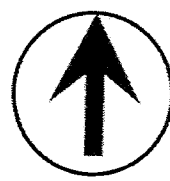


Date : 03/14/14

Count Number : TMC1403

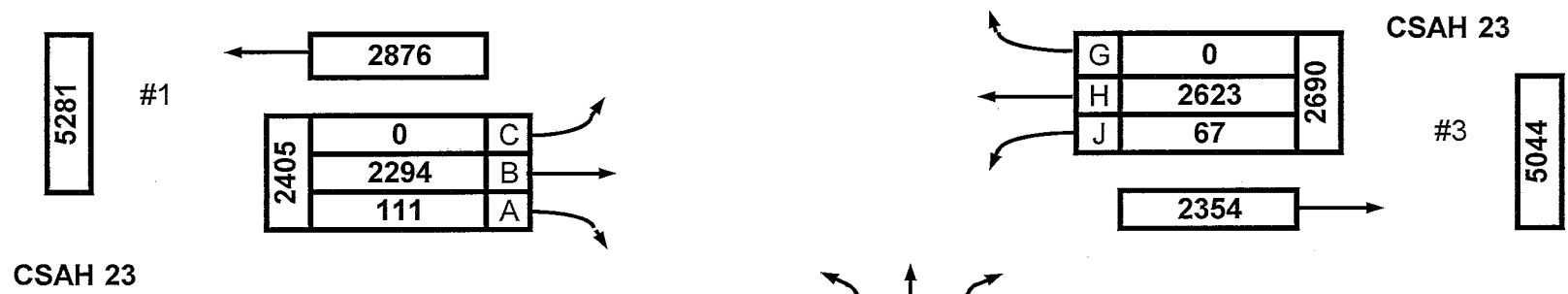
Location : CSAH 23 (Lake Dr.)  
@ Rendova St.



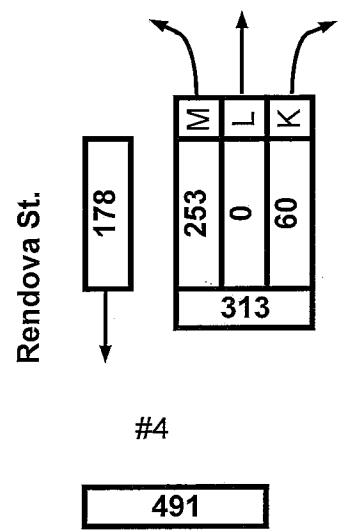
North

Collection Period : PEAK HOURS

6-9 AM, 4-7 PM



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



Anoka County Highway Department  
 Traffic Volume and Turning  
 Movement Study

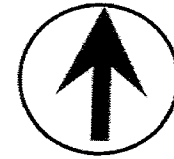
Date : 03/14/14

Count Number : TMC1403

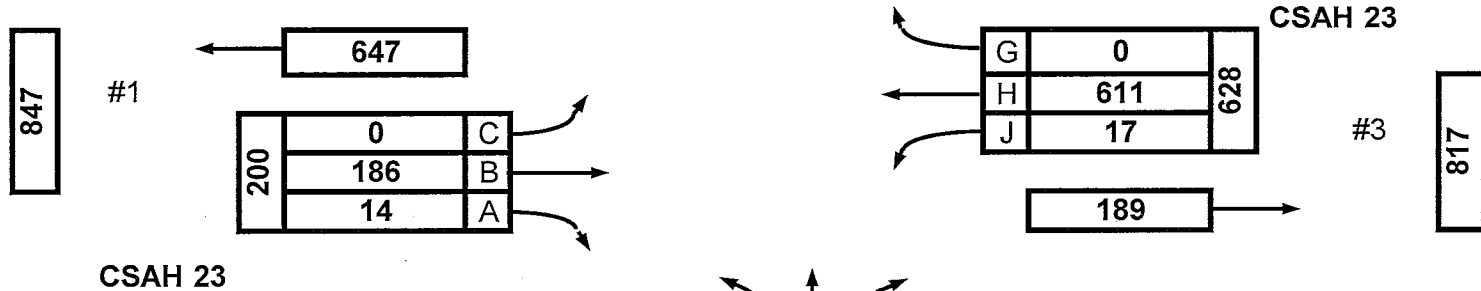
Location : CSAH 23 (Lake Dr.)  
@ Rendova St.

