Deansgrange Stream Flood Relief Scheme

Introduction

- Welcome to the 2nd Public Participation Event for the Deansgrange Stream Flood Relief Scheme. Since the last public consultation event, the project team has been working to identify & design a scheme to alleviate the risk of flooding for a 1 in 100 year return period event within the catchment of the Deansgrange Stream.
- Today, we will present the measures which form the Preferred Option. Kilbogget Park storage, is now complete & contributing to flood relief in the area.
- In addition to the technical feasibility; the scheme must be socially, environmentally and economically acceptable.
- **We welcome your thoughts and feedback on the preferred option.**
- Feedback be considered prior to the finalisation of the preferred option and subsequent submission of a planning application for the scheme in early 2023.

Location Map

Project Roadmap

Stage I Scheme Development & Design

Stage II Planning

Stage III Detailed Design & Construction Tender

Stage IV Construction

Stage V Handover

Stage I activities

- ✓ Hydrological Analysis
- ✓ Hydraulic Modelling
- ✓ Site Surveys
- ✓ Ecology and Environmental Surveys
- ✓ Options Appraisal
- ✓ Preliminary Design
- ✓ Environmental Assessment
- ✓ Option Selection
- ○ Public Consultation ← **We are here**

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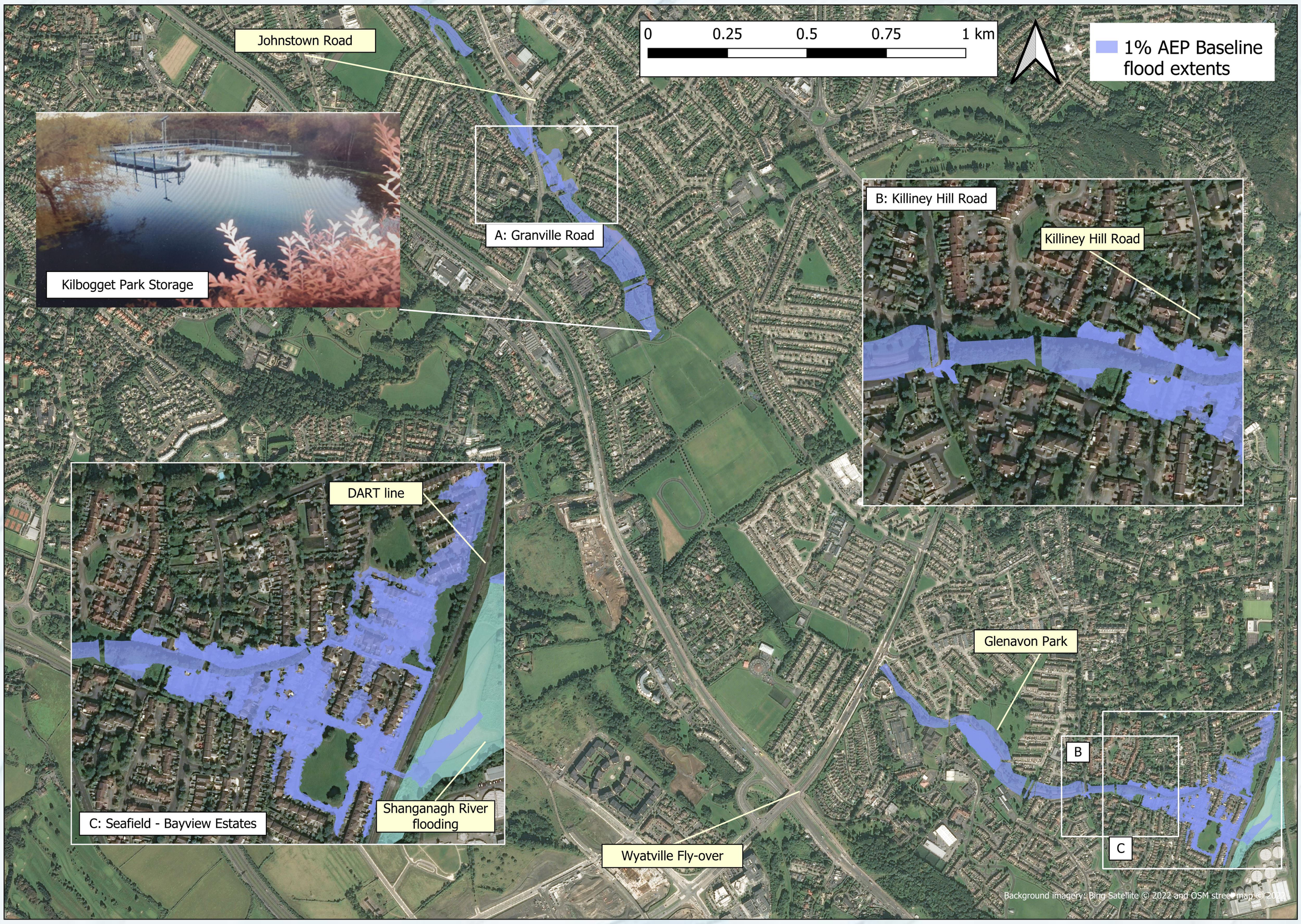
Flood Relief Scheme

Identified Areas at Flood Risk



Flood Extents for 1% AEP for Existing Scenario

- During the 1 in 100 years flood event used, the following areas are at risk:
  A. Granville Road
  B. Killiney Hill Road Bridge environs
  C. Seafield and Bayview Estates.
- Flooding in the catchment is due to constrictions to flow along the watercourse and intense response and volumes from the stormwater systems overwhelming the river resulting in flooding.
- Blockage of debris screens also contributes to flood risk by limiting the movement of water.
- Looking into the future and considering climate change we see the same areas are impacted but the depth and frequency of flooding increases.

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Flood Relief Scheme

Strategic approach to managing flood risk

How did we arrive at the preferred option?

High level review

Identifying approaches suitable for the catchment:

- Storage (hold water back),
- containment (stopping water flowing out)
- conveyance (letting water move more easily)

Detailed measures

Testing in hydraulic model.

How will these approaches work in reality?

Formation of options

Measures combined to make a scheme option

Climate change adaptation

How does a scheme option perform in the future? What can be adapted and does it impact the present day alignment

