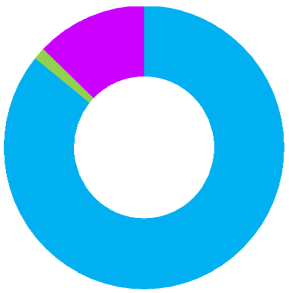
Kilwinning (Potentially Vulnerable Area 12/05)

Local Plan District	Local authority	Main catchment
Ayrshire	North Ayrshire Council	River Garnock

Summary of flooding impacts



At risk of flooding

- 170 residential properties
- 50 non-residential properties
- £400,000 Annual Average Damages

(damages by flood source shown left)

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.

Summary of actions to manage flooding

The actions below have been selected to manage flood risk.

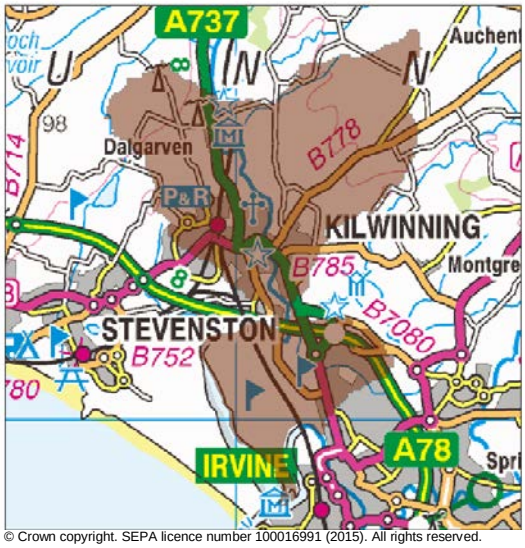
Flood protection scheme/works	*Natural flood management works*	New flood warning	*Community flood action groups*	*Property level protection scheme*	*Site protection plans*
Flood protection study	*Natural flood management study*	*Maintain flood warning*	Awareness raising	Surface water plan/study	Emergency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

Kilwinning (Potentially Vulnerable Area 12/05)

Local Plan District	Local authority	Main catchment
Ayrshire	North Ayrshire Council	River Garnock

Background

This Potentially Vulnerable Area is located to the north of Irvine and includes a large proportion of Kilwinning. It is approximately 30km^2 (shown below).



The area has a risk of river, surface water and coastal flooding. The majority of damages are caused by river flooding predominately from the River Garnock, River Irvine and the Bannoch Burn.

There are approximately 170 residential properties and 50 non-residential properties at risk of flooding. The Annual Average Damages is approximately £400,000.

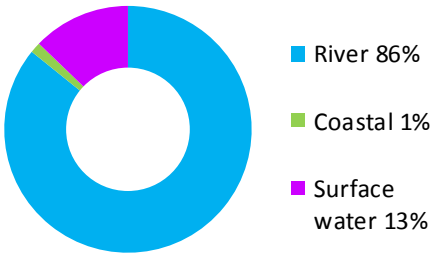


Figure 1: Annual Average Damages by flood source

Summary of flooding impacts

River flooding from the River Garnock, River Irvine and the Bannoch Burn present risk to residential and non-residential properties within Kilwinning and to the area south of the A78, where the Irvine Golf Club and former industrial area are deemed at risk. There are also transport routes at risk, notably railway lines and the A737 and A78. A flood study for the Bannoch Burn completed in February 2014 identified that the culverted section of the Bannoch Burn is lacking capacity and can contribute to flooding.

Surface water flooding is predicted to impact the residential area of Kilwinning with considerable potential disruption along the A737. The areas at highest risk from surface water flooding will require the preparation of surface water management plans.

There is a small risk from coastal flooding over the lower reaches of the River Garnock where there is a tidal influence but no residential or non-residential properties are predicted to be affected.

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.

Within this Potentially Vulnerable Area it is estimated that climate change will increase the number of residential properties at risk of flooding from approximately 170 to 220 and the number of non-residential properties from approximately 50 to 60.

