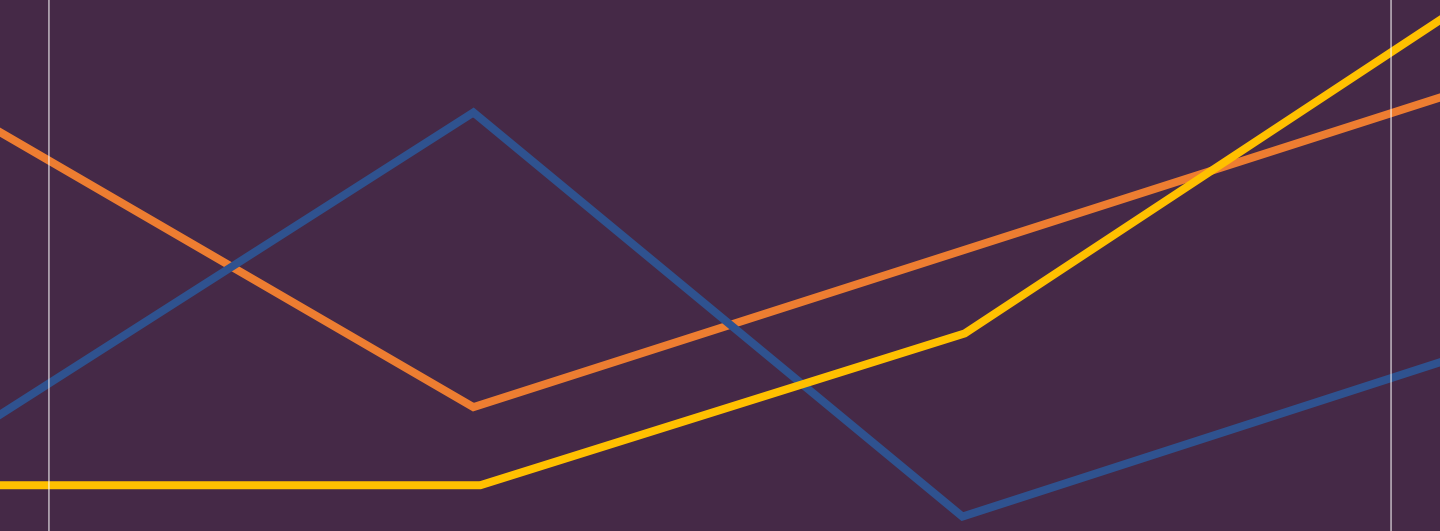
ABERDEEN CITY COUNCIL

ABERDEEN LOCAL DEVELOPMENT PLAN 2020
PROPOSED PLAN 2020

STRATEGIC FLOOD RISK ASSESSMENT



APRIL 2020

Aberdeen City Council
Local Development Plan 2022

Strategic Flood Risk Assessment

Working Document

Version	Date Updated
1	June 2018
2	November 2018
3	September 2019
4	March 2020

1. Introduction

Strategic Flood Risk Assessment (SFRA) is designed to inform the development planning process and to reduce flood risk by avoiding areas at significant risk of flooding.

SFRA is a strategic overview of flood risk to the development plan area and involves the collection, analysis and presentation of all exiting and readily derivable information on flood risk sources. It has been produced in consultation with the Scottish Environmental Protection Agency (SEPA) as well as other Council services.

This SFRA has been prepared to assist the preparation of the Local Development Plan 2022, particularly in regards to making decisions about preferred site allocations. It will also contribute to baseline monitoring for Strategic Environmental Assessment, assist in policy development and enable the planning of new flood management schemes.

2. Legislation and Policy

Scottish Planning Policy says that we should prevent development which would have a significant probability of being affected by flooding or would increase the probability of flooding elsewhere. We must take the probability of flooding from all sources and associated risks involved into account when preparing development plans. Strategic Flood Risk Assessment is used to inform choices about the location of development and policies for flood risk management.

Carrying out SFRA helps the Council to satisfy the requirements placed on local authorities under section 1 of the Flood Risk Management (Scotland) Act 2009 (‘the Act’). Section 1 of the Act requires Local Authorities to exercise their functions with a view to reducing overall flood risk and promoting sustainable flood risk management.

3. Aims and Objectives

The primary aim of the SFRA is to guide the emerging Local Development Plan to ensure that future development is directed to areas of little or no flood risk wherever possible and does not increase flood risk elsewhere, for example, by affecting the storage or conveyance capacity of flood plains. Its main objectives are:

- To identify flood risk areas based on the Flood Risk Framework identified in Scottish Planning Policy, helping to determine the appropriate planning response to development proposals in these areas;
- To identify functional flood plain areas (even if already developed) to help ensure that development on these areas does not increase the risk of flooding elsewhere;

- Provide an evidence-based report on flooding and drainage issues to contribute to the production of the Main Issues Report and emerging LDP;
- To contribute to the Monitoring Report and baseline for the Strategic Environmental Assessment.

4. Sources

This report has been prepared with reference to 'Strategic Flood Risk Assessment - Technical Guidance to Support Development Planning', a guidance document published by SEPA in August 2015. This guidance suggests a number of potential sources of information on flood risk which may be examined for the report. Those considered most useful for the Aberdeen City context are:

- SEPA Flood Extent Maps;
- SEPA National Flood Risk Assessment (and the draft NFRA 2);
- North East Flood Risk Management Plan
- The Aberdeen Integrated Catchment Study was carried out in to support the surface water management planning process in Aberdeen, Westhill, and Stonehaven. The study has improved knowledge and understanding of surface water flood risk and interactions between the above ground and below ground drainage network e.g. with the sewer network, watercourses and the sea.
- Previous Aberdeen City Council Biennial Reports on the prevention or mitigation of flooding in Aberdeen - the last Biennial Report was produced in 2009;
- Previous flood risk studies;
- GIS Layers including flood extents, watercourses and reservoirs, flooding incidents etc;
- Information on Flood Prevention Schemes in Aberdeen.

Note on SEPA Flood Maps
The key sources of evidence are the Indicative Flood Extent Maps produced by SEPA, which show different levels of flood risk for rivers and the coast. Updated maps became available during 2018 and the high-level assessment of flood risk included in this document is informed by these maps.

It should be noted that the Flood Maps do not show very small watercourses (those with a catchment area of less than 3km^2) and do not take account of the effect of any flood defences or hydraulic structures which may be present. SEPA's flood hazard maps are designed to give a high-level indication of potential flood risk, but do not imply complete accuracy or certainty.

Note on National Flood Risk Assessment
The National Flood Risk Assessment (NFRA) identifies those areas of Scotland which are most vulnerable to flooding, taking into account the likelihood of flooding from all sources and the potential impact on people, property and the environment. Although it is primarily intended to inform the

production of the new Flood Risk Management Plans, it also provides useful, albeit high-level, information for land use planning and the SFRA.

The NFRA classifies catchment units according to flood risk from 'Very Low' to 'Very High'. All units classified 'Medium' or above are designated as Potential Vulnerable Areas (PVAs). 5 units in Aberdeen City, covering most of the local authority area, are classified as PVAs. Datasheets are produced for each PVA and these provide a high-level indication of why the areas were designated as being at risk, details of the sources of flooding within it, and impacts predicted. These are now based on 500m grid squares.

As and when new or updated information becomes available, this document will be updated to reflect any changes.

5. Evidence of Flood Risk in Aberdeen

There a 6 main potential sources of flood risk: rivers (fluvial), the sea (coastal), surface water (pluvial), groundwater, drainage and sewers and infrastructure failure (e.g reservoir or canal breaches). This report now examines the flood risk posed to the ALDP area from each of these sources.

5.1 Fluvial and Coastal

There is over 600km of watercourses (both open and culverted) in Aberdeen City (Map 1). Many of these are small watercourses which are not identified by the SEPA maps, but may still be vulnerable to localised flooding, particularly where blockages occur. It is important to consider the presence of small watercourses when assessing flood risk on individual sites.

SEPA's flood hazard maps which are available online, show the areas identified as being at risk of flooding from fluvial, coastal and surface water sources. For the purposes of planning, we are chiefly concerned with areas affected by a 0.5% annual probability of flooding (1 in 200 years).

