Replacement Local Development Plan 2018-2033

Background Paper

BP34: Strategic flood consequences assessment (stage 2)

Deposit Plan

July 2025

CONWY

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Conwy Stage 2 Strategic Flood Consequence Assessment - Main Report

Final Report

July 2025

Prepared for:

Conwy County Borough Council

www.jbaconsulting.com

Document Status

Issue date	7 July 2025
Issued to	Richard Clarke
BIM reference	NQF-JBA-XX-XX-RP-Z-0001
Revision	P03
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Contract

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This report describes work commissioned by Conwy County Borough Council by an instruction dated 22 July 2024. The Client's representative for the contract was Richard Clarke of Conwy County Borough Council. Laura Thompson of JBA Consulting carried out this work.

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Abbreviations

AEP	Annual Exceedance Probability
CCBC	Conwy County Borough Council
CIRIA	Company providing research and training in the construction industry
DCWW	Dŵr Cymru Welsh Water
FCA	Flood Consequence Assessment
FMfP	Flood Map for Planning
FWMA	Flood and Water Management Act
FRAW	Flood Risk Assessment Wales
LFRMS	Local Flood Risk Management Strategy
LLFA	Lead Local Flood Authority
NRW	Natural Resources for Wales
PPW	Planning Policy Wales
RLDP	Replacement Local Development Plan
SAB	SuDS Approval Body
SFCA	Strategic Flood Consequence Assessment
SuDS	Sustainable Drainage Systems
TAN-15	Technical Advice Note 15
UKCP18	United Kingdom Climate Projections 2018

Executive Summary

Introduction and Context

This Stage 2 Strategic Flood Consequence Assessment (SFCA) document was prepared with the purpose of providing part of the evidence base for the Local Plan. It follows on from the Conwy Stage 1 SFCA which was produced in March 2023. This report should be read alongside the Conwy Stage 1 SFCA.

The primary purpose of the Stage 2 SFCA is to provide an appropriate understanding of the level of actual risk affecting the development included in the Local Plan Review. The assessment takes into account all sources of flooding and considers other factors affecting flood risk such as residual risk. The information provided as part of the Stage 2 SFCA enables Conwy County Borough Council (CCBC) to apply the Justification Test and Acceptability of Consequences in accordance with Technical Advice Note 15 (TAN-15) and Planning Policy Wales (PPW).

SFCA Objectives

Natural Resources Wales (NRW) provides guidance on the tiered approach to completing SFCA's. The aim of the Stage 2 assessment is to build on identified risks from Stage 1, to provide a greater understanding of fluvial, tidal, surface water, groundwater, and reservoir related flooding risks to the allocations. From this, the Local Council and developers can make more informed decisions and pursue development in an effective and efficient manner. The Stage 2 assessment also identifies allocations for further risk analysis at the site-specific Flood Consequence Assessment (FCA) stage.

Summary of the Stage 2 SFCA

CCBC provided 12 allocations for further assessment. These allocations were screened against flood risk datasets to assess the potential viability and provide flood risk recommendations.

Site assessment reports were prepared for all of the allocations where multiple sources of flood risk were assessed. The reports set out the flood risk to the allocation taking into account the potential benefit and residual risks from flood defences. The Flood Map for Planning - Risk of Flooding from Surface Water and Small Watercourses mapping has also been used as an indication of flood risk for smaller watercourses where detailed modelling does not exist.

Each report sets out the TAN-15 and PPW requirements for the allocation, as well as guidance for site-specific Flood Consequence Assessments.

1 Introduction

1.1 Study area

The study area (Figure 1-1) consists of the Conwy County Borough Council (CCBC) administrative area in North Wales covering an area of approximately 1,149 km^2. A number of watercourses classified as main rivers are present within the county, including the River Conwy, River Elwy, River Aled, Merddwr and River Ceirw. Snowdonia National Park covers an area of approximately 427 km^2 within the west of the administrative area. As Snowdonia National Park is a Local Planning Authority in its own right, the study area for this Stage 2 Strategic Flood Consequence Assessment (SFCA) is focused on the administrative area excluding the National Park.

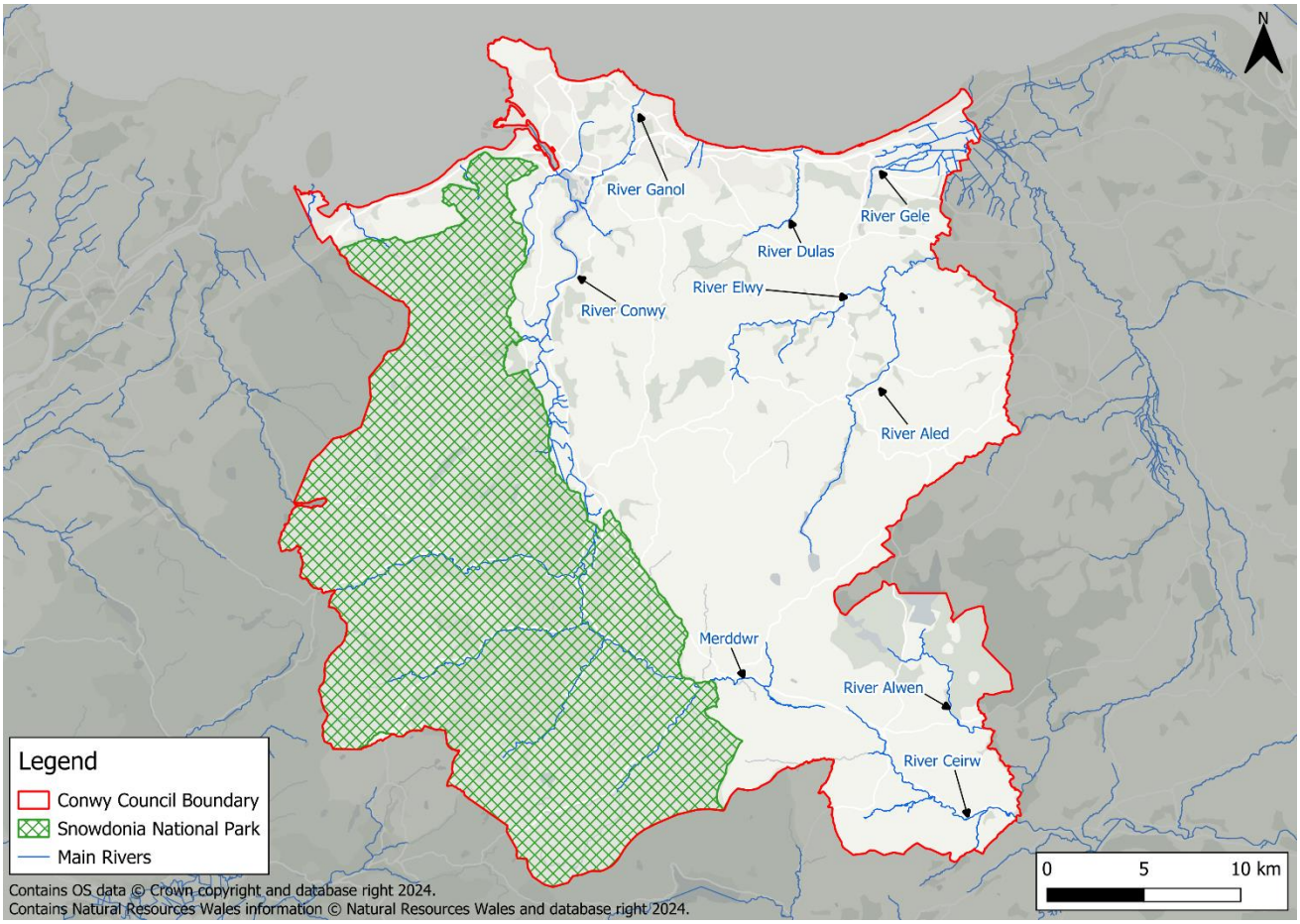


Figure 1-1 Conwy County Borough Council study area

1.2 Project overview

This Stage 2 SFCA has been commissioned by CCBC. This SFCA provides a robust evidence base to inform the Council's Replacement Local Development Plan (RLDP) and will inform the development of RLDP policies and land allocations. The SFCA has been carried out in accordance with the Welsh Government's development planning guidance,

Planning Policy Wales (PPW), Technical Advice Note 15: Development, flooding and coastal erosion (TAN-15) (March 2025) and associated Welsh Government's Chief Planning Officers letters and Welsh Government Flood Consequence Assessment (FCA) Climate Change allowances.

This Stage 2 SFCA builds on the work undertaken in the Stage 1 SFCA (2023) and assesses flood risk at the RLDP allocations.

