Co-funded by the European Union

Milestone 29 - At least 8 training events for local government specialists dealing with spatial planning and project development and 2 international training events or remote sensing data use for data professionals organised

Report of Seminars

"Valgalapõhine planeerimine ja looduspõhised sademeveelahendused linnade kliimakindluse tõstmiseks" *("Catchment-based planning and nature-based stormwater solutions to increase climate resilience in cities")* in Tartu 24.03.26 and "City Blues meets LATESTadapt" in Tallinn 25.03.26

Report of T7.1. - Training for developing follow-up projects to replicate project results in other Baltic Sea Region cities

LIFE LATESTadapt (LIFE21-CCA-EE-LIFE LATESTadapt/101074438)

(TalTech (BEN), Viimsi (COO))

24-25 March 2026

Co-funded by the European Union

Ministry of Smart Administration and Regional Development Republic of Latvia

Republic of Estonia Ministry of Climate

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General description

Aim of the events:
24.03.26 seminar Tartu: To exchange knowledge and practical experience on catchment-based stormwater planning and nature-based stormwater solutions for increasing urban climate resilience, drawing on lessons from Aarhus and Estonian municipalities.

25.03.26 meeting Tallinn: To bring together partners of Interreg Baltic Sea Region project CityBlues and LIFE LATESTadapt for exchange on tools, resources and pilot experiences supporting the uptake and mainstreaming of nature-based solutions in urban planning and implementation, accompanied with excursion to Interreg Central Baltic programme project MUSTBE Tallinn and Viimsi pilot sites and LIFE LATESTadapt Viimsi demo site.

Project specific activity: Milestone 29 - At least 8 training events for local government specialists dealing with spatial planning and project development and 2 international training events or remote sensing data use for data professionals organised

Participants:
24.03.26 Tartu: 27 persons – municipalities from Estonia and Denmark, state agencies, universities, water companies, SMEs, incl. Aarhus Municipality, Tartu City Government, Tallinn City Government, Viimsi Municipality, Tartu Municipality, Estonian Land and Spatial Development Board, Estonian University of Life Sciences, Tallinn University of Technology, Tartu University, KINO Landscape Architects LLC, Altren Project LLC, Tartu Waterworks, Tallinn Water Utility.

25.03.26 Tallinn: 26 persons – project partners and experts from LIFE LATESTadapt and CityBlues, including representatives of Tallinn University of Technology, Viimsi Municipality, Aarhus Municipality, City of Tampere, City of Tartu, City of Haapsalu,

Valmiera Municipality, Kompetenzzentrum Wasser Berlin, Baltic Environmental Forum Estonia, Ministry of Climate, University of Stavanger and The Baltic Institute of Finland.

Who organised:
24.03.26 Tartu: Tartu City Government, Viimsi Municipality, Tallinn University of Technology
25.03.26: Tallinn University of Technology, Viimsi Municipality

When and Where:
24.03.26 Tartu Centre For Creative Industries, Kalevi 17, Tartu, Estonia
25.03.26 Tallinn University of Technology, Mektory building, Raja 15, Tallinn, Estonia, afternoon site visits to pilot/demo sites in Tallinn Mustamäe district and Viimsi Haabneeme area.

Which partners/experts participated: Viimsi Municipality, Haapsalu Town Government, Valmiera Municipality, Tallinn University of Technology, Baltic Environmental Forum EE

24.03.2026 seminar

Opening of the seminar

Maris Pever, Tartu City Government

Maris Pever opened the seminar by introducing Tartu's climate and energy action plan goals for 2030, focusing on climate adaptation through green (improving vegetation to address heat islands and flooding), blue (flood risk mitigation through controlled flood areas), infrastructure (managing storm and extraordinary climate risks) and awareness-raising dimensions...

The role of the municipality in stormwater drainage in Aarhus

Kristiina Mardi, Hydrobiologist and project manager at Aarhus Municipality

Kristiina Mardi presented the municipality's role in stormwater management in Aarhus, introducing how the city integrates land use, groundwater protection, wastewater planning, stormwater planning, climate adaptation and nature-based solutions into holistic water management. The presentation emphasised the organisational structure dividing responsibilities between the municipal-owned utility (water supply, wastewater treatment, operation and maintenance) and the municipality (planning, water management plans, permits and enforcement).

