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Guidance

How to prepare a strategic flood risk assessment

What information local planning authorities need to include in a strategic flood risk assessment.

From:

[Environment Agency \(/government/organisations/environment-agency\)](https://www.gov.uk/government/organisations/environment-agency)

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Applies to England

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Local planning authorities should carry out a strategic flood risk assessment (SFRA) for their area. You should use this guide and the [good practice examples \(https://www.adeptnet.org.uk/system/files/documents/FRS18204%20SFRA%20Good%20Practice%20Guide_Final_Nov2021.pdf\)](https://www.adeptnet.org.uk/system/files/documents/FRS18204%20SFRA%20Good%20Practice%20Guide_Final_Nov2021.pdf) to help you do this.

The SFRA will help various parties consider flood risk when making planning decisions about the design and location of any:

- development
- flood risk management features and structures

In your SFRA, you should assess the:

- risk from all sources of flooding
- cumulative impact that development or changing land use would have on the risk of flooding
- effect of climate change on risk

Your SFRA should identify:

- opportunities to reduce the causes and impacts of flooding
- any land likely to be needed for flood risk management features and structures

How the SFRA helps your local planning authority

Your SFRA will help your planning authority make decisions about:

- your [local plan \(https://www.gov.uk/guidance/plan-making\)](https://www.gov.uk/guidance/plan-making) or spatial development strategy
- individual planning applications
- how to adapt to climate change
- future flood and coastal risk management
- emergency planning (the resources needed to make development safe)
- site masterplans and local design guidance or codes
- infrastructure planning
- [community infrastructure levy \(https://www.gov.uk/guidance/community-infrastructure-levy\)](https://www.gov.uk/guidance/community-infrastructure-levy) and [planning obligations \(https://www.gov.uk/guidance/planning-obligations\)](https://www.gov.uk/guidance/planning-obligations)

You also need it to help you:

- carry out the [sequential test for the local plan \(https://www.gov.uk/guidance/flood-risk-and-coastal-change#Sequential-Test-to-Local-Plan\)](https://www.gov.uk/guidance/flood-risk-and-coastal-change#Sequential-Test-to-Local-Plan) or spatial development strategy
- carry out the [sequential test for individual planning applications \(https://www.gov.uk/guidance/flood-risk-and-coastal-change#Sequential-Test-to-](https://www.gov.uk/guidance/flood-risk-and-coastal-change#Sequential-Test-to-)

[individual-planning-applications](#))

- do the [exception test for the local plan](https://www.gov.uk/guidance/flood-risk-and-coastal-change#Exception-Test-to-Local-Plans) (<https://www.gov.uk/guidance/flood-risk-and-coastal-change#Exception-Test-to-Local-Plans>), when you're proposing to allocate land for development in flood risk areas
- establish if a development can be made safe without increasing flood risk elsewhere
- decide when a flood risk assessment will be needed for individual planning applications
- identify if proposed development is in functional floodplain
- identify and safeguard from development, land likely to be needed for future flood risk management features and structures
- do the sustainability appraisal of the local plan or spatial development strategy

How others will use your SFRA

Your SFRA will be used by:

- the Environment Agency
- developers
- flood risk consultants
- emergency planners and the emergency services
- local resilience forums
- lead local flood authorities
- [risk management authorities](https://www.gov.uk/government/collections/flood-and-coastal-erosion-risk-management-authorities) (<https://www.gov.uk/government/collections/flood-and-coastal-erosion-risk-management-authorities>)
- neighbourhood planning bodies
- other departments within your council
- other local planning authorities
- combined authorities, where relevant

The Environment Agency uses your SFRA to inform their advice to you about the local plan or spatial development strategy.

Developers and flood risk consultants will use your SFRA:

- to inform their site-specific flood risk assessments
- as evidence to support the sequential and exception tests for individual applications
- to find suggestions of how development could help to reduce the causes and impacts of flooding

Emergency planners, the emergency services and local resilience forums will use your SFRA to:

- understand the risk of flooding to existing and proposed communities, so they can plan for emergencies
- advise on the impact of any proposed development on emergency planning, including any extra resources that may be needed
- advise on measures which should be included in development to avoid or minimise further impacts on emergency planning

Risk management authorities will use your SFRA to:

- inform their assessment and management of sources of flood risk they're responsible for
- identify opportunities where development may help to reduce the causes and impacts of sources of flood risk they're responsible for

Other departments within your council will use your SFRA to inform their work on, for example:

- highways
- transport
- public health
- urban design
- economic growth
- infrastructure planning
- local nature recovery strategies
- GIS and data management

Neighbourhood planning bodies will use your SFRA when considering whether neighbourhood planning areas may be appropriate for development.

Other local planning authorities will use your SFRA to inform their SFRAs, particularly in relation to cross-border risks and opportunities.

Minerals and waste planning authorities will use your SFRA to inform their minerals and waste local plans. Combined authorities will use your SFRA to inform spatial development strategies. They may need to prepare additional flood risk information, depending on what is included in their plans.

When to review or update your SFRA

Check your existing SFRA is up to date early in the process of producing your local plan or spatial development strategy. You'll need an up-to-date SFRA to make policies and decisions about the type and location of development.

You may need to either:

- update your existing SFRA
- create a new SFRA, if your existing document is very out of date

You may also need to review your SFRA when there are changes to:

- the [predicted impacts of climate change on flood risk](https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances) (<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>)
- detailed flood modelling from the Environment Agency or your lead local flood authority
- your local plan, spatial development strategy or relevant local development documents
- local flood management schemes
- flood risk management plans
- shoreline management plans
- local flood risk management strategies
- national planning policy or guidance

You should review your SFRA after a significant flood event.

