Interreg Baltic Sea Region

Co-funded by the European Union

Klaipeda University

SUSTAINABLE WATERS
WaterMan

The WaterMan project
Storm water retention ponds in public areas

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Final concept, 31 Dec 2025

The Challenge: A New Water Reality in Gargždai

- **The Local Problem: A Dual Challenge for Klaipėda District**
  - **Excess Stormwater:** Due to climate change, heavy rainfall overwhelms our insufficient, Soviet-era infrastructure, leading to localized flooding.
  - **Wasted Drinking Water:** During the summer, the municipality uses approximately **300 m³ of high-quality drinking water** annually just to irrigate 50,000–60,000 square meters of green spaces in central Gargždai.
- **The Need for a New Solution:** The current situation is unsustainable. We need a modern, climate-resilient approach that turns our stormwater problem into a valuable resource.
- **The Opportunity: The Stormwater Pond**
  - By creating a stormwater retention pond, we can naturally treat runoff and reuse it for municipal needs, saving precious drinking water.
  - This aligns with our strategic goals for sustainable infrastructure.

Impact and Systemic Causes

- **Who is Affected?**
  - **Local Authorities & Water Companies:** They are the key actors responsible for water supply and climate change adaptation, but for most, water reuse is still a novelty.
  - **Water Consumers:** Citizens, farmers, and industries are directly affected by water shortages. Their acceptance is crucial for the successful adoption of water reuse practices.
  - **The Baltic Sea Environment:** The sea suffers from nutrient and hazardous substance runoff. Retaining and reusing water on land helps reduce these outflows.
- **Underlying Causes:**
  - **Environmental Driver: Climate Change** – The primary driver, which alters precipitation patterns and causes more frequent and intense droughts and rainfall events.
  - **Systemic Barriers:**
    - **Lack of Awareness and Capacity:** Local authorities lack knowledge about the potential of water reuse.
    - **Outdated Infrastructure:** Our pilot project addresses a specific problem—**insufficient and outdated Soviet-era infrastructure** that cannot cope with current weather events.
    - **Mindsets and Acceptance Barriers:** Shifting away from using drinking water for all purposes requires a fundamental change in thinking from both consumers and the water industry. Gaining consumer and stakeholder acceptance can be more challenging than the technical aspects.

Objectives of the Gargždai Pilot Project

- **Primary Goal: Test and Validate a Nature-Based Solution**
  - The pilot aims to implement, test, and validate a **stormwater retention pond** as a practical and replicable solution for water reuse in the Baltic Sea Region (BSR).
  - It is designed to be a "blueprint" that can be easily transferred to other municipalities facing similar challenges.
- **Prove Technical Feasibility & Usefulness**
  - A key objective is to demonstrate the **technical feasibility and usefulness** of recirculating retained stormwater for municipal services.
  - The project will test the pond's effectiveness as a natural purification system and its ability to supply water for:
    - **Irrigating parks and streets** in Gargždai.
- **Achieve Water Savings & Increase Climate Resilience**
  - The project intends to prove that reusing stormwater can significantly **reduce the use of drinking water**, aiming for an estimated saving of **300 m³ annually**.
  - This contributes to the broader objective of making our local water supply more **climate-resilient** by diversifying water sources.

