

## How is flood risk managed by the Aberdeenshire Council?

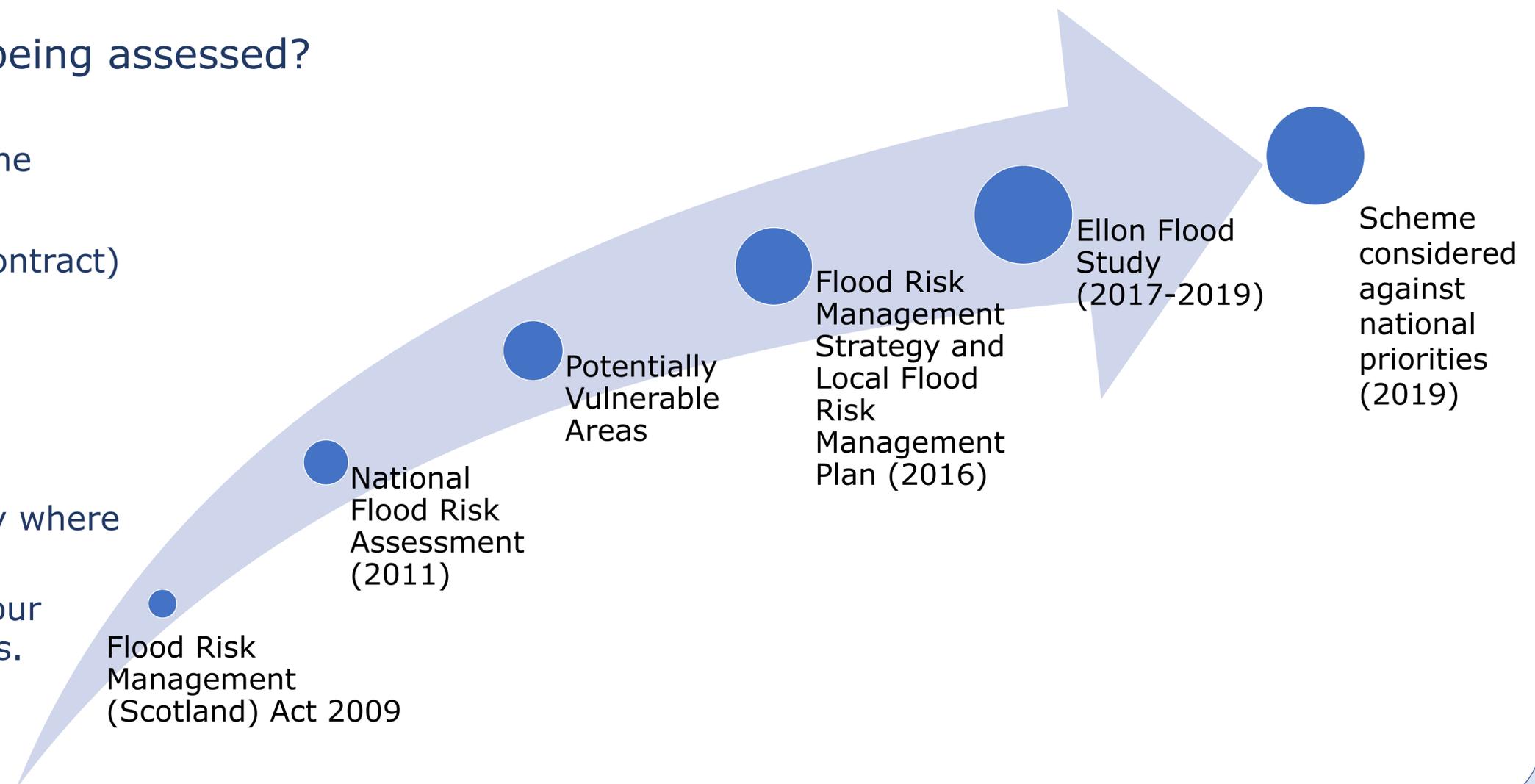
- The Flood Risk Management (Scotland) Act 2009 aims to prioritise flood mitigation across Scotland using a proactive and risk based process for assessing flood risk.
- This approach led to the preparation of SEPA's Flood Risk Management Strategies by SEPA and the Local Flood Risk Management Plan for the North East Local Plan District developed by Aberdeenshire Council.
- These plans identified specific communities as being at risk and in need of a detailed flood study to help inform the management of flood risk in each community.

