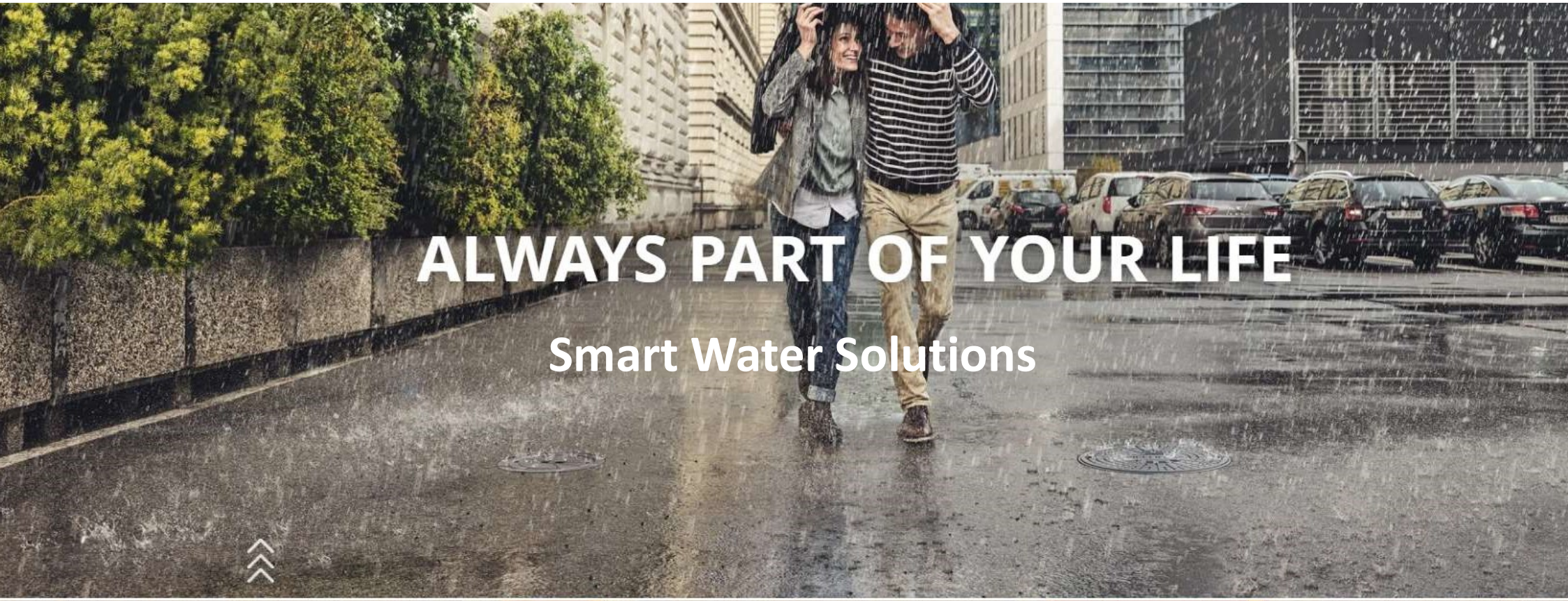

02.11.2023

Kontaktløs vannføringsmåling i avløpsnett, VA-dagene 2023

Frøydis Sjøvold, Pipelife Norge AS

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Smart Water Solutions

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Hva gjør en Smart løsning?

Kontaktløs vannføringsmåling i avløpsnett

- er det mulig ?

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Nivåmåler med integrert sender og batteri

SMART LEVEL SENSOR 20021 with SIM

Elegant & Functional: Our Design casing seals in all the sensors – object distance, ambient temperature, and orientation, making the device robust and waterproof.

Energy-efficient: Smart power control enables longer than usual operating times, by default over 5 years with single set of batteries.

Modern and completely wireless: Members of the Aistin family never require a separate gateway. The device is connected to the internet via 4G NB-IoT.

