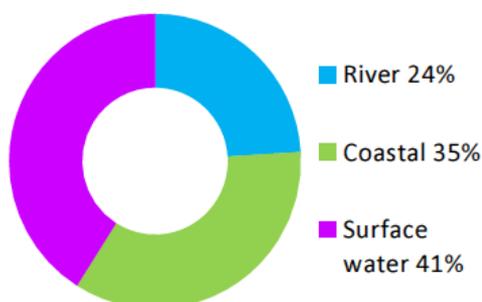


# Dunbar and West Barns (Potentially Vulnerable Area 10/25)

Local Plan District	Local authority	Main catchment
Forth Estuary	East Lothian Council	East Lothian coastal

## Summary of flooding impacts



### At risk of flooding

- 40 residential properties
- 20 non-residential properties
- £220,000 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.

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

Actions

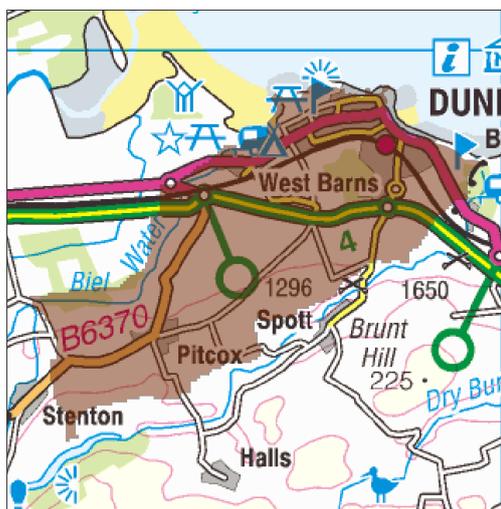
## Dunbar and West Barns (Potentially Vulnerable Area 10/25)

Local Plan District	Local authority	Main catchment
Forth Estuary	East Lothian Council	East Lothian coastal

### Background

This Potentially Vulnerable Area is 19km<sup>2</sup> and part of the East Lothian and Berwickshire catchment group (shown below). This is a small, coastal area covering Dunbar and West Barns and its immediate surroundings.

The main watercourse is the Biel Water which flows through the west of the area towards the north east, passing around the West Barns and discharging into the North Sea at Belhaven Bay.

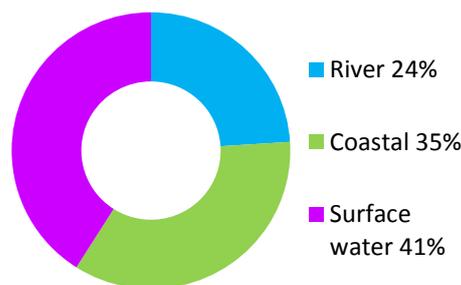


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The area has a risk of river, coastal and surface water flooding. The majority of damages in this Potentially Vulnerable Area are caused by surface water flooding.

There are approximately 40 residential properties and 20 non-residential properties at risk of flooding.

The Annual Average Damages are approximately £220,000.



**Figure 1: Annual Average Damages by flood source**

### Summary of flooding impacts

The greatest risk of river flooding is from the Biel Water and the Hedderwick Burn to Dunbar and West Barns. The greatest risk of coastal flooding is from the North Sea to Dunbar and West Barns.

