

1) Why do we need flood protection?

Caol has a long flood history and flooded most recently in 2005.

Studies have been carried out by professionals that agree there is a clear risk of river and coastal flooding in Caol.



Caol is in an area of flood risk from the River Lochy and Loch Linnhe.

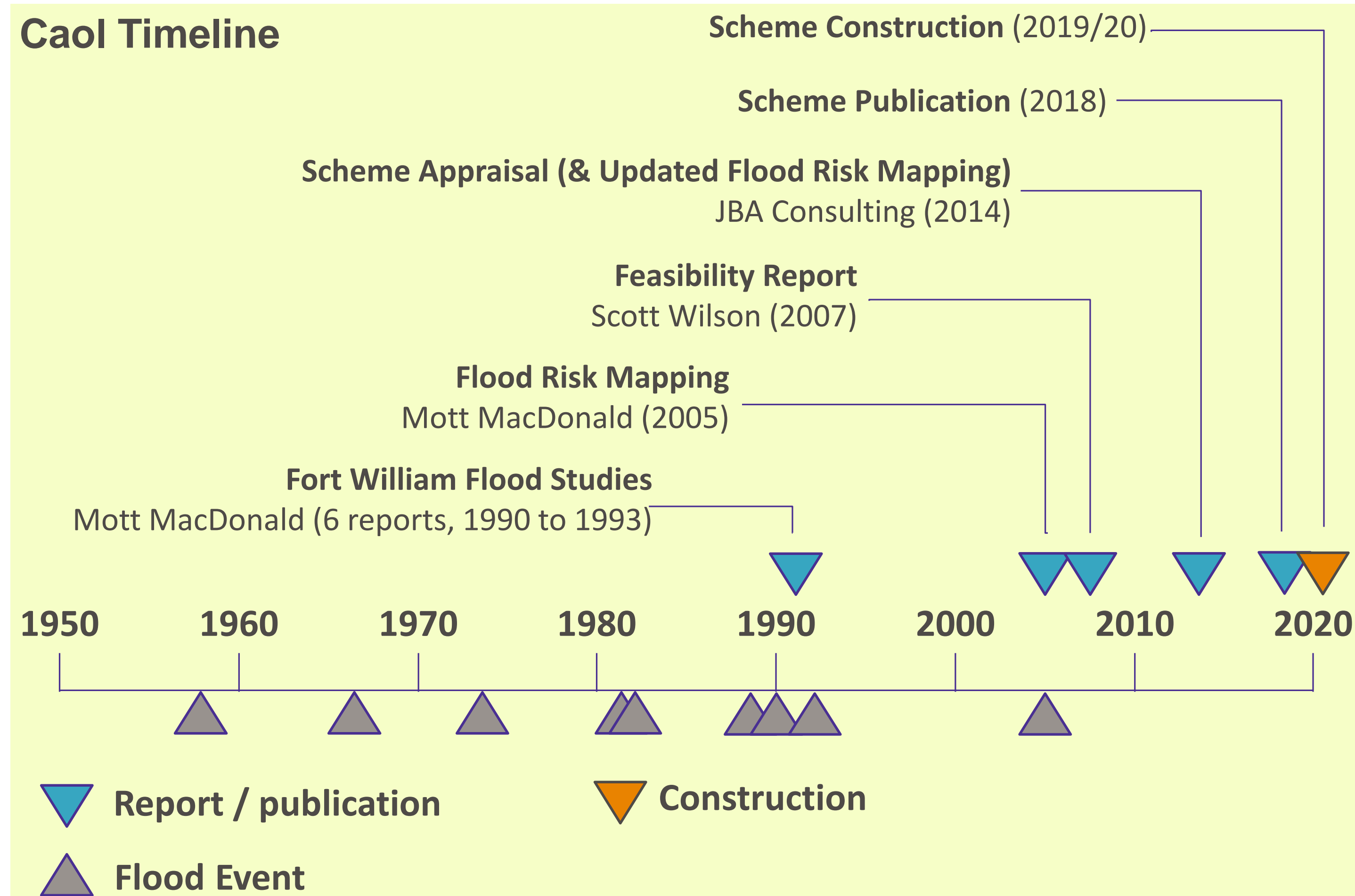
Flooding within Caol can occur due to four processes;

- extreme sea-levels surging into the Loch,
- wind-generated waves breaking over the foreshore,
- river flows exceeding the bank level of the River Lochy and inundating the surrounding floodplain and
- surface water.

