Peak District National Park Authority

Peak District National Park

Level 1 Strategic Flood Risk Assessment

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Prepared for:

Peak District National Park Authority

Purpose

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1 Executive Summary

1.1.1 PJA have been commissioned by the Peak District National Park Authority (PDNPA) to prepare a Level 1 Strategic Flood Risk Assessment (SFRA) to support the Evidence Base for the preparation of the Peak District National Park Local Plan.

1.1.2 This Report aims to provide a comprehensive and robust evidence base on flood risk issues across the Peak District National Park Authority area, utilising the best available information at the time of writing.

1.2 Objectives

1.2.1 The key objectives of the study are:

- Present current flood risks, whilst considering future flood risks.
- Enable informed decision making for local authorities, developers, communities and environmental leaders, which promote sustainable development and reduce vulnerability in the area.
- Support long-term adaptation strategies amid climate change.
- Provide stakeholders with the evidence base to apply Sequential Tests and Exception Tests.

1.3 Summary of Flood Risk in the Peak District National Park

Table 1-1: Flood Risk Summary

Source	Summary
Fluvial	There are multiple watercourses which generate flood risk in the PDNP area. The source of the River Derwent is within the centre of the PDNP and flows south, along the eastern border of the park boundary. This is met by the River Wye, which flows into the park to the east of Buxton, and meets the Derwent along the south-eastern boundary. The River Wye flows through Bakewell; the most densely populated town in the PDNP. Due to Bakewell's proximity to the River Wye, a large proportion of the town is identified to be located within Flood Zones 2 & 3.
Surface Water	High, medium and low surface water flood risk is identified across a large area in the northern moorlands of the PDNP, however due to the low levels of population density and infrastructure this is not considered to be of immediate concern. In more densely populated areas (e.g. Bakewell, Heathersage and Bradwell), areas of low, medium and high surface water flood risk is identified associated with ordinary watercourses, areas of development and other localised features (e.g. railway embankments, areas of low and high ground etc.).
Groundwater	Potential for groundwater flooding varies across the PDNP. There are localised areas where groundwater flooding has potential to occur at surface, with the majority of the PDNP having limited potential for groundwater flooding to occur.
Sewer	Due to the size of the PDNP, sewer infrastructure is managed by three water authorities: Severn Trent Water, United Utilities and Yorkshire Water. Severn Trent Water, covering approximately 990km^2 area of the PDNP, have records of 212 of sewer flood incidents within the PDNP United Utilities covers an area of 230km^2 at the east of the PDNP and have had no reports of sewer flooding in the PDNP area due to hydraulic overload (exceeding capacity).

Source	Summary
	Yorkshire Water covers an area of 227km^2 at the north-west of the PDNP and whilst they have been consulted in writing this SFRA, no response has been received at the time of writing.
Canals	The Huddersfield narrow canal is the only canal within the PDNP boundary. It passes underground of the northern tip (to its western side) inside of the Standedge Tunnel, which is the longest canal tunnel in the UK. Due to this canal passing through the PDNP entirely underground, the risk of canal flooding within the PDNP is considered very low.
Reservoirs	The primary flood risk from reservoirs originates from the Howden, Derwent and Ladybower reservoirs located in the Upper Derwent Valley. These reservoirs hold approximately 46bn litres, which should failure occur, would generate extensive flooding in the southeastern area of the PDNP.
Failure of Flood Defences	Engineered flood defences are associated with both the River Wye and the River Derwent, as they flow into the more densely populated areas in the south eastern parts of the PDNP. Key flood defences to note are sections of engineered high ground in Bakewell Town Centre (nearby Bakewell Bridge) due to risk caused by the River Wye, as well as areas of engineered high ground in Castleton and Bradwell (tributaries of the River Derwent), followed by Grindleford and Baslow as the River Derwent flows south though the PDNP Boundary.

1.3.1 Flood risk mapping is available at the SFRA Mapping Portal, by scanning the following QR Code:

1.3.2 The SFRA Mapping Portal can also be found at the following web address: https://arcg.is/1P1bD42

1.4 How to use this Level 1 SFRA Report[1]

1.4.1 This Level 1 SFRA will be used to inform the Local Plan and other spatial development strategies.

1.4.2 This Level 1 SFRA will be used to inform developers and consultants in:

- identifying the requirements of a site-specific flood risk assessment
- informing site-specific flood risk assessments
- informing surface water management approaches, particularly with regard to implementing Sustainable Drainage Systems (SuDS)

[1] https://www.gov.uk/guidance/local-planning-authorities-strategic-flood-risk-assessment#how-the-sfra-helps-your-local-planning-authority

- providing evidence to support sequential and exception tests for individual applications, where necessary
- identifying opportunities for development in reducing the causes and impacts of flooding

1.4.3 This Level 1 SFRA will be used by emergency planners, the emergency services and local resilience forums to:

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

1.4.4 This Level 1 SFRA will be used by risk management authorities (RMAs) to:

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

1.4.5 This Level 1 SFRA will be used by the PDNP's constituent authorities within the area to inform their work, which may include, but are not exclusive to:

- Highways
- Transport
- Public health
- Local design guides or codes
- Economic growth
- Infrastructure planning
- Green infrastructure strategies
- Local nature recovery strategies
- GIS and data management
- Parks & recreation

1.4.6 This Level 1 SFRA will be used by neighbourhood planning bodies when considering whether the following may be appropriate for development:

- neighbourhood planning areas
- neighbourhood development orders
- community right to build orders

1.4.7 This Level 1 SFRA will also be used:

- by other local planning authorities and constituent authorities to inform their SFRAs, particularly in relation to cross-border risks and opportunities.

2 Introduction

2.1 Document Purpose

2.1.1 PJA have been commissioned by the Peak District National Park Authority (PDNPA) to conduct a Level 1 Strategic Flood Risk Assessment (Level 1 SFRA). This Level 1 SFRA will provide a high-level informed review of known flood risk sources and provide essential information for the PDNPA Local Plan.

2.1.2 This Level 1 SFRA will replace the 'Peak Sub Region Level 1 Strategic Flood Risk Assessment' which was published in September 2008.

2.1.3 Strategic policies should be informed by a Level 1 SFRA and should manage flood risk from all sources. This Level 1 SFRA:

- Considers cumulative impacts in, or affecting, local areas susceptible to flooding.
- Takes account of advice from the Environment Agency and other relevant flood risk management authorities e.g., lead local flood authorities (LLFAs) and water companies.
- Helps to inform the Sequential Test, both for the PDNP Local Plan and for individual planning applications.
- Helps to inform the Exception Test for the PDNP Local Plan and for individual planning applications when development proposals are located in flood risk areas.
- Sets out when a Flood Risk Assessment is required for individual development applications.
- Establishes if a development can come forwards without increasing flood risk elsewhere.

2.2 Previous Work

2.2.1 The PDNP has a pre-existing Level 1 SFRA which was completed in 2008, assessing all forms of flood risk and took climate change's impacts into account. The Level 1 SFRA used maps and GIS layers to interrogate descriptive information within the PDNP boundary, with data that was relevant at the time of publication.

2.3 Study Area

2.3.1 The Peak District National Park (PDNP) is in Central England and covers approximately 1,437km^2. The PDNP comprises two main areas; the Dark Peak to the north of the park, and the White Peak to its south/southwest, as identified in Figure 2-1.

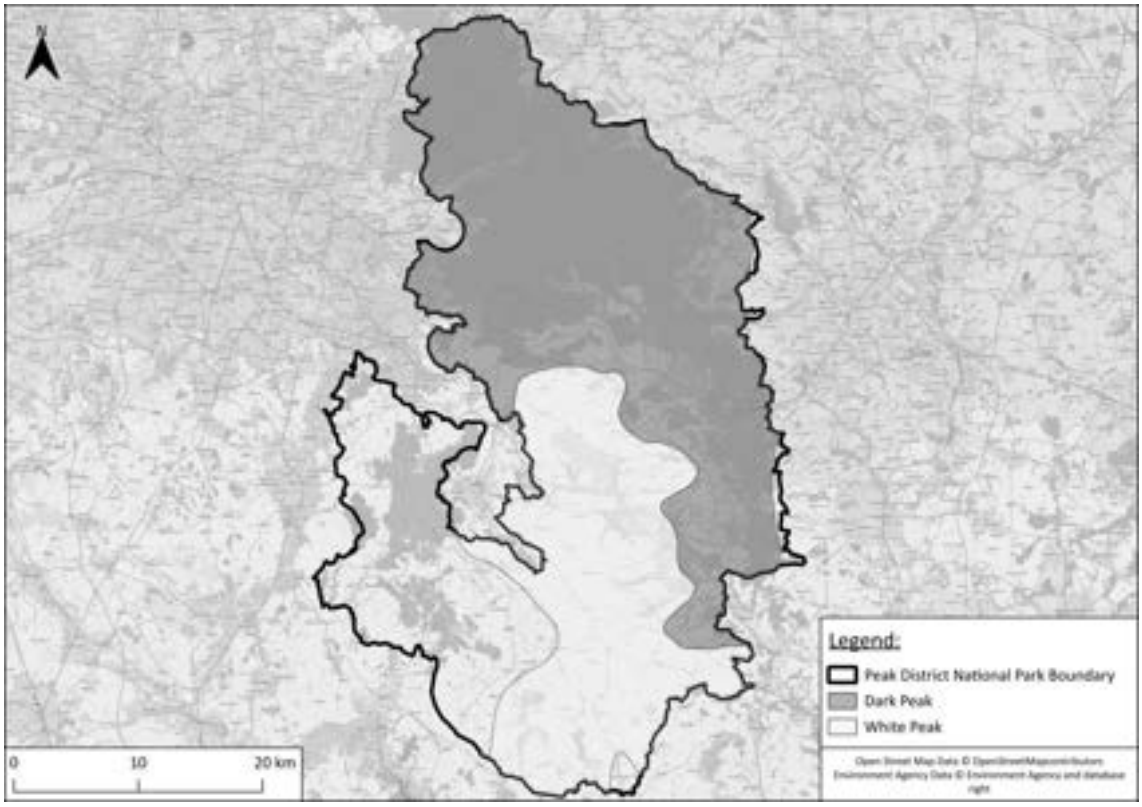

Figure 2-1: White Peak and Dark Peak

2.3.2 Due to its size and geographical location, the Peak District National Park crosses numerous unitary or higher tier Council jurisdictions, which include:

- Derbyshire County Council
- Staffordshire County Council
- Barnsley Metropolitan Borough Council
- Cheshire East Council
- Kirklees Council
- Oldham Council
- Sheffield City Council

2.3.3 The unitary and higher tier Council jurisdictions are illustrated in Figure 2-2.

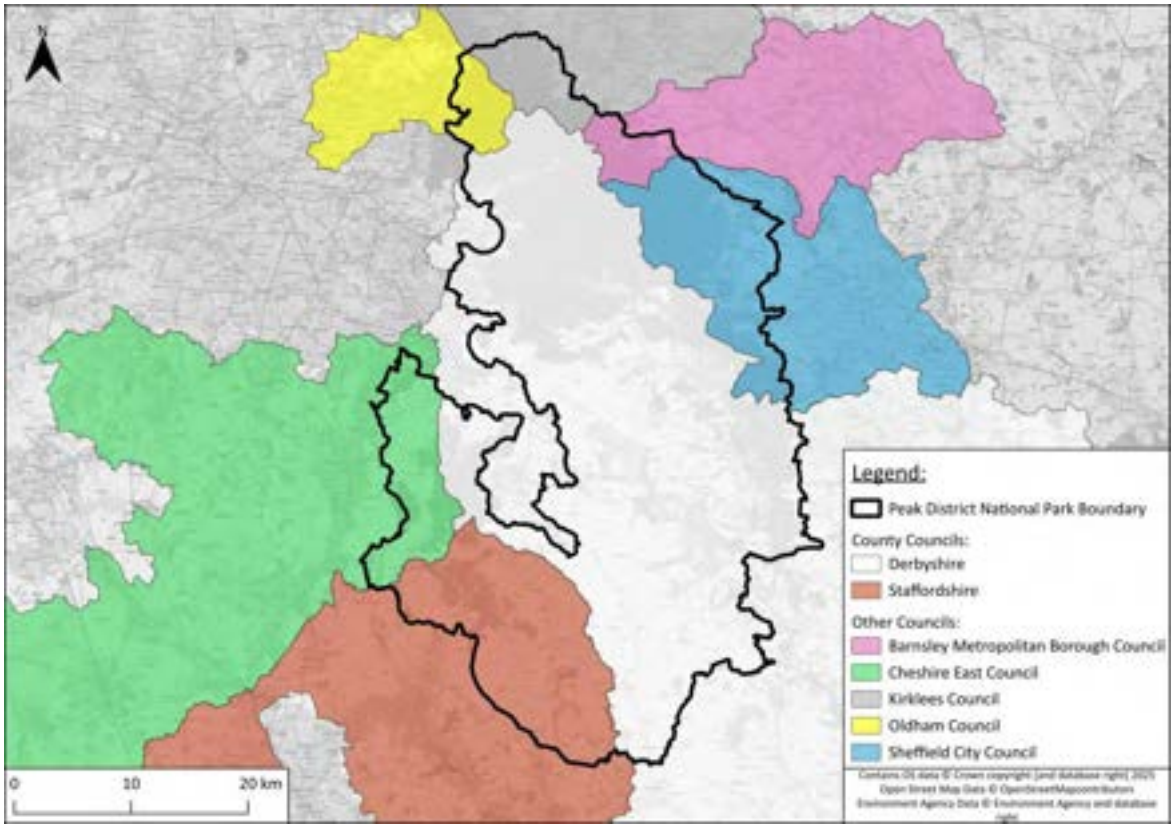

Figure 2-2: Unitary and higher tier Councils associated with the PDNP.

2.3.4 In addition to multiple unitary and higher tier Councils, numerous District and Borough (lower tier) Councils are associated with the PDNP, including:

- Derbyshire Dales District Council
- Staffordshire Moorlands District Council
- High Peak Borough Council
- Northeast Derbyshire District Council
- Sheffield City Council
- Barnsley Metropolitan Borough Council
- Kirklees Council
- Oldham Council
- Tameside Metropolitan Borough Council
- Cheshire East Council
- Stockport Metropolitan Borough Council

2.3.5 Figure 2-3 illustrates the PDNP with regard to the District and Borough authorities.

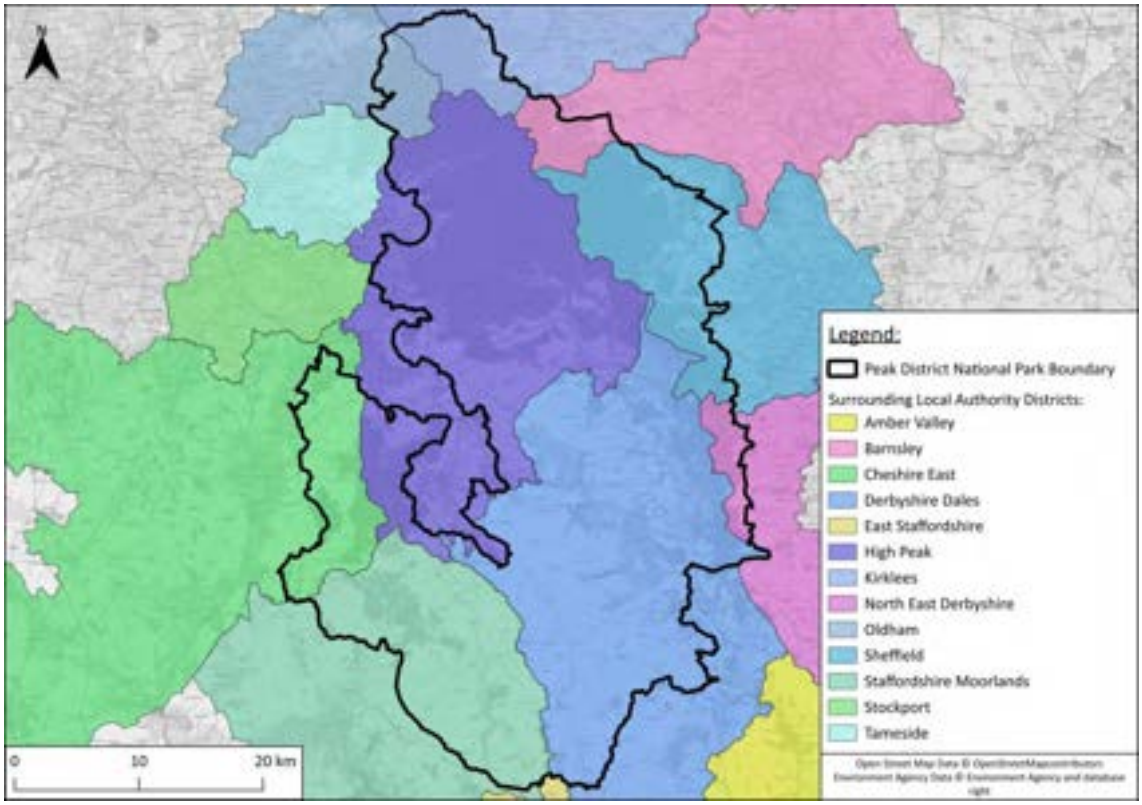

Figure 2-3: Peak District National Park with reference to the surrounding authorities.

2.3.6 Furthermore, there are several additional smaller parish and neighbourhood Councils within the PDNP.

2.4 SFRA Levels

2.4.1 All local planning authorities are required to produce a Level 1 SFRA and may also need to produce a Level 2 SFRA depending on whether your local authority has plans for development in flood risk areas[2].

