

1 Introduction

Emerging Options Public Participation Day

- The project team will present the emerging options for the Flood Relief Scheme for Bantry town and environs.
- The event follows extensive investigation including detailed hydrological and hydraulic modelling by the project team.
- We welcome your thoughts and feedback on the presented options.
- Feedback from the event will be considered, with all other relevant assessment items, to identify the preferred flood scheme.
- An opportunity for comment from the public when the preferred flood scheme is identified will be provided by a third Public Participation Day at a later date.



Publicity Poster for Public Participation Day



Map of catchment showing location of potential measures.

Feedback

- 📄 Questionnaire available at PPD reception or website
- 🌐 www.bantryfrs.ie
- ✉ info@bantryfrs.ie
- ✉ Bantry FRS c/o JBA Consulting, Unit 24 Grove Island, Corbally, Limerick

Design Development

Proposed potential measures presented for this Public Participation Day will be subject to further assessment following the receipt of feedback and any other relevant information that becomes available during design development. The eventual proposals for the preferred scheme may differ from those presented.

Project Roadmap

We are here →

Scheme Development & Design

- ✓ Opening Public Participation Day 🧑🧑
- ✓ Environmental Surveys
- ✓ Hydrological Analysis
- ✓ Site Survey and Ground Investigation
- ✓ Baseline Hydraulic Modelling and Flood Extents
- ✓ Testing Measures and Appraisal of Viable Options
- Emerging Options Public Participation Day 🧑🧑
- Identification of Preferred Scheme
- Preferred Scheme Public Participation Day 🧑🧑

