

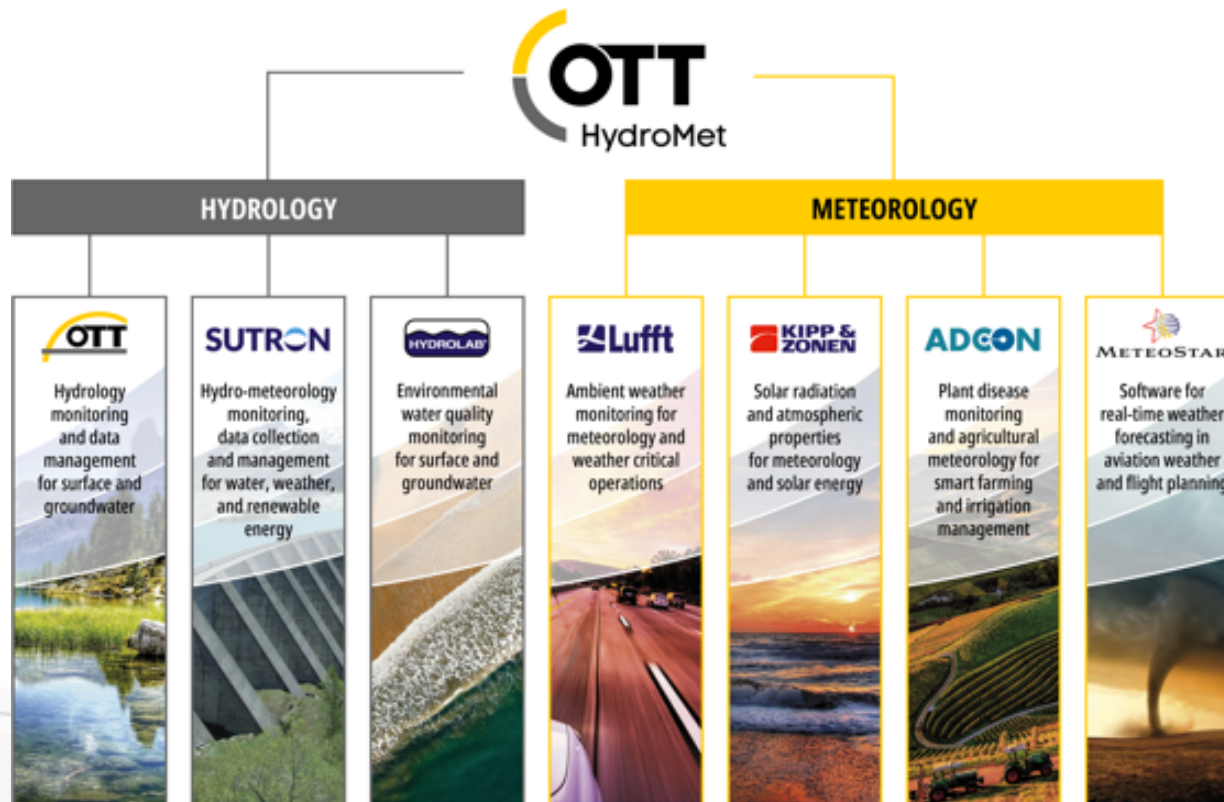
Proactive Management of Flooding With Innovative Technology for Every Budget

WHO WE ARE



Measuring the world's water cycle and surface weather

Through a range of brands to offer complete hydrologic and meteorologic solutions that serve to monitor and protect the environment and lives.



Experience & expertise in hydrology



Surface Water Quantity

Water level, flow and precipitation monitoring with remote communication and data solutions

Flood warning

Water level and precipitation monitoring, alerts and data solutions


Groundwater

Short and long-term water level monitoring


Water Quality


Spot checking and long-term continuous monitoring

TODAY'S AGENDA

01 Benefits of A Flood Warning System 

02 Components of a Flood Warning System
Budget Costs for Different Budgets 

03 Your Flood Management Toolbox 

04 Case Studies, Q&A, Closing Remarks 

Slide 5

PJ7

Thought Derek agreed to read this slide on Tuesday

Penczak, Daniel J, 9/9/2021

NM14

You're right, my apologies. Changed in the notes.

