

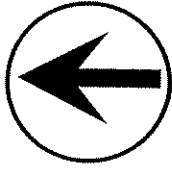
Date : 09/08/11

Count Number : TMC1128

Location : CSAH 21 (Centerville Rd.)

@ CSAH 32 (Ash St.)

Collection Period : 6:00AM - 7:00PM



North

5677

#2

CSAH 21

2994	248	2746	0
D	F	F	F

2683

3792	1689
#1	

2103	245	0	1858
A	B	C	

CSAH 32

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

CSAH 21

4604

#4

8483

1441	2438	0
M	L	K

Anoka County Highway Department

Traffic Volume and Turning

Movement Study

Date : 09/22/11

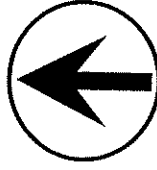
Count Number : TMC1128

Location : CSAH 21 (Centerville Rd.)

@ CSAH 32 (Ash St.)

Collection Period : AM PEAK

Hour : 7:00 AM - 8:00 AM



North

CSAH 21  
#2  
673

513	D	F	F	F
0	66	447	0	

160

#1

444				
194	A	B	C	
181		0	13	

250

CSAH 32

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

CSAH 21

628

184	M			
147	L			
0	K			
331				

#4

959

Anoka County Highway Department

Traffic Volume and Turning

Movement Study

Date : 09/08/11

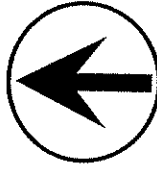
Count Number : TMC1128

Location : CSAH 21 (Centerville Rd.)

@ CSAH 32 (Ash St.)

Collection Period : PM PEAK

Hour : 4:30 PM - 5:30 PM



North

633

#2

CSAH 21

199	0	F
176		E
23		D

434

535			
	204		
		C	
		B	
		A	

#1

CSAH 32

42	331
0	
289	

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

CSAH 21

465

#4

1038

181	573
392	
0	

Anoka County Highway Department

Traffic Volume and Turning

Movement Study





# Anoka County Highway Department

## Traffic Engineering Section

### Traffic Volume and Turning Movement Study

Weather: Sun/Warm  
 Counter: DB-400  
 study conducted by: Sam/Andrea

File Name : TMC1128  
 Site Code : 11280202  
 Start Date : 09/08/2011  
 Page No : 2

#### Groups Printed- Unshifted

Start Time	CSAH 21 Southbound					NONE Westbound					CSAH 21 Northbound					CSAH 32 Eastbound					Excl. Total	Incl. Total	Int. Total
	Left	Thru	Right	Heavy	App. Total	Left	Thru	Right	Heavy	App. Total	Left	Thru	Right	Heavy	App. Total	Left	Thru	Right	Heavy	App. Total			
18:00	0	31	2	0	33	0	0	0	0	0	32	91	0	3	123	10	0	53	0	63	3	219	222
18:15	0	24	4	1	28	0	0	0	0	0	21	88	0	0	109	4	0	46	2	50	3	187	190
18:30	0	38	3	0	41	0	0	0	0	0	28	61	0	2	89	6	0	37	1	43	3	173	176
18:45	0	31	1	0	32	0	0	0	0	0	18	43	0	1	61	2	0	35	0	37	1	130	131
Total	0	124	10	1	134	0	0	0	0	0	99	283	0	6	382	22	0	171	3	193	10	709	719
Grand Total	0	2746	248	68	2994	0	0	0	0	0	1441	2438	0	142	3879	245	0	1858	183	2103	393	8976	9369
Apprch %	0	91.7	8.3			0	0	0			37.1	62.9	0			11.7	0	88.3			4.2	95.8	
Total %	0	30.6	2.8		33.4	0	0	0			16.1	27.2	0		43.2	2.7	0	20.7		23.4			

Start Time	CSAH 21 Southbound					NONE Westbound					CSAH 21 Northbound					CSAH 32 Eastbound					Excl. Total	Incl. Total	Int. Total
	Left	Thru	Right	Heavy	App. Total	Left	Thru	Right	Heavy	App. Total	Left	Thru	Right	Heavy	App. Total	Left	Thru	Right	Heavy	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	0	122	15		137	0	0	0	0	0	37	27	0	64	2	0	35		37		238		238
07:15	0	108	15		123	0	0	0	0	0	44	30	0	74	3	0	44		47		244		244
07:30	0	102	17		119	0	0	0	0	0	47	46	0	93	4	0	57		61		273		273
07:45	0	115	19		134	0	0	0	0	0	56	44	0	100	4	0	45		49		283		283
Total Volume	0	447	66		513	0	0	0	0	0	184	147	0	331	13	0	181		194		1038		1038
% App. Total	0	87.1	12.9			0	0	0			55.6	44.4	0		6.7	0	93.3						
PHF	.000	.916	.868		.936	.000	.000	.000	.000	.000	.821	.799	.000	.828	.813	.000	.794		.795		.917		.917