2.4.2 A Level 1 SFRA is required to provide sufficient detail so that all flood risk areas may be identified, which should:

(1) Be based on all known sources of flooding
(2) Take into account Climate Change
(3) Not consider flood management features (e.g., defences) unless they may increase flood risk

[2] https://www.gov.uk/guidance/local-planning-authorities-strategic-flood-risk-assessment#how-the-sfra-helps-your-local-planning-authority

2.4.3 A Level 2 SFRA is required where it is demonstrated that all future development cannot be implemented outside areas identified to be at flood risk or if the Council anticipates a high number of planning applications in flood risk areas, which are not identified in the Local Plan.

2.5 Consultation

2.5.1 Table 2-1 summarises the risk management authorities that have been consulted during the preparation of this Level 1 SFRA.

Table 2-1: Consultation

Stakeholder Consultation	
Lead Local Flood Authorities	Barnsley Metropolitan Borough Council
	Cheshire East Council
	Derbyshire County Council
	Kirklees Metropolitan Borough Council
	Oldham Metropolitan Borough Council
	Sheffield City Council
	Staffordshire County Council
Local Planning Authorities/District Councils	Barnsley Metropolitan Borough Council
	Cheshire East Council
	Derbyshire Dales District Council
	High Peak Borough Council
	Kirklees Metropolitan Borough Council
	North East Derbyshire District Council
	Oldham Metropolitan Borough Council
	Sheffield City Council
	Staffordshire Moorlands District Council
Water & Sewerage Companies	Severn Trent Water
	United Utilities
	Yorkshire Water
Environment Agency	
Canal & River Trust	
National Highways	

2.6 Level 1 SFRA Outputs

2.6.1 The key outputs from this Level 1 SFRA comprise:

- Identification of key flood risk policy (national and local) and national guidance.
- Appraisal of known sources of flooding from accessible information.
- Review and mapping of historic flood incidents.
- Mapping of flood risk from all known sources, inclusive of the influence of climate change.
- Identification of which areas of the PDNP will be most at risk of flooding in the future.
- A comprehensive insight of suitable development areas to planners and developers.
- Recommendations to planners and developers for Sequential Test requirements.
- Methods to mitigate flood risk in future developments.

3 Flood Risk Policy, Strategy & Guidance

3.1 Flood Risk Roles & Responsibilities

3.1.1 The key Risk Management Authorities (RMAs), and associated roles and responsibilities, within the PDNP area are summarised in Table 3-1.

Table 3-1: RMAs and Their Associated Roles & Responsibilities in Relation to SFRAs

Risk Management Authority	Strategic Role & Responsibilities	Operational Role & Responsibilities	Planning Role & Responsibilities
Environment Agency	- Strategic overview of flooding from fluvial sources of flooding and water quality / pollution	- Main Rivers. - Reservoirs	- Statutory consultee for developments in Flood Zones 2 and 3 and over 1ha
Lead Local Flood Authorities (LLFAs).	- Produce Preliminary Flood Risk Assessments - Produce Flood Risk Management Strategy	- Groundwater - Surface Water - Ordinary Watercourses	- Statutory consultee for all major developments in relation to surface water drainage and flood risk from groundwater, surface water flood risk and flood risk from ordinary watercourses
Borough / District Councils	- Produce Local Plans as Local Planning Authority	- - Manage open spaces under Council ownership	- Local Planning Authority who determine planning applications
Highway Authorities	- Highway drainage	- Highway drainage	- Statutory consultee for highways
Yorkshire Water, Severn Trent and United Utilities	- management of surface and foul drainage assets - Develop Drainage and Wastewater Management Plans	- Public sewer networks	- Non-statutory consultee

3.2 Relevant Legislation, & National Policy

3.2.1 The PDNP is classified as a Category V Protected Area under the International Union for Conservation of Nature (IUCN) World Commission on Protected Areas classification system.

3.2.2 The relevant flood risk and drainage legislation, national policy and guidance outlined in Table 3-2 has been considered.

Table 3-2: Relevant National Legislation, Policy & Guidance

Legislation	Policy	Guidance
Town and Country Planning Act (1990)	National Planning Policy Framework (NPPF) (December 202 with minor amendments February 2025)	Environment Agency Flood Risk Assessments: Climate Change Guidance (August 2022)
Water Industry Act (1991)		Planning Practice Guidance (PPG): Flood Risk & Coastal Change (September 2025)
Land Drainage Act (1991)		Flood Risk Assessments: Applying for Planning Permission
Flood Risk Regulations (2009)		Construction Industry Research and Information Association (CIRIA) C753 'The SuDS Manual' (CIRIA, 2015)
Flood & Water Management Act (2010)		Sewerage Sector Guidance (Water UK, 2023)
Water Environment Regulations (2017)		National Standards for Sustainable Drainage Systems (SuDS) (DEFRA, June 2025)
Environment Act (2021)		

3.3 Relevant Local Policy

3.3.1 As there are a number of local authorities which fall under the PDNP, relevant local policy varies and has been reviewed in terms of Flood Risk and Drainage below.

3.3.2 Policy relating to flood risk and drainage outlined by Local Planning Authorities and the PDNP is critical to steer development to the most appropriate locations and ensure it does not increase flood risk elsewhere Table 3-3 sets out the most salient points from each Local Plan however, these policies should be read in full within the policy documents.

Table 3-3: Policy Review

Flood Risk	Drainage
Peak District National Park Authority – Local Development Framework, 2011 Policy CC1, CC2 and CC5	
New development supported in areas with lowest risk of current and future flooding and without increasing risk of flooding elsewhere. Development must not damage or inhibit existing flood defence / flood risk management structures or measures and will not cause or worsen flooding on site or elsewhere, reducing flood risk where possible. Where a watercourse is present, applicants expected to undertake river restoration and enhance natural river corridors in line with the Water Framework Directive. Development should be laid out to enable adequate watercourse maintenance and must allow an appropriate set-back distance for maintenance.	Implement SuDS to reduce risk of surface water runoff flooding and contribute to onsite flood alleviation. This should be informed by specific catchment and ground characteristics. Undertake discussions with LLFA to ensure SuDS can be fully integrated into development layout.
Derbyshire Dales Local Plan, Adopted 2017 – Policies PD7, PD8 & PD9	
The salient points in relation to flood risk from Policies PD,8 and 9 have been reprinted below: • New development is supported in areas with lowest risk of current and future flooding and without increasing the risk of flooding elsewhere. • Development must consider all relevant Catchment Flood Management Plans and Local Flood Risk Management Strategies. • Development must not damage or inhibit existing flood defence / flood risk management structures or measures and will not cause or worsen flooding on site or elsewhere, reducing flood risk where possible. • Development must be subject to site-specific FRA demonstrating flood resilience, resistance and safety for its users for the lifetime of the development. • Schemes in flood risk areas should demonstrate how the sequential approach as set out by NPPF has been used to demonstrate this is the only site where development can be located, and to locate most vulnerable parts of development in areas of lowest flood risk. • Development in areas with known ground and surface water flooding issues will seek to provide betterment in flood storage and remove obstructions to flood flow routes where appropriate.	Wherever possible SuDS will be expected to contribute towards wider sustainability considerations, including amenity, recreation, conservation of biodiversity and landscape character, making use of the role that trees, woodland and other green infrastructure play in flood alleviation and water quality control.
High Peak Local Plan, Adopted 2016 (EQ10 & EQ11)	
New development supported in areas with lowest risk of current and future flooding and without increasing risk of flooding elsewhere. Development must consider all relevant Catchment Flood Management Plans and Local Flood Risk Management Strategies.	Development, including proposals for SuDS should have regard to the Buxton Mineral Water Catchment Area, and Nitrate Vulnerable and Groundwater Source Protection Zones in terms of their impact on water quality and quantity. Wherever possible SuDS will be expected to contribute towards wider sustainability considerations, including amenity, recreation, conservation of biodiversity and landscape

Flood Risk	Drainage
Development must not damage or inhibit existing flood defence / flood risk management structures or measures and will not cause or worsen flooding on site or elsewhere, reducing flood risk where possible. Development must be subject to site-specific FRA demonstrating flood resilience and resistance and safe for its users for the lifetime of the development. Schemes in flood risk areas should demonstrate how the sequential approach, as set out by NPPF, has been used to demonstrate this is the only site where development can be located, and to locate most vulnerable parts of development in areas of lowest flood risk. Where a watercourse is present, applicants expected to undertake river restoration and enhance natural river corridors in line with the Water Framework Directive. Development should be laid out to enable adequate watercourse maintenance and must allow an appropriate set-back distance for maintenance. Culverting of watercourse will not normally be permitted, and development should open up culverted watercourses to increase flood water storage and create green corridors.	character, making use of the role that trees, woodland and other green infrastructure play in flood alleviation and water quality control
Staffordshire Moorlands Local Plan, Adopted 2020 (Policies SD4 and 5)	
New development will be supported in areas with lowest risk of current and future flooding and without increasing risk of flooding elsewhere. Development must consider all relevant Catchment Flood Management Plans and Local Flood Risk Management Strategies. Development must be subject to site-specific FRA demonstrating flood resilience and resistance and safe for its users for the lifetime of the development. Schemes in flood risk areas should demonstrate how the sequential approach, as set out by NPPF, has been used to demonstrate this is the only site where development can be located, and to locate most vulnerable parts of development in areas of lowest flood risk. Where a watercourse is present, applicants expected to undertake river restoration and enhance natural river corridors in line with the Water Framework Directive. Development should be laid out to enable adequate watercourse maintenance and must allow an appropriate set-back distance for maintenance.	SuDS should be implemented to reduce risk of surface water runoff flooding and contribute to onsite flood alleviation. This should be informed by specific catchment and ground characteristics. Undertake discussions with LLFA to ensure SuDS can be fully integrated into development layout. Preference for new development to include genuine sustainable drainage systems as opposed to underground tanked storage for surface water. Approved development proposals expected to be supplemented by appropriate maintenance and management regimes for surface water drainage schemes. Wherever possible SuDS will be expected to contribute towards wider sustainability considerations, including amenity, recreation, conservation of biodiversity and landscape character, making use of the role that trees, woodland and other green infrastructure play in flood alleviation and water quality control. On brownfield sites aim to reduce runoff rates and volumes. On greenfield sites aim to ensure that there is no increase in the rate and volume of surface water runoff.

Flood Risk	Drainage
Culverting of a watercourse will not normally be permitted, and development should open up culverted watercourses to increase flood water storage and create green corridors. Support implementation of Natural Flood Management (NFM) measures that contribute to reduced local and catchment wide flood risk and impacts of climate change.	Surface water from new development should be discharged in the following order of priority: An adequate soakaway or some other form of Sustainable Drainage System An attenuated discharge to watercourse. An attenuated discharge to public surface water sewer or highway drain. An attenuated discharge to public combined sewer.
North East Derbyshire Local Plan, Adopted 2021 (Policies SD11)	
Development must be subject to site-specific FRA demonstrating flood resilience and resistance and safe for its users for the lifetime of the development. Schemes in flood risk areas should demonstrate how the sequential approach as set out by NPPF has been used to demonstrate this is the only site where development can be located, and to locate most vulnerable parts of development in areas of lowest flood risk.	Implement SuDS to reduce risk of surface water runoff flooding and contribute to onsite flood alleviation. This should be informed by specific catchment and ground characteristics. Undertake discussions with LLFA to ensure SuDS can be fully integrated into development layout. Development will only be permitted where adequate foul water treatment and drainage infrastructure currently exists or can be made available to serve the development unless the developer can demonstrate acceptable alternative private solutions.

3.3.3 The following surrounding relevant local authorities in, and adjacent to, the PDNP do not address the PDNP in their Local Plans, and therefore have not been reviewed as part of this Level 1 SFRA:

- Oldham Metropolitan Borough Council
- Cheshire East Council
- Sheffield City Council
- Barnsley Metropolitan Borough Council
- Kirklees Metropolitan Borough Council

4 Understanding of Flood Risk within the Peak District National Park

4.1.1 Flood risk within the PDNP has been assessed based on a review of publicly available information (e.g., Environment Agency flood data). A summary of the flood risk is contained in Table 4-1.

Table 4-1: Flood Risk Summary

Source	Summary
Fluvial	There are multiple watercourses which generate flood risk in the PDNP area. The source of the River Derwent is within the centre of the PDNP and flows south, along the eastern border of the park boundary. This is met by the River Wye, which flows into the park to the east of Buxton, and meets the Derwent along the south-eastern boundary. The River Wye flows through Bakewell; the most densely populated town in the PDNP. Due to Bakewell's proximity to the River Wye, a large proportion of the town is identified to be located within Flood Zones 2 & 3.
Surface Water	High, medium and low surface water flood risk is identified across a large area in the northern moorlands of the PDNP, however due to the low levels of population density and infrastructure this is not considered to be of immediate concern. In more densely populated areas (e.g. Bakewell, Heathersage and Bradwell) areas of low, medium and high surface water flood risk is identified associated with ordinary watercourses, areas of development and other localised features (e.g. railway embankments, areas of low and high ground etc.).
Groundwater	Potential for groundwater flooding varies across the PDNP. There are pockets of areas where groundwater flooding has potential to occur at surface across the PDNP, with the majority of the PDNP having limited potential for groundwater flooding to occur.
Sewer	Due to the size of the PDNP, sewer infrastructure is managed by three water authorities: Severn Trent Water, United Utilities and Yorkshire Water. Severn Trent Water, covering approximately 990km^2 area of the PDNP, have records of 212 of sewer flood incidents within the PDNP United Utilities covers an area of 230km^2 at the east of the PDNP and have had no reports of sewer flooding in the PDNP area due to hydraulic overload (exceeding capacity). Yorkshire Water covers an area of 227km^2 at the north-west of the PDNP and whilst they have been consulted in writing this SFRA, no response has been received at the time of writing.
Canals	The Huddersfield narrow canal is the only canal within the PDNP boundary. It passes underground of the northern tip (to its western side) inside of the Standedge Tunnel, which is the longest canal tunnel in the UK. Due to this canal passing through the PDNP boundary entirely underground, the risk of canal flooding within the PDNP is considered very low.
Reservoirs	The primary flood risk from reservoirs originates from the Howden, Derwent and Ladybower reservoirs located in the Upper Derwent Valley. These reservoirs hold approximately 46bn litres, which should failure occur, would generate extensive flooding in the southeastern area of the PDNP.

Source	Summary
Failure of Flood Defences	Engineered flood defences are associated with both the River Wye and the River Derwent, as they flow more into the more densely populated areas in the south eastern parts of the PDNP. Key flood defences to note are sections of engineered high ground in Bakewell Town Centre (nearby Bakewell Bridge) due to risk caused by the River Wye, as well as areas of engineered high ground in Castleton and Bradwell (tributaries of the River Derwent), followed by Grindleford and Baslow as the River Derwent flows south though the PDNP Boundary.

4.2 Sources of Flooding

4.2.1 Flooding can be caused by numerous mechanisms which can greatly affect the duration, intensity and impact of any flood event with regard to people, properties and the environment.

4.2.2 The known sources of flooding within the PDNP are summarised below:

- **Fluvial** – Occurs when water levels within rivers exceed the bank levels, spilling onto surrounding adjacent land (e.g. floodplains). This type of flooding can be impacted by features within, and adjacent to rivers (e.g. bridges, culvert, embankments etc.).
- **Groundwater** – Occurs when the below ground water table rises above the surface.
- **Surface Water** – Occurs when rain lands on the surface and is unable to enter a formal/designated system (e.g. pipe network, attenuation area, watercourse etc.) for conveying surface water.
- **Sewerage Failure** – Occurs when blocked or overloaded sewage systems cause water to back up from the underground systems into properties, this is more common in extended periods of heavy precipitation but also can occur due to rising groundwater levels.
- **Reservoir Failure** – Occurs when reservoirs fail in terms of their structure or overtopping their banks.
- **Canal** – Mainly occurs when adjacent rivers overflow, causing the volume of water to exceed the canal's banks. This can also be caused by canal failure, due to insufficient maintenance or by structural damage (e.g., caused by storm events).

4.3 Likelihood

4.3.1 Flood likelihood, or probability, is the chance of a flood occurring in any given year.

4.3.2 Sources of flooding may also be categorised by the chance of them occurring annually (i.e. Annual Exceedance Probability (AEP)) such as fluvial and surface water flood risk being categorised in this way. Due to the management and maintenance of other sources of flood risk (e.g., reservoirs and sewers), the likelihood is much more difficult to ascertain.

4.3.3 Likelihood is constantly changing over time for all areas, the reason for which is largely associated with the impacts of climate change (such as prolonged dry periods followed by intense rainfall events are likely to increase flooding due to reducing lag times in the hydrological system).

4.4 Consequence

4.4.1 The consequences of flooding vary drastically.

4.4.2 Flooding in urban areas can damage properties, cause injury at different rates dependant on the victims' demographics, negatively affect the mental health of victims of floods, and damage numerous aspects of the living environment. These consequences can be influenced by the remoteness of the area which is flooding; the availability of rescue resources, the level/duration of the flood among other factors.

4.4.3 This portrays the importance of well-informed flood risk information to minimise the likelihood of developments from flooding, both at present and in the future.

4.5 Risk

4.5.1 There is no set scale for defining the risk of flooding due to the vast differences of characteristics between different types of floods, and their catchment areas. Due to the extent of the PDNP, the risk of floods will vary dramatically within each region depending on its context and the respective flood mechanism.

