

**Draft PPS15 Consultation Paper
Planning and flood risk in Northern Ireland**

Comments from Professor David Crichton

David Crichton is a visiting professor at the Benfield Hazard Research Centre (the leading natural hazard research centre in Europe) and a visiting professor at the Middlesex University Flood Hazard Research Centre. He is based in Scotland where he is an honorary Research Fellow at the University of Dundee. He has many years experience in the insurance industry and is a Fellow of the Chartered Insurance Institute. He has advised governments and insurers in four continents around the world on climate change and natural hazards and is author of many publications on the subject. He is a co-author of a successful text book for architects published in January, entitled "Adapting buildings and cities for climate change".

He has advised several local authorities in England on flood issues, and 28 (out of 32) local authorities in Scotland, where he is a member of all 18 Flood Liaison and Advice Groups. He is a member of the Scottish Executive Research Committee on building standards, and was the only person from the insurance industry invited to give oral evidence to the recent Scottish Parliamentary Inquiry into climate change.

General Comments

The draft PPS 15 is an excellent piece of work, and the authors are to be congratulated. Nevertheless I have some suggestions, mainly from an insurance point of view, which I hope you will find helpful and constructive. I will be happy to elaborate if required.

Flood Liaison and Advice Groups (FLAGS)

These are groups of stakeholders convened by local planning authorities in Scotland to provide advice on planning and flood alleviation measures and insurance issues¹. They also advise on sustainable solutions to drainage and other issues. As flood insurance is becoming more difficult and costly to obtain, areas which have FLAGS are finding fewer insurance problems.

A report² published by Whitehall in October 2004 deals with the planning response to climate change and states:

"On the particular issues raised by flood risk, authorities in England and Wales can consider establishing Flood Appraisal Groups or Flood Advisory Groups similar to those in Scotland, where adjoining local authorities, representatives of different local stakeholders, SEPA and the Water Authority are represented."

This refers to the Flood Liaison and Advice Groups (FLAGS) which now cover 98% of Scotland and which have made great progress in virtually eliminating new building in flood hazard areas. The first of these groups was established in 1995 following the recommendations of the Scottish planning policy guidelines³. The latest Scottish planning policy⁴ confirms their success and it is now Scottish Executive policy that every local planning authority should establish or participate in such a group. There are now 18 FLAGS, involving 28 Scottish planning authorities.

¹ Crichton, D., (2005) "Flood risk and insurance in England and Wales: are there lessons to be learned from Scotland?" Technical Paper Number 1, Benfield Hazard Research Centre, University College London. Available for free downloading from www.benfieldhrc.org

² CAG Consultants and Oxford Brookes university (2004) "The planning response to climate change – overview and best practice." ODPM, Scottish Executive and Welsh Assembly Government, 15 October 2004. ISBN 1 85 1127 15 1, Price £20 or can be downloaded free from http://www.odpm.gov.uk/stellent/groups/odpm_planning/documents/page/odpm_plan_032088.pdf

³ Scottish Office, 1995. "National Planning Policy Guidelines; 7 - Flood" (NPPG 7), Scottish Office, Edinburgh.

⁴ Scottish Planning Policy Guideline 7: Planning and Flooding (SPP 7). Scottish Executive, 2004. Available at: <http://www.scotland.gov.uk/library5/planning/spp7-01.asp>

Dams and reservoirs

Climate change will significantly increase the risk of dam failure⁵, and given that fifteen dams failed around the world in only three months last summer⁶, concern over dam safety is becoming a major issue in the UK where most dams are over 100 years old. It might be useful to consider importing legislation along the lines of Sections 74 to 80 of Whitehall's Water Act 2003.

Ideas from Sweden

Compared to most other countries, flooding has not been a major problem in Sweden until the last decade, when it has become an important political issue⁷. There are three aspects which may be worth considering for N. Ireland:

1. They have indicative flood maps, which include dam break inundation maps for the whole country.
2. Sweden has a legal system which makes the planners and building control officers legally liable for flood damage. This has been extremely effective; in the last serious floods, no buildings with a building permit more recent than 1990 were flooded.
3. As in the UK, local planners express risk in terms of an acceptable event return period, but unlike the UK, in Sweden this varies depending on the "social tolerance" of flooding expressed in terms of impact. Thus inner city areas with a high level of people at risk and a high level of investment have the lowest tolerance.

