

# The 5x5 of Data Loggers at Storm Overflows

5 reasons, 5 use cases + bonustrack tools for implementation





# Introducing

The climate is changing and with it we are experiencing more frequent heavy rainfall events. These often bring the sewage system to its limits. If combined sewer overflow - sewage or wastewater mixed with rain - leaks, it poses a threat to our environment. This is due to fact that untreated combined sewer overflow contains numerous pollutants. In the 5x5 of

rainwater overflow in sewers, we show you 5 reasons why monitoring with data loggers is the way to go. Afterwards, we provide you with 5 practical use cases for rainwater overflow in the sewer. Bonus track: Finally, we show you devices and technologies to implement such rainwater overflow monitoring in the canal with efficient data loggers.

## Index

3		<b>Introducing</b>
4		<b>5 reasons for using data loggers to monitor stormwater overflows</b>
5		<b>Meeting legal requirements</b>
5		<b>Protecting the environment and water bodies</b>
6		<b>Preventing clogging</b>
7		<b>Early warning as a service for citizens</b>
7		<b>Detecting critical situations at an early stage</b>
8		<b>5 use cases for data loggers in stormwater overflows</b>
9		<b>Level measurement</b>
9		<b>Flow measurement</b>
10		<b>Alerting</b>
11		<b>Rain overflow log</b>
11		<b>Visual monitoring</b>
11		<b>Indirect dischargers - bonus use case</b>
12		<b>Bonus track: Tools for the realization of the use cases</b>
13		<b>Rain overflow reporting and level measurement in the sewer</b>
15		<b>Level measurement in the storage sewer, stormwater overflow basin or stormwater retention areas</b>
17		<b>Drainage monitoring and monitoring of reservoir gauges and stormwater overflow basins</b>
19		<b>Platform</b>



Stormwater overflows or combined sewer overflows are structural measures to relieve sewers during heavy rainfall events. A stormwater overflow reduces the inflow of combined sewer peaks into the wastewater treatment plant. Stormwater overflow basins, stormwater retention areas or storage sewers are further structural facilities for collecting water during heavy rainfall events.



# 5 reasons for using data loggers to monitor stormwater overflows



## 1. Meeting legal requirements



From country to country and sometimes on a regional scale, laws and regulations govern wastewater treatment, including stormwater overflow. From mandatory monitoring to logging, the requirements are extensive.

### A few examples:

- In Germany and Austria, the amount of overflow must be recorded and submitted to the district office with a stormwater overflow report.
- In Denmark, visual event logging of stormwater overflow basins is mandatory to avoid unnecessary trips for on-site inspections.

In addition to the requirements of authorities for logging of stormwater overflow data, the data is an important factor in planning the expansion of residential areas.

## 2. Protecting the environment and water bodies



During a heavy rain event, the sewer system can reach its limits. A large amount of rain flows into the sewer in a short time. Rainwater mixes with sewage and the combined sewer emerges from the system. The environment is polluted by the untreated wastewater diluted with

the rainwater. To initiate appropriate measures in this case, it is necessary to record exactly how much mixed water has leaked from the sewer. If this happens frequently and even with light rainfall, it is an indication of an overloaded or undersized sewer system.



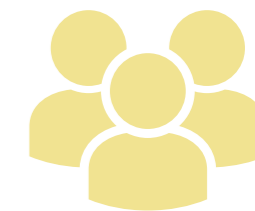
### 3. Preventing clogging



During heavy rain, not only rainwater flows into the sewer. Mud is washed in from the surrounding fields and meadows. Dirt and flotsam are swept away by the water. This clogs the dirt grate, and the mud blocks the holes in the manhole cover. The water shoots over the manhole cover. The water masses make their way and flow into deeper basements and garages. Such clogging can be de-

tected and alerted accordingly. This means that appropriate measures can be initiated on the affected manholes. Blockages and clogging can also occur at the rake of the stormwater overflow basin. Wood and dirt get caught in the rake and keep the stormwater overflow basin clean. The washed-up materials must be removed in regular intervals, for the water to continuously drain.

### 4. Early warning as a service for citizens



In the case of a so-called impoundment of water, the sewer is overloaded. The combined sewer water rises in the shaft and the pressure in the sewer increases. Due to the high pressure the manhole cover lifts, and the combined sewer water comes out of the manhole.