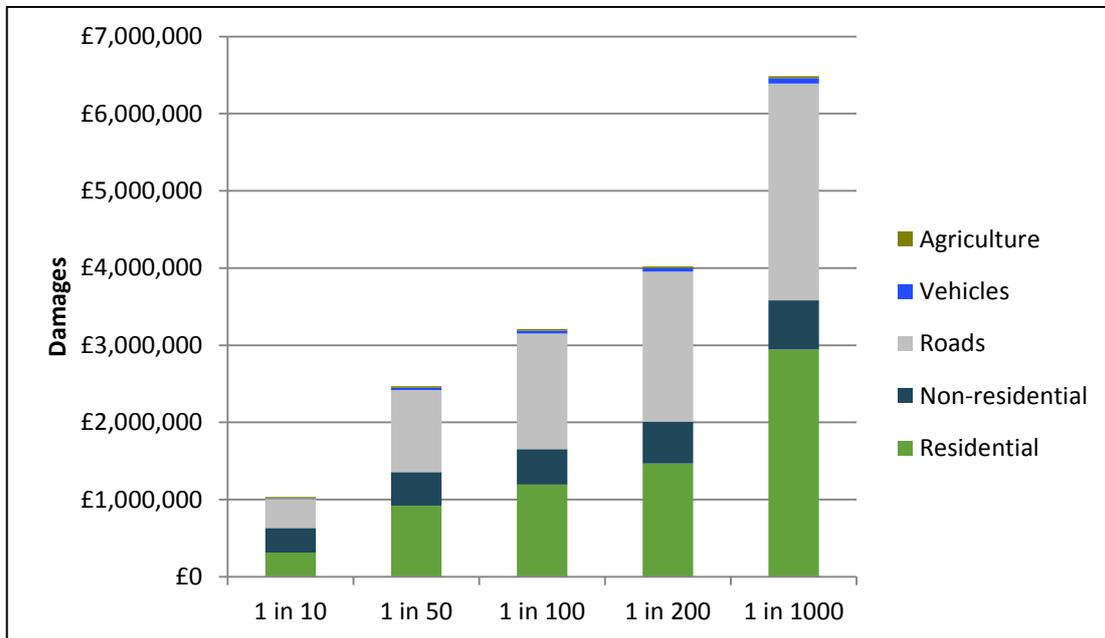
The risk of flooding to people, property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is summarised in Table 1.

The damages associated with floods of different likelihood are shown in Figure 2. For this Potentially Vulnerable Area the highest damages are to roads, notably the A1 and Shore Road, and residential properties. The location of the impacts of flooding is shown in Figure 3.

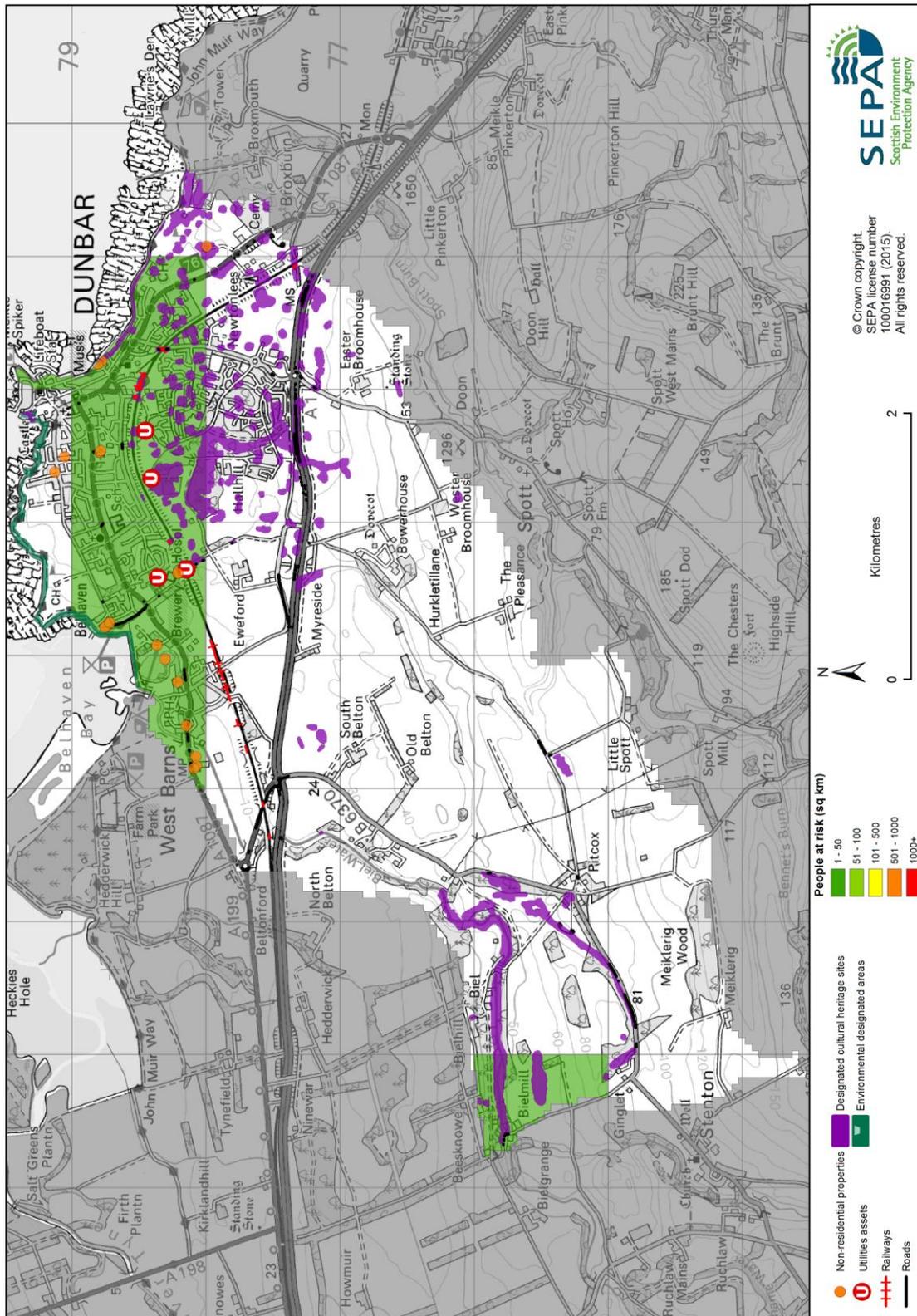
The figures presented for Annual Average Damages include damages to residential properties, non-residential properties, transport and agriculture.

