MICROINQUINANTI EMERGENTI E SOLUZIONI NATURALI IN CITTÀ
DALLA RICERCA ALLA POLIS

Integrated Decision Support System for NBS: monitoring, modelling and planning

D4RUNOFF

Funded by the European Union

Promosso e co-organizzato da KlinK

con la co-organizzazione di LE2C

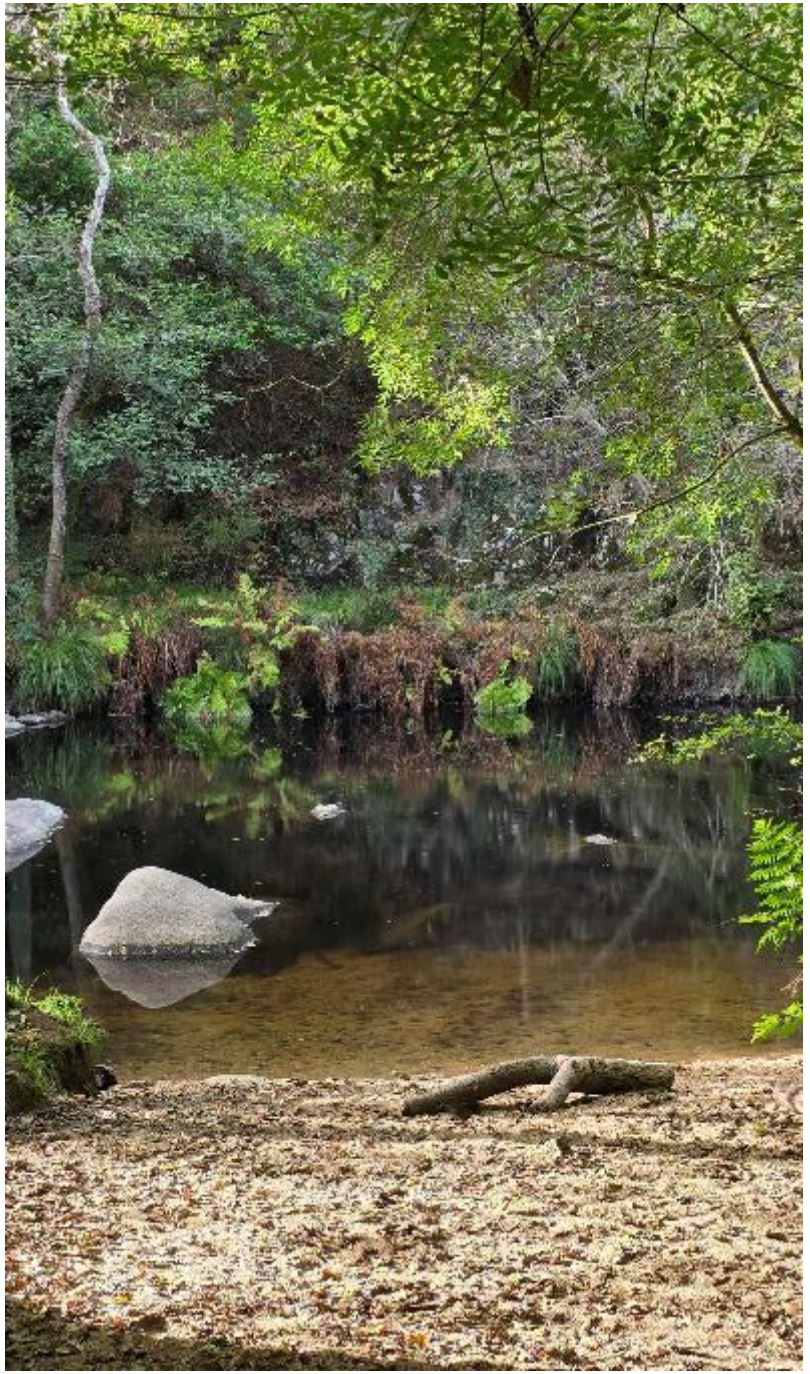
e con il patrocinio della Provincia di Pavia

.grow
.transform
.imagine

- Perception vs. Reality
- Legal Framework
- Perspective
- Experience
- The DSS in a Nutshell

Perception vs. Reality

Triple Crisis & NBS




+ Pollution


+ Extreme Events


- Biodiversity


Nature Base Solutions
(NBS)
Mitigation
Reduction
Recycling

Legal Framework

UE Legal Framework
&
Water

Domain	Key Instrument
Integrated management	Water Framework Directive
Drinking water	Drinking Water Directive (2020)
Sanitation	**Urban Waste Water Treatment Directive** **Directive (UE) 2024/3019**
Bathing	Bathing Water Directive
Groundwater	Groundwater Directive
Chemicals	EQS Directive
Industry	Industrial Emissions Directive
Agriculture	Nitrates Directive
Marine	Marine Strategy Framework Directive
Reuse	Water Reuse Regulation
Floods	Floods Directive

Perspective

Multistakeholder & Technical

OPERATIONAL
& STRATEGIC

RISK
ASSESSMENT

POLICY-
MAKING

SOCIAL

Perspective

The end Users

The analysis behind

Perspective

RISK
ASSESSMENT

POLICY-
MAKING

SOCIAL


The end Users
OPERATIONAL
& STRATEGIC
Politicians
Technicians
Citizens

The Analysis Behind → Technical - Engineering

OPERATIONAL & STRATEGIC

What problem do they solve or mitigate?

