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'Is the Clyde prepared? An Insurance Industry Perspective'**

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This paper represents the author's personal views.

**Introduction**

In Jan 1993 there was a storm. In terms of atmospheric pressure differential it was the worst storm in Europe since records began. It was stronger than many category five hurricanes. Not only that but it lasted for 22 days.

**Still it only affected Iceland and Scotland so it didn't matter...**

... except that the storm had left heavy snowfalls in the River Tay catchment and when milder weather came, Perth was badly affected by snowmelt flooding.

This prompted the local planning authority to establish the first Flood Liaison and Advice Group (FLAG) in the country. Now FLAGS cover over 94% of the Scottish population (see Annexe 1). Why did local planners set them up? Having been a founder member of all 19 FLAGS the feedback I have gained is that there were various reasons:

1. Fear of insurance blight if property owners found insurance unavailable or unaffordable.
2. Desire to have some balance against the pressure from property developers.
3. Sincere concern over the plight of flood survivors.
4. The desire to avoid the costs and bad public relations from having a serious flood event.

As more planners set up these groups, a momentum built up and the insurance template (see Annexe 2) was increasingly adopted as planning strategy in order to present a united front to the property developers. Most property developers were faced with a new era in planning and could no longer claim that one authority was being inconsistent with another. It helped that property developers were invited to FLAGS and were often surprised to find a consensus from all key stakeholders that they had to stop developments in flood hazard areas.

There are still a few planning authorities which defy government policy on FLAGS. Their "English approach" could be due to a simple attitude of denial and complacency, or could there be a more sinister explanation? The insurance industry has guaranteed the availability of flood insurance since 1961 and this has meant that planners in these remaining authorities have been taking insurance for granted.

**The Crichton Risk Triangle**

The planning system can stop the increase in exposure to flood hazards, but there are still other things that can be done. The Crichton risk triangle suggests that risk is made up of three elements, exposure, vulnerability and hazard. Exposure can be controlled by the planning function. It can even be reduced, by buying properties in flood risk areas and demolishing them as has happened in London Ontario and after floods in the USA. Already it is much lower in Scotland than the rest of Britain (see annexe 1).

Vulnerability can be reduced by tougher building regulations, such as those found in Iceland and Scotland. This was why the 1993 storm didn't matter as there was little damage, unlike lesser storms further south. Even for existing buildings, vulnerability can be reduced in the longer term by introducing retrospective regulations so that if a building is damaged by flood or storm the insurer is

forced to reinstate to the latest standards. There is already a precedent for this with fire insurance. At the request of the Scottish Building Standards Agency, I have visited the senior managers of all of the leading insurers to explain and discuss this point and they all told me that compulsory resilient reinstatement would be quite acceptable to them as long as there is the level playing field of legislation and a lead in time so premiums can be adjusted. Scotland now has enabling legislation to allow this to be introduced.

Following the 1993 floods in Perth, flood data for the whole of Britain has been collected by Dundee University using a sophisticated data collection system called FASTER (Flood and Storm Event Reporting System) to ensure data quality. Dundee now has the biggest database on the costs of flood damage in the world. (See Annexe 3) and regularly publishes detailed analyses used by insurers and government.

Some might think that nothing can be done about the hazard. It may not be possible to stop it raining, but it is quite possible to ensure that drainage infrastructure is properly specified and maintained, and that agricultural practices use natural flood management. Climate change will not only bring more three day heavy rainfall events, milder winters will reduce frost heave which helps to break up the soil and make it more absorbent. Farmers could be encouraged to aerate the soil mechanically, which helps crops to grow, brings nutrients to the surface and allows the fields to soak up water, thus reducing flood risk downstream.

The Met Office has predicted drier summers with climate change, but other climate change models indicate wetter ones. In any case, there was heavy rainfall during most of the summer of 2007. In fact it was the 12<sup>th</sup> wettest summer in Britain since 1766.

### **Much of this rain was in Scotland so it didn't matter...**

... The reason it didn't matter was because there are statutory duties in Scotland to ensure that drains and rivers are well maintained.

It was different in England, where the effects were disastrous because of:

1. flood plain development in the last fifty years
2. inadequate, blocked, and overloaded drainage systems
3. failure to clean drains and rivers.
4. Widespread use of asphalt and paving in gardens with impermeable grouting to provide car parking.

A review by Sir Michael Pitt identified 92 recommendations for England. Many of these have been implemented in Scotland for years.