Collection Period : AM PEAK

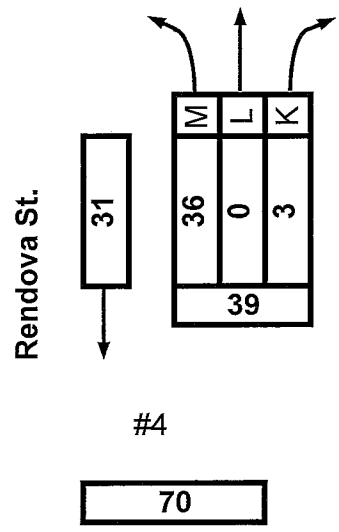
Hour : 7:15 - 8:15 AM



North



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



Anoka County Highway Department  
 Traffic Volume and Turning  
 Movement Study

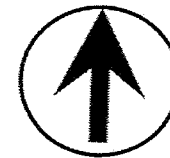
Date : 03/13/14

Count Number : TMC1403

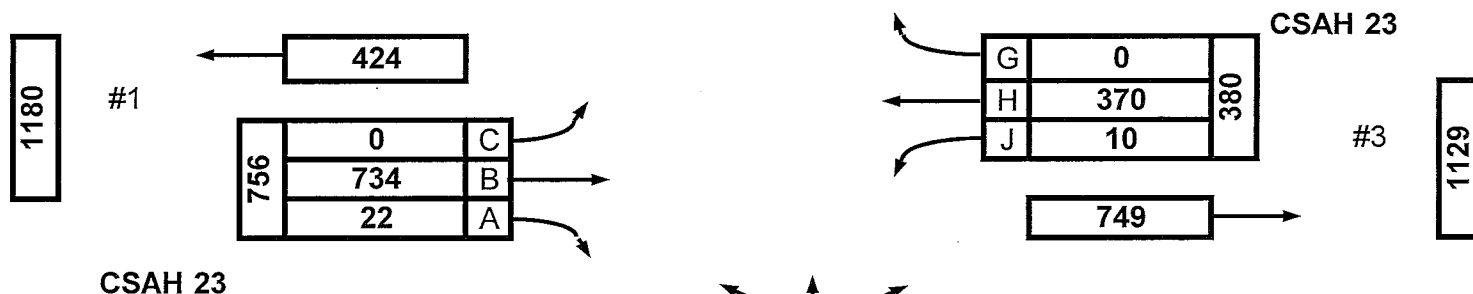
Location : CSAH 23 (Lake Dr.)  
@ Rendova St.

Collection Period : PM PEAK

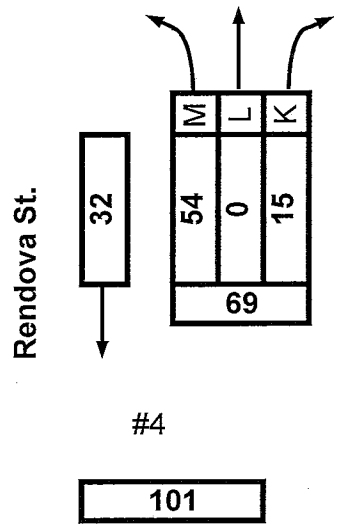
Hour : 4:45 PM - 5:45 PM



North



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



Anoka County Highway Department  
 Traffic Volume and Turning  
 Movement Study

# Anoka County Highway Department

## Traffic Engineering Section

### Traffic Volume and Turning Movement Study

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

File Name : tmc1403  
 Site Code : 14030202  
 Start Date : 03/13/2014  
 Page No : 1

