

Memo



Date: June 4, 2009
To: Kevin Stewart and Chad Kudym
From: Markus Ritsch
Subject: May 2009 ALERT Data Analysis

I. ALERT Data Source

Raw ALERT data records extracted from the Urban Drainage and Flood Control District's Nova Star 4.0 base station (ALERT 2) were analyzed for the period May 1 through May 31, 2009.

II. General System Analysis Summary

A total of 326,207 ALERT data reports were analyzed from the ALERT 2 base station. Meteorological sensors account for 72 percent, water level sensors 12 percent, and rain sensors 5 percent of the total monthly records.

More than ninety-nine percent (99%) of the received data reports were flagged as "good" by the Nova Star validation process.

The system-wide radio traffic loading was 10,523 reports per day with an average hourly loading of 438 reports. The peak hourly traffic loading was 1,009 reports, which occurred on May 25, between 10:00 PM and 11:00 PM. A plot of monthly average and peak hourly traffic loading is provided.

A. Specific Issues Identified this Month

The performance of the following sensors was unacceptable due to either poor timer performance, poor event performance, or due to the large number of invalid reports received. Issues at these sensors should be resolved immediately.

Table 1. Rain Sensors with Unacceptable Performance

Sensor ID	Description	Timer Performance	Event Performance	Invalid Reports	Recommendation
110	Ralston Reservoir	62.90%	25.86%	2	
540	Parker/Mississippi	50.00%	59.68%	2	
610	Harvard @ Jackson	88.71%	73.61%	9	
1350	Chatfield COE	11.29%	30.85%	7	
2210	Hiwan G.C.	103.23%	98.68%	26	
2230	Bear Cr below Cub	91.94%	84.21%	13	
2270	Cub Cr below Blue	32.26%	85.48%	3	
2850	Cherry Cr bl Bayou Gch	11.29%	40.00%	8	Telemetry issue, route this station through West Creek repeater.
2320	Choke Cherry Resvr	51.61%	36.28%	8	

III. Rain Sensor Timer Reporting Summary

The following analysis assumes that each rain sensor has a 12-hour timer-reporting interval. System-wide, the ALERT 2 base station received approximately 84 percent of the non-incrementing timer reports. The worst performing rain sensors for the month are summarized (Table 1).

Table 2. Monthly Summary of Sensors with Poor Timer Performance (Sensor ID)

Jan*	Feb*	Mar*	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2850	4030	2840	1360	1350							
1650	4200	1020	1640	2850							
1810	4490	1040	2270	2270							
4250	4520	1720	1600	410							
4790	4790	1030	2850	540							
4300	4020	1550	1350	2320							

*-Timer statistics are skewed in these months because system start-up occurs and the Blue Mountain repeater was down. The network is operational by April 1.

Sensor ID 1460 and 700 have a 24-hour timer-reporting interval and Sensor ID 1810 has an 18-hour timer-reporting interval.

Sensors identified as having poor timer performance in multiple months are shaded with unique colors. A developing trend can thus be identified from the color shading as the year progresses.

IV. Rain Sensor Event Reporting Summary

A. District-Wide Total Tip/Count Statistics

The incrementing reports from all 1-mm rain sensors were analyzed to quantify the District-wide statistical total monthly tip summary (Table 3).

Table 3. District-Wide Total Tip/Count Statistical Summary

Statistical Parameter	Value	Comments
Mean	63.45	Only the 1-mm rain sensors were included in the analysis
Median	61.5	Only the 1-mm rain sensors were included in the analysis
Standard deviation	19.75	Only the 1-mm rain sensors were included in the analysis
Mean plus three standard deviations	122.69	Only the 1-mm rain sensors were included in the analysis
Minimum total count	15	Hidden Lake (ID 1300)
Maximum total count	149	Expo Park (ID 420) – Influenced by Lawn Irrigation

B. High Rain Totals

Three sensors reported more than the mean plus three standard deviations and these sensors were 420, 4360 and 630. Note that the following rain gages are influenced by lawn irrigation.

420 Expo Park	510 Virginia Court	720 Confluence Pond
430 Utah Park	630 Temple Pond at DTC	750 Quincy Reservoir
500 Havana Park	640 Goldsmith @ Eastman	830 Side Creek Park
1500 Powers Park		

a. Expo Park (ID 420)

This station was operational for the entire month. Anomalies in the sequential data series were not noted in the manual inspection of the ALERT reports received from this sensor.

b. Justice Center (ID 4360)

This station was operational for the entire month. Anomalies in the sequential data series were not noted in the manual inspection of the ALERT reports received from this sensor.

c. Temple Pond at DTC (ID 630)

This station was operational for the entire month. Anomalies in the sequential data series were not noted in the manual inspection of the ALERT reports received from this sensor.

