Transitioning surface water collection to surface water reuse systems

Section 1: Project Overview

Introduction

The Centre of Expertise for Waters (CREW) intends to commission a **capacity building project** aligned with CREW's Land and Water Resource Management theme. The project supports Scottish Water's surface water management ambition to reduce the volumes of rainwater entering the combined sewer network by transitioning Scotland's **surface water collection and treatment systems** to **surface water providing systems** enabling water reuse in the urban environment.

Background & knowledge gap

Background

Scottish Water's Climate Change Adaptation Plan 2024 describes how changes to our climate will bring warmer, drier summers. These changes may increase the risk of deteriorating raw water quality, droughts and more frequent, more extreme storms that will disrupt our assets and services.

Scottish Water's Surface Water Policy drives a 'no more in, what's in out' ambition to reduce the volume of rainwater entering the combined sewer network. Rainwater is collected from roofs and roads and is drained either through the combined sewer network for treatment at a wastewater treatment works, or on new developments separately through surface water sewers and/or to sustainable urban drainage systems (SUDS). Rainwater from roofs/domestic properties generally has a low pollutant load, with run-off from roads generally being more polluted from plastics, metals, oils and other toxins from engines, tyres and brake pads.

To support this strategy and drive resilience of the sewer network to climate change, one option is to reuse the rainwater that has been collected in greywater systems for **non-potable** (not consumed by humans, e.g., non-edible crop irrigation, vehicle cleaning and cooling systems) water use, changing it from a problem to a resource.

This proactive approach can help to reduce sewer flooding and overflows into the water environment. Additionally, reusing this water for **non-potable** needs can ease the demand for potable water from our water treatment works and environmental sources, and reducing demand on water resources during times of water stress.

Knowledge gap

The potential of Scotland's current surface water management network[1] to be a source of water for wider **non-potable** uses[2] remains a significant knowledge gap. For example, information is lacking regarding the potential for place-based solutions for reuse of un-treated surface water, regulatory requirements, the economic drivers to enable this and the consumer enthusiasm to do so.

Reusing untreated surface water in Scotland is heavily regulated due to concerns regarding water quality, public health, environmental protection and concerns over trade barriers on agricultural goods from land irrigated with untreated surface water. The Water Framework Directive (WFD) ensures water bodies meet a minimum ecological status. Reusing untreated surface water could reduce water quality, should the reuse lead to contamination in natural water bodies. The reuse of untreated surface water may also be constrained by legislation such as the Environmental Protection Act 1990, Water Environment (Controlled Activities) (Scotland) Regulations 2011, and Pollution Prevention and Control (Scotland) Regulations 2012.

Policy Relevance

The Scottish Government is considering policy for the future of the water industry in Scotland and has carried out a consultation on the proposed strategic principles to be applied. Included in these are the principles of taking opportunities to disconnect drainage from combined sewer systems and re-use surface water to carry out activities that do not require potable water. This will also support the drive to better use water resources and reduce treatment costs and use of chemicals. This research is also relevant to the Circular Economy (Scotland) Act 2024 and the Climate Change (Scotland) Act 2009. Also links to Flood resilience strategy and work of the SG Water Efficiency Stakeholder Group.

Industry Relevance

From the Water Sector Vision, there are many relevant objectives: Scotland's wastewater will be collected, treated, and recycled in ways that generate value and protect the environment. We will transform how we work to live within the means of our planet's resources, enhance the natural environment and maximise our positive contribution to Scotland achieving net zero emissions. We will be agile and will collaborate within the sector and with others to be resilient to the challenges that will face us. We will keep services affordable by innovating and delivering the greatest possible value from our resources, helping those who need it most.

Aim and key questions

The overall aim of this project is to explore the emerging area of interest in surface water reuse before the next regulatory planning period (April 2027-March 2033) and demonstrate clear policy/strategic alignment.

[1] Includes all sources of rainwater and grey water opportunities domestic and industrial. e.g. rainwater and road water captured through surface water sewers/SUDS, domestic water butts, as well as non-domestic collected surface water that can be disconnected from the combined sewer for use by industry and the local are e.g. irrigation and cooling.

[2] Note combined sewer systems, private water systems, house toilet flushing systems, reusing surface water as drinking water are out of scope for this project.

The project will focus on **non-potable** uses, such as non-food agriculture, car washing, and cooling systems, which are less regulated, but may still require adherence to local planning and environmental legislation.

Careful consideration will therefore be given to:

- Where water is captured from, given that rainwater from roofs generally contains a lower pollutant load than surface water from roads, for example.
- What untreated surface water can be used for, within current legislation.
- Feasibility of minor treatment/settlement/screening of surface water to allow captured water to be reused more widely.
- Which legislations exist regarding the reuse of grey water for non-potable uses.