Building resilience

Under recent legislation⁸, the Scottish Building Standards Agency is granted discretionary powers to require properties to be reinstated to a more resilient standard after flood or storm damage. The main burden of this would fall on the insurance industry, but interviews with all the leading insurers⁹ indicate that they find this acceptable so long as there is a level playing field. Some insurers are already practicing resilient reinstatement, especially where the additional costs are small, for example moving electrical sockets above the flood level.

Water Framework Directive

The EU Water Framework Directive, 2000 will increasingly have significant consequences for flood hazards in England, Wales, and Northern Ireland. The Directive itself has very little mention of flood: it is concerned with water quality and preventing the modification of watercourses and standing water. As such, however it will limit many activities aimed at reducing flood risk, such as dredging, or construction of flood defences. It is anticipated that by transposing the Directive as it stands there could be considerable legal problems for future flood management in England, Wales, and Northern Ireland.

In Scotland, a very different approach has been taken. The Scottish Parliament rightly consider the Directive so important that primary legislation to transpose the Directive was enacted in the form of the Water Environment and Water Services (Scotland) Act, 2003.

⁵ Babtie Group and the Centre for Ecology and Hydrology, 2002. "*Climate Change Impacts on the Safety of British Reservoirs*" Report commissioned by the Department of the Environment, Transport and the Regions (DETR) now DEFRA, through their reservoir safety research programme. Available from http://www.defra.gov.uk/environment/water/rs/pdf/climate_change_reservoirs.pdf

⁶ Bosshard, P., and Switkes, G., 2004. "*Rash of Dam Failures Raise Safety Concerns*" World Rivers Review Vol. 19 No. 4, p7. August 2004. International Rivers Network, Berkeley, California, USA.

⁷ See Thorsteinsson, D., Semadeni-Davies, A., and Larsson, R., (In press, in a book series by Natural Hazards) "*Planning for river induced floods in urban areas – experiences and key issues for Sweden.*" Department of Water Resources Engineering, Lund University, Box 118, SE 22100 Lund, Sweden.

⁸ The Building (Scotland) Act 2003 (Available from <http://www.scotland-legislation.hmso.gov.uk/legislation/scotland/acts2003/20030008.htm>)

⁹ Clark, M., Priest, S. J., Treby, E. J., Crichton, D., 2002 "*Insurance and UK Floods: a strategic reassessment.*" A Research Report for TSUNAMI (now the "Risk Group"). University of Southampton, Southampton.

Thanks to energetic lobbying by a group of 32 environmental NGOs led by WWF and RSPB (and assisted by the author), this legislation goes well beyond the Directive and produces a much more holistic solution to water problems in which flooding hazards are fully taken into account. In respect of flood risk management, the 2003 Act (Subsections (3) and (4)) requires *“Scottish Ministers, SEPA and the responsible authorities to work in an integrated fashion and co-operate with each other to promote sustainable flood management”*.

Scotland also has the benefit of its national network of Flood Liaison and Advice Groups which include all the stakeholders required under the Directive’s insistence on liaison with stakeholders at a local level. Work is currently under way in Scotland to integrate the River Basin Management groups required by the Directive with the existing network of Flood Liaison and Advice Groups, and the Scottish Executive is consulting on standard exemption regulations to apply for most types of routine flood risk management activities. This should ensure a sensible and balanced approach.

Brussels now seem to have realised the problems which the WFD will bring, especially for cross border floods, but rather than create a new Directive, which could take some time to prepare, they propose to set up a European Action Programme on Flood Risk Management¹⁰.

Risk Framework

In the Scottish planning policy SPP 7 there is a risk framework which suggests different levels of risk for different types of development. For example hospitals and emergency services should be located in safer areas than housing. This framework is consistent with the “insurance template” which was produced to help planners to assess what levels of risk could be insured at normal terms. Some or all of the elements of the insurance template have been adopted in almost all Scottish structure plans and local development plans.

