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## 2. Managing Flood Risk in Ayrshire Local Plan District

### 2.1 *Understanding of flooding within the Ayrshire Local Plan District*

This chapter presents the summaries of flooding for the Ayrshire Local Plan District and for the 18 Potentially Vulnerable Areas (PVAs) and one candidate PVA. Planned actions to manage flooding that have been prioritised for delivery between 2016 and 2021 across the whole of the LPD area and in each PVA are detailed. It identifies who will be responsible for the delivery and implementation of the actions, along with a timetable of when the actions will be undertaken and the funding arrangements.

This chapter summarises the characteristics and impacts of flooding from river, coastal and surface water sources on the Ayrshire Local Plan District and how flooding from these mechanisms are going to be managed. Greater detail on this contained within the Strategy.

Section 2.2 presents a summary for the LPD with the detail to be found in Chapter 3. Sections 3.1 to 3.19 detail actions by PVAs. Section 3.20 describes other flood risk activities undertaken by local authorities in the Ayrshire Local Plan District in order to provide as full a picture as possible of how flood risk is managed in the Ayrshire Local Plan District.

#### 2.1.1 *Flood mapping*

River, coastal and surface water flood maps were developed by SEPA for the whole of Scotland using a consistent methodology to produce outputs for the whole Scotland. This was supplemented with more detailed, local assessments where available and suitable for use.

In developing the flood maps SEPA have:

- Used the most up to date modelling techniques
- Used industry endorsed methods
- Been able to show more information than ever before on the sources and impacts of flooding
- Developed the first national natural flood management maps showing the areas where natural techniques to help reduce flood risk could be most effective.

In developing the maps SEPA worked in partnership with local authorities. They also worked with industry to define the overall approach to flood hazard mapping and undertook a series of internal checks and local authority reviews of outputs. Further information on Flood Hazard and Risk including mapping can be found at <http://map.sepa.org.uk/floodmap/map.htm>

## 2.2 Local Plan District summary

There are 18 PVAs and 1 Candidate PVAs across the Ayrshire Local Plan District – see Figure 1 and Table 1.

12/01 Noddsdale Water
12/02 Great Cumbrae Island
12/03 Largs to Stevenston
12/04 Upper Garnock Catchment
12/05 Kilwinning
12/06 River Irvine and Annick Water
12/07 Irvine to Troon
12/08 Isle of Arran
12/09 Prestwick to Ayr
12/10 Pow Burn Catchment
12/11 River Ayr
12/12 Ayr east
12/13 Ayr south
12/14 Cumnock and Catrine
12/15 Dalrymple and Patna
12/16 Straiton
12/17 Dailly
12/18 Girvan
12/19c Dalmellington

