

# FLOOD RISK

---

1. [The Flood Risk Management \(Scotland\) Act 2009](#) (FRM Act) introduced a more co-ordinated and sustainable approach to flood risk management. The Act establishes a framework for the assessment and sustainable management of flood risk with the aim of reducing the adverse consequences of flooding from all sources. The FRM Act places a general duty on Scottish Ministers, SEPA and responsible authorities (including local and national park authorities) to exercise their flood risk related functions with a view to reducing overall flood risk.

## Sources of flood risk

2. [Scottish Planning Policy \(SPP\)](#) states that planning authorities should have regard to the probability of flooding from all sources. Sources of flood risk include:

### Watercourse (Fluvial Flooding)

3. The principal cause of watercourse flooding is excessive rainfall (or snow melt) within a limited period, which overwhelms the capacity of the watercourse, particularly when the ground is already saturated. It can also arise as a result of the blockage of a watercourse and/or associated structures such as small bridges and culverts.

### Pluvial Flooding

4. Flooding occurs when rainwater ponds or flows over the ground (overland flow) before it enters a natural or man-made drainage systems (e.g. a river or sewer/drain). It can also occur when drainage systems are at full capacity. It is often combined with sewer flooding and groundwater flooding.

### Sewer Flooding

5. Sewer flooding occurs when the sewerage infrastructure has to deal with loads beyond its design capacity. This occurs most often as a result of high intensity rainfall events.

### Groundwater

6. Groundwater flooding occurs when the water table rises above ground level. In Scotland this is most commonly associated with the movement of water through sands and gravels, often connected to the rise and fall of river levels.

### Coastal

7. Coastal flooding is largely due to combinations of high tide, storm surge and wave activity raising the level of the sea above adjoining land.

## Understanding flooding

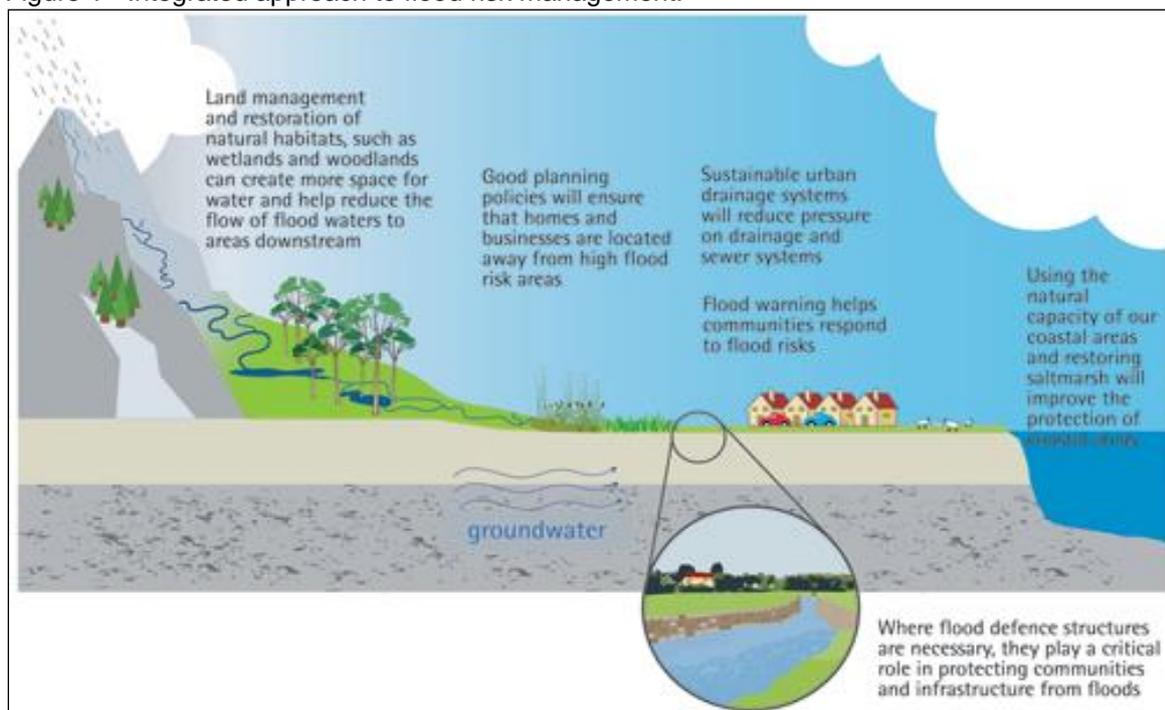
8. The impacts of flooding vary at different locations. Flooding in a densely populated area presents a greater threat to life and property than flooding of agricultural land.