The insurance industry recognises that it cannot dictate to planners, but that it does have a duty to make it clear that in the future it may not be possible to provide flood insurance for new buildings where the flood hazard exceeds 0.5% probability (1 in 200 years). There will also be problems for new coastal buildings below the 5 metre contour. One option may be floodproofing as detailed in the Appendix.

Land use planning – The Insurance Template

Scottish authorities with flood liaison and advice groups have now accepted some or all of the “insurance template”, developed by the author as guidance for planners, and adopted by the Association of British Insurers. As a result, building in flood plains has virtually ceased in Scotland. Elements of the insurance template are now embodied in the latest national planning guidelines for Scotland, the Scottish planning policy guideline number 7 (SPP 7), published in February 2004.

¹⁰ “Flood risk management, flood prevention, protection and mitigation.” Brussels, 12.07.2004 COM(2004)472 final. Communication From The Commission To The Council, The European Parliament, The European Economic And Social Committee And The Committee Of The Regions. Can be downloaded from: http://europa.eu.int/comm/environment/water/pdf/com_2004_472_en.pdf

Source: "Flood appraisal groups, NPPG 7, and insurance." David Crichton. In: *Proceedings of the "Flood Issues in Scotland" seminar held in Perth in December 1998*. Stirling: Scottish Environment Protection Agency. p 37-40

Both return period and probability are given up to the year 2050, taking climate change into account.

National Flood Insurance Claims Database¹¹

This is the largest database of its type in the world and analyses the costs of thousands of flood insurance claims by type of flood and type of property. It can be helpful in modelling the costs of hypothetical flood events, for example for cost benefit appraisals for new flood defences. It has also proved useful in assessing the benefits of resilient reinstatement after a flood¹².

Specific sections

8.2 Definition of a floodplain.

It is noted that the draft adopts the English standards of a 1% return period for fluvial flood and 0.5% for a coastal flood. This is outdated in the light of climate change and tougher attitudes by insurers. In Scotland a 0.5% return period (1 in 200 years) is considered the highest acceptable risk for housing, following insurance industry representations.

8.16 Caravan sites

A distinction should be made between static caravans and touring caravans. It can be reasonably safe to allow touring caravans to locate on floodplains up to a 1 in 50 year return period during the summer, provided there are adequate warning notices and evacuation procedures. A blanket ban can seriously harm tourism. It is more important to ensure that caravans are not located in areas where they can be swept into rivers and create a temporary dam under a bridge.

8.19 Resilience

It is most important to stress that "dry proofing" can be a dangerous practice. If flood water is kept out of a building, the differential pressure on the walls can cause collapse. Dry proofing should not exceed 1 metre in height. Research has shown that above that height, collapse of conventional walls is a very real possibility¹³. Indeed in Toronto a limit of 0.8m is used (see Appendix).

Temporary flood defences can be very effective in certain circumstances¹⁴.

8.29 Drainage Impact Assessment

It is wise to specify the need for a drainage impact assessment in connection with any new development, especially where Suds are to be used. This assessment should identify the impact of a 200 year return period flood. For award winning DIA guidance now used by many Scottish local planning authorities see North East Scotland Flood Appraisal Group (2002) "*Drainage Impact Assessment: Guidance for Developers and Regulators*." Aberdeenshire Council, Stonehaven, 2002.

Annex B

¹¹ Black, A and Evans, S (1999) "*Flood damage in the UK: New insights for the insurance industry*." University of Dundee. ISBN 0 903674 37 8. Dundee, Scotland.

¹² Building Research Establishment, 2003 "*Assessment of the Cost and Effect on Future Claims of Installing Flood Damage Resistant Measures*." Commissioned and published by the Association of British Insurers, London, May 2003. Available from - http://www.abi.org.uk/Display/File/78/Flood_Resistance_report.pdf

¹³ Kelman, I., 2002. "*Physical flood vulnerability of residential properties in coastal, Eastern England*." PhD Dissertation submitted September 2002 to the University of Cambridge. Available for free download from <http://www.arct.cam.ac.uk/curbe/ilanphd.html#ilanphddownload>.