If the manhole cover is located on a road, traffic is affected or even accidents can occur. The lifted manhole

cover is often invisible for the road users under the combined sewer water. If they drive through the water unsuspectingly, they can, for example, get their tires stuck in the sewer.

With an early warning system, road users can be informed of potential danger in near real time, for example with an LED band above the road. The potential danger, even roadblocks can be communicated via the LED bands.

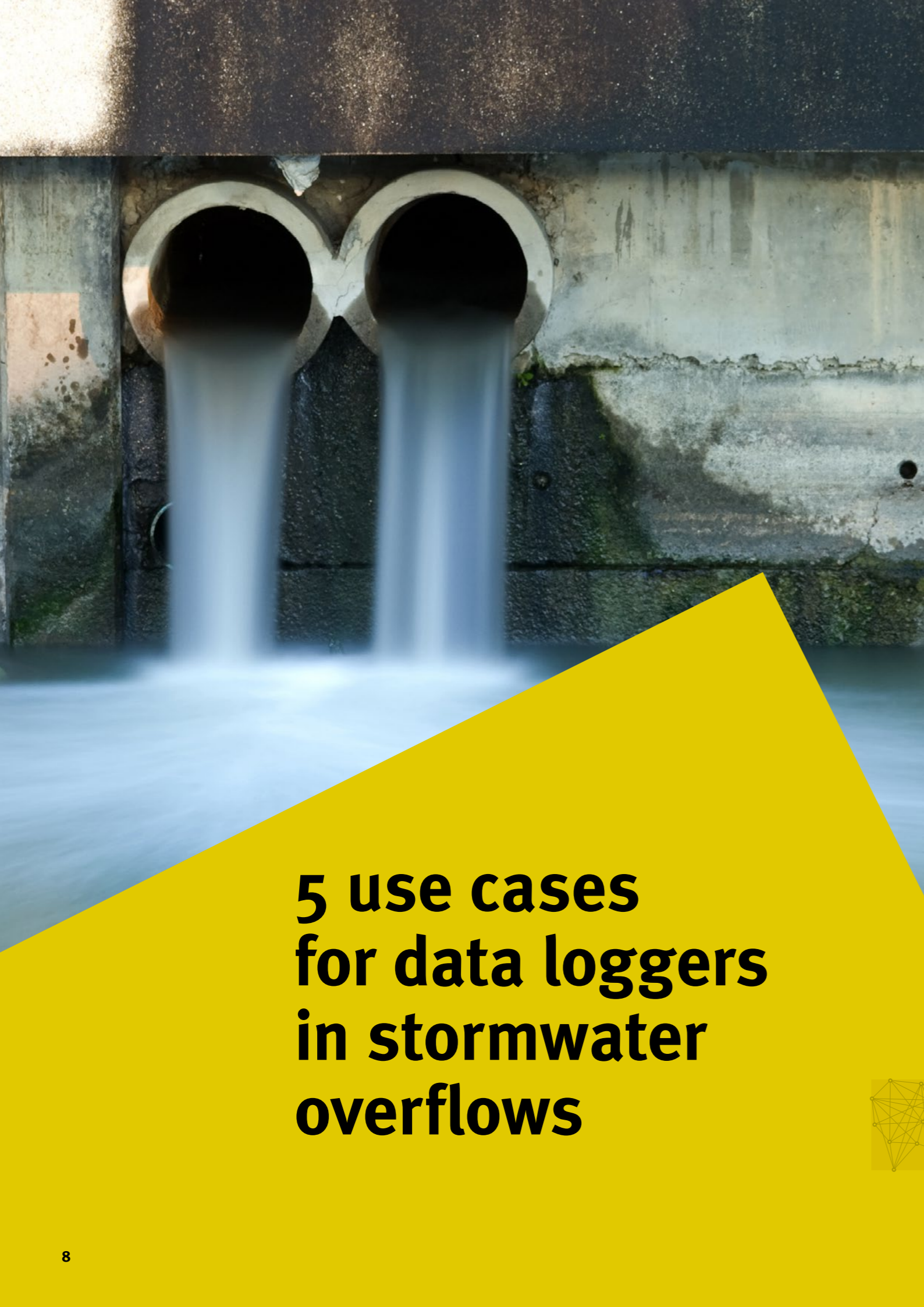
### 5. Detecting critical situations at an early stage



Critical events can be detected at an early stage through permanent real-time monitoring of relevant data (fill level, flow rate, temperature, over-

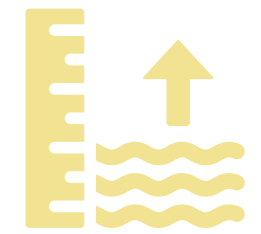
flow). Alerting also makes it possible to inform relevant stakeholders automatically and to initiate targeted measures.