Behaviour	In terms of Pollutants	In terms of Water Retention
Selection	Objective & Purpose	Location & Preliminary Design
Impact	Environmental	Policy

Which ones are there?

Experience

Case Studies

D4Runoff Project: Preventing and managing pollution from urban water runoff

5 Case Studies

+5 replication analysis

D4RUNOFF has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No 101060638.

DSS in a Nutshell

D4RUNOFF
AI Assisted Platform

D4RUNOFF

AI-Assisted Platform

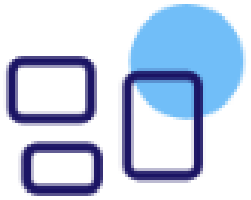
DATA GATHERING

OPERATIONAL & STRATEGIC

RISK ASSESSMENT

POLICY-MAKING

SOCIAL



OPERATIONAL & STRATEGIC

Funded by the European Union

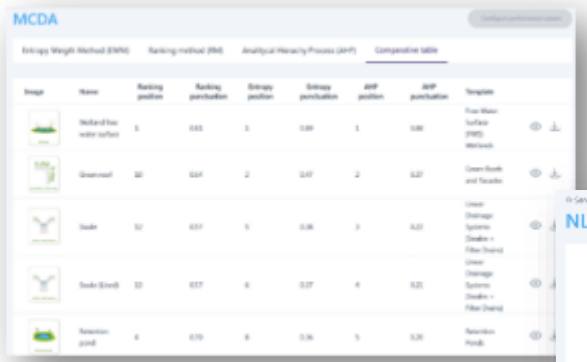
Purpose

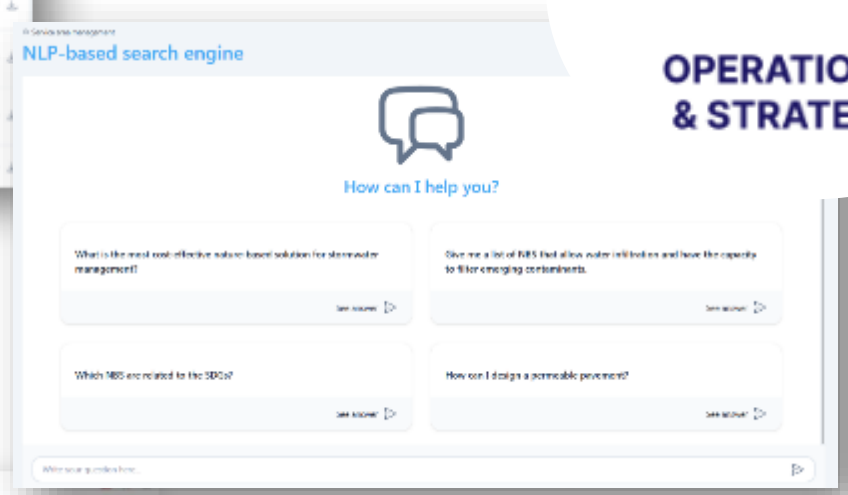
Catatalogue & Selection

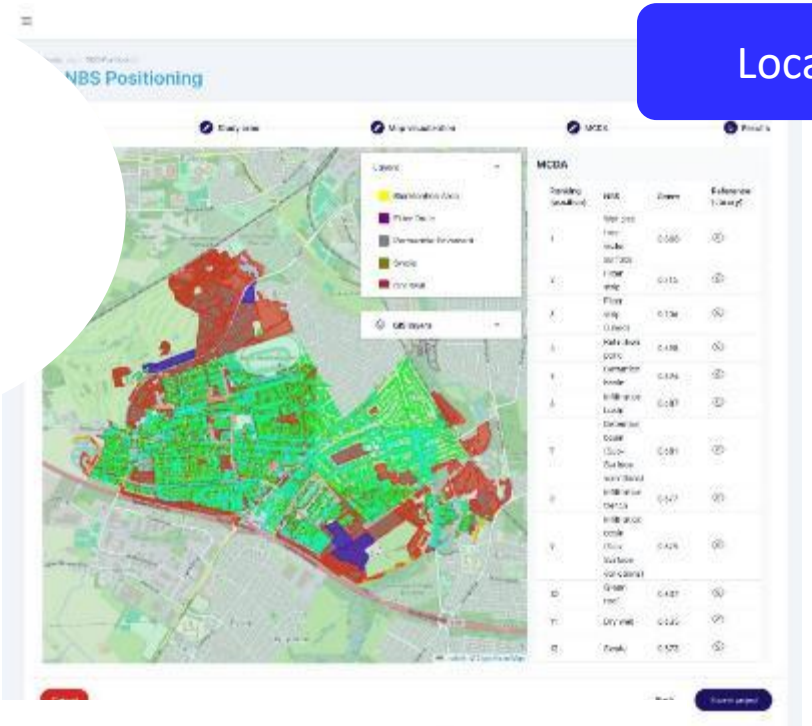
Location

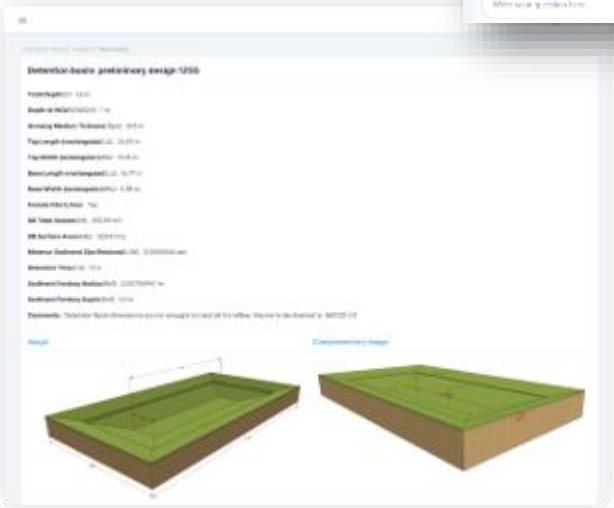
OPERATIONAL & STRATEGIC

Behaviour & Impact









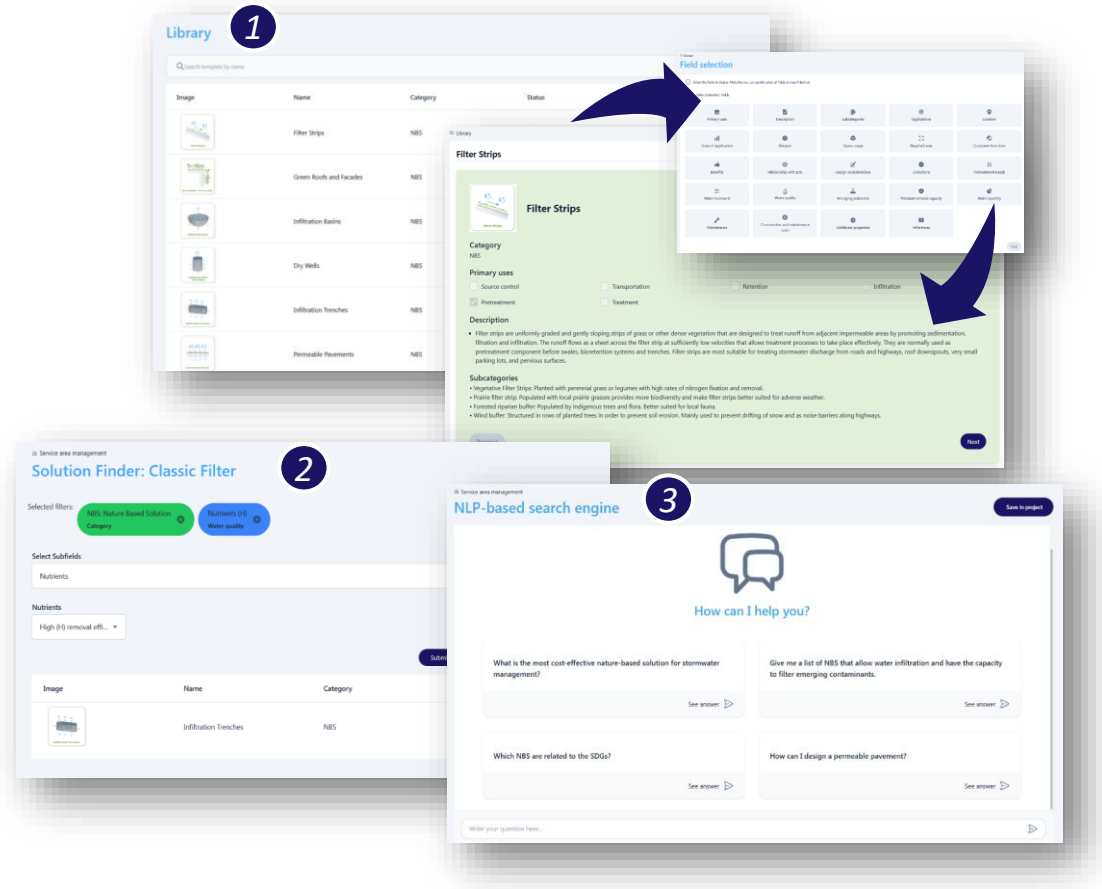
Selection → Objective & Purpose → Location & Preliminary Design

