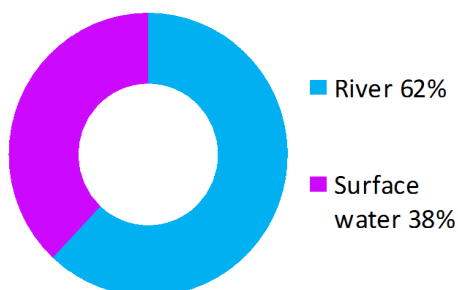


Dunblane and Bridge of Allan (Potentially Vulnerable Area 09/03)

Local Plan District	Local authority	Main catchment
Forth	Stirling Council	Allan Water

Summary of flooding impacts



At risk of flooding

- 370 residential properties
- 50 non-residential properties
- £550,000 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.

Flood protection scheme/works	<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>
<i>Flood protection study</i>	<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

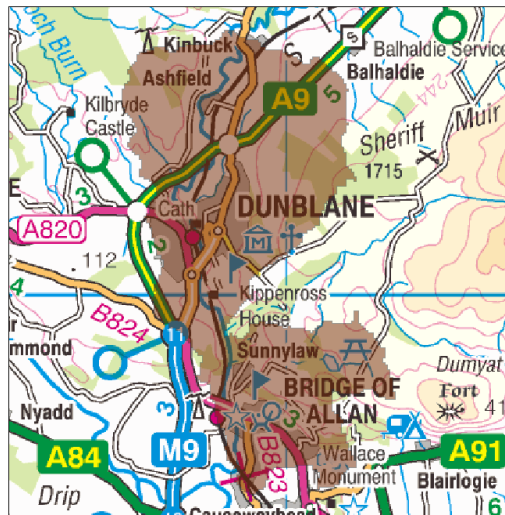
Actions

Dunblane and Bridge of Allan (Potentially Vulnerable Area 09/03)

Local Plan District	Local authority	Main catchment
Forth	Stirling Council	Allan Water

Background

This Potentially Vulnerable Area is 29km² and is part of the Stirling catchment (shown below). It contains a mixture of urban and rural areas and includes the towns of Dunblane and Bridge of Allan. The main river is the Allan Water, which flows from the north of the area through its entire length, before converging with the River Forth.



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The area has a risk of river and surface water flooding. The majority of damages in this Potentially Vulnerable Area are caused by river flooding.

There are approximately 370 residential properties and 50 non-residential properties at risk of flooding. The Annual Average Damages are approximately £550,000.

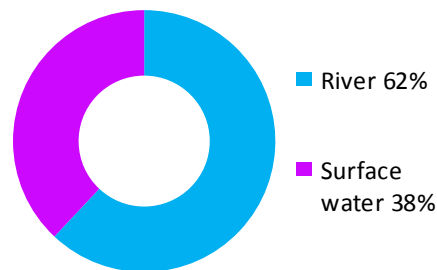


Figure 1: Annual Average Damages by flood source

Summary of flooding impacts

The highest risk of river flooding is from the Allan Water and River Forth to Bridge of Allan. The highest risk of surface water flooding is in Dunblane and Bridge of Allan.

The risk of flooding to people, 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 properties followed by damages to roads, notably the A9. 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.

	1 in 10 High likelihood	1 in 200 Medium likelihood	1 in 1000 Low likelihood
Residential properties (total 5,800)	10	370	490
Non-residential properties (total 600)	<10	50	60
People	30	810	1,100
Community facilities	<10 Emergency services	<10 Emergency services	<10 Emergency services
Utilities	<10	10	20
Transport links (excluding minor roads)	2 A roads, 3 B roads at 60 locations 2 Railway routes at 28 locations: Dunblane to Stirling Perth to Dunblane	2 A roads, 3 B roads at 109 locations 2 Railway routes at 48 locations: Dunblane to Stirling Perth to Dunblane	2 A roads, 3 B roads at 122 locations 2 Railway routes at 49 locations: Dunblane to Stirling Perth to Dunblane
Environmental designated areas (km ²)	0.2	0.2	0.2
Designated cultural heritage sites	4	5	5
Agricultural land (km ²)	0.9	1.2	1.5