4.5.2 Risk will incorporate the primary sources of flooding for an area and will consider any flood defences or flood management structures to evaluate potential dangers to people, property and local environment within the risk area.

Residual Risk

4.5.3 The residual risk of flooding refers to the risk which remains in place from flood defences and other management structures e.g., flooding caused by an intense rainfall event which the existing drainage system cannot accommodate, as well as residual risk to a development after specific flood control measures are evaluated e.g., a failure of flood forecasting/warning.

4.6 Topography, Geology & Hydrology

4.6.1 Topography, geology and hydrology are all influencing factors in how a catchment manages rainfall.

Topography

4.6.2 Northern areas of the PDNP contain peaks of around 500-600mAOD in elevation, which are also accompanied with steep valleys where watercourses form in low-laying areas. The south and

southern areas of the PDNP are at a lower elevation (approximately 350-100mAOD), with two predominant low-lying valleys, approximately 100mAOD, associated with the Main Rivers of the River Derwent and River Wye.

4.6.3 An extract of the publicly available 1m Digital Terrain Model (DTM) LiDAR data is contained in Figure 4-1.

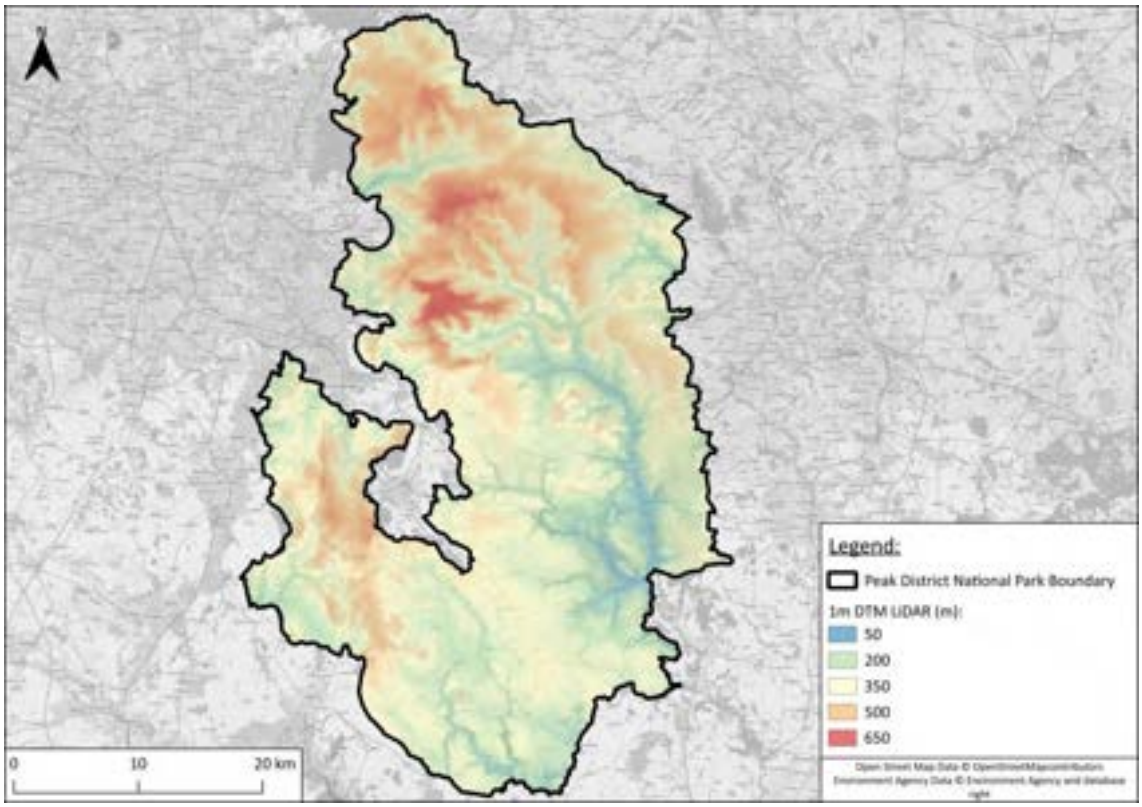

Figure 4-1: PDNP 1m DTM LiDAR Data

4.7 Geology

4.7.1 The bedrock geology of the northern western extent of the Peak District National Park consists largely of Carboniferous Millstone Grit Group, which includes:

- Mudstone
- Siltstone
- Sandstone

4.7.2 The bedrock geology of the central and southern areas of the PDNP consist of Dinantian Rocks from the Mississippian age. The rock type is mainly formed of:

- Limestone with subordinate sandstone and argillaceous rocks

4.7.3 The bedrock which exists within the hydrological regimes in the PDNP (from southeast & southwest up to western boundary,) are Bowland high group and Craven Group carboniferous rocks, including:

- Mudstone
- Siltstone
- Sandstone

4.7.4 On the eastern/northeastern PDNP boundary, and within the Southwest corner of the PDNP, the bedrock geology comprises Pennine lower coal measures formation from the Bashkirian age, which consists of:

- Mudstone
- Siltstone
- Sandstone
- Coal
- Ironstone
- Ferricrete

4.7.5 The superficial geology, particularly to the north of the PDNP, consists largely of sedimentary deposits from organic materials. The existence of peat in the elevated northern parts of the PDNP is common, identifying potential areas of bogs and swamps. It should be noted that this northern area of the PDNP is largely uninhabited, with few manmade structures.

4.7.6 Lower areas in the PDNP, e.g., the large valleys to the eastern side and to the south of the boundary, contain superficial deposits of Alluvium; clay, silt, sand and gravel. These are largely associated with watercourses within these areas. Extracts of this mapping is shown in Figure 4-2 and 4-3.

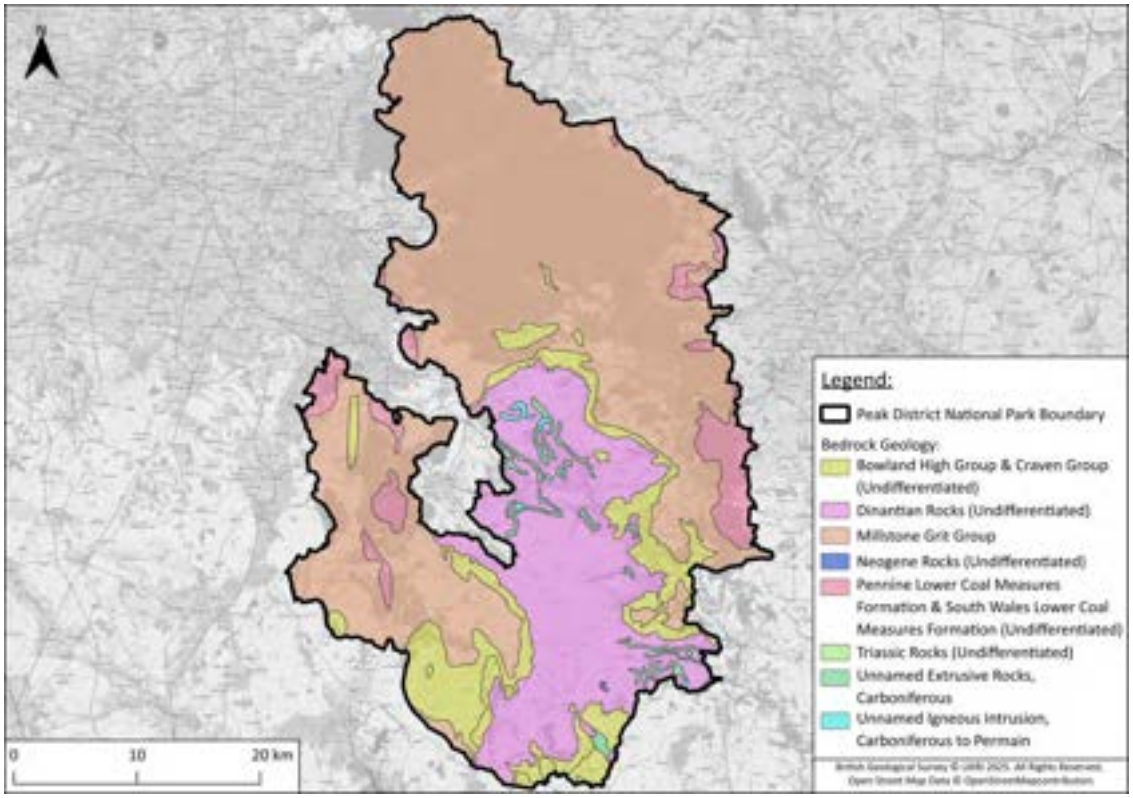

Figure 4-2: BGS Bedrock Geology Map Extract

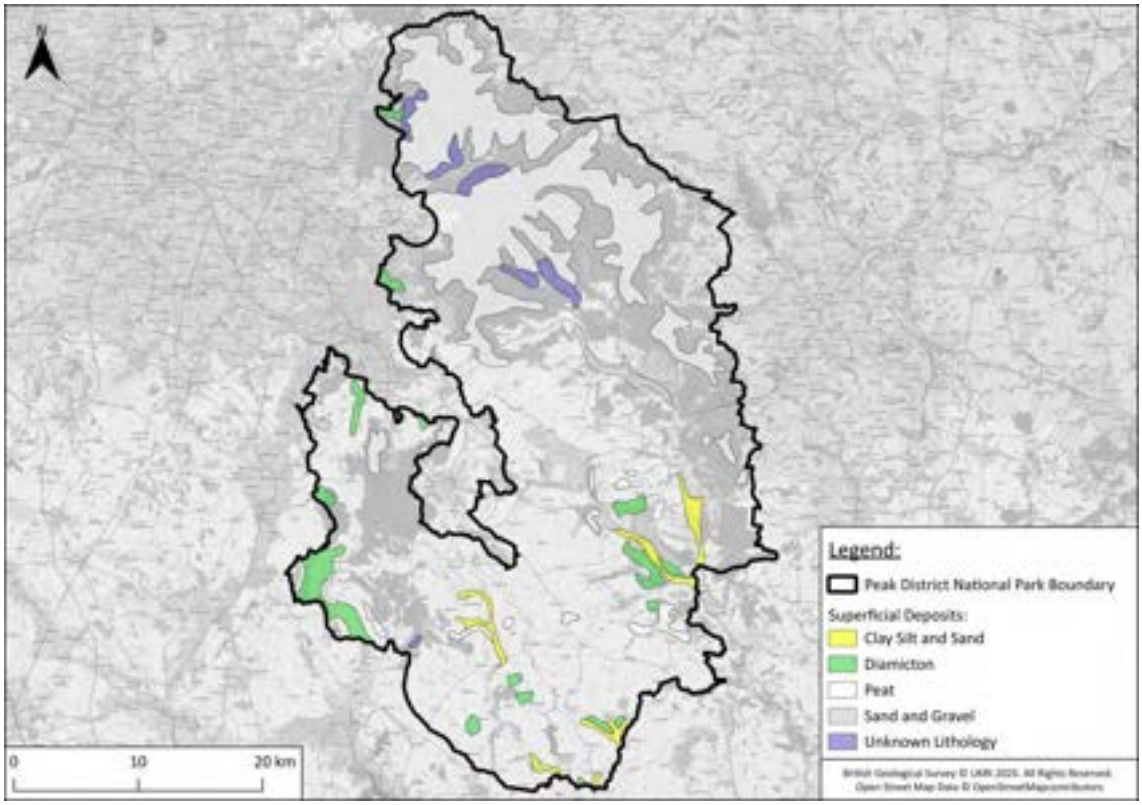

Figure 4-3: BGS Superficial Deposits Map Extract

4.8 Soils

4.8.1 Figure 4-1 contains information from the LandIS Soilscape Viewer and identifies that there is a large proportion of '*freely draining slightly acid but base-rich soils*' in the southern/central areas of the PDNP. This is in addition to blanket bog peat soils to the north of the boundary and freely draining slightly acid loamy soils to the boundary's east, among other smaller areas of differing types of soil.

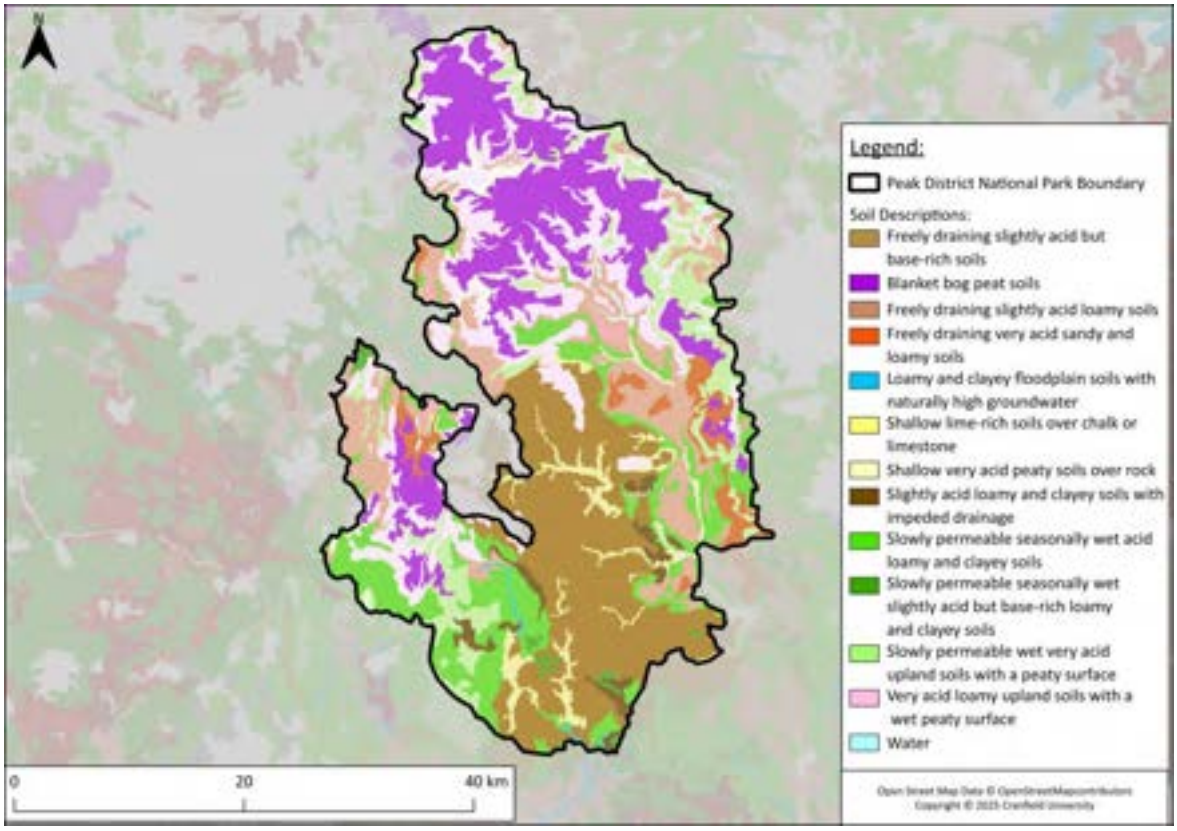

Figure 4-4: LandIS Soilscape Viewer Map Extract

4.9 Hydrology.

4.9.1 There are two main watercourses which flow throughout the PDNP, as shown in Figure 4-5. The source of the River Derwent is within the centre of the PDNP and flows south, along the eastern border of the park boundary. This is met by the River Wye, which flows into the park to the east of Buxton, and meets the Derwent along the south-eastern boundary.

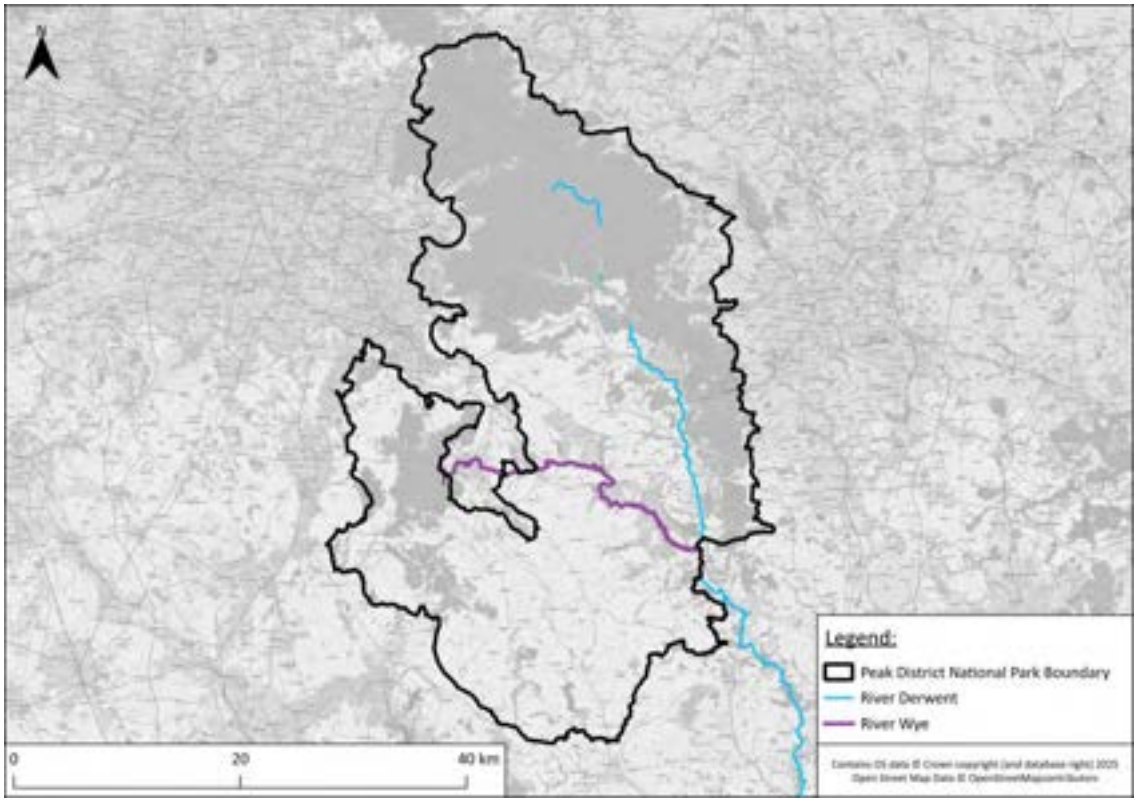

Figure 4-5: Main rivers found within the PDNP

4.9.2 Within Figure 4-5 the River Derwent appears to be split into numerous sections in the northern half of the PDNP. The river is split due to the extents of stored water from the Howden Dam and Derwent & Ladybower reservoirs located in the PDNP.

