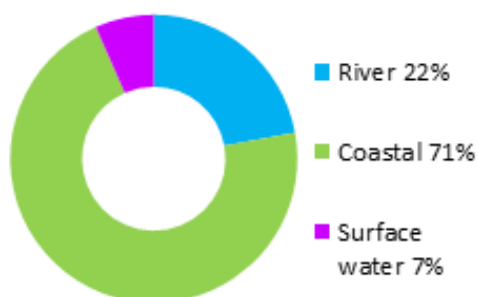


## St Andrews to Guardbridge (Potentially Vulnerable Area 07/16)

Local Plan District	Local authority	Main catchment
Tay Estuary and Montrose Basin	Fife Council	North Fife coastal

### Summary of flooding impacts



#### At risk of flooding

- 80 residential properties
- 40 non-residential properties
- £680,000 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>	New flood warning	<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
<i>Maintain flood protection scheme</i>	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

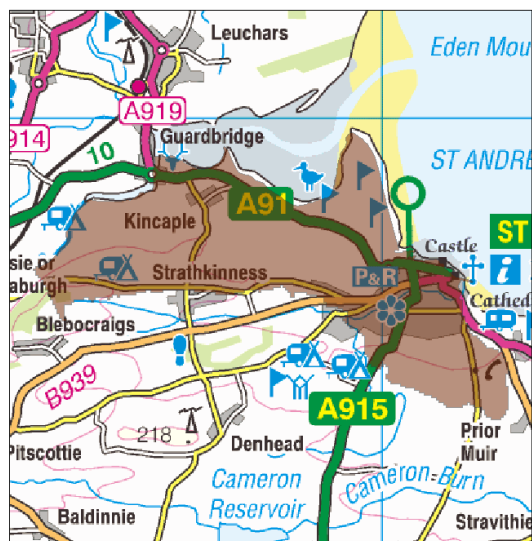
Actions

# St Andrews to Guardbridge (Potentially Vulnerable Area 07/16)

Local Plan District	Local authority	Main catchment
Tay Estuary and Montrose Basin	Fife Council	North Fife coastal

## Background

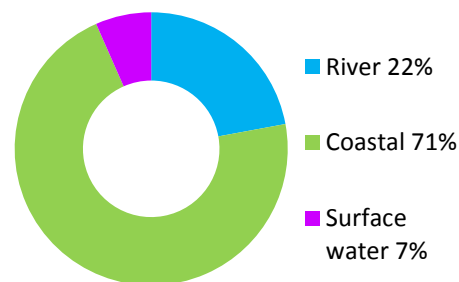
This Potentially Vulnerable Area is 23km<sup>2</sup> (shown below). It is situated on the south side of the River Eden and the Eden Estuary and also contains the lower reaches of the Kinness Burn. It includes the urban areas of Guardbridge and St Andrews.



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This Potentially Vulnerable Area has a risk of river, coastal and surface water flooding with the majority of damages caused by coastal flooding.

There are approximately 80 residential properties and 40 non-residential properties at risk of flooding. The Annual Average Damages are approximately £670,000.



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

## Summary of flooding impacts

The highest risk of flooding is in St Andrews from the Kinness Burn and surface water flooding. Roads are notably impacted with A91 road showing the highest damages.

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 roads, residential properties and non-residential properties. The location of the impacts of flooding is shown in Figure 3.