Governance arrangements for preparing your SFRA

You should set up appropriate governance arrangements at an early stage to cover SFRA:

- scoping
- consultation and engagement
- production
- adoption
- implementation
- monitoring
- reviews and updates
- ongoing data and GIS management

It may be appropriate to use the same governance as the local plan or spatial development strategy.

You should assign a single point of contact for preparing your SFRA. This individual would benefit from having relevant skills and experience in flood risk management.

Consider creating a steering group to guide the SFRA preparation. It should consist of relevant experts from a range of different organisations and council departments.

Producing a SFRA with other local planning authorities

Working jointly with other local planning authorities to produce an SFRA might help you find better ways to deal with the causes and impacts of flooding.

A joint SFRA could save money, improve consistency and speed up decision making, particularly when one or more of the following applies:

- you're producing a joint local plan or spatial development strategy
- you're part of a combined authority
- the minerals and waste planning authority is also preparing a minerals and waste local plan
- flood risk is a shared priority
- the causes of flood risk in your area lie elsewhere
- the best solutions to addressing the risk lie elsewhere
- land use and development in your area affects flood risk elsewhere
- you share a river catchment or coastal area
- strategic documents, such as flood risk management plans, identify catchment-wide solutions

Who to consult when producing your SFRA

You need to consult certain organisations to help complete your SFRA. You should consult early and widely. Maximise opportunities to engage with consultees by joining with other planned engagement.

Early stages (scoping phase)

You should carry out a consultation on the scope of your SFRA before commissioning any work on the document itself. At this early stage, the main organisations to consult are:

- the Environment Agency
- your lead local flood authority

They should:

- comment on the proposed scope of your SFRA
- advise on the availability of any relevant data and information and whether you need data sharing agreements
- highlight relevant information in other strategic flood risk documents that may be useful to you in preparing your SFRA
- help you identify if you'll need to commission any further modelling work - it's useful to establish this early, as modelling work could add costs and time to your SFRA

Contact the Environment Agency

<https://www.gov.uk/government/organisations/environment-agency#org-contacts>) to

discuss your needs. They can provide initial advice on your SFRA for free, but will need to charge for detailed advice.

You should also consult with other departments within your council to make sure the scope of your SFRA will help inform other work areas. Other departments may also be able to provide useful data, support or alternative sources of funding for your SFRA.

Depending on the sources of flooding in your area, it may also be appropriate to consult with other organisations. They may be able to provide helpful advice, information or support such as:

- internal drainage board, if relevant
- coastal protection authority, if relevant
- water and sewerage companies

As work on your SFRA progresses

You should continue to consult with the Environment Agency and your lead local flood authority. In addition, you should now also consult with:

- emergency planners
- emergency services
- water and sewerage companies
- reservoir owners or undertakers, if relevant
- internal drainage boards, if relevant
- coastal groups, if relevant
- the coast protection authority, if relevant
- the Canal and River Trust, if relevant
- [catchment partnerships \(https://catchmentbasedapproach.org/\)](https://catchmentbasedapproach.org/), if relevant
- highways authorities
- district councils
- regional flood and coastal committees
- [local flood action groups \(https://nationalfloodforum.org.uk/working-together/communities/what-is-a-flood-action-group/\)](https://nationalfloodforum.org.uk/working-together/communities/what-is-a-flood-action-group/), if relevant

Ask those you're consulting with to:

- share relevant data and information
- highlight opportunities to reduce the causes and impacts of flooding
- comment on drafts of your SFRA
- endorse the final document - this will reduce the risk of issues being raised later during the public examination of the local plan

When your SFRA is complete

You should share your completed SFRA with those you consulted during its preparation.

You should include relevant flood risk information on the mapping systems you use to check and administer planning applications. This should include:

- functional floodplain
- areas where a flood risk assessment will be required
- maps to inform the sequential test
- areas likely to be needed for future flood risk management features and structures

You may also wish to:

- issue a press release
- advertise your SFRA on the front page of the council's website and make sure it can be found easily
- promote your SFRA on social media
- send email circulars to your networks of local developers and consultants
- run a launch event to promote your SFRA to both internal and external users

Which level of SFRA to produce

All local planning authorities need to produce a level 1 SFRA.

You may also need to produce a level 2 SFRA depending on whether your local authority has plans for development in flood risk areas.

How to work out if you need a level 2 SFRA

Your level 1 SFRA needs to include enough detail so you can identify all flood risk areas. Flood risk areas should:

- be based on all sources of flooding
- take climate change into account
- not consider flood risk management features and structures unless they might increase the extent of flooding

You may then need to carry out a level 2 SFRA if either:

- you cannot allocate all land for development outside flood risk areas
- you can allocate all land for development outside flood risk areas, but believe you may get high numbers of applications in flood risk areas on sites not identified in the local plan

Your level 2 SFRA should give more detail on the nature of the flood risks you've identified.

If you're still not sure whether you need to prepare a level 2 SFRA, [contact the Environment Agency \(https://www.gov.uk/government/organisations/environment-agency#org-contacts\)](https://www.gov.uk/government/organisations/environment-agency#org-contacts) and your lead local flood authority for advice.

Level 1 SFRA: geographical area to cover

Your level 1 SFRA should cover flood risks for the area covered by:

- your local planning authority
- any other planning authorities who you are jointly producing a SFRA with

You should also consider flood risks to and from surrounding areas by referring to strategic documents such as:

- flood risk management plans
- other local authorities' SFRAs

Level 1 SFRA: what to include

Your level 1 SFRA should be published online and include:

- maps
- a supporting report
- user guidance

Include online maps showing all sources of flood risk that affect your area, or could in the future.