4.10 Historic Reports of Flooding

4.10.1 The Environment Agency hold records of land that have previously been subject to flooding in England. This excludes flooding from surface water, except in areas where it is impossible to determine whether the source is fluvial or surface water, but the dominant source is fluvial. with records spanning from 1946. An extract of this mapping is contained in Figure 4-6.

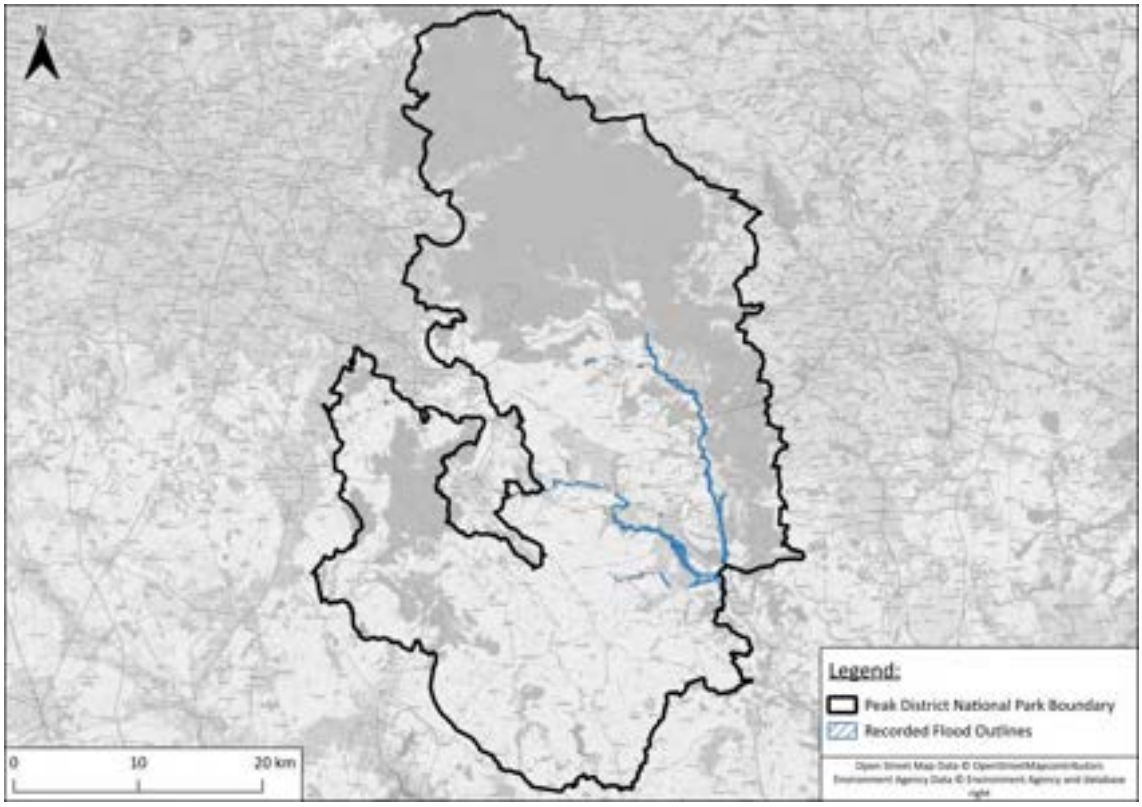

Figure 4-6: Recorded Flood Outlines Map Extract

4.10.2 The Environment Agency Recorded Flood Outlines data identifies two main areas which have recorded flooding from these sources, which primarily extend to the two valleys of the PDNP.

4.10.3 The collapse of a spillway at Toddbrook Reservoir (containing 1,280,000-million-gallon), near Whaley Bridge in August 2019 resulted in the evacuation of approximately 1,500 residents. This collapse caused a severe flood risk warning to the town of Whaley Bridge, which was followed by the evacuation of the town's residents as emergency services worked to contain the risk and associated damage to the reservoir.

4.10.4 There are seven LLFAs which operate within the PDNP. Each LLFA was consulted as part of the writing of this Level 1 SFRA to obtain any records of flooding they hold within the PDNP.

Table 4-2: LLFA Reported Incidents of Flooding within the PDNP

LLFA	Reported Incidents of Highway Flooding within the PDNP	Reported Incidents of Internal Property Flooding within the PDNP	Other Reported Incidents of Flooding within the PDNP
Derbyshire County Council	No available log on highway flooding incidents (N/A)	There are 189 records of internally flooded properties within the PDNP under Derbyshire County Council's jurisdiction, illustrated in Appendix D.	N/A
Staffordshire County Council	N/A	N/A	N/A
Cheshire East Council	No response provided at the time of writing		
Kirklees Council	N/A	N/A	N/A
Barnsley Council	N/A	N/A	N/A
Oldham Council	N/A	N/A	N/A
Sheffield Council	N/A	There are no records of historic flooding of property in the Sheffield City Council area which is within the Peak District National Park Boundary.	The only notable community in the area with property (non-residential sports fields) in Flood Zones is Lower Bradfield. This area is at potential risk from an unnamed ordinary watercourse.

4.10.5 Additionally, District Councils that are not LLFAs were also consulted to confirm any records of flooding and of those who replied to the data request, all confirmed they held no records of flooding. This information is presented in Table 4-3.

Table 4-3: Additional Local Planning Authority Reports of Incidents within the PDNP

LPA	Reported Incidents of Highway Flooding within the PDNP	Reported Incidents of Internal Property Flooding within the PDNP	Other Reported Incidents of Flooding within the PDNP
Derbyshire Dales District Council	N/A	N/A	N/A
High Peak Borough Council	No response provided at the time of writing		
North-East Derbyshire District Council	N/A	N/A	N/A
Staffordshire County Council	N/A	N/A	N/A

4.11 Fluvial Flood Risk

4.11.1 Fluvial flood risk has been determined using DEFRA's Flood Map for Planning and is categorised into Flood Zone 2 and Flood Zone 3. This flood risk is identified associated with key watercourses in the PDNP; River Wye (southeast), River Derwent and its tributaries (east) and River Manifold (south).

This data is available on the SFRA Mapping Portal: Flood risk mapping is available at the SFRA Mapping Portal : https://arcg.is/1P1bD42

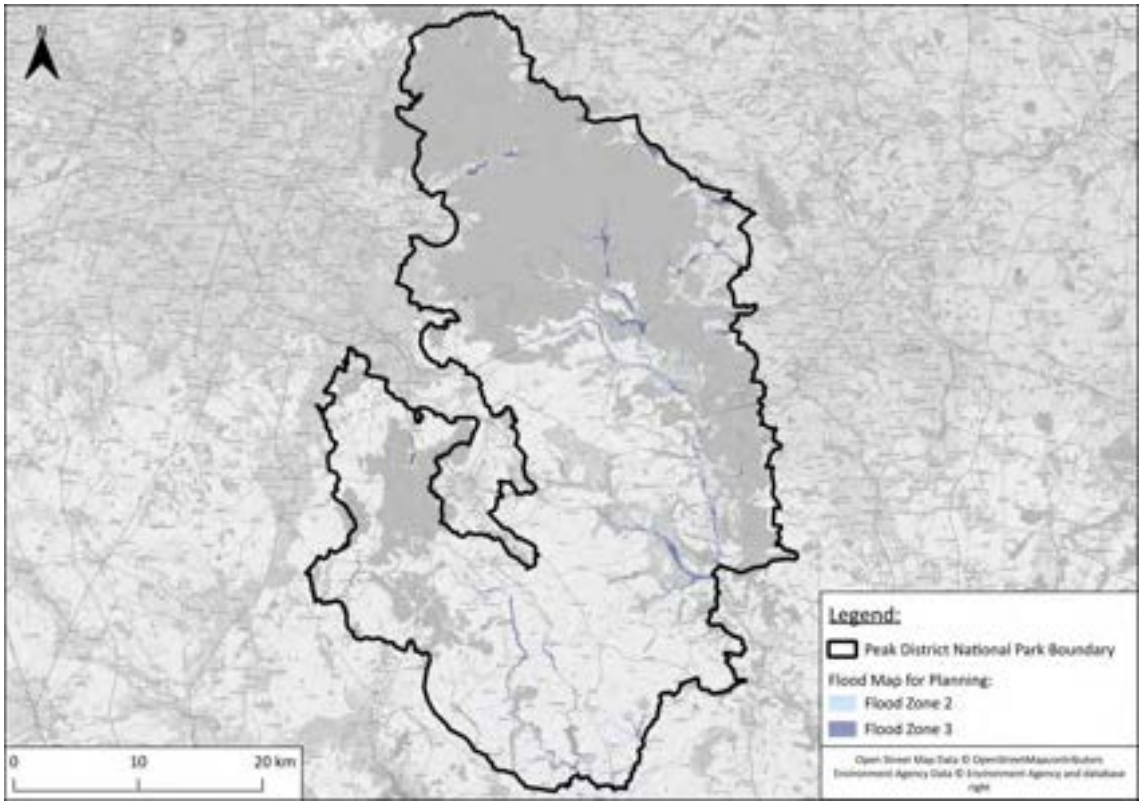

Figure 4-7: Flood Zones 2 & 3 Map Extract

4.11.2 The area which is of critical importance when considering fluvial flood risk is the town of Bakewell, as this town is the largest of all settlements within the Peak District National Park. The town has a population of approx. 4,000 people, with a population density of approximately 2,000 per square kilometre a number far greater than the population density of the rest of the PDNP (approx. 100 per square kilometre). The extents of Flood Zone 2 and 3 associated with the River Wye through Bakewell are shown in Figure 4-8.

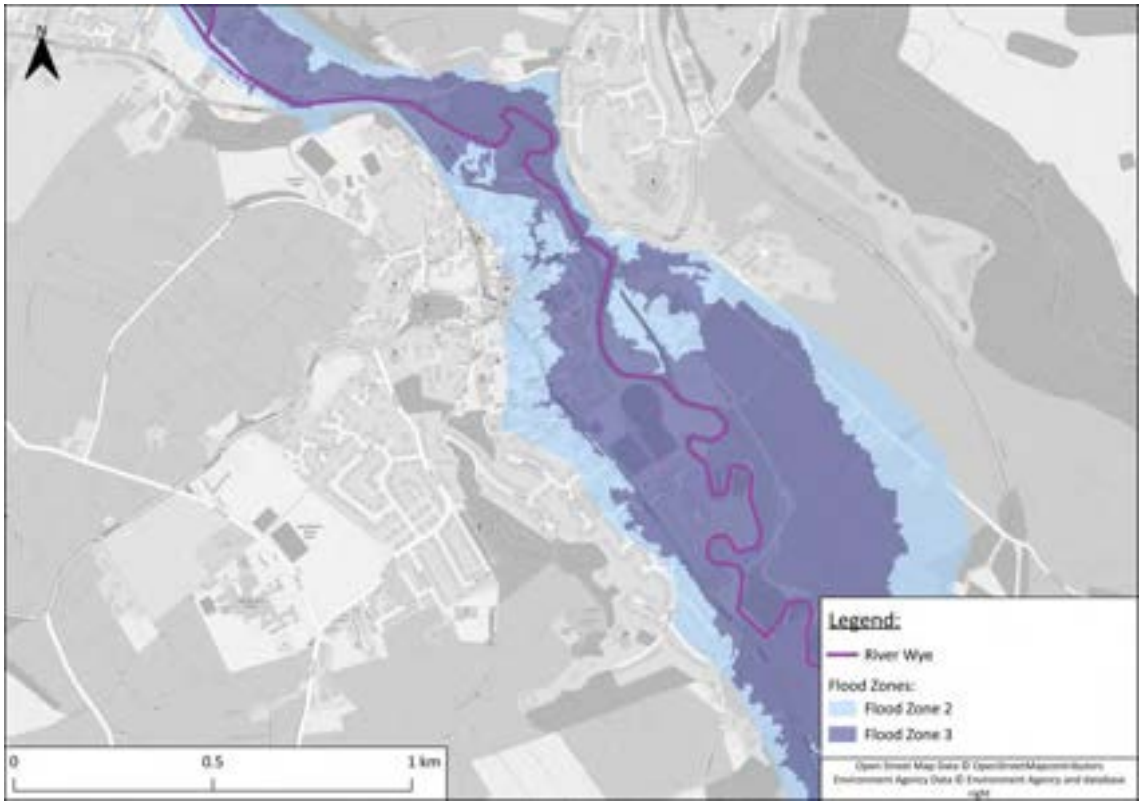

Figure 4-8: Flood Zones 2 & 3 in Bakewell

4.11.3 The Flood Map for Planning Flood Zones plus Climate Change consider the influence of climate change to determine future extents of flood zones. These are shown in Figure 4-9 with the data also available on the SFRA Mapping Portal: Flood risk mapping is available at the SFRA Mapping Portal : https://arcg.is/1P1bD42

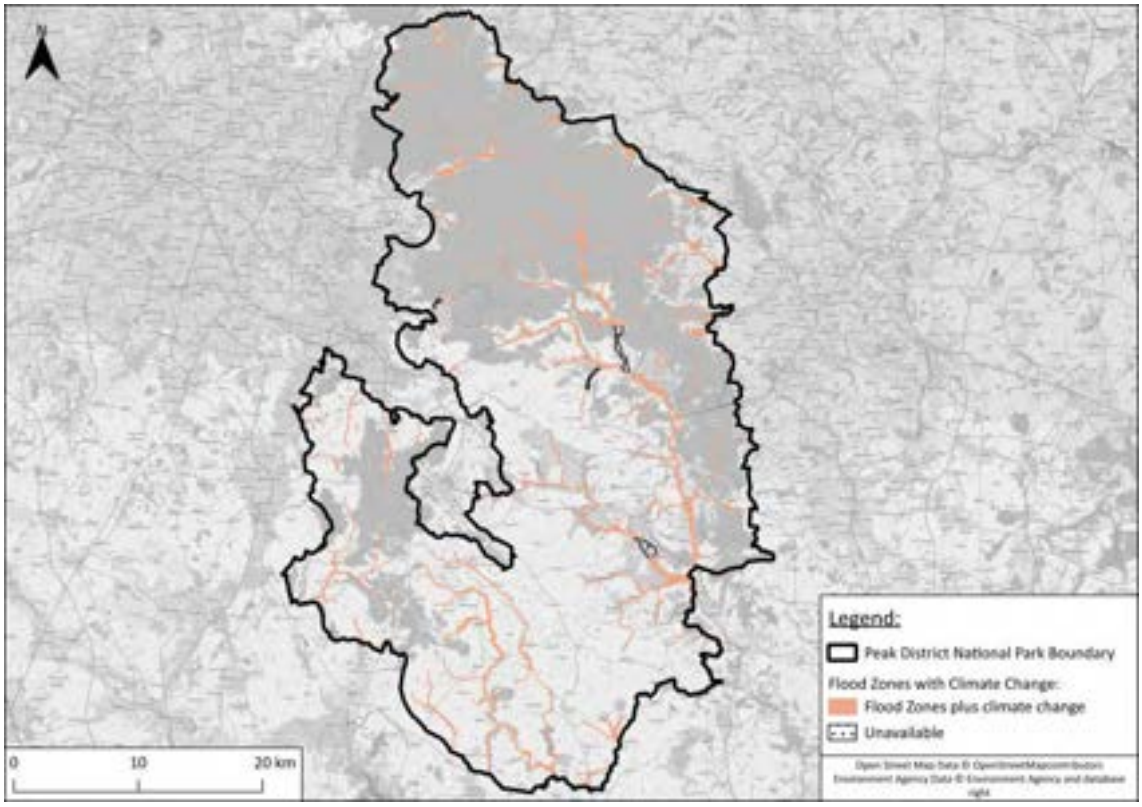

Figure 4-9: Flood Map for Planning Flood Zones plus Climate Change

4.11.4 The extents from Figure 4-9 are largely in the same vicinity as the identified Flood Zones 2 and 3 (without Climate Change), but the extents are generally greater.

4.11.5 It should be noted that whilst there are sections of the data identified as 'unavailable.' This is likely due to the Environment Agency needing to undertake site-specific hydraulic modelling to provide an improved accurate overview of the potential extents associated with climate change.

4.11.6 The Environment Agency's Risk of Flooding from Rivers and the Sea illustrates flood risk after considering the presence and condition of flood defences.

