# River Deel (Crossmolina)
# Flood Relief Scheme
# EIA Scoping Document

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# 1. INTRODUCTION AND BACKGROUND

## 1.1. Brief History

The River Deel and Crossmolina Town have a long history of flooding. The most recent flood events have resulted in extensive flooding within Crossmolina Town.

At the request of Mayo County Council, the Office of Public Works (OPW) carried out a Feasibility Study in 2012, which established the potential viability of a Flood Relief Scheme for the River Deel.

## 1.2. River Deel Flood Relief Scheme

In order to further develop a Flood Relief Scheme, the OPW engaged Engineering and Environmental Teams as follows:

- Ryan Hanley in association with JBA Consulting has been commissioned by the OPW to provide engineering services in relation to the proposed River Deel (Crossmolina) Flood Relief Scheme.
- Ryan Hanley in association with McCarthy Keville O'Sullivan has been commissioned to provide the environmental services required for the same project.

Progress to date has included:

- Literature Review and Site Surveys
- A Public Information Day (14 September 2013 and 13 June 2014) attended by OPW, Mayo County Council and the Engineering and Environmental Teams
- A Constraints Study by the Environmental Team in advance of an
- Environmental Impact Statement at Stage 2
- Screening for Appropriate Assessment by the Environmental Team
- Hydrological Analysis and Hydraulic Modelling, culminating in submission by the Engineering Team of a Hydrology and Modelling Report to the OPW in March 2014
- Preparation of a Potential Flood Risk Management Options Report, submitted to the OPW in July 2014
- Revised options assessment following exclusion of first preferred option following detailed investigations.
- Additional Public information day in April 2016 to inform public of revised options
- Further detailed hydrological/hydrogeological assessments in 2016 and 2017
- Additional ecological surveying, site investigation and flow measurement in 2016 & 2017.

A number of options were originally considered under their technical, social, environmental and economic viability. On the basis of the preliminary assessment, four options were shortlisted for further consideration. These included those outlined below:

| Option | Brief Description |
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| A | Flood Defences (standalone solution) |
| B | Combination of Flood Defences and Increased Conveyance (Dredging) |
| C | Combination of Flood Defences and Increased Conveyance (Bridge Replacement) |
| D | Diversion Channel |

Table 1.1 Options Shortlisted for Detailed Consideration

Option A – Flood Defences as a standalone option was originally chosen as the preferred option following consideration of the Flood Risk Management Strategy Options. However, during detailed assessment, it was discovered that the Jack Garrett Bridge would require replacement in order to facilitate the progression of this option. The additional cost associated with the replacement of the bridge meant that it was no longer identified as the preferred option and a second public information day was held in Crossmolina Town in April 2016 to inform the public of the situation, the remaining viable options and the potential for delays to the delivery of the scheme. One aspect of the revised consideration of options was the requirement for additional assessment in relation to the diversion channel. This included detailed hydrological and hydrogeological investigations to determine whether this option was viable. These investigations were undertaken during 2016 and 2017 and concluded that the diversion channel is a viable option. This has now been confirmed as the preferred option and the Environmental Impacts associated it, are currently being assessed.

The following information with regard to the preferred option has been supplied to statutory and non-statutory consultees as part of the EIA Scoping process.

# 2. PREFERRED FLOOD OPTION – DIVERSION CHANNEL

Based on the updated hydraulic model, a diversion channel with a 110 cumec capacity is required in order to address flooding in Crossmolina in the 1% AEP flood event.

A channel route was then chosen, taking into account the preferred intake and discharge locations and the topography and land boundaries in between. The preferred design is provided in the drawing that accompanies this pack.

The main components of the channel are as follows:

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| Intake Structure: | It is proposed to construct a reinforced concrete weir with a crest level of 18.0m O.D. A steel plate will increase the weir level to the design crest level of 18.2m O.D. The steel plate allows flexibility to adjust the weir level following construction of the scheme and recalibration of the hydraulic model. |
| Spillway: | It is proposed to construct a concrete spillway downstream of the weir. Concrete has been chosen to provide scour resistance and prevent infiltration from the river. The sides of the spillway will also consist of reinforced retaining walls. |
| Bridges: | It is proposed to construct two bridges; one at Pollnacross near the intake point, and a second on the R315 Castlebar Crossmolina Road at Mullenmore. |
| Road Diversion: | It is proposed to divert a section of the Lake Road at Mullenmore in order to avoid the requirement for a bridge on this road and two local access tracks. This will create a new junction between the Lake Road and the R315 to the North of the existing junction. |

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| Channel surface: | It is proposed that the channel be lined in grass, designed i.a.w. CIRIA Report 116: Design of Reinforced Grassways. The grass will generally be unreinforced, with reinforcement at locations where high velocities are predicted by the model. |
| Channel Dimensions: | –The proposed base width is 18m.<br>–sThe proposed side slopes are 1:2, unless otherwise determined at detailed design stage following detailed geotechnical investigation.<br>– Invert levels vary from 16.0m O.D. at Pollnacross bridge to 13.2 m O.D. at Mullenmore Springs.<br>– The proposed channel will have a gradient of 1:670 upstream of Mullenmore Bridge, and 1:125 downstream of the bridge.<br>–gThe volume of excavated material is 160,000m3, the majority of which will be transported off site.<br>–The surface area of the channel is 6ha (15 Acres), including the area between channel and boundary fences. |

## Operation:

The weir level of 18.20m O.D. has been set in order to limit the river water levels in Crossmolina Town to levels that will not cause flooding in the 1% AEP event. The weir level has been selected whilst adopting a conservative approach in relation to the weir coefficient of discharge and also taking into account the dynamic relationship between the water level at the weir and the freeboard at Jack Garrett Bridge in Crossmolina Town. As a result, the weir may overtop more often than would be required to reduce flooding. As noted above, the weir will be designed to be adjustable, so that the weir level can be modified if necessary as the model is recalibrated during the operation of the scheme.

The proposed 18.2m O.D. would have been overtopped on approximately 45 occasions over the past 16 years. An alternative 18.5m O.D. weir which was also modelled would have been overtopped on 8 occasions over the same period.

The channel will transfer a portion of the flood waters in the River Deel to Lough Conn approximately

3.5 hours in advance of the natural peak arriving from the River Deel. This means that the water levels in the lake will rise more rapidly following a flood event in the river as a result of the operation of the channel. This will not have an appreciable effect on the overall flood levels in the lake.

During the 100% AEP flood event, water levels in the channel will increase at a rate of up to 0.47m/hour.

At the downstream end of the channel, flood waters will propagate across the existing springs, and the surrounding agricultural land en route to Lough Conn. This will create washlands, on which agricultural activity will need to be restricted as a result of the channel construction.