**Table 1: Ayrshire LPD catchment group**

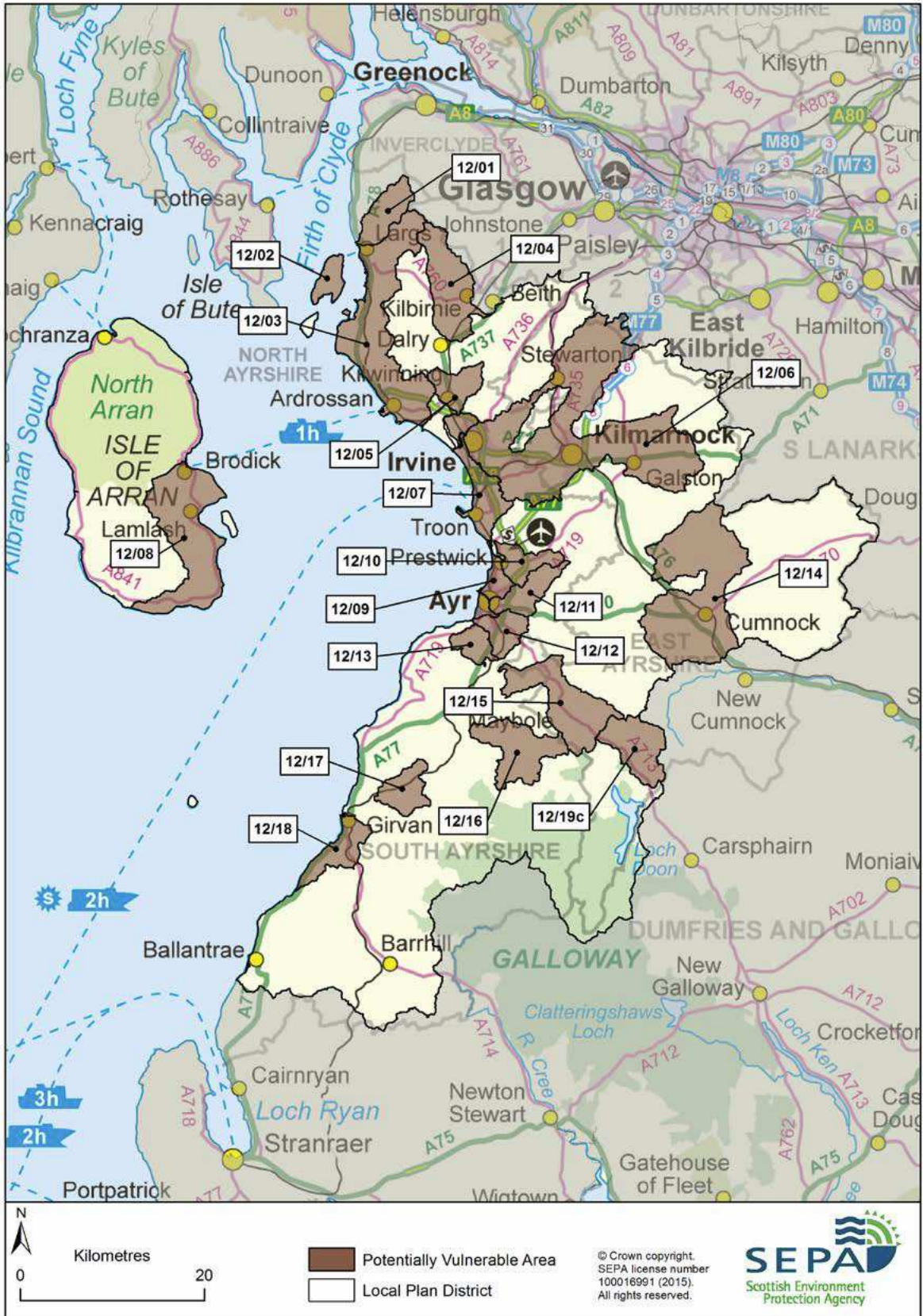
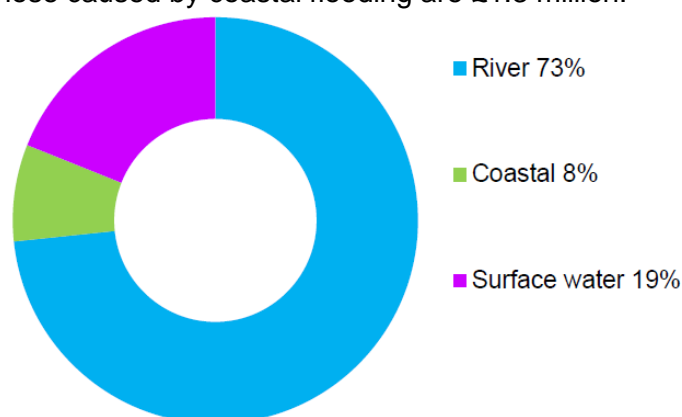


Figure 1: Ayrshire LPD catchment group

There are approximately 7,800 residential properties and approximately 2,700 non-residential properties with a risk of flooding in the Ayrshire Local Plan District. This is approximately 5% of the residential properties and over 16% of non-residential properties in the area. It is estimated that 90% of residential and non-residential properties at risk are located within Potentially Vulnerable Areas. The Annual Average Damages from flooding are approximately £17 million.

River flooding is the main source of flooding in the Local Plan District, closely followed by surface water flooding (Figure 2 to 4). The Annual Average Damages caused by river flooding are £12 million, those caused by surface water flooding are £3.1 million and those caused by coastal flooding are £1.3 million.