C. Monthly Average Tip/Count Summary

A monthly summary of the District-wide mean total tip/count is presented (Table 4).

Table 4. Monthly Summary of District-Wide Mean Total 1-mm Tip/Count

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ave
2006	4.62	5.92	18.39	20.47	19.44	13.75	74.03	46.89	24.17	41.13	5.04	16.45	24.19
2007	11.56	5.40	29.75	65.03	68.30	15.87	36.20	46.38	22.13	29.50	6.54	11.29	29.00
2008	4.05	7.38	12.26	20.57	54.82	26.06	16.43	90.20	37.54	19.59	2.82	9.24	25.08
2009	6.33	3.11	11.37	59.26	63.45								

D. Sensors with a Jump of Six or More in the Sequential Count

Several sensors experienced a jump in the sequential tip count (Table 5).

Table 5. Sensors with a Jump of More than 6 in Sequential Count

Sensor Description	Sensor ID	Comment
Justice Center	4360	Several large jumps in tip count occur on May 8, 2009.
Choke Cherry Reservoir	2320	Several large jumps in tip count occur on May 23 and May 24, 2009.
Chatfield COE	1350	The tip count from this sensor was erratic from May 1 through May 29. On May 29 the series looks to be reasonable. Field maintenance may have occurred on May 29 to fix issues experienced during the month.
Marston Lake North	1520	Several large jumps in tip count occur on May 24 and May 29, 2009.

E. Sensor-by-Sensor Incrementing Count Summary

The system-wide reception rate of incrementing, 1-mm tip reports for the month was approximately 83.5 percent. A total of 7,840 incrementing reports were received and a total of 9,390 were expected. The total loss of incrementing reports for the month was approximately 16.51 percent. Those sensors with the worst event transmission performance are summarized (Table 6).

Table 6. Monthly Summary of Sensors with the Most Missed Tips

Jan	Feb*	Mar*	Apr**	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
140	4030	860	860	110							
4490	4470	840	840	1350							
1420	4490	700	1640	2320							
4040	4110	2840	2850	2850							
4160	4510	1340	700	540							
4470	4790	920	1350	1810							

* - Event statistics are poor in February and March due to system start-up.

** - Poor event performance is evident at every station because the ALERT2 base station was unable to receive data for part of this month.

Sensors identified as having poor event performance in multiple months are shaded with unique colors. A developing trend can thus be identified from the color shading as the year progresses.

V. Heavy Radio Traffic Analysis

Periods exceeding 700 messages per hour are analyzed independently in an attempt to identify rain tip sequences where three (3) or more, sequential messages are lost.

A. The Heaviest Hourly Traffic Periods This Month

The hours of highest radio traffic this month include:

Peak Traffic Periods	Reports/hour	Hour Beginning
Peak Hourly Traffic	1,009	5/25/09 10:00 PM
2nd Max	966	5/25/09 11:00 PM
3rd Max	966	5/25/09 9:00 PM
4th Max	922	5/25/09 8:00 PM
5th Max	911	5/25/09 7:00 PM

B. May 25, 2009

The heaviest period of radio traffic occurred on May 25, between 7:00 PM and midnight. Incrementing rain records from the 1-mm gages for the heavy radio traffic period were examined to characterize the loss of sequential incrementing tip transmissions (Table 7). During the heavy traffic period, a total of 1,566 reports were expected and 1,243 were received yielding a loss of approximately 20.63% of the incrementing transmissions.

Table 7. Peak Traffic Analysis - Loss of Incrementing Tip Reports

Heavy Traffic Period (May 25)	Occurrences of lost sequential tip reports during period			
	Loss of 3 sequential tips	Loss of 4 sequential tips	Loss of 5 sequential tips	Loss of 6 or more sequential tips
7:00 PM to 11:59 PM	11	5	1	0

The heavy traffic period was composed primarily of reports from stream and precipitation sensors. Those precipitation sensors that lost three or more sequential reports during this heavy traffic period include:

Rain Sensor	Total Performance	Loss of 3 tips	Loss of 4 tips	Loss of 5 tips
1030	38%	1	0	0
2350	38%	0	0	1
2360	40%	1	0	0
2850	43%	1	0	0
1810	56%	0	1	0
220	56%	1	0	0
1550	57%	2	0	0
1420	61%	0	1	0
320	64%	0	1	0
1040	67%	0	1	0
1370	68%	1	0	0
2840	68%	1	0	0
300	69%	1	0	0
4010	70%	1	0	0
610	73%	1	0	0
530	74%	0	1	0

VI. Unknown Device Analysis – Received Data Log

The ALERT IDs present in the audio signal received by the decoder are compared against a list of “active” device IDs that are defined within NovaStar. Those IDs received by the decoder that are not defined within NovaStar are considered to be “unknown” and may be the result of radio noise or problems with the telemetry system. The reception of “unknown” device reports for the month is summarized (Table 8).