Broader Objectives: Fostering Acceptance and Regional Strategy

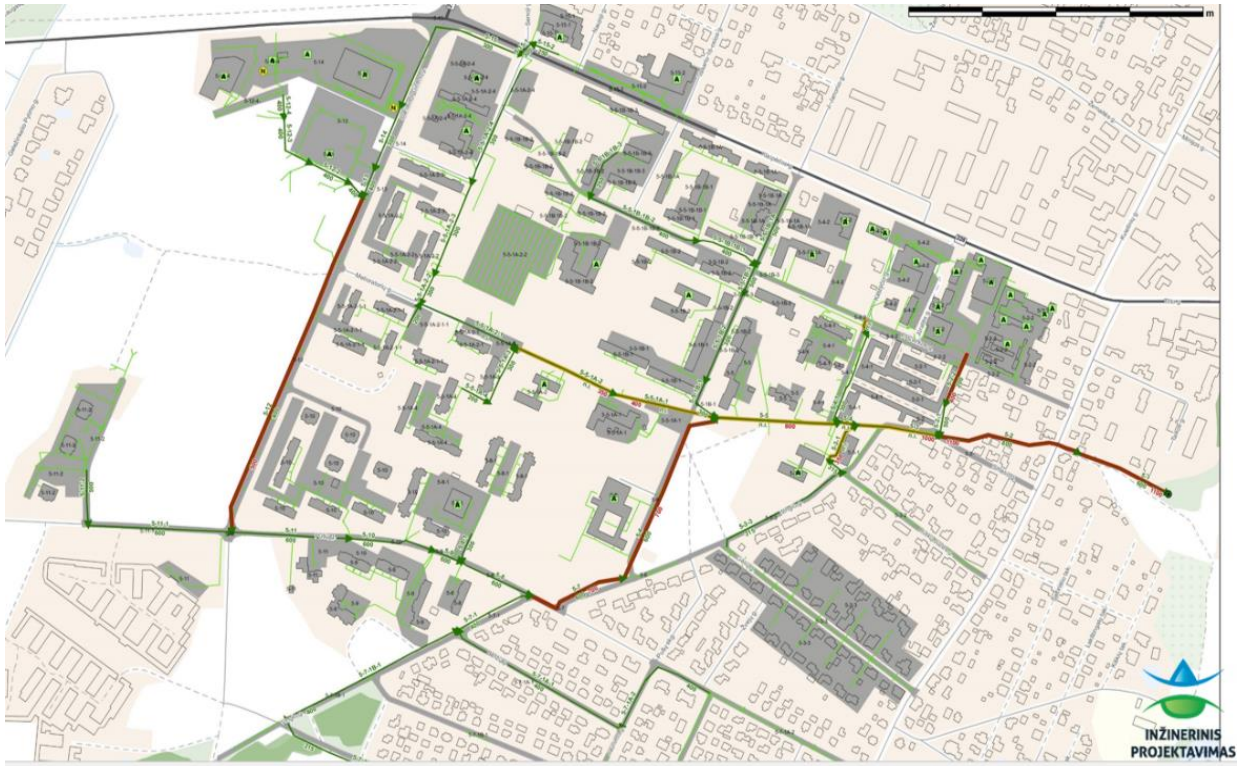
- **Test and Promote Social & Stakeholder Acceptance**
  - A critical aim of the overall WaterMan project, and our pilot, is to address and promote **consumer and stakeholder acceptance** for water reuse.
  - Experience from other European regions shows that gaining acceptance can be more challenging than the technical implementation.
  - We will engage local users and stakeholders through meetings and a media campaign to build awareness.
- **Contribute to a Trans-Municipal Strategy**
  - Our local pilot is not an isolated project; it's a key component of a larger regional effort. We aim to contribute experiences and data to the development of a **trans-municipal water reuse strategy** for the entire Klaipėda Region, in cooperation with the Association "Klaipėda Region" and Klaipėda University.
- **Create a Multi-functional Public Space**
  - Beyond its technical function, the project aims to improve the local environment by transforming an underutilized area.
  - The plan includes creating a **new recreational area** with walking paths and enhancing local biodiversity by planting native species, thereby increasing the site's public and ecological value.

Context: Why Gargždai?

- **Specific Location:** The pond is being built in Gargždai town, near Taikos St. 11 & 12, in the Minija river valley.
- **Targeting an Existing Problem:** The site was chosen because it is the discharge point for a **110-hectare urban drainage basin**. This area includes multi-story residential buildings, public buildings, and some private homes.
- **Infrastructure Challenge:** Currently, stormwater from this large area flows through an existing, but non-operational, sand trap and is discharged untreated into the Minija river valley via an open ditch.
- **High-Impact Opportunity:** The central part of Gargždai uses approximately **300 m³ of drinking water annually** just for irrigating 50,000-60,000 square meters of green spaces. The pond is strategically located to capture runoff that can be reused for this very purpose, creating a direct and measurable benefit.
- **Land Availability:** The project is planned on state-owned land that is not yet formally designated, which facilitates its development for public infrastructure.

