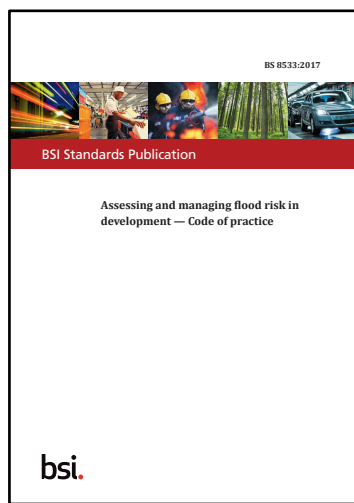


BS 8533:2017 Assessing and Managing Flood Risk in Development - Code of Practice.



One of the Lead Local Flood Authorities core responsibilities is to investigate significant local flooding incidents and publish the results of such investigations. Local Govt. Guidance notes that the British Standards Institute has developed a 'BSI Standard [BS 85600:2017] 'Post-event flood assessments – Guidance on investigating flooding incidents'', which deals with post-event flood assessment.

With regard to flood risk assessment, the appellant notes that the BSI is also publishes 'BSI Standard (BS 8533:2017) Assessing and Managing Flood Risk in Development - Code of Practice'. The standard details established best practice in the determination of flood risk.

Extracts of BS 8533:2017 are shown below for the propose of illustrating to the Inspector that rigorous procedures for the assessment of flood risk to a development site are well established and should have be followed by the LPA in its determination of flood risk to the appeal site. Instead it relied solely upon it's own interpretation of risk, based on it's own simplistic misunderstanding of the purpose of Local Flood Risk Zones; which as we a have previously discussed in our Statement of Case (Para 59), in the words of the LPA's own uFMfSW maps, which delineate the Local Flood Risk Zones themselves, at 6.4.11 says: "It should be noted that the uFMfSW [Updated Flood Map for Surface Water] should not be used on a site-specific basis due to the limitations of the modelling, but instead should be used as a guide for potential risk."

4 Assessing the risk of flooding

4.1 General

Users of this document should consult all relevant national and local planning policies and regulatory guidance for their area of interest.

A development-based flood risk assessment should be undertaken to determine:

- the probability and consequence of flooding in and around the development, from all sources, in accordance with 4.3, 4.4 and 4.6;
- how the development might alter the existing flooding regime, potentially increasing the risk of flooding elsewhere, in accordance with 4.5; and
- the design measures needed to manage the risk of flooding in and around the development, in accordance with 5.4 and 5.5.

NOTE By undertaking the flood risk assessment at an early stage, it can be used to influence the conceptual layout and design of the development and reduce (or avoid) the risk of flooding for the lifetime of the development.

4.2 Site information

Before undertaking an assessment of the risk of flooding, information about the site and surroundings should be obtained, including:

- details of existing infrastructure (e.g. watercourses, reservoirs, canals, water mains, flood risk management infrastructure and/or drainage infrastructure);
- details of existing raised flood risk management infrastructure (e.g. the level of protection afforded by them and their condition);
- evidence of historical flooding;

NOTE 1 This is sometimes available from published media and risk management authorities, including for example reports required under section 19 of the Flood and Water Management Act 2010 [2]. Local residents might also be able to provide anecdotal information.

- topographic mapping (including local features, e.g. boundary walls and watercourses/drainage features); and

- information on site ground conditions.

NOTE 2 This information can be found from British Geological Survey borehole logs and the National Soil Resources Institute (NSRI) and site specific ground investigations.

NOTE 3 Published sources of information relating to the risk of flooding include, for example, existing assessments of the risk of flooding, e.g. strategic flood risk assessments (SFRAs), strategic flood consequence assessments (SFCAs) or site-based flood risk assessments; flood risk management strategies, plans and maps; surface water management plans (SWMP); river basin management plans (RBMP); catchment flood management plans (CFMP); shoreline management plans (SMP); estuary management plans (EMP); strategic asset management plans (SAMPS); drainage assessments; water cycle studies; water level management plans (WLMP); and coastal habitat management plans (CHAMP).

NOTE 4 Regulatory authorities and stakeholder groups that can be useful sources of information include, for example, the Environment Agency, Natural Resources Wales, Scottish Environment Protection Agency or Rivers Agency of Northern Ireland; lead local flood authorities (LLFAs); local authorities; sewerage undertakers and water companies; internal drainage boards; highway authorities; the British Geological Survey; infrastructure (e.g. reservoir, canal and railway) operators; and harbour authorities.