Preferred Scheme Option

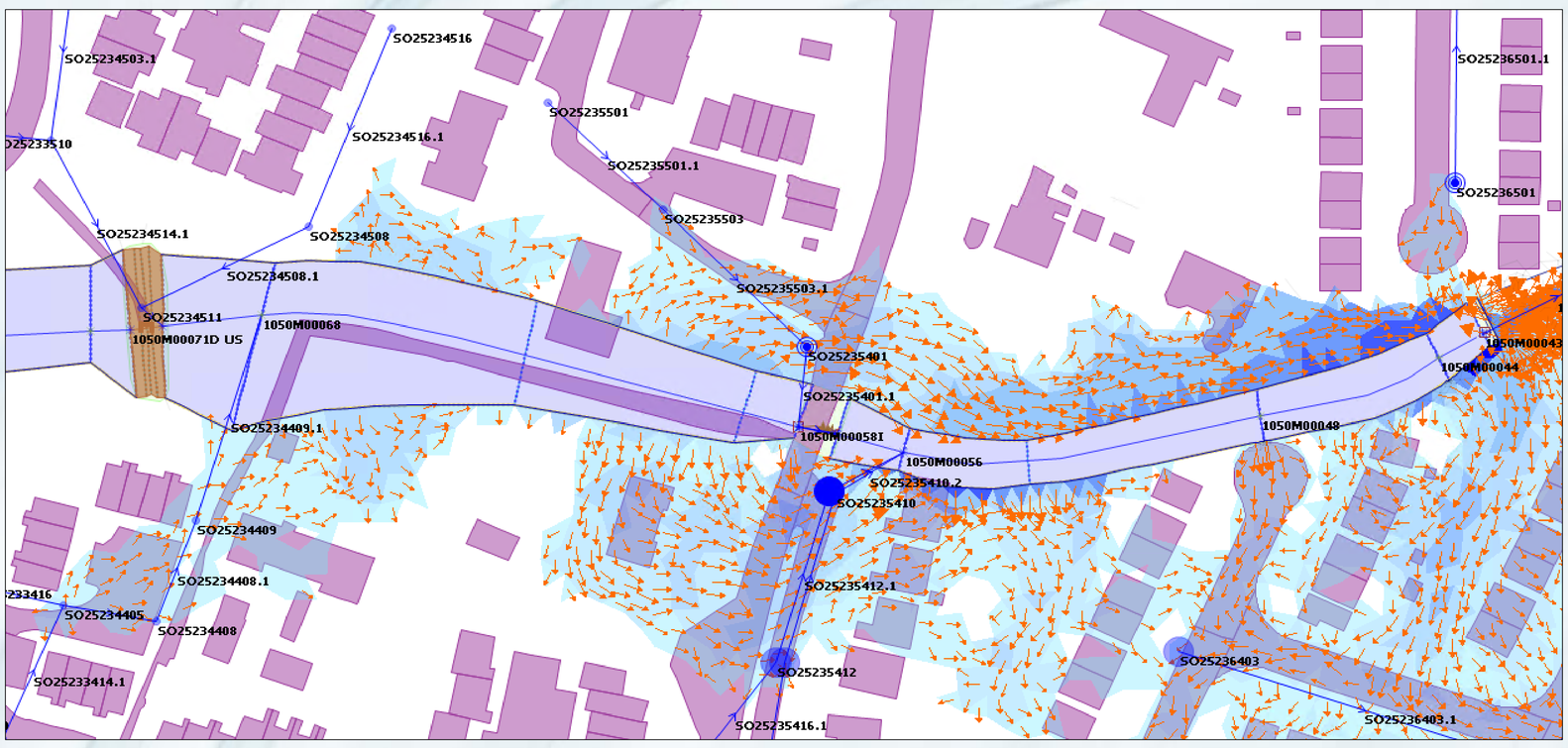

Image of Killiney Hill Road represented in hydraulic model with flooding

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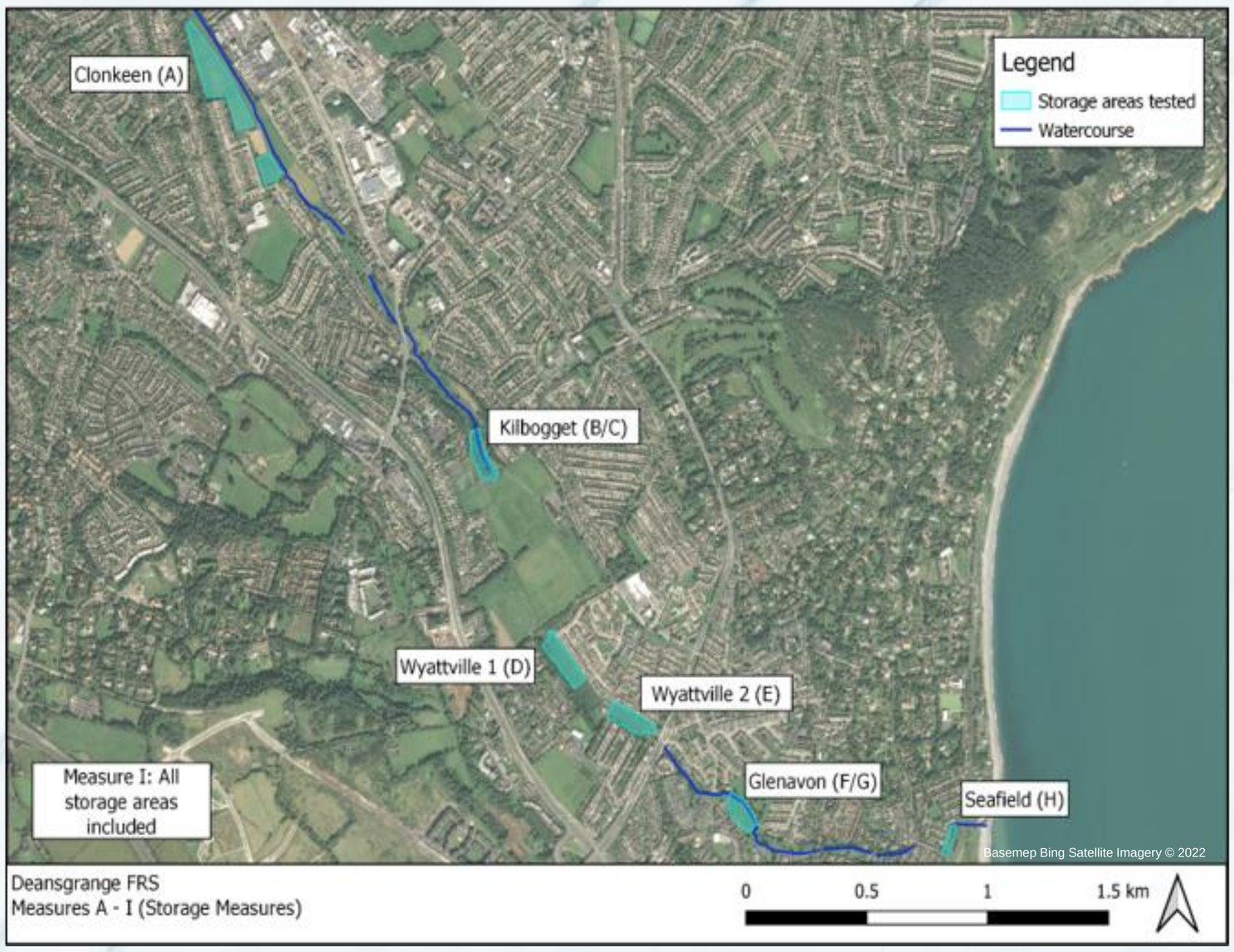
Strategic approach to managing flood risk

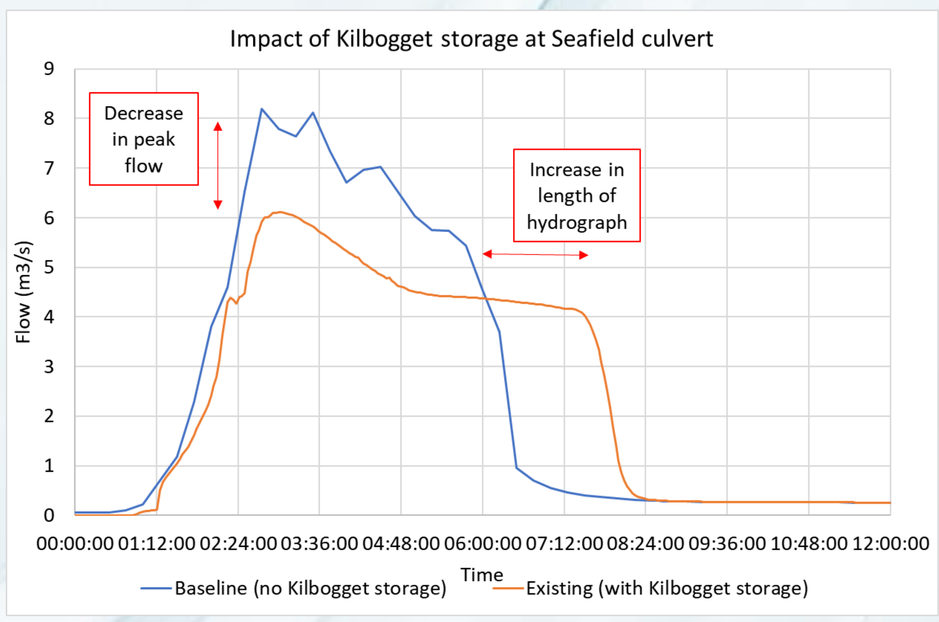
Measures tested – Storage, Containment and Conveyance