The main areas at high flood risk in Aberdeen are along the large watercourses, including the River Dee, River Don and the Denburn and the coast and harbour-side area (Maps 2 to 4).

SEPA have mapped natural susceptibility to coastal erosion based on natural features including the height and geology of the land (relative to sea level), distance to the sea and wave action.

The National Coastal Change Assessment aims to create a shared evidence base to support more sustainable coastal and terrestrial planning decisions in the light of a changing climate. Coastal erosion maps can be viewed at www.dynamiccoast.com

5.2 Pluvial (Surface Water) and Rising Groundwater

Pluvial flooding, or flooding due to excess surface water, occurs after periods of intense and prolonged rainfall which saturate either the natural substrate or urban drainage systems, so excess water cannot be safely drained away. Therefore, pluvial flooding is more likely to occur where the ground is naturally poorly drained or has been developed without adequate urban drainage systems in place.

SEPA has produced maps showing flood risk from surface water at a national level (Maps 5, 6 and 7). This map is available from the SEPA website and gives some indication that areas in Aberdeen may be at risk from pluvial flooding.

Flooding due to rising groundwater is also likely to occur after periods of intense and prolonged rainfall, when the water table rises up from underlying rocks or flowing from springs. Groundwater is generally a contributing factor to flooding rather than the primary source. The SEPA website has a map showing where groundwater could influence the duration and extent of flooding from other sources. It does not show where groundwater alone could cause flooding.

Map 8 gives a broad indication of vulnerability to groundwater flooding and is based on the BGS Hydrogeology Groundwater Vulnerability Index. Each OP site has been assessed to see which area or areas it lies in. The PVA datasheets also give an indication of which catchment units may be at risk from rising groundwater; this type of flooding has the potential to affect a large part of the Aberdeen City Area.

5.3 Roads Drainage and Sewers

Roadside drains, sewers and culverts can also be the cause of flood events if they fail, become blocked or are inundated with water that exceeds their capacity. Many of the flood incident points shown on Map 9 occurred as a result of blocked drains, gullies, culverts and other small watercourses. These occurred all across the city, although ‘hotspots’ may be identified.

Flooding due to blocked drains is addressed by Roads Maintenance. There is also a regime for the inspection of open watercourses in place, and hecks (debris screens) are inspected on a monthly basis and before anticipated high level rainfall.

5.4 Infrastructure Failure

There is not considered to be any significant risk of flooding due to infrastructure failure in Aberdeen. Although a number of reservoirs and canals do exist in and around the urban area, there are no large dams or levees and no records of previous flooding of this type. Flooding may also occur as a result of burst water mains, however these are the responsibility of Scottish Water and it is not possible to predict these events.

See Map 10 for a map of reservoirs in Aberdeen, of which there are very few. The majority of these are located in the Deeside area. SEPA have also produced Reservoir Inundation Maps which show the area of land that is likely to be flooded in the event of an uncontrolled release of water from a reservoir. This can be viewed on the SEPA website.

5.5 Natural Flood Management

The NFM maps on the SEPA website identify areas where there are opportunities for alteration or restoration of natural features to help manage flood risk. The maps are of a strategic nature and are primarily to support FRM planning decisions at the catchment level. They provide a high level assessment of those areas within catchments and along coastlines where the implementation of the specified NFM techniques could be most effective and merit further investigation. Five natural flood management maps have been produced: run- off reduction; floodplain storage; sediment management; estuarine surge attenuation; wave energy dissipation.

Whilst we are likely to be supportive of Natural Flood Management proposals in principle, as with any new scheme or development there is the potential it could increase flood risk elsewhere, for example by altering flow paths and/or floodplain storage and conveyance. Any proposals for NFM measures should be supported by an appropriate flood risk assessment.

6. Significant Historical Flooding Events in Aberdeen

Council Committee Reports and media reports provide a useful source of information on significant flooding events experienced in Aberdeen.

- Historic flood events on the River Dee have been reported in 1789, 1790, 1829, 1873, 1876, 1881, 1882, 1892, 1894, 1909, 1920, 1922, 1926, 1927, 1928, 1929, 1938 and 1946. The Den Burn is reported to have flooded in 1869, 1872, and 1874.

- The Bridge of Don area experienced flooding in 2000 and 2001, when problems with the drainage system resulted in ponding. This was exacerbated by gullies surcharging due to the high water level in the Glashieburn and properties in Lochside Drive, Jesmond Drive and Brook Crescent were affected. Regular surcharging of the combined sewer in Jesmond Drive has been reported as has flooding at Ellon Road due to debris accumulation blocking the watercourse.

- September 2009 – Weeks of solid rain in the North East resulted in heavy flooding in parts of Aberdeen, many properties affected had previously been flooded, highlighting their vulnerability.

- 25 August 2012 (*see Committee Report EPI 12 240, 6 November 2012)* - On this date, Aberdeen experienced a localised, intense rainfall event of relatively short duration. It is believed that up to 30mm fell within one hour, meaning the downpour was at least a 1 in 100 year

event. This gave rise to a number of flooding incidents across the city, affecting both commercial and residential properties, as well as disrupting travel. The full Committee Report details all of the recorded flooding incidents for this day.

- November 2012 – The coastal village of Footdee was engulfed in sea foam after intense storms swept Aberdeen. The foam caused a good deal of damage and nuisance, and required a large expenditure on clean up operations.

- Large parts of Aberdeen were affected by surface water flooding in July 2015. Many manhole covers became dislodged, roads were submerged and Aberdeen airport's terminal building was flooded. Many roads were affected by flooding, including Market Street, Guild Street and Holburn Street. Cars on Polmuir Road started to float due to the depth of the water. A nursery had to be evacuated due to flooding in its basement.

- January 2017 – Storm Frank caused extensive flood damage to housing and other properties throughout north east Scotland. Areas especially affected on the River Don include Kemnay, Inverurie, Kintore and into Aberdeen including Riverside Drive and the Grandholm area. On the River Dee, Ballater was particularly affected.

- The Cults Burn has caused flooding at Inchgarth Road due to blockages on the watercourse backing it up from the River Dee.

7. Existing Flood Defence Schemes

The primary purpose of flood protection schemes is to protect existing development from flood risk, rather than to facilitate new development. Flood Prevention Schemes currently in place or under construction in Aberdeen include:

- Glashieburn, Bridge of Don close to Lochside Drive

- Fraser Road, to the north of Hutcheon Street

- Gilcomston Burn

- West Cults Farm (private scheme)

- Jacks Brae

- Aberdeen Beach Recharge- To protect the revetments and the area around Aberdeen beach from continued erosion and failure, a programme of beach recharge took place in July and August 2006. To ensure the stability of the new beach and to protect the area from further erosion, rock t-head extensions to the present timber groynes were constructed.

- Leggart Terrace Culvert divertion
- Bridge of Dee Flood gates
- Stronsay Park Flood Control structure
- Maidencraig Flood storage Scheme
- Heatheryfold Park SUDS

Regional SUDS Schemes

Areas are currently being identified by the Council for upstream retention basins to help reduce run-off further downstream and prevent flooding in the more built up areas of the City. These areas will be identified through the next Local Development Plan and safeguarded from development. The Maidencraig Flood Storage Scheme mentioned above is the first to be developed.

8. The Impacts of Climate Change on flood risk

Annual rainfall in Scotland has increased by 7% since 1961. UK Climate Projections (UKCP09) sets out climate information for areas of the UK and includes data for the north east of Scotland region.

In the coming decades the climate of the north east of Scotland will change, with an increase in the frequency and severity of extreme weather events. Climate projections indicate for Aberdeen and the north east area, this will mean:

- Average temperatures will increase in all seasons (H), with the greatest increase in summer (M). What is considered a heatwave or extremely hot summer today will occur more frequently in future (M).
- Rainfall is projected to become more seasonal, with an increase in average winter and autumn rainfall (M). Average summer rainfall may decrease (L). Heavy rainfall events may occur more frequently in winter, spring, and autumn (M). An increase in summer heavy rainfall events is uncertain (L)
- Snow is projected to be less frequent in coastal locations like Aberdeen with rising temperature (H), although by how much is complicated by increased winter precipitation (L).
- The growing season will continue to lengthen due to increasing temperatures in spring and autumn (H).
- Winter storms with extreme rainfall may become more frequent (L), although there is large uncertainty in models.

