

Welcome to the community drop-in session for the Alyth Natural Flood Management (NFM) study.

The purpose of this event is to provide you with an update on the work carried out as part of the study, including:

- Improved understanding of flood risk and flooding mechanisms;
- Present the draft findings from the NFM study, and;
- Explain the next steps

Your Views

We value your input and want to ensure that your opinions are clearly heard. This consultation event provides a platform for you to express your views on the proposed flood risk management options. Your feedback is important to us in deciding how to take our proposals forward.

Representatives from the Council's Flooding Team, AECOM, and the Scottish Flood Forum are here today. Please ask questions, share your experiences, and comment on the draft outputs.

We thank you for taking the time to attend this event. Your views matter, and we look forward to hearing your comments on the flood study.

Why are we carrying out an NFM study?

The Alyth NFM study forms part of the Tay Flood Risk Management Plan and Local Flood Risk Management Plan

Perth & Kinross Council engaged AECOM to carry out the study and develop proposals to manage flood risk from the main watercourses in Alyth.

This builds on a previous flood study carried out in 2006 by the Council. This focussed on structural flood defences but unfortunately did not identify any feasible measures.

Flood History

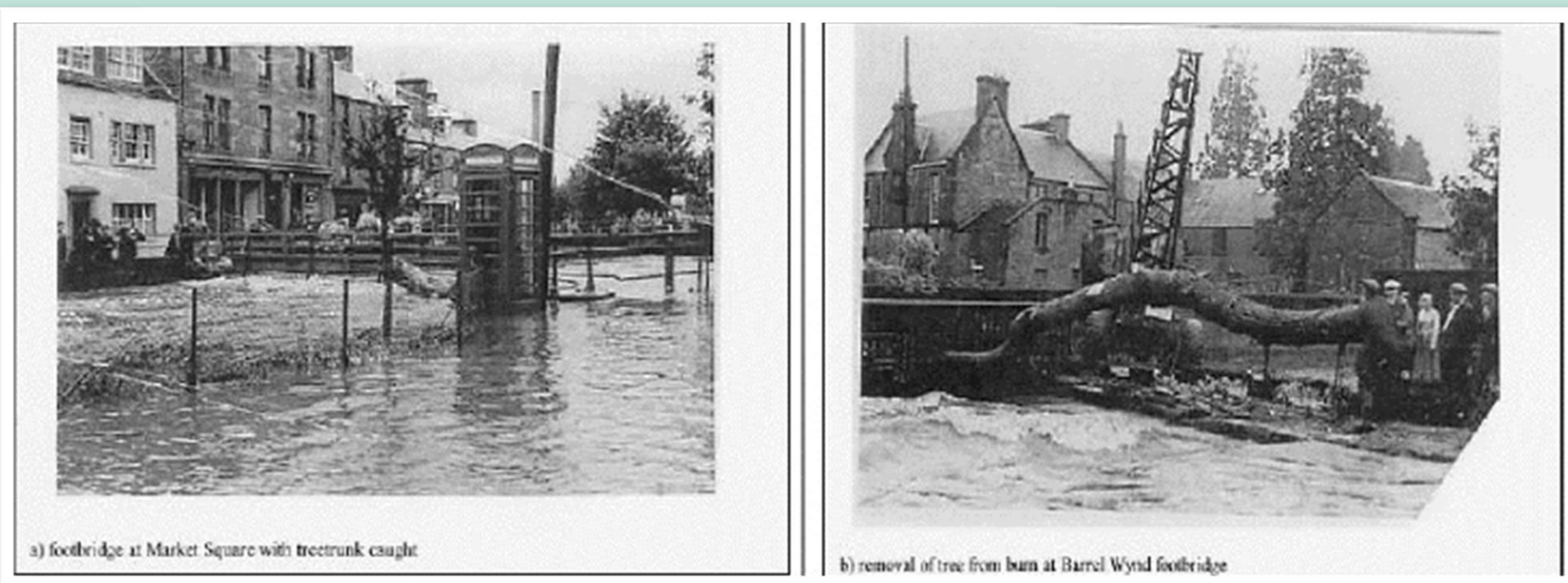
There is a long history of flooding in Alyth from the Alyth Burn, as well as the smaller tributaries - the Johnshill and Doctor's Burns.

Notable flooding has occurred in August 1956, January 1993, September 1998, July 2015 and August 2020.

There have also been other instances of flooding from the local watercourses with lesser impacts than those noted above.

It is noticeable in the flood history that the most significant flood events have largely been associated with intense summer rain storms, although flooding can also occur from more prolonged rainfall and snow melt (typically winter rainfall events).

