

# Memo



**Date:** April 13, 2017  
**To:** Kevin Stewart  
**From:** Markus Ritsch  
**Subject:** March 2017 ALERT Data Analysis

## I. ALERT Data Source

Raw ALERT data records extracted from the Urban Drainage and Flood Control District's NovaStar 5 base station were analyzed for the period March 1 through March 31, 2017.

## II. General System Analysis Summary

The District receives data through both the legacy ALERT channel and through the ALERT2 (concentrator plus A2 self-reports) channel. The following (Table 1) quantifies the data reports received by each channel.

**Table 1. Reception of Data at Diamond Hill (Legacy, ALERT2 and Concentrator Reports from Recdatalog)**

| Month        | Jan            | Feb              | Mar              | Apr      | May      | Jun      | Jul      | Aug      | Sep      | Oct      | Nov      | Dec      | Tot              |
|--------------|----------------|------------------|------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|------------------|
| Legacy       | 234,074        | 212,539          | 255,638          |          |          |          |          |          |          |          |          |          | 702,251          |
| Concentrator | 361,187        | 367,684          | 388,156          |          |          |          |          |          |          |          |          |          | 1,117,027        |
| ALERT2       | 327,977        | 422,710          | 422,580          |          |          |          |          |          |          |          |          |          | 1,173,267        |
| <b>TOTAL</b> | <b>923,238</b> | <b>1,002,933</b> | <b>1,066,374</b> | <b>0</b> | <b>0</b> | <b>0</b> | <b>0</b> | <b>0</b> | <b>0</b> | <b>0</b> | <b>0</b> | <b>0</b> | <b>2,992,545</b> |
| Conc/Leg     | 1.54           | 1.73             | 1.52             | 0.00     | 0.00     | 0.00     | 0.00     | 0.00     | 0.00     | 0.00     | 0.00     | 0.00     | 1.59             |
| DataChron    | 668,091        | 637,926          | 741,413          |          |          |          |          |          |          |          |          |          | 2,047,430        |

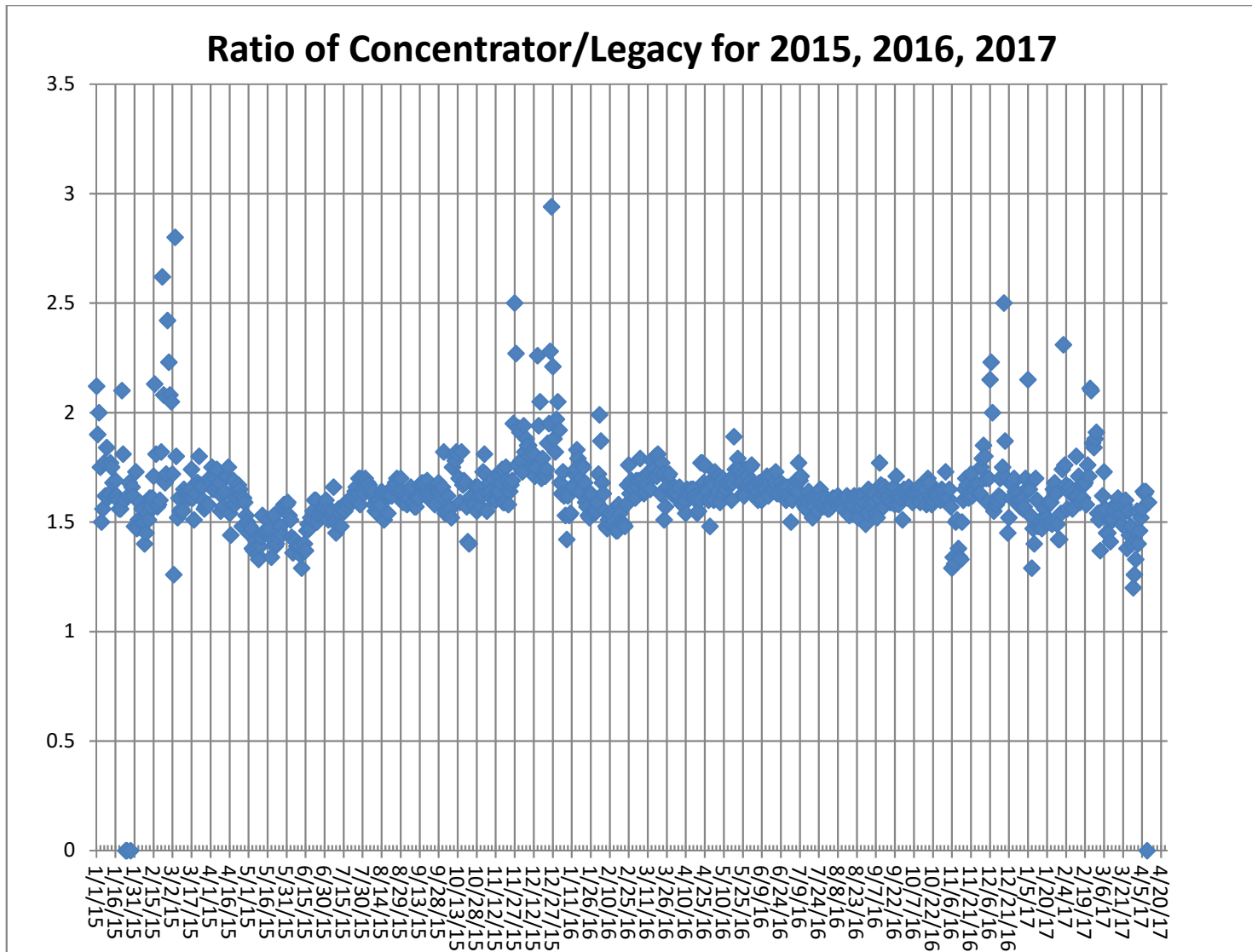
The District operates two NovaStar5 base stations: the primary (ns5a) at Diamond Hill and a redundant base (ns5b) at Greenhouse Data. Additional analyses are conducted on the data received by these two base stations (Table 2). The data received by both base stations for the month are shown below.

**Table 2. Comparison of Data Reception by ns5a and ns5b**

| NS5A (Diamond Hill)      | Jan     | Feb                        | Mar     | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Tot       |
|--------------------------|---------|----------------------------|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------|
| Legacy                   | 234,074 | 212,539                    | 255,638 |     |     |     |     |     |     |     |     |     | 702,251   |
| Concentrator             | 361,187 | 367,684                    | 388,156 |     |     |     |     |     |     |     |     |     | 1,117,027 |
| ALERT2                   | 327,977 | 422,710                    | 422,580 |     |     |     |     |     |     |     |     |     | 1,173,267 |
| <b>NS5B (Greenhouse)</b> |         |                            |         |     |     |     |     |     |     |     |     |     |           |
| Legacy                   | 234,037 | 211,806                    | 255,357 |     |     |     |     |     |     |     |     |     | 701,200   |
| Concentrator             | 360,898 | 364,788                    | 387,844 |     |     |     |     |     |     |     |     |     | 1,113,530 |
| ALERT2                   | 327,807 | 419,042                    | 422,268 |     |     |     |     |     |     |     |     |     | 1,169,117 |
| <b>Diff (NS5a-NS5b)</b>  |         |                            |         |     |     |     |     |     |     |     |     |     |           |
| Legacy (Digi One)        | 37      | 733                        | 281     | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 1,051     |
| Concentrator (B2010)     | 289     | 2,896                      | 312     | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 3,497     |
| ALERT2 (B2010)           | 170     | 3,668                      | 312     | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 4,150     |
| Comments                 |         | GH Network outage on Feb 8 |         |     |     |     |     |     |     |     |     |     |           |

The reception rates between Diamond Hill and Greenhouse are consistent. Differences are likely due to the IP network feed between the ALERT2 decoder and the Diamond Hill base (which resides in Denver) and the Greenhouse base (which resides in Wyoming).

The daily ratio of concentrator to legacy reports is shown.



**Figure 1. Daily Ratio of Concentrator Reports to Legacy Reports**

The ratio becomes more volatile in the cold months as the Blue Mountain repeater has problems with legacy ALERT reporting when the temperature drops below zero. The ratio stays very consistent all the way through October in 2016 which may be due to the fact the air temperatures were relatively warm throughout the fall. The ratio seems a bit volatile in February and March of 2017.

## A. Continuous Operation of Base Receiver/Decoder

The base station was not in continuous operation for the entire month. Data was collected on a continuous basis for a total of 743 hours of operation. On March 12, the base missed one hour of data due to the change to day light savings time. Outages of less than one hour are not identified.

## B. Specific Issues Identified

Performance of the following sensors (Table 3) was questionable this month.

**Table 3. Sensors with Poor Performance Characteristics**

| Sensor ID | Description                   | Comments  |
|-----------|-------------------------------|---|
| 2790      | W. Cherry Creek - WX          | Poor timer and poor event performance                 |
| 1620      | Slaughterhouse gulch          | Poor event performance, missing rain tips on March 24 |
| 2940      | Willow Creek                  | Poor event performance                                |
| 3020      | West Creek WX                 | ALERT2 station with drifting clock (negative latency) |
| 3040      | E. Cherry Cr. Russellville Rd | Transmitting unknown IDs 3044 and 3047                |
| 0, 1, 2   | Unknown                       | Unknown IDS transmitted on legacy ALERT               |
| 2270      | Cub Cr. Below Blue            | Unknown IDs 2271 and 2272                             |
| 410       | Kelly Dam                     | Unknown ID 409 possibly from this site                |
| 410       | Kelly Dam                     | Large number of invalid reports this month            |

## C. ALERT2 Repeater Loading

The District's ALERT2 architecture utilizes 5 repeaters with a single transmit frequency (170.300 MHz) to Diamond Hill. The repeaters utilize a 20 second frame where each repeater is allocated a slot of specific size and an offset within the frame. The slot allocated to each repeater is sized appropriately to accommodate the total number of existing and future remote sites routed through that repeater. Each repeater is shown along with its designated slot (Table 4). Currently there is no pass-listing for the ALERT2 repeaters. Any remote ALERT2 site can be received by all repeaters and re-broadcast to the base except for West Creek which has an input frequency unique to Douglas County.

**Table 4. ALERT2 Repeater Architecture**

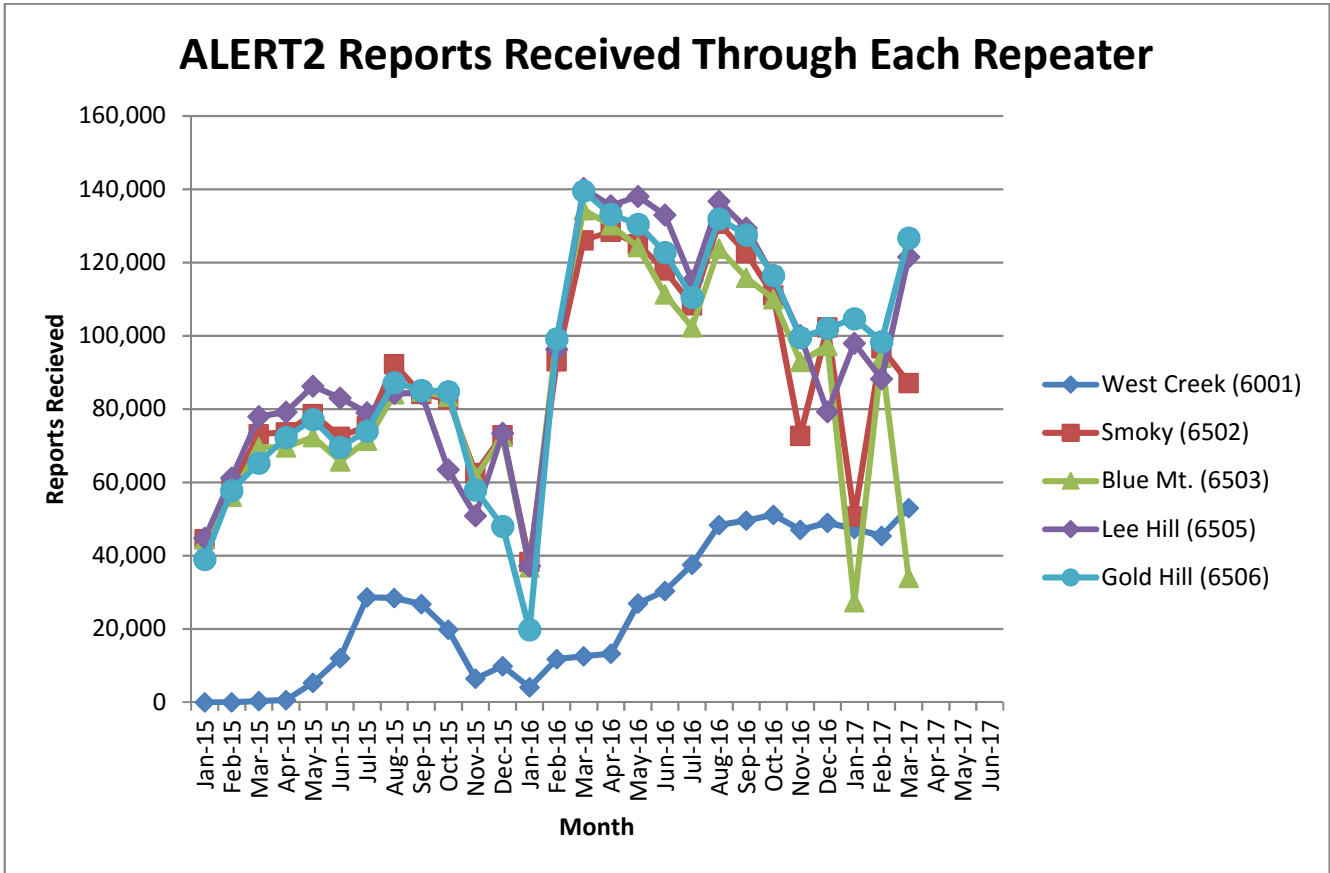
| Repeater   | Slot Size (sec) | Slot Offset (sec) | Source Address | ALERT2 Input Frequency (MHz) | ALERT2 Output Frequency (MHz) – received at Diamond Hill |
|------------|-----------------|-------------------|----------------|------------------------------|--|
| West Creek | 2               | 0                 | 6001           | 169.425                      | 170.300  |
| Smoky      | 3               | 2                 | 6502           | 169.525                      | 170.300  |
| Blue Mt.   | 4               | 5                 | 6503           | 169.525                      | 170.300  |
| Lee Hill   | 3               | 9                 | 6505           | 169.525                      | 170.300  |
| Gold Hill  | 3               | 12                | 6506           | 169.525                      | 170.300  |
| Magnolia   | 5               | 15                | 6507           |                              | 170.300  |
| Frame Size | 20              |                   |                |                              |  |