Climate change projections indicate huge increases in the costs of flooding by 2080. The extent of these increases will depend on how society develops socially and economically. For example, there are indications that England is on track for the "World Markets" scenario, while most of Scotland is on track for the "Local Stewardship" scenario (see Annexe 4).

### **Three stages of insurance adaptation**

There would seem to be three stages of adaptation:

- **Stage 1. REACT**
  - Passive acceptance, short term strategies, denial and complacency, base price on historic costs. Subsidise price in flood risk areas for cross selling and marketing purposes. Maintain cover in flood hazard areas for fear of upsetting the media or government, even if this encourages more flood plain development.
- **Stage 2. ANTICIPATE**
  - Research and collect data, construct computer GIS models, assess trends, project future costs for pricing. Charge full technical rate and "cherry-pick" from those still in

stage 1. Manage exposure accumulations in preparation for the Solvency II Directive. Monitor legal and social changes, and encourage demountable defences.

- **Stage 3. MANAGE**

- Work in partnership with other key stakeholders and government to influence behaviour and gain market intelligence. Use pricing incentives to improve risk. Use better market intelligence to “Cherrypick” from those still in stage 1 and 2. Use legal powers to recover claims costs from irresponsible local authorities and others. Lobby local and national government to protect the interests of the public and the financial sector and promote natural flood management.

The Dundee Tables are an example of what insurers can do when they move to stage 2.

FLAGs are an example of what they can do when they get to stage 3.

Many insurers are still at stage 1.

As the Foresight scenarios show (Annexe 4), by 2080 the cost of flood losses will have increased to levels that are almost unbelievable today. These levels represent the unanimous views of the 86 leading experts in flooding in the UK. Most UK insurance companies seem to show little interest or awareness of what happens in Scotland. When it comes to flood risk, there are 30 significant differences between Scotland and England (see Annexe 5), but most insurers don't know about any of them. But there is no room for complacency in Scotland. Flood has such a devastating effect, and there is so much more to be done.

(The Crichton Risk Triangle, the Insurance Template, and the FASTER system are © Crichton.)

**Annex 1: List of Flood Liaison and Advice Groups in Scotland (Source: Crichton)**

1. Almond River (West Lothian, Edinburgh City)
2. Angus
3. Argyll and Bute (coastline longer than France)
4. Ayrshire (South, East, and North Ayrshire Councils)
5. Cart River and Lower Clyde (Glasgow City and Renfrewshire)
6. Clackmannan
7. Clyde Catchment (East Dunbartonshire, East Renfrewshire, Glasgow City, Inverclyde, North Lanarkshire, Renfrewshire, South Lanarkshire, West Dunbartonshire.)
8. Dumfries and Galloway "DAGFLAG"
9. Dundee, City of
10. Edinburgh, City of
11. Falkirk
12. Fife
13. Highland
14. Kelvin River and Forth/Clyde Canal. (N. Lanarkshire, E. Dunbartonshire, Glasgow City)
15. North East Scotland "NESFLAG" (Aberdeenshire and Aberdeen City)
16. Perth and Kinross
17. Scottish Borders
18. Shetland Islands
19. Stirling

Country	% of existing properties at risk	% of new build in flood hazard areas
England (100 year flood)	<b>9</b> (Source: ABI)	<b>11</b> (Source: DCLG Select Ctte.)
Wales (100 year flood)	<b>12</b> (Source: Welsh Assembly)	<b>negligible</b> (since 2004)
Scotland ( <b>200 year flood</b> )	<b>3.8</b> (Source: Scottish Government)	<b>negligible</b> (since 1995)

**Annexe 2: The “Insurance Template”. All Scottish local authorities with FLAGs have adopted some or all of these standards for several years.**

**Residential standards required if insurance is to be offered at normal terms are as follows:**

Type of housing	Standard of protection	
	Return period	Annual probability
Sheltered housing, and homes for the disabled and elderly	1,000 year	0.10 per cent
Children's homes, boarding schools, hotels, hostels	750 year	0.15 per cent
Basements used for accommodation	750 year	0.15 per cent
Bungalows without escape skylights	500 year	0.20 per cent
Ground floor flats	500 year	0.20 per cent
"Flashy" catchments (little or no flood warning available)	500 year	0.20 per cent
Bungalows with escape skylights	300 year	0.33 per cent
Caravans for seasonal occupancy only, provided adequate warning notices and evacuation systems are in place	50 year	2.00 per cent
<b>All other residential property</b>	200 year	0.50 per cent

In each case up to the year 2050, taking climate change into account.

