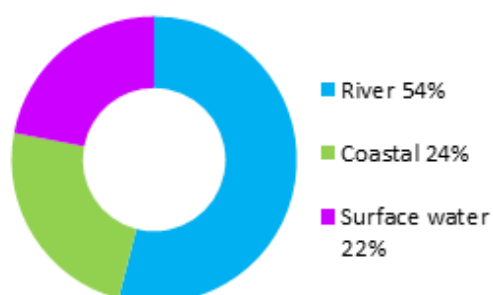


Perth centre (Potentially Vulnerable Area 08/13)

Local Plan District	Local authority	Main catchment
Tay	Perth and Kinross Council	Perth coastal

Summary of flooding impacts



At risk of flooding

- 320 residential properties
- 260 non-residential properties
- £1.8 million Annual Average Damages

(damages by flood source shown left)

Summary of flooding impacts

Summary of objectives to manage flooding

Objectives have been set by SEPA and agreed with flood risk management authorities. These are the aims for managing local flood risk. The objectives have been grouped in three main ways: by reducing risk, avoiding increasing risk or accepting risk by maintaining current levels of management.

Many organisations, such as Scottish Water and energy companies, actively maintain and manage their own assets including their risk from flooding. Where known, these actions are described here. Scottish Natural Heritage and Historic Environment Scotland work with site owners to manage flooding where appropriate at designated environmental and/or cultural heritage sites. These actions are not detailed further in the Flood Risk Management Strategies.

Objectives

Summary of actions to manage flooding

The actions below have been selected to manage flood risk.

<i>Flood protection scheme/works</i>	<i>Natural flood management works</i>	<i>New flood warning</i>	<i>Community flood action groups</i>	<i>Property level protection scheme</i>	<i>Site protection plans</i>
Flood protection study	<i>Natural flood management study</i>	Maintain flood warning	Awareness raising	Surface water plan/study	Emergency plans/response
Maintain flood protection scheme	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

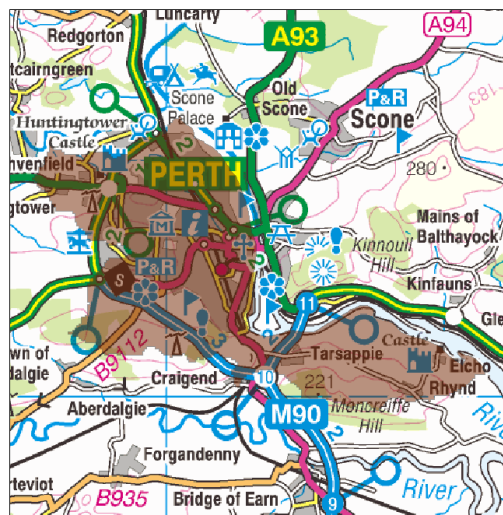
Actions

Perth centre (Potentially Vulnerable Area 08/13)

Local Plan District	Local authority	Main catchment
Tay	Perth and Kinross Council	Perth coastal

Background

This Potentially Vulnerable Area is 28km² and part of the River Tay catchment (shown below). It covers the west bank of the lower River Tay where it meets the Firth of Tay and includes the city of Perth. The main watercourse is River Tay. Other watercourses include the Town's Lade that carries water from the River Almond to the River Tay and the Craigie Burn.



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The area has a risk of surface water, coastal and river flooding. The majority of flood damages are caused by river flooding.

There are approximately 320 residential properties and 260 non-residential properties at risk of flooding. The Annual Average Damages are approximately £1.8 million.

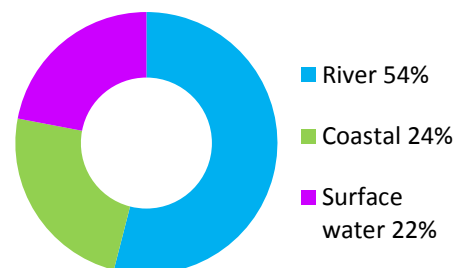


Figure 1: Annual Average Damages by flood source

Summary of flooding impacts

It should be noted that Perth Flood Protection Scheme reduces the risk of river and coastal flooding in Perth.