## Which communities are being assessed?

- **Ellon**
- Inverurie and Port Elphinstone
- Inch
- Ballater (under a different contract)

## How will Flood Protection Schemes be prioritised?

- SEPA will prioritise nationally where funding should be allocated.
- The reports and findings of our study will inform this process.





## 1) Develop better understanding of flood risk in the community

- Create, update or develop new / existing flood model information;
- Determine existing flood risk;
- Develop improved flood mapping;

## 2) Engage partners and stakeholders

- **Including today's consultation.**

## 3) Develop recommendations for management of flood risk

- Develop a range of options to manage flood risk, including structural and non-structural options;
- Appraise options to manage flood risk (consider the pros and cons and economic viability for all proposed options);
- Recommend options for the future management of flood risk;

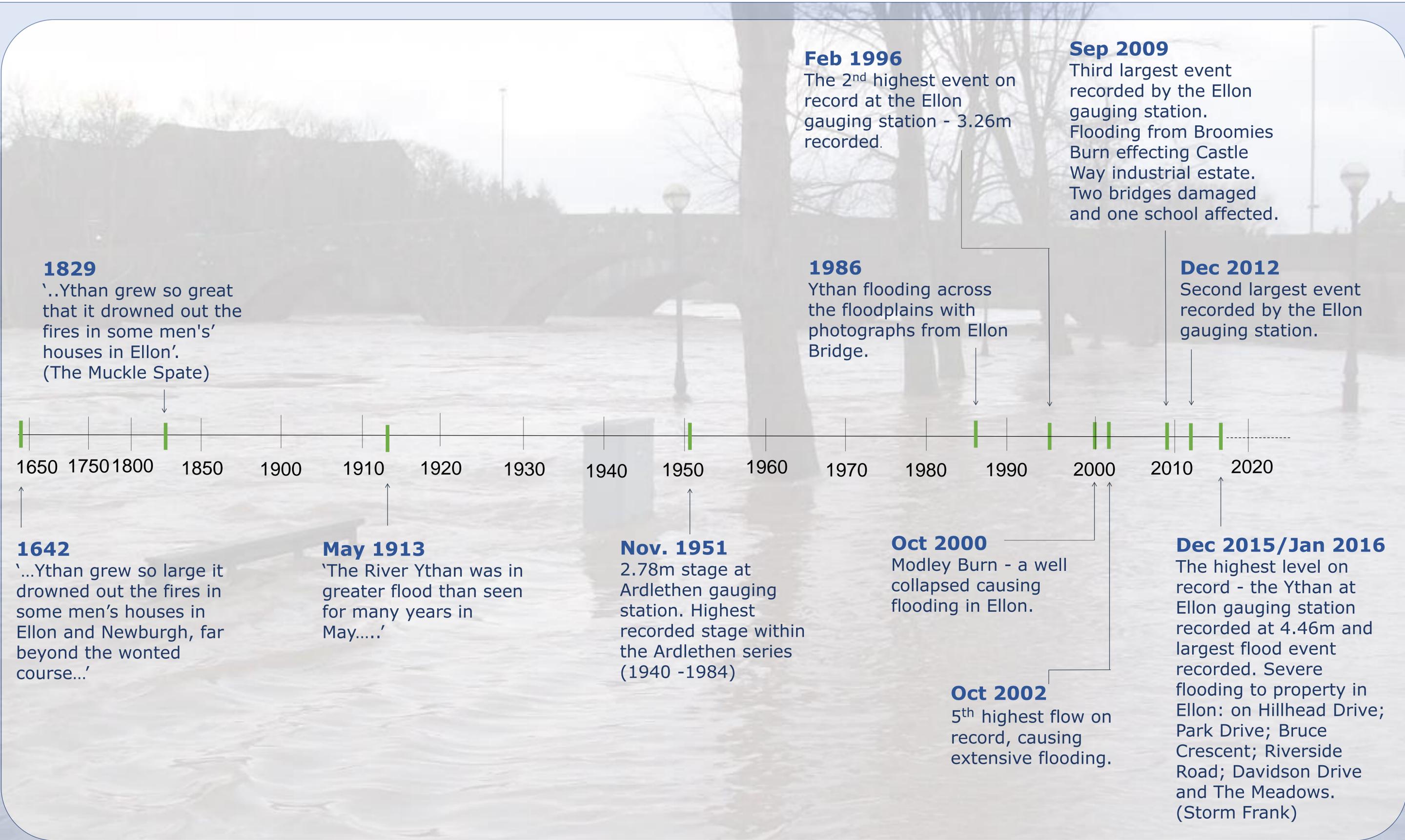
## 4) Select a preferred approach to manage flood risk in each community and identify recommendations that the Council will take forward

