

## RENFREWSHIRE COUNCIL

To: Council  
On: 30 October, 2008

Report by  
Lead Officer

### Flooding in Renfrewshire

#### 1 Summary

- 1.1 The Scrutiny & Petitions Board conducted a review of flooding in Renfrewshire, the purpose of which was to identify the main issues which arose from flooding at present and were predicted to arise in the future, to consider what the Council and partner bodies were doing to tackle these problems, and to assess whether these activities could be improved.
- 1.2 The review was conducted over a number of meetings of the Board and was informed by evidence from a range of key personnel from Renfrewshire Council and other agencies.
- 1.3 The attached report was approved by the Scrutiny & Petitions Board at its meeting held on 30<sup>th</sup> September, 2008.

#### 2. Recommendations

- 2.1 That the report and its recommendations be approved; and
- 2.2 That the Council's thanks be conveyed to those persons who contributed to the review.

#### IMPLICATIONS OF THIS REPORT

1. **Financial implications** – No direct financial implications but the report identifies potential future financial implications arising in particular from the new responsibilities which will be placed on the Council as a result of the new Flood Risk Management Bill which is currently before the Scottish parliament
2. **Personnel implications** – See financial implications – additional requirements arising from the Flood Risk Management Bill may require additional staff but this will require to be assessed when the new responsibilities are finally established
3. **Community Plan Implications** – Sustainable development – Managing flood risk in a sustainable way is an integral part of sustainable development
4. **Legal Implications** - None
5. **Property Implications** – No direct property implications but the report raises a number of issues relating to the protection of council property from flooding, and dealing with flooding arising from run-off from Council property
6. **Information Technology Implications** – The report identifies potential resource implications for the Council's Geographical Information System which will form an essential component of future measures to deal with the management of flood risk.

- 7 **Equal Opportunity Implications** - None
- 8 **Health & Safety Implications** – No direct implications but flooding has clear implications for health and safety of residents, employees and property owners in Renfrewshire.
- 9 **Procurement Implications** - None

## FLOODING IN RENFREWSHIRE

### 1 Introduction

0.1 At its meeting on 25 June 2007, the Scrutiny and Petitions Board agreed to include "Flooding in Renfrewshire" as a subject for review in its programme for 2007 / 2008.

0.2 At the meeting of 12 May 2008 the Board approved the Scoping Report prepared by the Lead Officer.

0.3 The Board agreed that the purpose of the investigation should be to identify the main issues which arise from flooding at present and are predicted to arise in the future; to consider what the Council and partner bodies are doing to tackle these problems; and to assess whether these activities can be improved. It agreed that the review should:-

- Consider the requirements of existing legislation and national guidance;
- Assess the performance of Renfrewshire Council in relation to statute and guidance and review flood mitigation measures taken by the Council since 1996;
- Consider current partnership working arrangements with external bodies and the extent and effectiveness of integrated responses to flooding;
- Identify the opportunities for improvements to the level of service provided by the Council as a corporate body and in its partnership working arrangements, and appraisal of costs and benefits; and,
- Consider the implications of the forthcoming Flooding Bill for the Council.

### 0.4 Scope of the Review

The Board also agreed that the review should examine:

- The legislative context, government policy and guidance on flooding (including the Flooding Bill);
- The nature and extent of flood risk within Renfrewshire as presently understood, including assessment of climate change impacts;
- The concept of sustainable flood management, the conclusions of the Interreg IIIB Urban Water Project and the implications of the EU Flood Directive for the Council;
- The Council responses and investment made to date and appraise revenue and capital costs of service;
- The effectiveness of working relationships between and within departments and with external organisations;
- The potential contribution and financial implications of integrated catchment management planning within Renfrewshire.

0.5 Concerns and activities relating to flooding focus on two main areas

Dealing with emergency flood events - covering flood warning, emergency planning, emergency responses, and the measures which can be taken during periods of flooding.

Reducing the risk of flooding - covering flood prevention schemes, incorporation of flood prevention measures in new development, sustainable urban drainage schemes (SUDS) (See Glossary and Definitions), planning policy on flooding, modelling and forecasting of flooding events, and flood management planning.

Both of these aspects of flooding are equally important and relate one to the other. Some of the parties involved in flooding and in giving evidence have more interest in one aspect than others while some bodies are equally engaged in both aspects. The recommendations and conclusions of this report reflect these two broad areas of concern. However the evidence summarised in the second part of this report is set out broadly in the order in which it was presented to the Board as this allows for clarity between the parties involved. The order in which the evidence is presented in this report is shown below under the heading of the relevant meetings of the Scrutiny and Petitions Board. A reference is given to the paragraph of this report where the evidence is summarised.

#### 9 June 2008 – Renfrewshire Council departments

- Planning and Transport - Engineering Design [2.1]
- Planning and Transport - Planning [2.2]
- Chief Executive's Civil Contingencies Unit [2.3]
- Environmental Services [2.4]
- Housing and property Services [2.5]
- Finance and IT (submitted to meeting of 18 August 2008) [2.6]
- Legal Services (submitted to meeting of 23 June 2008) [2.7]

#### 23 June 2008 – External partner organisations

- Strathclyde Police [2.8]
- Strathclyde Fire and Rescue [2.9]
- Scottish Environmental Protection Agency [2.10]
- Scottish Water (presented at meeting of 18 August 2008) [2.11]
- Scottish Government [2.12]

#### 18 August – Consultants and other interested parties

- Blair Melville – Homes for Scotland [2.13]
- Dr John Riddell - Consulting Engineer [2.14]
- Dr Yusuf Kaya – Consulting Engineer [2.15]
- Professor Chris Jeffries [2.16]
- Mike Donaghy – World Wildlife Fund [2.17]
- Simpson and Marwick – on behalf of Council's insurance providers. (submitted after the Board meeting as a written statement) [2.18]

0.6 Further information was provided by officers of the Council resulting from issues raised at the Board meetings or as follow up enquiries arising from evidence provided. Where appropriate this has been included in the report.

#### 0.7 Record of thanks

Providing evidence is no easy task and in most cases required extensive work and the allocation of valuable time. I would therefore like to record my thanks, on behalf of the Scrutiny and Petitions Board, to all of the witnesses who gave evidence both through written submissions and by attending the Board.

### **Structure of this Report**

1.1 The report commences with a section covering *Key Issues, Conclusions and Recommended Actions* which aims to: - identify matters which have been highlighted as being of particular

importance; draw conclusions from the evidence received; and, where appropriate, set out recommended actions. This is followed by a summary record of the evidence received, in the order set out above in paragraph 0.5. The actions which comprise the Action Plan are incorporated into the *Key Issues, Conclusions and Recommended Actions* to provide the background reasoning for the actions and are shown in bold text. Each action is cross referred to the body of the evidence shown by the paragraph number in square brackets and includes an indication of departmental responsibility. Departmental responsibility is summarised in Table 2 at the end of the section after paragraph 1.7.2, page 17. The key issues are presented under the headings – “Dealing with emergency flood events,” and “Reducing the risk of flooding.” The summary commences with a discussion of the background to flooding in Renfrewshire, relevant legislation, and roles and responsibilities. A glossary and definition of some technical terms is provided at the end of the report.

## 1.2 **Key Issues, Conclusions and Recommended Actions**

### 1.2.1 **Flooding in Renfrewshire.**

In recent years there have been more frequent flood events throughout Scotland. Renfrewshire has experienced major flood events in 1994, 1999 and most recently in December 2006. Flood events in Renfrewshire are typically characterised by a complex interaction between intense rainfall events, watercourses exceeding peak flow capacities, surface water run-off from developed areas, and lack of capacity in the sewerage system and the tidal influence of the Clyde. The key flooding issue in the urban area, as evidenced in December 2006, relates to the lack of capacity in the sewerage system and local watercourses, exacerbated by overland flow i.e. water which becomes concentrated and flows across land after heavy rainfall (see report to HECS Policy Board, 9 January 2007, item 27).

1.2.2 Although recent flood events are not statistically unusual when measured over long time periods, they perhaps can be attributed to the onset of the predicted global climate change. Climate change is presenting new challenges and threats. Research predicts that Scotland will become warmer, sea levels may rise, rainfall will increase, particularly in the west of Scotland, ground water levels will rise and storm events will become more frequent. Flood hazards from river and coastal flooding and from intense rainfall overloading natural and artificial drainage systems are predicted to increase during the 21st century. Climate change is predicted to impact on flooding by increasing peak intensities and / or storm durations, and generally increasing the volumes of surplus surface water to be dealt with. The future level of rainfall will be the main determinant on future patterns of flooding.

### 1.2.3 **Legislation and Government Policy.**

Following the flood events in Scotland in 1994, changes were made to national policy guidance on flooding and new legislation was introduced. These changes had significant implications for local authorities. In 1995, new planning policy guidance (National Planning Policy Guideline (NPPG) 7 was introduced which required Councils to fully consider flood risk as a material consideration in determining planning applications and in the preparation of development plans. It also recommended that local authorities set up flood appraisal groups and take a lead role in co-ordinating measures and responses to flooding. The guidance was subsequently updated and reinforced in 2004 by Scottish Planning Policy (SPP) 7 which emphasised the importance of taking account of the probability of flooding from all sources. In 1997, the Flood Prevention and Land Drainage (Scotland) Act 1961 was amended which increased Councils' duties in flood prevention, requiring a more proactive role in watercourse maintenance and watercourse flooding assessments. Around the same time, the concept of Sustainable Urban Drainage Systems (SUDS) (See Glossary and Definitions) was introduced for new developments. SUDS attempt to mimic natural drainage patterns to minimise surface

water runoff rates using attenuation (i.e. surface water storage) and ground infiltration techniques. Planning advice on this subject was provided in Planning Advice Note (PAN) 61 (2001).

- 1.2.4 The Civil Contingencies Act 2004 introduced a range of new statutory duties in relation to emergency events including flooding.
- 1.2.5 In February 2008, the Scottish Government published a consultation document entitled *The Future of Flood Risk Management in Scotland* which sets out the proposals for a new Flooding Bill. The proposals are designed to implement the EU Floods Directive and establish a framework within which sustainable flood management in Scotland will be defined and operate more effectively than at present. The EU Floods Directive requires:
- the production of Preliminary Flood Risk Assessments to identify areas at significant flood risk by December 2011;
  - the production of Flood Hazard Maps and Flood Risk Maps for areas at significant risk of flooding by December 2013;
  - the production of Flood Risk Management Plans for areas at significant risk of flooding by 2015.
- 1.2.6 The Draft Flooding Bill proposes that SEPA be designated as the “competent authority” to oversee the implementation of the Act but expects local authorities to play a key role and to lead at the local level. The Flooding Bill has potentially significant implications for the manner in which local authorities undertake their flood management responsibilities and engage with partner organisations. The emphasis on sustainable flood management and an integrated approach to the preparation of flood risk management plans has been welcomed by the Council (see report to Environment and Infrastructure Policy Board 23 April 2008 - Response to Scottish Government consultation on proposed Flooding Bill). Council involvement will be required in all parts of the process from Preliminary Flood Risk Assessment, the production of Flood Hazard and Risk Maps to the preparation and implementation of Flood Risk Management Plans.

### **1.3 Dealing with emergency flood events,**

#### **1.3.1 Roles and responsibilities**

Severe weather threats and flooding incidents are the most common major emergency situations that Renfrewshire Council responds to, occurring on a regular and often annual frequency. The Council has statutory responsibilities under the Civil Contingencies Act to prepare for, respond to, and manage severe flood emergencies. The Council’s Civil Contingencies Unit works in partnership with other Council departments and with outside agencies such as the Police and Fire and Rescue services in fulfilling these responsibilities. The Council also has a duty of care for those in the community. But in addition there is also a public expectation of service and support from the Council during major flood incidents which has to be recognised, managed and catered for. The Council’s Geographic Information System (GIS) provides a mechanism for monitoring and assessing flooding in emergency situations and for supplying up-to-date map based information to the Council, its partners and the public including via the Council’s web site.

#### **1.3.2 Role of other agencies**

Whilst local authorities have a range of powers in relation to flooding, other agencies also have responsibilities for flooding issues. The division of responsibilities for flood prevention and watercourse maintenance, piped water systems, flood warning and flood emergency response requires co-operation between the respective agencies involved, principally the local authority, SEPA, Scottish Water and the emergency services, in order to secure appropriate action during emergency flood events.

#### Public expectations

- 1.3.3 Flooding is stressful and a highly emotive issue for those under threat or directly involved. Evidence from the flooding which took place in Yorkshire in 2007 showed that the experience had major detrimental effects on family life and relationships and also had an effect on the health of many who were affected by the floods. Flood events put our Council resources and response arrangements under great pressure and, because floods can seriously affect the Council's reputation, if it is perceived that the Council has under-performed or mismanaged the event, it can leave the Council open to public and political censure, Public Inquiry or even litigation. Flooding is identified in the Council's Corporate Risk Register 2008/2009 which was approved by the General Management and Finance Policy Board at the meeting on 23 April 2008. This includes a summary of actions which are taken to manage the risk of flooding at the Council level. The public have an expectation of service and assistance over and above statutory responsibilities and there is a need to recognise, cater for where appropriate, and manage these expectations. There is a need to educate the public about flood risk and the need for householders and businesses to take greater ownership of the risks and take precautionary action in the same way they would against other hazards. There is also a need to investigate how greater community resilience can be fostered which would enable communities to prepare for and provide mutual support during emergency flood events. It was suggested in evidence that community awareness and resilience projects should be targeted through community safety and other local forums. This could include encouraging the public to prepare flood kits and provide a programme of support and encouragement to individuals to be better prepared and more self-reliant during emergencies. However it has to be recognised that any culture change towards fostering greater community resilience in respect of flooding is likely to be a very long term process and may only be achieved in areas which are subject to regular flooding events. It was noted that SEPA have undertaken work in schools on flooding and that this could be beneficial in Renfrewshire.

#### **Action 1**

**Investigate mechanisms to establish public expectations of the responding agencies to:- determine the level of self and group resilience and local interest in establishing collective community emergency response; and to improve community resilience and mutual assistance within the community in our flood prone areas. (2.3.7)**

**Action by Civil Contingencies Manager**

#### **Action 2**

**Investigate the potential to provide information on flood risk through schools and through community safety and other local forums. [2.15.3-4]**

**Action by Civil Contingencies Manager, Director of Education and Leisure**

#### Changing responsibilities in Council

- 1.3.4 During the flood events of 2006 the Roads Division took on an extensive role over and above their core statutory activities. Dr Riddell in his evidence [2.14.2] suggested among other things that a single senior officer should have sole responsibility for flooding. The Director of

Planning and Transport has the primary responsibility for flooding within the Council. However, in accordance with the report to the Infrastructure and Environment Policy Board of 21 November 2007 [2.1.12-15] during flood emergencies the Planning and Transport Department is now taking a support role by providing advice to other departments in respect of predicted significant surface water overland flow paths. For future flood events responses will be required from individual departments and departments will, of course, require to fund their actions from their own budgets. This approach appears to run counter to evidence provided by the external consultants who stressed the need to have a clear definition of who has overall responsibility for flooding [2.14.2] and pointed to lessons to be learned from Holland where one body was responsible for all aspects of flooding [2.16.3]. The Civil Contingencies Manager has also expressed concerns about the new division of responsibilities on the basis that:

- the lack of a single lead department with responsibility for flooding (or indeed clear lines of responsibility for a Corporate response) creates difficulty in integrating flood response planning and provides the vulnerability of a fragmented emergency response;
- that a pan-Renfrewshire flooding or extreme weather event would overwhelm departmental DLOs acting quasi-independently and that a mechanism to provide a unified DLO effort at some trigger point needs to be developed.