Stage I

Planning

- Environmental Impact Assessment
- Planning Application 🧑🧑

Stage II

Detailed Design & Construction Tender

Stage III

Construction

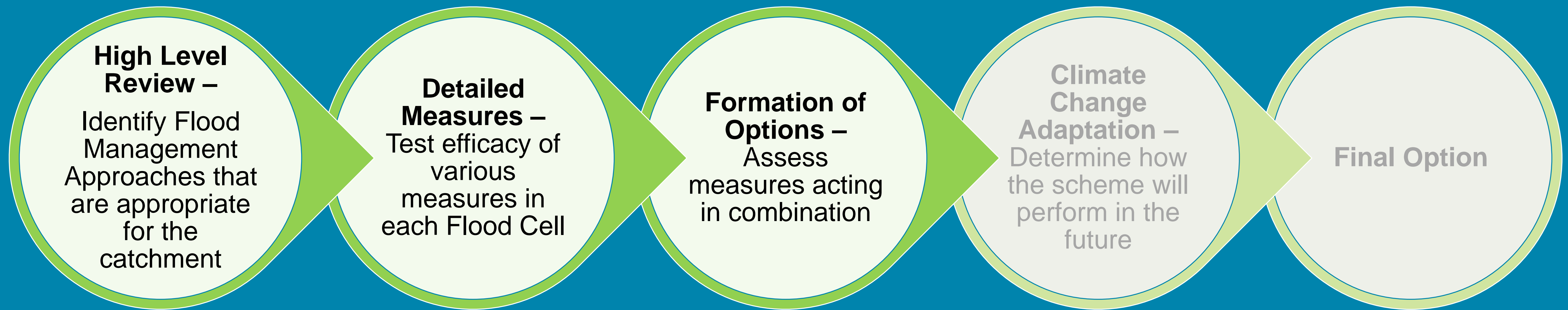
Stage IV

Handover

Stage V

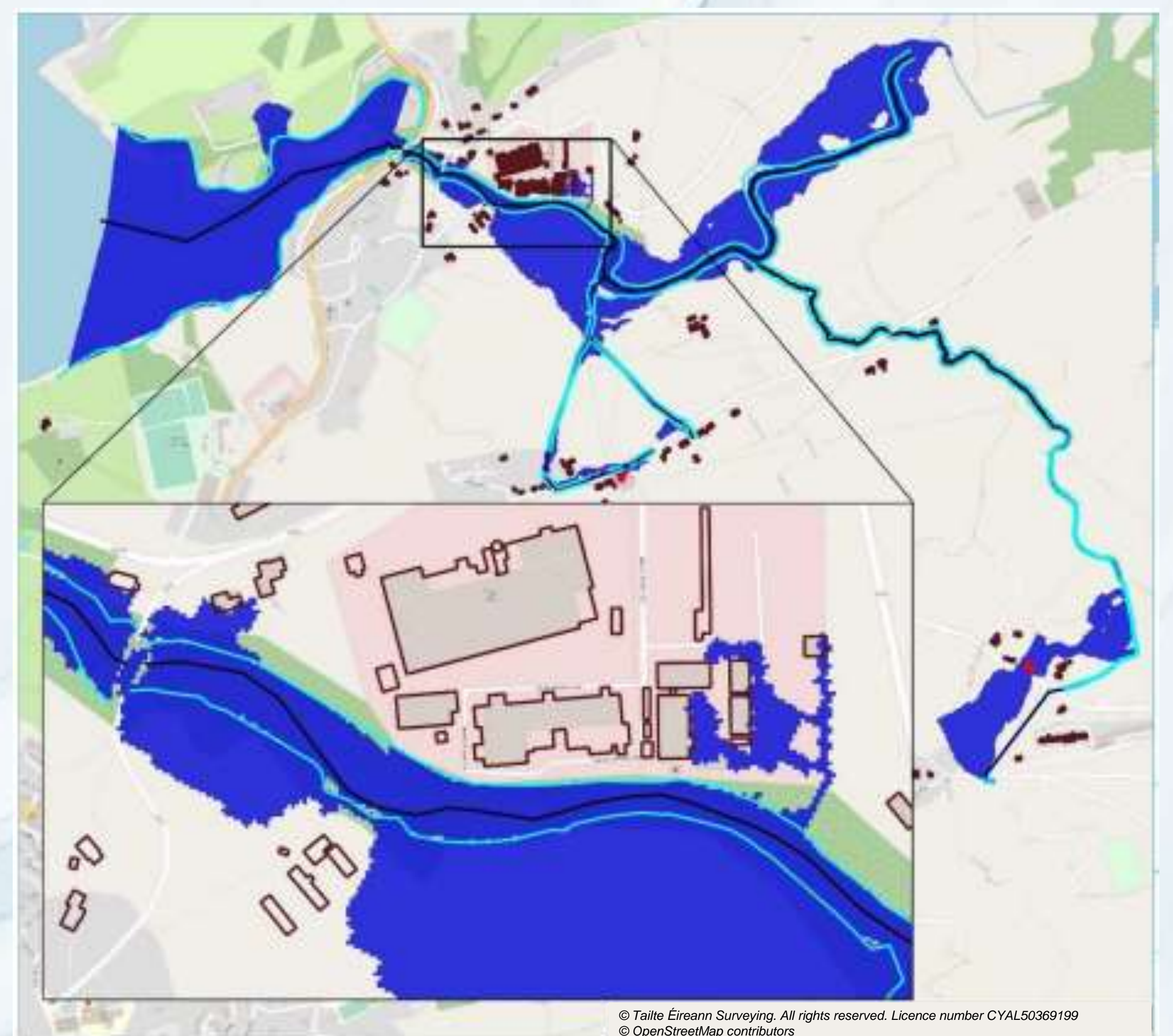
2 Designing for Management of Flood Risk

