



Product 4: Supporting Documentation

GUIDANCE INCLUDED:

- 1. PRODUCT 4 FACT SHEET.
- 2. FLOOD ZONE 3 FACTSHEET EAST ANGLIA (EAST)
- 3. FLOOD RISK ASSESSMENT (FRA) CHECKLIST
- 4. NEW TIDAL CLIMATE CHANGE ALLOWANCES FOR ESSEX, NORFOLK AND SUFFOLK
- 5. UPDATED FLUVIAL CLIMATE CHANGE ALLOWANCES FOR ESSEX, NORFOLK AND SUFFOLK

PARTNERSHIP AND STRATEGIC OVERVIEW TEAM - EAST ANGLIA (EAST) Version 5 Updated March 2023

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incident hotline

floodline

creating a better place

Product 4 Fact Sheet



Thank you for your enquiry.

We respond to requests under the Freedom of Information Act 2000 and Environmental Information Regulations 2004.

Please refer to the Open Government Licence available here: <u>http://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/</u> which explains the permitted use of this information.

You should consider contacting the relevant Local Planning Authority and/or water/sewerage undertaker for the area.

Please be aware that flooding can come from different sources. Examples of these are:

- from rivers or the sea
- surface water (i.e. rainwater flowing over or accumulating on the ground before it is able to enter rivers or the drainage system)
- overflowing or backing up of sewer or drainage systems which have been overwhelmed
- groundwater rising up from underground aquifers

Currently the Environment Agency can only supply flood risk data relating to the chance of flooding from rivers or the sea.

Areas Benefiting from Flood Defences

Areas benefiting from flood defences are defined as those areas which benefit from formal flood defences specifically in the event of flooding from rivers with a 1% (1 in 100) chance in any given year or flooding from the sea with a 0.5% (1 in 200) chance in any given year.

If the defences were not there, these areas would be flooded. An area of land may benefit from the presence of a flood defence even if the defence has overtopped, if the presence of the defence means that the flood water does not extend as far as it would if the defence were not there.

Flood Risk Assessment Checklist

If you are planning on using this data within a Flood Risk Assessment, we recommend that you take the time to fill in the attached FRA checklist, and to read the attachments which contain information relevant to the area that interests you.

We would like to stress the importance of filling in the Flood Risk Assessment check list and providing up-to-date and correct data. The data will be checked against our records when we review the Flood Risk Assessment in our role as statutory consultee.

It is important that you provide a map in section 2 of the FRA checklist (See Appendix A), including the highest and most representative flood levels for your site. We recommend using a number of nodes that provide a fair representation of the modelled data across your site. For example, if it is a small extension (< 250 square metres) then approximately 5-10 nodes would be sufficient. For larger sites, approximately 10 to 20 nodes would be appropriate.

If you have a new enquiry or would like us to review the information we have provided under the Freedom of Information Act 2000 and Environmental Information Regulations 2004 please contact us within two months by email at



Flood Zone 3 Factsheet



East Anglia (East)

Oct 2017 - v.7

This factsheet provides information to assist with the preparation of a Flood Risk Assessment (FRA) in support of development proposals reviewed by the East Anglia teams, based at Ipswich. It should be read alongside the Environment Agency's general FRA advice (<u>FRA Guidance note 3</u>). For information relating to proposals managed by East Anglia teams please contact:

This factsheet covers issues relating to FRAs only and does not address other matters we may take into account when considering development proposals (e.g. proximity to a watercourse, contaminated land, Water Framework Directive and biodiversity requirements). For further information on those issues, please contact:

Sequential Test and Exception Test

The Local Planning Authority (LPA) will need to be satisfied that the proposed development passes the flood risk Sequential Test, and if applicable, the first part of the Exception Test, in line with requirements of the National Planning Policy Framework (NPPF). We therefore strongly suggest you speak to them prior to commencing work on an FRA. Information regarding the <u>aim of the Sequential Test</u>, <u>applying the</u> <u>Sequential Test</u> and the <u>Exception Test</u> can all be found in the Practice Guide supporting the NPPF.

