



Sanitation Master Plan and Capacity of Public Sewerage Utilities through Innovative Approaches and Activities in Greater Tirana

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Using the example of the ongoing **Greater Tirana Integrated Strategy**.

Consultant:

ECOPSIS (Switzerland )

in association with

EBS (Albania )

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Confederaziun svizra

Swiss Confederation

Federal Department of Economic Affairs,
Education and Research EAER
State Secretariat for Economic Affairs SECO

Coordinator of Albanian stakeholders :  **AKUK**

Project duration : 21 months, April 2024 to June 2026

Project area: greater Tirana including
Tirana, Kamza and Vora Municipalities & Utilities



Part 1 – Data Driven Approach

to develop city strategies and master plan

Why and What Data?

What data?

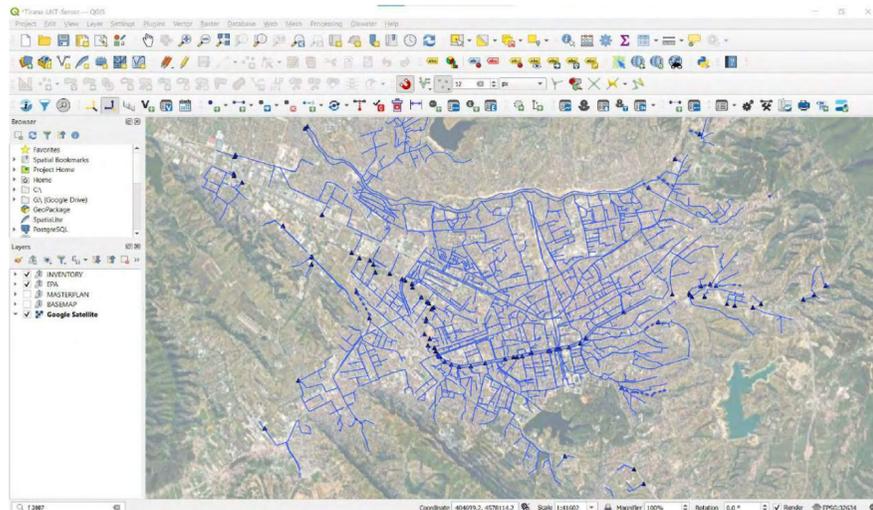
up-to-date digital geo data of

population/demand

infrastructures

environment

Geographical Information System
(GIS)



Why?

High value of data for planning

High value for O&M optimisation

no data = assumptions =
approximations = loss of investment
or O&M efficiency

Examples:

- Planning: oversizing of infrastructures
- O&M: impossible to optimize energy utilization at WWTP

How?

Surveys to fill initial gaps

Datasets' **maintenance**

Monitoring to continuously generate data

Seamless **data flow** between organisations

examples of Tirana on next slides

Field Measurements and Surveys

Extensive field investigation works were carried out for approximately 8 months to generate evidence and data, which will inform the planned hydraulic modelling of the planned centralised sewer networks.



Sewer Networks

- Sewer network survey
- Sewer flow measurements
- Sewage 24h sampling and analysis



Main Rivers: Lana and Tirana

- River flow measurements (hydrometric stations)
- Water quality in rivers



Topography

- Topography and drone survey along the 2 rivers (inc. hydraulic structures)