1956



September 1998 – Photo from Arup Flood Study

1998



August 1956 – Photo from Arup Flood Study

2015



17 July 2015 – Source: Angus Forbes Photography.

2020



12 August 2020 – Alyth Burn Source: Residents Images



22 October 2020 – Johnshill Rd Source: Residents Images



22 October 2020 – Flooding from Doctor's Burn Source: Residents Images



22 October 2020 – Flooding from Johnshill Burn Source: Residents Images



- Peatland in upper catchment



- Limited bank erosion



- Steep river gradients



- Former glacial landscape with improved grassland for grazing



- Mature woodland areas



- Gravel and cobbles transported downstream



- High energy river in gorge



- High energy river in gorge



- Flatter, human influenced river channel in historic town



- Weirs impact channel capacity and water levels

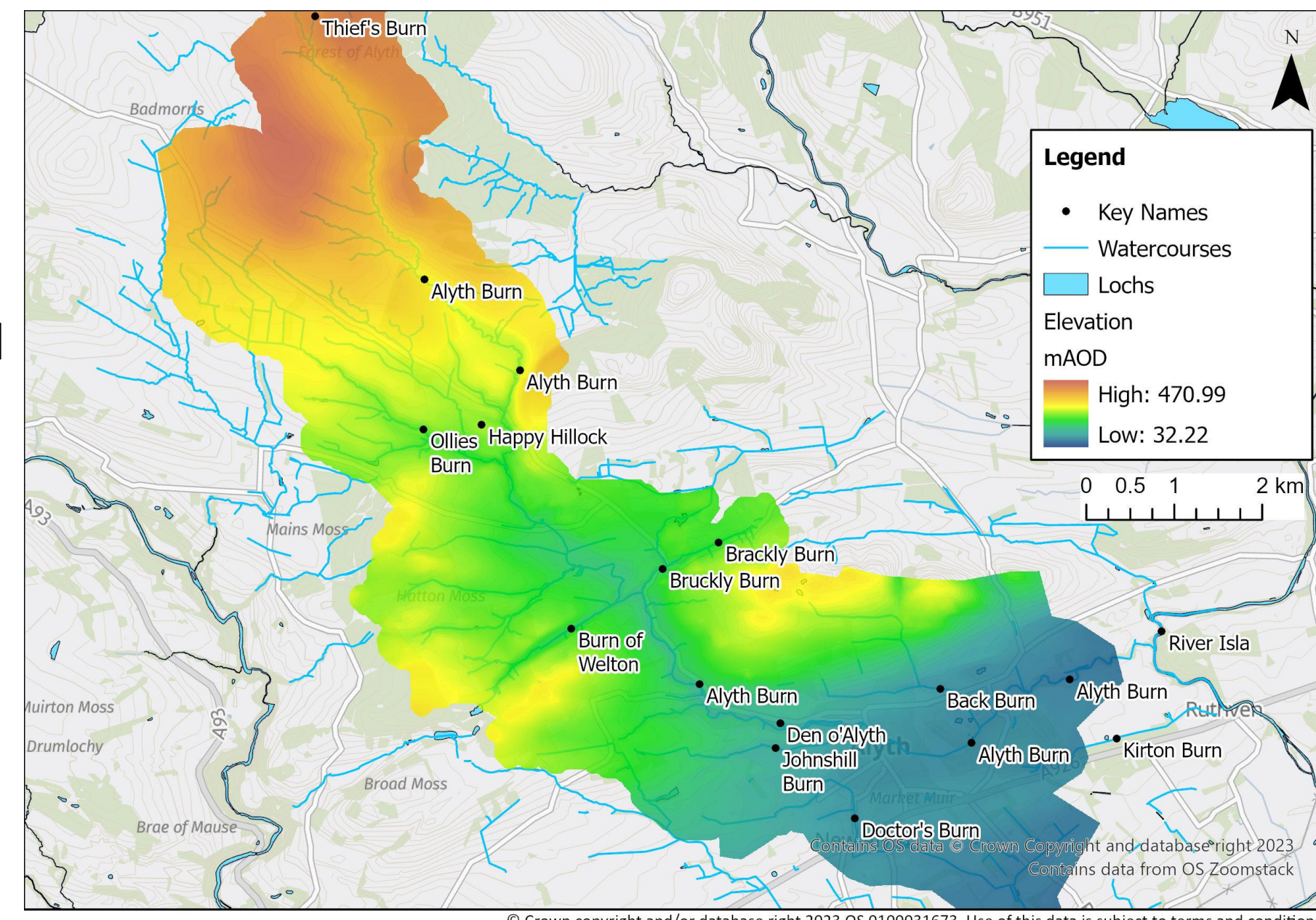
These characteristics result in:

- Rapid runoff when it rains
- Quick rise in river levels
- Lots of gravel and wood transported downstream
- The burn does not have capacity for high flows
- Flow spreads easily across flat areas of the town

For reducing flooding this means:

- It is very challenging to reduce flows coming into Alyth
- Flow spreads easily across flat areas of the town

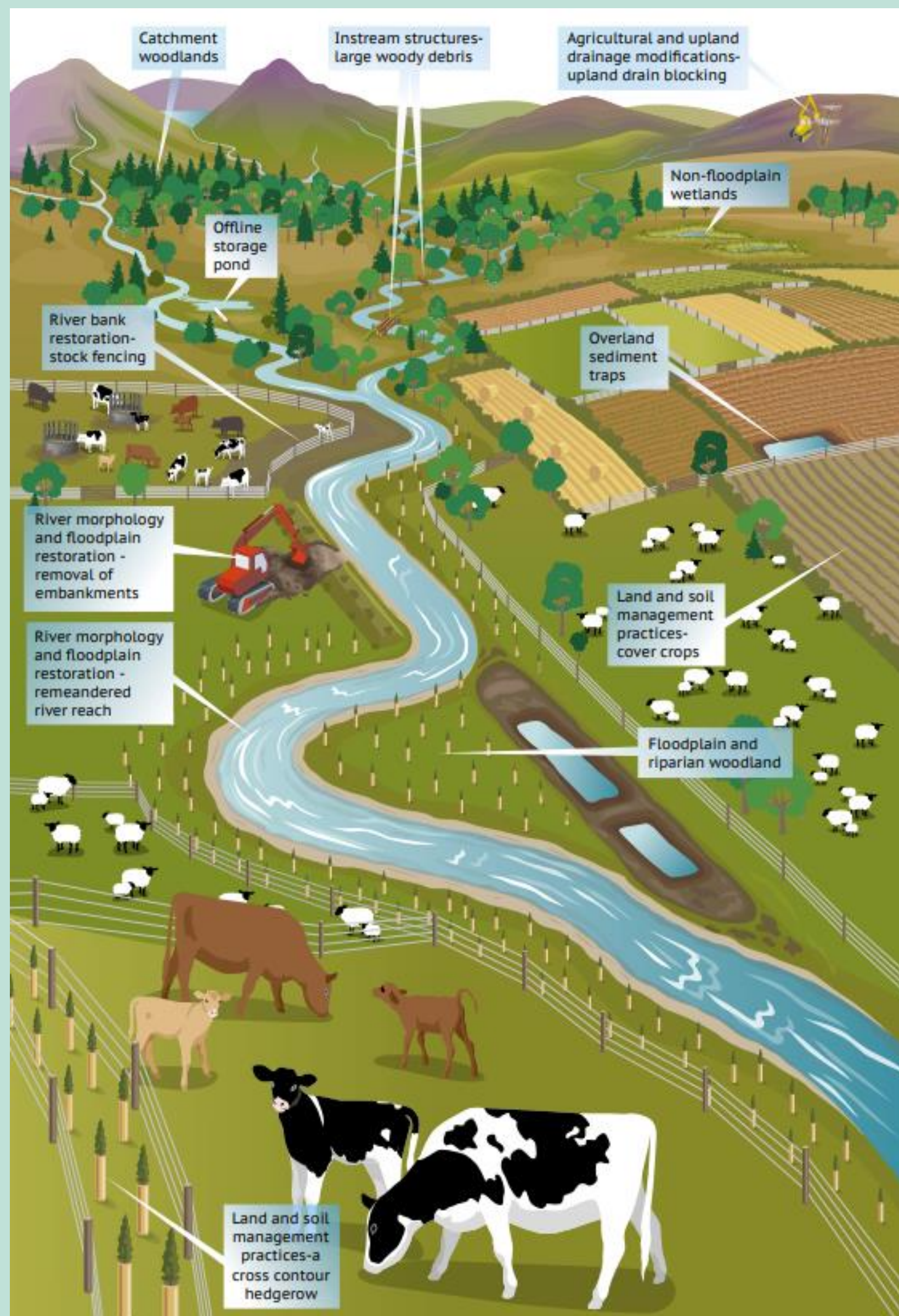
The elevations across the catchment are shown in the map below. We can see that across the town of Alyth, the area is very flat.



What Is NFM?

Natural Flood Management (NFM) uses natural processes to reduce flooding. These processes aim to protect, restore and mimic the natural functions within a catchment and across the floodplain to slow and store water.

NFM is most effective at reducing flood risk when applied across a river catchment, due to the cumulative effect. NFM provides wider benefits including biodiversity, improving water quality, carbon capture and improving habitat and local green spaces.



