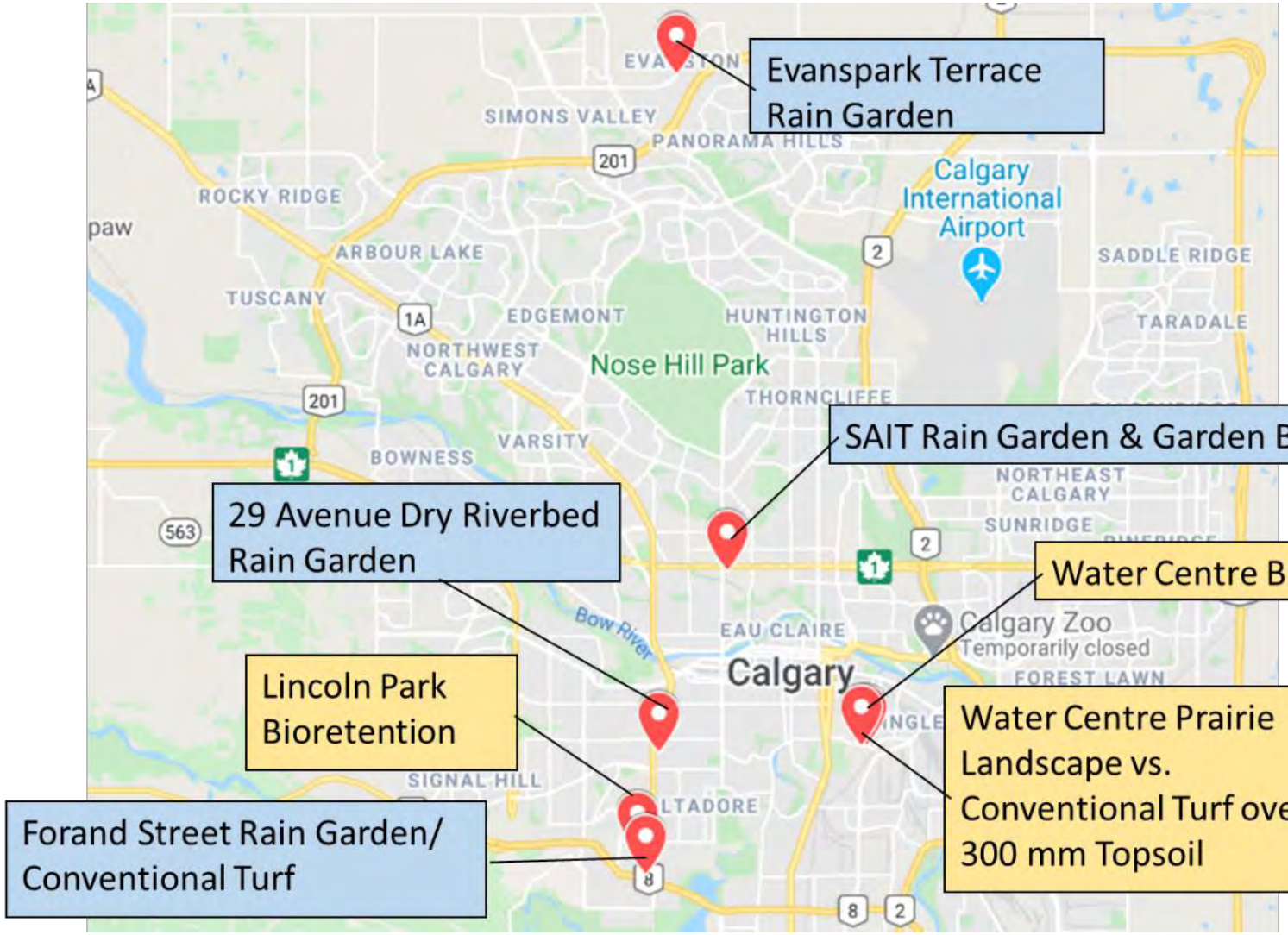
# ALIDP Monitoring Program and Results

- Rainwater for Resilience (RW4R) Program
  - Alberta Environment and Parks Watershed Resiliency and Restoration Program
- A three-year performance monitoring program of landscaping, bioretention/bioswales, and rain gardens in Calgary led by MPE Engineering
- Findings to confirm performance, refine design and construction guidance, validate modelling, and inform future monitoring needs
- 2020 is anticipated to be the final year for monitoring
- RAMWG will provide a platform for sharing data and knowledge on this and other stormwater initiatives around the province