The following tables summarize the total number of reports received through each repeater (Table 5). This helps to quantify repeater loading for the ALERT2 backbone.

**Table 5. ALERT2 Reports Received through Each Repeater (Only A2 Self Reports)**

| Month-Yr | West Creek<br>(6001) | Smoky<br>(6502) | Blue Mt.<br>(6503) | Lee Hill<br>(6505) | Gold Hill<br>(6506) | TOTAL   |
|----------|----------------------|-----------------|--------------------|--------------------|---------------------|---------|
| Jan-15   | 0                    | 44,501          | 44,636             | 44,783             | 39,007              | 172,927 |
| Feb-15   | 0                    | 58,543          | 56,150             | 61,160             | 57,764              | 233,617 |
| Mar-15   | 346                  | 73,198          | 69,604             | 77,968             | 65,323              | 286,439 |
| Apr-15   | 595                  | 73,711          | 69,568             | 79,215             | 72,310              | 295,399 |
| May-15   | 5,259                | 78,694          | 72,340             | 86,297             | 77,174              | 319,764 |
| June-15  | 11,987               | 72,449          | 65,742             | 82,998             | 69,570              | 302,746 |
| July-15  | 28,595               | 75,379          | 71,394             | 79,026             | 74,041              | 328,435 |
| Aug-15   | 28,409               | 92,299          | 84,057             | 84,363             | 87,211              | 376,339 |
| Sep-15   | 26,809               | 84,143          | 84,776             | 84,289             | 85,123              | 365,140 |
| Oct-15   | 19,775               | 82,683          | 83,390             | 63,475**           | 84,825              | 334,148 |
| Nov-15   | 6,438                | 62,615          | 61,477             | 50,888             | 58,004              | 239,422 |
| Dec-15   | 9,835                | 72,886          | 72,465             | 73,431             | 47,996              | 276,613 |
| Jan-16   | 4,034                | 38,348          | 36,826             | 37,168             | 19,768              | 138,160 |
| Feb-16   | 11,732               | 93,120          | 99,206             | 96,284             | 99,188              | 399,530 |
| Mar-16   | 12,533               | 126,123         | 134,329            | 140,226            | 139,536             | 552,747 |
| Apr-16   | 13,262               | 128,473         | 130,223            | 135,499            | 133,197             | 540,654 |
| May-16   | 27,002               | 125,098         | 124,280            | 138,033            | 130,513             | 544,926 |
| Jun-16   | 30,405               | 117,877         | 111,309            | 133,036            | 122,798             | 515,425 |
| Jul-16   | 37,492               | 108,334         | 102,335            | 115,028            | 110,577             | 473,766 |
| Aug-16   | 48,323               | 130,666         | 123,827            | 136,746            | 131,957             | 571,519 |
| Sep-16   | 49,555               | 122,625         | 115,898            | 129,454            | 127,606             | 545,138 |
| Oct-16   | 51,170               | 111,105         | 110,038            | 116,087            | 116,489             | 504,889 |
| Nov-2016 | 47,039               | 72,761          | 92,941             | 100,083            | 99,508              | 412,332 |
| Dec-2016 | 48,946               | 102,329         | 97,321             | 79,274             | 102,097             | 429,967 |
| Jan-2017 | 47,286               | 50,748**        | 27,307**           | 97,947             | 104,689             | 327,977 |
| Feb-2017 | 45,366               | 96,629          | 94,065             | 88,239             | 98,411              | 422,710 |
| Mar-2017 | 53,021               | 87,160**        | 33,983**           | 121,578            | 126,722             | 422,464 |

\*\* - The number of reports coming through these repeaters declined significantly



**Figure 2. Reports received through each repeater (ALERT2 Only)**

A convenient mechanism to track repeater performance throughout the year is to monitor total ALERT2 reports passed by each repeater. In general, each of the primary repeaters in the District process an equivalent number of ALERT2 reports because pass/block filtering is not being used. Several months are evident where the throughput of one repeater is not consistent with the other three.

In January of 2017 the ALERT2 reports received through Blue Mountain and through Smoky Hill showed a significant decrease. There may be a problem at these repeaters or it is possible that pass/block lists have been implemented.

In March of 2017 the ALERT2 reports received through Blue Mountain and through Smoky Hill showed a significant decrease. There may be a problem at these repeaters or it is possible that pass/block lists have been implemented.

The following tables summarize the system-wide latency of ALERT2 self-reports (Table 6 and Table 7).

**Table 6. System-Wide Latency of ALERT2 Self-Reports (seconds)**

| Statistical Parameter | Value (sec) | Comments   |
|-----------------------|-------------|--|
| Mean                  | 55.86       | The average time it took a report from the field to reach the base     |
| Minimum               | -23         | The minimum time it took for a report to go from the field to the base |
| Maximum               | 43,177      | The maximum time it took for a report to go from the field to the base |

**Table 7. Summary of ALERT2 System-Wide Latency (seconds)**

| Statistical Parameter    | Jan  | Feb    | Mar    | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|--------------------------|------|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Mean                     | 53.1 | 51.39  | 55.86  |     |     |     |     |     |     |     |     |     |
| Minimum                  | -29  | -23    | -23    |     |     |     |     |     |     |     |     |     |
| Maximum                  | 286  | 12,946 | 43,177 |     |     |     |     |     |     |     |     |     |
| Station with Max Latency |      |        |        |     |     |     |     |     |     |     |     |     |

The negative latencies are observed only from the station West Creek WX. This is a HydroLynx transmitter. It is likely that the clock on this transmitter is drifting badly. WET will service the transmitter in April when access to the site is open. The large positive latency is also from the West Creek WX.

The West Creek Repeater (6001) experienced a significant clock drift beginning on March 28, extending through March 29. WET field staff did manage to visit the repeater on March 29 to reset the repeater clock.

## **D. Rain Sensor Timer Reporting Summary**

The following analysis assumes that each legacy rain sensor has a 12-hour timer-reporting interval and each A2 rain sensor has a 1-hour timer-reporting interval. The worst performing rain sensors for the month are summarized (Table 8).

**Table 8. Monthly Summary of Sensors with Poor Timer Performance (Sensor ID)**

| Jan*   | Feb* | Mar*   | Apr | May | Jun | Jul | Aug | Sep | Oct* | Nov* | Dec* |
|--------|------|--------|-----|-----|-----|-----|-----|-----|------|------|------|
| 2790   | 2790 | 4470   |     |     |     |     |     |     |      |      |      |
| 5720   | 4100 | 100150 |     |     |     |     |     |     |      |      |      |
| 4510   | 4330 | 2360   |     |     |     |     |     |     |      |      |      |
| 100260 | 4040 | 2970   |     |     |     |     |     |     |      |      |      |
| 4870   | 4270 | 2270   |     |     |     |     |     |     |      |      |      |
| 5940   | 4510 | 2350   |     |     |     |     |     |     |      |      |      |

\*- Only sensors that operate year-round (weather stations and stations in Boulder County) are included for the analysis in these months.

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.

## **III. 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 9). For the months of January, February, March, October, November and December only the stations that operate year-round are included in the rain event analysis. These stations include all weather stations and the stations in Boulder County.

**Table 9. District-Wide Total Tip/Count Statistical Summary**

| Statistical Parameter                        | Value | Comments   |
|--|-------|--|
| Mean   | 27.7  | Only the 1-mm rain sensors were included in the analysis |
| Median                                       | 29    | Only the 1-mm rain sensors were included in the analysis |
| Standard deviation                           | 11.4  | Only the 1-mm rain sensors were included in the analysis |
| Mean plus three standard deviations          | 62.0  | Only the 1-mm rain sensors were included in the analysis |
| Mean minus two standard deviations           | 4.8   | Only the 1-mm rain sensors were included in the analysis |
| Minimum total count                          | 1     | Flying J (850)   |
| Maximum total count                          | 55    | Genesee Village (2310)                                   |
| Sensors showing <b>NO</b> rain for the month |       |  |
| Sensors greater than 3 SD (over reporting)   |       | None   |

## B. Monthly Average Tip/Count Summary

A monthly summary of the District-wide mean total tip/count is presented (Table 10).

**Table 10. 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       | <b>24.19</b> |
| 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       | <b>29.00</b> |
| 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        | <b>25.08</b> |
| 2009       | 6.33        | 3.11         | 11.37        | 59.26        | 63.45        | 68.00        | 65.00        | 20.00        | 27.29        | 30.24        | 11.00       | 5.60        | <b>30.89</b> |
| 2010       | 5.97        | 11.90        | 32.54        | 70.57        | 39.63        | 56.04        | 50.23        | 31.01        | 4.18         | 18.31        | 8.30        | 3.31        | <b>27.67</b> |
| 2011       | 6.78        | 7.45         | 7.54         | 33.94        | 92.68        | 39.42        | 90.87        | 18.25        | 37.67        | 25.73        | 10.41       | 13.59       | <b>32.03</b> |
| 2012       | 4.89        | 13.57        | 2.35         | 30.17        | 38.97        | 19.35        | 73.03        | 11.31        | 48.81        | 22.32        | 2.98        | 4.18        | <b>22.66</b> |
| 2013       | 2.96        | 14.31        | 21.86        | 35.96        | 45.87        | 16.39        | 52.33        | 50.63        | 229.74       | 29.64        | 5.86        | 4.00        | <b>42.46</b> |
| 2014       | 6.88        | 11.86        | 25.91        | 29.30        | 77.30        | 29.16        | 99.73        | 43.59        | 50.96        | 29.26        | 13.36       | 8.11        | <b>35.45</b> |
| 2015       | 9.88        | 24.42        | 20.78        | 69.75        | 143.07       | 86.93        | 54.59        | 29.95        | 7.16         | 53.28        | 22.08       | 10.80       | <b>44.39</b> |
| 2016       | 4.68        | 9.91         | 32.30        | 52.10        | 49.40        | 40.50        | 24.20        | 31.00        | 8.86         | 7.51         | 8.56        | 8.74        | <b>23.23</b> |
| 2017       | 13.3        | 5.84         | 27.70        |              |              |              |              |              |              |              |             |             |              |
| <b>Ave</b> | <b>6.83</b> | <b>10.09</b> | <b>20.23</b> | <b>44.28</b> | <b>62.99</b> | <b>37.41</b> | <b>57.88</b> | <b>38.11</b> | <b>45.32</b> | <b>27.86</b> | <b>8.81</b> | <b>8.66</b> | <b>30.64</b> |

\*- Only sensors that operate year-round (weather stations and stations in Boulder County) are included for the analysis in these months.

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

Several sensors experienced a large jump in the sequential tip count (Table 11).