1.3.5 It is clearly essential that the actions of the various departments are coordinated to ensure a comprehensive response to flood events. Response to flood events needs to be seen as a Council responsibility and not a departmentalised responsibility. The various departments involved in dealing with flooding will have to be prepared to respond immediately to emergencies, as any delay in action arising from unclear responsibilities or clarifications of financial arrangements are likely to reduce the effectiveness of the Council's response and are unlikely to be understood or accepted by the public. There is a need to ensure that the division of responsibilities will provide an integrated and unified response to flood emergencies and that senior managers and all staff within Council departments who may be called on during flood events are fully trained and prepared for emergency situations and are aware of the line of responsibility and command and that financial arrangements are in place to deal with emergencies. The Civil Contingencies Manager has suggested that consideration be given to the creation of a Corporate Flood Response Group which would include Strathclyde Fire and Rescue as a key partner and, among other things, would aim to effectively combine the emergency efforts and resources of the Council's various DLOs.

### **Action 3**

- (a) Set up a Corporate Flood Response Group incorporating key departments and emergency services and establish procedures and responsibilities for dealing with emergency flood events**
  - (b) Ensure that the established division of responsibilities for flood response will provide an integrated and unified response to flood emergencies with a clear line of responsibility and command. [2.14.2, 2.16.3]**
  - (c) Ensure that Directors, Heads of Service and all relevant staff are fully informed, aware, trained and equipped to deal with flood emergencies and that procedures and responsibilities are fully tested including scenarios where major costs are incurred by departments. [1.3.5] [2.1.9 – 2.1.16] [2.3.8]**
  - (d) Procedures should include the potential use of GIS [2.6.2] and linkages to other agencies, in particular SEPA [2.10.7] Scottish Water [2.11.6 – 9], Strathclyde Police [2.8] and Strathclyde Fire and Rescue [2.9]**
- Action by all Directors and Civil Contingencies Manager**

1.3.6 In a similar way to the division of responsibilities for taking action in flood emergencies, there is a division of financial implications arising from responses to flood emergencies. Table 1 shows the departmental financial burden arising from some of the emergency incidents dated 2006 to 2008. This does not include the recent expenditure on the Maich Dam at Lochwinnoch, which at the time of writing was running at £60,600.

TABLE 1 – Expenditure on Emergency Responses 2006 /2008

	A	B	C	D	E
1	Department	Incident details	Date	Costs	Total
2	Education and Leisure	Severe weather incident	w/c 12 December 2006	£ 10,918.00	
3	Education and Leisure	Severe Weather Incident	W/c 07 January 2008	£ 8,000.00	£ 18,918.00
4	Environmental Services	Severe weather incident	w/c 12 December 2006		
5	Finance and IT Services	Glasgow Airport Terrorist	30-Jun-07	£ 200.00	
6	Finance and IT Services	Ecoli Incident	W/c 13 August 2007	£ 200.00	£ 400.00
7	Housing and Property	Severe weather incident	w/c 12 December 2006	£ 380,000.00	
8	Housing and Property	Oxy Actelyene Incident, 3	20-May-07	£ 2,100.00	
9	Housing and Property	Severe Weather Incident	W/c 07 January 2008	£ 150,000.00	£ 532,100.00
10	Planning and Transport	Glasgow Airport Terrorist	30-Jun-07	£ 5,766.00	
11	Planning and Transport	Dangerous Building	05-Jan-08	£ 46,610.06	
12	Planning and Transport	Severe weather incident	w/c 12 December 2006	£ 470,000.00	£ 522,376.06
13					
14				£ 1,073,794.06	

1.3.7 The Director of Finance and IT has advised that it is recognised that Directors across the Council can be required to manage a range of budget pressures which may emerge unexpectedly throughout any particular financial year. Such pressures can relate to a wide variety of issues ranging from flooding and other emergencies to the outcome of a contractual disputes or the unexpected increase in key supplies e.g. energy and fuel. Directors have delegated responsibility to manage their budget on a bottom line basis and this flexibility will be used in the first instance to manage the impact of such costs from within the overall resources available to services. Where costs are of a significant nature, there will be ongoing dialogue with the Director of Finance, in order to discuss and agree the proposed action to manage costs within the bottom line budget. In addition, the Council retains general unallocated revenue reserves, in line with good practice, there is reserved funding to allow the Council to respond to issues which due to the scale of the financial costs involved, would not be reasonably containable within the existing year revenue budget. This approach has worked very effectively over the history of the Council and unlike many Councils, there has never been a departmental overspend within any financial year.

#### Notification and publicity

1.3.5 The Council has well developed and robust alerting and emergency management procedures which are regularly exercised and frequently tested. The Council's Civil Contingencies Unit is engaged in work to develop a corporate plan to meet the requirement under the Civil Contingencies Act to warn, inform and advise the public in the event of an emergency. During the Maich Dam incident in August 2008 a Public Information Line was established with regular updates to the recorded message and the Council's internet was used to communicate regular updates regarding public safety. Currently Strathclyde Fire and Rescue are provided with

weather information for the whole of their operational area. This is generic and does not identify particular local threats. Strathclyde Fire and Rescue have made a request to receive updates on local flood warnings and severe weather immediately the Council receive these to assist them in planning for emergency flood events. There are proposals to update the Council's flood pages on its web site and to issue a leaflet giving advice and outlining new departmental and external agency responsibilities and contacts. As this will be an essential part of dealing with emergency flood events, this should be done as a matter of priority.

**Action 4**

**Communicate local weather and flood alerts to Strathclyde Fire and Rescue.**

**[2.9.4]**

**Action by Civil Contingencies Manager.**

**Action 5**

**(a) Complete, issue and publicise the corporate plan for public warning , information and advice**

**Action by Civil Contingencies Manager**

**(b) Update Council web pages relating to flooding and prepare leaflet summarising actions to be taken by the public during severe flood events.**

**These should set the responsibilities of the various departments of the Council, SEPA and Scottish Water along with contact points and telephone numbers. [2.1.15]**

**Action by Director of Planning and Transport, Civil Contingencies Manager, IT Web Team, and Corporate GIS Team.**

**Emergency procedures**

Flood Plan

- 1.3.6 The Council has a Council Flood Plan which promotes a level of departmental pro-activity prior to the main winter flood season. The Plan outlines arrangements to identify pre-flooding issues and puts in place contingency arrangements, such as a late autumnal programme of grid and watercourse clearance, identifies sandbag stocks and their holding areas, and reviews the location and activation of evacuation centres in particularly vulnerable areas, etc. The Flood Plan was first created in 1995 and following modification has served its purpose well in setting out the framework of our flood response. It has successfully made the council better prepared. However, with new challenges and changes, the plan required a full review and overhaul which is now underway. Strathclyde Fire and rescue recommend that Renfrewshire Civil Contingencies Unit progress flooding elements of the Community Risk Register as part of the Strathclyde Emergencies Co-ordinating Group - West Group. Work is presently underway to create a local version of the Community Risk register which will apply to Renfrewshire, Inverclyde and East Renfrewshire. This will be available to the public on the Civil Contingencies pages on the Council's web site from October 2008.

**Action 6**

**Complete the review of the Council's Flood Plan as a matter of priority. [2.3.8] taking account of any decisions in response to Action 3(a) in respect of the formation of a Corporate Flood Response Group**

**Action by Civil Contingencies Manager**

**Action 7**

**Progress flooding elements of the Community Risk Register [2.9.4]**

## **Action by Civil Contingencies Manager**

### Flood risk to and arising from Council property

- 1.3.7 Departments will require to identify potential sources of flooding to property under their control and ensure that appropriate action is taken to provide protection against any identified risk. They should also identify locations where flooding arises from run-off from Council property to adjoining property. A number of playing fields suffer from flooding and measures are in hand to mitigate these problems. In addition a number of areas were identified in evidence where run-off from recreational areas on to adjoining property has caused problems which are being managed by the Department of Environmental Services [2.4.3 - 4]. Further areas have been identified by the Head of Roads and investigation is required to ensure that appropriate measures are taken to investigate these Strathclyde Fire and Rescue has requested information on premises at risk of flooding which may require assistance in the event of flooding. Evidence was provided on the arrangements made by and on behalf of Amey, the provider of a number of schools in Renfrewshire under PPP and the need to ensure that they are fully informed during flood emergencies.

#### **Action 8**

**Provide a list and map of those premises within the recognised flood areas which may require assistance in rescuing vulnerable persons, such as care homes, sheltered housing etc. [2.6.2] [2.9.4]**

**Action by Directors of Social Work, Housing and Property, Planning and Transport, Education and Leisure, Finance and IT, and Civil Contingencies Manager.**

#### **Action 9**

**Review emergency rest centres and emergency accommodation using latest flood risk information to establish flood risk at these establishments and establish revised list and GIS mapping of centres if required. [2.1.18] [2.3.10]**

**Action by All Directors and Civil Contingencies Manager**

#### **Action 10**

**Confirm Amey's ability to act in severe flood events which may affect properties constructed and operated under PPP. Confirm what arrangements require to be introduced to provide Amey with flood risk warnings and to incorporate them into the emergency flood planning for Council premises.[2.3.14]**

**Action by Director of Housing and Property, and Director of Education, Civil Contingencies Manager.**

#### **Action 11**

**Monitor flooding of Council recreational areas to ensure flood mitigation works are effective. [2.4.3] Identify all areas where run-off from Council owned land has caused flood problems in adjoining property and prepare measures to mitigate these problems [2.4.4]**

**Action by Director Environmental Services**

### Contaminated Land

- 1.3.8 The Environment Agency and the Health Protection Agency have developed a tool which provides a Risk Assessment Framework for potential chemical contamination from contaminated land during flood events. The Civil Contingencies Manager has advised that he will assess it to determine whether it has local value in flood incidents where there may be levels of chemical contamination from contaminated land or other sources.

## **Action 12**

**Evaluate the Environment Agency and Health Protection Agency risk assessment framework for the assessment of potential contamination during flood events, to determine whether it should be incorporated into the Council's emergency flood response procedures. [2.4.2]**

**Action by Director of Environmental Services and Civil Contingencies Manager**

### Role of Emergency Services

- 1.3.9 In major incidents, Strathclyde Police will assume a coordinating role. They have standard and well rehearsed generic procedures to deal with emergencies which are adapted to meet specific needs, including flood events.
- 1.3.10 Under the legislation which governs the operation of Strathclyde Fire and Rescue (SFR) its role in relation to flood incidents is that of rescue, the saving of life and ensuring persons are taken to a place of safety. Although the duties of SFR are limited to those specified above, where resources allow, they do provide humanitarian services such as pumping or removal of water. Experience has shown that this is an expectation of the public, but that it cannot always be provided due to limited resources. SFR has recently acquired a high volume pump to assist in dealing with emergencies including flooding. This pump can be used to move large volumes of water over distances up to 3 Kilometres. However if it is to be utilised in flood situations there is a requirement to establish the routing for the hoses and the identification of suitable locations to which water can be transported which will have the capacity to accept the pumped water and which will not lead to flooding elsewhere. This should be included in emergency planning and should benefit from the mapping and modelling of sewers and watercourses being undertaken by the Council.

### Responding to flood events - Conclusion

- 1.3.11 In general, the council is reasonably well positioned to forecast and respond to flood events and is demonstrably working in an integrated manner with its emergency services partners and other key agencies. The prolonged rainfall of November / December 2006 severely stretched the capacity of the Council and the private sector and events of greater severity, which must be planned for, will require greater resource both in terms of personnel and funding. While there is confidence in the Council's ability to manage a range of flood incidents, a very large scale event may overwhelm present systems and resources and more development needs to be undertaken to mitigate such a situation.

## **1.4 Grants and assistance to owners and occupiers**

### Sandbags

- 1.4.1 The Council supplies sand bags during flood events. There is no statutory duty to provide or deliver sandbags to individual properties. The public place a disproportionate trust in the effectiveness of sandbags. There is a need to allocate responsibility for the provision of sandbags as part of the allocation of new duties within the Council. The departmental responsibility for filling and supplying sand bags to the public requires to be clearly established and built into the Council's Flood Plan.
- 1.4.2 A variety of flood protection equipment is available which can be used by householders and which may be more effective than sand bags. The SEPA web site provides information on equipment and suppliers.

### Grants

- 1.4.3 The Council has a range of powers under which it could make grants assistance available. If the Council were to proceed with the provision of grants for flood protection it would have to

develop detailed procedures and criteria for the making of grant assistance and would have to establish the financial implications and insurance liabilities. The Environment Agency in England is piloting a grant scheme in five locations. The results of these pilots have not yet been reported.

- 1.4.4 The Council should investigate the feasibility of providing grants as an integral part of sustainable flood management. It should however await the implementation of the new Flooding Act to establish what powers this legislation may introduce and await the outcome of the pilot grants scheme being undertaken in England before considering implementing a scheme in Renfrewshire. The potential to hold a stock of flood protection equipment which could be supplied in flood affected areas should be investigated.

**Action 13**

**Investigate the feasibility of providing grants as an integral part of sustainable flood management. Investigation should take account of:-**

- any grant giving powers which are included in the new Flooding Act
- the outcome of the pilot grants scheme being undertaken in England by the Environment Agency.[2.7.1 - 2.7.3]

**Action by Director of Corporate Services, Director of Planning and Transport, Director of Housing and Property, and Director of Finance and I.T.**

**Action 14**

**Prepare a policy on the provision of sandbags [1.4.1] [2.3.5]**

**Action by Civil Contingencies Manager**

**Action 15**

**Assess the effectiveness of sandbagging [1.4.1] [2.3.5] as a means for individuals to protect property and consider the provision of more modern and potentially effective equipment, specifically designed to protect premises from flooding, to supplement or replace the provision of sand bags. [1.4.2][2.3.6]**

**Action by Director of Housing and Property Services, Director of Planning and Transport**

**Reducing the risk of flooding**

Flood prevention works in Renfrewshire

- 1.5.1 The storm events of winter 2006/7 generally showed that the works to date on flood prevention and protection, and on watercourses both buried and open had been successful, with the sewers generally being seen to be discharging in isolation. However there were still significant urban fringe overland flows which led to flooding within Renfrewshire.
- 1.5.2 Measures implemented within Renfrewshire, have included major flood prevention schemes, two major flood barriers at Collier Street, Johnstone and Crosslee, and one major storage scheme at Moredun / Stanely Reservoirs (Moredun stores 25,000 m3). The flood protection scheme for the River Clyde at Renfrew started on site in August 2008.
- 1.5.3 Major flood prevention measures undertaken in Renfrewshire have been funded under capital borrowing consent and government grant aid varying from 50% to 80%. The grant has now been incorporated into the block grant system, with a national sum of £126M over 3 years being divided across all Scottish local authorities. It is important that the Council continues to invest in flood prevention measures and that appropriate resources from the block grant are allocated to this crucially important aspect of the Council's work. Flooding tends to become a headline issue when serious flood events occur but it is important that investment in flood

prevention continues over the long term if the Council is to ensure that the risk of flooding is effectively managed.