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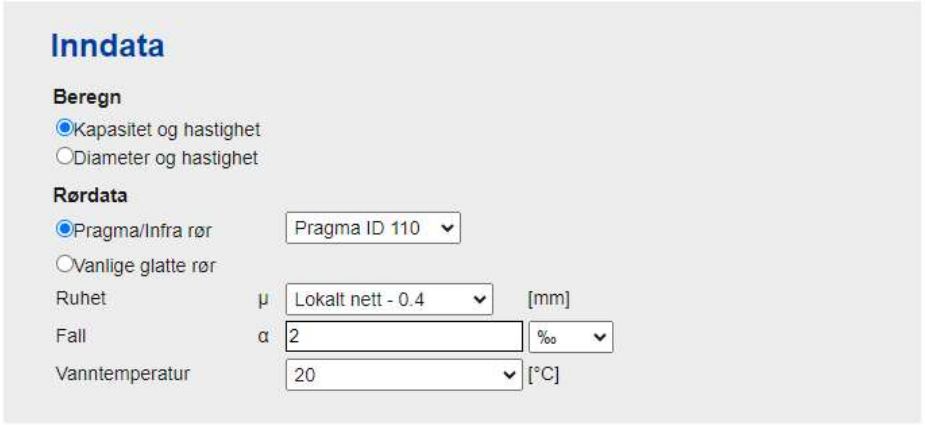
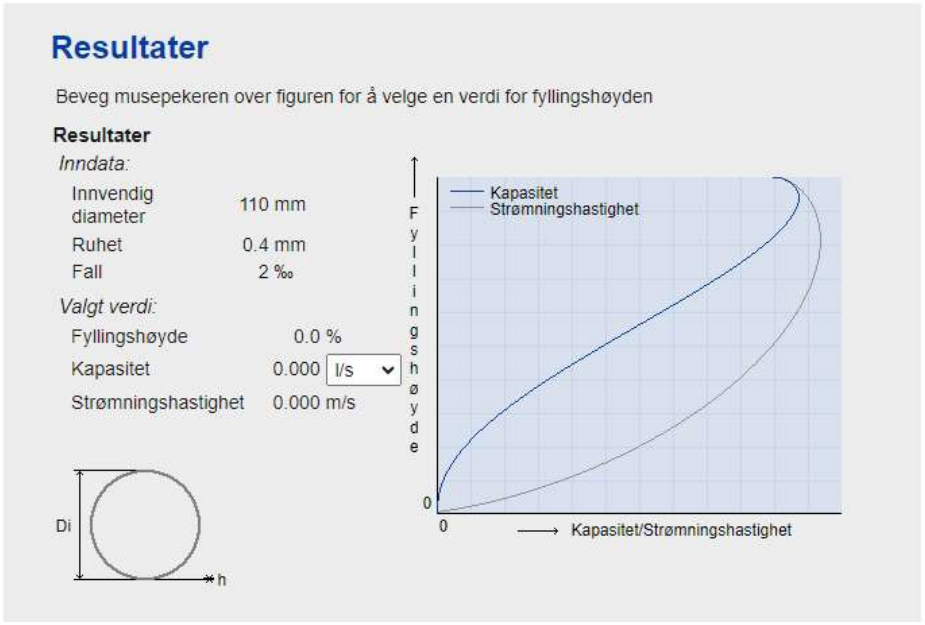
Fra nivåmåling til vannføring

Bruk av Colebrook-Whites formel
+ Ruhet
+ Helningen på røret
Regnes om til vannføring?





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Gir den pålitelig måling for vannføring ?