	1 in 10 High likelihood	1 in 200 Medium likelihood	1 in 1000 Low likelihood
Residential properties (total 4,100)	<10	40	60
Non-residential properties (total 600)	10	20	20
People	20	80	140
Community facilities	0	0	0
Utilities	<10	<10	<10
Transport links (excluding minor roads)	3 A roads, 1 B road at 39 locations  1 Railway route at 15 locations: Berwick-upon-Tweed to Edinburgh	3 A roads, 1 B road at 49 locations  1 Railway route at 17 locations: Berwick-upon-Tweed to Edinburgh	3 A roads, 1 B road at 57 locations  1 Railway route at 18 locations: Berwick-upon-Tweed to Edinburgh
Environmental designated areas (km <sup>2</sup> )	0.2	0.2	0.2
Designated cultural heritage sites	9	10	10
Agricultural land (km <sup>2</sup> )	0.3	0.4	0.5

**Table 1:** Summary of flooding impacts



**Figure 2:** Damages by flood likelihood



**Figure 3: Impacts of flooding**

## History of flooding

The following flood events have been identified as significant in this Potentially Vulnerable Area:

- 5 December 2012: A combination of wind and high tides caused large waves and coastal flooding along the east coast of Scotland. There was significant damage to North Berwick harbour and damage to the communal slipway at Dunbar harbour.
- 30 March 2010: A tidal surge coinciding with the highest mean tides of the year caused extensive flooding along the east coast of Scotland. Locations within this coastal area affected included Leith, Musselburgh, Prestonpans, Port Seton, Dunbar and North Berwick. The flood caused damage to properties, harbours, seawalls and roads.
- 22 October 2002: Belhaven hospital flooded from the river. Patients had to be evacuated after the generator room was shut down and wards closed.
- August 1949: Storm surge resulted in flooding to Dunbar.

## Objectives to manage flooding in Potentially Vulnerable Area 10/25

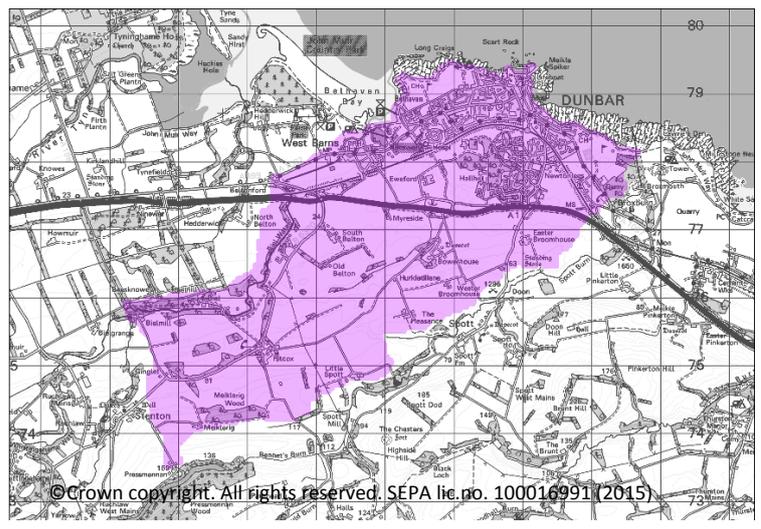
Objectives provide a common goal and shared ambition for managing floods. These objectives have been set by SEPA and agreed with flood risk management authorities following consultation. They were identified through an assessment of the underlying evidence of the causes and impacts of flooding. Target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

