

SG LSD 8: Flooding and erosion

We will refuse any new development on land at risk from flooding, including on any functional flood plain, or on land that may be required for long term managed retreat or that is at risk from erosion, unless:

- 1) a hydrological, drainage impact and/or flood risk assessment or geomorphology assessment, which includes an allowance for freeboard and climate change where appropriate, is provided at the applicant's expense, and demonstrates that the risk is neither medium nor high risk as defined by Appendix 2; OR**
- 2) it is for flood or erosion prevention measures; OR**
- 3) it is development that is consistent with the flood storage function of flood plains or would otherwise be unaffected by flooding; OR**
- 4) it would be for essential infrastructure or otherwise inappropriate to locate it elsewhere; OR**
- 5) it is within a built-up area and flood prevention or erosion measures to the appropriate standard will exist at the time the development is occupied.**

In these cases and if development is to be permitted on land at risk from flooding, then, subject to other policies, it must be designed:

- a) to incorporate flood resilient design measures, water resistant materials and construction methods to assist in the evacuation of people and to minimise damage from flooding; AND**
- b) not to impede the ability of any flood plain to store water or flood naturally, nor to reduce the capacity of flood defences or of any other arrangement for flood management; AND**
- c) not to result in a significant increase in the risk or severity of flooding elsewhere through altering flood storage capacity or the pattern of flow of flood waters; AND**
- d) to avoid any water courses being culverted, unless there is no practicable alternative and it will not impede the passage of amphibians or fish species; AND**
- e) to provide for maintenance buffer strips for any water body; AND**
- f) to include land-raising and/or excavations with the proposal, only if:**
 - (i) it is for a flood alleviation measure; and**
 - (ii) it is linked to the provision and maintenance of direct or indirect compensatory flood water storage to replace the lost capacity of the functional flood plain; and**
 - (iii) it will not create a need for flood prevention measures elsewhere; and**

- (iv) it will not create any island or islands of development within the functional flood plain that could become inaccessible during a flood.

Due to the continuing changes in climatic patterns, the precautionary principle will apply when reviewing any application for development in an area at risk from inundation by flood water or erosion.

Reasoned Justification

The aims of this supplementary guidance are to avoid developments likely to increase the risk of flooding or that would be at risk from inundation themselves from fluvial, pluvial or coastal flooding, and to maintain the Council's duty to promote sustainable flood management. It further aims to ensure development is not located on land at risk from landslips or erosion. The Council has responsibilities in relation to the likelihood of flooding, under the *Flood Risk Management (Scotland) Act 2009* and as a responsible authority under the *Water Environment and Water Services (Scotland) 2003 Act*. A definition of the different types of flooding and glossary are provided in Appendix 1.

Coastal areas are at risk from rising sea level and storm surges. New development below the 5m contour above Ordnance Datum mark is considered at high risk from flooding. A flood risk assessment must also be provided for new development proposed on land between the 5m and 10m contours above Ordnance Datum mark. Extensions or alterations are clearly "inappropriately located elsewhere", but must incorporate flood resilience.

Erosion risk includes both physical erosion and processes, such as landslip, that are a result of erosion processes. If an area of potential erosion is made safe, development is not prohibited.

Appendix 2 provides a basis for making planning decisions relating to flood risk. It sets out a risk framework, which divides flood risk into three categories – high, medium and low. Areas with an annual probability of fluvial, pluvial or coastal flooding greater than 0.5% (1:200 years) are considered to be at medium to high flood risk of flooding. These areas are generally not suitable for residential, institutional, commercial or industrial development, or essential civil infrastructure such as hospitals, fire stations, emergency depots etc. Where such infrastructure must be located in these areas or is being substantially extended, it must be capable of remaining operational and accessible during extreme flooding events. New caravanning and camping sites should not be located in high flood risk areas.

The uncertainty of flood prediction makes it essential that developers and planning authorities err on the side of caution in decision-making whenever flooding is an issue. When undertaking a flood risk assessment, freeboard allowance should be added to the design flood level to account for any uncertainty in estimating the probability of flooding. Freeboard allowance gives a margin for safety, which takes account of possible waves or turbulence and climate change.