- Sea level will rise (H). Storm surge conditions may cause wave overtopping and coastal flooding and erosion.

*Assessment of 'Overall Confidence' in scientific evidence for individual statements: High (H), Medium (M) and Low (L).

Sea level rise scenarios are given below.

Sea level rise	**2degrees**			**4 degrees**		
	2020	**2050**	**2080**	**2020**	**2050**	**2080**
Aberdeen	0.02m	0.09m	0.18m	0.13m	0.32m	0.56m

The UK Climate Change Risk Assessment 2017 Evidence report – Summary for Scotland, indicates an increase in future flood risks affecting buildings, transport, energy, digital and communication networks, communities, habitats and heritage.

The National Flood Risk Assessment has considered the flood risk for north east of Scotland river basin regions. Under the UKCP09 high emissions scenario for 2080, average peak river flows for the Dee catchment by 2080 may increase by 24%. This would potentially increase in the number of residential properties at risk of river flooding from approximately 8,400 to 11,000 and the number of non-residential properties from 1,800 to 2,100.

The same scenario on the River Don may increase flows for the Don catchment by 24%. This would potentially increase in the number of residential properties at risk of river flooding from approximately 2,600 to 4,200 and the number of non-residential properties from 530 to 680.

9. Assessment of Site Options According to Flood Risk

The main aim of collecting the evidence in section 1 of the SFRA is to assist in directing development to areas of little or no flood risk wherever possible, referring to the Flood Risk Framework contained in Scottish Planning Policy . The following assessment is for preferred Opportunity Sites in the Main Issues Report and sites likely to be carried forward from the existing LDP.

The flood risk category into which a site falls is identified using the following annual flood probabilities:

- Little or No Risk – annual flooding probability less than 0.1% (1:1000)
- Low to Medium Risk – annual flooding probability between 0.1 and 0.5% (between 1:1000 and 1:200), or site adjacent to but not within a medium to high risk area.
- Medium to high risk – annual probability 0.5% (1:200) or greater.

The table below shows a high-level assessment of flood risk on a site by site basis.

Sources used or referred to during the preparation of this report:

Aberdeen City Council Reports

Committee Report EPI 12 240 'City Wide Flooding Issues' 6 Nov 2012
6th and 7th Flood Prevention Biennial Reports (2008/2009)

Aberdeen City Council GIS resources

Watercourses and Reservoirs
Flood Incidents
Groundwater Vulnerability

SEPA Resources

Flood Extent Maps
National Flood Risk Assessment- Potentially Vulnerable Areas
North East Flood Risk Management Plan

Other sources

UK Groundwater Forum www.ukgroundwater.co.uk

Useful Contacts:

Local Development Plan Team
Strategic Place Planning
Aberdeen City Council
Business Hub 4, Marischal College
Broad Street
Aberdeen AB10 1AB
ldp@aberdeencity.gov.uk

SEPA Aberdeen Office
Inverdee House
Baxter Street
Torry
ABERDEEN, AB11 9QA
Tel: 01224 26662

Flood Risks on Proposed Local Development Plan Opportunity Sites

OP	Site Name	SEPA Flood Map Fluvial Flooding Category				Other Sources				Proposed Use	Comments
		Minimal	Low-Med or adj, to M-H	Med-High (Undevel)	Med-High (Built Up)	Coastal	Ground Water	Surface Water	Small Watercourses & Culverts		
OP1	Murcar			X		N	3 and 4a	Y	N	Employment	Northern boundary has med-high fluvial and surface water flood risk. FRA required.
OP2	Cloverhill			X		N	3 and 4a	Y	Y	Residential	Small part of site at med-high fluvial flood risk. Some flood risk from small watercourses, groundwater and surface water. Flood Risk Assessment required. DIA recommended.
OP3	Findlay Farm, Murcar	X				N	3	Y	N	Employment	Some risk of surface water flooding in small pockets. DIA recommended.
OP4	North Denmore	X				N	4a	Y	N	Residential	Minimal surface water flood risk.
OP5	Balgownie Centre	X				N	3	N	N	Residential	Minimal flood risk
OP6	WTR Site at Dubford	X				N	3 and 4a	N	N	Residential	Minimal flood risk
OP7	Aberdeen College Gordon Centre	X				N	3	Y	N	Residential	Risk of surface water flooding. DIA recommended.
OP8	East Woodcroft North	X				N	4a	N	N	Residential	Minimal flood risk
OP9	Grandhome		X			N	3, 4a and 5	Y	Y	Residential, employment	Adjacent to med-high flood risk areas, but topography suggests flooding unlikely. Some risk of surface water flooding on parts of site. DIA recommended.
OP10	Dubford			X		N	3 and 4a	Y	Y	Residential	Part of site is at med-high risk from fluvial and surface water sources. Some historical accounts of flooding on site. Flood Risk Assessment required.
OP11	Balgownie Area 4	X				N	3 and 4a	N	Y	Residential	Small watercourse present. DIA recommended.
OP12	Silverburn House	X				N	3 and 4a	Y	Y	Residential	Small watercourse and surface water flooding present. Flood Risk Assessment required.
OP13	AECC Bridge of Don	X				N	3	Y	Y	Mixed Use	Some risk of flooding from surface water and small watercourses/blockages. Drainage Impact Assessment recommended.
OP14	Former Cordyce School			X		N	4a	Y	Y	Mixed Use	Area next to River Don has Medium to high fluvial and surface water flood risk. Flood Risk Assessment required.
OP15	Carden School	X				N	3	N	N	Residential	Minimal flood risk
OP16	Davidsons Papermill, Mugiemoss Road				X	N	3 and 4a	Y	Y	Residential	Part of site at med-high flood risk from surface water and fluvial sources (River Don). Flood Risk Assessment required.
OP17	Former Bucksburn Primary School				X	N	4a	Y	N	Residential	Small part of site at med-high risk from fluvial and surface water sources. Flood Risk Assessment required.
OP18	Craibstone North & Walton Farm				X	N	2, 3 and 4a	Y	Y	Employment	Part of site at med-high flood risk (Green Burn). Also risk of surface water flooding. Flood Risk Assessment required. DIA recommended.

OP19	Rowett North				X	N	2, 3 and 4a	Y	Y	Employment	Part of site at med-high flood risk (Green Burn). Also risk of flooding from groundwater, surface water and small watercourses. Flood Risk Assessment required. DIA recommended.
OP20	Craibstone South	X				N	2 and 3	Y	Y	Residential	Some small watercourses on site - risk of surface water flooding along the burns.
OP21	Rowett South	X				N	2 and 3	Y	Y	Residential	Some small watercourses and surface water flooding but generally small scale.
OP22	Greenferns Landward	X				N	3 and 4a	Y	Y	Residential	Some small watercourses on site which have risk of surface water flooding. FRA required.
OP23	Dyce Drive	X				N	2, 3 and 4a	Y	Y	Employment	Flood risk from small watercourses, groundwater and surface water. Flood Risk Assessment required. DIA recommended.
OP24	Central Park Dyce	X				N	3	N	Y	Medical Centre	Possible small watercourse on southern edge of site. DIA recommended.
OP25	Woodside				X	N	4a	Y	Y	Residential	Part of site at med-high flood risk from fluvial sources (River Don). Also risk from surface water and small watercourses. Flood Risk Assessment required. DIA recommended.
OP26	Old Skene Road	X				N	4a	N	N	Residential	Minimal flood risk
OP27	Greenfern Infant School	X				N	2	N	N	Residential	Minimal flood risk
OP28	Greenferns		X			N	4a	Y	Y	Residential, Employment	Ajacent to area at medium-high risk from fluvial sources (Bucks Burn). Also some risk from surface water and small watercourses. Flood Risk Assessment required; DIA recommended.
OP29	Prime Four	X				N	3 and 4a	Y	Y	Employment	Some small watercourses present and some surface water flooding to the south of the site.
OP30	Kingsford			X		N	2 and 3	Y	Y	Stadium and training facilities	North and western edges of the site at med-high risk of fluvial and surface water flooding. Flood Risk Assessment required.
OP31	Maidencraig South East		X			N	4a	Y	Y	Residential	Adjacent to area at high-med risk from fluvial sources (Den Burn) and surface water flooding and some small watercourses also present. FRA required.
OP32	Maidencraig North East	X				N	3 and 4a	N	Y	Residential	Minimal flood risk
OP33	Greenferns		X			N	3 and 4a	Y	Y	Residential, employment	Ajacent to area at medium-high risk (Bucks Burn). Also some risk from surface water and small watercourses. Flood Risk Assessment required. DIA recommended.
OP34	East Arnhall				X	N	3 and 4a	N	Y	Employment	Part of site at med-high flood risk from fluvial sources (Brodiach Burn) and surface water flooding. Flood Risk Assessment required.
OP35	Summerhill House, Eday Road	X				N	3	Y	N	Residential	Risk of surface water flooding. DIA recommended.
OP36	Charlie House				X	N	3 and 4a	Y	N	Children's Hospice	Southernmost part of site at med-high risk of fluvial and surface water flooding. Development should be limited to areas not at flood risk. FRA required.
OP37	Woodend Hospital				X	N	3 and 4a	Y	N	Residential	Adjacent to the Denburn with med-high fluvial and surface water flood risk, however topography may reduce this. DIA recommended. FRA required.

