Marlfield Lake
Flood Relief Scheme

Welcome to our event

Comhairle Contae Thiobraid Árann
Tipperary County Council

OPW Oifig na nOibreacha Poiblí Office of Public Works

NICHOLAS O'DWYER an RSK company

Nicholas O'Dwyer Limited (NOD) has been commissioned to carry out the Marlfield Lake Flood Relief Scheme (FRS) by Tipperary County Council, working in partnership with the Office Public Works (OPW).

ABOUT US

Tipperary County Council is the Local Authority for the scheme area and in partnership with the Office for Public Works (OPW) has commissioned this project.

The OPW is the lead Agency for Flood Risk Management in Ireland. A key part of its role is to oversee and manage the implementation of a programme of investment in capital flood relief works and is providing funding and technical oversight for the Marlfield Lake Flood Relief Scheme. Under the Government's National Development Plan to 2030, the Government is investing €1.3bn to implement a proactive plan for managing Ireland's flood risk, from rivers and the sea, that includes future proofing the increased flood risk from climate change.

Nicholas O'Dwyer Ltd. is a consulting engineering firm with its head office in Dublin. Since its founding in 1932, Nicholas O'Dwyer Ltd. has carried out projects across Ireland and in 20 countries worldwide and is currently working on flood relief projects in Wexford, Tipperary, Louth, and Dublin.
Nicholas O'Dwyer Ltd. is an RSK group company with offices in Dublin, Cork, Newry, Birmingham, and Johannesburg.

WHY ARE WE HERE TODAY

During this Second Public Consultation Day (PCD) we are here to present two additional flood protection options not previously discussed in our last PCD and to inform you about the project updates and the functionality of the sluice works.

Marlfield Lake Flood Relief Scheme

1. Scheme Introduction

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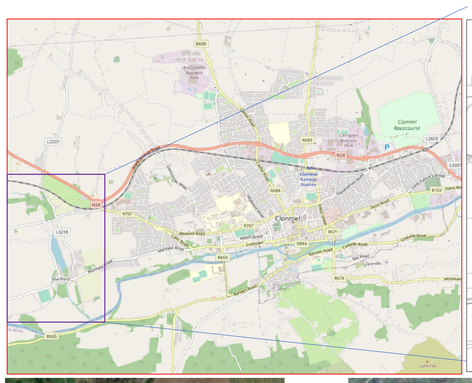
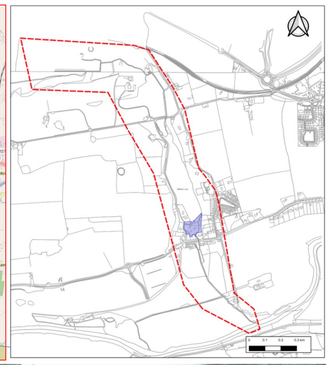
The overall objectives of this project are to improve the resilience of Marlfield Dam, and the identification, design, and submission (for planning consent) of a Flood Relief Scheme that is technically, socially, environmentally, and economically acceptable, to alleviate the risk of flooding to the community of Marlfield.

LOCATION



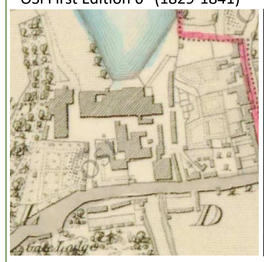


The study area for the Marlfield Flood Alleviation Works is shown by the red line in the top right image above.

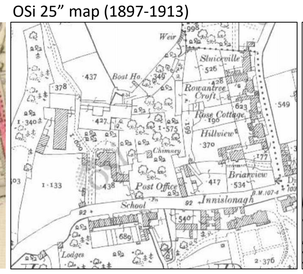
Marlfield Lake is a freshwater, artificial lake covering an area of approximately 56,000m^2 (5.6 ha) and with an upstream surface catchment of approximately 19 km^2.

HISTORY

OSi First Edition 6" (1829-1841)



OSi 25" map (1897-1913)



OSi current vector map

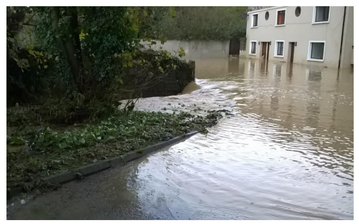
The lake was created by damming the stream to run mill machinery in the mid-1700's.

The mill was recorded as being built in 1769, becoming a distillery from 1817, until closure around 1857.

Marlfield house estate used a hydroelectric turbine on one sluice outlet to power the house.

