

NATIONAL TECHNICAL ADVISORY GROUP ON FLOODING ISSUES SUSTAINABLE FLOOD MANAGEMENT

Purpose

1. This paper gives some background information on the provision in Part 2 of the Water Environment and Water Services (Scotland) Act 2003 ("the 2003 Act") which places a duty on relevant authorities to promote sustainable flood management. The National Technical Advisory Group on flooding issues ("the Group") has been set up to offer advice to the Scottish Executive in the preparation of technical guidance on flood risk management and this should include guidance on sustainable flood management.

Background

2. Part 1 of the 2003 Act transposes the EC Water Framework Directive, and in doing so introduces a new framework for the management and protection of Scotland's water environment. Part 2 of the Act changes the way in which the cost of providing water and sewerage infrastructure for new housing developments is funded.

3. During Stage 2 of the Bill, the Executive brought forward a sustainable flood risk amendment in response to commitments given to the Transport and Environment Committee. This introduced a clear link between flood management and river basin planning on the face of the Act. This provision ensures that Scottish Ministers, SEPA and the responsible authorities, designated under section 2 of the Act, have a duty to promote sustainable flood management where their functions in terms of section 2 are relevant. For example, Scottish Ministers are required to promote sustainable flood management when considering councils' flood defence schemes for confirmation.

4. Local authorities will also be required to implement this sustainable flood management provision. Under section 2 of the 2003 Act, Ministers will be able to designate local authorities as "responsible authorities" for the purposes of Part 1 of the Act, and their flood prevention functions under the Flood Prevention (Scotland) Act 1961 ("the 1961 Act") as "designated functions". This means that local authorities will be required to exercise their functions under the 1961 Act so as to secure compliance with the 2003 Act, which could contribute to the mitigation of floods. In light of the sustainable flood management amendment local authorities also have a duty to promote sustainable flood management so far as is consistent with that function.

5. River Basin Management Planning will provide a strategic framework within which flood prevention measures can be considered. It brings together all those with an interest in flood management issues at the strategic level. The 2003 Act gives Scottish Ministers the power to make regulations under section 10 to specify any matters that must be covered by the river basin management plans. Ministers can therefore stipulate that plans must address flood prevention issues should it be necessary to give such direction.

6. In due course the construction of flood defence schemes will require consent in terms of the new control regime introduced under section 20 as well as existing requirement for confirmation by Ministers and to satisfy the planning process.

Discussion

7. The concept of sustainable flood management is likely to mean different things to different people. The most widely quoted definition of sustainable development is taken from The Brundtland Report (*Our Common Future*; World Commission on Environment and Development (1987); Oxford University Press) where it is defined as ‘development which meets the needs of the present without compromising the ability of future generations to meet their own needs’. While the read across to flood management is not straightforward the Group is asked to bear this principle in mind when considering what sustainable flood management entails and when advising the Executive on a definition of sustainable flood management.

8. In 2001 the Institute of Civil Engineers’ report “Learning to Live with Rivers” describes sustainable development in similar terms. A copy of the report can be found at: <http://www.ice.org.uk/rftpdf/iceflooding.pdf>. (See Annex A for extract.)

9. WWF has also recently commissioned work in this area and has produced a (draft) definition which the Group may wish to discuss. Mike Donaghy, who will represent the interests of Scottish Environment LINK on the Group, will offer further details at the first meeting.

10. The Group will also wish to take account of the approach that has already been adopted by the Executive in relation to sustainable flood management. For example discussions will take into account the Executive's planning policy set out in the proposed Scottish Planning Policy 7- Planning and Flooding, which is planned to be issued in the new year. The new guidance will confirm that built development on the functional flood plain should not be given planning permission on the basis that it will be unsustainable.

Working arrangements

11. In light of the new provisions in the 2003 Act it will be a priority for the Group to discuss and support the Executive to define sustainable flood management. We anticipate that this piece of work will be progressed through a short term sub-group, reporting back to the main Group for the third meeting, which is scheduled for 1 April 2004. In view of the time constraints on the Group, we recognise that, exceptionally, the preparation of draft guidance on sustainable flood management might best be carried out on a consultancy basis.

Conclusions

12. **Members are invited to agree that:**

- **a sub-group should be set up to discuss and offer advice to the Executive on a definition of sustainable flood management;**
- **the sub-group should report its conclusions in time for the third meeting of the main Group on 1 April 2004 and**
- **the preparation of draft technical guidance on sustainable flood management may require the services of a consultant.**

**NATIONAL TECHNICAL ADVISORY GROUP ON FLOODING ISSUES
EXTRACT FROM “LEARNING TO LIVE WITH RIVERS”**

Chapter 5: Engineering solutions

5.2 Sustainability

There are many definitions of sustainability but essentially the aim is ‘*to provide for today’s needs without compromising the ability of future generations to meet theirs*’. The constant reference to sustainability into today’s world implies that we have been acting in a non-sustainable manner in the past. In the context of flood defences this is hardly true in the sense that most existing fluvial flood defence schemes would be classified as sustainable over the next few generations. However, continued development of such schemes is in danger of compromising future generations unless the full implications are assessed and addressed now.

The most sustainable of solutions are likely to be those that address the issue of runoff at source. The introduction (or re-introduction) of storage into the rainfall-runoff relationship can be particularly effective when applied near to the point where runoff begins. Storage is also very effective further down the system if it is sufficiently large in proportion to the problem, as has been demonstrated beyond doubt in the recent autumn 2000 floods (e.g. Leigh Barrier on the River Medway and Lincoln Washlands).