Inappropriate development

<u>Table 2</u> of the Practice Guide categorizes developments according to their vulnerability and <u>table 3</u> sets out which vulnerabilities are inappropriate in Flood Zone 3. You should be aware that we are likely to object in principle where it is indicated that a development is not compatible in Flood Zone 3. Please note that Flood Zone 3b is defined by the Local Planning Authority's Strategic Flood Risk Assessment, or by the 5% (1 in 20 year) modelled flood outlines and levels held by the Environment Agency.

More detail on what should be in the FRA (additional to that highlighted in Guidance Note 3):

The FRA should assess all sources of flooding and provide sufficient information on the characteristics of flooding at the site, such as frequency, depth, velocity, speed of onset, and duration. As a minimum the FRA needs to assess the flood risk on site by comparing our modelled flood levels with a GPS verified topographical survey of the site to determine the anticipated flood depths during the 5% (1 in 20), 1% / 0.5% (1 in 100 / 200) (design) and 0.1% (1 in 1000) (extreme) events including allowances for climate change. Climate change allowances can be found on <u>our website</u>. If the area is protected by defences then the FRA should consider both the actual flood risk to the site through overtopping of the defences, and the residual risk posed by the defences being breached.

Sequential approach on site

If the site contains a range of Flood Zones, the sequential approach should be applied within the site to direct development to the areas of lowest flood risk. If it isn't possible to locate all development in Flood Zone 1, then the most vulnerable elements should be located in the lowest risk parts of the site.

Finished Floor Levels

Proposals for 'more vulnerable' development should include floor levels set no lower than 300 mm above the level of any flooding that would occur if defences were overtopped in a 1% / 0.5% flood event (including allowances for climate change). Safe refuge should also be provided above the 0.1% undefended/breach flood level (including allowances for climate change). We are likely to raise an objection where these requirements are not achieved.

We recommend 'less vulnerable' development also meets this requirement to minimize disruption and costs in a flood event. If this is not achievable then it is recommended that a place of refuge is provided above the 0.1% flood level (including allowances for climate change). Where safety is reliant on refuge it is important that the building is structurally resilient to withstand the pressures and forces (hydrostatic & hydrodynamic) associated with flood water. The LPA may need to receive supporting information and calculations to provide certainty that the buildings will be constructed to withstand these water pressures.

Safe Access

During a flood, the journey to safe, dry areas completely outside the extent of a 1% / 0.5% flood event (including allowances for climate change), should not involve crossing areas of potentially fast flowing water. Those venturing out on foot in areas where flooding exceeds 100 millimetres or so would be at risk from a wide range of hazards, including, for example unmarked drops, or access chambers where the cover has been swept away. Safe access and egress routes should be assessed in accordance with the guidance document 'FD2320 (Flood Risk Assessment Guidance for New Developments)'.

• Emergency Flood Plan

Where safe access cannot be achieved, or if the development would be at actual flood risk or residual risk of flooding in a breach, an emergency flood plan must be provided. The plan should deal with matters of evacuation and refuge, and should demonstrate that people will not be exposed to flood hazards. The emergency flood plan should be submitted as part of the FRA and will need to be agreed with the Local Planning Authority.

Flood Resilience / Resistance Measures

To minimize the disruption and cost implications of a flood event we encourage development to incorporate flood resilience/resistance measures up to the extreme 0.1% climate change flood level. Information on preparing property for flooding can be found in the documents '<u>Improving the Flood</u> <u>performance of new buildings'</u> and '<u>Prepare your property for flooding</u>'.

Betterment

Every effort should be made by the applicant to improve the flood risk to the local area, especially if there are known flooding issues. Opportunities should also be taken to provide environmental enhancements as part of the design, for example naturalizing any rivers on the site with a buffer zone on both sides.

Increases in Built Footprint (excluding open coast situations)

It will need to be shown that any increase in built footprint within the extent of a 1% flood event (including allowances for climate change), can be directly compensated for on a volume-for-volume and level-forlevel basis to prevent a loss of floodplain storage. If there are no available areas for compensation above the design flood level and compensation will not be possible, then a calculation of the offsite flood risk impacts will need to be undertaken. If this shows significant offsite impacts then no increases in built footprint will be allowed. Further guidance on the provision of compensatory flood storage is provided in section A3.3.10 of the CIRIA document C624.