Two hydraulic ram pumps provided water supply from the lake for the locality in the past.

FLOOD HISTORY



Flooding has occurred on several occasions in the recent past causing significant damage.

Flooding is reported to have occurred in Marlfield on dates including:

- 19th & 20th November 2009
- 14th November 2014
- 29th December- 2nd January 2013/2014

Marlfield Lake
Flood Relief Scheme

2. Environment

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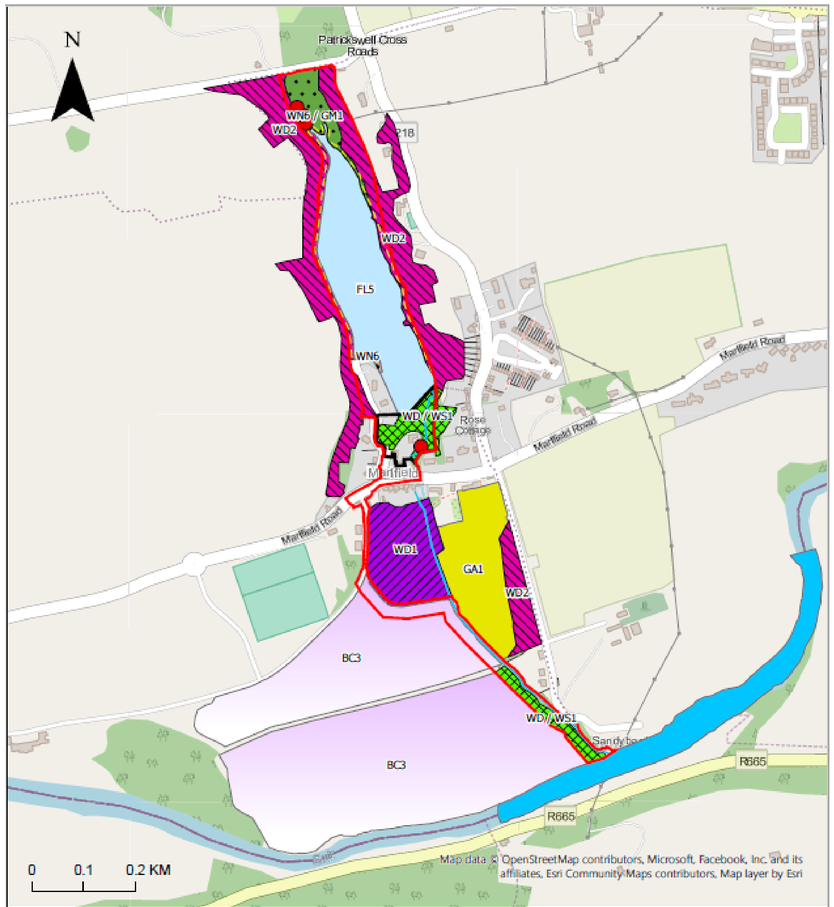
Baseline environmental data was collected to inform the assessments. The following surveys and assessments have been carried out to date:

Preliminary AA Screening (2018), Winter bird survey (Winter 2020), Baseline ecological survey, Freshwater Crayfish survey, Breeding Bird survey (Summer 2021),

Bat survey (Summer 2021), Archaeological and Built Heritage assessment (August 2021), and Arboriculture Assessment & Impact (August 2021)