# Monitoring Program - Overview



# Monitoring Program - Sites

SAIT Rain Garden

Forand Street Rain Garden

Evanspark Rain Garden

29 Ave  Rain Garden

Water Centre East Bioretention

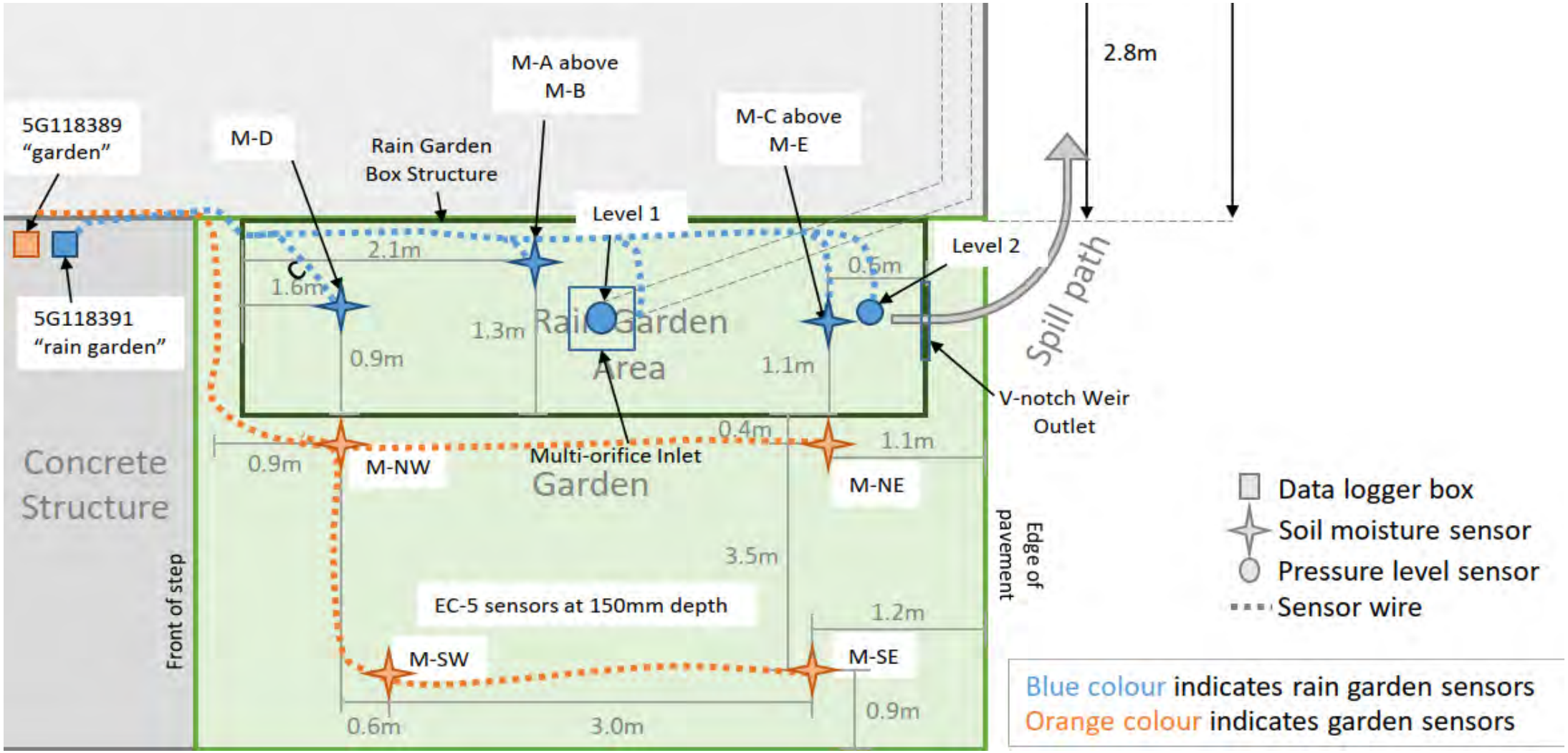
Water Centre Landscaping

Lincoln Park (Multiple Sites)