Flood Defence Consent

Flood Defence Consents now fall under the Environmental Permitting (England and Wales) Regulations 2010 system (EPR). You may need an environmental permit for flood risk activities if you want to do work in, under, over or within 8 metres of a fluvial river or any flood defence structure or culvert / 16m from a tidal river or any flood defence structure or culvert. New forms and further information can be found at: https://www.gov.uk/guidance/flood-risk-activities-environmental-permits.

Local policies and recommendations

You will need to demonstrate to the Local Planning Authority that the requirements of any local flood risk planning policies have been met and the recommendations of the relevant Strategic Flood Risk Assessment, Shoreline Management Plans and Catchment Flood Management Plans have been considered.

Further Information:

If you require the flooding information we hold for this site then please email our local Customers and Engagement Team: For further details on our flood map products please visit our website at: www.environment-agency.gov.uk/research/planning/93498.aspx.

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ww.environment-agency.gov.uk



Flood Ri	sk Assessment (FRA) Checklist				
This document should be attached to the front of the Flood Risk Assessment (FRA) issued to Local Planning Authorities (LPA) in support of a development proposal which may be at risk of flooding. This document is not a substitute for a FRA. Please note, under our responsibilities as a statutory consultee we will review any submitted FRA only in respect to fluvial and tidal risk. Your FRA should also consider other sources of flooding such as surface water, drainage, and ground water flooding.					
1.Development Proposal					
Site name					
National Grid Reference (NGR)					
Flood Risk Assessment	Reference/Title: Date:				
Existing site use & vulnerability classification					
Proposed site use & vulnerability classification					
2. Flood Risk					
Flood Zone(s) affecting the site/property					
Sources of flooding affecting the site					
Have you considered flood storage compensation?	Yes/No **				
flood levels for your proposed development. For example, if it is a small extension (< 250 square metres) then approximately 5-10 nodes would be sufficient. For larger sites, approximately 10 to 20 nodes would be appropriate.					
4. Mitigation					
Finished floor levels (in mAOD) for each proposed floor.					
Have you considered a freeboard for these Finished Floor Levels?***					
Drawing reference showing Finished Floor Levels for proposed development					
Have you considered suitable internal and external access for safe refuge above the flood level?	Yes/No				
5. Proximity to the watercourse/ flood defe	nce/ culvert				
Are the proposed developments on, over, under or within 8 metres of a fluvial main river or 16 metres of a tidal main river or flood defence?	Yes/No If yes, please provide a cross section drawing in your planning application showing the distance of the proposed development in relation to the watercourse/flood defence/culvert. If yes, this will require a Flood Risk Activity Permit.				
Map Many of our flood datasets are available online:					
Flood Map For Planning (Flood Zone 2, Flood Zone 3, Flood Storage Areas, Flood Defences, Areas Benefiting from					
Defences, , Risk of Flooding from Rivers and Sea, Historic Flood Map, Current Flood Warnings					

** Please be aware floodplain compensation may be required for your site. Floodplain compensation is normally required when the proposed site use has an increased built footprint in relation to the existing site use and lies primarily in Flood Zone 3, which is considered the fluvial floodplain. This is normally demarked in the modelled data by the 1 in 100 + Climate Change flood return period. *** Please refer to the Local Authority's SFRA for further guidance on freeboard requirements for each type of development

Environment Agency, Iceni House, Cobham Road, Ipswich, IP3 9JD Customer services line: Email:

www.environment-agency.gov.uk



Planning advice and guidance

The Environment Agency are keen to work with partners to enable development which is resilient to flooding for its lifetime and provides wider benefits to communities. If you have requested this information to help inform a development proposal, then we recommend engaging with us as early as possible by using the pre-application form available from our website:

https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion

Complete the form in the link and email back to

We recognise the value of early engagement in development planning decisions. This allows complex issues to be discussed, innovative solutions to be developed that both enables new development and protects existing communities. Such engagement can often avoid delays in the planning process following planning application submission, by reaching agreements up-front. We offer a charged pre-application advice service for applicants who wish to discuss a development proposal.