1.3 Stages of an SFCA

To provide a robust assessment of the potential flood risk, SFCAs should involve the collection, analysis, and presentation of all the available information from all sources of flood risk in the study area.

Typically, SFCAs are completed in three stages, with an increasing level of detail required in the analysis at each stage. The three stages of SFCAs are summarised below in Figure 1-2.

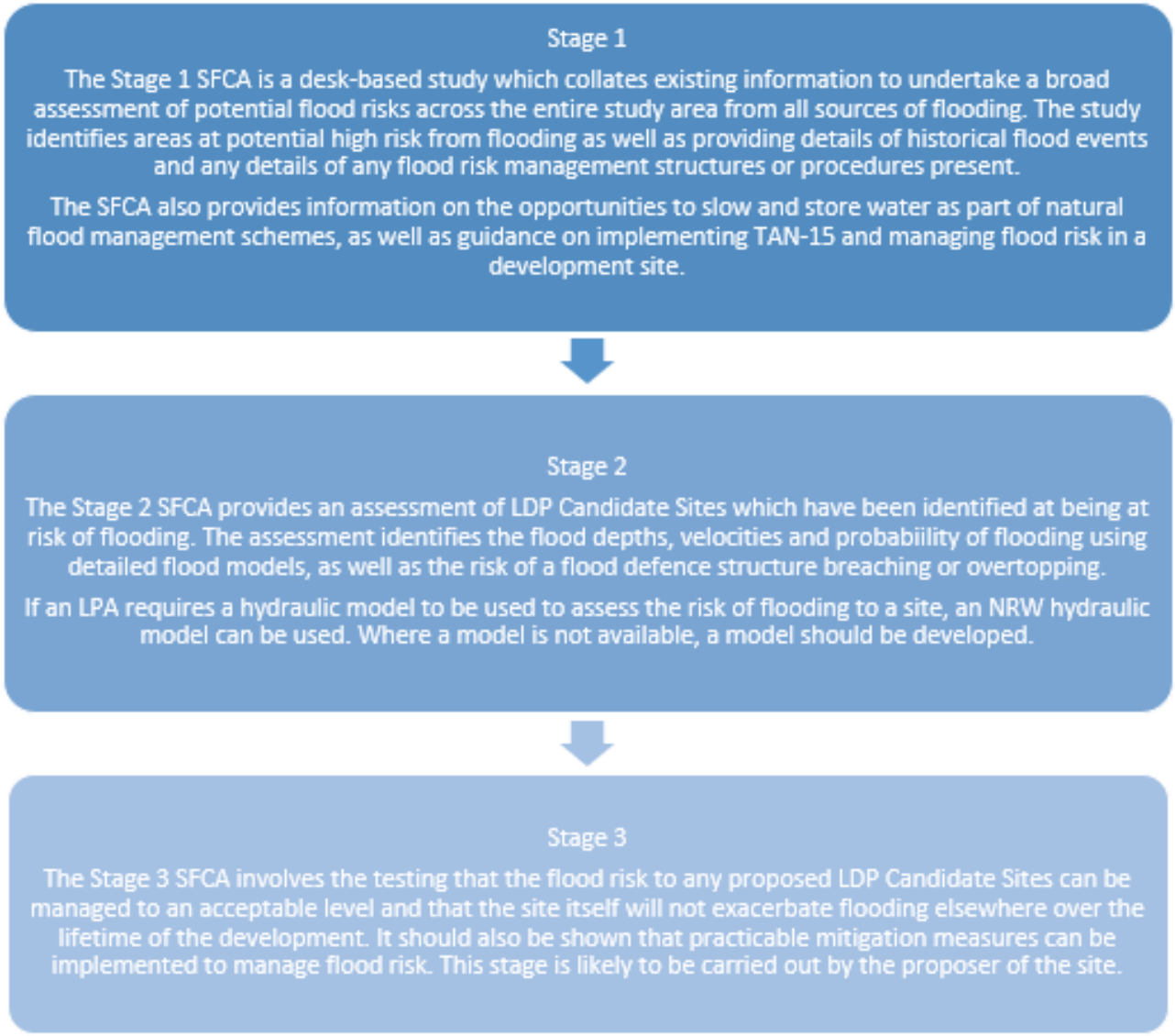


Figure 1-2 Outline of the SFCA process

1.4 Aims of the Stage 2 SFCA

Objectives of this Stage 2 SFCA are to:

- Assess the flood risk to RLDP allocations using the latest available flood risk data and climate change uplifts where available.
- Provide information and mapping to show flood risk from all sources for each allocation.
- Provide recommendations for making the allocation safe from flooding throughout its lifetime of development in accordance with the Justification Test and Acceptability Criteria as outlined in TAN-15.
- Consider, as far as practically possible, the most recent policy legislation in PPW, TAN-15, and Lead Local Flood Authority (LLFA) SuDS guidance.

2 Local policy and guidance

2.1 TAN-15

PPW sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes (TANs), Welsh Government Circulars, and policy clarification letters, which together with PPW provide the national planning policy framework for Wales. These policies have the aim that all development in Wales is sustainable and improve the social, economic, environmental and cultural wellbeing of Wales as set out in the Wellbeing of Future Generations Act 2015.

TAN-15: Development, flooding and coastal erosion sets out the criteria against which the consequences of a development in an area at risk of flooding can be assessed.

TAN-15 also states that local planning authorities should ensure that development is set back appropriately from flood zones to allow for extreme surface water and small watercourse events.

TAN-15 was introduced in 2004 by the Welsh Government. It is technical guidance related to development planning and flood risk using a sequential characterisation of risk based on the Development Advice Map (DAM). An update to TAN-15, which is supported by the Flood Map for Planning (FMfP), was initially released in September 2021 for implementation from December 2021. However, on the 24 November 2021 Welsh Government suspended the implementation of the new TAN-15. This SFCA has been prepared in accordance with the March 2025 release of TAN-15 and the associated FMfP.

TAN-15 reflects the core principles of the National Strategy for Flood and Coastal Erosion Risk Management in Wales to adopt a risk-based approach in respect of new development in areas at risk of flooding and coastal erosion. TAN-15 comprises technical guidance related to development planning and flood risk and provides a framework within which the flood risks arising from rivers, the sea and surface water, and the risk of coastal erosion can be assessed.

Its initial requirement is to identify the flood zones and vulnerability classification relevant to the proposed development, based on an assessment of current and future conditions. An indicative sequence to negotiating the various elements of TAN-15 is provided below in Figure 2-1.

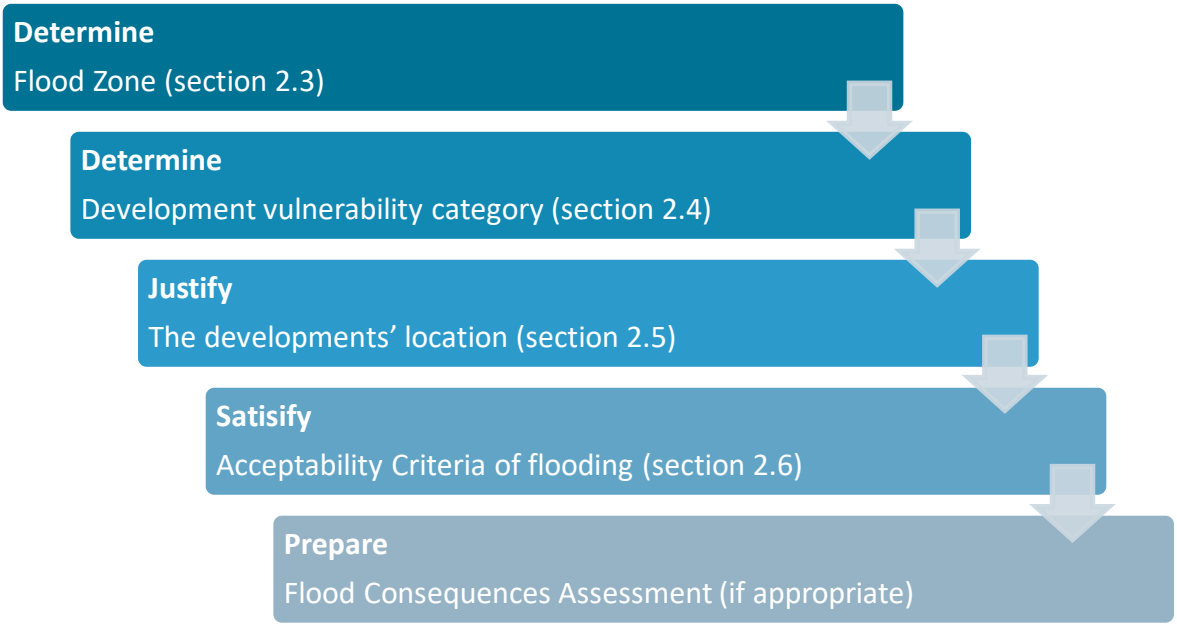


Figure 2-1 Navigating TAN-15 requirements

2.1.1 Flood Map for Planning

The FMfP and the Flood Risk Assessment Wales (FRAW) map together make up the Wales Flood Map. The FMfP is the starting point for consideration of flood risk in the planning system. The FMfP is considered in the site allocation assessment appraisals in Appendix A to direct proposed new development to the lowest areas of flood risk.

