

Introduction

Introduction

Welcome to the Cavendish Avenue/Gray Street community drop-in session which has been jointly arranged by Scottish Water and Perth & Kinross Council. The aim of this drop-in session is to provide you with more information on the joint investigation work carried out to date into the flood risk in this area, including:

- the potential options considered;
- to discuss the operational response to flooding and property flood resilience.
- The decision-making process and next steps.

Officers from Perth & Kinross Council, Scottish Water, SEPA and the Scottish Flood Forum are available today. Please feel free to ask questions about any aspect of the project.

Your views

Your views are important to us. Please feel free to ask questions. Comment forms are available to allow you to record your views.

Flood History

This area of Perth is at high risk of surface water flooding. A number of significant surface water flooding events have occurred over the years, with the most notable events occurring in June 2002, July 2011 and June 2018. More recently, flooding has also occurred on 11/12 August 2020, 15 August 2022 and 8 September 2022 with properties being affected. Flooding of the road also occurs on a frequent basis, typically following short intense summer rainstorm events.

As well as the wider surface water flood risk, Scottish Water are aware of a number of properties which are at risk from flooding from the sewer network in less severe rain storm events. Scottish Water's 'At Risk Register' includes:

- 4 properties at risk of internal flooding.
- 21 properties at risk of external flooding.

The flooding mechanisms in the area are complex and are the result of interactions between the combined sewer system and overland surface water flows from the steep surrounding topography.



Flooding on Pickletullum Road (June 2002)



Flooding on lower Cavendish Avenue (July 2009)



Flooding on Gray Street (June 2018)

Background

The Council and Scottish Water have undertaken various studies to improve our understanding of the flooding mechanisms:

- **Perth Integrated Catchment Study:**
 - Considered the complex interactions between rivers, surface water drainage and combined sewer systems;
 - Delivered in December 2019 by Scottish Water, with input from the Council;
 - Identified 32 'hotspots' of flood risk in the Perth Sewer catchment.
- **Perth Priority Internal Flooding Project (formerly Perth IFOS project):**
 - On-going detailed investigation of 5 areas of highest flood risk in Perth – Cavendish Avenue/Gray St is one of those areas;
 - Consideration of potential measures to manage, and where achievable reduce, the identified flood risk;

This display provides an update on this work and the next steps.