#### Groups Printed- Unshifted

Start Time	None Southbound					CSAH 23 Westbound					Rendova St. 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	0	0	0	0	0	2	99	0	1	101	11	0	2	6	13	0	17	1	2	18	9	132	141
06:15	0	0	0	0	0	2	138	0	1	140	7	0	0	1	7	0	22	2	2	24	4	171	175
06:30	0	0	0	0	0	6	162	0	0	168	6	0	1	1	7	0	30	2	1	32	2	207	209
06:45	0	0	0	0	0	3	120	0	2	123	8	0	1	2	9	0	29	2	3	31	7	163	170
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>13</b>	<b>519</b>	<b>0</b>	<b>4</b>	<b>532</b>	<b>32</b>	<b>0</b>	<b>4</b>	<b>10</b>	<b>36</b>	<b>0</b>	<b>98</b>	<b>7</b>	<b>8</b>	<b>105</b>	<b>22</b>	<b>673</b>	<b>695</b>
07:00	0	0	0	0	0	2	146	0	1	148	9	0	2	2	11	0	35	2	2	37	5	196	201
07:15	0	0	0	0	0	3	154	0	1	157	8	0	2	0	10	0	38	0	2	38	3	205	208
07:30	0	0	0	0	0	6	181	0	4	187	3	0	0	0	3	0	51	3	8	54	12	244	256
07:45	0	0	0	0	0	5	145	0	3	150	10	0	1	0	11	0	51	9	5	60	8	221	229
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>16</b>	<b>626</b>	<b>0</b>	<b>9</b>	<b>642</b>	<b>30</b>	<b>0</b>	<b>5</b>	<b>2</b>	<b>35</b>	<b>0</b>	<b>175</b>	<b>14</b>	<b>17</b>	<b>189</b>	<b>28</b>	<b>866</b>	<b>894</b>
08:00	0	0	0	0	0	3	131	0	2	134	15	0	0	4	15	0	46	2	6	48	12	197	209
08:15	0	0	0	0	0	6	121	0	6	127	10	0	1	1	11	0	33	4	5	37	12	175	187
08:30	0	0	0	0	0	4	116	0	5	120	8	0	2	1	10	0	44	7	1	51	7	181	188
08:45	0	0	0	0	0	4	103	0	1	107	8	0	0	0	8	0	52	8	7	60	8	175	183
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>17</b>	<b>471</b>	<b>0</b>	<b>14</b>	<b>488</b>	<b>41</b>	<b>0</b>	<b>3</b>	<b>6</b>	<b>44</b>	<b>0</b>	<b>175</b>	<b>21</b>	<b>19</b>	<b>196</b>	<b>39</b>	<b>728</b>	<b>767</b>

\*\*\* BREAK \*\*\*

16:00	0	0	0	0	0	2	72	0	0	74	23	0	11	4	34	0	182	5	5	187	9	295	304
16:15	0	0	0	0	0	2	80	0	2	82	22	0	3	2	25	0	163	7	1	170	5	277	282
16:30	0	0	0	0	0	1	78	0	3	79	15	0	8	1	23	0	173	9	2	182	6	284	290
16:45	0	0	0	0	0	2	88	0	2	90	10	0	5	2	15	0	192	3	3	195	7	300	307
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>7</b>	<b>318</b>	<b>0</b>	<b>7</b>	<b>325</b>	<b>70</b>	<b>0</b>	<b>27</b>	<b>9</b>	<b>97</b>	<b>0</b>	<b>710</b>	<b>24</b>	<b>11</b>	<b>734</b>	<b>27</b>	<b>1156</b>	<b>1183</b>
17:00	0	0	0	0	0	2	80	0	1	82	16	0	6	1	22	0	192	6	2	198	4	302	306
17:15	0	0	0	0	0	5	120	0	2	125	13	0	1	1	14	0	172	6	1	178	4	317	321
17:30	0	0	0	0	0	1	82	0	2	83	15	0	3	1	18	0	178	7	1	185	4	286	290
17:45	0	0	0	0	0	2	97	0	0	99	8	0	3	1	11	0	165	5	0	170	1	280	281
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>10</b>	<b>379</b>	<b>0</b>	<b>5</b>	<b>389</b>	<b>52</b>	<b>0</b>	<b>13</b>	<b>4</b>	<b>65</b>	<b>0</b>	<b>707</b>	<b>24</b>	<b>4</b>	<b>731</b>	<b>13</b>	<b>1185</b>	<b>1198</b>
18:00	0	0	0	0	0	1	95	0	0	96	3	0	1	1	4	0	122	6	1	128	2	228	230
18:15	0	0	0	0	0	2	78	0	1	80	5	0	2	1	7	0	115	6	2	121	4	208	212
18:30	0	0	0	0	0	0	72	0	1	72	10	0	1	0	11	0	94	5	2	99	3	182	185
18:45	0	0	0	0	0	1	65	0	1	66	10	0	4	1	14	0	98	4	0	102	2	182	184
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>310</b>	<b>0</b>	<b>3</b>	<b>314</b>	<b>28</b>	<b>0</b>	<b>8</b>	<b>3</b>	<b>36</b>	<b>0</b>	<b>429</b>	<b>21</b>	<b>5</b>	<b>450</b>	<b>11</b>	<b>800</b>	<b>811</b>
<b>Grand Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>67</b>	<b>2623</b>	<b>0</b>	<b>42</b>	<b>2690</b>	<b>253</b>	<b>0</b>	<b>60</b>	<b>34</b>	<b>313</b>	<b>0</b>	<b>2294</b>	<b>111</b>	<b>64</b>	<b>2405</b>	<b>140</b>	<b>5408</b>	<b>5548</b>
Apprch %	0	0	0	0	0	2.5	97.5	0	0	97.5	80.8	0	19.2	0	80.8	0	95.4	4.6	0	95.4	2.5	97.5	97.5
Total %	0	0	0	0	0	1.2	48.5	0	0	49.7	4.7	0	1.1	0	4.7	0	42.4	2.1	0	44.5	2.5	97.5	97.5