The key questions to be addressed are:

1. **What learnings can be made from perspectives and practical examples of water reuse in surface water management networks in the wider UK and internationally? Suggested elements include but are not limited to:**
    a. What case studies are available where other countries have successfully or unsuccessfully attempted to capture and reuse water in surface water management networks, upstream of treatment?
    b. What was the motivation of these countries in capturing and reusing this water, and how does that tie in with the key aims of this project?
    c. What learnings could be gathered from other water companies' projects on water reuse e.g., Anglian Water On-Site Water Reuse System.
    d. What are other countries regulatory requirements? Are there any learnings and, is there any applicability to Scotland's situation?
    e. What, if any, financial incentives or penalties were put in place? Were there any changed behaviours and economic benefits?
    f. Use of findings for successful countries to inform opportunities where a similar project in Scotland might be undertaken, considering influence of differing factors (e.g., legislation, climate, land use, and socioeconomic factors)?
2. **What are the potential sources (type and estimated volumes)[3] for water reuse within Scotland's current surface water management network? Suggested elements include but are not limited to:**
    a. What are potential source types for water reuse (e.g., roads, roofs, and urban green space)?
    b. If feasible, using publicly available/accessible information, consider how much surface water is currently being processed by Scotland's surface water management system and assign a general hierarchy of ease of access.
    c. If feasible, consider what, at a high-level, using publicly available/accessible data, is the potential volume of surface water available for capture and reuse at a catchment level?

[3] Discussions with the project steering group regarding specifics of data availability/accessibility will be held at a pre-contract meeting

3. **What are the opportunities/limitations/challenges/practicalities of surface water reuse within Scotland's current surface water management network? Suggested elements include but are not limited to:**
    a. What level of contamination is typically present in surface water management networks and what are the risks posed by these contaminants?
    b. What is the current legislation regarding the reuse of untreated surface water?
    c. What are the categories of land/water use where surface water can be used in the absence of treatment?
    d. What are the environmental impacts and public health impacts, feasibility and practicality of capturing/treating surface water for reuse, considering supply and demand, and infrastructure requirements.
4. **Recommendations for next steps. Suggested elements include but are not limited to:**
    a. Where can water in Scotland's surface water management network be reused and how much potable water would this replace? How could this be prioritised both by regions and economic and environmental benefits?
    b. What treatment would be required to the surface water to extend this opportunity? Is it worth it? – treatment cost, long-term carbon capture etc.

Deliverables

- Communications and impact plan – supported by CREW at the start and throughout the project
- Online stakeholder workshop to identify the best approach to transition Scotland's assets from collection to reuse
- Mapping, if feasible, to inform key questions 2b & c), of potential volume of surface water available for capture and reuse at high-level (e.g., catchment level), using publicly available/accessible data.
- Professional quality infographics or visuals (to be generated in consultation with the project steering group and research team's communications team and a professional graphics designer).
- A final report of 20-30 pages, excluding annexes and the bibliography, and including:
    - A literature/current state review including policy/relevant regulations
    - A summary of sources, volumes, potential reuse opportunities (with assessment of feasibility)
    - Workshop summary
    - A concise set of recommendations
    - Cover image(s) with associated photo credits
- A plain English summary of aims and results (up to 1 page)
- Website summary (200 words)

Events/meetings

- Three online Project Steering Group meetings (throughout the project lifecycle[4])
- One online Stakeholder workshop

[4] Please note, CREW requests a brief written update c. two weeks prior to project steering group meetings.

Intended impacts

There are multiple pathways for a project to achieve impact, and multiple factors that can impact the project's ability to achieve what it intends to do; both along the project lifecycle (A.IMPACT) and beyond project completion (B.IMPACT) (Figure 1).

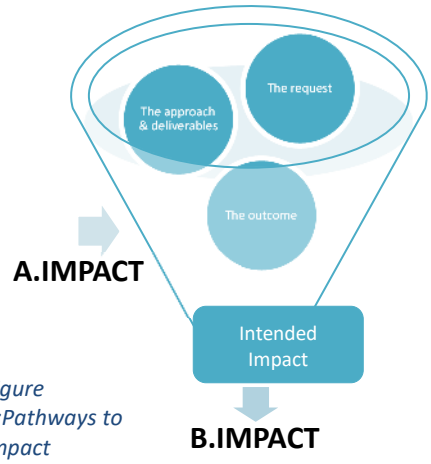

Figure 1:Pathways to impact

- **The request**: the problem/ gap that has been identified that drives the project.
- **The approach & deliverables:** the 'methods' that explain how the request is being answered and the 'outputs' that are tangible products delivered by the project.
- **The outcome:** this is directly correlated to the findings; this is short to mid-term change because of the research.
- **Intended impact:** Explicitly what this project intends to achieve to address, which is connected to the request.
- **Along impact**: the conditions and causal factors that can influence the project during its life cycle.
- **Beyond impact:** more significant wider change that occurs at a longer timescale following the project's completion.

