Dublin Urban Rivers LIFE Project

Layman's Report

SDCC
Comhairle Contae Átha Cliath Theas
South Dublin County Council

LIFE17 ENV/IE/000281

dlr
Comhairle Contae County Council

The Dublin Urban Rivers LIFE (DURL) Project

Rivers are an integral component of our urban areas and enhanced water quality positively impacts on their biodiversity and natural amenity value. Our rivers and lakes continue to be under pressure from human activities. In urban areas water pollution is predominately attributed to urban runoff from roads and unpaved areas, misconnections and leaking sewers.

Domestic Misconnection Pollution

In urban areas there are two drainage systems around your house. Stormwater drains take rainwater from roofs, paths, driveways and gullies and discharge directly to the local river. Foul sewer drains take the discharges from household appliances (such as washing machines, dishwashers and toilets) and drain to wastewater treatment plants.

A domestic (i.e. householder) misconnection occurs when one or more discharge pipes from household appliances are mistakenly connected to the stormwater drain and discharge directly to the local river. Often householders are unaware that their household appliances are wrongly connected (i.e. misconnected) and causing significant, persistent damage to the biodiversity and ecosystems of their local river.

Domestic misconnection pollution is a chronic issue that impacts on the local river every time the misconnected appliance is used. It results in untreated sewage, detergents and soaps being discharged directly into rivers, causing pollution, malodours, an unhealthy environment and damage to aquatic life.

Full video on our Youtube channel: https://youtu.be/_nYTQTXAGI0

With approximately 75% of the EU's population living in urban areas, and approximately 8% of housing estates having a misconnection, domestic misconnections are a significant pollution source in urban areas. Domestic misconnections must be remediated to achieve a healthier aquatic environment and to achieve the minimum criteria of 'Good Status' for waterbodies by 2027, in line with the requirements of the Water Framework Directive.

A Dublin Local Authority Collaborative Approach

The DURL Project is a collaboration between South Dublin County Council (Project Lead) and Dún Laoghaire-Rathdown County Council, with funding also received from the EU LIFE Programme. Both local authorities have large urban areas, with domestic misconnections identified as a significant pressure on the urban rivers and aquatic environments.

Assessments to identify domestic misconnection pollution were carried out in the River Griffeen catchment in South Dublin County Council and the Carrickmines Stream and Shanganagh River in Dún Laoghaire-Rathdown County Council. Both catchments are similar in size (approximately 8 km^2) with populations of around 14,000 households. Four wetlands were developed in the River Dodder, River Griffeen and River Poddle catchments in South Dublin County Council and a fifth wetland was developed on the Trimbleston Stream in Dún Laoghaire-Rathdown County Council.

The **Dublin Urban Rivers LIFE (DURL) Project** sought to improve water quality and aquatic biodiversity in urban rivers by addressing pollution from domestic misconnections using novel approaches. Community education and awareness and householder participation underpinned the work of the project team.

Key Actions:

Development of a Geographic Information System (GIS) based approach to streamline the misconnection assessment process and enable a more efficient and cost-effective method to identify domestic misconnections using a high pollution risk technique.

Household stormwater drainage checks in the River Griffeen catchment in South Dublin County Council and the Carrickmines Stream and Shanganagh River catchment in Dún Laoghaire-Rathdown County Council, and replumbing of misconnected appliances to the foul sewer drain at homeowner's own cost, for treatment at a wastewater treatment plant.

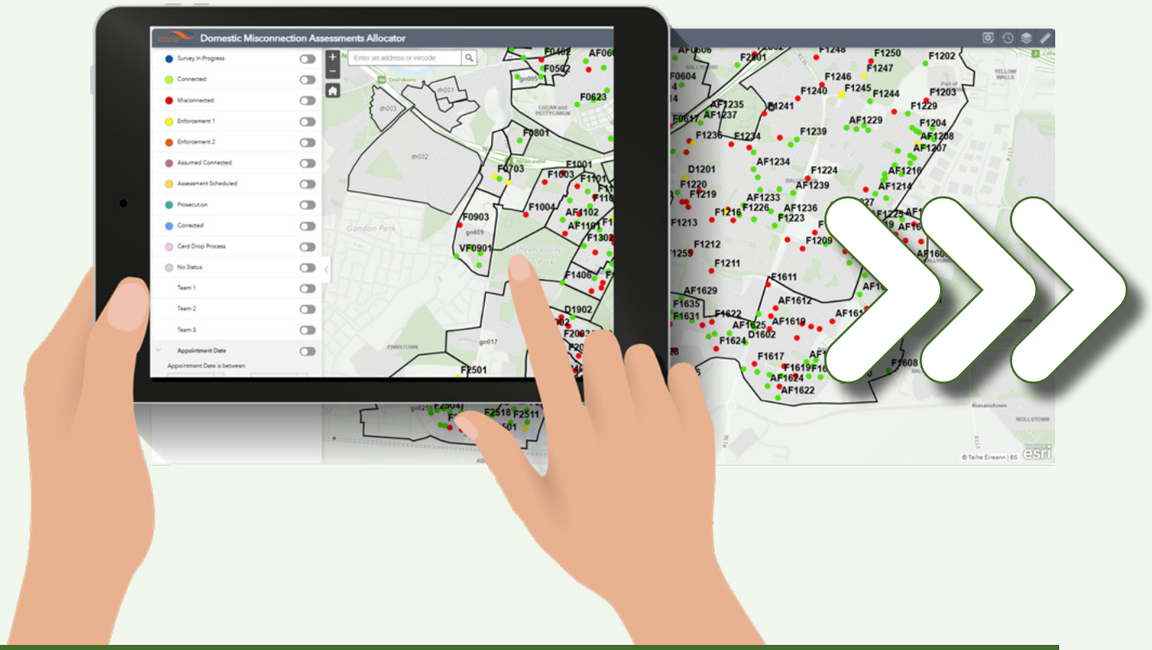
Local community education and awareness initiatives highlighted the importance of enhanced surface water quality for biodiversity and provision of information on how to identify and repair misconnections.