Perth Priority Internal Flooding Project

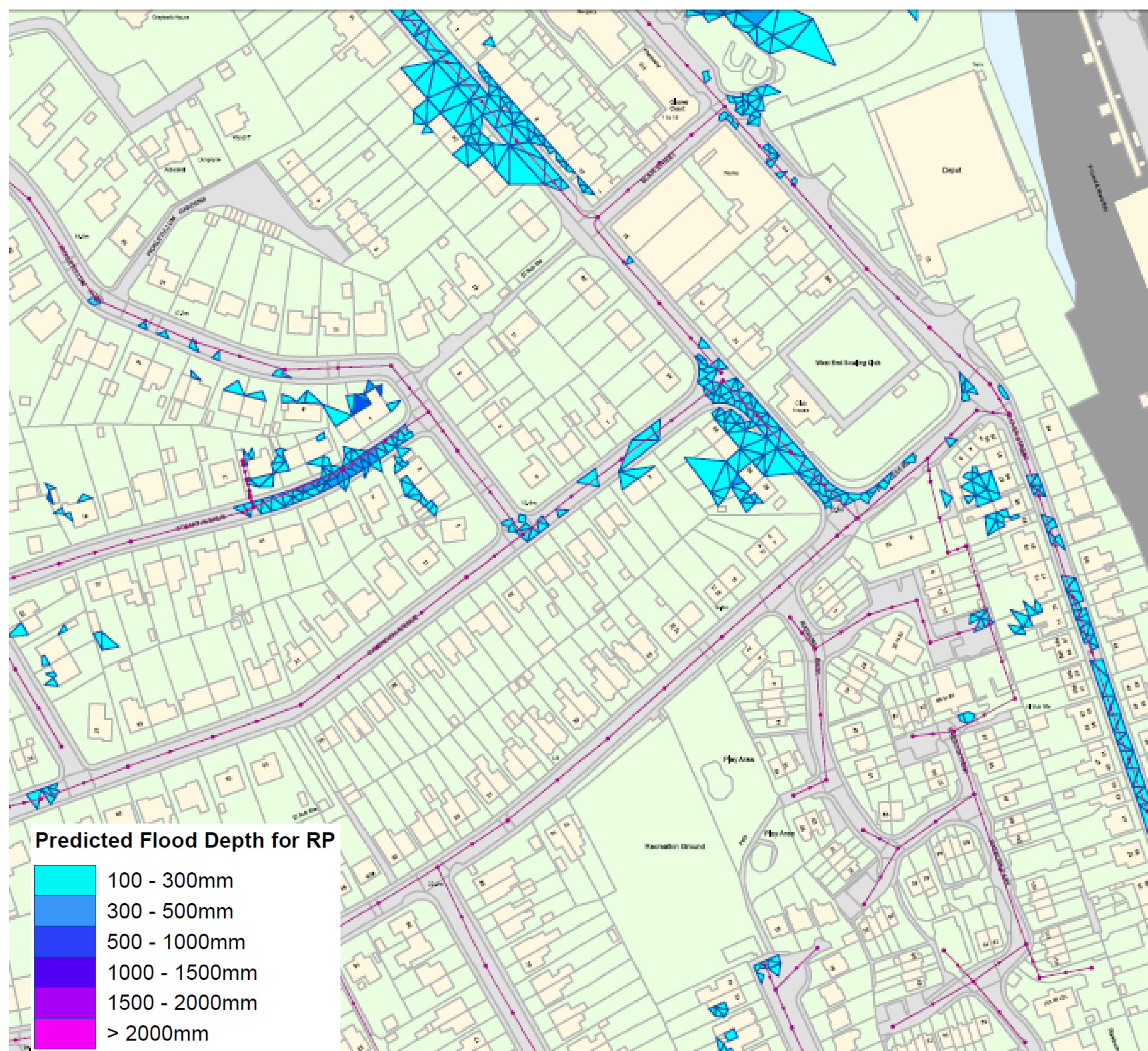


Perth IFOS (Internal Flooding from Overloaded Sewers) Project

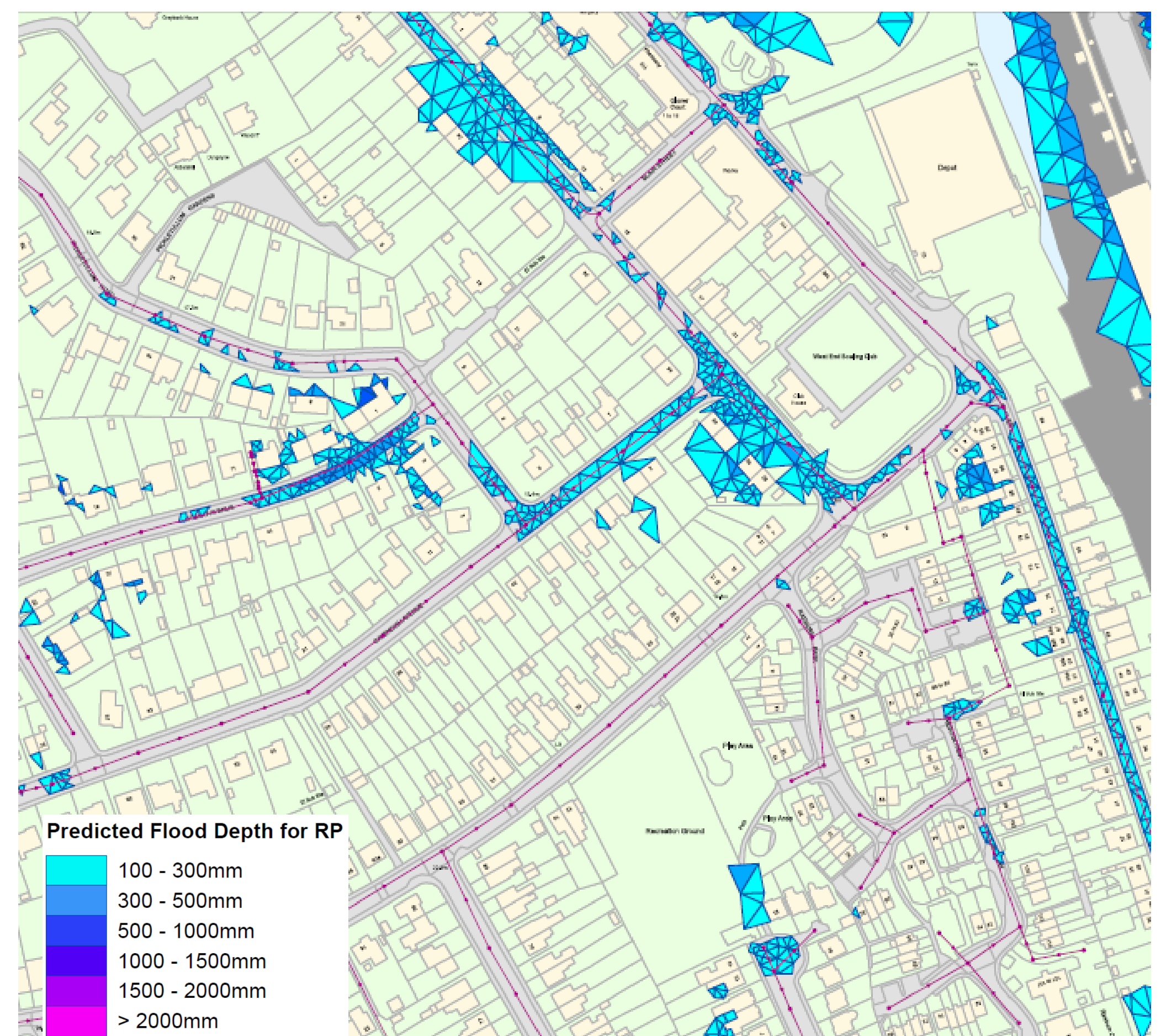
- Builds on existing knowledge and modelling work developed during the Perth Integrated Catchment Study;
- Joint investigation by Scottish Water (into internal sewer flooding) and Perth & Kinross Council (project extended to also consider surface water flooding).

Perth Integrated Catchment Study - Flood Risk maps

Cavendish Avenue/Gray Street Flood Map – 30 year storm event



Cavendish Avenue/Gray Street Flood Map – 200 year storm event



What was considered?

- An initial long-list of options was considered and refined to a short-list for further, more detailed assessment.
- The short-list was further reviewed to identify actions for further appraisal. These included:
 - Surface Water Management – separating surface/storm water out of the combined sewer/retrofitting SUDS (sustainable urban drainage systems);
 - Upsizing sewer network/building new sewers;
 - Flood Storage;
 - Low cost modifications (such as ground re-profiling)
 - Improving property flood resilience (fitting flood products, e.g. flood gates for doors, air brick covers, etc)
 - The continued application of development planning policy.
- The impact and benefits of some of the options were assessed using the flood model.

The findings of this work are detailed on the following board, along with the economic appraisal.

Perth Priority Internal Flooding Project

Options Appraisal

During the study work, it became apparent that managing the flood risk at Cavendish Avenue/Gray St would require a number of the potential options to be combined. The project initially identified that the greatest potential reduction in flood risk could be delivered through a combination of the following actions:

- **Surface Water Management** – removal of large roof/paved areas and road drainage from sewer network;
- **Sewer (Grey) Solution** – new sewers with flood storage tank.