# 5 use cases for data loggers in stormwater overflows

## 1. Level measurement



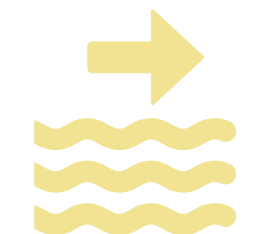
Pressure or radar sensors are used to determine the water level in the sewer and in the stormwater overflow basin. The level is measured in regular intervals, for example every 10 seconds. Once a day, the measured values are transmitted to the cloud.

Since the water level does not change so drastically under normal conditions, it is sufficient to transmit the data daily. In case of a heavy rain event, the rapid

rise of the water level and the reaching of a predefined threshold value, it makes sense to transmit the measured data in shorter intervals to enable a quick implementation of measures.

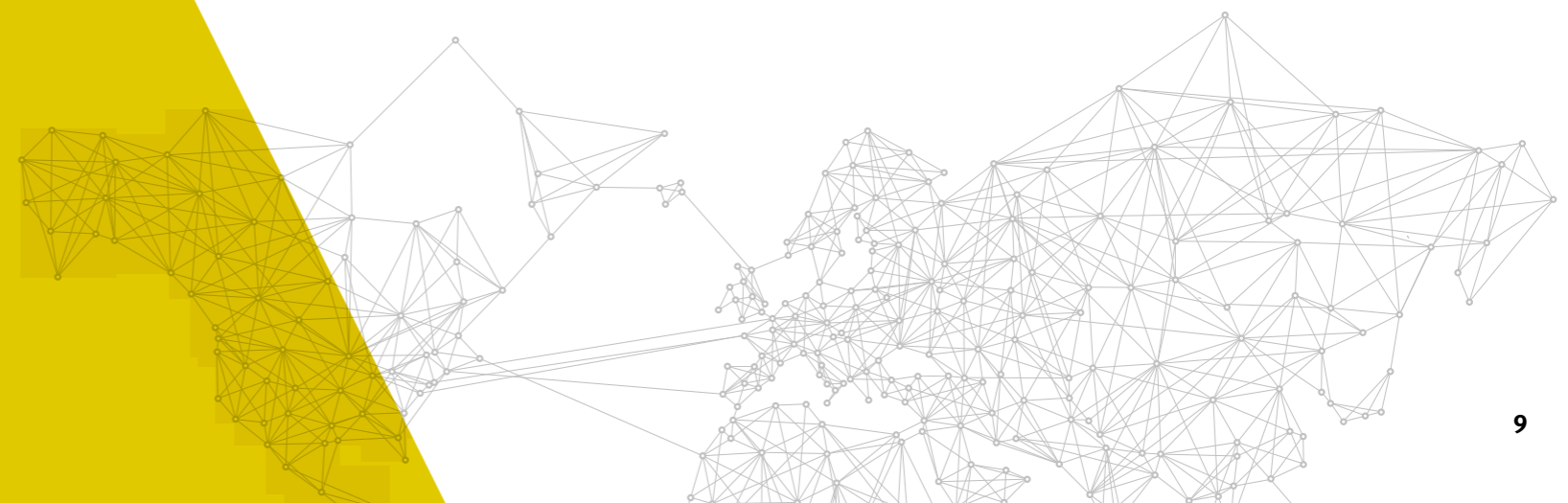
By regularly measuring the level and its change as well as the implemented water quantities (impoundment frequency, knockdown frequency, impoundment height), the relevant measured variables are documented.

## 2. Flow measurement



In addition to the level in the sewer and in the stormwater overflow basin, the measurement of the flow rate at basin sills is important information. In the case of the outfall and receiving water, the

quantity of the flow is interesting to determine the actual overflow in the event of an incident in the stormwater overflow basin and the quantity of the overflow into the water body, respectively.