A Misconnection Decision Support Tool to enable stakeholders to utilise the GIS based approach to identify domestic misconnections and benefit from the learnings of the DURL Project.

The development of 5 Integrated Constructed Wetlands (ICWs) in park lands in strategic catchments to improve water quality, while simultaneously creating new wildlife areas and amenity value. Stormwater containing urban runoff and domestic misconnections is filtered and treated using native plants as it flows through the ICWs, prior to discharging to the local river.

Provision of an ICW Builder Tool to provide a blueprint for Water Quality/Policy Managers looking to construct an Integrated Constructed Wetland (ICW) and to provide guidance on the most suitable approach.

Key Project Measures and Results



GIS Applications Capturing Field Data on Handheld Tablet

Dashboard Presenting Domestic Misconnection Details

Geographic Information System Approach To Streamline Resources

The DURL Project integrated Geographic Information System (GIS) technologies and site assessment work to create efficient procedures for finding misconnections and organising workloads. Data gathered in the field was recorded on a handheld tablet and uploaded in real-time, creating a seamless link between the office and site colleagues. ArcGIS software was used to consolidate all necessary information into key maps, applications and dashboards, enabling online management of work, instant recording of field data and immediate analysis of results. The DURL Project's GIS approach to identifying domestic misconnections achieved the ESRI Ireland Standout Success Award in the category of Data Management and Collection.

ESRI Ireland Standout Success Award

High Pollution Risk Technique

Test

Polluted River Outfall Pipes

Inspect

Manhole Pollution Checks

Assess

Assessing Individual Houses

Correct

Repairing Misconnections

Misconnection High Pollution Risk Technique

In the field, pollution was traced from river outfalls to strategic manholes in the drainage network and the houses on the polluted section of the stormwater drainage network were identified. Misconnections often arise during home renovation works, where household appliances such as washing machines, dishwashers and toilets are re-located and erroneously piped into the stormwater drainage system. To enable the detection of increased numbers of misconnections per number of houses checked, a 'High Pollution Risk Technique' was implemented on polluted sections of the stormwater network, whereby houses with extensions and large outbuildings were selected for misconnection assessment. All misconnection details were recorded in real time on an online **Door-to-Door Misconnection Assessments Application** and graphically displayed on a dashboard to enable instant analyses of the collated data. This enabled detailed analyses of results and the ability to notice trends and patterns to inform future work.

To demonstrate the efficacy and cost-effectiveness of the 'High Pollution Risk Technique' theory, test sub-catchments were also selected where the traditional method of assessing all houses was carried out. When misconnection rates were compared for the traditional and bespoke DURL Project methods, there was a correlation with higher rates of misconnections using the unique Geographical Information Systems technique. As such, the DURL Project Geographical Information Systems based approach is maximising efficiency and use of resources to address domestic misconnection pollution.

Results

Developed a transferable and easily replicated Geographical Information Systems approach to identifying domestic misconnection pollution;

- Using ArcGIS products that most local authorities in Ireland and Europe know and use already
- Providing real time tracking of the progress of misconnection assessments and dashboards enabling instant analyses of collated data
- Maximising efficiency and streamlining resources by supporting the detection of increased numbers of misconnections per number of houses checked