#### **Climate Change**

This adjustment should reflect the possibility that the 100 year return period flood now will, by 2050, become:

- 10 to 20 year for coastal flood (ignoring increasing wave heights)
- 60 to 65 year for fluvial flood

#### **Source:**

Scottish Executive Central Research Unit Report, May 2001

### **Annexe 3: National Flood Insurance Claims Database (The “Dundee Tables”)**

Details of thousands of British flood insurance claims since 1993.

Produced by Dundee University with assistance from:

- ABI
- Allianz
- AON (previous sponsor)
- AXA
- CILA
- CIS Co-op.
- Congregational and General
- Cunningham Lindsay
- Direct Line (current sponsor)
- esure
- GAB Robbins
- Halifax General Insurance (previous sponsor)
- Liverpool Victoria
- Lloyds TSB
- NFU Mutual
- NMA Insurance
- Norwich Union Group (previous sponsor)
- Salvation Army General Insurance
- Zurich Financial Services (UKISA) Ltd

Can be used for

- Premium setting
- Reinsurance requirements
- Claims validation
- Benchmarking
- Valuation of benefits of flood defences.
- Training
- Modelling
- Cost of under insurance
- Monitoring claims inflation
- Identifying causes of damage for improving building standards.
- Identifying fraud.

**Annexe 4: Foresight Project Predictions of annual average costs (insured plus uninsured) of UK flooding by 2080 (£billion at 2004 prices)**

Scenario	Drainage floods	River + coastal	Total	(% of GDP)
World Markets (High Growth)	15	27	42	0.19
Global Sustainability:	3.9	7	10.9	0.08
National Enterprise:	10	20	30	0.41
Local Stewardship (Risk Management)	1.5	4	5.5	0.08
Current average	0.3	1.0	1.3	0.2

Policy in England is very much looking for high economic growth even at the expense of increased flooding costs, in other words the World Markets scenario. Ignoring the human factors, this can make some sense. High economic growth can compensate for loss of property along the way. Under the World Markets scenario, flood damage costs would still only represent 0.2% of GDP. (The floods of summer 2007 in England cost the equivalent of 0.3% of the GDP at that time). Scotland seems to take more account of the human factors and may be on track for the Local Stewardship scenario, but the much lower flood damages with Local Stewardship still represent 0.08% of GDP, due to lower economic growth, and remember these are UK figures. Society needs to decide whether the human factors are more important than growth.

The insured cost of the two events in 2007 totalled more than double the current average insured and uninsured cost of £1.3 bn shown above. This highlights the fact that flood damage occurs in concentrated bursts, geographically and in time. Flood events would be concentrated in high risk areas and would vary from year to year. We could be looking at huge costs in some areas, with considerable human costs and long term economic decline. For insurers, it would raise issues of solvency, and challenge claims-handling systems, particularly if they cannot be standardised and rationalised as designed in the FASTER system.

In fact, in 2008, the Pitt Review revisited the Foresight predictions, and judged that the position is likely to be worse. “...the latest work on climate change shows a small but plausible risk of much greater sea-level rise.”, and “we may have to cater for bigger increases in river flows than we have envisaged to date.”

In all scenarios, Foresight research shows that some places are particularly exposed, especially around major estuaries. For example the Firth of Forth has one of the biggest oil refineries and one of the biggest coal fired power stations in Europe at risk of flood, as well as a main food distribution hub and thousands of homes. None of these are adequately defended against flood.

**Source:**

Evans, E., Ashley, R., Hall, J., Penning-Rowsell, E., Saul, A., Sayers, P., Thorne, C. and Watkinson, A. 2004. “*Foresight. Future Flooding. Scientific Summary: Volume I Future risks and their drivers.*” Office of Science and Technology, London.

Evans, E., Simm, J., Thorne, C., Arnell, N., Ashley, R., Hess, T., Lane, S., Morris, J., Nicholls, R., Penning-Rowsell, E., Reynard, N., Saul, A., Tapsell, S., Watkinson, A., Wheeler, H. 2008 *An update of the Foresight Future Flooding 2004 qualitative risk analysis.* Cabinet Office, London.

