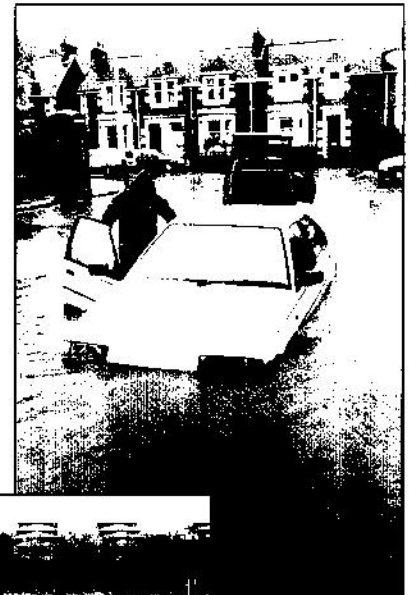
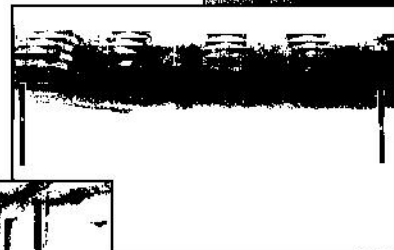


Flood Prevention Report 1999

1999



Dundee
City Council

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Cover photograph courtesy of the Courier and Evening Telegraph Dundee

1 BACKGROUND

1.1 On 26 May 1997 the Flood Prevention and Land Drainage (Scotland) Act 1997 came into force. This placed a duty on local authorities to:

- assess watercourses in their area from time to time to determine whether their condition is likely to cause flooding;
- carry out maintenance works on watercourses which would significantly prevent or mitigate the likelihood of flooding; and
- to prepare and publish reports.

The 1997 Act limits Local Authorities responsibilities to the flooding of non-agricultural land. Where any flood prevention works would benefit only one person or organisation, then the Local Authority is not required to carry out such works.

1.2 The first report was published in December 1997 and it is a requirement of the act to publish further reports every two years setting out:

- all occurrences of such flooding since that date;
- the measures which have been taken since the date of publication of their previous report; and
- the measures that are required to prevent or mitigate the flooding of non-agricultural land in their area;

1.3 The purpose of publishing these reports is to ensure that local people and other interested parties have ready access to local authority records and information with regard to flooding in their area. This report is the second to be published.

1.4 The City Council seeks the participation of the citizens of Dundee in providing information on flooding within the City. This report sets out the current position as far as it is known and proposes appropriate future action.

Anyone who has additional information on known flooding risk areas which have not been identified in this report is invited to bring it to the attention of:

The City Engineer
Planning and Transportation Department
Dundee City Council
Floor 14, Tayside House
Crichton Street
DUNDEE DD1 3RB

2 IDENTIFICATION OF WATERCOURSES

A schedule of all watercourses within the Council's boundaries has been prepared and is set out in Appendix 1. The map in Figure 1 shows the location of all known watercourses and is based on information gathered from historical records. Many of the watercourses have been culverted or piped below ground level at some time in the past and have subsequently been either diverted for industrial purposes in earlier times or more recently moved to make way for development works. Accordingly, precise records have been difficult to obtain. Where there is doubt over the exact line of a watercourse, the anticipated line has been shown as a broken line on the plan.

The main watercourses which affect the city are:

- River Tay;
- Dighty Water and its tributaries, the Gelly, Fithie and Murroes Burns;
- The Logie Spout/Scourin' Burn;
- Lochee Burn; and
- Dens Burn.

3 REVIEW OF FLOODING EVENTS SINCE DECEMBER 1997

There have been a number of minor events which have occurred resulting in localised road flooding although it is not intended to deal with these within this report. Such local events are generally associated with blocked surface water drainage systems, combined with intense rainfall events.

Since the first biennial report there have been two significant flooding events which have resulted in damage to property and major disruption. These are noted below:

3.1 River Tay - Dundee City Centre Flooding

On 30 July 1998 the central area of Dundee suffered serious flooding within Allan Street, Trades Lane, Gellatly Street, Commercial Street, Dock Street and Marketgait South. In addition, flooding of basements throughout the City Centre Area was widespread. The flooding was occasioned by severe rainfall coinciding with a high tide resulting in surface water backing-up within the drainage system and resulting in flooding within the above area to depths of approximately 300mm.