Visual summary of storage measures tested in the Deansgrange catchment

Storage measures

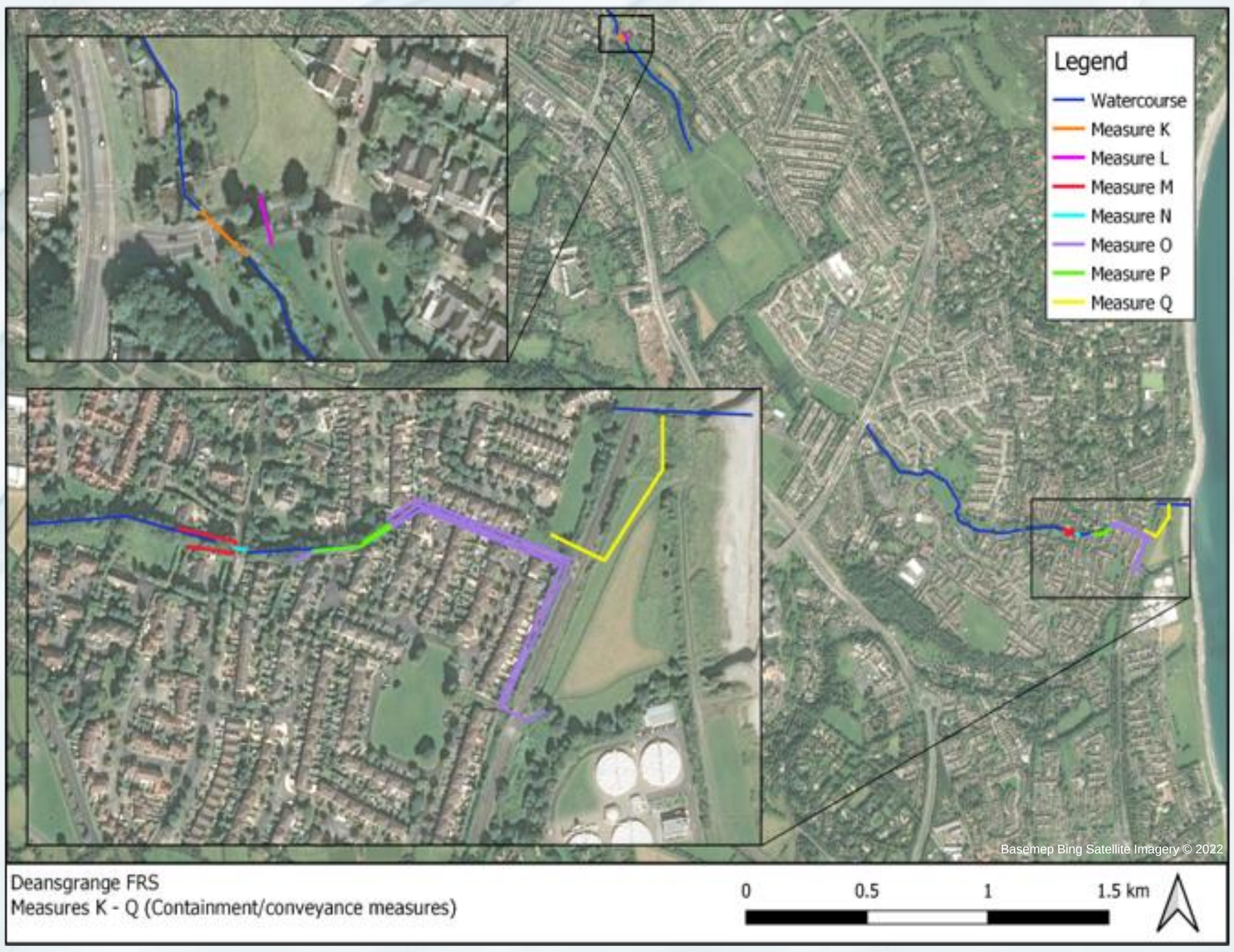
- Storage – hold water back to reduce peak flows and levels
- Storage alone does not achieve the Standard of Protection even with all areas tested used.
- Storage at Kilbogget Park (already in place) and Glenavon Park shown to provide benefit



Modelled hydrographs showing impact of Kilbogget storage on peak flow at Seafield culvert

Containment and conveyance measures

- Containment – prevent water from spilling out of bank.
- Conveyance – remove restrictions to flow and let water move more easily.
- Both types of measures tested and required to have a workable scheme.
- Conveyance under the railway line at Seafield/Bayview is integral for the scheme.
- Works at Granville Road and Killiney Hill Road also shown as necessary



Visual summary of containment and conveyance measures tested in the Deansgrange catchment

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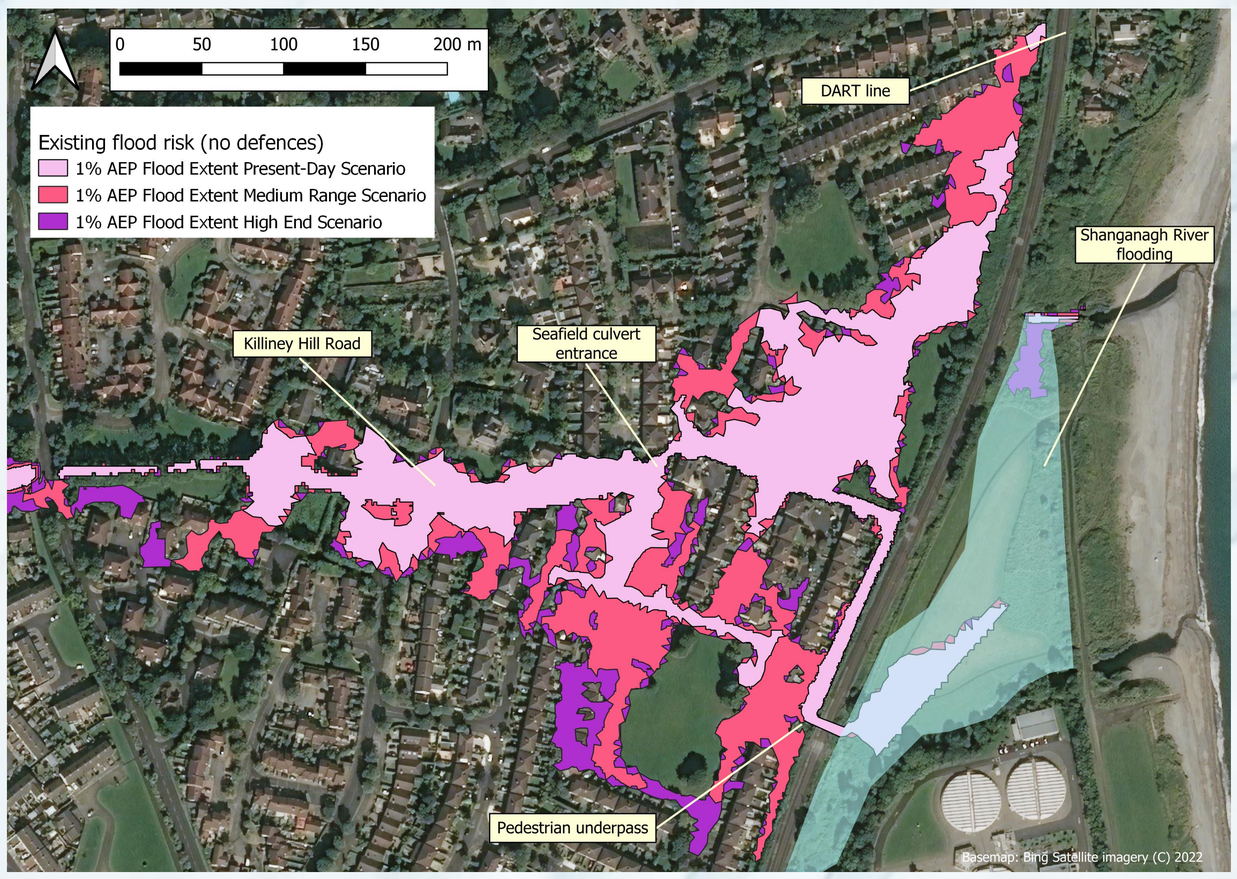
Strategic approach to managing flood risk

Climate Change Adaptation

The Present Day – this scheme

- Key measures were identified for the scheme to make the Option:
  - Culvert upgrade at Granville Road
  - Storage at Kilbogget Park (already in place)
  - Glenavon Storage
  - Walls at Killiney Hill Road
  - Screen upgrades and installations
  - Flood relief culvert under the railway line
- **<u>Without these measures, the Standard of Protection (1 in 100 year) cannot be achieved.</u>**
- Storage at Glenavon Park was shown to be critical to defending properties upstream of Killiney Hill Road Bridge and has environmental and amenity benefits.



