 

# Annex 14

# Local flood management

 

Compiled by John Blanksby, Pennine Water Group, University of Sheffield

# Summary

This note presents the outline of a process by which flood management strategies and plans can be implemented at local scale in a multi stakeholder environment, including the involvement and support of citizens and communities.

Contents

[Part 1. Setting the context 1](#_Toc426374720)

[Part 2: The components of local flood management 2](#_Toc426374721)

[Flood management strategies and flood management plans 3](#_Toc426374722)

[Partnerships 4](#_Toc426374723)

[Community groups 7](#_Toc426374724)

[Developing organisational interactions, infrastructure and processes to develop, maintain and implement plans 7](#_Toc426374725)

[Developing a common understanding of the context 7](#_Toc426374726)

[Developing a common understanding of flood processes 7](#_Toc426374727)

[Developing a common understanding of the likelihood and consequences of flooding 7](#_Toc426374728)

[Developing a common understanding of the certainties and uncertainties associated with flooding 7](#_Toc426374729)

[Developing a common understanding of the interactions between flooding and other aspects of the built, natural and water environments 7](#_Toc426374730)

[Structural measures for the alleviation and avoidance of flooding 8](#_Toc426374731)

[Non-structural measures for the alleviation and avoidance of flooding 8](#_Toc426374732)

[Non-structural measures for action and assistance in the event of flooding 9](#_Toc426374733)

[Maintenance of strategy, partnerships and community groups 10](#_Toc426374734)

[Maintenance of capacity and organisational infrastructure and processes 10](#_Toc426374735)

[Maintenance of understanding 10](#_Toc426374736)

[Maintenance of structural and non-structural measures, action and assistance 10](#_Toc426374737)

# Part 1. Setting the context

Local flood management is a partnership of local communities and service providers coming together to develop sustainable plans to deal with the certainties and uncertainties of flooding without causing problems for surrounding communities. Such partnerships will

* Develop strategies to meet stakeholder objectives,
* develop stakeholder partnerships to implement those strategies, and
* initiate and maintain appropriate Interactions with citizens and community groups.

The scope of local flood management is relevant to all sorts of flooding, but the partnership approach is particularly important where the flooding is caused by water flowing from higher to lower ground and where actions taken to protect properties and infrastructure may alter the flow pathways, thus potentially causing problems for others. It’s scope is primarily about:

* Surface water,
* ground water,
* drainage infrastructure,
* exceedence pathways, and
* streams and ponds.

However it also involves:

* Artificial water bodies,
* rivers and lakes, and
* coastal waters

especially where theses interact with the primary areas of interest.

Local flood management is about developing and implementing a balanced achievable (proportional and sustainable) portfolio of alleviation, avoidance, action and assistance measures to meet the objectives for flood management both now and in the future.

In order to achieve this it will be necessary to develop capacity to:

* understand flooding issues and
* to plan, identify, implement and maintain appropriate measures within the local built and natural environments

This will entail:

* the development of human and organisational capacity,
* the understanding of context, flood processes, relevant technology, local likelihood and consequences of flooding, certainties and uncertainties, and
* understanding the impact of measures and the potential direct and indirect benefits that they can bring to local communities.

# Part 2: The components of local flood management

The basic components of local flood management are as follows:

* Create and support:
  + Strategy (Local flood and water management strategy aligned with other organisational strategies)
  + Partnerships (With other operational organisations (public and private sector) and with R & D enablers)
  + Community groups (Local residential and business communities)
* Develop :
  + The capacity to make effective decisions (Data and information, knowledge and experience)
  + Organisational interactions, infrastructure and processes to develop, maintain and implement plans (Data collection, management and archives, integrated and aligned management and communications systems)
* A common understanding of:
  + The context (The wider physical and socio economic environmental contexts in which flooding and flood management take place, including local stakeholder and community objectives)
  + The flood processes (Flood processes in general and in specific cases)
  + The likelihood and consequences of flooding (How often, on average that flooding of a certain scale is likely to occur and the consequences of that flooding)
  + The certainties and uncertainties associated with flooding (What is certain or almost certain and what is uncertain about flooding and its consequences)
  + The interactions between flooding and other aspects of the built, natural and water environments (How to achieve a balance between satisfying the objectives of the Flood Directive and other Directives and how to maximise the benefits to local communities through aligned management approaches)
* Identify and implement:
  + Structural measures (large or small scale, to alleviate and avoid current and future flooding)
  + Non-structural measures (Through planning and design in the built and natural environments to alleviate and avoid current and future flooding) including:
    - Actions in the event of flooding (Taken prior to, during and after periods of flooding to support communities)
    - Assistance in preparing for, during and after flood events (Given prior to, during and after periods of flooding to support communities)
* Maintenance of:
  + Strategy, partnerships and community groups (Updating to reflect emerging circumstances, organisational and community changes)
  + Capacity and organisational infrastructure and processes (Maintaining awareness (knowledge and experience) of technical and organisational issues linked to an integrated approach to organisational management)
  + Understanding (Improving understanding through new knowledge and documenting experience)
  + Structural and non-structural measures, action and assistance (Keeping measures and actions to be taken current in the consciousness of organisations and communities)

## Flood management strategies and flood management plans

Flood management strategies and flood management plans will reflect local circumstances. However, it is likely that the process of developing capacity within organisations and of developing local flood management plans will be similar to that shown in Figure 1. 

**Figure 1: Local flood management strategies and local flood management plans**

## Partnerships

The first steps in the process of developing partnerships are to

* Identify stakeholder organisations,
* Find out who does what and why do they do it?
* develop aligned policies within the stakeholder organisations and develop organisational and inter organisational infrastructure, and
* develop common approaches for engagement with citizens and communities

Table 1 provides an example showing the range of stakeholders that can be involved in local flood management.

Tables 2 and 3 provide examples of a preliminary who does what and why analysis of the main stakeholders within the Bradford district