Start Time	CSAH 21 Southbound					NONE Westbound					CSAH 21 Northbound					CSAH 32 Eastbound					Excl. Total	Incl. Total	Int. Total
	Left	Thru	Right	Heavy	App. Total	Left	Thru	Right	Heavy	App. Total	Left	Thru	Right	Heavy	App. Total	Left	Thru	Right	Heavy	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	0	47	6		53	0	0	0	0	0	46	91	0	137	14	0	81		95		285		285
16:45	0	44	6		50	0	0	0	0	0	54	114	0	168	6	0	73		79		297		297
17:00	0	42	7		49	0	0	0	0	0	45	93	0	138	9	0	65		74		261		261
17:15	0	43	4		47	0	0	0	0	0	36	94	0	130	13	0	70		83		260		260
Total Volume	0	176	23		199	0	0	0	0	0	181	392	0	573	42	0	289		331		1103		1103
% App. Total	0	88.4	11.6			0	0	0			31.6	68.4	0		12.7	0	87.3						
PHF	.000	.936	.821		.939	.000	.000	.000	.000	.000	.838	.860	.000	.853	.750	.000	.892		.871		.928		.928



**Anoka County Highway**  
**PC-WARRANTS**  
 Traffic Signal Warrant Analysis

Study Name : TMC1128  
 Study Date : 09/23/11  
 Page No. : 1

**Signal Warrants - Summary**

**Major Street Approaches**

**Northbound: CSAH 21**

Number of Lanes: 1  
 Approach Speed: 50  
 Total Approach Volume: 3,879

**Southbound: CSAH 21**

Number of Lanes: 1  
 Approach Speed: 50  
 Total Approach Volume: 2,994

**Minor Street Approaches**

**Eastbound: CSAH 32**

Number of Lanes: 2  
 Total Approach Volume: 2,103

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

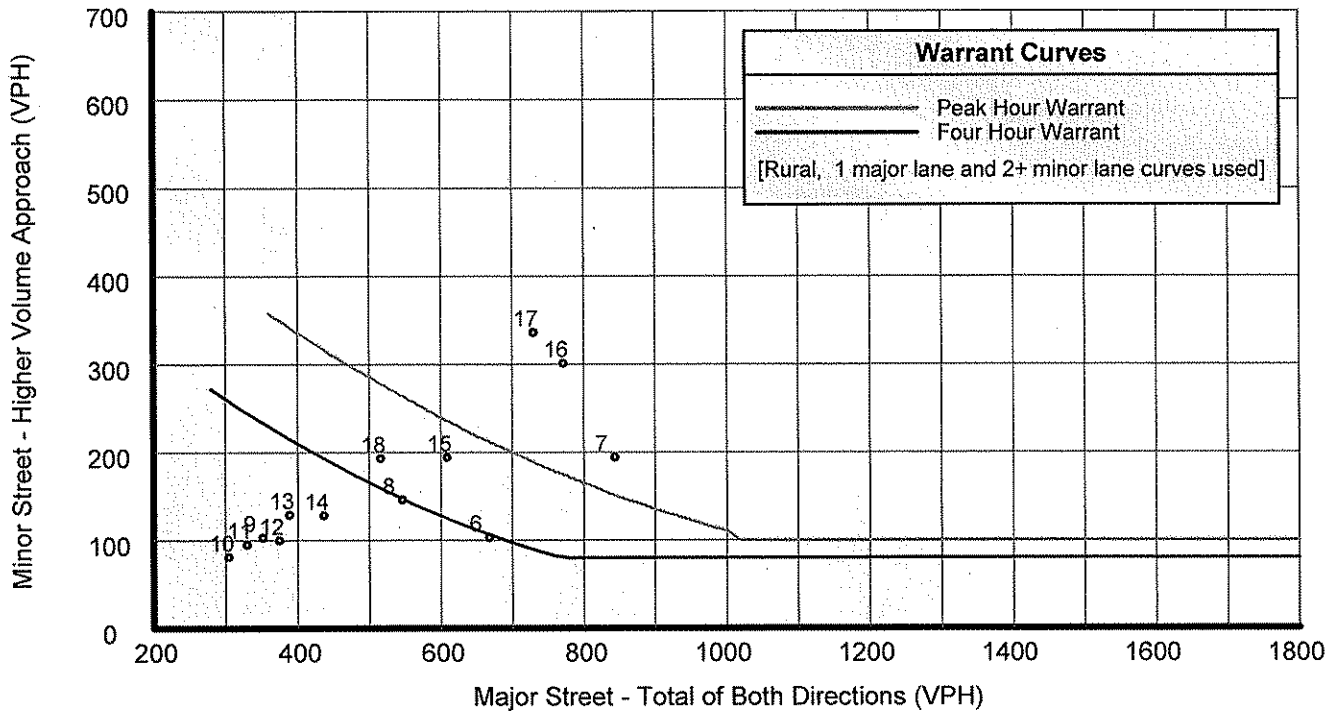
- Warrant 1 - Eight Hour Vehicular Volumes** ..... **Not Satisfied**
  - Warrant 1A - Minimum Vehicular Volume** ..... **Not Satisfied**  
 Required volumes reached for 6 hours, 8 are needed
  - Warrant 1B - Interruption of Continuous Traffic** ..... **Not Satisfied**  
 Required volumes reached for 6 hours, 8 are needed
  - Warrant 1 A&B - Combination of Warrants** ..... **Not Satisfied**  
 Required volumes reached for 7 hours, 8 are needed
  
