PHF	.672	.917	.946	.961	.833	.946	.676	.929	.906	.881	.500	.815	.528	.840	.500	.761	.964				

Start Time	CSAH 17 Southbound				App. Total	CSAH 23 Westbound				App. Total	CSAH 17 Northbound				App. Total	CSAH 23 Eastbound				Int. Total	
	Left	Thru	Right	App. Total		Left	Thru	Right	App. Total		Left	Thru	Right	App. Total		Left	Thru	Right	App. Total		
Peak Hour Analysis From 12:00 to 18:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 16:30																					
16:30	45	67	27	139	14	41	18	73	21	112	35	168	72	91	6	169	549				
16:45	34	65	29	128	21	50	21	92	24	142	21	187	59	126	9	194	601				
17:00	35	73	28	136	25	50	23	98	20	127	22	169	51	111	11	173	576				
17:15	38	83	28	149	23	64	15	102	18	159	25	202	48	110	9	167	620				
<b>Total Volume</b>	<b>152</b>	<b>288</b>	<b>112</b>	<b>552</b>	<b>83</b>	<b>205</b>	<b>77</b>	<b>365</b>	<b>83</b>	<b>540</b>	<b>103</b>	<b>726</b>	<b>230</b>	<b>438</b>	<b>35</b>	<b>703</b>	<b>2346</b>				
<b>% App. Total</b>	<b>27.5</b>	<b>52.2</b>	<b>20.3</b>		<b>22.7</b>	<b>56.2</b>	<b>21.1</b>		<b>11.4</b>	<b>74.4</b>	<b>14.2</b>		<b>32.7</b>	<b>62.3</b>	<b>5</b>						
PHF	.844	.867	.966	.926	.830	.801	.837	.895	.865	.849	.736	.899	.799	.869	.795	.906	.946				



**ANOKA COUNTY HIGHWAY  
PC-WARRANTS  
TRAFFIC SIGNAL WARRANT ANALYSIS**

Study Name : TMC1401  
Study Date : 03/17/14  
Page No. : 1

**Signal Warrants - Summary**

**Major Street Approaches**

**Northbound: CSAH 17**  
Number of Lanes: 2  
85% Speed < 40 MPH.  
Total Approach Volume: 2,464

**Southbound: CSAH 17**  
Number of Lanes: 2  
85% Speed < 40 MPH.  
Total Approach Volume: 3,144

**Minor Street Approaches**

**Eastbound: CSAH 23**  
Number of Lanes: 2  
  
Total Approach Volume: 2,069

**Westbound: CSAH 23**  
Number of Lanes: 2  
  
Total Approach Volume: 2,398

**Warrant Summary (Urban values apply.)**

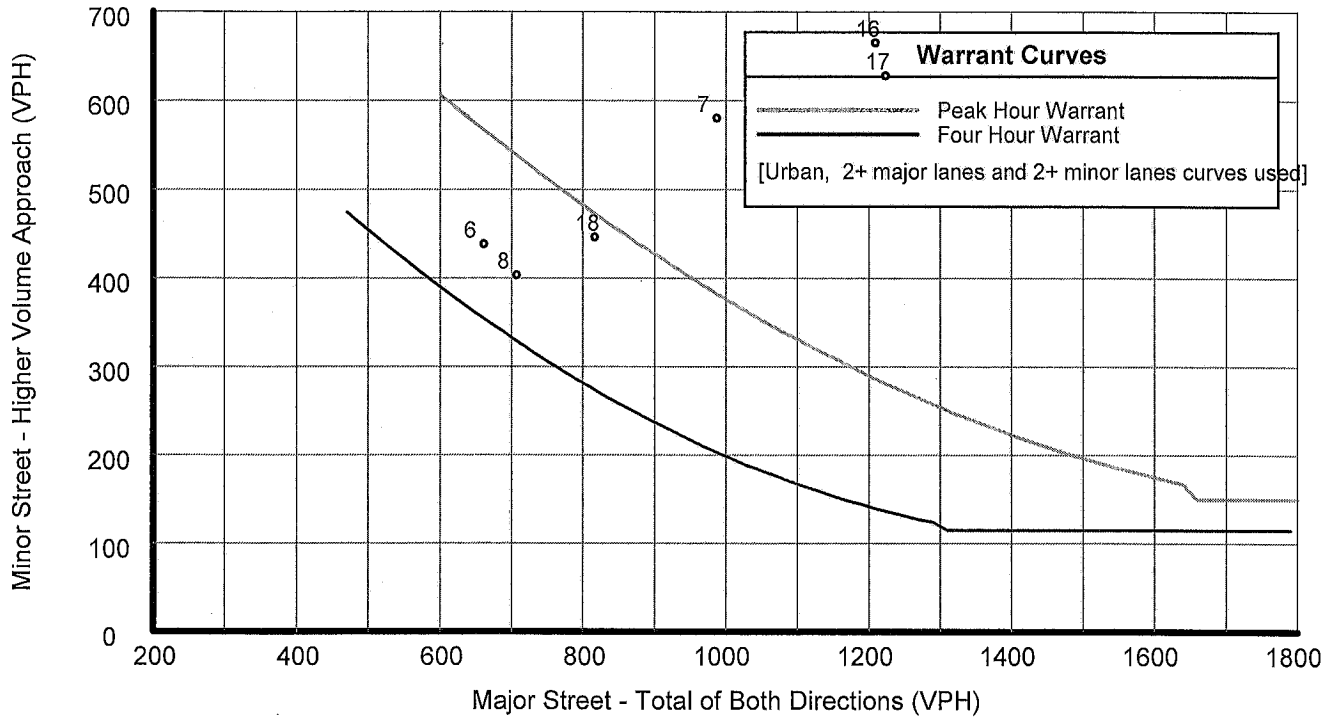
- Warrant 1 - Eight Hour Vehicular Volumes** ..... Not Satisfied
  - Warrant 1A - Minimum Vehicular Volume** ..... Not Satisfied  
Required volumes reached for 6 hours, 8 are needed
  - Warrant 1B - Interruption of Continuous Traffic** ..... Not Satisfied  
Required volumes reached for 3 hours, 8 are needed
  - Warrant 1 A&B - Combination of Warrants** ..... Not Satisfied  
Required volumes reached for 5 hours, 8 are needed
  