¹⁴ Crichton, D. 2004. "*Temporary local flood protection in the United Kingdom. - An independent assessment*." A Benfield Hazard Research Centre technical report. Free download from: http://www.benfieldhrc.org/SiteRoot/activities/misc_papers/Temporary_local_flood_protection.pdf

B 1-3 The concern for human health and well being is to be welcomed and is a notable omission from PPG25 (England and Wales) and SPP7 (Scotland)

B 4-5 The section on insurance availability is very well written, giving a concise summary of the situation in Britain. Whether the same situation applies in Northern Ireland is not so clear cut, but it should be noted that in any event the ABI's Statement of Principles only applies up to the end of 2007 and its renewal is entirely dependent on actions in Whitehall.

Annex C

This is an excellent description of Suds. In Scotland, where Suds have been widespread for some years¹⁵, the biggest problem is turning out to be maintenance issues. Many local authorities have expressed concern and various solutions have been tried, including the use of a planning gain levy on developers to fund future maintenance. The insurance industry could assist by providing a solvency bond for up to 25 years. Scottish Ministers have agreed to fund Scottish Water to provide maintenance from some date in the future and SW are currently preparing a manual of standards they will need before they will adopt Suds. I was a member of the Steering Committee for the CIRIA manuals on Suds and I have been collecting "frequently asked questions" from local authorities in Scotland and England for some years along with model answers. I can supply a copy if this is of interest.

Annex D

Again very well written. I should like to see some procedure for checking the risk assessment for accuracy. Developers can often put hydrologists under great pressure to come up with an assessment which will allow development to proceed. In Scotland the risk assessments are independently checked by SEPA to ensure that the approved methodology is used along with the best available sources of data.

Annex E

The Disability Discrimination Act has had some unfortunate impacts on the flood risk in Scotland. The level access requirements mean that new houses no longer have doorsteps, and this has led to a number of minor floods which would otherwise have only affected gardens because builders have often simply lowered the ground floor to avoid having to build ramps. In some cases, ramps actually slope downwards from the street to the door, making the property very vulnerable to surface water flooding.

Another issue is the question of an increased use of ground floor toilets which can back up, allowing raw sewage to enter the house. Ground floor toilets in flood prone areas should be fitted with one way valves.

¹⁵ Planning Advice Note 61 "Planning and Sustainable Urban Drainage Systems" Scottish Executive, Edinburgh, July 2001. ISBN 0 7559 2097 X

Some suggested items for a bibliography

Crichton, D., (2005) *"Flood risk and insurance in England and Wales: are there lessons to be learned from Scotland?"* Technical Paper Number 1, Benfield Hazard Research Centre, University College London. Available for free downloading from www.benfieldhrc.org

Lancaster, J W, Preene, M., and Marshall, C.T.(Arup), 2004. *"Development and flood risk; guidance for the construction industry."* CIRIA publication C624. ISBN 0 86017 624 X. Construction Industry Research and Information Association, London. www.ciria.org

May, R., Martin, P., and Price, N. (1998) *"Low cost options for prevention of flooding from sewers."* CIRIA Report C506

CIRIA Report C521

"Sustainable urban drainage systems. Design manual for Scotland and Northern Ireland", London 2000.

In Press. *"Standards for the repair of buildings following flooding"* CIRIA Research Project RP676

Roaf, S. Crichton, D., and Nicol, F., 2005 *"Adapting Buildings and Cities for Climate Change"* Architectural Press, Oxford. ISBN 0 75065 9114.