- Warrant 2 - Four Hour Volumes** ..... **Satisfied**  
 Number of hours (5) volumes exceed minimum >= minimum required (4).
  
- Warrant 3 - Peak Hour** ..... **Satisfied**
  - Warrant 3A - Peak Hour Delay** ..... **Satisfied**  
 Number of hours (20) 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**



# Anoka County Highway PC-WARRANTS Traffic Signal Warrant Analysis

Study Name : TMC1128  
Study Date : 09/23/11  
Page No. : 2

## Signal Warrants - Summary



### Analysis of 8-Hour Volume Warrants:

Hour Begin	Major Total	Higher Minor Vol	Dir	War-1A			War-1B			War-1A&B		
				Major Crit	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?
00:00	0	0	EB	350-No	140-No	---	525-No	70-No	---	420-No	112-No	---
01:00	0	0	EB	350-No	140-No	---	525-No	70-No	---	420-No	112-No	---
02:00	0	0	EB	350-No	140-No	---	525-No	70-No	---	420-No	112-No	---
03:00	0	0	EB	350-No	140-No	---	525-No	70-No	---	420-No	112-No	---
04:00	0	0	EB	350-No	140-No	---	525-No	70-No	---	420-No	112-No	---
05:00	0	0	EB	350-No	140-No	---	525-No	70-No	---	420-No	112-No	---
06:00	668	103	EB	350-Yes	140-No	Major	525-Yes	70-Yes	Both	420-Yes	112-No	Major
07:00	844	194	EB	350-Yes	140-Yes	Both	525-Yes	70-Yes	Both	420-Yes	112-Yes	Both
08:00	546	146	EB	350-Yes	140-Yes	Both	525-Yes	70-Yes	Both	420-Yes	112-Yes	Both
09:00	352	103	EB	350-Yes	140-No	Major	525-No	70-Yes	Minor	420-No	112-No	---
10:00	305	81	EB	350-No	140-No	---	525-No	70-Yes	Minor	420-No	112-No	---
11:00	330	95	EB	350-No	140-No	---	525-No	70-Yes	Minor	420-No	112-No	---
12:00	375	100	EB	350-Yes	140-No	Major	525-No	70-Yes	Minor	420-No	112-No	---
13:00	389	129	EB	350-Yes	140-No	Major	525-No	70-Yes	Minor	420-No	112-Yes	Minor
14:00	437	128	EB	350-Yes	140-No	Major	525-No	70-Yes	Minor	420-Yes	112-Yes	Both
15:00	609	194	EB	350-Yes	140-Yes	Both	525-Yes	70-Yes	Both	420-Yes	112-Yes	Both
16:00	772	301	EB	350-Yes	140-Yes	Both	525-Yes	70-Yes	Both	420-Yes	112-Yes	Both
17:00	730	336	EB	350-Yes	140-Yes	Both	525-Yes	70-Yes	Both	420-Yes	112-Yes	Both
18:00	516	193	EB	350-Yes	140-Yes	Both	525-No	70-Yes	Minor	420-Yes	112-Yes	Both
19:00	0	0	EB	350-No	140-No	---	525-No	70-No	---	420-No	112-No	---
20:00	0	0	EB	350-No	140-No	---	525-No	70-No	---	420-No	112-No	---
21:00	0	0	EB	350-No	140-No	---	525-No	70-No	---	420-No	112-No	---
22:00	0	0	EB	350-No	140-No	---	525-No	70-No	---	420-No	112-No	---
23:00	0	0	EB	350-No	140-No	---	525-No	70-No	---	420-No	112-No	---