The highest risk of river flooding is from the Town's Lade and Craigie Burn to Perth. The interaction between river and coastal flooding where the River Tay meets the Firth of Tay is an important factor for flooding in Perth. Coastal flooding extends upstream of the River Tay as far as Perth racecourse.

The risk of flooding to people and property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is summarised in Table 1. The damages associated with floods of different likelihood are shown in Figure 2. For this Potentially Vulnerable Area the highest damages are to residential and non-residential properties. The location of the impacts of flooding is shown in Figure 3.

The figures presented for Annual Average Damages include damages to residential properties, non-residential properties, transport and agriculture.

The risk of flooding to utilities in Table 1 does not include Scottish Water data. Scottish Water undertook a national assessment of above ground assets at medium likelihood of flooding (including water treatment works, wastewater treatment works and pumping stations). Within this Potentially Vulnerable Area there are two assets identified as being at risk of flooding.

	1 in 10 High likelihood	1 in 200 Medium likelihood	1 in 1000 Low likelihood
Residential properties (total 20,000)	90	320	4,000
Non-residential properties (total 3,600)	30	260	1,300
People	200	710	8,900
Community facilities	0	<10 Educational buildings	<10 Includes: emergency services and educational buildings
Utilities assets	<10	30	80
Transport links (excluding minor roads)	1 M road (M90), 4 A roads, 1 B road at 74 locations 2 Railway routes at 13 locations: Perth to Inverness Dundee to Dunblane	1 M road (M90), 5 A roads, 1 B road at 146 locations 2 Railway routes at 41 locations: Perth to Inverness Dundee to Dunblane	1 M road (M90), 5 A roads, 1 B road at 240 locations 2 Railway routes at 76 locations: Perth to Inverness Dundee to Dunblane
Environmental designated areas (km ²)	0.1	0.1	0.1
Designated cultural heritage sites	5	9	9
Agricultural land (km ²)	1.0	1.6	2.6