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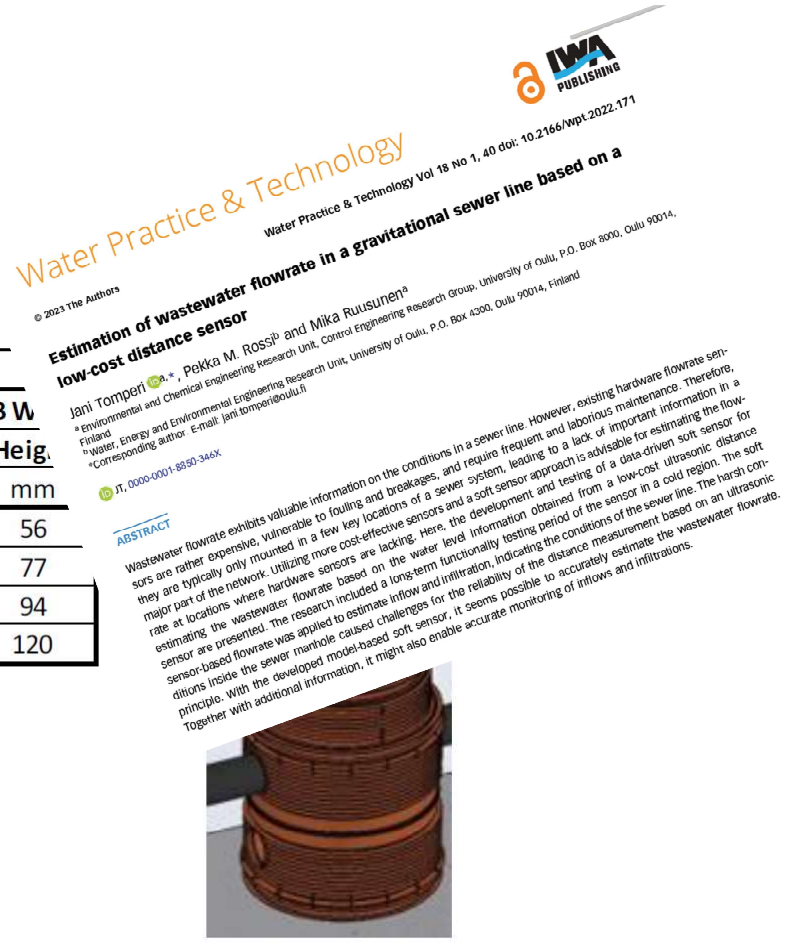
Testing the smart level meter

First results centered location of smart level meter

	MH1					MH2				
Flowrate	Tape measure		sensor		CB W calc	Tape measure		sensor		CB W
pump	Height	Accuracy	Height	Accuracy	Height	Height	Accuracy	Height	Accuracy	Heig
m3/hr	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
25,4	59	+/- 2	59	+/- 2	56	55	+/- 3	60	+/- 2	56
45	80	+/- 2	84	+/- 2	77	78	+/- 2	84	+/- 2	77
64,2	94	+/- 3	101	+/- 2	94	145	+/- 5	156	+/- 5	94
95	118	+/- 3	120	+/- 5	120	198	+/- 5	202	+/- 3	120



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Estimation of wastewater flowrate in a gravitational sewer line based on a low-cost distance sensor

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ABSTRACT

Wastewater flowrate exhibits valuable information on the conditions in a sewer line. However, existing hardware flowrate sensors are rather expensive, vulnerable to fouling and breakages, and require frequent and laborious maintenance. Therefore, they are typically only mounted in a few key locations of a sewer system, leading to a lack of important information in a major part of the network. Utilizing more cost-effective sensors and a soft sensor approach is advisable for estimating the flowrate at locations where hardware sensors are lacking. Here, the development and testing of a data-driven soft sensor for estimating the wastewater flowrate based on the water level information obtained from a low-cost ultrasonic distance sensor are presented. The research included a long-term functionality testing period of the sensor in a cold region. The soft sensor-based flowrate was applied to estimate inflow and infiltration, indicating the conditions of the sewer line. The harsh conditions inside the sewer manhole caused challenges for the reliability of the distance measurement based on an ultrasonic principle. With the developed model-based soft sensor, it seems possible to accurately estimate the wastewater flowrate. Together with additional information, it might also enable accurate monitoring of inflows and infiltrations.

Conclusion:

Deviation of smart meter sensor is within acceptable limits and can be used for flow calculation as long as the outgoing flow can flow freely

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Kan en nivåmåler benyttes til å finne fremmedvann ?