Nash, Megan, 9/9/2021

BENEFITS of a Flood Warning system

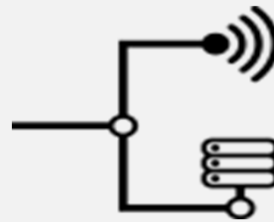
- **Deploy the City/Town/County's limited resources** to initiate proactive measures
- **Reliability:** Have accurate data available at all times
- Assists Department Heads in **assessing situations quickly**
- **Equipment/instruments can be installed directly at local/susceptible flooding locations** with minimal impact to public/private property.
- Obtain the information you need to **be able to justify with decision makers to invest in flood warning** solutions

MONITORING SYSTEMS & THEIR COMPONENTS

Monitoring Heavy Rain and Rising Water Levels Associated with Stormwater



Sensors – Camera – Sampler



System Integration



Software, Dashboard, Alert

Water Level Gauge



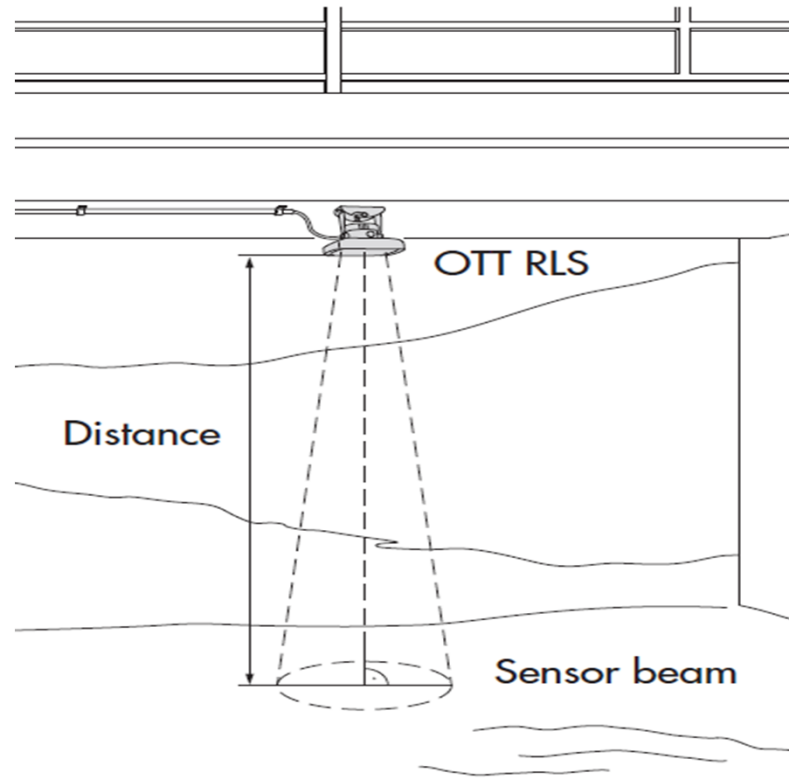
OTT RLS Radar Level Sensor

Advantages

- Contactless measurement
- No damage during flood conditions
- Simple installation and maintenance out of the water

Important to know

- Has to be installed above flood level
- Radar beam can be reflected by other obstacles which leads to wrong measurements