Flood map showing the flood risk for the existing (no defences in place now and into the future

Options in the future

- In the future flows, tides and rainfall are to increase putting more pressure on the system.
- The scheme is adaptable. This means that it protects now and can be modified to protect in the future.
- Key adaptations of Present Day scheme for the Medium Range Scenario:
  - Increased storage at Kilbogget Park
  - Raised walls at Killiney Hill Road
- Walls at Killiney Hill Road are beneficial both now and in the future and so are incorporated into the preferred option.
- Key adaptations of the Medium Range scheme for the High End Scenario:
  - Raise walls further at Killiney Hill Road
  - Additional flood relief culvert under the railway line
- In the High End Scenario all available adaptations are needed for continued protection.

Scenario	Flow/ rainfall increase	Tide increase
Medium Range	+20%	+0.50m
High End	+30%	+1.00m

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Environmental Aspects

All environmental aspects identified for the Constraints Study were considered during Options Selection and influenced the design and placement of particular measures.

The Preferred Option will be subject to Environmental Assessment at the planning stage. This will include Environmental Impact Assessment Screening and Appropriate Assessment.

Vegetation Managing and reducing effects on riparian corridors has been considered as part of the proposed scheme.

Access Pedestrian access from Bayview Close to Hackettsland Bay Beach will be maintained during construction using temporary diversions.

Biodiversity Mammal surveys have been carried as part of ecological studies to locate these features and where possible avoid as part of the proposed scheme.

Cultural Heritage No designated heritage sites will be affected by the proposed scheme, e.g. Loughlinstown House (above), south of Glenavon Park will be avoided.

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Preferred Option

Flood Extents for 1% AEP Preferred Option Scenario

Location	Proposed Measures
Granville Road	• New concrete box culvert to replace 2 No. existing 1050mm dia. pipes.
Glenavon Park	• New flood defence embankment to transform Glenavon Park into a storage area in times of high flows. • New multi functional park landscaping to enhance amenity value & incorporated pedestrian & cycle routes to promote active travel. • Enhance biodiversity and water quality measures.
Killiney Hill Road	• New flood defence walls on the left and right banks upstream of Killiney Hill Road Bridge. Reinforcement of the existing stone parapet at bridge.
Seafield & Bayview Housing Estates	• New overflow pipeline and outfall to increase conveyance during times high flows. A short section of the overflow pipeline will traverse beneath the existing railway line.
Other works to manage debris & blockages of culverts	• Existing screens to be replaced at Glenavon Park & Shanganagh Road. • A new screen is proposed at the Abberley footbridge & at the inlet to Seafield culvert.

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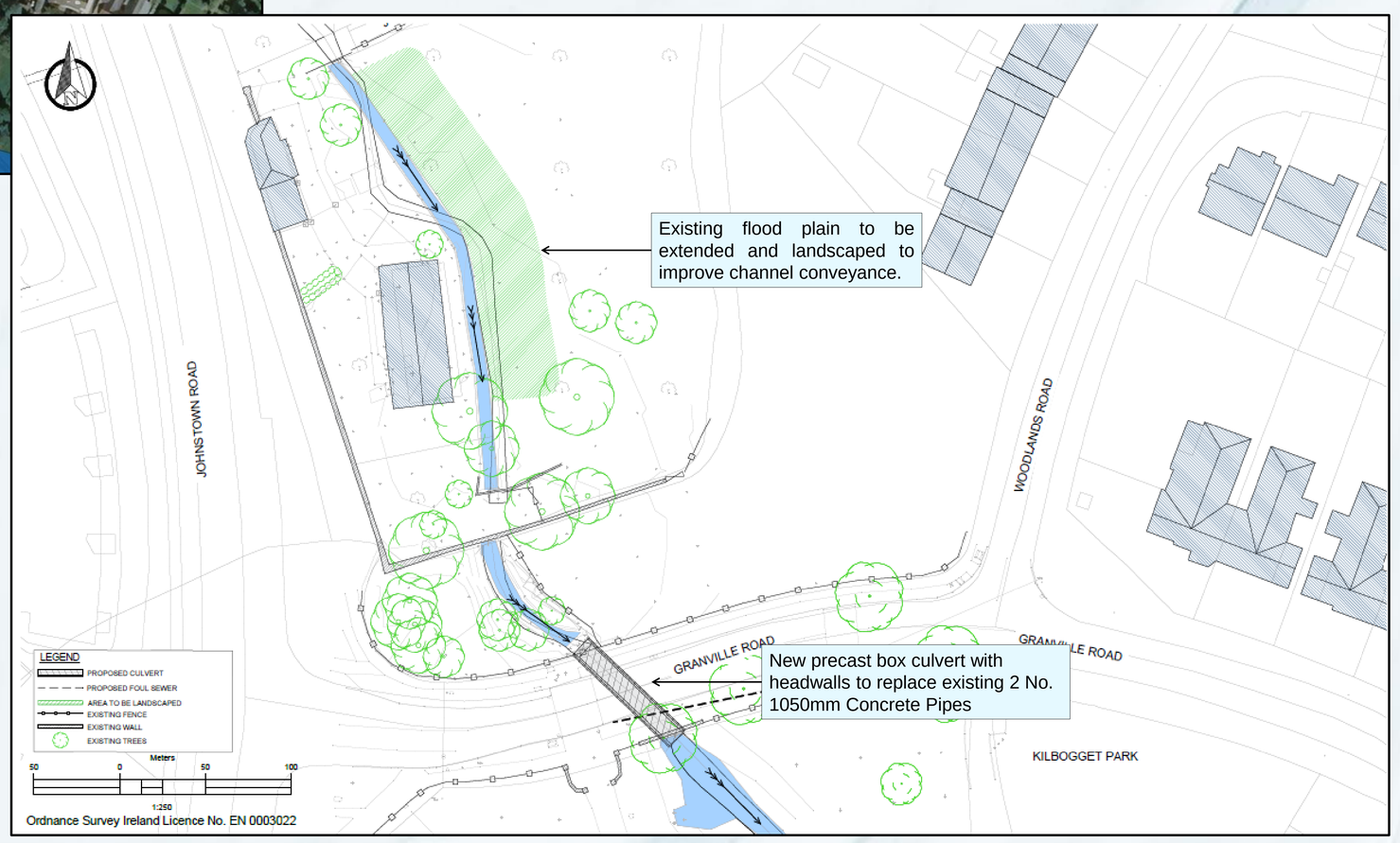
Flood Relief Scheme

Granville Road

Comparison of Flood Extents for 1% AEP for Existing & Preferred Option Scenarios

Kilbogget Park from the Granville Road bridge surroundings

Existing 1050mm dia. Pipes



Site Plan of Proposed Works

Culvert Upgrade

Current Situation

- Two existing 1050mm dia. culvert pipes under Granville Road do not have sufficient hydraulic capacity and as a result flooding occurs to the residential properties upstream at Johnstown Road and Granville Road.