This incident was dealt with by closing roads and over-pumping by the Fire Brigade. Sandbags were deployed but were of little practical use due to the very rapid onset of the flood and the equally rapid abatement once tidal levels within the River Tay had fallen.

3.2 Gelly Burn - Ardler Central Core Flooding

On 25 December 1999, the central shopping area within Ardler was flooded as a result of the Gelly Burn over-topping the inlet grille at the entry to the closed culvert section.

The flooding was occasioned by a period of prolonged heavy rainfall falling onto frozen ground. The recently constructed detention pond was over-topped and the flood water found its way into the new swaile prior to entering the culvert. However the culvert inlet became choked due to scour of topsoil within the swaile where the recently planted grass had not become properly established. The over-topping of the culvert inlet resulted in severe flooding of the shops and their immediate surroundings. The incident was dealt with by the placing of sandbags by Tayside Contracts and over-pumping by the Fire Brigade. The swaile has been subsequently completed and the vegetation is now becoming well established.

4 MEASURES TAKEN SINCE DECEMBER 1997

4.1 Assessment of Watercourses

The 1997 Act requires the Council to assess watercourses from time to time to establish whether or not their condition is likely to lead to flooding of non-agricultural land. In order to satisfy this requirement, a series of regular inspections are carried out concentrating particularly at known flood risk areas. In addition, inspections are carried out during periods of heavy rainfall to monitor the known risk areas.

4.2 Flood Alleviation Operations

Since the last biennial report, works have been carried out to the Gelly Burn at Ardler as part of a major redevelopment of the area which will help alleviate the risk of flooding.

The first phase of this work saw the construction of the new upper detention pond and swaile to the east of Dalmahoy Drive. In addition, the inlet grille to the west of Dalmahoy Drive has been replaced to allow for proper maintenance to be carried out and to provide for over-topping in times of flood.

The second phase of these works which involves a second detention pond and the further use of swailes is planned to be carried out within the next two to three years.

4.3 Hydrological Studies

The Council in conjunction with University of Abertay, Dundee is continuing to develop detailed hydrological models of two of the main watercourses which run through the Council's boundaries. These are the Dighty Water and its tributary, the Gelly Burn. The areas covered by the current studies are illustrated in Figure 3.

The aim of these studies is to build up a detailed computer model of the watercourses and their catchment areas to enable predictions to be made on the likely consequences of future developments on the watercourses. The computer model shall also enable predictions to be made on the effects of carrying out maintenance or flood prevention works in specific locations.

The Dighty element of the hydrological study has been extended to include the lower section of the Fithie Burn and development of the remainder of the model is ongoing. The Dighty model has been used to justify intervention with development of land along the river corridor which has seen Sustainable Urban Drainage systems incorporated within new developments. The Gelly Burn study was completed in 1998 and has been used to influence development within its catchment. As a direct consequence flood alleviating ponds have been constructed to cater for Urban Regeneration.

A recent topographical survey has recently been carried out within the Broughty Ferry area to determine the potential impact of flooding due to a rise in sea water levels. With this information, options for raising the level of sea defences are being investigated.

4.4 Flood Emergency and Warning Planning

In the event of a major emergency involving flooding, the City Council has in place an integrated emergency management procedure which has four main aims:

- To clarify the roles of the organisations involved in dealing with emergencies;
- To ensure that the City Council are able to provide the resources at its disposal in dealing with the emergency;
- To provide information on the support and assistance available from the City Council and all other agencies and organisations; and
- To ensure that appropriate arrangements are in place to co-ordinate the City Council's response to such an emergency.

As part of the overall emergency plan a detailed section on 'Response Measures to Flooding Emergencies' has been drafted and is due to be issued within the next few months.

As part of this procedure, the City Council has access to information from various sources to assist in the warning of potential flooding occurrences. Information on severe weather conditions, atmospheric surge conditions in the Tay estuary and predicted tide levels is collated. In addition, contacts have been made with the Scottish Environment Protection Agency (SEPA) who can provide information on flow levels due to extreme events such as snow melt combined with heavy rainfall with the Tay catchment area.