Example NFM Measures

Often NFM is grouped into 4 key categories of management types:

- Soil & Land Management
- Woodland Management
- River and Floodplain Management / Restoration
- Runoff Management



Soil and land management

- Cover crops
- Machinery best practice
- Buffer strips and hedgerows
- Cross drains



Woodland Management

- Hedgerow Creation
- Woodland creation/enhancement
- Riparian planting and buffer strips



River and Floodplain Management/ Restoration

- River re-meandering
- Bank stabilisation by re-vegetating and fencing
- Floodplain reconnection



Runoff Management

- Leaky barriers
- Wetland or peatland creation/improvement
- Increasing storage capacity e.g. Loch upsizing

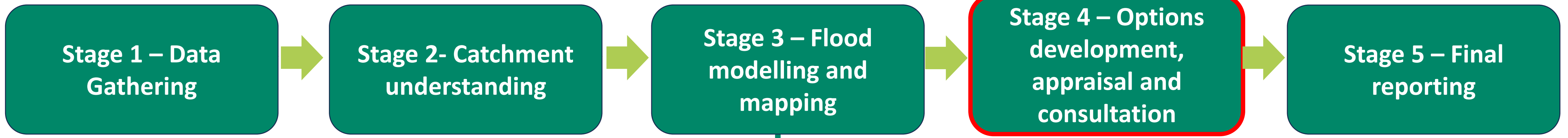
For more information on NFM scan the QR code or visit:

<https://thefloodhub.co.uk/natural-flood-management-nfm-toolkit/>



3 Flood Study Process

Project Phases

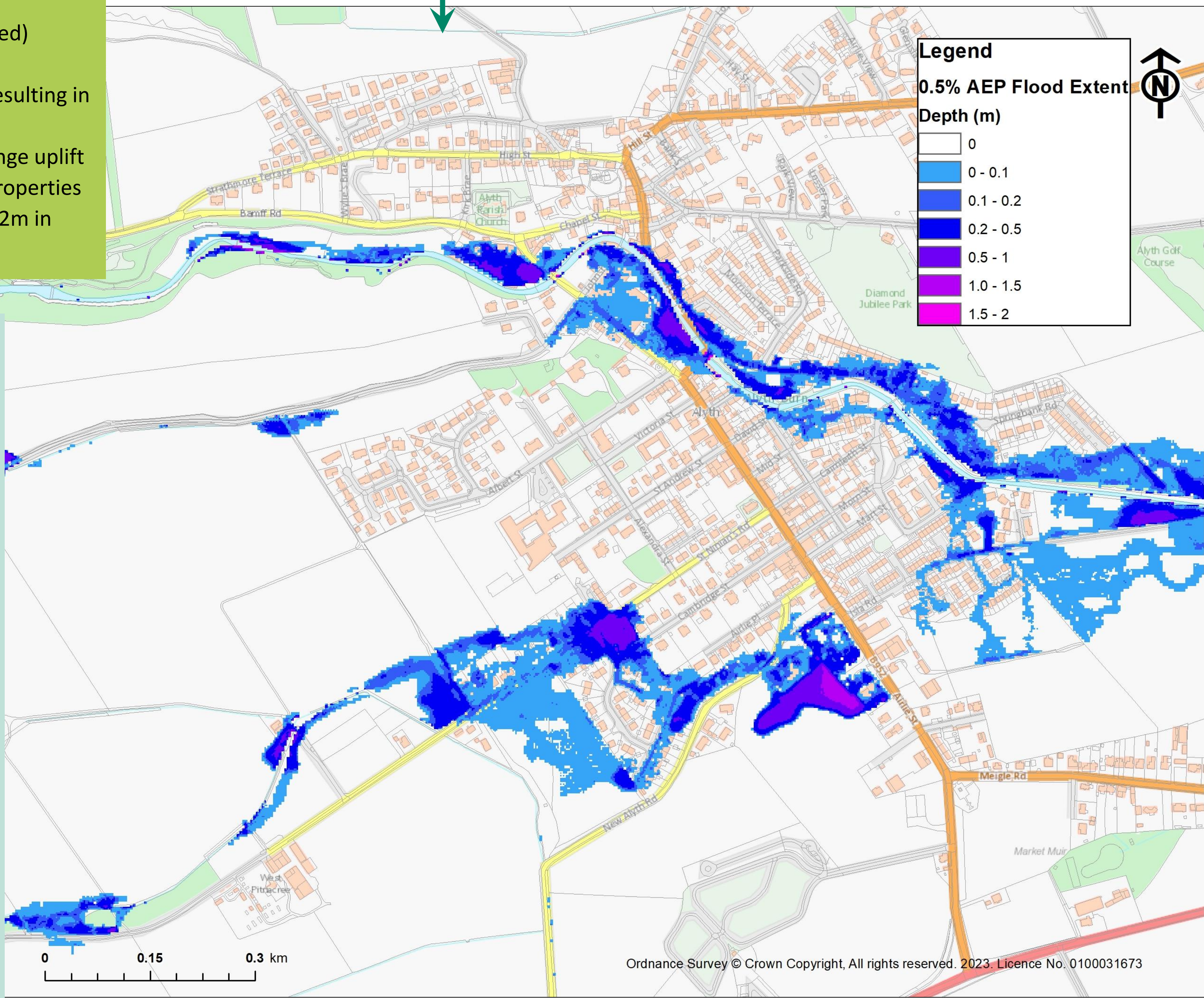


Flood risk in numbers
 0.5% AEP baseline (undefended) scenario:

- 150 properties affected resulting in £2.65m in damages

When applying a climate change uplift to the 0.5% AEP event, 265 properties are affected, resulting in £7.22m in damages.

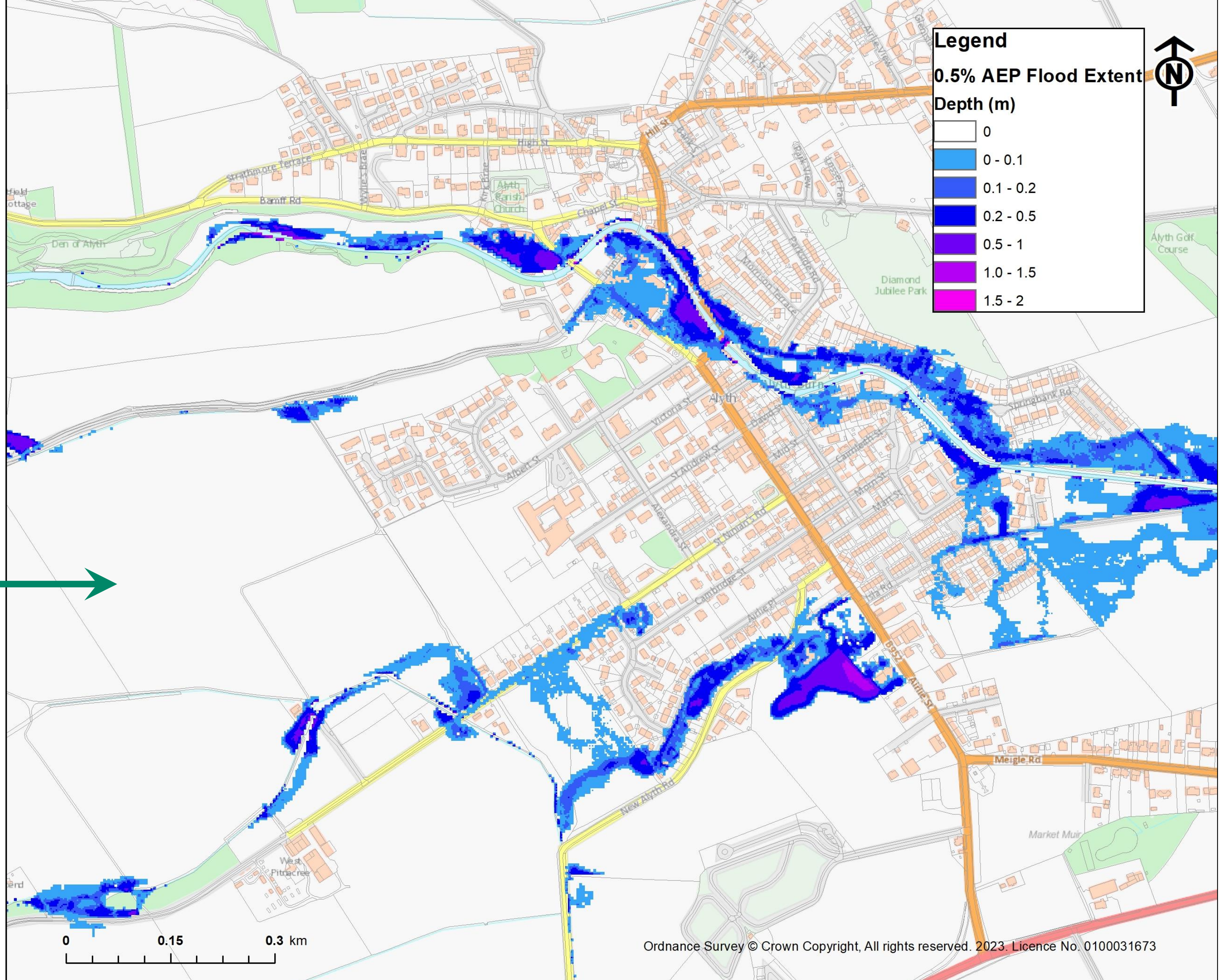
What about my Property?
 Feel free to check these flood maps to see the general flood risk in your area. It's important to keep in mind that the computer modelling used to generate these maps looks at the overall catchment area and may not consider specific details of individual properties. Factors like raised floor levels, roads, and garden walls, which can influence the flow of water in reality, are not specifically accounted for in the modelling. So, while the maps give a good indication of the flood risk, they may not reflect all the localised features that could affect water flow paths at your specific property.