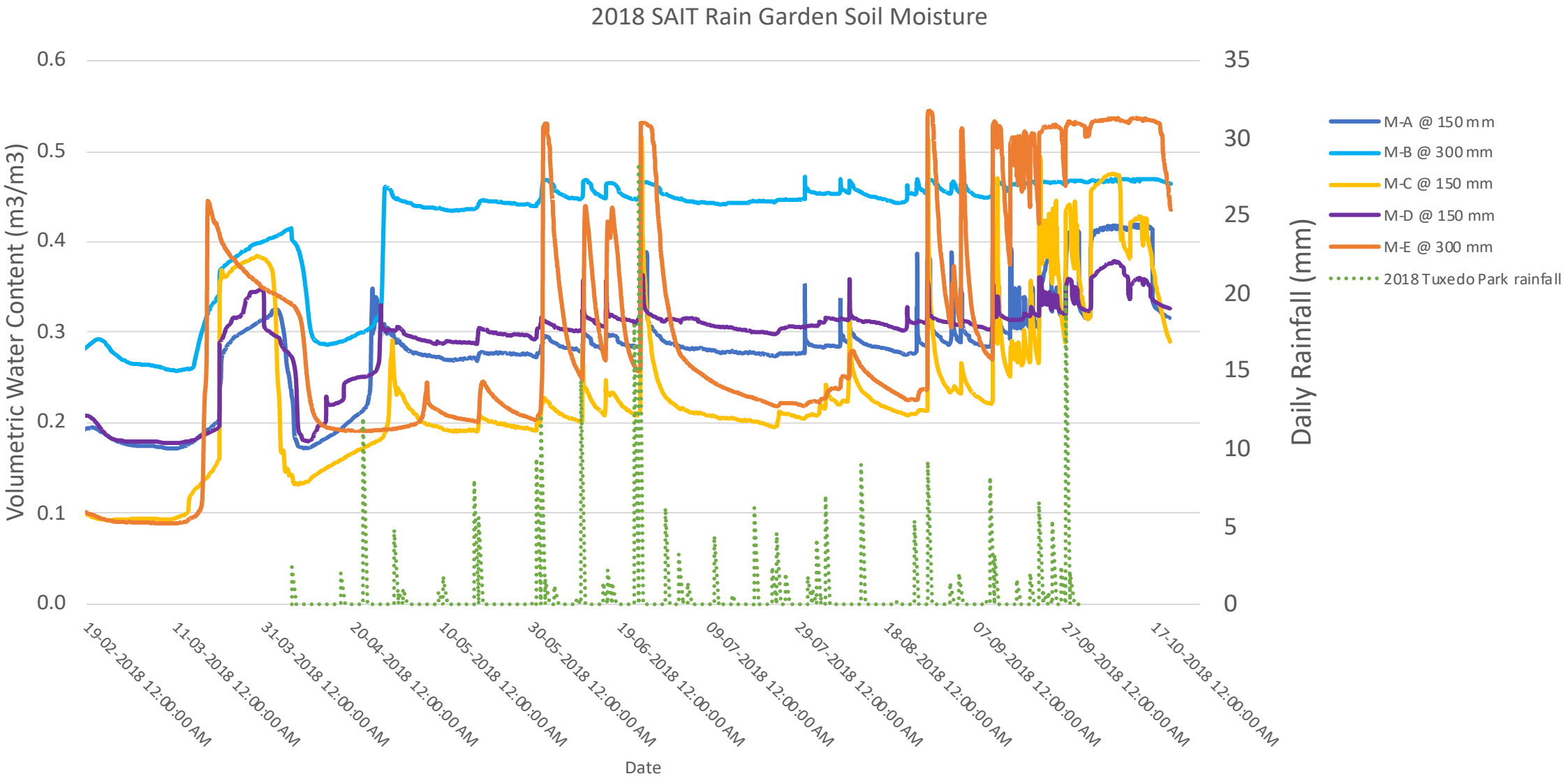
# Monitoring Program – Types of Data

- Soil Moisture
- Water Levels
- Infiltration
- Soil Analysis
- Vegetation Assessments


# Example – SAIT Rain Garden



# SAIT Rain Garden Soil Moisture



# Results and Takeaways

- The most important finding so far is that monitoring numbers validate assumptions pertaining to performance
- Monitoring supports the original modeling prediction of performance for rain gardens. An I/P ratio of 4 retains a 100-year, 30-minute storm
- Rain gardens were shown to retain 75% of runoff, which is 10 to 15 times that of conventional turf + downspout arrangement
- Downspout placement and use of deeper topsoil are valuable design considerations
- Prairie landscape provides significant storage capacity compared to other landscaping treatments (vegetation matters!)