NBS Guidance module

Module developed to ***assist in addressing urban runoff issues*** from a technical perspective, primarily focusing on mitigating the problem through the ***implementation of NBS*** in urban environments

- Key functionalities developed to:

1. ✓ Consult, complete, and update the **NBS/ EDS Library**
   ✓ Suggest suitable NBS/EDS types based on user context and needs through:
2. ○ Classical filtering of solutions
3. ○ Interact through a Natural Language Processing **(NLP) assistant**



Selection

Objective & Purpose

Location & Preliminary Design

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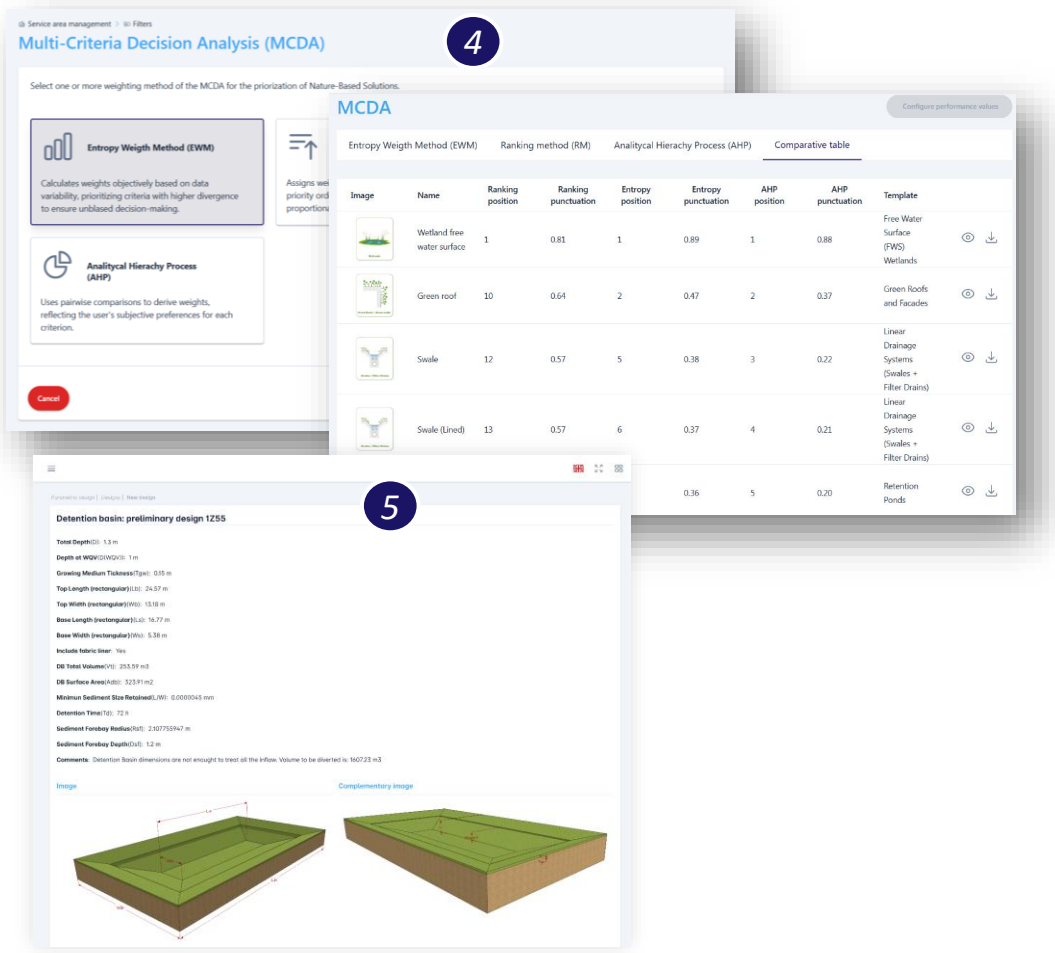
2
- Classical filtering of solutions

3
- Interact through a Natural Language Processing (NLP) assistant

4 ✓ Apply three **MCDA** methods to rank **NBS** alternatives based on user-defined criteria and support to positioning