**Action 16**

**Ensure that appropriate funding from the block allocation continues to be allocated for flood management planning and dealing with emergency flood events. [2.1.4] [2.1.17]**

**Action Directors of Finance and IT, and Planning and Transport.**

Roads and drainage

- 1.5.4 Roads form an important part of the drainage network. The Controlled Activities Regulations (see Glossary and Definitions) requires new roads discharging water other than to a combined sewer, to be drained through Sustainable Urban Drainage Systems. This is likely to increase the cost and complexity of road construction and the future maintenance of such measures.

Scottish Water investment

- 1.5.5 The Scottish Water design standards for new developments is to convey a 1 in 30 year return period storm. (See Glossary and Definitions) Some combined sewers have been found to have substantial deposition which reduces capacity. Scottish Water are targeting capital investment towards sewers which cannot cater for a 1 in 10 year return period storm event. The investment should be designed to provide a 30 year return period capability.

Sustainable Flood Management / Interreg

- 1.5.6 The Council has been part of a project sponsored and funded by the European Union - Interreg North West Europe Urban Water, which has examined best practice in sustainable flood management. Sustainable Flood Management aims to move away from an approach based on the erection of flood barriers to the treatment of the cause of flooding close to its source. As part of the Interreg project the Council has developed an integrated model of the sewers and watercourses within the Johnstone pilot area. It has also acquired LIDAR (See Glossary and Definitions) topographic data which provides very accurate height data for the whole of Renfrewshire. This has the potential to provide lower cost modelling for other flood risk areas in Renfrewshire. The project also allowed the Council to gain an understanding of current practices in Europe. Of particular relevance is the concept of a "water plan" already in place in Holland which provides a comprehensive and coordinated view of water and drainage facilities including flooding; and the important role which disconnection of surface water from the sewer system can play in reducing flood risk. Both of these are likely to play an important role in the Council's future approach to managing flood risk and the development of sustainable flood management. Scottish Water are committed to the development of a Surface Water Management Plan and recognise the benefits which have arisen from joint working with the Council's Flood Team. SEPA are also committed to the promotion of sustainable flood management.

**Action 17**

**Continue to develop the Council's approach towards sustainable flood management to secure maximum benefit from the knowledge and expertise gained from the Interreg project. [2.1.18] [2.2.4] [2.12.2][2.15.3] [2.16.1]. This should include partnership working with Scottish Water [2.11.10] and SEPA [2.10.8].**

**Action by Director of Planning and Transport**

Modelling, Mapping and GIS

- 1.5.7 SEPA have developed and published flood risk maps for the whole of Scotland. These maps are not suitable for assessing flood risk in relation to individual properties and errors in the maps for Renfrewshire have been identified by the Council. Detailed modelling undertaken through, and in conjunction with, the Interreg project has produced more accurate and detailed flood risk maps for the Johnstone catchment. It is intended to prepare similar modelling and mapping for the whole of Renfrewshire.
- 1.5.8 The Council's Geographic Information System (GIS) plays a key role both in modelling and in providing information on flood risk. It is anticipated that the information gathered from modelling will be made available to interested parties in the Council and other bodies using the Council's corporate GIS which will allow all parties to view flood related information on a map base. There is a need to ensure that access and training is provided for all parties engaged in planning for flooding and flood emergencies

**Action 18**

**Include data relating to contaminated land [2.4.2] and major infrastructure [2.15.5] in mapping which is used to support emergency planning.**

**Action by Director of Environmental Services, GIS manager, Civil Contingencies Manager**

**Action 19**

**Provide access to latest flood risk mapping to all parties engaged in emergency planning. [2.1.18] [2.3.8]**

**Action by GIS Manager.**

**Action 20**

**Use GIS mapping and modelling to identify routes potentially subject to disruption during severe events and supply to emergency services. [2.1.18] [2.9.4]**

**Action by GIS Manager, Director of Planning and Transport, Civil Contingencies Manager**

**Action 21**

**Identify potential routes for the high volume pump and locations to discharge water and supply to Strathclyde Fire and Rescue. [2.1.18] [2.9.4]**

**Action by GIS Manager, Director of Planning and Transport, Civil Contingencies Manager**

**Action 22**

**Provide Strathclyde Fire and Rescue with priority list and map of premises at risk of flooding. [2.1.18] [2.9.4]**

**Action by GIS Manager, Director of Planning and Transport.**

- 1.5.10 The Council's GIS has a major role to play in the assessment of flood risk, planning and preparing for flooding, and dealing with emergency flood events. Securing its full potential will have resource implications

**Action 23**

**Assess the resource implications required to secure the full potential role of GIS in the management of flooding [2.6.3]  
Action by GIS Manager, Director of Planning and Transport.**

**1.6 New Approach to Managing Flood Risk**

Future Prospects: A Catchment Perspective on Sustainable Drainage

- 1.6.1 There is a growing recognition of the benefits of adopting catchment based approaches to flood management. This is founded on the need for a holistic view of the urban water drainage system (comprising watercourses, the sewer network and roads drainage) and the promotion of integrated surface water management. The approach is predicated on the need for joint working and integrated action particularly by the local authority and Scottish Water in the management of their roads and sewers respectively. The Water Environment and Water Services Act (WEWS) places a duty on SEPA to promote sustainable flood management.
- 1.6.2 The approach now being taken by the Council to catchment management has built on the knowledge gained from the Interreg project and aims to make best use of opportunities to secure improvements. It involves developing models of drainage systems and surface water flows to provide an accurate basis for assessing flood risk and to act as a basis for identifying the most cost effective investment options. The approach is long term in nature and requires integrated investment, partly levered in from new development and redevelopment via the planning process, with concurrent and supporting investment by Scottish Water and by the Council in the management of sewers, roads, and other assets as well as watercourse management functions. It will require to be built into the development planning and development management systems. Integrated catchment management offers financial and environmental benefits, improved management of flood events resolution of drainage constraints in new development. This approach is supported by SEPA and Scottish Water

**Action 24**

**Complete the modelling of drainage and watercourses in Renfrewshire to create a comprehensive understanding of flood risk throughout the area.**

**[2.1.18]**

**Action by Director of Planning and Transport**

- 1.6.3 It is also suggested that an initial programme of works be prepared to provide exemplar projects which would utilise the information gathered as a result the Council's participation in the Interreg project and Action 24 and introduce flood mitigation measures using sustainable techniques. In preparing the programme consideration should be given to dealing with flooding arising from Council property including that outlined in paragraph 2.4.4 of this report.

**Action 25**

**Prepare and implement a programme of exemplar projects for flood mitigation.**

**Action by Director of Planning and Transport**

The Flooding Bill

- 1.6.3 The Flooding Bill, and in particular its commitment to sustainable flood management and Flood Risk Management Plans, provides the opportunity to progress the work undertaken under Renfrewshire's Interreg project. The Flooding Bill supports and promotes the catchment-based holistic approach advocated by the Council. The intention is to create a framework in which all persons and organisations involved in flood risk management can coordinate their efforts to reduce the adverse consequences of flooding to health, the environment, cultural heritage and economic activity. The key to this is adopting a sustainable

approach to flood risk management. By protecting and working with the environment, sustainable flood risk management is intended to provide the maximum possible social and economic resilience against flooding for current and future generations. The aim is to establish, for the first time in Scotland, a coordinated approach to assessing flood risk and establishing plans to deliver sustainable flood risk management. The Flooding Bill will set out procedures in relation to the production of flood risk assessments and flood risk management plans. The provisions of the Bill aim to ensure that a nationally consistent and catchment focused approach is taken to flood risk management planning.

**Action 26**

**Prepare, plan for and allocate adequate resources to fulfil the new powers, responsibilities and procedures which will arise from the new Flooding Act, including implementing Flood Risk management plans. [2.12.1 – 2.12.6]**

**Action by Director of Planning and Transport.**

The role of the Planning System

1.6.7 The planning system has a key role to play in flood avoidance and flood alleviation through its ability to influence the development and use of land,. The Glasgow and Clyde Valley Structure Plan, which was approved in April 2008, provides strategic planning policy in respect of flooding. The Renfrewshire Local Plan which was approved in March 2006 contains flood policies based on the former National Planning Policy Guideline (NPPG) 7. This has been superseded by Scottish Planning Policy (SPP) 7. The Council has issued Drainage Assessment Guidelines which provide guidance for developers on the assessment of drainage and flood alleviation measures. The development management process ensures that flood risk is fully assessed and managed in new developments and that sustainable drainage systems and attenuated storage are provided. SEPA and Scottish Water are statutory consultees in the Development Management process and are consulted on applications in respect of drainage and flood risk. The Development Management process allows the requirements set by SEPA and Scottish Water to be incorporated into new developments. The systematic application of planning policy over time has the potential to significantly improve the functioning of the catchment drainage network. By harnessing development industry investment in this way, planning contributes to the cost effectiveness of the catchment based approach to flood management. Consideration requires to be given to updating the policies in the Local Plan and the Drainage Assessment Guidelines.

1.6.8 On a more detailed level Dr Riddell in his evidence referred to a recent flooding event which had resulted from the demolition of a wall which had previously acted as flood defence. Whilst the planning system deals generally with the effect of new proposals there is a need to ensure that consideration is given to demolitions which may have an impact of flood risk. Certain forms of demolition are covered by planning legislation and any applications for or notifications of these would be assessed under planning flood policy. However demolition is more generally covered by Building Standards and there is an opportunity to ensure that flood risk is incorporated into the assessment of applications under Building Standards for demolition

**Action 27**

**(a) Review the need to provide updated policy on flooding through the Renfrewshire Local Plan, the Roads Development Guidelines and the Drainage Assessment Guidelines and take action to update and replace where required. [2.2.1]**

**(b) Include the assessment of flood risk in the consideration of applications for demolition under Building Standards. [2.14.3]**

**Action by Director of Planning and Transport.**

## **1.7 Conclusions**

1.7.1 The evidence received by the Board has shown that the Council has already undertaken a great deal of work to deal with flood risk, This includes:- dealing with flood incidents, implementing flood prevention measures, planning to reduce the risk of flooding, and developing innovative, cost-effective, sustainable long term solutions to the flood problem. The external witnesses who gave evidence to the Board on 18 August 2008, all reported that the Council was performing well in respect of flooding and is one of the leading authorities in this field in Scotland. The fact that this scrutiny into flooding in Renfrewshire has been undertaken reflects the priority which the Council attaches to flooding. Notwithstanding performance to date, the evidence has made clear that the problem of flooding will increase through climate change and the measures required by the Council will place an increasing burden on resources. In particular, the new Flooding Act is likely to introduce new additional statutory duties for the Council. The Council has developed a high level of expertise and experience and it is essential that this is maintained and developed to allow the Council to meet the challenges which flooding will present in the years to come.

### **1.7.2 Priorities for Actions**

The allocation of responsibilities for the actions set out above is summarised below in Table 1. Recognition has to be given to the fact that there are a large number of recommended actions arising from the scrutiny, many of which fall to the Civil Contingencies Manager and the Director of Planning and Transport. In view of the potential burden there will be a need to schedule the work required to secure these actions over a period of time. However it is recommended that priority be given to implementing Actions 3, 5 and 6 which relate to dealing with, and planning for, flood emergencies.

**Table 2**  
**Scrutiny and petitions Board - Scrutiny of flooding in Renfrewshire**  
**Allocation of responsibilities for actions**

Action Number	Chief Exec (Civil Contingencies)	Corporate Services	Education and Leisure	Environmental Services	Finance and I.T.	Housing and Property	Planning and Transport	Social Work
1	✓							
2	✓		✓					
3	✓	✓	✓	✓	✓	✓	✓	✓
4	✓							
5	✓				✓		✓	
6	✓							
7	✓							
8	✓		✓		✓	✓	✓	✓
9	✓	✓	✓	✓	✓	✓	✓	✓
10	✓		✓			✓		
11				✓				
12	✓			✓				
13		✓			✓	✓	✓	
14	✓							
15						✓	✓	
16					✓		✓	
17							✓	
18	✓			✓	✓			
19					✓			
20	✓				✓		✓	
21	✓				✓		✓	
22					✓		✓	
23					✓		✓	
24							✓	
25							✓	
26							✓	
27							✓	

## **2. Summary of Evidence**

### **Renfrewshire Council Departmental Submissions**

#### **2.1 Planning and Transport - Engineering Design**

Stephen Tingle – Assistant Principal Engineer

##### **2.1.1 Sources of flooding**

With the exception of tidal flooding, flooding generally arises as a result of a surplus of surface water being unable to use the sewers, drains, and watercourses resulting in overland flow and areas of ponding. Renfrewshire has experienced a variety of storm events, including short intense rainfall events, long protracted rainfall events, and a mixture of both. Since the flooding events of December 1994 a series of flood mitigation works have been implemented across the Council at a cost of some £10M. These measures have focussed on areas which have previously flooded. It is envisaged that the focus of action for the Council will now shift to projected future flooding and means to deal with this.

##### **2.1.3 Climate change**

The Scrutiny Board at its meeting of 29 March 2005 approved a report on the “Review of the effects of climate change and their implications for Renfrewshire Council services and the local community.” This provides extensive information on climate change. Although recent flood events are not statistically unusual when measured over long time periods, they perhaps can be attributed to the onset of globally predicted climate change. Climate change is presenting new challenges and threats. Research predicts that Scotland will become warmer; sea levels will rise; rainfall will increase, particularly in the west; ground water levels will rise; and storm events will become more frequent. Flood hazards from river and coastal flooding and from intense rainfall overloading natural and artificial drainage systems are predicted to increase during the 21st century. Climate change is predicted to impact on flooding by both increasing peak intensities and / or storm durations, generally increasing the volumes of surplus surface water to be dealt with. The future level of rainfall will be the main determinant of future patterns of flooding. The implications of climate change and changes to the rainfall patterns are taken to include the following:-

- Reduced design life of roads and similar infrastructure.
- Increased wetness of the ground generally and the build up of groundwater, leading to increased settlement of buildings, and greater flows onto footways.
- Increased infiltration into the ageing sewer system with consequent increase in the frequency of sewer flooding and increased pollution where the sewers overflow into the burns and rivers.
- General increased flood hazard to existing development and by inference more reactive responses to property inundation.
- Increase in constraints to new development.
- Reduction in capital receipts to the Council for existing property portfolio within existing developed areas.
- Increased disruption to emergency vehicle routes, and key arterial transport routes.
- Increase in the extent of areas potentially affected by flood hazard.
- Blight on already developed areas within flood plains, unless at least limited improvements are permitted.
- European and National Statutes / Guidance increase the responsibilities and funding demands upon Local Authorities.