Catchment-based planning and the XL to XS perspective in Aarhus

Dr. Nikolaj Kruse Christensen, Hydrogeologist, Aarhus Municipality

Nikolaj Christensen explained Aarhus's systematic multi-scale approach to stormwater planning, ranging from city-wide (XL) strategies to site-specific (XS) solutions. Key elements included landscape-based spatial planning, the Water Vision strategy with six principles (creating space for water, added value, cost-effectiveness, proactiveness, collaboration, newest knowledge), regulatory instruments (municipal plans, wastewater plans, local development plans, discharge and connection permits), stormwater disposition plans at catchment level, and stormwater management plans at local development level. The presentation demonstrated how co-creation between municipality, utility and developers, combined with planning across scales, enables both climate adaptation and public value creation.

Water utility challenges in stormwater drainage in a changing climate

Elina Saat, Stormwater Project Manager at AS Tallinna Vesi

Elina Saat outlined the challenges faced by Tallinn's water utility due to increasing rainfall intensity and frequency. She explained that annual precipitation has grown 21% over 100 years, with a 32% increase in intensity since 1950, and projections indicate further increases. Tallinn's sewer network (1800 km total, 600 km separate stormwater) faces flooding in 21 major locations, particularly in combined sewer areas. Stormwater constitutes approximately 50% of wastewater treatment plant load during rainfall. Saat emphasised that pipe-based solutions alone are too expensive and hydraulically insufficient, and that utilities must combine conventional infrastructure with nature-based solutions, catchment-wide planning, sewer separation, detention basins and green infrastructure to manage climate change impacts.

Lessons from the planning journey for the stormwater solution for the Port Rail Corridor

Maris Pever, climate specialist at the Tartu City Government

Maris Pever shared practical lessons learned from Tartu's CityBlues pilot project at the Port Rail Corridor (Sadamaraudtee), which aimed to address flooding at the Riia-Vaksali viaduct. The project experienced multiple setbacks: three procurement rounds, changes in project management, lack of continuity, discovery of soil contamination requiring additional investigations, and coordination challenges with the water utility. Key lessons included the importance of defining the problem clearly, robust project management (timeline, budget, quality), comprehensive risk analysis (site history, soil quality), flexibility and adaptability, strong communication and cooperation, and synchronising goals and priorities between municipality and utility.

On the planning, design and cost-effectiveness of nature-based stormwater solutions

Kerta Kõiv, doctoral student and junior researcher at Tallinn University of Technology

Kerta Kõiv presented a comprehensive overview of nature-based solutions (NBS) from planning through design to cost-effectiveness. She introduced EU policy context requiring integrated stormwater management plans with prioritisation of NBS, catalogued Estonian-suitable NBS types (green roofs, rain gardens, bioswales, detention ponds, constructed wetlands, permeable pavements), and explained their multifunctionality (flood reduction, heat mitigation, biodiversity, water quality, social interaction). Planning considerations included multi-benefit analysis, year-round functionality (including snow management), pollutant treatment mechanisms, and design requirements such as hydraulic efficiency, maintenance

needs, and how solutions evolve over time. She presented cost-benefit analysis from pilot projects in Viimsi, Tallinn, Sweden, Finland and Latvia, showing benefit-cost ratios ranging from 1.36 to 4.27 over 30 years. Challenges highlighted included limited NBS experience in Estonia, insufficient information on water quality, need for interdisciplinary cooperation, and longer planning and larger budget requirements compared to conventional solutions.

Planning stormwater systems using the example of Viimsi

Siim Reinla, Infrastructure Project Manager at Viimsi Municipality

Siim Reinla presented Viimsi's approach to stormwater planning in challenging conditions (shallow permeable topsoil over 70m of impermeable clay, high proportion of impervious surfaces, aging infrastructure). Viimsi manages a separate stormwater system with 83 catchments, 270 km of ditches, 175 km of pipes, flow meters and treatment devices. The municipality has integrated stormwater requirements into planning at three levels: general plan (strategic - requiring maximum on-site infiltration, stormwater solutions mandatory, no directing runoff to neighbouring properties, NBS obligatory), detailed plan (spatial - specifying development requirements and dividing responsibilities), and construction project (technical - municipality determines outfall and coordinates technical solutions). Core principles include retaining water on-site through infiltration and detention, slowing flow to reduce peak discharge, treating stormwater before discharge to nature (sediments, nutrients, micropollutants), and using nature-based rather than pipe-only solutions. Viimsi issues stormwater technical conditions that specify outfall location, connection obligations, maximum discharge rates and technical/legal requirements. Examples showcased included the LIFE UrbanStorm Randvere Road parking lot pilot with different permeable pavements, monitoring systems, and ongoing LIFE LATESTadapt and MUSTBE pilot projects.