Flood Risk Terminology
 We communicate risk by using the **probability** of a flood event of a certain magnitude occurring in any specific year. This is expressed as a percentage known as **the Annual Exceedance Probability** or AEP. For example, a '1 in 200-year' event would have a 0.5% chance of occurring **each year** and therefore is written as a 0.5% AEP event. A flood event with a return period of 2 years a '1-in-2-year' event has a 50% chance of occurring each year, written as a 50% AEP event.

The baseline flood risk impacts used in the study are based on the **Undefended Scenario**. This means we do not include informal flood defences (such as the embankments along the Doctor's Burn). This is in line with national guidance for these studies and shows the 'worst-case'.

Model runs were also carried out including these informal defences and are more reflective of what may have been witnessed in previous flooding.



4 Options Considered

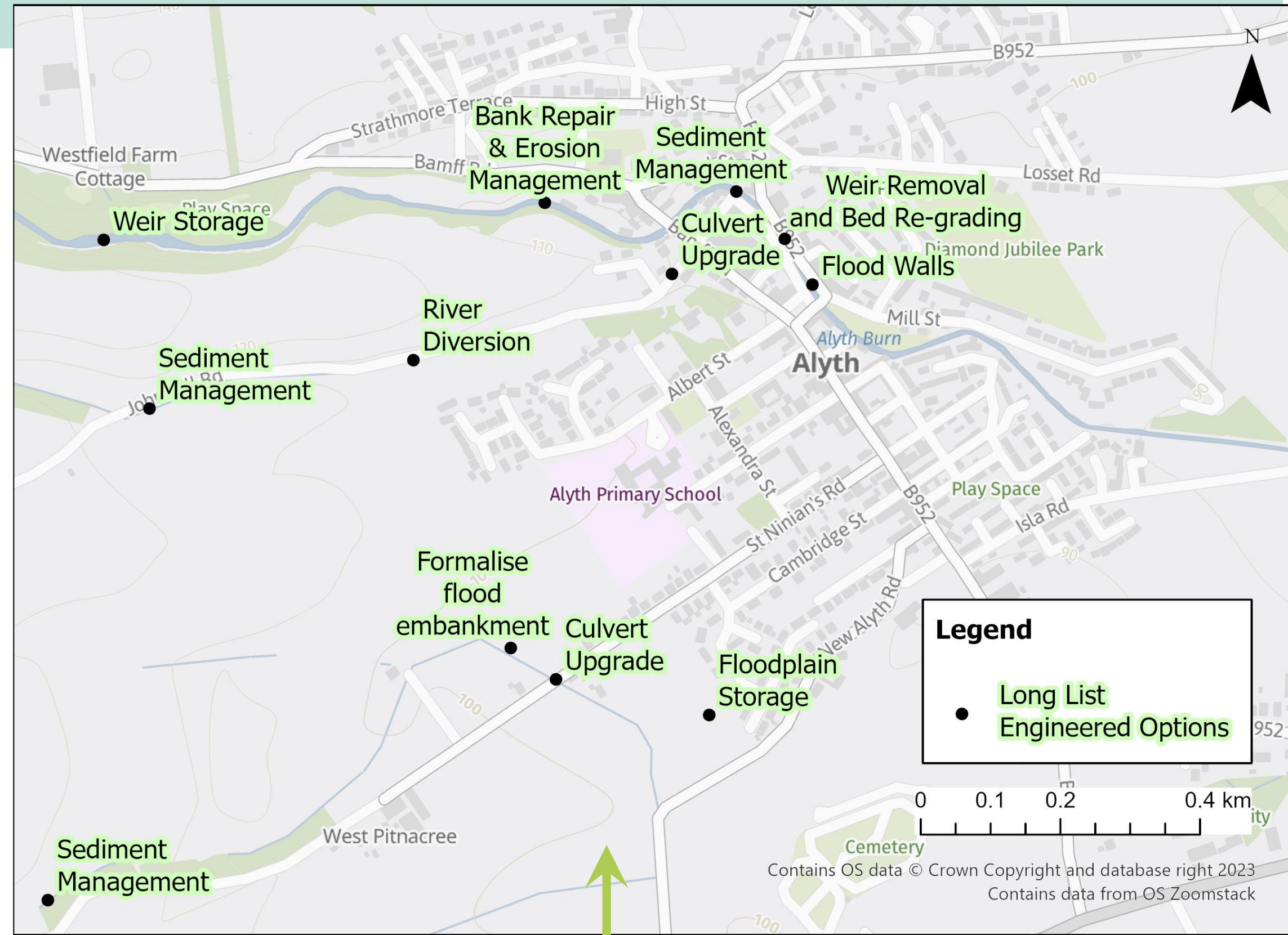
A long-list of actions was initially considered. This also included non-NFM engineered actions, such as flood walls, embankments and sediment management. The long list was appraised based on a **multi criteria analysis** which considered technical feasibility, legal implications, cost and environmental impact of each option.