- 2.1.4 Flood prevention measures  
Measures implemented within Renfrewshire, have included major flood prevention schemes, two major flood barriers (Collier Street, Johnstone and Crosslee), and one major storage scheme at Moredun / Stanely Reservoirs (Moredun stores 25,000 m<sup>3</sup>). Other measures have included culvert upgrades, screen upgrades, debris traps and other measures intended to bring the minimum conveyance potentials up to the average over the length of the watercourse. These measures were generally targeted at the problems as they were understood at 1996.
- 2.1.4 Funding  
Major flood prevention measures introduced in Renfrewshire were funded under capital borrowing consent and government grant aid varying from 50% to 80%. The grant has now been incorporated into the block grant system, with a national sum of £126M over 3 years being divided across all Scottish local authorities.
- 2.1.5 The Drainage System and relation to Roads  
The drainage system is the responsibility of Scottish Water. New developments are provided with a separate drainage system, a foul water drain which takes sewerage to waste water treatment works and a drain to take surface water to water courses. Unfortunately this separation does not always occur with many older separate systems draining into the sewer network creating a combined system. As a result during storm events much of the surface water drains into the sewer network leading to sewer discharges onto roads and even inside properties. The sewer network is designed to allow for excess flow to drain into watercourses during storm events. This occurs at combined sewer overflows (CSOs) which are constructed to allow sewers to spill over into rivers during storm events. This is why there are often signs of sewage along river banks after storm and flood events.
- 2.1.6 Roads form an important part of the drainage network. Traditionally roads drainage was designed to provide for a 1 in 2 year return period rainfall event (see Glossary and definitions for explanation of “return periods”). Much of the older roads drainage is limited to getting water off the road surface, and into the combined sewer. Connection of the Road drainage to the sewer system is done under agreements under Section 7 of the Sewerage (Scotland) Act 1968. Flooding on roads can arise from faults with gullies, blocked or damaged sewers, or where watercourses to which surface water drains are at a high level which constrains the outflow from the gully. At times of storm events surface water drains into sewers which can contribute to overloading of the sewerage network leading to the problems described above. Sewers surcharging on to the road can result in foul water draining along a road back into the sewerage network.
- 2.1.7 Under the Controlled Activities Regulations (see Glossary and Definitions) new roads discharging water other than to a combined sewer require to be drained through Sustainable Urban Drainage Systems (SUDS) (see Glossary and Definitions). This assists in attenuating the flow of water into the drainage system and also assists in reducing contaminants and sediment prior to the water draining to watercourses.
- 2.1.8 The Scottish Water drainage design standards for new development are designed to convey a 1 in 30 year return period storm. Some combined sewers have been found to have substantial deposition which reduces capacity. Scottish Water are targeting capital investment towards sewers which cannot cater for a 1 in 10 year return period storm event. The investment should be designed to provide a 30 year return period capability.

### 2.1.9 Emergency response

Subsequent to the flooding events in Winter 2006/7 the sequence of predicted flooding has been defined as having 3 stages.

- Stage 1 is where we do not have general road flooding and severance,
- Stage 2 is where road severance is becoming a serious issue, and
- Stage 3 is where significant evacuation of the public is required.

2.1.10 Winter 2006/7 was regarded as being at the top of stage 2, whereas winter 1994, would have been regarded as a stage 3 event. This does not necessarily imply that the rainfall was worse in hydrological terms for 1994, but that the drainage network in 1994 was less capable of dealing with such rainfall.

2.1.11 The established response to protracted / intense rainfall events was that the Departments in action to deal with stage 1 events would continue and gradually move to a corporate role with corporate contingency funding becoming available.

2.1.12 The lack of response from Scottish Water in Winter 2006/7 with the exception of defending Water supply infrastructure, and the subsequent joint working to try and resolve some of the underlying infrastructure problems across Renfrewshire has been reported at an earlier date. (See Housing, Environment and Community Safety Policy Board, 9 January 2007, Item 28 *"Emergency Works Due To Exceptional Adverse Weather Conditions"* and Environment and Infrastructure Policy Board, 21 November 2007, Item 8 *"Update on Severe Flooding Events of November / December 2007"*).

2.1.13 The magnitude and extent of flooding within Renfrewshire in winter 2006/7 was mitigated as a result of maximising the conveyance potential away from areas of potential and / or limited flooding, by repeatedly cleansing the entries to buried culverts that often had been cleansed earlier. The constant cleansing up to 3 times per week, for a period of nearly 3 months, using external contractors to assist the Council's in-house service when extreme rainfall was predicted, incurred significant costs.

2.1.14 It should be noted that whilst the storm events of winter 2006/7 generally showed that the works to date on the watercourses both buried and open had been successful, with the sewers generally being seen to be discharging in isolation. However there were still significant urban fringe overland flows which led to flooding within Renfrewshire.

### Changing responsibilities within the Council

2.1.15 In accordance with the Report to the Environment and Infrastructure Board of 21 November 2007 (Item 28) the approach taken at the time of the 2006 floods has now been amended with each department being responsible for surface water coming onto, going across, and going off land or property for which it is responsible. During the flood events of 2006 the Roads Division took on an extensive role over and above their core, statutory activities which are limited to:- inspection and maintenance of grills and clearing of culverted watercourses; maintenance of flood defences; and maintenance of roads drainage. The Report to the Environment and Infrastructure Board of 21 November 2007 aimed to clarify the position relative to the Roads Service responsibilities and capabilities and ensure that all departments were aware of their specific responsibilities during any flooding event. It included the role of various departments potentially involved in dealing with flood events. The Planning and Transport Department is now taking a clearer support role by its provision of advice to other

departments in respect of predicted significant surface water overland flow paths. In the report the responsibilities of the various departments during flood events was summarised as follows:-

- Dept. of Planning and Transport      Addressing Flooding from watercourses and highway drainage systems
- Dept. of Housing and Property              Addressing Flooding to all Council Property
- Dept. of Environmental Services      Managing Flooding arising from surface water run off from parks, open spaces recreational areas etc
- Department of Education and Leisure      Managing Flooding from major assets such as schools.
- Scottish Water      Addressing Flooding from sewerage network/ defence of water supply.
- Housing Associations and Private House owners      Flooding to all privately owned residential property.

2.1.16 For future flood events responses on behalf of the Council will be as outlined above. It is proposed that the Council's flood web pages be updated and a leaflet produced summarising the actions to be taken by the public during severe flood events. The web pages and leaflet will also set out the responsibilities of the various departments and Scottish Water and will provide contact points and telephone numbers. It is clearly essential that the actions of the various departments are coordinated to ensure a comprehensive response not only to flood events but also to proactive preventative measures prior to flood occurrence. Discussions have taken place with the Civil Contingencies Manager to secure appropriate coordination.

#### 2.1.17 Budgetary implications

The Roads budget for 2006/07 included £824,000 for emergencies. The emergency work undertaken as a result of the flooding in late 2006 led to an additional spend of some £500,000 over and above the budgetary allocation. This provides a very general indication of the magnitude of expenditure which can be incurred as a result of the flood event experienced in winter 2006/7. The emergency budget for Roads for the current year (2008/09) is broadly the same as that for 2006/7, although the sum identified in the budget is £470,000 due to the fact that some elements previously included under the emergency budget have been moved to other headings to allow better identification of expenditure. It is essential that all responsible Departments are aware of the potential expenditure implications arising from flood events. The various departments involved in dealing with flood emergencies will have to be prepared to respond immediately to emergencies, as any delay in action arising from unclear responsibilities or clarifications of financial allocations are unlikely to be understood or accepted by the public. Further discussion of public expectations is provided in the evidence by the Civil Contingencies Manager.

#### 2.1.18 Interreg

The Council has been part of a project sponsored and funded by the European Union - Interreg North West Europe Urban Water which has examined best practice in sustainable flood prevention. Sustainable Flood management aims to move away from an approach based on the erection of flood barriers to the treatment of the cause of flooding close to its source. The Interreg project concluded in June 2008 and documentation of the outcomes can be accessed from the Council's web site from the Flooding – European Funding page. As

part of this project the Council has developed models of the sewers and watercourses within the Johnstone pilot area and has also acquired LIDAR topographic data which provides very accurate height data. This is being used to develop a cost effective method of modelling, more accurately, areas of Renfrewshire likely to be affected by flooding both from rivers, overland flow and sewers. The results can be shown as a flood risk map using the Council's Geographic Information System (GIS). The project also allowed the Council to gain an understanding of current practices in Europe. Of particular relevance is the concept of a "water plan" already in place in Holland which provides a comprehensive and coordinated view of water and drainage facilities including flooding; and the important role which water attenuation and disconnection of surface water from the sewer system can play in reducing flood risk. Both of these are likely to play an important role in the Council's future approach to flood risk management. It is anticipated that the information gathered from modelling will be made available to interested parties in the Council and other bodies using the Council's corporate Geographic Information System (GIS) which will allow all parties to view flood related information on a map base.

## **2.2 Planning and Transport Department – The Role of Planning**

Frank Bradley – Supervisory Planner

### National Planning Policy

2.2.1 The planning system, through its ability to influence development and the use of land, has a key role to play in flood avoidance and flood alleviation. National planning policy on flooding is set out in Scottish Planning Policy (SPP) 7 – Planning and Flooding, which was issued in 2004. The main guidelines are

- New development should not take place on areas subject to significant flood risk or which will increase the risk of flooding elsewhere
- Flood risk requires to be taken into account in development plans.
- The storage capacity of the functional flood plain should be safeguarded.
- Drainage is a material consideration in assessing development proposals.
- SUDS will be required wherever practicable

SPP7 provides a flood risk framework against which development proposals can be assessed. It refers to flood risk maps provided by SEPA which are to be used for strategic purposes. It is noted that there are a number of errors in the SEPA flood risk maps covering Renfrewshire.

### 2.2.2 Development Plan

The Glasgow and the Clyde Valley Structure Plan provides the strategic policy framework for flood risk assessment whilst the Renfrewshire Local Plan provides detailed local policies. The policies in the Local Plan were prepared prior to the publication of SPP7. The Planning Division uses its own flood proximity maps to scope flood risk in respect of development proposals. To assist the promotion of SUDS and the consideration of drainage matters more fully within the planning application process, *Drainage Assessment Notes for Guidance* were prepared by the Council and issued in 2004. This drainage assessment guidance provides a comprehensive framework for the consideration of drainage systems, infiltration, groundwater, surface water flow, foul and storm water disposal, SUDS and drainage related flooding issues. It promotes and facilitates the consideration of drainage issues, including flooding, at the early stages of development. Drainage assessment is now a standard part of the Development Management process through which planning applications are assessed by the Council.

### 2.2.3 Consultation and partnership working

Flood Liaison and Advice Groups (FLAGS) were promoted through SPP7 as a basis for developing flood expertise and exchanging information, particularly between local authorities, Scottish Water and SEPA. The Council hosts and chairs the Carts Rivers FLAG. This is attended by planning and engineering representatives from five local authorities with the Carts and lower Clyde catchments, Scottish Water, SEPA and Scottish Natural Heritage. A Strategic FLAG also operates for the wider Clyde Valley catchment. In 2005, Scottish Water entered into a service level agreement (SLA) with councils as a means of improving quality, consistency and efficiency in its relationship. Under the SLA agreement, quarterly tripartite meetings are held between Scottish Water, SEPA and the Council. Discussions contribute to an integrated approach to the resolution of drainage matters at the local level. The Council also makes an active contribution to the preparation of the River Basin Management Plan which is being coordinated by SEPA.

### 2.2.4 Future Prospects: A Catchment Perspective on Sustainable Drainage

In recent years, there has been an increasing impetus to adopt catchment based approaches to flood management. This is founded on the need for a holistic view of the urban water drainage system (comprising watercourses, the sewer network and roads drainage) and the promotion of integrated surface water management. The approach recognises that unattenuated (unlimited and uncontrolled) conveyance of extreme rainfall events within buried infrastructure is neither economically feasible nor practical; the future drainage network requires a combination of attenuation and conveyance to suit the developed sub-catchment. The approach is predicated on the need for joint working and integrated action particularly by the local authority and Scottish Water in the management of their roads and sewers. The planning process has also a potentially key role to play by ensuring flood risk is fully assessed and managed in new development and that sustainable drainage systems and attenuated storage are provided. The systematic application of planning policy over time has the potential to significantly improve the functioning of the catchment drainage network. By harnessing development industry investment in this way, planning contributes to the cost effectiveness of the catchment based approach to flood management.

## 2.3 **Chief Executive's**

Alastair Mackay - Civil Contingencies Manager

2.3.1 Severe weather threats and flooding incidents are the most common major emergency situations that Renfrewshire Council responds to on a regular and annual basis. Major flooding incidents involve extended multi-agency working with our emergency services partners and may require the evacuation of the public to a place of safety. Flood events put Council resources and response arrangements under great pressure and because flooding is stressful and a highly emotive issue for those under threat or directly involved, floods can seriously affect the Council's reputation. If it is perceived that the Council has under-performed or mismanaged the event, it can leave the Council open to public and political censure, public enquiry or even litigation.

### 2.3.2 Responsibility of Renfrewshire Council in flood emergencies

There are several aspects of duty and responsibility that the council has in preparing for, responding to and managing severe flood emergencies. There are new statutory emergency management duties under the Civil Contingencies Act 2004 and there is the legal aspect of our duty of care to those in our community. There is a further aspect, which is much more difficult to define, but it is that of matching public expectation of service and support levels during major incidents, for example in the distribution of sandbags. Under the Civil Contingencies Act the Council has to:- carry out risk assessments of emergency situations and review the Council's ability to respond; maintain contingency plans to reduce, control and

mitigate incidents; maintain business continuity plans; and make arrangements to warn and inform the public before during and after emergency incidents. The Civil Contingencies Unit is working with departments and external partners in developing arrangements and systems for these and other areas, to ensure Council compliance with the legislation and to provide a leading-edge response capability. In addition to its statutory obligations the Council has a duty of care to the population in its area. If the Council does not meet its statutory duties in relation to a flood incident, it could be liable for damages. However, regardless of the Council's powers and duties there may be an expectation within the public, and also other bodies who may be involved in dealing with emergencies, about the role that the council will perform and the assistance that the council will provide in emergency situations. Ideally, the Council should manage these expectations so that everyone is clear what the Council can, will or will not do.

### 2.3.3 Emergency priorities

When emergency services respond and deploy to a major emergency event they act on a basic list of priority actions which are expected of them in a modern society, to protect life, prevent escalation of the emergency situation and as far as possible, preserve property and the environment. The Council works with very finite resources in flooding incidents. This means that in responding to a severe flood situation, our resources need to be coordinated and directed to similar priority tasks.

### 2.3.4 Public expectations

There is an expectation within the community and perhaps also in the commercial sector that even in a major flood event, an emergency service or the Council will attend to and provide a range of services, including protecting their homes and property. While some level of individual support may be possible in a small-scale flooding event, in the context of severe flooding situations, with wide-spread levels of disruption, then, unless there is an element of threat to life or of harm, individual property protection cannot be a priority for the emergency services, or the Council. Under extreme flood events the Council and its emergency services partners need to operate at a tactical and strategic level rather than to service individual demands. In effect this may mean, for example, redirecting resources to clear the road access to hospitals for ambulances; assist in protecting a telephone exchange or power sub-station to allow them to continue to provide their essential service to the area or create barriers to protect areas under flood threat. Without taking these tactical actions there is a danger that a flood incident could escalate its effects and have much more severe consequences. However, these priority actions may mean that individual members or small groups of the public would not receive a level of assistance that they may have expected in relation to the protection of their property. This often relates to the provision of sandbags.

### 2.3.5 Sandbags

The proper tactical use of sandbags and the limitations they have when issued to individual property owners are areas which are open to confusion and probably not fully appreciated. Sandbagging and sandbag deployment is highly labour intensive and is used to best effect, in advance, to either create or bolster flood defence systems that are under threat of overtopping or to divert flowing water away from an at-risk area to a less vulnerable location. They are most effectively deployed in bulk in this role and priority will be given to their being used in these engineering projects to protect large areas of property under threat.