HABITATS MAP

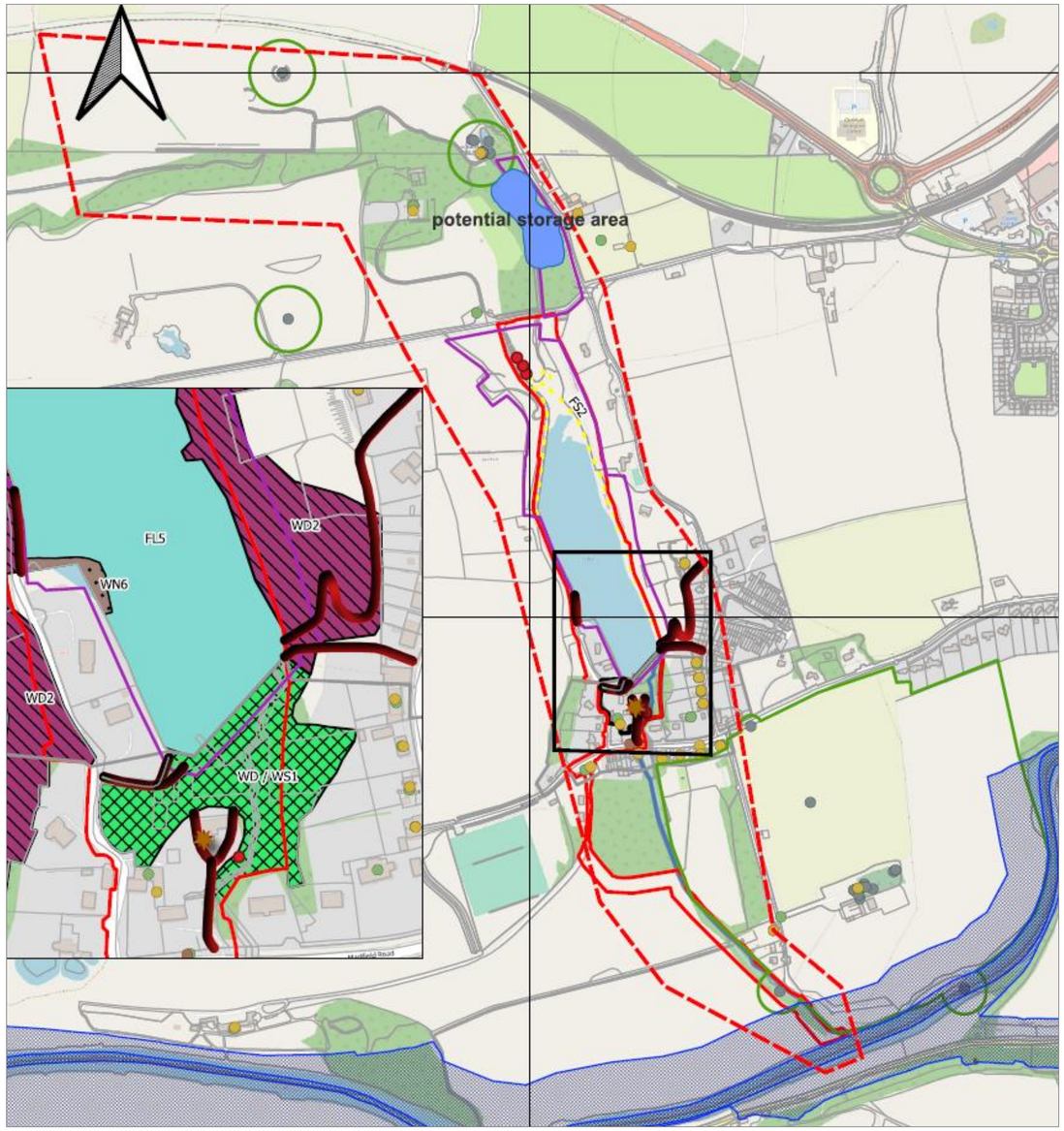


Marlfield Baseline Surveys Habitat Map

Symbol	Habitat Code and Description	Symbol	Habitat Code and Description
	FL5 - Eutrophic Lakes		BC3 - Tilled Land
	WD / WS1 - Mixed Woodland / Scrub		River
	WD1 - Mixed broad-leaved woodland		Japanese Knotweed
	WD2 - Mixed broad-leaved and conifer woodland		Tall herb swamp
	WN6 - Wet willow-alder-ash woodland		River
	WN6 / GM1 - Wet willow-alder-ash woodland / Freshwater marsh		Study Area
	GA1 - Improved agricultural grassland		Baseline Survey

EirEco Environmental Consultants | Nicholas O'Dwyer Ltd

ENVIRONMENTAL CONSTRAINTS MAP



Legend:

- Extended scheme area
- potential_upstream_storage
- proposed access points
- SPA_ITM_2019_06
- SAC_ITM_2019_06
- pNHA_ITM_2015_11
- NHA_ITM_2019_06
- SMRZONE
- Register_of_Protected_Structures
- Proposed_Register_of_Protected_Structures
- Significant bat roost
- NIAH_Sites
- National_Monuments
- Architectural_Conservation_Areas
- Japanese Knotweed

Habitat Line

- FS2 - Tall herb swamp
- River
- Baseline Survey
- Basemap

Habitat Area

- BC3 - Tilled Land
- FL5 - Eutrophic Lakes
- GA1 - Improved agricultural grassland
- WD / WS1 - Mixed woodland / Scrub
- WD1 - Mixed broad-leaved woodland
- WD2 - Mixed broad-leaved and conifer woodland
- WD2 / WS1 - Mixed Woodland / Scrub
- WN6 - Wet willow-alder-ash woodland
- WN6 / GM1 - Wet willow-alder-ash woodland / Freshwater marsh
- others
- WD / WS1 - Mixed Woodland / Scrub