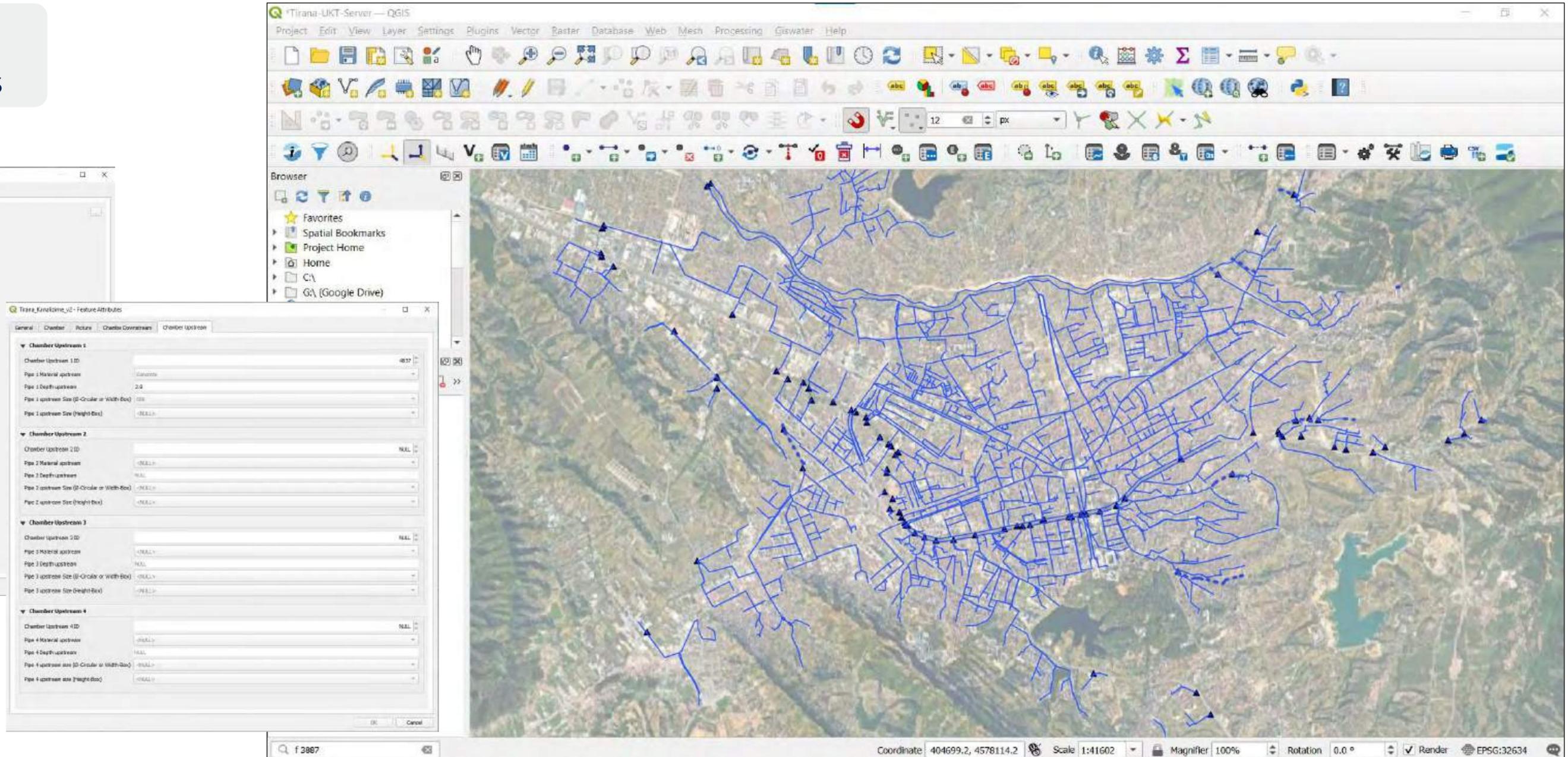
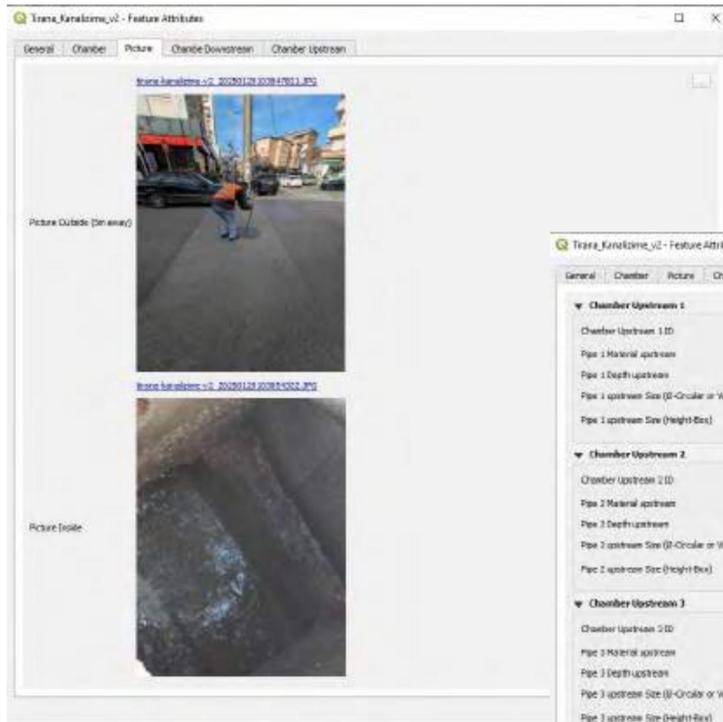