Table 8. Summary of Unknown IDs

Description	Quantity
Total number of unknown IDs (IDs without a device definition)	376
Total reports from unknown IDs	1,617
Unknown IDs with only a single received report (potential noise)	265
Total reports from all IDs – RecData Log entire month	326,207
Unknown reports as a fraction of total reports	0.50%

The total number of reports from unknown sensors is very small relative to the total reports received for the month.

A number of “unknown” sensors had multiple reports which may indicate the existence of a transmitter that is sending information on an ID that is not currently defined within NovaStar. The unknown IDs with multiple reports including the number of reports received by each are shown.

Table 9. Reports Received by Unknown IDs

Unknown ID	Reports
8102**	315
8101**	245
8100**	245
1485	49
2224	36
2215	27
2239	21
1663	17
2216	15
2232	13
2228	13
2272	12
2271	12
2221	12
1355	12
2925	11
2275	11
2217	11
1661	10
2227	8
1657	8
1631	8
2229	7
2237	7

2736	5
910	5
668	5
2278	5
2277	5
767	5
2219	5
4269	4
956	4
4786	4
409	4
4796	4
2238	4
2222	4
4663	3
759	3
2200	3
702	3
696	3
884	3
642	3
4289	3
5022	3
676	3
719	3
109	3

**** - these reports may be from a newly installed station not yet defined on ALERT2**

The “unknown” device reports are analyzed temporally to understand when they are received during the day (Table 10). The goal of this analysis is to determine a pattern of occurrence that may correspond to a source of noise in the system, such as the use of a wireless microphone nearby.

Table 10. Temporal Distribution of Unknown Reports

Hour (AM)	Reports	Hour (PM)	Reports
0:00-00:59	129	12:00-12:59	128
1:00-1:59	45	1:00-1:59	46
2:00-2:59	22	2:00-2:59	41
3:00-3:59	119	3:00-3:59	135
4:00-4:59	20	4:00-4:59	67
5:00-5:59	25	5:00-5:59	48
6:00-6:59	113	6:00-6:59	131
7:00-7:59	24	7:00-7:59	28
8:00-8:59	20	8:00-8:59	35
9:00-9:59	118	9:00-9:59	127
10:00-10:59	42	10:00-10:59	43
11:00-11:59	78	11:00-11:59	33

VII. Reporting Issues Identified this Month

Precipitation sensors with a large number of invalid reports (bit flip/contention errors/random decode):

Description	Sensor ID	No. of Invalid Reports
Hiwan G.C.	2210	26
Evergreen Lake	2220	17
Bear Cr below Cub	2230	13
Harvard @ Jackson	610	9
Cherry Cr bl Bayou Glch	2850	8
Choke Cherry Resvr	2320	8
Chatfield COE	1350	7
Mission Viejo Park	760	5
Goldsmith at Eastman	640	5
Idledale	2350	4
Pine Cliff Road	2810	4
Kinney Peak	2280	3
Cold Sprg Glch conf	2240	3
Indian Hills	2360	3
Englewood Dam	1600	3
Button Rock	4790	3
Cub Cr below Blue	2270	3
SPR at Henderson	1660	2
Doudy Draw	4820	2
Cal-Wood Ranch	4770	2
El Rancho	2340	2
Granby Ditch @ 6th	810	2
Parker/Mississippi	540	2
Taylor Mountain	4260	2
Ralston Reservoir	110	2

Sensors reporting frequently (over reporting):

FirstOfDescription	FirstOfGroup1	Sensor ID	CountOfCount
Quincy Reservoir	Wind Gust	749	6170
Boulder Cr at Broadway	Water Level PT-HSE	4583	4675
Green Ditch	Water Level PT-HSE	4593	4564
Spring Valley Road	Wind Speed Average & Azimuth	2927	4223
Castle Rock	Wind Speed Average & Azimuth	2747	3204
Salisbury Park	Wind Speed Average & Azimuth	2727	3115
Castle Rock	Temperature	2752	3034
Castle Rock	Relative Humidity	2751	2970
Aurora Reservoir	Solar Radiation	908	2927
Castle Rock	Wind Gust	2744	2905
Blue Mountain	Wind Gust	139	2891
Button Rock	Relative Humidity	4791	2886
Blue Mountain	Wind Direction	138	2882
Aurora Reservoir	Barometric Pressure	903	2875