Water Level Gauge



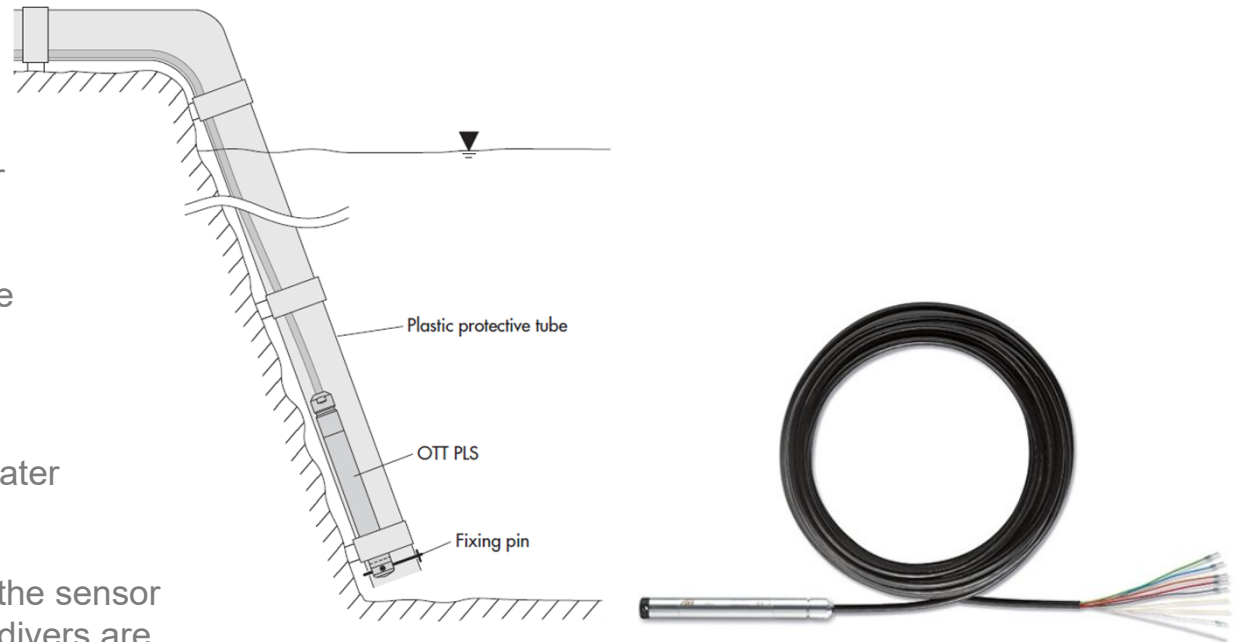
OTT PLS Pressure Level Sensor

Advantages

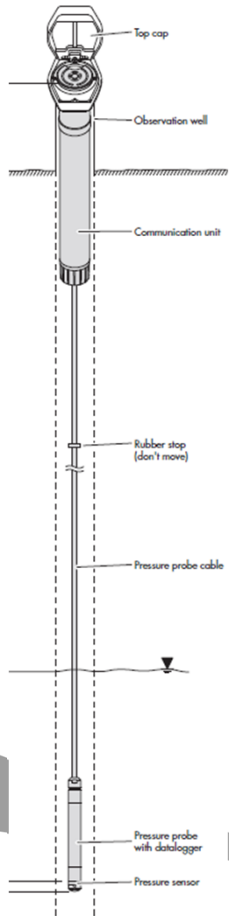
- Very accurate
- Measurement directly in the water
- Cost effective
- OTT Hydromet's ceramic pressure measuring cell

Important to know

- Always needs to be covered by water
- Debris can damage the sensor
- Depending on the site conditions the sensor can be installed from the bank or divers are needed



Water Level Gauge



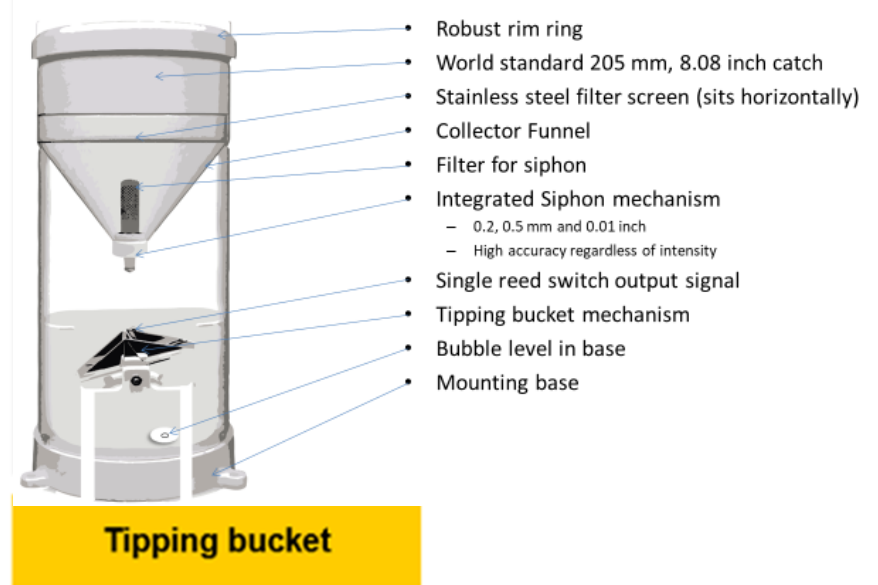
All-in-one solution – Ecolog 1000

- Package contains
 - Pressure Level Sensor
 - Battery
 - Datalogger & Modem
- Advantages
 - Small solution
 - Cost effective
- Important to know
 - Cellular signal required



WEATHER STATION OPTIONS

- Can have a tipping bucket or radar rain gauge
- Can add wind speed, wind direction, compass, temperature, relative humidity, barometric pressure, and global radiation



CAMERA

- Camera to be used for visual confirmation of water level and conditions
- Still shot can be viewed and downloaded through Cloud based solutions



The screenshot displays the Hydromet Cloud web application interface. At the top, there is a navigation bar with the Hydromet Cloud logo and a welcome message for 'mcounty (Montgomery County, MD)'. Below the navigation bar, there is a map showing the location of the camera in Montgomery County, MD. The map includes various landmarks and roads. Below the map, there are tabs for 'Current Data', 'Graph', 'Station Info', and 'Live Images'. The 'Live Images' tab is selected, showing a list of images for 'DENNIS.jpg' from 2020, including dates from May 28 to July. A thumbnail image of the bridge is visible in the bottom right corner of the interface.