We can also provide a preliminary opinion for free which will identify environmental constraints related to our responsibilities including flooding, waste, land contamination, water quality, biodiversity, navigation, pollution, water resources, foul drainage or Environmental Impact Assessment.

Flood Risk Assessments guidance

In preparing your planning application submission, you should refer to the Environment Agency's Flood Risk Standing Advice and the Planning Practice Guidance for information about what flood risk assessment is needed for new development in the different Flood Zones. This information can be accessed via:

https://www.gov.uk/flood-risk-assessment-standing-advice

http://planningguidance.planningportal.gov.uk/

https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications

https://www.gov.uk/guidance/flood-risk-and-coastal-change

You should also consult the Strategic Flood Risk Assessment and flood risk local plan policies produced by your local planning authority.

You should note that:

- 1. Information supplied by the Environment Agency may be used to assist in producing a Flood Risk Assessment where one is required, but does not constitute such an assessment on its own.
- 2. This information covers flood risk from main rivers and the sea, and you will need to consider other potential sources of flooding, such as groundwater or overland runoff. You should discuss surface water management with your Lead Local Flood Authority.
- 3. Where a planning application requires a FRA and this is not submitted or deficient, the Environment Agency may well raise an objection due to insufficient information

Advice to Consultants

The data provided in the checklist and FRA will be checked against our records as we review the FRAs when consulted on by the Local Planning Authority in our remit as statutory consultee for flood risk from tidal and fluvial sources. We require you to get in touch with us to check for the most up to date model information and FRA checklist. Having the latest data is important as not having the data will possibly delay us in reviewing your application at planning stage.





Appendix A: (This is an example only for how to do the node map and accompanying table)

- 1. Outline your site boundary clearly
- 2. Clearly mark the node points where you are extracting data from

3. Select node points that cover the site, around the site itself, and along the access route to the site to give a representative sample

	National Grid Reference		Modelled Levels
Node	Easting	Northing	[insert return period]
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Environment Agency, Iceni House, Cobham Road, Ipswich, IP3 9JD Customer services line: Email: www.environment-agency.gov.uk

Updated guidance: peak river flow allowances have been updated in 'Flood risk assessments: climate change allowances'

Who are these messages for?

These messages are for local planning authorities and developers preparing Strategic Flood Risk Assessments (SFRAs) and site specific flood risk assessments (FRAs).

For risk management authorities preparing flood and coastal erosion risk management schemes and strategies, please refer to a separate briefing explaining the peak river flow allowances update to <u>'Flood and coastal risk projects, schemes</u> <u>and strategies: climate change allowances</u>', which has also been updated. Contact Andrew Eden

Main messages

What's changed?

On 20th July 2021 the peak river flow allowances in <u>'Flood risk assessments: climate</u> change allowances' were updated so they reflect the latest projections in UKCP18 and subsequent research that models how the latest rainfall projections are likely to affect peak river flows.

The main changes are as follows:

- Peak river flow allowances are provided for 'management catchments' rather than river basin districts.
- The central allowance for peak river flow will be used to assess most developments, however, the higher central and upper end will be important for some assessments still.

Why have these changes been made?

These changes have been made because:

- the latest climate science and research shows peak river flows could more than double by 2100 in some locations. By ensuring the guidance is premised on the latest climate change projections, it promotes resilient and sustainable communities and built environment, helping local planning authorities and developers to demonstrate they are prepared for the climate emergency.
- using a smaller geography to provide the allowances mean they better reflect variability in how different catchments will respond to the impact of climate change.
- the central allowance, based on the 50th percentile of the high emission scenario, represent a 4°C increase by 2100, providing robust resilience planning.

This update supports the Environment Agency goal for 'a nation resilient to climate change'

In our corporate plan '<u>EA 2025</u>' we state our ambition to be a stronger leader on climate adaptation and resilience, encouraging others to act now on the climate emergency and invest in adaptation.

The guidance promotes a robust approach to climate resilience, based on the high emission scenario of UKCP18, with the central allowance representing a 4°C increase by 2100. This ensures our approach is grounded on the latest evidence on the global climate change pathway we are currently following, reflected in <u>UNEP</u> Adaptation Gap report (Jan 2020), which states we are heading for a 3°C temperature rise this century, but this could be as high as 4°C.