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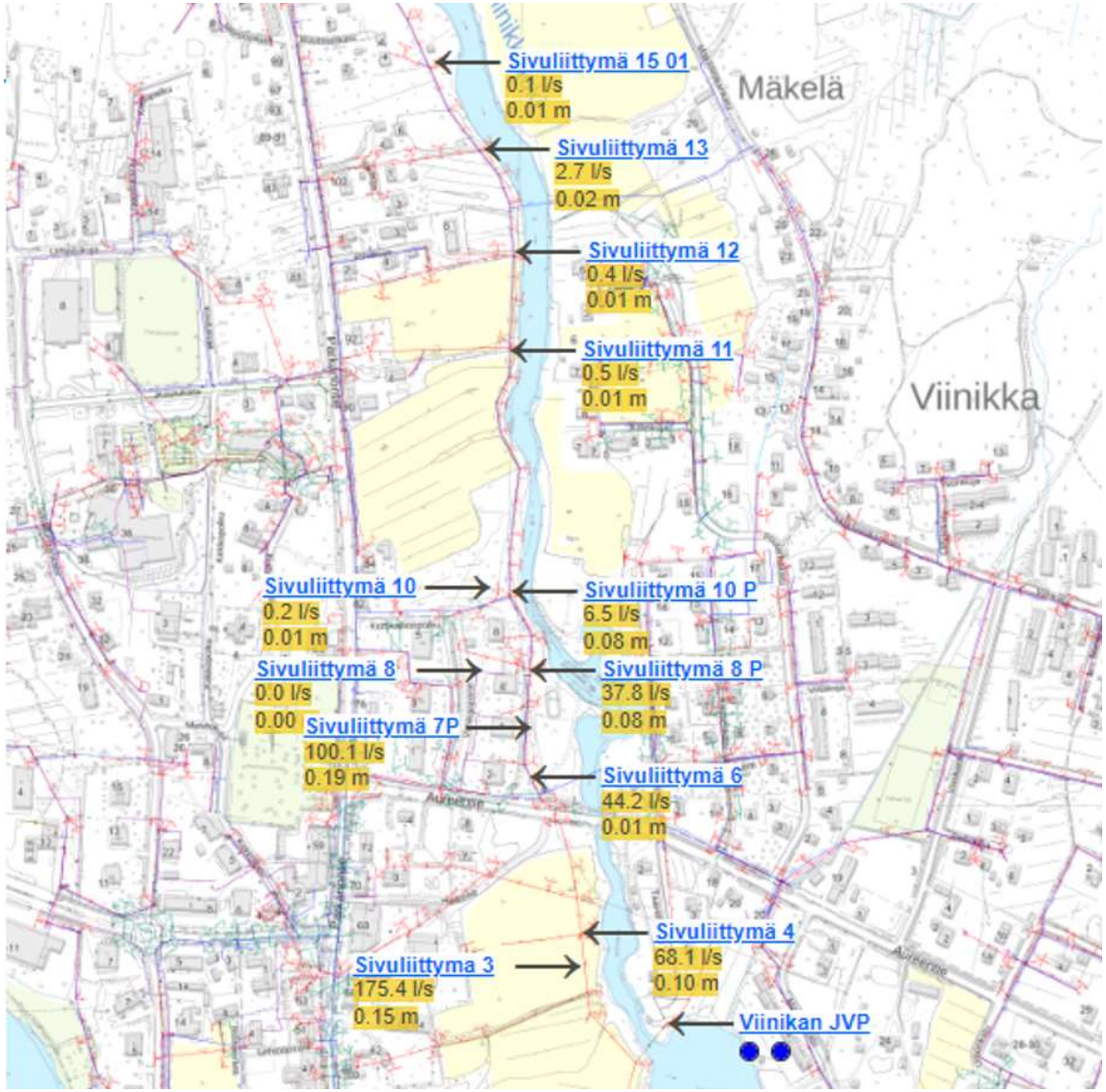