Table 2-1 summarises the definition of the flood zones in the FMfP. The FMfP flood extents are based on the central estimates of climate change, assuming a 100-year lifetime of development.

" *The Flood Map for Planning is the starting point for consideration of flood risk in the planning system. The map uses flood zones to indicate the degree to which land is at risk of flooding from rivers, the sea, surface water and small watercourses. This TAN outlines the actions that should be taken when considering development in the different flood zones* ". (TAN-15 para 4.2).

The FMfP is considered in the site allocation assessment appraisals in Appendix A to direct proposed new development to the lowest areas of flood risk.

Table 2-1 TAN-15 Definition of FMfP Flood Zones

Zone	Flooding from Rivers	Flooding from the Sea	Flooding from Surface Water and Small Watercourses
1	Less than 1 in 1000 (0.1%) (plus climate change) chance of flooding in any given year.		
2	Less than 1 in 100 (1%) but greater than 1 in 1000 (0.1%) chance of flooding in a given year, including climate change.	Less than 1 in 200 (0.5%) but greater than 1 in 1000 (0.1%) chance of flooding in a given year, including climate change.	Less than 1 in 100 (1%) but greater than 1 in 1000 (0.1%) chance of flooding in a given year, including climate change.
3	A greater than 1 in 100 (1%) chance of flooding in a given year, including climate change.	A greater than 1 in 200 (0.5%) chance of flooding in a given year, including climate change.	A greater than 1 in 100 (1%) chance of flooding in a given year, including climate change.
TAN-15 Defended Zone	Areas where flood risk management infrastructure provides a minimum standard of protection against flooding from rivers of 1:100 (plus climate change and freeboard).	Areas where flood risk management infrastructure provides a minimum standard of protection against flooding from the sea of 1:200 (plus climate change and freeboard).	Not applicable.

2.1.2 Flood Risk Assessment Wales (FRAW)

The FRAW map displays present day risk and does not account for the impacts of climate change like the FMfP does. The FRAW map provides a comprehensive picture of the nature and scale of flood risks and hazards. The FRAW should be consulted when seeking information about the current risk of flooding to existing properties.

The FRAW map is considered in the site allocation assessment appraisals in Appendix A.

2.2 Flood and Water Management Act - Schedule 3

The Flood and Water Management Act (FWMA) 2010 aims to improve both flood risk management and the way water resources are managed by creating clearer roles and responsibilities and instilling a risk-based approach.

Schedule 3 of the FWMA (2010) was enacted in Wales in January 2019, leading to the requirement for all new developments to incorporate the four pillars of SuDS design, as shown in Figure 2-2. SuDS aim to mimic the natural processes of Greenfield surface water drainage by allowing water to flow along natural flow routes and also aims to reduce the runoff rates and volumes during storm events, whilst providing water treatment benefits.

As part of Schedule 3, the Flood and Water Management Act (2010) established each LLFA as a SuDS Approval Body (SAB). A such, the SAB has responsibility for the approval of proposed drainage systems in new developments and redevelopments. Approval must be given before the developer commences construction, and the SAB are also responsible for adopting and maintaining SuDS which serve more than one property.

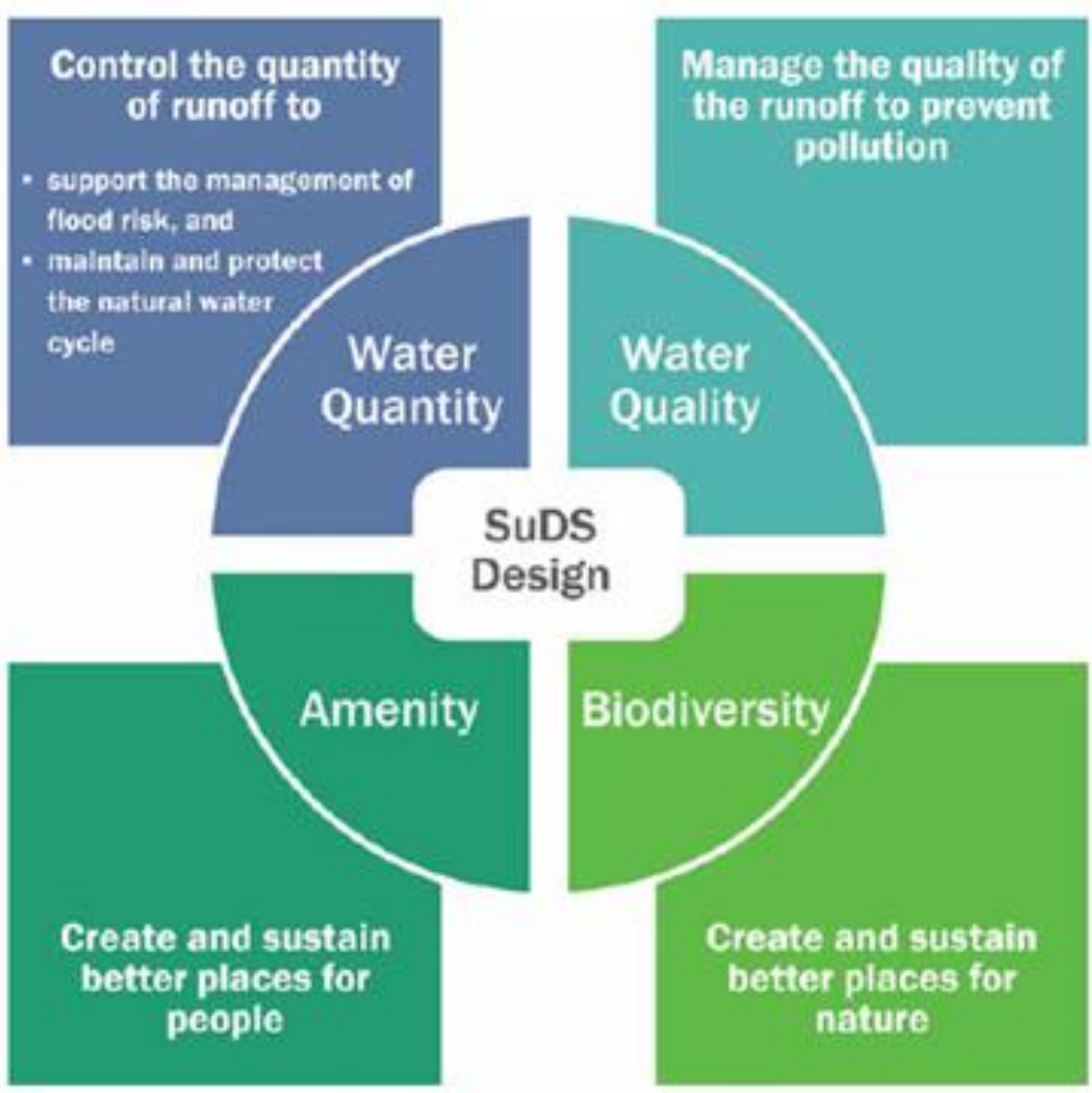


Figure 2-2 Four pillars of SuDS design (CIRIA 2015)

2.3 Local Flood Risk Management Strategy

The LLFA is required to develop, maintain, apply, and monitor its local strategy for flood risk management in its area. The local strategies will build on information such as national risk assessments and will use consistent risk-based approaches across different Local Authority areas and catchments. The local strategy will not be secondary to the National Strategy; rather it will have distinct objectives to manage local flood risks important to local

communities. The CCBC Local Flood Risk Management Strategy[1] (LFRMS) was adopted in February 2013. The strategy objectives seek to achieve the following outcomes:

1. To improve the understanding of local flood and coastal risks;
2. Increasing individual and community awareness and preparedness for flood and coastal erosion events and the impacts of climate change on flood risk;
3. To collaborate with FRMA's, stakeholders and the public to reduce flood and coastal risks, and share data and resources to the greatest benefit;
4. To reduce the impact and consequence for individuals, communities, businesses and the environment from flooding and coastal erosion;
5. To ensure that planning decisions are properly informed by flooding issues and the impact future planning may have on flood risk management and long term developments;
6. Improve and/or maintain the capacity of existing drainage systems by targeted maintenance;
7. Take a sustainable approach to flood risk management balancing economic, environmental and social benefits;
8. Increase approaches that utilise the natural environment;
9. Ensure the development of skills required to implement effective and innovative flood risk management measures; and
10. Identify projects and programmes which are affordable, maximising capital funding from internal and external sources.