DURL Stormwater Assessors

Domestic Misconnection Replumbing

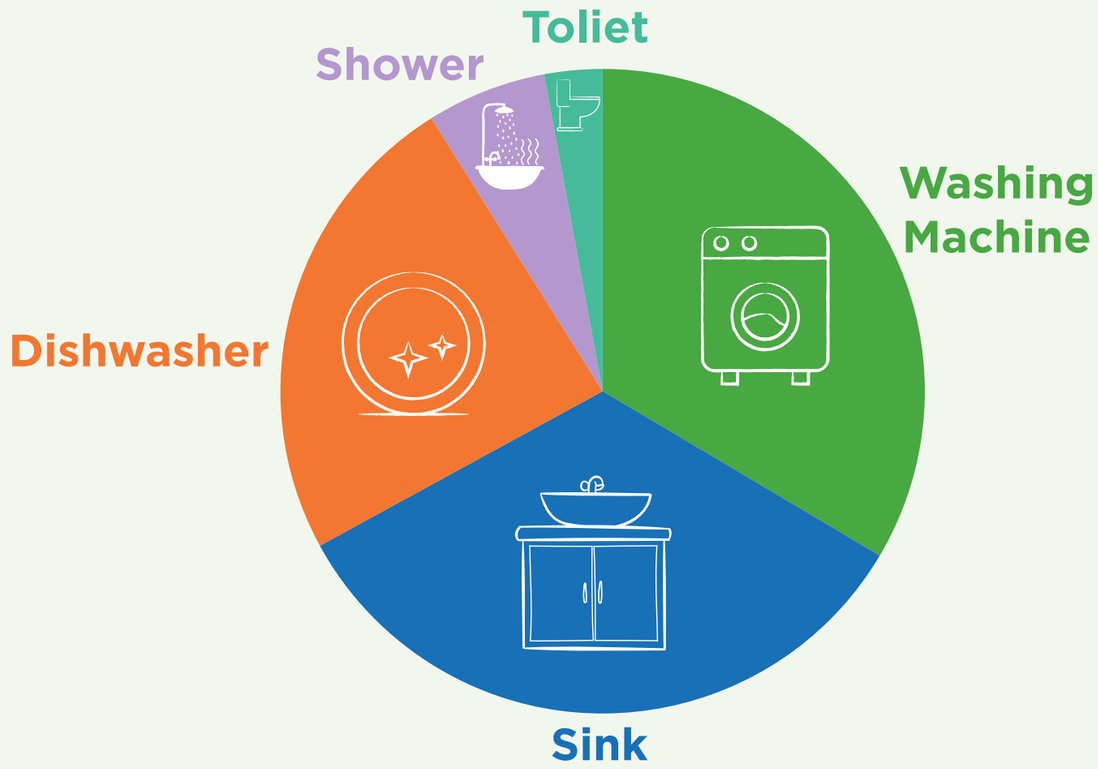
Trained DURL Project staff conducted misconnection assessments at selected houses. Misconnection assessments were generally completed in 15 minutes and were carried out on the stormwater drainage around the outside of the house. Where misconnected appliances were identified, the homeowner was provided with information on how replumbing to the correct wastewater sewer drain could be carried out by the homeowner (DIY), with family help or using local tradespeople.

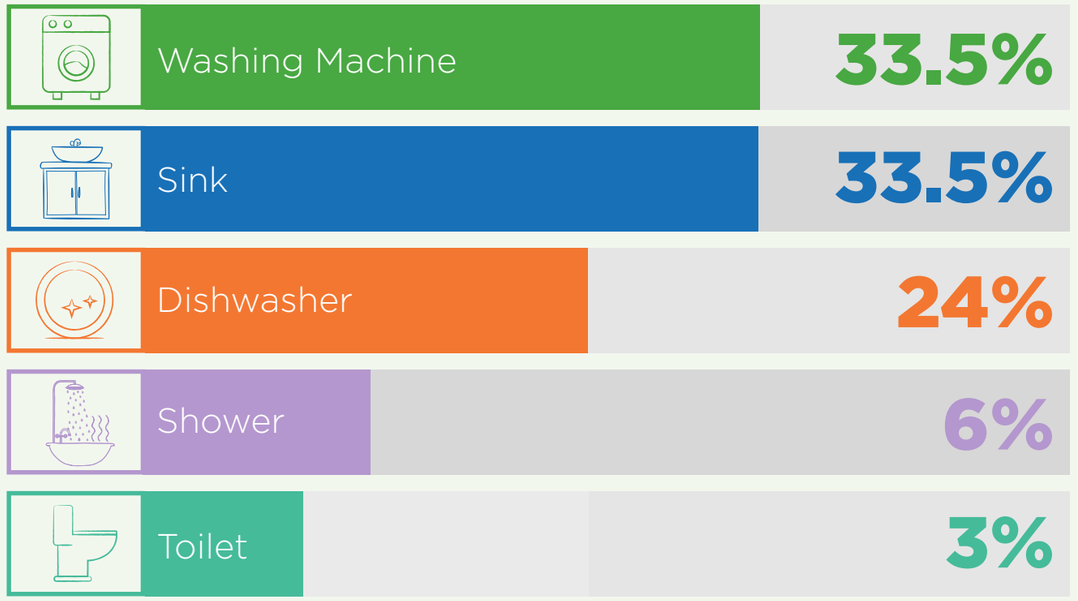
Domestic misconnections were identified as a continuous urban issue as, on average, 8% of houses in estates were identified as misconnected. Additionally houses that were older (pre-1991), large (>120m^2) and contained a side access were identified as having a higher risk of being misconnected.