Camera - Little Sugar Creek – Charlotte – Mecklenburg

Courtesy of CMSWS CMANN program



OTT HydroMet Datalogging and Telemetry Technologies



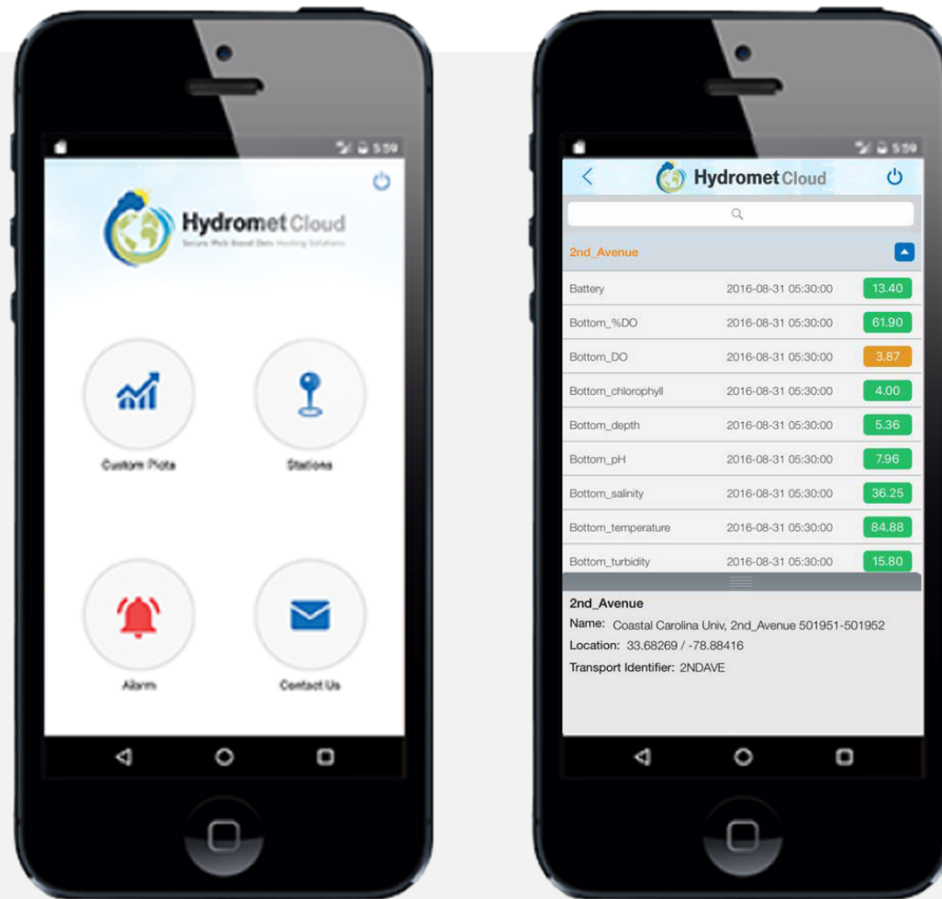
SUTRON XLink



**Sutron XLink 100/500 Logging
Transmitter**

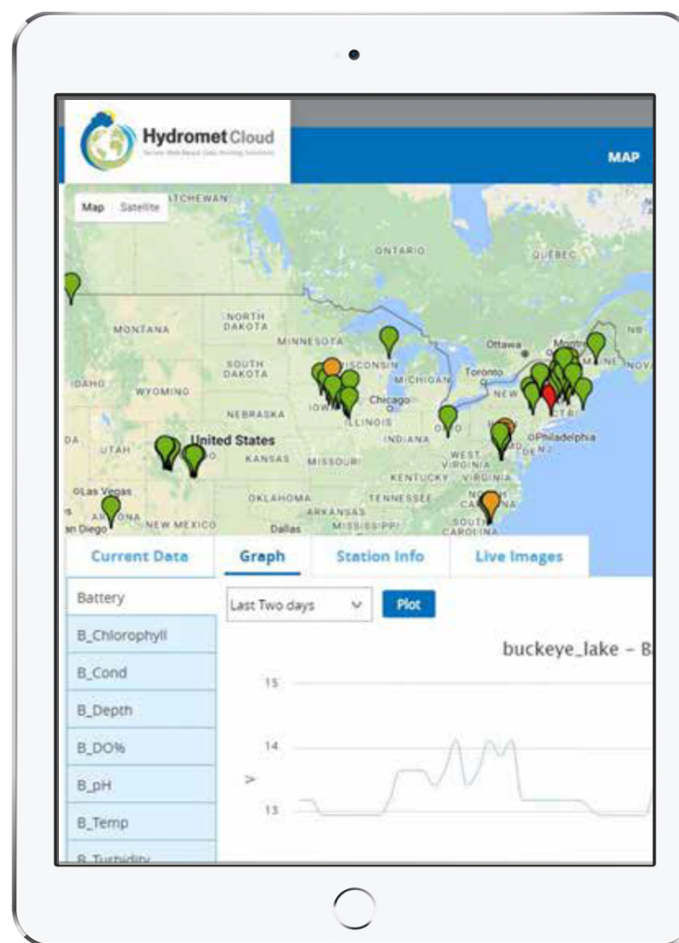
- Digital and analog sensors
- Iridium and cellular telemetry options
- Low-cost

Hydromet cloud



Hydromet cloud

- ANYTIME, ANYWHERE access to current and historic measurement data
- Quickly view current data to check current conditions and know the station is running properly
- Plot data for quick visualization and analysis
- Receive automatic alarm messages via email, text message, or voice message
- Create and download custom data reports in tabular or graphical format
- Can do calculations or derived parameters



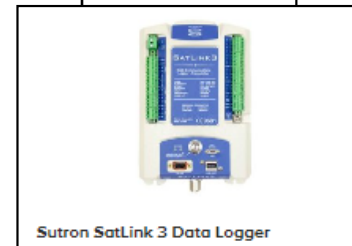
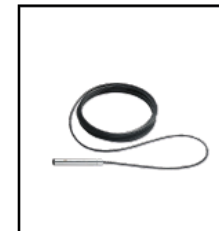
Costs of a Flood Warning System

