

Stewardship and decision making

will the 'internet of things' deliver for municipalities?

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Stewardship and decision making

- Synopsis
- Data Collection
- Internet of Things
- Best Management Practices
- LID Data Collection
- Summary and Actions



Synopsis

Low-impact development (LID) - new best management practice (BMP)

Owners/municipalities need to demonstrate stewardship of natural heritage systems and use BMPs to assure this outcome

How will this be demonstrated with LIDs compared to stormwater management ponds (SWMP)?

Internet of Things (IoT) promises smart cities technology to improve asset management through real-time data aggregation

Smart, transparent cities may be just around the corner – not just for park benches, but for stormwater too!



Data collection

Imagine a future where ...

... the data collects you ...



Data collection

Much easier to do poorly

Discrete vs. time series
Metadata
Telemetry

Won't always do it right the first time
If you do, do it again

It can be hard

Expense

Data Management

Reporting

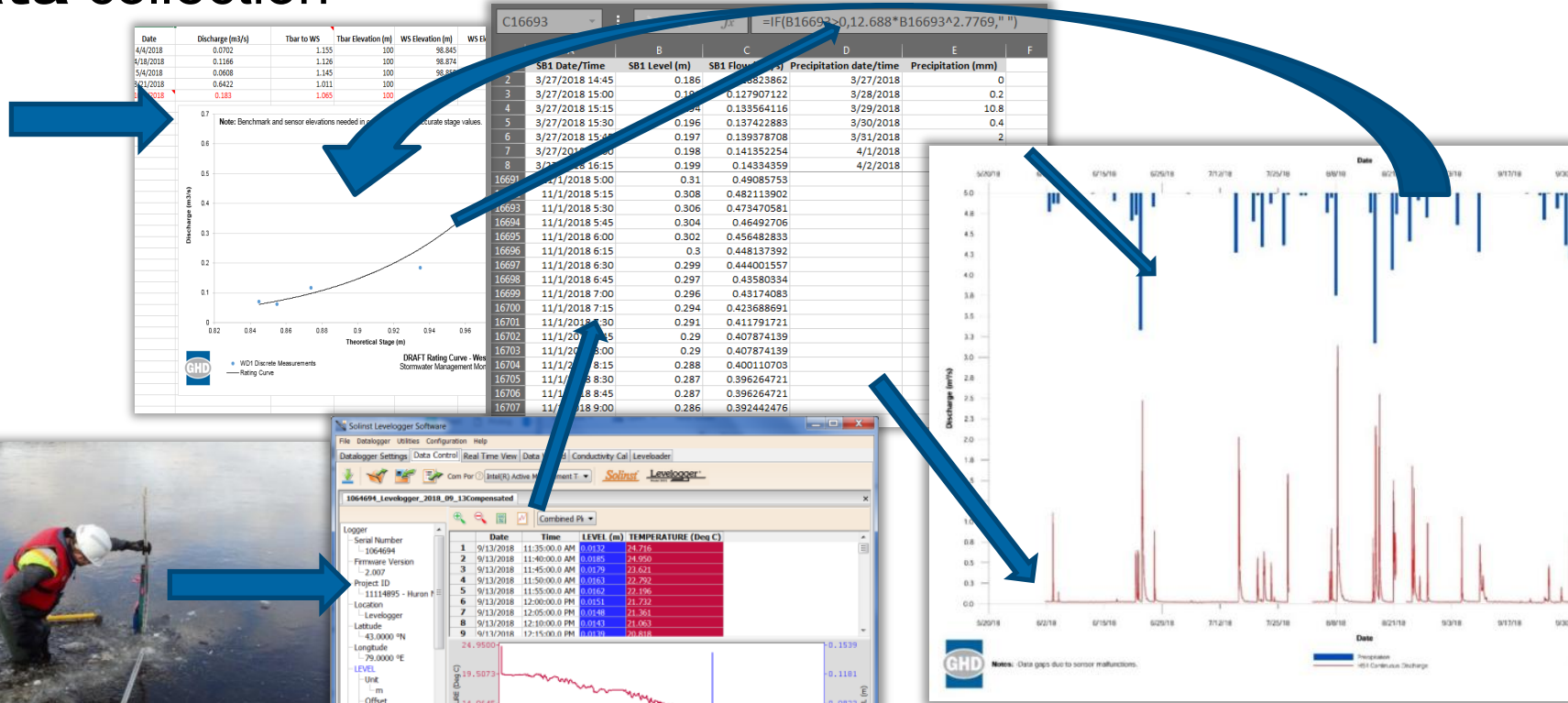
Learn & Repeat

Equipment
Field time
Training
Safety
CSE gear

Quality control
Target audience
Meaningful presentation
Analytics/insights



Data collection



Internet of things

Imagine a future where
data fixes everything....