Your maps should be:

- available in GIS format, with a summary layer plus more layers for technical details
- in a high enough resolution to let the user pan and zoom to site scale (if this is appropriate for the information being shown)
- labelled, showing any relevant features such as flood embankments and pumps
- clear about what each map shows - including magnitude of event, source of risk, mechanism of flooding, defence assumptions and climate change allowances
- referenced – give sources for the information shown on each map, for example, a particular modelling study

You could combine several sources of information onto fewer maps, if it would make your SFRA easier to use.

For example, you could produce a single map which works for both:

- applying the sequential test
- identifying the need for a site-specific flood risk assessment

You may need to commission a flood consultant to create these maps for you.

Your level 1 SFRA should also include a supporting report with information on:

- the sources of flood risk

- areas of flood zone 1 where the sequential test and flood risk assessments will be needed
- flood management and defences
- land that is likely to be needed for flood risk management features and structures
- reservoir risk
- the cumulative impacts of development and land-use change
- expected effects of climate change
- functional floodplain
- opportunities to reduce the causes and impacts of flooding
- recommendations on how to address flood risk in development

Make sure you can update the maps and report separately so that it's easy to keep your SFRA accurate.

Your SFRA should also have a user guidance section, explaining how to use the SFRA. Include guidance on which maps and sections users should refer to for certain tasks.

You should include a method to rank flood risk. This ranking will inform how to apply the sequential test to plans and planning applications. You should discuss and agree the method with the Environment Agency. Factors to consider when creating your ranking method could include the:

- likelihood of flooding, for example, is it a functional floodplain
- extent of flooding, for example, whether the whole site is affected or just a small part of a site
- severity of flooding, for example, flood hazard, depth and duration
- impacts of climate change on flood risk throughout the lifetime of the development
- source of flood risk and whether sites are at risk from multiple sources of flooding
- residual flood risk from flood risk management structures and features

Your SFRA could also include guidance on suitable 'areas of search' for applying the sequential test to common development types. 'Areas of search' are places to look for alternative, lower risk sites. Doing this will help to improve the rigor and consistency of the sequential test. It will also provide more certainty for developers.

Mapped flood risk from all sources

Your maps should show risk of flooding from:

- rivers, sea and estuaries - use the [flood map for planning \(https://flood-map-for-planning.service.gov.uk/\)](https://flood-map-for-planning.service.gov.uk/) and detailed flood modelling

- surface water - use the Environment Agency's [long term flood risk maps](https://www.gov.uk/check-long-term-flood-risk) (<https://www.gov.uk/check-long-term-flood-risk>) and other detailed surface water flood risk modelling
- reservoirs - use the Environment Agency's [long term flood risk maps](https://www.gov.uk/check-long-term-flood-risk) (<https://www.gov.uk/check-long-term-flood-risk>), which show the credible worst case from a dam failure, to inform your assessment - but do not use it in isolation
- groundwater - use the [British Geological Survey groundwater flooding data](https://www.bgs.ac.uk/products/hydrogeology/groundwaterFlooding.html) (<https://www.bgs.ac.uk/products/hydrogeology/groundwaterFlooding.html>), [groundwater: current status and flood risk](https://www.gov.uk/government/collections/groundwater-current-status-and-flood-risk) (<https://www.gov.uk/government/collections/groundwater-current-status-and-flood-risk>), and the guide on [mining and groundwater constraints for development](https://www.gov.uk/guidance/mining-and-groundwater-constraints-for-development) (<https://www.gov.uk/guidance/mining-and-groundwater-constraints-for-development>)
- coastal erosion - use [coastal erosion data](https://data.gov.uk/search?q=National+coastal+erosion+risk+mapping&filters%5Bpublisher%5D=Environment+Agency&filters%5Btopic%5D=Environment&filters%5Bformat%5D=&sort=best) (<https://data.gov.uk/search?q=National+coastal+erosion+risk+mapping&filters%5Bpublisher%5D=Environment+Agency&filters%5Btopic%5D=Environment&filters%5Bformat%5D=&sort=best>) from data.gov and relevant [shoreline management plans](https://www.gov.uk/government/publications/shoreline-management-plans-smpls) (<https://www.gov.uk/government/publications/shoreline-management-plans-smpls>) to assess whether coastal erosion is likely to affect the nature and extent of flooding
- [areas with critical drainage problems](https://data.gov.uk/dataset/d10fb8e5-f3af-48c1-a489-8c975b0165de/areas-with-critical-drainage-problems) (<https://data.gov.uk/dataset/d10fb8e5-f3af-48c1-a489-8c975b0165de/areas-with-critical-drainage-problems>)
- areas where sewer capacity may be causing drainage issues and contributing to local flood risk - get this information from the [sewerage companies and their drainage area plans](https://www.water.org.uk/advice-for-customers/find-your-supplier/) (<https://www.water.org.uk/advice-for-customers/find-your-supplier/>)

You can use integrated catchment modelling if a quality assurance process shows it's fit for purpose. However, do not use integrated catchment modelling in isolation. Make sure you use it together with other sources of information so you do not underestimate flood risk.