Strategic approach to managing flood risk



Surveys

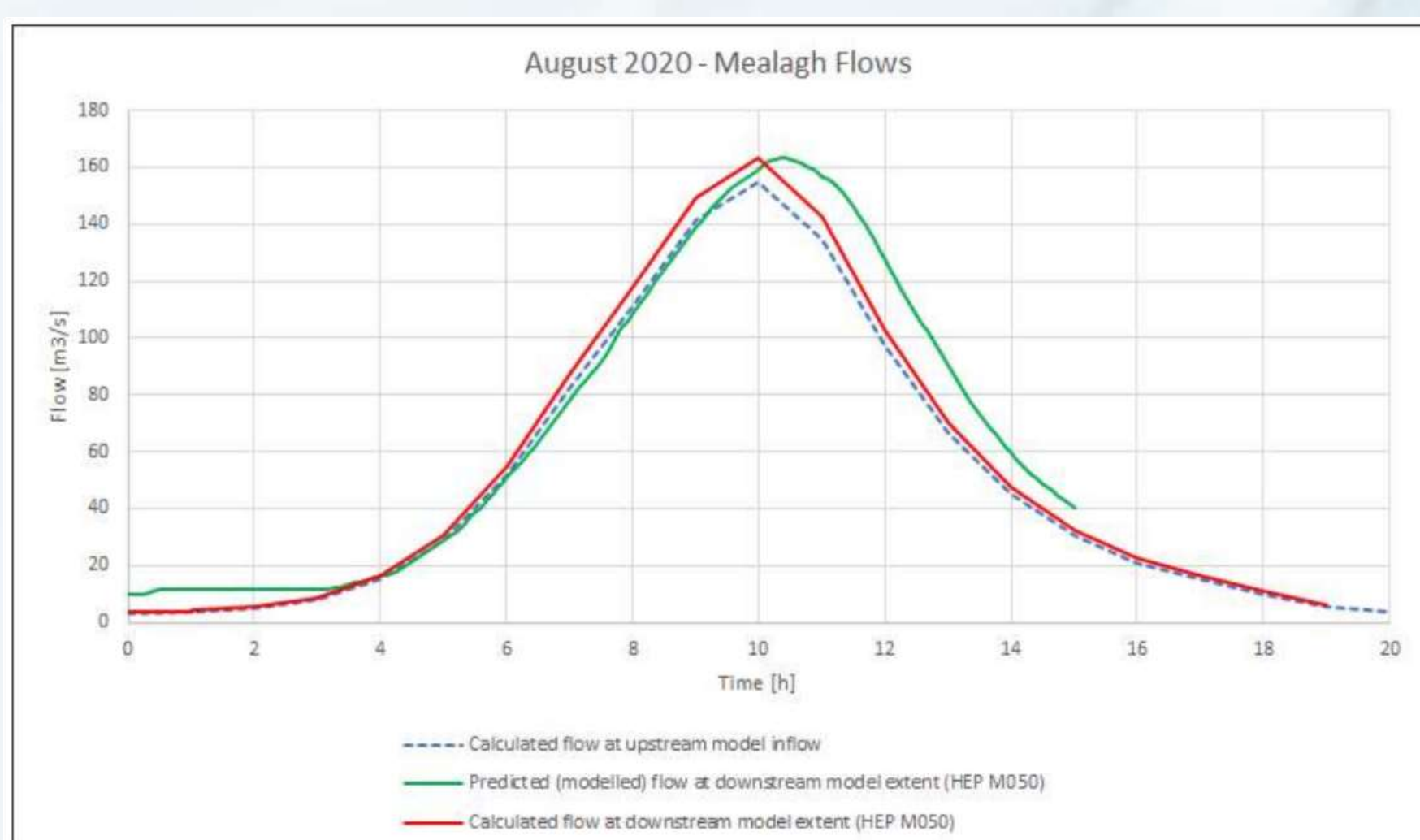
- Detailed in-stream, culvert network and topographical surveys have been undertaken to supplement existing survey information. This data allowed accurate modelling of the geometry of the watercourses across both the Mill & Mealagh catchments.
- Building thresholds were surveyed to allow a determination of the level of risk to each property.
- A tidal gauge has been installed at the sea wall to provide live open-source information of sea levels (<https://waterlevel.ie/0000021063/>).
- A level gauge has been installed within the Mill River adjacent to the Library to collate river levels (<https://waterlevel.ie/0000021023/>).
- A number of rain gauges have been installed across the catchment to gather information on rainfall depth variation across the study areas.