... if you believe that I have a
bridge investment opportunity for
you but you need to act quickly...



Internet of things

Probably as many definitions as devices out there

Implies:

- Everything is connected (always)
- Everything is 'Smart'
- Life is going to be better

What it actually is:

- Sensors
- Telemetry
 - Not unlike Wi-Fi or Cellular but neither of these
 - Low-power
 - Low-cost
- 'Smart' part comes with what you use the data for



Internet of things

Samsung Family Hub 36" 24.2 CuFt French Door Refrigerator with Ice & Water Dispenser-Stainless Steel

★★★★☆ (6) [Write a Review >](#) **Model Number:** RF265BEAESR **Web Code:** 10736341



....What I picture



Internet of things

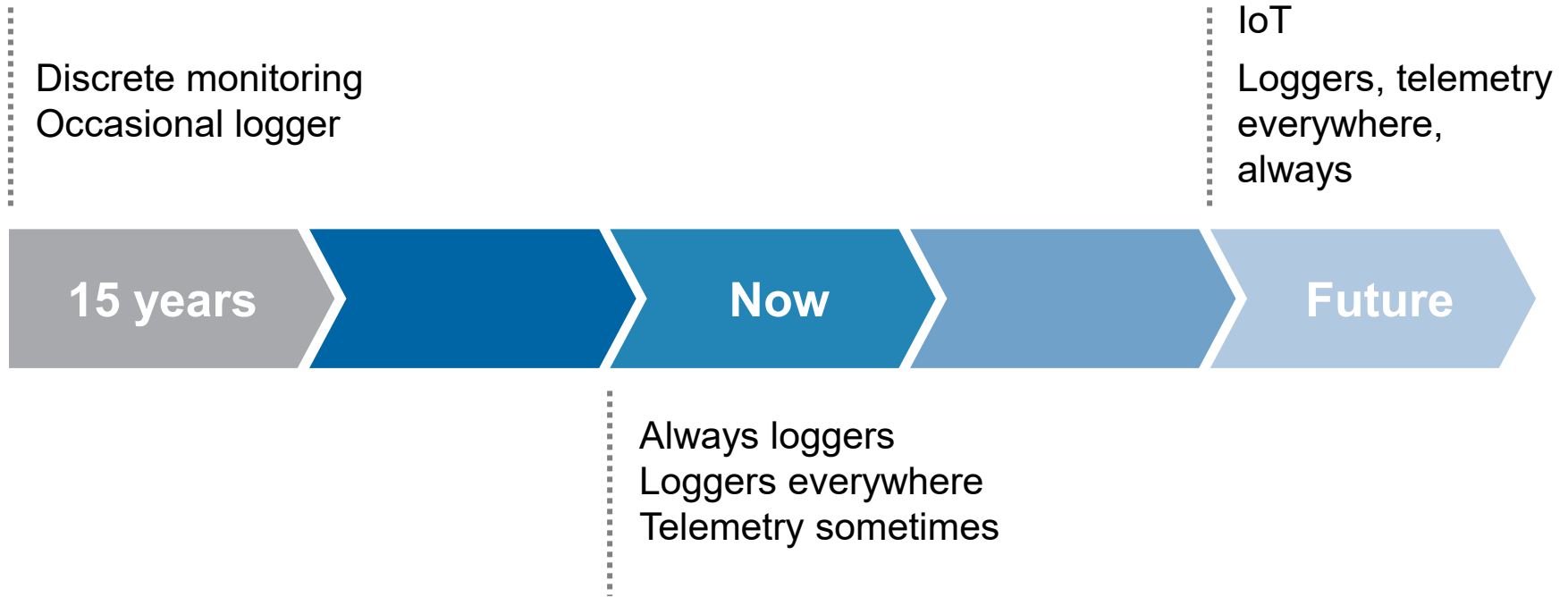
Reality (LowRaWAN)



What I want



IoT data collection – it's about change!