**Table 11. Sensors with a Jump of 6 or More in Sequential Count**

| Sensor Description   | Sensor ID | Comment                                  |
|----------------------|-----------|--|
| Genesee Village      | 2310      | Spring turn-on/maintenance               |
| Slaughterhouse Gulch | 1620      | Missed rain tips the morning of March 24 |
|                      |           |  |

## D. Sensor-by-Sensor Incrementing Count Summary

The system-wide reception rate of incrementing, 1-mm tip reports for the month was approximately 92.6 percent. A total of 4,996 incrementing reports were received and a total of 5,393 reports were expected. The total loss of incrementing reports for the month was approximately 7 percent. Those sensors with the worst event transmission performance are summarized (Table 12).

**Table 12. Monthly Summary of Sensors with the Worst Performance**

| Jan* | Feb*   | Mar* | Apr | May | Jun | Jul | Aug | Sep | Oct* | Nov* | Dec* |
|------|--------|------|-----|-----|-----|-----|-----|-----|------|------|------|
| 2790 | 4330   | 2790 |     |     |     |     |     |     |      |      |      |
| 4870 | 750    | 1620 |     |     |     |     |     |     |      |      |      |
| 1920 | 2790   | 2940 |     |     |     |     |     |     |      |      |      |
| 3010 | 100260 | 2750 |     |     |     |     |     |     |      |      |      |
| 4510 | 4270   | 2980 |     |     |     |     |     |     |      |      |      |
| 4330 | 4490   | 5900 |     |     |     |     |     |     |      |      |      |

\*-Only sensors that are operational year-round (weather stations and stations in Boulder County) are included for the analysis in these months.

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.



## IV. 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 13).

**Table 13. Summary of Unknown IDs**

| Description  | Concentrator | Legacy  | A2      |
|--|--------------|---------|---------|
| Total number of unknown IDs (IDs without a device definition)    | 438          | 421     | 0       |
| Total reports from unknown IDs                                   | 1,207        | 1,361   | 0       |
| Unknown IDs with only a single received report (potential noise) | 229          | 224     | 0       |
| Total reports from all IDs – RecData Log entire month            | 388,156      | 255,638 | 422,580 |
| Unknown reports as a fraction of total reports                   | 0.31%        | 0.53%   | 0%      |

The total number of reports from unknown sensors is very small relative to the total reports received for the month. Shown below (Table 14) are the total reports received from unknown sensor IDs for each month of the year.

**Table 14. Monthly Summary of Total Reports from Unknown IDs (Concentrator)**

| Year | Jan    | Feb   | Mar   | Apr   | May    | Jun    | Jul   | Aug   | Sep   | Oct   | Nov    | Dec   |
|------|--------|-------|-------|-------|--------|--------|-------|-------|-------|-------|--------|-------|
| 2010 | 1,220  | 1,474 | 1,276 | 1,174 | 721    | 5,707  | 610   | 1,738 | 442   | 533   | 2,857  | 6,396 |
| 2011 | 1,231  | 2,165 | 3,065 | 1,254 | 2,051  | 439    | 489   | 456   | 191   | 683   | 747    | 861   |
| 2012 | 692    | 750   | 1,575 | 977   | 5,469  | 11,016 | 453   | 683   | 774   | 2,657 | 3,854  | 5,466 |
| 2013 | 4,265  | 994   | 1,100 | 2,589 | 3,623  | 6,973  | 5,230 | 1,070 | 4,429 | 781   | 13,459 | 1,213 |
| 2014 | 870    | 4,284 | 2,399 | 2,104 | 25,746 | 1,832  | 3,983 | 268   | 369   | 448   | 470    | 1,099 |
| 2015 | 542    | 9,137 | 1,524 | 1,007 | 946    | 699    | 1,179 | 1,860 | 1,153 | 1,063 | 600    | 619   |
| 2016 | 323    | 1,241 | 3,085 | 3,586 | 1,268  | 945    | 1,408 | 2,029 | 1,413 | 753   | 617    | 879   |
| 2017 | 11,875 | 844   | 1,207 |       |        |        |       |       |       |       |        |       |

The fraction of reports from unknown sensors relative to the total number of reports is shown below (Table 15).

**Table 15. Monthly Percent of Unknown Sensor Reports (Concentrator)**

| Year | Jan   | Feb   | Mar   | Apr   | May   | Jun   | Jul   | Aug   | Sep   | Oct   | Nov   | Dec   |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 2010 | 0.42% | 0.56% | 0.38% | 0.32% | 0.20% | 1.61% | 0.17% | 0.49% | 0.13% | 0.16% | 0.93% | 1.88% |
| 2011 | 0.39% | 0.73% | 0.90% | 0.37% | 0.58% | 0.12% | 0.12% | 0.05% | 0.12% | 0.18% | 0.22% | 0.26% |
| 2012 | 0.30% | 0.25% | 0.43% | 0.26% | 1.37% | 2.74% | 0.11% | 0.18% | 0.20% | 0.72% | 1.15% | 1.62% |
| 2013 | 1.40% | 0.31% | 0.29% | 0.60% | 0.37% | 0.61% | 0.82% | 0.21% | 0.96% | 0.31% | 5.37% | 0.23% |
| 2014 | 0.14% | 0.94% | 0.40% | 0.34% | 3.95% | 0.34% | 0.66% | 0.03% | 0.03% | 0.07% | 0.11% | 0.26% |
| 2015 | 0.15% | 2.25% | 0.34% | 0.22% | 0.19% | 0.14% | 0.26% | 0.42% | 0.29% | 0.24% | 0.15% | 0.15% |
| 2016 | 0.10% | 0.30% | 0.69% | 0.82% | 0.28% | 0.22% | 0.33% | 0.50% | 0.36% | 0.18% | 0.17% | 0.22% |
| 2017 | 3.29% | 0.23% | 0.31% |       |       |       |       |       |       |       |       |       |

Any month shaded in yellow has an excessive number of reports from unknown sensors.

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 16).

**Table 16. Reports Received by Unknown IDs**

| Concentrator |         | Legacy ALERT |           | Comment                             |
|--------------|---------|--------------|-----------|-------------------------------------|
| Unknown ID   | Reports | Unknown ID   | Reports   |                                     |
| 409          | 41      | 0,1,2        | 136,62,62 | Legacy reports for IDs 0, 1, 2 only |
| 3044         | 37      | 409          | 41        |                                     |
| 3047         | 35      | 2271         | 36        |                                     |
| 2271         | 32      | 1470         | 33        |                                     |
| 1470         | 31      | 2272         | 33        |                                     |
| 2272         | 29      | 2274         | 29        |                                     |

## V. Sensors with Invalid Reports

The sensors below (Table 17 and Table 18) have the largest number of invalid decodes as determined by the validation process defined at the District NovaStar5 base station. These invalid reports may indicate poor radio paths (bit flip/contention errors/random decode) or validation criteria that do not match the physical installation at the site.

**Table 17. Rain Sensors with the Most Invalid Reports**

| Sensor ID               | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1530-Bear Cr. At Lowell | 9   | 11  | 8   |     |     |     |     |     |     |     |     |     |
| 2810-Pine Cliff Rd.     | 41  | 32  | 9   |     |     |     |     |     |     |     |     |     |
| 3010-Wx-EPC @ 105       | 6   | 7   | 2   |     |     |     |     |     |     |     |     |     |
| 3050-E/W Trailhead      | 23  | 18  | 7   |     |     |     |     |     |     |     |     |     |
| 4030-Red Garden         | --  | 10  | 5   |     |     |     |     |     |     |     |     |     |
| 4240-Sunset             | --  | 9   | 5   |     |     |     |     |     |     |     |     |     |
| 4790-Wx-Button Rock     | --  | --  | 5   |     |     |     |     |     |     |     |     |     |

**Table 18. Level Sensors with the Most Invalid Reports**

| <b>Sensor ID</b>                    | <b>Jan</b> | <b>Feb</b> | <b>Mar</b> | <b>Apr</b> | <b>May</b> | <b>Jun</b> | <b>Jul</b> | <b>Aug</b> | <b>Sep</b> | <b>Oct</b> | <b>Nov</b> | <b>Dec</b> |
|-------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 413-Kelly Dam                       | --         | --         | 43         |            |            |            |            |            |            |            |            |            |
| 213-Leyden Confluence               | --         | --         | 17         |            |            |            |            |            |            |            |            |            |
| 723-WTG above Conf Pond             | --         | 8          | 0          |            |            |            |            |            |            |            |            |            |
| 1483-Third Creek at DIA             | --         | 8          | 4          |            |            |            |            |            |            |            |            |            |
| 1523-Marston Lake North             | 10         | 8          | 11         |            |            |            |            |            |            |            |            |            |
| 1649-SPR at 19 <sup>th</sup> Street | 152        | --         | 1          |            |            |            |            |            |            |            |            |            |
| 2813-Pine Cliff Road                | 16         | 12         | 11         |            |            |            |            |            |            |            |            |            |
| 3013-EPC@Hwy 105                    | 3          | --         | 4          |            |            |            |            |            |            |            |            |            |
| 4383-Eldorado Springs               | 16         | 2          | 2          |            |            |            |            |            |            |            |            |            |
| 4593-Green Ditch                    | --         | --         | 16         |            |            |            |            |            |            |            |            |            |

## VI. Rainfall Alarms and Intensity Analysis

The following rainfall rate alarms from the Urban Drainage and Flood Control District NovaStar 5.0 Web Server were identified this month.

---

| Sensor | Name                                | Alarm Trigger                                       | Date/Time       |
|--------|-------------------------------------|---|-----------------|
| 2970   | Rampart Range Road Precipitation-DG | 2970 Rampart Range Road 0.2" in 30 Minutes Rainfall | 3/24/2016 12:15 |

# General System Analysis

**Database Name** C:\A207-UDFCD Data Analysis\2017\03-2017\ALL\_DATA.mdb

|                               |                  |                    |       |
|-------------------------------|------------------|--------------------|-------|
| <b>First Date in Database</b> | 2/28/17 11:59 PM | <b>Total Days</b>  | 31.0  |
| <b>Last Date in Database</b>  | 3/31/17 11:59 PM | <b>Total Hours</b> | 744.0 |

Summarize

**Total Records Analyzed** 388,156

| Records by Group        | Concentrator   | Percent       | Legacy         | Percent       | ALERT2         | Percent       |
|-------------------------|----------------|---------------|----------------|---------------|----------------|---------------|
| Wind Data               | 161,114        | 41.5%         | 91,147         | 35.7%         | 143,519        | 34.0%         |
| Temperature             | 61,954         | 16.0%         | 37,206         | 14.6%         | 65,579         | 15.5%         |
| Relative Humidity       | 54,141         | 13.9%         | 36,390         | 14.2%         | 62,560         | 14.8%         |
| Barometric Pressure     | 29,931         | 7.7%          | 21,433         | 8.4%          | 1,402          | 0.3%          |
| Battery Voltage         | 26,269         | 6.8%          | 12,714         | 5.0%          | 49,840         | 11.8%         |
| Water Level             | 13,846         | 3.6%          | 14,498         | 5.7%          | 37,494         | 8.9%          |
| Precipitation           | 12,531         | 3.2%          | 11,318         | 4.4%          | 31,957         | 7.6%          |
| Solar Radiation         | 9,176          | 2.4%          | 10,841         | 4.2%          | 0              | 0.0%          |
| Fuel Moisture           | 4,551          | 1.2%          | 5,868          | 2.3%          | 0              | 0.0%          |
| Fuel Temperature        | 4,543          | 1.2%          | 5,859          | 2.3%          | 0              | 0.0%          |
| Soil Moisture           | 2,631          | 0.7%          | 2,895          | 1.1%          | 0              | 0.0%          |
| Hayman Battery          | 2,487          | 0.6%          | 0              | 0.0%          | 0              | 0.0%          |
| Repeater Status Report  | 1,642          | 0.4%          | 2,288          | 0.9%          | 0              | 0.0%          |
| Unknown                 | 1,207          | 0.3%          | 1,361          | 0.5%          | 0              | 0.0%          |
| Wind Direction          | 728            | 0.2%          | 0              | 0.0%          | 0              | 0.0%          |
| ET-Hourly               | 578            | 0.1%          | 669            | 0.3%          | 0              | 0.0%          |
| 12Hr Status Report      | 226            | 0.1%          | 267            | 0.1%          | 1,583          | 0.4%          |
| GPS Lock                | 221            | 0.1%          | 1              | 0.0%          | 19,886         | 4.7%          |
| Not Used                | 110            | 0.0%          | 109            | 0.0%          | 185            | 0.0%          |
| Water Temp              | 108            | 0.0%          | 115            | 0.0%          | 0              | 0.0%          |
| Repeater Pass List      | 69             | 0.0%          | 548            | 0.2%          | 0              | 0.0%          |
| Handar 585 ALARM Status | 44             | 0.0%          | 55             | 0.0%          | 0              | 0.0%          |
| ET-Daily                | 27             | 0.0%          | 32             | 0.0%          | 0              | 0.0%          |
| Solar Power             | 19             | 0.0%          | 21             | 0.0%          | 0              | 0.0%          |
| ALERT/A2 Testing        | 2              | 0.0%          | 2              | 0.0%          | 0              | 0.0%          |
| Longmont Water Level PT | 1              | 0.0%          | 1              | 0.0%          | 0              | 0.0%          |
| Dew Point Temperature   | 0              | 0.0%          | 0              | 0.0%          | 6,337          | 1.5%          |
| Flasher Status          | 0              | 0.0%          | 0              | 0.0%          | 2,235          | 0.5%          |
| Missing Data (100327)   | 0              | 0.0%          | 0              | 0.0%          | 3              | 0.0%          |
| <b>Total</b>            | <b>388,156</b> | <b>100.0%</b> | <b>255,638</b> | <b>100.0%</b> | <b>422,580</b> | <b>100.0%</b> |