What impact will the update have? How have customers been prepared for it?

Reflecting variability within catchments means allowances will be lower than the current allowances in some places, but also they will be higher in others. Focus on use on the central allowance will ameliorate the impact where updated allowances are higher than the previous allowances.

Local Environment Agency teams have been making customers aware of the upcoming changes to the peak river flow allowances since the beginning of 2021. In some cases they will have provided specific advice if the pending update was likely to present a significant change in allowances. On this basis, and given we don't expect a significant increase in allowances used in most assessments in the large majority of locations, we don't expect the update to present significant or unexpected issues for developers or local planning authorities.

How soon should developers and LPAs use the updated allowances?

The updated guidance will come into immediate effect from 20th July 2021. In cases where customers have been given specific advice because a significant change in allowances was likely, we will expect customers to have used this specific advice.

Where this is not the case, to avoid significant delays for development proposals and associated flood risk assessments that are well advanced when the updated allowances were published, the Environment Agency will normally base its advice on the previous guidance in the following circumstances:

- 1. For local plans submitted for examination on or before 20th July 2021.
- 2. For planning applications validated on or before 20th July 2021.

The Environment Agency may also take this approach for planning applications and plans that were well advanced by 20th July 2021. Local Environment Agency teams will decide this by taking a risk-based approach for each case. This is only likely to be appropriate for a few weeks after the 20th July 2021.

Future updates

The allowances for sea level rise were updated based on sea level rise projections in UKCP18 in December 2019. The allowances for peak rainfall are unchanged for the time being. This is because high resolution rainfall projections were published later

as part of UKCP Local (2.2km) in September 2019 and research is still ongoing to develop peak rainfall allowances from the projections in UKCP Local, which is due to be published summer 2021. Once this research has been published we will start work to understand if and how the peak rainfall allowances need to be updated. It is unlikely updates to the peak rainfall allowances will happen until late 2021 at the earliest.

Frequently asked questions

What are updated peak river flow allowances based on?

The peak river flow allowances updated in July 2021 are based on research commissioned by the Environment Agency, Scottish Environmental Protection Agency and Natural Resources Wales and carried out the UK Centre for Ecology and Hydrology (UKCEH) to use the rainfall projections in UKCP18 to model peak river flow uplifts (<u>'Project SC150009'</u>).

Project SC150009 provides high resolution climate change projections for peak river flow, allowing us to provide allowances that better represent variability in peak river flow within river basin districts. On this basis the climate change allowances for peak river flow are provided at a management catchment scale.

In line with allowances for sea level rise, the allowances are based on UKCP18 RCP8.5, which is equivalent to a high emission scenario. Allowances are provided using the 50th, 70th and 95th percentiles.

What were the previous peak river flow allowances based on?

The previous peak river flow allowances (published in 2016) use the 'A1FI' and 'A1B' emissions scenarios. For both 'Flood Risk Assessment: Climate change allowances (2016)' and 'Adapting to Climate Change: Advice for Flood & Coastal Erosion Risk Management Authorities (2016)', the emissions scenarios are applied as follows to peak flows:

The higher (90th) percentiles for the 2080s use A1FI scenario The 70th and 50th percentiles for the for all epochs use the A1B scenario

Scenario definitions are given below.

A1 Scenarios

The A1 scenarios are of a more integrated world. The A1 family of scenarios is characterized by:

Rapid economic growth

A global population that reaches 9 billion in 2050 and then gradually declines The quick spread of new and efficient technologies.

A convergent world - income and way of life converge between regions. Extensive social and cultural interactions worldwide.

There are subsets to the A1 family based on their technological emphasis:

A1FI - An emphasis on fossil-fuels (Fossil Intensive) (i.e. a higher emissions scenario)

A1B - A balanced emphasis on all energy sources (i.e. a medium emissions scenario)

A1T - Emphasis on non-fossil energy sources.

What are management catchments and how do they compare to river basin districts? Why were they chosen as the geography for the updated allowances for peak river flow?