4.11.7 An extract from the Risk of Flooding from Rivers and the Sea dataset is shown in Figure 4-10, with the data also available on the SFRA Mapping Portal: Flood risk mapping is available at the SFRA Mapping Portal : https://arcg.is/1P1bD42

4.11.8 Figure 4-10 illustrates that areas which have flood defences (or flood defences exist upstream) have reduced risk of fluvial flooding, in comparison to flood extents identified within the Flood Map for Planning, as these areas are unprotected from fluvial flooding.

4.11.9 While there are defences present in these areas, there is a residual risk associated in these areas, due to the possibility of flood defences being overtopped when the river level is very high, or flood defences failing, hence there are flood extents represented in these areas.

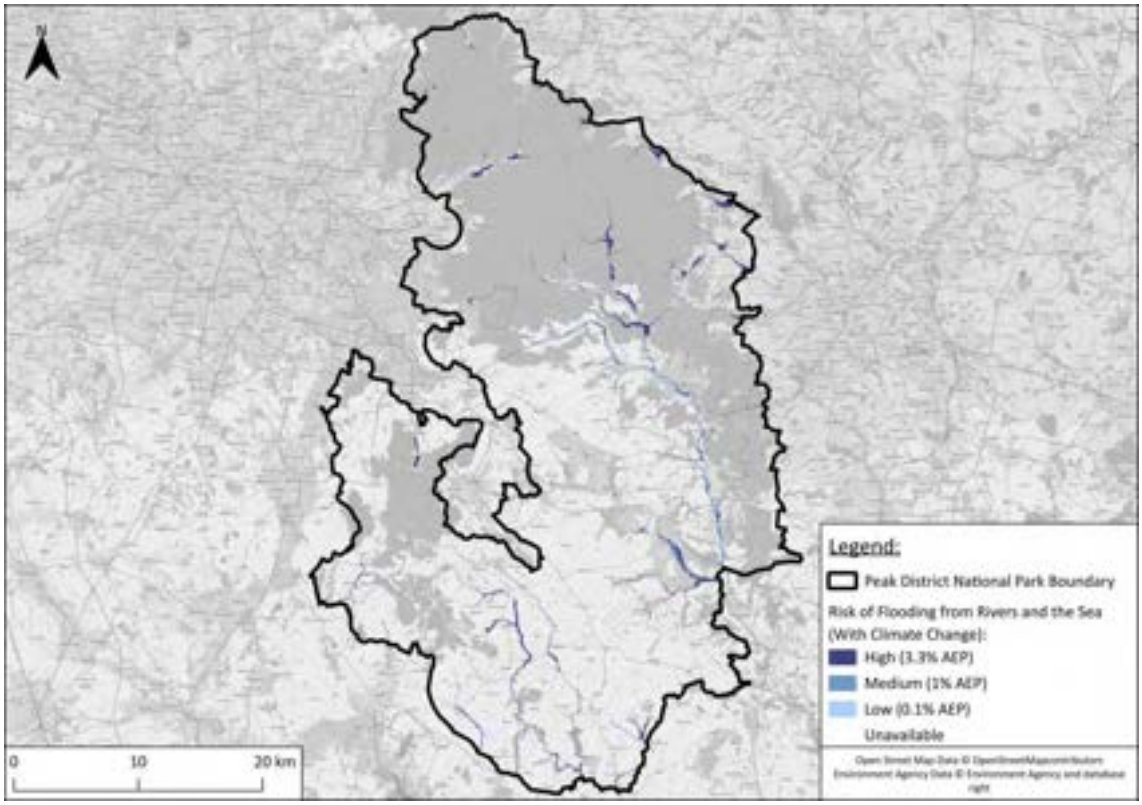

Figure 4-10: Risk of Flooding from Rivers and the Sea Extract

Functional Floodplain

4.11.10 Functional Floodplain (Flood Zone 3b) is identified within the Flood Risk and Coastal Change PPG as:

- Land having a 3.3% or greater annual probability of flooding, with any existing flood risk management infrastructure operating effectively; or
- Land that is 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 of flooding).

4.11.11 It is the duty of the Local Planning Authority to identify Flood Zone 3b in their SFRA, as it is not distinguished on the Environment Agency Flood Map for Planning from Flood Zone 3a.

4.11.12 The following hydraulic model data has been provided by the Environment Agency to aid in determining the Functional Floodplain (Flood Zone 3b) within the PDNP area:

- River Derwent – Upper Derwent HR Wallingford (2001);
- River Derwent - Matlock Belper SFRM Capita Symonds (2011);
- River Wye – River Wye SFRM, Halcrow, (August 2010);
- Peakshole Water – Peakshole Water, Hyder (2011);
- Dale Brook – Dale Brook (Rapid Response Catchments) (June 2011);

- River Sett – Rover Sett at Hayfield and New Mills (2015);
- Hollingworth Clough – Hollingworth Clough Brook (2007);
- River Dean – Harrop Brook (2001);
- River Tame – Tame review and Hazard Mapping (2019);
- Glossop Brook – Glossop Brook and Tributaries (2011);
- Hurst Brook – Hurst Brook (2011);
- Long Clough Brook – Long Clough Hazard (2011);
- River Goyt – River Goyt (2001);
- River Goyt – River Goyt at Whaley Bridge (2015); and
- Black Brook – Black Brook (2009).

4.11.13 Whilst the definition of Functional Floodplain (Flood Zone 3b) relates to the 3.33% AEP event, not all hydraulic models supplied by the Environment Agency have been run for this event. Where the 3.3% AEP model event data is not available, the Flood Zone 3b event extent has been determined by the 2% AEP model (1 in 50 year) event extent. Where neither the 3.3% AEP or the 2% AEP model data was available, mapping of these extents have either reverted to the former definition of Functional Floodplain (5% AEP or 1 in 20 year event extent) or to the nearest available flood events extent that has been run. Table 4-4 identifies each model and the % AEP which has been used to determine the functional floodplain for the purposes of this SFRA.

Table 4-4: Environment Agency Hydraulic Model Data Used to Determine Functional Floodplain.

Environment Agency Model Name and Date	Key Watercourses	Location	% AEP Used to Define Functional Floodplain
Harrop Brook 2001	River Dean	Nr. Bollington	2% AEP
Glossop Brook and Tributaries 2011	Glossop Brook	Nr. Glossop	5% AEP
Hurst Brook 2018	Hurst Brook	Nr. Glossop	3.3% AEP
Long Clough Hazard 2011	Long Clough	Nr. Glossop	5% AEP
Hollingworth Clough Brook 2007	Hollingworth Clough	Nr. Hayfield	1% AEP
River Sett at Hayfield and New Mills 2015	River Sett	Nr. Hayfield	3.3% AEP
Tame review and Hazard Mapping 2019	River Tame	River Tame Corridor	3.3% AEP
River Goyt at Whaley Bridge 2015	River Goyt	Whalley	3.3% AEP
Black Brook 2009	Black Brook	Black Brook Watercourse Corridor	5% AEP
River Goyt 2001	River Goyt	River Goyt Corridor	2% AEP
River Wye SFRM, Halcrow, August 2010	River Wye	River Wye Corridor	2% AEP
Upper Derwent HR Wallingford 2001	River Derwent	River Derwent Corridor	2% AEP
Dale Brook, Hyder (Rapid Response Catchments), June 2011	Dale Brook	Nr. Stoney Middleton	2% AEP
Matlock Belper SFRM Capita Symonds 2011	River Derwent	Matlock	2% AEP
Peakshole Water, Hyder, 2011	Peakshole Water	Nr. Castleton and Hope	2% AEP

4.11.1 Should development (including infrastructure or crossing of watercourses) be proposed within or within proximity to these extents, site-specific hydraulic modelling is likely to be required, with reference to Environment Agency best practice and guidance. This should use best practice hydrology and relevant topographic / watercourse survey (where required) to define the Functional Floodplain at a Site-specific level.

4.12 Surface Water Flood Risk

4.12.1 Surface water flood risk is presented in the Long-Term Flood Risk Information, Flood Risk from Surface Water (RoFSW) mapping. The RoFSW map is an assessment of where surface water flooding may occur. This happens when rainwater lies on or flows over the ground, instead of draining away through the normal drainage systems or soaking into the ground. The RoFSW map shows flooding that is likely to occur as a result of rainfall with a 3.3% (1 in 30), 1% (1 in 100) and 0.1% (1 in 1000) chance of happening in any given year. It includes information about flooding extents and depths.

4.12.2 Due to the large extent of the PDNP, multiple plans from the RoFSW mapping have been created, with reference to a labelled grid reference system for better understanding of the location of each figure. These are contained in Appendix D of this Report with the data also available on the SFRA Mapping Portal: Flood risk mapping is available at the SFRA Mapping Portal : https://arcg.is/1P1bD42 .

4.12.3 Areas which have the highest risk of surface water flooding are in the upland areas, with little infrastructure, and in green areas, such as nature reserves.

4.12.4 Most notably, Bakewell has a population at risk of surface water flooding, with flows bisecting the Town to discharge to the River Wye. Figure 4-6 illustrates the extents of surface water flood risk in Bakewell.

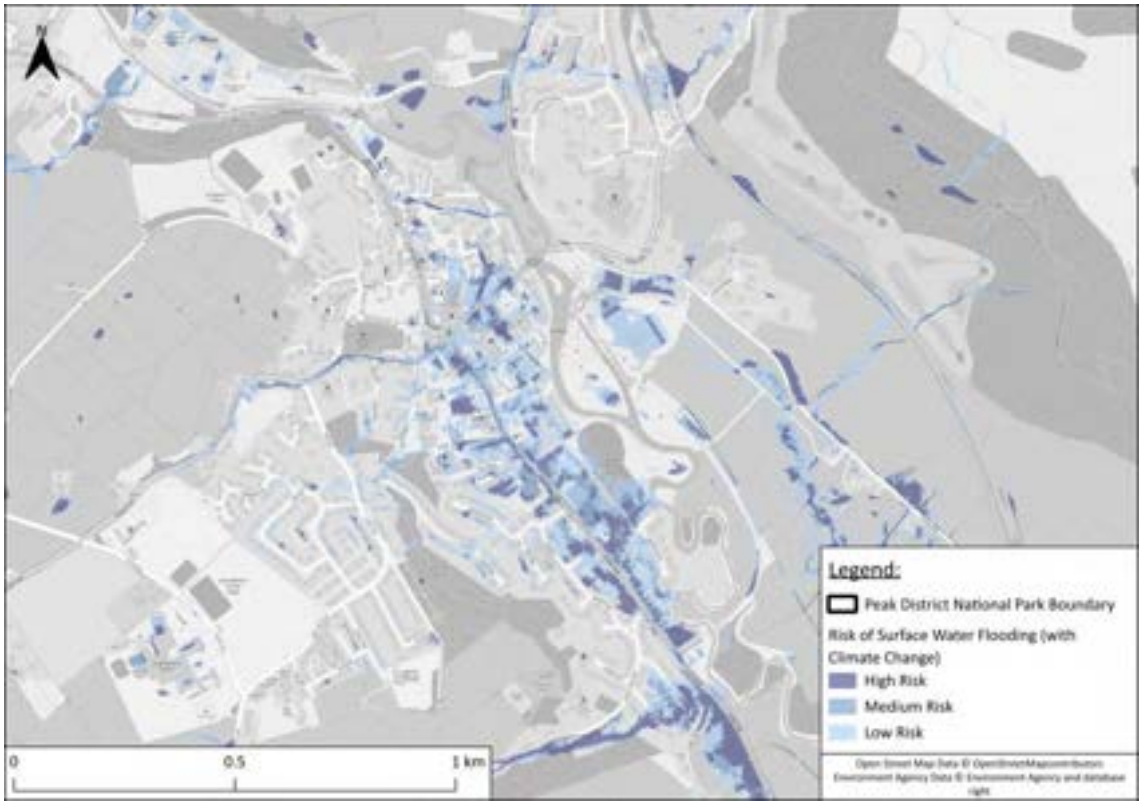

Figure 4-11: Risk of Surface Water Flooding in Bakewell.

4.13 Groundwater Flood Risk

4.13.1 Groundwater flooding is the emergence of groundwater at the ground surface. Groundwater flooding happens in response to a combination of already high groundwater levels (usually during mid or late winter) and intense or unusually lengthy storm events. Groundwater flooding often lasts much longer than flooding caused by a river overflowing its banks. It may last many months and can cause significant social and economic disruption to the affected areas. This is represented in

the BGS Groundwater Flood Risk Mapping and is displayed in Figure 4-12 which has been licensed from the BGS

4.13.2 This identifies that the majority of areas in the central/southern parts of the PDNP have limited potential of groundwater flooding, while areas to the west and the east have both potential for groundwater flooding in property below ground level and potential for groundwater flooding at the surface. These extents overlap areas of concern, such as Bakewell, the most populated area in the PDNP.

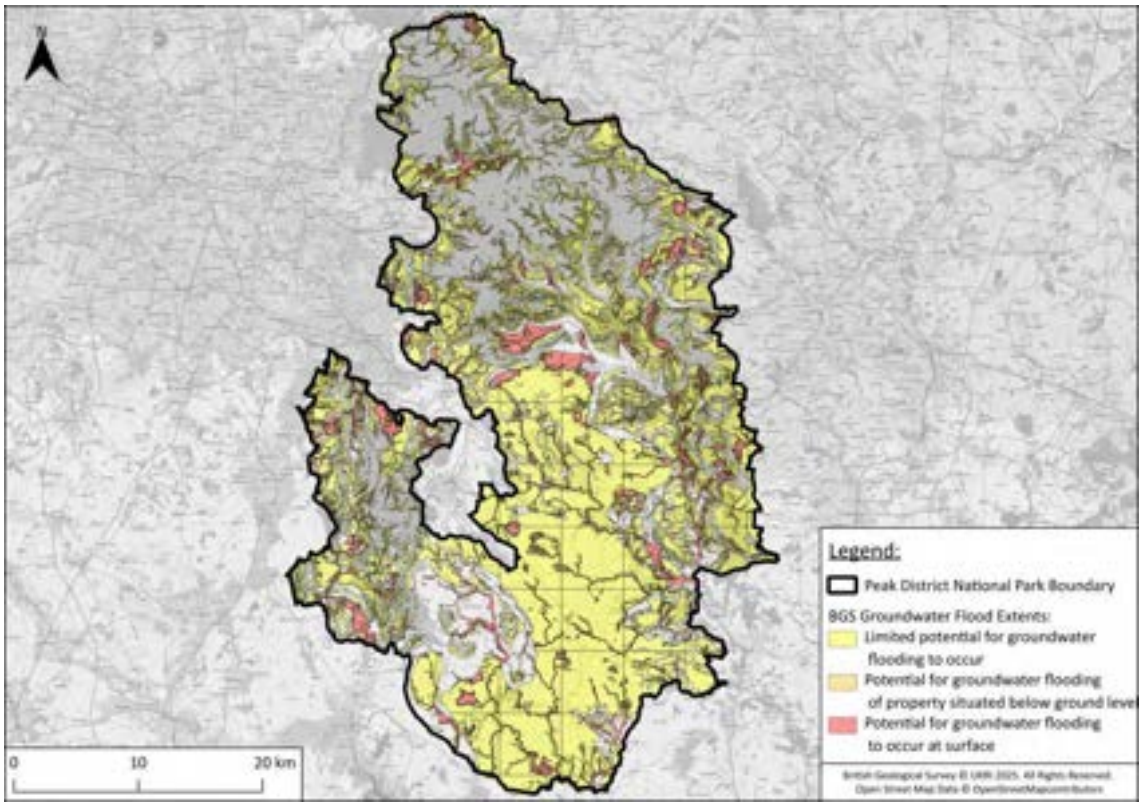

Figure 4-12: BGS Groundwater Flood Risk Map Extract

4.13.3 This mapping illustrates the areas within the PDNP which are at most risk of groundwater flooding. There are numerous areas which are at risk of groundwater flooding to some extent, but one of the areas which is most at risk is the town of Bakewell. A large proportion of the southern section of Bakewell is classed as having potential for groundwater flooding to occur at the surface, which has the potential to cause detriment to all property and infrastructure in this area (Figure 4-13).

