INDIVIDUAL RISK ASSESSMENT

Hazard/threat category	**Sub-category**
Severe weather	Flooding (major fluvial, urban)
Hazard and threat description, plus scale	**Risk reference number**
Local Fluvial Flooding	HL19
Author	Environment Agency
Version	2
Date of revision	**Next review**
December 2007	December 2009

1. Overview of hazard or threat

A sustained period of heavy rainfall extending over 2 weeks, perhaps combined with snow melt, resulting in steadily rising river levels over a region. Localised flooding of 100 to 1,000 properties for 2 -7 days up to 5 fatalities and 50 casualties. Up to 5,000 people evacuated. Up to 200 people stranded over a large area and in need of rescue. Some impact on minor roads and some A/trunk roads impassable for a time. Some minor rail lines and stations may need to be closed for a week for repair.

Impact on Infrastructure:

- Water damage.
- Road and bridge damage.
- Sediment movement and contamination of water supplies.
- Loss of essential utilites to 5,000 homes for 14 days.
- Substantial disruption for 7-14 days, significant debris and clear up needed.
- Up to 250 people needing assistance with sheltering for up to 12 months.

Assumes:

- 2 days of severe flood warnings issued.
- Sub regional impact and is a real threat to lives, localised economic damage and need between 6 and 18 months recovery.
- Significant mutual aid would be deployed from neighbouring counties, but the response effort could be contained in a region.

Most commonly caused by intense bursts of rain causing surface water runoff or more likely prolonged rainfall on saturated ground which results in rivers or other watercourses overflowing their banks.

May lead to a minor inundation of properties and road closures, or result in loss of life and devastation of property necessitating the implementation of a co-ordinated recovery plan.

2. Key historical evidence

National

- Summer 2007 floods – England and Wales - Exceptionally heavy rain culminated in two severe, disruptive flooding events covering Yorkshire and the Humber, Derbyshire, Lincolnshire and Worcestershire and then the Severn and its tributaries in Gloucestershire, Worcestershire, Herefordshire, Shropshire, and along the Thames and its tributaries in Wiltshire, Oxfordshire, Berkshire and Surrey. This resulted in approximately 55,357 business and residential properties flooding from both surface water and rivers. The cumulative rainfall total in the UK for May, June and July 2007 was unprecedented; Met Office records show that 414.1 mm of rain fell across England and Wales, making it the wettest May to July since the England and Wales Precipitation record began in 1766.
- June 2005 - North Yorkshire - thunderstorms caused one month of rain to fall in two hours. This led to dramatic and extensive surface water flooding with water surging down hills and along roads. The flash floods damaged 121 properties; some of them partially or completely washed away, destroyed or damaged bridges and roads and swept hundreds of animals to their death. Miles of dry stone walls and fencing were washed away and hundreds of tonnes of trees, vegetation and silt were washed into roads, streams and rivers. Over 120 properties were flooded by either surface water running off the land, overflowing drains or sewers, or from flood swollen streams or rivers. Flash flooding affected properties in the villages of Hawnby, Thirlby, Boltby and Sutton-under-Whitestonecliffe and the towns of Thirsk and Helmsley. While no deaths occurred a number of people were evacuated with some needing to be airlifted to safety. Electricity supplies were lost for 2,500 homes in the immediate area and 38,000 homes in the Region during the storms.
- 7, 8, 9 January 2005 - Floods in Cumbria affected more than 3,000 properties.
- Autumn 2000 floods - United Kingdom – prolonged severe rainfall led to the flooding of 12,000 homes nationwide.
- March 1999 – North Yorkshire – River Derwent burst its banks and inundated Malton and Norton forcing 200 families to abandon their homes (recurred in November 2000).
- Easter 1998 floods - extensive flooding killed 5 in the Midlands and damaged 4,500 homes in Northamptonshire, Warwickshire and Oxfordshire.