Sensors reporting infrequently (under reporting):

FirstOfDescription	FirstOfGroup1	Sensor ID	CountOfCount
Button Rock Inflow	Longmont Flow Gage	4487	19
Button Rock Lake	Longmont Water Level PT	4483	19
WTG above Conf Pond	Water Level PT-HSE	723	20
Gunbarrel	Water Level PT	1113	21
Hayman	Hayman Precipitation	5780	22
Piney at Liverpool	Water Level PT	953	28
Kelly Dam	Battery Voltage HSE	415	29

1 Hour Peak Intensities > 1.0 inches			
Station	Date	Tips	Inches
4360	5/8/09 13:04	52	2.047
1400	5/23/09 18:06	40	1.575
420	5/25/09 12:47	34	1.339
1550	5/24/09 16:15	33	1.299

General System Analysis

Database Name

P:\A207-UDFCD-Data-Analysis\2009\05-2009\Novastar_extract_2009May.mdb

First Date in Database
Last Date in Database

5/1/09 12:00 AM
5/31/09 11:59 PM

Total Days
Total Hours

31.0
744.0

Total Records Analyzed

326207

Records by Group

Wind Gust	52869	16%
Temperature	47192	14%
Relative Humidity	46400	14%
Water Level PT-HSE	27375	8%
Wind Speed Average & Azimuth	21528	7%
Wind Direction	20625	6%
Barometric Pressure	19023	6%
Precipitation	17115	5%
Wind Speed Average	17016	5%
Solar Radiation	9549	3%
Battery Voltage HSE	7461	2%
Battery Voltage Digital	6610	2%
Water Level Float	5148	2%
Water Level PT	3865	1%
Fuel Moisture	3695	1%
Fuel Temperature	3685	1%
Battery Voltage Analog	3651	1%
Soil Moisture	2812	1%
Longmont Flow Gage	2785	1%
Hayman Precipitation	1264	0%
Wing Gust	732	0%
Battery	680	0%
Repeater Pass List	604	0%
Hayman Battery	523	0%
Repeater Status Report	491	0%
12Hr Status Report	429	0%
Precipitation - Test	236	0%
Battery Voltage	225	0%
Hayman Stage	116	0%
Handar 585 ALARM Status	96	0%
Longmont Water Level PT	19	0%
Precipitation-Old	5	0%
Precipitation-ASCII	2	0%
Unknown IDs	1617	0%
Total	325443	

Records by Major Group

Meteorologic Sensors	234202	72%
Water Level Sensors	39192	12%
Sensor Status Transmissions	19342	6%
Rain Sensors	17117	5%
Soil and Fuel Sensors	10192	3%
Total	320045	

Records by Validation Type

Good	0	324937	99.6%
Questionable	1	1270	0.4%
Total		326207	

Sensors With Most Invalid Data

Description	Sensor	Reports
Hiwan G.C.	2212	82
Hiwan G.C.	2209	78
Hiwan G.C.	2207	65
Quincy Reservoir	755	56
Hiwan G.C.	2211	44

Traffic Loading Summary

Alert Reports	326207	
Average Daily Traffic	10523	
Average Hourly Traffic	438	
Median Hourly Traffic	426	hour beginning
Peak Hourly Traffic	1009	5/25/09 10:00 PM
2nd Max	997	5/24/09 4:00 PM
3rd Max	966	5/25/09 11:00 PM
4th Max	966	5/25/09 9:00 PM
5th Max	949	5/24/09 3:00 PM

Rain Timer Performance

Analyze Rain Sensors

systemwide average (days)