The Pitt Review into the floods in England in 29007 noted that:

*'Strategic sandbagging' can be successfully used alongside roads or adjacent to important buildings to prevent them from flooding, but the work needs to be done properly by experts. The Review was unable to obtain any significant evidence that*

*sandbags were particularly effective during the 2007 summer floods in providing protection to individual households.*

*Nevertheless, sandbags are still widely regarded as an important focus for community action and they should not simply be withdrawn. The general provision of sandbags should be phased out in favour of better products such as kite-marked flood boards, air brick covers and other forms of temporary defence.”*

Pitt Review recommendations (Executive Summary ES.49 and ES.50)

The public place a disproportionate trust in the effect of sandbags at their doors, which is largely misplaced. Sandbags are porous and ill-fitting and must only be considered a very temporary solution to water penetration when used in a domestic situation. At some point, often fairly quickly, water will enter the building through the wall vents, floor and as the water deepens and pressure increases, permeate through the sandbag and through the brick itself. There is no statutory requirement for the Council to provide or deliver sandbags to individual properties. This is a discretionary matter whereby the Council may provide sandbags, if resources are available and an assessment has been made that they would be effective at a domestic level. It is therefore difficult to determine whether the Council requires to provide sandbags as a matter of course. The Council would need to take a view on what would be a reasonable response to an emergency situation. What is reasonable would take into account factors such as the severity and scale of the emergency, the extent of risk to life and property, resources available to the council for deployment and the availability of other solutions.

2.3.6 The Civil Contingencies Manager has investigated alternative forms of household defence. Scottish Water have also provided and installed flood defence equipment to a number of households known to suffer from sewer flooding. Scottish Water have found that not all householders wish to accept such equipment due, in part, to the effect which acknowledging flood risk may have on property values

### 2.3.7 **Public Expectations – community resilience and self reliance:**

The concept of developing a more robust, disaster-resilient community is very common in America and other areas where very extreme weather events are experienced. However, the essential community spirit of “neighbourliness”; the capacity of individual self-reliance to respond productively to significant changes that disrupt normal routine is coming under greater strain in modern times. No matter what the scale of the disturbance, there is now a concern that a greater part of some communities may feel that somehow they will be looked after and that an agency will attend to them. It may be the case that many in our community believe that calling “999” will generate an instant, personal response, whatever the scale of the incident. A modern society enjoying 24/7 instant access to a range of services, such as shopping, banking and on-demand entertainment has perhaps encouraged an ever-increasing complacency to do something, to take action for themselves, their families and for their neighbours and the vulnerable. Unfortunately, there is very little research material available in the UK regarding the psychosocial aspect of individual resilience and self-reliance and the level of public expectation of the local authority during a major emergency event. With finite emergency resources at the disposal of both the emergency services and the Council, it may well be worth considering a future research initiative in our flood prone areas to establish public expectations of the responding agencies; determine the level of self and group resilience and local interest in establishing collective community emergency response

### Current plans, arrangements and procedures.

### 2.3.8 Council Flood Plan

The Council has a Council Flood Plan which promotes a level of departmental pro-activity prior to the main winter flood season. The Plan outlines arrangements to identify pre-flooding issues and puts in place contingency arrangements, such as a late autumnal programme of grid and watercourse clearance, identifies sandbag stocks and their holding areas and reviews the location and activation of evacuation centres in particularly vulnerable area, etc.

The Flood Plan was first created in 1995 and following modification has served its purpose well in setting out the framework of our flood response. It has successfully made the council better prepared. However, with new challenges and changes, the plan required a full review and overhaul which is now underway.

In consultation with departments and our emergency services partners and agency partners, the revised plan will take into account:

- operational changes in the council and departments;
- changes in legislation, guidance and best practice;
- improved weather forecasting and tidal predictions;
- better communications systems;
- increased public and political interest and expectations in our flooding arrangements.

#### 2.3.9 Flood arrangements and procedures

The council has well developed and robust alerting and emergency management procedures which are regularly exercised and frequently tested. These involve liaison with emergency services and the appropriate departmental representatives in the Council and allow for escalation of action as emergency incidents develop. Should it be clear that a flooding event is likely to engage a number of departments, either through social or infrastructure disruption, then the Duty Officer from the Civil Contingencies Unit will call together the Council Emergency Management Team (EMT), to fully assess the situation and determine future action. The Emergency Management Team consists of a number of directors and heads of service representing all departments of the Council. Under the guidance of the Chief Executive the EMT will then take on the strategic decision making process regarding priorities, aims and resource deployment.

#### 2.3.10 Flood prediction and Warning systems

The Council relies on two main external agencies, SEPA and the Met Office, for severe weather and flood warnings. SEPA provides a 24 hour flood warning system with information available on their web site and the Civil Contingencies Unit Duty officer receives pager alerts directly from SEPA. The Duty officer also receives information directly from the Met Office. The Civil Contingencies Unit has established procedures for notification of adverse weather and flood risk to partner agencies and the public.

#### 2.3.11 Working relationships

During flood events the Civil Contingencies Unit has to work with a number of internal departments and external agencies. The Unit works with all departments to develop contingency arrangements and our Council's response to a range of emergency situations, however, in relation to flooding incidents, some departments have specific involvement :

- Planning and Transport – provide our Flood Prevention liaison and the DLO response to infrastructure flooding, damage or emergency closure, e.g. roads, bridges.

- Social Work – assist with evacuation, Rest Centre management, social and trauma support and manage the contribution of the voluntary agencies such as Red Cross, WRVS, St Andrew's, Faith Groups, etc.
- Housing and Property Services – DLO (Housing and Property Services – Building Services) support for emergency housing repairs and key council property protection e.g. depots, schools, area offices, etc. They also support Social Work at Rest Centres in managing any homelessness aspects and re-housing issues.
- Environmental Services – health related issues regarding flooding effects, DLO for fallen tree clearance teams. Provide feeding and refreshments to the Rest Centres.
- Corporate Services – set up of the Council Emergency Suite for the liaison, command and control of the event and the provision of the Council Helpline and its volunteer staff.
- Finance and IT – provision of GIS mapping, IT and communications support and the financial management of any disaster appeal.

There is a need to ensure that senior managers within Council departments who may be called on during flood events are fully trained and prepared for emergency situations. The Council has a number of arrangements to maintain awareness and situational confidence including:- The Council's Emergency Management Team meeting to discuss training and exercise requirements; Departmental Emergency Teams which require to undertake appropriate training and awareness raising; training for Directorate seminar and guidance booklet for Members of the Council; provision of briefings by Civil Contingencies Unit during emergencies. The Civil Contingencies Unit also actively maintains links with partner agencies including the Met Office, SEPA, Scottish Water, Police, Fire and Rescue, NHS, the military, and the Scottish Government. There are also a series of groups from the national through regional to the local level to secure appropriate coordinated action depending on the level of emergency event

### 2.3.12 The Pitt Review

After the severe flooding experienced in north and west England during the summer of 2007 Sir Michael Pitt was commissioned to undertake an urgent review of the multi-agency response and recovery. The report makes a number of urgent recommendations aimed at adapting to and dealing more effectively with flooding on the unprecedented level experienced last summer. The report highlights some key areas that need actions to be taken forward:

- The monitoring of all sources of flooding and mapping of areas that are at risk;
- That prediction and flood warning needs to be better understood and improved to help those in flood risk areas be prepared;
- The need to have a co-ordinated approach to flood risk management and to better engage the whole community to identify sustainable ways to manage those risks;
- There needs to be bringing together of organisations during a flood event to co-ordinate a response and inform the public;
- Flood resilience/resistance measures need to be better considered for housing and critical infrastructure;
- Information and managing of other sources of flooding, particularly the management of surface water;
- The resources available to carry forward these actions, in relation to both skills and funds, needs to be addressed.

The conclusions of the report provide a useful focus for those involved in flood risk management

### Assessment of Council flood response capability

2.3.13 There are three main aspects to the council's ability to successfully respond to and manage flooding incidents:- time scale, area of impact, and council resources available. The Council has a very robust record of dealing with short duration and local area impact floods, however like all agencies, if not properly coordinated and managed; it would struggle to maintain a response capability for a wide-area flood event which runs for an extended time period. This assessment is not due to any systemic failing in the council's systems, but simply due to the logistics of maintaining staff shift-working, resource deployment, provision of social support over a large number of venues, and disruption of the council's own resources and staffing levels. Major flooding events usually coincide with highly disruptive severe gale force storms which inevitably affect our staff as much as the general public. A further element is timing. The council can draw on several hundred members of staff if a flood threatened during normal working hours, however, as is often the case, floods occur at night or at weekends when available staff numbers are very finite in key departments :

- Planning and Transport have a 24/7 capability, however they only operate with around 20 men on duty or standby out of hours. During the winter period this resource is mainly committed to winter gritting` duties.
- Housing and Property also have a 24/7 capability and may have 10-14 men available out of hours. If required some 230-240 staff could be called in to assist on a voluntary basis, however there would be a lengthy delay as they were contacted and called in.
- Environmental Services have only one on-call supervisor available. With enough lead-in time, more staff could be called in. However, some staff, such as drivers, would only be available according to their hours already worked in the week.
- Education and Leisure Services rely heavily on Housing and Property Services during flooding incidents to protect their high-value assets. They also involve Amey who have facilities management of PPP schools, but the position is unclear as to Amey's resources and 24/7 emergency capability over an area.

In general, the Council is well positioned to forecast and respond to flood events and is demonstrably working in an integrated manner with our emergency services partners and other key agencies. However, while there is confidence in our Council's ability to manage a range of flood incidents, a very large scale event may overwhelm our present systems and resources and more development needs to be undertaken to mitigate such a situation. The present level of resilience and self-reliance within the community and the community's expectations and needs in flood events are not fully established.

2.3.14 In response to issues raised at the Board in respect of flood risk at schools built and managed under PPP the Director of Education and Leisure advised that there are currently 10 PPP schools in Renfrewshire. Amey has sole responsibility for these properties as facilities manager. All "soft" facilities (cleaning, catering, janitorial, etc) management services are contracted out to Amey. As part of the Council's PPP contract Amey are responsible for ensuring the school is available and fit for purpose. Amey are contracted to provide fit for purpose facilities and would have to replace flooring etc in the event of a flood. Historically there have been some internal flooding events which Carillion, the PPP construction company, have had to remedy and pay for. It appears that there is not a formal process for Education and Leisure passing on weather advisory notices to Amey. This issue will be taken up at the PPP client liaison meeting.

## 2.4 Environmental Services

Robert Graydon, Environmental Protection Manager;  
Andy Summers, Street Scene Manager;  
Karen Anderson, Amenity Services Manager

### 2.4.1 Implications for Waste Disposal

Environmental Services have established procedures for dealing with waste disposal during flood events. Information relating to provision of waste services such as the potential suspension of services, alternative collection schedules, extra precautions e.g. safe and secure containerisation of waste, advice on removal of debris or loose hazardous material caused by the flooding would be made available. Procedures exist in relation to the collection, separation, transportation and disposal of flood debris and water damaged items. The department would also be engaged in clean up operations after any flood event

### 2.4.2 Implications for Contaminated Land

The main issue of concern when land which is contaminated and is then subjected to flooding is the impact this will have on the land and wider environment and other effects such events may have on human health. Following the floods in 2007, the Environment Agency and the Health Protection Agency have developed a tool which provides a Risk Assessment Framework for potential chemical contamination during flood events. It consists of a checklist to assess potential contamination issues from, (a) reports of contamination received during a flooding event, and (b) during routine site investigations of regulated sites following a flooding event. The tool should provide a resource for agencies during and after flooding events. It is also suggested that it may be of particular use to emergency planners in relation to flooding emergency response plans. The risk assessment tool is based, as with all contaminated land issues, on the source – pathway – receptor model, the source being the origin or cause of the contamination, the receptor the person, animal, plant or eco-system that may be harmed by the contaminant, and the pathway is the route the contaminant takes to reach the receptor. The exposure to flood water is considered to be the key pathway in the majority of flooding incidents. The spread of contamination occurring through elevated ground water levels and surface water and will be dependent on site specific characterisations. The implications for contaminated land from a flooding event will therefore be dependent on site specific conditions and types of contamination present, the pathways which exist to transfer the contamination, e.g. ground waters or surface waters, and the presence of a vulnerable receptor, e.g. human beings, wildlife or the environment.

### 2.4.3 Impact of flooding on outdoor recreation facilities

The principal facilities affected by flooding are listed below

1. Moredun Playing Fields (3 pitches)
2. St James Playing Fields (24 pitches)
3. Ralston Playing Fields (2 pitches)
4. Lochfield Playing Fields (2 pitches)
5. Ferguslie Park Football Pitches (adjacent to Candren Burn, 2 pitches)
6. Morar Drive Football pitch
7. Thomas Shanks Park (2 Football pitches)
8. Glenpatrick Football pitch
9. Durrockstock Park Football pitch

Moredun Playing Fields in Foxbar, Paisley, is a designated flood plain, and is intended to intercept flood water running from Gleniffer Braes and the reservoirs there. There are 24 football pitches at St James Playing Fields in Paisley, and their susceptibility to flooding is due to the high water table in this area. The Glasgow Airport Rail Link should significantly reduce this problem. Sites 3 – 9 above have been upgraded as part of the Glasgow Airport Rail Link.

#### 2.4.4 Impact of Run-off onto and from outdoor recreation areas.

The evidence from Environmental Services indicated that there are currently no identified significant problems with run off either to or from outdoor recreation areas, except for Moredun Playing Fields as identified above. Issues currently being managed include:-

- (1) Surface run off from Gleniffer Braes affecting houses at Nethercraigs Road,
- (2) Leakage from the pond at Ferguslie Gardens affecting neighbouring properties during heavy rainfall, and
- (3) Surface runoff from Barwood Park affecting properties at Blantyre Court, Erskine

Subsequent comment provided by the Head of Roads indicated that problems of run-off from Council owned land occurred at Cardell Road, Paisley; Station Road, Langbank; rear of Rowan Road, Linwood; and a school at Beith Road, Johnstone. He recommended that these areas be investigated

## 2.5 **Housing and Property Services**

Graeme Crawford – Technical Services manager

### 2.5.1 Taking account of flood risk in the design process

Housing and Property Services are aware of flooding issues and are experienced in finding innovative, affordable and best practice solutions to these matters and work with Planning and Transport to bring best value to the Council. Major construction work carried out by Renfrewshire Council's Investment and Technical Services are subject to an assessment of flood risk. Where development proposals are located in areas of flood risk this is taken into account in the design process. Flood mitigation measures must be considered at an early and strategic stage to reduce and manage the flood risks associated with development. All planned development, whether in the floodplain or not, must consider the implications for its drainage on flood risk. In particular, this applies to development of greenfield sites, where a significant increase in impermeable areas can considerably increase runoff volumes and rates from the site. A strategic approach to the drainage of new urban areas is likely to increase the effectiveness and efficiency of the drainage and flood risk management proposals, and reduce the flood risks associated with new development. There is a need to control drainage and runoff to ensure there are no increases in overland flow as a result of any development. SUDS are employed where appropriate. Disposal systems take account of rainfall projections and maintenance of the SUDS is provided in the lifecycle allowances. Where necessary flood resistance and resilience measures are incorporated at the design stage to reduce the impact on the building should flooding occur. At design stage of Council projects, full consultation is entered in to with Planning and Transport, Scottish Water and SEPA.

### 2.5.2 Flooding of Council Property

In relation to flooding of Council property, the Investment and Technical Services Section are requested by Clients to investigate localised flooding issues on an ad hoc basis and are required to find simple and affordable solutions. This usually is by way of soakaway, although retrospective attenuation is considered.