Watercourses

On maps, label rivers and other watercourses as either:

- a [main river](https://environment.maps.arcgis.com/apps/webappviewer/index.html?id=17cd53dfc524433980cc333726a56386) (<https://environment.maps.arcgis.com/apps/webappviewer/index.html?id=17cd53dfc524433980cc333726a56386>)
- an ordinary watercourse
- a drainage channel managed by another organisation, such as an internal drainage board

Lead local flood authorities, water companies and internal drainage boards

Your maps should show the administrative areas of any:

- lead local flood authorities
- water and sewerage companies

- internal drainage boards

Historic flooding

Your maps should show historic instances of flooding and their sources. Get data from:

- the Environment Agency's [recorded flood outlines](https://data.gov.uk/dataset/16e32c53-35a6-4d54-a111-ca09031eaaaf/recorded-flood-outlines) (<https://data.gov.uk/dataset/16e32c53-35a6-4d54-a111-ca09031eaaaf/recorded-flood-outlines>)
- your lead local flood authority
- any local authority flood investigation reports – local authorities must investigate floods under [section 19 of the Flood and Water Management Act 2010](https://www.legislation.gov.uk/ukpga/2010/29/section/19) (<https://www.legislation.gov.uk/ukpga/2010/29/section/19>)
- water companies

Flood warning alerts

Your maps should show how people in your area can receive flood warnings.

You can find information online on [flood warning areas](https://data.gov.uk/dataset/0d901c4a-6e1a-4f9a-9408-73e0c1f49dd3/flood-warning-areas) (<https://data.gov.uk/dataset/0d901c4a-6e1a-4f9a-9408-73e0c1f49dd3/flood-warning-areas>) and [flood alert areas](https://data.gov.uk/dataset/7749e0a6-08fb-4ad8-8232-4e41da74a248/flood-alert-areas) (<https://data.gov.uk/dataset/7749e0a6-08fb-4ad8-8232-4e41da74a248/flood-alert-areas>). You can also contact the Environment Agency for information, if you need to.

Flood risk management features and structures

Show flood risk management features and structures on your maps as well as providing information about them in your supporting report.

You should describe important flood risk management structures or features relevant to your area. These could include:

- flood gates
- flood walls
- flood embankments
- water storage areas
- pumps
- barriers
- any structure or feature designated by the Environment Agency or lead local flood authority acting as a flood defence

You should also explain how your users can find up-to-date detailed information about flood risk management features and structures. This is important as this information will change over time.

For important flood risk management features and structures, you should describe or show on your maps:

- the current type of protection
- the standard of protection
- whether it is in public or private ownership
- the condition it's in

You should identify and label on the maps:

- any land and access to land that may be needed for flood schemes in the future - sources of information include the [6-year capital programme](https://www.gov.uk/government/publications/programme-of-flood-and-coastal-erosion-risk-management-schemes) (<https://www.gov.uk/government/publications/programme-of-flood-and-coastal-erosion-risk-management-schemes>), the Environment Agency, lead local flood authorities and other risk management authorities
- a buffer along all watercourses, which may be needed for access, maintenance or future flood risk management to make sure development in these areas does not increase flood risk
- areas benefitting from existing flood risk management features and structures from the [flood map for planning](https://flood-map-for-planning.service.gov.uk/) (<https://flood-map-for-planning.service.gov.uk/>) but be aware this does not necessarily mean land is protected from all sources of potential flooding
- areas designed to flood (such as a flood attenuation scheme), even if it would only flood in more extreme events (such as 0.1% annual probability flood) In your report include:
- local schemes planned in the [6-year capital programme](https://www.gov.uk/government/publications/programme-of-flood-and-coastal-erosion-risk-management-schemes) (<https://www.gov.uk/government/publications/programme-of-flood-and-coastal-erosion-risk-management-schemes>)
- the effect of existing flood defences and other features or structures which help reduce flood risk
- the potential effect of planned new or upgraded defences, and other features which help reduce flood risk - you should also be clear about the level of certainty you have that these improvements will be constructed

Functional floodplain

Your maps should:

- show [functional floodplain](https://www.gov.uk/guidance/flood-risk-and-coastal-change#Table-2-Flood-Risk-Vulnerability-Classification) (<https://www.gov.uk/guidance/flood-risk-and-coastal-change#Table-2-Flood-Risk-Vulnerability-Classification>) - land where water has to flow, or which stores water, in times of flooding
- give the sources of information shown

Show land that:

- would flood with an annual probability of 1 in 20 (5%) or greater in any year, with flood risk management features and structures operating effectively

- would normally form the river channel

In your report, you should include a detailed explanation of your approach to defining and mapping functional floodplain.

You may decide to assess the potential impacts of climate change on the future extent of functional floodplain. This will help inform the sequential approach.

Effect of local defences on functional floodplain

Take into account local circumstances when you define the functional floodplain. You should use the parameters set out in the [planning practice guidance \(https://www.gov.uk/guidance/flood-risk-and-coastal-change#Table-1-Flood-Zones\)](https://www.gov.uk/guidance/flood-risk-and-coastal-change#Table-1-Flood-Zones) as a starting point to identify the functional floodplain.

In any modelling used to identify the functional floodplain, include defences and other flood risk management features and structures.

You may not need to designate the functional floodplain in locations where evidence shows flooding would be prevented by existing:

- flood defences
- flood risk management features or structures
- solid buildings

Water storage areas are shown on the [flood map for planning \(https://flood-map-for-planning.service.gov.uk/\)](https://flood-map-for-planning.service.gov.uk/). [Contact the Environment Agency \(https://www.gov.uk/government/organisations/environment-agency#org-contacts\)](https://www.gov.uk/government/organisations/environment-agency#org-contacts) to check if they are suitable to include in your designation of the functional floodplain.

If you do not have evidence of functional floodplain

If you do not have enough detailed information to identify the functional floodplain, make this clear on your maps. This ensures the risk is not underestimated.

Instead, use site-specific flood risk assessments to determine whether a site is affected by functional floodplain. If sites are proposed for development in such areas in your local plan, you'll need to do a level 2 assessment to map the location of functional floodplain.