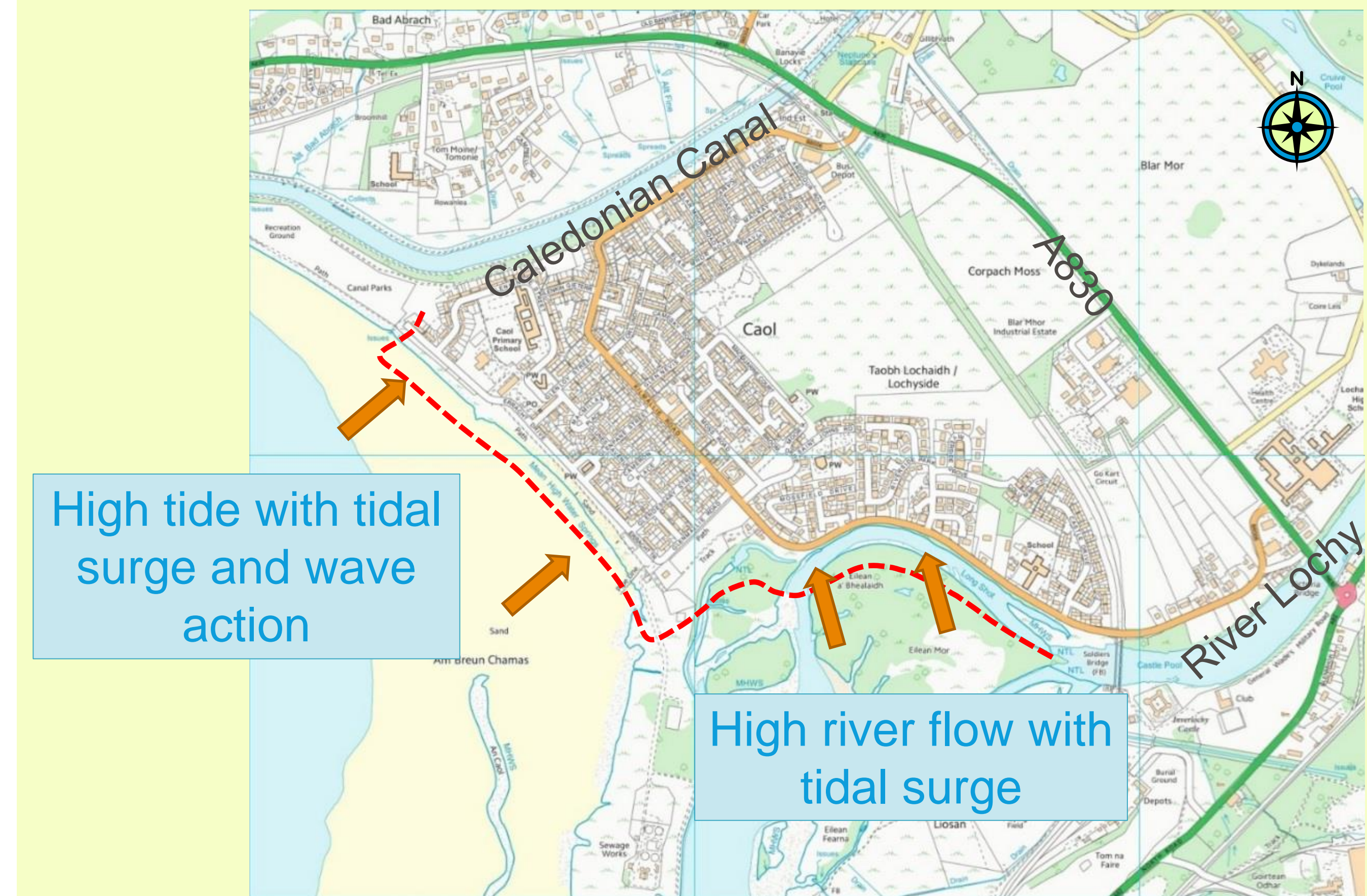
Each process may occur in isolation or, during some cases, occur simultaneously to produce extreme flooding.

This is likely to get worse as the effects of climate change have an impact on sea levels and increase the rainfall running off the land into the River Lochy.

Caol Timeline



Caol Flood Risks



2 – Flood impacts in Caol and Lochyside

What is tidal surge?

A tidal or storm surge is a change in sea level that is caused by a storm, predominantly from high winds pushing the sea water towards the coast, causing it to pile up there. The strong winds in the storm generate large waves on top of the surge which can cause damage to sea defences, or spill over the top adding to the flood risk. The height of a storm surge depends on many factors such as the size and strength of the storm, the direction it approaches the coast, and the shape of the coastline and seabed. In areas with large tides, such as the UK, the timing of a storm surge is particularly important and just a couple of hours' difference may mean the difference between an area being flooded or staying safe.