9. The characteristics and nature of a flood will also determine its impact. Rapid flows from flash flooding, for example, pose a greater risk to life than a steady rise in water level.

10. A good understanding of the sources and impacts of flooding, and the links between them, can help identify the right combination of actions to tackle particular flooding challenges. For example, where high rates of run-off in rural upland areas are contributing to flooding problems, measures to store or slow run-off, such as tree planting or storage ponds, may offer some benefit. In urban areas, an understanding of sources and pathways of flooding can help identify appropriate Sustainable Drainage Systems (SUDS) and influence the layout and design of new developments. An understanding of flooding can also help to identify, retain and protect any important man made or natural features which help reduce the impact of flooding.

11. Flood risk management measures can be most effective when they are coordinated across catchments. The approach to flood management should, where appropriate, extend across administrative boundaries and in a way which understands the relationships between water and flood risk at a catchment scale. An integrated approach to flood risk management, across catchments, is important, allowing for a combination of structural and non-structural approaches and mechanisms to address flooding (see Figure 1 below).

Figure 1 - Integrated approach to flood risk management.



Source: [Introducing a new approach to flood risk management.](#)

## **Avoidance of Flood Risk/Flood Risk Framework**

12. The Scottish Planning Policy (SPP) promotes a precautionary approach to flood risk. The planning system should prevent development which would have a significant probability of being affected by flooding or would increase the probability of flooding elsewhere.

13. The avoidance of flood risk, by not locating development in areas at risk of flooding, is recognised as a key part of delivering sustainable flood risk management. This is stressed in the SPP which states that the planning system should safeguard flood storage and conveyance capacity and locate development away from functional flood plains and medium to high flood risk areas.

14. The undeveloped functional flood plain provides an important flood management role by storing and conveying water during a flood and should be protected from future development. The functional flood plain generally has a greater than 0.5% probability of flooding in any given year, also expressed as a ratio of 1:200 years.

15. The SPP sets out a flood risk framework to guide development. This establishes three categories of coastal and watercourse flood risk (little or no risk; low to medium risk; and medium to high risk) and the appropriate planning approach within each category. It sets out the types of development that may or may not be acceptable depending on the level of flood risk.

16. The flood risk framework also refers to surface water flooding. Infrastructure and buildings should generally be designed to be free from surface water flooding in rainfall events where the annual probability of occurrence is greater than 0.5% (1:200 years). Planning authorities should liaise with their flood prevention team if surface water flood risk may be an issue in relation to development. Surface water hazard maps (published by SEPA in 2014 as part of their [flood maps](#) for Scotland) may provide a useful tool for planning authorities in their technical assessment of surface water flood risk and potential management solutions.

17. The flood risk framework should be read in conjunction with SEPA's [Land use vulnerability guidance](#) to aid decision making. The guidance is particularly relevant where changes of use are being proposed.

### **Development in areas of flood risk**

18. Avoidance of flood risk may not however be practicable and possible in all cases. Development in established built up areas, historical centres and regeneration areas may already be in areas at risk of flooding. The locational requirements of essential infrastructure such as roads, electricity generating stations or sewage treatment works may necessitate development in flood risk areas. The SPP states that where built development is permitted in medium to high flood risk areas, measures to protect against or manage flood risk will be required. In addition, any loss of flood storage capacity should be mitigated to achieve a neutral or better outcome. In such cases planning authorities may need to determine whether flood reduction (measures to reduce the volume and velocity of flooding), protection (e.g.

structural flood protection schemes) and resilience measures (e.g. use of flood resistant materials and construction techniques) can help to mitigate any flooding impact on development and adjacent land uses.

### **Site specific considerations**

19. The flood risk framework provides a basis for decision making relating to flood risk. The SPP notes that the calculated probability of flooding is one of a number of considerations in assessing proposals and that the following points should also be taken into account:

- the characteristics of the site;
- the design and use of the proposed development;
- the size of the area likely to flood;
- depth of flood water, likely flow rate and path, and rate of rise and duration;
- the vulnerability and risk of wave action for coastal sites;
- committed and existing flood protection methods: extent, standard and maintenance regime;
- the effects of climate change, including an allowance for freeboard;
- surface water run-off from adjoining land;
- culverted watercourses, drains and field drainage;
- cumulative effects, especially the loss of storage capacity;
- cross-boundary effects and the need for consultation with adjacent authorities;
- effects of flood on access including by emergency services; and
- effects of flood on proposed open spaces including gardens.