Questions and discussion

The afternoon roundtable discussions in three working groups addressed how to translate catchment-based planning and nature-based solutions from strategic level to detailed planning and project implementation practice. Discussions were led by Murel Truu (TalTech), Maris Pever (Tartu City Government), Kristiina Mardi (Aarhus Municipality), Margit Kõiv-Vainik (University of Tartu), Alice Laanemägi (Tallinn City Government), and Kerta Kõiv (TalTech).

The central conclusion was paradoxical yet clear: knowledge, strategies and good practices exist in Estonian cities, but the planning logic fails to implement them successfully. This points not to isolated deficiencies but to a systemic breakdown. The broken logic between planning levels manifests as follows: general plans create opportunities for catchment-based stormwater management but remain too general for implementation; detailed plans address stormwater only within plot boundaries, resulting in fragmented solutions; and at construction project stage, spatial and

building decisions are already fixed, leaving stormwater designers with limited options. As a result, sub-catchment stormwater systems emerge as a sum of random decisions rather than integrated design.

Four main problem areas were identified:

1. **Competence and cooperation.** Planners and architects often lack sufficient knowledge of functional stormwater solutions. General plans remain declarative without clear, enforceable requirements. Detailed plans treat stormwater generically—solutions appear as illustrations without performance analysis. Municipal specialists noted that landscape architects' training in stormwater is often insufficient and water and environmental engineers are not engaged adequately. Stormwater is addressed as a separate component only in the final construction project phase, when spatial decisions are already made. Interdisciplinary cooperation is weak—water engineers are involved too little and do not work systematically with architects. There is limited local experience and knowledge on how nature-based solutions function, creating reluctance to apply them. Universities lack unified frameworks for teaching NBS design, and designers lack sufficiently detailed technical guidance materials. Municipalities often lack technical specialists with the expertise to substantively guide and evaluate integrated stormwater and spatial planning processes.

2. **Lack of data and analysis.** Although catchments are mapped in most general plans, they are treated as isolated water and sewer infrastructure rather than flow path systems connected to urban space. There is often no comprehensive understanding of flood risk formation mechanisms—which factors determine risk, how they manifest spatially, and how spatial design can mitigate them. Detailed planning remains confined to development plots, leaving larger drainage areas and sub-catchments unaccounted for. Knowledge of existing system capacity and downstream receivers is absent, and existing map layers do not clearly distinguish stormwater systems from sewers or show actual flow directions. Minimal investment goes into development area pre-surveys, mostly limited to mandatory requirements. At construction project stage, stormwater is still solved within plot boundaries without assessing impact on downstream receivers and catchment systems. Design uses standard EVS 848 design storms, so analysis of system performance under extreme rainfall or excess load from neighbouring properties is not common practice. Several municipalities noted that projects often lack basic information—data on design storms, catchments and flow volumes are either insufficient or entirely missing.

3. **Planning logic problem.** Detailed plans focus on individual plots or development areas rather than catchment functioning. This approach ignores stormwater movement and system loads in broader spatial context. The problem is compounded by the practice of issuing building permits based on preliminary designs that do not include stormwater system performance analysis or verify whether proposed solutions are sufficient. Consequently, spatial and technical decisions are made when actual system functioning has not yet been determined or assessed.

4. **Fragmented responsibility.** Current regulations do not clearly define who is responsible for different system components—whether ditches, pipes, manholes or nature-based solutions belong to the municipality, utility, developer or property owner. It is equally unclear who is responsible for their construction, maintenance and long-term operation. This fragmentation means the system lacks a single responsible party, and decisions are made by stakeholders individually rather than based on overall system performance. The problem is compounded by the fact that stormwater management costs are not currently linked to actual system loads. Developing pipe-based solutions and over-dimensioning systems for extreme rainfall requires very large investments and maintenance costs that cannot be covered solely through water tariffs or municipal budgets. Therefore, there is no clear economic incentive to reduce stormwater runoff at source. A future framework should link stormwater costs to runoff volume generated from each property, for example by accounting for impervious surface area and runoff load directed to downstream receivers. This would create conditions for fairer cost distribution and motivate application of local and distributed stormwater solutions that reduce pressure on centralised systems.