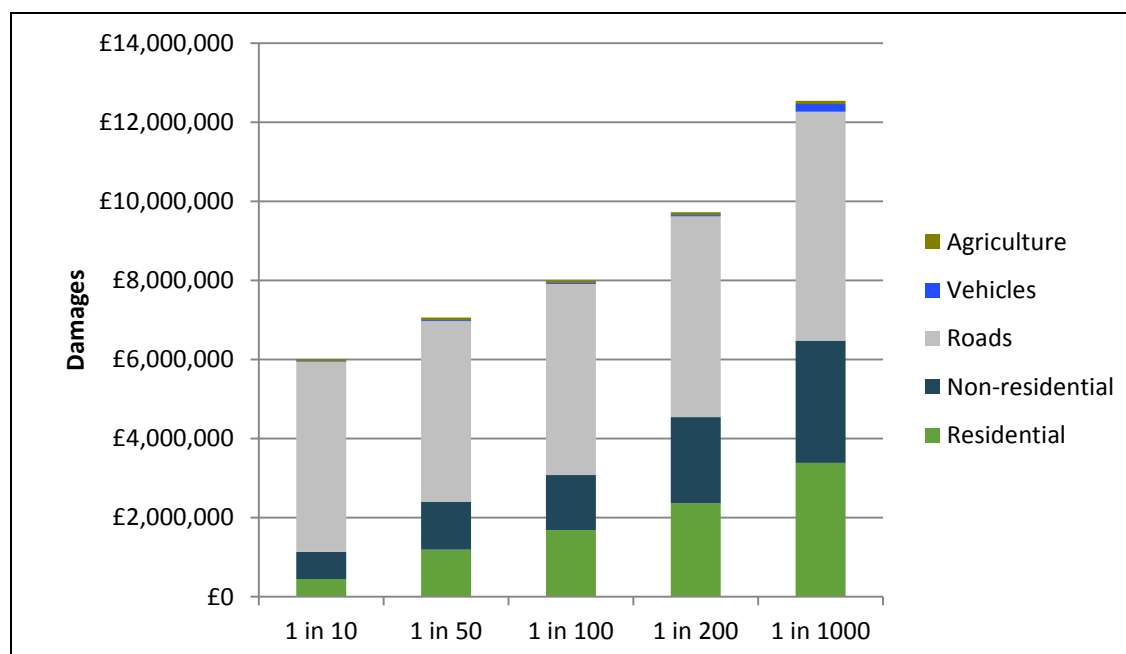
The figures presented for Annual Average Damages include damages to residential properties, non-residential properties, transport and agriculture.

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 5,900)	10	80	110
Non-residential properties (total 940)	20	40	60
People	30	180	240
Community facilities	0	<10 Educational buildings	<10 Includes: educational buildings and emergency services
Utilities assets	<10	<10	<10
Transport links (excluding minor roads)	3 A roads, 1 B road at 23 locations	3 A roads, 1 B road at 35 locations	3 A roads, 1 B road at 45 locations
Environmental designated areas (km <sup>2</sup> )	0.9	1.0	1.0
Designated cultural heritage sites	6	8	8
Agricultural land (km <sup>2</sup> )	1.9	2.6	3.0