The information obtained from these various sources is analysed and used to predict the likelihood of flooding in low lying areas adjoining the estuary such as the Broughty Ferry area at Fisher Street where a combination of adverse conditions occasionally results in local flooding events. Similarly, for the other watercourses, meteorological information is used to assess the risk of flood events occurring.

4.5 Flood Appraisal Group

Close internal links have been developed with other relevant Council Departments and proposals are well advanced in establishing a formal Flood Appraisal Group which will incorporate representatives from the City Council, the Scottish Environment Protection Agency and the North of Scotland Water Authority, together with representatives from neighbouring authorities as appropriate.

It is anticipated that a formal policy statement will be placed before the City Council during 2000, recommending the establishment of a formal Flood Appraisal Group.

5 FURTHER MEASURES TO BE TAKEN

5.1 Maintenance Inspection and Remedial Works

It is proposed to continue with regular inspections to monitor the condition of watercourses within the city boundaries. These inspections shall be carried out on a rolling programme and shall be prioritised with the areas of highest risk being targeted as requiring the greatest use of resources.

As a result of these inspections it may be necessary for the City Council to use its powers under the Flood Prevention (Scotland) Act 1961 to instruct maintenance works to be carried out. These powers would only be used where the maintenance works would substantially reduce the likelihood of flooding occurring and where the flooding is likely to affect more than one owner.

5.2 Identification of Capital Works

Where the inspections show that there is a requirement for more substantial works, other than routine maintenance, then consideration would be given to promoting a flood prevention scheme. Should such a scheme be required and funded from Capital then the Council would have to exercise its powers under 1961 Act to promote such works.

North of Scotland Water Authority (NOSWA) are aware of the limitations of their drainage systems within the City Centre Area which resulted in the flooding event on 30 July 1998. As part of a programme of forthcoming capital works, improvements to their plant shall be carried out within the next two years to help alleviate the problems of flooding within the City Centre Area.

5.3 Continuing Liaison

In order to help reduce the risk of flooding occurring in the future, it is vital that the City Council maintains and builds on its current links with other organisations and bodies. In order to achieve this, the City Council shall seek to develop closer links in this regard with the following organisations:

- Perth and Kinross Council;
- Angus Council;
- Scottish Environment Protection Agency;
- North of Scotland Water Authority;
- Scottish Natural Heritage; and
- Scottish Office Agriculture, Environment and Fisheries Department

5.4 Control of Future Development

Existing planning legislation already provides for the possibility of new development and must assess the risk of any such development in areas identified as being prone to flooding. In addition the National Planning Policy Guidance No 7 "Planning and Flooding" contains further detailed guidance on the inter-relationships between planning and flood risk issues.

Future development within the City shall be controlled in line with the National Planning Guidelines given in NPPG 7 and where appropriate, by reference to new national guidance in the form of the new design manual for Scotland & Northern Ireland; 'Sustainable Urban Drainage Systems' (S.U.D.S) this document is supported and promoted by amongst others, COSLA, SEPA, Scottish Water Authorities & Scottish Executive to deal with the disposal of surface water from development sites. To allow new development to proceed, a balance has to be achieved between improving surface water disposal through the use SUDS as recommended by SEPA and the requirement to reduce the risk of flooding. Such SUDS have the combined benefit of improving water quality and attenuating surface water discharges in order to minimise the risk of flooding downstream of the development.

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The Flood Prevention and Land Drainage (Scotland) Act 1997

The Flood Prevention (Scotland) Act 1961

National Planning Policy Guideline No 7 - "Planning and Flooding"
Scottish Office Environment Department

A Guide to Surface Water Best Management Practices - SEPA 1996
'Sustainable Urban Drainage Systems'
Sustainable Urban Drainage Scottish Working Party - 2000