Rainfall

- Rain gauge installed since several month

Sewer Network Survey

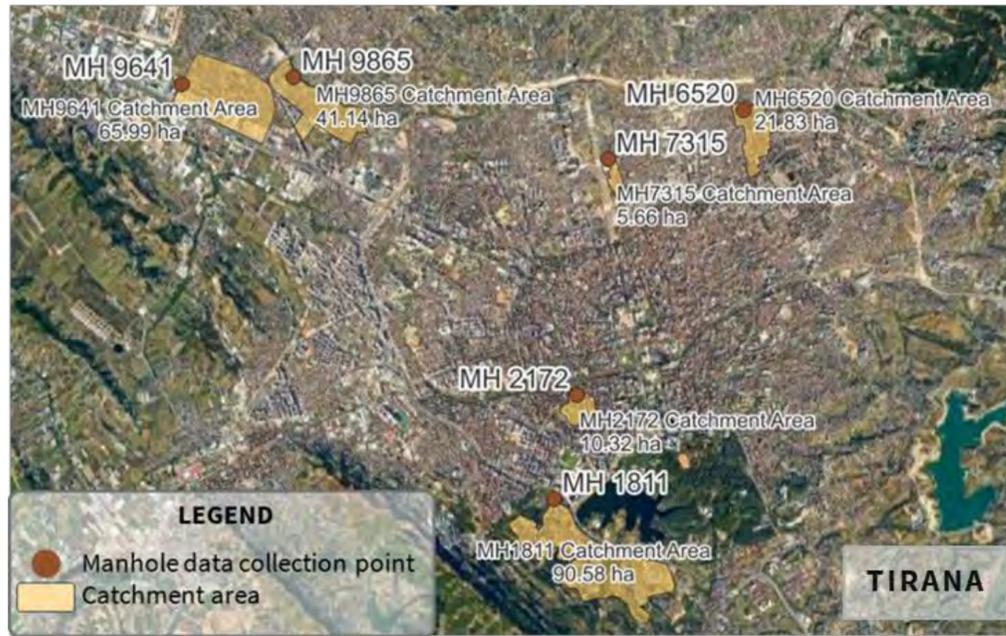
Survey collected for 7,000 sewer chambers