OpenStreetMap

Marlfield Lake
Flood Relief Scheme

3. Flood Model

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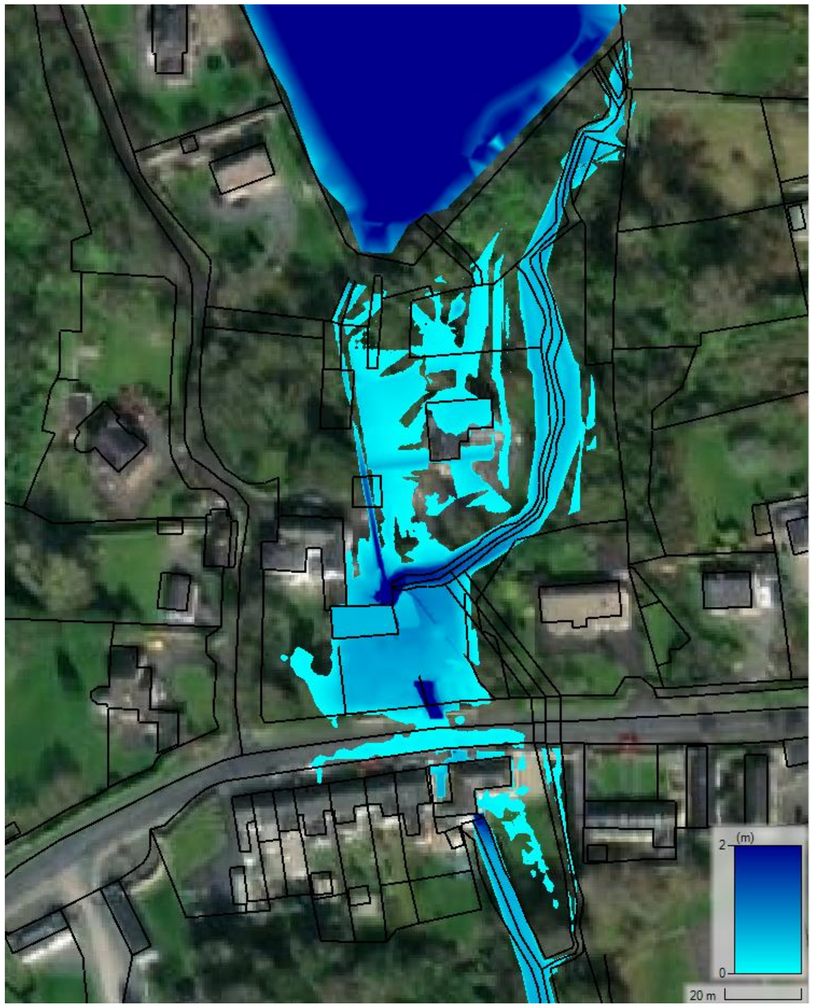
The current situation has been modelled using a two-dimensional computer model.

Flood events are presented in terms of their probability of occurring in any given year (e.g. the 1% AEP event has a 1% or 1 in 100 probability of happening in any year)