Risks from reservoirs

Assess:

- the potential loss of life and damage to buildings in the event of dam failure
- how any impounding reservoirs will affect existing flood risk
- whether emergency drawdown of the reservoir (reducing the water level) will add to flooding

You can get information about reservoir flooding using the Environment Agency's [long term flood risk maps](https://flood-warning-information.service.gov.uk/long-term-flood-risk/map?) (<https://flood-warning-information.service.gov.uk/long-term-flood-risk/map?>). Read guidance on [when and how to use the reservoir flood maps](https://www.gov.uk/guidance/reservoir-flood-maps-when-and-how-to-use-them) (<https://www.gov.uk/guidance/reservoir-flood-maps-when-and-how-to-use-them>).

Local authorities, as category 1 responders, can access more detailed information about reservoir risk using the [Resilience Direct](https://rdl.resilience.gov.uk/oxauth/auth/secureia/user-validation.htm) (<https://rdl.resilience.gov.uk/oxauth/auth/secureia/user-validation.htm>) system.

Cumulative impacts of development and land-use change

Include an assessment of the cumulative impacts of development and land-use change.

This should include any impact expected from:

- strategically planned development
- windfall development
- permitted development
- significant changes in land use, such as paving over domestic gardens or reforestation of uplands

Where impacts are likely to be significant, you may find it useful to carry out some sensitivity testing. You can do this by changing the parameters in relevant flood models. [Contact the Environment Agency](https://flood-map-for-planning.service.gov.uk/) (<https://flood-map-for-planning.service.gov.uk/>) to discuss the best way to do this.

This assessment should inform whether you need to take further action to prevent or mitigate these cumulative impacts. Actions could include:

- policies or allocations about the location and design of development
- the approach to green and other infrastructure
- the removal of permitted development rights

You can remove permitted development rights by:

- including a condition on individual planning permissions in line with paragraph 52 of the National Planning Policy Framework (NPPF) - you should only do this where there is a clear justification to do so
- making an [article 4 direction](https://www.legislation.gov.uk/uksi/2015/596/article/4/made) (<https://www.legislation.gov.uk/uksi/2015/596/article/4/made>) in line with paragraph 53 of the NPPF

Expected effects of climate change

You should:

- assess the effects of climate change on all sources of flooding
- identify areas on maps where you expect climate change to increase flood risk

- identify on maps where you expect the effects of climate change will make existing development unsustainable

All of these will help you identify any development that may need to be relocated to sustainable locations.

You can use [detailed flood models \(https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications/#get-information-to-complete-an-assessment\)](https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications/#get-information-to-complete-an-assessment) to show the impact of climate change on flood risk.

You may need to commission new or updated modelling if:

- models are not available
- climate change allowances (predicted effects of climate) in the model are not in line with current [climate change allowances \(https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances\)](https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances)

You may be able to commission modelling with other planning authorities, the Environment Agency or relevant developers to share the benefits and costs. Any new modelling will need to go through a transparent quality assurance process to make sure it is fit for purpose. [Contact your local Environment Agency \(https://www.gov.uk/government/organisations/environment-agency#org-contacts\)](https://www.gov.uk/government/organisations/environment-agency#org-contacts) office for the available data and to discuss joint working and quality assurance.

When you assess the impacts of climate change on flood risk you should use the [allowances for your area \(https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances\)](https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances).

You'll need information in your SFRA on the effect of climate change on flood risk to:

- inform your [sequential test for the local plan \(https://www.gov.uk/guidance/flood-risk-and-coastal-change#Sequential-Test-to-Local-Plan\)](https://www.gov.uk/guidance/flood-risk-and-coastal-change#Sequential-Test-to-Local-Plan)
- carry out the [sequential test for individual planning applications \(https://www.gov.uk/guidance/flood-risk-and-coastal-change#Sequential-Test-to-individual-planning-applications\)](https://www.gov.uk/guidance/flood-risk-and-coastal-change#Sequential-Test-to-individual-planning-applications)
- carry out the [exception test for the local plan \(https://www.gov.uk/guidance/flood-risk-and-coastal-change#Exception-Test-to-Local-Plans\)](https://www.gov.uk/guidance/flood-risk-and-coastal-change#Exception-Test-to-Local-Plans)
- help assess how site-specific development can be made safe without increasing risk elsewhere
- identify where a site-specific flood risk assessment will be needed
- make policies on climate change adaptation
- show how you're complying with your [climate change duty \(https://www.gov.uk/guidance/climate-change#statutory-duty-on-Climate-Change\)](https://www.gov.uk/guidance/climate-change#statutory-duty-on-Climate-Change)

Opportunities to reduce the causes and impact of flooding

Write about any opportunities to reduce the causes and impacts of flooding.