Digital forms for a sewer chamber in the GIS

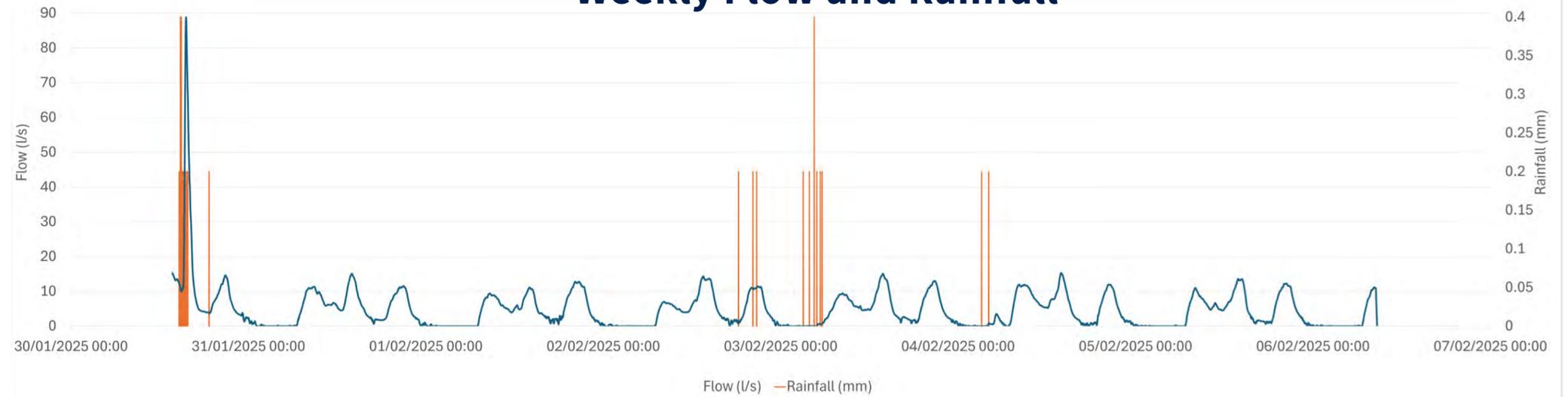
Sewage Flow Measurements & Rainfall

Several measurements / locations to get representative results

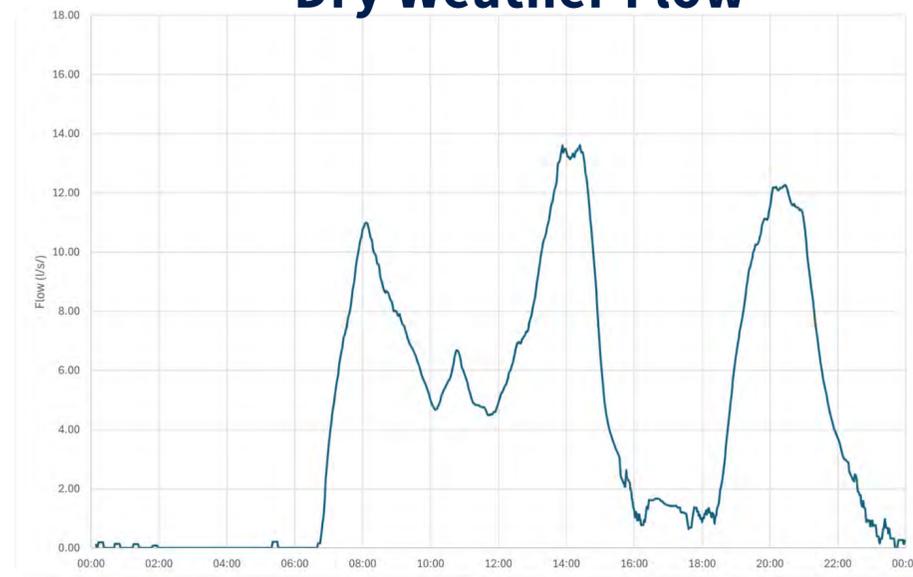


Online rain gauge, continuous measurements

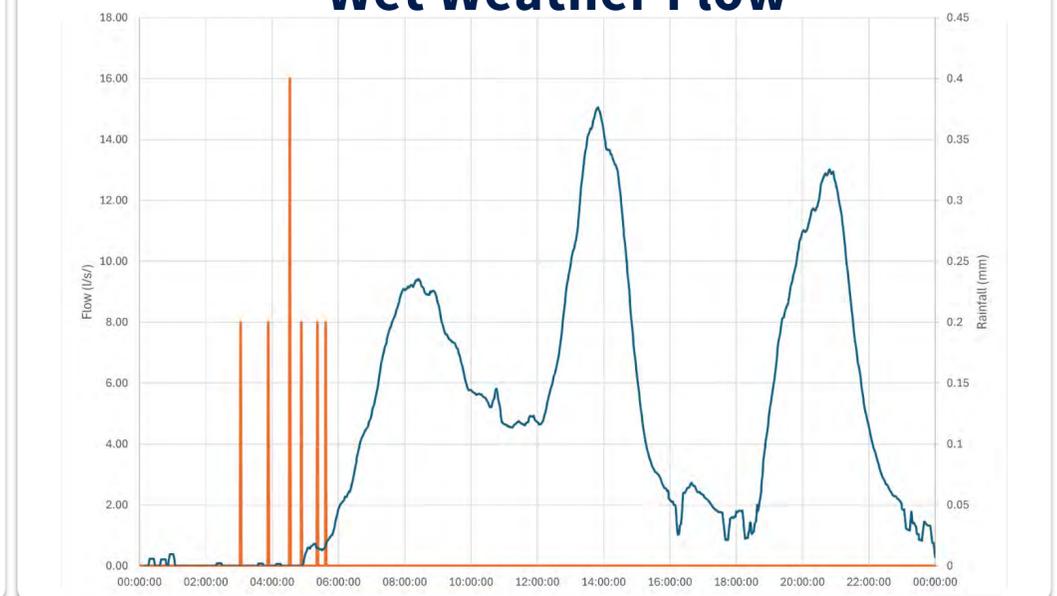
Weekly Flow and Rainfall



Dry Weather Flow



Wet Weather Flow



Sewage Flow Measurements & Rainfall



Sewage Characteristics: 24 h flow proportional sampling

Location	COD/BOD ratio	COD (mg/l)	BOD (mg/l)	TSS (mg/l)
Location 1 MG 2172	3.1	87	28	49
Location 2 MH 7315	3.1	285	92	136
Location 3 MH 9865	3.2	101	32	34