| Traffic Loading Summary | Concentrator |                  | Legacy  |                  | ALERT2  |                  |
|-------------------------|--------------|------------------|---------|------------------|---------|------------------|
| Alert Reports           | 388,156      |                  | 255,638 |                  | 422,577 |                  |
| Average Daily Traffic   | 12,130       |                  | 8,246   |                  | 13,206  |                  |
| Average Hourly Traffic  | 505          |                  | 344     |                  | 550     |                  |
| Median Hourly Traffic   | 514          | hour beginning   | 335     | hour beginning   | 569     | hour beginning   |
| Peak Hourly Traffic     | 939          | Mar 28, 12:00 PM | 761     | Mar 24, 2:00 AM  | 889     | Mar 30, 11:00 PM |
| 2nd Max                 | 863          | Mar 24, 11:00 AM | 687     | Mar 24, 1:00 AM  | 851     | Mar 30, 10:00 PM |
| 3rd Max                 | 861          |                  | 665     |                  | 848     |                  |
| 4th Max                 | 855          | Mar 24, 2:00 AM  | 562     | Mar 23, 11:00 PM | 841     | Mar 30, 7:00 PM  |
| 5th Max                 | 831          | Mar 23, 11:00 PM | 550     | Mar 24, 11:00 AM | 839     | Mar 30, 5:00 PM  |

# Rain Timer Performance

Analyze Rain Sensors

| Rain Sensors | Description                         | Rcv    | Timer | Exp    | Performance |
|--------------|-------------------------------------|--------|-------|--------|-------------|
| 850          | Flying J                            | 1.00   |       | 744.00 | 0%          |
| 4470         | Little Narrows                      | 9.00   | 8:59  | 64.00  | 14%         |
| 100150       | A2-Sellers Gulch at Haystack Precip | 139.00 |       | 744.00 | 19%         |
| 2360         | Indian Hills                        | 18.00  | 17:24 | 64.00  | 28%         |
| 2970         | Rampart Range Rd-Satellite          | 245.00 |       | 744.00 | 33%         |
| 2270         | Cub Cr below Blue                   | 25.00  | 10:42 | 64.00  | 39%         |
| 2350         | Idledale                            | 28.00  | 12:33 | 64.00  | 44%         |
| 3080         | Tallman Gulch                       | 28.00  | 13:31 | 64.00  | 44%         |
| 2230         | Bear Cr below Cub                   | 29.00  | 11:22 | 64.00  | 45%         |
| 2240         | Cold Sprg Glch conf                 | 29.00  | 12:32 | 64.00  | 45%         |
| 2250         | Rosedale                            | 29.00  | 11:57 | 64.00  | 45%         |
| 2280         | Kinney Peak                         | 29.00  | 11:57 | 64.00  | 45%         |
| 2860         | CC at Stroh Rd                      | 29.00  | 12:57 | 64.00  | 45%         |
| 3070         | A2-Newlin Gulch Precip              | 344.00 |       | 744.00 | 46%         |
| 1620         | Slaughterhouse Glch                 | 30.00  | 15:41 | 64.00  | 47%         |
| 1710         | Shop Creek                          | 30.00  | 0:02  | 64.00  | 47%         |
| 2310         | Genesee Village                     | 30.00  | 12:35 | 64.00  | 47%         |
| 2840         | Sulphur Gulch                       | 30.00  | 12:25 | 64.00  | 47%         |
| 2850         | Cherry Cr bl Bayou Glch             | 30.00  | 12:25 | 64.00  | 47%         |
| 3040         | CC @ Russelville Road Precip        | 30.00  | 11:27 | 64.00  | 47%         |
| 620          | Quincy/Highline                     | 31.00  | 12:25 | 64.00  | 48%         |
| 650          | Iliff Pond                          | 31.00  | 12:28 | 64.00  | 48%         |
| 2260         | Brook Forest                        | 31.00  | 11:58 | 64.00  | 48%         |
| 2330         | Morrison                            | 31.00  | 23:02 | 64.00  | 48%         |
| 310          | Guy Hill Ranch                      | 32.00  | 12:27 | 64.00  | 50%         |
| 1200         | Broomfield 3207                     | 32.00  | 11:58 | 64.00  | 50%         |
| 2340         | El Rancho                           | 32.00  | 11:25 | 64.00  | 50%         |
| 1530         | Bear Creek @ Lowell                 | 33.00  | 11:30 | 64.00  | 52%         |
| 150          | Nott Creek                          | 34.00  | 12:27 | 64.00  | 53%         |
| 1360         | Denver Zoo                          | 34.00  | 22:41 | 64.00  | 53%         |
| 2790         | Wx-W. Cherry Creek                  | 34.00  | 15:31 | 64.00  | 53%         |
| 200          | Leyden Reservoir                    | 35.00  | 11:58 | 64.00  | 55%         |
| 1100         | Louisville Rec Ctr                  | 35.00  | 11:59 | 64.00  | 55%         |
| 1550         | Lakewood CC                         | 35.00  | 12:24 | 64.00  | 55%         |
| 2880         | Happy Canyon at N Surrey Dr         | 35.00  | 12:20 | 64.00  | 55%         |
| 100          | A2-Carr Street                      | 414.00 |       | 744.00 | 56%         |
| 610          | Harvard @ Jackson                   | 36.00  | 12:21 | 64.00  | 56%         |
| 1110         | Gunbarrel                           | 36.00  | 12:23 | 64.00  | 56%         |
| 1400         | Upper Sloan Det.                    | 36.00  | 11:57 | 64.00  | 56%         |
| 600          | Harvard Gulch Park                  | 37.00  | 11:58 | 64.00  | 58%         |
| 2870         | Cottonwood (Apache)                 | 37.00  | 10:29 | 64.00  | 58%         |
| 1310         | LDC at 64th                         | 438.00 |       | 744.00 | 59%         |
| 1300         | Hidden Lake                         | 38.00  | 11:58 | 64.00  | 59%         |
| 1900         | Niver Detention                     | 38.00  | 11:57 | 64.00  | 59%         |
| 2810         | Pine Cliff Road                     | 38.00  | 10:49 | 64.00  | 59%         |
| 4100         | Filter Plant                        | 38.00  | 19:09 | 64.00  | 59%         |
| 1320         | SPR at 3rd Ave                      | 39.00  | 12:40 | 64.00  | 61%         |
| 1640         | SPR at Union Ave.                   | 39.00  | 12:55 | 64.00  | 61%         |
| 300          | Van Bibber Park                     | 41.00  | 11:59 | 64.00  | 64%         |
| 320          | Sports Complex                      | 41.00  | 12:21 | 64.00  | 64%         |
| 100140       | A2-Upper Sellers Gulch Precip       | 482.00 |       | 744.00 | 65%         |
| 1660         | SPR at Henderson                    | 43.00  | 17:20 | 64.00  | 67%         |
| 2370         | Red Rocks Park                      | 43.00  | 12:57 | 64.00  | 67%         |
| 220          | Upper Leyden                        | 44.00  | 12:01 | 64.00  | 69%         |

|        |                           |        |       |        |     |
|--------|---------------------------|--------|-------|--------|-----|
| 1010   | Denver West               | 44.00  | 11:59 | 64.00  | 69% |
| 1500   | Powers Park               | 44.00  | 11:40 | 64.00  | 69% |
| 1600   | Englewood Dam             | 44.00  | 12:18 | 64.00  | 69% |
| 1340   | Sanderson at Xavier       | 512.00 |       | 744.00 | 69% |
| 330    | Van Bibber @ Hwy 93       | 45.00  | 12:19 | 64.00  | 70% |
| 810    | Granby Ditch @ 6th        | 45.00  | 12:17 | 64.00  | 70% |
| 1030   | NREL/S. Table Mtn.        | 45.00  | 11:59 | 64.00  | 70% |
| 1050   | Jeffco Fairgrounds        | 45.00  | 11:59 | 64.00  | 70% |
| 710    | Horseshoe Park Drop       | 46.00  | 12:35 | 64.00  | 72% |
| 1350   | Chatfield COE             | 46.00  | 12:19 | 64.00  | 72% |
| 1370   | West Metro FS13           | 46.00  | 11:59 | 64.00  | 72% |
| 110    | Ralston Reservoir         | 47.00  | 11:20 | 64.00  | 73% |
| 120    | West Woods                | 47.00  | 11:01 | 64.00  | 73% |
| 440    | Fire Station #7           | 47.00  | 12:16 | 64.00  | 73% |
| 820    | ETG @ Buckley             | 47.00  | 11:41 | 64.00  | 73% |
| 2980   | Dakan Rd                  | 47.00  | 14:34 | 64.00  | 73% |
| 4270   | Cannon Mountain           | 47.00  | 13:48 | 64.00  | 73% |
| 1040   | Lena @ U.S. Hwy 6         | 48.00  | 11:59 | 64.00  | 75% |
| 3010   | WX-EPC at Hwy 105         | 49.00  | 14:13 | 64.00  | 77% |
| 3090   | A2-Highland Heritage Park | 49.00  | 1:04  | 64.00  | 77% |
| 4510   | Pinewood Springs          | 49.00  | 14:00 | 64.00  | 77% |
| 210    | Leyden Confluence         | 50.00  | 9:57  | 64.00  | 78% |
| 1060   | Heritage Square           | 50.00  | 11:22 | 64.00  | 78% |
| 2960   | Indian Creek              | 50.00  | 14:39 | 64.00  | 78% |
| 5720   | Four Mile Creek           | 50.00  | 14:37 | 64.00  | 78% |
| 4870   | SBC @ SB Road             | 51.00  | 13:13 | 64.00  | 80% |
| 510    | Virginia Court            | 53.00  | 11:43 | 64.00  | 83% |
| 2900   | Russelville Gulch-Douglas | 53.00  | 13:28 | 64.00  | 83% |
| 4330   | Hansen Rain               | 53.00  | 13:49 | 64.00  | 83% |
| 100320 | A2-Weir Gulch - Precip    | 53.00  | 1:03  | 64.00  | 83% |
| 2320   | Choke Cherry Resvr        | 54.00  | 13:10 | 64.00  | 84% |
| 2890   | Spruce Mt - Douglas       | 54.00  | 13:42 | 64.00  | 84% |
| 4050   | Walker Ranch              | 54.00  | 13:52 | 64.00  | 84% |
| 5940   | Log Jumper                | 54.00  | 12:33 | 64.00  | 84% |
| 500    | Havana Park               | 55.00  | 12:59 | 64.00  | 86% |
| 4490   | Apple Valley              | 55.00  | 13:41 | 64.00  | 86% |
| 940    | Aurora Regional Pond      | 56.00  | 12:44 | 64.00  | 88% |
| 2710   | Wx-Highlands Ranch WTP    | 56.00  | 12:56 | 64.00  | 88% |
| 2820   | Haskins Gulch Conf        | 56.00  | 12:56 | 64.00  | 88% |
| 2940   | Willow Creek - DougCnty   | 56.00  | 12:41 | 64.00  | 88% |
| 4030   | Red Garden                | 56.00  | 13:22 | 64.00  | 88% |
| 4040   | Martin Gulch              | 56.00  | 13:01 | 64.00  | 88% |
| 4060   | Lakeshore                 | 56.00  | 12:43 | 64.00  | 88% |
| 4290   | Red Hill                  | 56.00  | 13:03 | 64.00  | 88% |
| 2750   | Wx-Castle Rock            | 57.00  | 12:27 | 64.00  | 89% |
| 3030   | WX-Bingham Lake Park      | 57.00  | 12:28 | 64.00  | 89% |
| 3050   | East/West Trailhead       | 57.00  | 12:42 | 64.00  | 89% |
| 4230   | Golden Age                | 57.00  | 12:41 | 64.00  | 89% |
| 4820   | Doudy Draw                | 57.00  | 12:38 | 64.00  | 89% |
| 4830   | SBC @ San Souci           | 57.00  | 12:29 | 64.00  | 89% |
| 5900   | Horse Creek-Satellite     | 666.00 |       | 744.00 | 90% |
| 430    | Utah Park                 | 58.00  | 12:25 | 64.00  | 91% |
| 760    | Mission Viejo Park        | 58.00  | 12:26 | 64.00  | 91% |
| 840    | Fire Station 12           | 58.00  | 12:01 | 64.00  | 91% |
| 1480   | Third Creek at DIA        | 58.00  | 12:28 | 64.00  | 91% |
| 1520   | Wx-Marston Lake North     | 58.00  | 12:30 | 64.00  | 91% |
| 4070   | Bear Peak                 | 58.00  | 12:28 | 64.00  | 91% |
| 4110   | Betasso                   | 58.00  | 12:15 | 64.00  | 91% |
| 4180   | Gold Lake                 | 58.00  | 12:42 | 64.00  | 91% |