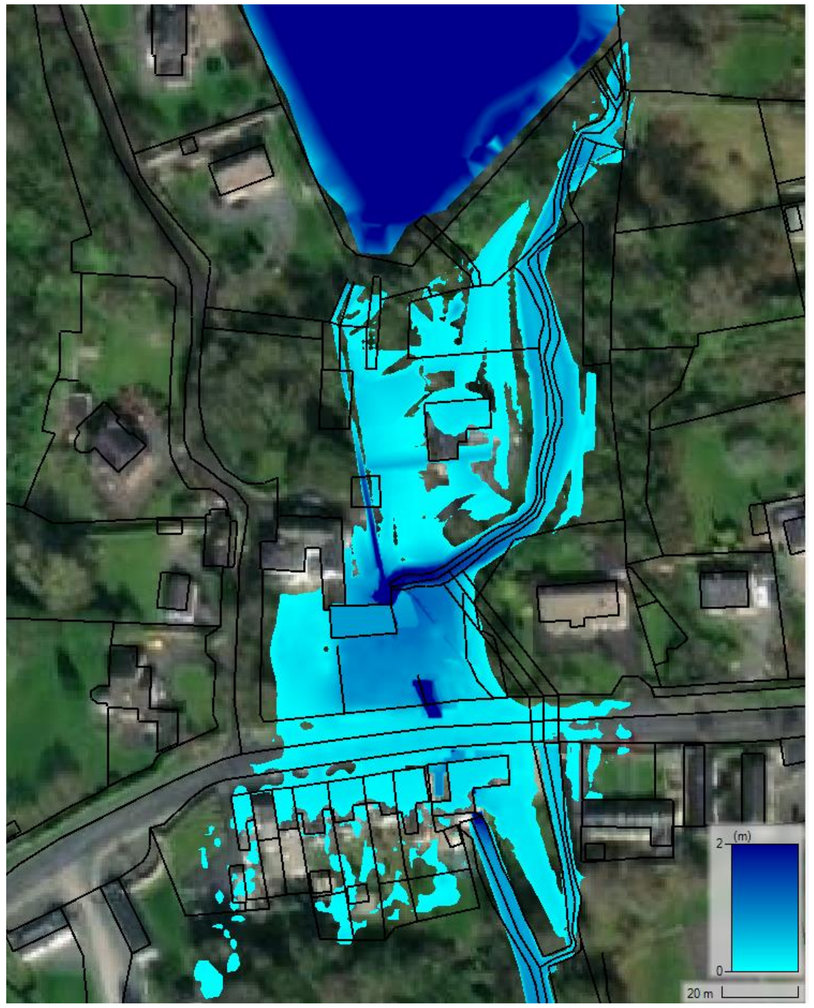
To examine the downstream risk from a failure of the dam, a dam breach analysis model run was also carried out.

MODELLED FLOOD EXTENTS

20% AEP (1 in 5-year Event)



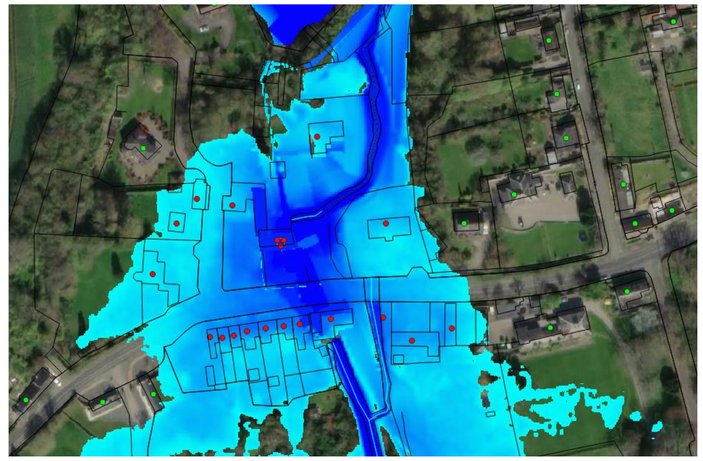
1% AEP (1 in 100-year Event)



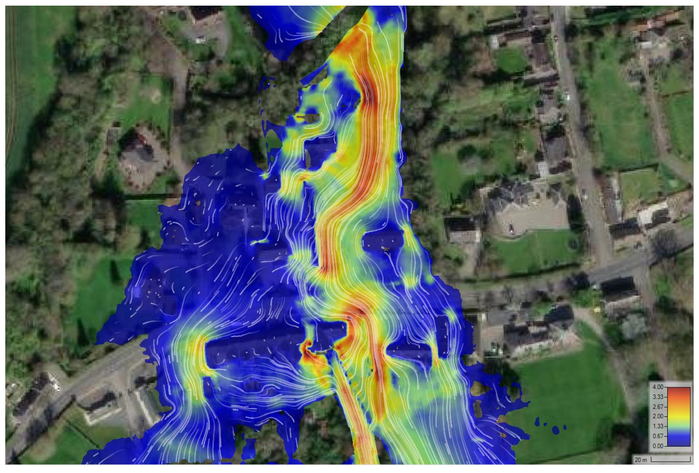
(AEP = Annual Exceedence Probability = chances of a flood of this magnitude or larger occurring in any particular year)

DAM BREACH - MODELLED FLOOD EXTENTS

Flow Depth (0-2m)



Flow Velocity (0-4m/s)



Marlfield Lake Flood Relief Scheme

4. Previously Presented Options

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An initial screening was carried out of an extensive set of flood relief measures and Options were developed to improve dam safety and mitigating flooding. Environmental and technical considerations were screened for obvious "showstoppers" and feedback from the first consultation process were collected and fed into the selection of a preferred option.