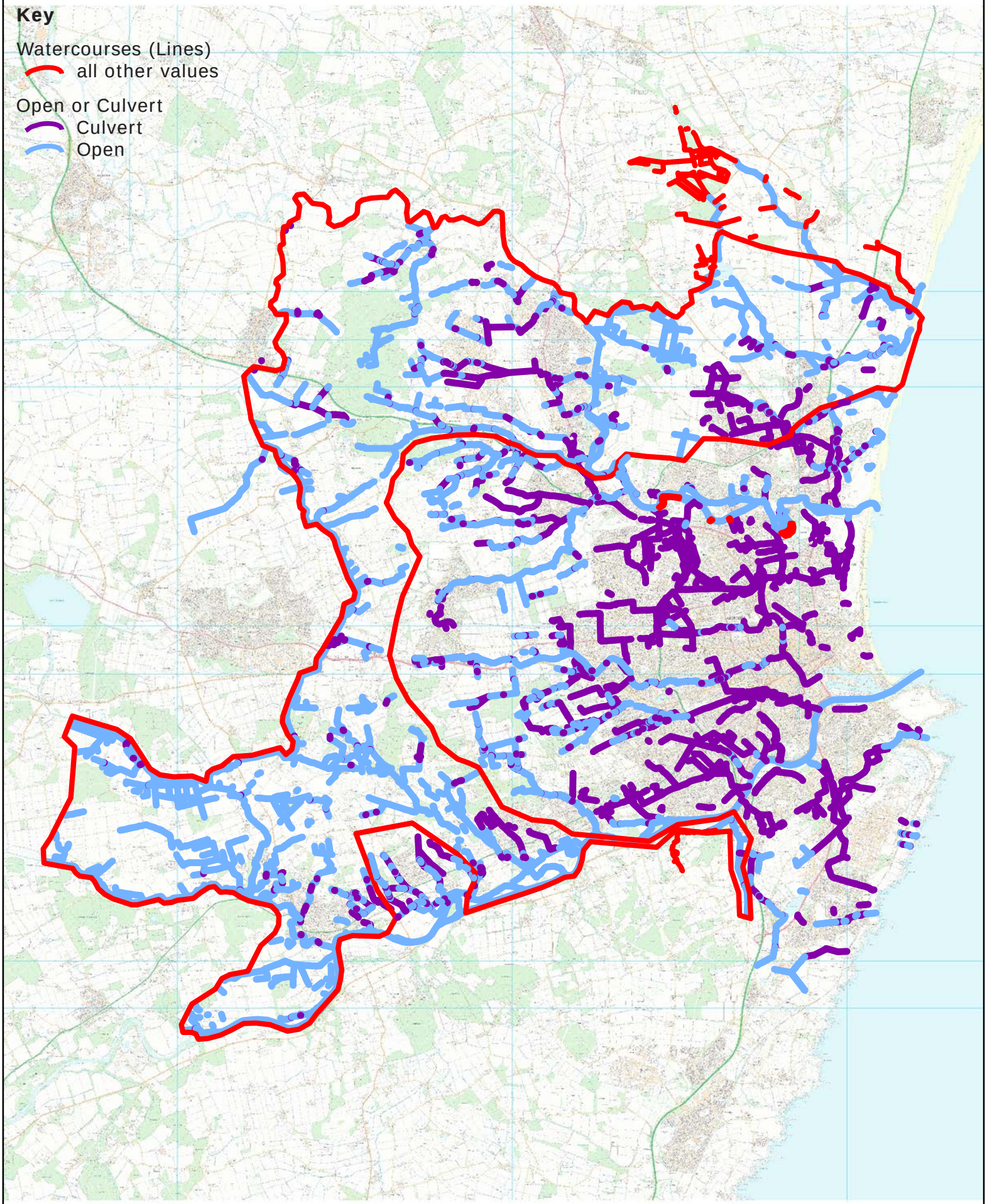
OP38	Countesswells	X				N	4a	Y	Y	Residential, employment	Flood risk from small watercourses and surface water. Flood Risk Assessment required. DIA recommended.
OP39	Braeside Infant School	X				N	4a	N	N	Residential	Minimal flood risk
OP40	Cults Pumping Station		X			N	4a	Y	Y	Residential	Adjacent to an area of med- high risk from fluvial sources (Cults Burn) and surface water flooding.
OP41	Friarsfield					N	4a and 5	Y	Y	Residential	Part of site at med-high flood risk from fluvial. Also risk of surface water flooding. Flood Risk Assessment required. DIA recommended.
OP42	Hazlehead Hotel and Equestrian Centre	X				N	3 and 4a	Y	Y	Hotel and Equestrian Centre	Small watercourse and surface water flooding present. Flood Risk Assessment required.
OP43	Milltimber Primary School	X				N	3	Y	Y	Residential	Flood risk from small watercourses and surface water flooding. Flood Risk Assessment required.
OP44	North Lasts Quarry			X		N	4a and 5	Y	N	Quarry	Small part of site at med-high flood risk (fluvial sources) and some risk of surface water flooding. Flood Risk Assessment required. DIA recommended.
OP45	Berryhill			X		N	3 and 4a	Y	Y	Business and Industrial	Small part of site at med-high fluvial flood risk. Some flood risk from small watercourses, groundwater and surface water. Flood Risk Assessment required. DIA recommended.
OP46	Royal Devenick Park			X		N	2, 3 and 4a	Y	Y	Residential	Parts of the site at high flood risk along the watercourse that runs through it. Flood Risk Assessment required.
OP47	Edgehill Road	X				N	2 and 3	N	Y	Residential	Flood risk from small watercourses and culverts. Flood Risk Assessment required.
OP48	Oldfold	X				N	3 and 4a	Y	Y	Residential, employment	Flood risk from small watercourses and surface water. Flood Risk Assessment required. DIA recommended.
OP49	Grove Nursery	X				N	3	N	Y	Community facilities	Flood risk from small watercourses and issues recorded nearby with blocked channels. Flood Risk Assessment required
OP50	Skene Road Hazlehead	X				N	3 and 4a	Y	Y	Cemetery	Flood risk from small watercourses and surface water. DIA recommended.
OP51	Peterculter Burn				X	N	3 and 4a	Y	Y	Residential	Part of site at med-high risk of flooding from fluvial sources (Culter Burn) and surface water flooding. Some small watercourses on site. Flood Risk Assessment required.
OP52	Malcolm Road	X				N	3	N	Y	Residential	Risk of flooding from groundwater and small watercourses. FRA required; DIA recommended.
OP53	Tillyoch, Peterculter	X				N	3, 4a and 5	Y	Y	Residential	Small patches of surface water flooding.
OP54	Craigton Peterculter	X				N	3	Y	Y	Residential	Small watercourses present. High risk of surface water on the south east part of the site. Flood Risk Assessment required.
OP55	Blackhills Quarry Cove	X				N	3, 4a and 5	Y	N	Quarry	Some risk from surface water, overall minimal risk. DIA recommended.
OP56	St Fitticks Park	X				N	1, 2 and 4a	Y	Y	Energy Transition Zone	Small watercourse and surface water flooding present. Flood Risk Assessment required.