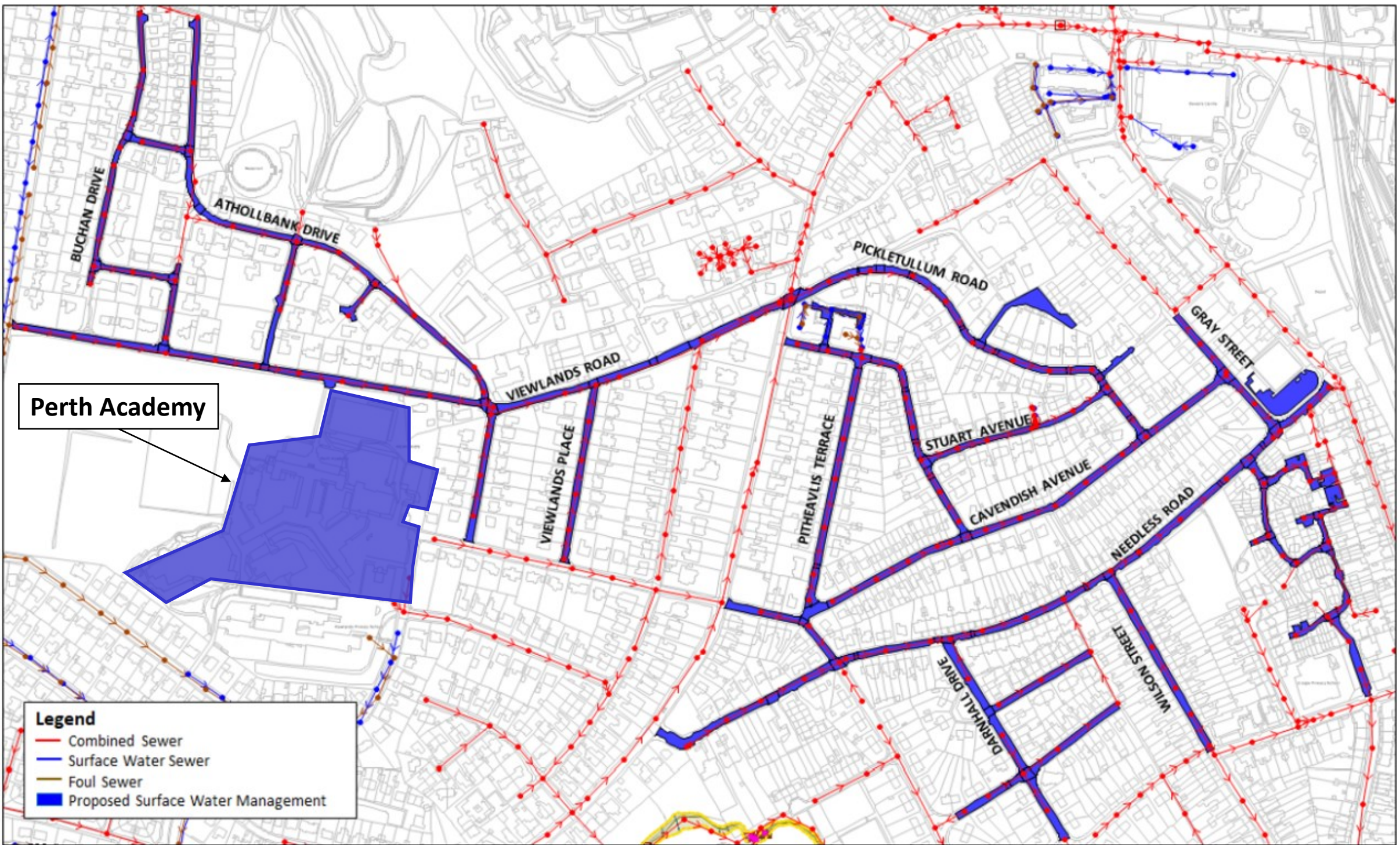
Surface Water Management - Perth Academy

- › Removal of large roof/hardstanding areas at Perth Academy from the combined sewer;
- › Initial modelling suggests this would result in a 10% reduction in flood volumes.