1 Conwy Local Flood Risk Management Strategy | February 2013

3 Flood risk in Conwy

3.1 Historic flooding

Figure 3-1 shows the shows the NRW recorded flood outlines dataset. The main sources of recorded flooding are fluvial and surface water. Significant flood events occurring within Conwy are highlighted within the Stage 1 SFCA (2023).

It is important to note that the absence of historic flood records does not mean that an area has never flooded, only that records are not held. For previously undeveloped sites, it is likely that historic flooding incidents may have gone unreported due to a lack of site use or interest. In addition, it is also possible that flooding mechanisms have changed since the date of a recorded flooding incident, making it more or less likely for flooding to occur on site.

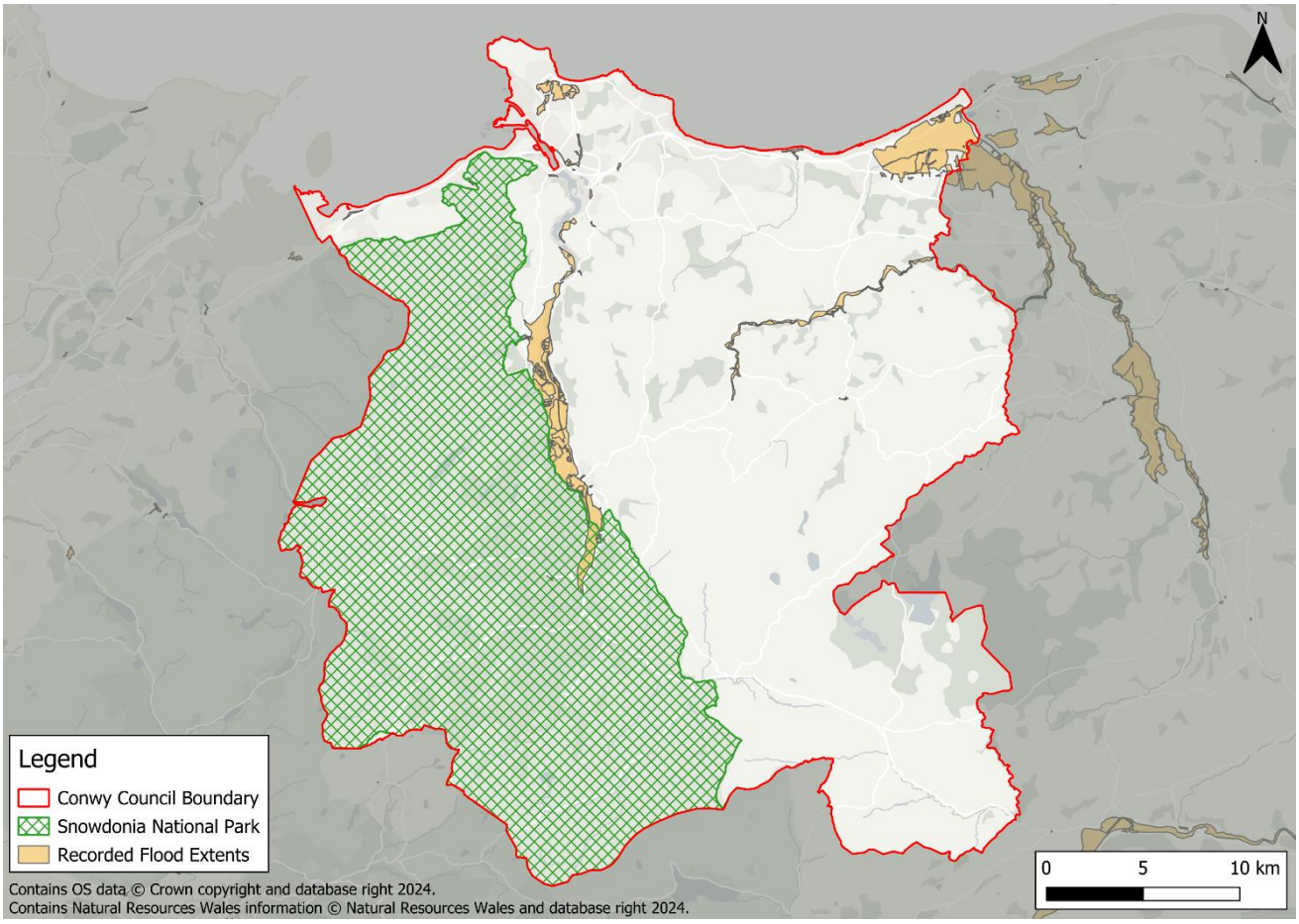


Figure 3-1 Flood Map for Planning - Recorded Flood Extents

3.2 Flooding from rivers

Fluvial flood risk is present throughout Conwy, particularly along main rivers and principal watercourses, namely the River Conwy, River Elwy, River Aled, Merddwr and River Ceirw. Figure 3-2 provides an overview of the fluvial flood risk across Conwy. There are no allocations within the mapped fluvial extent.

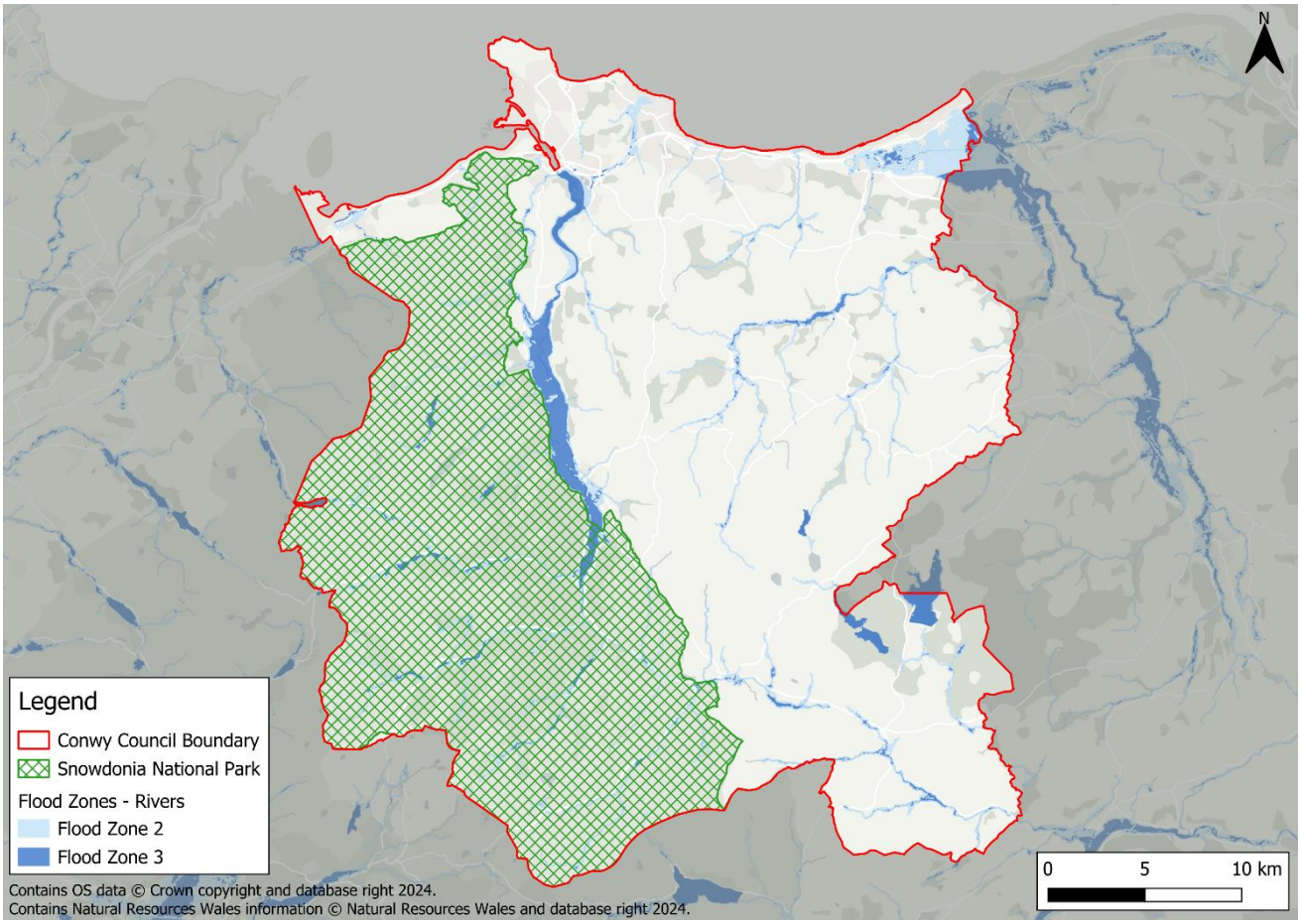


Figure 3-2 Flood Map for Planning - Rivers

3.2.1 Impact of climate change on fluvial flood risk

Climate change is anticipated to increase the risk of fluvial flooding. Welsh Government guidance of climate change for Flood Consequence Assessments[2] sets out climate change allowances to support planning applications and inform development plans. In line with TAN-15, the allowances are informed by latest available information on climate change projections. The anticipated increase in peak river flows for the West Wales and Dee River Basin Districts, which Conwy falls into, are indicated in Table 3-1 and Table 3-2 respectively. Figure 3-3 indicates which areas of Conwy are covered by each river basin district.