**Table 1:** Summary of flooding impacts



**Figure 2:** Damages by flood likelihood

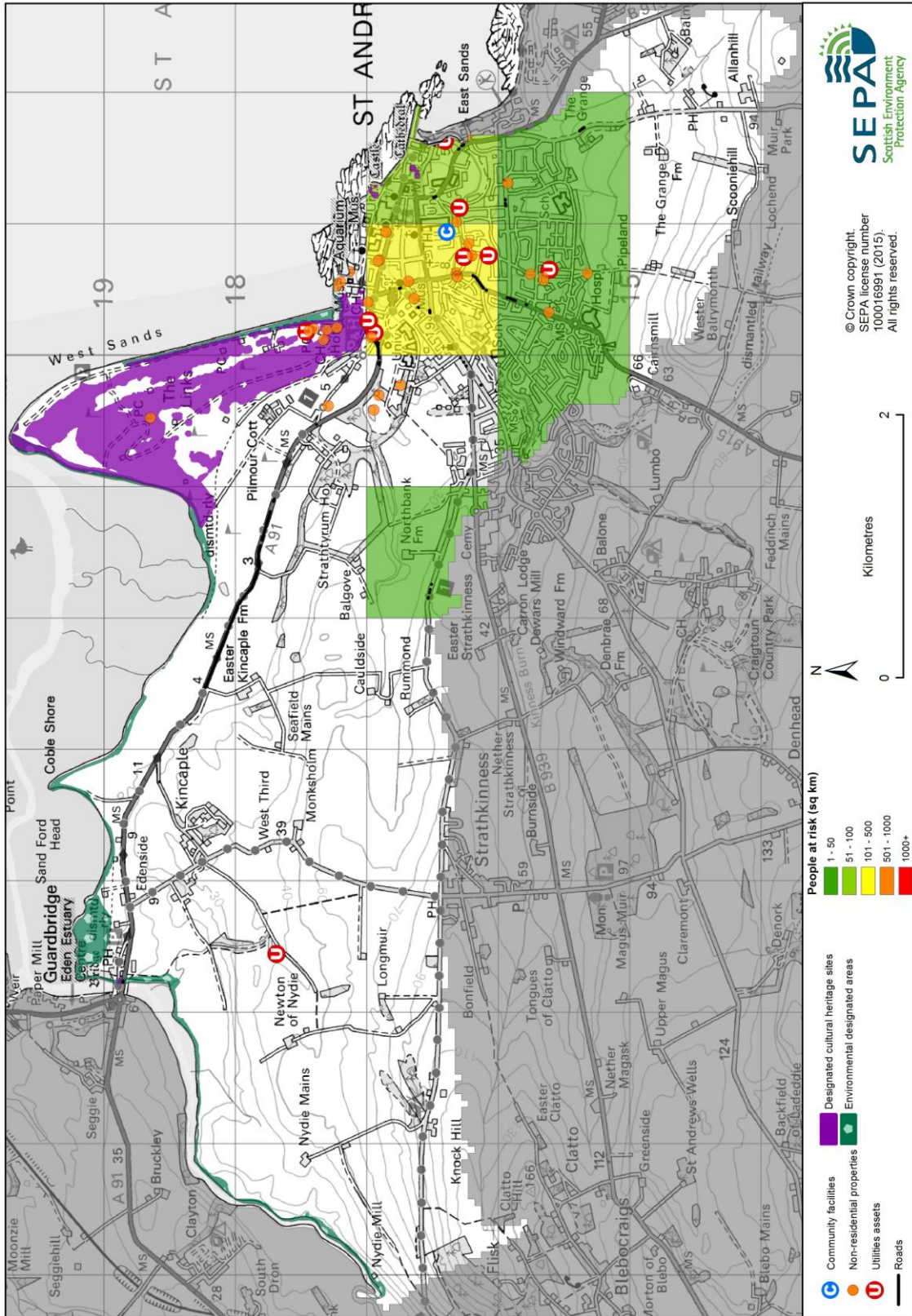


Figure 3: Impacts of flooding

## History of flooding

The following significant floods have been recorded in this Potentially Vulnerable Area:

- 15 December 2012: St Andrews was affected when a combination of wind and high tides caused large waves and coastal flooding along the east coast of Scotland.
- 30 March 2010: St Andrews was affected when a tidal surge coincided with the highest mean tides of the year causing extensive flooding along the east coast of Scotland.
- 10-11 August 2004: Kinness Burn overtopped resulting in flooding of properties in Murray Park, Auld Burn Park and Dempster Terrace.
- April 1988: Kinness Burn flooded affecting properties in Dempster Court, St Nicholas Street and Wood Burn Place.

## Objectives to manage flooding in Potentially Vulnerable Area 07/16

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 St Andrews to Guardbridge Potentially Vulnerable Area.

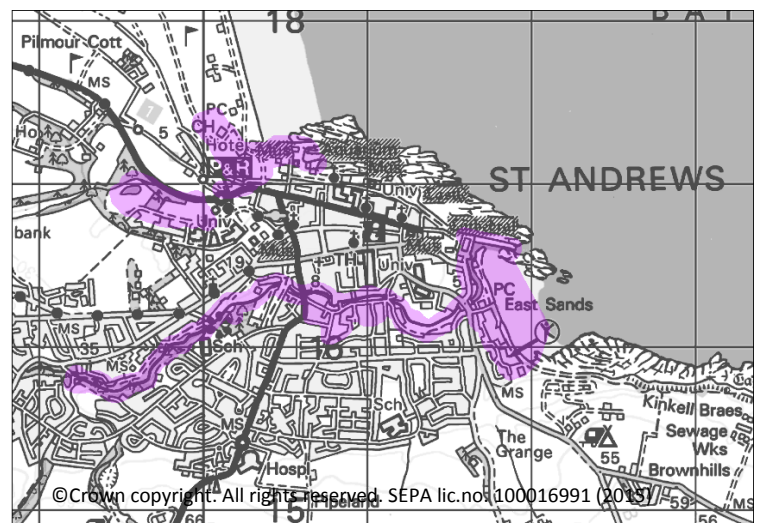
### Reduce economic damages to residential and non-residential properties and risk to people in St Andrews caused by flooding from the Kinness Burn

Indicators:

- 180 people
- £87,000 Annual Average Damages from residential properties
- £49,000 Annual Average Damages from non-residential properties

Objective ID: 7042, 7043

Target area:



Target area	Objective	ID	Indicators within PVA
St Andrews	Reduce economic damages and number of residential properties at risk of surface water flooding in St Andrews where practical	7040	* See note below
Applies across Tay Estuary and Montrose Basin Local Plan District	Avoid an overall increase in flood risk	7001	<ul style="list-style-type: none"> <li>• 80 residential properties</li> <li>• £670,000 Annual Average Damages</li> </ul>
Applies across Tay Estuary and Montrose Basin Local Plan District	Reduce overall flood risk	7054	<ul style="list-style-type: none"> <li>• 80 residential properties</li> <li>• £670,000 Annual Average Damages</li> </ul>
Applies across Tay Estuary and Montrose Basin 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 07/16 there are 10 residential properties at risk and Annual Average Damages of £41,000.