During the summer season, the marked in green central part of Gargždai is irrigated with drinking water
Approximately 50,000 - 60,000 square meters of irrigated green area

Stormwater catchment area – 110 hectares



Policy & Strategic Alignment

- **EU Policy Driver:** The project aligns with the EU's focus on climate resilience and sustainable water management. It directly contributes to the **EU Strategy on Adaptation to Climate Change** and supports the **EU Regulation 2020/741 on Water Reuse**.
- **Baltic Sea Region Strategy:** The WaterMan project contributes to the **EU Strategy for the Baltic Sea Region (EUSBSR)**, specifically Policy Area Nutri. By retaining and reusing stormwater, we **reduce the outflow of nutrients and hazardous substances** into the Minija River and ultimately the Baltic Sea.
- **Local & Regional Strategy:** The pilot is a core part of Klaipėda District Municipality's strategic development goal for **sustainable infrastructure**. It also serves as a practical component for a **trans-municipal water reuse strategy** being developed by the Association "Klaipėda Region" and Klaipėda University.
- **Conditions & Environment:**
  - **Environmental:** The primary driver is **climate change**, causing more frequent extreme weather events.
  - **Institutional:** The project is a collaborative effort between the **Klaipėda District Municipality** (implementer), **Klaipėda University** (provides scientific expertise), and the **Association "Klaipėda Region"** (coordinates the strategy).
  - **Economic:** The pilot project has a budget of **€272,195**, co-financed by the Interreg Baltic Sea Region Programme (ERDF).

Our Key Stakeholders & Their Roles

- **Core Project Partners (Local Implementation Team):**
  - **Klaipėda District Municipality (KDM):** As the lead implementer, we are responsible for the practical execution of the Gargždai pilot, including procurement, construction, and overall management of the retention pond project.
  - **Klaipėda University (KU):** Our scientific partner, providing essential technical and methodological expertise, including stormwater modeling and water quality analysis.
  - **Association "Klaipėda Region" (AKR):** This association unites seven local authorities. Their role is to ensure our pilot project contributes to a broader **trans-municipal water reuse strategy** and to help raise awareness among local politicians and stakeholders.
- **Local End-Users & Operational Partners:**
  - **Gargždai Town Eldership:** The primary envisaged user of the recycled water for irrigating the town's central green spaces.
  - **UAB "Klaipėdos rajono energija":** An operational partner who has agreed to use the recycled water for pipeline flushing, serving as a safe alternative use case.
- **AB "Klaipėdos vanduo":** The regional water utility, involved in stakeholder meetings to ensure alignment with broader water management practices.

Engaging Stakeholders Throughout the Process

- **Transnational Peer Learning & Co-creation:**
  - We actively participate in a structured international dialogue with partners from six countries. This involves **regular peer review sessions** where our pilot plans are commented on by partners and external experts, ensuring we benefit from a wide range of experiences.
  - We also engage in international **study trips and conferences** to "import" knowledge on best practices from regions where water reuse is more advanced, such as Spain.
- **Local & Regional Engagement:**
  - **Direct Meetings:** We are holding targeted meetings with key local users and partners—specifically the **Gargždai eldership**, **AB „Klaipėdos vanduo“**, and **UAB „Klaipėdos rajono energija“**—to align on practical implementation and gather feedback.
  - **Strategic Dialogue:** The Association "Klaipėda Region" involves local politicians and stakeholders in international dialogues and study trips to raise their awareness and inspire new solutions based on international experiences.
- **Public Awareness & Acceptance Building:**
  - Recognizing that stakeholder and consumer acceptance is critical, we are planning a **media campaign** involving articles, social media updates, and local press coverage to inform the public about the project.

The Solution: A Nature-Based Approach for Stormwater Reuse

- **Technical Solution:** A **stormwater retention pond** was designed and is being constructed in Gargždai town.
  - This solution replaces insufficient Soviet-era infrastructure with a modern, eco-efficient system designed according to sustainable urban drainage principles (SuDS).
  - The pond is a **nature-based solution** that uses natural processes like sedimentation and biodegradation for purification, avoiding the need for additional technical equipment or chemicals.
- **Organizational Solution:** The project is a collaborative effort led by the Klaipėda District Municipality.
  - It is one of ten pilot measures within the international **Interreg BSR WaterMan project**.
  - **Klaipėda University** provides scientific and technical support.
  - **Association "Klaipėda Region"** integrates the local pilot into a broader, **trans-municipal water reuse strategy** for seven municipalities.
  - Operational users like the **Gargždai Town Eldership** and **UAB "Klaipėdos rajono energija"** are key partners for the final use of the recycled water.