PRELIMINARY SCREENING

A preliminary screening was carried out to identify the objective targets of the Flood Relief Scheme

Dam

- **Reduce the water level in the lake** by at least 500mm, OR **Increase the dam crest level**

AND

- **Remove the trees** from the dam and **Protect the toe** of the dam from erosion

Village

- **Reduce the flow** through the village, OR **Increase the conveyance capacity** in the village

NON-VIABLE OPTIONS

Create Water Storage upstream of the road bridge to Marlfield Lake

This option requires the construction of a weir to create a storage on river west of St Patrick's well. The storage area can reduce the frequency of flooding by storing around 26500 m3 at 39m OD, and 55000 m3 at 40m OD. However not enough to hold 1% AEP flood.

Diverting the Lake

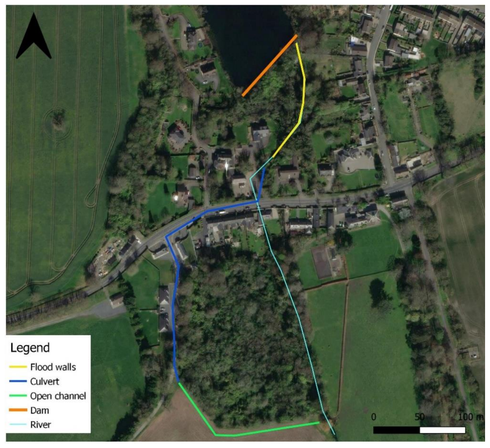
The effect of the diversion would be similar to the 'morning glory' options already considered. The diversion would not address the lake level against the dam and would require additional mitigation as per the morning glory options.

Re-open existing sluice gate

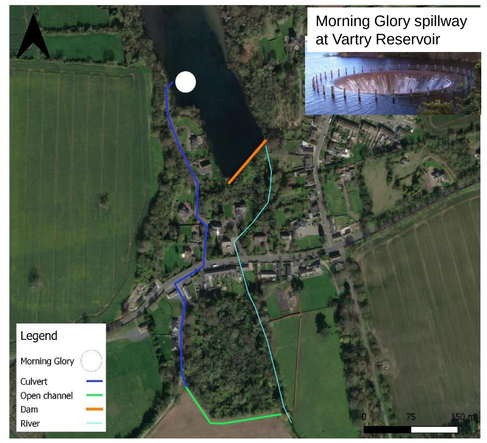
This requires a new sluice gate and a 0.5m dia pipe ca 80m long to the mill culvert.
This provides some additional control of lake levels but is insufficient as a standalone measure to provide protection from large events.
This option will be part of the emergency work carried out separately from the FRS to improve lake control.

PREVIOUSLY PRESENDED FLOOD PROTECTION OPTIONS

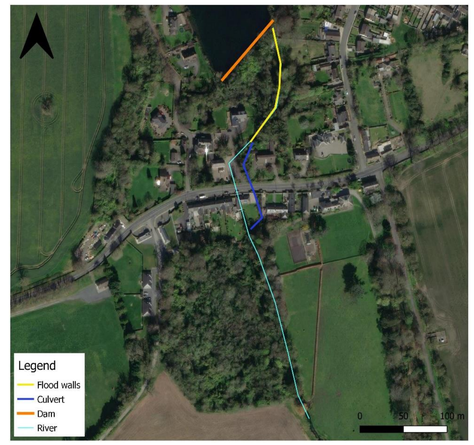
Option 1 – Lower Weir and upgrade existing spillway with walls and downstream diversion



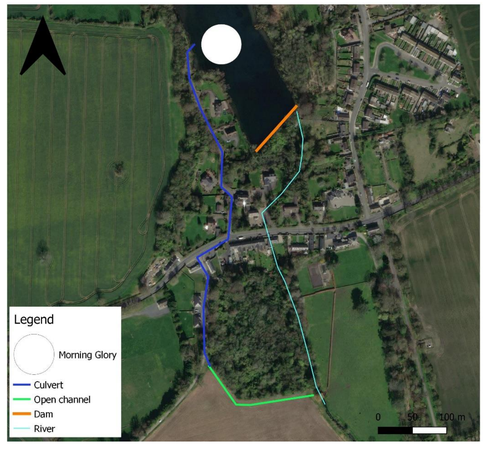
Option 2 –New Overflow with diversion culvert on pond road