Best management practices

Imagine a future where we can...

- reduce flooding
- improve our natural heritage resources
- reduce erosion
- improve water quality





Best management practices

SWMP – Incumbent BMP

- reduce flooding
- reduce erosion
- improve water quality
- well understood costs
 - installation
 - rehabilitation
- simple monitoring

LID – New BMP

- reduce flooding
- reduce erosion
- improve water quality
- improve aquifer recharge
- many configurations possible
- potential cost benefit
- complex monitoring

Best management practices

SWMP – monitoring

- ECA (becoming more common)
- visual, survey (bathymetry), water quality

Detection and maintenance

- relatively simple
- predictable – decades of experience

LID – monitoring

- ECA (?)
- visual, survey, infiltration, level, vegetation, discharge, overflow, water quality, etc.

Detection and maintenance

- not visible
- need data to detect or identify maintenance

LID data collection

Imagine a future where

- Data collection is easy....

... sorry, still not easy...



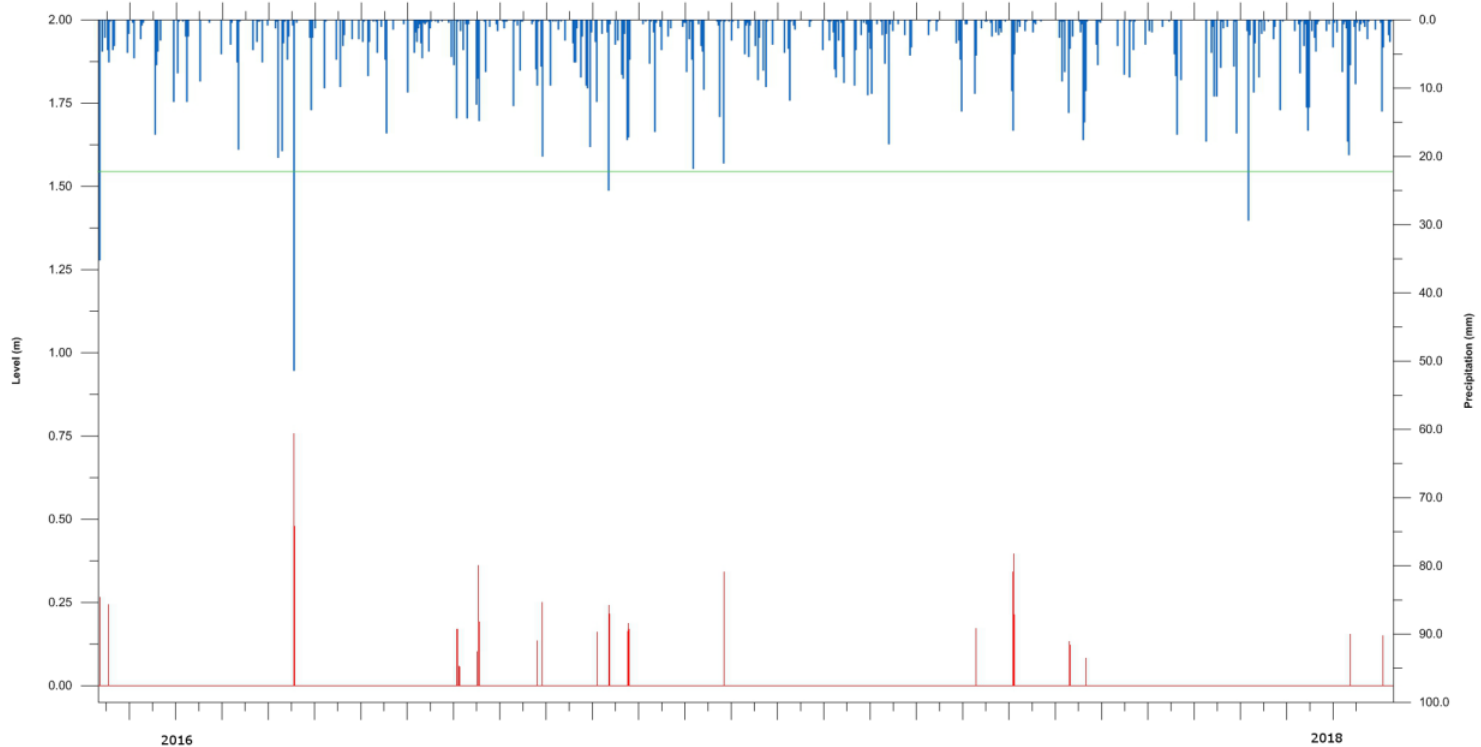
LID data collection



LID data collection

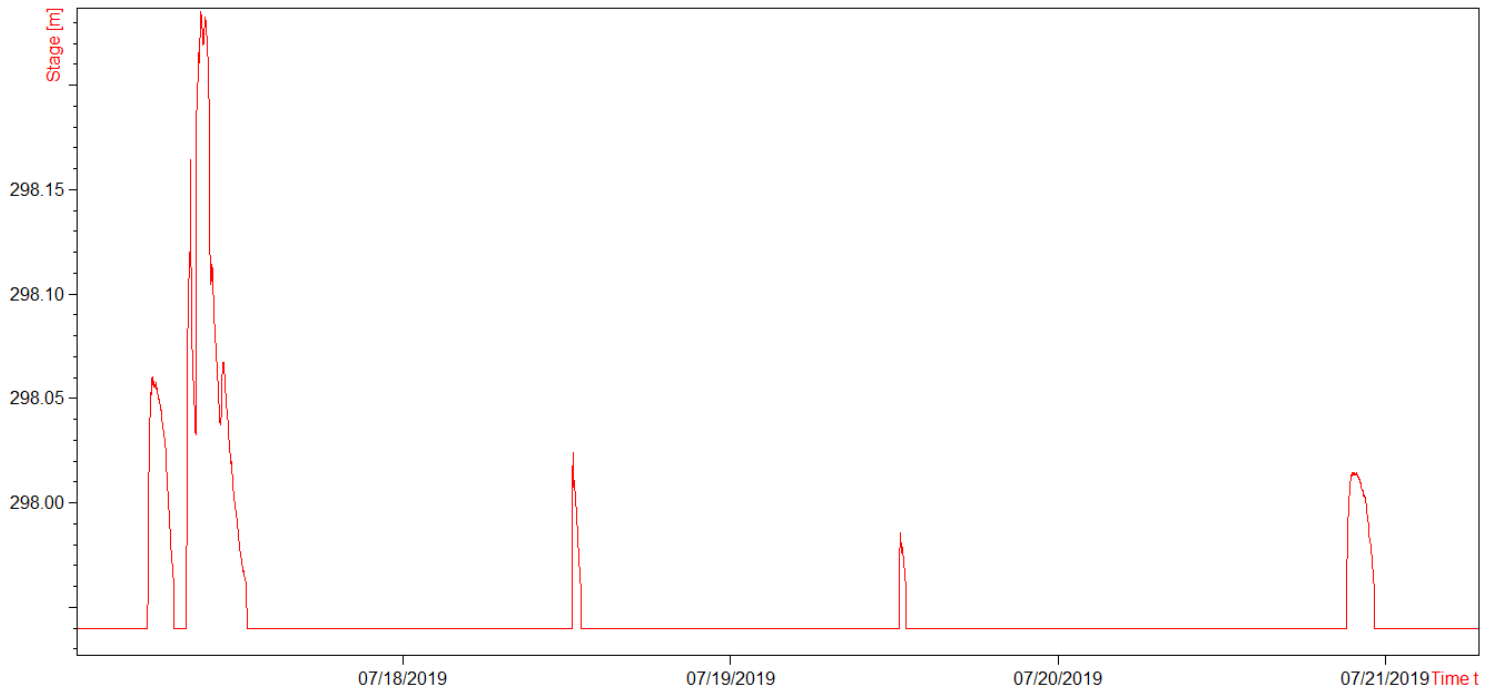


LID data collection



The exciting world of exfiltration galleries

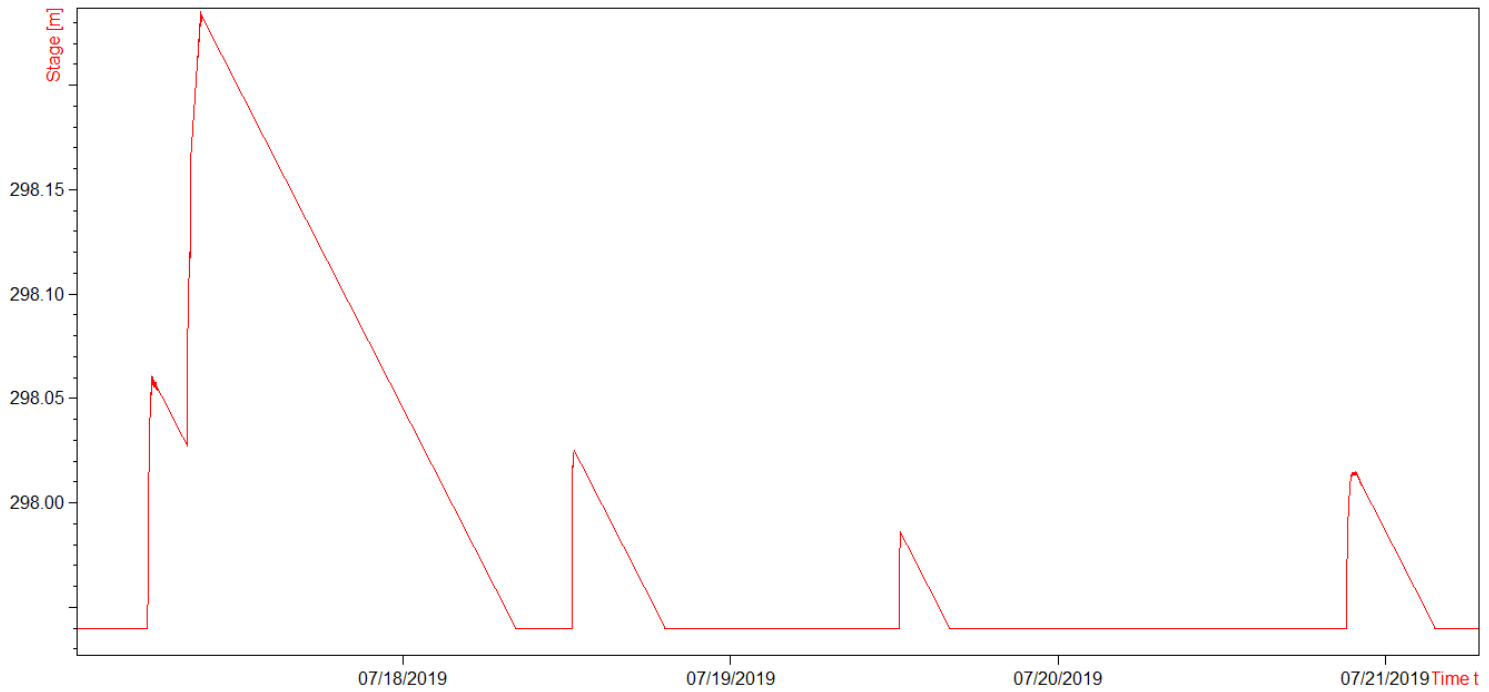