Watercourses and Culverts Appendix 1

Name	Length (m)	Watercourse Location
Dighty (open)	12192	Bridge at Baldovan to Estuary
Gelly Burn (open)	1219	Old Glamis Road to Claverhouse Road
Gelly Burn	3048	Macalpine Road/Dalmahoy Drive Old Glamis Road/Macalpine Road
Whitfield Burn (open)	2286	Berwick Drive to Fithie Burn
Whitfield	762	Berwick Drive
Fithie Burn (open)	1097	Rear of Pitkerro Mill to Dighty
Gorrie Burn (open)	1096	Pitempton Farm and west from Strathmartine Road parallel to Sidlaw Avenue
Gorrie	365	Bridge at Baldovan/Pitempton Farm and Strathmartine Road/Pitempton Farm
Invergowrie (open)	1676	Rear Swallow Hotel to Estuary
Murroes (open)	1036	Pitkerro House to Dighty
Lochee (open)	1341	Gourdie Industrial to Invergowrie Burn
Lochee	3047	Burnside Street/Gourdie Industrial Estate
Camperdown Park (open)	792	Through park
Camperdown	396	Liff Road/Kingsway
Clive Road (open)	152	Rear of houses at Clive Road at right angles to Gelly Burn
Back Burn (open)	243	Rear to sub-station at Macalpine Road parallel to Birkdale Place
Back Burn	2090	Macalpine Road/Strathmartine Road and Kirkton High/Dighty
Mause Burn	396	Commerical Street/Dock Street
Dens Burn	2636	Glenogil Avenue/Arthurstone Terrace and St Roques/East Dock Street
Logie Spout	1036	Victoria Park/Edward Street
Scouring Burn	1179	Edward Street/Ward Road
Ward Road	481	Length of Ward Road
Perth Road	198	Perth Road/Foreshore
Perth Road	182	Foreshore at 590 Perth Road
Foster Road	243	Foster Road/Gelly Burn
Kingsway	610	Tesco/Clive Road
Craigiebank	631	Arbroath Road/Craigie Avenue to Strips of Craigie
Claypotts	1829	Ferndale Drive/Church Street
Barnhill	1432	Strathmore Street/Monifieth Road
Tay (open)		Invergowrie/Barnhill

Flood Risk Locations

Appendix 2

No.	Name	Flooding Location	Flood Risk Potential	Flood Risk Category
1	Dighty (open)	Land between Harestane Road and Home Farm	Property damage and flooding of agricultural land	2
2		Dighty/Old Glamis Road junction	Flooding of local road	2
3		Land north of Trottick	Flooding of agricultural land	3
4		Land between Mill Ponds and Barns of Claverhous Road	Recreational and property damage	1
5		Playing fields west of St Saviours school	Flooding of recreational ground only	1
6		Industrial land west of Forties Road	Property damage	2
7		Land between Pearce Avenue and Tom Johnstone Road	Flood plain	2
8		Land northwest of Lilac Cottage on A92 Arbroath Road	Flooding of agricultural land	3
9		Land west of Milton Park Monifieth	Property damage	
10	Gelly Burn	Dalmahoy Drive/Turnberry Avenue junction	Property damage	1
11		South of Primary school Turnberry Avenue	Property damage	1
12		Turberry Avenue/Macalpine Road junction	Road flooding	2
13		Camperdown Road west of Strathmartine Road junction	Property damage	1
14		Gillburn Road south of Gillburn Primary School	Road flooding	2
15	Whitfield Burn (open)	Northwest of Berwick Drive/Ballumbie Road junction	Flooding of recreational ground	2
16	Fithie Burn (open)	Fithie/Drumgeith Road junction	Property damage	1
17	Gorrie Burn (open)	Gorrie Burn/Strathmartine Road junction	Property damage	1

Flood Risk Locations

Appendix 2

No.	Name	Flooding Location	Flood Risk Potential	Flood Risk Category
18	Gorrie	Farm land between Strathmartine Road and Pitempton Road	Flooding of agricultural land	3
19	Invergowrie (open)	Southwest of Swallow Hotel	Flooding of agricultural land	3
20		Pedestrian bridge and track	Pedestrian access problems	2
21	Murroes (open)	East end of Barlow Avenue	Flooding of agricultural land	3
22	Lochee	Bridge at Denhead of Gray	Flooding of agricultural land	3
23	Mause Burn & River Tay	Town centre shops	Flooding of roads possibly linked to tidal effects and storm water overflows	1 *(2)
24	Logie Spout	Industrial Development	Property damage	2
25	Perth Road	Riverside Avenue west of Wright Avenue	Localised flooding of road	3
26	Tay (open)	Fisher Street, Broughty Ferry	Damage to property and flooding of road due to tidal effects	1
27		St Vincent Street, Broughty Ferry underpass below railway line	Flooding of road associated with tidal effects	1
28	Back Burn	St Leonards Road/Cox Street	Flooding on road	2