### 2.5.3 Disposal of Council Property

Council land and property is marketed for sale after consultation with the Director of Planning and Transport. This input takes the form of guidance provided by the Head of Planning, or by a development brief approved by the Planning and Economic Development Policy Board. Guidance, information and contact points for flooding issues are provided as necessary by this means to prospective purchasers of council property. Offers received are evaluated by Housing and Property Services, in conjunction with officers from Planning and Transport.

Offers accepted under delegated powers, or recommended for acceptance to the General Management and Finance Policy Board as preferred bidders will incorporate flooding issues.

## **2.6 Finance and IT – The Role of Geographic Information Systems**

George Lynch – Application Services Manager

- 2.6.1 The Geographical Information System (GIS) which allows electronically stored data to be analysed and displayed in map form is a key tool in the Council's preparation for, and response to flooding related incidents. GIS is the computer system in which data relating to terrain, the built environment, roads, watercourses and rainfall events is managed and maintained. Due to the fact that flooding and flood-related events relate to geographic areas, GIS is the sole technology which can be used to view data, integrate with modelling and deliver information through various customer service channels in the form of maps and reports. The corporate GIS team within Finance and IT provides a substantial GIS service to the Council. The Planning and Transport Department has a dedicated GIS team who provide support for flooding work within the Planning and Transport Department.
- 2.6.2 GIS will be used by the Council in the preparation for flood events through the analysis of watercourses, terrain and rainfall models. GIS in conjunction with modelling will be able to identify areas which may be susceptible to flooding and detail the number of households potentially affected. By defining areas of susceptibility, departments will be able to identify implications for their own service. GIS will also be used by the Council during flood events, for example, to provide accurate data on the extent of floods and depths collated by field officers, which can be disseminated to all parties involved in emergency flood work. Using web based mapping, information relating to flood events can be rapidly disseminated to the public via the Council's web site. For example, information on which roads are closed. GIS will be used after flooding events to update the relevant Council Information Systems ensuring the continued provision of a targeted response. This will include integration from 3<sup>rd</sup> parties such as Scottish Water. There is a requirement for a "GIS Toolkit for Flooding" to be developed to enable all officers to gain access to consistent flood related data and tools for analysis purposes. This will require Corporate GIS assistance.
- 2.6.3 It is essential that consideration is given to the resource implications, which will require further analysis and quantification, for the Councils Corporate GIS team in meeting the requirements of the new Flooding Act and providing a sustainable flood management plan. There will be additional demands for GIS core staff in three main areas: data management, toolkit development, and information dissemination. Data management and information dissemination will require ongoing GIS resource commitment. The IT Development Programme and current operational demands already account for the available development and support time of the GIS team therefore any additional activities relating to flooding would present a challenge for Finance and IT. The current GIS infrastructure and software has recently (April 2008) been reviewed and is capable of supporting the anticipated demands of the flood related work. However much of the data related to flooding is extremely large in terms of data volumes (e.g. digital elevation data) and there may be a requirement to increase the disk storage available to GIS. This is not considered a major risk.

## **2.7 Legal Services – Grants for Flood Protection Measures**

Evelyn Pinkerton – Assistant Managing Solicitor

### Powers to give grants

- 2.7.1 The Council has a range of powers under which it may make grant assistance available. There is no duty (which the Council is legally obliged to perform), and the powers which exist

may be exercised at the discretion of the Council. In relation to flooding, several powers may be available. Both the Flood Prevention (Scotland) Act 1961 (Section 12) and the Roads (Scotland) Act 1984 (Section 32) give local authorities the power to make contributions towards private individuals and bodies in support of work which the Council may undertake. There are restrictions on what would be eligible for contributions and it is not absolutely clear whether particular administrative procedures would be required before the Council could rely on the powers, although there is no explicit restriction contained in the legislation.

Given this, the power to advance well-being, introduced by the Local Government (Scotland) Act 2003, may be the most appropriate power to rely on. It can be used by a local authority to do anything that it considers to be likely to promote or improve the well-being of the area and people within that area. The Council therefore has considerable discretion in how it exercises this power but would require to take account of the statutory guidance which has been issued on the power. The guidance gives examples of key factors which contribute to the promotion or improvement of well-being, this includes environmental factors such as freedom from a high risk of flooding. The power could be used in relation to the whole or part of the Council's area and could be used to benefit one individual as long as there is a wider benefit to the community in general. There are a small number of examples of this power being used in relation to flooding, including a contribution by Edinburgh City Council to works which were complimentary to a flood scheme and in Glasgow City where the Council relied on it as the basis for flood prevention works they undertook as part of the Clyde Waterfront development.

#### Legal and Administrative Implications for the Council of providing such grants

2.7.2 If the Council were to pursue the provision of grants it would require to set up appropriate procedures to be followed before the grant could be awarded. This would require to comply with the Council's Financial Codes. The process used to provide Housing repair Grants could act as a useful model. In addition to developing the appropriate procedures the Council would require to undertake further action including:-

- Developing the criteria to be used to determine grant applications;
- Assessing the likelihood of flooding and the effectiveness of any measure which could be supported by a grant;
- Establishing whether any planning approvals would be required in relation to the works and how this would be reflected in the grants approval and award processes;
- Establishing whether the power to approve grants should be delegated and if so to which officer of the Council
- Establishing what action the Council could take if the grant was not used to the Council's satisfaction or if the work was not carried out properly, or not maintained in the future.

The Council would also have to establish the financial implications and would have to investigate the insurance and liability issues which may arise as a consequence of the Council's involvement in funding such works. Whilst powers are available to the Council to provide such grants, the main constraints on the Council in the use of any of the available powers may be the more practical issues of the resources and priority the Council is able to devote to this.

#### Future Developments

2.7.3 As reported elsewhere in the Scrutiny Report the Scottish Government is preparing and is expected to issue a new Flooding Bill for consultation later this year. This may clarify existing powers or, indeed, introduce new options which may have a bearing on the provision of grants for flood protection. In addition, grants to help "flood proof" homes have recently been piloted by the Environment Agency in England in an initiative, which was launched in 2007 with an

initial budget of £400,000, to be divided between five locations. It was expected that the maximum grant offered would be £5,000 including professional and administrative costs, for which 20% of the value of the grant would be available. Issues which had to be considered by areas applying to be included in the pilot scheme included how the local authority, Environment Agency and other relevant groups would work together to implement the grant scheme; how local professional advice on the flood defence solution would be obtained and how the grant scheme would be promoted locally. At the time of writing, the findings from the pilot schemes have not yet been published but these should be taken into consideration in any further investigations into this area.

## **2.8 Strathclyde Police**

2.8.1 Evidence was provided by Inspector Eddie Gray, Criminal Justice and Operations Planning, Renfrewshire and Inverclyde Division, Strathclyde Police

2.8.2 The Police Service provides the initial response to most major incidents. They have a standard approach towards emergencies which is adapted to suit the particular circumstances. Priorities are:-

- Save life
- Prevent escalation
- Relieve suffering
- Investigate
- Safeguard the environment
- Protect property

In major incidents, i.e. incidents requiring the mobilisation of substantial manpower and resources for one or more of the emergency services, the Police Service will assume a coordinating role, cascading information to all services involved, including evacuation of endangered persons, transport of casualties, control of people and traffic, and organisation of media facilities and the co-ordination of press conferences. The Police service works in conjunction with other parties involved in any incident, the range of agencies will vary depending on the nature of the incident. It will act at different levels of management, operational, tactical or strategic depending in the nature and the scale of the incident.

## **2.9 Strathclyde Fire and Rescue (SFR)**

2.9.1 The presentation to the Board was provided by Richard Duncan, Head of Operations and Development, Renfrewshire and Inverclyde, Strathclyde Fire and Rescue. Written evidence was provided by Garry Milne, Area Commander of the Renfrewshire and Inverclyde Area of Strathclyde Fire and Rescue

2.9.2 Under the legislation which governs the operation of SFR, its role in relation to flood incidents is that of rescue, the saving of life and ensuring persons are taken to a place of safety. SFR is a primary responder under the Civil Contingencies Act and works in partnership with other agencies, most notably, Strathclyde Police, Renfrewshire Council Emergency Management Team, and Renfrewshire Council Civil Contingencies Unit in planning for major emergencies including flooding. The Strathclyde Emergency Coordinating Group (SECG) provides a coordinated planning approach and the Council's Civil Contingencies Manager chairs the local SECG which covers Renfrewshire, East Renfrewshire and Inverclyde. One of the activities of the local SECG is to prepare a Community Risk Register (CRR) which, among other things, will inform communities of a range of potentially disruptive events that members of the SECG have identified and to confirm the state of preparedness to deal with such emergencies. The

CRR identifies potential risks from major tidal flooding, fluvial flooding in urban areas and local flooding.

2.9.3 Although the duties of SFR are limited to those specified above, where resources allow, they do provide humanitarian services such as pumping and removal of water. Experience has shown that this is an expectation of the public, but that it cannot always be provided due to limited resources. SFR have equipment and training to undertake rescues in various water conditions including the use of boats for evacuation and rescue. SFR has also recently acquired a high volume pump to assist in dealing with emergencies including flooding. This pump can be used to move large volumes of water over distances up to 3 Kilometres. However if it is to be utilised in flood situations, there is a requirement to establish the routing for the hose and the identification of a suitable location to which water can be transported which will have the capacity to accept the pumped water and which will not lead to flooding elsewhere.

2.9.4 To support the joint working on flooding emergencies the following actions are suggested.

- Renfrewshire Civil Contingencies Unit to progress flooding elements of the Community Risk Register as part of the SECG West Group in relation to flooding
- SFR will provide comment of the Council's revised flood plan
- Currently SFR are provided with weather information for the whole of their operational area. This is generic and does not identify particular local threats. The Council's Civil Contingencies Unit should pass information on potential flooding to SFR as soon as possible after they receive it from SEPA, the Met Office or from other sources.
- The Council's Civil Contingencies Unit should identify and provide a 'priority' list of those premises within the known recognised flood areas which may require assistance in rescuing vulnerable persons, such as care homes, sheltered housing etc.
- The Council's Director of Planning and Transport should provide prior notification of those roads, which may become or are likely to become impassable due to flooding; this would assist in ensuring SFR response routes and times are not affected and are pre-planned
- The Director of Planning and Transport should provide information on the location of sites to which flood water could be redirected and routes along which the can be laid to allow for pre-planning of major flood events and the deployment of the High Volume Pump equipment.

## **2.10 Scottish Environmental Protection Agency**

2.10.1 Written evidence was submitted by Marc Becker, Senior Hydrologist, SEPA.

2.10.2 Flooding is a key priority for SEPA. SEPA are involved in a number of activities relating to flooding

### Hydrometric work.

2.10.3 SEPA maintain gauging stations throughout Scotland and these provide the basis for flood warning schemes. SEPA is the flood warning authority in Scotland. The flood warning duty officers in SEPA provide 24/7 service predicting the likelihood of flooding throughout Scotland. The flood warning system aims to provide owners and occupiers, local authorities and

emergency services with warnings to allow preparations to be made for mitigating the effects of flood events. Flood warnings are communicated to the public and partner organisations via the SEPA web site and the national Floodline recorded message service. A flood warning system exists for the Clyde and for the White Cart. Flood warnings on the Clyde are communicated directly to the Council.

#### Flood Awareness.

- 2.10.4 SEPA seek to raise awareness of flood of flooding and to lessen its impact by mounting flood awareness campaigns.

#### Statutory Consultee on Planning Applications and Flood Risk Assessment.

- 2.10.5 SEPA has a statutory duty to provide local authorities with advice on flood risk for development and new flood alleviation scheme proposals. The Council, through the Development Management system has developed procedures to assess potential flood risk in planning applications, and to refer those considered to be at significant risk, to SEPA for their consideration and advice. Hydrology staff provide expert flood risk advice to local authorities, businesses and the public. Advice on urban flooding is also provided, notably in Renfrewshire, as a partner in the Interreg Urban Water project. SEPA also participates in Flood Liaison and Advisory Groups (FLAGS)

#### Flood Mapping.

- 2.10.6 SEPA publish an indicative River and Coastal Flood Map for Scotland. This is intended to show areas at risk of flooding with an annual return period of 1 in 200 years or more. SEPA stress that the map was not designed for individual property assessment but was developed to be used as a strategic tool to enable local authorities and stakeholders to make planning decisions in support of Scottish Planning Policy 7 (Planning and Flooding). Since its launch, the map has received nearly 2 million hits. The flood map was scheduled for an update in late 2007.

#### Emergency Planning.

- 2.10.7 SEPA is designated as a Category 1 responder under the Civil Contingencies Act. As such SEPA engage with other parties to support risk assessment, business continuity planning, emergency planning, public awareness, and public information and advice. SEPA also participate in the Strathclyde Emergency Coordinating Group.

#### Sustainable Flood Management.

- 2.10.8 The Water Environment and Water Services Act (WEWS) places a duty on SEPA to promote sustainable flood management. SEPA believe that Sustainable Flood Management includes avoiding floodplain development, raising awareness of flood risk, providing accurate and timely flood warning as well as traditional flood alleviation measures and "natural flood management" techniques such as changes to land-use management. They also consider that it is important that local flood risk management measures are considered at the strategic level to ensure that they are sustainable at the catchment scale. SEPA will work to implement the EU Flood Directive and the new Flooding Bill. They consider that, within the urban context, projects such as Renfrewshire Interregg and the Glasgow Strategic Drainage Plan will be key to the successful delivery of the Directive.

## **2.11 Scottish Water**

### Scottish Water's Responsibilities in respect of Flooding

- 2.11.1 Evidence for Scottish Water was provided by Alistair Dyer, Waste Water Infrastructure Strategic Coordinator, John McCall, Development Account Liaison Manager, and Andrew Wilson, Strategic Account Manager
- 2.11.2 Scottish Water's responsibility with respect to flooding is set out in the Sewerage Scotland Act 1968. This requires Scottish Water to provide such public sewers as may be necessary for effectually draining its area of domestic sewage, surface water and trade effluent. The definition of surface water in the Act is "the run-off of rainwater from roofs and any paved ground surface within the curtilage of premises". The Act also allows Scottish Water to enter into agreements with Roads Authorities for shared drainage. The currently accepted definition of "effectually draining" is protecting properties from the risk of being flooded internally due to the hydraulic overloading of sewers more than once in ten years and designing new sewers to deal with the flows expected to be generated by rainfall events expected to occur once in thirty years.
- 2.11.3 It is Scottish Water's duty to protect properties from flooding from sewers caused by inadequate hydraulic capacity, based on the standards set out above, and flooding caused by blockages or collapsed sewers. Scottish Water holds a register of all properties that are connected to sewers of inadequate capacity and they are investing to remove properties throughout Scotland from the risk of internal flooding. Scottish Water is also working to improve their response to blockages and collapses to reduce the number of associated flooding incidents. Their performance is reported annually.