**Figure 2: Annual Average Damages by flood source**

Table 2 and Figure 3 show the main areas, number of properties at risk and the Annual Average Damages caused by flooding in the main towns within the Local Plan District. This includes damages to residential properties, non-residential properties, transport and agriculture. Note that economic damages to airports and rail infrastructure were not assessed as strategic information on damages at this scale is not available.

	Residential and non-residential properties at risk of flooding	Annual Average Damages
Irvine (including Dregghorn)	2,000	£4.7 million
Kilmarnock (including Hurlford)	1,300	£1.2 million
Prestwick/Ayr	1,100	£1.7 million
Troon	930	£430,000
Kilbirnie	850	£1.3 million
Saltcoats/Ardrossan	610	£450,000
Newmilns/Greenholm	420	£550,000
Galston	400	£620,000
Largs	290	£200,000
Stevenston	250	£490,000

**Table 2 Main areas at risk of flooding**

Action to manage flood risks	PVA																	
	Flood protection scheme/works	Natural flood Management works	Flood Protection Study	Natural flood Management study	Surface Water plan/study	Site protection plans	Property level protection scheme	Maintain Flood Protection Scheme	Community flood action groups	New flood warning	Maintain flood warning	Avareness raising	Emergency Plans and responses	Strategic mapping and modelling	Flood Forecasting	Self Help	Maintenance	Planning policies
12/01 Noddsdale Water			✓					N/A			N/A	✓	✓	✓	✓	✓	✓	✓
12/02 Great Cumbrae Island	✓✓		✓					✓			✓	✓	✓	✓	✓	✓	✓	✓
12/03 Largs to Stevenston			✓		✓			✓			✓	✓	✓	✓	✓	✓	✓	✓
12/04 Upper Garnock Catchment	✓			✓				N/A	✓	N/A	✓	✓	✓	✓	✓	✓	✓	✓
12/05 Kilwinning			✓		✓			N/A	✓	N/A	✓	✓	✓	✓	✓	✓	✓	✓
12/06 River Irvine and Annick Water			✓		✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
12/07 Irvine to Troon		✓	✓		✓			✓			✓	✓	✓	✓	✓	✓	✓	✓
12/08 Isle of Arran			✓					✓			✓	✓	✓		✓	✓	✓	✓
12/09 Prestwick to Ayr		✓	✓		✓			✓			✓	✓	✓	✓	✓	✓	✓	✓
12/10 Pow Burn Catchment					✓			N/A	✓	N/A	✓	✓	✓	✓	✓	✓	✓	✓
12/11 River Ayr					✓			N/A	✓	N/A	✓	✓	✓	✓	✓	✓	✓	✓
12/12 Ayr east								N/A		N/A	✓	✓	✓	✓	✓	✓	✓	✓
12/13 Ayr south								N/A		N/A	✓	✓	✓	✓	✓	✓	✓	✓
12/14 Cumnock and Catrine			✓				✓	N/A		N/A	✓	✓	✓	✓	✓	✓	✓	✓
12/15 Dalrymple and Patna			✓					✓		N/A	✓	✓	✓	✓	✓	✓	✓	✓
12/16 Straiton								N/A		N/A	✓	✓		✓	✓	✓	✓	✓
12/17 Dailly								N/A		N/A	✓	✓		✓	✓	✓	✓	✓
12/18 Girvan			✓					✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
12/19c Dalmellington*			✓					N/A		N/A	✓	✓	✓	✓	✓	✓	✓	✓

**Table 3 – Actions to manage flood risk per PVA**

Table 3 summarises the headline actions to manage flood risk over the six year plan period. These details are also provided for the LPD and each PVA in Section 2.2 and 3.1 to 3.19 respectively.