**Table 1: Stakeholder organisations in the Bradford District**



|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Table 2: Preliminary who does what and why analysis – Alleviation and Avoidance** | | Normal operational / supervisory responsibility | | | | | | | | | | | | | | | | | | | | | | |
| Exceedence pathways | Surface water and soil | | | | Ground water | | | Drainage infrastructure | | | | Small Streams and ponds | Large Streams and ponds | Rivers and lakes | Artificial water bodies | | | | | | | |
| |  |  | | --- | --- | | Operational organisations |  | | City of Bradford MDC |  | | Yorkshire Water Services |  | | Environment Agency |  | | Canals and Rivers Trust |  | | | Rural green space | Green space at urban fringe | Green space within urban area | Developed urban surface | Artificial superficial deposits | Natural superficial deposits | Bedrock | Sewers | SUDS/Source control | Pipe drain | Open Drain | Drainage channels | Ponds and Lakes | | Canals | | Reservoirs | | |
| Activities | Responsible CoB departments and other stakeholders |
| Strategy and master planning | Local Development Framework - ANDREW MARSHAL |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Development control | Development Services - CHRSTOPHER EATON |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Building control | Development Services - CHRSTOPHER EATON |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Water management | Development Services - CHRSTOPHER EATON |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Promoting/requiring flood risk adapted land use | Development Services - CHRSTOPHER EATON |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Promoting/requiring water sensitive urban design | Development Services - CHRSTOPHER EATON |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Promoting/requiring resilient and resistant infrastructure | Assistant Director Planning, Transportation & Highways - JULIAN JACKSON |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Promoting/requiring resilient and resistant buildings (Flood adaptive architecture) | Development Services - CHRSTOPHER EATON |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Duties for surface water management | Development Services - CHRSTOPHER EATON |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Duties for surface water maintenance | Yorkshire water, Highway Asset Management - CHRISTOPHER LEACH, Assistant Director Neighbourhood Services - STEVE HARTLEY |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Duties for developing alleviation options | Development Services - CHRSTOPHER EATON |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Duties for developing assessing and approving alleviation options | Development Services - CHRSTOPHER EATON |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Promoting/requiring appropriate use of adaptive and non adaptive responses | Development Services - CHRSTOPHER EATON |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Promoting/requiring flood minimisation by flow management | Development Services - CHRSTOPHER EATON |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Promoting use of insurance as a FRM measure | No |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Promoting use of reserve funds as a FRM measure | Finance |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Duties for FRM programme development | Development Services - CHRSTOPHER EATON |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Duties for FRM programme implementation | Assistant Director Planning, Transportation & Highways - JULIAN JACKSON |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Table 3: Preliminary who does what and why analysis – Action and Assistance** | | | Normal operational / supervisory responsibility | | | | | | | | | | | | | | | | | | | | | | | |
| Exceedence pathways | Surface water and soil | | | | | Ground water | | | Drainage infrastructure | | | | Small Streams and ponds | Large Streams and ponds | Rivers and lakes | Artificial water bodies | | | | | | | |
| |  |  | | --- | --- | | Operational organisations |  | | City of Bradford MDC |  | | Yorkshire Water Services |  | | Environment Agency |  | | Canals and Rivers Trust |  | | | | Rural green space | Green space at urban fringe | | Green space within urban area | Developed urban surface | Artificial superficial deposits | Natural superficial deposits | Bedrock | Sewers | SUDS/Source control | Pipe drain | Open Drain | Drainage channels | Ponds and Lakes | | Canals | | Reservoirs | | |
| Activities | | Responsible CoB departments and other stakeholders |
| Preparing for floods | Insurance of residual risk | Internal Audit & Insurance - MARK St ROMAINE |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Reserve funds | Business Services - TOM CASELTON |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Emergency Response | Emergency Planning - MICHAEL POWELL |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Evacuation and rescue plans | Emergency Planning - MICHAEL POWELL, fire, police |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Recovery plans | Emergency Planning - MICHAEL POWELL, Gold Silver & Bronze responders |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Flood warnings | Email | EA, emergency planning, highways, building control, drainage |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SMS On-line | EA, emergency planning, highways, building control, drainage |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Door knocking | Emergency planning |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Web site | Webmaster |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Press | Marketing & communications (Jane Lewis) |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Radio/TV | Marketing & communications (Jane Lewis) |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Responding to emergencies | Temporary flood protection | EA |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Telecommunications network | BT |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Transportation | Emergency Planning - MICHAEL POWELL |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Evacuation facilities | Emergency Planning - MICHAEL POWELL |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Emergency infrastructure | Emergency Planning - MICHAEL POWELL |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| The “All clear” process (at the end of the emergency) | | Emergency Planning - MICHAEL POWELL |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Helping recovery | | Emergency Planning - MICHAEL POWELL. Gold command |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

## Community groups

There are three broad categories of organisations/ communities that can be affected by flooding. These are:

* Public service providers (Local authority, health service etc.) where flooding can have a significant secondary effect on the communities that they serve, such as school closures etc.
* Residential communities (with different potential characteristic and differing needs in terms of support) including:
  + Social housing providers and communities
  + Private rental sector residential properties as part of a community
  + Private owner occupier residential properties as part of a community
  + Lone residential properties
* Business communities (commercial and industrial) including:
  + Managed estates
  + Owner occupier
  + Rental properties

The different communities have different needs in terms of support and in particular it should be noted that the perspectives of the need for action may differ between landlords and tenants.

## Developing organisational interactions, infrastructure and processes to develop, maintain and implement plans

Data collection, management and archives, integrated and aligned management and communications systems

## Developing a common understanding of the context

The wider physical and socio economic environmental contexts in which flooding and flood management take place, including local stakeholder and community objectives

## Developing a common understan**d**ing of flood processes

Flood processes in general and in specific cases

## Developing a common understanding of the likelihood and consequences of flooding

How often, on average that flooding of a certain scale is likely to occur and the consequences of that flooding

## Developing a common understanding of the certainties and uncertainties associated with flooding

What is certain or almost certain and what is uncertain about flooding and its consequences

## Developing a common understanding of the interactions between flooding and other aspects of the built, natural and water environments

How to achieve a balance between satisfying the objectives of the Flood Directive and other Directives and how to maximise the benefits to local communities through aligned management approaches