Typical domestic misconnection

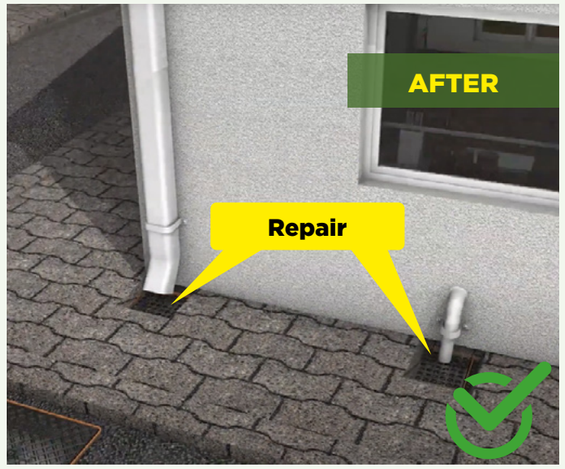
Replumbed and corrected

Misconnected Appliances % Breakdown





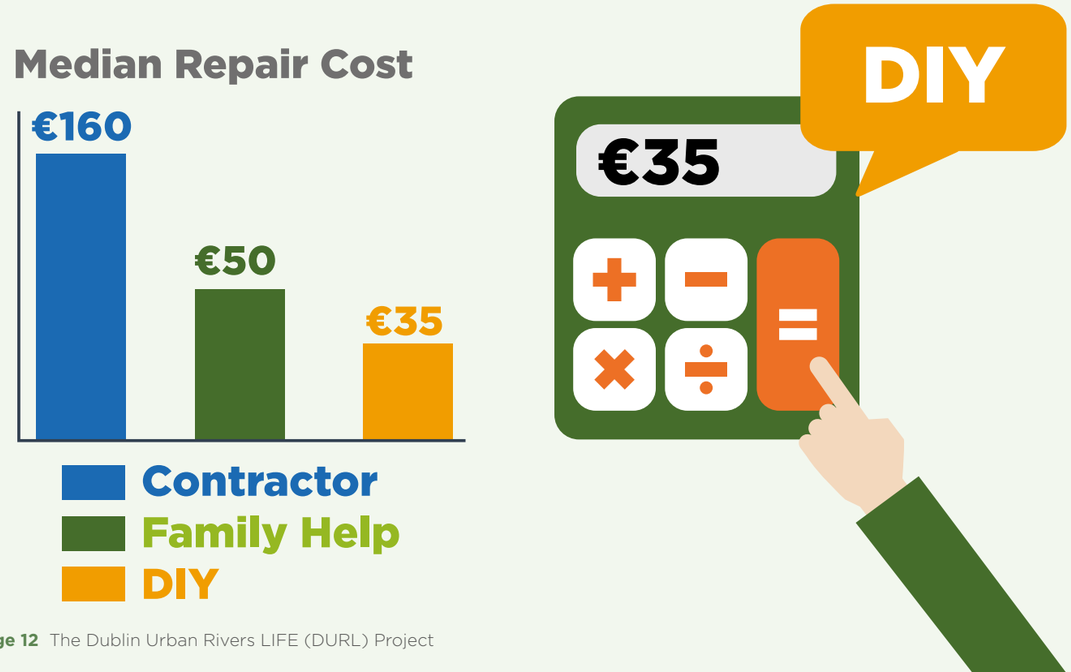
Typical domestic misconnection



Replumbed and corrected

Householder participation and community engagement underpinned the work of the project team, particularly emphasising the environmental impact of misconnections and the benefits of enhanced water quality in the local river for biodiversity and amenity value. Positive engagement enabled a misconnection assessment rate at 99.5% of properties contacted and over 1,070 misconnected appliances identified. Misconnected homeowners were given time to carry out the repair and make good the drainage connections, particularly as the repairs were at the homeowners' own cost, in line with the Polluter Pays Principle. The ecological health of local amenities was important to homeowners and, with domestic misconnection repairs identified as affordable, homeowners were willing to promptly fix the misconnection pollution issue for the betterment of their local environment.

Contractor, Family Help and DIY Repair Costs



Stormwater outfall **Before** and **After** domestic misconnections were replumbed between **2022** and **2023**

Watch video on domestic misconnection on our Youtube channel

https://youtu.be/Lz9d8j0aN1o

Results

The outcomes of the positive public participation in the DURL Projects domestic misconnection assessment work include;

- ☑ Greater than 17,000 houses screened through strategic manhole stormwater drainage checks
- ☑ Access permitted by 9,150 householders to carry out misconnection assessments at their properties
- ☑ Removal of pollution by homeowners, due to replumbing of over 1,000 misconnected appliances to the foul sewer drain, for treatment at a wastewater treatment plant
- ☑ Identification that washing machines, kitchen sinks and dishwashers are the appliances with highest risk of misconnection
- ☑ Repairs recognised as affordable, with approximately 40% of misconnection repairs costing €50 and 80% costing less than €200
- ☑ Repairs completed to date have contributed over €110,000 to the local economy
- ☑ Pollution reduction in the runoff from housing estates and a significant visual and odour improvement at local river outfalls
- ☑ Prevention of an annual discharge of 13 million litres of wastewater to the two project river catchments