Table 1: Summary of flooding impacts

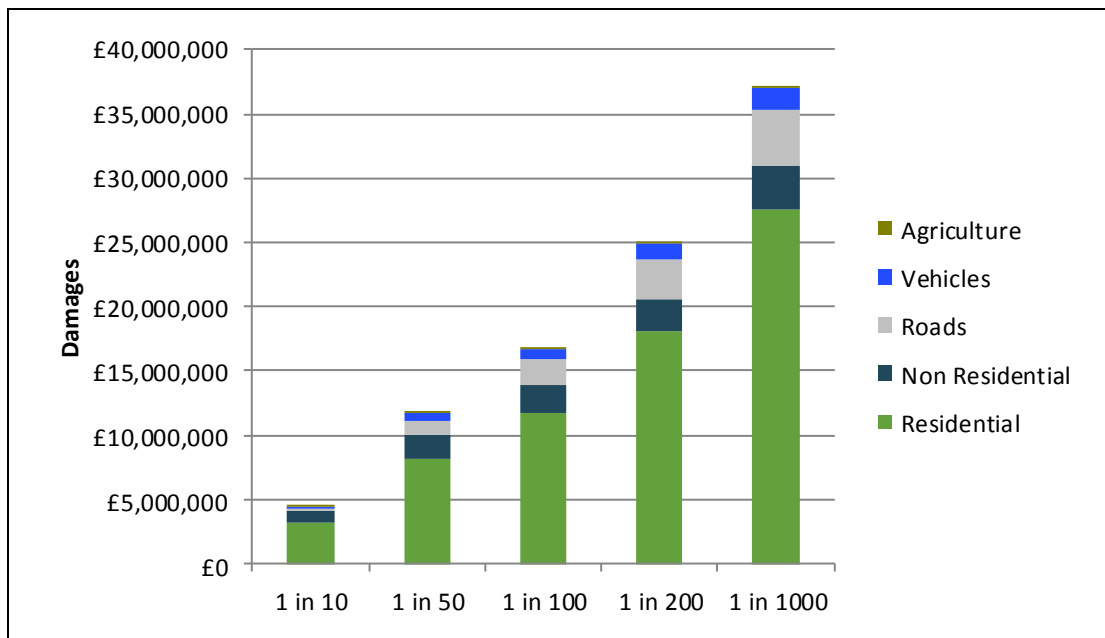


Figure 2: Damages by flood likelihood

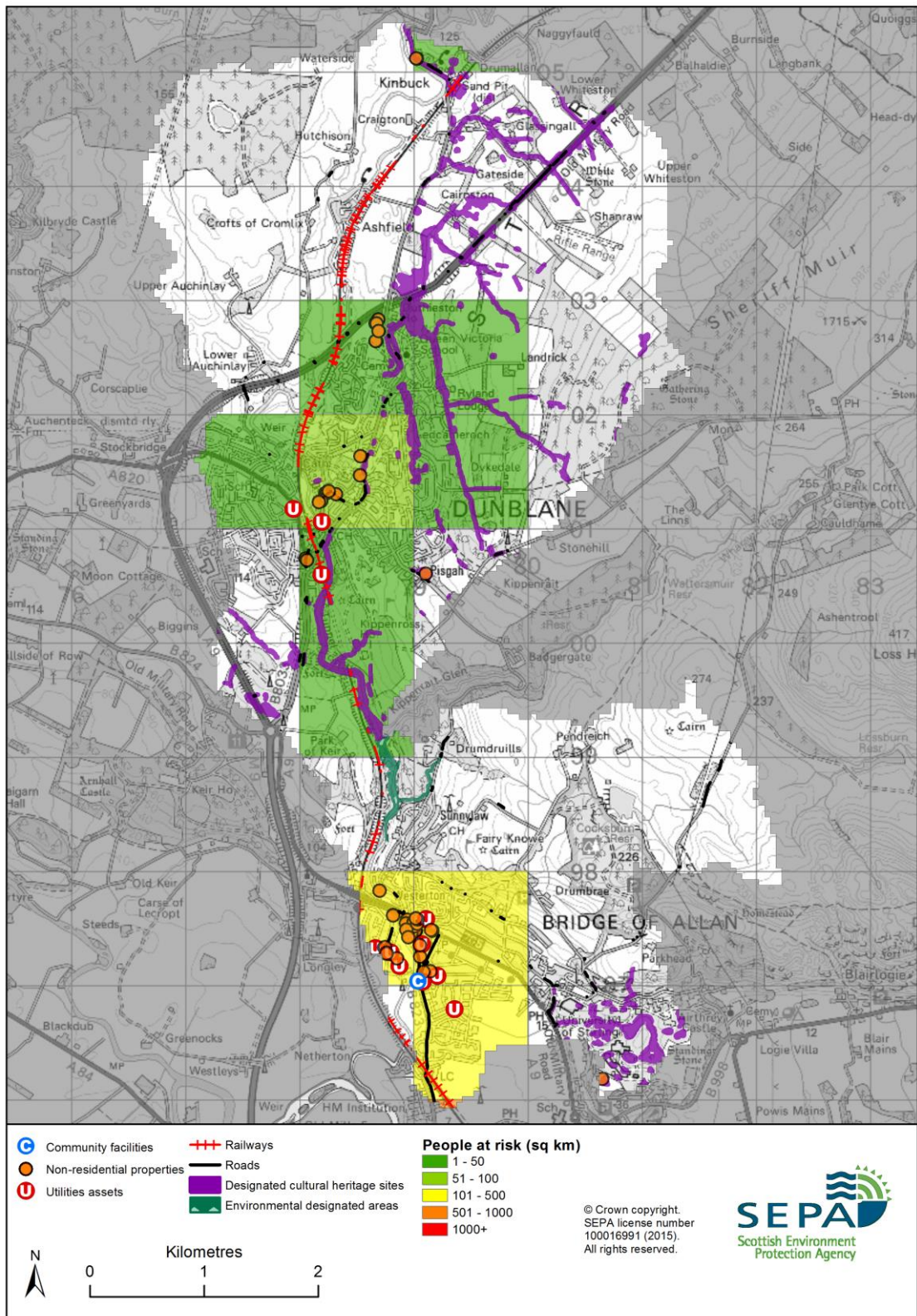


Figure 3: Impacts of flooding

History of flooding

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

- 29 August 2012: Approximately 64mm of rain fell within two hours causing localised surface water flooding to 25 properties in Bridge of Allan (Abercrombie Drive, John Murray Drive, Anne Drive, Fountain Road and Upper Glen Road) and 10 properties in Dunblane (Newton Crescent, High Street and Glen Road). The railway was closed in Dunblane and part of Upper Glen Road was washed out in Bridge of Allan.
- 14 December 2006: Flooding of Allan Water and River Forth affected a number of properties at Millrow in Dunblane, Cornton Road in Bridge of Allan and Bridgehaugh. The highest river level recorded at the SEPA gauging station on the River Forth at Craigforth was 3.97m above normal levels.
- January 1993: Estimated 1 in 100 year flood in Bridge of Allan caused property flooding.
- 1 October 1985: Allan Water burst its banks in the Bridge of Allan affecting properties on Allanvale Road and Cornton Road.
- 1 January 1984: Estimated 1 in 34 year event caused flooding to properties in Bridge of Allan. As a result, the current flood defence on Allanvale Road was constructed.

Objectives to manage flooding in Potentially Vulnerable Area 09/03

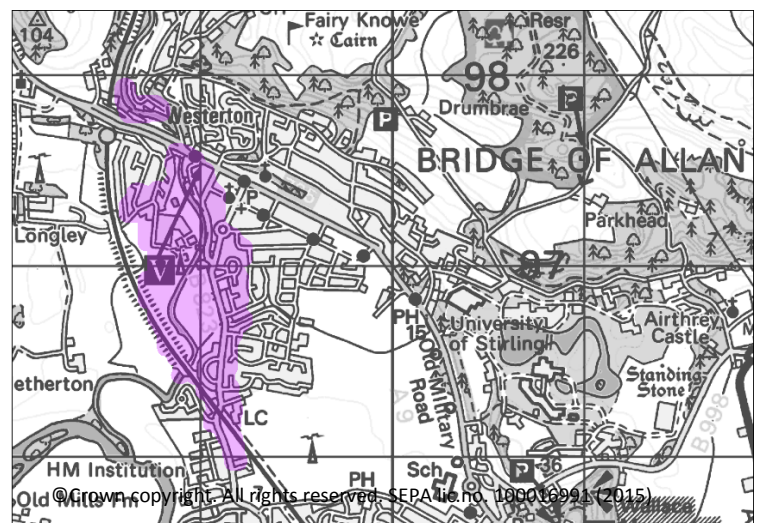