Development Process & Methods

- **Process of Development: Transnational Co-creation**
  - Our local pilot is part of a structured international process involving municipalities, water companies, and research institutions from six countries.
  - The core method is a **transnational peer learning and co-creation arena**. This involves:
    - **Regular Peer Reviews:** We present our pilot plans in sessions where partners from other countries and an international expert panel provide feedback and recommendations.
    - **"Importing" Knowledge:** We participate in study trips and conferences to learn from best practices in regions where water reuse is more advanced, such as Spain.
- **Process of Testing:**
  - The solution will be tested under **real-world conditions** to demonstrate its feasibility and usefulness.
  - Water reuse testing is scheduled for **September–November 2025**, following the completion of construction works.
  - Klaipėda University (KU) will conduct post-construction sampling and analysis, likely before the 2026 irrigation season, to allow the pond's ecosystem to stabilize

Tools, Technologies & Timeline

- **Technology: Nature-Based Solution (SuDS)**
  - The core technology is a **stormwater retention pond**.
  - It uses natural purification processes like **sedimentation and biodegradation** in a two-stage system (forebay (1040 m^2, 1666 m^3) and main pond (7043 m^2, 17400 m^3).
  - The system includes an intake point for collecting the treated water into mobile transport vehicles.
- **Methods for Planning & Analysis:**
  - **Preparatory Surveys (Baseline Analysis):** Before design, we conducted surveys to create a knowledge base.
  - **Stormwater Sampling and Analysis:** Klaipėda University conducted a comprehensive sampling campaign in 2023 to determine the runoff's chemical and microbiological characteristics.
- **Project Timeline & Milestones:**
  - **Phase 1: Preparation & Design (2023–2024):** Project appraisal completed in **October 2024**.
  - **Phase 2: Construction (2025):** Construction works are completed in **September 2025**.
  - **Phase 3: Testing & Evaluation (End of 2025):** Water reuse testing is planned for **September–November 2025**.


Photo credit: Laura Jankutė

Lessons Learned: What Didn't Go as Planned & Adjustments

- **Initial Concept vs. Practical Reality: Pipeline Installation**
  - **What didn't go as planned?** An intuitive idea for distributing the recycled water would be a permanent pipeline system.
  - **What needed adjustment?** A feasibility assessment showed this was not a rational approach for our specific site. The retention pond is located in the Minija river valley at a lower elevation than the town's green spaces.
  - **Lesson:** Pumping water up a 30-meter height difference over challenging terrain would be inefficient and costly. The plan was adjusted to use **mobile transport vehicles** to collect and distribute water, which is a more practical and flexible solution for this location.
- **Risk Mitigation: Construction Delays**
  - **What was identified as a potential problem?** The primary risk to the pilot's success within the WaterMan project timeline is a delay in construction works.
  - **Lesson:** We have proactively planned for potential delays by extending the pilot's internal timeline to December 2025, ensuring that even with setbacks, the project goals can be met.

Key Takeaways for Future Implementations

- **Lesson 1: Proactive Planning for Water Quality is Crucial**
  - **Takeaway:** A comprehensive **pre-construction sampling campaign**, like the one Klaipėda University conducted in 2023, is essential. This data is critical for the engineering design and for setting realistic expectations.
  - **Recommendation:** Always secure a scientific partner early. Also, plan for post-construction sampling before the main usage season (e.g., before the 2026 irrigation season) to allow the pond's natural ecosystem to stabilize.
- **Lesson 2: Secure a "Safe" Alternative Use Case from the Start**
  - **Takeaway:** The primary goal is irrigating green spaces, but it's vital to have a backup plan.
  - **Recommendation:** We secured an agreement with the local energy company, UAB "Klaipėdos rajono energija," to use the water for **pipeline flushing**. This provides a valuable, non-public-contact use case, ensuring the pilot's recycled water has a purpose regardless of initial testing outcomes and de-risks the investment.
- **Lesson 3: Don't Reinvent the Wheel – "Import" Knowledge**
  - **Takeaway:** Water reuse is a novelty for most municipalities in our region, but it's a well-established practice elsewhere. The WaterMan project's structure taught us the immense value of not starting from scratch.
  - **Recommendation:** Actively participate in transnational learning. Through **study trips to advanced regions like Spain** and regular peer reviews, we can "import" field-tested solutions and adapt them to our local Baltic Sea Region conditions