Proposals

- Replace the existing twin pipes with a new precast concrete box culvert of larger capacity.
- Improve conveyance upstream of the culvert crossing by widening the existing flood plain channel.

Constraints

- Road levels
- Traffic Management
- Existing services
- Vegetation and tree removal

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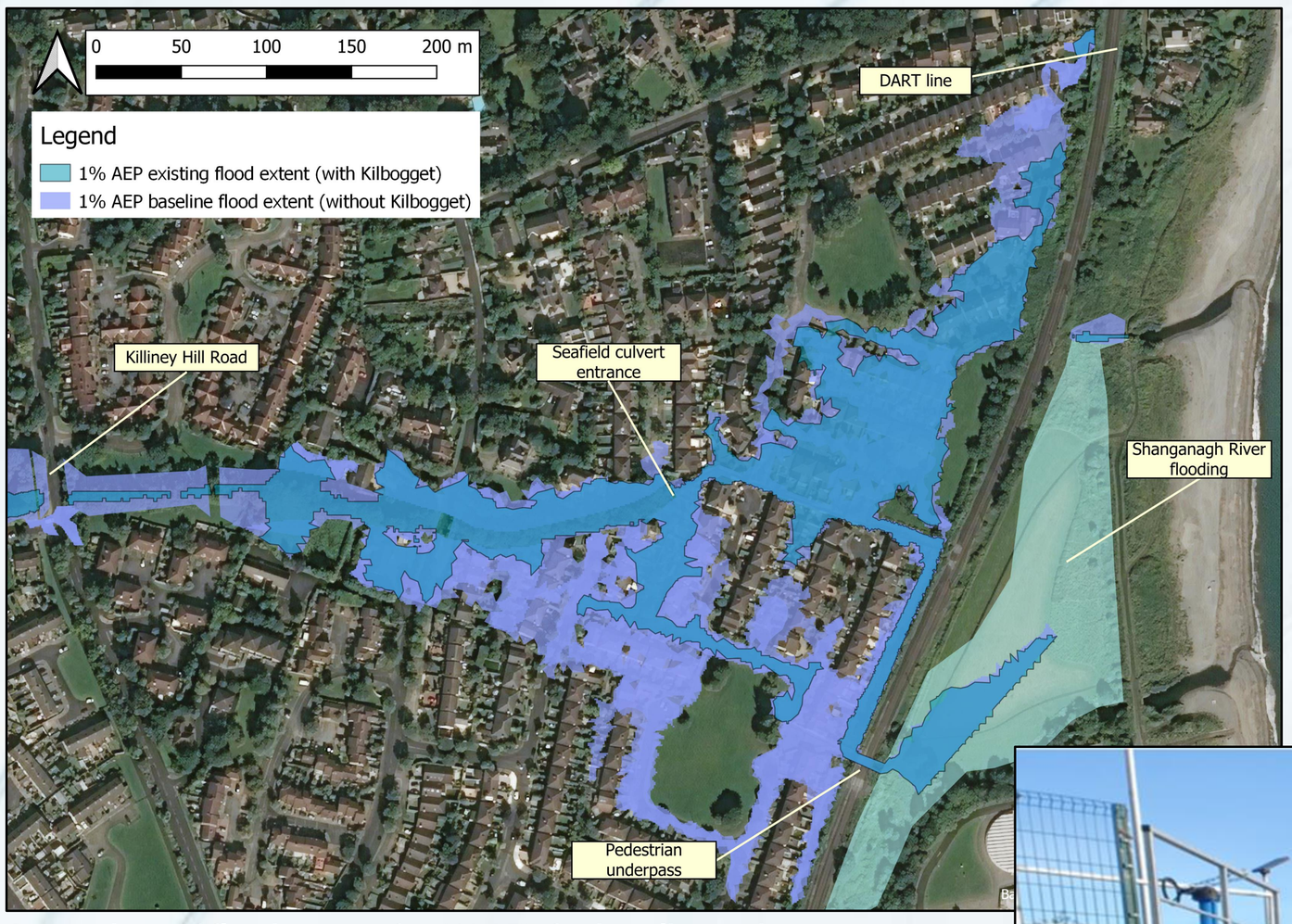
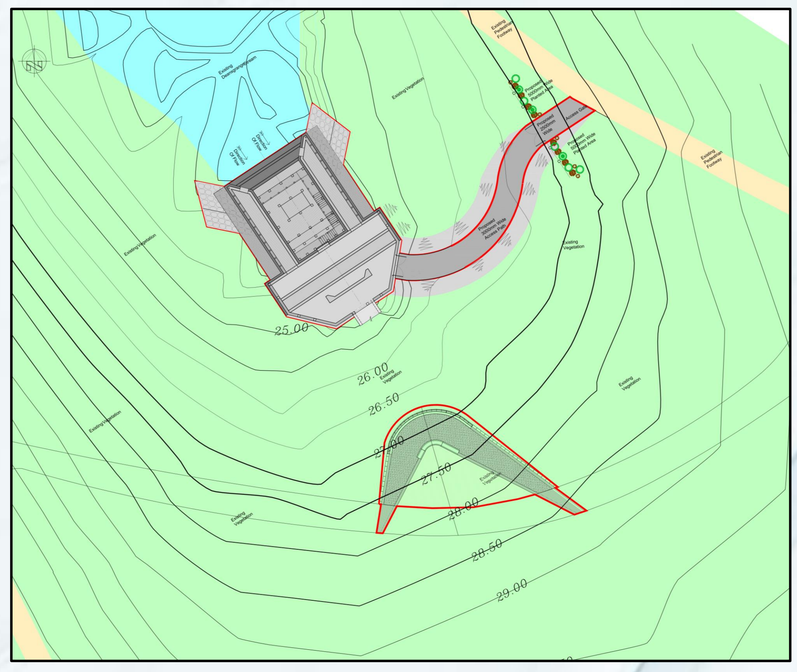
Flood Relief Scheme

Kilbogget Park



Comparison of flood extents for 1% AEP for baseline and existing scenarios



General layout of the measure as constructed

Photograph of the top of the control structure from the top of the pond

Photograph of the control structure from below

Flow Control Structure

Description

- Between Spring 2020 and 2021, a new attenuation structure including a sluice gate with trash screen was installed upstream of the existing Kilbogget culvert.
- The intention of the sluice gate is to limit the peak flow that is allowed to move downstream via the existing Kilbogget culvert. The rest of the water volume which can no longer move downstream is *'held back'* or stored in the Kilbogget ponds until the storm has abated and sufficient capacity becomes available in the culvert for the stored water to flow downstream again.
- Without works at Kilbogget, more flow is permitted to travel downstream flooding a greater number of properties**.**
- By reducing the peak flow at the existing Kilbogget Culvert, water levels and flood extents are reduced downstream including the Seafield and Bayview Estates.