Basic



\$2,000 - \$6,000

More User Friendly/Advanced



\$6,000 +



Depends on scope and technology selected

Your Flood Management Toolbox

FLOOD WATCH: IMPACT & RESPONSE

What monitoring activities are needed to best manage emergency flood events?

Stormwater Runoff

Inundation Patterns

Reservoir Level

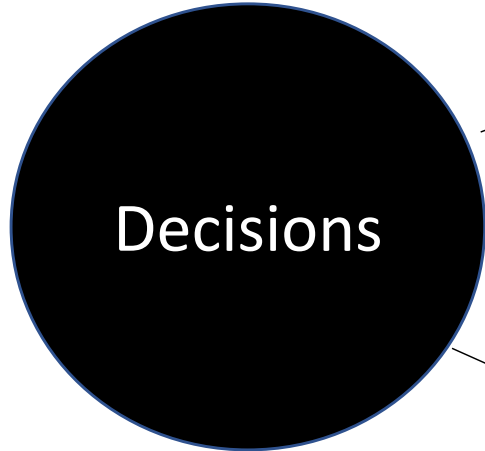
Dam Safety

Aquatic Habitat Changes

Coastal Community
Communications

MONITORING SYSTEMS & THEIR COMPONENTS

Understanding Your Requirements



Is there an existing network or telemetry choice your organization requires?

Is your data real-time and what does that mean for your application?

What is the budget for equipment/installation, ongoing data, and maintenance?

How often do you need to monitor/report?

KEY STEPS TO FOLLOW WHEN DEVELOPING A FLOOD RESILIENCE PLAN

Step 1: Assess

STEP 1: ASSESS

Determine which purposes the flood monitoring network needs to fulfill.