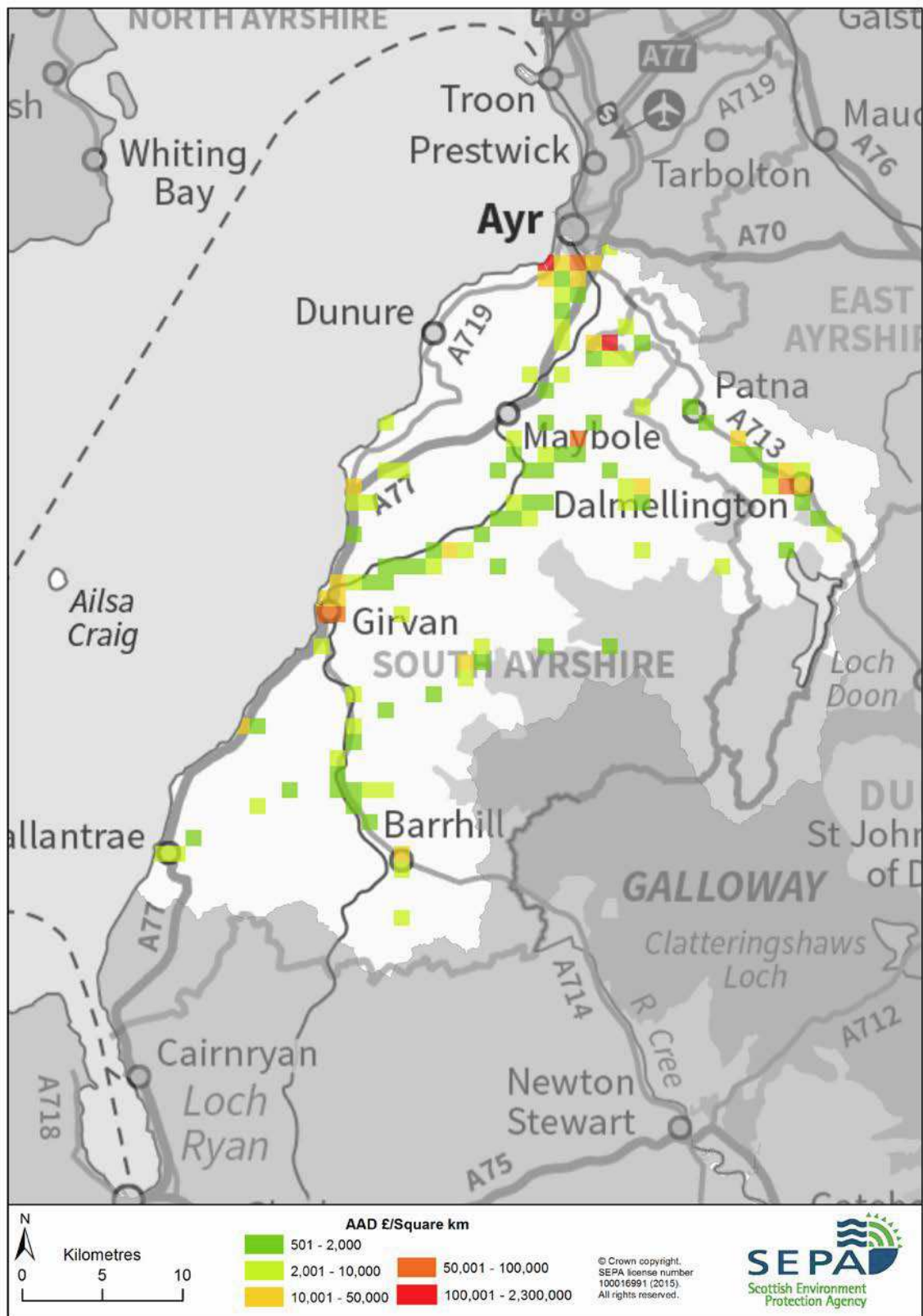
Area	Actions						
	NFM Studies	NFM Works	Flood Protection Study	Flood Protection Schemes/ Works	SWMP	Integrated Catchment Studies	Flood Warning Schemes
<b>SCOTLAND</b>	22	4	130	56	94	20	18
<b>LPD*</b>							
North Ayrshire Council	1	0	6+1 additional	3	2	2	4
East Ayrshire Council	0	0	4	0	1	1	0
South Ayrshire Council	0	2	4	0	1	1	2

\* Councils and responsible authorities may have other actions in other LPD.