The location of the impacts of flooding is shown in Figure 3. Most of the impacts from are within Kilwinning and Irvine. These include flooding risk to people, non-residential properties, utilities, roads and railways. The A78 is at risk of flooding between Kilwinning and Irvine. Three designated cultural heritage sites are at risk of flooding, and small areas of environmentally designated sites (approximately 1.5km^2) are also at risk.

	1 in 10 High likelihood	1 in 200 Medium likelihood	1 in 1000 Low likelihood
Residential properties (total 7,700)	60	170	200
Non-residential properties (total 380)	10	50	60
People	130	380	440
Community facilities	0	<10 Healthcare facilities	<10 Healthcare facilities
Utilities assets	<10	<10	<10
Transport links - roads (km)	1.7 (of which 0.4 is A road)	4.2 (of which 1.0 is A road)	4.6 (of which 1.4 is A road)
Transport links - rail (km)	0.1	2.3	2.4
Environmental designated areas (km^2)	1.3	1.5	1.6
Designated cultural heritage sites	3	3	3
Agricultural land (km^2)	2.6	3.4	3.8

Table 1: Summary of flooding impacts[1]

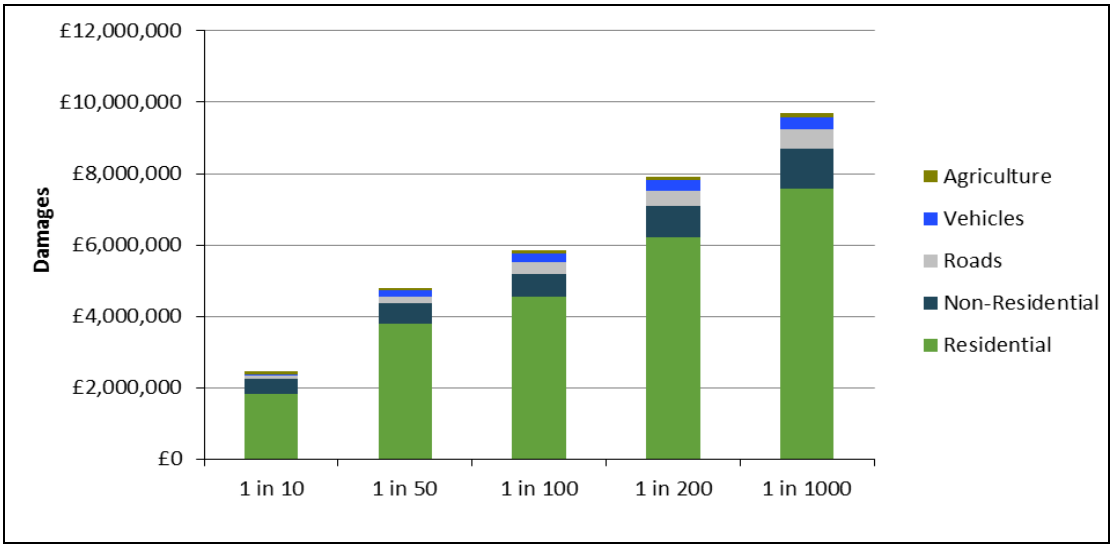


Figure 2: Damages by flood likelihood

[1] Some receptors are counted more than once if flooded from multiple sources

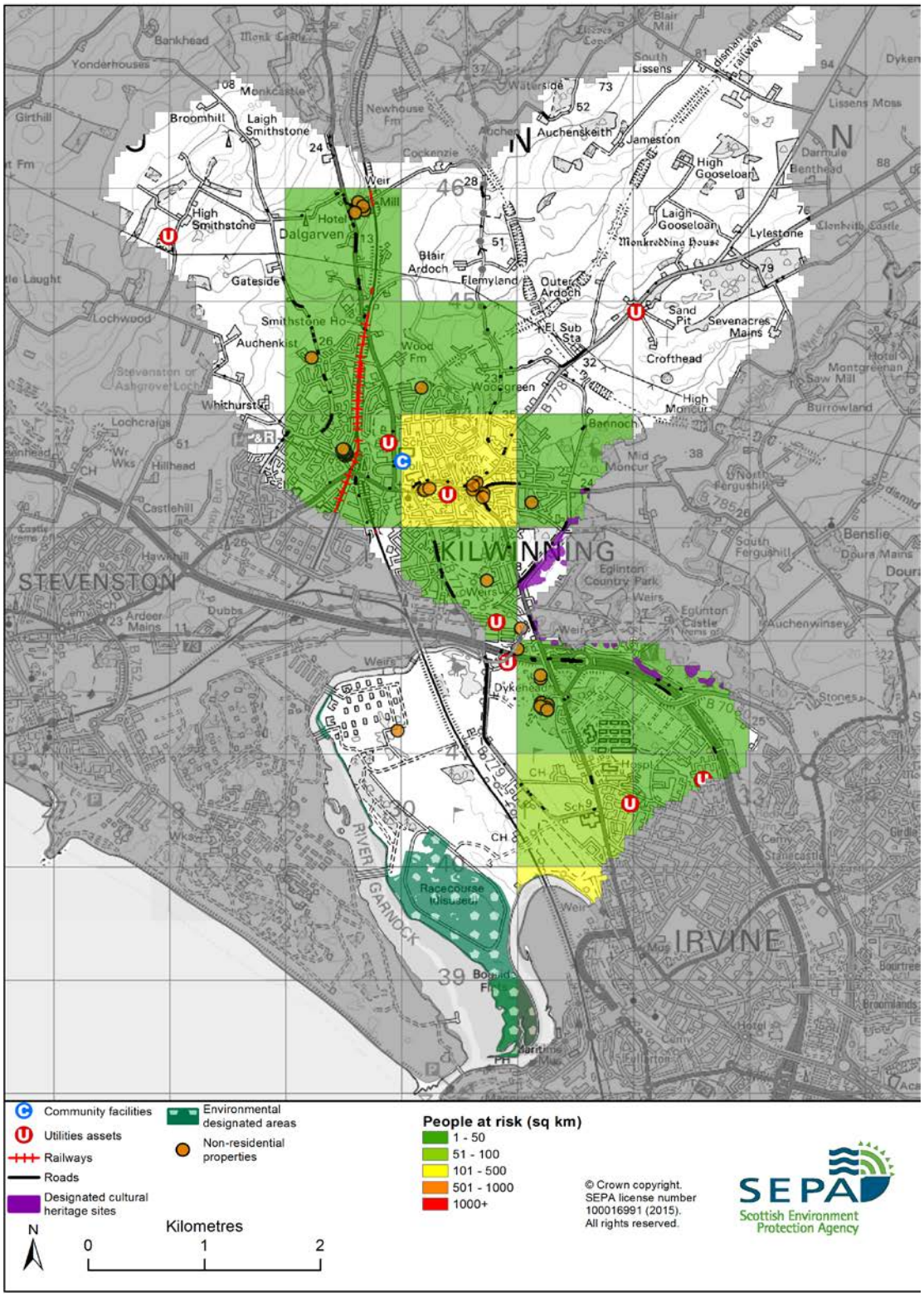


Figure 3: Impacts of flooding

History of flooding

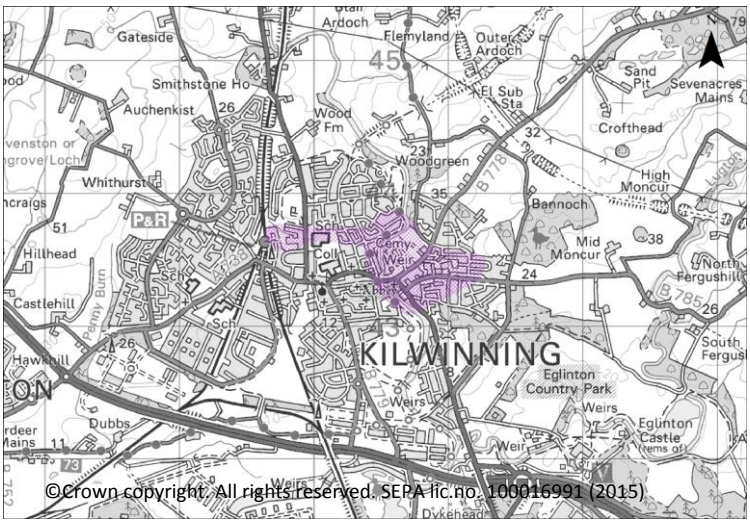