# Monitoring Program – Data Package

- A preview of the data package was presented at the ALIDP Research and Monitoring (RAM) Working Group kickoff meeting in June 2020
- Data package is being complied so that third parties can access the data collected to date
- Specific data for each site will include:
  - Overview of site type, location
  - Site Construction and Configurations
  - Monitoring sensor and data logger configuration as-builts, specifications
  - Compiled continuous sensor data
  - Site maintenance log, calibration tests, etc.
  - Infiltration tests, soil tests and vegetation assessments
  - Calculation sheets and equations for V-notch weir and multi-orifice inlet
  - Site Photos
  - Data graphic presentation and calculations for flow rate, surface and subsurface infiltration rates (where applicable)

# Example Data Package

| | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5G118391 | M-A @ 150 mm | M-A @ 150 mm | M-A @ 150 mm | M-B @ 300 mm | M-C @ 150 mm | M-D @ 150 mm | M-E @ 300 mm | M-E @ 300 mm | M-E @ 300 mm |
| 2 | 18500 records | 5TE | 5TE | 5TE | EC-5 | EC-5 | 5TE | 5TE | 5TE | EC-5 |
| 3 | Measurement Time | m³/m³ VWC | S/cm EC Bu | °C Temp | m³/m³ VWC | m³/m³ VWC | m³/m³ VWC | S/cm EC Bu | °C Temp | m³/m³ VWC |
| 4 | 3/1/2019 12:00 AM | 0.114 | 0.00 | -3.0 | 0.143 | 0.089 | 0.134 | 0.05 | -2.7 | 0.079 |
| 5 | 3/1/2019 12:05 AM | 0.114 | 0.00 | -3.0 | 0.143 | 0.089 | 0.134 | 0.05 | -2.7 | 0.079 |
| 6 | 3/1/2019 12:10 AM | 0.114 | 0.00 | -3.0 | 0.143 | 0.089 | 0.134 | 0.05 | -2.7 | 0.079 |
| 7 | 3/1/2019 12:15 AM | 0.114 | 0.00 | -3.0 | 0.143 | 0.089 | 0.134 | 0.05 | -2.7 | 0.079 |
| 8 | 3/1/2019 12:20 AM | 0.114 | 0.00 | -3.0 | 0.143 | 0.089 | 0.134 | 0.05 | -2.7 | 0.079 |
| 9 | 3/1/2019 12:25 AM | 0.114 | 0.00 | -3.0 | 0.143 | 0.089 | 0.134 | 0.05 | -2.7 | 0.079 |
| 10 | 3/1/2019 12:30 AM | 0.114 | 0.00 | -3.0 | 0.143 | 0.089 | 0.134 | 0.05 | -2.7 | 0.079 |
| 11 | 3/1/2019 12:35 AM | 0.114 | 0.00 | -3.0 | 0.143 | 0.089 | 0.134 | 0.05 | -2.7 | 0.079 |
| 12 | 3/1/2019 12:40 AM | 0.114 | 0.00 | -3.0 | 0.143 | 0.089 | 0.134 | 0.05 | -2.7 | 0.079 |
| 13 | 3/1/2019 12:45 AM | 0.114 | 0.00 | -3.0 | 0.143 | 0.089 | 0.134 | 0.05 | -2.7 | 0.079 |
| 14 | 3/1/2019 12:50 AM | 0.114 | 0.00 | -3.0 | 0.143 | 0.089 | 0.134 | 0.05 | -2.7 | 0.079 |
| 15 | 3/1/2019 12:55 AM | 0.114 | 0.00 | -3.0 | 0.143 | 0.089 | 0.134 | 0.05 | -2.7 | 0.079 |
| 16 | 3/1/2019 1:00 AM | 0.114 | 0.00 | -3.0 | 0.143 | 0.089 | 0.134 | 0.05 | -2.7 | 0.079 |
| 17 | 3/1/2019 1:05 AM | 0.114 | 0.00 | -3.0 | 0.143 | 0.089 | 0.134 | 0.05 | -2.7 | 0.079 |
| 18 | 3/1/2019 1:10 AM | 0.114 | 0.00 | -3.0 | 0.143 | 0.089 | 0.134 | 0.05 | -2.7 | 0.079 |
| 19 | 3/1/2019 1:15 AM | 0.114 | 0.00 | -3.0 | 0.143 | 0.089 | 0.134 | 0.05 | -2.7 | 0.079 |
| 20 | 3/1/2019 1:20 AM | 0.114 | 0.00 | -3.0 | 0.143 | 0.089 | 0.134 | 0.05 | -2.7 | 0.079 |

README | OVERVIEW | METADATA | RESULTS | DATA-RainGarden-WL | DATA-RainGarden-SM | DATA-2019 Rainfall | CHART-RainGardenWL | CHART-R ...

# Data sharing

- Members of the RAMWG and their employees, colleagues, and/or students may be involved in viewing, reviewing and analyzing this data
- All RAMWG members are required to enter into a Data Sharing Agreement with the ALIDP before accessing ALIDP data
- Dr. Wenming (William) Zhang from the University of Alberta Department of Civil and Environmental Engineering has already entered into a data sharing agreement with the ALIDP!
- In addition, the ALIDP has begun collaborating in different ways with SAIT, the University of Calgary, and the University of Alberta to work with the sites and the data