### 3. Alerting



When an event occurs, such as reaching a defined level or the overflow of a stormwater overflow basin, automatic alerts are sent, for example via text message.

This means enormous time saving for the personnel. Only measuring points,

which have sent an alert must be checked and measures, such as taking a sample or loosening a blockage, must be taken. By taking a sample from the drain, it is possible to determine how many pollutants are actually present in the wastewater, which has been heavily diluted by rainwater.



### 4. Rain overflow log



In many countries there is a reporting or logging obligation for critical events. To meet this obligation in a convenient and time-saving way, plat-

forms automatically create rain overflow logs from the recorded data and send them to the responsible people or authorities.

### 5. Visual monitoring



In addition to the monitoring of stormwater overflows with measured values and figures, the visual monitoring of sometimes difficult to access building structures is becoming more and more popular. A camera is mounted at the stormwater overflow and regularly takes a photo - especially in case of an event.

This way, the situation on site, for example in an underground stormwater overflow basin, can be monitored in the

office. Autonomous cameras can be installed at the stormwater overflow basin at critical points.

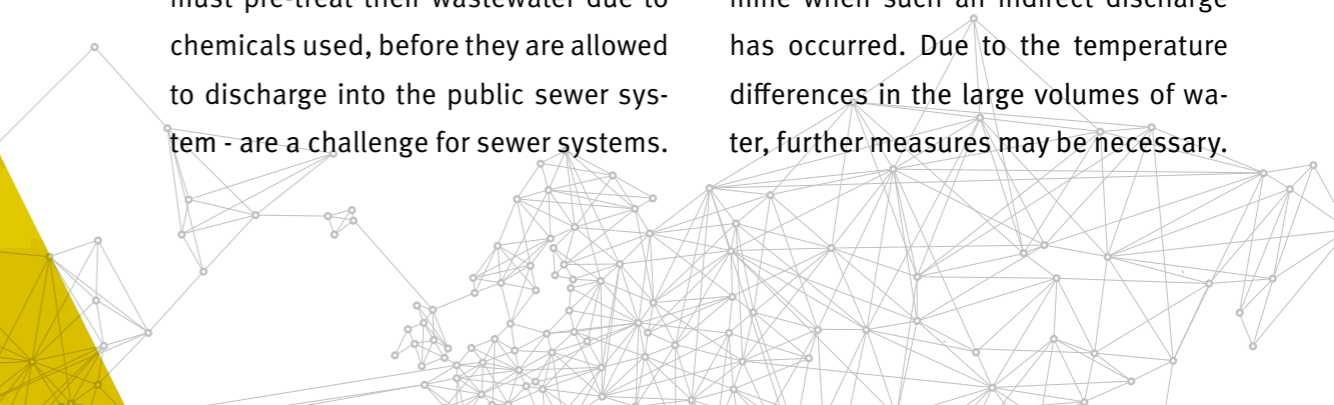
Rain makes the access more difficult. Therefore, it is helpful to get an overview of the situation with a photo. Access to underground stormwater overflow basins is difficult for employees because of occupational safety and is only possible with the appropriate equipment and gas measuring devices.

### Indirect dischargers - bonus use case



Regardless of stormwater overflows, indirect dischargers – e.g. factories, that must pre-treat their wastewater due to chemicals used, before they are allowed to discharge into the public sewer system - are a challenge for sewer systems.

Data loggers that measure water temperature, level and/or gauge can determine when such an indirect discharge has occurred. Due to the temperature differences in the large volumes of water, further measures may be necessary.