Eksempel fra vannføringsmålinger med Smart level sensor i Finland

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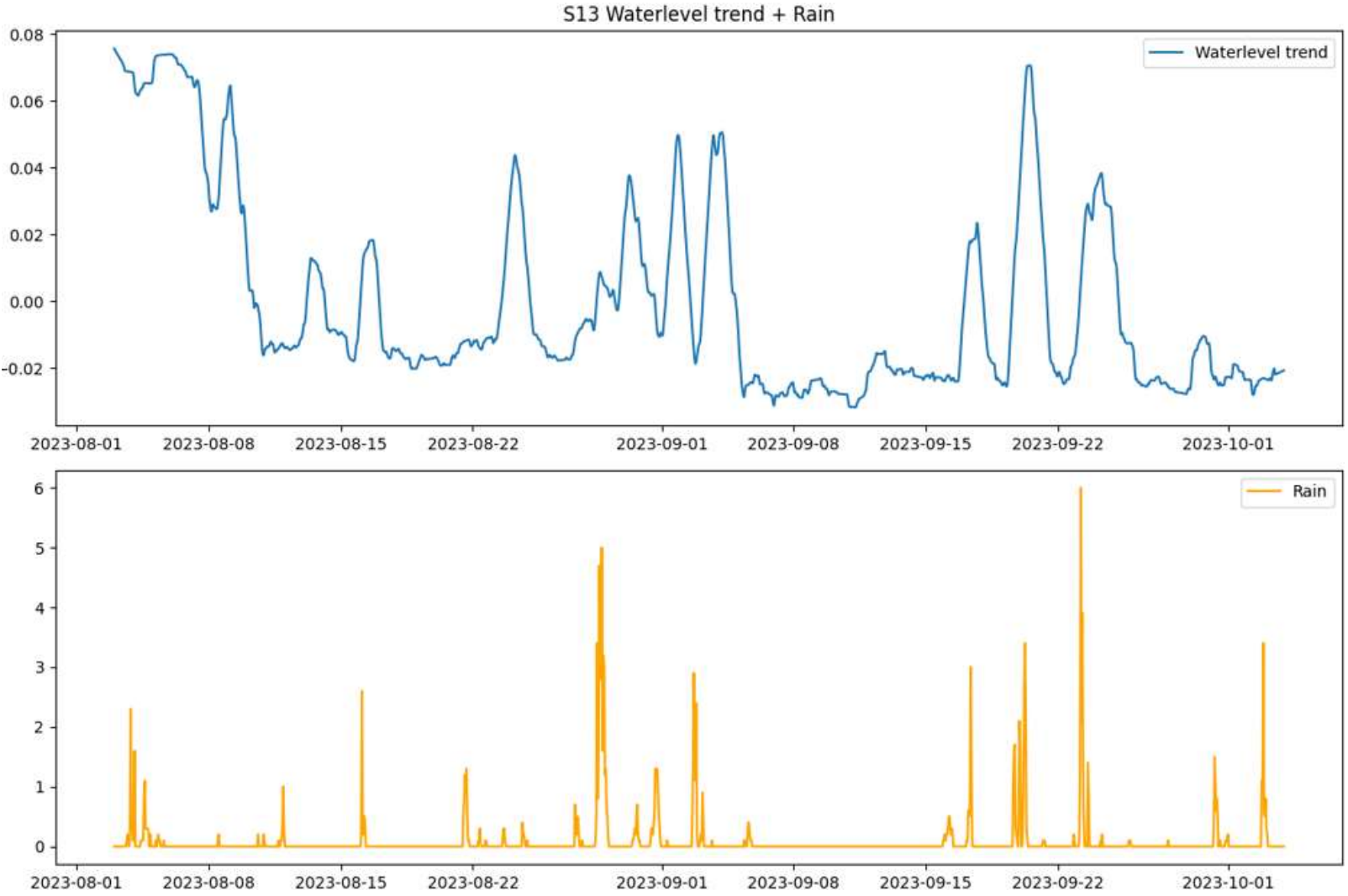