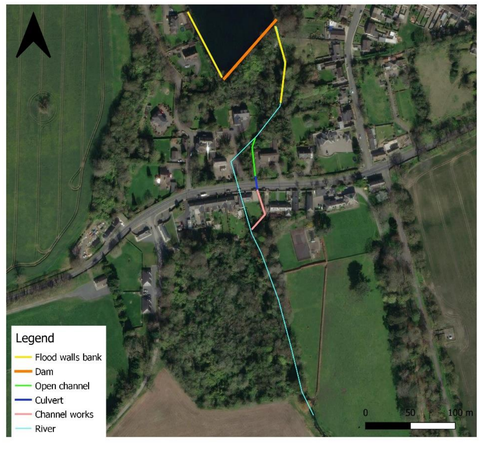
Option 3 – Lower weir and divert 1% AEP flow via new culvert at Mill Apartments downstream of existing road culvert



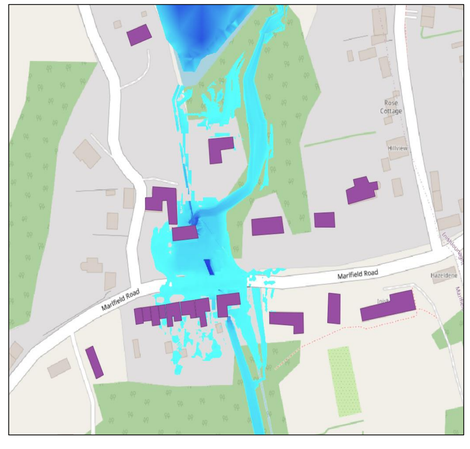
Option 4 – Lower of part of the Weir and add new Overflow Weir with diversion culvert on pond road



Option 5 – Raise dam embankment and divert 1% AEP flow via open channel and culvert



Option 6 – Relocated affected properties



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5. Additional Options

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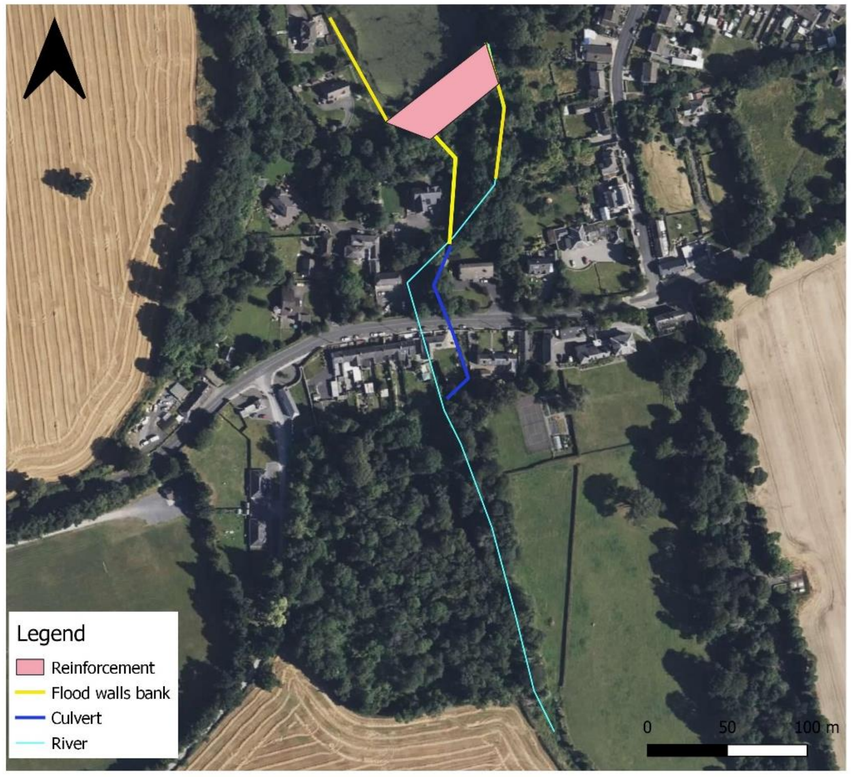
Option 7

Reinforcement of the dam and divert 1% AEP flow via new culvert at Mill Apartments to downstream of existing road culvert