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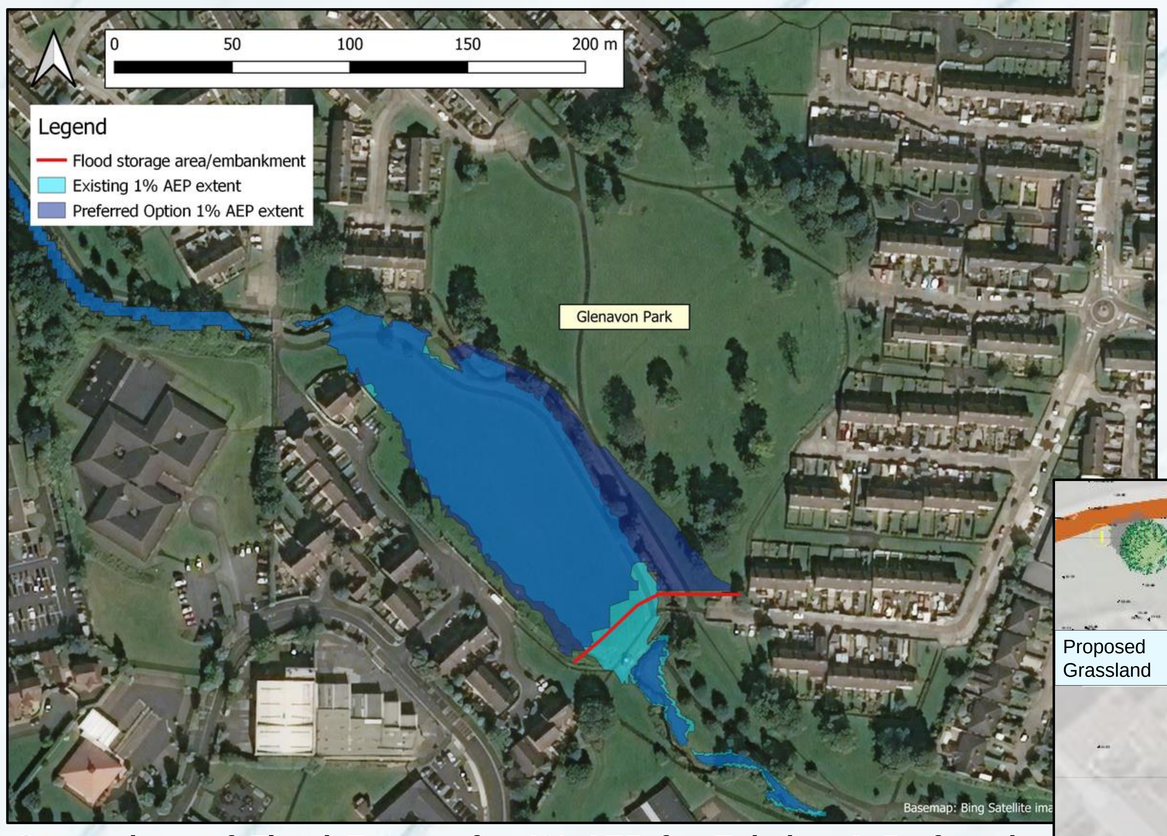
Flood Relief Scheme

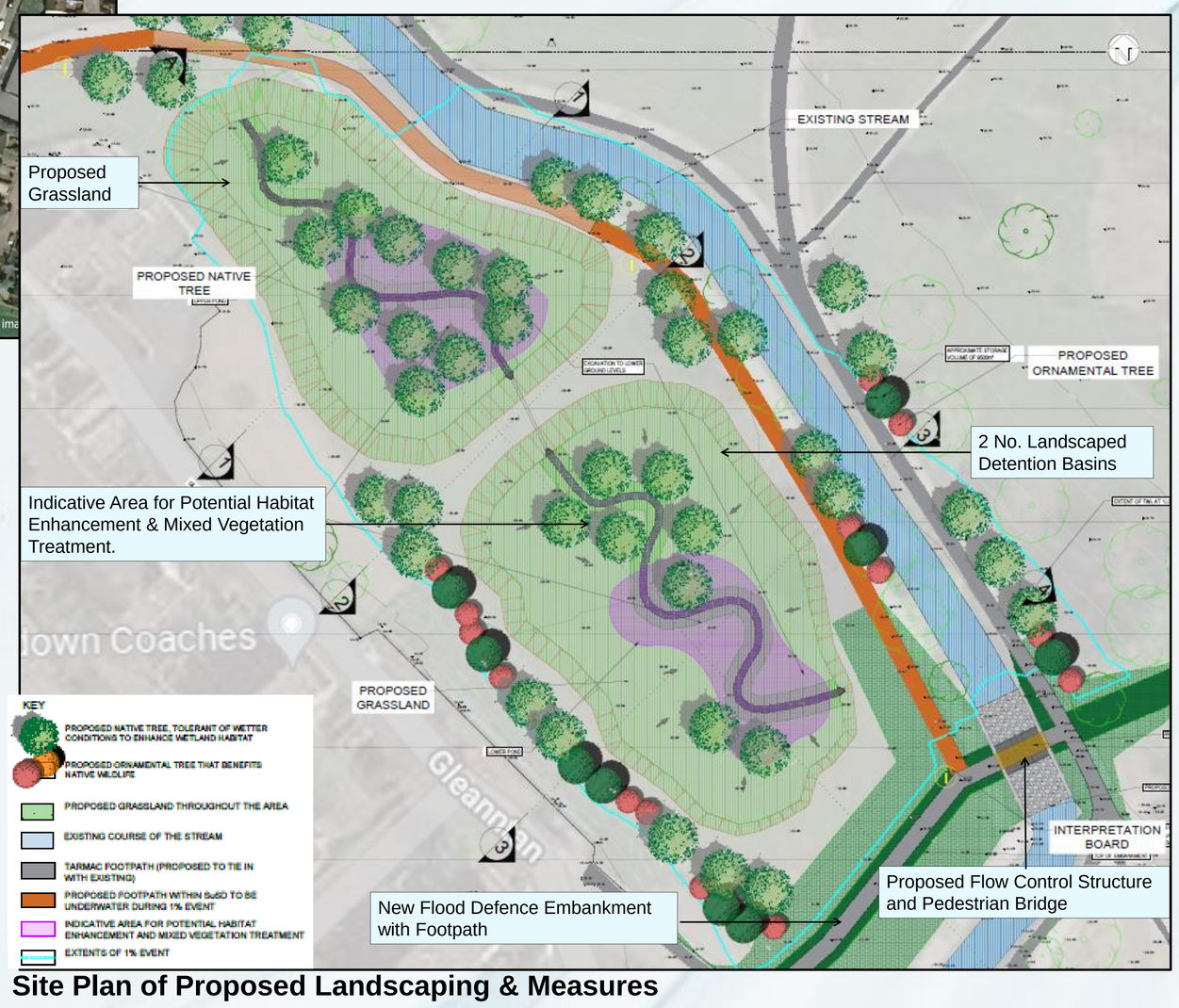
Glenavon Park



Comparison of Flood Extents for 1% AEP for Existing & Preferred Option Scenarios

Photograph of Glenavon Park

Photograph of Existing Bridge in Glenavon Park



Site Plan of Proposed Landscaping & Measures

Wetlands and Flood Storage Area

Current Situation

- There is no flooding of properties at Glenavon Park but the park offers an area to provide offline flood storage that would be an effective measure in alleviating flood levels in several areas at risk downstream.

Proposals

- New flood defence embankment to transform Glenavon Park into a storage area during more extreme storm events.
- New multi functional park landscaping and bridge to enhance amenity value & incorporate pedestrian & cycle routes to promote active travel.
- Enhance biodiversity & water quality measures.

Constraints

- Maintaining amenity of park and pedestrian/cycle routes.
- Returning flood flows that exceed the storage capacity to existing channel.
- Maintaining groundwater regimes to lessen impact on the river during periods of low flow.