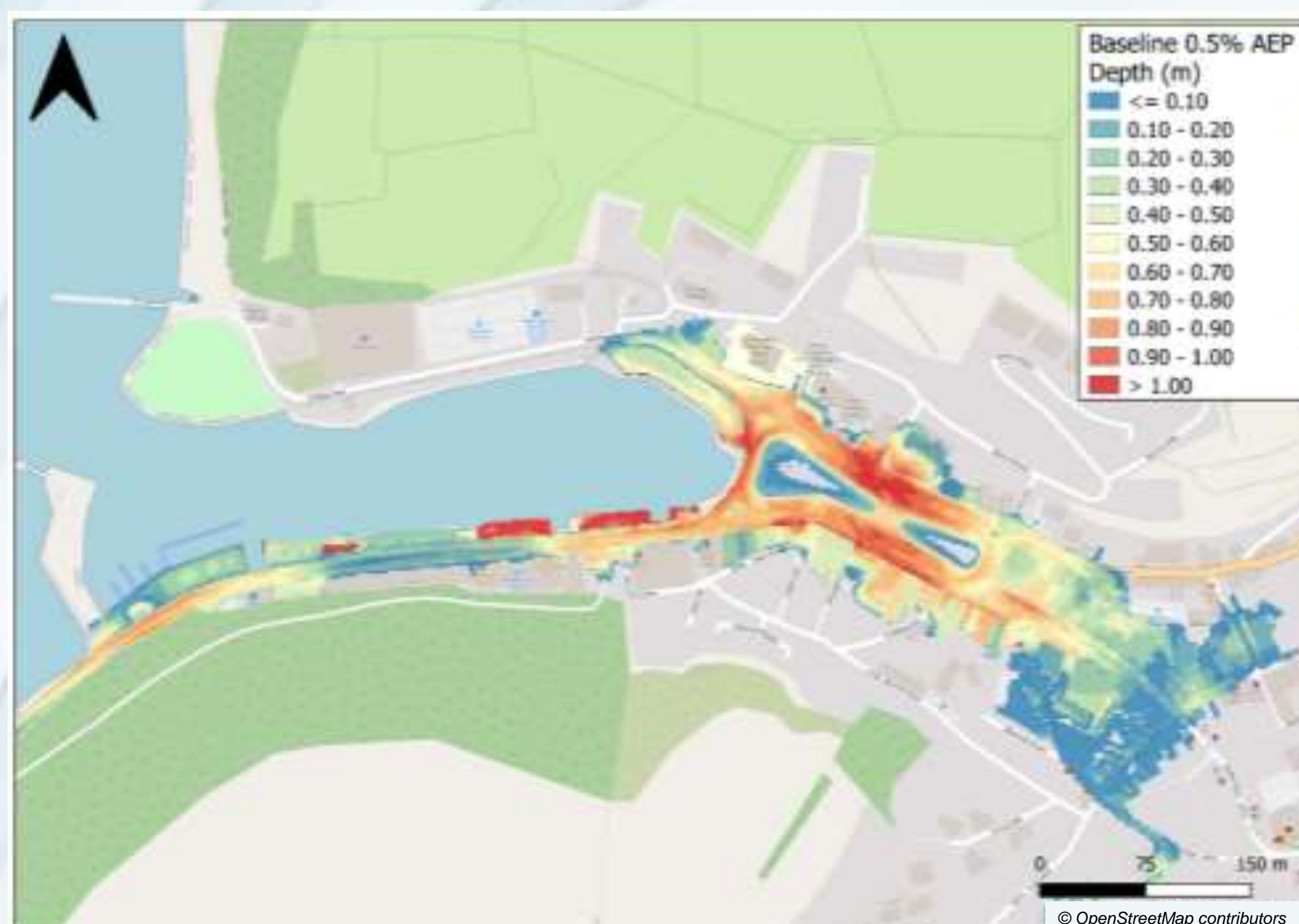
Example of modelling output for Mealagh River showing theoretical flood extents for August 2020 event

Modelling

- Two fluvial models have been built for the Mealagh & Mill Catchments.
- A separate coastal model has been built to identify tidal flooding risk.