Surface Water Management - Road Drainage

- › Removal of road drainage from the combined sewer
- › 25 streets (5ha of hardstanding) in the sewer catchment identified as potentially feasible
- › Various measures required – retrofitted SuDS, rain gardens, tree pits, swales, etc.

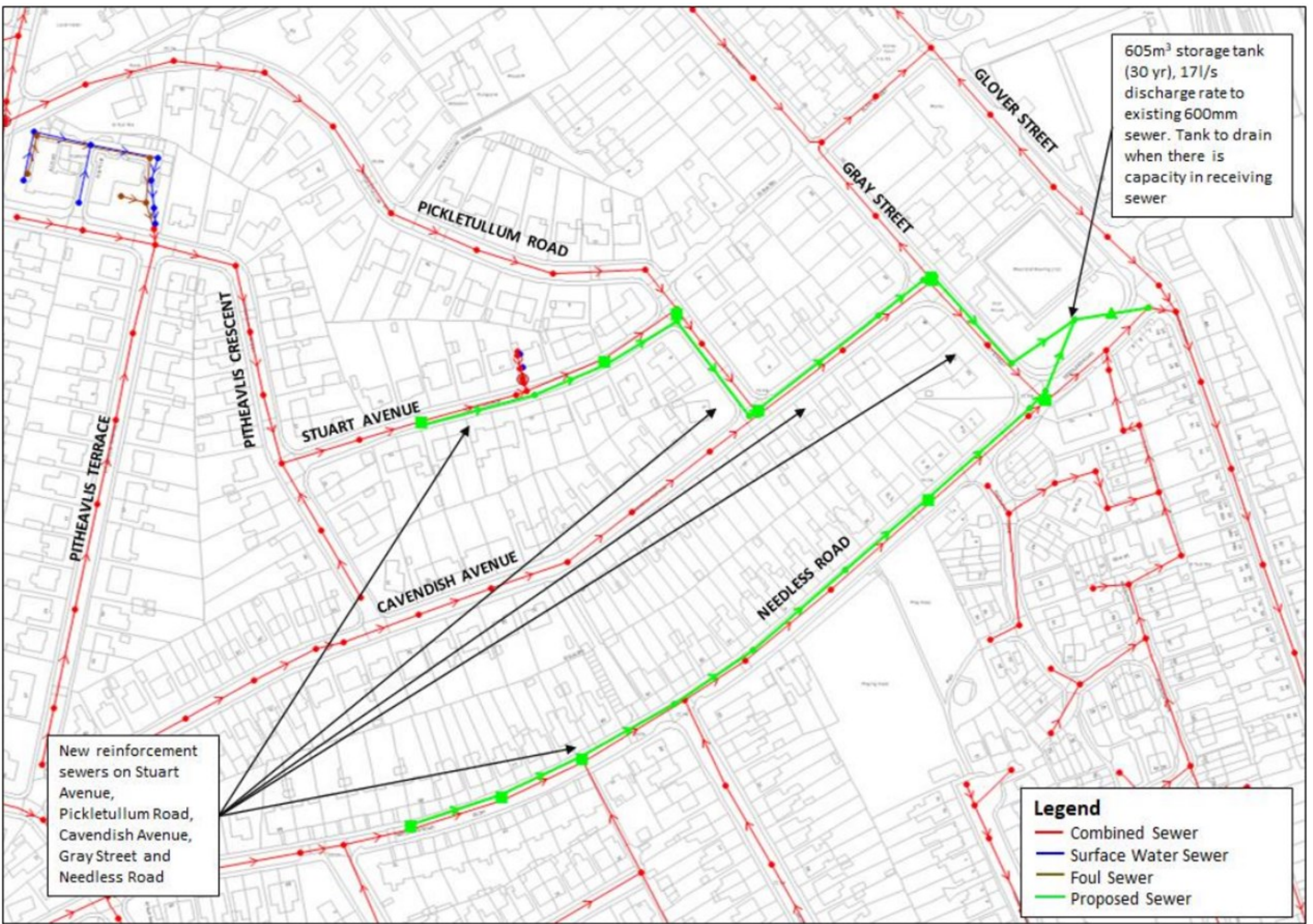
Cost Estimate - £ 6m



‘Grey’ Solution - New Sewer with Storage

- › 828m of new reinforcement sewers on Stuart Avenue, Pickletullum Road, Cavendish Avenue, Gray Street and Needless Road
- › New storage tank with pumped return to combined sewer (605m³ storage volume), potentially located under West End Bowling Club car park.

Cost Estimate - £2-3m



Optioneering Capital Cost estimate = £ 8-9m

Combined Benefit Cost ratio (BCR) = 0.045

Flood Cluster	Rainfall return Period	Total worst-case model predicted flooding (m³)				
		Future Baseline	SWM of road/paved/roof areas	% Reduction from Future Baseline	New sewers with tank and SWM	% Reduction from Future Baseline
Cavendish Avenue	10 year (No CC)	1634	189	88%	0	100%
	30 year (No CC)	3111	550	82%	11	100%

Advantages

- Works would protect properties from flooding up to the 1 in 30 year rainfall event;
- Removal of surface water from combined sewer system has wider benefits – reduced water treatment energy use/CSO spills;

Disadvantages

- Limited standard of protection – risk of flooding remains during events above design standard (30 year storm event) although the option would reduce the frequency and total volume of flooding;
- No allowance for increase in future flood risk due to the effects of climate change;
- High Capital cost (£8.6m) – refinement of option estimates indicate that this will increase further;
- Benefit cost ratio (0.045) is well below 1.0 – the estimated cost of the works therefore greatly exceeds the potential benefits over time. The works are therefore not economically viable.