#### Sewerage Systems

- 2.11.4 Sewerage systems in large towns and cities in Scotland are generally combined sewer systems. Domestic sewage is mixed with the rainwater from roofs and paved surfaces (including in most cases roads) and transported in pipes to a waste water treatment works. These combined systems are designed with release points, known as combined sewer overflows (CSOs), which operate during heavy rainfall to discharge a mixture of dilute sewage and rainfall to burns and rivers to protect households from sewer flooding. This has been accepted practice for over 100 years, but now these overflows have to meet modern environmental standards. Scottish Water is currently investing £160 million nationally to upgrade unsatisfactory CSOs in their current 2006-2010 regulatory period. They are proposing to further invest during the 2010 – 2014 regulatory period and foresee an ongoing investment requirement over the next 20 to 25 years. In general this investment is used to put barrier screens on the overflows to catch debris and to increase the storage in the sewerage system to reduce the number of times the system discharges to the environment.
- 2.11.5 It has long been recognised that combined systems are not an ideal way to collect and treat sewage and that wherever possible rainwater should not be mixed with domestic sewage. Since the 1960s all new developments have been built with separate sewerage systems where the domestic sewage is transported in a foul sewer and rainfall is transported in a separate surface water sewer. This avoids the environmental problem of sewer overflows and greatly reduces the risk of hydraulic overloading causing sewer flooding. However surface water sewers also have an adverse impact on the environment due to dangerous substances such as metals and hydrocarbons being washed off impervious surfaces like roads and driveways. New Sustainable Urban Drainage systems (SUDs) are now being promoted on new developments. SUDs can be used to ensure that there is no increase in downstream flood risk but their primary purpose is for providing surface water treatment.

#### Responsibility for Land Drainage

- 2.11.6 It is important to note that Scottish Water has no duty or responsibility with respect to Land Drainage (with the exception of land owned by Scottish Water). Land Drainage is one of the least well defined areas that contribute to flooding. Scottish Water's combined sewers and surface water sewers do provide a route for land drainage, by default, where groundwater infiltrates into the sewers through joints and manholes. In many older Scottish towns and cities land drainage has been diverted into the sewerage system and watercourses overflow into the sewerage system to protect land from flooding. These land drainage flows, by taking up capacity in the sewerage system, increase the risk of sewer flooding and the environmental impact of sewer overflows through premature operation.

#### Emergency Planning

- 2.11.7 Scottish Water has arrangements in place with the Met Office for receiving and acting on severe weather warnings. Scottish Water receives general warnings through the National Severe Weather Warning Service. In addition Scottish Water has a bespoke Severe Weather Warning service in place with the Met Office. This provides fairly detailed assessments and warnings of potential severe rainfall events. Warnings are monitored by Scottish Water's Control Room on a 24/7 basis and should predicted levels exceed a certain intensity then the Duty Emergency Planning staff are alerted. Additional information or clarification may be sought from the Met Office. If appropriate an alert is issued to all key parts of the business of potential disruptive weather conditions. From that point the actual weather conditions are monitored via rainfall radar, customer calls and in consultation with the Met Office.
- 2.11.8 If necessary, Scottish Water would initiate the formation of an incident team within Scottish Water. This decision would be based on the forecast conditions, number of calls received from customers of sewer flooding, notification by Operational Staff of significant sewer flooding, notification by a local authority, police, fire and rescue service of sewer flooding (actual or potential). The emergency planning departments within these organisations have been provided with a restricted telephone number to allow effective contact with Scottish Water in the event of an emergency.
- 2.11.9 Where necessary, Scottish Water would establish an Incident Control Team to manage its response to a sewer flooding incident and ensure that its efforts were co-ordinated with other responders such as local authorities, fire and rescue services and the police. There is a specific role within the Incident team to liaise with these agencies. Where appropriate, Scottish Water would send a member of staff to a multi agency group, if established, to facilitate communications and coordination with the other agencies. In the event of wide scale flooding across an extended geographic area, covering multiple council areas, it may not be possible to provide a liaison member of staff to all council areas. In such circumstances, Scottish Water would encourage the establishment of a Strategic Co-ordinating Group which Scottish Water will endeavour to attend.

#### The Way Forward

- 2.11.10 Scottish Water is committed to the development of Surface Water Management Plans with Local Authorities. They see this as a way of developing properly integrated urban drainage systems and as a first step towards this they wish to enter into a Section 7 Agreement with Local Authorities to allow shared drainage. A copy of a letter and draft Section 7 agreement was sent to Renfrewshire Council on the 30th October 2007. The new design manual for sewerage systems, *Sewers for Scotland 2*, sets out standards for SUDs which Scottish Water will adopt. It also requires developers to consult with Local Authorities on flood routing for 1 in 100 and 1 in 200 year events and to facilitate Section 7 agreements between Scottish Water and Local Authorities. In addition to the Flooding Bill, Scottish Water have ongoing liaisons with Renfrewshire Council's Flooding Team (headed by Stephen Tingle) which have proved

highly beneficial to the public affected by flooding. Some of the work which has been carried out is outlined below

2.11.11 There were approx 25 locations that were identified as being affected by flooding during a period of extreme heavy rainfall in December 2006 which had varied impacts on the public at each location. Renfrewshire Council and Scottish Water worked together in carrying out joint investigations to identify the flooding mechanisms and met on several occasions to agree to take appropriate actions and interventions where possible to reduce the risk of future flooding. Since this flooding, Scottish Water have provided 32 temporary solutions to properties within the Renfrewshire Council Boundary at a cost of approx £40,000 as part of their current temporary solutions programme for hydraulic incapacity problems. They are currently working on several permanent flood alleviation schemes to remove properties from their internal flooding register. Specific locations that have benefited from the joint working approach are:- Brierie Hills, Houston; Glasgow Rd, Ralston; and Seedhill Rd and Park Ave, Paisley. Scottish Water stated that it is their intention to arrange a meeting with Council staff in the near future to discuss the future working liaisons to meet the requirements of the New Flooding Bill.

## **2.12 Scottish Government**

2.12.1 Written Evidence was provided by Judith Tracey, Head of Flooding Policy Team, and Fiona Quinn Flooding Bill Manager, Environmental Quality Directorate, The Scottish Government.

2.12.2 The Flooding Bill seeks to establish a sustainable, risk-based approach to flood risk management. The intent is to create a framework in which all persons and organisations involved in flood risk management can coordinate their efforts to reduce the adverse consequences of flooding to health, the environment, cultural heritage and economic activity. The key to this is adopting a sustainable approach to flood risk management. By protecting and working with the environment, sustainable flood risk management is intended to provide the maximum possible social and economic resilience against flooding for current and future generations. The aim is to establish, for the first time in Scotland, a coordinated approach to assessing flood risk and establishing plans to deliver sustainable flood risk management.

2.12.3 The Bill will make substantive provision in relation to four main policy areas:

- (i) coordination and cooperation within the domain of flood risk management;
- (ii) assessing and managing flood risks;
- (iii) the statutory process for flood risk management measures; and
- (iv) reservoir safety

These provisions work within the context of the overarching objective for the Bill, which is to establish a sustainable, risk-based approach to flood management

2.12.4 The Bill will include a duty on SEPA and responsible authorities to collaborate in undertaking their functions for flood risk management. The Bill will designate SEPA as the Competent Authority who will lead at a national level and will identify local authorities as responsible authorities

### Flood Risk Management Planning

2.12.5 The Bill will set out procedures in relation to the production of flood risk assessments and flood risk management plans. The provisions aim to ensure that a nationally consistent and catchment focused approach is taken to flood risk management planning. It seeks to ensure

that national planning is underpinned by local co-ordination and delivery of measures by those bodies most experienced in implementing flood risk management measures in Scotland. The provisions set out in the Bill will also fulfil the Scottish Government's obligation to transpose the EC Flood Directive (2007/60/EC) ("the Floods Directive"). There will be two tiers of flood risk management plans

District Flood Risk Management Plans will set the national, strategic framework including setting out which measures will be planned or delivered at the local level. SEPA will lead on the District Plans. The District Plan will include:-

- a preliminary flood assessment to provide baseline information on where the most significant flood risks are likely to occur. (To be completed by December 2011)
- Flood hazard and Risk maps (To be completed by December 2013)
- A set of long term objectives and measures for addressing all areas identified as being at significant risk of flooding from all sources. Prioritised set of measures for each 6-year planning cycle. (To be completed by December 2015)

Local Flood Risk Management Plans will translate the District Plans into coordinated actions to manage flood risk in the local area. Local Authorities will take the lead in preparing these plans. These will include

- Summaries of relevant information from District Plans
- Supplemental local information
- Implementation strategy for 6 year planning period.

District Flood Risk Management Plans will be coincident with River Basin Management Plans and SEPA, in consultation with local authorities will be responsible for identifying the boundaries of Local Flood Risk Management Plans. There will also be provision for establishing advisory groups to support the production of the District and Local Flood Risk Management Plans.

- 2.12.6 The Bill will repeal the existing 1961 Act and will give general powers to local authorities to take measures to manage the consequences of flooding in their areas. For flood works carried out by local authorities there will be a new local authority based statutory authorisation process which will include deemed planning consent. This will replace the current arrangements which require Ministerial consent. The Bill will also introduce new duties and powers in respect of reservoirs

## 2.13 **Homes for Scotland – Blair Melville**

- 2.13.1 Mr Melville is the Head of Planning Strategy for Homes for Scotland which represents and consists of members drawn from across Scotland's private housing development industry. Mr Melville provided a paper which Homes for Scotland had presented to the Scottish Parliament's Rural Affairs and Environment Committee inquiry into flooding and flood management. The paper raised the issues of the Government's aspiration to increase the rate of house building in Scotland and the ability of the planning system to provide for this. They argue that if this higher rate of house building is to be achieved it is clear that a substantial national exercise would be necessary to assess areas free from flood risk. They support current planning policy which excludes development of greenfield sites on the functional flood plain. However they state that unprotected brownfield land will have to be utilised for future housing development and suitable methods of safeguarding it from flood risk will have to be demonstrated and provided without detriment to existing communities. To do otherwise would be to write off substantial parts of our existing communities which have been constructed on

functional flood plains. Homes for Scotland would welcome a review of the planning policy and consideration of new forms of legal framework to ensure consistent application of guidelines in Scotland. They also state that any further changes in building regulations where development is permitted in areas at risk of flooding will require careful assessment in relation to sustainable building and with due regard to the use of flood resilient materials, safe installation of services and engineering solutions based on best practice from abroad.

2.13.2 The Scottish Government have set a target of 35,000 house completions per year; the housing market is currently not buoyant, but we have to plan for the long term and Homes for Scotland are confident that the market will recover and that the Government's target level of house construction provides a reasonable target figure. The new planning system to be introduced under the 2006 Planning Act will require a good deal of preparatory work and this will provide the opportunity to identify planning issues before the submission of planning applications. It is essential that all agencies involved in the planning process participate in this process to ensure that developers are aware of all issues at the start of the process. SEPA have in the past been slow to respond on flooding matters. This appears to be largely caused by staff resources; it is essential that sufficient numbers of staff with hydrological and planning skills are available to avoid delays in assessing flood risk. Members of Homes for Scotland who are active in the local area have reported that Renfrewshire Council is one the better Councils in relation to dealing with flood issues through the planning process.

## 2.14 **Dr John Riddell – Consultant Engineer**

2.14.1 Dr Riddell is a consultant engineer with long involvement in hydrological and flooding matters and extensive experience of flooding issues in Renfrewshire. Dr Riddell's paper focussed on the need to maintain adequate staffing in local authorities to deal with flooding and made recommendations on defining priorities for action on flood prevention.

2.14.2 Dr Riddell pointed out that at local government reorganisation in 1996 most of the staff employed by Strathclyde Regional Council who had experience of flooding were transferred to the new water authority. This led to the situation where local councils inherited statutory responsibilities for flooding and gained duties under new legislation and planning guidance but had few staff to allow them fully to meet these responsibilities. Renfrewshire Council, in common with other councils designated roads engineering staff to undertake flood duties. In his opinion, whilst staff have required to undertake a steep learning curve, this arrangement has worked well in Renfrewshire, and better than in many other authorities. Particular benefits have accrued from having more than one person involved in flooding work, i.e. a team, and the ability to retain staff of increasing experience and most importantly interest in the subject. He raised two areas of concern in regard to staffing. Firstly he stated that it is not always clear who has overall responsibility for all aspects of flooding, and in particular who ensures the essential very close liaison between those in roads with specialist knowledge and those in the development control section of planning. It may be that there is a need for better understanding and cross-working between two essentially different professions. The division of responsibility causes a fundamental problem in dealing with flooding in Scotland. What is needed is a "one-stop shop" where flooding is dealt with comprehensively as a matter in its own right and would cover all aspects of flood prevention from the implementation of large scale schemes to cleaning of gulleys in areas where there is a known risk of flooding from roads. Secondly, flooding is unlikely to gain the status within any Scottish local authority accorded to education or social work, and it may be that some thought needs to be given to the promotional prospects of those with knowledge and experience of flooding that ensures that knowledge and experience are retained in the Council. He suggested that with the new Flooding Bill and other legislation the Council

may wish to review its corporate structure in relation to flood management, including having a member of the senior management team having direct responsibility for flooding and drainage issues.

#### Priorities

2.14.3 Whilst it is essential to understand the causes of flooding it is perhaps more important to recognise the consequences of flooding. Flooding is an absolutely miserable experience which has major adverse impacts on peoples' lives. It is essential that it is given a high priority by all bodies involved. Dr Riddell also suggested set of priorities based on the consequences of flooding, rather than the source, which should be used to prioritise the allocation of resources on flood prevention and reduction. The list is provided below with the highest priority first

- Risk to Life
- Critical Infrastructure
- Vulnerable persons
- Business Flooding
- Community flooding
- Isolated home flooding
- Inconvenience flooding e.g. general roads

2.14.3 On a more detailed level Dr Riddell referred a recent flooding event which had resulted from the demolition of a wall which had previously acted as flood defence. Whilst the planning system deals with the effect of new proposals there is a need to ensure that consideration is given to demolitions which may have an impact on flood risk.

#### 2.15 **Dr Yusuf Kaya – Consultant Engineer**

2.15.1 Dr Kaya is a consultant engineer who has wide knowledge and experience of flooding matters and has worked on flooding issues in Renfrewshire since the flood events in 1994. Dr Kaya provided a presentation to the Board. The presentation identified five different sources of flooding:- Fluvial (Rivers, streams), Coastal (In Renfrewshire Council – the River Clyde), Pluvial (Overland), Sewer (Combined sewers where sewerage and surface water is drained through a single system), and Reservoirs. Dr Kaya recorded the work undertaken by the Council since the 1994 floods and stated that investment made by the Council has been effective in reducing flood risk. However the risk of flooding still exists throughout the Council area. The *Drainage Assessment – Notes for Guidance* which the Council has prepared have provided clear guidance for developers and have proven to be very useful. Climate change is likely to result in increasing extreme rainfall and increases in sea level. This will have a number of potential implications for the Council

- Urban watercourses will become unable to contain high flows and overtop their banks to cause flooding
- Increase in frequency of combined sewer overflows increasing risk of flooding and deterioration of water quality
- Inadequate capacity of combined sewer system preventing future development
- Increased rainfall intensities overwhelming road drainage system and causing flooding and disrupting traffic

2.15.2 Extreme events may increase erosion of river structures increasing the need for maintenance. The poorest communities may suffer more with a lack of climate resistance in lowest quality housing and because many less affluent households are uninsured.