August 2020 – Mealagh flows

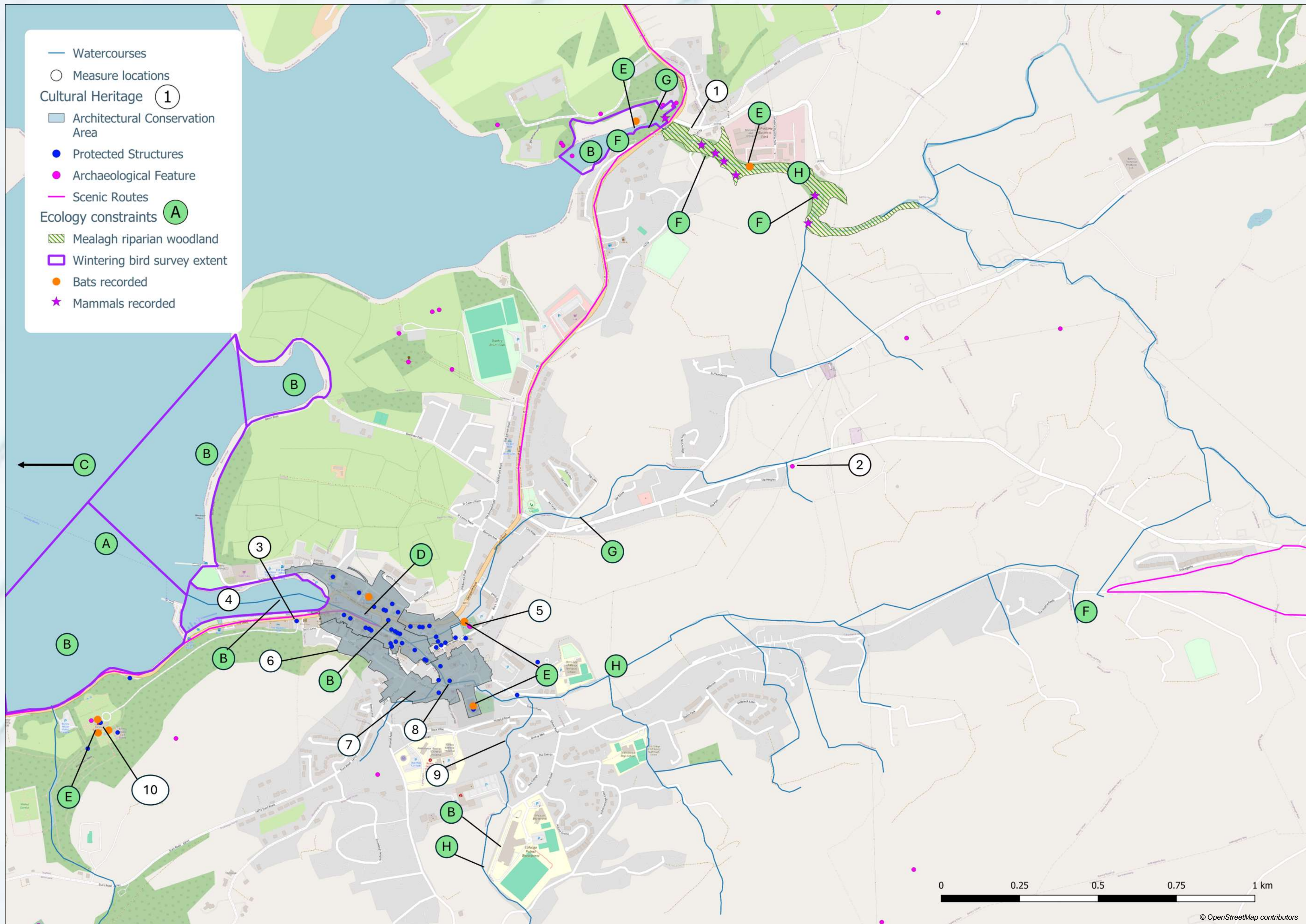


Predicted flood depths for 0.5% AEP tidal event



Example of modelling output for Mealagh River

3 Existing Environment



Map of the study area identifying key constraints for consideration during development of the scheme design

Map Legend

Cultural heritage

1. Old Donemark Bridge (NIAH)
2. Fulacht fiadh (Record of Monuments and Places)
3. Sand Quays gate lodge (Protected Structure)
4. Bantry Harbour Marina and Pier
5. Garryvurcha Church and Graveyard (Record of Monuments and Places)
6. Architectural Conservation Area
7. Rock House (NIAH)
8. Bantry Library (Protected Structure)
9. Sheskin Aqueduct (undesigned)
10. Bantry House (Protected Structure)

Ecology

- A. Bantry bay Marine mammals: Harbour Seal, Dolphin present.
- B. Wintering/ Sea birds: Listed/ Annex birds including Gulls, Oystercatcher, Curlew, Turnstone, Great Northern Diver are present in Bantry Bay and Donemark Bay. Woodcock in field next to Bantry Secondary School.
- C. Whiddy Island pNHA located 0.7km west of Bantry. All other designated sites >5km away
- D. Annex I habitat Mudflats [1140] possibly present in Bantry Bay.
- E. Bats: historical records of Lesser Horseshoe Bat in Donemark Mill. Known roosts present in Bantry House and in Bantry Town, JBA survey- small numbers of Pipistrelle bats along Mill stream by Garryvurcha Church, and behind Library, Daubenton's bat recorded along Mealagh River.
- F. Mammals: otter recorded along Mealagh River in 2022 and 2023, surveys to continue in 2024. Otter known in Donemark bay, Mink and Fox present. Possible badger near Ardnageehy Mor.
- G. Breeding birds: terrestrial surveys started in 2024. Grey wagtail present on Mill stream behind Library, Swifts observed in Bantry town.