To help assess development proposals the views of the Scottish Environment Protection Agency (SEPA), the Transport and Infrastructure Flood Prevention Unit and other relevant key agencies will be sought. Where it is believed there

is a significant risk of flooding, additional information such as a flood risk assessment will be sought from the developer. Flooding information provided by a developer (or a consultant employed by a developer) needs to meet standard requirements demonstrating the level of risk posed to life and property. SEPA provide technical guidance on their website to assist with the preparation and reporting of flood risk assessments, and this should be referred to by developers. Due to the potential damage to human life and property, developers must provide additional information as required in relation to flood risk calculations and models. The Council reserves the right to have flood risk information from developers independently assessed, to verify their flood risk conclusions and to seek additional information where clarification is needed.

Development should not take place on land that could otherwise contribute to managing flood risk, for instance through managed coastal realignment, washland creation or as part of a scheme to manage flood risk. Where a sustainable drainage system is proposed, it must be located outwith a functional flood plain.

Adequate provision must be provided for access to water bodies for inspection and maintenance wherever new development is proposed. Therefore, all new development must provide a buffer strip between a water body and the proposed development. New development should also not encroach onto a buffer strip. Buffer strips can help to reduce flooding, assist with fluvial processes, and become part of a habitat network. All buffer strips must be accessible to enable the inspection and maintenance of water bodies and their banks for pollution control and flood prevention purposes. Best practice advice is provided in *Buffer Strips adjacent to Water Courses and Water Bodies*.

Watercourses should not be culverted, as they are frequently the cause of local flooding. Existing culverts should be opened where possible. A culvert may be acceptable as part of a scheme to manage flood risk or where it is used to carry water under a road, path or railway, providing it is designed correctly and is demonstrated to adequately carry the design flow at both its maximum and minimum predicted flow-levels.

Appendix 1 – Types of Flooding and Glossary

Types of Flooding

The following provides a description of flooding types. Further information on flood risk assessments is provided in SEPA's *Technical Flood Risk Guidance for Stakeholders*.

Fluvial – flooding originating from a watercourse either natural or culverted. Normally caused when the river channel capacity (or culvert capacity) is exceeded and water overtops its bank onto the floodplain, which could either be natural floodplain or developed land.

Coastal – flooding originating from the sea (open coast or estuary), where water levels exceed the normal tidal range and flood onto the low-lying areas that define the coast line. This coastal plain could be either natural or developed. Apart from as a result of general rise in sea level, coastal flooding

can occur due to four physical elements (as below) either acting on their own or in combination with each other.

- **Predicted astronomical tide:** expected rise and fall of sea water level due to the gravitational effects of the sun and the moon.
- **Storm surge residual:** elevated sea level caused by the combined effect of low pressure and persistent, strong wind (for every millibar drop in pressure, a 10mm rise in the sea surface elevation occurs).
- **Wave effects:** a function of both wind strength and open water 'fetch' length. As a result of high winds, waves can also be associated with low pressure systems, which cause storm surge effects as described above.
- **Local bathymetric effects:** topographic funnelling due to the forcing of a large volume of open sea water into a restricted coastal embayment, e.g. estuary (Firth of Forth), tidal basin (Montrose Basin) or sea loch (Loch Fyne), which will elevate water levels locally. On a wider scale this effect is also seen in the North Sea as a result of channelling through the English Channel.

Pluvial – urban or rural flooding which results from rainfall-generated overland flow, before the run-off enters any watercourse, drainage system or sewer.

Groundwater – flooding due to a significant rise in the water table, normally as a result of prolonged and heavy rainfall over a sustained period of time (can affect cellars and drainage systems). Normally associated with catchments where porous substrate and/or aquifers exist. This type of flooding can last for a considerable period of time, i.e. weeks or months.

Drainage – flooding as a result of surcharging of man-made drainage systems, including combined sewers, where the capacity of the system to discharge run-off has been exceeded.

Infrastructure failure – flooding due to collapse/failure of man-made infrastructure, including hydro-dams, water supply reservoirs (private or public), canals, flood defence structures, underground conduits (e.g. sewers), and water treatment tanks.

Glossary

Drainage assessment – a statement of the drainage issues relevant to a proposal and the suitable means of providing drainage. The length and detail should be proportionate to the issues. As appropriate it may include existing drainage systems and problems, infiltration, groundwater, surface water flow, foul and storm water disposal, SuDS and drainage related flooding issues. It may also be called a Drainage Impact Assessment. See also PAN 61 paragraphs 23 – 24.

Flood plain – generally flat areas adjacent to a watercourse or the sea, where floodwaters naturally flow and/or are stored during times of flood. The limits of a flood plain are defined by the peak water level of an appropriate return period event.