0.5312

84%

Rain ID	Rcv	Interval	Exp	Performance
1350	7	17:56	62	11%
2850	7	23:58	62	11%
2270	20	19:56	62	32%
410	28	22:01	62	45%
540	31	18:52	62	50%
2320	128	3:00	248	52%
2340	33	23:55	62	53%
110	39	13:27	62	63%
870	39	18:48	62	63%
2280	41	15:49	62	66%
2810	43	15:31	62	69%
1480	44	13:17	62	71%
2820	44	14:32	62	71%
1660	46	14:39	62	74%
1710	46	16:27	62	74%
310	47	14:17	62	76%
1570	47	12:58	62	76%
1460	24	0:44	31	77%
4010	48	13:45	62	77%
1050	49	14:03	62	79%
2350	49	14:10	62	79%
4750	49	13:50	62	79%
200	50	14:00	62	81%
1010	50	14:00	62	81%
1500	50	12:59	62	81%
1530	50	14:20	62	81%
2370	50	13:08	62	81%
4170	50	14:12	62	81%
4220	50	14:01	62	81%
4560	50	14:19	62	81%
4570	50	13:42	62	81%
4730	50	12:35	62	81%
4790	50	15:00	62	81%
4850	50	13:56	62	81%
120	51	12:48	62	82%
300	51	13:06	62	82%
650	51	12:49	62	82%
1320	51	13:57	62	82%
1620	51	13:48	62	82%
4130	51	13:29	62	82%
1810	34	20:00	41	83%
420	52	12:45	62	84%
830	52	12:46	62	84%
920	52	12:34	62	84%
1310	52	13:04	62	84%
1330	52	13:21	62	84%
2990	52	12:00	62	84%
4060	52	13:43	62	84%
4240	52	13:11	62	84%
4860	52	11:59	62	84%
700	27	3:36	32	84%
520	53	13:06	62	85%
1060	53	13:06	62	85%
1300	53	12:14	62	85%

1550	53	12:49	62	85%
2310	53	12:31	62	85%
4090	53	13:22	62	85%
4180	53	12:56	62	85%
4470	53	13:30	62	85%
4530	53	12:49	62	85%
100	54	12:47	62	87%
630	54	12:18	62	87%
640	54	12:47	62	87%
710	54	12:44	62	87%
720	54	12:44	62	87%
850	54	12:16	62	87%
900	54	12:18	62	87%
1000	54	12:46	62	87%
1040	54	13:25	62	87%
4190	54	12:02	62	87%
140	55	13:10	62	89%
150	55	12:14	62	89%
220	55	12:32	62	89%
440	55	12:28	62	89%
530	55	12:14	62	89%
600	55	12:43	62	89%
610	55	12:56	62	89%
840	55	13:00	62	89%
940	55	12:31	62	89%
970	55	12:15	62	89%
1440	55	12:48	62	89%
1720	55	12:30	62	89%
2240	55	12:48	62	89%
2250	55	13:03	62	89%
2730	55	12:17	62	89%
4040	55	12:32	62	89%
4080	55	12:46	62	89%
4150	55	12:51	62	89%
4260	55	12:15	62	89%
4810	55	12:49	62	89%
500	56	12:15	62	90%
750	56	12:43	62	90%
810	56	12:13	62	90%
950	56	12:29	62	90%
1020	56	13:03	62	90%
1030	56	12:28	62	90%
1370	56	12:32	62	90%
1520	56	12:16	62	90%
2190	56	12:36	62	90%
2750	56	12:16	62	90%
2840	56	12:16	62	90%
2920	56	12:00	62	90%
2930	56	12:45	62	90%
2940	56	12:16	62	90%
4030	56	11:59	62	90%
4140	56	12:46	62	90%
4490	56	12:45	62	90%
4510	56	13:25	62	90%
4710	56	12:00	62	90%
4770	56	12:34	62	90%
130	57	12:49	62	92%
320	57	12:44	62	92%
730	57	12:47	62	92%

760	57	12:13	62	92%
1630	57	12:57	62	92%
1920	57	12:14	62	92%
2230	57	12:59	62	92%
2710	57	12:16	62	92%
4100	57	12:32	62	92%
4340	57	12:30	62	92%
4350	57	12:14	62	92%
330	58	12:27	62	94%
620	58	12:27	62	94%
860	116	6:07	124	94%
1100	58	12:14	62	94%
1110	58	11:58	62	94%
1340	58	12:15	62	94%
1420	58	12:19	62	94%
1600	58	12:12	62	94%
2260	58	12:13	62	94%
4020	58	12:46	62	94%
4050	58	11:58	62	94%
4070	58	12:28	62	94%
4200	58	12:32	62	94%
4230	58	12:30	62	94%
4360	58	12:28	62	94%
4550	58	11:57	62	94%
4820	58	12:29	62	94%
820	59	12:11	62	95%
1610	59	12:22	62	95%
2330	59	12:42	62	95%
2360	59	12:29	62	95%
4160	59	12:14	62	95%
4250	59	12:13	62	95%
4830	59	12:12	62	95%
4840	59	12:13	62	95%
800	60	11:57	62	97%
1900	60	11:58	62	97%
4110	60	11:59	62	97%
4290	60	12:30	62	97%
4310	60	11:33	62	97%
4270	61	12:32	62	98%
4300	61	11:41	62	98%
4520	61	12:01	62	98%
2220	63	11:34	62	102%
2210	64	11:32	62	103%