Diagram of shore frontage showing key flood levels and land/property levels

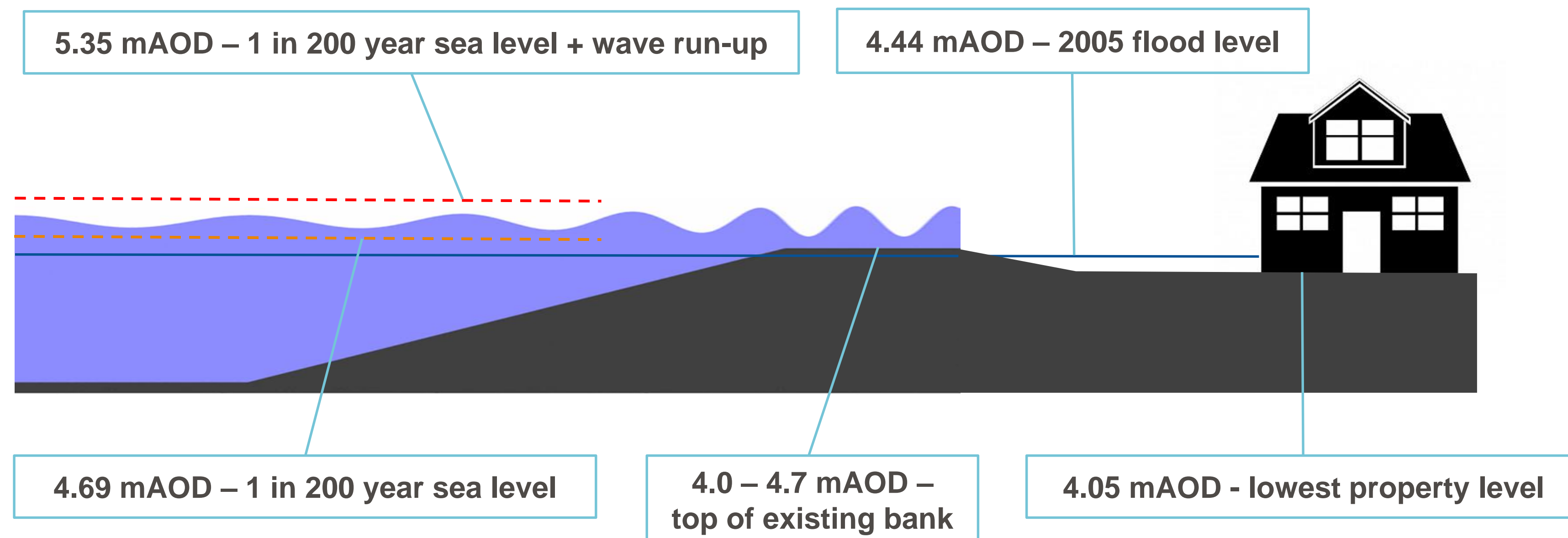
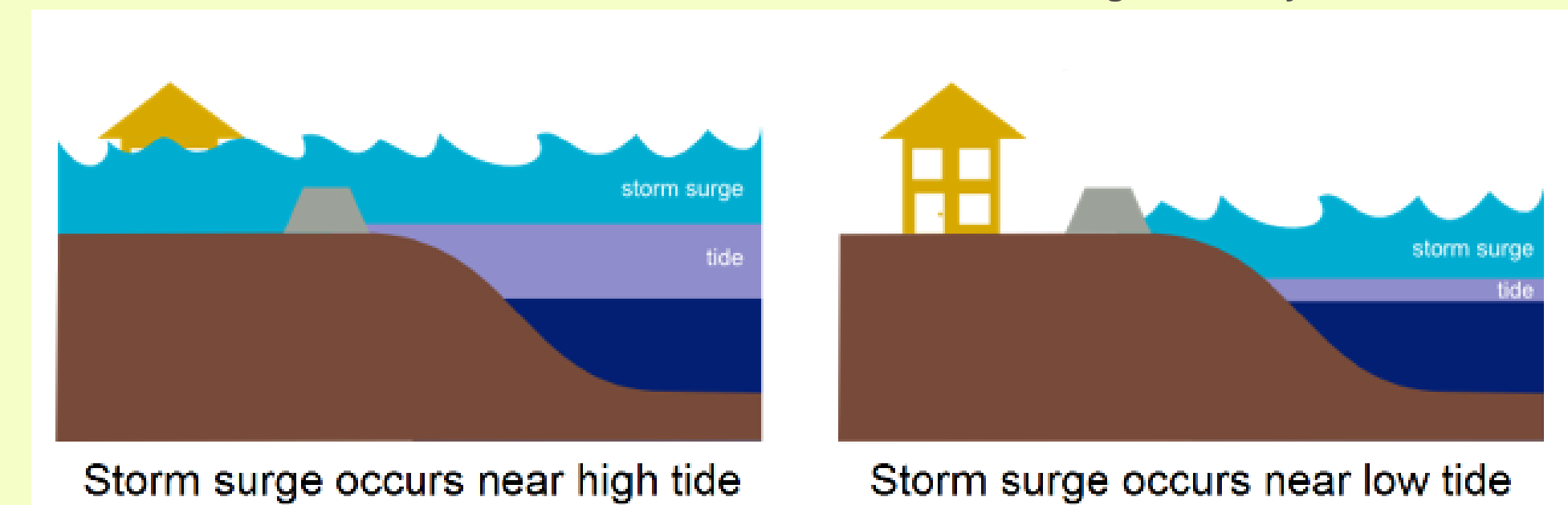


Illustration of storm surge and impact of timing of tide

Image: courtesy of the Met Office



Flood Warning:

Call Floodline on 0345 988 1188 or visit:

<http://floodline.sepa.org.uk/floodupdates>

River and coastal processes considered:

Wave modelling was undertaken to propagate waves and surge through Loch Linnhe

- Funnel shape of Loch acts to converge storm surges and waves
- Long straight, SW Loch acts to 'push' water up Loch
- Both factors result in increased elevations at head of Loch

River modelling was undertaken to estimate flood levels along Kilmallie Road from the River Lochy.

How high does the defence need to be?

Based on the analysis undertaken to protect against high tides, surge, waves and high river levels the defence would need to be the following elevation:

- | | | |
|--------------|----------------------------------|------------------|
| • Canal Park | 1:200yr sea level | 4.99 mAOD |
| • Sea front | 1:200yr sea level + wave run-up | 5.35 mAOD |
| • Croft land | 1:200yr sea level + river levels | 5.04 mAOD |
| • Croft land | 1:200yr river levels | 4.99 mAOD |

3 – What benefits will the scheme achieve?

Properties at risk:

The scheme will provide protection to approximately 300 properties currently believed to be at risk of flooding from the sea/River Lochy.

Of these 300 properties, 23 are commercial or public buildings which includes the current Caol Primary School, Kilmallie Free Church and the police station.