On-going Action

Scottish Water Temporary Mitigation Investigation

In parallel to the wider study, Scottish Water are investigating the feasibility of temporary property level mitigations which could reduce the risk of internal sewer flooding. The Council's Housing team are liaising with Scottish Water where properties are Council-owned.

Any feasible measures must ensure that they do not simply transfer the flood risk to other properties. They will also only address the risk of internal sewer flooding, and therefore the risk of external sewer and surface water flooding would remain.

Initial assessments and discussions have been held with property owners, and Scottish Water will seek to confirm the next steps at the earliest opportunity.

Property Flood Resilience

Beyond Scottish Water and the Council's efforts, you can also play an important role in making your property more resilient and helping to reduce the impact of flooding. Consider flood protection products (including sandbags) for your property and ensure your insurance provides adequate cover for flood damage. The Council and Scottish Water can offer advice regarding this, which can be found on our websites.

The Scottish Flood Forum are also in attendance today to offer independent, specialist advice on property flood resilience.

Emergency Response

All public agencies seek to work together to assist residents in emergencies – and both Scottish Water and Perth & Kinross Council are very aware of the flood risk at Cavendish Avenue/Gray Street.

No two flood events are the same. The accurate forecasting of flood impacts is difficult, but preparations are made when relevant flood alerts are issued by SEPA.

The speed of response is influenced by the scale of flooding both locally and across the country, as well as by potential disruption to the road network.