It is recommended that the central estimate for the 2080s is used to assess the potential impact of climate change as part of an FCA. For a precautionary approach, the upper end estimate should be used to inform mitigation measures to help ensure the long-term resilience of a development.

2 Flood Consequences Assessments: Climate change allowances | September 2021

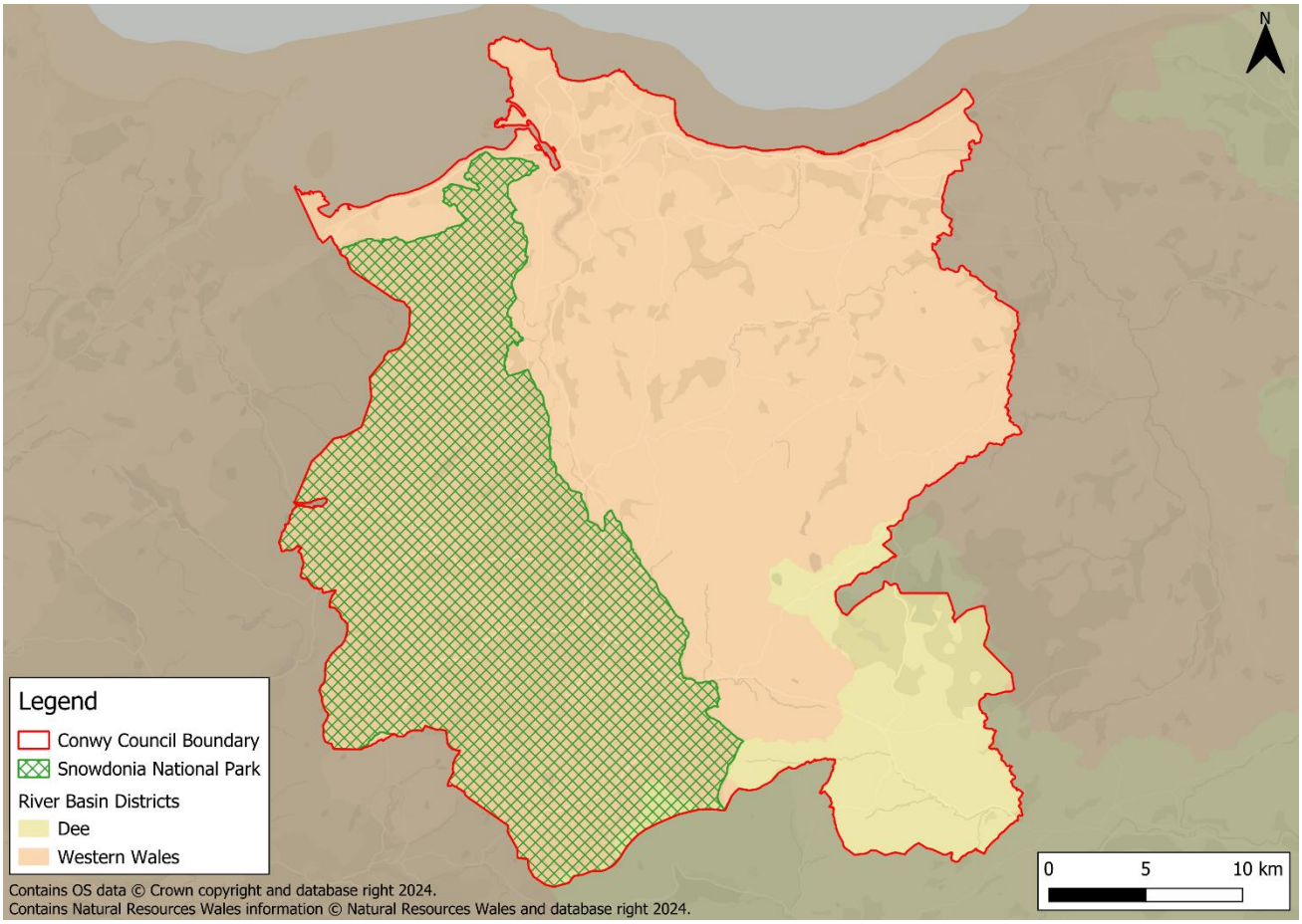


Figure 3-3 River Basin Districts

Table 3-1 Peak river flow allowances for West Wales river basin district

Allowance	Total potential change anticipated by the 2020s	Total potential change anticipated by the 2050s	Total potential change anticipated by the 2080s
Upper end estimate	25%	40%	75%
Central estimate	15%	25%	30%
Lower end estimate	5%	10%	15%

Table 3-2 Peak river flow allowances for Dee river basin district

Allowance	Total potential change anticipated by the 2020s	Total potential change anticipated by the 2050s	Total potential change anticipated by the 2080s
Upper end estimate	20%	30%	45%
Central estimate	10%	15%	20%
Lower end estimate	5%	5%	5%

3.3 Flooding from the sea

Figure 3-4 provides an overview of the tidal flood risk across Conwy. Tidal risk is present adjacent to the north Wales coastline and along tidal watercourses within the county. There are no allocations within the mapped tidal extent.