|        |                                       |        |       |        |     |
|--------|---------------------------------------|--------|-------|--------|-----|
| 4360   | Justice Center                        | 58.00  | 12:44 | 64.00  | 91% |
| 4570   | St. Antons                            | 58.00  | 12:32 | 64.00  | 91% |
| 4770   | Wx-Cal-Wood Ranch                     | 58.00  | 12:26 | 64.00  | 91% |
| 5730   | West Creek                            | 58.00  | 12:41 | 64.00  | 91% |
| 100260 | Wx-A2-Trumbull (Hayman) - Precip      | 675.00 |       | 744.00 | 91% |
| 140    | Wx-Blue Mountain                      | 59.00  | 12:15 | 64.00  | 92% |
| 530    | Fire Station #19                      | 59.00  | 12:26 | 64.00  | 92% |
| 630    | Temple Pond at DTC                    | 59.00  | 12:25 | 64.00  | 92% |
| 730    | No Name @ Quincy                      | 59.00  | 12:25 | 64.00  | 92% |
| 900    | Wx-Aurora Reservoir                   | 59.00  | 12:27 | 64.00  | 92% |
| 1570   | Wx-Brighton Ditch                     | 59.00  | 12:15 | 64.00  | 92% |
| 1700   | Cherry Cr @ Champa                    | 59.00  | 12:13 | 64.00  | 92% |
| 1720   | Cherry Cr @ Steele                    | 59.00  | 12:12 | 64.00  | 92% |
| 2930   | Wx-Spring Valley Rd-DougCnty          | 59.00  | 12:27 | 64.00  | 92% |
| 2950   | DC Public Works                       | 59.00  | 12:26 | 64.00  | 92% |
| 2990   | Wx-Tomah Rd-DougCnty                  | 59.00  | 12:14 | 64.00  | 92% |
| 4010   | Crescent                              | 59.00  | 12:13 | 64.00  | 92% |
| 4020   | Rio Grande                            | 59.00  | 12:14 | 64.00  | 92% |
| 4080   | Twin Sisters                          | 59.00  | 12:14 | 64.00  | 92% |
| 4190   | Slaughterhouse                        | 59.00  | 12:28 | 64.00  | 92% |
| 4250   | Geer Canyon                           | 59.00  | 12:23 | 64.00  | 92% |
| 4260   | Taylor Mountain                       | 59.00  | 12:26 | 64.00  | 92% |
| 4300   | Big Elk Park                          | 59.00  | 12:11 | 64.00  | 92% |
| 4320   | Lee Hill Rain 2012                    | 59.00  | 12:28 | 64.00  | 92% |
| 4550   | Boulder Jail                          | 59.00  | 12:29 | 64.00  | 92% |
| 4710   | Wx-Ward C-1                           | 59.00  | 12:15 | 64.00  | 92% |
| 4790   | Wx-Button Rock                        | 59.00  | 12:14 | 64.00  | 92% |
| 4860   | Fairview Peak                         | 59.00  | 12:01 | 64.00  | 92% |
| 5740   | Trail Creek                           | 59.00  | 12:01 | 64.00  | 92% |
| 5860   | Cedar Mountain                        | 59.00  | 12:27 | 64.00  | 92% |
| 5880   | Hackett Mountain                      | 59.00  | 12:13 | 64.00  | 92% |
| 540    | Parker/Mississippi                    | 60.00  | 12:26 | 64.00  | 94% |
| 700    | Toll Gate @ 6th                       | 60.00  | 12:14 | 64.00  | 94% |
| 950    | Piney at Liverpool                    | 60.00  | 12:12 | 64.00  | 94% |
| 1420   | Wx-A2-Diamond Hill                    | 60.00  | 12:01 | 64.00  | 94% |
| 1440   | Wx-Elbert                             | 60.00  | 12:14 | 64.00  | 94% |
| 1920   | Wx-Brighton                           | 60.00  | 12:01 | 64.00  | 94% |
| 2730   | Wx-Salisbury Park                     | 60.00  | 12:12 | 64.00  | 94% |
| 2910   | East Cherry Cr-Douglas                | 60.00  | 12:13 | 64.00  | 94% |
| 2920   | West Cherry Head-Douglas Cnty         | 60.00  | 12:27 | 64.00  | 94% |
| 4160   | Sunshine                              | 60.00  | 12:13 | 64.00  | 94% |
| 4220   | Fling's                               | 60.00  | 12:27 | 64.00  | 94% |
| 4310   | Johnny Park                           | 60.00  | 12:26 | 64.00  | 94% |
| 4340   | Riverside                             | 60.00  | 11:58 | 64.00  | 94% |
| 4350   | Conifer Hill                          | 60.00  | 12:11 | 64.00  | 94% |
| 4520   | Eagle Ridge                           | 60.00  | 12:01 | 64.00  | 94% |
| 4730   | Wx-Sugarloaf                          | 60.00  | 12:15 | 64.00  | 94% |
| 4810   | Shanahan Ridge                        | 60.00  | 11:59 | 64.00  | 94% |
| 4840   | SBC@S Boulder Ditch                   | 60.00  | 12:12 | 64.00  | 94% |
| 4880   | Whispering Pines                      | 60.00  | 12:13 | 64.00  | 94% |
| 5810   | Stump Bump                            | 60.00  | 12:13 | 64.00  | 94% |
| 100110 | A2-ETG @ Hampden Precip               | 60.00  | 12:01 | 64.00  | 94% |
| 100200 | Wx-A2-OneRain Weather - Precipitation | 60.00  | 12:01 | 64.00  | 94% |
| 100240 | A2-Westerly Cr Dam Precip             | 701.00 |       | 744.00 | 94% |
| 520    | Jewell Detention                      | 61.00  | 12:12 | 64.00  | 95% |
| 640    | Goldsmith @ Eastman                   | 61.00  | 11:59 | 64.00  | 95% |
| 720    | Confluence Pond                       | 61.00  | 11:59 | 64.00  | 95% |
| 750    | Wx-Quincy Reservoir                   | 61.00  | 11:59 | 64.00  | 95% |
| 800    | Sable Ditch @ 18th                    | 61.00  | 12:12 | 64.00  | 95% |



|        |                                   |        |       |        |      |
|--------|-----------------------------------|--------|-------|--------|------|
| 830    | Side Creek Park                   | 61.00  | 12:01 | 64.00  | 95%  |
| 920    | Wx-Aurora Town Hall               | 61.00  | 11:34 | 64.00  | 95%  |
| 970    | Pump Sta 3                        | 61.00  | 12:01 | 64.00  | 95%  |
| 1460   | Wx-Urban Farm                     | 61.00  | 12:01 | 64.00  | 95%  |
| 1800   | Sand Creek Park                   | 61.00  | 11:59 | 64.00  | 95%  |
| 2210   | Wx-Hiwan G.C.                     | 61.00  | 12:01 | 64.00  | 95%  |
| 4090   | Magnolia                          | 61.00  | 11:59 | 64.00  | 95%  |
| 4130   | Swiss Peaks                       | 61.00  | 11:57 | 64.00  | 95%  |
| 4150   | Gold Hill                         | 61.00  | 11:59 | 64.00  | 95%  |
| 4170   | Pine Brook                        | 61.00  | 11:59 | 64.00  | 95%  |
| 4200   | Lazy Acres                        | 61.00  | 12:00 | 64.00  | 95%  |
| 4240   | Sunset                            | 61.00  | 11:59 | 64.00  | 95%  |
| 4530   | Winiger Ridge                     | 61.00  | 11:58 | 64.00  | 95%  |
| 4750   | Wx-Louisville Lake                | 61.00  | 12:01 | 64.00  | 95%  |
| 100100 | A2-Blackstone Precip              | 61.00  | 12:01 | 64.00  | 95%  |
| 100270 | Wx-A2-WestCreek (Hayman) - Precip | 720.00 |       | 744.00 | 97%  |
| 420    | Expo Park                         | 62.00  | 11:33 | 64.00  | 97%  |
| 4140   | Logan Mill                        | 62.00  | 11:59 | 64.00  | 97%  |
| 6601   | Wx-A2-Magnolia WX-Precip          | 91.00  | 8:00  | 93.00  | 98%  |
| 100290 | A2-PlumCr at Sedalia - Precip     | 733.00 |       | 744.00 | 99%  |
| 100410 | A2-Brantner Gulch - Precip        | 734.00 |       | 744.00 | 99%  |
| 100420 | A2-Thorncreek - Precip            | 734.00 |       | 744.00 | 99%  |
| 100300 | A2-CoalCreek at McCaslin - Precip | 736.00 |       | 744.00 | 99%  |
| 870    | A2-Murphy Creek GC                | 737.00 |       | 744.00 | 99%  |
| 100230 | A2-Havana Pond Precip             | 737.00 |       | 744.00 | 99%  |
| 1000   | A2-Maple Grove Resv.              | 738.00 |       | 744.00 | 99%  |
| 4850   | Porphory Mtn                      | 738.00 |       | 744.00 | 99%  |
| 100160 | A2-Sand Creek at Colfax Precip    | 738.00 |       | 744.00 | 99%  |
| 3020   | Wx-West Creek WX                  | 749.00 |       | 744.00 | 101% |
| 410    | Kelly Dam                         | 95.00  | 7:23  | 93.00  | 102% |
| 3060   | Fire Sta 47                       | 761.00 |       | 744.00 | 102% |