Each category was given a score and those with a total score over the determined threshold were taken forward to the short list.

During this process AECOM **consulted** with PKC, Local Community Groups, SEPA, Bamff Estate, NatureScot, Scottish Forestry and The Hutton Institute.

NFM Actions Considered

- Tree planting and woodland enhancement
- Wetland enhancement
- Leaky barriers
- Buffer strips and riparian planting
- Increase loch storage capacity
- Agricultural land management
- Sediment Management
- Floodplain reconnection
- Flood storage area
- River restoration and floodplain reconnection



Engineered (Non-NFM) Actions Considered:

- Bank repair and erosion management
- Dredging/ Sediment management
- Debris Traps
- Weir removal
- Weir storage (online)
- Floodplain storage (offline)
- Flood walls / Embankments
- River Diversion
- Culvert upgrades

Resilience Measures:

As part of a flood study we also consider the applicability of resilience measures to manage flood risk. These included:

- Formal + Community Flood Warning
- Maintenance
- Property Flood Resilience
- Planning Policies (National + Local)
- Community Resilience
- Self Help



Short List Appraisal

The final short list consisted of 5 options (each including a number of actions). A detailed appraisal of each one was carried out, including testing within the hydraulic model to fully understand the potential impacts.

The appraisal considers factors such as level of protection/benefit, affordability, environmental and social aspects.

The adjacent table displays the outcome of this assessment.

Option ID	Description of measures	Total Benefit (present value)	Estimated Capital Cost	Standard of Protection (SOP)	Benefit-Cost Ratio
A	Johnshill Burn culvert upgrades	£837,381	£647,064	0.5% AEP	1.19
B	Alyth Burn flood walls and Johnshill burn culvert upgrade	£3,644,226	£5,855,524	0.5% AEP	0.61
C	Alyth Burn weir removal, Johnshill burn culvert upgrade & flood wall	£3,407,015	£6,888,605	1% AEP	0.49
D	Doctor's Burn channel upgrades	£2,040,776	£800,161	1% AEP	2.25
E	Catchment wide NFM (excluding loch upsizing)	£412,827	£1,114,301	n/a	0.18

Recommended Options

Following the options appraisal carried out, only two options were found to be viable based on their benefits and benefit-cost ratio. These two options are described in more detail below.

No viable structural measures were identified that would significantly reduce flood risk from the Alyth Burn. Small-scale measures, such as **debris traps** may help on the Alyth Burn, as well as maintaining the ongoing maintenance regime (both landowners and PKC).