20. These considerations can be examined in more detail as part of a Flood Risk Assessment (see below) to supplement evidence as to whether a proposed development meets the requirements of SPP as set out in the flood risk framework.

21. On flood protection, it is important to note that protection schemes can reduce flood risk but they cannot eliminate it entirely. The level of protection offered by a scheme will depend upon factors such as the design standard, the design life and the maintenance regime. Redevelopment in built up areas behind flood defences provides an opportunity to reduce overall flood risk by considering a reduction in the vulnerability of the development use, numbers of properties and more resilient design and construction.

22. Planning authorities should consider flood risk as part of their wider assessment of the effectiveness of development sites. This is particularly relevant for housing sites.

### **Flood Risk Management Plans**

23. A key part of the FRM Act approach to managing flood risk is the preparation and implementation of flood risk management plans. These comprise Flood Risk Management Strategies and Local Flood Risk Management Plans. These plans aim to enhance our understanding, raise awareness and help deliver coordinated action and decision making to reduce flood risk. The first cycle of plans will run from 2015

to 2021 with plans being reviewed and updated every six years. Land use planning will have a pivotal role to play in the implementation of the plans.

24. Flood risk management plans are underpinned by the National Flood Risk Assessment.

- [National Flood Risk Assessment](#) (published December 2011) – a high-level assessment used to identify [Potentially Vulnerable Areas](#) where further studies, investment and actions may be required. The assessment identified 14 geographical areas known as [Local Plan Districts](#) for which Flood Risk Management Strategies and Local Flood Risk Management Plans will be prepared.
- **Flood Risk Management Strategies** (to be published by December 2015) - a total of 14 strategies will be produced, for each of the local plan districts. The strategies will identify the main flood hazards and impacts, set out objectives for reducing flood risk and identify the most sustainable combination of actions. These will include actions relating to land use planning. They are being prepared by SEPA in consultation with Scottish Water and local authorities. Together these 14 strategies will constitute a national flood risk management plan for Scotland.
- **Local Flood Risk Management Plans** (to be published June 2016) - a total of 14 plans will be prepared to complement the Flood Risk Management Strategies. The plans will coordinate the strategies into integrated actions to reduce the impacts of flooding. They will also include specific actions on surface water management. They will be prepared by lead local authorities in consultation with SEPA, Scottish Water, and local advisory groups. Local advisory groups will include local authority staff and stakeholders with an interest or responsibility for flooding issues. This is likely to include planning representatives.
- **Surface Water Management Plans** will be used to identify measures to reduce surface water flooding. The need for surface water management plans will be identified in Flood Risk Management Strategies and Local Flood Risk Management Plans. Where required, they will be prepared by local authorities in consultation with SEPA, Scottish Water, and local advisory groups. More information on the preparation of these plans is contained within [Surface Water Management Planning Guidance](#).

25. The Town and Country Planning (Development Planning) (Scotland) Regulations 2008 (as amended) require that when preparing strategic development plans and local development plans, planning authorities must have regard to any approved flood risk management strategy or finalised local flood risk management plan relating to the strategic development plan and local development plan area.

26. More information on Flood Risk Management Plans is available in the publication [Flood Risk Management Planning in Scotland: Arrangements for 2012-2016](#).

## SEPA Flood Maps

27. SEPA published new [flood maps](#) for Scotland on 15 January 2014. These replace SEPA's Indicative River and Coastal Flood Map for Scotland. Publication of the maps will support the development of flood risk management plans. SEPA's web map viewer indicates flood extents, depths and velocities for individual sources of flooding (fluvial, coastal and surface water) for high, medium and low probabilities. Information is also provided on groundwater, flood defences, the impacts of flooding and natural flood management measures. SEPA has provided a 'planning sub-folder' of the map to planning authorities which provides information on the 1:200 year, 1:1000 year and historical flood extent information. Planning authorities should use this information to screen proposed developments for fluvial and coastal flood risk, and assess the need to consult with SEPA. The surface water maps should be used as a trigger to consult local authority flood prevention teams. Flood map information should also be used in the preparation of development plans to identify areas at flood risk and to protect areas with potential for natural flood management.