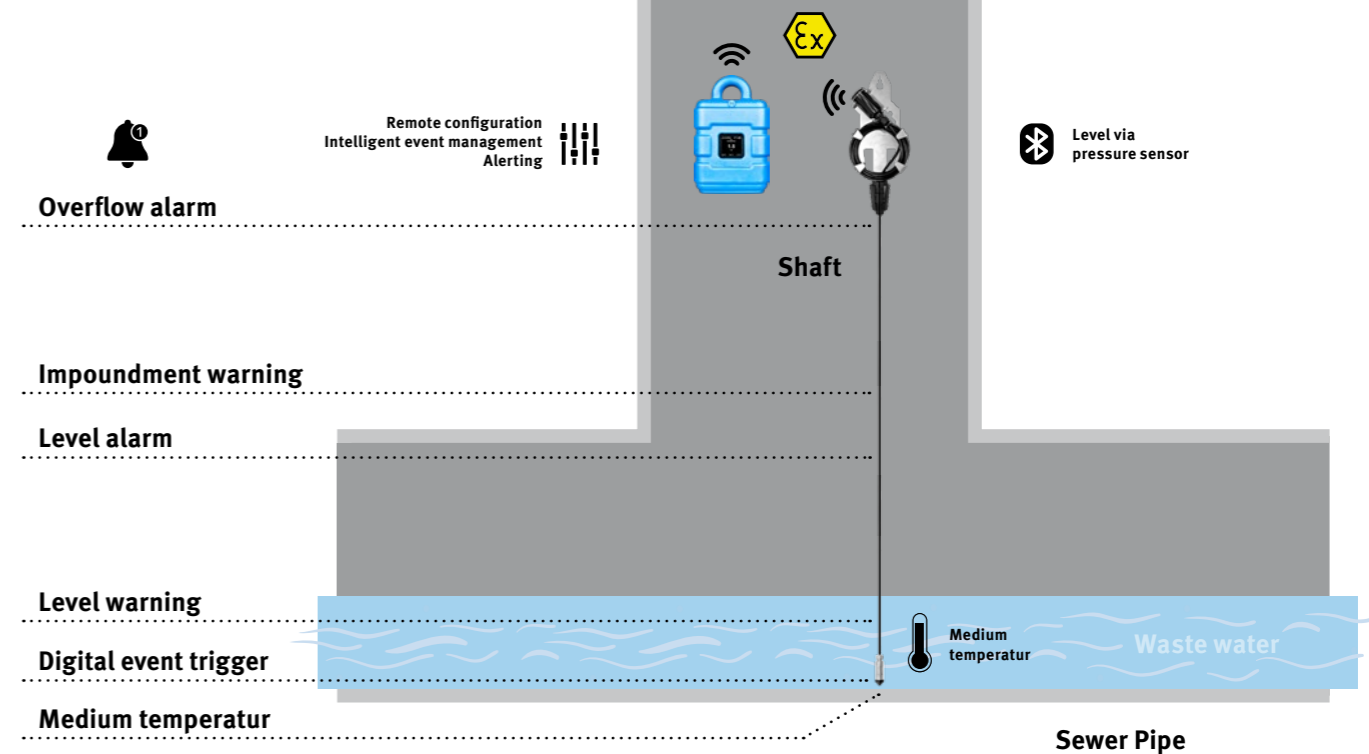
# Rain overflow reporting and level measurement in the sewer

## myDatalogGauge with integrated platform

- Detection of critical situations (for example, backwater) through permanent monitoring of fill level and temperature
- Alerting in case of unexpected overflow or blockage
- Outstanding data quality with time stamp; no missed data
- Automated data preparation and e-mail reporting
- Immediate response due to 10 seconds measuring interval with a runtime of up to 8 years
- Maintenance concept tailored to service cycles reduces trips to a minimum
- Efficient personnel deployment through online access and easy administration