Local

- Summer 2007 floods – After an unusually wet spring and summer, widespread intense rainfall in July resulted in significant flooding across the TVLRF area. The flooding was caused by both surface water and subsequent high river levels. Particularly badly affected were Oxford, Abingdon, Witney, Pangbourne, Thatchham, Newbury, Wokingham, Maidenhead, Brackley, Buckingham and Stoney Stratford**.**. Approximately 9,390 properties were flooded.

- December 2002 / January 2003 – worst affected catchments, properties flooded - Thames corridor, Thame, Leach, Ock, Cherwell, Colne, Loddon. Most other catchments in TVLRF area had Flood Watches issued.
- December 2000 – worst affected catchments, properties flooded - Thames corridor, Churn, Coln, Windrush, Ock, Loddon, Kennet. Most other catchments in TVLRF area had Flood Watches issued.
- Easter 1998 – Cherwell catchment and River Great Ouse / River Ousel.
- March 1947 - The flood outline suggests that the whole of the TVLRF area was affected by extensive flooding.
- October 1939 – River Great Ouse.

Flood Mapping

The Environment Agency provides flood mapping on its website at: http://www.environment-agency.gov.uk/subjects/flood/826674/829803/858477/?version=1&lang=_e.

The Flood Map is a multi-layered map which provides information on:

- Flooding from rivers or sea without defences: the natural flood plain area that could be affected in the event of flooding from rivers and the sea
  - For flooding from rivers the map indicates the extent of a flood with a 1% (1 in 100) chance of happening each year*
- Extent of extreme flood: a flood with a 0.1% (1 in 1000) chance of happening each year
- Flood defences: such as embankments, walls and flood storage areas (which are areas of land designed and operated to store flood water)
- Areas benefiting from flood defences: where possible the EA map out the areas that benefit from flood defences in the event of flooding from rivers or the sea (as described above*). If the defences were not there, these areas would flood. Note that the EA do not show all areas that benefit from flood defences.

Where possible, the Environment Agency will assist professional partners' by producing customised maps to assist their flood planning eg showing sites of Emergency Services, schools, COMAH sites etc.

3. Likelihood

Hazard	Outcome description	Likelihood
Severe weather	**Local Fluvial Flooding** Flooding affecting 100 to 1,000 properties.	**Possible (4)**

4. Impact

Summary

Hazard	Outcome description	Impact				
Severe weather	**Local Fluvial Flooding**	Health	Social	Env	Econ	Overall
	Flooding affecting 100 to 1,000 properties.	3	4	4	4	4

Details

Impacts
Primary
Drowning of people, pets and livestock
Pollution/health risks from sewerage systems, chemical stores, fuel storage tanks
Evacuation and temporary/long-term accommodation needs
Damage to property and surrounding land
Closure, or washing away, of roads, bridges, railway lines. Disruption to infrastructure – road and rail travel and community services.
Loss of (and possible damage to) telephone, electricity, gas and water supplies
Communities unable to function without support. Care required for vulnerable people.
Secondary
Need for recovery strategy in aftermath of major flood.
Disruption of economic life and major costs of rebuilding infrastructure
Public need for information, advice, benefits/emergency payments
Insurance implications, including help for the uninsured
Safety assessments/possible demolition of damaged buildings and structures
Shortage/overstretch of key resources (equipment and personnel) and agencies
Overstretch of normal communication links, including mobile phones
Displacement of people post flooding, accommodation problems

5. Vulnerability and resilience

Catchments in the TVLRF area with a high potential for flooding and more than 100 properties at risk of flooding. This includes all catchments in the TVLRF area, excluding the Evenlode catchment, Leach catchment and the Ampney Brook catchment which have less than 100 properties at risk of flooding.

Large Areas of the TVLRF Area are vulnerable to flooding because of the proportion of urbanisation within the river catchments.

Large areas of hard surfaces increase the speed that water enters drains and watercourses. This increases the rate of rise of the watercourse and the peak level reached.

Large urban areas are also prone to surface water flooding when drainage systems become quickly overwhelmed in storm conditions.