Location 4 MH 6520	3.3	501	152	88
Location 5 MH 1811	3.1	460	148	173
Location 6 MH 32100	2.1	177	83	277
Location 7 MH 196	1.3	241	179	172
Location 8 MH 9641	1.9	292	152	203



River Flows

Lana River

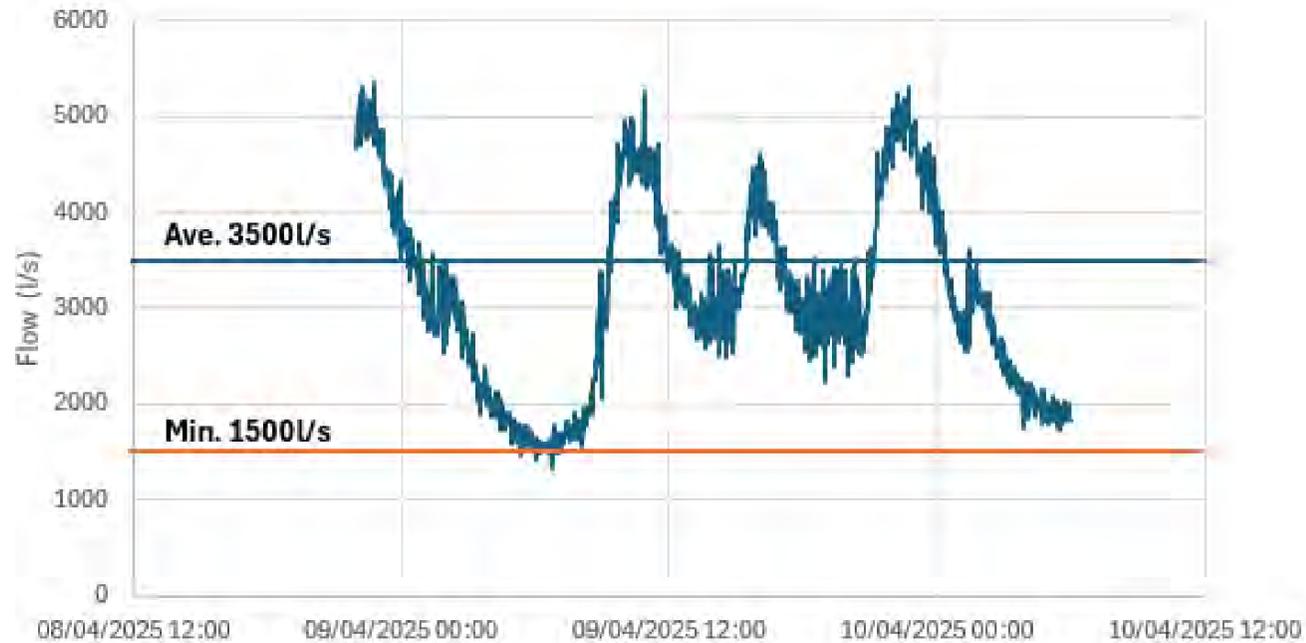
Wastewater flow: Strong influence from wastewater, with clearly defined peaks in the morning afternoon and evenings.

Catchment area: 40 km²

% of wastewater in river flow: 60%

Peak Wastewater Flow: 3.5 m³/s

Hourly wastewater Peak Factor: 1.8



Hydro station installed on Tirana river



Tirana River

Wastewater flow: Influenced, but less strongly, with longer recovery from rainfall events to reach equilibrium.