- SEPA will prioritise nationally where funding should be allocated;
- The reports and findings of our study will inform this process.

## Why consider options for large magnitude floods?

- Scottish Planning Policy requires new build properties to be located outwith areas affected by large magnitude floods
- These areas are considered to be low risk by the flood insurance companies as whilst large magnitude floods can cause more damage, they occur less frequently than smaller magnitude floods
- Schemes which have options to address both small and large magnitude floods will be considered more favourably by SEPA's scheme prioritisation.

# Ellon flood history



# What has been done so far?

Completed



Flood review



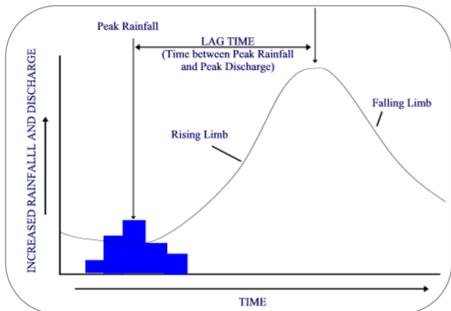
Topographic surveys



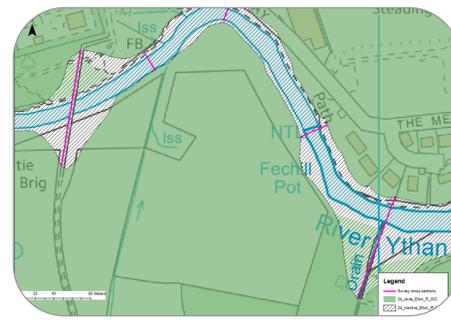
Asset inspections

The studies aim to better assess current flood risks in the community by: undertaking a review of past flood events; generating updated and detailed flood maps; determining the likely risk to different properties; and to propose a set of mitigation measures to reduce the flood risk to an acceptable level.

The models developed form a basis for assessing future flood levels, flood mitigation options, detailed design of schemes and the costs to deliver them.



Hydrology



Modelling



Flood mapping

## Return periods and annual probabilities

- When a river floods the severity of the flood is known as a 1 in x year flood. This terminology represents the probability of that event occurring in any year.
- For reference, the January 2016 event (Storm Frank) on the River Ythan in Ellon is estimated to have had greater than a 1 in 400 chance of occurring in any year (or 0.25% annual probability).
- This does not mean that the flood will occur once every 400 years; it could occur tomorrow and again next week, or not for another 200 years.
- For example, there is a 1 in 100 (or 1%) chance of a flood exceeding the 100 year flood in any one year.