Rain Event Performance				Analyze Rain Sensors										
		Reports Received	7,840											
	Systemwide Avg	Total Tips	9,390											
	83.5%	Data Loss	16.51%											
Rain ID	Performance	1-tips	2-tips	3-tips	4-tips	5-tips	6-tips	>6-tips	Rcv	Exp	Miss	Hold	Bucket	
110	26%	12	1	1	0	1	0	1	15	58	43	0	0.0393701	
1350	31%	19	8	2	0	0	0	2	29	94	65	0	0.0393701	
2320	36%	19	9	5	4	2	2	2	41	113	72	0	0.0393701	
2850	40%	12	5	1	2	0	0	2	20	50	30	0	0.0393701	
540	60%	20	12	3	1	1	0	0	37	62	25	0	0.0393701	
4360	63%	84	8	2	2	2	2	2	100	158	58	2	0.0393701	
1810	64%	28	8	3	2	1	0	0	42	66	24	0	0.0393701	
2810	68%	30	9	2	1	1	0	0	43	63	20	0	0.0393701	
1420	69%	37	13	4	0	1	0	0	55	80	25	0	0.0393701	
220	70%	32	9	4	1	0	0	0	46	66	20	0	0.0393701	
1480	72%	29	12	1	1	0	0	0	43	60	17	0	0.0393701	
1600	72%	34	7	4	1	0	0	0	46	64	18	0	0.0393701	
2350	72%	39	12	2	0	0	1	0	54	75	21	0	0.0393701	
1530	72%	46	11	4	0	0	1	0	62	86	24	0	0.0393701	
200	73%	27	7	2	1	0	0	0	37	51	14	0	0.0393701	
330	73%	32	8	2	0	1	0	0	43	59	16	0	0.0393701	
1330	73%	31	10	3	0	0	0	0	44	60	16	0	0.0393701	
300	74%	30	6	1	2	0	0	0	39	53	14	0	0.0393701	
610	74%	37	14	1	1	0	0	0	53	72	19	0	0.0393701	
1550	75%	58	10	3	3	0	0	0	74	99	25	0	0.0393701	
1030	75%	43	5	0	1	1	1	0	51	68	17	0	0.0393701	
1570	75%	44	9	5	0	0	0	0	58	77	19	0	0.0393701	
1500	75%	57	16	3	1	0	0	0	77	102	25	0	0.0393701	
310	76%	37	7	1	2	0	0	0	47	62	15	0	0.0393701	
4140	76%	33	8	3	0	0	0	0	44	58	14	0	0.0393701	
1310	76%	36	10	1	1	0	0	0	48	63	15	0	0.0393701	
1320	76%	39	10	3	0	0	0	0	52	68	16	0	0.0393701	
2360	77%	46	7	2	2	0	0	0	57	74	17	0	0.0393701	
1520	77%	53	12	2	0	1	0	1	68	88	20	0	0.0393701	
600	78%	38	8	3	0	0	0	0	49	63	14	0	0.0393701	
1920	78%	32	8	2	0	0	0	0	42	54	12	0	0.0393701	
1660	78%	31	5	3	0	0	0	0	39	50	11	0	0.0393701	
640	78%	49	11	1	0	1	0	0	62	79	17	0	0.0393701	