Start Time	None Southbound				CSAH 23 Westbound				Rendova St. Northbound				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 07:15																	
07:15	0	0	0	0	3	154	0	157	8	0	2	10	0	38	0	38	205
07:30	0	0	0	0	6	181	0	187	3	0	0	3	0	51	3	54	244
07:45	0	0	0	0	5	145	0	150	10	0	1	11	0	51	9	60	221
08:00	0	0	0	0	3	131	0	134	15	0	0	15	0	46	2	48	197
<b>Total Volume</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>17</b>	<b>611</b>	<b>0</b>	<b>628</b>	<b>36</b>	<b>0</b>	<b>3</b>	<b>39</b>	<b>0</b>	<b>186</b>	<b>14</b>	<b>200</b>	<b>867</b>
% App. Total	0	0	0	0	2.7	97.3	0	97.3	92.3	0	7.7	92.3	0	93	7	93	97.3
PHF	.000	.000	.000	.000	.708	.844	.000	.840	.600	.000	.375	.650	.000	.912	.389	.833	.888

Peak Hour Analysis From 12:00 to 18:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 16:45																	
16:45	0	0	0	0	2	88	0	90	10	0	5	15	0	192	3	195	300
17:00	0	0	0	0	2	80	0	82	16	0	6	22	0	192	6	198	302
17:15	0	0	0	0	5	120	0	125	13	0	1	14	0	172	6	178	317
17:30	0	0	0	0	1	82	0	83	15	0	3	18	0	178	7	185	286
<b>Total Volume</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>10</b>	<b>370</b>	<b>0</b>	<b>380</b>	<b>54</b>	<b>0</b>	<b>15</b>	<b>69</b>	<b>0</b>	<b>734</b>	<b>22</b>	<b>756</b>	<b>1205</b>
% App. Total	0	0	0	0	2.6	97.4	0	97.4	78.3	0	21.7	78.3	0	97.1	2.9	97.1	97.4
PHF	.000	.000	.000	.000	.500	.771	.000	.760	.844	.000	.625	.784	.000	.956	.786	.955	.950