28. SEPA's flood maps are indicative and do not cover all potential flood risks. There may be smaller scale and more localised flood risks, which can have significant consequences locally, which are not covered by SEPA's maps. Where available, other relevant information should be considered to help ascertain the extent and impact of flooding from any source. Planning authorities can use Appendix 1 of SEPA's [Technical flood risk guidance for stakeholders](#) which contains details on further sources of flooding information. Planning authorities should also consult with local authority flood prevention colleagues.

## Strategic Flood Risk Assessment (SFRA)

29. Strategic Flood Risk Assessment is designed to inform the development planning process, primarily by showing areas of flood hazard. SFRA will provide a strategic overview of flood risk in development plan areas, informed by the collection, analysis and presentation of all existing available and readily derivable information on flood risk from all sources. As noted in the SPP an SFRA should be used to assess flood risk when identifying land for development. SFRA can also assist with the development of policies for flood risk management, including surface water management.

30. Planning authorities should prepare an SFRA in consultation with SEPA and other stakeholders to achieve co-ownership of the assessment. SFRA may also usefully inform flood risk considerations beyond the development plan process.

31. In order to support planning authorities in undertaking SFRA for development plans SEPA have prepared [Strategic Flood Risk Assessment Guidance](#).

## Flood Risk Assessment (FRA)

32. A Flood Risk Assessment is supplied in support of an application for development. The purpose of an FRA is to investigate the likely probability of flooding at a specific site and to assess the likely risk to the proposed development and to adjacent people and property. An FRA will assess factors such as the source

and type of potential flood, flood depths, extent, speeds, flow pathways across a site, and details of structures which may influence site hydraulics. It will also detail flood mitigation options. The applicant is expected to provide an FRA, prepared by technical consultants with the required competency.

33. The scale, nature and location of a proposed development will help to inform the requirement for and the scope of an FRA. FRA should be required for development in the medium to high risk category of flood risk (1:200 years), and may be required in the low to medium category at the upper end of the probability range (i.e. close to 0.5%). It should also be required for essential infrastructure and the most vulnerable uses or where other factors indicate heightened risk. Figure 2 below outlines considerations relevant to the requirement for FRA.

34. SEPA have a role in assessing FRAs as part of their assessment of planning applications that they are consulted on. SEPA have produced [Technical flood risk guidance for stakeholders](#) on preparing Flood Risk Assessment which should be used to guide the development of FRAs.

## **Multiple benefits**

35. Flood risk management can involve engineering and infrastructure works that can provide an opportunity to contribute to placemaking, a principal policy of the SPP. In addition to flood risk management, flooding infrastructure can contribute to green networks and biodiversity enhancement, access and recreation provision, public realm and streetscape improvements and economic investment. Where feasible, development planning and development management should be used to realise these opportunities to deliver wider benefits from flood risk management.

## **Planning advice**

36. The planning system has a key role to play in delivering sustainable flood risk management through both development planning and development management.

## **Development Planning**

37. The following points should be considered in the preparation of strategic and local development plans. They will be relevant to a greater or lesser degree depending on the stage of development plan preparation:

- Understand and identify flood risk from all sources at the earliest opportunity.
- Strategic Flood Risk Assessment should be carried out to inform preparation of the development plan.
- Develop policies setting out the planning authority's approach to flood risk based on the principle of flood avoidance in accordance with the Flood Risk Framework set out in the SPP.
- Indicate the functional flood plain and any other relevant flooding constraints on the proposals map/spatial framework.

- Where relevant to the development strategy, flood protection and reduction measures and opportunities, including natural flood management and coastal realignment, should be indicated in the development plan and protected and promoted as appropriate.
- Natural and man-made features which help reduce the impact of flooding or flood risk should be identified and appropriately protected from development.
- Ensure any assessment of the effectiveness of sites, especially housing sites, takes flood risk into account. Sites that have previously been allocated for development may need to be reassessed where flood risk has not previously been a consideration or where new information on flood risk has become available since allocation.
- Take forward opportunities to deliver multiple benefits through flood risk management approaches. There may be scope to complement other relevant policy areas in the development plan and to contribute to wider placemaking.
- Set criteria against which the need for FRA will be assessed.
- Consider the inclusion of policy highlighting opportunities to reduce flood risk through redevelopment (including change of use) in flood risk areas.
- Promote flood resilience through the design and construction of buildings, as appropriate.

38. SEPA's flood maps, SFRA and flood risk management plans (i.e. Flood Risk Management Strategies and Local Flood Risk Management Plans) should be used to inform all of the above.

39. Development plans should support the delivery of actions in the flood risk management plans for their area.

40. Consultation should be undertaken with relevant local authority departments, SEPA, Scottish Water, developers, the public and communities to establish flooding constraint issues and opportunities at an early stage in the development planning process.