Table 1: Summary of flooding impacts

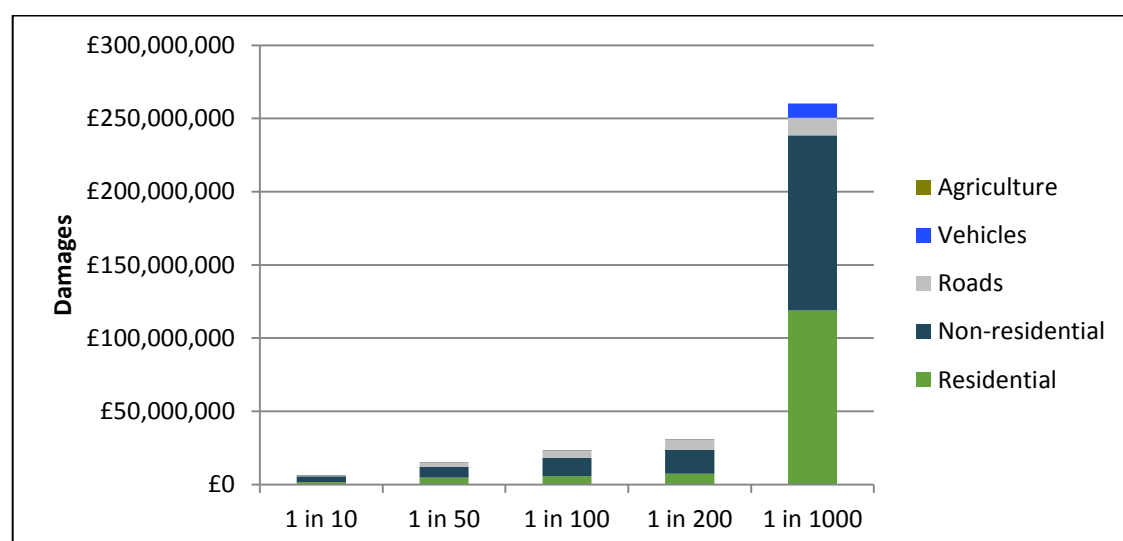


Figure 2: Damages by flood likelihood

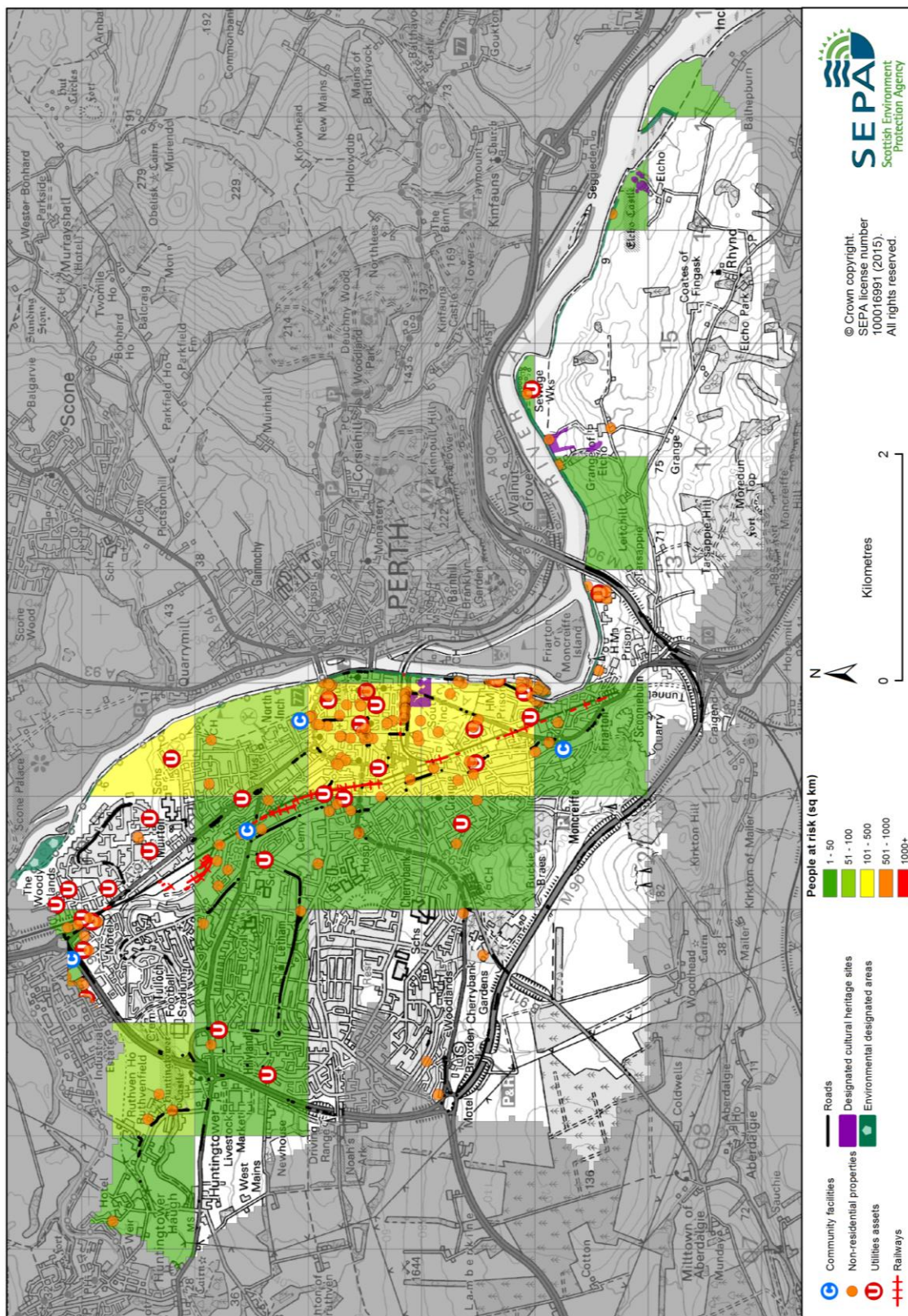


Figure 3: Impacts of flooding

History of flooding

Perth has a long history of flooding. The following significant floods have been recorded in this area:

- 20-21 December 2012: Heavy rain and snow melt affected a number of locations in Perth including Marshall Place from James Street to Princes Street, Moncrieffe Island, Edinburgh Road, North Port and Tay Street. Flood levels reached 5.68m above normal levels at Smeaton's Bridge.
- 16 July 2011: Heavy rain caused surface water flooding in Perth. Homes and businesses were affected.
- 21 July 2010: Extensive surface water flooding around Perth affecting properties and roads.
- 6 August 2002: There was flash flooding on the Craigie Burn in Perth when approximately 30mm of rain fell in 60 minutes.
- 16 January 1993: Widespread flooding resulted in damage to communication networks, hundreds of properties and farmland in and around Perth, causing an estimated £20 million of damage. Residents were evacuated in the North Muirton housing estate after flood defences were breached.
- 17 February 1950: Flooding within Perth on several roads including Tay Street, North and South Inches, the junction of Scott Street and Marshall Street, Moncrieffe Island, Commercial Street (Bridgend) and James Street. Telephone cables damaged outside of Perth and properties flooded.
- 22 January 1928: Wettest January on record caused flooding across Perth and Kinross including Perth and Muirton. Residents of several farms in Muirton had to be rescued as roads became impassable. The River Tay reached 5.77m above normal levels at Smeaton's Bridge in Perth.
- 31 January 1903: Nearly all cellars in Perth flooded after heavy rains and strong gales resulted in flooding on the River Tay, including North and South Inches, Rose Terrace, North Port, Lower Commercial Street, Princes Street, Nelson Street, Scott Street, James Street, King Street, Edinburgh Road, Marshall Place, Moncrieffe Island. Many roads impassable.
- 7 October 1847: Flooding from the River Tay affected Perth, Dunkeld, Dalguise and Dalmarnock. Many residents were evacuated and there were reports of cattle being swept away in flood waters. The water level at Smeaton's Bridge in Perth was estimated to be 6.11m above ordinary levels.
- 12 February 1814: Blocks of ice on the River Tay caused bridges to become blocked resulting in widespread flooding to the Perth region. North and South Inch were submerged for two days. An estimated flood height of 7.0m above ordinary levels was recorded on the River Tay which is the highest known flood level.
- 12-14 October 1621: Constant heavy rain over a two day period caused flooding from the River Tay. Residents were evacuated from numerous properties and severe damage was caused to Milne's Bridge. Perth was surrounded by water for 5-6 days after the event.

Objectives to manage flooding in Potentially Vulnerable Area 08/13

Objectives provide a common goal and shared ambition for managing floods. These objectives have been set by SEPA and agreed with flood risk management authorities following consultation. They were identified through an assessment of the underlying evidence of the causes and impacts of flooding. Target areas have been set to focus actions; they do not necessarily correspond to areas at risk in SEPA's flood map. The objectives below have been set for Perth centre Potentially Vulnerable Area.

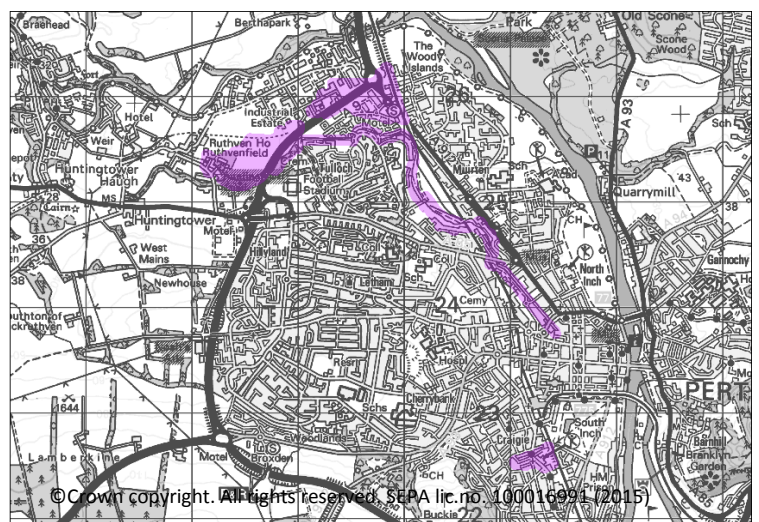
Reduce economic damages to residential and non-residential properties and risk to people in Perth caused by flooding from the Perth Town Lade and the Craigie Burn

Indicators:

- 220 people
- £850,000 Annual Average Damages from residential properties
- £640,000 Annual Average Damages from non-residential properties

Objective ID: 8029, 8031

Target area:

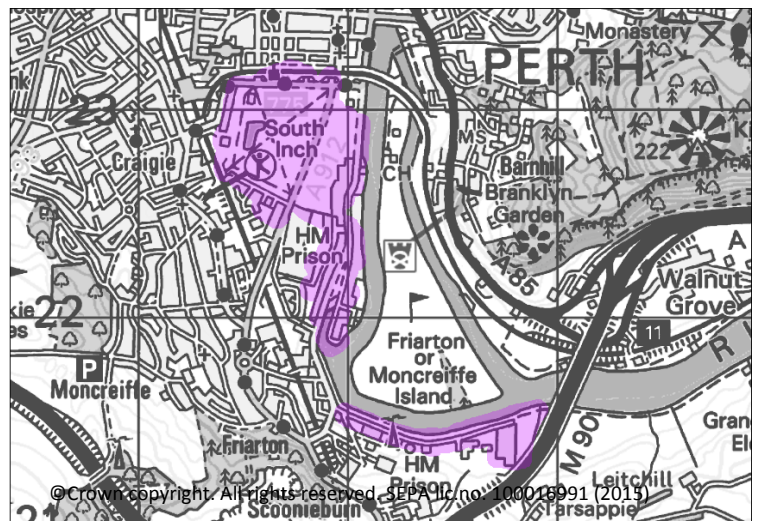


Accept that risk in Perth from flooding on the River Tay, Craigie Burn, Scouring Burn and coastal flooding is being managed appropriately and maintain existing actions that reduce flood risk

Indicators:

- 150 residential properties protected
- 350 non-residential properties protected
- £28 million damages avoided

Objective ID: 8030



Target area	Objective	ID	Indicators within PVA
Perth	Reduce economic damages and number of residential properties at risk of surface water flooding in Perth where practical	8024	* See note below
Applies across Tay Local Plan District	Avoid an overall increase in flood risk	8001	<ul style="list-style-type: none"> • 320 residential properties • £1.8 million Annual Average Damages
Applies across Tay Local Plan District	Reduce overall flood risk	8041	<ul style="list-style-type: none"> • 320 residential properties • £1.8 million Annual Average Damages
Applies across Tay Local Plan District	Organisations such as Scottish Water, energy companies and Historic Environment Scotland actively maintain and manage their own assets, including the risk of flooding. These actions are not detailed further in the Flood Risk Management Strategies.		

* This objective will be monitored using surface water flood risk across the Potentially Vulnerable Area. For 08/13 there are 110 residential properties at risk and Annual Average Damages of £400,000.

Actions to manage flooding in Potentially Vulnerable Area 08/13

Actions describe where and how flood risk will be managed. These actions have been set by SEPA and agreed with flood risk management authorities following consultation. Selection of actions to deliver the agreed objectives was based on a detailed assessment and comparison of economic, social and environmental criteria. The actions shaded and then described below have been selected as the most appropriate for Perth centre Potentially Vulnerable Area.

Selected actions					
<i>Flood protection scheme/works</i>	<i>Natural flood management works</i>	<i>New flood warning</i>	Community flood action groups	<i>Property level protection scheme</i>	<i>Site protection plans</i>
Flood protection study	<i>Natural flood management study</i>	Maintain flood warning	Awareness raising	Surface water plan/study	Emergency plans/response
Maintain flood protection scheme	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Action (ID):	FLOOD PROTECTION STUDY (80290005)		
Objective (ID):	Reduce economic damages to residential and non-residential properties and risk to people in Perth caused by flooding from the Perth Town Lade and the Craigie Burn (8029, 8031)		
Delivery lead:	Perth and Kinross Council		
Priority:	National:		Within local authority:
	116 of 168		6 of 6
Status:	Not started	Indicative delivery:	2016-2021
Description:	A flood protection study has been recommended for Perth and should consider flood risk from the Craigie Burn. The study should assess direct flood defences and sediment management. The study should take a catchment approach and consider the potential benefits and disbenefits and interaction between actions upstream and downstream.		
Potential impacts			
Economic:	The study could benefit 58 residential properties and four non-residential properties at risk of flooding in this location, with potential damages avoided of up to £2.8 million.		
Social:	Social impacts will depend on the outcome of the study and recommended actions. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people located within the study area.		
Environmental:	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment land designated sites. Where possible opportunities to enhance and restore the environment should be sought, for example through natural flood management. To be in accord with the FRM		