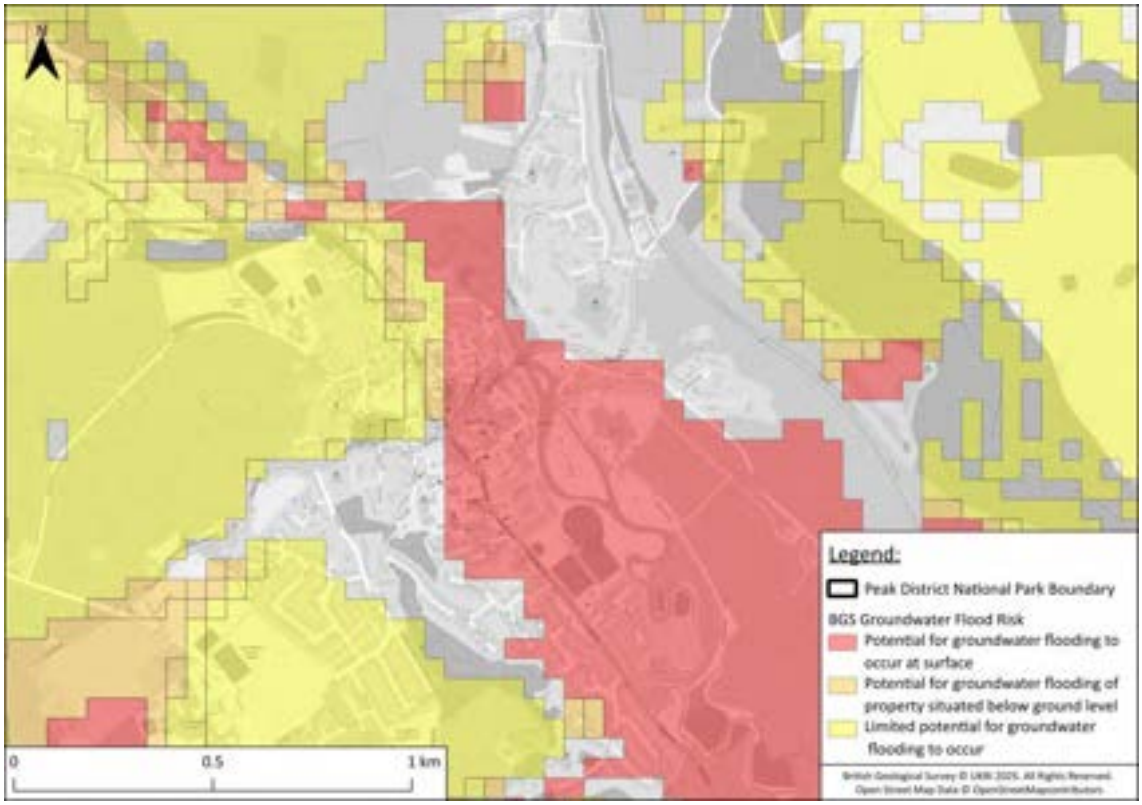

Figure 4-13: Risk of Groundwater Flooding in Bakewell

4.14 Sewer Flood Risk

4.14.1 Three water authorities cover the PDNP area due to its large extent. These authorities are:

- Severn Trent Water
- United Utilities
- Yorkshire Water

4.14.2 The breakdown of these water authorities and their associated extents within the PDNP boundary are shown in Figure 4-14.

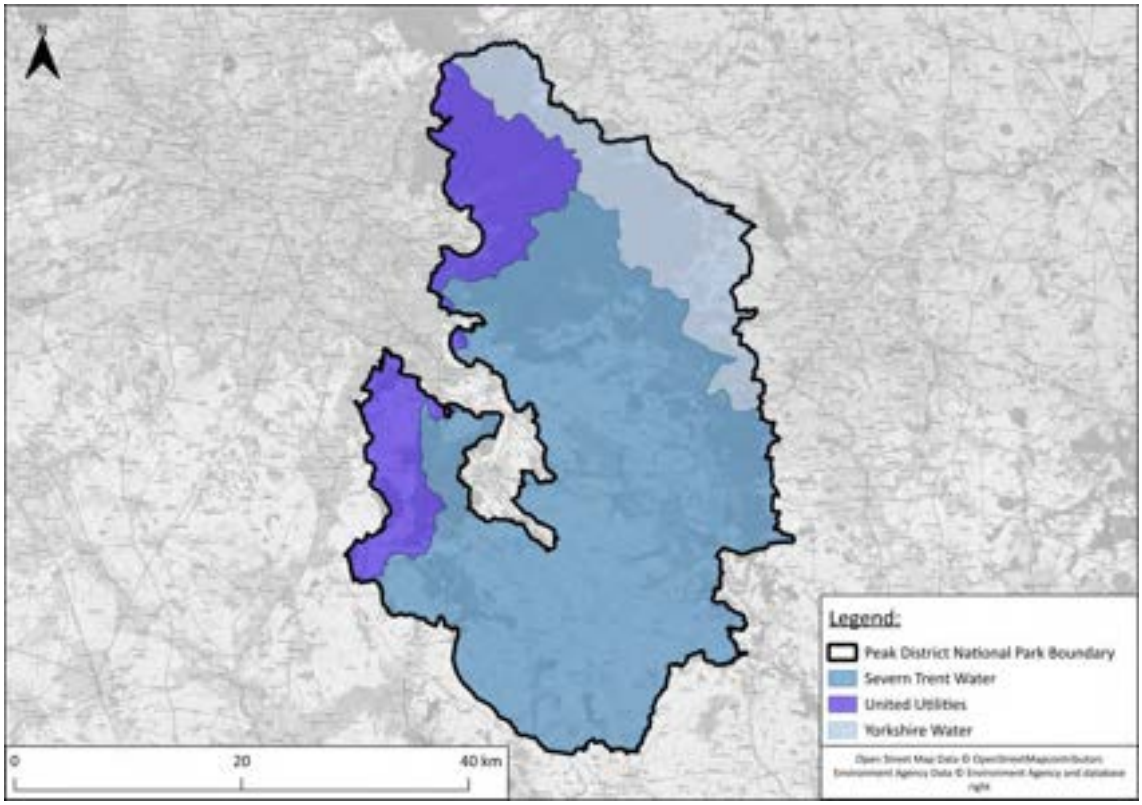

Figure 4-14:Water Company Boundaries within the PDNP

4.14.3 The three water companies were consulted for sewer flood records and provided the following responses.

Severn Trent Water

4.14.4 Severn Trent Water provided their sewer flood records for the PDNP, which include the postcode area of each incident and whether it caused flooding to internal property. Highway or curtilage and when the flood incident took place. These flood records have been tabulated in Appendix B and a map identifying their locations is shown in Figure 4-15.

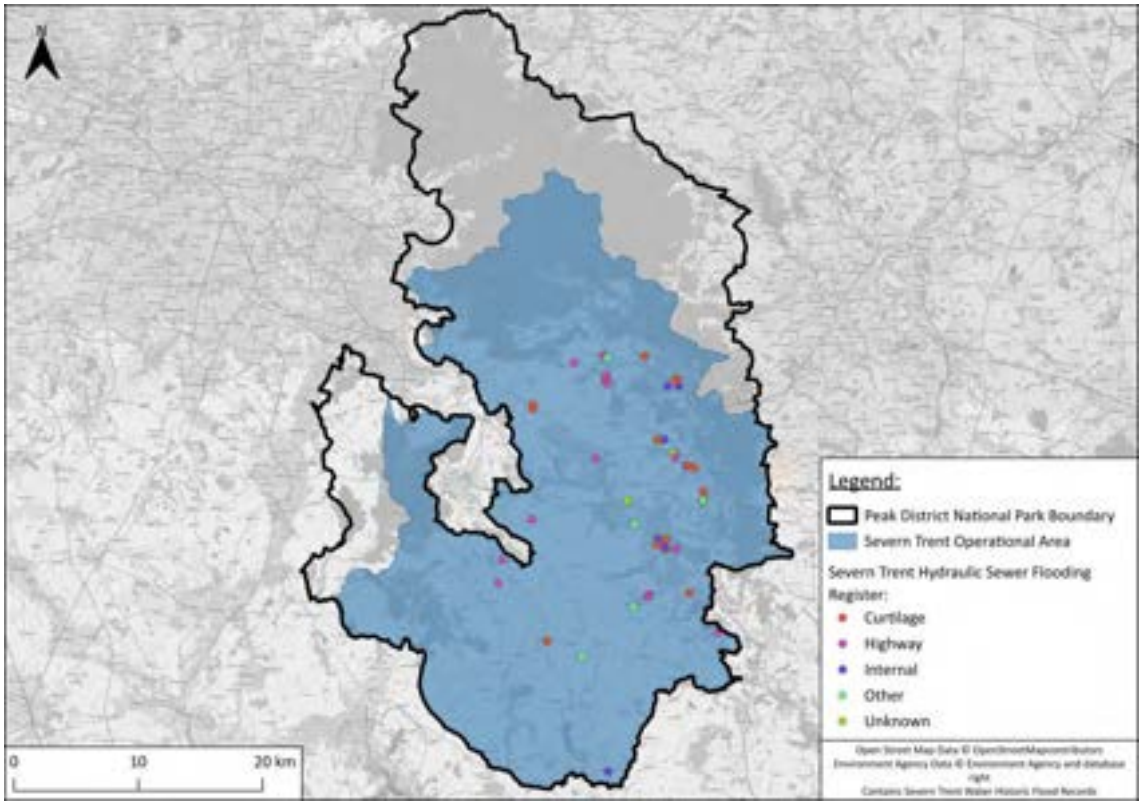

Figure 4-15: Sewer Flood Records within Severn Trent Water Operation Area

United Utilities

4.14.5 United Utilities confirmed that they do not have any recorded sewer flooding events due to the sewer network being at above the capacity of their infrastructure within the extent of the PDNP.

Yorkshire Water

4.14.6 Yorkshire water provided their sewer flood records within their operational area of the PDNP, with data originating from 2008 onwards. The records were categorised into postal code areas, and the data contained in Appendix C identifies the number of sewer flood events per area, and the flood's cause. The postal codes which contain historic sewer flood records have been illustrated in Figure 4-16.

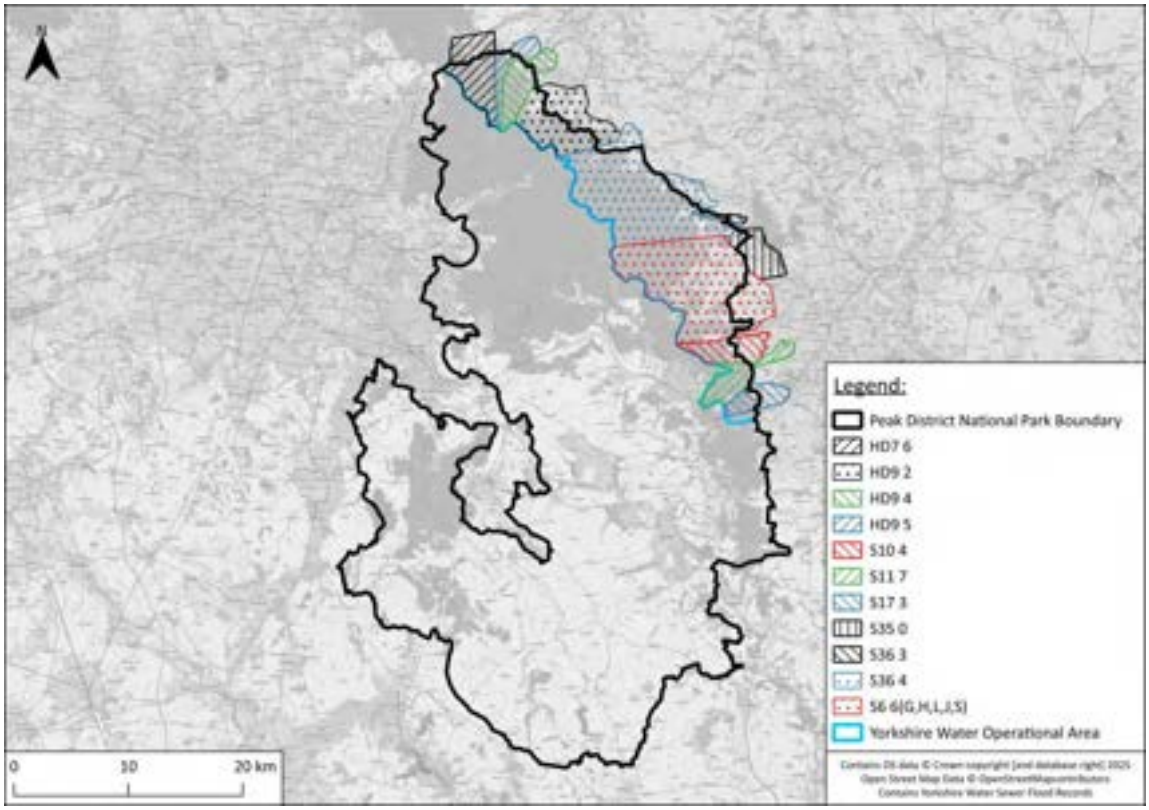

Figure 4-16: Yorkshire Water's Recorded Sewer Flood Events

4.15 Reservoir Flood Risk

4.15.1 The publicly available Long-Term Flood Risk Information, Flood Risk from Reservoirs mapping has been reviewed. There are two flooding scenarios shown on the reservoir flood maps. They are a 'dry-day' and a 'wet-day'. The 'dry-day' scenario predicts the flooding that would occur if the dam or reservoir failed when rivers are at normal levels. The 'wet-day' scenario predicts how much worse the flooding might be if a river is already experiencing an extreme natural flood.

4.15.2 Extracts of both the wet and dry day mapping is shown within Figure 4-17 and Figure 4-18 with the data also available on the SFRA Mapping Portal: Flood risk mapping is available at the SFRA Mapping Portal : https://arcg.is/1P1bD42

4.15.3 The flood extents from a breach of reservoirs within and surrounding the PDNP boundary generally flow away from / out of the PDNP boundary. The primary reservoir flood extent, associated with the Three Derwent Valley Reservoirs (Howden Reservoir, Derwent Reservoir and Ladybower Reservoir) and the River Ashop (tributary of the River Derwent behind the Lady bower dam), is located in the centre of the PDNP and flows within the topographical valley to the southeast boundary of the PDNP.

4.15.4 These three reservoirs work together and hold a capacity of approximately 46bn litres of water, forming the largest area of open water in Derbyshire and the Peak District.

4.15.1 In addition to this, there are a number of other reservoirs located within the Peak District National Park, one which has historically caused severe flood risk is the Toddbrook Reservoir, located in Whalley Bridge. This reservoir is owned / operated by CRT. A prolonged period of heavy rainfall in August 2019 caused the spillway of the reservoir to collapse as the concrete slabs which lined the spillway were damaged, exposing the clay beneath them. This placed the downstream areas from the dam, including Whalley Bridge, to be evacuated and an emergency response incident to be put in place.

4.15.2 While the reservoir itself did not flood, due to emergency works, repairs are ongoing with the aim of the reservoir being refilled over the winter of 2025 / 2026, with CRT most recently identifying that construction works will be complete by the end of 2025[3].

4.15.3 All large reservoirs must be inspected and supervised by reservoir panel engineers. As the enforcement authority for the Reservoirs Act 1975 in England, the Environment Agency ensure that reservoirs are inspected regularly, and essential safety work is carried out.

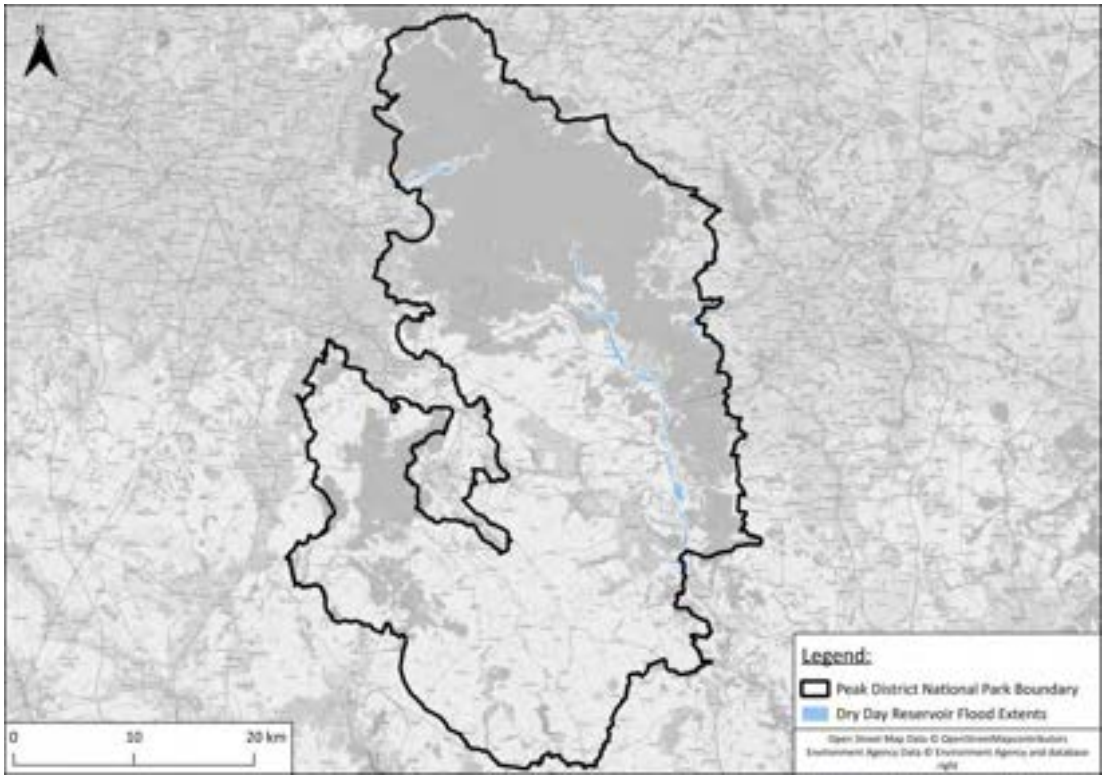

Figure 4-17: Dry Day Reservoir Flood Risk Extents

[3] https://canalrivertrust.org.uk/about-us/where-we-work/north-west/restoring-toddbrook-reservoir

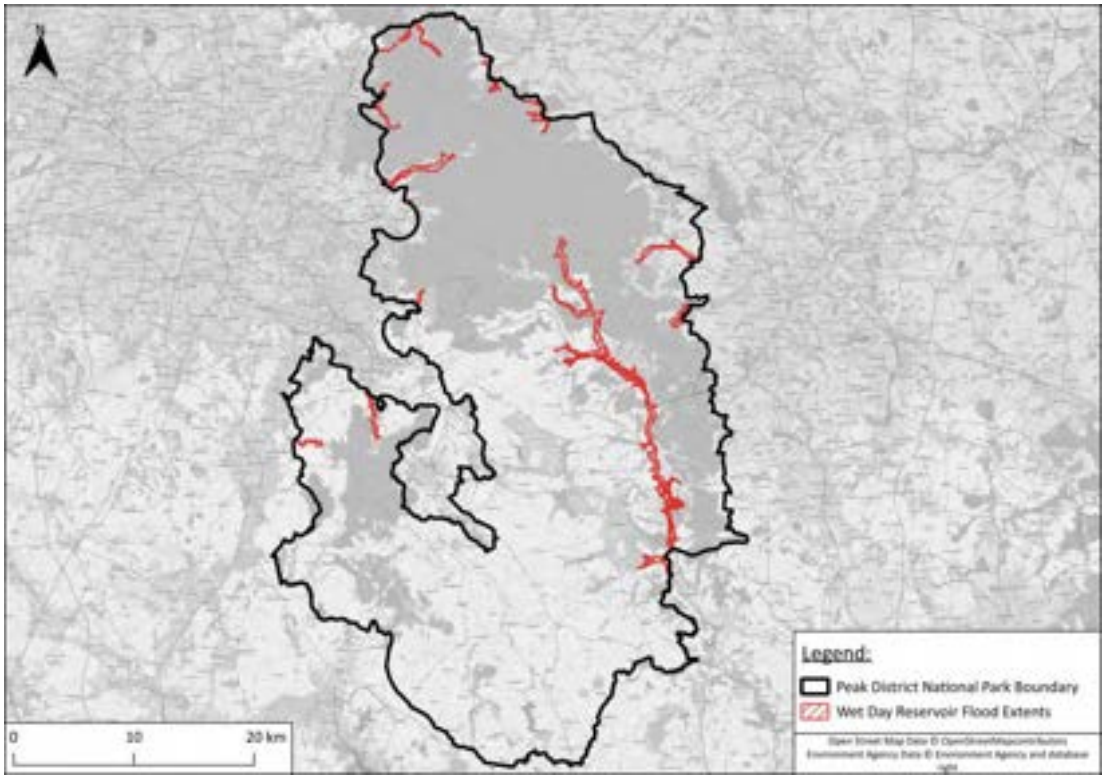

Figure 4-18: Wet Day Reservoir Flood Risk Extents

4.16 Canal Flood Risk

4.16.1 The Huddersfield narrow canal is the only canal which is located within the PDNP and passes underground the northern tip of the Park's boundary (Figure 4-19).