OP57	Craighill Primary School	X				N	3	N	N	Residential	Minimal flood risk
OP58	Stationfields Cove	X				N	4a	Y	Y	Residential	Surface water flooding near the reilway line.
OP59	Loirston	X				N	3, 4a, 4b and 5	Y	Y	Residential, employment	Some flood risk from small watercourses, groundwater and surface water. Flood Risk Assessment required. DIA recommended.
OP60	Charleston	X				N	3 and 4a	Y	Y	Employment	Some flood risk from small watercourses and surface water. Flood Risk Assessment required. DIA recommended.
OP61	Doonies					N	4a and 5	Y	N	Energy Transition Zone	Small pockets of surface water flooding – DIA recommended.
OP62	Bay of Nigg	X				Y	2, 3, 4a and 5	Y	Y	Harbour	Whole site at med-high risk of coastal flooding. Harbour uses require coastal location. Flood Risk Assessment required.
OP63	Prime Four Phase 5	X				N	3 and 4a	Y	N	Employment	Small area of surface water flooding. DIA recommended.
OP64	Ness Solar Farm	X				N	4a and 5	Y	N	Solar Farm	Very small areas shown to be at surface water flood risk. Overall minimal flood risk.
OP65	Haudaugain Triangle	X				N	3 and 4a	Y	Y	Mixed Use	Some risk from surface water flooding. DIA recommended.
OP66	Granitehill	X				N	3 and 4a	Y	Y	Residential	Some flood risk from surface water and small watercourses. DIA recommended.
OP68	1 Western Road	X				N	4a	Y	N	Residential	Small risk from surface water, overall minimal risk. DIA recommended.
OP69	152 Don Street, Old Aberdeen		X			N	4a	Y	Y	Residential	Surface water flooding on the northern part of the site. DIA recommended.
OP70	Denburn Valley - City Centre Intervention Area				X	N	4a	Y	Y	Mixed Use	Denburn has medium to high risk of flooding from surface water and the Den Burn. A Flood Risk Assessment is required.
OP72	Aberdon House	X				N	4a	Y	N	Residential	Surface water flooding on a small part of the site.
OP73	Balgownie Machine Centre	X				N	4a	Y	N	Mixed Use	Some risk from surface water, overall minimal risk. DIA recommended.
OP74	Broadford Works				X	N	4a	N	Y	Mixed Use	Majority of site at med-high risk of flooding, including surface water. History of flood due to culverts and burst drains. Flood Risk Assessment required.
OP75	Denmore Road	X				N	3	Y	Y	Retail	Flood risk from surface water and small watercourses. DIA recommended.
OP76	Former Raeden Centre	X				N	4a	N	N	Residential	Minimal flood risk.
OP77	Cornhill Hospital	X				N	4a	Y	N	Residential	Small pockets of surface water flooding.
OP78	Frederick Street	X				N	4a	N	Y	Mixed Use	Minimal flood risk
OP79	Crown House	X				N	4a	N	N	Mixed Use	Minimal flood risk
OP80	Mastrick Clinic	X				N	4	N	N	Neighbourhood Centre	Minimal flood risk
OP81	Queens Square - City Centre Masterplan Intervention Area	X				N	1, 3 and 4a	Y	N	Mixed Use	Small pockets of surface water flooding.
OP82	Dunbar Halls of Residence	X				N	4a	N	N	Residential	Minimal flood risk
OP83	Urquhart Building, City Hospital	X				N	4a	N	N	Residential	Minimal flood risk.
OP84	Resource Centre, City Hospital	X				N	4a	N	N	Mixed use	Minimal flood risk

OP85	King Street/Beach Esplanade	X				N	2 and 4a	N	N	Place of Worship	Minimal flood risk
OP86	Dyce Railway Station	X				N	3	N	N	Car Park	Minimal flood risk
OP87	Pittodrie Park	X				N	2 and 4a	Y	N	Residential	Surface water flood risk. DIA recommended.
OP88	Shore Porters Warehouse	X				N	4a	N	N	Warehouse & Storage	Minimal flood risk
OP89	Kaimhill Outdoor Centre	X				N	3	N	Y	Residential	Minimal flood risk
OP90	St Machar Primary	X				N	4a	Y	N	Residential	Risk from surface water flooding. DIA recommended.
OP91	Union Street West - City Centre Masterplan Intervention Area				X	N	3 and 4a	Y	Y	Mixed Use	Denburn runs through the area with med-high risk from fluvial and surface water sources.
OP92	St Peter's Nursery	X				N	4a	N	N	Residential	Minimal flood risk.
OP93	Summerhill Academy	X				N	3	Y	Y	Residential	Small pockets of surface water flooding. DIA recommended.
OP94	Tillydrone Primary School	X				N	4a	Y	Y	Residential	Small pockets of surface water flooding. DIA recommended.
OP95	Station Gateway - City Centre Masterplan Intervention Area				X	N	4a	Y	Y	Mixed Use	Denburn runs through the area with med-high risk from fluvial and surface water sources.
OP96	Castlegate and Castlehill - City Centre Masterplan Intervention Area	X				N	3	N	Y	Mixed Use	Minimal flood risk
OP97	Victoria Road Primary	X				N	2 and 3	Y	N	Residential	Small pockets of surface water flooding.
OP98	VSA Gallowgate	X				N	1	N	N	Residential	Minimal flood risk.
OP99	Old Torry				X	Y	2 and 4a	N	Y	Mixed Use	Part of site is at med-high risk of coastal and fluvial flooding. Flood Risk Assessment required.
OP100	North Dee - City Centre Masterplan Intervention Area				X	Y	2, 3 and 4a	Y	Y	Mixed Use	Adjacent to River Dee. Flood Risk Assessment required.
OP101	Woodside Congregational Church	X				N	4a	N	N	Residential	Minimal flood risk.
OP102	George Street/Crooked Lane				X	N	1	Y	Y	Retail core	Site is at med-high risk of flooding from fluvial sources, surface water flooding and records of flooding due to culverts. FRA Required. DIA recommended. Condition and capacity of culverts to be assessed.
OP103	Torry Nursery School	X				N	4a	N	N	Residential	Minimal flood risk
OP105	Kincorth Academy	X				N	3	N	N	Residential	Minimal flood risk
OP106	Torry Waterfront - City Centre Masterplan Intervention Area	X				Y	2, 3 and 4a	Y	N	Mixed Use	Adjacent to area at med-high risk from coastal sources but topography suggests flooding unlikely from these sources. Surface water flooding.
OP107	East Tullos Gas Holder	X				N	4a	Y	Y	Energy from Waste	Risk from surface water, overall minimal risk. DIA recommended.
OP109	Woodend Culter	X				N	4a	Y	N	Residential	Small pockets of surface water flooding.
OP110	Heart of the City City Centre Masterplan Intervention Area				X	N	4a	Y	Y	Mixed Use	Medium and high risk of fluvial and surface water flooding.
OP111	Skene Road Maidencraig			X		N	4a and 5	Y	Y	Residential	Northern part of site adjacent to area of med-high risk fluvial and surface water flooding
OP112	West of Contlaw Road	X				N	3 and 4a	Y	Y	Residential	Risk of surface water flooding. DIA recommended.
OP113	Culter House Road	X				N	3 and 4a	N	Y	Residential	Minimal flood risk
OP115	34-40 Abbotswell Road		X			N	4a			Residential	Adjacent to River Dee but fluvual flooding unlikely. Risk of surface water flooding.
OP116	Froghall Terrace	X				N	2, 3 and 4a	Y	N	Residential	Risk of surface water flooding. DIA recommended.