5 ✓ **Generate preliminary NBS designs** directly from the platform

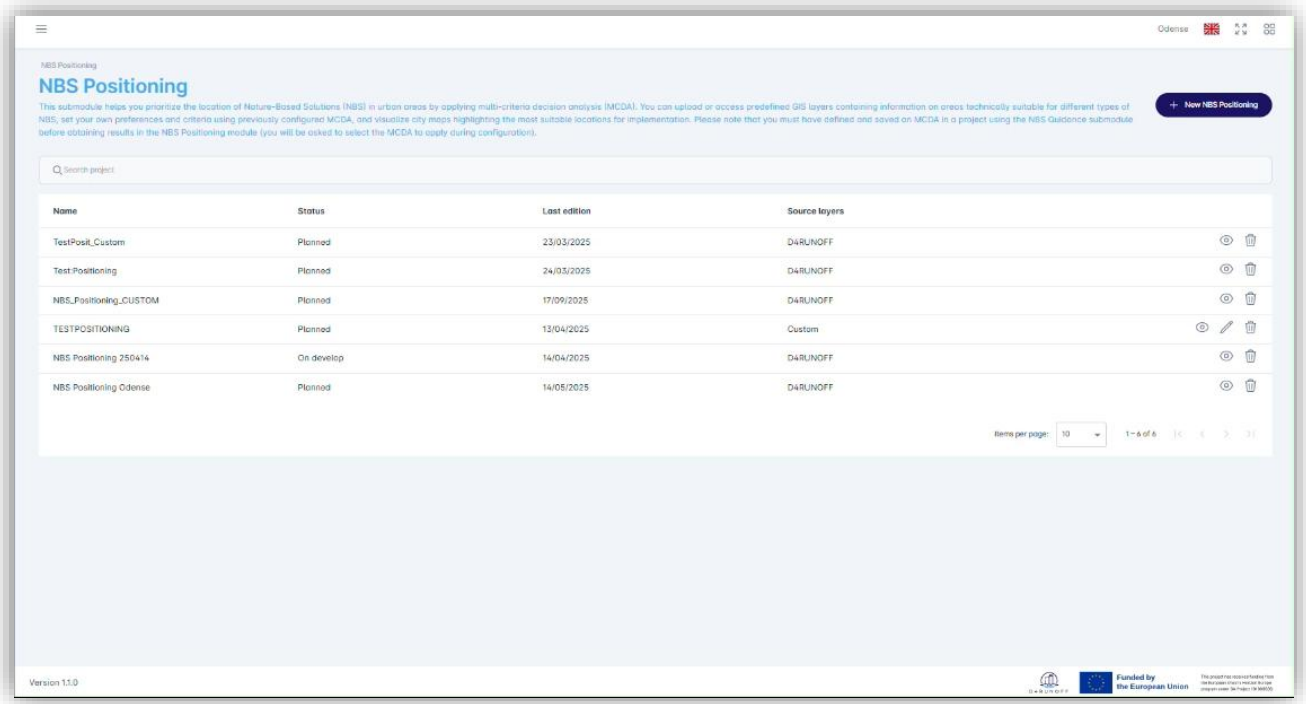


Selection → Objective & Purpose → Location & Preliminary Design

NBS Guidance module

NBS Positioning submodule

Enables users to identify potential locations for NBS implementation integrating MCDA in a GIS environment, supporting the selection of technically appropriate solutions