- H. Fisheries and Aquatic Invertebrates: Fresh water pearl mussel survey conducted on Mealagh in 2022- none present. Fisheries surveys to be conducted in summer 2024 – Salmon present in Mealagh. Eel, Brown trout, Lamprey to be surveyed.
- I. Invasive species- not mapped as large number of locations across scheme. 3rd schedule plant species present include Japanese knotweed, Rhododendron ponticum, Gunnera tinctoria, Himalayan balsam. Treatment is being carried out by Cork CC at 150 locations in Bantry. Mink recorded on Mealagh.

Environmental Surveys

The following surveys have been carried out over 2022, 2023 & 2024

- Birds (breeding and wintering surveys)
- Mammals and bat
- Fish and aquatic invertebrates incl. Lamprey, Salmon, Fresh Water Pearl Mussel (to be conducted in Summer 2024)
- Invasive species

Nature Based Solutions

What are they?

Nature Based Solutions (NBS) use natural features and processes to address issues such as flood risk. Nature based solutions in the context of Bantry FRS aim to mimic or restore riverine processes, with a particular emphasis on floodplain connectivity.

Why are NBS important?

- Man-made, “grey” infrastructural responses to flood protection contain high embedded carbon costs, require high-maintenance strategies and are largely unsustainable as well as depreciating over time.
- NBS can, in appropriate locations, provide a more sustainable and cost-effective solution. NBS appreciate over time as the natural riverine processes result in a maturing and enhancement of the existing biodiversity habitat.
- NBS result is a slowing of the flow of any river they’re introduced into. This process results in sediment dropout within the floodplain, providing improved water quality benefits downstream.