## Actions to manage flooding in Potentially Vulnerable Area 07/16

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 St Andrews to Guardbridge 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

<b>Action (ID):</b>	<b>FLOOD PROTECTION SCHEME/WORKS (70420006)</b>		
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties and risk to people in St Andrews caused by flooding from the Kinness Burn (7042, 7043)		
<b>Delivery lead:</b>	Fife Council		
<b>Priority:</b>	National:		Within local authority:
	<b>8 of 42</b>		<b>1 of 1</b>
<b>Status:</b>	<b>Under development</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	A flood protection scheme has been proposed for the Kinness Burn in St Andrews. The scheme requires detailed study and design. Part of this proposed flood protection scheme is located in Potentially Vulnerable Area 07/17. The benefits and impacts have been assessed for the whole scheme.		
<b>Potential impacts</b>			
<b>Economic:</b>	Estimated damages avoided of £11 million. The flood protection scheme has an estimated benefit cost ratio of 6.0.		
<b>Social:</b>	A reduction in flood risk would have a positive benefit to the health and wellbeing of the community. There may be negative impacts through disturbance to the local community during the construction phase.		
<b>Environmental:</b>	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 located on the Kinness Burn (water body ID 6107). The physical condition of this river has been 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		



**Environmental:** planning.

<b>Action (ID):</b>	<b>NEW FLOOD WARNING (70540010)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (7054)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	The area under consideration includes properties affected by flooding in Fife and Perth and Kinross and is likely to include St Andrews which is affected by flooding from the Kinness Burn. Further feasibility assessment will be required to assess delivery potential and the final detail of communities for which warnings can be provided will be determined during the scoping process.		

<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (70420005)</b>		
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties and risk to people in St Andrews caused by flooding from the Kinness Burn (7042, 7043)		
<b>Delivery lead:</b>	Fife Council		
<b>Priority:</b>	National:	Within local authority:	
	<b>57 of 168</b>	<b>7 of 16</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 St Andrews to assess whether a combination of structural actions could reduce flood risk from the Kinness Burn. The study should look at installation / modification of fluvial control structures, flood defences and natural flood management. Natural flood management options that should be considered include runoff control, river / floodplain restoration and sediment management. The study should also investigate the viability of property level protection. The study should take a catchment approach and consider the potential benefits and disbenefits and interaction between actions upstream and downstream. It should build on previous studies carried out in 2007 and 2011. Part of this proposed flood protection study is located in Potentially Vulnerable Area 07/17. The benefits and impacts have been assessed for the whole study.		
<b>Potential impacts</b>			
<b>Economic:</b>	The study could benefit 127 residential properties and six non-residential properties at risk of flooding in this location, with potential damages avoided of up to £6.1 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 and socially vulnerable people located within the study area. In addition the study could benefit two utilities located within the study area. 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. The Kinness Burn (water body ID 6107) is located within the study area and the physical condition of this river has been 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. Conservation areas, designated bathing waters 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>SURFACE WATER PLAN/STUDY (70400018)</b>		
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in St Andrews where practical (7040)		
<b>Delivery lead:</b>	Fife Council		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (70540016)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (7054)		
<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 St Andrews 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 (70540019)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (7054)		
<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 review the 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 (70540030)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (7054)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	Continue to maintain the Guardbridge and St Andrews flood warning areas which are part of the Firth of Forth and Tay coastal flood warning scheme.		

<b>Action (ID):</b>	<b>FLOOD FORECASTING (70540009)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (7054)		
<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>SELF HELP (70540011)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (7054)		
<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 (70540013)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (7054)		
<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 undertake flood risk education and awareness raising activities. In addition, SEPA will engage with Fife Council and community resilience groups 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>		

<b>Action (ID):</b>	<b>MAINTENANCE (70540007)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (7054)		
<b>Delivery lead:</b>	Fife 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 (70540014)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (7054)		
<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>Fife Council operates an emergency flood plan. Fife Council also provides flood sacks for use in emergencies and has installed flood pods containing flood protection products for use in emergencies in flood risk areas.</p>		

<b>Action (ID):</b>	<b>PLANNING POLICIES (70010001)</b>		
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (7001) Reduce overall flood risk (7054)		
<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>		