Integrated Constructed Wetlands (ICWs)

The DURL Project developed 5 **Integrated Constructed Wetlands** (ICWs) in local authority park lands in the River Griffeen, River Dodder, River Poddle (in collaboration with Office of Public Works) and Trimbleston Stream catchments. The wetlands are an environmentally friendly nature-based solution to filter and treat urban runoff (i.e. rainfall contaminated with pollutants from vehicles, animals, spillages and dumping) and sewage, detergents and soaps from domestic misconnections.

The wetlands are constructed as a system of heavily planted shallow ponds (typically 200mm deep) that mimic natural wetland processes and increase biodiversity in the urban park lands by providing a refuge for insects, frogs, newts and birds. Community groups and local resident volunteers assisted in the planting of native pollinator-friendly and colourful plant varieties on the banks of the wetlands, creating a hands-on connection with the wetland and a sense of ownership for years to come.

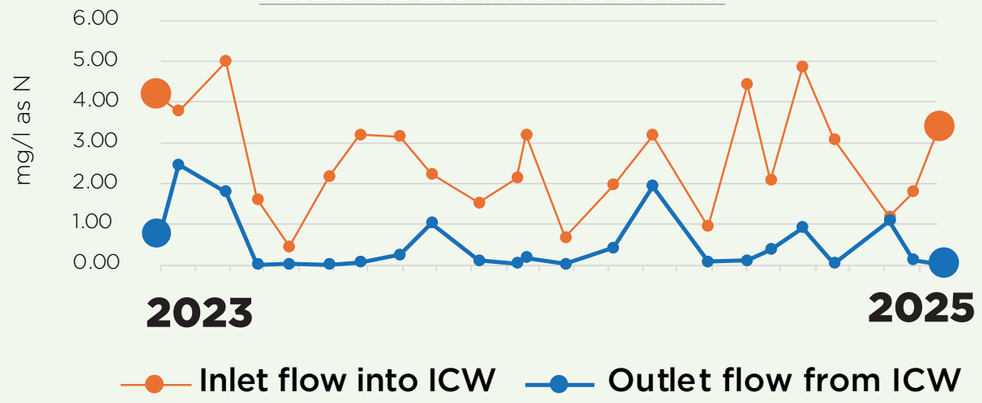
Results

5 Integrated Constructed Wetlands (ICWs) developed in park lands in strategic water bodies to intercept polluted water from the stormwater drain before discharging to the river:

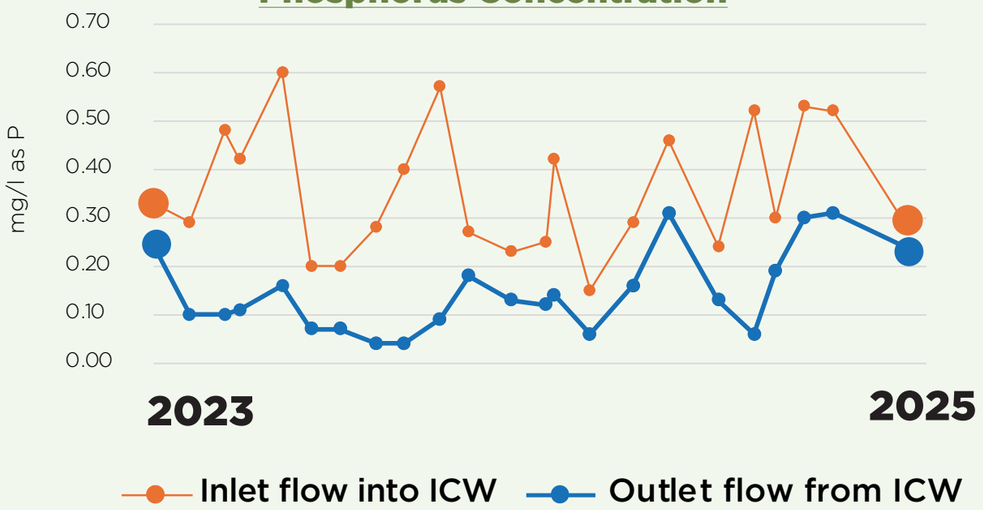
- ☑ Simultaneously improving water quality while creating new wildlife areas and amenity value
- ☑ Reducing nutrient discharges to the local river, with 80% ammonia declines achieved
- ☑ Delivering 100% reduction in the harmful bacteria *E. coli* discharges
- ☑ Promoting a relationship between green infrastructure and public wellbeing
- ☑ Assisting flood alleviation during high rainfall events by reducing flow to the rivers
- ☑ Providing a water reservoir habitat during prolonged dry weather periods