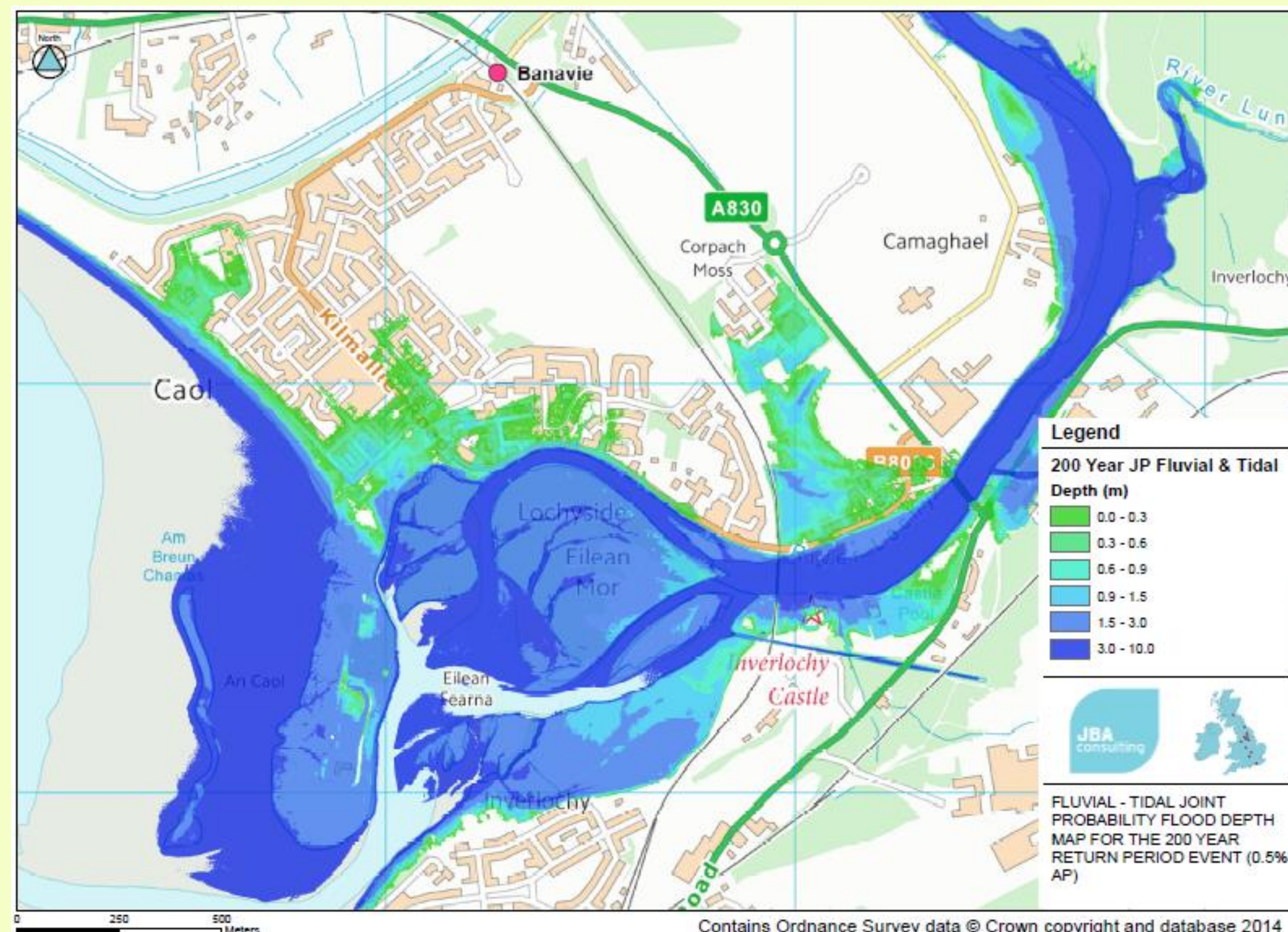
Total properties at risk

2 year	5 year	10 year	20 year	50 year	100 year	200 year
0	7	30	50	93	171	296

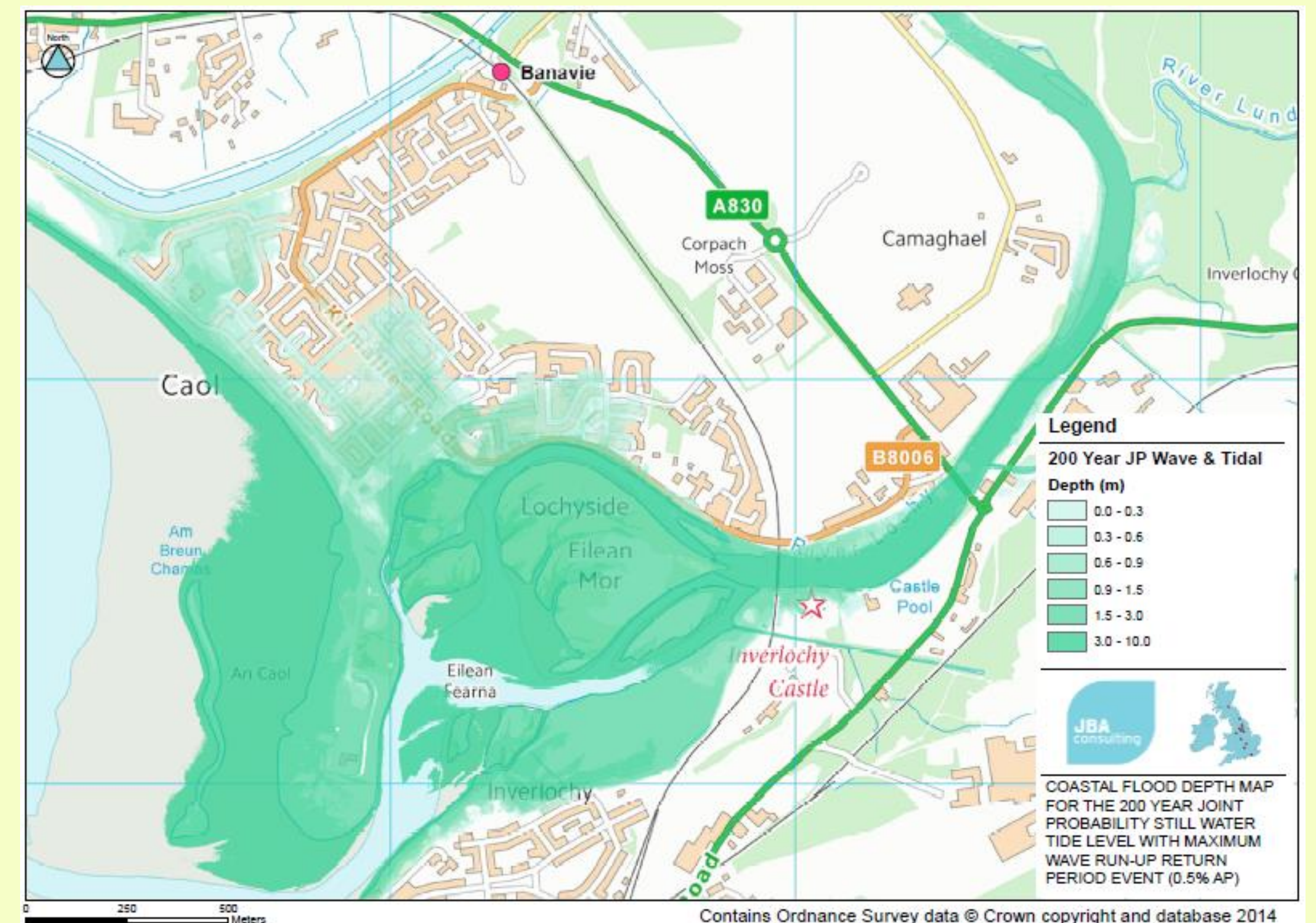
Wider benefits of the scheme:

- Improved linkages with walking and cycle networks.
- Increased recreational users visiting Caol.
- Involvement of the community in aesthetics of the design.
- Removal of invasive species (e.g. Japanese Knotweed).
- Opportunities for appropriate local planting.

Predicted Flood Depths from the River Lochy



Predicted Flood Depths from Waves and Tidal Surge



4 - What is the proposed scheme?

Connecting path to existing canal towpath and Great Glen Way. Path will be suitable for wheelchair users.

Allow access to beach for maintenance, boats and leisure.

Opportunities to include design interventions that reflect development of school and community centre site. Elements could include new seating, access or ornamental planting.

Integrate new beach access with visual/physical link to shopping parade.

Key views from Church across Loch: mitigating partial loss of view with visual elements such as planting.

New ramped access will integrate with existing layouts to provide clear routes onto new flood embankment wall. The new promenade and footpath alongside the Lochy will provide an improved path for part of the Great Glen way.

Sympathetic designs of embankment and green spaces will allow for more attractive, multi-functional spaces that will enhance the streetscape, improving activity and movement.

Access provided to beach from Glenmallie Road.

Onward route for users of the Great Glen Way is clearly visible from Glenmallie Road

Our proposed scheme is described on these boards and the printed plans

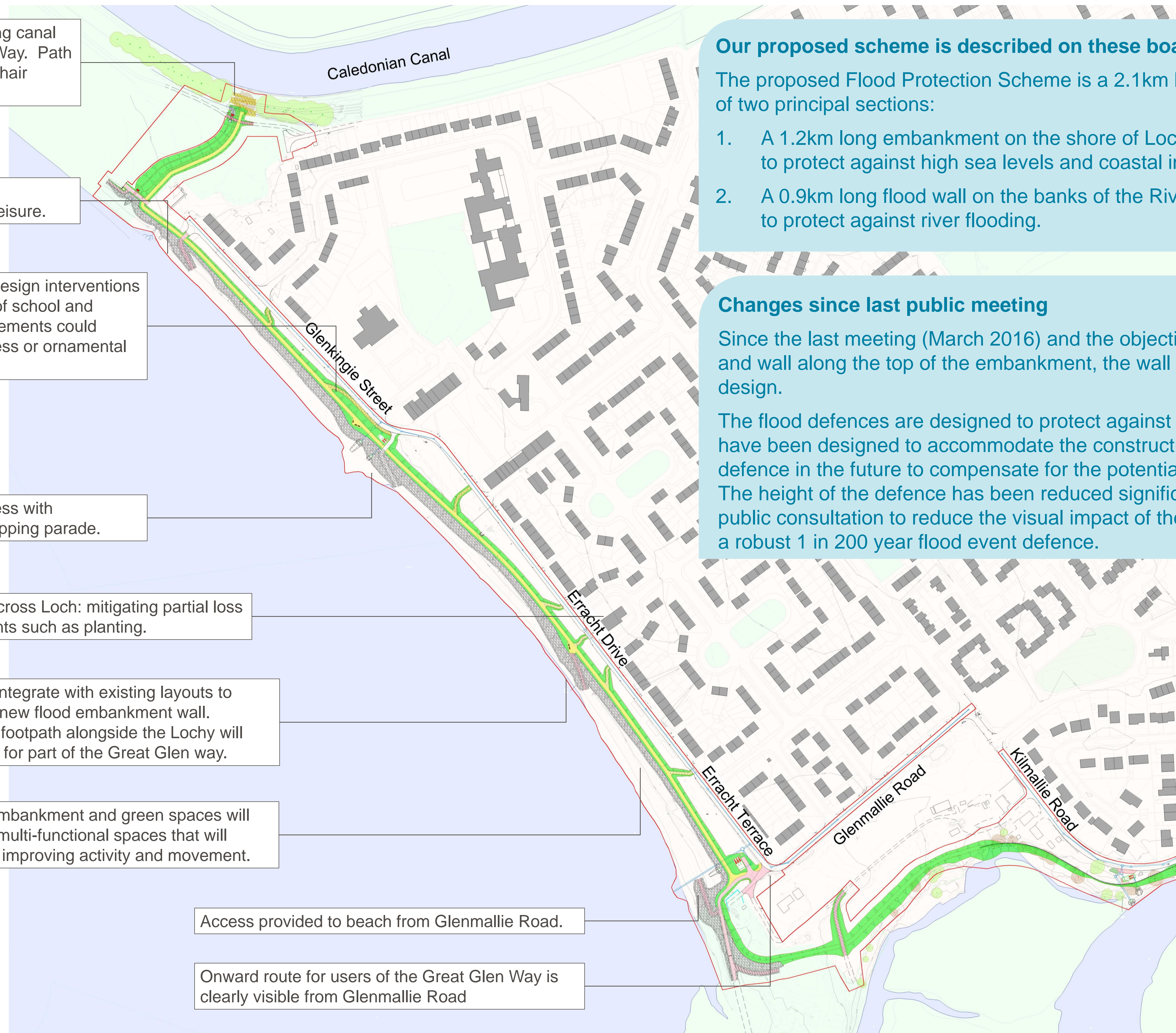
The proposed Flood Protection Scheme is a 2.1km long defence which consists of two principal sections:

1. A 1.2km long embankment on the shore of Loch Linnhe, primarily intended to protect against high sea levels and coastal inundation from Loch Linnhe.
2. A 0.9km long flood wall on the banks of the River Lochy, primarily intended to protect against river flooding.

Changes since last public meeting

Since the last meeting (March 2016) and the objections to the height of defence and wall along the top of the embankment, the wall was removed from the design.

The flood defences are designed to protect against a 200-year flood event and have been designed to accommodate the construction of an improved flood defence in the future to compensate for the potential impacts of climate change. The height of the defence has been reduced significantly since the previous public consultation to reduce the visual impact of the scheme whilst maintaining a robust 1 in 200 year flood event defence.



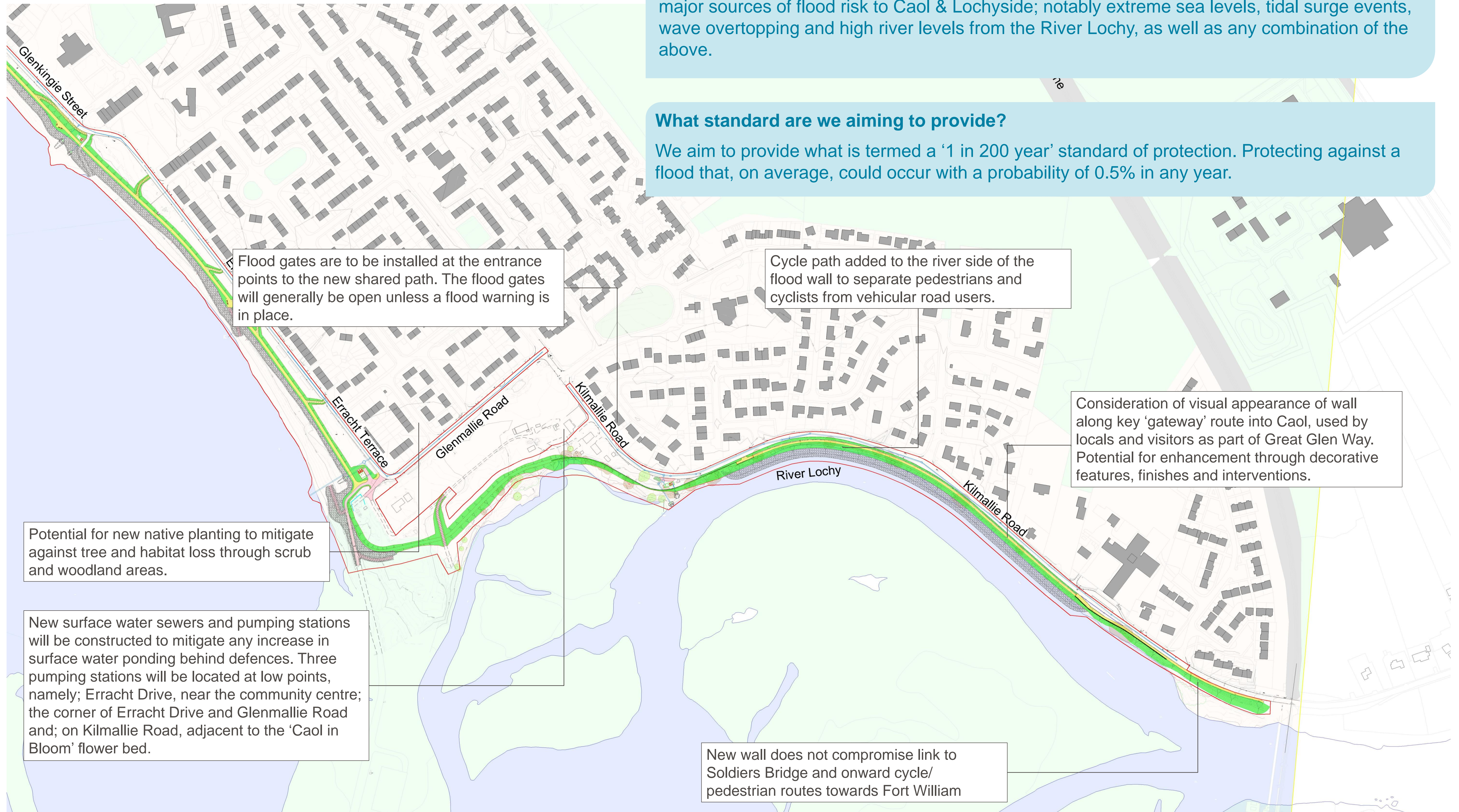
5 - What is the proposed scheme?