Management catchments are sub catchments of river basin districts. There are 93 management catchments in England compared to 11 river basin districts used for peak river flow allowances previously.

They were chosen as the geography to provide the updated peak river flow allowances because they largely follow hydrological boundaries and provide an optimal approach to represent of the coverage provided by the 1km grid projections in Project SC150009. Smaller boundaries risked creating catchments without any data, and continued use of river basin districts would mask significant variation between catchments within river basin districts.

Why have some of the allowances changed so much since the 2016 update? Why so high in some places? Why so low in some places?

One of the main reasons for undertaking Project SC150009 was to develop higher resolution modelling for a greater number of watercourses was to better understand variability between catchments within river basin districts that we knew was present, but did not have the detailed modelling to be able to fully represent in climate change projections or allowances. Furthermore, the previous allowances were based on UKCP09 which has been updated with UKCP18. Consequently differences between the current and new allowances are to be expected.

In summary any differences in allowances are likely to be due to a combination of:

- Peaks and troughs in catchment responsiveness being revealed behind the current river basin district averages by the new high resolution modelling. While precipitation is a major driver of river flows, other climatic and nonclimatic factors (including catchment characteristics) are also important, explaining why there is variation in responsiveness between and within catchments.
- 2. Changes in rainfall projections in UKCP18 compared to UKCP09 (UKCP18 found the west of the UK to be wetter than in UKCP09).
- 3. Using a different emissions scenario the new allowances are based solely on a high emissions scenario (equivalent), while the previous allowances use the medium emissions scenario at the central and higher central and the high emissions scenario at the upper end.
- 4. The upper end for the new allowances is based on the 95th percentile, the current upper end allowances are based on the 90th percentile.

Why has there been a change in focus from using the range of allowances to greater focus on just using the central allowance?

UKCP18 provided us with a greater appreciation of how emissions scenarios (called 'RCPs') relate to global temperature increases. A 4°C increase by 2100 is approximately equivalent to the 50th percentile (central allowance) of RCP8.5 (the emissions scenario we have used for the central, higher central and upper end in the

draft updated allowances). So, there is a reasonable case to focus more on use of the central allowance with the upper end used more like an H++ allowance to reflect credible maximum scenarios.

How can some allowances be negative? How does this affect allowances used for flood risk assessments?

For some management catchments the allowances are much lower than previously and in a few rare cases they are negative.

We know that as a result of climate change, sea level will rise (and continue to rise beyond the end of the century). We also know that rainfall patterns will change, with more rain overall and more wet days in winter, and less rain overall and fewer wet days in summer. Regardless of the season, rainfall intensity will increase as temperatures rise, and short-duration and extreme rainstorms will become even more intense. Therefore, we also expect pluvial/surface water flooding to increase as a result of climate change.

The link between changing rainfall patterns and fluvial flooding is less simple. While precipitation is a major driver of river flows, air temperature, potential evaporation/evapotranspiration and other non-climatic factors are also important.

Project SC150009 has attempted to understand how different catchment characteristics will respond to these climatic changes to come up with future peak flows. New and emerging research on the links between rainfall intensity and fluvial flood risk has identified antecedent soil moisture as key to this relationship, with suggestions that in some locations (particularly in more arid climates), fluvial flooding does not always increase (and may actually decrease) as rainfall intensity increases.

Regardless of future changes, we still have to plan for current day risks, so where the % allowance is a minus, use of the current day models will apply and it is not appropriate to plan for decreased flood risk.

In locations where new local allowances have changed, are recent new developments under or over resilient?

When deciding on resilience design standards within our planning advice, we can only use the best information available at the time of design. As our understanding of climate change and modelling processes improves, our previous understanding about what we needed to ensure resilience will also change. However, in many locations the allowances will be similar (within 10% either way) and thus changes in resilience standards will not be an issue.

For those few areas where allowances have increased significantly, recent developments will be considered to be resilient to future flood risk for several decades to come, giving us time to adapt to longer term risk as necessary. Where allowances have decreased significantly, additional built in resilience will help ensure infrastructure and development is protected against more extreme flood events (than 1 in 100 plus CC), and to longer term CC (beyond a 100 year lifetime).