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

Study Name : TMC1403  
Study Date : 03/17/14  
Page No. : 1

**Signal Warrants - Summary**

**Major Street Approaches**

**Eastbound: CSAH 23**  
Number of Lanes: 1  
85% Speed > 40 MPH.  
Total Approach Volume: 2,407

**Westbound: CSAH 23**  
Number of Lanes: 1  
85% Speed > 40 MPH.  
Total Approach Volume: 2,692

**Minor Street Approaches**

**Northbound: Rendova St.**  
Number of Lanes: 1  
  
Total Approach Volume: 315

**Southbound: None**  
Number of Lanes: 1  
  
Total Approach Volume: 0

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

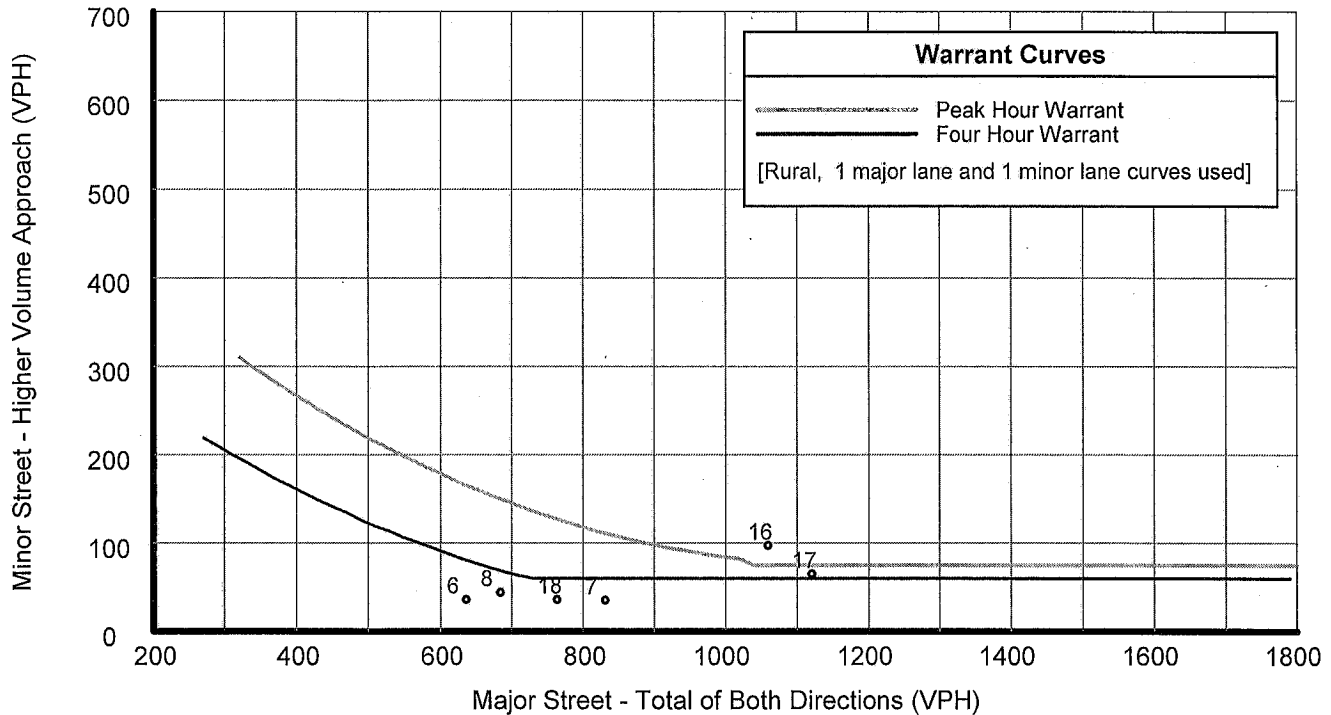
- Warrant 1 - Eight Hour Vehicular Volumes** ..... Not Satisfied
  - Warrant 1A - Minimum Vehicular Volume** ..... Not Satisfied  
Required volumes reached for 0 hours, 8 are needed
  - Warrant 1B - Interruption of Continuous Traffic** ..... Not Satisfied  
Required volumes reached for 2 hours, 8 are needed
  - Warrant 1 A&B - Combination of Warrants** ..... Not Satisfied  
Required volumes reached for 1 hours, 8 are needed
  
- Warrant 2 - Four Hour Volumes** ..... Not Satisfied  
Number of hours (2) volumes exceed minimum < minimum required (4).
  