Environmental:	Strategy, the responsible authority should seek to ensure as part of the study that the action will not have an adverse effect on the integrity of the River Tay Special Area of Conservation.
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Action (ID):	SURFACE WATER PLAN/STUDY (80240018)		
Objective (ID):	Reduce economic damages and number of residential properties at risk of surface water flooding in Perth where practical (8024)		
Delivery lead:	Perth and Kinross Council		
Status:	Not started	Indicative delivery:	2016-2027
Description:	The area must be covered by a surface water management plan or plans that set objectives for the management of surface water flood risk and identify the most sustainable actions to achieve the objectives.		

Action (ID):	SURFACE WATER PLAN/STUDY (80240019)		
Objective (ID):	Reduce economic damages and number of residential properties at risk of surface water flooding in Perth where practical (8024)		
Delivery lead:	Scottish Water in partnership with local authorities		
Status:	Ongoing	Indicative delivery:	2016-2021
Description:	An integrated catchment study will be carried out to support the surface water management plan process and improve knowledge and understanding of surface water flood risk and interactions with other sources of flooding e.g. with the sewer network, watercourses and the sea.		

Action (ID):	STRATEGIC MAPPING AND MODELLING (80410016)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	SEPA		
Status:	Not started	Indicative delivery:	2016-2021
Description:	SEPA will seek to develop flood mapping in the River Almond area to improve understanding of flood risk. The extent and timing of improvements will depend on detailed scoping and data availability. Where this work coincides with local authority studies, SEPA will work collaboratively to ensure consistent modelling approaches are applied.		

Action (ID):	STRATEGIC MAPPING AND MODELLING (80410019)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Scottish Water		
Status:	Not started	Indicative delivery:	2016-2021
Description:	Scottish Water will review the assessment of flood risk within the highest risk sewer catchments to improve knowledge and understanding of surface water flood risk.		

Action (ID):	MAINTAIN FLOOD PROTECTION SCHEME (80290017)		
Objective (ID):	<p>Reduce economic damages to residential, non-residential properties and community facilities in Almondbank and Lochty from the River Almond and East Pow Burn (8020)</p> <p>Reduce economic damages to residential and non-residential properties and risk to people in Perth caused by flooding from the Perth Town Lade and the Craigie Burn (8029, 8031)</p>		
Delivery lead:	Perth and Kinross Council		
Status:	Existing	Indicative delivery:	Ongoing
Description:	Continue to maintain the flood protection schemes that protect Perth against flooding. The schemes include the Perth Flood Protection Scheme that was completed 2002, defences on the Perth Town Lade and Craigie Burn and the Almondbank Flood Protection Scheme which is currently under construction and due to be completed in 2016.		

Action (ID):	MAINTAIN FLOOD PROTECTION SCHEME (80300017)		
Objective (ID):	Accept that risk in Perth from flooding on the River Tay, Craigie Burn, Scouring Burn and coastal flooding is being managed appropriately and maintain existing actions that reduce flood risk (8030)		
Delivery lead:	Perth and Kinross Council		
Status:	Existing	Indicative delivery:	Ongoing
Description:	Continue to maintain the Perth Flood Protection Scheme. The scheme was completed in 2002 and includes major flood defence works such as embankments, walls, sluice gates, ponds and pumping stations.		