| Rain Event Performance            |                  |                  |        |                      |        |        |        |        |         |     |     |  |      |         |                                |  |
|-----------------------------------|------------------|------------------|--------|----------------------|--------|--------|--------|--------|---------|-----|-----|--|------|---------|--------------------------------|--|
|                                   | Reports Received | Reports Received | 4,996  | Analyze Rain Sensors |        |        |        |        |         |     | 0   | <<show stations with zero rain (1=yes, 0=no) |      |         |                                |  |
|                                   | Systemwide Avg   | Total Tips       | 5,393  |                      |        |        |        |        |         |     |     |  |      |         |                                |  |
|                                   | 92.64%           | Data Loss        | 7.36%  |                      |        |        |        |        |         |     |     |  |      |         |                                |  |
| Description                       | Sensor           | Performance      | 1-tips | 2-tips               | 3-tips | 4-tips | 5-tips | 6-tips | >6-tips | Rcv | Exp | Miss   | Hold | Bucket  |                                |  |
| Wx-W. Cherry Creek                | 2790             | 25%              | 1      | 0                    | 1      | 1      | 0      | 2      | 1       | 5   | 20  | 15   | 0    | 0.03937 |                                |  |
| Slaughterhouse Glch               | 1620             | 46%              | 10     | 4                    | 1      | 1      | 0      | 0      | 1       | 16  | 35  | 9  | 0    | 0.03937 | Mean 27.66                     |  |
| Willow Creek - DougCnty           | 2940             | 58%              | 10     | 1                    | 1      | 1      | 1      | 0      | 0       | 14  | 24  | 10   | 0    | 0.03937 | Median 29.00                   |  |
| Wx-Castle Rock                    | 2750             | 60%              | 3      | 2                    | 1      | 0      | 0      | 0      | 0       | 6   | 10  | 4  | 0    | 0.03937 | St. Dev 11.45                  |  |
| Dakan Rd                          | 2980             | 64%              | 22     | 2                    | 2      | 0      | 0      | 2      | 0       | 28  | 44  | 16   | 0    | 0.03937 | Mean plus 3 SD 62.01           |  |
| Horse Creek-Satellite             | 5900             | 69%              | 16     | 0                    | 0      | 1      | 0      | 1      | 1       | 18  | 26  | 8  | 0    | 0.03937 | Min 1.00 Flying J 850          |  |
| East/West Trailhead               | 3050             | 73%              | 17     | 0                    | 0      | 1      | 1      | 0      | 0       | 19  | 26  | 7  | 0    | 0.03937 | Max 55.00 Genesee Village 2310 |  |
| CC @ Russelville Road Precip      | 3040             | 74%              | 12     | 1                    | 0      | 0      | 1      | 0      | 0       | 14  | 19  | 5  | 0    | 0.03937 | Mean minus 2 SD 4.76           |  |
| Sanderson at Xavier               | 1340             | 75%              | 5      | 0                    | 1      | 0      | 0      | 0      | 0       | 6   | 8   | 2  | 0    | 0.03937 |                                |  |
| SPR at Union Ave.                 | 1640             | 75%              | 2      | 1                    | 0      | 0      | 0      | 0      | 0       | 3   | 4   | 1  | 0    | 0.03937 |                                |  |
| Sand Creek Park                   | 1800             | 75%              | 12     | 1                    | 2      | 0      | 0      | 0      | 0       | 15  | 20  | 5  | 0    | 0.03937 |                                |  |
| Morrison                          | 2330             | 75%              | 20     | 5                    | 2      | 0      | 0      | 0      | 0       | 27  | 36  | 9  | 0    | 0.03937 |                                |  |
| WX-Bingham Lake Park              | 3030             | 77%              | 23     | 2                    | 0      | 2      | 0      | 0      | 0       | 27  | 35  | 8  | 0    | 0.03937 |                                |  |
| Cherry Cr bi Bayou Glch           | 2850             | 78%              | 26     | 0                    | 1      | 2      | 0      | 0      | 0       | 29  | 37  | 8  | 0    | 0.03937 |                                |  |
| CC at Stroh Rd                    | 2860             | 79%              | 8      | 3                    | 0      | 0      | 0      | 0      | 0       | 11  | 14  | 3  | 0    | 0.03937 |                                |  |
| Wx-Tomah Rd-DougCnty              | 2990             | 79%              | 30     | 0                    | 1      | 1      | 1      | 0      | 0       | 33  | 42  | 9  | 0    | 0.03937 |                                |  |
| Happy Canyon at N Surrey Dr       | 2880             | 79%              | 20     | 1                    | 1      | 1      | 0      | 0      | 0       | 23  | 29  | 6  | 0    | 0.03937 |                                |  |
| Hansen Rain                       | 4330             | 79%              | 23     | 3                    | 0      | 0      | 1      | 0      | 0       | 27  | 34  | 7  | 0    | 0.03937 |                                |  |
| Wx-A2-Diamond Hill                | 1420             | 80%              | 27     | 3                    | 1      | 1      | 0      | 0      | 0       | 32  | 40  | 8  | 0    | 0.03937 |                                |  |
| Russelville Gulch-Douglas         | 2900             | 81%              | 23     | 0                    | 0      | 2      | 0      | 0      | 0       | 25  | 31  | 6  | 0    | 0.03937 |                                |  |
| Tallman Gulch                     | 3080             | 81%              | 23     | 1                    | 1      | 1      | 0      | 0      | 0       | 26  | 32  | 6  | 0    | 0.03937 |                                |  |
| WX-EPC at Hwy 105                 | 3010             | 82%              | 25     | 5                    | 1      | 0      | 0      | 0      | 0       | 31  | 38  | 7  | 0    | 0.03937 |                                |  |
| Wx-Spring Valley Rd-DougCnty      | 2930             | 82%              | 7      | 2                    | 0      | 0      | 0      | 0      | 0       | 9   | 11  | 2  | 0    | 0.03937 |                                |  |
| Cottonwood (Apache)               | 2870             | 83%              | 20     | 3                    | 1      | 0      | 0      | 0      | 0       | 24  | 29  | 5  | 0    | 0.03937 |                                |  |
| Indian Creek                      | 2960             | 83%              | 36     | 1                    | 1      | 0      | 0      | 1      | 0       | 39  | 47  | 8  | 0    | 0.03937 |                                |  |
| Bear Cr below Cub                 | 2230             | 84%              | 26     | 4                    | 1      | 0      | 0      | 0      | 0       | 31  | 37  | 6  | 0    | 0.03937 |                                |  |
| Denver Zoo                        | 1360             | 85%              | 20     | 2                    | 1      | 0      | 0      | 0      | 0       | 23  | 27  | 4  | 0    | 0.03937 |                                |  |
| Little Narrows                    | 4470             | 85%              | 19     | 4                    | 0      | 0      | 0      | 0      | 1       | 23  | 27  | 4  | 0    | 0.03937 |                                |  |
| Cannon Mountain                   | 4270             | 85%              | 25     | 3                    | 1      | 0      | 0      | 0      | 0       | 29  | 34  | 5  | 0    | 0.03937 |                                |  |
| Cub Cr below Blue                 | 2270             | 87%              | 28     | 5                    | 0      | 0      | 0      | 0      | 0       | 33  | 38  | 5  | 2    | 0.03937 |                                |  |
| Temple Pond at DTC                | 630              | 87%              | 24     | 2                    | 1      | 0      | 0      | 0      | 0       | 27  | 31  | 4  | 0    | 0.03937 |                                |  |
| Taylor Mountain                   | 4260             | 87%              | 24     | 2                    | 1      | 0      | 0      | 0      | 0       | 27  | 31  | 4  | 0    | 0.03937 |                                |  |
| Louisville Rec Ctr                | 1100             | 88%              | 24     | 4                    | 0      | 0      | 0      | 0      | 0       | 28  | 32  | 4  | 1    | 0.03937 |                                |  |
| Kinney Peak                       | 2280             | 88%              | 24     | 4                    | 0      | 0      | 0      | 0      | 0       | 28  | 32  | 4  | 0    | 0.03937 |                                |  |
| A2-Upper Sellers Gulch Precip     | 100140           | 88%              | 12     | 2                    | 0      | 0      | 0      | 0      | 0       | 14  | 16  | 2  | 0    | 0.03937 |                                |  |
| Indian Hills                      | 2360             | 88%              | 32     | 3                    | 1      | 0      | 0      | 0      | 0       | 36  | 41  | 5  | 0    | 0.03937 |                                |  |
| Haskins Gulch Conf                | 2820             | 88%              | 34     | 1                    | 2      | 0      | 0      | 0      | 0       | 37  | 42  | 5  | 0    | 0.03937 |                                |  |
| Ralston Reservoir                 | 110              | 88%              | 28     | 0                    | 2      | 0      | 0      | 0      | 0       | 30  | 34  | 4  | 0    | 0.03937 |                                |  |
| Wx-Hiwan G.C.                     | 2210             | 88%              | 29     | 0                    | 0      | 0      | 1      | 0      | 1       | 30  | 34  | 4  | 1    | 0.03937 |                                |  |
| Gunbarrel                         | 1110             | 88%              | 21     | 1                    | 1      | 0      | 0      | 0      | 0       | 23  | 26  | 3  | 0    | 0.03937 |                                |  |
| Van Bibber @ Hwy 93               | 330              | 89%              | 15     | 0                    | 1      | 0      | 0      | 0      | 0       | 16  | 18  | 2  | 0    | 0.03937 |                                |  |
| Heritage Square                   | 1060             | 89%              | 29     | 2                    | 1      | 0      | 0      | 0      | 0       | 32  | 36  | 4  | 0    | 0.03937 |                                |  |
| Jewell Detention                  | 520              | 89%              | 22     | 3                    | 0      | 0      | 0      | 0      | 0       | 25  | 28  | 3  | 0    | 0.03937 |                                |  |
| Choke Cherry Resvr                | 2320             | 90%              | 40     | 1                    | 2      | 0      | 0      | 0      | 1       | 43  | 48  | 5  | 2    | 0.03937 |                                |  |
| Pine Cliff Road                   | 2810             | 90%              | 32     | 2                    | 1      | 0      | 0      | 0      | 0       | 35  | 39  | 4  | 0    | 0.03937 |                                |  |
| Bear Peak                         | 4070             | 90%              | 31     | 4                    | 0      | 0      | 0      | 0      | 0       | 35  | 39  | 4  | 0    | 0.03937 |                                |  |
| Apple Valley                      | 4490             | 90%              | 17     | 0                    | 1      | 0      | 0      | 0      | 0       | 18  | 20  | 2  | 0    | 0.03937 |                                |  |
| Wx-Button Rock                    | 4790             | 90%              | 26     | 0                    | 0      | 1      | 0      | 0      | 0       | 27  | 30  | 3  | 0    | 0.03937 |                                |  |
| Wx-Aurora Reservoir               | 900              | 90%              | 16     | 2                    | 0      | 0      | 0      | 0      | 0       | 18  | 20  | 2  | 0    | 0.03937 |                                |  |
| Van Bibber Park                   | 300              | 90%              | 26     | 1                    | 1      | 0      | 0      | 0      | 0       | 28  | 31  | 3  | 0    | 0.03937 |                                |  |
| Riverside                         | 4340             | 90%              | 26     | 1                    | 1      | 0      | 0      | 0      | 0       | 28  | 31  | 3  | 0    | 0.03937 |                                |  |
| A2-CoalCreek at McCaslin - Precip | 100300           | 91%              | 27     | 1                    | 1      | 0      | 0      | 0      | 0       | 29  | 32  | 3  | 0    | 0.03937 |                                |  |
| Genesee Village                   | 2310             | 91%              | 48     | 1                    | 0      | 0      | 1      | 0      | 1       | 50  | 55  | 5  | 1    | 0.03937 |                                |  |
| Lakeshore                         | 4060             | 91%              | 28     | 3                    | 0      | 0      | 0      | 0      | 0       | 31  | 34  | 3  | 0    | 0.03937 |                                |  |
| Lakewood CC                       | 1550             | 91%              | 19     | 2                    | 0      | 0      | 0      | 0      | 0       | 21  | 23  | 2  | 0    | 0.03937 |                                |  |
| Eagle Ridge                       | 4520             | 91%              | 19     | 2                    | 0      | 0      | 0      | 0      | 0       | 21  | 23  | 2  | 0    | 0.03937 |                                |  |
| SBC @ SB Road                     | 4870             | 91%              | 38     | 4                    | 0      | 0      | 0      | 0      | 0       | 42  | 46  | 4  | 0    | 0.03937 |                                |  |