LID data collection



Actual response data



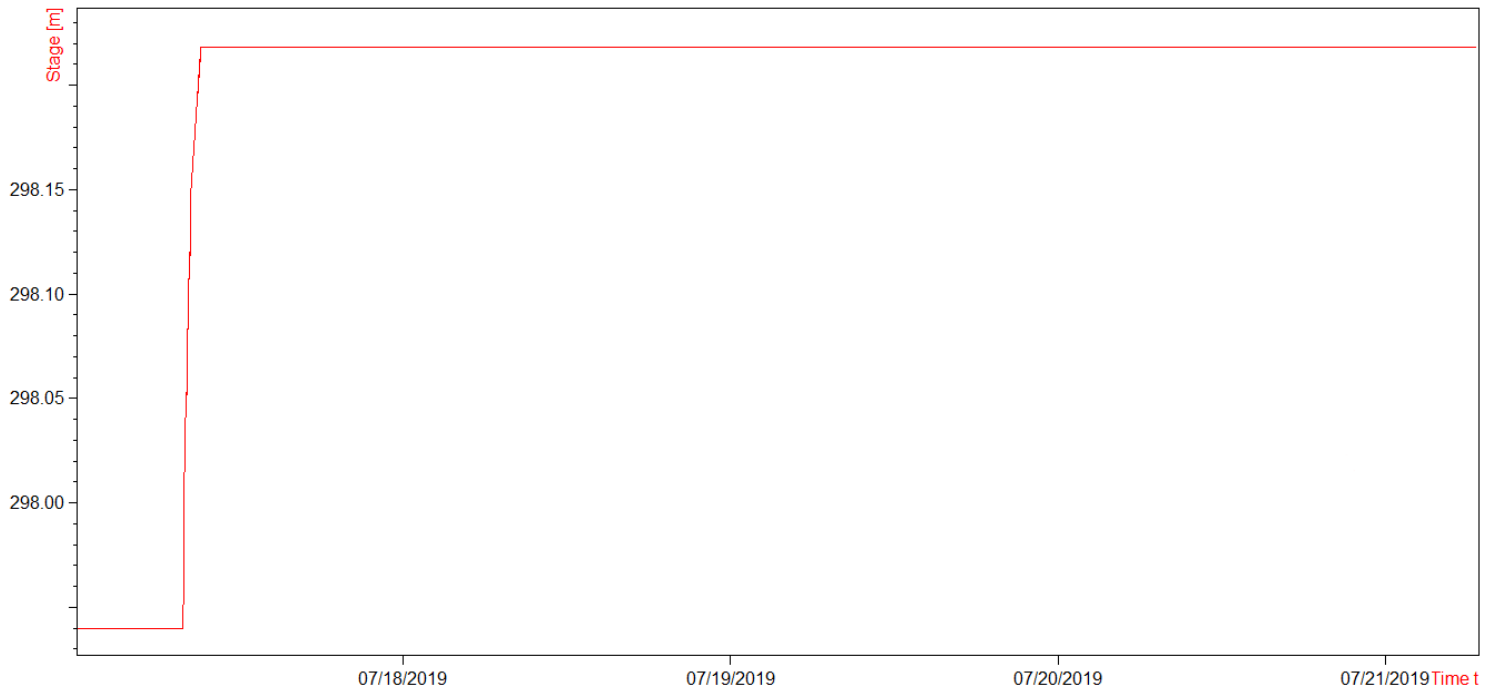
LID data collection



hypothetical impairment



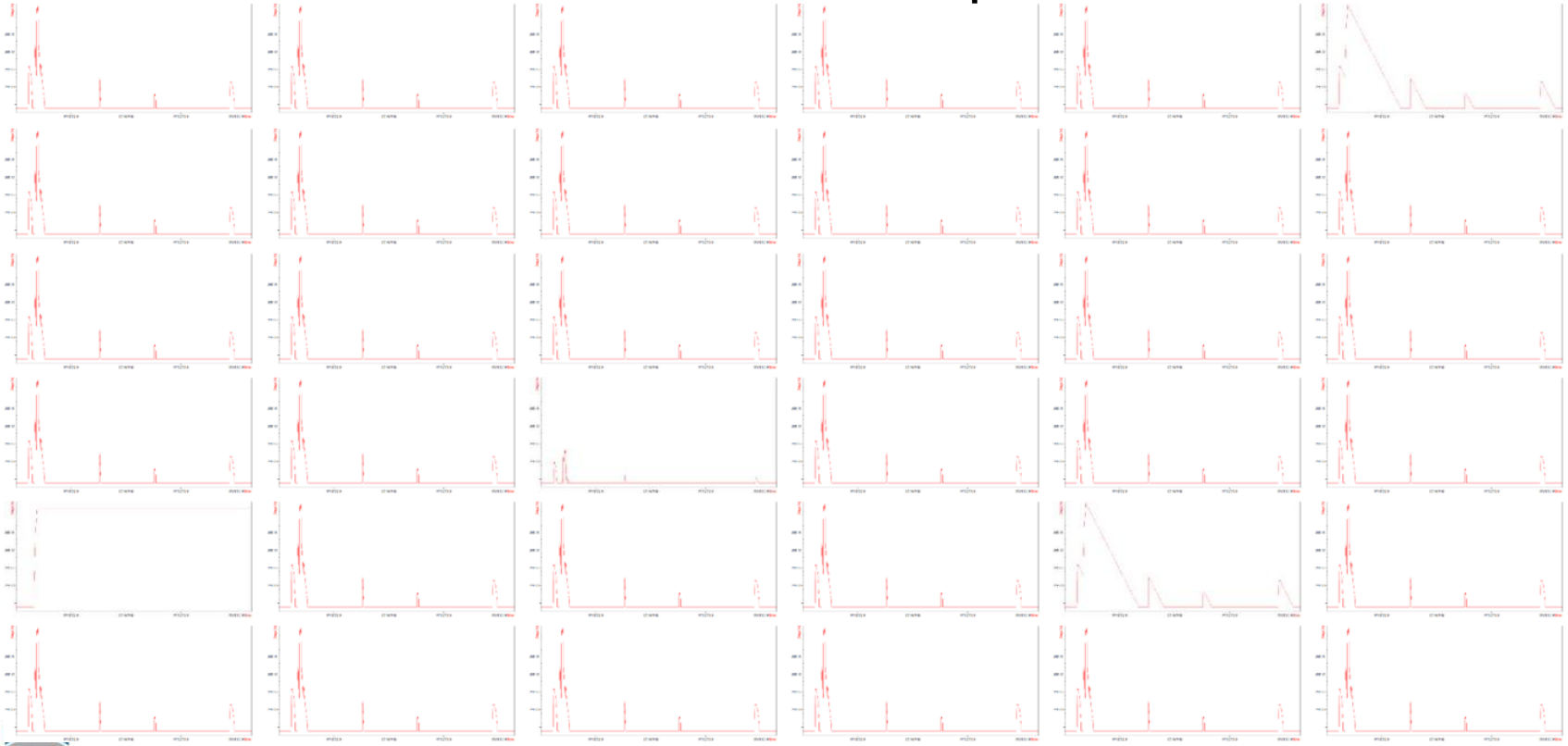
LID data collection



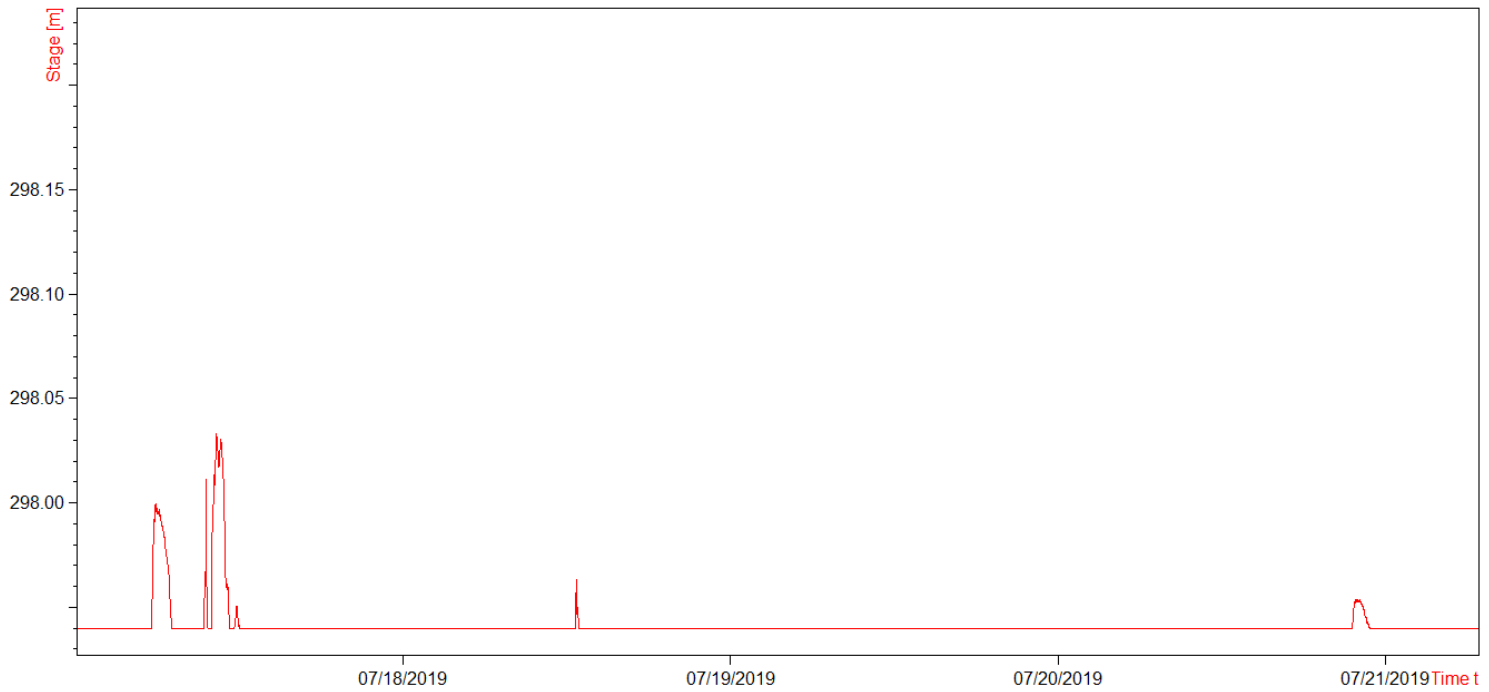
hypothetical failure



LID data collection = maintenance prioritization



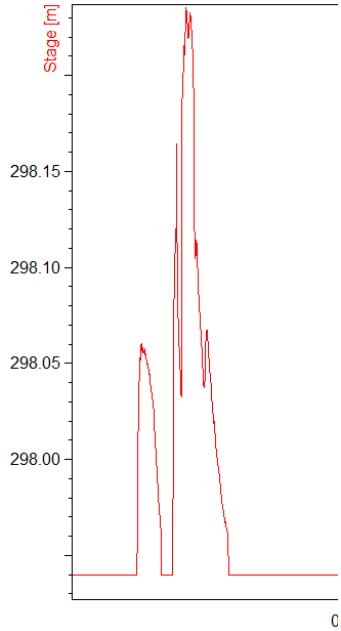
LID data collection



reduced inflow