## Structural measures for the alleviation and avoidance of flooding

Structural measures for the alleviation and avoidance of flooding can range from the very large, such as coastal defences, to the very small, such as a mound to direct water around a building. A structural measure must be permanent, and must affect the flow of water. In this respect it does not include flood resistant or resilient building construction. The following list summarises the different types of structural measures for the alleviation and avoidance of flooding:

Water management measures for surface water and streams

* Measures associated with buildings
* Measures for developed urban surfaces
* Measures for urban and near urban green space
* Sub surface conveyance measures including culverted streams
* Inlets
* Landscaping measures

Water management measures for rivers and streams

* Dikes / Flood Defence Walls /Embankments
* Retention Structures
* Optimizing the Operation of Retention Structures
* New channels and pipes
* Flood storage
* Groundwater Defence
* Relocation of Dikes
* River Restoration

Water management measures for coastal waters

* Dikes / Flood Defence Walls /Embankments
* Groundwater Defence

Water management measures in the built and natural environments

* Land raising
* Elevated building
* Adapted Land Use
* River / Floodplain Maintenance
* Maintaining the landscape in the built environment

## Non-structural measures for the alleviation and avoidance of flooding

Non-structural measures for the alleviation and avoidance of flooding are those measures that are associated with the management of the built and natural environments. This includes measures such as effective planning , so as to development in areas that may flood, or flood resilient or resistant (flood adapted) construction where development needs to take place in areas that do flood. The following list summarises the different types of non-structural measures for the alleviation and avoidance of flooding:

Strategy and master planning

* Regulation
  + Support
  + Guidance
  + Experience
* Land use zoning, ordinances and maps

Development control

* Regulation
  + Support
  + Guidance
  + Experience

Building control

* Regulation
  + Support
  + Guidance
  + Experience

Water management

* Regulation
  + Support
  + Guidance
  + Experience

Promoting/requiring flood risk adapted land use

Promoting/requiring water sensitive urban design

Promoting/requiring resilient and resistant infrastructure

Promoting/requiring resilient and resistant buildings (Flood adapted architecture)

* Dry proofing
* Wet proofing

Responsibilities for surface water management

Responsibilities for surface water maintenance

Responsibilities for developing alleviation options

Responsibilities for assessing and approving alleviation options

Promoting/requiring appropriate use of adaptive and non-adaptive responses

Promoting/requiring appropriate use of structural and non-structural responses

Promoting/requiring flood minimisation by flow management

Responsibilities for flood management programme development

Responsibilities for flood management programme implementation

## Non-structural measures for action and assistance in the event of flooding

Preparing for events and incidents

* Financial Preparedness
  + Insurance of residual risk
  + Reserve funds
* Residual risk
  + Preparing and testing emergency Response
  + Preparing and testing evacuation and rescue plans
  + Preparing and testing recovery plans

Warnings

* Email
* SMS On-line
* Web site
* Radio/TV
* Press
* Door knocking
* Signage adjacent to watercourse?

Responding to emergencies

* Providing temporary protection
  + Local scale
  + Property scale
* Emergency operations
  + Telecommunications network
  + Transportation
  + Emergency infrastructure
  + Evacuation facilities
* Pollution source removal
  + Stem an illegal or accidental discharge
  + Fix a broken pump
  + Unblock sewer
* Pollution barriers
  + Surface barriers for oil
* Diversion of polluted flows
* Pollution removal/neutralisation
  + Pads to soak up oil
  + Hydrogen peroxide to re-oxygenate

The “All clear” process (at the end of the emergency)

Helping recovery

## Maintenance of strategy, partnerships and community groups

Updating to reflect emerging circumstances, organisational and community changes

## Maintenance of capacity and organisational infrastructure and processes

Maintaining awareness (knowledge and experience) of technical and organisational issues linked to an integrated approach to internal organisational management and aligned approaches to inter organisational management.

## Maintenance of understanding

Building understanding through new knowledge and documenting experience

## Maintenance of structural and non-structural measures, action and assistance

Keeping measures and actions to be taken current in the consciousness of organisations and communities.