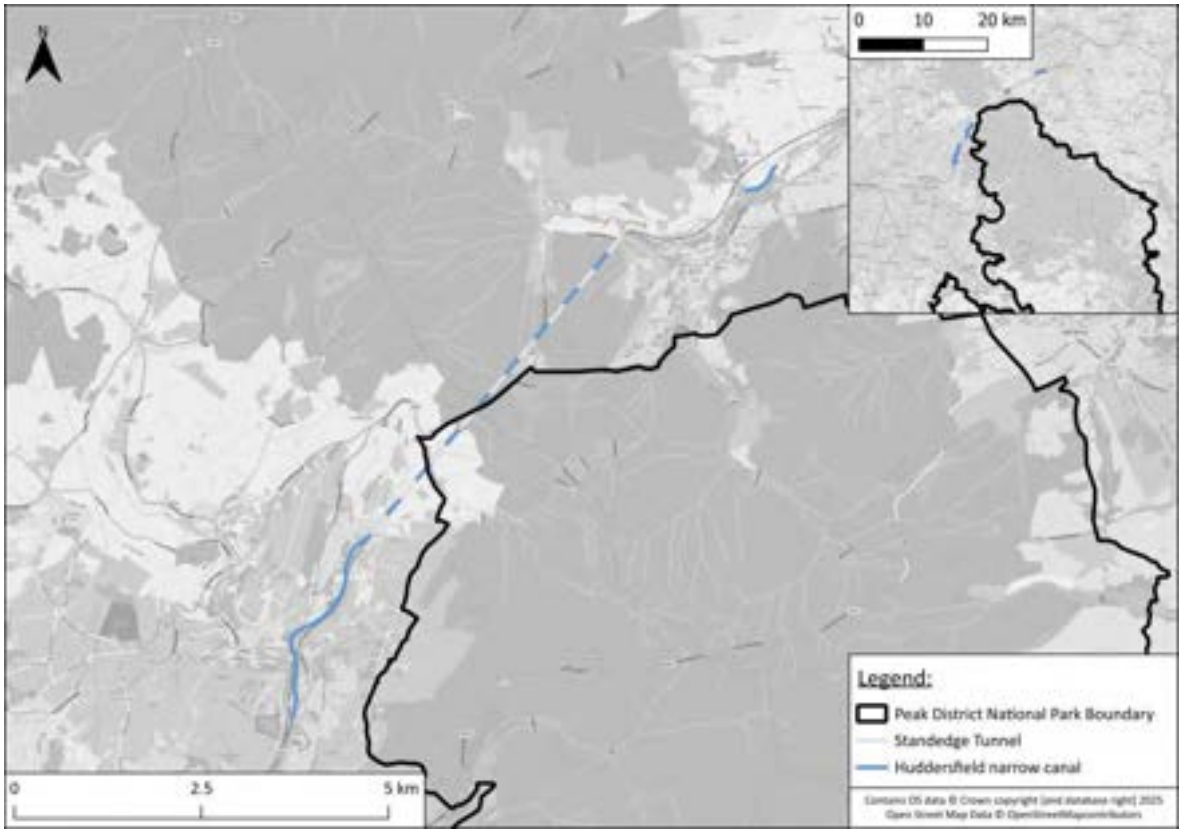

Figure 4-19: Location of the Huddersfield narrow canal and the Standedge Tunnel in relation to the PDNP Boundary

4.16.2 As the Huddersfield narrow canal passes through the PDNP entirely within the Standedge tunnel, it is unlikely that any flooding from the canal will impact land situated within the boundary.

4.16.3 In addition to this, the section of the canal which is situated to the south of the tunnel opening is located approximately 1km from the PDNP boundary, with an elevation increase to the boundary of approximately 50m. The section of the canal which is north of the tunnel opening is approximately 1.5km from the boundary, with an elevation increase of 35m to the PDNP boundary.

4.16.4 This being considered, the flood risk posed by canals in the PDNP is likely to be very low.

4.17 Flood Alerts

4.17.1 There are numerous Flood Alert Areas within the PDNP, with the most notable areas being associated with the River Derwent and River Wye:

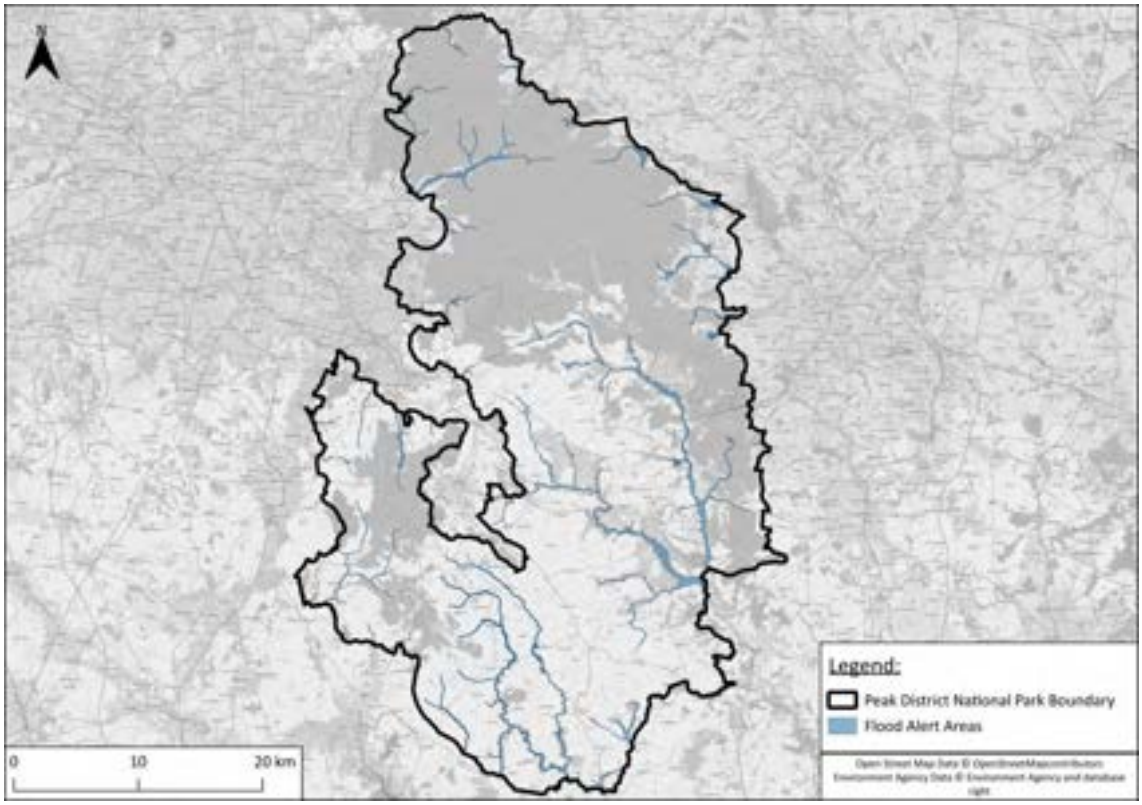

Figure 4-20: Flood Alert Areas within the PDNP

4.17.2 Flood alerts are made earlier than flood warnings, to provide communities with notice that areas could flood and could be issued when there is less confidence on the likelihood of the events occurring. These alerts could cover the whole floodplain, occurring in low lying areas, with floods being caused by fluvial flooding and groundwater flooding.

4.17.3 The areas which are of highest concern for flood alerts are within the eastern/southeastern areas of the PDNP, as this part contains the more densely populated towns and settlements. This is particularly of concern where there are also more vulnerable populations, for example around 1/3 of people in the Bakewell/southeastern area of the PDNP are over the age of 65.

4.18 Flood Warning Areas

4.18.1 From a review of the Environment Agency's Flood Warning Areas dataset, it has been identified that Flood Warning Areas are limited to the extents of the Main Watercourses in the PDNP, the River Wye and the River Derwent.

4.18.2 The Flood Warning Areas are illustrated in Figure 4-21.

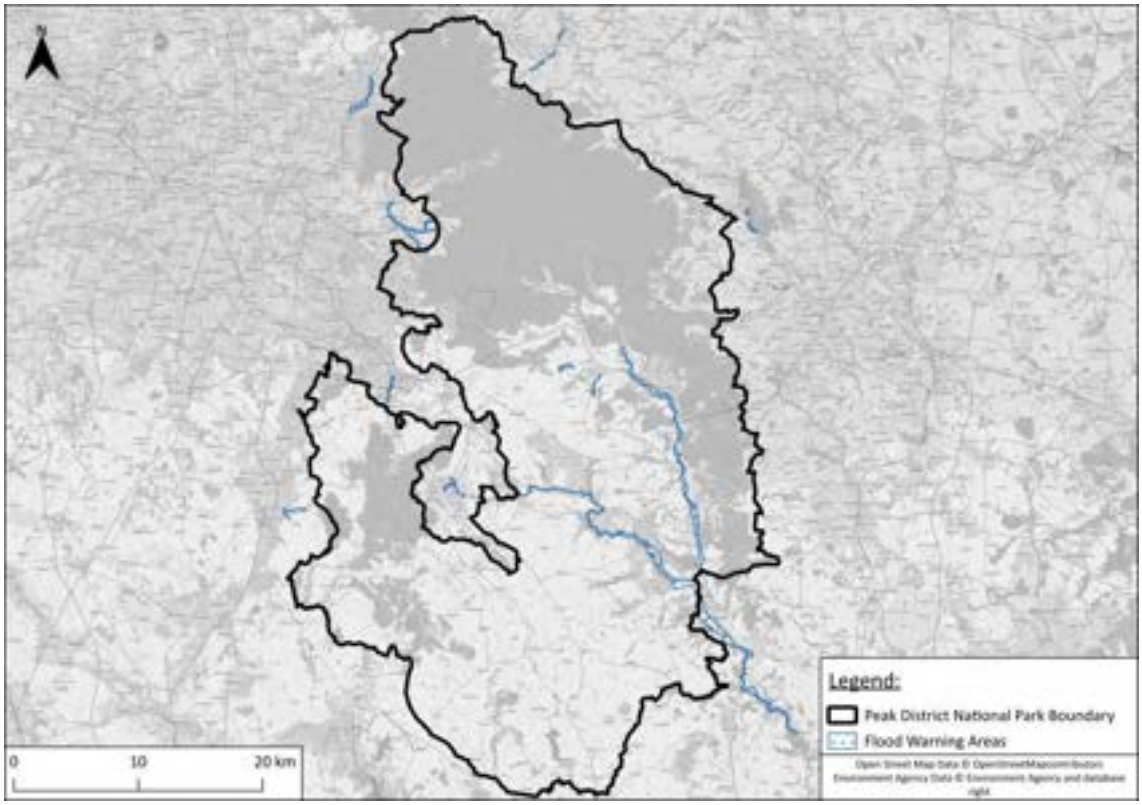

Figure 4-21: Flood Warning Areas in the Peak District National Park.

4.18.3 The Flood Warning Areas are located in more densely populated areas and areas which are impacted by other flood risks, such as from surface water and reservoir failures, with some of the largest Warning Areas towards the southeast of the PDNP boundary, due to the confluence of the River Wye and the River Derwent.

4.1 Flood Risk Summary

4.1.1 Flood risk from all assessed sources has been summarised in Table 1-1. Flood risk from all known sources has been reviewed including consultation with relevant key stakeholders with regard to flood risk management.

5 Climate Change Impacts

5.1.1 Climate Change projections anticipate warmer, wetter winters and drier, hotter summers in the UK. This is likely to lead to more regular intense rainfall within the PDNP which may result in severe flooding occurring more often and a larger burden on flood risk management infrastructure and reservoirs.

5.1.2 On 19th February 2016, the Environment Agency released updated guidance on climate change allowances[4], which was later revised for peak river flows in 2021 and for peak rainfall intensity in 2022.

5.1.3 Climate change allowances are predictions of anticipated change for:

- Peak river flow
- Peak rainfall intensity

5.2 Peak River Flow Allowances

5.2.1 Peak river flow allowances show the anticipated changes to peak flow by management catchment. Management catchments are sub-catchments of river basin districts.

5.2.2 The range of allowances is based on percentiles. A percentile describes the proportion of possible scenarios that fall below an allowance level. The 50th percentile is the point at which half of the possible scenarios for peak flow fall below it, and half fall above it.

5.2.3 The:

- central allowance is based on the 50th percentile
- higher central allowance is based on the 70th percentile
- upper end allowance is based on the 95th percentile

5.2.4 An allowance based on the 50th percentile is exceeded by 50% of the projections in the range. At the 70th percentile it is exceeded by 30%. At the 95th percentile it is exceeded by 5%.

5.3 Relevant Peak River Flow Allowances for the Peak District National Park Authority Area

5.3.1 The relevant peak river flow allowances for the Management Catchments within the PDNP have been extracted into Table 5-1.

[4] Flood risk assessments: climate change allowances. Environment Agency 2016. https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances

Table 5-1: PDNP Peak River Flow Climate Change Allowances

Management Catchment	Allowance Category	Total Potential Change Anticipated for '2020s' (2015-39)	Total Potential Change Anticipated for '2050s' (2040 to 2069)	Total Potential Change Anticipated for '2080s' (2070 to 2115)
Derwent, Derbyshire	Upper End	29%	38%	63%
	Higher Central	18%	23%	39%
	Central	13%	17%	29%
Dove	Upper End	28%	39%	62%
	Higher Central	17%	24%	40%
	Central	13%	18%	31%
Weaver Gowy	Upper End	36%	64%	106%
	Higher Central	24%	40%	67%
	Central	19%	30%	52%
Upper Mersey	Upper End	27%	51%	85%
	Higher Central	17%	31%	53%
	Central	13%	22%	41%
Aire and Calder	Upper End	24%	31%	51%
	Higher Central	15%	18%	31%
	Central	11%	13%	23%
Don and Rother	Upper End	25%	36%	60%
	Higher Central	15%	21%	38%
	Central	11%	15%	28%

5.4 Using Peak River Flow Allowances for Flood Risk Assessments

5.4.1 The mapping provided within the Level 1 SFRA does not encompass all climate change scenarios due to the scale of the PDNP and the availability of Environment Agency and LLFA data.

5.4.2 Anyone required to complete a Flood Risk Assessments for proposed development within the PDNP will be required to complete a detailed site-specific assessment of climate change, which may require the development of a site-specific hydraulic model, using detailed channel and topographic survey data. The Environment Agency should be consulted to provide any further information on the use of their climate change guidance and the below summary has been set out to provide an indication on how this is applied:

1 Use Annex 3 of the NPPF (December 2025), to classify the vulnerability of your development.

2 Assess both the central and higher central allowances for strategic flood risk assessments.

3 If In Flood Zones 2 or 3a for:

- essential infrastructure – use the higher central allowance
- highly vulnerable – use central allowance (development should not be permitted in flood zone 3a)
- more vulnerable – use the central allowance

- less vulnerable – use the central allowance
- water compatible – use the central allowance

Or Flood Zone 3b for:

- essential infrastructure – use the higher central allowance
- highly vulnerable – development should not be permitted
- more vulnerable – development should not be permitted
- less vulnerable – development should not be permitted
- water compatible – use the central allowance

5.4.3 Apply the peak river flow allowances to developments and allocations where the strategic flood risk assessment shows an increased risk of flooding in the future. This includes locations that are currently in Flood Zone 1, but might be in Flood Zone 2 or 3 in the future.