ICW Pollution Reduction

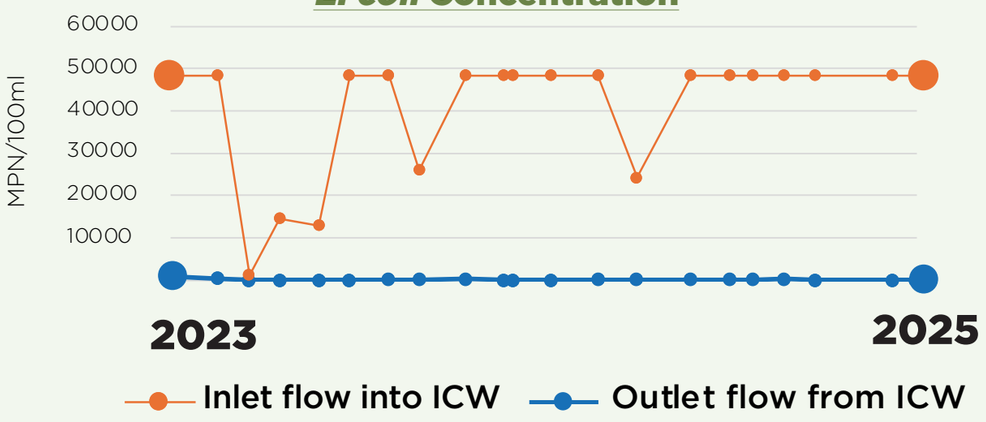
Ammonium Concentration

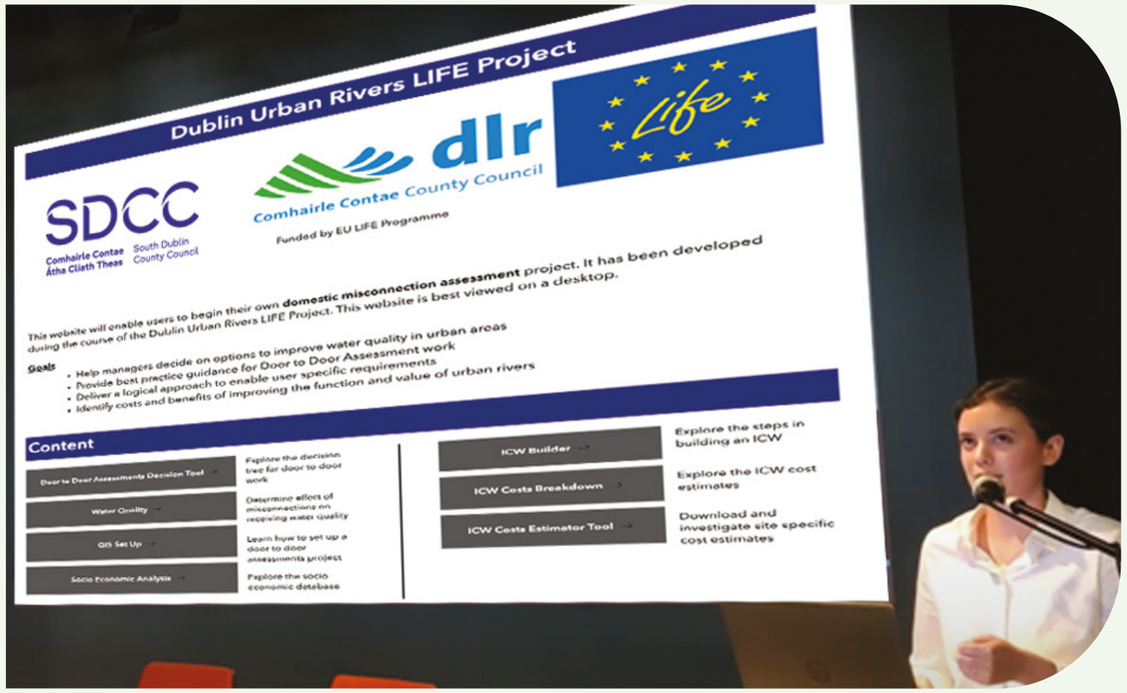


Phosphorus Concentration



E. coli Concentration

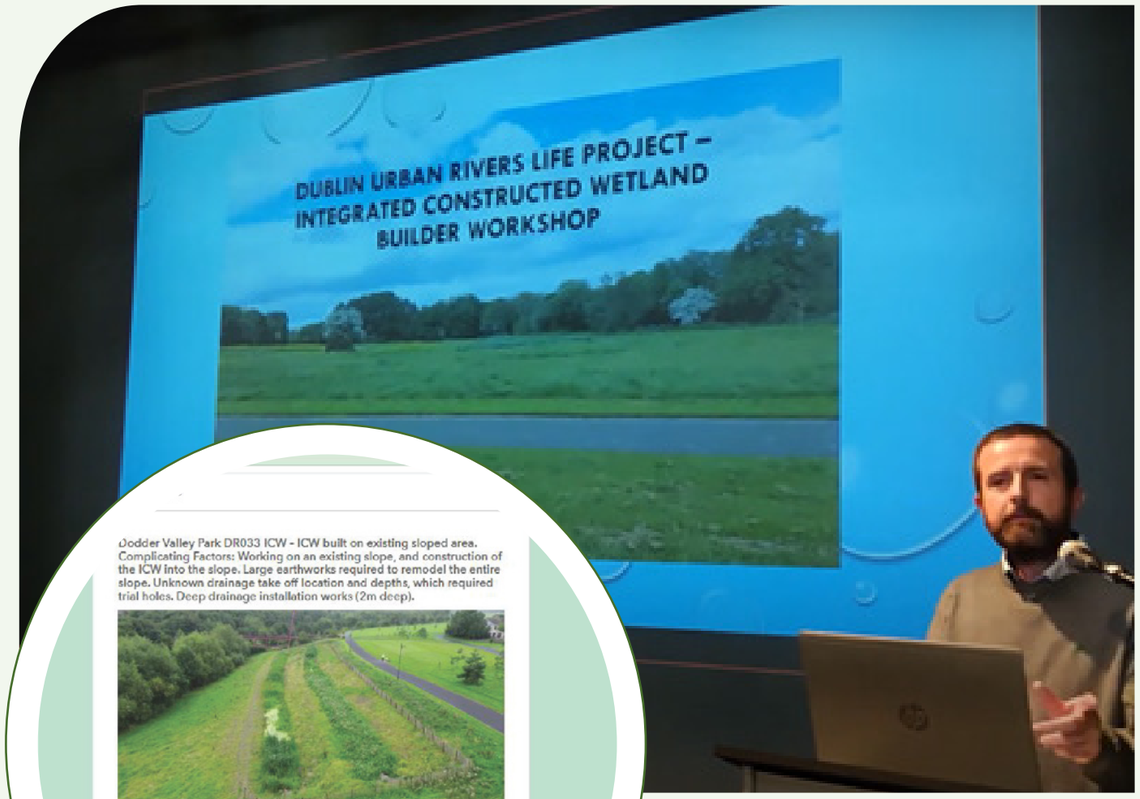




Decision-Support Tool and ICW Builder Tool

A Misconnection Decision-Support Tool and an Integrated Constructed Wetland (ICW) Builder Tool was developed to help interested parties use the learnings of the project to improve water quality and biodiversity in urban areas. The Misconnection Decision Support Tool provides best practice guidance for misconnection assessment work and incorporates standards and templates from the Project. The ICW Builder Tool provides a comprehensive guide for those considering the feasibility of building an ICW and an insight into site-specific options.

To enable dissemination to local authority staff and Water Quality/Policy Managers, the **DURL Project Water Quality in Urban Rivers Conference** featured a demonstration of the practical and user-friendly support tools. Workshops and meetings with eleven national local authorities, aiming to target misconnections in their urban rivers, were utilised to refine the tool. The step-by-step approach in both tools are catered to the user's specific requirements and identifies costs and benefits of improving the function and value of urban rivers.



Results

Developed a novel informative and interactive Misconnection Decision Support Tool and Integrated Constructed Wetland Builder Tool:

- ☑ Providing best practise guidelines and templates to replicate domestic misconnection work on a local, regional and national scale
- ☑ Enabling access to site specific design parameters, Integrated Constructed Wetland cost estimates and planning obligations
- ☑ Delivering a logical approach to enable user-specific requirements
