

Wetland feasibility study

Cork Great, Ireland

Key facts

- Feasibility study to create a wetland for educational purposes in Corke Valley Park, Co. Dublin.
- IE Consulting were commissioned to prepare a hydrological characterisation of the Wilford Stream and its catchment.
- A 2D hydraulic model was developed to determine the impact of the proposed wetland, embankment and viewing area.
- 2D output allowed IE Consulting to design a wetland which caused a minimal impact on the existing hydrological regime while still delivery a suitable design.
- Five culverts along the Wilfred Stream were modelled using the embedded structures tool in Flood Modeller.

Corke Valley Park is a public park located in the townland of Cork Great, County Dublin, Ireland. The Wilford Stream flows through the centre of the park and discharges into the Irish Sea to the east of the site. IE Consulting were commissioned by Denyer Ecology on behalf of Dun Laoghaire Rathdown County Council to prepare a hydrological characterisation of the Wilford Stream and its catchment at Corke Valley Park.

This assessment was in support of a feasibility study to create a wetland for educational purposes in Corke Valley Park. The intention was to construct a wetland off-line from the Wilford Stream, which would still allow a portion of the flow through the proposed wetland but not result in a loss of maintenance flows on the Wilford Stream.

To ensure the proposed wetland did not result in an increase flood risk to other areas of Corke Valley Park and did not cause an increase of velocities within the Wilford Stream, a detailed hydraulic model was built using Flood Modeller.

The proposed wetland construction involved building an embankment between the right-hand bank of the Wilford Stream, excavating the footprint of the proposed wetland, and building a viewing platform to the right of the proposed wetland for educational purposes.

To gain an understanding of the current hydrological regime within the Wilford Stream, Flood Modeller was used to build a hydraulic model. Initially an integrated 1D-2D linked model was developed. However, the Wilford Stream has a flat floodplain, where water easily flows overbank, even during small rainfall events. The channel itself also braids in and out several times within Croke Valley Park making the 1D component a poor representation of how the water naturally flows within the park. Due to these limitations the model was redesigned in Flood Modeller as an entirely 2D model.

The Wilford Stream model was developed using high quality topographic survey data which was procured specially for this assessment. All of the drains, river channels, and hydraulic structures within Croke Valley Park were explicitly modelled. Z-lines were used to represent the invert levels of the Wilford Stream channel.

What our users say

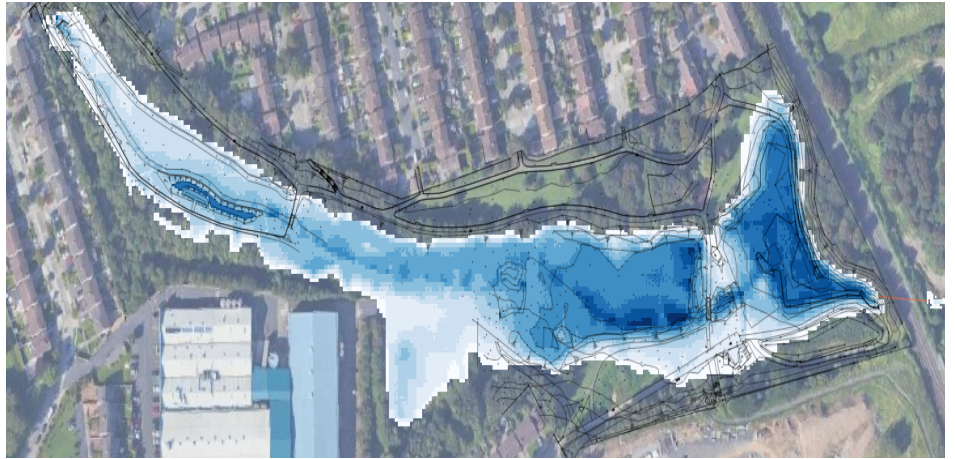
"Flood Modeller allowed us to simulate a variety of hydrological regimes throughout Ireland, and consistently produces accurate and reliable quantitative results"

Micheal O'Flatharta
Project Hydrologist
IE Consulting

This tool in Flood Modeller made it possible to account for the flow constricting nature of the culverts, while still maintaining the complex 2D flow paths within the Wilford Stream floodplain.

The baseline scenario was first run in the model, which represented the current hydrological regime within Corke Valley Park. The baseline results showed the 2D peak velocity within the Wilford stream catchment were highest within the channel and reduced in the floodplain.

For this assessment the 2D flood extent, depth, and velocity outputs from Flood Modeller were very valuable. It made it possible to make minor adjustments to the exact position of the proposed wetland to reduce its impact on the surrounding velocities and flood extents.



Corke Park model - Source: IE Consulting

Once the baseline scenario was completed the model was updated to include the proposed ground levels for the wetland area, the embankment level along the right-hand side of the Wilford Stream, and the floor level viewing area located to the right of the wetland area. The model was then re-run to assess the impact those features had on the surrounding hydrological regime.

The 2D velocity results in the proposed scenario illustrated that there was no significant increase in velocities in the Wilford Stream and did not result in an unsuitably high velocity within the proposed wetland itself. The baseline flood extents were also compared against the proposed flood extents and no increase was noted within vicinity of the proposed wetland or any other areas within Corke Valley Park.

Flood Modeller made it possible to model the complex flow paths on Wilford Stream while still representing the constriction from hydraulic structures. The detailed 2D results output by Flood Modeller also improved our understanding of the hydrological regime of the Croke Valley Park immensely and allowed us to design a wetland which caused a minimal impact on the existing hydrological regime while still delivery a suitable design.

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