Perth & Kinross Council Emergency Response

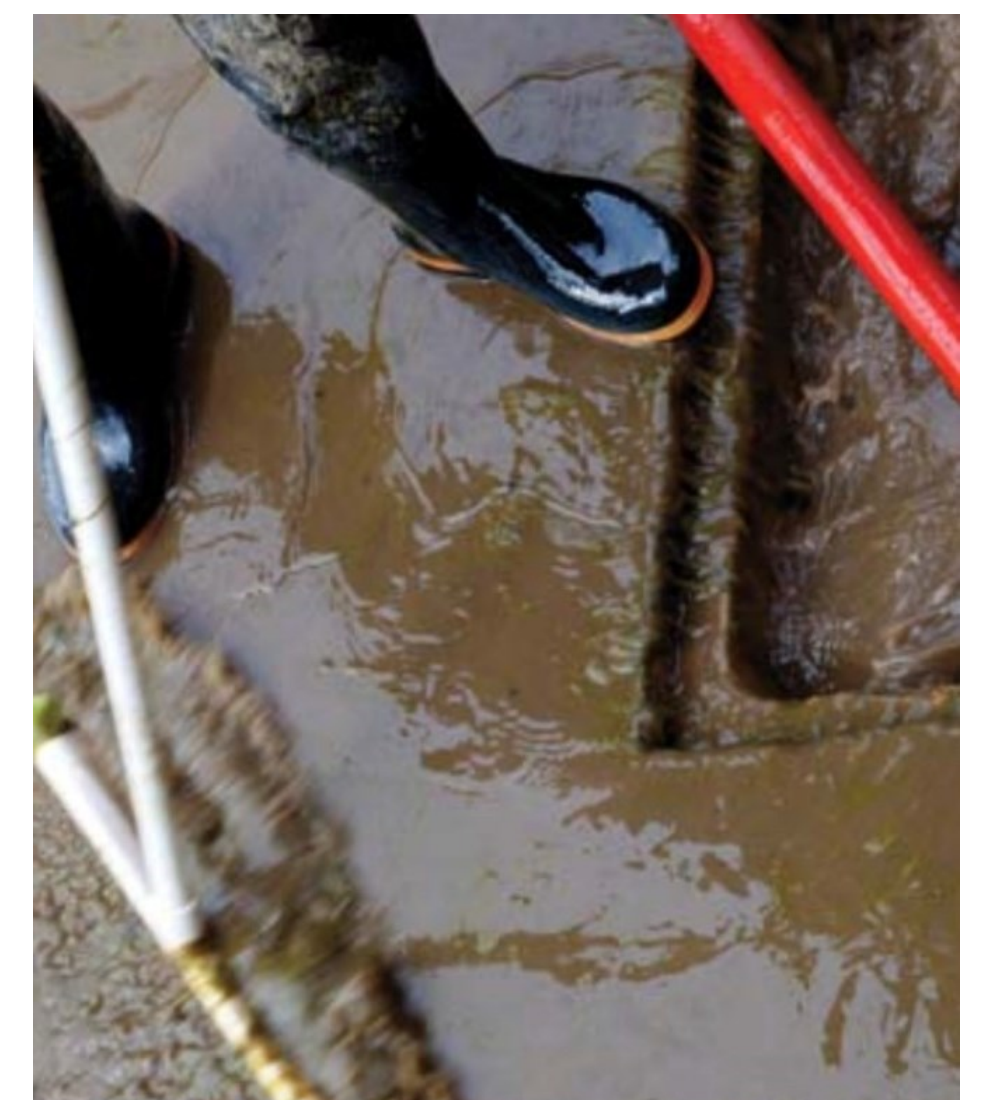
The responsibility for protecting individual properties lies with the property owner. The Council has no statutory duty to prevent properties from flooding, but we will help residents and communities as much as we can.

As sandbags are in limited supply, we can only provide them to properties that are in imminent danger of being flooded. In extreme flooding situations it may not be possible to provide you with sandbags due to the level of demand placed on resources.

We would strongly advise residents in flood risk areas to maintain their own supply of sandbags, or other flood protection products, in advance of flooding.

Scottish Water Emergency Response

Scottish Water will provide clean-up assistance to customers if they are affected by sewer flooding within their homes or gardens as soon as possible after flooding has occurred. Please call 0800 077 8778 if your home is affected.