- ☑ Streaming decision making and supporting urban water quality improvement
- ☑ Online tools available on the project website at **www.dublinriverlife.ie**

Dissemination Activities

Public Misconnection Awareness Programme

Engaging with local representatives, communities and householders to raise awareness of the impact of domestic misconnections on urban rivers commenced at the outset of the project and was central to successfully achieving the project aims. Local community education and awareness initiatives highlighted the importance of enhanced surface water quality for biodiversity and provided information on how to identify and repair misconnections.

Positive environmental campaigns by the project team through in person contact with homeowners, local school workshops, urban green space demonstrations, website updates and social media posts has increased awareness of domestic misconnections and promoted a behavioural change which will continue to positively enhance the environment.

2 Wetland planting days with local community groups

20 Visit www.newsgroup.ie

DUBLIN URBAN RIVERS LIFE LAUNCH

The Mayor of South Dublin County Councillor Mark Ward, officially launched the Dublin Urban Rivers LIFE project at Rathfarnham Castle Park on Monday 17th September.

This is a joint project between South Dublin County Council (SDCC) and Dun Laoghaire-Rathdown County Council (DLRCC).

This river water quality improvement projected is estimated to cost €2.54 million over a four year period from August 2019 to June 2023 with 50% funding from the EU LIFE Fund Programme. SDCC will be the lead authority on the project.

The Project aims to address the issue of pollution in urban rivers using technologies with proven results relating to domestic misconnection sources and integrated constructed wetland development.