Along Impact *(A.Impact)*:

These stakeholders are anticipated to be a key influence on this project: Scottish Water; SEPA; Scottish Government; Consumer Scotland; WICS; DWQR; and Local Authorities (planning and buildings standards in particular).

Goals for the stakeholders at the proposed online workshop would be to identify the best approach to transition our assets from collection to reuse in partnership with industry and private business and relevant legislation acting as a barrier to this transition. Furthermore, Scottish Government and WICS may help determine if the benefits of this transition justify specific funding consideration.

Beyond Impact *(B.Impact)*:

The intended audience for the project deliverables include:

- Water utilities
- local users
- Government
- local authorities
- developers
- businesses who want to reduce drainage charges/improve their climate resilience

The project deliverables will be used by Scottish Water to review strategy which eventually filters down to best practice in the next strategic funding period.

It is anticipated that infographics will be developed and used for stakeholder and public communication of any proposals, as well as internal discussions.

The project offers opportunity to bring together stakeholders with different roles to play in the management of surface water and taking a systems thinking approach to managing rainwater and road runoff.

Section 2: Further information for applicants

Project management

Day-to-day communication will be between the research/review team (the contractor) and a CREW Project Manager and is likely to involve short catchups as agreed.

Project steering group

A small group including representatives of Scottish Government and its delivery partners plus a CREW representative, will meet with the preferred bidder for a pre-contract meeting and provide feedback on the bidder's proposed approach.

Anticipated timescale

A precontract meeting will be held in June 2025. The project will commence c.w.b. 16th June 2025, depending on contract processing and signage, with the project outputs signed off by the CREW Director by c. 15th February 2026.

Funding

The maximum amount of funding available **exclusive of VAT** (where applicable) is £85,000

This includes an associated cost for professional graphics design sub-contractor budget of up to: £3,000.

Submitting a proposal

Please send a completed application form using the most recent version (the link to this form is available on the CREW Call for Proposal webpage (Call for Proposals | CREW | Scotland's Centre of Expertise for Waters) addressing the project requirements.

A copy of expectations and the award criteria are provided below for reference.

Proposals need to be submitted to Procurement@crew.ac.uk for evaluation **by noon on Wednesday 7th May 2025.** We aim to notify the preferred bidder **c. w.b. 2nd June 2025**.

Please contact Procurement@crew.ac.uk if you would like any clarification on any of the above by **30th April 2025**.

You should highlight any potential conflicts of interest in your proposal. For queries about what may constitute a potential conflict of interest please contact the CREW Deputy Manager (Nikki.Dodd@hutton.ac.uk).

Expectations

No.	Criteria	Descriptor
1	Duration	The proposed duration will align closely to the details provided in the anticipated timescales section of the specification.
2	Staff time and effort	The proposed allocation of staff time and effort is appropriate and includes all deliverables. The proposal provides a commitment that named staff members will be available to work on the contract if the bid is successful. For any unnamed staff, appropriate risk identification and mitigation measures are provided.
3	Project costs	The estimated breakdown of project costs is realistic and inclusive of all deliverables.

Award criteria

No.	Criteria	Descriptor
1	Understanding the project ask and policy background	The proposal should include an introduction which demonstrates a clear understanding of the project requirements. This should include an understanding of the policy background and the supporting role of this project; the need for this research; the project aim; and how the proposal will address this aim.
2	Proposed methodology	The proposal should demonstrate a high quality and workable methodology, including: how the evidence will be identified, reviewed and assessed; consulting relevant stakeholders and/or experts where appropriate to address the key questions and produce the deliverables in the timescales required. It should explain the suitability, robustness and limitations of the proposed methodology.
3	Milestones	The project milestones are logical, practical and include all deliverables.
4	Project Management	The staff, resources and expertise are appropriate for conducting the proposed project. The proposal should name the project lead and outline their project management experience.
5	General and specific topic expertise and experience	The proposal should provide details of individual staff members who will work on this project and demonstrate how they will meet the project requirements, specifically: general research experience and expertise; specific experience and expertise on the topic of rainwater reuse for non-potable purposes;
6	General communication and deliverables	The proposal should describe the approach to producing the deliverables, which will be published on the CREW website. It should detail who will take lead responsibility for report-writing and overall report quality. It should provide examples of previously published research regarding rainwater reuse in which they have been involved.
7	Quality assurance	The proposal should provide details of quality assurance procedures to demonstrate how the contract will be continuously delivered to a high standard. It should specifically address issues of quality control at different stages of the project, including evidence gathering, analysis and report writing. It should include a timetable for delivery of tasks, project milestones and allocation of staff and staff time against each task, covering the duration of the contract.
8	Risk	The proposal should provide a risk assessment matrix detailing any risks identified in relation to the delivery of this contract, and proposed mitigation measures to minimise their probability and impact, focused particularly on risk to completion on time.