Contacting Scottish Water and Perth & Kinross Council

Both Scottish Water and the Council can be contacted for assistance in flood emergencies. The Council's customer service centre can be contacted for assistance during office hours (8am to 6pm) on **01738 475000** and the out of hours emergency number is **01738 476476**. Please contact Scottish Water via the Scottish Water 24 hour customer helpline on **0800 077 8778**.

Conclusions

Surface Water Flooding

In managing flood risk, Perth & Kinross Council is required to have regard to the economic impact of its actions. The cost of building a flood scheme must not exceed the benefits, i.e. the benefit/cost ratio must be greater than 1.0.

Unfortunately, the Perth Priority Internal Flooding Project has not identified an economically viable option to reduce the risk of surface water flooding at Cavendish Avenue/Gray Street. The Council cannot promote this option as a flood scheme for the following reasons:

- The option provides a limited degree of flood protection, and flooding would still occur in times of greater rainfall (above the 1 in 30-year event). No allowance for increased flood risk due to future climate change has been included.
- The option has a very low benefit/cost ratio of 0.045 and is therefore not economically viable. The project will not secure capital grant funding, and no alternative funding solutions are available.

Next Steps

The Council will review any comments raised today and a response will be provided to the community in due course. The Council will then report the outcome to the next available meeting of the Climate Change and Sustainability Committee.

Scottish Water

Following the identification of the proposed phased interventions for Cavendish Avenue/Gray Street and the significant costs involved, some further refinement is continuing to support the next stage in Scottish Water's decision-making process.

A Project Investment Appraisal will be carried out before a final decision is taken by Scottish Water's senior management team. This process is expected to take place during Autumn 2023. Scottish Water will communicate with local residents once this internal process is complete to confirm if a project will be delivered or not.

Scottish Water will also advise residents of the outcome of their temporary mitigations investigation, and undertake any recommended work.

Where customers whose homes are at risk of internal flooding have had protection measures installed by Scottish Water, these will be maintained for as long as they are needed – and we will continue to review what we can do to assist customers with reducing the impact of flooding on homes and garden areas.

Tay Local Flood Risk Management Plan

These investigations have led to an improved understanding of flooding in the area and have informed other on-going actions to manage flood risk. This area is covered by the Tay Flood Risk Management (FRM) Plan, published in December 2021 by SEPA. The Council has also published the updated Tay Local FRM Plan in December 2022 – see www.pkc.gov.uk/frmplans.

Both the Tay FRM Plan and Local FRM Plan include actions for the public bodies and land and property owners to manage flood risk including awareness raising, the provision of data to support climate resilience, links with emergency planning, flood forecasting and warning, developing guidance, flood mapping, land use planning, maintenance (of drainage networks, and watercourse clearance and repair works) and self-help (including individual property flood measures).

Work also continues on the Perth Surface Water Management Plan (SWMP), which will build on existing knowledge of surface water flood risk in Perth. The SWMP will identify and prioritise the main areas of surface water flood risk and consider a range of potential measures to manage that risk. We currently anticipate the completion of the SWMP in autumn 2023.

Thank You

We would like to thank you for your attendance and comments today. Community involvement is a key part of flood risk management, and your views are appreciated.

Any Comments or Questions?

Please speak with a representative from Scottish Water or Perth & Kinross Council. SEPA and the Scottish Flood Forum are also here today. Please also take this opportunity to record your views by completing a comment form.

Contact Details

These information boards can also be viewed on the Council's Consultation Hub, where feedback can also be recorded. Please visit: <https://consult.pkc.gov.uk/communities/cavendish-avenue-gray-street-flooding>

For further information on the proposals please contact:

- Scottish Water: Gavin Steel, Corporate Affairs Manager (North) 0800 077 8778 / gavin.steel@scottishwater.co.uk
- Perth & Kinross Council: Gavin Bissett, Engineer, Flooding Team - 01738 475000 / GABissett@pkc.gov.uk