**Bonus track:  
Tools for the  
realization  
of the use cases**

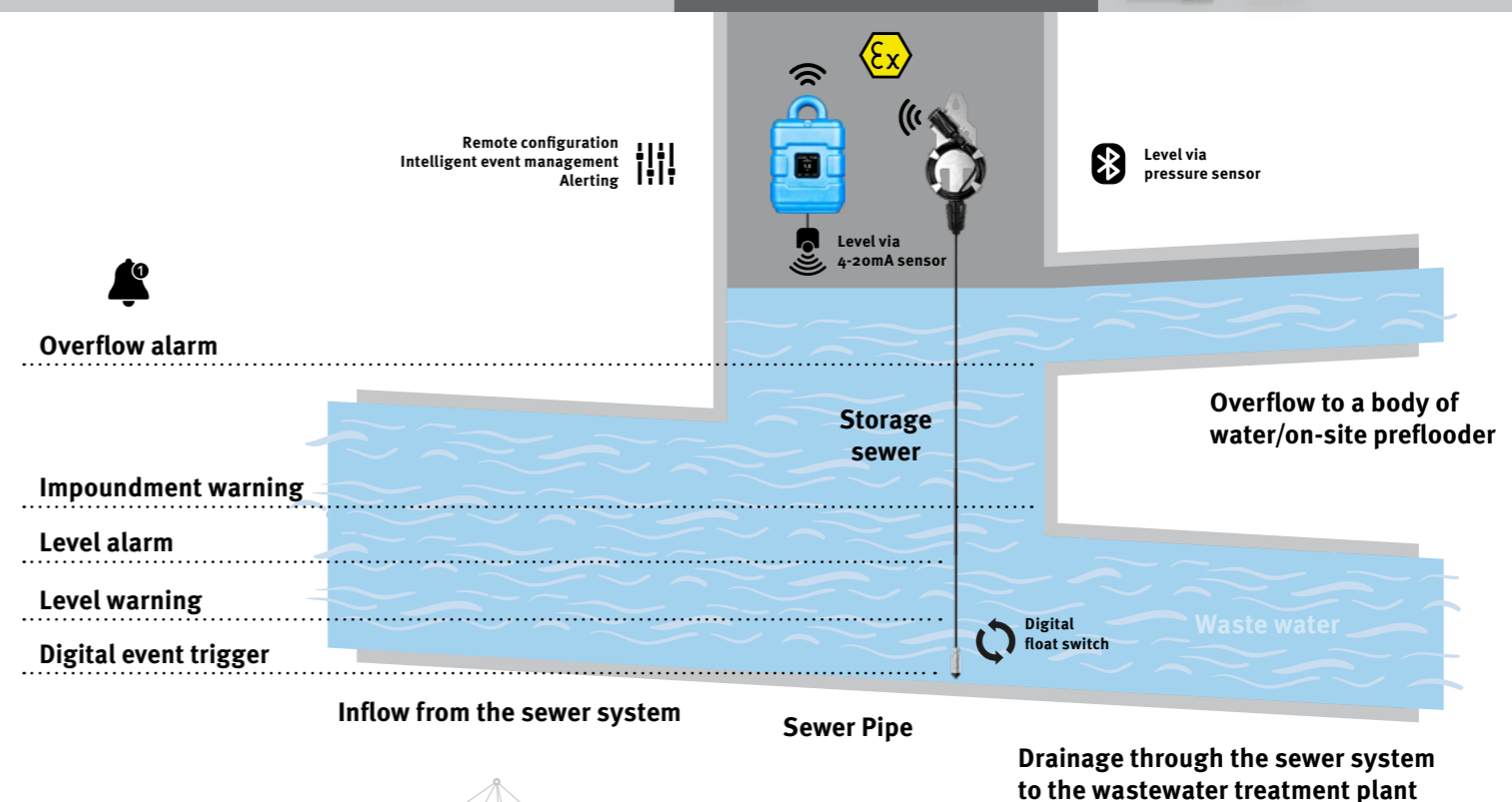




## Level measurement in the storage sewer, stormwater overflow basin or stormwater retention areas

### myDatalogEx with multiple sensors and integrated platform

- Detection of critical situations through permanent monitoring of fill level overflow
- Automated data processing and e-mail reporting of overflow events
- Alerting in case of unexpected overflow or clogging
- Outstanding data quality with time stamp; no missed data
- Innovative sensor (for example digital float switch) fusion extends battery life up to 8 years, based on a 4-20mA sensor
- Maintenance concept tailored to service cycles reduces trips to a minimum
- Efficient personnel deployment through online access and easy administration







# Drainage monitoring and monitoring of reservoir gauges and stormwater overflow basins

myDatalogEASY IoT ATEX or rapidM2M C3 with multiple sensors and integrated platform

- Detection of critical situations (pump failure during drainage) through permanent monitoring of fill levels and overflow
- Outstanding data quality with time stamp; no missed data
- Automated data preparation and e-mail reporting
- Alerting in case of unexpected overflow or blockage
- Integrated 4-20 mA barriers for sensors up to ATEX Zone 0
- Maintenance concept matched to service cycles reduces trips to a minimum
- Efficient personnel deployment through online access and easy administration