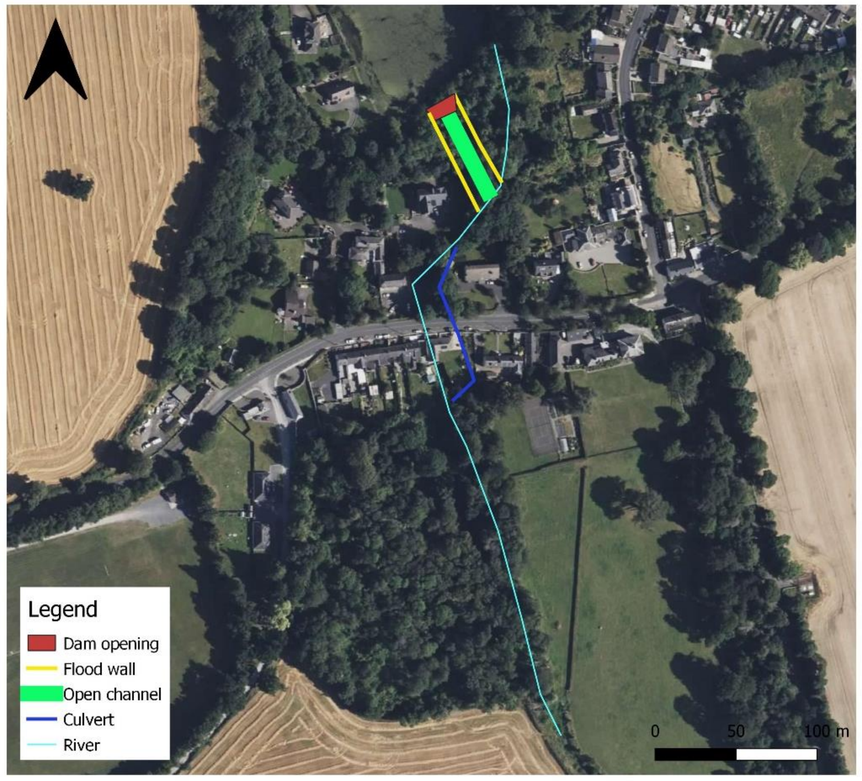
- Reinforce the dam with concrete or plastic pavement grass
- Re-slope and re-profile the channel downstream
- Flood walls for approx. 90m along the spillway
- The existing embankment on the west side of the lake should be replace with a more robust wall 70m long 600mm high.
- New weir wall across the river with an opening in the base to allow low flows to follow the existing stream course.
- Diversion culvert approx. 90m long

Potential constraints

- Site access during weir works
- Potential loss of habitats due to raising the water level in the lake
- Impact of the flood wall on architectural heritage (Mill ruin)
- Culvert construction in the grounds of residential properties
- Works on a stream connected into a SAC (River Suir)

Option 8

Remove of the dam, and divert 1% AEP flow via new culvert at Mill Apartments to downstream of existing road culvert



- Remove the dam
- Construction of new open channel 5m wide and 65m long going downstream and reconnecting to the existing one.
- Flood walls for approx. 65m along the new channel
- Re-slope and re-profile the channel downstream
- New weir wall across the river with an opening in the base to allow low flows to follow the existing stream course.
- Diversion culvert approx. 90m long

Potential constraints

- Site access during weir works
- Loss of the lake
- Impact of the flood wall on architectural heritage (Mill ruin)
- Culvert construction in the grounds of residential properties
- Works on a stream connected into a SAC (River Suir)

Marlfield Lake
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6. Upcoming Works & Next Steps

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GROUND INVESTIGATION WORKS

Ground investigation works will be carried out on the dam during summer 2024 to learn more about the dam stability and construction.

SLUICE WORKS

The existing dilapidated sluice gate and outlet pipe will be replaced with a new sluice gate and a 0.5m diameter ca 80m long pipe to the mill culvert. This will allow some limited control of the water level to create additional storage in the lake before forecast flood events.

Sluce in 2017 – Looking Upstream

Sluce in 2023– Looking Upstream

Existing sluice outlet pipe
2017

2023

WHAT IS NEXT

Emerging Preferred Option

The emerging preferred option will be the one which best meets the Social, Economic, Environmental and Technical criteria to deliver a sustainable solution.

3rd PCD

A third Public Consultation Day will be held to present this Preferred Option.

Design & Planning

The preferred option will be developed and brought forward for statutory consultation and submitted for planning.

CONTACT US

Please have your say – speak to the project representatives today.
Further questions can be directed to:
Tipperary County Council or to Nicholas O'Dwyer Limited

Marlfield Lake Flood Relief Scheme
Nicholas O'Dwyer Ltd. Unit 4E Nutgrove Office Park, Nutgrove Avenue, Dublin D14 V3F6

MarlfieldFRS@nodwyer.com

www.floodinfo.ie/marlfieldlakefrs