Assessing the risk of flooding to the development site and beyond

The risk of flooding associated with a proposed development should be assessed as the combination of the probability of flooding and its consequence.

The following factors should be assessed:

- how likely, and to what extent, the site might flood and the source and nature of that flood hazard;
- the impact that the development could have on flooding elsewhere, including residual risk; and
- the consequence of flooding (e.g. damage to property, injury to people or loss of life).

The assessment of flood risk should quantify the risk of flooding, both to and from the site, from the following sources:

- sea, estuarine and fluvial (watercourse) (see 4.4.2 and 4.5.2);
- surface water (see 4.4.3 and 4.5.3);
- sewers and drains (see 4.4.4);
- groundwater (see 4.4.5 and 4.5.4); and
- failure of infrastructure (see 4.4.6).

Assessing the probability of flooding to the development site

General

The probability of flooding to the proposed development site, from all sources, should be assessed in accordance with 4.4.2, 4.4.3, 4.4.4, 4.4.5 and 4.4.6. The effects of climate change on flood risk should be assessed in accordance with 4.6.

4.4.2.1 Flood maps

Flood maps and registers should be used in the first instance to assess the probability of flooding in and around the development.

Surface water flooding

COMMENTARY ON 4.4.3

Surface water flooding can occur as a result of either overland flow or ponding. Overland flow occurs following heavy or prolonged rainfall, or snow melt, where water can no longer be absorbed on the surface and results in surface run-off. Unless it is channelled elsewhere, the run-off travels overland, following the natural gradient of the land. Ponding occurs as the overland flow reaches natural depressions or blockages in the local topography.

The probability of surface water flooding should be assessed by examining the following information:

- maps of surface water flood risk and reports of observed flooding incidents in and around the development, where available;

NOTE 1 These are sometimes available from published media and risk management authorities, including for example reports required under section 19 of the Flood and Water Management Act 2010 [2]. Water and sewerage companies, highways authorities and local residents might also be able to provide anecdotal information.

- a study of the site-specific and surrounding topography to identify areas that might be susceptible to ponding and overland flow routes. This study should include:

- an assessment of the on-site run-off characteristics for a range of storm events, from the 50% AEP to the 1% AEP design rainfall (or 0.5% AEP design rainfall in Scotland) for a range of storm durations, including but not limited to the critical storm duration;

5 Managing the risk of flooding

5.1 A risk-based approach for managing flood risk within a development

A sequential, risk-based approach should be taken to managing flood risk within a development. Each stage in this hierarchical process should be completed before moving onto the next. The stages should be completed as follows.

- Stage 1 – Assessing and understanding the flood risk.** The first stage in this approach is to assess and understand the risk that is posed by flooding, in accordance with Clause 4. Until a sound understanding of the variation in flood risk across the development site (and the surrounding area) has been achieved, it is not practicable to plan to avoid and manage the risk.
- Stage 2 – Avoiding the risk.** Having assessed and understood the risk of flooding, the next stage is to avoid the risk (see 5.2), where practicable. Developers should avoid building within flood affected areas of their site (see 5.2).
- Stage 3 – Substitution.** Where flood risk cannot be avoided completely then the consequence of flooding within the development should be managed through substitution. This could include substituting land uses for ones that are less vulnerable to flooding, or orientating the development within the site so that more vulnerable uses are situated in areas that are least likely to flood frequently and/or to a significant depth, in accordance with 5.3.
- Stage 4 – Land raising, flood control/surface water management incorporation.** Where the flood risk cannot be managed completely through development location, land raising, flood control and surface water management infrastructure should be incorporated into the development, including (for example) SuDS, overland flow pathways or flood barriers in accordance with 5.4.
- Stage 5 – Resistant/resilient building techniques.** As a final measure after stages 1 to 4 have been exhausted, the risk of flooding should be mitigated by adopting resistant and/or resilient building techniques to minimize the damage and disruption that is caused by flooding in accordance with 5.5.
- Stage 6 – Safety.** The safety of occupants in the event of flooding should be taken into account in accordance with 5.7 for any residual risks.