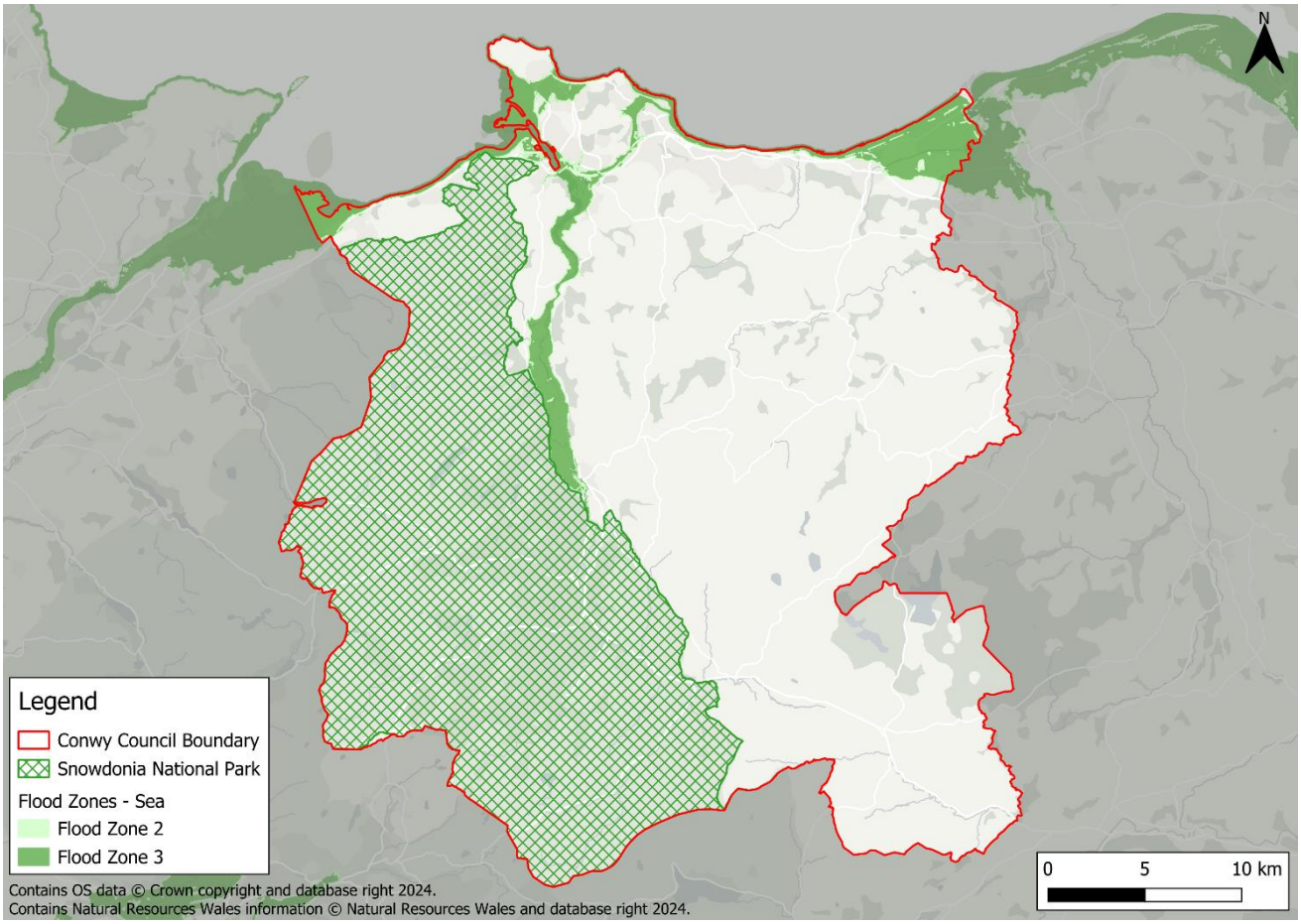


Figure 3-4 Flood Map for Planning - Sea

3.3.1 Impact of climate change on tidal flood risk

Welsh Government guidance has been updated to reflect an increase in global mean surface temperature. Table 3-3 sets out estimates of cumulative sea level rise for Conwy County to 2100 and 2120 (to reflect the 100-year lifetime of development for residential development). The allowances are derived using the UKCP18 2100 dataset.

As a minimum, development proposals should be assessed against the 70th percentile; however, an assessment against the 95th percentile should also be made to inform mitigation measures, access and egress routes and emergency evacuation plans.

Table 3-3 Estimated mean sea level rise for Conwy Local Authority area

Percentile	Mean sea level rise (metres) by 2100	Mean sea level rise (metres) by 2120
70th	0.75	0.89
95th	1.01	1.21

3.4 Surface water flooding

Figure 3-5 illustrates the Flood Map for Planning - Surface Water and Small Watercourses, which shows the potential extent of flooding for the 100-year (Flood Zone 3) and the 1000-year (Flood Zone 2) rainfall events. Risk is spread across Conwy, notably following ordinary watercourses and areas of lower elevation where surface water ponds within topographic low spots. The mapping uses generalised assumptions on the performance of local drainage systems.

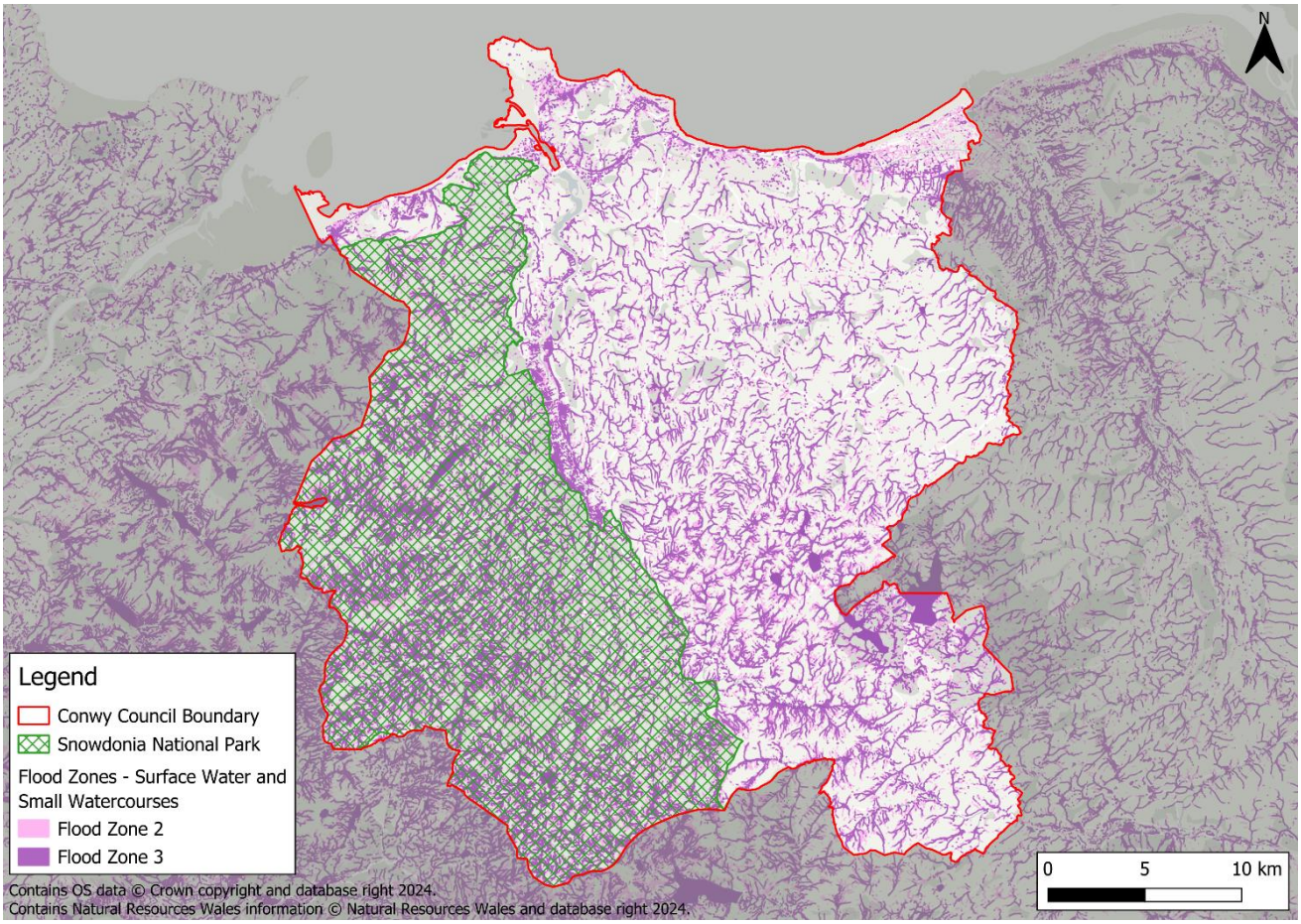


Figure 3-5 Flood Map for Planning - Surface Water and Small Watercourses

3.4.1 Impact of climate change on flood risk from surface water and small watercourses

Climate change is predicted to result in wetter winters and increased summer storm intensities. This increased rainfall intensity will affect land and urban drainage systems, resulting in surface water flooding, due to the increased volume of water entering the system.

Anticipated changes in peak rainfall intensity for small catchments (less than 5km²) is shown in Table 3-4, which is extracted from the Welsh Government climate change guidance. Both the central and upper estimates should be assessed to understand the range of impact, and as a minimum, development proposals should be assessed against the central estimate to inform design levels. Where assessment indicates a significant flood

risk for the upper estimate, the FCA will need to indicate mitigation measures required to protect people and property.

For river catchments over 5km², the peak flow ranges in Section 3.2.1 should be used.

Table 3-4 Peak rainfall intensity (for small catchments only)

Allowance	Total potential change anticipated for 2020s (2015-2039)	Total potential change anticipated for 2050s (2040-2069)	Total potential change anticipated for 2080s (2070-2115)
Upper estimate	10%	20%	40%
Central estimate	5%	10%	20%

3.5 Groundwater flooding

Risk of flooding from groundwater is most notable within the coastal areas of Conwy, and in areas adjacent to the River Dulas, River Cledwen and the River Conwy which runs through the centre of the administrative area. There are also areas at high groundwater flood risk within Llanrwst and Abergele.

JBA has developed a range of Groundwater Flood Map products at the national scale. The 5m resolution JBA Groundwater map has been used within this SFCA and is displayed in Figure 3-6. The modelling involves simulating groundwater levels for a range of return periods (including 75,100 and 200 years). Groundwater levels are then compared to ground surface levels to determine the head difference in metres. The JBA Groundwater Map categorises the head difference (m) into five feature classes based on the 100-year model outputs. These are outlined in Table 3-5.

It should be noted that as the JBA Groundwater Flood Map is based on national modelling it should only be used for general broad scale assessment of the groundwater flood hazard in an area and it is not explicitly designed for the assessment of flood hazard at the scale of a single property, in high-risk areas a site-specific flood consequence assessment for groundwater flooding is recommended to fully inform the likelihood of flooding.

Only two allocations are located within areas that have a possibility of being at risk from groundwater flooding:

- Education Offices, Dinerth Road, Rhos on Sea (Site Ref 132),
- Land south of Aber Road (Site 2), Llanfairfechan (Site Ref 157).