Map 1 - Watercourses in Aberdeen City

ABERDEEN CITY COUNCIL



Map 2 - River and Coastal Flood Risk - 10% Annual Probability

ABERDEEN CITY COUNCIL

Key

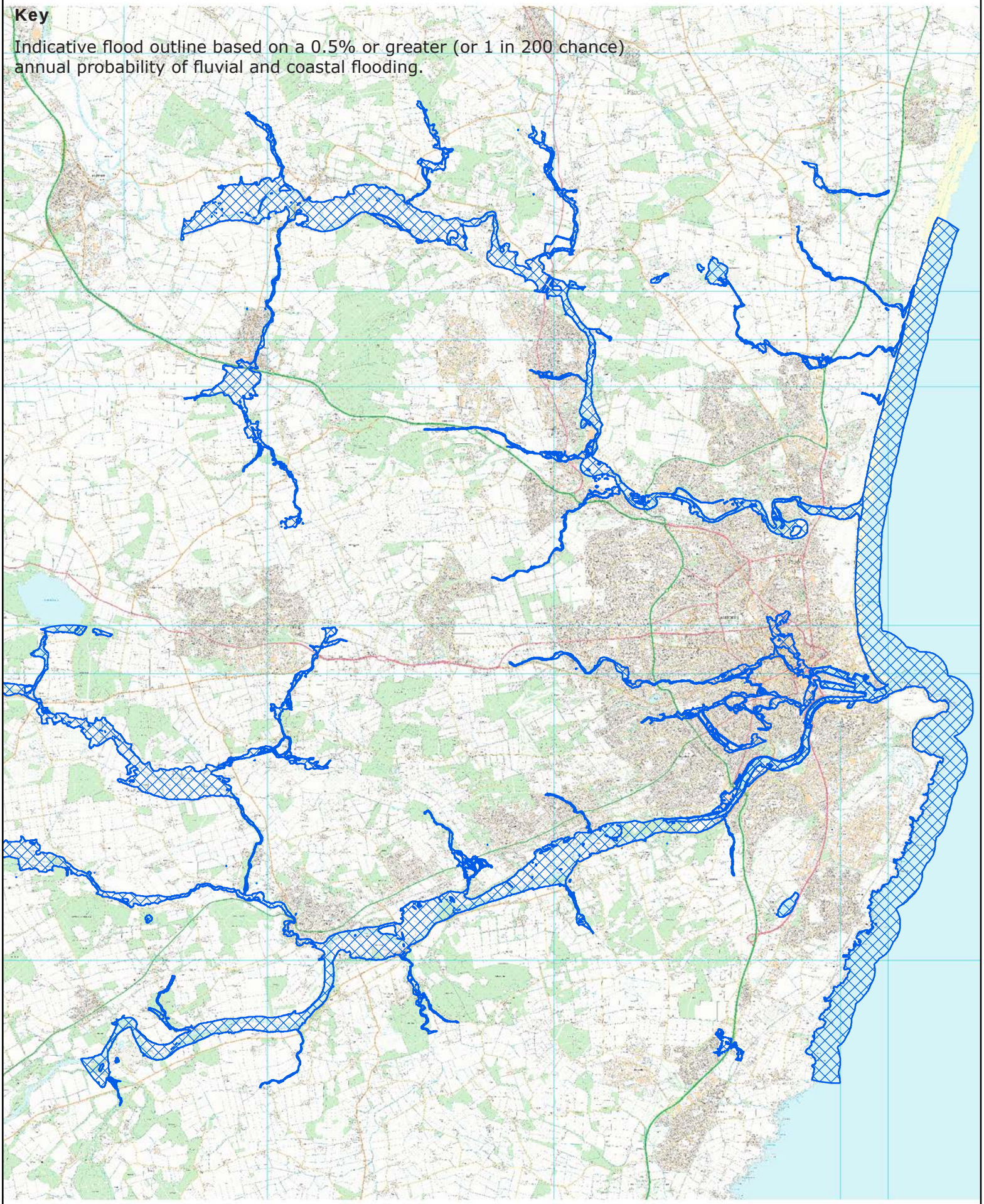
Indicative flood outline based on a 1% or greater (or 1 in 100 chance) annual probability of fluvial and coastal flooding.

Map 3 - River and Coastal Flood Risk - 0.5% Annual Probability

ABERDEEN CITY COUNCIL

Key

Indicative flood outline based on a 0.5% or greater (or 1 in 200 chance) annual probability of fluvial and coastal flooding.

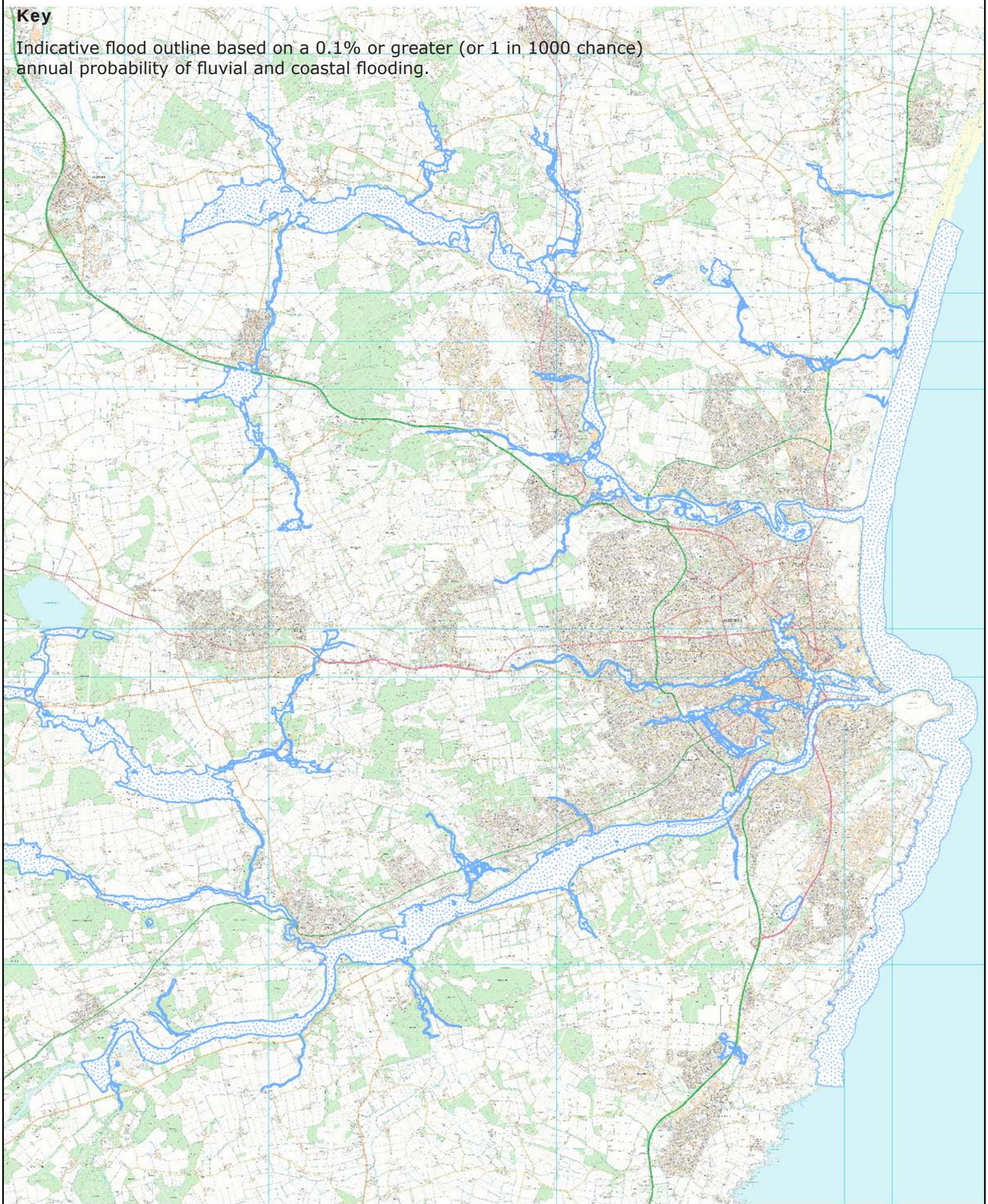


Map 4 - River and Coastal Flood Risk - 0.1% Annual Probability

ABERDEEN CITY COUNCIL

Key

Indicative flood outline based on a 0.1% or greater (or 1 in 1000 chance) annual probability of fluvial and coastal flooding.