Moving forward requires fundamental change in integrated stormwater and urban planning approaches. Stormwater must be treated as a separate planning object linked to both technical drainage areas and natural catchments. At general plan level, cities need to define and map actual flow path networks—flow directions, volumes and spatial requirements. Detailed planning must shift from plot-based approaches to integrated solutions that ensure overall system performance and do not transfer flood risk from development sites to neighbouring areas. Stormwater analysis must be an integral part of preliminary design, especially in high flood-risk areas, based on adequate pre-surveys including geological, hydrological and hydrogeological analyses. Equally important is clearly defining responsibility boundaries between stakeholders and developing better data platforms that allow integrated analysis of catchments, soils, infiltration and runoff. Clearer guidance is needed for designing nature-based and combined stormwater systems and verifying their performance already at planning stage. Implementing integrated stormwater and urban planning requires greater professional competence and closer cooperation among different specialists.

Key recommendations from participants included:

- Stormwater must be a separate planning object, treated as a system linked to catchments—both technical drainage areas and natural water body catchments. Cities should develop integrated stormwater strategies accounting for causes, spatial variation and risk locations (extreme rainfall, flooding, pollution).
- At general plan level, cities need to define informal flow path networks, including flow directions, volumes and spatial requirements. Detailed planning cannot remain limited to plot-level solutions—planners must ensure that planning solutions do not increase flood risk for surrounding plots and drainage systems.
- In high-risk areas, preliminary designs must require stormwater analysis. Preliminary design should be based on prior surveys within the construction

area: geology, geodesy, hydrology, hydrogeology, dendrological analysis, flow calculations, vertical planning.

- At general plan/green area thematic plan level, responsibility boundaries between municipality and utility need clarification and agreement, and opportunities identified.
- Better data systems are needed to integrate and analyse drainage area planning information. Dense urban areas lack easily accessible information on geology, catchments and infiltration. Currently, users must toggle between map layers when these should be overlaid.
- Better guidance is needed for implementing nature-based and combined stormwater systems. NBS requirements should be reflected in detailed plans in sufficient detail, with verified performance analysis.
- Permanent cooperation mechanisms are needed between municipal planners and utilities, as well as between planners and specialist experts, especially when updating general plans.
- More competent experts on stormwater systems are needed, along with better cooperation among them.

25.03.2026 meeting

Welcome & opening of the meeting. Plans and program

Ivar Annus, Tallinn University of Technology

Ivar Annus opened the meeting and introduced the aims and structure of the day. The meeting was designed as a joint exchange between CityBlues and LIFE LATESTadapt partners, combining project overviews, presentations on tools and resources for nature-based solutions, short pilot introductions, a roundtable discussion on better pilots and stronger project impact, and afternoon site visits in Tallinn and Viimsi.

Tools and resources for NBS uptake from CityBlues and LATESTadapt

Anna Vilhula, City of Tampere
Tanel Mätlik, Viimsi Municipality

The introductory session presented the two projects and their complementary roles. CityBlues focuses on blue-green nature-based solutions for climate adaptation and citizen wellbeing, while LIFE LATESTadapt aims to increase the resilience of Estonian and Latvian urban areas to extreme weather events through nature-based solutions, digital tools, improved planning, monitoring and stakeholder engagement. LIFE LATESTadapt was presented as a cross-border project implemented by Estonian and Latvian municipalities, universities, NGOs and SMEs, with eight municipal demo sites serving as test grounds for climate-resilient solutions.

Tools and resources for NBS uptake from CityBlues and LATESTadapt

Murel Truu, Tallinn University of Technology
Ivar Annus, Tallinn University of Technology
Paul Schütz, Kompetenzzentrum Wasser Berlin

This session focused on practical tools and resources developed within the two projects to support mainstreaming of nature-based solutions. The agenda included guidance on native species design from LATESTadapt, NBS model benchmarking at strategic level from CityBlues, multi-level risk assessment planning, and monitoring, operation and maintenance perspectives from Kompetenzzentrum Wasser Berlin and other project experts. The discussion highlighted that effective uptake of NBS depends not only on technical design but also on planning support tools, risk assessment methods, guidance materials, monitoring frameworks and institutional learning across cities.