You should refer to relevant strategic flood risk documents to help you identify opportunities. These might include:

- building new or improved flood defences
- funding for new or improved defences
- area-wide sustainable drainage systems to remove surface water from combined sewers
- natural flood management
- changes to land management
- surface water storage areas
- removal of culverts or other restrictions on flow
- river restoration, such as removing canalisation and re-introducing meanders
- removing permitted development rights in sensitive areas

Get this information from the Environment Agency, the lead local flood authority and the water company. You can also get this information from your local:

- [flood risk management plan \(https://www.gov.uk/government/collections/flood-risk-management-plans-frmps-2015-to-2021\)](https://www.gov.uk/government/collections/flood-risk-management-plans-frmps-2015-to-2021)
- [shoreline management plan \(https://www.gov.uk/government/publications/shoreline-management-plans-smpls/shoreline-management-plans-smpls\)](https://www.gov.uk/government/publications/shoreline-management-plans-smpls/shoreline-management-plans-smpls) if your area includes coast
- [river basin management plan \(RBMPs\) \(https://www.gov.uk/government/collections/river-basin-management-plans-2015\)](https://www.gov.uk/government/collections/river-basin-management-plans-2015) – [you have a duty to have regard to RBMPs \(http://www.legislation.gov.uk/ukxi/2017/407/regulation/33/made\)](http://www.legislation.gov.uk/ukxi/2017/407/regulation/33/made)
- surface water management plans, and local flood risk management strategies prepared by [lead local flood authorities \(https://www.gov.uk/find-local-council\)](https://www.gov.uk/find-local-council)

You can also get information on natural flood management from:

- [working with natural processes to reduce flood risk \(https://www.gov.uk/flood-and-coastal-erosion-risk-management-research-reports/working-with-natural-processes-to-reduce-flood-risk\)](https://www.gov.uk/flood-and-coastal-erosion-risk-management-research-reports/working-with-natural-processes-to-reduce-flood-risk) – this evidence base has information about different natural flood management techniques and their benefits, including case studies
- [mapping the potential for working with natural processes \(https://eur03.safelinks.protection.outlook.com/?url=http%3A%2F%2Fwww.np.jbahosting.com%2F&data=04%7C01%7Csam.kipling%40environment-agency.gov.uk%7Cb14c7e5b341f4446cb2b08d936fb0379%7C770a245002274c6290c74e38537f1102%7C1%7C0%7C637601273978745013%7CUnknown%7CTWFpbGZsb3d8eyJWlloiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6IjEhaWwiLCJXVCi6Mn0%3D%7C1000&sdata=ZhAcHhT%2Fgb61FT2tV%2FI9tg%2Bi5ZgIL4OoaKAfyBdlImY%3D&reserved=0\)](https://eur03.safelinks.protection.outlook.com/?url=http%3A%2F%2Fwww.np.jbahosting.com%2F&data=04%7C01%7Csam.kipling%40environment-agency.gov.uk%7Cb14c7e5b341f4446cb2b08d936fb0379%7C770a245002274c6290c74e38537f1102%7C1%7C0%7C637601273978745013%7CUnknown%7CTWFpbGZsb3d8eyJWlloiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6IjEhaWwiLCJXVCi6Mn0%3D%7C1000&sdata=ZhAcHhT%2Fgb61FT2tV%2FI9tg%2Bi5ZgIL4OoaKAfyBdlImY%3D&reserved=0) - shows areas where there may be an opportunity to implement particular techniques (best viewed with Internet Explorer)
- [spatial prioritisation of catchments suitable for using natural flood management \(https://eur03.safelinks.protection.outlook.com/?url=http%3A%2F%2Fwww.np.jbahosting.com%2F&data=04%7C01%7Csam.kipling%40environment-agency.gov.uk%7Cb14c7e5b341f4446cb2b08d936fb0379%7C770a245002274c6290c74e38537f1102%7C1%7C0%7C637601273978745013%7CUnknown%7CTWFpbGZsb3d8eyJWlloiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6IjEhaWwiLCJXVCi6Mn0%3D%7C1000&sdata=ZhAcHhT%2Fgb61FT2tV%2FI9tg%2Bi5ZgIL4OoaKAfyBdlImY%3D&reserved=0\)](https://eur03.safelinks.protection.outlook.com/?url=http%3A%2F%2Fwww.np.jbahosting.com%2F&data=04%7C01%7Csam.kipling%40environment-agency.gov.uk%7Cb14c7e5b341f4446cb2b08d936fb0379%7C770a245002274c6290c74e38537f1102%7C1%7C0%7C637601273978745013%7CUnknown%7CTWFpbGZsb3d8eyJWlloiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6IjEhaWwiLCJXVCi6Mn0%3D%7C1000&sdata=ZhAcHhT%2Fgb61FT2tV%2FI9tg%2Bi5ZgIL4OoaKAfyBdlImY%3D&reserved=0)

[url=https%3A%2F%2Fenvironment.data.gov.uk%2Fdataset%2F793f7e63-0c3e-49cd-808f-9f77e55382d2&data=04%7C01%7Csam.kipling%40environment-agency.gov.uk%7Cb14c7e5b341f4446cb2b08d936fb0379%7C770a245002274c6290c74e38537f1102%7C1%7C0%7C637601273978745013%7CUnknown%7CTWFpbGZsb3d8eyJWljojMC4wLjAwMDAiLCJQIjoiV2luMzliLCJBTiI6Ik1haWwiLCJXVCi6Mn0%3D%7C1000&sdata=TKzRNzzpX4gOen%2BtopByxNoPhmLijcpGcOktYpjc%2F%2BQ%3D&reserved=0](https%3A%2F%2Fenvironment.data.gov.uk%2Fdataset%2F793f7e63-0c3e-49cd-808f-9f77e55382d2&data=04%7C01%7Csam.kipling%40environment-agency.gov.uk%7Cb14c7e5b341f4446cb2b08d936fb0379%7C770a245002274c6290c74e38537f1102%7C1%7C0%7C637601273978745013%7CUnknown%7CTWFpbGZsb3d8eyJWljojMC4wLjAwMDAiLCJQIjoiV2luMzliLCJBTiI6Ik1haWwiLCJXVCi6Mn0%3D%7C1000&sdata=TKzRNzzpX4gOen%2BtopByxNoPhmLijcpGcOktYpjc%2F%2BQ%3D&reserved=0) - identifies some (generally small and rural) catchments where measures that slow the flow of water are likely to provide the greatest flood benefits