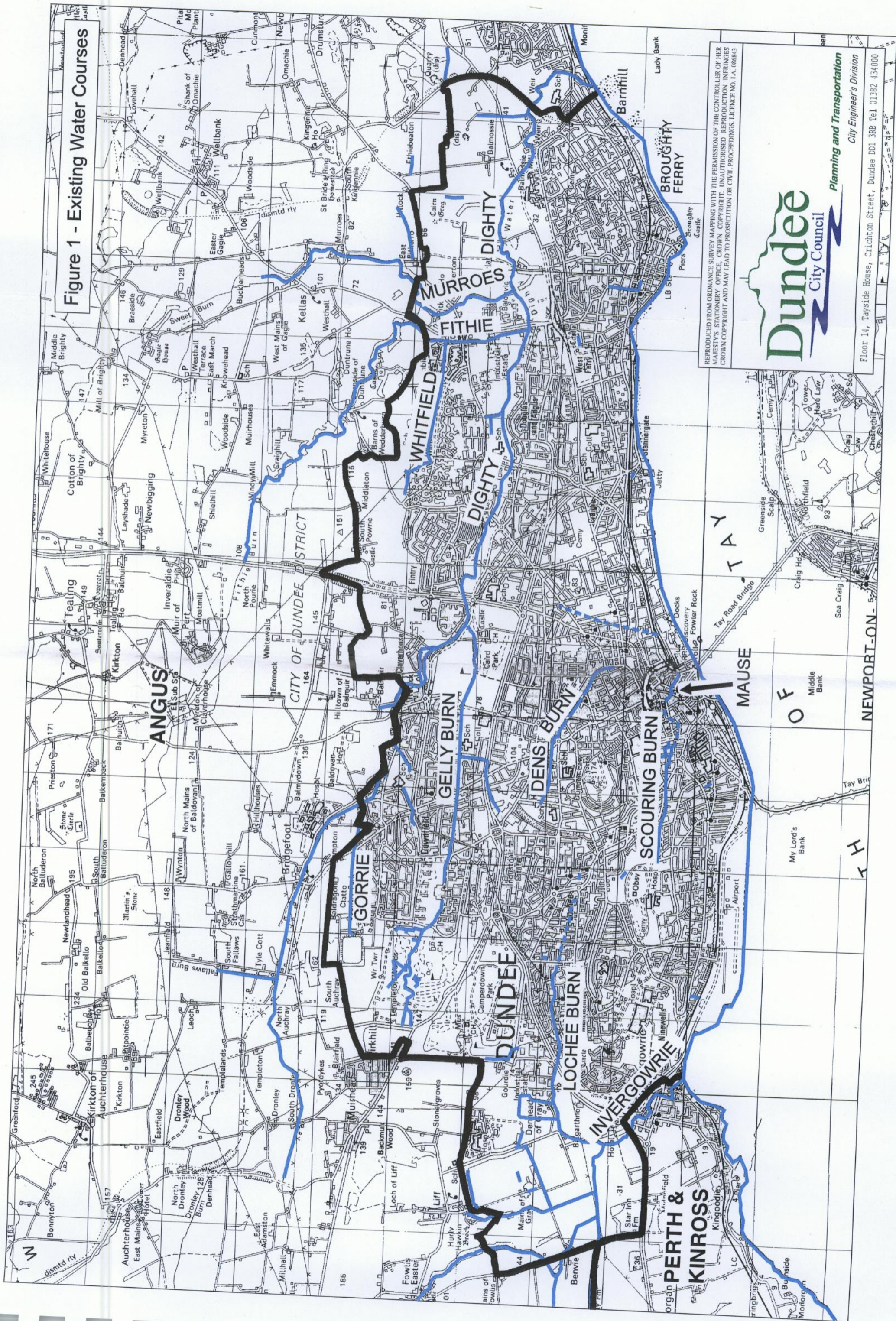
*() - Figure in brackets refers to flood risk category from previous report.