vannføring

+ regn

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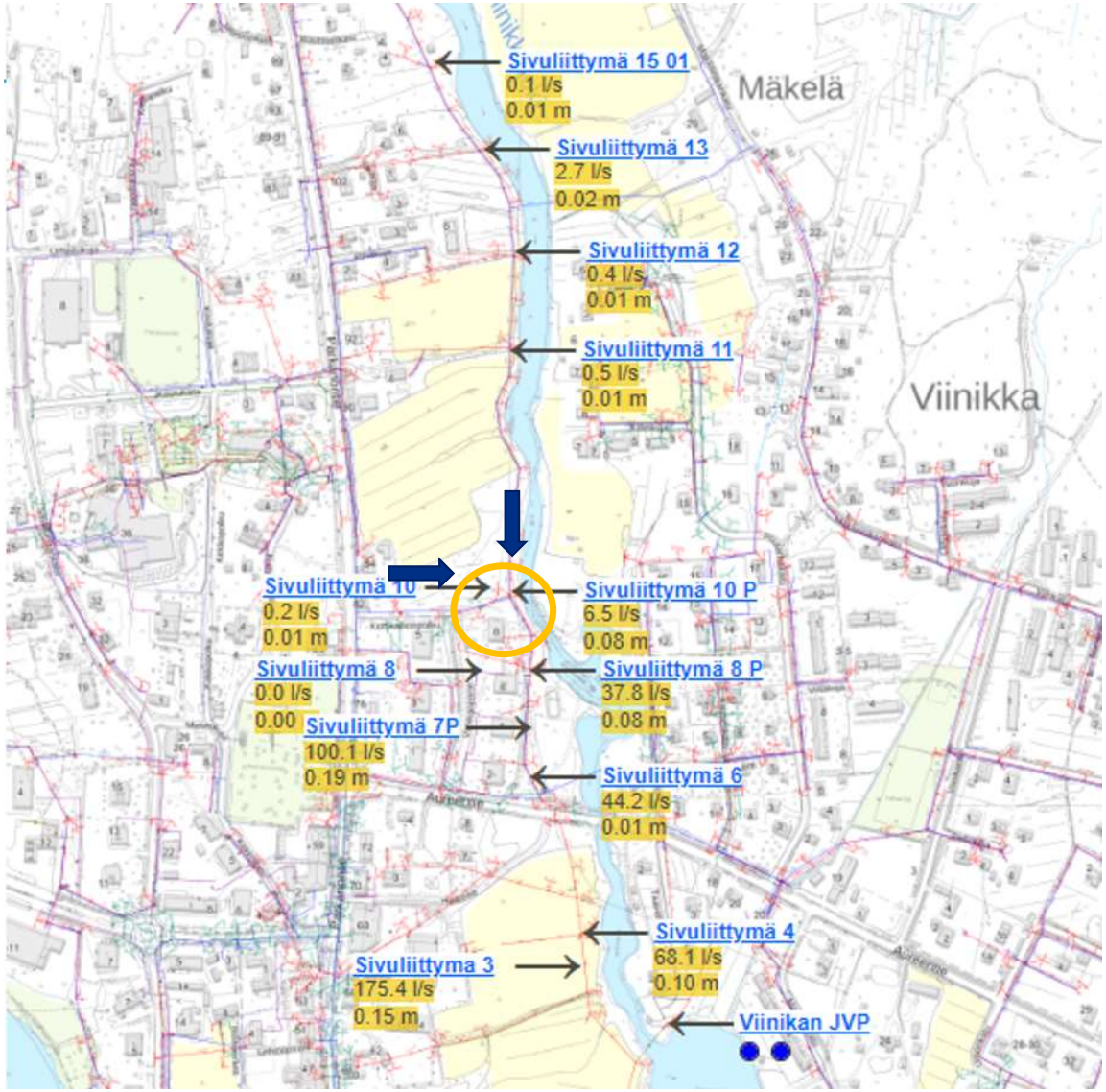
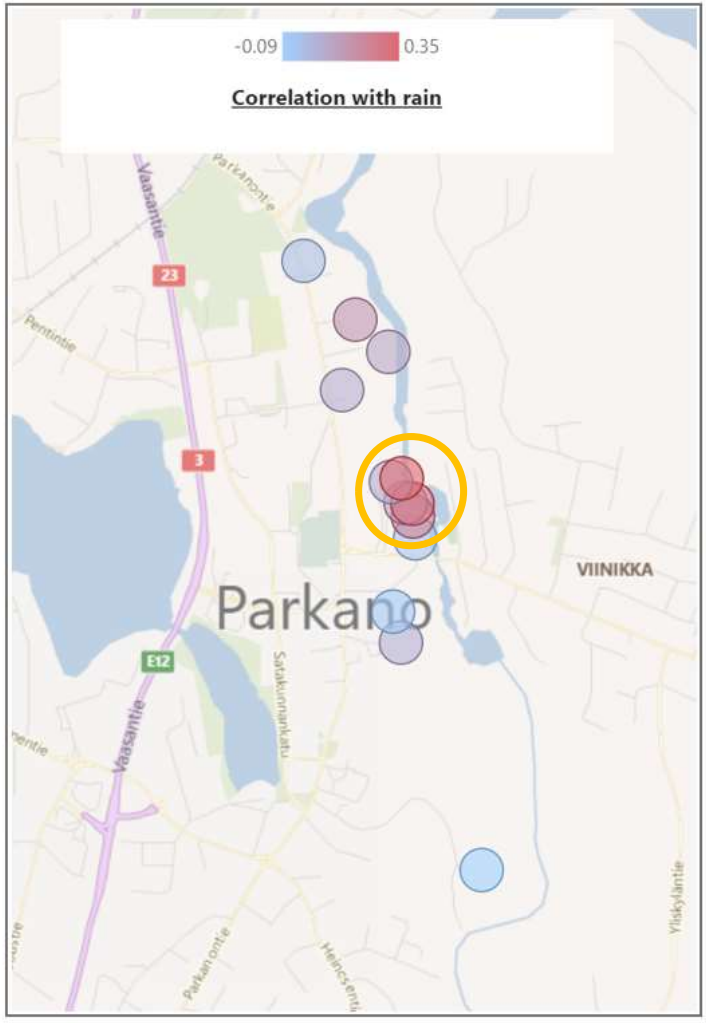