The least sustainable of options include further raising of flood defences to constrain a river ‘within bank’, or the construction of new defences to provide protection to new urban areas on the flood plain (Figure 16). Such solutions generally worsen the problem for other riparian land owners or developments and it would be easy to say that they should only be considered when no other option is viable. However, this is too simplistic and the quest should be to find a solution that suits each particular case. Otherwise, successful schemes such as that for Gainsborough, which combined flood risk management with a parallel need for urban waterfront regeneration, might not have gone ahead. This highly commendable scheme was completed just in time to ensure that the inhabitants escaped the misery that was visited upon 10,000 less fortunate people in autumn 2000.

The longer term sustainable option is to let rivers have space in urban areas and to encourage the development of an urban river corridor that can accommodate increased flood capacity in sympathy with the urban use of the land.

5.3 Getting the balance right

The secret of flood risk management is getting the balance right. This requires weighing the needs of people against our desire to conserve the environment, while also taking into account other demands on the public purse, including health and education.

One major initiative that will help us to conduct this delicate balancing act is the move away from a focus on local solutions to a broader, catchment-wide approach to flood risk management. In this regard, the adoption of strategy studies as a basis for developing solutions along our major rivers, and the more recent initiative of catchment flood management plans, are to be welcomed. However, besides thinking globally there will be a continuing need to act locally by providing engineered solutions. **A particular area for**

further study is the link between land use and flooding, so as to have confidence in policy changes that could lead to significant reduction of flood risk. It is recommended that whole-catchment modelling be undertaken with greater vigour to address this issue.

In the autumn 2000 floods, it was apparent that in many of the locations that were flooded only a small number of properties were affected (Environment Agency, 2001d). In Wales, for example, at 182 of the 211 locations that were flooded, less than 10 properties were flooded. It was a similar story in the Anglian Water region, where out of 40 locations, 37 had five or fewer properties affected and none had more than ten. This tends to suggest that flood proofing (i.e. making buildings more resistant to flood damage) and localised flood mitigation measures may form an important part of flood risk management in the future.

In circumstances where it is appropriate to provide engineered defences to protect significant numbers (i.e. hundreds) of people in a community, the aim should be to provide a high standard of defence even if the economic analysis reveals that a lower standard would yield a larger benefit-cost ratio. This is already the case in statutory reservoir safety policy. **It is recommended that the target should be based on providing standard protection against the 100-1 chance flood (1% annual probability of flooding or 100-year return period) as a minimum.**

Lower standards would only be adopted where there was overriding justification for doing so and not, as at present, because a 75-1 chance flood (1.33% annual probability of flooding or 75-year return period) standard gives a higher benefit-cost ratio. Nor is it acceptable to have adjacent flood defences constructed to different standards justified solely on the basis of the benefit-cost ratio.

These protection standards are presented in the traditional 'event-based' terminology that has driven our approach to flood risk management for the past 50 years. This should not be interpreted as a plea to continue this approach for the next 50 years. We are now in a much better position to take a broader view of flood defence, allowing us to examine the performance of schemes for a wide range of flood events, and testing the sensitivity of the solutions to variations in the basic assumptions. This process will allow us to be more confident in the schemes that are proposed and implemented, especially in terms of their performance in extreme flood events. Nevertheless, regardless of the complexity and breadth of the analytical process used, the promoters of these schemes must still be in a position to assure the defended community that the scheme will ensure that the risk of them being flooded is less than 100-1 in any 1 year.

A town in the south-west has a current standard of protection for a 2-1 chance flood (50% annual probability of flooding or 2-year return period). It has been flooded five times in the last 3 years. A 25-1 chance flood (4% annual probability of flooding or 25-year return period) standard could be achieved for an investment of £0.5 million. The 100-1 chance flood (1% annual probability of flooding or 100-year return period) standard could be obtained by the construction of a flood storage scheme, but would cost twice as much. Both options have acceptable benefit-cost ratios. There are more easily identified environmental concerns about the storage option but it is a clear winner in terms of the standard of protection provided and it brings with it the positive benefits gained from flood storage. Under current rules, funding will only be provided for the 25-1 chance flood scheme. In such cases there should be a balance in favour of the human factor, and the 100-1 chance flood scheme should be funded.

In the case of existing heavily urbanised areas and for new developments in flood risk areas where there are overriding reasons to develop, the balance should be tilted back in favour of human safety and technical soundness rather than environmental impact.

The performance measures for DEFRA's *High Level Targets for Flood and Coastal Defence (MAFF, 1999b)* are

- the number of lives lost through flooding
- **the aggregate benefit-cost ratio for grant-aided schemes (the aim is to achieve 5-1 or better).**

Whereas the desire to reduce lives lost is clearly laudable, the only other identified indicator is a strictly economic measure. **We strongly recommend that another performance indicator is added, and that is the number of households damaged and distressed by flooding in a year.** Whereas this will clearly vary depending on the prevailing climatic conditions, it is important to drive down the number of incidents of people that suffer from flood damage, by whatever means.

Furthermore, with respect to grant aid, there is a perception that the 'level of proof' required by DEFRA in support of an application for grant aid is unnecessarily onerous for the level of funding available. In addition, there seems to be an ethos of 'fine tooth combing' submissions, rather than accepting them for what they are. The *Lessons Learned Report (Environment Agency, 2001a)* notes a perception that DEFRA's 'benefit-cost decision rule leads to a reduced standard of defence at a time of increased uncertainty such as climate change and changes in catchment characteristics'. **We recommend that the focus on the benefit-cost ratio is redirected to take into account the human dimension.**

Learning to live with Rivers, published by the Institute of Civil Engineers (November 2001)