River flooding is the most commonly reported flood source in the area although there is no discernible pattern or clustering. There have been reports of flooding from the Bannoch Burn between 2004 and 2014, including flooding to the A737 trunk road. On the 22 October 2013 the Bannoch Burn flooded at Redstone Avenue and Fergushill Road, Kilwinning resulting in some properties being evacuated. An event of similar magnitude also occurred on the 29 September 2010.

River floods have also been attributed to the Red Burn and Wood Burn. In 2006 the Wood Burn flooded properties in Gavin Way and The Meadows. In 2004 the Red Burn flooded an area of the Kilwinning road.

Objectives to manage flooding in Potentially Vulnerable Area 12/05

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 Kilwinning Potentially Vulnerable Area.

Reduce the risk of river flooding to residential properties and non-residential properties in Kilwinning

Indicators:	Target area:
• 90 residential properties • <10 non-residential properties • £240,000 Annual Average Damages	
Objective ID: 12013	

Target area	Objective	ID	Indicators within PVA
Kilwinning, Saltcoats, Ardrossan and Stevenston	Reduce the economic damages and risk to people from surface water flooding in Kilwinning, Saltcoats, Ardrossan and Stevenston	12041	* See note below
Irvine	Reduce the economic damages and risk to people from surface water flooding in Irvine	12042	* See note below
Applies across Ayrshire Local Plan District	Avoid an overall increase in flood risk	12039	• 170 residential properties • £400,000 Annual Average Damages
Applies across Ayrshire Local Plan District	Reduce overall flood risk	12082	• 170 residential properties • £400,000 Annual Average Damages