|                                   |        |     |    |   |   |   |   |   |   |    |    |   |   |         |  |  |  |  |
|-----------------------------------|--------|-----|----|---|---|---|---|---|---|----|----|---|---|---------|--|--|--|--|
| Quincy/Highline                   | 620    | 91% | 29 | 3 | 0 | 0 | 0 | 0 | 0 | 32 | 35 | 3 | 0 | 0.03937 |  |  |  |  |
| Upper Sloan Det.                  | 1400   | 92% | 20 | 2 | 0 | 0 | 0 | 0 | 0 | 22 | 24 | 2 | 0 | 0.03937 |  |  |  |  |
| SPR at Henderson                  | 1660   | 92% | 10 | 1 | 0 | 0 | 0 | 0 | 0 | 11 | 12 | 1 | 0 | 0.03937 |  |  |  |  |
| Wx-Louisville Lake                | 4750   | 92% | 20 | 2 | 0 | 0 | 0 | 0 | 0 | 22 | 24 | 2 | 0 | 0.03937 |  |  |  |  |
| Big Elk Park                      | 4300   | 92% | 21 | 2 | 0 | 0 | 0 | 0 | 0 | 23 | 25 | 2 | 0 | 0.03937 |  |  |  |  |
| Confluence Pond                   | 720    | 92% | 11 | 1 | 0 | 0 | 0 | 0 | 0 | 12 | 13 | 1 | 0 | 0.03937 |  |  |  |  |
| Granby Ditch @ 6th                | 810    | 92% | 22 | 2 | 0 | 0 | 0 | 0 | 0 | 24 | 26 | 2 | 0 | 0.03937 |  |  |  |  |
| Broomfield 3207                   | 1200   | 92% | 22 | 2 | 0 | 0 | 0 | 0 | 0 | 24 | 26 | 2 | 0 | 0.03937 |  |  |  |  |
| West Cherry Head-Douglas Cnty     | 2920   | 92% | 11 | 1 | 0 | 0 | 0 | 0 | 0 | 12 | 13 | 1 | 0 | 0.03937 |  |  |  |  |
| DC Public Works                   | 2950   | 92% | 22 | 2 | 0 | 0 | 0 | 0 | 0 | 24 | 26 | 2 | 0 | 0.03937 |  |  |  |  |
| Kelly Dam                         | 410    | 93% | 34 | 3 | 0 | 0 | 0 | 0 | 0 | 37 | 40 | 3 | 1 | 0.03937 |  |  |  |  |
| Expo Park                         | 420    | 93% | 23 | 2 | 0 | 0 | 0 | 0 | 0 | 25 | 27 | 2 | 0 | 0.03937 |  |  |  |  |
| Harvard @ Jackson                 | 610    | 93% | 35 | 3 | 0 | 0 | 0 | 0 | 0 | 38 | 41 | 3 | 0 | 0.03937 |  |  |  |  |
| Iliff Pond                        | 650    | 93% | 25 | 0 | 1 | 0 | 0 | 0 | 0 | 26 | 28 | 2 | 0 | 0.03937 |  |  |  |  |
| Slaughterhouse                    | 4190   | 93% | 37 | 1 | 1 | 0 | 0 | 0 | 0 | 39 | 42 | 3 | 0 | 0.03937 |  |  |  |  |
| Wx-A2-Trumbull (Hayman) - Precip  | 100260 | 93% | 24 | 2 | 0 | 0 | 0 | 0 | 0 | 26 | 28 | 2 | 0 | 0.03937 |  |  |  |  |
| Virginia Court                    | 510    | 93% | 25 | 2 | 0 | 0 | 0 | 0 | 0 | 27 | 29 | 2 | 1 | 0.03937 |  |  |  |  |
| Denver West                       | 1010   | 93% | 25 | 2 | 0 | 0 | 0 | 0 | 0 | 27 | 29 | 2 | 0 | 0.03937 |  |  |  |  |
| West Woods                        | 120    | 94% | 28 | 2 | 0 | 0 | 0 | 0 | 0 | 30 | 32 | 2 | 1 | 0.03937 |  |  |  |  |
| Pinewood Springs                  | 4510   | 94% | 28 | 2 | 0 | 0 | 0 | 0 | 0 | 30 | 32 | 2 | 0 | 0.03937 |  |  |  |  |
| Rio Grande                        | 4020   | 94% | 31 | 2 | 0 | 0 | 0 | 0 | 0 | 33 | 35 | 2 | 0 | 0.03937 |  |  |  |  |
| Aurora Regional Pond              | 940    | 94% | 31 | 2 | 0 | 0 | 0 | 0 | 0 | 33 | 35 | 2 | 0 | 0.03937 |  |  |  |  |
| Lazy Acres                        | 4200   | 94% | 32 | 2 | 0 | 0 | 0 | 0 | 0 | 34 | 36 | 2 | 0 | 0.03937 |  |  |  |  |
| West Metro FS13                   | 1370   | 95% | 33 | 2 | 0 | 0 | 0 | 0 | 0 | 35 | 37 | 2 | 0 | 0.03937 |  |  |  |  |
| Upper Leyden                      | 220    | 95% | 34 | 2 | 0 | 0 | 0 | 0 | 0 | 36 | 38 | 2 | 0 | 0.03937 |  |  |  |  |
| Toll Gate @ 6th                   | 700    | 95% | 17 | 1 | 0 | 0 | 0 | 0 | 0 | 18 | 19 | 1 | 0 | 0.03937 |  |  |  |  |
| Sable Ditch @ 18th                | 800    | 95% | 17 | 1 | 0 | 0 | 0 | 0 | 0 | 18 | 19 | 1 | 0 | 0.03937 |  |  |  |  |
| Powers Park                       | 1500   | 95% | 34 | 2 | 0 | 0 | 0 | 0 | 0 | 36 | 38 | 2 | 0 | 0.03937 |  |  |  |  |
| Fling's                           | 4220   | 95% | 34 | 2 | 0 | 0 | 0 | 0 | 0 | 36 | 38 | 2 | 0 | 0.03937 |  |  |  |  |
| Wx-A2-WestCreek (Hayman) - Precip | 100270 | 95% | 18 | 1 | 0 | 0 | 0 | 0 | 0 | 19 | 20 | 1 | 0 | 0.03937 |  |  |  |  |
| Wx-Quincy Reservoir               | 750    | 95% | 40 | 2 | 0 | 0 | 0 | 0 | 0 | 42 | 44 | 2 | 0 | 0.03937 |  |  |  |  |
| A2-Maple Grove Resv.              | 1000   | 95% | 20 | 1 | 0 | 0 | 0 | 0 | 0 | 21 | 22 | 1 | 0 | 0.03937 |  |  |  |  |
| Mission Viejo Park                | 760    | 96% | 21 | 1 | 0 | 0 | 0 | 0 | 0 | 22 | 23 | 1 | 0 | 0.03937 |  |  |  |  |
| Martin Gulch                      | 4040   | 96% | 42 | 2 | 0 | 0 | 0 | 0 | 0 | 44 | 46 | 2 | 0 | 0.03937 |  |  |  |  |
| Shanahan Ridge                    | 4810   | 96% | 42 | 2 | 0 | 0 | 0 | 0 | 0 | 44 | 46 | 2 | 0 | 0.03937 |  |  |  |  |
| Wx-Urban Farm                     | 1460   | 96% | 22 | 1 | 0 | 0 | 0 | 0 | 0 | 23 | 24 | 1 | 0 | 0.03937 |  |  |  |  |
| Cold Sprg Glch conf               | 2240   | 96% | 45 | 2 | 0 | 0 | 0 | 0 | 0 | 47 | 49 | 2 | 0 | 0.03937 |  |  |  |  |
| Piney at Liverpool                | 950    | 96% | 23 | 1 | 0 | 0 | 0 | 0 | 0 | 24 | 25 | 1 | 0 | 0.03937 |  |  |  |  |
| Parker/Mississippi                | 540    | 96% | 25 | 1 | 0 | 0 | 0 | 0 | 0 | 26 | 27 | 1 | 0 | 0.03937 |  |  |  |  |
| Cherry Cr @ Steele                | 1720   | 96% | 25 | 1 | 0 | 0 | 0 | 0 | 0 | 26 | 27 | 1 | 0 | 0.03937 |  |  |  |  |
| Wx-Highlands Ranch WTP            | 2710   | 96% | 25 | 1 | 0 | 0 | 0 | 0 | 0 | 26 | 27 | 1 | 0 | 0.03937 |  |  |  |  |
| A2-Carr Street                    | 100    | 96% | 26 | 1 | 0 | 0 | 0 | 0 | 0 | 27 | 28 | 1 | 0 | 0.03937 |  |  |  |  |
| No Name @ Quincy                  | 730    | 96% | 26 | 1 | 0 | 0 | 0 | 0 | 0 | 27 | 28 | 1 | 0 | 0.03937 |  |  |  |  |
| LDC at 64th                       | 1310   | 96% | 26 | 1 | 0 | 0 | 0 | 0 | 0 | 27 | 28 | 1 | 0 | 0.03937 |  |  |  |  |
| Bear Creek @ Lowell               | 1530   | 96% | 26 | 1 | 0 | 0 | 0 | 0 | 0 | 27 | 28 | 1 | 0 | 0.03937 |  |  |  |  |
| El Rancho                         | 2340   | 96% | 26 | 1 | 0 | 0 | 0 | 0 | 0 | 27 | 28 | 1 | 0 | 0.03937 |  |  |  |  |
| Wx-West Creek WX                  | 3020   | 96% | 26 | 1 | 0 | 0 | 0 | 0 | 0 | 27 | 28 | 1 | 0 | 0.03937 |  |  |  |  |
| Sports Complex                    | 320    | 97% | 27 | 1 | 0 | 0 | 0 | 0 | 0 | 28 | 29 | 1 | 0 | 0.03937 |  |  |  |  |
| Lena @ U.S. Hwy 6                 | 1040   | 97% | 27 | 1 | 0 | 0 | 0 | 0 | 0 | 28 | 29 | 1 | 0 | 0.03937 |  |  |  |  |
| Leyden Confluence                 | 210    | 97% | 28 | 1 | 0 | 0 | 0 | 0 | 0 | 29 | 30 | 1 | 0 | 0.03937 |  |  |  |  |
| NREL/S. Table Mtn.                | 1030   | 97% | 28 | 1 | 0 | 0 | 0 | 0 | 0 | 29 | 30 | 1 | 0 | 0.03937 |  |  |  |  |
| Utah Park                         | 430    | 97% | 29 | 1 | 0 | 0 | 0 | 0 | 0 | 30 | 31 | 1 | 0 | 0.03937 |  |  |  |  |
| Jeffco Fairgrounds                | 1050   | 97% | 29 | 1 | 0 | 0 | 0 | 0 | 0 | 30 | 31 | 1 | 0 | 0.03937 |  |  |  |  |
| Sulphur Gulch                     | 2840   | 97% | 29 | 1 | 0 | 0 | 0 | 0 | 0 | 30 | 31 | 1 | 0 | 0.03937 |  |  |  |  |
| Johnny Park                       | 4310   | 97% | 29 | 1 | 0 | 0 | 0 | 0 | 0 | 30 | 31 | 1 | 0 | 0.03937 |  |  |  |  |
| Chatfield COE                     | 1350   | 97% | 32 | 1 | 0 | 0 | 0 | 0 | 0 | 33 | 34 | 1 | 0 | 0.03937 |  |  |  |  |
| Conifer Hill                      | 4350   | 97% | 32 | 1 | 0 | 0 | 0 | 0 | 0 | 33 | 34 | 1 | 0 | 0.03937 |  |  |  |  |
| Idledale                          | 2350   | 97% | 33 | 1 | 0 | 0 | 0 | 0 | 0 | 34 | 35 | 1 | 0 | 0.03937 |  |  |  |  |
| St. Antons                        | 4570   | 97% | 33 | 1 | 0 | 0 | 0 | 0 | 0 | 34 | 35 | 1 | 0 | 0.03937 |  |  |  |  |
| Justice Center                    | 4360   | 98% | 38 | 1 | 0 | 0 | 0 | 0 | 0 | 39 | 40 | 1 | 0 | 0.03937 |  |  |  |  |
| Betasso                           | 4110   | 98% | 42 | 1 | 0 | 0 | 0 | 0 | 0 | 43 | 44 | 1 | 0 | 0.03937 |  |  |  |  |
| SBC @ San Souci                   | 4830   | 98% | 42 | 1 | 0 | 0 | 0 | 0 | 0 | 43 | 44 | 1 | 0 | 0.03937 |  |  |  |  |