- Warrant 3 - Peak Hour** ..... Satisfied
  - Warrant 3A - Peak Hour Delay** ..... Not Satisfied  
Approach volumes on minor street don't exceed minimums for any hour. 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 : TMC1403  
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 350	Min 105	Hour Begin	Major Total	Minor Vol	Dir	Maj 525	Min 53	Hour Begin	Major Total	Minor Vol	Dir	Maj 420	Min 84
16:45	1,136	69	NB	Yes	No	16:45	1,136	69	NB	Yes	Yes	16:00	1,059	97	NB	Yes	Yes
16:30	1,129	74	NB	Yes	No	15:45	774	82	NB	Yes	Yes	17:00	1,120	65	NB	Yes	No
17:00	1,120	65	NB	Yes	No	17:45	865	33	NB	Yes	No	17:15	1,064	47	NB	Yes	No
16:15	1,078	85	NB	Yes	No	07:00	831	35	NB	Yes	No	17:30	962	40	NB	Yes	No
17:15	1,064	47	NB	Yes	No	07:15	828	39	NB	Yes	No	17:45	865	33	NB	Yes	No
16:00	1,059	97	NB	Yes	No	07:30	797	40	NB	Yes	No	07:00	831	35	NB	Yes	No
17:30	962	40	NB	Yes	No	06:45	775	33	NB	Yes	No	07:15	828	39	NB	Yes	No
17:45	865	33	NB	Yes	No	18:00	764	36	NB	Yes	No	07:30	797	40	NB	Yes	No
07:00	831	35	NB	Yes	No	06:30	734	37	NB	Yes	No	06:45	775	33	NB	Yes	No
07:15	828	39	NB	Yes	No	07:45	727	47	NB	Yes	No	15:45	774	82	NB	Yes	No
07:30	797	40	NB	Yes	No	06:15	703	34	NB	Yes	No	18:00	764	36	NB	Yes	No
06:45	775	33	NB	Yes	No	08:00	684	44	NB	Yes	No	06:30	734	37	NB	Yes	No
15:45	774	82	NB	Yes	No	06:00	637	36	NB	Yes	No	07:45	727	47	NB	Yes	No
18:00	764	36	NB	Yes	No	18:15	540	32	NB	Yes	No	06:15	703	34	NB	Yes	No
06:30	734	37	NB	Yes	No	15:30	513	60	NB	No	Yes	18:00	684	44	NB	Yes	No
07:45	727	47	NB	Yes	No	08:15	502	30	NB	No	No	06:00	637	36	NB	Yes	No
06:15	703	34	NB	Yes	No	05:45	483	27	NB	No	No	18:15	540	32	NB	Yes	No
08:00	684	44	NB	Yes	No	18:30	339	25	NB	No	No	15:30	513	60	NB	Yes	No
06:00	637	36	NB	Yes	No	08:30	339	19	NB	No	No	08:15	502	30	NB	Yes	No
18:15	540	32	NB	Yes	No	05:30	283	20	NB	No	No	05:45	483	27	NB	Yes	No
15:30	513	60	NB	Yes	No	15:15	262	35	NB	No	No	18:30	339	25	NB	No	No
08:15	502	30	NB	Yes	No	08:45	169	9	NB	No	No	08:30	339	19	NB	No	No
05:45	483	27	NB	Yes	No	18:45	168	14	NB	No	No	05:30	283	20	NB	No	No
18:30	339	25	NB	No	No	05:15	119	13	NB	No	No	15:15	262	35	NB	No	No



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

Study Name : TMC1403  
Study Date : 03/17/14  
Page No. : 1

**Multi-Way Stop Warrant Report**

**Major Street Approaches**

**Eastbound: CSAH 23**  
Total Approach Volume: 2,407  
85% Speed > 40 MPH.

**Westbound: CSAH 23**  
Total Approach Volume: 2,692  
85% Speed > 40 MPH.

**Minor Street Approaches**

**Northbound: Rendova St.**  
Total Approach Volume: 315

**Southbound: None**  
Total Approach Volume: 0

**Warrant Summary**

**Criteria A - Interim Measure** ..... Not Evaluated  
If traffic signals are justified, stop signs can be installed as an interim measure.

**Criteria B - Crash Experience** ..... Not Evaluated

**Criteria C - Minimum Volumes and Delays** ..... Not Satisfied  
Delay data not evaluated  
Required volumes reached for 0 hours, 8 are needed

**Criteria D - 80% of Volumes, Delays, and Crashes** ..... Not Evaluated  
Delay data not evaluated  
Number of crashes (-1) is less than the minimum required (4).  
Required volumes reached for 0 hours, 8 are needed