Scheme aims

The aims of the scheme are to provide robust flood protection and promote the most technically sound, economically viable and environmentally sustainable option which mitigates against the major sources of flood risk to Caol & Lochyside; notably extreme sea levels, tidal surge events, wave overtopping and high river levels from the River Lochy, as well as any combination of the above.

What standard are we aiming to provide?

We aim to provide what is termed a '1 in 200 year' standard of protection. Protecting against a flood that, on average, could occur with a probability of 0.5% in any year.



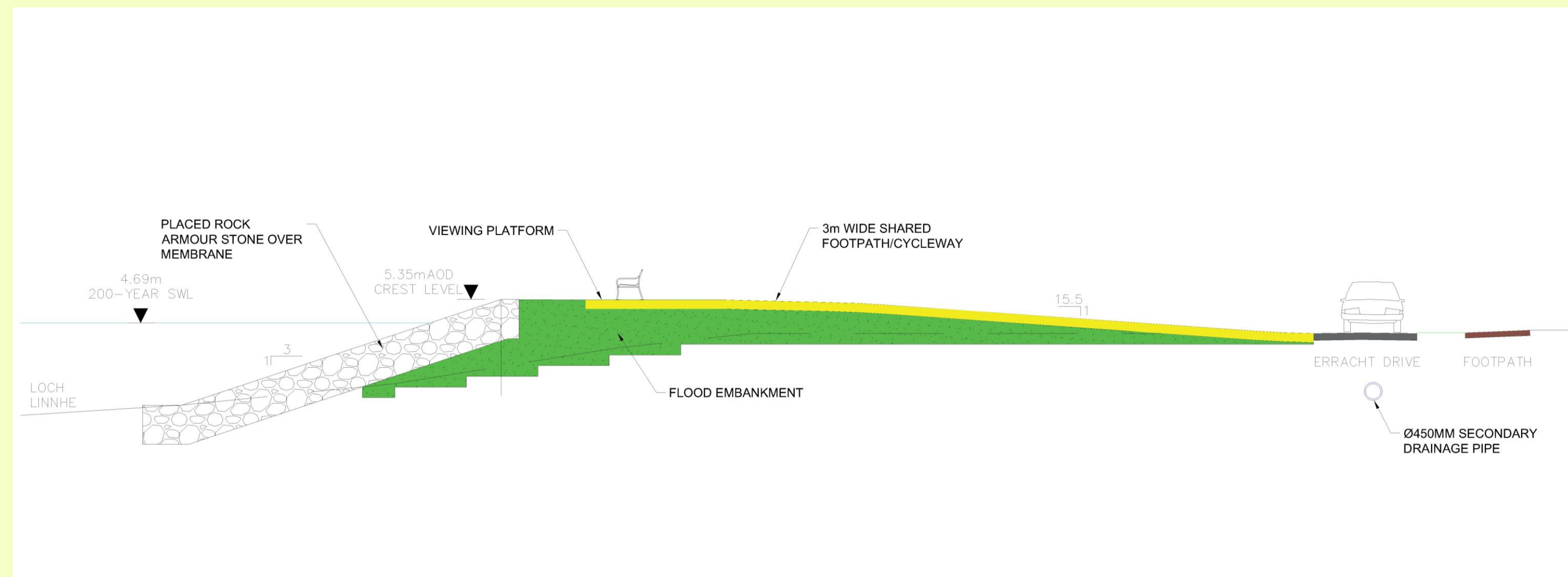
6 - Section through shoreline embankment

Flood bank along shore

The proposals are to raise a flood bank along the shore of Loch Linnhe. The shoreline area consists of an earthworks embankment with rock armour face. The crest level of the defence is based on the still water level plus an allowance for wave action.

The design allows for a shared cycleway / footpath to be provided along the seafront. The embankment will have sloping access points to the foreshore.

Typical cross section through embankment



Sketch view of how the flood defence might look from the Erracht Drive



Sketch view of how the flood defence might look from the Erracht Drive



3D visualisation looking along the shore frontage (junction between Erracht Terrace and Glenmallie Road)