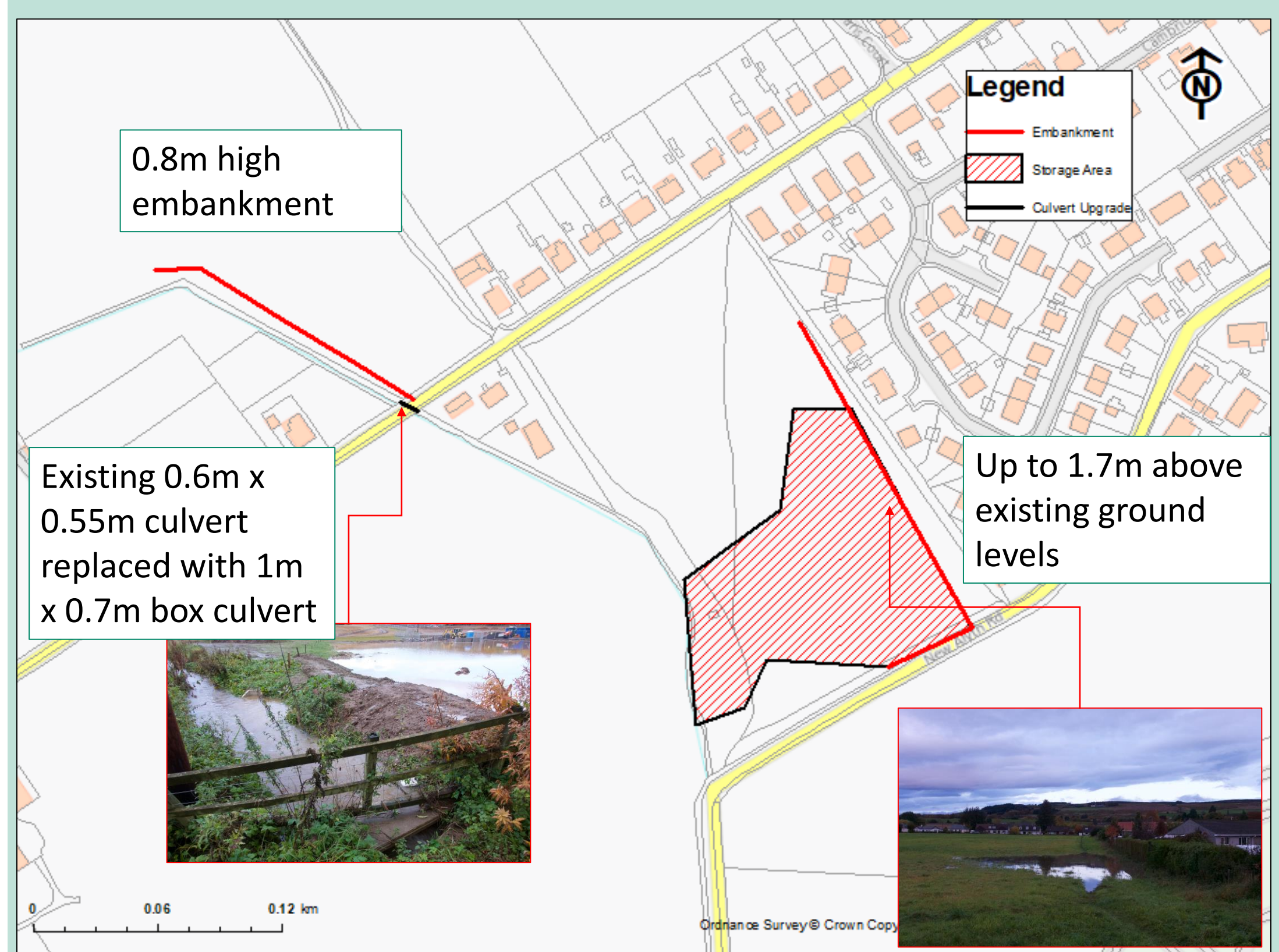
Non-structural options such as Property Flood Resilience, Community Resilience, Self Help & Flood Warning were also noted as providing benefit. The study recognises the significant effort of the Alyth Community, and in particular through the various active community groups including, Retained Alyth Flood Team, River Keepers, Alyth Development Trust and Alyth Community Council.

Option A – Culvert upgrade on the Johnshill Burn



- Culvert capacity increased to the **0.5% AEP** flood flow
- Reduce risk of flooding to up to **10 properties** from this watercourse, but risk remains from Alyth Burn
- Alignment to be confirmed at outline design stage, as well as ensuring no increased flood risk downstream.

Option D – Improved existing flood embankments, culvert upgrade and flood storage area on the Doctor's Burn



- Provide a **1% AEP** Standard of Protection
- Reduce flood risk for **up to 40 properties** in the 1% AEP flood (when informal flood defences are not accounted for)

Next steps

The Council will review any comments raised today and a 'Question & Answer' report will be provided to the community in due course.

AECOM will then finalise their flood study and the Council will report the outcome to the next available Climate Change and Sustainability Committee. The findings will also be reported to SEPA for inclusion and prioritisation in the next Tay Local Flood Risk Management Plan for 2028-2034.

Further information

Further information on tackling flooding can be viewed on the Council's website at www.pkc.gov.uk/flooding

For any further information or queries please contact: Gavin Bissett, Engineer (Flooding) 01738 475000 / flood@pkc.gov.uk

How can you provide your feedback?

Comment forms are available to fill in and return, either during the event, by post or (preferably) by e-mail.

These display boards are also available online on the Council's consultation hub until Friday 14 June, and comments can also be recorded online. Please visit: <https://consult.pkc.gov.uk/communities/alythnfmstudy> (Link can be accessed by scanning the QR code)



Thank you!

We would like to thank you for your attendance and comments today.

Community involvement is a key part of flood risk management - your views are important.