Appendix: Toronto flood proofing guidelines

TABLE 4.4

Floodproofing Guidelines									
Provincial Policy:	<ul style="list-style-type: none"> • Allow no new buildings within the Regulatory Flood Plain which are susceptible to or will cause flood damage; and • Allows development in the Flood Plain if the buildings are protected to the Regulatory Flood Level. 								
Concept:	<ul style="list-style-type: none"> • Involves the use of structural changes/additions to reduce or eliminate flood damages; • Flood Proofing matters are site specific. These Guidelines should be applied with caution; and • Professional engineers or architects may have to be consulted. 								
Where Applicable:	<ul style="list-style-type: none"> • For new rather than existing buildings; • Flood velocities are small; • Short flooding duration; • Structural flood measures (dams, diversions) cannot be applied; and • Long term maintenance assured by the owner. 								
Implementation:	<ul style="list-style-type: none"> • Municipal planning documents must identify the type and location of acceptable floodproofing measures for various land uses. 								
Dry Floodproofing:	<ul style="list-style-type: none"> • Involves isolating the building and contents from floodwaters; • Passive Dry Floodproofing involves using fill or columns to elevate the building above Regulatory Flood Levels; <ul style="list-style-type: none"> • Dry passive measures most desirable for new development; • Maximum fill height 1.8 to 2.4 metres; • Height limitations for elevating posts <table border="0" style="margin-left: 20px;"> <tr> <td>• Timber and Steel</td> <td style="text-align: right;">3.0 to 3.6 m</td> </tr> <tr> <td>• Brick</td> <td style="text-align: right;">0.4 to 1.8 m</td> </tr> <tr> <td>• Reinforced Concrete & Masonry:</td> <td style="text-align: right;">0.4 to 2.4 m</td> </tr> <tr> <td>• poured in place Reinforced Concrete</td> <td style="text-align: right;">0.4 to 3.6 m</td> </tr> </table> • Active Dry Floodproofing involves closing all openings before flooding occurs. 	• Timber and Steel	3.0 to 3.6 m	• Brick	0.4 to 1.8 m	• Reinforced Concrete & Masonry:	0.4 to 2.4 m	• poured in place Reinforced Concrete	0.4 to 3.6 m
• Timber and Steel	3.0 to 3.6 m								
• Brick	0.4 to 1.8 m								
• Reinforced Concrete & Masonry:	0.4 to 2.4 m								
• poured in place Reinforced Concrete	0.4 to 3.6 m								
Wet Floodproofing:	<ul style="list-style-type: none"> • Involves allowing floodwaters to enter the building; • Wet floodproofing most desirable for nonhabitable uses: <ul style="list-style-type: none"> • Building space below the design flood level should remain uninhabitable; • Storage of immovable or hazardous material is prohibited; • Mechanical and electrical equipment located above the design flood level; • Sump pump is required at all times. • Dependent upon the following: <ul style="list-style-type: none"> • Nature of development; • Local flood conditions <ul style="list-style-type: none"> - depth and duration of flooding; - rate of rise and fall of floodwaters; - flow velocities; • Physical characteristics of the river system (upstream/downstream impacts); • Threat to life; • Flood warning systems; • Structural integrity. • The use of seals and closures may cause structural damage to walls and floors; and • Upper flooding depths for conventionally designed buildings is 0.8 m. 								
<p>Source: Provincial Flood Plain Planning Policy Statement, Implementation Guidelines, August 1988.</p>									

Davison, John

From: Davison, John
Sent: 26 April 2005 15:48
To: 'david@crichton.sol.co.uk.'
Subject: Planning & Flood Risk - PPS 15

dear professor crichton,

your comments on draft PPS15 were greatly appreciated and will help inform our final document.

Notwithstanding that the implications of pursuing SUDs based solutions in Northern Ireland (given our slightly different geography) are the subject of ongoing research by DOE, we as a planning authority have the same concern about long term maintenance issues that you highlight in your response.

Could I therefore avail of your offer to supply a copy of your collection of FAQs and model answers.

thanks,

john davison
planning policy team
planning service hq
millenium house
19-25 gt victoria street
belfast
bt2 7bn

McAlister, Nuala

From: McAlister, Nuala
Sent: 26 April 2005 15:33
To: 'david@crichton.sol.co.uk'
Subject: PPS15 - Planning and Flood Risk Consultation

Dear Sir

I acknowledge receipt of your email on the above matter and would thank you for the comments you have made. The Planning Service in drafting the final policy statement will take these matters into consideration.

Should you have any queries or require further information please do not hesitate to contact myself on 028 9041 6795 or Mr John Linden on 028 9041 6786.

Yours faithfully

Nuala McAlister,
(on behalf of Mr John Davison)

John Davison
Senior Planning Officer.
Planning Headquarters
Millennium House
19-25 Great Victoria Street
Belfast
BT2 7BN