Correlation with rain map



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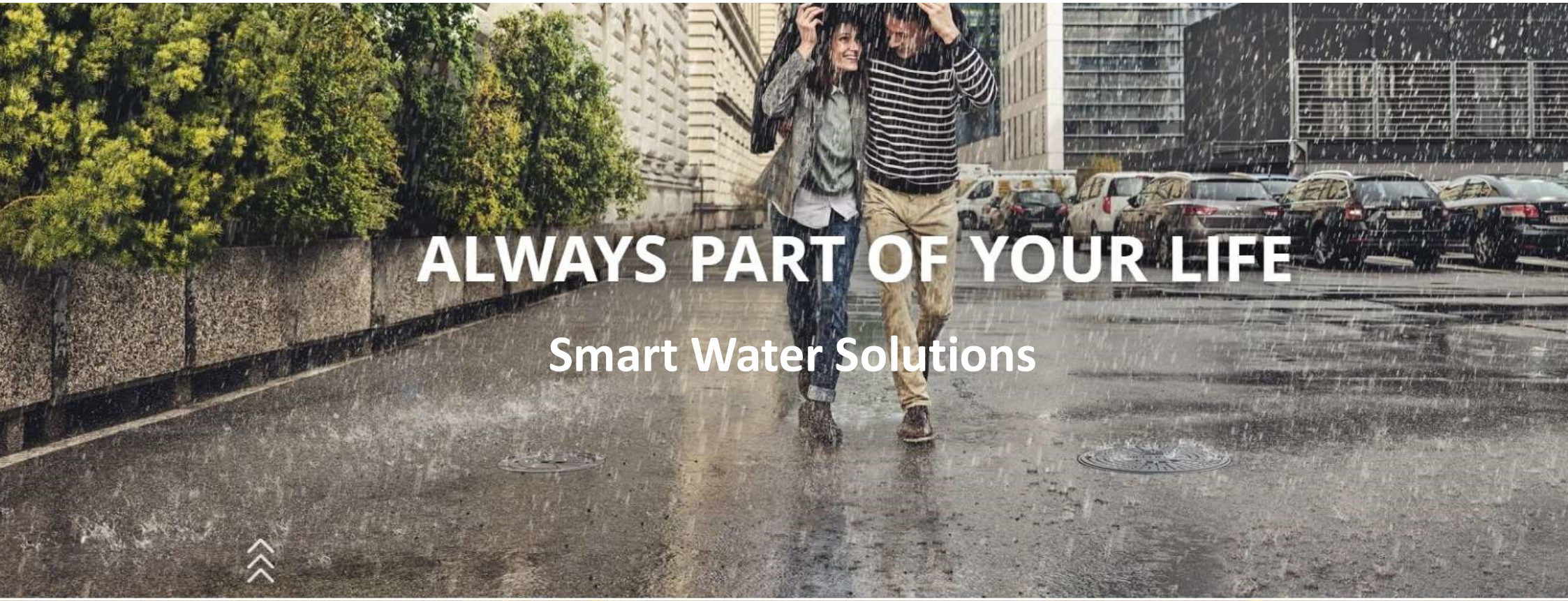
Er en slike målinger kostbart ?

Har du lyst til å prøve en sånn løsning ?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