KEY STEPS TO FOLLOW WHEN DEVELOPING A FLOOD RESILIENCE PLAN

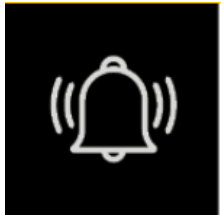
Step 1: Assess



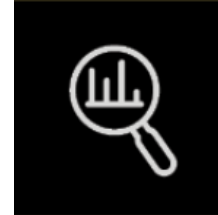
Assess risk of frequency, duration, and amount of heavy rain or high water



Measure the effectiveness of flood mitigation measures



Raise alarms for water levels above a certain threshold



Monitor flood sensitive locations and problem areas



Track long-term trends for frequency and duration of flooding, overtopping, and ponding



Provide accurate water resource statuses and heavy rain alerts

KEY STEPS TO FOLLOW WHEN DEVELOPING A FLOOD RESILIENCE PLAN
Step 2: Define Network

STEP 2: DEFINE NETWORK

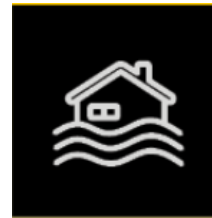
Develop an understanding of
where sites will be placed to measure water data.

KEY STEPS TO FOLLOW WHEN DEVELOPING A FLOOD RESILIENCE PLAN

Step 2: Define Network



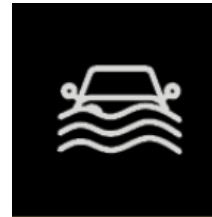
Critical areas/risk hot spots



Where there is flood inundation potential (water ponding potential)



Problem areas on flood risk maps



Where water may overtop roads, culverts, etc., or flash floods



'Sensitive areas' > upstream/downstream of neighborhoods, buildings, and schools

KEY STEPS TO FOLLOW WHEN DEVELOPING A FLOOD RESILIENCE PLAN

Step 3: Select Technologies

STEP 3: SELECT TECHNOLOGIES

The next step is to choose the technology for each site, which will be dictated by the individual site's needs.

KEY STEPS TO FOLLOW WHEN DEVELOPING A FLOOD RESILIENCE PLAN

Step 3: Select Technologies

PRECIPITATION SENSORS

To measure rainfall and intensity

WATER LEVEL SENSORS

For rising water levels

DATA LOGGER & TELEMETRY

Collect and Transmit

SOFTWARE

*Acquire, process,
and model data efficiently*

KEY STEPS TO FOLLOW WHEN DEVELOPING A FLOOD RESILIENCE PLAN

Step 4: Define Alarm Conditions

STEP 4: DEFINE ALARM CONDITIONS

Within your monitoring stations, you can set thresholds to trigger alarm notifications when exceeded. Detailed investigations should be conducted to define the procedure for alarm conditions.

KEY STEPS TO FOLLOW WHEN DEVELOPING A FLOOD RESILIENCE PLAN

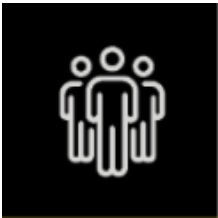
Step 4: Define Alarm Conditions



How these alarms will be raised



What measures should then be undertaken



Who will be contacted and how

KEY STEPS TO FOLLOW WHEN DEVELOPING A FLOOD RESILIENCE PLAN

Step 5: Adapt & Improve

STEP 5: ADAPT & IMPROVE

With the benefit of a comprehensive monitoring network, flood events can help water managers to better understand the conditions that cause flooding and increase confidence in warning system effectiveness.

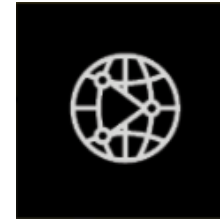
KEY STEPS TO FOLLOW WHEN DEVELOPING A FLOOD RESILIENCE PLAN

Step 5: Adapt & Improve

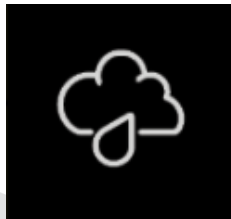
Continue refining and improve:



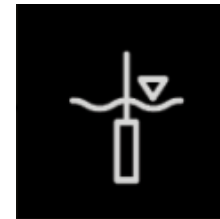
Data reliability and speed of data availability



Flood protection models



Alarm conditions



Technology/gauges and where to find them

CASE STUDY: MONTGOMERY COUNTY HIGH HAZARD DAM MONITORING

Challenge:

Flood warning station needed with alerts and data sent to a web-based data management system



Background

The County needed a reliable monitoring system that could function well in low to high water level situations



Solution & Benefits

Site visits with OTT personnel led to selecting a Constant Flow Bubbler for water level measurement, and use of Hydromet Cloud for alerting and data management. The bubbler was chosen for its ability to defend itself and reliability and easy maintenance



Q&A SESSION



Dan Penczak

Field Sales Lead, OTT HydroMet

dan.penczak@otthydromet.com