- 2.15.3 Flood risk can be reduced in a number of ways. The planning system, including development plans and development management, plays a key role. The Council has a good system in place at present but it will need to be improved and expanded as national and local flood risk management plans are developed. The new Flooding Act will require all councils to develop sustainable solutions to flooding. This will require a catchment wide approach with extensive use of SUDS. The experience and expertise gained through the Council's participation in the Interreg project will assist in achieving this. There is also a requirement to raise awareness and to educate local communities on flood risk and what can be done to reduce it. SEPA already work with schools to provide information on flooding and the potential to expand this should be explored. Whilst a lot of good work has been done much remains to be done. There is a need to prepare more accurate flood risk maps and the Council will require to lead on the preparation of a Local Flood Risk Management Plan. There is a need for a greater understanding of flooding resulting from overland flow (pluvial flooding). This will occur where there is a severe local rain storm and can result in areas being flooded where there is no previous occurrence. Whilst sewer flooding per se is not included in the Flooding Act there is a need for close cooperation with Scottish Water to deal with flooding which occurs through the combined drainage network. Finally the Council has powers under the Reservoirs Act 1975 which places a duty on the Council to regulate the safe operation and proper management of reservoirs which hold more than 25,000 cubic metres of water. However there is also a need to assess the risk of inundation in all reservoirs notwithstanding their capacity
- 2.15.4 Flooding is a complex phenomenon and requires an integrated approach and joined-up thinking which will be encouraged in the new Flooding Act. A lot has been done by the Council, but there are still many high risk areas and more needs to be done. Sustainable solutions will require combinations of measures; this may include the provision of storage for storm water either locally or upstream, capacity improvement, use of roads as overland flow routes, and may also involve consideration of vacating floodplains. This will become clear once flood management plans are prepared. It is essential that the whole community becomes aware of flood risk and understand that everyone has a role to play. It is also essential to ensure that works are coordinated and that consideration of flooding is incorporated into all new development and renewal of infrastructure.
- 2.15.5 Councillor Kelly raised the issue of the potential affect of landslips on utilities infrastructure. Any assessment of flood risk should take account of the potential of flooding or resulting landslips may affect utilities and utility companies should be engaged in this process

## 2.16 **Professor Chris Jeffries – University of Abertay**

- 2.16.1 Professor Jeffries heads the Urban Water Technology Centre at the University of Abertay, Dundee. He has been closely involved with the Council in the Interreg project and has extensive knowledge of flood issues internationally and as well as within Renfrewshire. He emphasised that flooding is very complex and it is important that the Council develops a full understanding of it. In Renfrewshire Council the Planning Division is heavily engaged with the Roads Division engineering staff in flooding issues and it is essential that this continues. The Council has been actively engaged in the Interreg Urban Water project and this has allowed the Council to get up to speed with best practice in Europe. A good deal of knowledge and expertise has been gained from the Interreg project. Professor Jeffries is currently engaged in a technical assessment of the Glasgow Strategic Drainage Plan which involves substantial investment in new drainage infrastructure. In contrast the approach proposed in Renfrewshire relies on a longer term

strategy to coordinate investment and lever in contributions by all parties including Scottish Water and private developers.

- 2.16.2 Renfrewshire, in common with Scotland as a whole, has a basically Victorian sewer network and it is not financially feasible to replace this. There is a need improve it but there is also a need to develop integrated, long-term solutions. There is a need to accept that we have to make space available for flood water; more water requires to be retained above ground with less going into the combined sewer network. Scottish Water need to undertake short-term fixes through their investment programme where there are existing problems but also need to engage with the Council in developing longer term sustainable solutions.
- 2.16.3 The Council's *Drainage Assessment – Notes for Guidance* reflect best practice for Councils in Scotland. Flooding appears to be given a priority in Renfrewshire Council which is not reflected in most other councils. The Council has a high level of expertise in their engineering and planning staff and it is essential that it retains and improves on this staff resource. In Holland Water Boards are locally elected and manage all aspects of drainage and flood protection. This provides a clear basis for coordinated and planned action. Whilst there is no statutory basis for doing this in Scotland it is important that flooding be recognised as an issue in its own right and that it be given a high priority by the Council and that actions on flooding are coordinated and fully integrated to achieve a unified approach by all concerned parties. It is also important to recognise the planning system as key to developing integrated solutions. Experience from Holland shows the benefits of a high level of public engagement. It also demonstrates how money can be pooled from many different sources including roads improvement, drainage investment, housing renewal and environmental improvement. There are also measures in place to ensure that work by various agencies is coordinated. One outcome from the Interreg project stressed by Professor Jeffries is the notion of a Water Vision which could provide a bridge between the technical assessment of flood matters by the Council and the wider community by explaining issues and solutions in a manner which is readily understood by the local community.

## **2.17 Mike Donaghy – World Wildlife Fund (WWF)**

- 2.17.1 Mr Donaghy is the Freshwater Policy Officer for Scotland for the World Wildlife Fund. He sits on government advisory groups on flood management and has been instrumental in promoting, and providing expertise on sustainable flood management in Scotland. WWF is piloting more nature friendly solutions to flooding which do not rely on huge concrete structures. Mr Donaghy provided written evidence.
- 2.17.2 Mr Donaghy stated that the new Flooding Bill will introduce a sustainable approach to flood management in Scotland. This will view the management unit for consideration of flooding as the catchment, it will require those engaged in flood prevention to work with natural processes such as flood plains and wetlands and uses a whole suite of techniques to lower flood risk to communities, particularly in regard to fluvial floods. He anticipates that the new approach will include better flood warning, planning to avoid areas at risk, hard and soft engineering, flood resilience, flood mapping and natural flood management. Local Authorities will have a duty for working with other authorities to produce and implement a flood plan. He stated that Renfrewshire Council is well placed to play a leading part in modern flood management. Having a wide mix of rural and highly urban areas provides a framework for a wide range of methods aimed at reducing flood risk from a number of flood-types. In addition, the work of Stephen Tingle and others in the Council has shown the potential for creative solutions to flood problems. The Council area and capacity offer excellent opportunities for long-term demonstration sites. He suggested that a particular subject that could be explored is how flood risk to urban communities could be lowered by actions taken to restore natural

processes in watercourses upstream of the conurbations. He also advocated work to prevent the mixing of clean and foul water in the exploration of the role of SUDs in flood prevention.

## **2.18 Simpson and Marwick – Insurance**

2.18.1 Written evidence was provided by Frances McChlery of Simpson and Marwick on behalf of the Council's insurers. Frances McChlery is a consultant solicitor with Simpson and Marwick who specialises in planning and environmental issues.

### The Risk Environment relating to flooding

2.18.2 Flooding at the UK level and in Scotland is addressed by a number of diverse statutory measures, and these are about to be enhanced in Scotland through a Flooding Bill shortly to be published, which is the response to the EC Floods Directive. The whole thrust of the EU Directive is to establish a framework for the assessment and management of flood risks, including the production of preliminary flood risk assessment, the production of flood hazard maps and flood risk maps, and the production of flood risk management plans. Disastrous flooding incidents of recent years across the UK have been considered by both government and the insurance industry to be increasing in frequency and severity. Flooding in summer 2007 particularly in northern England, resulted in further assessment and scrutiny of how the effects of flooding on citizens can be mitigated. This resulted in a review for UK Ministers by Sir Michael Pitt, *The Pitt Review: Learning the lessons from the 2007 floods* and the ABI report *Summer Floods 2007: Learning the Lesson*, Association of British Insurers (ABI) November 2007.

2.18.3 From the insurance industry's perspective, climate change has meant that it is becoming less easy to predict, with sufficient certainty, when flooding will occur, and how serious the losses will be. The insurance industry accordingly has a stake in national arrangements to predict and control flooding. The insurance industry also has an interest in technological mechanisms to ensure early warning. The risks which the insurance industry must address include not only direct flooding from natural water courses, but in a very substantial proportion of claims, failure of additional infrastructure such as drains and culverts.

2.18.4 Just as the national agencies have invested in new technology and environmental information in order to meet their statutory responsibilities in providing information to emergency services and citizens, so the insurance industry has developed technological tools to improve the information they have to allow them to make decisions about what they should be prepared to insure, and how much to charge for it. This is used to identify what premiums any particular householder should pay. In areas prone to flooding, insurance premiums can be tailored to individuals. As matters currently stand, there are relatively few completely uninsurable properties. Even if a property is refused flood cover by a mainstream household insurance product, brokers may be able to find cover, albeit at a price. The government is obviously keen to maintain widespread cover and minimise uninsurable properties.

2.18.5 Insurers also have an interest in "flood proofing" buildings, either by making their indemnity insurance contingent on improvements being made to buildings, or through other market mechanisms, including refusing insurance to vulnerable buildings. Modern insurance will reflect in premiums the preparedness of the insured, and the security of the building or property they wish to insure.

### The insurance industry and Government

2.18.6 The insurance industry and the UK government have been in dialogue about the implications of a changing risk environment. It is not clear to what extent the Scottish or Welsh devolved administrations were involved in this. The negotiations were led on behalf of all the countries by

DEFRA and it is understood that the devolved administrations are considering the outcome of the dialogue described below before giving details of their specific response. The Scottish Government position on the insurance industry is accordingly not yet available.

- 2.18.7 Household insurance in the UK, in contrast to most other European countries, tends to include cover for flooding automatically. There is nothing compulsory about this; it is simply an industry norm. The Government is obviously anxious to maintain this position. The industry, on the other hand, while regarding flood cover as an important product, may be unwilling or unable to sustain this on the same widespread basis in changing circumstances.
- 2.18.8 The insurance industry has an interest in adequate public spending on flood defences. Major insurers have commented adversely on the level of public expenditure by central and local government on flood defences. Insurers have criticised the existing statutory framework for lack of accountability, and have criticised the government for lack of investment. As modern drainage practices develop including SUDS (sustainable urban drainage systems) the insurance industry has lobbied to encourage innovative engineering solutions but has expressed concern about long term maintenance.
- 2.18.9 During Summer 2008 the ABI negotiated with the government to encourage a long term strategic approach to managing flooding, designed to ensure that the insurance industry would continue to provide flood insurance throughout Britain, both in the immediate future and in the longer term. This resulted from the insurance industry's acute concern at the level of flood related claims over past years. The insurance industry lobbied to have the government implement the recommendations of Sir Michael Pitt's report. This resulted in a statement of commitment entitled *Revised Statement of Principles on the provision of flood insurance* issued in July 2008.
- 2.18.10 This concordat between government and the insurance industry includes an agreement by central government to legislate to prevent inappropriate development in flood risk areas. Where development has to be in a flood prone area, it must be flood resilient. In return the insurers agree to provide flood cover to high risk properties, within limits, for a further five years although the new agreement will not cover properties built after 1 January 2009. The outcome should be that flood insurance will remain widely available, at least until the expiry of this Revised Statement of Principles. It should be noted that Insurers are able to withdraw from the agreement with government if insufficient progress has been made and that the arrangement is subject to annual review. It should also be noted that the agreement does not extend to all properties. Properties which have an annual probability of flooding of greater than 1 in 75 and are not due to have flood defences improved within the next five years, will not necessarily be covered by the agreement and could face rejection. All new build properties from 1 January 2009, in addition, will fall outwith the agreement.

## **Glossary and Definitions.**

### **Return periods**

Flood events are assessed in terms of “return periods.” The return period for a flood event is stated, for example, as a “1 in 10” or a “1 in 50” year event. This relates to the risk of an event of a given magnitude occurring over a given period. The term is a statistical statement and does not mean that any given level of flooding will occur at the stated interval, e.g. once every 10 or 50 years. It means that for a 1 in 10 year event there is a 10% chance of it occurring in any year and for a 1 in 50 event there is a 2% chance. A 1 in 200 year event has a 0.5% chance of occurring in any year but has a 1 in 4 chance of occurring over any 50 year period.

If a flood event of 1 in 100 were to occur, this does not mean that it will not occur for another 100 years, the likelihood of another event remains the same after the event, indeed the fact that an event of a given magnitude has occurred may increase the chance of its recurring in a shorter period when the return period is reassessed.

Return periods will be affected by changes in weather patterns. Put simply, a 20% increase in rainfall, effectively turns an expected 1 in 200 year return period event into a 1 in 100 year event.

### **Sustainable Urban Drainage Systems (SUDS)**

SUDS manage the flow of rainwater and run-off and mimic natural systems by providing storage or flow attenuation, and by exploiting the natural processes of sedimentation, filtration and biodegradation to remove pollutants. In addition, SUDS can be integrated into their environmental setting and some devices offer the opportunity to improve wildlife habitats in urban areas. There are 4 general methods of control:

#### **Filter strips and swales**

Filter strips are areas of vegetated land through which surface water runoff is directed. They usually lie between a hard-surfaced area and a receiving stream. Filter strips can be planted with grass and or shrubs. They work by filtering-out pollutants from surface water runoff and by providing flow attenuation.

Swales are linear depressions formed in the ground to receive runoff and slowly move water to a discharge point. Unlike ditches, they are normally dry outwith wet weather and are grassed. Side and longitudinal slopes are gentle. The slow movement of water along the swale, aided by grass and check dams, encourages deposition of solids washed off the hard standing

#### **Filter drains and permeable surfaces**

Filter drains receive rain water near to where it falls, via over-the-edge flow. Filter drains work by providing capacity for attenuation. Water quality is improved by filtration and some biological degradation. They have been widely applied to road drainage in Scotland.

Permeable surfaces allow rainwater to pass through the surface layer. They are effective as they provide attenuation of flow. Water treatment is provided by filtration and some biological breakdown of pollutants. They can be designed to fit in with a variety of environmental settings, for instance hard surfaces in car parks in towns, gravel surfaces for lighter traffic load, or grasscrete for green cover in rural areas or soft landscape settings

#### **Infiltration devices**

Infiltration devices dispose of surface water run-off into the ground. A prerequisite is that both groundwater and ground conditions are suitable to receive the quality and volume of water generated. Infiltration devices, such as soakaways, provide considerable storage of water. Water quality is improved by filtration, sedimentation and some biological breakdown of pollutants. Infiltration devices can be incorporated into open-space areas e.g. playing fields, as part of a flood management scheme.

#### **Basins, ponds and wetlands.**

These devices collect surface water runoff from a larger drainage catchment via a pipe network or from other SUDS upstream. They provide flow attenuation and storage capacity. Basins are planted with grass and are dry, except after a rainfall event. By contrast, ponds and wetlands retain a body of water and are planted with wetland and aquatic plant species. Basins allow for some sedimentation of pollutants to occur, as water is retained for only short periods of time. Ponds and wetlands retain water for longer periods, allowing for all the natural processes of sedimentation, filtration and biological degradation to occur.

### **Controlled Activities Regulations CARS**

The Water Environment (Controlled Activities) (Scotland) Regulations 2005 (as amended) requires SEPA to regulate activities which affect water bodies such as abstraction, impoundment and engineering activities, as well as pollution. These Regulations became effective on 1 April 2006. Activities include

- abstractions from surface and groundwater;
- impoundments of rivers, lochs, wetlands and transitional waters;
- groundwater recharge;
- engineering in rivers, lochs and wetlands;
- engineering activities in the vicinity of rivers, lochs and wetland which are likely to have a significant adverse impact upon the water environment;
- activities liable to cause pollution;
- direct or indirect discharge of List I substances to groundwater; and
- any other activities which directly or indirectly is liable to cause a significant adverse impact upon the water environment.

Permission requires to be sought from SEPA in order to undertake such activities. Such permission is in addition to any other statutory consents required under planning, roads and other legislation.

### **LIDAR**

Airborne LIDAR (**L**ight **D**etection **a**nd **R**anging) measures the height of the ground surface and other features in large areas of landscape with a resolution and accuracy hitherto unavailable, except through labour-intensive field survey or photogrammetry. It provides highly detailed and accurate models of the land surface at metre and sub-metre resolution. LIDAR operates by using a pulsed laser beam which is scanned from side to side as the aircraft flies over the survey area, measuring between 20,000 to 100,000 points per second to build an accurate, high resolution model of the ground and the features upon it. It provides a cost-effective method of providing detailed topographic information.