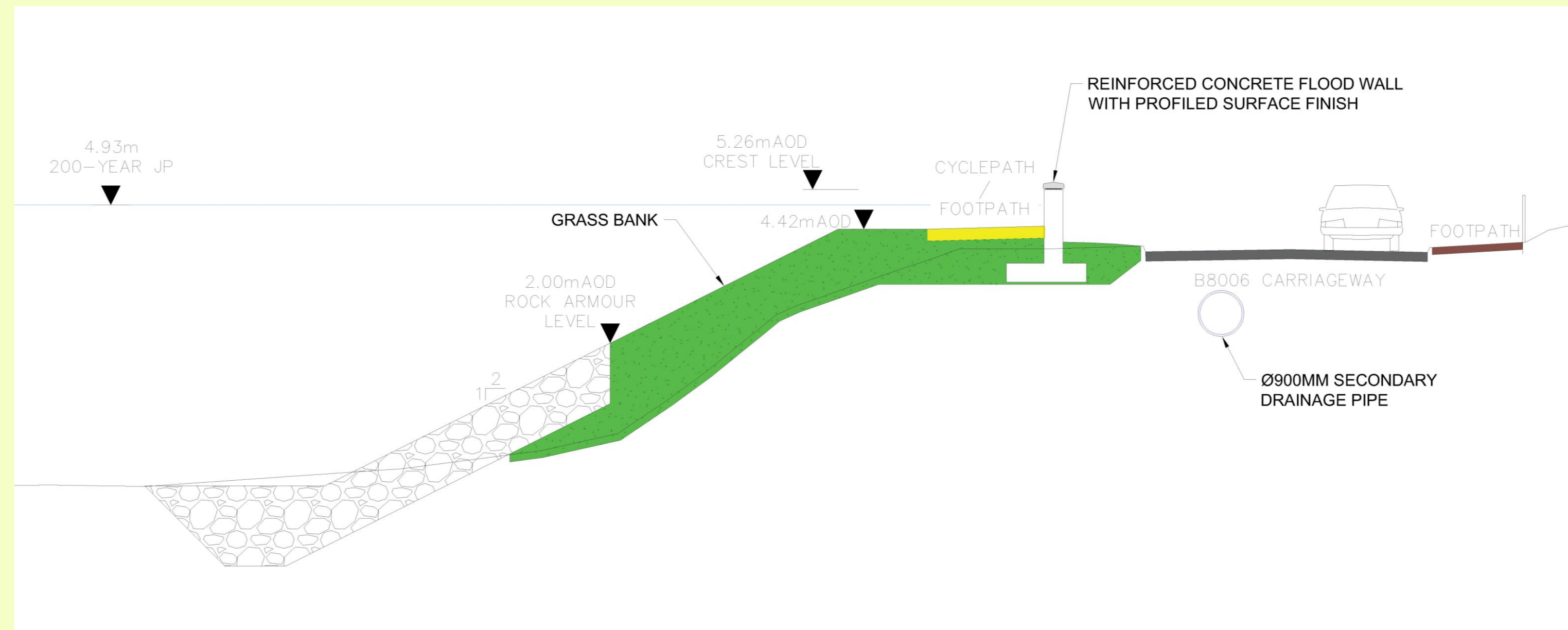


7 - Section through wall

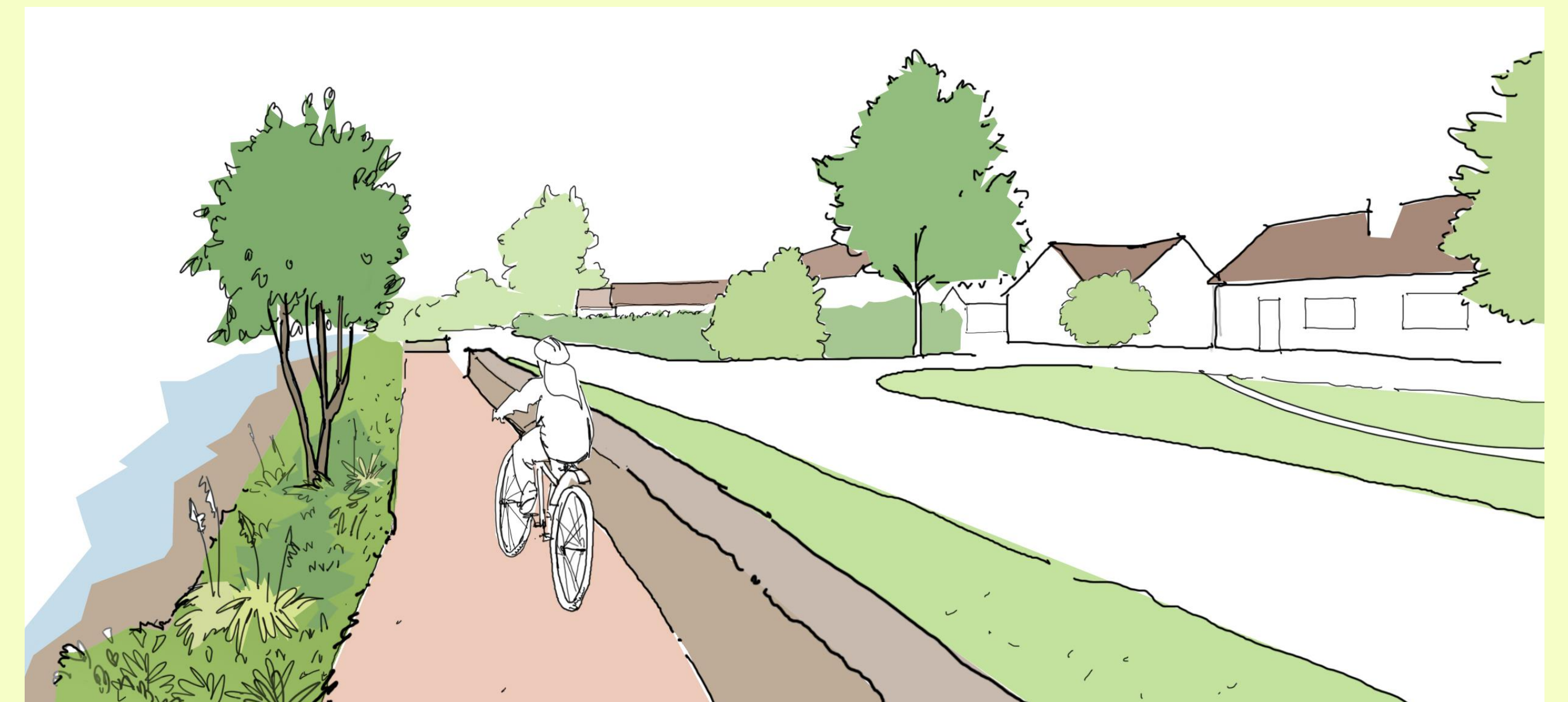
Flood wall along Kilmallie Road

The flood wall along Kilmallie Road and associated works may provide opportunities to improve pedestrian and cycle access and connectivity to the Great Glen Way. By improving the path there may be opportunities to provide better links to the services in Caol.

Cross section through wall at Kilmallie Road showing defence height



Landscape architects sketch of how the wall/cycle path might look



Landscape architects sketch of how the wall might look



3D visualisation of how the wall might look