Flood Risk Category:-

- 1 - Serious damage to property, risk of personal injury, major disruption to services and transportation links.
- 2 - Nominal damage to property, disruption of services and transportation links.
- 3 - Minor inconvenience or little disruption to members of the public.

Kwilkinson\ken\floodprv

Figure 1 - Existing Water Courses



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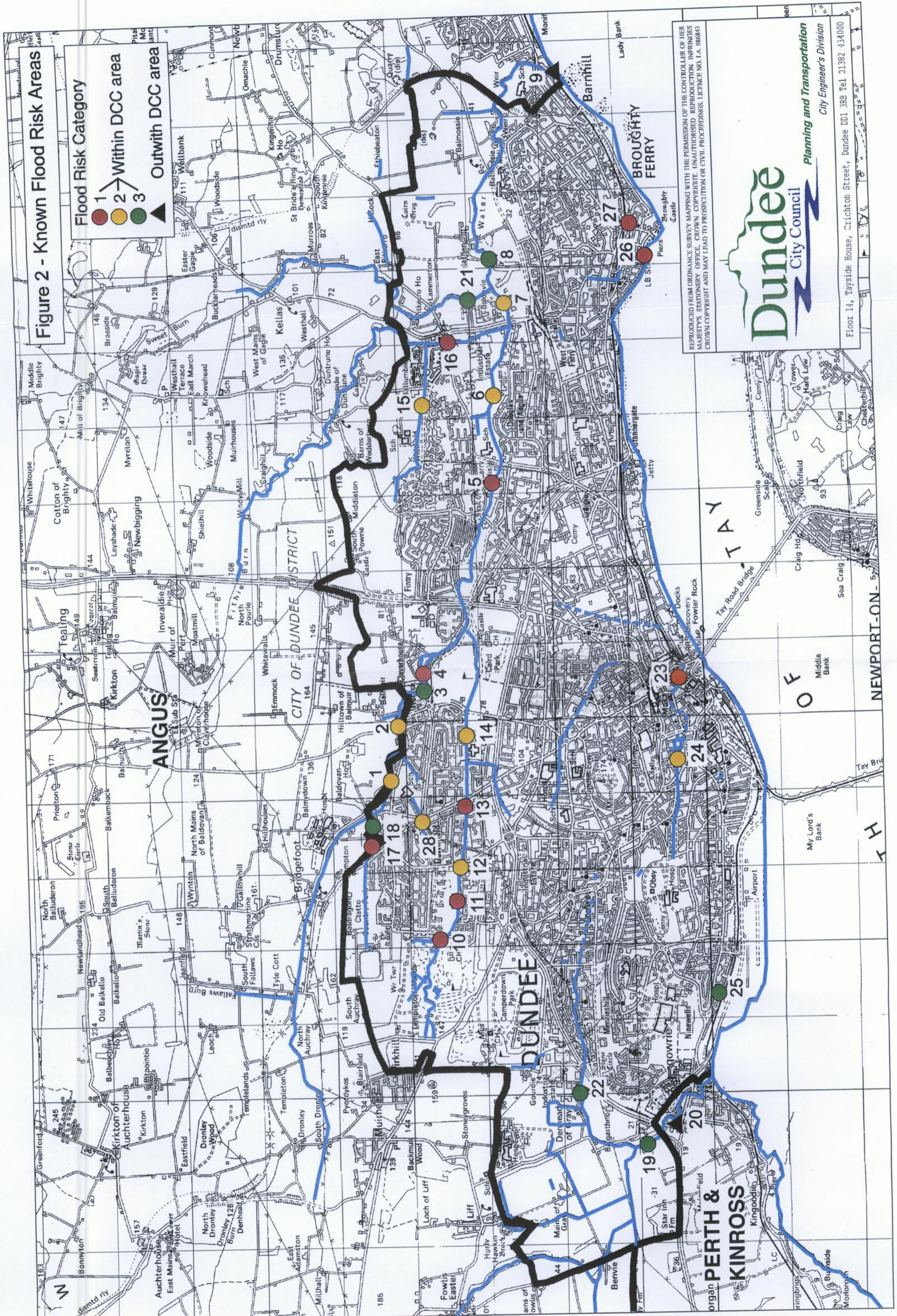
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Figure 2 - Known Flood Risk Areas