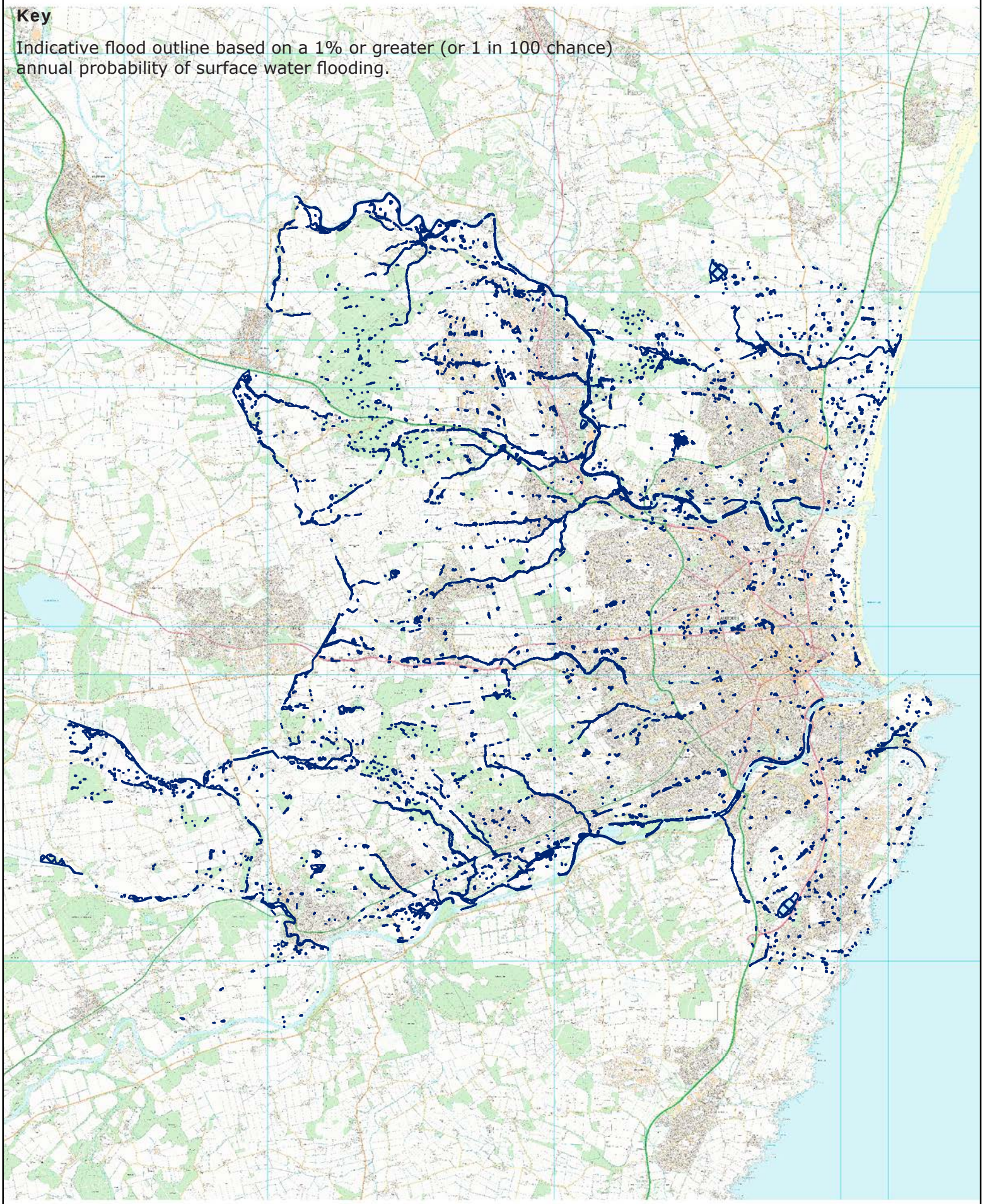


Map 5 - Surface Water - High Annual Probability

ABERDEEN CITY COUNCIL

Key

Indicative flood outline based on a 1% or greater (or 1 in 100 chance) annual probability of surface water flooding.



Map 6 - Surface Water - Medium Annual Probability

ABERDEEN CITY COUNCIL

Key

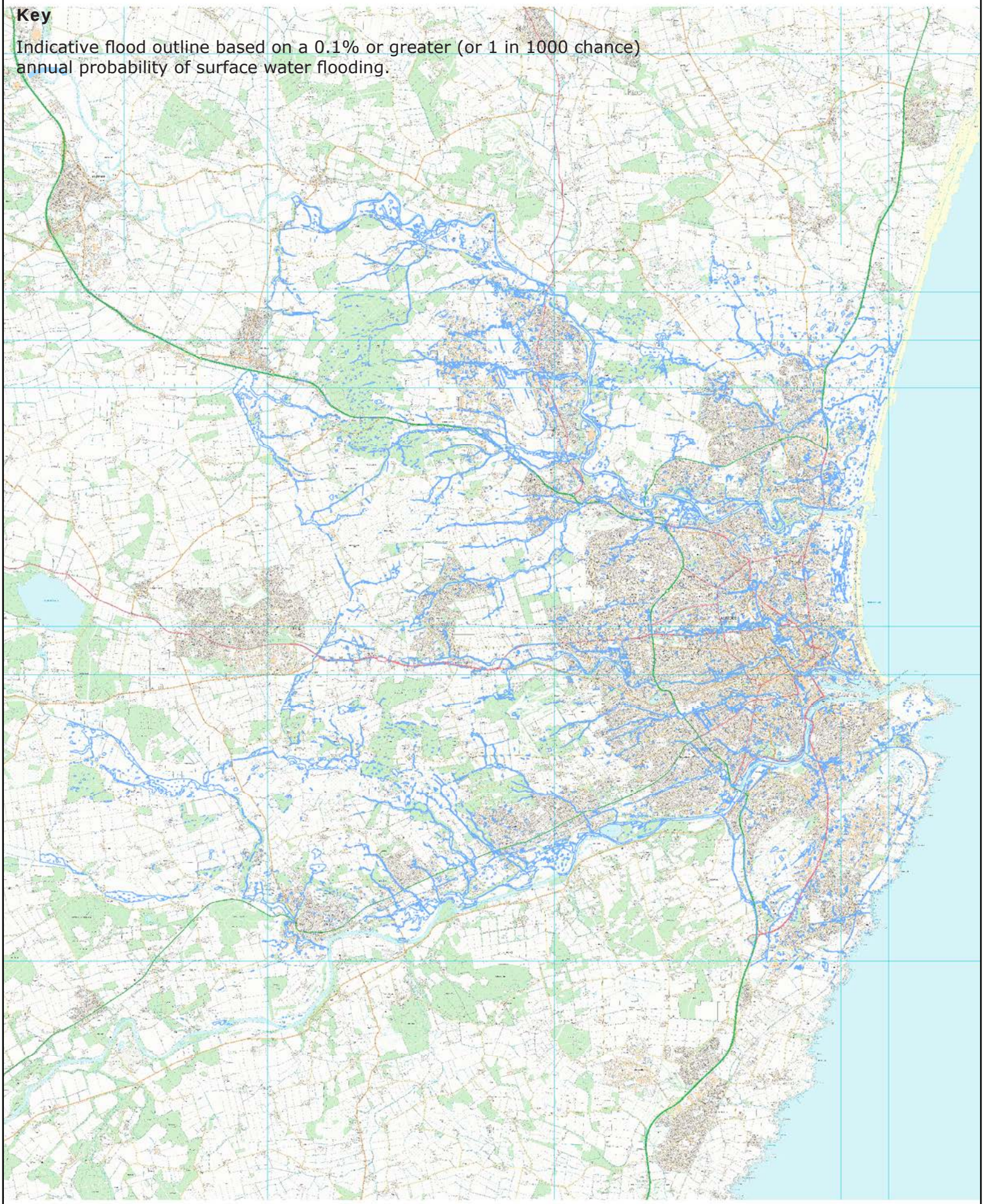
Indicative flood outline based on a 0.5% or greater (or 1 in 200 chance) annual probability of surface water flooding.