Catchment area: 140 km²

% of wastewater in river flow : 20%

Peak Wastewater Flow: 1.0 m³/s

Hourly wastewater Peak Factor: 1.7



River Water Quality

The discharge points for wastewater showed a significant increase in both flow and COD for the Lana and Tirana rivers, demonstrating that both channels are heavily impacted by the sewer discharges.



① Lana River



② Tirana River

Total load measured in rivers is around **440,000 PE_{COD120}**



Part 2 – Build Capacities of Utilities

progressively and according to their demand

Assess the Needs & the Demands for Capacity Building

Collect information on the capacities:

- In Tirana, we used digital online forms that were self-entered by the staff

Engage with and discuss with the utility staff:

- Listen and understand the utility staff demand; don't lecture them
- Identify relevant staff with potential impact

Respect their demand:

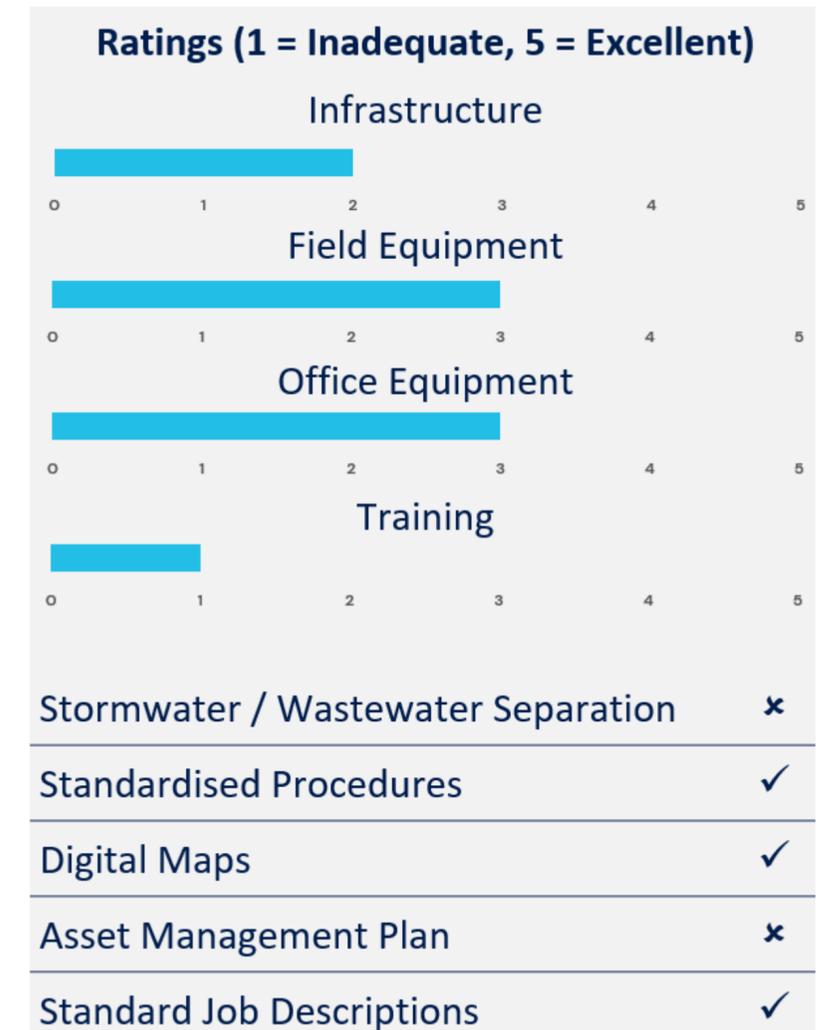
- In Tirana, there was no immediate demand for complex asset management or hydraulic modelling software,
- but for *GIS*, support the strengthening of their O&M

Acknowledge it can take years to build capacities:

- Gradual and realistic improvements

Utilities to play an active role (e.g. sewer survey in Tirana) to avoid project based efforts only by consultants