Self-sufficient or switch cabinet



Q/h Table to determine the discharge quantity



Overflow alarm

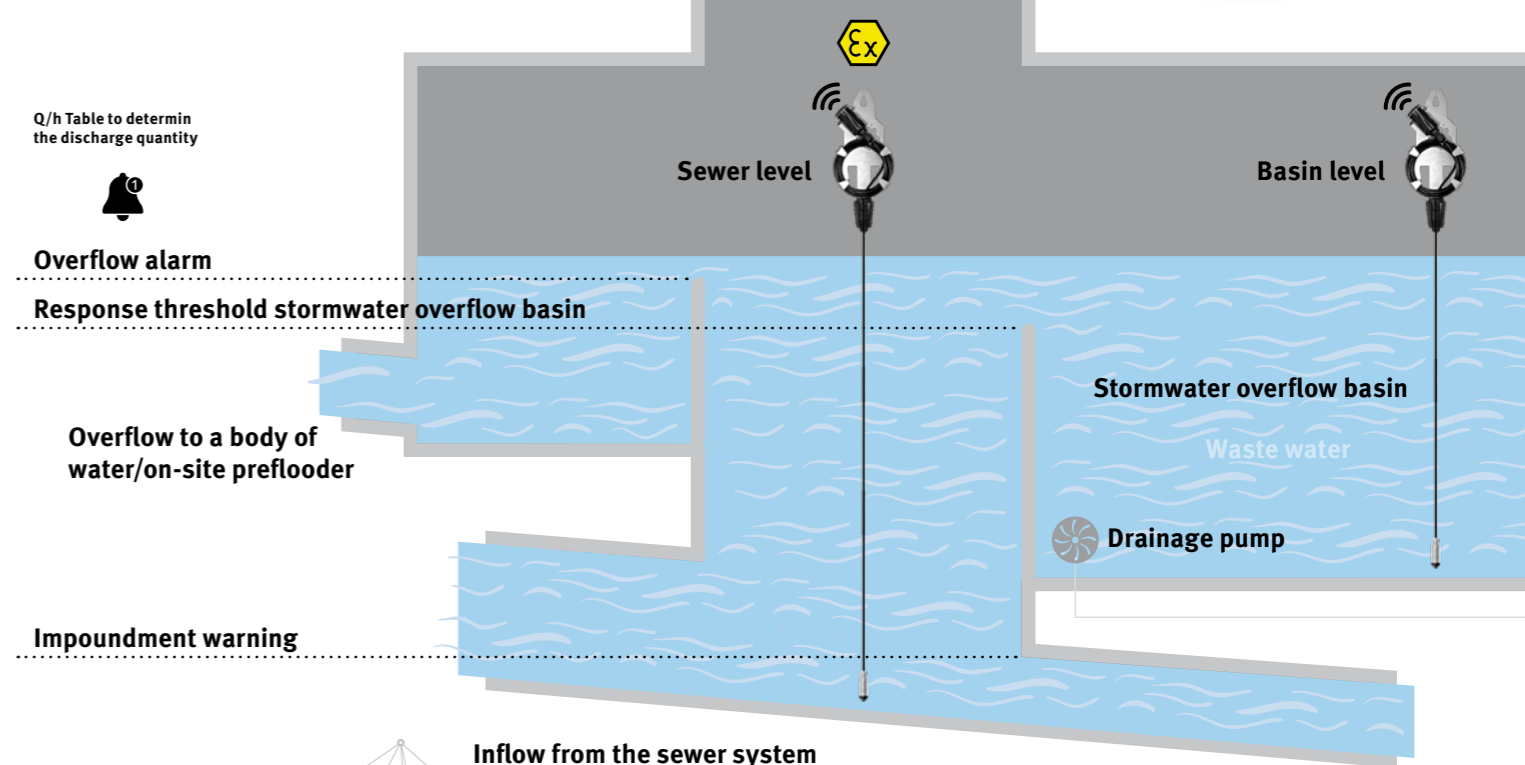
Response threshold stormwater overflow basin