Behaviour

In terms of Pollutants

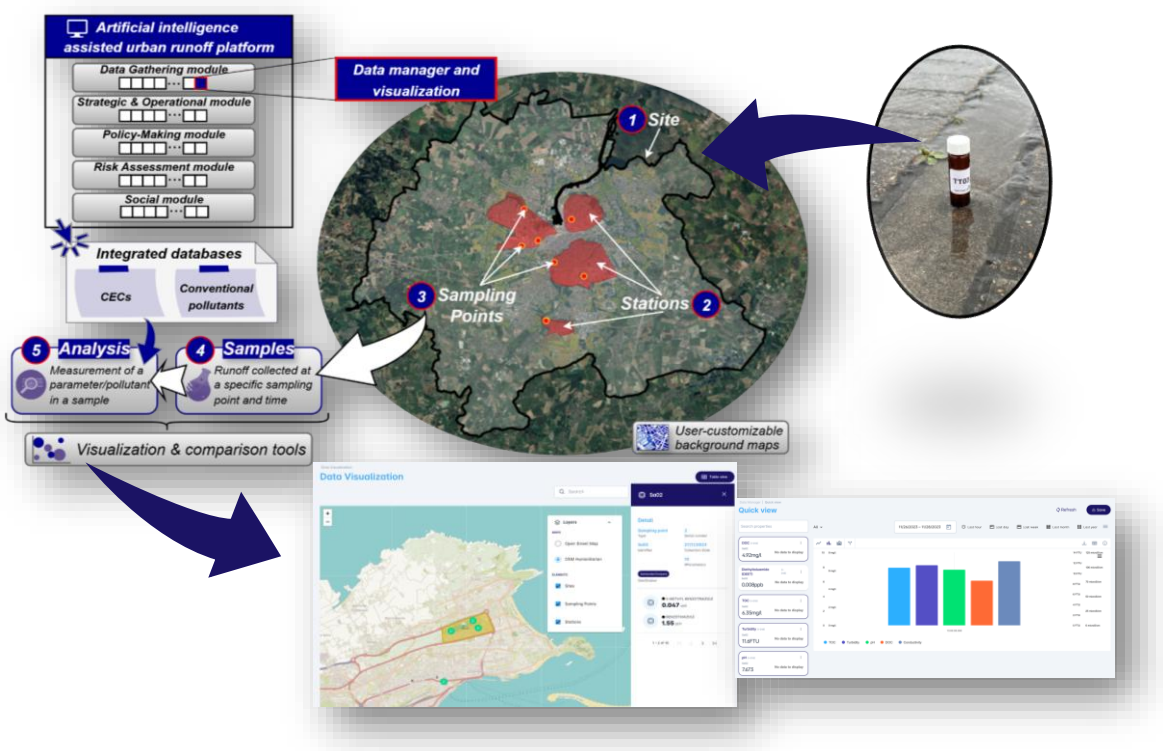
In terms of Water Retention

IoT & Data Gathering

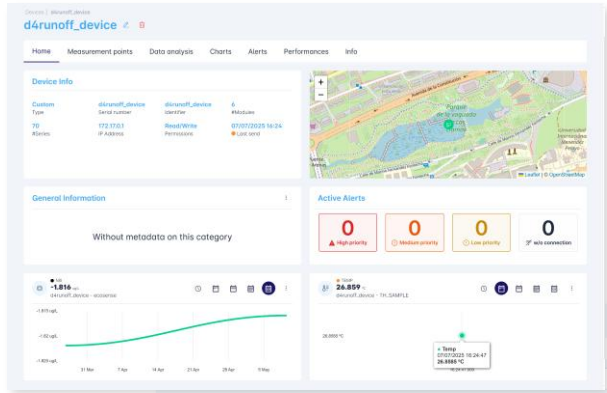
IoT and Data Collection. Module developed to ***store, process, and display data generated within the D4RUNOFF project***, as well as external data required for the overall operation of the platform (e.g., meteorological services)

*Storage and display of **lab results from a novel detection method** for water contaminants*

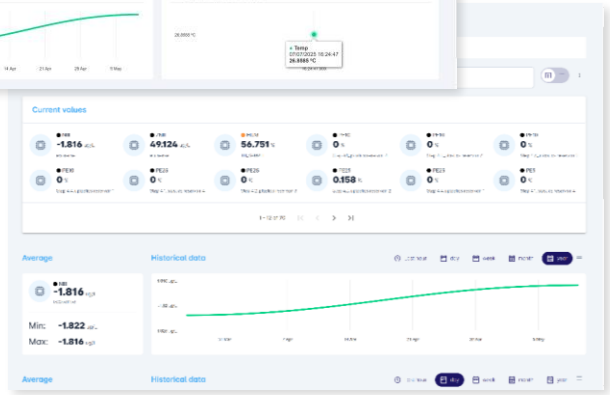
***Real-time connection with innovative sensors** for in situ CEC detection*



Data …



… but not only



Behaviour

In terms of Pollutants

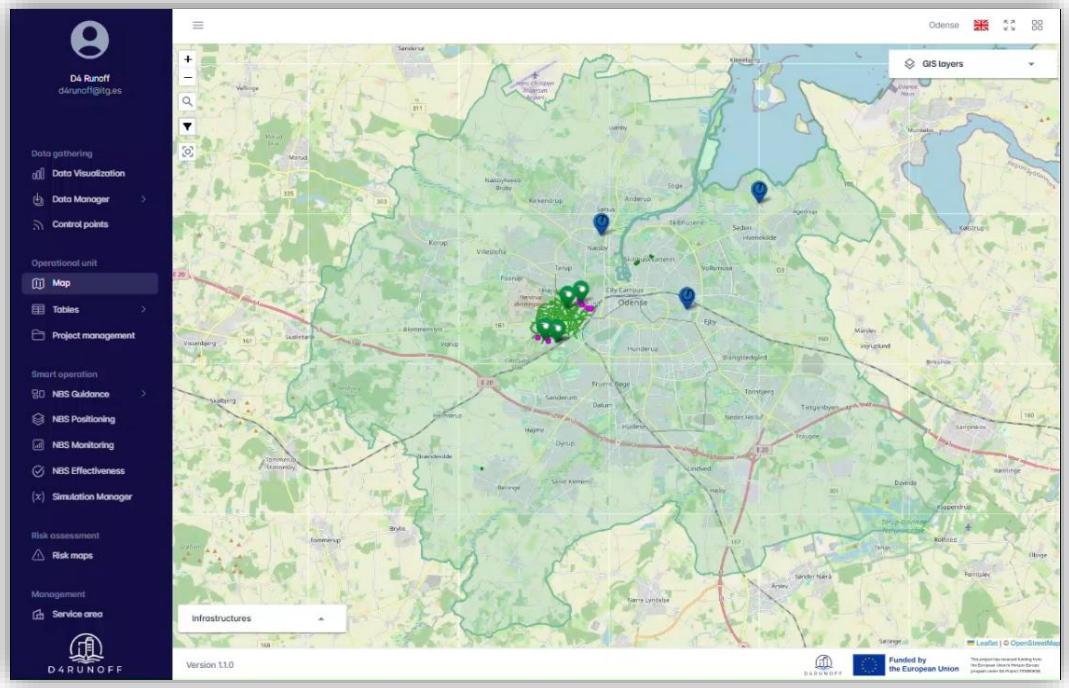
In terms of Water Retention

IoT & Data Gathering

- Ability to store ***drainage and sewer infrastructure data***, providing a comprehensive view of the sanitation system in the study areas through ***GIS functionalities***