**Table 4: Summary of actions by LPD and Council Areas**

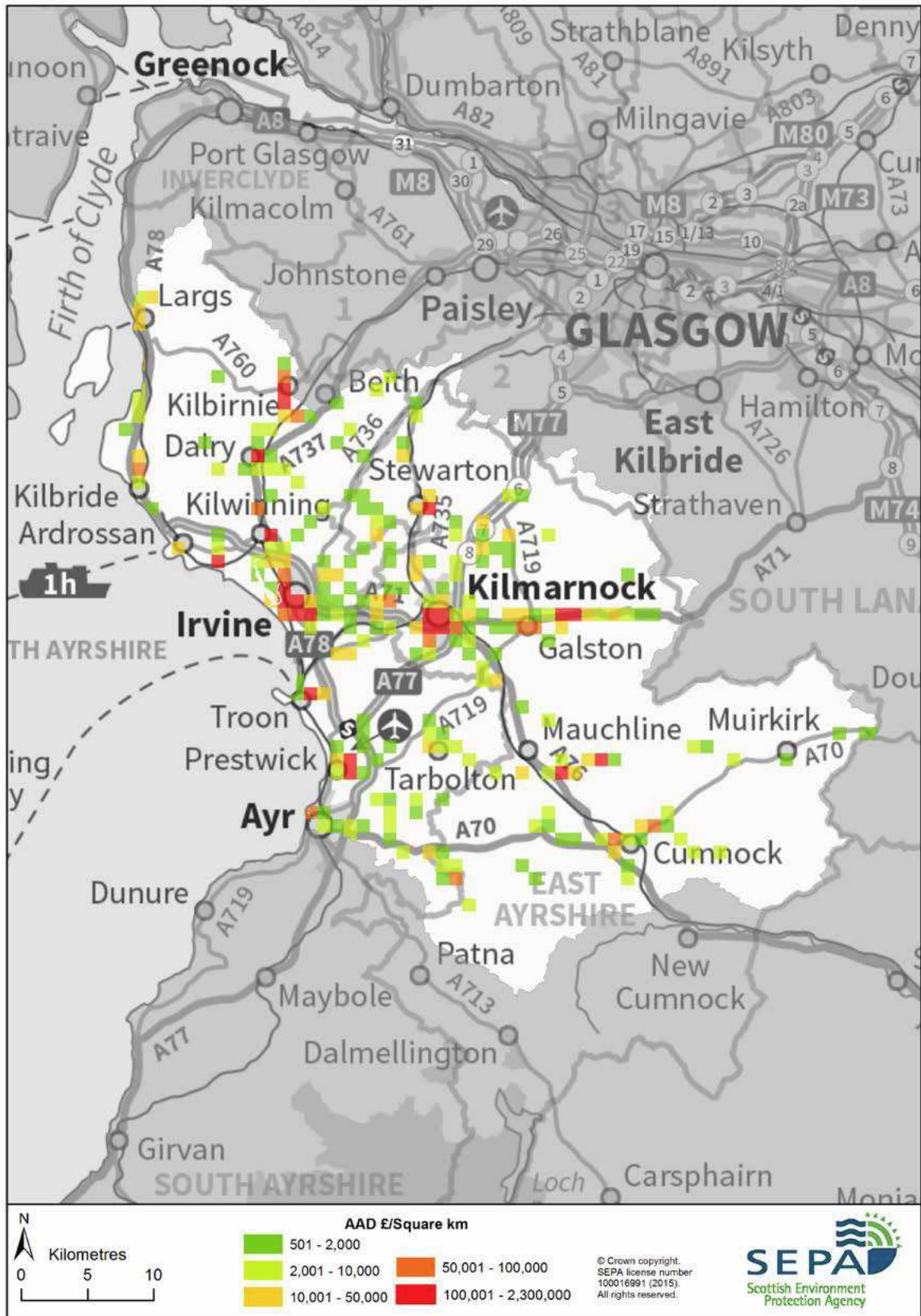
The following figures present Annual Average Damages across the Ayrshire Local Plan District:

- Figure 3: Annual Average Damages from river flooding – Doon Group River Catchment (from SEPA Flood Risk Management Strategy 2015)
- Figure 4: Annual Average Damages from river flooding – River Irvine and Ayr Catchment Group (from SEPA Flood Risk Management Strategy 2015)
- Figure 5: Annual Average Damages from river flooding – Isle of Arran Catchment Group (from SEPA Flood Risk Management Strategy 2015)
- Figure 6: Annual Average Damages from coastal flooding for Ayrshire LPD
- Figure 7: Annual Average Damages from surface water flooding for Ayrshire LPD