2750	79%	34	8	2	0	0	0	0	44	56	12	0	0.0393701	
2370	79%	53	8	2	0	0	1	0	64	81	17	0	0.0393701	
1060	79%	56	13	3	0	0	0	0	72	91	19	0	0.0393701	
1050	79%	49	10	3	0	0	0	0	62	78	16	0	0.0393701	
4470	80%	34	8	0	1	0	0	0	43	54	11	0	0.0393701	
100	80%	40	9	2	0	0	0	0	51	64	13	0	0.0393701	
120	80%	42	9	0	0	1	0	0	52	65	13	0	0.0393701	
320	80%	44	7	1	0	1	0	0	53	66	13	0	0.0393701	
2820	80%	40	6	3	0	0	0	0	49	61	12	0	0.0393701	
1010	81%	48	10	2	0	0	0	0	60	74	14	0	0.0393701	
4010	81%	43	7	1	1	0	0	0	52	64	12	0	0.0393701	
1040	82%	50	6	0	1	1	0	0	58	71	13	0	0.0393701	
140	82%	39	11	0	0	0	0	0	50	61	11	0	0.0393701	
2840	82%	42	6	1	1	0	0	0	50	61	11	0	0.0393701	
4090	82%	45	9	0	1	0	0	0	55	67	12	0	0.0393701	
700	82%	39	5	1	1	0	0	0	46	56	10	0	0.0393701	
1000	82%	42	7	2	0	0	0	0	51	62	11	0	0.0393701	
2310	82%	62	10	3	0	0	0	0	75	91	16	0	0.0393701	
4080	83%	40	6	2	0	0	0	0	48	58	10	0	0.0393701	
2340	83%	45	6	1	1	0	0	0	53	64	11	0	0.0393701	
1460	83%	47	6	1	1	0	0	0	55	66	11	0	0.0393701	
4060	83%	44	11	0	0	0	0	0	55	66	11	0	0.0393701	
4820	83%	42	7	0	1	0	0	0	50	60	10	0	0.0393701	
4750	83%	29	5	1	0	0	0	0	35	42	7	0	0.0393701	
920	84%	59	3	0	0	1	1	0	64	76	12	0	0.0393701	
2230	84%	54	8	2	0	0	0	0	64	76	12	0	0.0393701	
4790	84%	26	6	0	0	0	0	0	32	38	6	0	0.0393701	
840	85%	28	4	1	0	0	0	0	33	39	6	0	0.0393701	
870	85%	27	6	0	0	0	0	0	33	39	6	0	0.0393701	
150	85%	50	11	0	0	0	0	0	61	72	11	0	0.0393701	
800	85%	33	5	1	0	0	0	0	39	46	7	0	0.0393701	
2730	85%	32	7	0	0	0	0	0	39	46	7	0	0.0393701	
4150	85%	49	8	1	0	0	0	0	58	68	10	0	0.0393701	
2270	85%	46	5	2	0	0	0	0	53	62	9	0	0.0393701	
4220	86%	60	10	1	0	0	0	0	71	83	12	0	0.0393701	
1370	86%	67	8	1	1	0	0	0	77	90	13	0	0.0393701	
1340	86%	67	11	1	0	0	0	0	79	92	13	0	0.0393701	
1710	86%	33	4	1	0	0	0	0	38	44	6	0	0.0393701	
650	87%	51	7	1	0	0	0	0	59	68	9	0	0.0393701	
520	87%	57	8	1	0	0	0	0	66	76	10	0	0.0393701	