Your report should be consistent with and make use of information from:

- other studies such as [green infrastructure frameworks and strategies](https://www.gov.uk/guidance/natural-environment#para027) (<https://www.gov.uk/guidance/natural-environment#para027>)
- [water cycle studies](https://www.gov.uk/guidance/water-supply-wastewater-and-water-quality#water-cycle-studies) (<https://www.gov.uk/guidance/water-supply-wastewater-and-water-quality#water-cycle-studies>)
- strategic flood risk documents such as flood risk management plans
- natural capital approaches - these documents include measures to reduce the causes and impact of flooding
- drainage and wastewater (sewerage) management plans by water and sewerage companies

Recommendations for addressing flood risk

You should include recommendations for:

- how flood risk should be addressed in new developments and changes of use, in line with the hierarchical approach described in paragraphs 161 and 167 of the [NPPF](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/807247/NPPF_Feb_2019_revised.pdf) (https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/807247/NPPF_Feb_2019_revised.pdf) and the planning practice guidance
- how and where sustainable drainage systems will provide the greatest benefits
- property level resistance and resilience measures, with reference to the [CIRIA property flood resilience code of practice](https://www.ciria.org/ItemDetail?iProductCode=C790F&Category=FREEPUBS) (<https://www.ciria.org/ItemDetail?iProductCode=C790F&Category=FREEPUBS>) and [CIRIA's guidance for local authority planners](https://www.ciria.org/Resources/Free_publications/CoP_for_PFR_resource.aspx) (https://www.ciria.org/Resources/Free_publications/CoP_for_PFR_resource.aspx)
- how emergency plans should address access and escape issues with reference to [flood risk emergency plans for new development](https://www.adeptnet.org.uk/floodriskemergencyplan) (<https://www.adeptnet.org.uk/floodriskemergencyplan>)
- what emergency provision is needed in flood risk areas, where relevant
- how [residual risks](https://www.gov.uk/guidance/flood-risk-and-coastal-change#development-will-be-safe) (<https://www.gov.uk/guidance/flood-risk-and-coastal-change#development-will-be-safe>) should be managed

You should produce these recommendations in consultation with:

- the Environment Agency
- your local emergency services

- emergency planners
- lead local flood authorities
- water companies
- local resilience forums
- internal drainage boards, if relevant

Level 2 SFRA: geographical area to cover

Your level 2 SFRA can either:

- cover your own local authority
- cover several local authorities if you are jointly preparing an SFRA
- focus on specific areas or sites where development is proposed

Level 2 SFRA: what to include

Your level 2 SFRA should be published online and should include a:

- different set of maps
- supporting report for these maps
- user guide

It should:

- be detailed enough for you to identify which development allocation sites have the least risk of flooding
- contain the information needed to apply the exception test, if relevant
- enable you to decide if development can be made safe without increasing flood risk elsewhere

It should allow you to:

- apply the sequential test by identifying the severity and variation in risk within medium and high flood risk areas
- establish whether proposed allocations or windfall sites, on which your local plan will rely, are capable of being made safe throughout their lifetime without increasing flood risk elsewhere
- apply the exception test, where relevant

In your level 1 SFRA, your maps showed the sources and extents of flood risk. In your level 2 SFRA, you should now show more detailed maps to illustrate the nature of the flood risks.

Include a user guidance section detailing how it should be used. This should include guidance on which maps and sections of the report to refer to in different circumstances.

Nature of flood risk from all sources

You should include detailed mapping about the nature of flooding from all sources. Consider the risks now and in the future.

Include detail on:

- speed of onset
- depth
- velocity
- hazard
- duration
- sources
- mechanism, for example breach or overtopping

For information about how to calculate flood hazard, check [flood risk assessment guidance for new development \(https://www.gov.uk/flood-and-coastal-erosion-risk-management-research-reports/flood-risk-assessment-guidance-for-new-development\)](https://www.gov.uk/flood-and-coastal-erosion-risk-management-research-reports/flood-risk-assessment-guidance-for-new-development) particularly table 13.1 of phase 2 full technical report.

Identify the communities, features, structures and properties affected by flood risk.

You may have to commission new or updated models, or rerun existing models if the information you need is not available.

When assessing the nature of risk from all sources of flooding, [take climate change into account \(https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances\)](https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances).

If flood risk management features and structures fail

Assess what would happen if flood risk management features and structures failed or were breached. You should also consider what would happen if the design standard of flood risk structures or features were exceeded. The design standard is the magnitude of flood events that structures or features are designed to cope with. Take climate change into account.

Be cautious about any assumptions you make, as it's difficult to predict changes to flood risk management features and structures over the lifetime of development.

Decide what will be the most likely mechanism, or combination of mechanisms of future flooding, for example breach or overtopping. To do this:

- consider evidence in planned approaches to flood risk management, for example flood risk management plans
- take advice from the [Environment Agency \(https://www.gov.uk/guidance/local-planning-authorities-strategic-flood-risk-assessment#contact-the-environment-agency\)](https://www.gov.uk/guidance/local-planning-authorities-strategic-flood-risk-assessment#contact-the-environment-agency) and other [risk management authorities](#)

<https://www.gov.uk/government/collections/flood-and-coastal-erosion-risk-management-authorities>)

Use breach and detailed models to show what would happen if:

- existing flood defences failed
- proposed flood defences failed
- existing defences following proposed improvements failed

Ask the Environment Agency for the information they hold on [flood defence breach](https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications#get-information-to-complete-an-assessment) (<https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications#get-information-to-complete-an-assessment>).