**Anoka County Highway**  
**PC-WARRANTS**  
 Traffic Signal Warrant Analysis

Study Name : TMC1128  
 Study Date : 09/23/11  
 Page No. : 1

**Multi-Way Stop Warrant Report**

**Major Street Approaches**

**Northbound: CSAH 21**

Total Approach Volume: 3,879  
 Approach Speed: 50

**Southbound: CSAH 21**

Total Approach Volume: 2,994  
 Approach Speed: 50

**Minor Street Approaches**

**Eastbound: CSAH 32**

Total Approach Volume: 2,103

**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

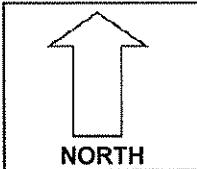
**Criteria C - Minimum Volumes and Delays** ..... Not Satisfied  
 Delay data not evaluated  
 Required volumes reached for 6 hours, 8 are needed

**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?
06:30 - 07:30	782	145	210-Yes	140-Yes	Both	240-Yes	160-No	Major
07:30 - 08:30	755	184	210-Yes	140-Yes	Both	240-Yes	160-Yes	Both
14:30 - 15:30	489	162	210-Yes	140-Yes	Both	240-Yes	160-Yes	Both
15:30 - 16:30	708	230	210-Yes	140-Yes	Both	240-Yes	160-Yes	Both
16:30 - 17:30	772	331	210-Yes	140-Yes	Both	240-Yes	160-Yes	Both
17:30 - 18:30	659	292	210-Yes	140-Yes	Both	240-Yes	160-Yes	Both
05:30 - 06:30	284	42	210-Yes	140-No	Major	240-Yes	160-No	Major
05:45 - 06:45	479	78	210-Yes	140-No	Major	240-Yes	160-No	Major
06:00 - 07:00	668	103	210-Yes	140-No	Major	240-Yes	160-No	Major
06:15 - 07:15	760	128	210-Yes	140-No	Major	240-Yes	160-No	Major
08:30 - 09:30	448	127	210-Yes	140-No	Major	240-Yes	160-No	Major
08:45 - 09:45	406	119	210-Yes	140-No	Major	240-Yes	160-No	Major
09:00 - 10:00	352	103	210-Yes	140-No	Major	240-Yes	160-No	Major
09:15 - 10:15	290	85	210-Yes	140-No	Major	240-Yes	160-No	Major
09:30 - 10:30	284	83	210-Yes	140-No	Major	240-Yes	160-No	Major
09:45 - 10:45	292	82	210-Yes	140-No	Major	240-Yes	160-No	Major
10:00 - 11:00	305	81	210-Yes	140-No	Major	240-Yes	160-No	Major
10:15 - 11:15	314	85	210-Yes	140-No	Major	240-Yes	160-No	Major
10:30 - 11:30	331	88	210-Yes	140-No	Major	240-Yes	160-No	Major
10:45 - 11:45	331	84	210-Yes	140-No	Major	240-Yes	160-No	Major
11:00 - 12:00	330	95	210-Yes	140-No	Major	240-Yes	160-No	Major
11:15 - 12:15	358	104	210-Yes	140-No	Major	240-Yes	160-No	Major
11:30 - 12:30	357	102	210-Yes	140-No	Major	240-Yes	160-No	Major
11:45 - 12:45	365	105	210-Yes	140-No	Major	240-Yes	160-No	Major





COUNT LOCATION:

CSAH 21 (Centerville Rd.) @

DATE:

09/22/2011

CSAH 32 (Ash St.)

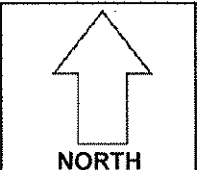
APP. #1 = CSAH 32
APP. #2 = CSAH 21
APP. #3 =
APP. #4 = CSAH 21

APP. #2
APP. #1
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.