Objectives provide a common goal and shared ambition for managing floods. These objectives have been set by SEPA and agreed with flood risk management authorities following consultation. They were identified through an assessment of the underlying evidence of the causes and impacts of flooding. Target 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 Dunblane and Bridge of Allan Potentially Vulnerable Area.

Reduce economic damages to residential and non-residential properties in Bridge of Allan caused by flooding from the Allan Water

Indicators:

- £240,000 Annual Average Damages from residential properties
- £44,000 Annual Average Damages from non-residential properties

Target area:



Objective ID: 9007

Target area	Objective	ID	Indicators within PVA
Dunblane	Reduce economic damages and number of residential properties at risk of surface water flooding in Dunblane where practical	9005	* See note below
Stirling and Bridge of Allan	Reduce economic damages and number of residential properties at risk of surface water flooding in Stirling and Bridge of Allan where practical	9016	* See note below
Applies across Forth Local Plan District	Avoid an overall increase in flood risk	9001	<ul style="list-style-type: none"> • 370 residential properties • £550,000 Annual Average Damages
Applies across Forth Local Plan District	Reduce overall flood risk	9032	<ul style="list-style-type: none"> • 370 residential properties • £550,000 Annual Average Damages
Applies across Forth 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 09/03 there are 70 residential properties at risk and Annual Average Damages of £210,000.

Actions to manage flooding in Potentially Vulnerable Area 09/03

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 Dunblane and Bridge of Allan Potentially Vulnerable Area.