Map 7 - Surface Water - Low Annual Probability

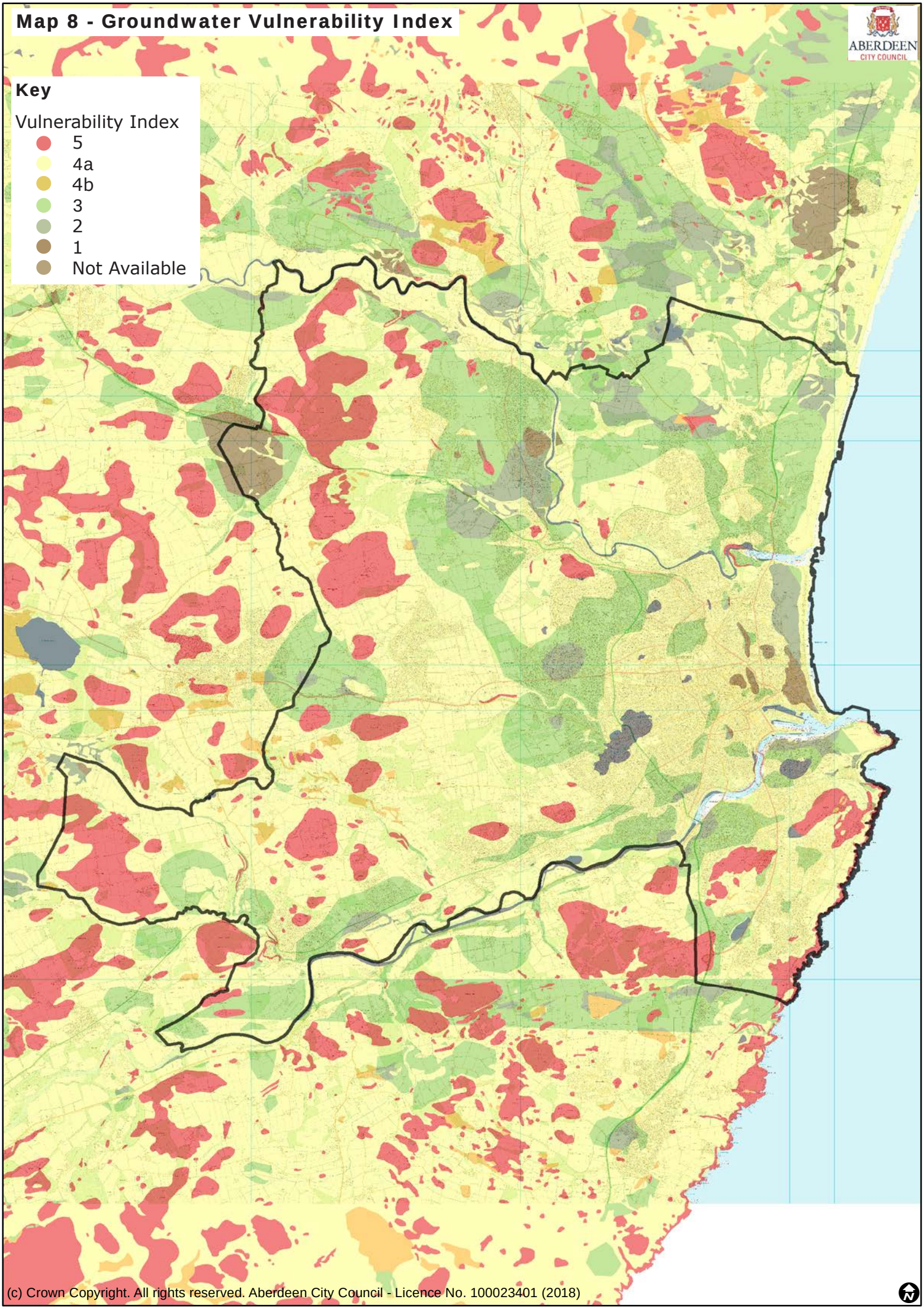
ABERDEEN CITY COUNCIL

Key

Indicative flood outline based on a 0.1% or greater (or 1 in 1000 chance) annual probability of surface water flooding.

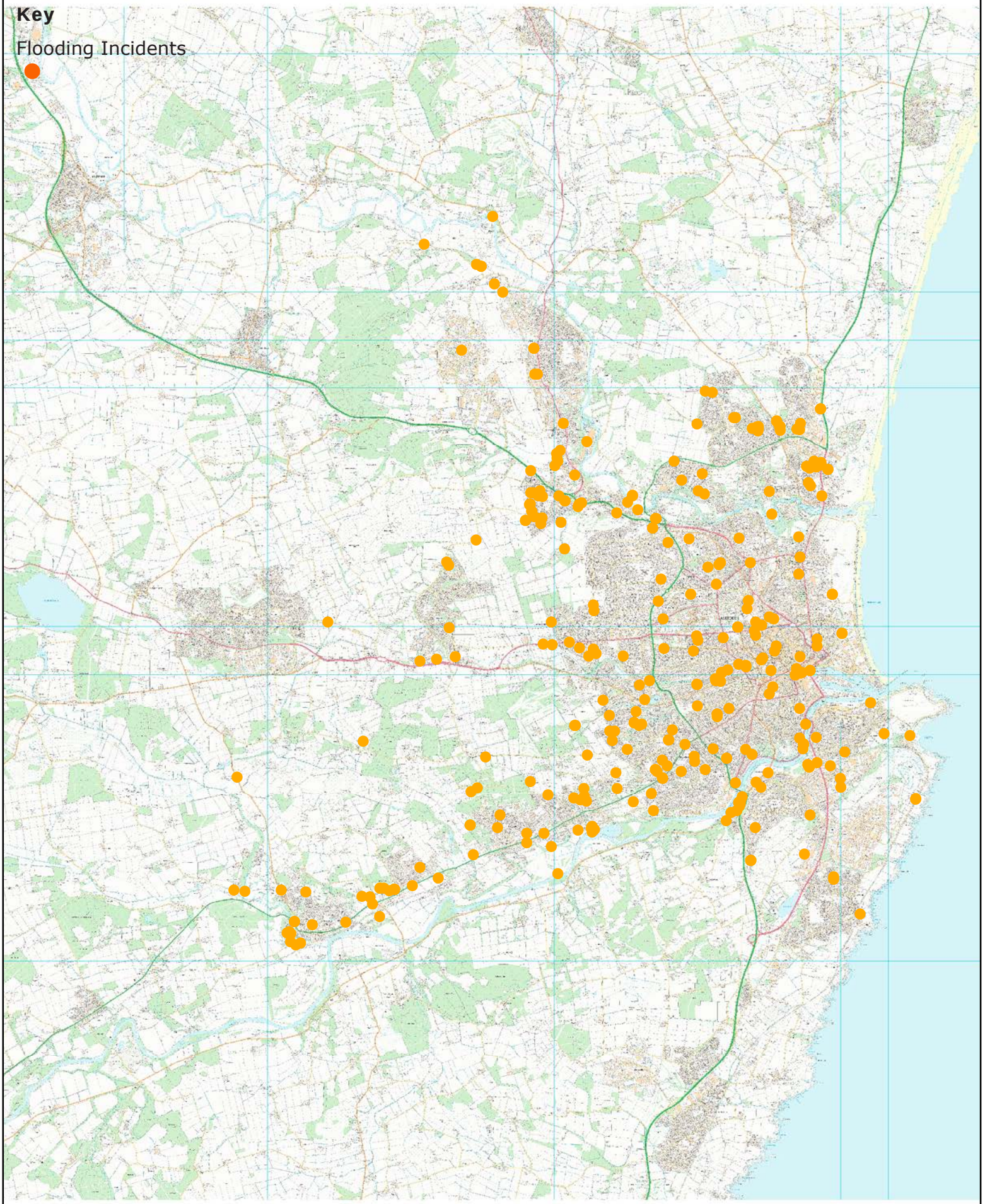


Map 8 - Groundwater Vulnerability Index



Map 9 - Flooding Incidents

ABERDEEN CITY COUNCIL



Map 10 - Reservoirs

ABERDEEN CITY COUNCIL