Example of online survey results



Example with UK Tirana

On the job training to survey the sewer network GIS

Assistance to UKT to set up themselves a GIS server

Training on GIS

Further support foreseen to continue the sewer survey

Further support foreseen to maintain the GIS dataset

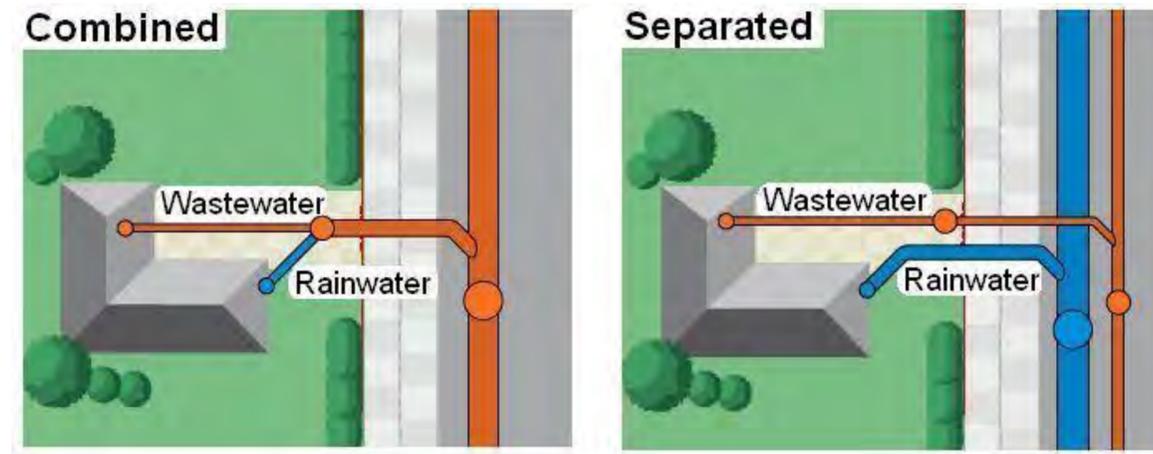
Once the GIS of their infrastructures will be sustainably maintained, it can then be further upgraded (O&M, assets, hydraulics, etc.)



Part 3 – Combined Sewer Systems

part of existing – and future – infrastructures

99% of Sewers in Tirana are Combined Sewers



Frequently it is said by some people that “combined sewer are non-compliant and should disappear”. Using the example of Greater Tirana:

- Who will finance the separation of the **1,000,000 m combined sewer pipes** and 30,000 combined sewer chambers sewer in Tirana? **EUR 250,000,000 to 500,000,000**
- Who will agree to the construction of sewers throughout the city (tens of construction sections in parallel spread across the city), which would worsen **traffic jams and other inconveniences for the city for 20 to 30 years (a generation)**?

Removing all combined sewers is not the approach adopted in EU cities

Example of Germany (2016):