Flood prevention measures – works including walls, new channels, embankments and flood water storage areas: usually components of a flood prevention scheme.

Flood risk assessment – an assessment carried out to predict and assess the probability of flooding for a particular site or area, and to recommend mitigation measures, including maintenance.

Freeboard allowance – a height added to the predicted level of a flood, to take account of the height of any waves or turbulence and the uncertainty in estimating the probability of flooding.

Functional flood plain – the areas of land where water flows in times of flood, which should be safeguarded from further development because of their function as flood water storage areas.

Sustainable Drainage Systems – also called Sustainable Urban Drainage Systems or SuDS, describes a range of techniques for managing the flow of water run-off from a site, by treating it on site and so reducing the loading on conventional piped drainage systems.

Washland – an alternative term for the functional flood plain, which carries the connotation that it floods very frequently.

Watercourse – all means of conveying water except a water main.

Water table – the level of ground-water, below which the ground is saturated.

Appendix 2: Flood Risk Framework

The prime consideration in any proposed development must be risk to the health and safety of the residents and the public. Where rivers are “flashy”, floodwaters can rise very quickly, without warning, leaving little time for evacuation. The velocity of the floodwater can wash away vehicles and buildings, and cause fatalities. Sometimes, however, there may be compelling commercial or practical reasons for siting certain types of development in a relatively hazardous area.

The following risk framework, which is taken from Part 3 of the *Scottish Planning Policy* (SPP), is intended to provide guidance in proportion with the flood risk at each proposed site, and the nature of each proposed development. It should be read in conjunction with the whole policy and within the context of SPP Part 3. The annual probabilities of flooding referred to below relate to the land at the time a planning application is made.

Category One – Little or no risk areas

Annual probability of watercourse, tidal or coastal flooding is less than 0.1% (1:1000).

- No constraints due to watercourse, tidal or coastal flooding.

Category Two – Low to medium risk areas

Annual probability of watercourse, tidal or coastal flooding is in the range of 0.1% - 0.5% (1:1000 – 1:200).

- It will not usually be necessary to consider flood risk unless local conditions indicate otherwise. These areas will be suitable for most development. A flood risk assessment may be required at the upper end of the probability range (i.e. close to 0.5%) or where the nature of the development or local circumstances indicate heightened seriousness of the risk (as opposed to the probability of the risk).
- Water resistant materials and construction may be required depending on the flood risk assessment.
- Subject to operational requirements, including response times, these areas are generally not suitable for essential civil infrastructure such as hospitals, fire stations, emergency depots etc. Where such infrastructure must be located in these areas or is being substantially extended, it must be capable of remaining operational and accessible during extreme flooding events.

Category Three – Medium to high risk areas

Annual probability of watercourse, tidal or coastal flooding is greater than 0.5% (1:200).

- Generally not suitable for essential civil infrastructure such as hospitals, fire stations, emergency control centres, schools, electricity supplies, telephone exchanges, mobile telephone or broadcasting transmitters, where facilities must continue to function in times of flooding.
- The policy for development on functional flood plains applies.
- Land raising is only acceptable in exceptional circumstances.
- Within settlements:
 - i) Medium to high risk areas may be suitable for residential, institutional, commercial or industrial development, provided flood prevention measures to the appropriate standard already exist, are under construction or are planned as part of a long term development strategy.
 - ii) Water resistant materials and construction should be used where appropriate.
- Outwith settlements:
 - i) Medium to high risk areas are generally not suitable for additional development, including residential, institutional, commercial and industrial development.
 - ii) Development may be allowed in exceptional circumstances, if a location is essential for operational reasons, e.g. for navigation and water based recreation uses, agriculture, transport or some utilities infrastructure, and an alternative lower risk location is not achievable.

Such infrastructure should be designed and constructed to remain operational during floods.

- iii) It may be suitable for some recreation, sport, amenity and nature conservation uses, provided adequate evacuation procedures are in place.
- iv) In exceptional circumstances, job-related accommodation (e.g. for caretakers and operational staff) may be acceptable, if it is associated with development listed in ii) or iii) above.
- v) New caravan and camping sites should not be located in these areas.
- vi) If built development is permitted, measures to manage flood risk are likely to be required and the loss of flood storage capacity must be minimised. Water resistant materials and construction should be used where appropriate.