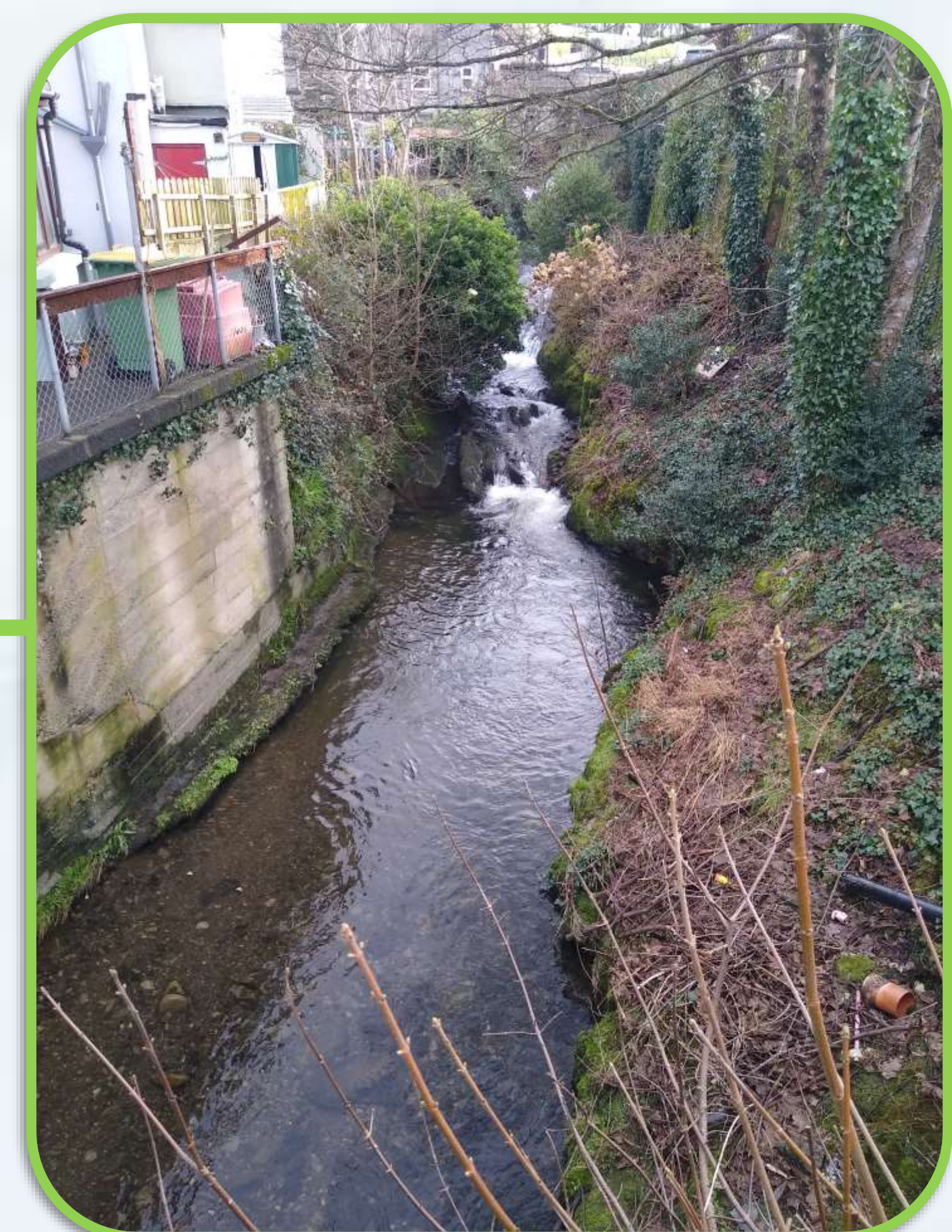


What NBS were looked at in scheme development?