Pilots' short intros 7 x 5'
LATESTadapt: Võru, Valmiera, Haapsalu, Viimsi
Indrek Tamberg, Võru Town Government
Agnese Vasiljeva, Valmiera Municipality
Gerda Ladva, Haapsalu Town Government
Siim Reinla, Viimsi Municipality

CityBlues: Tartu, Tampere, Aarhus
Maris Pever, Tartu City Government
Anna Vihula, Tampere City Government
Nikolaj Kruse Christensen, Aarhus Municipality

LATESTadapt:
The short pilot presentations introduced seven city cases and their main objectives, challenges and early lessons. LIFE LATESTadapt pilots included Võru's constructed wetland to slow runoff and purify stormwater before it reaches Lake Tamula; Valmiera's systems for microclimate improvement, expansion of green areas and better stormwater management before discharge to the Gauja River; Haapsalu's coastal meadow and detention approach to reduce flood risk and improve the condition of Tagalaht bay; and Viimsi's smart stormwater collection and reuse solution with new greenery for public use.

CityBlues:
CityBlues pilots included Tartu's ongoing work to address flooding in the Port Rail Corridor area, Tampere's pilot-related work on NBS uptake, and Aarhus's development-area approach using blue-green planning and risk-based preparation. The pilot presentations repeatedly underlined the value of early investigations, sufficient baseline data, stakeholder engagement, realistic budgeting, and cooperation between different departments, utilities and landowners.

Roundtable of 7 pilots.

Agreeing on a joint statement on how to increase the impact of projects and create better pilots to mainstream NBS?

Moderator: Ivar Annus; statement drafting led by Murel Truu; discussion with pilot representatives and experts

The roundtable discussion focused on how pilot projects can generate stronger long-term impact and contribute more effectively to mainstreaming nature-based solutions. The pilots showed different local conditions, but many shared similar implementation challenges: insufficient budgets, land ownership complications, limited baseline data, need for better stakeholder involvement, and uncertainty over how pilot results can be transferred into long-term planning and investments.

A common conclusion was that pilots are most effective when they are embedded in a broader planning and governance framework rather than treated as isolated demonstration activities. Participants stressed the importance of involving the right

municipal departments, utilities, landowners, experts and stakeholders already in the preparation phase; clarifying responsibilities early; carrying out more detailed risk and baseline analyses before submitting project applications; and ensuring that pilot activities are linked to future implementation pathways within municipal planning, investment and maintenance systems.

The discussion also emphasised that better pilots should not only test technical solutions, but also strengthen organisational capacity and create reusable methods, planning tools and cooperation models. This was especially relevant for mainstreaming NBS, because the barriers are often institutional and procedural as much as technical. The meeting therefore helped align CityBlues and LIFE LATESTadapt experiences and supported preparation of a joint statement on how to deliver more impactful and more transferable NBS pilots in Baltic Sea Region cities.

See the full text of joint statement: https://www.linkedin.com/pulse/delivering-nature-based-solutions-baltic-sea-region-cities-murel-truu-xkwrf/

25.03.2026 site visits

Interreg Central Baltic programme project MUSTBE Tallinn pilot site

In the afternoon, participants visited the Interreg Central Baltic programme project MUSTBE pilot site in Tallinn. During the visit, participants were introduced to a practical example of how nature-based stormwater solutions can be integrated into urban public space in order to improve climate resilience and environmental quality. The site visit supported the meeting discussions on how pilot actions can serve as testing grounds for solutions that combine stormwater management, spatial quality and public benefit.

The visit enabled participants to discuss on site how pilot projects can move beyond single technical interventions and become part of broader urban planning and implementation processes. The Tallinn pilot site illustrated the importance of visibility, transferability and real-life demonstration value when developing and communicating nature-based solutions in cities. Further information: https://centralbaltic.eu/project/mustbe/18-pilot-sites/

Interreg Central Baltic programme project MUSTBE Viimsi pilot site and LIFE LATESTadapt Viimsi demo site

After the Tallinn pilot site visit, participants continued to Viimsi, where they visited the Interreg Central Baltic programme project MUSTBE Viimsi pilot site and the LIFE LATESTadapt Viimsi demo site. The visits gave participants an opportunity to observe how stormwater management, public-space improvement and climate adaptation can be combined in one location through practical blue-green solutions. At the MUSTBE Viimsi pilot site, participants saw a solution located next to the Lubja cliff area, which is an important groundwater recharge area with significant groundwater outflow throughout the year. The pilot demonstrates an innovative approach to stormwater and surface water management, where water is not simply conveyed into the sewer system but is delayed and equalised in a pond, purified, and then directed into a tank for reuse. The solution is part of a wider public-space concept connected with a new fountain square and pocket park, illustrating how stormwater infrastructure can be combined with urban design and community functions.