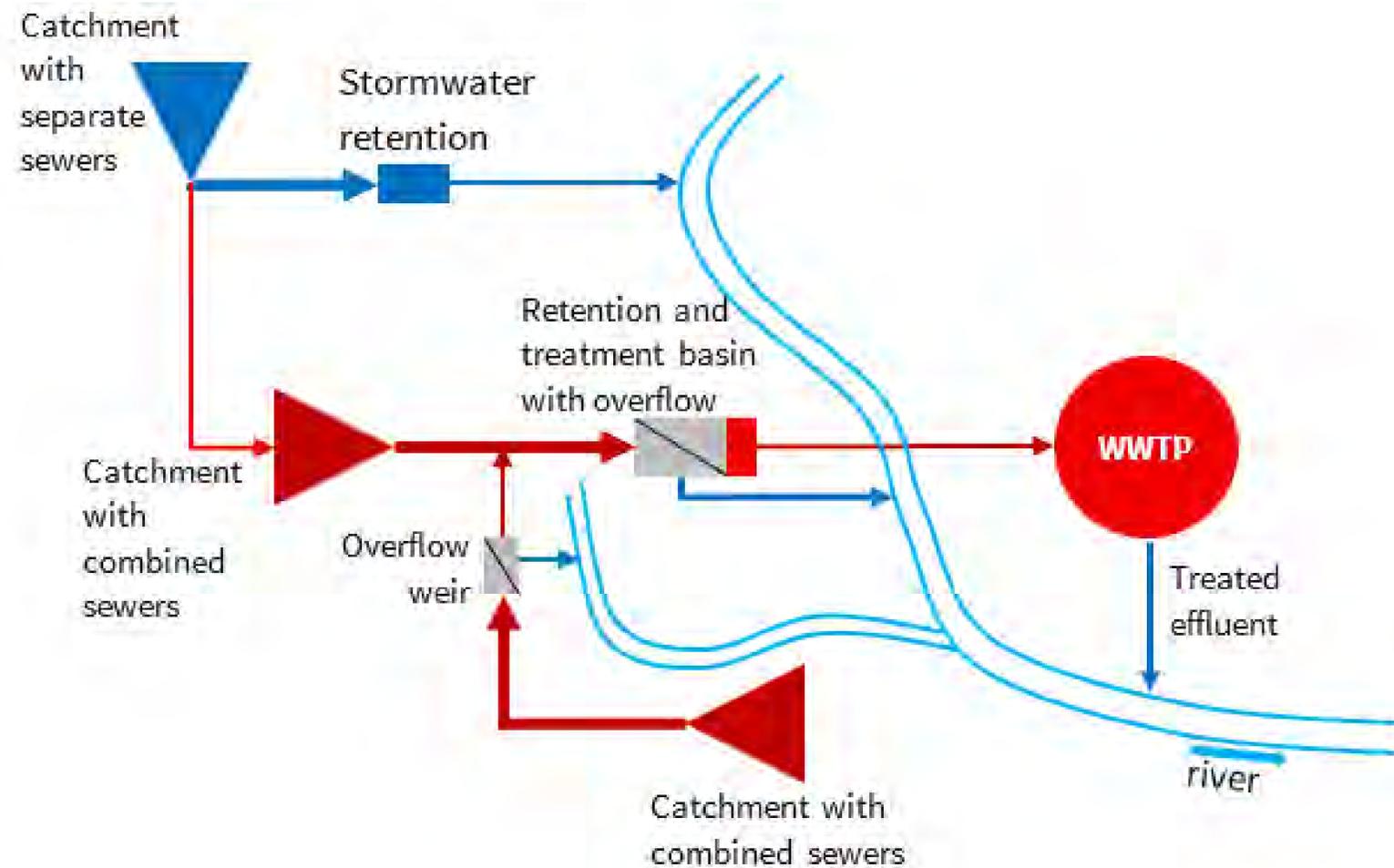
Item	Values
Separate sewer length	347,000 km / 58%
Combined sewer length	247,000 km / 42%

Sewers Systems in EU Cities:

Hybrid systems: former combined sewers are kept, sewer extensions are separated systems

Improved combined systems: basins and overflow weirs to reduce discharge of pollutants and impacts on rivers

Typical sewer system in EU cities



- Advanced systems are using **SCADA to control online the systems** (flow limitations) to further reduce the discharges into rivers
- More advanced SCADA systems integrate AI types of **dynamic system control (digital twins)**

Example of Germany (2016):

Item	Values	Equivalent value for Tirana	Cost estimate for Tirana
Combined wastewater basin with overflow	15,969,000 m ³	200,000 m ³	EUR 100,000,000
Stormwater retention basin	42,059,000 m ³	500,000 m ³	EUR 100,000,000

Exampel of Combined Sewage Basins

Example of rectangle open basin



Example of round underground basin



Example of complementary nature based pre-treatment & storage



Faleminderit për vëmendjen tuaj !



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Frédéric is Director of ECOPSIS, which is a Swiss consultancy firm founded in 1992. We have worked in over 60 countries globally, providing advisory services for optimising available natural, human and financial resources to strengthen circular economy and climate responsiveness for more pleasant and sustainable cities.

He is an international consultant with more than 20 years of experience, with significant references in various fields related to water, flood management, sanitation, solid waste management and circular economy, in projects financed by various international donors such as the Swiss Cooperation, World Bank, African Development Bank, GiZ, KfW, EU, etc. His interventions focus on technical expertise but also sector analysis, and public and private capacity building.

He has conducted several studies aimed at developing sanitation policies, strategies, and master plans in several countries on different continents, including the **ongoing integrated wastewater and stormwater management strategy for Greater Tirana.**