A degree of resilience to flooding has been achieved over many years by the large number of improvements to watercourses that have been constructed in some areas. However in most cases the river would still be unable to contain a large flood.

In addition, many communities are vulnerable to a blockage in any of the many culverts and grills in urban areas. An ongoing maintenance schedule reduces the risk of this occurring, however the risk in never completely removed. Emergency clearance is always dependent on the workforce being able to reach the site in time on congested roads.

The resilience of a community is improved when there is an awareness of the risk of flooding and the actions that can be taken to reduce damage. In many communities this awareness of the risk of flooding from rivers is low. Flooding may also occur at times when people are at work or asleep; therefore their ability to take appropriate action is delayed.

Within flood risk areas there are some groups of people that are particularly vulnerable. These groups included:

- Those that do not receive a warning;
- The elderly;
- Disabled;
- Non-English speakers;
- Single parent families, and those with young children;
- People new to the area;
- Visitor and tourists.

For details of the locations of Flood Risk Areas in the TVLRF Area, please refer to the Local Flood Warning Plan for the Berkshire, Buckinghamshire, Oxfordshire and Wiltshire Areas.

6. Overall assessment

Category	**Sub-category**		
Severe weather	Flooding (major fluvial, urban)		
Outcome description	**Impact**	**Likelihood**	**Risk**
Flooding affecting 100 to 1,000 properties.	Significant (4)	Possible (4)	Very High

Controls in place

- Environment Agency Incident Management Plans
- Environment Agency 24/7 incident response
- Environment Agency Issued Flood Warnings primarily using Floodline Warnings Direct
- Environment Agency Memorandum of Understanding with Fire Brigades, Police, Local Authorities, Highways Agency, Health Protection Agency and Health Authority.
- Environment Agency Local Flood Warning Plans for Oxfordshire, Buckingham and Berkshire.
- Oxfordshire County Council Emergency Plan Part 3, Section 4.
- Buckinghamshire County Flood Plan
- Milton Keynes Council Flood Plan
- Buckinghamshire County Council Emergency Plan
- Aylesbury Vale District Council Emergency Plan
- Chiltern District Council Emergency Plan
- South Bucks District Council Emergency Plan
- Wycombe District Council Emergency Plan
- Oxfordshire, Royal Berkshire and Two Shires Ambulance NHS Trusts Major Incident Plan
- West Berkshire Council – Major Incident Plan
- Royal Berkshire Hospital NHS Trust Major Incident Plan
- Heatherwood and Wexham Park Hospitals NHS Trust Major Incident Plan
- Berkshire Primary Care Organisations Major Incident Plan and Operational Response Manuals
- Berkshire Healthcare Trust Major Incident Plan
- Buckinghamshire Hospitals NHS Trust Major Incident Plan
- Milton Keynes Hospital NHS Trust Major Incident Plan
- Buckinghamshire Mental Health Trust Major Incident Plan
- Buckinghamshire Primary Care Organisations Major Incident Plan
- Oxford Radcliffe Hospitals NHS Trust Major Incident Plan
- Oxford Mental Health Trust Major Incident Plan
- Nuffield Orthopaedic Clinic Major Incident Plan
- Oxfordshire Primary Care Organisations Major Incident Plan
- Thames Valley Strategic Health Authority Major Incident Plan
- Berkshire Integrated Emergency Planning Structure
- Wokingham District Council Emergency Plan
- Reading Borough Council Emergency Plan
- West Berkshire Council Emergency Plan
- Bracknell Forest Borough Council Emergency Plan
- Royal Borough Council of Windsor and Maidenhead Emergency Plan
- Slough Borough Council Emergency Plan
- BFRS : OC 15/1/1, Spate Conditions
- BFRS : OC 85/5, Waterborne & unstable surfaces response
- BFRS : GRA 2.08, Rescues involving flooding

Additional risk treatment required

- Regular exercising of emergency plans.
- Regular training of duty officers and staff involved in flooding events.
- Encourage further take up of Flood Warning service in areas at risk of flooding and better flood preparedness in local communities.