If breach models are not available, [ask the Environment Agency](https://www.gov.uk/guidance/local-planning-authorities-strategic-flood-risk-assessment#contact-the-environment-agency) (<https://www.gov.uk/guidance/local-planning-authorities-strategic-flood-risk-assessment#contact-the-environment-agency>) how to assess the potential effect and reach of flood water if a defence is breached. Also refer to [Flood Risk Assessment Guidance for New Development](http://sciencesearch.defra.gov.uk/Document.aspx?Document=FD2320_3364_TRP.pdf) (http://sciencesearch.defra.gov.uk/Document.aspx?Document=FD2320_3364_TRP.pdf), particularly section 12 of phase 2 full technical report.

Your maps should show clearly whether sites are at risk from:

- frequent flooding even when flood risk management features and structures are working properly
- residual flooding which would only occur if features and structures fail or design standard is exceeded
- both of these

Impact on reservoirs

If proposed development is at risk of flooding from a reservoir, assess if the design or maintenance of the reservoir would need improving. You may need evidence and expert advice to do this. You can check if the development is at risk of flooding from a reservoir using the Environment Agency's [long term flood risk maps](https://flood-warning-information.service.gov.uk/long-term-flood-risk/map?) (<https://flood-warning-information.service.gov.uk/long-term-flood-risk/map?>). Read guidance on [when and how to use the reservoir flood maps](https://www.gov.uk/guidance/reservoir-flood-maps-when-and-how-to-use-them) (<https://www.gov.uk/guidance/reservoir-flood-maps-when-and-how-to-use-them>).

Refer to relevant guidance in the Institution of Civil Engineers' publication [Floods and Reservoir Safety](https://www.icevirtuallibrary.com/doi/book/10.1680/frs.60067) (<https://www.icevirtuallibrary.com/doi/book/10.1680/frs.60067>) (4th edition) and the Environment Agency's [guide to risk assessment for reservoir safety management](https://www.gov.uk/government/publications/guide-to-risk-assessment-for-reservoir-safety-management) (<https://www.gov.uk/government/publications/guide-to-risk-assessment-for-reservoir-safety-management>). Consider seeking expert advice from an [all reservoirs panel engineer](https://www.gov.uk/guidance/reservoirs-owner-and-operator-requirements#how-to-appoint-a-panel-engineer) (<https://www.gov.uk/guidance/reservoirs-owner-and-operator-requirements#how-to-appoint-a-panel-engineer>).

If development could affect the operation of a reservoir, you should assess the impact on flood risk. Read [guidance on understanding and assessing reservoir](#)

[safety \(https://www.gov.uk/guidance/reservoirs-owner-and-operator-requirements#reservoir-safety\)](https://www.gov.uk/guidance/reservoirs-owner-and-operator-requirements#reservoir-safety). Work out the cost and the impacts of additional work. Consult the reservoir owner or operator to help you.

Local authorities, as [category 1 responders \(https://www.gov.uk/guidance/preparation-and-planning-for-emergencies-responsibilities-of-responder-agencies-and-others\)](https://www.gov.uk/guidance/preparation-and-planning-for-emergencies-responsibilities-of-responder-agencies-and-others), can access more detailed information about reservoir risk and reservoir owners using the [Resilience Direct \(https://rdl.resilience.gov.uk/oxauth/auth/secureia/user-validation.htm\)](https://rdl.resilience.gov.uk/oxauth/auth/secureia/user-validation.htm) system.

Information for the sequential test

If you cannot identify sites with a lower risk of flooding, information in the level 2 SFRA will inform the [sequential test \(https://www.gov.uk/guidance/flood-risk-and-coastal-change#Sequential-Test-to-Local-Plan\)](https://www.gov.uk/guidance/flood-risk-and-coastal-change#Sequential-Test-to-Local-Plan) by providing information on:

- the severity and variation in the nature of risk within high and medium risk areas
- how this risk will vary over time with the impacts of climate change

This will help you find the sites within flood risk areas which have the lowest risk.

Your level 2 SFRA should build on the method for ranking flood risk included in your level 1 SFRA. The method should make use of the additional flood risk information included in your level 2 SFRA. You should discuss and agree the method with the Environment Agency.

Information for assessing the safety of development

You should include information in your SFRA which will allow your local planning authority to decide whether proposed development is capable of being:

- made safe from flooding for its lifetime
- designed so it will not increase flood risk elsewhere

Access and escape routes

Assess [access and escape routes \(https://www.gov.uk/guidance/flood-risk-and-coastal-change/#access-and-egress\)](https://www.gov.uk/guidance/flood-risk-and-coastal-change/#access-and-egress) in and out of areas where development is proposed. Identify and show on your map any evacuation routes which would stay dry, or experience only non-hazardous flooding.

You should consult with emergency planners, the emergency services and local resilience forums when preparing this information.

Information for the exception test

Your level 2 SFRA should provide information that you and developers can use to apply the exception test. This should show how development could:

- reduce flood risk overall where possible
- provide wider sustainability benefits to the community that outweigh flood risk

This information should also help you assess whether your local plan will be deliverable.

Refine your level 2 SFRA

You may now be able to refine or add to any level 1 SFRA maps or guidance in the following level 2 SFRA sections:

- opportunities to reduce the causes and impacts of flooding
- recommendations for addressing flood risk
- functional floodplain
- managing residual risks

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[Review individual flood risk assessments: standing advice for local planning authorities](/guidance/flood-risk-assessment-local-planning-authorities) [\(/guidance/flood-risk-assessment-local-planning-authorities\)](/guidance/flood-risk-assessment-local-planning-authorities)

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