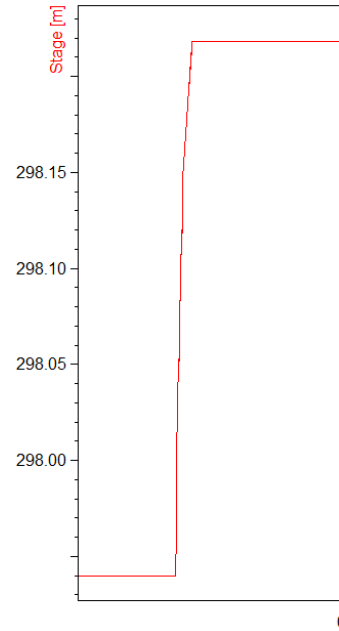
LID data collection – early indicators



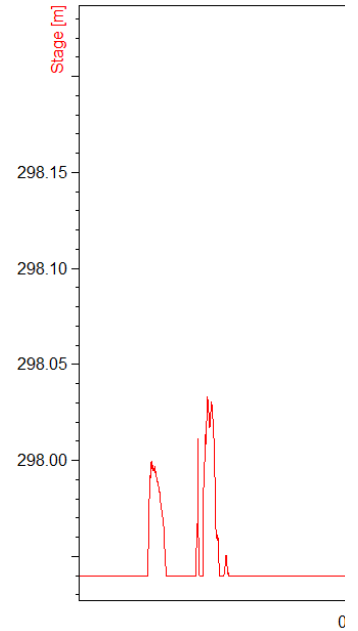
Baseline



Degraded



Failure/Overflow



Reduced Inflow

Summary and reactions

Data collection is still hard

LIDs do not make monitoring easier than we have it now

IoT - significantly lower-cost telemetry than traditional means

Lower cost for sensors and telemetry will result in proliferation



Summary and reactions

IoT could mean taking a drink from the data-firehose

‘Smart’ data applications using IoT sourced data will drive new insights

Data-driven decisions will improve management of stormwater assets, providing transparent justification for improvement expenditures

Better management of these assets will benefit natural heritage resources for all



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www.ghd.com