Table 3-5 JBA groundwater flood risk map categories

Flood depth range during 1% AEP flood event	Groundwater flood risk
Groundwater levels are either at or very near (within 0.025m of) the ground surface.	Within this zone there is a risk of groundwater flooding to both surface and subsurface assets. Groundwater may emerge at significant rates and has the capacity to flow overland and/or pond within any topographic low spots.
Groundwater levels ate between 0.025m and 0.5m below the ground surface.	Within this zone there is a risk of groundwater flooding to both surface and subsurface assets. There is the possibility of groundwater emerging at the surface locally.
Groundwater levels are between 0.5m and 5m below the ground surface.	There is a risk of flooding to subsurface assets, but surface manifestation of groundwater is unlikely.
Groundwater levels are at least 5m below the ground surface.	Flooding from groundwater is not likely.
No risk.	This zone is deemed as having a negligible risk from groundwater flooding due to the nature of the local geological deposits.

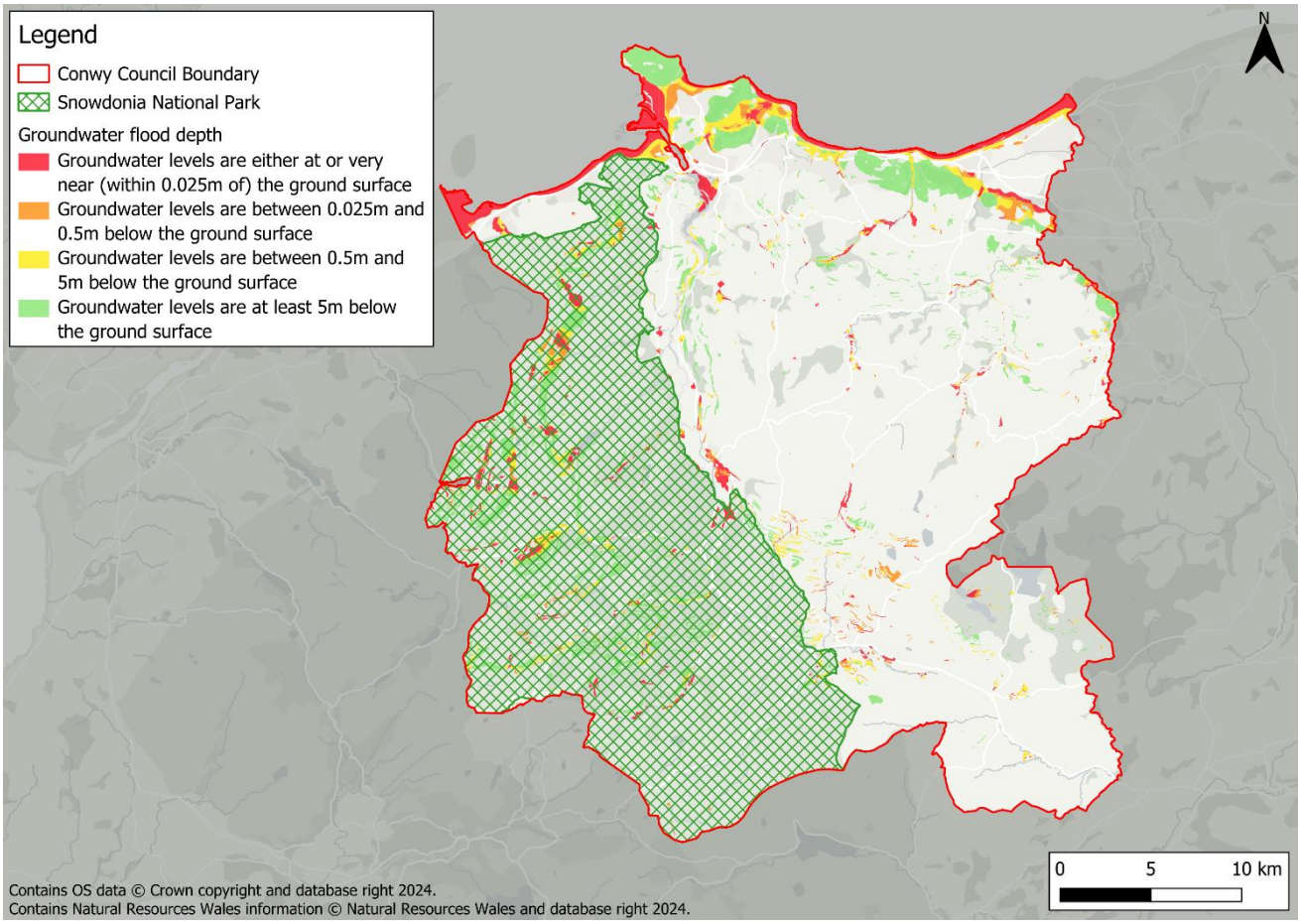


Figure 3-6 Flood risk from groundwater

3.5.1 Impact of climate change on groundwater flooding

The impact of climate change is more uncertain for groundwater flooding associated with river catchments and watercourses where groundwater has a large influence on winter flood flows. Changes in frequency and intensity of groundwater flooding due to climate change would depend on the flooding mechanism and geological characteristics.

Milder, wetter winters may increase the frequency of groundwater flooding incidents in areas that are already susceptible, but warmer drier summers may counteract this effect by drawing down groundwater levels to a greater extent during the summer months.

In the coastal floodplain, it is possible that the rise in mean sea level could affect the influence of groundwater and affect the capability of drainage systems and watercourses as means of drainage. In circumstances where such effects could be material over the lifetime of development, more detailed assessment should be performed to identify and address any matters that could affect the proposed development.

3.6 Reservoir flooding

The risk of inundation following a reservoir breach or failure has been identified using the Flood Map for Planning - Flood Risk from Reservoirs dataset, shown in Figure 3-7. The failure of a reservoir could cause catastrophic damage due to the sudden release of large

volumes of water. However, reservoirs in the UK have an excellent safety record, and NRW is the enforcement authority for the Reservoirs Act 1975 in Wales. All large reservoirs must be regularly inspected with any essential safety work carried out supervised by qualified reservoir panel engineers. These reservoirs, therefore present a minimal risk. There are no allocations mapped to be within the risk of flooding from reservoirs extent.