At the LIFE LATESTadapt Viimsi demo site in Haabneeme, participants were introduced to the planned nature-based solution for stormwater reuse for public purposes. The demo site includes a smart stormwater collection tank, pedestrian path, planting and other green infrastructure elements designed to make the area more attractive and useful for local inhabitants. The site demonstrates how collected stormwater can be reused while at the same time supporting greener public space and local climate adaptation.

The Viimsi visits also highlighted the broader planning logic used by the municipality in stormwater management. In this way, the visits complemented the seminar and meeting discussions by showing practical examples of integrated planning and implementation. Further information: https://lifelatestadapt.viimsivald.ee/demo-sites/viimsi_demo/

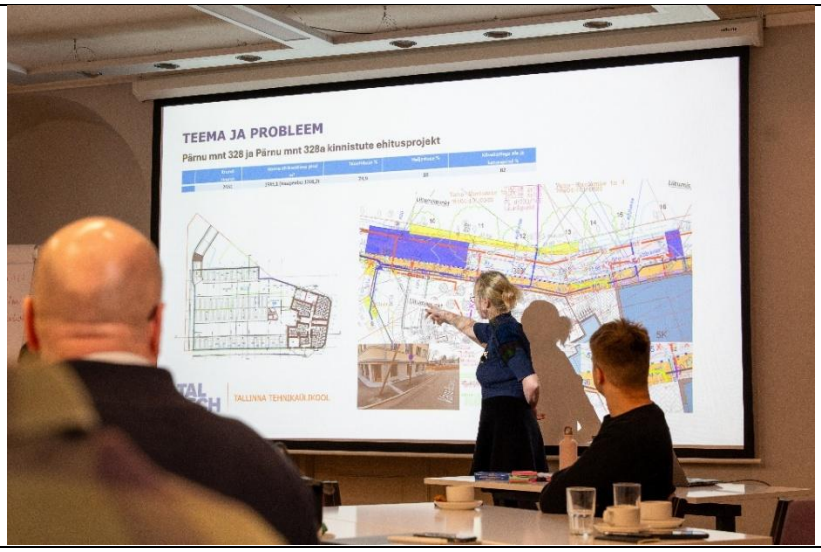
Summary and conclusions of the events

The 24.03.26 seminar in Tartu focused on catchment-based planning and nature-based stormwater solutions as key approaches for increasing urban climate resilience. The programme combined international experience from Aarhus with examples from Estonian municipalities, expert presentations and group discussions on how to improve planning and implementation practice. The seminar highlighted that climate adaptation in cities requires a shift from fragmented and pipe-based stormwater management towards integrated, spatial and nature-based solutions connected to catchment logic.

A central message of the seminar was that good knowledge, strategies and examples already exist, but implementation is hindered by systemic weaknesses in current planning practice. Participants discussed how general plans are often too broad, detailed plans too plot-based, and project design too late in the process to ensure functioning catchment-scale solutions. Additional challenges identified included insufficient interdisciplinary cooperation, lack of data and analysis, limited experience with nature-based solutions, and fragmented responsibilities between municipalities, utilities, developers and property owners.
The seminar concluded that stormwater should be treated as a separate planning object linked to both technical drainage areas and natural catchments. Better results require improved baseline data, clearer responsibility boundaries, stronger cooperation between planners and technical experts, and more detailed guidance for planning and designing nature-based and combined stormwater systems. Overall, the Tartu seminar provided a valuable platform for knowledge exchange and for identifying practical and institutional changes needed to mainstream catchment-based and nature-based stormwater planning in Estonian cities.

The 25.03.26 meeting in Tallinn demonstrated the value of structured exchange between projects working on urban climate adaptation and nature-based stormwater solutions. By combining presentations on tools, pilot experiences, roundtable discussion and field visits, the event supported mutual learning on how to improve pilot preparation, implementation and long-term impact. A key shared message was that successful mainstreaming of nature-based solutions requires not only good technical ideas, but also stronger planning integration, better baseline analyses, clearer responsibilities, realistic budgets, and closer cooperation between municipalities, utilities, experts and stakeholders.

Photos of the 24.03.26 seminar



Photos of the 25.03.26 meeting