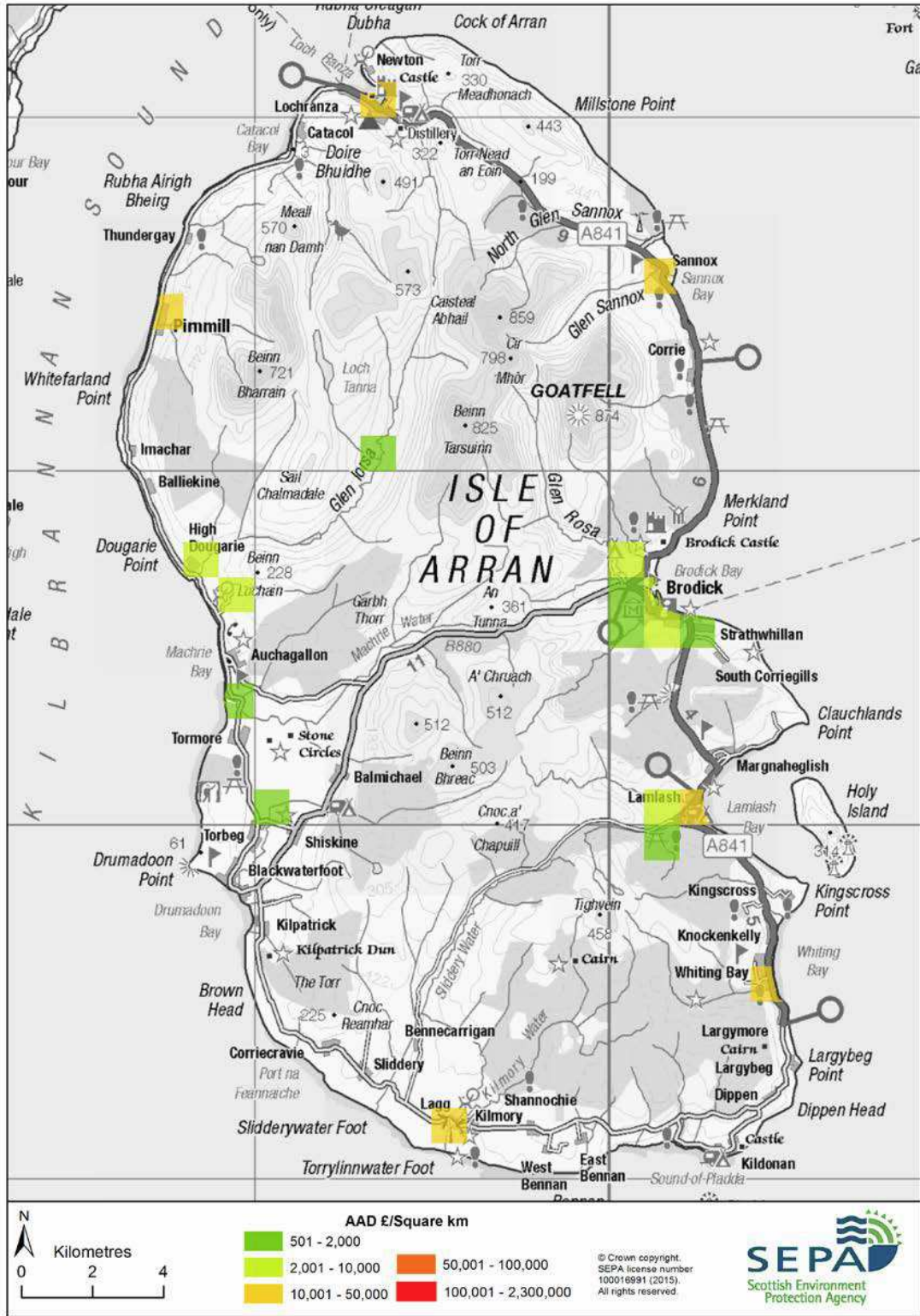


**Figure 3: Annual Average Damages from river flooding – Doon Group River Catchment (from SEPA Flood Risk Management Strategy 2015)**