**Annexe 5: Summary of some differences between Scotland and England regarding flood risk.**

		<b>Scotland</b>	<b>England</b>
1	Planning Policy	No building in floodplain (follows insurance template)	Floodplain building allowed under "sequential rule". Average 11% of all new buildings have been in the floodplain since 2000. 12% of schools and hospitals are at risk.
2	Direct involvement of local communities and local knowledge.	Flood Liaison and Advice Groups (FLAGs) cover 94% of Scottish population. FLAGs enable planners to have dialogue with key stakeholders and adjoining local authorities.	No system for planners to consult with insurers or other key stakeholders other than the EA.
3	Planners can be sued for allowing floodplain development	Yes, under Hedley Byrne v Heller (1963)	No, following Ryeford Homes v Sevenoaks District Council (1990)
4	Flood maps	River, estuary and coastal flood, modelled and historic including combined effects.	As for Scotland but excluding combined effects.
5	Flood defence schemes	Details available showing type, standard of service and area protected.	Details not fully available.
6	Minimum standard of service for flood defences	100 year return period plus climate change allowance.	No minimum standard outside the centre of London.
7	Benefit cost assessment for grant aid for flood defences.	Benefits must exceed costs.	Priority scoring system effectively means benefits must be five times costs to receive grant. In practice benefits have had to be six times costs for recent projects.
8	Authority to build flood defences.	Only the local authority and relevant riparian owners. This discourages them from floodplain development because they know they will have the problem of defending it and will be democratically accountable.	Around 600 separate bodies, under the general supervision of the Environment Agency. Planners have no need to worry about finding the money for flood defences so no incentive to avoid flood hazard areas.
9	Sustainable flood management	Requirements under primary legislation (WEWS Act 2003). Major natural flood management demonstration projects in River Devon catchment and elsewhere.	No legal requirement. Single demonstration project discontinued in 2007 due to lack of funding.
10	Water Framework Directive	Transposed subject to sustainable flood management requirements.	Modification of rivers and lakes to cope with heavier rainfall events and thus reduce flooding risks is forbidden.
11	Cleaning watercourses of vegetation and debris. (An increasing problem due to Japanese Knotweed, Habitats Directive, Water Framework Directive and Waste Directive)	Statutory duty on local authorities with central grant funding. For example, Falkirk council now clean some watercourses on a weekly basis due to fly tipping.	No statutory duty and no funding. Habitats Directive used as an excuse to avoid clearing watercourses. Fly tipping will be a growing problem.
12	Artificial land drainage. (Causes increased run off into rivers.)	Figures not available, but Scottish topography is less suitable for major land drainage schemes. One of the biggest schemes is in Moray.	5 million hectares drained by 1900. Accelerated by the Wars and farming subsidies
13	Sewage	New developments not allowed if the sewage or water supply systems do not have surplus capacity. Hence the almost universal use of SUDS	New developments may be connected to sewage systems even if they are already overloaded. (Water Industry Act 1991).
14	Sustainable Drainage Systems. (SUDS)	Required for every new development. FLAGs have been invaluable in spreading best practice such as drainage impact assessments for the 200 year event.	Not always used due to uncertainty over ownership or responsibility issues. Anecdotal evidence of inappropriate systems which can increase the flood risk.
15	Sustainable Drainage Systems. (Maintenance)	WEWS Act makes provision for Scottish Water to set standards for SUDS and to adopt and maintain schemes.	No maintenance standards or agreement on who will maintain.
16	Record of flood events.	All non agricultural flood events no matter how small must be recorded and details published every two years along with action taken or proposed to prevent a recurrence.	No formal systems
17	Flooding from agricultural land.	The Roads (Scotland) Act 1984 gives local authorities power to require farmers to prevent mud escaping from fields onto roads. This can be done by aerating soil, not ploughing to the edge of low lying fields, and by planting hedges and other	No action taken to prevent.

