

Improving water quality in urban rivers

South Dublin County Council & Dún Laoghaire-Rathdown County Council

The Challenge

- Reduce River Pollution by finding misconnected appliances
- Create an efficient, replicable, digital process for inspecting homes

The Benefits

- Targeted action to find misconnected appliances
- Significant reduction in the discharge of polluted water
- 50% cost saving from more efficient process
- Seamless capture and sharing of real-time data
- Easily replicated solution for use elsewhere

Two county councils in Ireland are working together to find and remove hundreds of misconnected household appliances that are disgorging polluted water into local rivers. This EU-funded project is being delivered using a highly efficient, easily replicated ArcGIS process, which has already prevented two million litres of contaminated waste water from polluting Dublin's river environments.

The Challenge

Throughout Europe's urban areas, alarmingly high numbers of rivers and streams are polluted by misconnected pipes at domestic properties. Often unbeknown to home-owners, some washing machines, dishwashers and kitchen sinks empty into surface water drainage systems instead of sewers, causing significant, persistent damage to the biodiversity and ecosystems of urban waterways.

To address this issue in Dublin, South Dublin County Council and Dún Laoghaire-Rathdown County Council joined forces to identify misconnections and improve water quality in two river catchment areas in the county. The project attracted funding from the European Union's LIFE programme and aimed to develop a best practice approach for finding misconnections and improving water quality that could be replicated easily across Ireland and Europe.

The Solution

The project team decided to use Esri's ArcGIS system for the Dublin Urban Rivers LIFE project for three reasons: the widespread use of ArcGIS within the local authority sector; the affordability and perpetuity of the ArcGIS Survey123 app; and the support available from Esri Ireland. The entire end-to-end solution was built using Esri's out-of-the-box templates to make it easy and cost effective for other local authorities to replicate the process.

The Dublin Urban Rivers LIFE project has been up and running since 2021 and the ArcGIS-led project methodology is now firmly embedded and proven to be successful. First, field-based teams use ArcGIS Field Maps to view maps of the surface water drainage network on their mobile devices. Using this app, they lift manholes in residential areas, record signs of pollution in stormwater drains and upload their findings directly to ArcGIS Online.

All locations of pollution are instantly visible to office-based staff, who use an ArcGIS Online web app on their desktops to identify the domestic properties that are associated with each polluted drain. They then conduct further geospatial analysis using satellite imagery to pinpoint high probability houses that have been extended or significantly modified, as these are the most likely properties to have misconnections.

Appointments are scheduled with home-owners at 'high probability' properties. Then, field officers use ArcGIS Survey123 on mobile devices to record data during these house visits, using up to 85 different data fields.

All the data collected is uploaded in real-time to ArcGIS Online, where it can be viewed instantly on a series of ArcGIS Online Dashboards, including a core management dashboard showing where home visits are taking place and how many misconnections have been identified to date. A separate stakeholder dashboard provides a high-level overview of the project's impact.

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// ArcGIS enables us to find as many houses as possible with misconnected appliances, as efficiently as possible, to help Dublin’s rivers reach a good standard of water quality. //

Lorraine Beirne, Dublin Urban Rivers LIFE Project Co-ordinator, South Dublin County Council

// Project information is transparent to everyone working on the project, whether in the field or in the office. //

Briana Shiels, GIS Officer, South Dublin County Council

The Benefits

Targeted action to find misconnected appliances

Using the ArcGIS process, council employees in Dublin no longer waste time visiting properties that are unlikely to have a misconnection and instead focus their efforts in the locations that are most likely to lead to an opportunity to reduce pollution. “The driver for the project is always the quality of the rivers,” emphasises Briana Shiels, GIS Officer at South Dublin County Council. “ArcGIS enables us to find as many houses as possible with misconnected appliances, as efficiently as possible, to help Dublin’s rivers reach a good standard of water quality.”

Significant reduction in the discharge of polluted water

As a direct result of the Dublin Urban Rivers LIFE project, action has been taken to remove over 1,000 misconnected devices at 500+ properties, and far less washing detergent is now reaching Dublin’s rivers. “Householder repairs are helping to improve water quality and aquatic biodiversity in local rivers with over 85% of the misconnections fixed to date,” says Shiels. “We estimate that we have removed around 2 million litres of polluted waste water per year from two river catchments, using our ArcGIS process.”

50% cost saving from more efficient process

In two and a half years, the project team has carried out over 8,300 house inspections, and the rate of finding a misconnection is double the number that would have been possible using the previous indiscriminate door-to-door approach. By extension, this also means that the cost of finding misconnections, over this same period, reduced by 50%, delivering a better return on investment. “On average 8% of domestic properties in Dublin have a misconnection and the DURL Project has identified a misconnection rate of greater than 30% in some housing estates” explains Lorraine Beirne, Dublin Urban Rivers LIFE Project Co-ordinator. “We now have a better system to pinpoint these properties and take action far more efficiently with ArcGIS.”

Seamless capture and sharing of real-time data

The inherent integration of ArcGIS products enables data to be seamlessly captured and shared in real-time. Furthermore, ArcGIS Online Dashboards provide a highly effective way to share key project metrics, keeping senior managers and stakeholders abreast of progress. “Project information is transparent to everyone working on the project, whether in the field or in the office,” says Shiels.

Easily replicated solution for use elsewhere

The project team has now created a ‘lite’ version of its ArcGIS water management solution that can be easily picked up and used as a foundation stone by other local authorities. “Custom-written solutions can cost hundreds of thousands of Euros and be a disaster,” muses Beirne. “With ArcGIS, we have built a replicable, standard solution with products that most local authorities in Ireland know and use already.”

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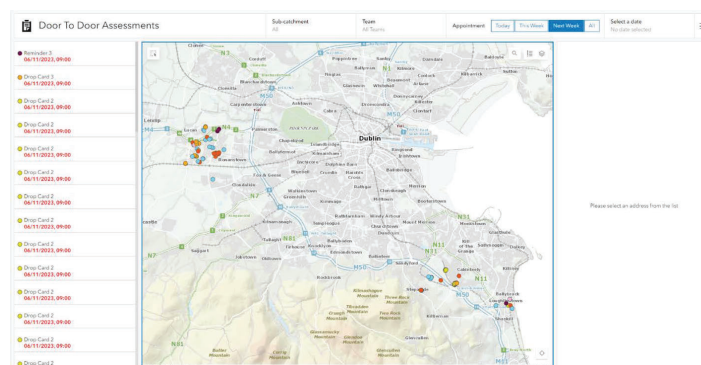
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Screenshot of the ArcGIS Online Dashboard field staff use when carrying out domestic misconnection assessments