41. Cross boundary working is important to address whole water catchments and flood plains that cross boundaries. This should reflect the catchment scale approach in flood risk management plans and enable planning authorities to work together to plan for and take an integrated approach to flood risk.

42. Planning officers should seek to be involved in local flood risk management planning advisory groups. Dialogue and relationship building will be important to ensure that the two planning regimes are coordinated.

## **Development Management**

43. The following points should be taken into account as part of the development management process:

- Establish whether the development site is susceptible to flooding, from all sources, and whether development of the site would lead to an increase in flood risk elsewhere.

- Consider proposals within the context of the Flood Risk Framework, location and site specific circumstances, the characteristics and nature of any flood risk and the type and design of development proposed.
- Applications that may lead to an increase in flood risk on or off site should be supported, as appropriate, by a Flood Risk Assessment (see diagram 2 below) in accordance with SEPA's [Technical flood risk guidance for stakeholders](#).
- Where development is allowed in a flood risk area measures to protect against or manage flood risk and loss of storage capacity should be agreed.
- For redevelopment and change of use proposals in areas at flood risk, consider options to reduce flood risk vulnerability through e.g. design, type and use of development or number of buildings.
- Consider the impacts of climate change during the lifetime of the development and whether the development needs to be designed to be adaptable to climate change, e.g. to potentially rising levels of flood waters.

44. Pre-application discussions can provide applicants with an early indication of whether development on a particular site is likely to increase flood risk on or off-site. Where flood risk is identified, discussions can help ensure that all parties have a shared understanding of the nature of the proposed development, the flood risk posed, the need for FRA and potential mitigation options that may be relevant.

45. Local authority departments should work together to address flood risk. Planners, flooding and drainage officers, environmental, building control, roads and access officers should communicate on how best to approach and manage flood risk. Internal local authority working groups on flood risk may provide a useful mechanism to support cross-departmental working. Where still active Flood Liaison and Advisory Groups may provide such a mechanism or can provide advice.

46. The passage and management of surface water across a development site should be an integral component of site design. This should be considered from the outset of a development proposal, including consideration of SUDS requirements, to minimise impacts and maximise opportunities such as delivering high quality places and green infrastructure.

## **Planning Authority Consultation with SEPA**

47. Schedule 5 Section 1.(1) of The Town and Country Planning (Development Management Procedure) (Scotland) Regulations 2008 (the Development Management Regulations) requires that planning authorities must, before determining an application for planning permission, consult with SEPA where the development is likely to result in a material increase in the number of buildings at risk of being damaged by flooding.

48. [SEPA - Planning Authority protocol \(Policy 41\)](#) contains principles to be followed by SEPA and planning authorities regarding advice and consultation on flood risk issues. The protocol requires planning authorities to screen development proposals for flood risk before they consult with SEPA. In addition SEPA have produced [Standing advice on Development Management Consultations](#) for certain types of development where the flood risk is less significant. SEPA do not require to

be consulted on these types of development. Where a proposal is not covered by SEPAs standing advice and poses a flood risk SEPA should be consulted in accordance with the Development Management Regulations.

49. Consultation with SEPA should be supported by adequate information on flood risk. This will usually be in the form of a Flood Risk Assessment.

50. A range of information can be used by planning authorities to screen applications for flood risk. In addition to the planning subfolder of SEPA's flood maps, SFRA and flood risk management plans, planning authorities can refer to Appendix 1 of SEPA's [Technical flood risk guidance for stakeholders](#) which contains details of potential further sources of flood risk information. An important source of information can be the local authority flood prevention officer who often hold considerable local knowledge of flooding issues within their area.

51. Planning authorities should not use the surface water hazard filter on SEPA's flood maps as a basis for routine consultation with SEPA. Instead they should ensure that appropriate assessment of surface water flood risk is carried out in consultation with their flood prevention team. Consultation with Scottish Water may also be necessary to clarify surface water drainage and flooding constraints from the sewerage system.

52. [Circular 3/2009 Notification of Planning Applications](#) sets out the circumstances in which proposals should be notified to Ministers where SEPA has advised against the granting of planning permission or has recommended conditions which the planning authority does not propose to attach to the planning permission. The Circular is clear that it is only notified applications where there is a national interest that Ministers would consider call in.

Figure 2 – Consideration of Flood Risk Assessment requirement in relation to fluvial and coastal flood risk.