		barriers.	
18	Social housing and contents insurance.	57% take up of insurance following £500,000 spend by the Scottish Executive.	39% take up of insurance.
19	Housing density	30 dwellings per hectare are considered high density.	Average 40 dwellings per hectare for new developments. Thames Gateway will have 200 dwellings per hectare.
20	Water undertakers	Scottish Water is publicly owned and responsible to ministers. Westminster tried to sell it off for £5bn, but the Scottish Parliament vetoed the move.	Fully privatised.
21	Completing of flood defences.	Targets announced for the completion of flood defences for the 100 year return period event by 2008.	No target for completion. New buildings are being constructed in hazardous areas faster than defences can be built.
22	Building Regulations	Building Standards deal with mitigating the damage to buildings and removing the threat to the health and safety of occupants as a result of flooding. Guidance is given on the use of building materials that are not adversely affected by flood water. The Building (Scotland) Regulations 2004 Standard is relevant to new buildings prone to flooding (Scottish Buildings Standards Agency, 1996):	In the Building Regulations (England and Wales – The Building Regulations 2000 (SI 2000/2531) (as amended)) there are only limited provisions for flood mitigation. Approved Document C provides practical guidance on site preparation and resisting contaminants and moisture. It does not provide information on preventing or reducing the impacts of flooding. Approved Document H provides practical information on drainage and waste disposal and deals with the mitigation of flood risk associated with the surcharge of drains and sewers.
23	Insurance	A survey by ISL Ltd (a company which administers quotation systems for household insurance) published in “Scotland on Sunday” on 12 November 2006 found that householders in flood-risk areas in Aberdeen, Glasgow, Edinburgh and Perth could significantly reduce their annual building insurance premium by switching to one of the insurers which recognise that flood risks are being well managed in Scotland. Specifically, homeowners in flood-risk areas of Perth could save £117.20, in Glasgow £143.46, in Aberdeen £75.11, and in Edinburgh’s Stockbridge, which flooded in 2000, £92.36. ( <a href="http://scotlandonsunday.scotsman.com/business.cfm?id=1671912006">http://scotlandonsunday.scotsman.com/business.cfm?id=1671912006</a> downloaded on 6 May 2007.)	Insurance policies in floodplains are often subject to large excesses, typically £10,000 as well as premium loadings. For example, NU apply an excess to policies which have paid out flood claims. The excess equates to ten percent of the claims payment. There is anecdotal evidence of excesses up to £50,000 for a household policy.
24	Deprivation index.	Index of multiple deprivation is calculated at a higher resolution than England. Their “data zones” average 200 houses and are similar in size to Census Enumeration Districts.)	Index of Multiple Deprivation produced by the Department of National Statistics, which ranks electoral wards based on an assessment of a mix of economic indicators.
25	Target lists for evacuation of vulnerable people.	Thanks to advice from FLAGS, many emergency planning officers have established lists of people requiring special assistance for evacuation.	No action known.
26	Communications in an emergency	Planning policy SPP7 specifies that mobile phone base stations and electricity sub stations should be located in such a way that they cannot be disabled by flood events	No special treatment.
27.	Waterborne pathogens	Cryptosporidium (Scottish Water) Directions 2003 introduced monitoring which found that cryptosporidium and E. coli were found in 14 of Scotland’s 32 council areas in 2004, which suggests that the problem could be widespread in England too.	No controls known. A flood in the USA resulted in 400,000 people falling ill from cryptosporidium in 1993 and 100 died. Since then there have been over 2,000 recorded cryptosporidium incidents in Britain. Current British water and sewage treatment plant does not kill the pathogen which is often fatal for children and old people. The most recent outbreak was in Wales in summer 2008 due to heavy rainfall.
28	Flood Rescue	There is a statutory duty for fire and rescue services to provide flood rescue cover. Senior officers regularly attend FLAGS and discuss issues with insurers and other stakeholders.	No legal obligation to rescue flood victims. The Chief Fire Officers’ Association warns that many areas do not have trained personnel or appropriate equipment for flood rescues.
29	Population issues	In Scotland, where the birth rate has reached a 13 year high, the population is still expected to only increase from 5.1 million to 5.4 million by 2031.	England’s population is expected to increase from 50 million to 60 million by 2031 according to the National Office of Statistics figures published on 12 June 2008. According to the Migrationwatch think

			<p>tank some 70% of this increase will be driven by immigration. This means that England will face high costs of integrating 191,000 immigrants each year as it becomes an increasingly multicultural society. Already the population of England has increased by a million in the last three years. DCLG says that a third of the millions of new homes needed in England will be required for immigrants. New estimates are expected to show at least 38 % will have to be built for immigrants. Social cohesion will become a growing problem in England, especially as climate change is likely to increase immigration figures.</p>	
30	Maps of areas at risk from reservoir failure	Freely available to emergency planners, police and rescue services so that contingency plans can be drawn up.	<p>Secret even from the police on the grounds of national security. (The police in England are apparently regarded as a security risk.) No area has proper dam break contingency maps.</p>	