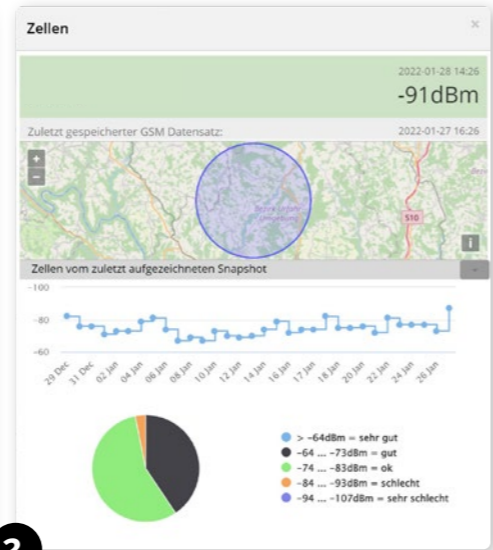
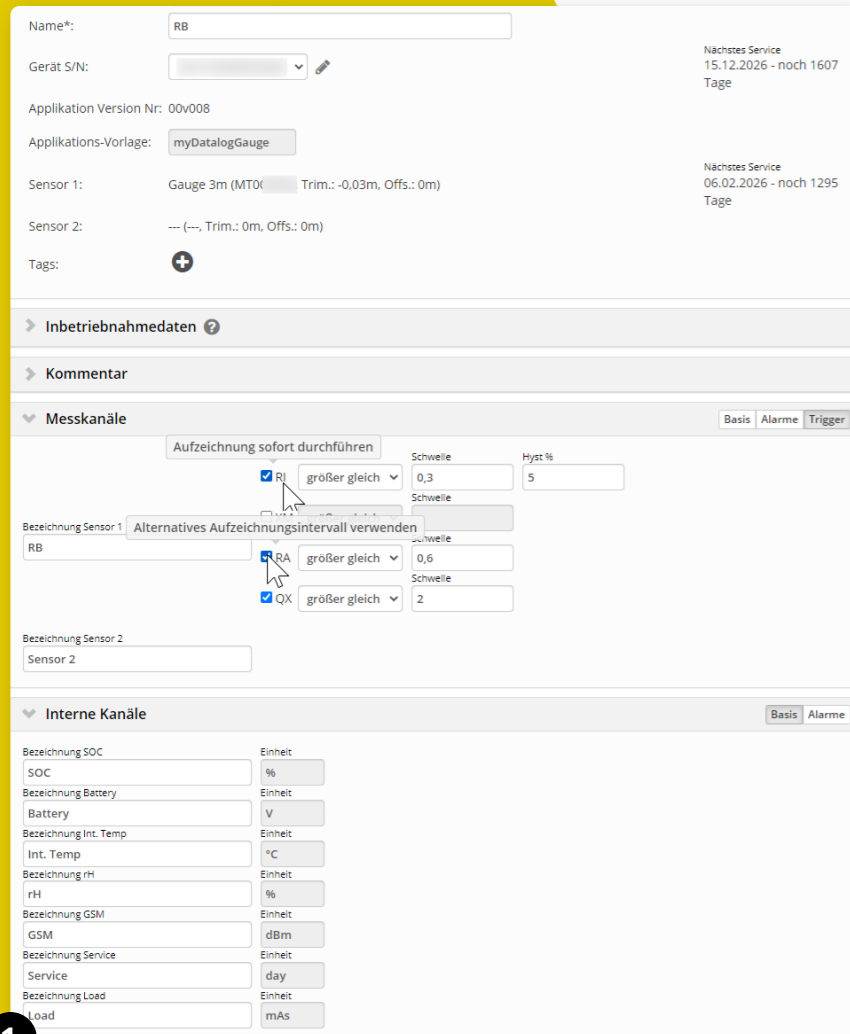
Overflow to a body of water/on-site preflooder

Impoundment warning

Inflow from the sewer system

Drainage through the sewer system to the wastewater treatment plant





1.

2.

3.

4.



5.

# Platform

Robust, self-sufficient devices and sensors measure and transmit the data (level, filling level, temperature) from the sewer and the stormwater overflow basin to a platform. On a platform, the data from different devices and measuring points gets merged and processed. Thus, it provides relief in daily activities.

- Consistent data storage of user data and historical time series
- Device management with status information
- Configuration of devices and applications remotely via the platform
- Alert management with alert call schedules
- Automatic logging and reporting
- Hosting of the platform in Austria
- Microtronics is certified according to ISO/IEC 27.001 for information security management



1.

2.

3.

4.

1. Configuration from a distance (over-the-air)
2. Reception quality of the mobile phone connection
3. Alarm management
4. Device management
5. API

1. Real-time event data
2. Automated data analysis
3. Historical data and time series
4. Alarm overview





[www.microtronics.com](http://www.microtronics.com)