Applies across Ayrshire 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 12/05 there are 70 residential properties at risk and Annual Average Damages of £52,000.

Actions to manage flooding in Potentially Vulnerable Area 12/05

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 Kilwinning 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):	**NEW FLOOD WARNING** (120820010)		
Objective (ID):	Reduce overall flood risk (12082)		
Delivery lead:	SEPA		
Status:	**Ongoing**	Indicative delivery:	**2016-2021**
Description:	Continue with the development and implementation of a flood warning scheme on the River Garnock. Detail of communities that will benefit from the warnings will be determined during scheme development.		

Action (ID):	**FLOOD PROTECTION STUDY** (120130005)		
Objective (ID):	Reduce the risk of river flooding to residential properties and non-residential properties in Kilwinning (12013)		
Delivery lead:	North Ayrshire Council		
Priority:	National:	Within local authority:	
	43 of 168	**3 of 5**	
Status:	**Not started**	Indicative delivery:	**2016-2021**
Description:	As part of the Stevenston Point integrated catchment study further hydraulic modelling will be undertaken on the Wood Burn. Upgrading of culverts on the Wood Burn will be appraised as part of that detailed study along with sustainable drainage systems. In addition, it is recommended that a study is undertaken, to further investigate the feasibility of a flood protection scheme focusing on,		