4240	87%	48	2	3	0	0	0	0	53	61	8	0	0.0393701
4810	87%	47	4	2	0	0	0	0	53	61	8	0	0.0393701
4040	88%	50	6	1	0	0	0	0	57	65	8	0	0.0393701
4570	88%	44	7	0	0	0	0	0	51	58	7	0	0.0393701
4730	88%	39	4	1	0	0	0	0	44	50	6	0	0.0393701
810	88%	33	3	1	0	0	0	0	37	42	5	0	0.0393701
4130	88%	46	5	1	0	0	0	0	52	59	7	0	0.0393701
530	88%	55	4	0	0	1	0	0	60	68	8	0	0.0393701
2280	88%	61	7	1	0	0	0	0	69	78	9	0	0.0393701
1620	89%	62	9	0	0	0	0	0	71	80	9	0	0.0393701
4710	89%	63	9	0	0	0	0	0	72	81	9	0	0.0393701
940	89%	50	5	1	0	0	0	0	56	63	7	0	0.0393699
440	89%	37	3	1	0	0	0	0	41	46	5	0	0.0393701
850	89%	36	5	0	0	0	0	0	41	46	5	0	0.0393701
630	89%	103	10	2	0	0	0	0	115	129	14	0	0.0393701
2710	89%	66	7	1	0	0	0	0	74	83	9	0	0.0393701
410	89%	29	4	0	0	0	0	0	33	37	4	0	0.0393701
830	89%	29	4	0	0	0	0	0	33	37	4	0	0.0393701
820	89%	30	4	0	0	0	0	0	34	38	4	0	0.0393701
4530	90%	53	7	0	0	0	0	0	60	67	7	0	0.0393701
4170	90%	39	3	1	0	0	0	0	43	48	5	0	0.0393701
500	90%	61	8	0	0	0	0	0	69	77	8	0	0.0393701
4250	90%	39	5	0	0	0	0	0	44	49	5	0	0.0393701
2940	90%	49	3	0	1	0	0	0	53	59	6	0	0.0393701
4050	90%	40	5	0	0	0	0	0	45	50	5	0	0.0393701
4180	90%	58	5	1	0	0	0	0	64	71	7	0	0.0393701
720	90%	25	3	0	0	0	0	0	28	31	3	0	0.0393701
620	91%	64	5	1	0	0	0	0	70	77	7	0	0.0393701
4110	91%	55	4	1	0	0	0	0	60	66	6	0	0.0393701
1900	91%	45	5	0	0	0	0	0	50	55	5	0	0.0393701
1110	91%	27	3	0	0	0	0	0	30	33	3	0	0.0393701
2330	91%	55	6	0	0	0	0	0	61	67	6	0	0.0393701
4510	91%	46	5	0	0	0	0	0	51	56	5	0	0.0393701
4270	91%	66	5	1	0	0	0	0	72	79	7	0	0.0393701
760	92%	30	3	0	0	0	0	0	33	36	3	0	0.0393701
4840	92%	53	5	0	0	0	0	0	58	63	5	0	0.0393701
4830	92%	44	2	1	0	0	0	0	47	51	4	0	0.0393701
4290	92%	45	4	0	0	0	0	0	49	53	4	0	0.0393701
420	93%	127	11	0	0	0	0	0	138	149	11	0	0.0393701
4020	93%	60	5	0	0	0	0	0	65	70	5	0	0.0393701
4200	93%	48	4	0	0	0	0	0	52	56	4	0	0.0393701
4190	93%	62	5	0	0	0	0	0	67	72	5	0	0.0393701
4230	93%	50	4	0	0	0	0	0	54	58	4	0	0.0393701
900	93%	53	2	1	0	0	0	0	56	60	4	0	0.0393699
2260	93%	53	4	0	0	0	0	0	57	61	4	0	0.0393701
4310	93%	40	3	0	0	0	0	0	43	46	3	0	0.0393701
2920	94%	47	3	0	0	0	0	0	50	53	3	0	0.0393701
4300	94%	48	1	1	0	0	0	0	50	53	3	0	0.0393701
950	94%	48	3	0	0	0	0	0	51	54	3	0	0.0393701
2250	95%	68	2	1	0	0	0	0	71	75	4	0	0.0393701
4070	95%	67	4	0	0	0	0	0	71	75	4	0	0.0393701
1720	95%	71	2	1	0	0	0	0	74	78	4	1	0.0393701
2990	95%	53	3	0	0	0	0	0	56	59	3	0	0.0393701
1100	95%	54	3	0	0	0	0	0	57	60	3	0	0.0393701
730	95%	40	2	0	0	0	0	0	42	44	2	0	0.0393701
970	95%	40	2	0	0	0	0	0	42	44	2	0	0.0393701
2190	96%	63	3	0	0	0	0	0	66	69	3	0	0.0393701
2240	96%	68	3	0	0	0	0	0	71	74	3	0	0.0393701
1440	96%	26	1	0	0	0	0	0	27	28	1	0	0.0393701
4770	96%	53	2	0	0	0	0	0	55	57	2	0	0.0393701
4030	97%	61	2	0	0	0	0	0	63	65	2	0	0.0393701
710	98%	39	1	0	0	0	0	0	40	41	1	0	0.0393701
2930	98%	42	1	0	0	0	0	0	43	44	1	0	0.0393701
4490	98%	49	1	0	0	0	0	0	50	51	1	0	0.0393701
4350	98%	52	1	0	0	0	0	0	53	54	1	1	0.0393701
4520	98%	52	1	0	0	0	0	0	53	54	1	1	0.0393701
4100	98%	56	1	0	0	0	0	0	57	58	1	0	0.0393701
4550	98%	56	1	0	0	0	0	0	57	58	1	0	0.0393701
2210	99%	74	1	0	0	0	0	0	75	76	1	0	0.0393701
4160	100%	57	0	0	0	0	0	0	57	57	0	0	0.0393701
4260	100%	57	0	0	0	0	0	0	57	57	0	0	0.0393701
4340	100%	53	0	0	0	0	0	0	53	53	0	0	0.0393701
750	100%	32	0	0	0	0	0	0	32	32	0	0	0.0393701
860	100%	21	0	0	0	0	0	0	21	21	0	0	0.0393701
1300	100%	15	0	0	0	0	0	0	15	15	0	0	0.0393701
Total Tips		6,759	866	148	40	18	9	10	7,840	9,390	1,550	5	

Monthly Traffic Loading