Flood Risk Category

- 1 ● Within DCC area
- 2 ● Within DCC area
- 3 ● Within DCC area
- ▲ Outwith DCC area



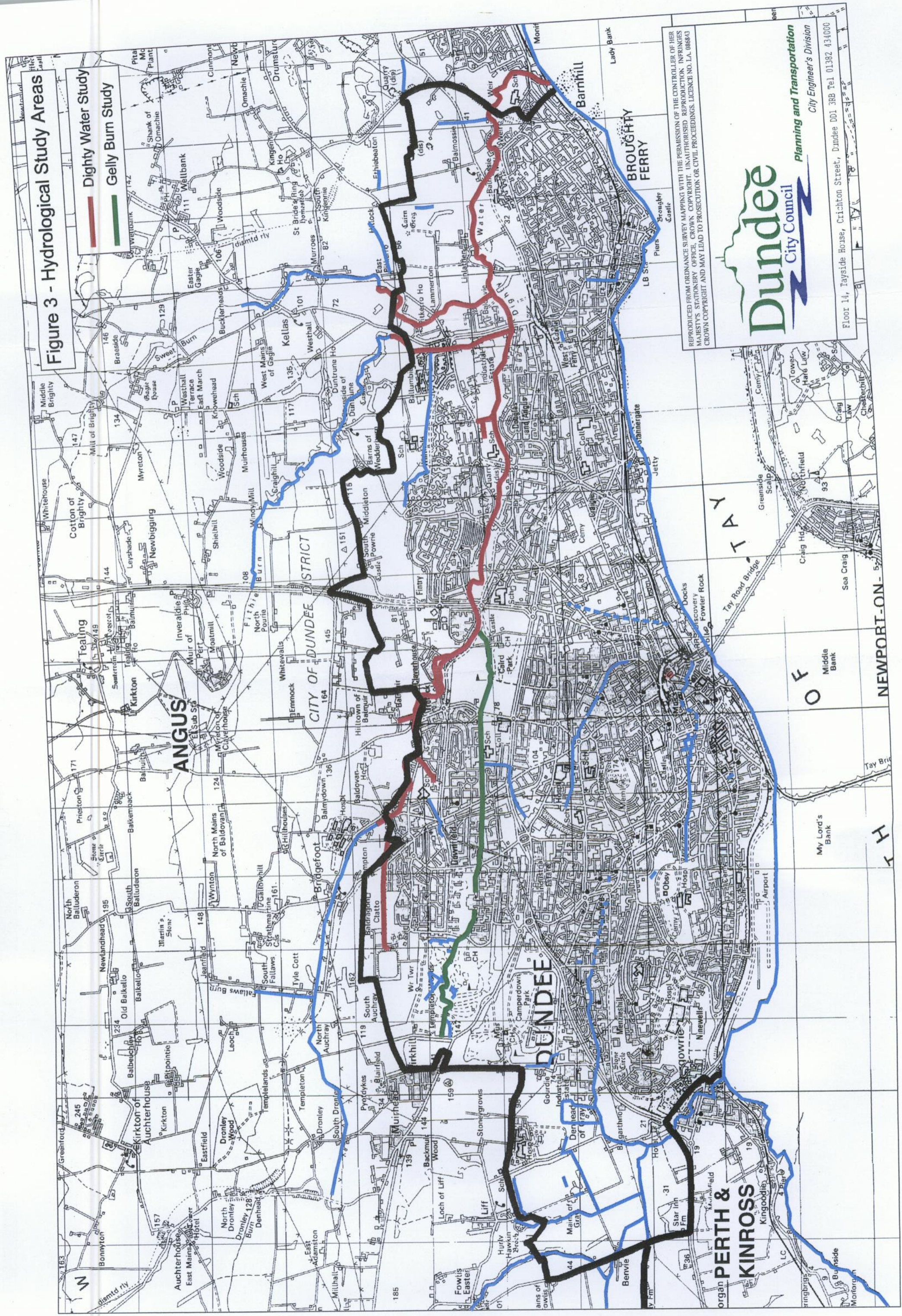
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Figure 3 - Hydrological Study Areas

- Dighty Water Study
- Gelly Burn Study



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