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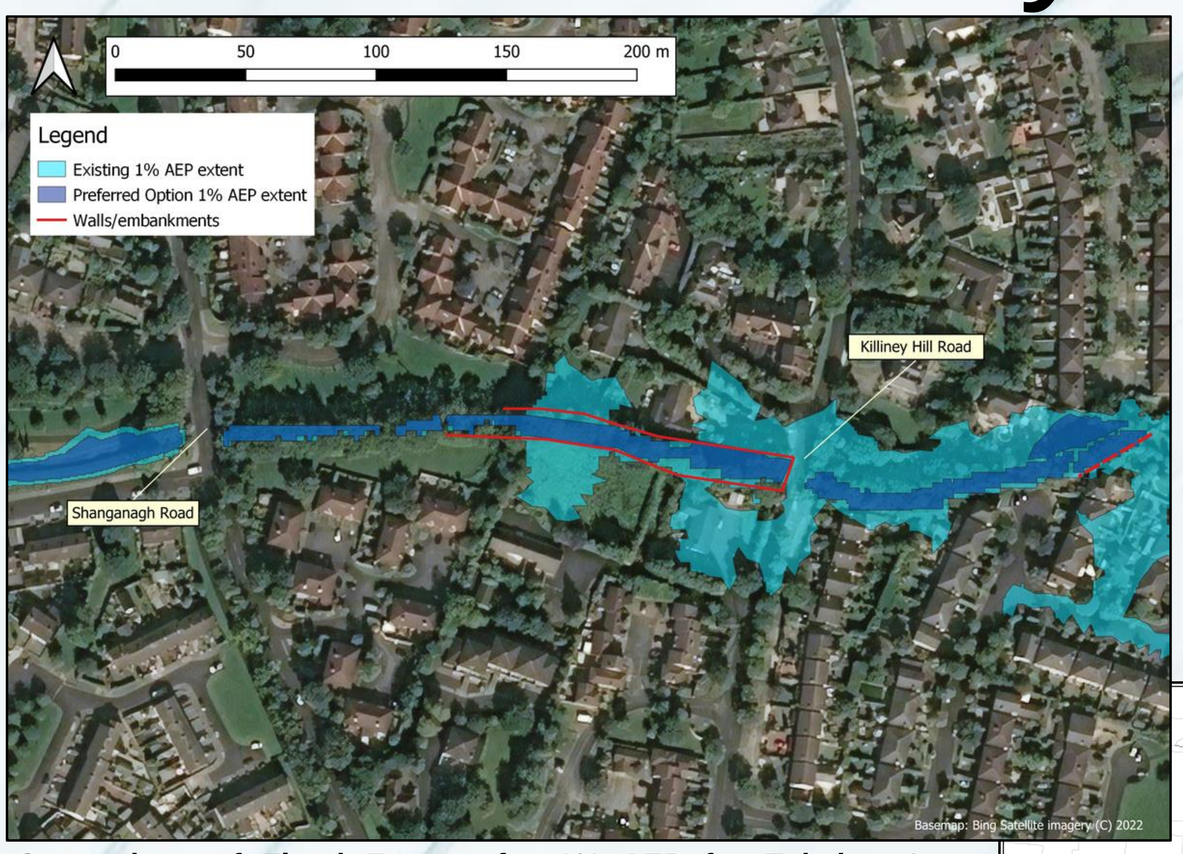
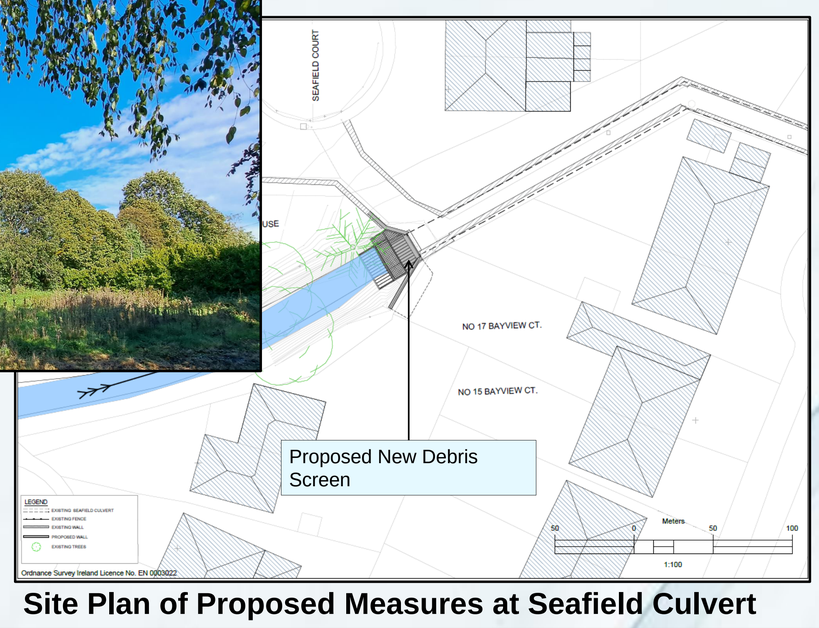
Flood Relief Scheme