	modification of control structures by removing a weir and construction of a river wall along the River Garnock. This study should take account of the proposed defences on the River Garnock. It should also consider the potential for runoff control and sediment management within the catchment and the natural flood management study on the River Garnock and tributaries. Other actions may also be considered to select the most sustainable combination of actions.
Potential impacts	
Economic:	The flood protection study should consider how to reduce flood risk to 85 residential properties and 5 non-residential properties in this location, with potential damages avoided of up to £7.1 million. The economic impact of natural flood management actions is difficult to define. However, these actions can reduce flood risk for high likelihood events. In this location, it has been estimated that 49 residential and non-residential properties could potentially benefit from natural flood management actions.
Social:	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 flood protection study area. Natural flood management actions can restore and enhance natural environments and create opportunities for recreation and tourism. There may be negative impacts through disturbance to the local community during the construction phase.
Environmental:	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment. Natural flood management actions can have a positive impact by restoring and enhancing natural habitats. This study is proposed for a number of rivers. Part of the River Garnock (water body ID 10379) is identified by river basin management planning to be at less than good status for its physical condition. Future works could improve the condition of the rivers or degrade them. Opportunities to improve the condition of the rivers should be considered by coordinating with river basin management planning. There are no international, national or local level environmental designations that are likely to be significantly impacted by this action. Downstream of these culverts there may be negative impacts on water quality through increased erosion and sedimentation on the River Garnock. There is the potential for improvements to fish passage from upgrading of the culverts and weir removal. Increased flows from removal of this weir may cause increased erosion and sedimentation on the River Garnock. There is likely to be a direct loss of natural and semi-natural habitat and displacement of species in the footprint and vicinity of the direct defences. There is the potential for negative impacts on local water quality downstream of works during the construction period. However, there is the potential for slight positive impacts on water quality from the implementation of sustainable drainage systems in the area. There is also the potential for negative impacts on the Kilwinning Bridge listed heritage structure.

Action (ID):	**SURFACE WATER PLAN/STUDY** (120410018)
Objective (ID):	Reduce the economic damages and risk to people from surface water flooding in Kilwinning, Saltcoats, Ardrossan and Stevenston (12041)

Delivery lead:	North Ayrshire Council		
Status:	**Not started**	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** (120410019)		
Objective (ID):	Reduce the economic damages and risk to people from surface water flooding in Kilwinning, Saltcoats, Ardrossan and Stevenston (12041)		
Delivery lead:	Scottish Water in partnership with North Ayrshire Council		
Status:	**Not started**	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):	**SURFACE WATER PLAN/STUDY** (120420018)		
Objective (ID):	Reduce the economic damages and risk to people from surface water flooding in Irvine (12042)		
Delivery lead:	North Ayrshire Council		
Status:	**Not started**	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** (120420019)		
Objective (ID):	Reduce the economic damages and risk to people from surface water flooding in Irvine (12042)		
Delivery lead:	Scottish Water in partnership with North Ayrshire Council		
Status:	**Ongoing**	Indicative delivery:	**2016-2021**
Description:	An integrated catchment study for Irvine is under development which will assess flood mitigation actions in detail. As this study progresses it should further investigate in detail the potential benefit of natural flood management for runoff control to Irvine.		

Action (ID):	**STRATEGIC MAPPING AND MODELLING** (120820019)		
Objective (ID):	Reduce overall flood risk (12082)		
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):	**FLOOD FORECASTING** (120820009)		
Objective (ID):	Reduce overall flood risk (12082)		
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** (120820011)		
Objective (ID):	Reduce overall flood risk (12082)		
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** (120820013)		
Objective (ID):	Reduce overall flood risk (12082)		
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 engage with the community through local participation in national initiatives, including partnership working with Neighbourhood Watch Scotland. In addition, SEPA will engage with local authorities and community resilience groups 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** (120820007)		
Objective (ID):	Reduce overall flood risk (12082)		
Delivery lead:	Local authorities, 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** (120820014)		
Objective (ID):	Reduce overall flood risk (12082)		
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** (120390001)		
Objective (ID):	Avoid an overall increase in flood risk (12039) Reduce overall flood risk (12082)		
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.		