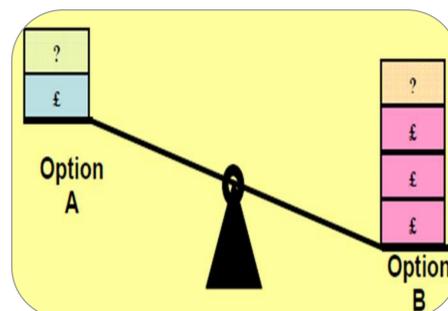
Underway



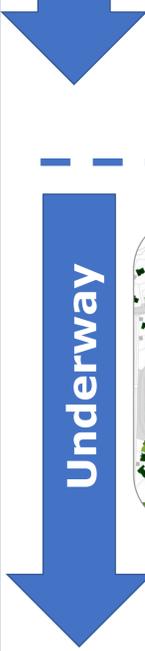
Properties at risk

| Options selected | Working with natural processes  | Climate change adaptation   | Mitigating residual risks  | Improved public awareness   | Best use of public money  |
|------------------|---|---|--|---|---|
| 20               | Opportunities for flood risk reduction identified wherever possible. Manual in-channel works. | NFM measures and bank reinforcement to be used wherever possible to provide additional benefits.                      | Defence heights to be reviewed and updated if necessary. Large number of gates required. | Increased defence levels to be considered for all flood risk areas. Large number of gates required. Large number of gates required. | Option should be considered for all flood risk areas. Large number of gates required. Large number of gates required. |
| 30               | Opportunities for flood risk reduction identified wherever possible. Manual in-channel works. | Opportunities to use NFM measures and bank reinforcement to be used wherever possible to provide additional benefits. | Defence heights to be reviewed and updated if necessary. Large number of gates required. | Increased defence levels to be considered for all flood risk areas. Large number of gates required. Large number of gates required. | Option should be considered for all flood risk areas. Large number of gates required. Large number of gates required. |
| 40               | Opportunities for flood risk reduction identified wherever possible. Manual in-channel works. | Opportunities to use NFM measures and bank reinforcement to be used wherever possible to provide additional benefits. | Defence heights to be reviewed and updated if necessary. Large number of gates required. | Increased defence levels to be considered for all flood risk areas. Large number of gates required. Large number of gates required. | Option should be considered for all flood risk areas. Large number of gates required. Large number of gates required. |
| 50               | Opportunities for flood risk reduction identified wherever possible. Manual in-channel works. | Opportunities to use NFM measures and bank reinforcement to be used wherever possible to provide additional benefits. | Defence heights to be reviewed and updated if necessary. Large number of gates required. | Increased defence levels to be considered for all flood risk areas. Large number of gates required. Large number of gates required. | Option should be considered for all flood risk areas. Large number of gates required. Large number of gates required. |
| 60               | Opportunities for flood risk reduction identified wherever possible. Manual in-channel works. | Opportunities to use NFM measures and bank reinforcement to be used wherever possible to provide additional benefits. | Defence heights to be reviewed and updated if necessary. Large number of gates required. | Increased defence levels to be considered for all flood risk areas. Large number of gates required. Large number of gates required. | Option should be considered for all flood risk areas. Large number of gates required. Large number of gates required. |