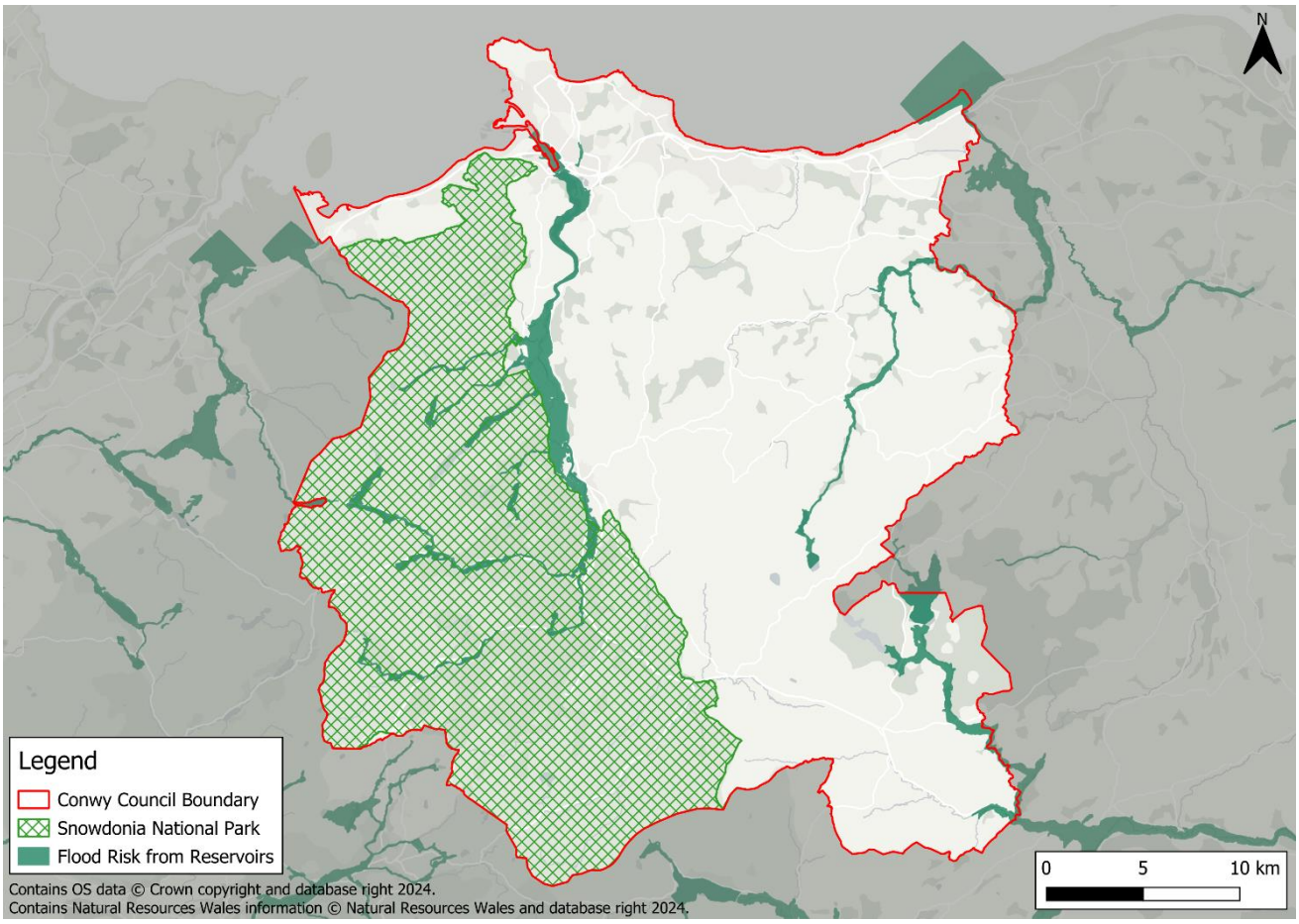


Figure 3-7 Flood Map for Planning - Flood Risk from Reservoirs

3.7 Sewer flooding

Flooding from sewers occurs when rainfall exceeds the capacity of networks or when there is infrastructure failure. This includes combined and surface water sewers, sewer pumping stations and water treatment facilities. The impact of sewer flooding is usually confined to relatively small, localised areas. However, flooding associated with blockage or failure of the sewer network can be rapid and unpredictable. Dŵr Cymru Welsh Water (DCWW) is responsible for sewer infrastructure across the study area and for recording sewer flooding incidents.

3.7.1 Impact of climate change on sewer flooding

Climate change is likely to result in an increase in sewer flooding incidents as a result of its interaction with other flood risk sources. Where sewer flooding is known to be an issue, this should be considered at the planning application stage. The LLFA and DCWW should be

consulted to provide specific advice on any known history of sewer flooding and any remedial action required.

3.8 Residual risk

The existence of robust flood defences does not mean development should be permitted without further consideration of flood risks. Flood defences reduce the risk of flooding but do not eliminate it. The consequences of flooding can be particularly severe in the event of defences being overtopped or breached, resulting in rapid and hazardous flooding. Furthermore, hydraulic structures such as bridges and culverts can block, and pumps sluices, and flaps can fail to operate.

Where appropriate, a site-specific FCA should demonstrate that in the event of overtopping, breach, or blockage, the consequences of flooding can be managed to an acceptable level. This will be needed for allocations that benefit from the type of defences that can be breached or blocked, including flood embankments, sea walls and culverts. NRW and/or the LLFA should be consulted at an early stage to discuss the requirement for residual risk assessment, technical assumptions and the application to the acceptability criteria.

4 Stage 2 site appraisals

4.1 Site appraisals

When allocating land for development, consideration should be given to the potential cumulative impact of the loss of floodplain storage volume and potential effects of increased volumes of runoff from proposed development. Whilst the loss of storage or potential increase in flow volume for individual developments may only have minimal impact on flood risk, the cumulative effect of multiple developments may be more severe.

RLDP allocations within the study area were provided by CCBC. Site summary reports are included for the 12 allocation sites in Appendix A, including recommendations for further evaluation and management of flood risk at each of the allocations.

Notwithstanding the recommendations of this Stage 2 SFCA, site-specific FCAs will need to be undertaken in accordance with the latest policy, guidance, flood risk and defence information including for the contents of the SFCA.

5 Summary

This Stage 2 SFCA delivers site-specific guidance and recommendations for 12 RLDP allocations within the Conwy County Borough Council authority area. It should be read in conjunction with the Stage 1 SFCA, which provides a strategic assessment of all sources of flooding in the administrative area.

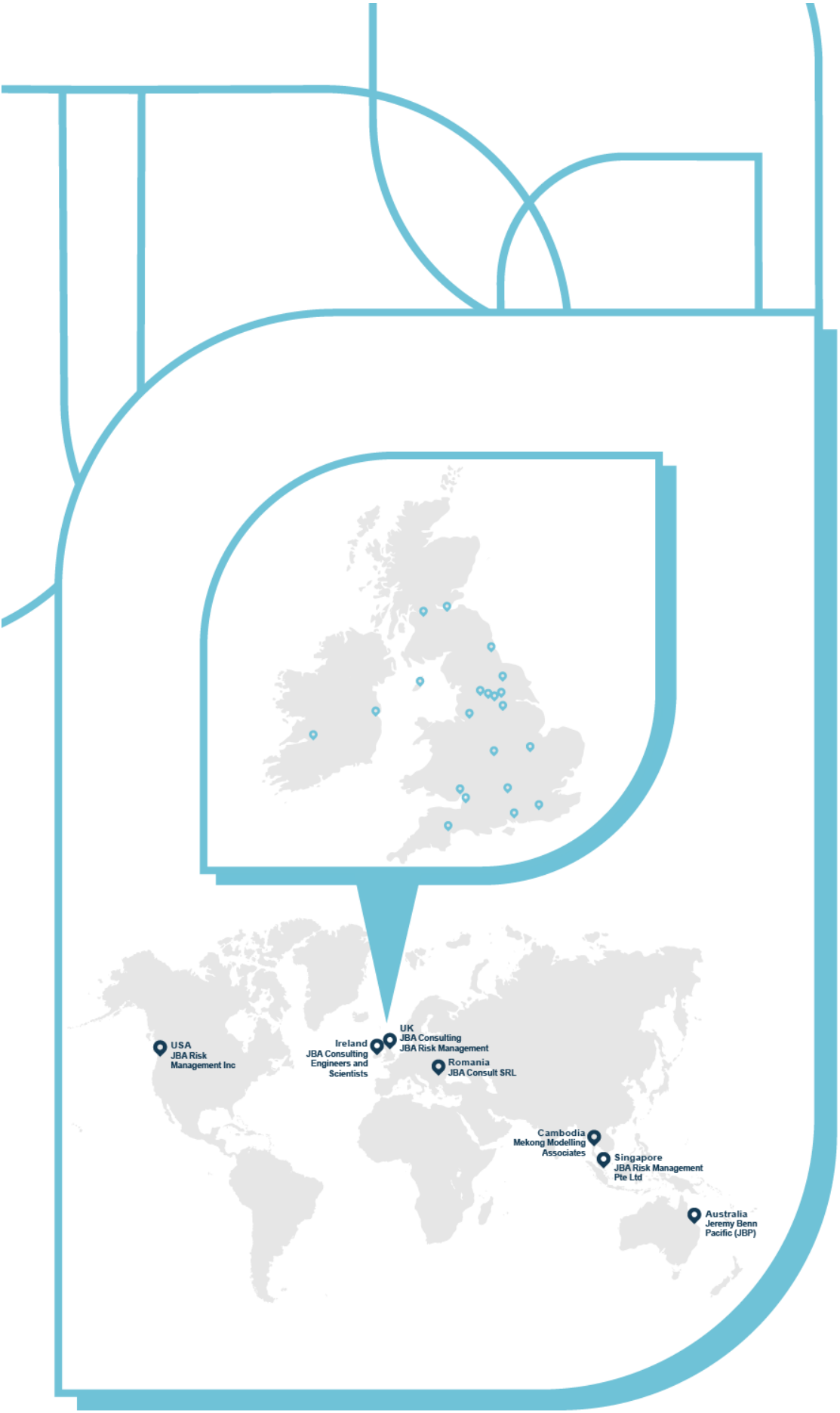
Recommendations from this report should be considered in addition to recommendations within Section 9.2 the Stage 1 SFCA.

It is important to note that this SFCA has been developed using the best available information at the time of writing. This relates both to the current risk of flooding from all sources and the potential impacts of future climate change.

This SFCA should be treated as a 'live' document, and as a result should be updated when new information on flood risk, flood warning, or new planning guidance or legislation becomes available. Additional guidance should be sought from CCBC, NRW and DCWW to ensure that the most up to date information is considered within any new assessments. Such information may be in the form of:

- Policy / legislation updates
- Flood event information
- New hydraulic modelling outputs
- Flood Map for Planning updates
- New flood defence or alleviation schemes

NRW regularly review their flood risk mapping, and it is important that they are approached to determine whether updated information is available prior to commencing an FCA.



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