- Warrant 2 - Four Hour Volumes** ..... Satisfied  
Number of hours (6) volumes exceed minimum < minimum required (4).
  
- Warrant 3 - Peak Hour** ..... Satisfied
  - Warrant 3A - Peak Hour Delay** ..... Satisfied  
Number of hours (12) volumes exceed minimum >= required (1). Delay data not evaluated.
  - Warrant 3B - Peak Hour Volumes** ..... Satisfied  
Volumes exceed minimums for at least one hour.
  
- Warrant 4 - Pedestrian Volumes** ..... Not Evaluated
  
- Warrant 5 - School Crossing** ..... Not Evaluated
  
- Warrant 6 - Coordinated Signal System** ..... Not Evaluated
  
- Warrant 7 - Crash Experience** ..... Not Evaluated
  
- Warrant 8 - Roadway Network** ..... Not Evaluated
  
- Warrant 9 - Intersection Near a Grade Crossing** ..... Not Evaluated



# ANOKA COUNTY HIGHWAY PC-WARRANTS TRAFFIC SIGNAL WARRANT ANALYSIS

Study Name : TMC1401  
Study Date : 03/17/14  
Page No. : 2

## Signal Warrants - Summary



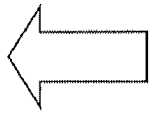
### Analysis of 8-Hour Volume Warrants:

#### War 1A-Minimum Volume

#### War 1B-Interruption of Traffic

#### War 1C-Combination of Warrants

Hour Begin	Major Total	Minor Vol Dir	Maj 600	Min 200	Hour Begin	Major Total	Minor Vol Dir	Maj 900	Min 100	Hour Begin	Major Total	Minor Vol Dir	Maj 720	Min 160
16:45	1,256	691 EB	Yes	Yes	17:00	1,223	628 EB	Yes	Yes	16:45	1,256	691 EB	Yes	Yes
07:00	987	580 W	Yes	Yes	16:00	1,209	665 EB	Yes	Yes	07:15	951	574 W	Yes	Yes
17:45	927	474 EB	Yes	Yes	06:45	929	563 W	Yes	Yes	17:45	927	474 EB	Yes	Yes
15:45	894	471 EB	Yes	Yes	15:45	894	471 EB	No	Yes	15:45	894	471 EB	Yes	Yes
08:00	707	403 W	Yes	Yes	06:30	867	520 W	No	Yes	06:15	772	474 W	Yes	Yes
06:00	661	438 W	Yes	Yes	18:00	817	446 EB	No	Yes	06:00	661	438 W	No	Yes
15:30	587	303 EB	No	Yes	07:45	781	458 W	No	Yes	15:30	587	303 EB	No	Yes
05:45	455	325 W	No	Yes	06:15	772	474 W	No	Yes	08:15	525	267 W	No	Yes
15:15	314	134 EB	No	No	08:00	707	403 W	No	Yes	05:45	455	325 W	No	Yes
05:30	264	216 W	No	Yes	06:00	661	438 W	No	Yes	08:30	339	175 W	No	Yes
18:45	172	103 EB	No	No	18:15	588	332 EB	No	Yes	15:15	314	134 EB	No	No
05:15	108	106 W	No	No	15:30	587	303 EB	No	Yes	05:30	264	216 W	No	Yes
15:00	2	1 W	No	No	08:15	525	267 W	No	Yes	08:45	192	75 W	No	No
14:45	2	1 EB	No	No	05:45	455	325 W	No	Yes	18:45	172	103 EB	No	No
14:30	2	0 W	No	No	18:30	379	205 EB	No	Yes	05:15	108	106 W	No	No
09:00	2	1 W	No	No	08:30	339	175 W	No	Yes	15:00	2	1 W	No	No
14:15	1	0 W	No	No	15:15	314	134 EB	No	Yes	14:45	2	1 EB	No	No
09:15	1	1 W	No	No	05:30	264	216 W	No	Yes	14:30	2	0 W	No	No
22:45	0	0 W	No	No	08:45	192	75 W	No	No	09:00	2	1 W	No	No
22:30	0	0 W	No	No	18:45	172	103 EB	No	Yes	14:15	1	0 W	No	No
22:15	0	0 W	No	No	05:15	108	106 W	No	Yes	09:15	1	1 W	No	No
22:00	0	0 W	No	No	15:00	2	1 W	No	No	22:45	0	0 W	No	No
21:45	0	0 W	No	No	14:45	2	1 EB	No	No	22:30	0	0 W	No	No
21:30	0	0 W	No	No	14:30	2	0 W	No	No	22:15	0	0 W	No	No



**NORTH**

**COUNT LOCATION:**

CSAH 23 (Lake Dr.)

**DATE:**

03/10/2014

@ CSAH 17 (Lexington Ave.)

APP.  
#2

- HEAVY VEHICLE- ANY VEHICLE HAVING MORE THAN FOUR TIRES TOUCHING THE PAVEMENT
- A. TRUCKS- A HEAVY VEHICLE INVOLVED PRIMARILY IN THE TRANSPORT OF GOODS OR IN THE DELIVERY OF A SERVICE.
  - B. RV- A HEAVY VEHICLE OPERATED BY A PRIVATE MOTORIST AND INVOLVED IN THE TRANSPORT OF RECREATIONAL EQUIPMENT OR FACILITIES.
  - C. BUSES- A HEAVY VEHICLE INVOLVED IN THE TRANSPORTATION OF GROUPS OF PEOPLE.

APP.  
#1

APP.  
#3

APP.  
#4

APP. #1 = CSAH 17
APP. #2 = CSAH 23
APP. #3= CSAH 17
APP. #4= CSAH 23

TIME	PEDESTRIANS					HEAVY VEHICLES		
	APP. #1	APP. #2	APP. #3	APP. #4	15 MIN TOT	TRUCKS	RV	BUS
6:00-6:15AM						4		1
6:15-6:30						6		3
6:30-6:45						5		
6:45-7:00						6		
<b>HOURLY TOTAL</b>						<b>HOURLY TOTAL</b>		<b>25</b>
7:00-7:15AM						8		2
7:15-7:30						2		6
7:30-7:45						3		7
7:45-8:00						4		10
<b>HOURLY TOTAL</b>						<b>HOURLY TOTAL</b>		<b>42</b>
8:00-8:15AM						4		2
8:15-8:30						7		8
8:30-8:45						9		10
8:45-9:00						7		3
<b>HOURLY TOTAL</b>						<b>HOURLY TOTAL</b>		<b>50</b>
					<b>TOTAL</b>		<b>TOTAL</b>	<b>117</b>

TIME	PEDESTRIANS					HEAVY VEHICLES		
	APP. #1	APP. #2	APP. #3	APP. #4	15 MIN TOT	TRUCKS	RV	BUS
4:00-4:15PM						6		6
4:15-4:30			2		2	2		4
4:30-4:45						5		
4:45-5:00						6		1
<b>HOURLY TOTAL</b>					<b>2</b>	<b>HOURLY TOTAL</b>		<b>30</b>
5:00-5:15PM						1		
5:15-5:30						7		
5:30-5:45						4		
5:45-6:00						3		
<b>HOURLY TOTAL</b>						<b>HOURLY TOTAL</b>		<b>15</b>
6:00-6:15PM								
6:15-6:30						2		1
6:30-6:45						5		
6:45-7:00						1		
<b>HOURLY TOTAL</b>						<b>HOURLY TOTAL</b>		<b>9</b>
					<b>TOTAL</b>	<b>2</b>	<b>TOTAL</b>	<b>54</b>