Killiney Hill Road

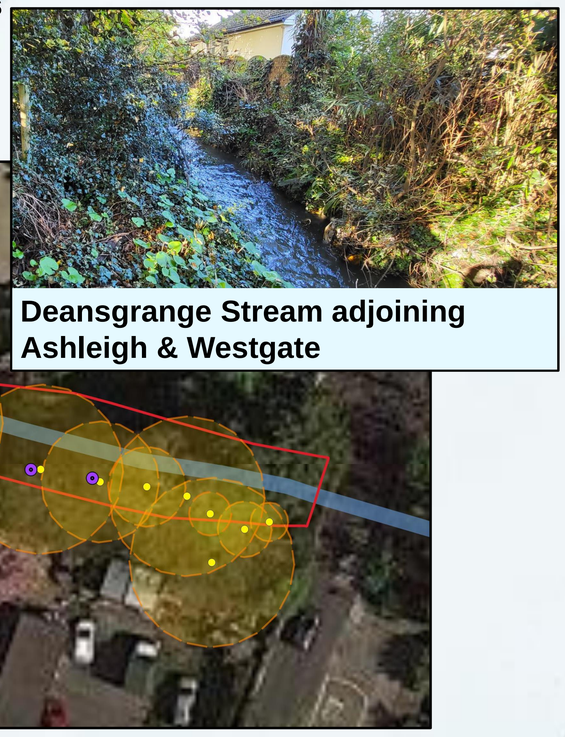


Comparison of Flood Extents for 1% AEP for Existing & Preferred Option Scenarios

Deansgrange Stream at Abberly

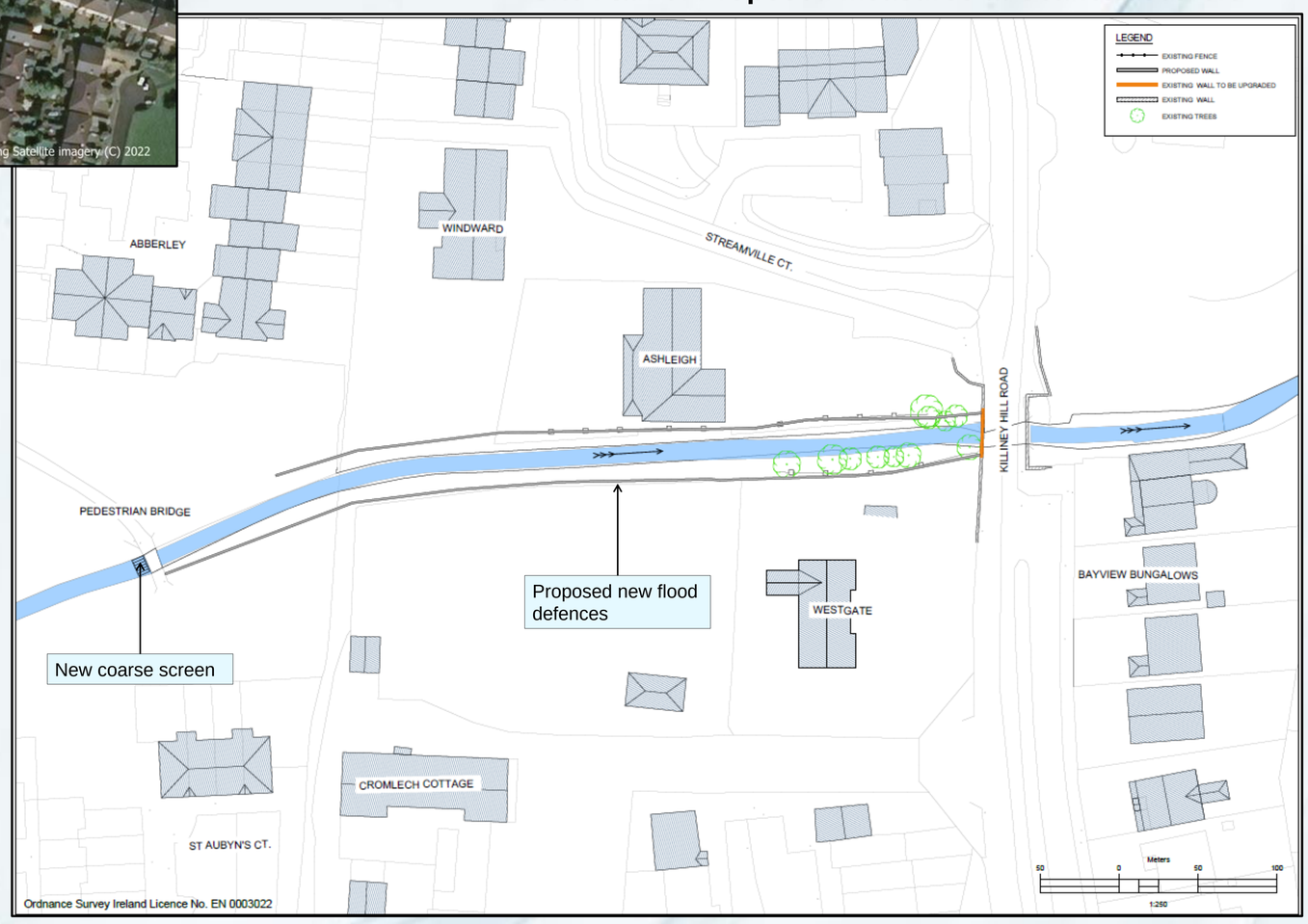


Site Plan of Proposed Measures at Seafield Culvert



Deansgrange Stream adjoining Ashleigh & Westgate

Extract Environmental Survey Map



Site Plan of Proposed Measures at Killiney Hill Road

Containment (Flood Defence Walls)

Current Situation

- Properties immediately upstream of Killiney Hill Road bridge on both banks of the Deansgrange Stream are at risk of flooding. The existing culvert at Killiney Hill Road contains obstruction & Seafield Culvert Screen is prone to blockage from debris.

Proposals

- Installation of new flood defence walls on both banks of the stream extending from Killiney Hill Road bridge to the pedestrian bridge traversing from Abberly to St Aubyns Court. Reinforcement of the existing Killiney Hill Road bridge parapet to contain flood levels.
- Replace Debris Screen at Inlet to Seafield Culvert downstream.

Constraints

- Consideration is being given to the mature trees along the riversides, which form an important local wildlife corridor. The wall typology and foundations are being designed to minimise damage to the tree roots, and as much vegetation as possible will be preserved.

Deansgrange Stream
Flood Relief Scheme

Seafield and Bayview

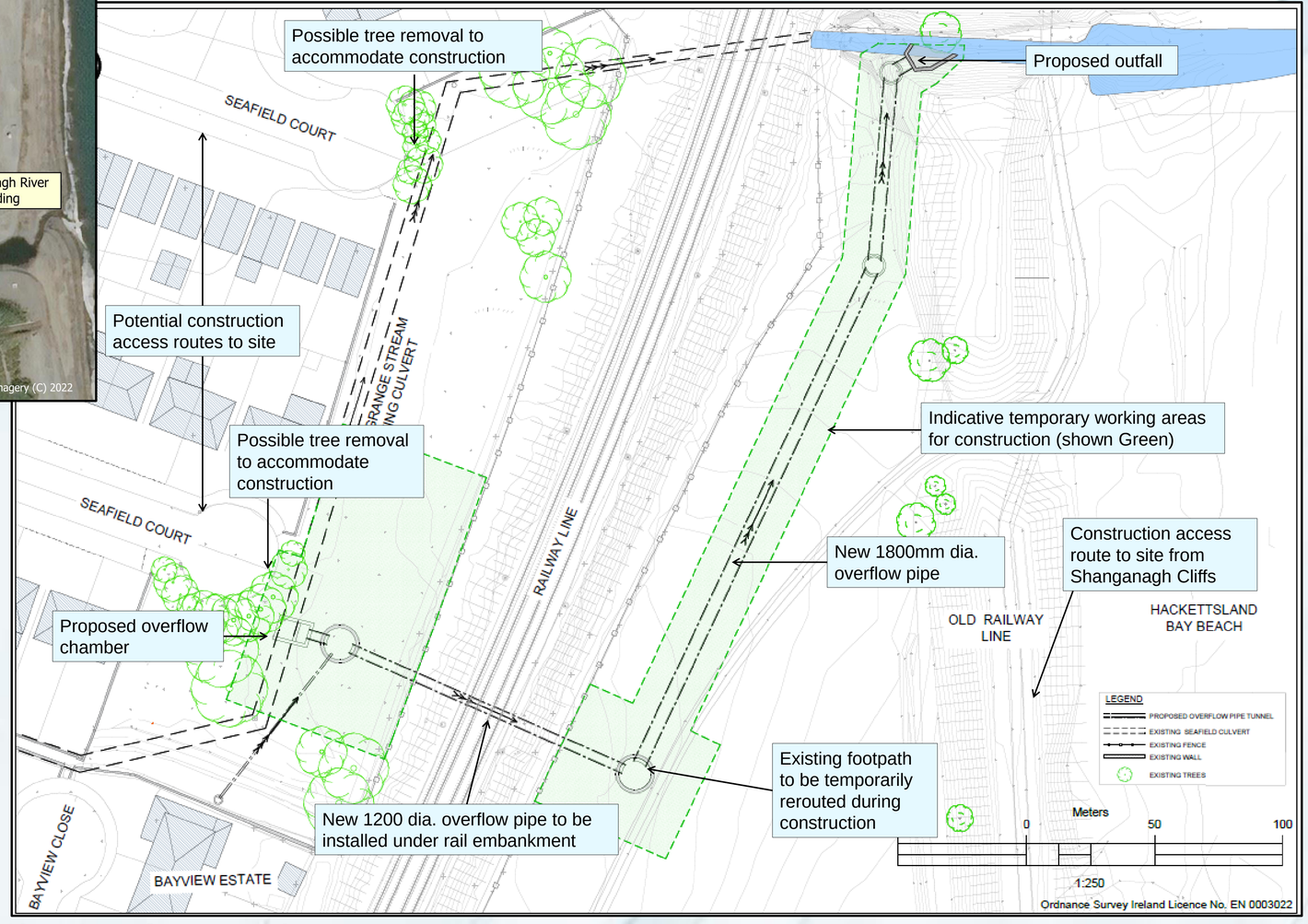
Comparison of Flood Extents for 1% AEP for Existing & Preferred Option Scenarios

Photograph of Pedestrian Walkway Adjoining Railway

Photograph of Outfall Location

Photograph of Seafield Alleyway

Photograph of Bayview Railway Underpass



Site Plan of Proposed Measures

New Seafield Culvert Overflow

Current Situation

- Lack of hydraulic capacity within the existing Seafield culvert is causing flooding of residential properties upstream of the culvert and in the pedestrian alleyway between the Seafield and Bayview housing estates. Once the pedestrian alleyway becomes a flood path, flow continues overground to the pedestrian underpass which then becomes activated with flooding.

Proposals

- Install a new overflow pipe to increase the hydraulic capacity in the system.
- Construction will involve tunnelling a large pipe beneath the railway embankment using trenchless techniques. The overflow pipe will then be installed on seaward/ eastern boundary of the railway embankment to a new outfall near the pedestrian footbridge.

Constraints

- Construction methodology (trenchless construction), temporary working areas, construction routes (maintain existing amenity access). Proximity to residential areas (noise & dust limits). Protect CIE assets and existing rail service.
- pNHA on Killiney Strand & trees at Bayview. No work is taking place in the pNHA, and trees will be retained where possible.

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