**Figure 4: Annual Average Damages from river flooding – River Irvine and Ayr Catchment Group (from SEPA Flood Risk Management Strategy 2015)**



**Figure 5: Annual Average Damages from river flooding – Isle of Arran Catchment Group (from SEPA Flood Risk Management Strategy 2015)**

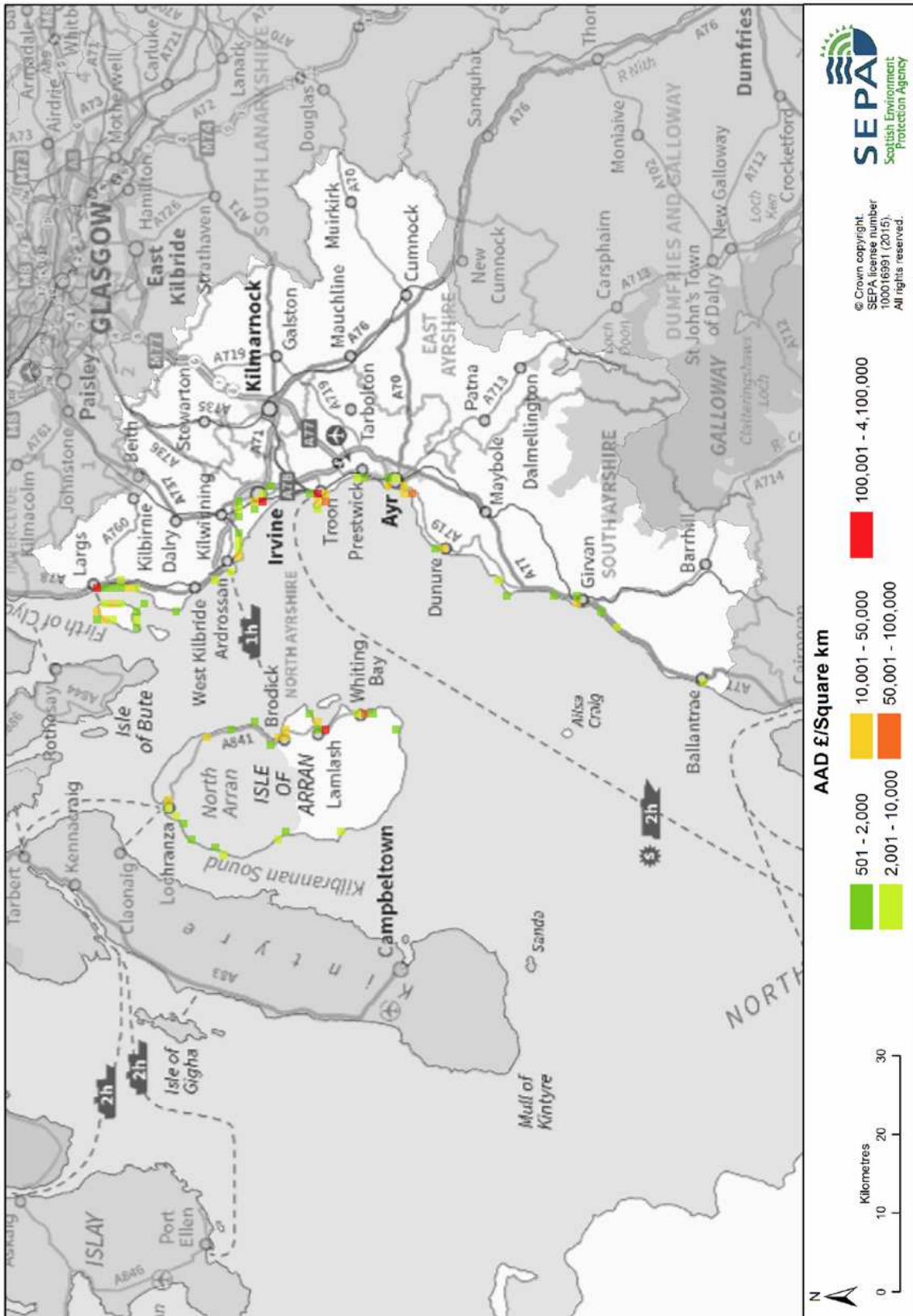


Figure 6: Annual Average Damages from coastal flooding for Ayrshire LPD

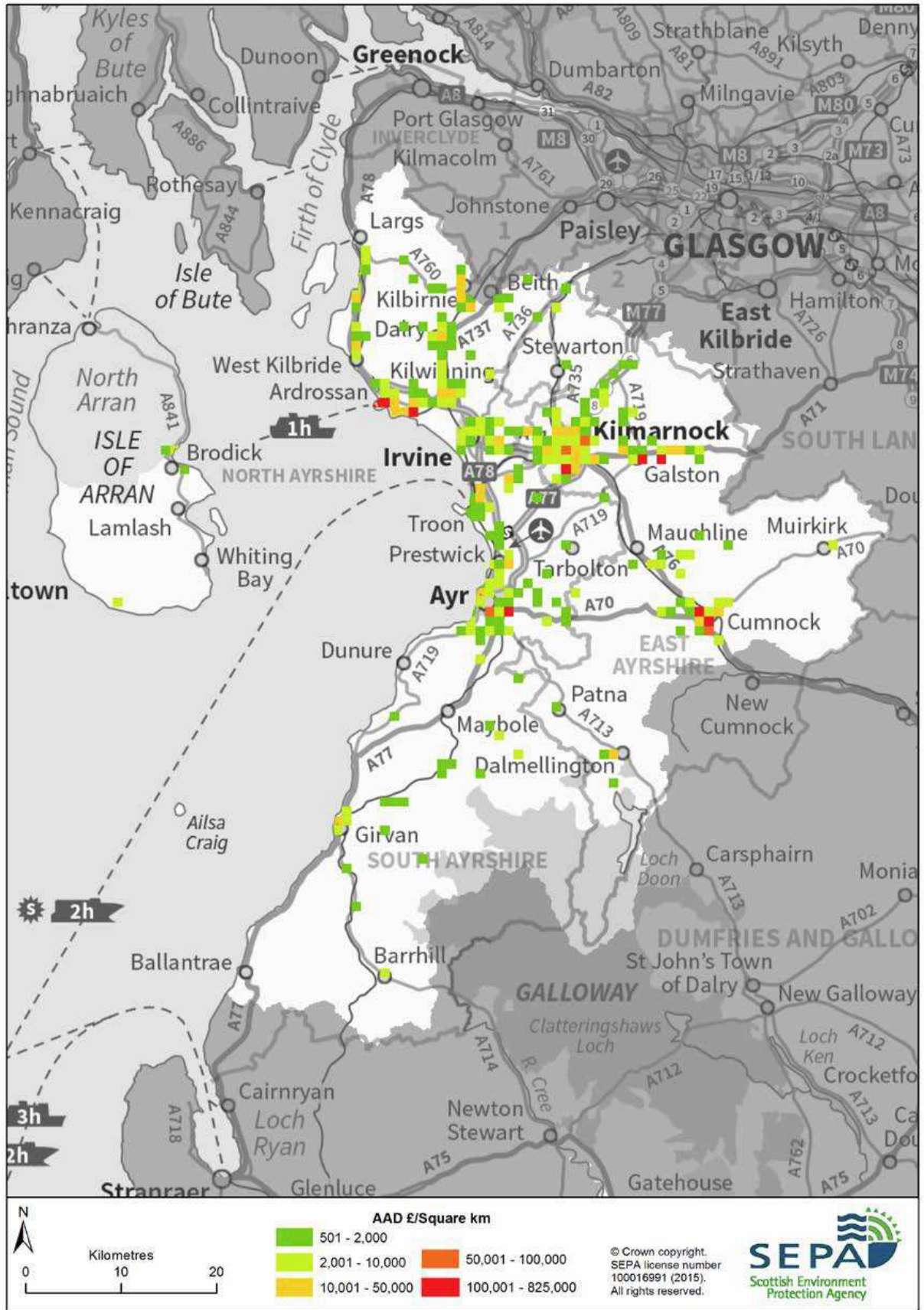


Figure 7: Annual Average Damages from surface water flooding for Ayrshire LPD