Action (ID):	MAINTAIN FLOOD WARNING (80410030)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	SEPA		
Status:	Existing	Indicative delivery:	Ongoing
Description:	<p>Continue to maintain the Almondbank and the Inveralmond Industrial Estate flood warning areas which are part of the Almond (Perth) river flood warning scheme.</p> <p>Continue to maintain the North Muirton Industrial Estate and the Basement Properties from North Inch to Friarton Bridge flood warning areas which are part of the Tay river flood warning scheme.</p>		

Action (ID):	FLOOD FORECASTING (80410009)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	SEPA		
Status:	Existing	Indicative delivery:	Ongoing
Description:	<p>The Scottish Flood Forecasting Service is a joint initiative between SEPA and the Met Office that produces daily, national flood guidance statements which are issued to Category 1 and 2 Responders. The service also provides information which allows SEPA to issue flood warnings, giving people a better chance of reducing the impact of flooding on their home or business. For more information please visit SEPA's website.</p>		

Action (ID):	COMMUNITY FLOOD ACTION GROUPS (80290012)		
Objective (ID):	Reduce economic damages to residential and non-residential properties and risk to people in Perth caused by flooding from the Perth Town Lade and the Craigie Burn (8029, 8031)		
Delivery lead:	Community		
Status:	Existing	Indicative delivery:	Ongoing
Description:	<p>Perth Business Community Resilience Group operates in this area. Membership of the group includes Perth and Kinross Council, SEPA, Tayside Fire and Rescue and the Scottish Flood Forum. The group aims to reduce flooding to businesses and communities within Perth city centre, improve joint working before, during and after flooding and develop ways of increasing community resilience against flooding.</p>		

Action (ID):	SELF HELP (80410011)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	—		
Status:	Existing	Indicative delivery:	Ongoing
Description:	<p>Everyone is responsible for protecting themselves and their property from flooding. Property and business owners can take simple steps to reduce damage and disruption to their homes and businesses should flooding happen. This includes preparing a flood plan and flood kit, installing property level protection, signing up to Floodline and Resilient Communities initiatives, and ensuring that properties and businesses are insured against flood damage.</p> <p>Perth and Kinross Council is working with a group of businesses in Perth city centre to develop a maintenance plan.</p>		

Action (ID):	AWARENESS RAISING (80410013)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Responsible authorities		
Status:	Existing	Indicative delivery:	Ongoing
Description:	<p>SEPA and the responsible authorities have a duty to raise public awareness of flood risk. Improved awareness of flood risk and actions that prepare individuals, homes and businesses for flooding can reduce the overall impact.</p> <p>From 2016 SEPA will undertake flood risk education and awareness raising activities. In addition, SEPA will engage with community resilience groups and participate in property level protection events delivered by the Scottish Flood Forum where possible.</p> <p>Local authorities will be undertaking additional awareness raising activities. Further details will be set out in the Local FRM Plan.</p>		

Action (ID):	MAINTENANCE (80410007)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Perth and Kinross Council, asset / land managers		
Status:	Existing	Indicative delivery:	Ongoing
Description:	<p>Local authorities have a duty to assess watercourses and carry out clearance and repair works where such works would substantially reduce flood risk. They produce schedules of clearance and repair works and make these available for public inspection. Scottish Water undertake inspection and repair on the public sewer network. Asset owners and riparian landowners are responsible for the maintenance and management of their own assets including those which help to reduce flood risk.</p>		

Action (ID):	EMERGENCY PLANS/RESPONSE (80410014)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Category 1 and 2 Responders		
Status:	Existing	Indicative delivery:	Ongoing
Description:	Providing an emergency response to flooding is the responsibility of many organisations, including local authorities, the emergency services and SEPA. Effective management of an emergency response relies on emergency plans that are prepared under the Civil Contingencies Act 2004 by Category 1 and 2 Responders. The emergency response by these organisations is co-ordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations.		

Action (ID):	PLANNING POLICIES (80010001)		
Objective (ID):	Avoid an overall increase in flood risk (8001) Reduce overall flood risk (8041)		
Delivery lead:	Planning authority		
Status:	Existing	Indicative delivery:	Ongoing
Description:	Scottish Planning Policy and accompanying Planning Advice Notes set out Scottish Ministers' priorities for the operation of the planning system and for the development and use of land. In terms of flood risk management, the policy supports a catchment-scale approach to sustainable flood risk management and aims to build the resilience of our cities and towns, encourage sustainable land management in our rural areas, and to address the long-term vulnerability of parts of our coasts and islands. Under this approach, new development in areas with medium to high likelihood of flooding should be avoided. For further information on the application of national planning policies see Annex 2.		