**Analysis of 8 Hour Volume Warrants:**

Time	Major Total	Minor Total	Crit C			Crit D		
			Major	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?
05:30 - 06:30	283	20	210-Yes	140-No	Major	240-Yes	160-No	Major
05:45 - 06:45	483	27	210-Yes	140-No	Major	240-Yes	160-No	Major
06:00 - 07:00	637	36	210-Yes	140-No	Major	240-Yes	160-No	Major
06:15 - 07:15	703	34	210-Yes	140-No	Major	240-Yes	160-No	Major
06:30 - 07:30	734	37	210-Yes	140-No	Major	240-Yes	160-No	Major
06:45 - 07:45	775	33	210-Yes	140-No	Major	240-Yes	160-No	Major
07:00 - 08:00	831	35	210-Yes	140-No	Major	240-Yes	160-No	Major
07:15 - 08:15	828	39	210-Yes	140-No	Major	240-Yes	160-No	Major
07:30 - 08:30	797	40	210-Yes	140-No	Major	240-Yes	160-No	Major
07:45 - 08:45	727	47	210-Yes	140-No	Major	240-Yes	160-No	Major
08:00 - 09:00	684	44	210-Yes	140-No	Major	240-Yes	160-No	Major
08:15 - 09:15	502	30	210-Yes	140-No	Major	240-Yes	160-No	Major
08:30 - 09:30	339	19	210-Yes	140-No	Major	240-Yes	160-No	Major
15:15 - 16:15	263	34	210-Yes	140-No	Major	240-Yes	160-No	Major
15:30 - 16:30	514	59	210-Yes	140-No	Major	240-Yes	160-No	Major
15:45 - 16:45	774	82	210-Yes	140-No	Major	240-Yes	160-No	Major
16:00 - 17:00	1,059	97	210-Yes	140-No	Major	240-Yes	160-No	Major
16:15 - 17:15	1,078	85	210-Yes	140-No	Major	240-Yes	160-No	Major
16:30 - 17:30	1,129	74	210-Yes	140-No	Major	240-Yes	160-No	Major
16:45 - 17:45	1,136	69	210-Yes	140-No	Major	240-Yes	160-No	Major
17:00 - 18:00	1,120	65	210-Yes	140-No	Major	240-Yes	160-No	Major
17:15 - 18:15	1,064	47	210-Yes	140-No	Major	240-Yes	160-No	Major
17:30 - 18:30	962	40	210-Yes	140-No	Major	240-Yes	160-No	Major
17:45 - 18:45	865	33	210-Yes	140-No	Major	240-Yes	160-No	Major



**NORTH**

**COUNT LOCATION:**

CSAH 23 (Lake Dr.)

**DATE:**

03/13/2014

@ Rendova St.

APP. #2

APP. #3

APP. #4

- 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 = None
APP. #2 = CSAH 23
APP. #3= Rendova St.
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						6		3
6:15-6:30						4		1
6:30-6:45						2		
6:45-7:00						5		2
<b>HOURLY TOTAL</b>						<b>HOURLY TOTAL</b>		<b>23</b>
7:00-7:15AM						6		
7:15-7:30						2		1
7:30-7:45						10		2
7:45-8:00						6		2
<b>HOURLY TOTAL</b>						<b>HOURLY TOTAL</b>		<b>29</b>
8:00-8:15AM						11		1
8:15-8:30						6		7
8:30-8:45						5		1
8:45-9:00						3		5
<b>HOURLY TOTAL</b>						<b>HOURLY TOTAL</b>		<b>39</b>
					<b>TOTAL</b>		<b>TOTAL</b>	<b>91</b>

TIME	PEDESTRIANS					HEAVY VEHICLES		
	APP. #1	APP. #2	APP. #3	APP. #4	15 MIN TOT	TRUCKS	RV	BUS
4:00-4:15PM						7		3
4:15-4:30						3		1
4:30-4:45						4		2
4:45-5:00						7		
<b>HOURLY TOTAL</b>						<b>HOURLY TOTAL</b>		<b>27</b>
5:00-5:15PM						2		2
5:15-5:30						3		1
5:30-5:45						3		1
5:45-6:00								
<b>HOURLY TOTAL</b>						<b>HOURLY TOTAL</b>		<b>12</b>
6:00-6:15PM								1
6:15-6:30						6		
6:30-6:45						4		
6:45-7:00								
<b>HOURLY TOTAL</b>						<b>HOURLY TOTAL</b>		<b>11</b>
					<b>TOTAL</b>		<b>TOTAL</b>	<b>50</b>