Data model *designed for uploading information on different elements of the* ***drainage/sewer network***

Connection with external GIS layer services *to provide contextual information*



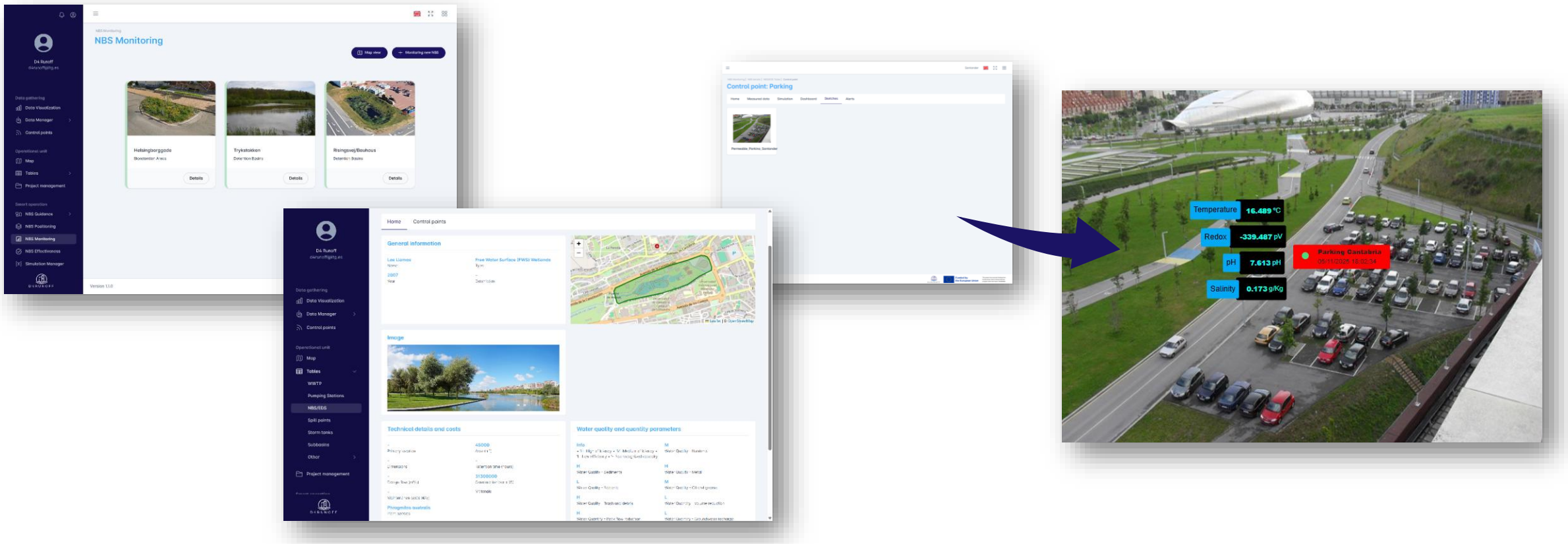
Behaviour

In terms of Pollutants

In terms of Water Retention

NBS Monitoring

Enables users to register implemented NBS at real pilot sites in the AI-Assisted Platform to support monitoring and performance assessment