- Natural storage and floodplain reconnectedness have been the key NBS for addressing flood risk within the scheme. A number of areas have been identified where existing storage occurs and the scheme aims to both retain and/or enhance that storage. Seafield Marsh (left) is one such example of a retained upstream storage solution
- The scheme has also looked to “daylight” existing culverted watercourses where potential floodplain connectivity was possible.
- In an effort to further slow flows, the meandering of existing rivers and stream is being considered.

What are the constraints?

- Connectivity to the rivers floodplains is not available due to existing urban development adjacent to or on the existing river alignment, such as the Mill River (right). This hinders the opportunity to allow the river to connect to its floodplain.
- The upper Mill catchment is steep. The enhancement of the upstream floodplain is therefore limited as the natural river process is to flow rapidly towards the base of the valley where Bantry town now resides.
- Interaction with utilities, cultural heritage features and existing areas of ecological interest also limit where NBS storage can be implemented.



Climate Change Adaptation

What is climate change adaptation?

Climate change adaptation is ensuring that the flood risk management interventions designed to address present-day flood risk are also planned with consideration of the potential increase in flood risk that could arise in the future due to climate change. It is to also ensure that the proposed interventions are flexible and adaptable to a range of climate change scenarios.

What scale of climate change is planned for?

The Intergovernmental Panel on Climate Change (IPCC) has reported that it is virtually certain that global mean sea level will continue to rise over the 21st Century. For context, recent EPA research has identified that the sea level around Ireland has risen by approximately 2-3mm per year since the early 1990s.

Rainfall has and will continue to increase in intensity. Annual average rainfall was 7% higher in the period 1990-2019 compared with the 30-year period 1961-1990.

In order to plan for this anticipated change, the flood relief scheme defines two future scenarios the mid-range future scenario (MRFS) and high-end future scenario (HEFS). For each of these, an estimated increase in climate conditions is applied. These are shown in the table to the right.

Parameter	MRFS	HEFS
Extreme Rainfall Depths	+20%	+30%
Peak Flood Flows	+20%	+30%
Mean Sea Level Rise	+500mm	+1000mm
Land movement	- 0.5mm/year	-0.5mm/year
Forestation	- 1/6 Tp	- 1/3 Tp + 10% SPR

Trajectory	Indicative IPCC Scenario	Current	MRFS	HEFS
Most Optimistic Case	SSP1-1.9	2024	2130	2270
Slower Onset	SSP2-4.5	2024	2100	2160
Medium Onset	SSP5-8.5	2024	2085	2120
Faster Onset	SSP5-8.5, including ice sheet instability	2024	2060	2080

When will adaptation be needed?

There remains inherent uncertainty in all climate models that seek to simulate extremely complex and dynamic natural systems. There is, thus, a range of global and regional climate and circulation models in use internationally that create ensembles of varying impacts for a given emissions scenario. As a result, the timeline is less an exact year, but more an estimated range. These are shown in the table to the left. The trigger point for when these adaptation measures will be implemented will be informed by a post-construction monitoring regime of the rivers and tide levels.

What climate change adaptation measures are being considered?

- In some cases, it is beneficial to build in climate change allowances during the present-day construction phase. This is an economical approach with less disruptive impacts to the environment and landowners. Examples of this include:
 - Design of culvert sizes will consider HEFS flows
 - Where access is disruptive or complex, defenses will be constructed with the HEFS requirements
 - Constructing foundations now to be able to accommodate the HEFS flows and volumes. This makes for ease of adaptability in future scenarios
- There are also nature-based solutions that are being considered as part of the climate change adaptation plan. This takes a holistic view of the river catchments and assesses whether forestation upstream could provide a future benefit when established. As forestation would take time to mature in order to provide substantial benefit, it would need to be decided on decades prior to being required. This is why the monitoring regime is important for informing climate change planning.