### Reduce economic damages to residential and non-residential properties in the Dunbar and West Barns Potentially Vulnerable Area caused by river and coastal flooding

Indicators:

Target area:

- £66,000 Annual Average Damages from residential properties
- £32,000 Annual Average Damages from non-residential properties



Objective ID: 10083

Target area	Objective	ID	Indicators within PVA
Applies across Forth Estuary Local Plan District	Avoid an overall increase in flood risk	10001	<ul style="list-style-type: none"> <li>• 40 residential properties</li> <li>• £220,000 Annual Average Damages</li> </ul>
Applies across Forth Estuary Local Plan District	Reduce overall flood risk	10099	<ul style="list-style-type: none"> <li>• 40 residential properties</li> <li>• £220,000 Annual Average Damages</li> </ul>
Applies across Forth Estuary 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.		

## Actions to manage flooding in Potentially Vulnerable Area 10/25

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 Dunbar and West Barns Potentially Vulnerable Area.

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

<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (100830005)</b>		
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties in the Dunbar and West Barns Potentially Vulnerable Area caused by river and coastal flooding (10083)		
<b>Delivery lead:</b>	East Lothian Council		
<b>Priority:</b>	National:	Within local authority:	
	<b>110 of 168</b>	<b>3 of 3</b>	
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	A flood protection study has been recommended for Dunbar/ West Barns to assess whether modification of conveyance, flood defences, sediment management and natural flood management could reduce flood risk. The study should also consider the viability of property level protection. Natural flood management options that should be considered include wave attenuation. The study should take a sustainable approach and consider the interaction between actions upstream and downstream and potential effects on coastal processes along the shoreline. The study should also assess the risk and mitigation of wave overtopping at North Berwick.		
<b>Potential impacts</b>			
<b>Economic:</b>	The study could benefit 49 residential properties and 15 non-residential properties at risk of flooding in this location, with potential damages avoided of up to £3.4 million.		
<b>Social:</b>	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. Natural flood management actions can restore and enhance natural environments and create opportunities for recreation and tourism.		

<b>Environmental:</b>	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment and 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 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 Firth of Forth Special Protection Area. Conservation areas, battlefields and listed buildings are also present in the study area and could be positively or negatively impacted.
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<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990016)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (10099)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	SEPA will seek to develop flood mapping in the Dunbar to Stirling area to improve understanding of coastal 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.		

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990019)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (10099)		
<b>Delivery lead:</b>	Scottish Water		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	Scottish Water will carry out an assessment of flood risk within the highest risk sewer catchments to improve knowledge and understanding of surface water flood risk.		

<b>Action (ID):</b>	<b>MAINTAIN FLOOD WARNING (100990030)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (10099)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	Continue to maintain the Dunbar including West Barns flood warning area which is part of the Firth of Forth and Tay coastal flood warning scheme.		

<b>Action (ID):</b>	<b>FLOOD FORECASTING (100990009)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (10099)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>COMMUNITY FLOOD ACTION GROUPS (100830012)</b>		
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties in the Dunbar and West Barns Potentially Vulnerable Area caused by river and coastal flooding (10083)		
<b>Delivery lead:</b>	Community		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	Dunbar Shore and Harbour Neighbourhood Group, East Lothian Tenants and Residents Panel and North Berwick Environment Group operate in this area. The groups could help increase community resilience to flooding.		

<b>Action (ID):</b>	<b>SELF HELP (100990011)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (10099)		
<b>Delivery lead:</b>	—		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>AWARENESS RAISING (100990013)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (10099)		
<b>Delivery lead:</b>	Responsible authorities		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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 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.</p>		

<b>Action (ID):</b>	<b>MAINTENANCE (100990007)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (10099)		
<b>Delivery lead:</b>	East Lothian Council, asset / land managers		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (100990014)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (10099)		
<b>Delivery lead:</b>	Category 1 and 2 Responders		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>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.</p> <p>East Lothian Council strategically deploys temporary flood barriers and sandbags when properties are threatened by flooding.</p>		

<b>Action (ID):</b>	<b>PLANNING POLICIES (100010001)</b>		
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (10001) Reduce overall flood risk (10099)		
<b>Delivery lead:</b>	Planning authority		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>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.</p>		