Impact | Environmental | Policy

NBS Monitoring

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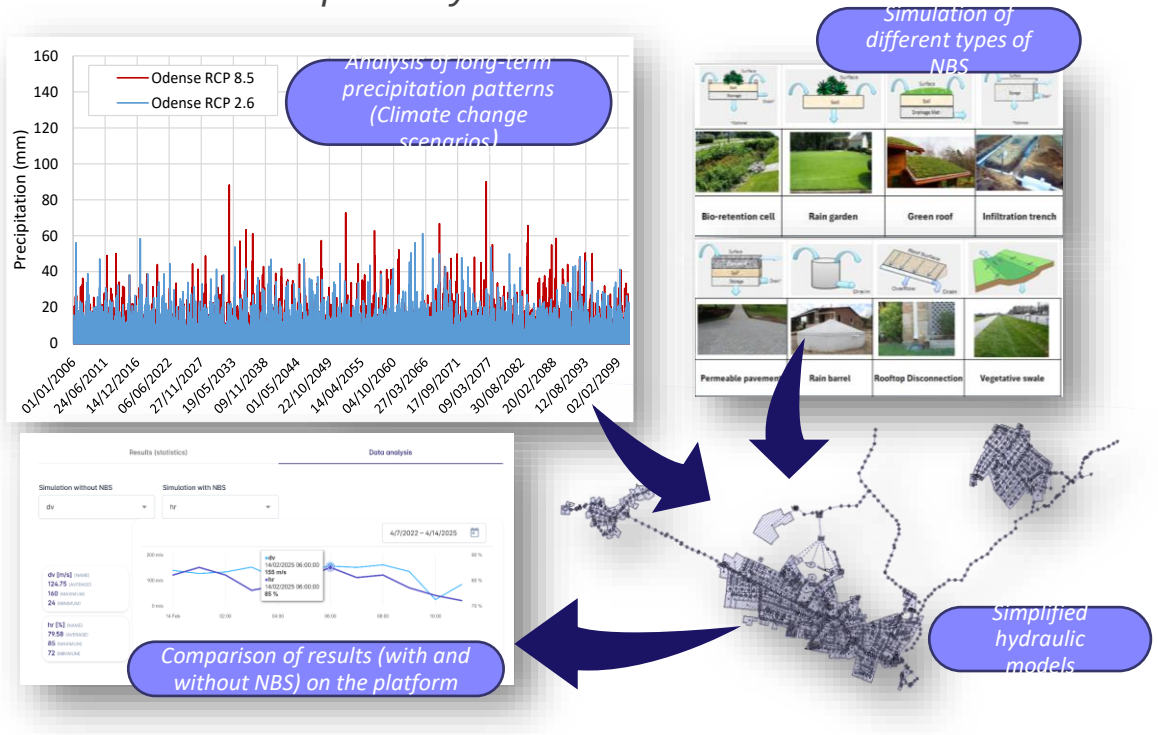
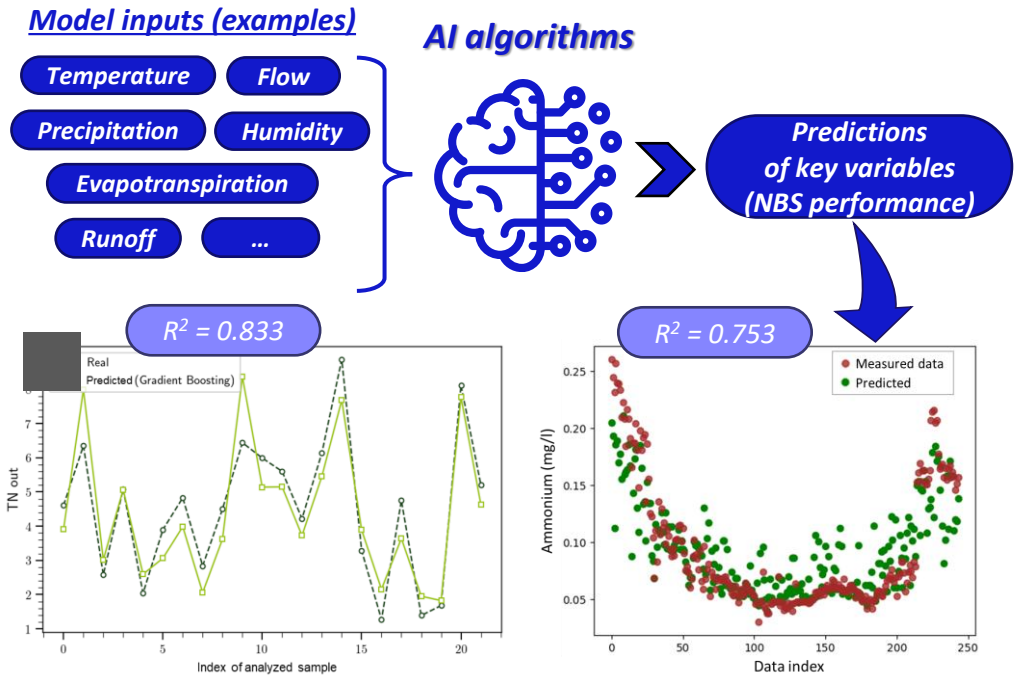
NBS Effectiveness submodule

Comparative analyses of the potential effects of NBS implementation and climate change using simulations from simplified hydraulic models



Artificial Intelligence simulations

Development and integration in the platform of AI-based models to predict key variables for urban runoff management



Acknowledgment

Aknowledgement:
D4Runoff Partners, specially:

- **University of Cantabria:** ->>>> MCDA
- **University of Copenhaghen:** ->>>> Pollution & No – Targeted Analysis
- **Mitiga:** - >>>> Risks Asssesment
- **Three O'Clock:** ->>>> Co-creation workshops

- **And Klink:** ->>>> Policy Making, Strategic Thinking and Support

¡Gracias!

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