Two rivers have been identified for water quality improvement - the River Griffeen in South Dublin County and the Carrickmines Stream in Dun Laoghaire-Rathdown County. As the project develops significant awareness and engagement campaigns will be initiated for the benefit of residents in these catchments.

Speaking at the event, Mayor of SDCC, Cllr Mark Ward said "I would like to wish the Dublin Urban Rivers LIFE project well, and look forward to seeing its implementation, and the improvements to river water quality over the next four years."

The Project not only sees about improving these selected rivers but also has an agenda of sharing and applying knowledge and experiences gained to a wider audience in Ireland and Europe. The Project is also the first of its kind in Ireland and when completed in 2022 both councils intend to meet their Water Framework Directive objectives for the selected rivers and set out a road map for future sustained progress on the issue of improving urban water quality in both counties.

SDCC Chief Executive Danny McLoughlin, Cllr Sioban Smyth Cathaoirleach of DLRCC and Mayor of SDCC Cllr Mark Ward with Representatives from SDCC, DLRCC and the Department of Communications, Climate Action & Environment gather at Rathfarnham Castle for Life Programme 2014-2020.

3 Newspaper articles, podcast and newsletter

Education and awareness tools and events:

1 Participation at Climate Action Week festival, Eco Week, Biodiversity Week & World Waters Day events

4 Website, social media posts, videos and animation

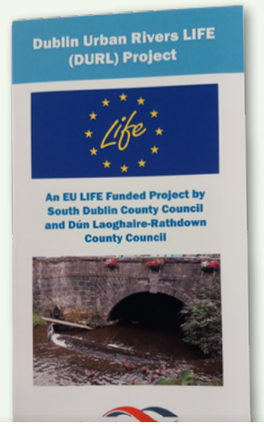
Education and awareness tools and events:

5 Conference presentations, workshops and radio interviews

7 Wetland planting days with local residents

6 Green Estate Demonstrations with local representatives and residents

8 Information signs in public parks and park user surveys



9 Leaflets, infographics and frequently asked questions (FAQs)

Key Stakeholder Organisation Engagement Approach

A focussed and interactive engagement programme was established with key stakeholder organisations to ensure the effective implementation and longevity of the DURL Projects actions to enhance urban water quality. Targeted meetings and workshops were held with national local authorities, policy makers and regulatory bodies and the Misconnection High Pollution Risk Technique methodology was replicated on a pilot sub-catchment basis in other local authorities.

Project presentations at the Environmental Protection Agency Waters Conference, The Local Authorities Waters Programme/Environment Services Training Group Conference and the Inland Fisheries Ireland Rivers Habitats Forum enabled direct engagement with key stakeholder organisations to raise awareness and disseminate information on domestic misconnection resolution.

A two-day **DURL Project Water Quality in Urban Rivers Conference**, featuring experts in Integrated Constructed Wetlands, water quality research and environmental policy, protection and management was hosted by the project in May 2024. The event incorporated workshops on the Misconnection Decision Support Tool and Integrated Constructed Wetland Builder Tool and a site visit to two of the DURL Project wetlands. The event offered a unique platform for key stakeholder organisations to engage with practitioners who are directly influencing urban water quality, management and policy, on a national and international scale.

Results

Provided a space for public and key stakeholder organisation engagement and awareness of misconnections and the importance of enhanced water quality on urban rivers;

- Completed over 21,400 engagements with householders regarding misconnection assessments and repair completion
- Wetland Planting days and Park User Surveys participation from 413 volunteers
- Animated awareness videos produced in 7 languages
- DURL Project website received over 12,600 unique users

- Involved in 46 local and national events, issued 52 newspaper and magazine articles and engaged with 20 Community Groups
- Misconnection Awareness Green Estate Demonstrations with Local Representatives, Householders and Residents Association Groups
- Presentations at national and international conferences and part of 4 conference publications
- Interactions with 33 key stakeholder organisations to stimulate interest and synergies in relation to resolution of domestic misconnections
- Engaged with 31 local authorities through meetings, presentations and workshops and replication of the DURL Project methodology on a pilot sub-catchment basis
- Shortlisted for ‘Best Environmental Project’ category in the 2024 Local Authority Members Association (LAMA) Awards
- Winner of the ESRI Ireland Standout Success Award for the DURL domestic misconnections GIS approach

Project Name:	**The Dublin Urban Rivers LIFE (DURL) Project**
Project Outline:	To demonstrate novel techniques to address urban pollution from domestic misconnections
Grant Agreement Number:	LIFE17 ENV/IE/000281
Project Location:	River Griffeen, South Dublin County Council Carrickmines Stream and Shanganagh River, Dún Laoghaire-Rathdown County Council
Project Beneficiaries:	South Dublin County Council (SDCC) and Dún Laoghaire-Rathdown County Council (DLRCC)
Project Start Date:	02/07/2018
Project End Date:	31/03/2025
Duration:	81 Months

Total Budget:	€3,718,827.13
EU contribution:	€1,291,528
SDCC contribution:	€2,171,624.32
DLRCC contribution:	€255,674.81
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