The water usage for pipeline flushing

Video credit: UAB „Klaipėdos rajono vandenys“

Before

After

Photo credit: UAB „Klaipėdos rajono vandenys“

Scalability: From a Local Pilot to a Regional Blueprint

- **Can the Measure be Scaled Up? Yes, it is designed for it.**
  - The Gargždai pilot project is explicitly designed to be a **replicable blueprint** for other municipalities, not just a one-off solution.
  - The knowledge and results are processed into a **"BSR Water Reuse Toolbox"** which gives other local authorities concrete guidance on how to replicate these measures.
- **Scaling Up within the Klaipėda Region:**
  - The project is a cornerstone for a **trans-municipal water reuse strategy** being developed for all seven member municipalities of the Association "Klaipėda Region".
  - The experience from Gargždai will directly inform and enable similar projects in neighboring municipalities.
- **Scaling Up Across the Baltic Sea Region:**
  - The entire WaterMan project is structured as a **transnational peer learning and co-creation process**, ensuring that the lessons learned in Lithuania are shared and validated with partners.

Financial Viability of Scaling Up

- **Financial Sustainability:**
  - **Reduced Operational Costs:** The primary financial benefit is long-term savings from **reducing the use of high-quality, expensive drinking water**. Our Gargždai pilot is estimated to save **300 m³ of drinking water annually**.
  - **Nature-Based Solution:** The retention pond is an **eco-efficient solution** that relies on natural purification. This avoids the high operational and maintenance costs associated with more complex technologies.
- **Financial Viability (Funding):**
  - **Leveraging Transnational Funding:** The Gargždai pilot is made possible by co-financing from the **Interreg Baltic Sea Region Programme**, which covers 80% of the costs.
  - **Blueprint for Future Funding Applications:** The successful implementation of the Gargždai pilot and the creation of the **"BSR Water Reuse Toolbox"** provide a proven concept and strong justification for future funding applications.

Transferability of the Solution and Preconditions for Success

- **How can the solution be adapted to other regions?**
  - The core method for transfer is the **"BSR Water Reuse Toolbox"**. This online catalogue will contain **"replication blueprints"** that present the solution in an easy-to-understand way, allowing other municipalities to adapt the most suitable solutions.
  - The project's **transnational peer learning and co-creation arena** is a key process for adapting solutions, including "importing" knowledge from more advanced regions like Spain.
- **Preconditions for Successful Replication:**
  - **1. Local Need & Political Will:** There must be a recognized local challenge, such as water scarcity or flooding, and strong support from local authorities.
  - **2. A Structured, Data-Driven Planning Process:** This requires **preparatory surveys (baseline analysis)**, including site-specific analysis and water quality assessment.
  - **3. Stakeholder Engagement and Acceptance: Early and continuous dialogue with stakeholders** and a strategic plan to build public acceptance are critical.
  - **4. Collaborative Partnerships:** A strong partnership between the implementing municipality and a **scientific/research institution** is essential.

Final Reflections & Our Wish for the Future

- **Our primary wish is for our pilot to become a true catalyst for change.**
  - We hope it serves as a tangible, trusted **blueprint that is actively replicated** by other municipalities across Lithuania and the wider Baltic Sea Region.
  - Ultimately, we wish for a fundamental **shift in mindset**—where both the public and the water industry see recycled stormwater not as waste, but as a valuable and essential resource for building a climate-resilient future. Our pond, with its integrated recreational paths and enhanced biodiversity, is designed to be a living demonstration of that new way of thinking.

Photo credit: Vytautas Valantinas

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The „BSR Water Recycling Toolbox" was elaborated as part of the WaterMan project, which is co-financed by the European Union (European Regional Development Fund) and implemented within the Interreg Baltic Sea Region Programme. More information:

eurobalt.org/WaterRecyclingToolbox
interreg-baltic.eu/project/waterman

WaterMan promotes a Baltic Sea Region-specific approach to water recycling, which makes use of the alternation of too much and too little water that has become typical for humid areas in the EU to strengthen the resilience of local water supply. Building on this approach, the project supports municipalities and water companies in adapting their water supply strategies.