TIME	PEDESTRIANS					HEAVY VEHICLES		
	APP. #1	APP. #2	APP. #3	APP. #4	15 MIN TOT	TRUCKS	RV	BUS
6:00-6:15AM								
6:15-6:30						2		
6:30-6:45						2		1
6:45-7:00						2		4
<b>HOURLY TOTAL</b>						<b>HOURLY TOTAL</b>		<b>11</b>
7:00-7:15						5		4
7:15-7:30						6		4
7:30-7:45						7		2
7:45-8:00						9		5
<b>HOURLY TOTAL</b>						<b>HOURLY TOTAL</b>		<b>42</b>
8:00-8:15						12		2
8:15-8:30						4		3
8:30-8:45						8		
8:45-9:00						8		3
<b>HOURLY TOTAL</b>						<b>HOURLY TOTAL</b>		<b>40</b>
9:00-9:15						8		2
9:15-9:30						12		1
9:30-9:45						7		2
9:45-10:00						4		1
<b>HOURLY TOTAL</b>						<b>HOURLY TOTAL</b>		<b>37</b>
10:00-10:15						4		3
10:15-10:30						7		
10:30-10:45						7		1
10:45-11:00						7		
<b>HOURLY TOTAL</b>						<b>HOURLY TOTAL</b>		<b>29</b>
11:00-11:15						8		
11:15-11:30						8		
11:30-11:45						4		
11:45-12:00						6		
<b>HOURLY TOTAL</b>						<b>HOURLY TOTAL</b>		<b>26</b>
12:00-12:15						4		2
12:15-12:30						10		
12:30-12:45						6		
12:45-1:00						7		2
<b>HOURLY TOTAL</b>						<b>HOURLY TOTAL</b>		<b>31</b>
1:00-1:15						7		1
1:15-1:30						4		1
1:30-1:45						13		1
1:45-2:00						4		1
<b>HOURLY TOTAL</b>						<b>HOURLY TOTAL</b>		<b>32</b>
					<b>TOTAL</b>		<b>TOTAL</b>	<b>248</b>

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COUNT LOCATION:

CSAH 21 (Centerville Rd.) @

DATE:

09/08/2011

CSAH 32 (Ash St.)

APP. #1 = CSAH 32
APP. #2 = CSAH 21
APP. #3 =
APP. #4 = CSAH 21

APP. #2
APP. #1
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.

TIME	PEDESTRIANS					HEAVY VEHICLES		
	APP. #1	APP. #2	APP. #3	APP. #4	15 MIN TOT	TRUCKS	RV	BUS
2:00-2:15PM						5		
2:15-2:30						2		2
2:30-2:45		1			1	9		2
2:45-3:00						10		1
<b>HOURLY TOTAL</b>					<b>1</b>	<b>HOURLY TOTAL</b>		<b>31</b>
3:00-3:15						9		4
3:15-3:30						5		3
3:30-3:45						9		2
3:45-4:00						6		
<b>HOURLY TOTAL</b>						<b>HOURLY TOTAL</b>		<b>38</b>
4:00-4:15						8		5
4:15-4:30						9		1
4:30-4:45						10		1
4:45-5:00						1		
<b>HOURLY TOTAL</b>						<b>HOURLY TOTAL</b>		<b>35</b>
5:00-5:15						10		4
5:15-5:30						8		1
5:30-5:45						7		
5:45-6:00						2		1
<b>HOURLY TOTAL</b>						<b>HOURLY TOTAL</b>		<b>33</b>
6:00-6:15						1		
6:15-6:30						3		
6:30-6:45						2		
6:45-7:00						1		
<b>HOURLY TOTAL</b>						<b>HOURLY TOTAL</b>		<b>7</b>
7:00-7:15								
7:15-7:30								
7:30-7:45								
7:45-8:00								
<b>HOURLY TOTAL</b>						<b>HOURLY TOTAL</b>		
8:00-8:15								
8:15-8:30								
8:30-8:45								
8:45-9:00								
<b>HOURLY TOTAL</b>						<b>HOURLY TOTAL</b>		
9:00-9:15								
9:15-9:30								
9:30-9:45								
9:45-10:00								
<b>HOURLY TOTAL</b>						<b>HOURLY TOTAL</b>		
					<b>TOTAL</b>	<b>1</b>	<b>TOTAL</b>	<b>392</b>

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