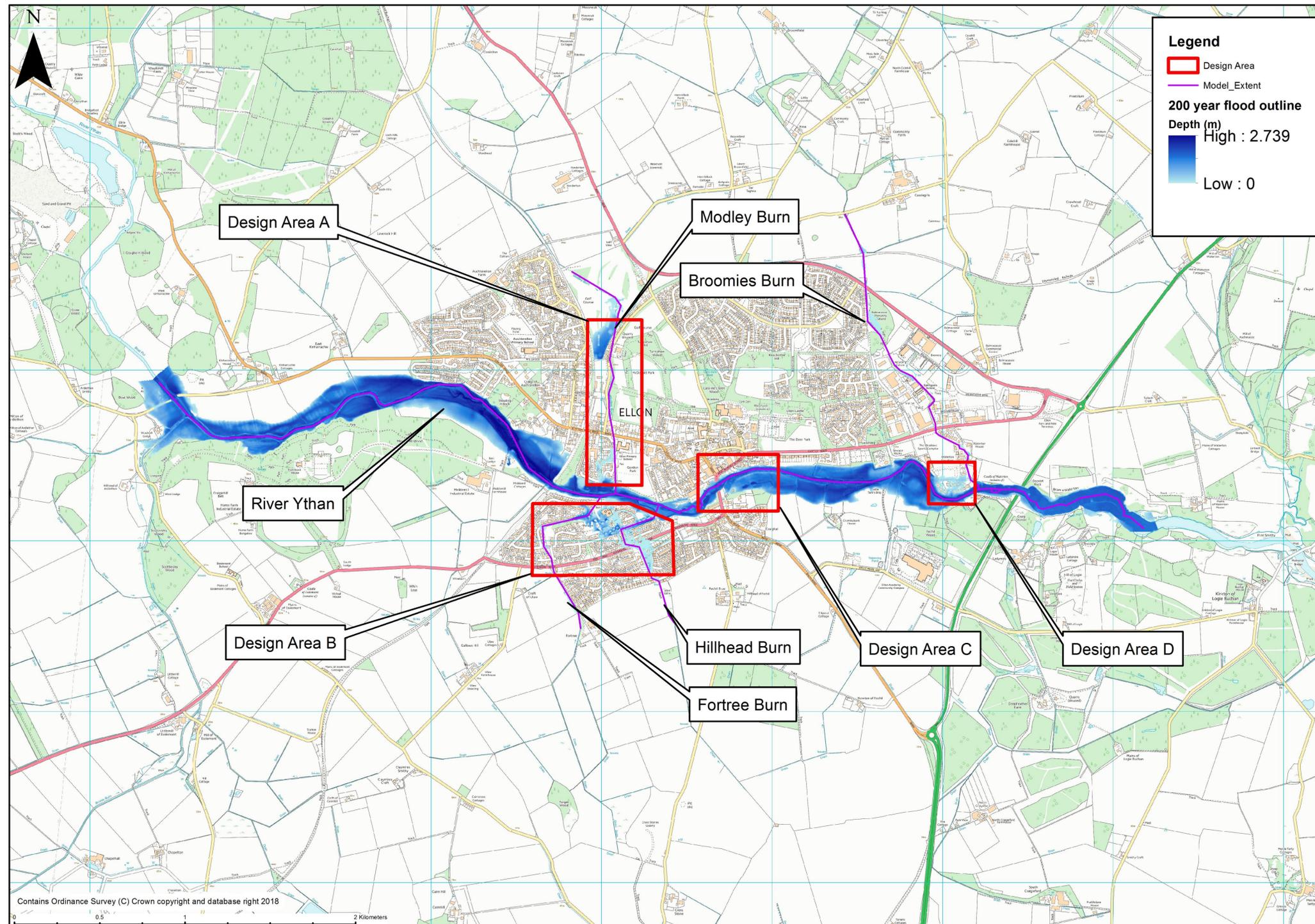
Options appraisal



Cost-Benefit



Ellon is at flood risk from the River Ythan, Broomies Burn, Modley Burn, Hillhead Burn and Fortree Burn. Each watercourse has its own mechanism of flood risk and therefore to assess flood risk four areas have been identified.



The process for selecting flood mitigation options involves assessing a wide range of possible measures and narrowing it down to a short list according to whether the options are technically, environmentally and socially acceptable. The range of options that will be assessed are listed below:

- **Natural Flood Management** – Aims to reduce flood risk and deliver wider environmental improvements through consideration of runoff, river / floodplain restoration and sediment management.
- **Storage (engineering)** – Consideration of land upstream of Ellon suitable for the storage of flood waters without inundating properties or roads.
- **Conveyance** – Improve the channels ability to convey water, including diversion channel (where consideration would need to be given to consider suitable route for the diversion around the properties at risk), removal of hydraulic constrictions and channel realignment.
- **Control structures** – Sluice gate, weir, trash screens and pumping stations. Environmental and maintenance implications likely outweigh the small benefit.
- **Direct defences** – A number of permanent walls could contain flows on the watercourse to a medium standard of protection.
- **Demountable defences** – Temporary defences would be less expensive and reduce the burden on council resources
- **Watercourse maintenance** – Council should continue the scheduled maintenance regime.
- **Property level protection (resistance and resilience measures)** – Property level protection is well suited to shallow flood depths.
- **Relocation** – Relocation or abandonment of properties not usually socially or politically viable but phased abandonment may be an option for the lowest lying properties.
- **Flood forecasting and warning** – Flood warnings on the Ythan should be developed. Flood warning on small tributaries unlikely to be achievable due to lack of lead time for warning.
- **Structure modification** – Look at bridges and weirs that have been shown to reduce flood conveyance.



# What happens next?

## The following sets out the Council wide steps required to progress preferred options to a Flood Protection Scheme