|                            |        |      |    |   |   |   |   |   |   |    |    |   |   |          |  |  |  |  |
|----------------------------|--------|------|----|---|---|---|---|---|---|----|----|---|---|----------|--|--|--|--|
| Nott Creek                 | 150    | 98%  | 45 | 1 | 0 | 0 | 0 | 0 | 0 | 46 | 47 | 1 | 0 | 0.03937  |  |  |  |  |
| Rampart Range Rd-Satellite | 2970   | 98%  | 53 | 1 | 0 | 0 | 0 | 0 | 0 | 54 | 55 | 1 | 0 | 0.03937  |  |  |  |  |
| A2-Brantner Gulch - Precip | 100410 | 100% | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 16 | 16 | 0 | 0 | 0.039371 |  |  |  |  |
| A2-Thorncreek - Precip     | 100420 | 100% | 23 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 23 | 0 | 0 | 0.039371 |  |  |  |  |
| Wx-Blue Mountain           | 140    | 100% | 27 | 0 | 0 | 0 | 0 | 0 | 0 | 27 | 27 | 0 | 1 | 0.03937  |  |  |  |  |
| Leyden Reservoir           | 200    | 100% | 3  | 0 | 0 | 0 | 0 | 0 | 0 | 3  | 3  | 0 | 0 | 0.03937  |  |  |  |  |
| Guy Hill Ranch             | 310    | 100% | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 20 | 0 | 0 | 0.03937  |  |  |  |  |
| Fire Station #7            | 440    | 100% | 26 | 0 | 0 | 0 | 0 | 0 | 0 | 26 | 26 | 0 | 0 | 0.03937  |  |  |  |  |
| Havana Park                | 500    | 100% | 29 | 0 | 0 | 0 | 0 | 0 | 0 | 29 | 29 | 0 | 0 | 0.03937  |  |  |  |  |
| Fire Station #19           | 530    | 100% | 30 | 0 | 0 | 0 | 0 | 0 | 0 | 30 | 30 | 0 | 0 | 0.03937  |  |  |  |  |
| Harvard Gulch Park         | 600    | 100% | 31 | 0 | 0 | 0 | 0 | 0 | 0 | 31 | 31 | 0 | 0 | 0.03937  |  |  |  |  |
| Goldsmith @ Eastman        | 640    | 100% | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 16 | 16 | 0 | 0 | 0.03937  |  |  |  |  |
| Horseshoe Park Drop        | 710    | 100% | 22 | 0 | 0 | 0 | 0 | 0 | 0 | 22 | 22 | 0 | 0 | 0.03937  |  |  |  |  |
| ETG @ Buckley              | 820    | 100% | 21 | 0 | 0 | 0 | 0 | 0 | 0 | 21 | 21 | 0 | 0 | 0.03937  |  |  |  |  |
| Side Creek Park            | 830    | 100% | 18 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 18 | 0 | 0 | 0.03937  |  |  |  |  |
| Fire Station 12            | 840    | 100% | 3  | 0 | 0 | 0 | 0 | 0 | 0 | 3  | 3  | 0 | 0 | 0.03937  |  |  |  |  |
| Flying J                   | 850    | 100% | 1  | 0 | 0 | 0 | 0 | 0 | 0 | 1  | 1  | 0 | 0 | 0.03937  |  |  |  |  |
| A2-Murphy Creek GC         | 870    | 100% | 27 | 0 | 0 | 0 | 0 | 0 | 0 | 27 | 27 | 0 | 0 | 0.03937  |  |  |  |  |
| Wx-Aurora Town Hall        | 920    | 100% | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 14 | 14 | 0 | 0 | 0.03937  |  |  |  |  |
| Pump Sta 3                 | 970    | 100% | 9  | 0 | 0 | 0 | 0 | 0 | 0 | 9  | 9  | 0 | 0 | 0.03937  |  |  |  |  |
| Hidden Lake                | 1300   | 100% | 32 | 0 | 0 | 0 | 0 | 0 | 0 | 32 | 32 | 0 | 1 | 0.03937  |  |  |  |  |
| SPR at 3rd Ave             | 1320   | 100% | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 25 | 25 | 0 | 0 | 0.03937  |  |  |  |  |
| Wx-Elbert                  | 1440   | 100% | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 15 | 0 | 0 | 0.03937  |  |  |  |  |
| Third Creek at DIA         | 1480   | 100% | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 17 | 17 | 0 | 0 | 0.03937  |  |  |  |  |
| Wx-Marston Lake North      | 1520   | 100% | 34 | 0 | 0 | 0 | 0 | 0 | 0 | 34 | 34 | 0 | 0 | 0.03937  |  |  |  |  |
| Wx-Brighton Ditch          | 1570   | 100% | 24 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | 24 | 0 | 0 | 0.03937  |  |  |  |  |
| Englewood Dam              | 1600   | 100% | 29 | 0 | 0 | 0 | 0 | 0 | 0 | 29 | 29 | 0 | 0 | 0.03937  |  |  |  |  |
| Cherry Cr @ Champa         | 1700   | 100% | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 12 | 0 | 0 | 0.03937  |  |  |  |  |
| Shop Creek                 | 1710   | 100% | 2  | 0 | 0 | 0 | 0 | 0 | 0 | 2  | 2  | 0 | 0 | 0.03937  |  |  |  |  |
| Niver Detention            | 1900   | 100% | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 16 | 16 | 0 | 0 | 0.03937  |  |  |  |  |
| Wx-Brighton                | 1920   | 100% | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 16 | 16 | 0 | 0 | 0.03937  |  |  |  |  |
| Rosedale                   | 2250   | 100% | 38 | 0 | 0 | 0 | 0 | 0 | 1 | 38 | 38 | 0 | 0 | 0.03937  |  |  |  |  |
| Brook Forest               | 2260   | 100% | 47 | 0 | 0 | 0 | 0 | 0 | 0 | 47 | 47 | 0 | 0 | 0.03937  |  |  |  |  |
| Red Rocks Park             | 2370   | 100% | 39 | 0 | 0 | 0 | 0 | 0 | 0 | 39 | 39 | 0 | 1 | 0.03937  |  |  |  |  |
| Wx-Salisbury Park          | 2730   | 100% | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 14 | 14 | 0 | 0 | 0.03937  |  |  |  |  |
| Spruce Mt - Douglas        | 2890   | 100% | 9  | 0 | 0 | 0 | 0 | 0 | 0 | 9  | 9  | 0 | 0 | 0.03937  |  |  |  |  |
| East Cherry Cr-Douglas     | 2910   | 100% | 20 | 0 | 0 | 0 | 0 | 0 | 1 | 20 | 20 | 0 | 0 | 0.03937  |  |  |  |  |
| Fire Sta 47                | 3060   | 100% | 26 | 0 | 0 | 0 | 0 | 0 | 0 | 26 | 26 | 0 | 0 | 0.03937  |  |  |  |  |
| A2-Newlin Gulch Precip     | 3070   | 100% | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 17 | 17 | 0 | 0 | 0.03937  |  |  |  |  |
| A2-Highland Heritage Park  | 3090   | 100% | 3  | 0 | 0 | 0 | 0 | 0 | 0 | 3  | 3  | 0 | 0 | 0.03937  |  |  |  |  |
| Crescent                   | 4010   | 100% | 32 | 0 | 0 | 0 | 0 | 0 | 0 | 32 | 32 | 0 | 0 | 0.03937  |  |  |  |  |
| Red Garden                 | 4030   | 100% | 48 | 0 | 0 | 0 | 0 | 0 | 0 | 48 | 48 | 0 | 0 | 0.03937  |  |  |  |  |
| Walker Ranch               | 4050   | 100% | 30 | 0 | 0 | 0 | 0 | 0 | 0 | 30 | 30 | 0 | 0 | 0.03937  |  |  |  |  |
| Twin Sisters               | 4080   | 100% | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 35 | 35 | 0 | 0 | 0.03937  |  |  |  |  |
| Magnolia                   | 4090   | 100% | 45 | 0 | 0 | 0 | 0 | 0 | 0 | 45 | 45 | 0 | 0 | 0.03937  |  |  |  |  |
| Swiss Peaks                | 4130   | 100% | 37 | 0 | 0 | 0 | 0 | 0 | 0 | 37 | 37 | 0 | 0 | 0.03937  |  |  |  |  |
| Logan Mill                 | 4140   | 100% | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 35 | 35 | 0 | 0 | 0.03937  |  |  |  |  |
| Gold Hill                  | 4150   | 100% | 43 | 0 | 0 | 0 | 0 | 0 | 0 | 43 | 43 | 0 | 0 | 0.03937  |  |  |  |  |
| Sunshine                   | 4160   | 100% | 32 | 0 | 0 | 0 | 0 | 0 | 0 | 32 | 32 | 0 | 0 | 0.03937  |  |  |  |  |
| Pine Brook                 | 4170   | 100% | 28 | 0 | 0 | 0 | 0 | 0 | 0 | 28 | 28 | 0 | 0 | 0.03937  |  |  |  |  |
| Gold Lake                  | 4180   | 100% | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 35 | 35 | 0 | 0 | 0.03937  |  |  |  |  |
| Golden Age                 | 4230   | 100% | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 20 | 0 | 0 | 0.03937  |  |  |  |  |
| Sunset                     | 4240   | 100% | 32 | 0 | 0 | 0 | 0 | 0 | 0 | 32 | 32 | 0 | 0 | 0.03937  |  |  |  |  |
| Lee Hill Rain 2012         | 4320   | 100% | 37 | 0 | 0 | 0 | 0 | 0 | 0 | 37 | 37 | 0 | 0 | 0.03937  |  |  |  |  |
| Winiger Ridge              | 4530   | 100% | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 10 | 0 | 0 | 0.03937  |  |  |  |  |
| Boulder Jail               | 4550   | 100% | 32 | 0 | 0 | 0 | 0 | 0 | 1 | 32 | 32 | 0 | 1 | 0.03937  |  |  |  |  |
| Wx-Ward C-1                | 4710   | 100% | 27 | 0 | 0 | 0 | 0 | 0 | 0 | 27 | 27 | 0 | 0 | 0.03937  |  |  |  |  |
| Wx-Sugarloaf               | 4730   | 100% | 38 | 0 | 0 | 0 | 0 | 0 | 0 | 38 | 38 | 0 | 0 | 0.03937  |  |  |  |  |
| Doudy Draw                 | 4820   | 100% | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 14 | 14 | 0 | 0 | 0.03937  |  |  |  |  |
| SBC@S Boulder Ditch        | 4840   | 100% | 37 | 0 | 0 | 0 | 0 | 0 | 0 | 37 | 37 | 0 | 0 | 0.03937  |  |  |  |  |
| Whispering Pines           | 4880   | 100% | 41 | 0 | 0 | 0 | 0 | 0 | 0 | 41 | 41 | 0 | 0 | 0.03937  |  |  |  |  |
| Four Mile Creek            | 5720   | 100% | 7  | 0 | 0 | 0 | 0 | 0 | 0 | 7  | 7  | 0 | 0 | 0.03937  |  |  |  |  |

|                                       |        |            |      |     |    |    |   |   |    |      |      |     |    |         |  |  |  |  |
|---------------------------------------|--------|------------|------|-----|----|----|---|---|----|------|------|-----|----|---------|--|--|--|--|
| West Creek                            | 5730   | 100%       | 7    | 0   | 0  | 0  | 0 | 0 | 0  | 7    | 7    | 0   | 0  | 0.03937 |  |  |  |  |
| Trail Creek                           | 5740   | 100%       | 5    | 0   | 0  | 0  | 0 | 0 | 0  | 5    | 5    | 0   | 0  | 0.03937 |  |  |  |  |
| Stump Bump                            | 5810   | 100%       | 7    | 0   | 0  | 0  | 0 | 0 | 0  | 7    | 7    | 0   | 0  | 0.03937 |  |  |  |  |
| Cedar Mountain                        | 5860   | 100%       | 7    | 0   | 0  | 0  | 0 | 0 | 0  | 7    | 7    | 0   | 0  | 0.03937 |  |  |  |  |
| Hackett Mountain                      | 5880   | 100%       | 6    | 0   | 0  | 0  | 0 | 0 | 0  | 6    | 6    | 0   | 0  | 0.03937 |  |  |  |  |
| Log Jumper                            | 5940   | 100%       | 11   | 0   | 0  | 0  | 0 | 0 | 1  | 11   | 11   | 0   | 0  | 0.03937 |  |  |  |  |
| A2-Blackstone Precip                  | 100100 | 100%       | 16   | 0   | 0  | 0  | 0 | 0 | 0  | 16   | 16   | 0   | 0  | 0.03937 |  |  |  |  |
| A2-ETG @ Hampden Precip               | 100110 | 100%       | 24   | 0   | 0  | 0  | 0 | 0 | 0  | 24   | 24   | 0   | 0  | 0.03937 |  |  |  |  |
| A2-Sellers Gulch at Haystack Precip   | 100150 | 100%       | 5    | 0   | 0  | 0  | 0 | 0 | 1  | 5    | 5    | 0   | 0  | 0.03937 |  |  |  |  |
| A2-Sand Creek at Colfax Precip        | 100160 | 100%       | 18   | 0   | 0  | 0  | 0 | 0 | 0  | 18   | 18   | 0   | 0  | 0.03937 |  |  |  |  |
| A2-Havana Pond Precip                 | 100230 | 100%       | 21   | 0   | 0  | 0  | 0 | 0 | 0  | 21   | 21   | 0   | 0  | 0.03937 |  |  |  |  |
| A2-Westerly Cr Dam Precip             | 100240 | 100%       | 21   | 0   | 0  | 0  | 0 | 0 | 0  | 21   | 21   | 0   | 0  | 0.03937 |  |  |  |  |
| A2-PlumCr at Sedalia - Precip         | 100290 | 100%       | 43   | 0   | 0  | 0  | 0 | 0 | 0  | 43   | 43   | 0   | 0  | 0.03937 |  |  |  |  |
| A2-Weir Gulch - Precip                | 100320 | 100%       | 5    | 0   | 0  | 0  | 0 | 0 | 0  | 5    | 5    | 0   | 0  | 0.03937 |  |  |  |  |
|                                       |        | Total Tips | 4727 | 199 | 41 | 16 | 7 | 6 | 12 | 4996 | 5393 | 387 | 14 |         |  |  |  |  |
|                                       |        |            |      |     |    |    |   |   |    |      |      |     |    |         |  |  |  |  |
|                                       |        |            |      |     |    |    |   |   |    |      |      |     |    |         |  |  |  |  |
|                                       |        |            |      |     |    |    |   |   |    |      |      |     |    |         |  |  |  |  |
| Porphory Mtn                          | 4850   | 100%       | 175  | 0   | 0  | 0  | 0 | 0 | 0  | 175  | 175  | 0   | 0  | 0.01    |  |  |  |  |
| Fairview Peak                         | 4860   | 94%        | 93   | 3   | 0  | 1  | 0 | 0 | 1  | 97   | 103  | 6   | 0  | 0.01    |  |  |  |  |
| Wx-A2-Magnolia WX-Precip              | 6601   | 100%       | 145  | 0   | 0  | 0  | 0 | 0 | 0  | 145  | 145  | 0   | 0  | 0.01    |  |  |  |  |
| Wx-A2-OneRain Weather - Precipitation | 100200 | 88%        | 62   | 2   | 1  | 0  | 0 | 1 | 0  | 66   | 75   | 9   | 0  | 0.01    |  |  |  |  |

## 2017 Monthly Peak Hour ALERT Radio Traffic Summary