Selected actions					
Flood protection scheme/works	Natural flood management works	New flood warning	Community flood action groups	Property level protection scheme	Site protection plans
Flood protection study	Natural flood management study	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 SCHEME/WORKS (90070006)				
Objective (ID):	Reduce economic damages to residential and non-residential properties in Bridge of Allan caused by flooding from the Allan Water (9007)				
Delivery lead:	Stirling Council				
Priority:	National:		Within local authority:		
	35 of 42		1 of 3		
Status:	Under development	Indicative delivery:	2016-2027		
Description:	A flood protection scheme has been proposed for Bridge of Allan. The scheme would consist of flood embankments and sheet piling to protect properties from the 1 in 50 year event.				
Potential impacts					
Economic:	The proposed flood protection scheme has estimated damages avoided of £3.2 million and an estimated benefit cost ratio for temporary defences of 1.22; for permanent defences of 0.72 (based on 50 year flood).				
Social:	A reduction in flood risk would have a positive benefit to the health and wellbeing of the community. In addition there are one community facility, one emergency service and two utilities which have been identified as potentially benefitting from this action. There may be negative impacts through disturbance to the local community during the construction phase.				
Environmental:	Flood protection schemes can have both positive and negative impacts on the ecological quality of the environment depending on how they are designed. The proposed flood protection works are partially located on the Allan Water (water body ID 6832). The				

Environmental:	physical condition of this river is identified by SEPA to be at less than good status. Opportunities to improve the condition of the river should be considered by coordinating with river basin management planning. To be in accord with the FRM Strategy, the responsible authority (and where applicable, the licensing authority) should seek to ensure that the works will not have an adverse effect on the integrity of the Kipeenrait Glen Special Area of Conservation and River Teith Special Area of Conservation. Furthermore, a number of nationally and locally designated sites are present in the study area and could be positively or negatively impacted. These include conservation areas and listed buildings.
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Action (ID):	SURFACE WATER PLAN/STUDY (90050018)		
Objective (ID):	Reduce economic damages and number of residential properties at risk of surface water flooding in Dunblane where practical (9005)		
Delivery lead:	Stirling Council		
Status:	Ongoing	Indicative delivery:	2016-2021
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 (90160018)		
Objective (ID):	Reduce economic damages and number of residential properties at risk of surface water flooding in Stirling and Bridge of Allan where practical (9016)		
Delivery lead:	Stirling Council		
Status:	Ongoing	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 (90160019)		
Objective (ID):	Reduce economic damages and number of residential properties at risk of surface water flooding in Stirling and Bridge of Allan where practical (9016)		
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 (90320019)		
Objective (ID):	Reduce overall flood risk (9032)		
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 (90070017)		
Objective (ID):	Reduce economic damages to residential and non-residential properties in Bridge of Allan caused by flooding from the Allan Water (9007)		
Delivery lead:	Stirling Council		
Status:	Existing	Indicative delivery:	Ongoing
Description:	Continue to maintain the existing flood protection scheme that protects Bridge of Allan. The Bridge of Allan Flood Protection Scheme consists of earth embankments, flood walls and other works.		

Action (ID):	MAINTAIN FLOOD WARNING (90320030)		
Objective (ID):	Reduce overall flood risk (9032)		
Delivery lead:	SEPA		
Status:	Existing	Indicative delivery:	Ongoing
Description:	Continue to maintain the Dunblane and Bridge of Allan flood warning areas which cover the Allan Water and are part of the Stirling river flood warning scheme.		

Action (ID):	FLOOD FORECASTING (90320009)		
Objective (ID):	Reduce overall flood risk (9032)		
Delivery lead:	SEPA		
Status:	Existing	Indicative delivery:	Ongoing
Description:	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.		

Action (ID):	SELF HELP (90320011)		
Objective (ID):	Reduce overall flood risk (9032)		
Delivery lead:	—		
Status:	Existing	Indicative delivery:	Ongoing
Description:	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.		

Action (ID):	AWARENESS RAISING (90320013)		
Objective (ID):	Reduce overall flood risk (9032)		
Delivery lead:	Responsible authorities		
Status:	Existing	Indicative delivery:	Ongoing
Description:	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. 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. Local authorities will be undertaking additional awareness raising activities. Further details will be set out in the Local FRM Plan.		

Action (ID):	MAINTENANCE (90320007)		
Objective (ID):	Reduce overall flood risk (9032)		
Delivery lead:	Stirling Council, asset / land managers		
Status:	Existing	Indicative delivery:	Ongoing
Description:	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.		

Action (ID):	EMERGENCY PLANS/RESPONSE (90320014)		
Objective (ID):	Reduce overall flood risk (9032)		
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 (90010001)		
Objective (ID):	Avoid an overall increase in flood risk (9001) Reduce overall flood risk (9032)		
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.		