- To ensure the safety of people using the development when designing safe access and egress routes, use the central allowance for all development types except for essential infrastructure. Use the higher central allowance for this.
- If the local planning authority considers the development is appropriate, even though it will not follow the Flood Zone Compatibility for Flood Zones 2, 3a or 3b, use the higher central allowance.
- Where it is appropriate to apply a credible maximum scenario, use the upper end allowance.

5.5 Relevant Peak Rainfall Allowances for the Peak District National Park Authority Area

5.5.1 The relevant Peak Rainfall Allowances for the Management Catchments within the PDNP have been included within Table 5-2.

Table 5-2: PDNP Peak Rainfall Climate Change Allowances

Management Catchment	Annual Exceedance Rainfall Event	Allowance Category	Total Potential Change Anticipated for '2050s' (2040 to 2069)	Total Potential Change Anticipated for '2070s' (2070 to 2115)
Derwent, Derbyshire	3.3%	Upper End	35%	35%
		Central	20%	25%
	1%	Upper End	40%	40%
		Central	20%	30%
Dove	3.3%	Upper End	35%	35%
		Central	20%	25%
	1%	Upper End	40%	40%
		Central	25%	30%
Weaver Gowy	3.3%	Upper End	35%	40%
		Central	20%	25%
	1%	Upper End	40%	45%
		Central	25%	30%
Upper Mersey	3.3%	Upper End	35%	40%
		Central	20%	30%
	1%	Upper End	40%	45%
		Central	25%	30%
Aire and Calder	3.3%	Upper End	35%	40%
		Central	20%	25%
	1%	Upper End	40%	45%
		Central	25%	30%
Don and Rother	3.3%	Upper End	35%	35%
		Central	20%	25%
	1%	Upper End	40%	40%
		Central	20%	25%

5.6 Using the Peak Rainfall Allowances

5.6.1 Increased rainfall affects surface water flood risk and how surface water drainage systems should be designed.

5.6.2 The peak rainfall allowances contained in Table 5-2 should be utilised for site-scale applications (for example, drainage design) and for surface water flood mapping in small catchments (less than 5 square kilometres) and urbanised drainage catchments. A surface water catchment is urban if the land use is a town or city. If you are unsure if your catchment is urban or rural, please contact the LLFA.

5.6.3 For modelling large areas (larger than 5 square kilometres) with rural land use, direct rainfall modelling is unlikely to be appropriate and fluvial flood risk should be assessed using the Peak River

Flow Allowances (Table 5-1). Do not use the peak river flow allowances to adjust rainfall totals as they are not compatible.

5.6.4 Use the development lifetime guidance to work out the lifetime of your development. You should consider residential development to have a minimum lifetime of a 100 years.

5.6.5 For flood risk assessments, assess the upper end allowances. You must do this for both the 1% and 3.3% annual exceedance probability events for the 2070s epoch (2061 to 2125).

5.6.6 Design development so that for the upper end allowance in the 1% annual exceedance probability event:

- There is no increase in flood risk elsewhere
- Your development will be safe from surface water flooding for the lifetime of that development

5.7 Impact of Climate Change on Fluvial Flood Risk

5.7.1 The main causes of increased fluvial flood risk from climate change are increased volumes of water in river systems causing rivers to exceed bank full height more often – which could also be negatively influenced by the installation of flood defences upstream.

5.7.2 The publicly available Flood Map for Planning has published Flood Zones with climate change data. Whilst this is available in some areas of the PDNP, it is not available for all areas.

5.7.3 Until such time as data for all identified Flood Zones is available, Flood Zone 2 has been used as a proxy for changes to flood extent due to climate change. Comparing the change in flood extent between FZ3 and FZ2 indicates areas which are the most sensitive to fluvial impacts of climate change. Areas in the PDNP that are most sensitive to fluvial impacts of climate change are:

- Areas within the vicinity of the River Wye and the River Derwent (and their associated tributaries).

5.8 Impact of Climate Change on Surface Water Flood Risk

5.8.1 Areas which have artificial, impermeable surfaces and regions which are topographically lower than the surrounding areas in the PDNP will be at increased surface water flood risk, as increased intensity and duration of precipitation events will cause a greater amount of surface water when in impermeable areas – as the water is unable to drain freely.

5.8.2 Using the 1% AEP surface water mapping datasets with allowances for climate change included, an indication of climate change can be understood (as well as for smaller watercourses; some of which are not included in the Environment Agency publicly available Flood Zone mapping). Areas in the PDNP most sensitive to changes in surface water flood risk due to climate change are typically in

areas of low-lying topography on the floodplains of the main watercourses. In particular the following areas are sensitive to increased surface water flooding due to climate change:

- Towns; such as Bakewell, due to artificially raised ground, increased impermeability and areas of lower lying topography within the PDNP

5.9 Impact of Climate Change on Groundwater Flood Risk

5.9.1 There is no technical data available to assess climate change impacts on groundwater. Climate change can alter recharge rates and a combination of wetter winter, and drier summers can lead to more extreme and rapid fluctuations in groundwater levels. The increased variability in rainfall means that the frequency and severity of both groundwater droughts (periods of low water levels) and groundwater-related floods (periods of high water levels) may increase.

5.10 Impact of Climate Change on Reservoir Flood Risk

5.10.1 Climate change increases flood risk from artificial reservoirs primarily by causing more intense rainfall events, which can overtop dams if spillways in reservoirs cannot handle the volume of water, and by stressing older dams through erosion and instability.

5.11 Impact of Climate Change on Sewer Flood Risk

5.11.1 Climate change increases flood risk from sewers by increased rainfall exceeding the existing capacity of sewers. Conversely, dry periods can lead to blockages from sediment and increased odour and corrosion from gases.

5.12 Climate Change Summary

5.12.1 Climate Change could increase the risk of all flooding types in all regions within the Peak District National Park, as summarised in Table 5-3.

Table 5-3: Climate Change Impact Summary

Flood Risk Mechanism	Climate Change Impacts
Fluvial	Most noticeable influence of climate change influences occur within proximity to the River Derwent, River Wye and its tributaries. The Environment Agency Flood Map for Planning should be reviewed to understand climate change impact from fluvial sources.
Surface Water	Lower lying areas of the PDNP which have impermeable surfaces are at greater surface water flood risk. The Environment Agency Long-Term Flood Risk Mapping – Surface Water Flood Risk Map includes allowances for climate change.
Groundwater	Areas already identified as at 'potential risk' from groundwater flooding may become increasingly at risk, with higher probability of groundwater emergence.
Reservoir	Reservoirs reaching capacity and unable to cope with volumes of water could lead to increased risk from this source within the PDNP.
Sewer	Increased rainfall intensity and longer drier periods leading to increased blockage could cause increased sewer flood risk.

6 Flood Alleviation Schemes & Assets

6.1.1 There are a number of flood defence assets located within the PDNP. The largest flood defence, as identified by the Environment Agency, is in the natural high ground in the centre of the PDNP, associated with the River Wye.

6.1.2 A list of all the identified flood defences from the Environment Agency AIMS database within the PDNP have been listed in Table 6-1 and a figure showing their locations is available in Figure 6-1.

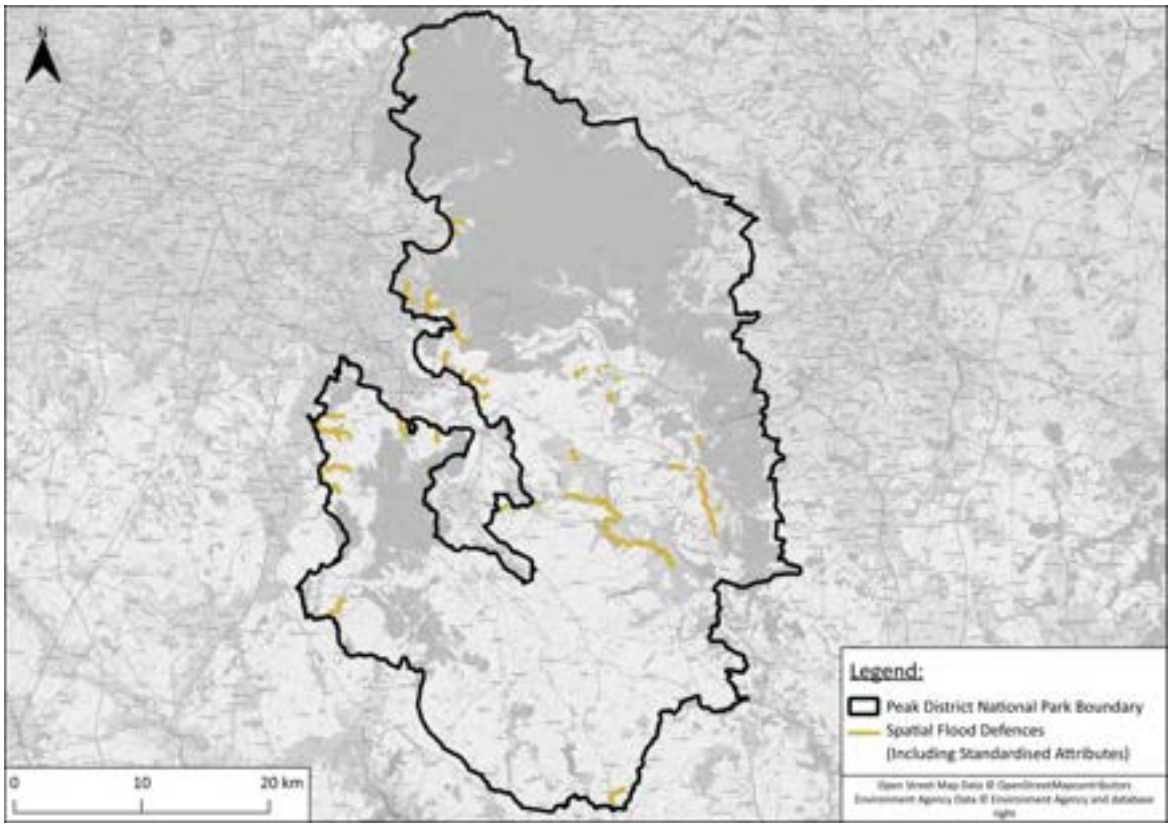

Figure 6-1: AIMS Dataset Flood Defence Mapping

Table 6-1: AIMS Flood Defence Data

Watercourse	Location	Asset Type	Design Standard of Protection (Years)
Shelf Brook	Upstream of Old Glossop	Natural High Ground	5
Hurst Brook	Glossop & District Golf Course	Natural High Ground	5
Un-named Main River	Downstream of Black Rowarth	Natural High Ground	5
River Kinder	Upstream of Hill Houses	Natural High Ground	5
River Sett	Upstream of Hayfield	Natural High Ground	5
Otter Brook	Upstream of Alders Farm	Natural High Ground	5
Un-named Main River	Slack House Farm	Natural High Ground	5
Hickham Brook	Upstream of Wash	Natural High Ground	5
Un-named Main River	Downstream of Bagshaw	Natural High Ground	5
River Wye	A6 nr. Kings Sterndale	Natural High Ground	1
River Wye	Ashford in the Water to Millers Dale	Natural High Ground	1
River Wye	Bakewell	Natural High Ground	Not available
River Wye	Bakewell	Demountable Defence	Not available
Meverill Brook	Combs	Natural High Ground	5
River Goyt	Downstream of Fernilee Reservoir	Natural High Ground	5
Un-named Main River	Bakestonedale Road, Shringley Road, Spuley Lane	Natural High Ground	5
River Dean	Upstream of Bollington	Natural High Ground	5
River Dean	Upstream of Rainow	Natural High Ground	5
Un-named Main River	Upstream of Bollington	Natural High Ground	5
River Dane	Downstream of Danebridge	Natural High Ground	5
Bentley Brook	B5056, Fenny Bentley, A515	Natural High Ground	25
Tideswell Brook	North of Tideswell	Natural High Ground	2
Rier Derwent	Calver Slough, Calver, Curbar and Baslow	Engineered High Ground	Not available
River Derwent	Paines Bridge, east of Chatworth House	Engineered High Ground	1
Dale Brook	Stoney Middleton	Engineered High Ground	1
River Derwent	Gridleford	Engineered High Ground	Not available
Bradwell Brook	Bradwell	Engineered High Ground	10
Bradwell Brook	Stertfield Road, Brough-on-Noe	Engineered High Ground	10
Bradwell Brook	Bessel Lane	Engineered High Ground	10
Bradwell Brook	New Road	Engineered High Ground	10
Peakshole Water	Castleton	Engineered High Ground	1
Peakshole Water	Castleton Road / How Lane, Castelton	Engineered High Ground	1
Peakshole Water	Hope Cement Works Railway Spur Watercourse Crossing	Engineered High Ground	1
Peakshole Water	Pindale Road Bridge	Engineered High Ground	1
Bar Brook	Baslow	Engineered High Ground	50

6.1.3 Further to this, the LLFAs which sit within the PDNP area were consulted as part of the writing of this Level 1 SFRA and of those that responded, none identified any known hard-engineering flood defence works being proposed within the PDNP area.

6.1.4 Derbyshire County Council, in their role as the LLFA, did indicate that a number of Natural Flood Management (NFM) schemes were coming forwards in the upper catchments of the Peak District, including the installation of leaky dams on the Bar Brook (nr. Baslow). Furthermore, they also indicated that a number of properties have been fitted with Property Flood Resilience (PFR) measures since Storm Babet in October 2023 to help protect residential and educational properties in flood risk areas.

6.2 Flood Defences Summary

6.2.1 There are numerous flood defences within the PDNP, the majority of which are classed as natural high ground, indicating that the flood risk in these regions is not high enough to warrant permanent engineered structures.

6.2.2 There are multiple sections of engineered high ground within the PDNP, most of which are located on the Bradwell Brook, Peakshole Water and the River Derwent.

6.2.3 The flood defences design standards of protection vary with each location, but the natural high ground flood defences with the longest lifespan is identified to be 25 years at the Bentley Brook (tributary of River Dove) and the engineered high ground flood defences with the longest lifespan is identified to be 50 years at the Bar Brook (tributary of River Derwent).

6.2.4 The watercourse with the most flood defences with a design standard of protection of more than 5 years is Bradwell Brook (tributary of the River Derwent), with four sections of engineered high ground, each with a lifespan of 10 years.

7 Flood Risk Management for Developers

7.1 When is an FRA Required?

7.1.1 The PDNPA require a Flood Risk Assessment to be provided when a Site is partially, or completed within:

- Flood Zones 2 or 3 (see flood map for planning)
- Flood Zone 3b
- Flood Zone 1, with a site area of 1 hectare or more
- Flood Zone 1 and the flood map for planning shows it is at increased risk of flooding from rivers or sea during its lifetime
- Flood Zone 1 and the Long Term Flood Risk Information shows it to be at risk of flooding from surface water
- Flood Zone 1 where the LPA's strategic flood risk assessment (SFRA) shows it will be at increased risk of flooding during its lifetime
- an area identified to be at risk of flooding from any source now, or in the future
- an area identified to have critical drainage problems

7.1.2 The supporting Environment Agency guidance[5] should also be reviewed and the most conservative guidance should be applied to when a Flood Risk Assessment is required.

7.1.3 A competent flood risk consultant or specialist should be used to complete a Flood Risk Assessment to support any planning application.

7.1.4 The following template has been published by the Environment Agency to support in writing a Flood Risk Assessment: https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fecab.planningportal.co.uk%2Fuploads%2Fea%2FEnvironment-Agency_Flood-Risk-Assessment-Template.docx&wdOrigin=BROWSELINK

7.1.5 Alongside the following supporting guidance: https://ecab.planningportal.co.uk/uploads/ea/Environment-Agency_Flood-Risk-Assessment-Template_Guidance.pdf

[5] https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications#when-you-need-a-flood-risk-assessment

7.2 Sequential & Exception Test

National Planning Policy Framework (NPPF)

7.2.1 The revised National Planning Policy Framework (NPPF) was published by the Ministry of Housing, Communities and Local Government in December 2024 and most recently updated with minor amendments in February 2025.

NPPF Planning Practice Guidance (PPG)

7.2.2 The NPPF's Planning Practice Guidance (PPG) supports the NPPF and is an online resource that is frequently updated. The Flood Risk & Coastal Change PPG advises how to take account of and address the risks associated with flooding and coastal change in the planning process.

7.2.3 Paragraph 171 of the NPPF states:

"Strategic policies should be informed by a strategic flood risk assessment, and should manage flood risk from all sources. They should consider cumulative impacts in, or affecting, local areas susceptible to flooding, and take account of advice from the Environment Agency and other relevant flood risk management authorities, such as lead local flood authorities and internal drainage boards".

7.2.4 Paragraph 172 states:

"All plans should apply a sequential, risk-based approach to the location of development – taking into account all sources of flood risk and the current and future impacts of climate change – so as to avoid, where possible, flood risk to people and property. They should do this, and manage any residual risk, by:

a) applying the sequential test and then, if necessary, the exception test as set out below;

b) safeguarding land from development that is required, or likely to be required, for current or future flood management;

c) using opportunities provided by new development and improvements in green and other infrastructure to reduce the causes and impacts of flooding, (making as much use as possible of natural flood management techniques as part of an integrated approach to flood risk management); and

d) where climate change is expected to increase flood risk so that some existing development may not be sustainable in the long-term, seeking opportunities to relocate development, including housing, to more sustainable locations".

7.2.5 Paragraph 173 also notes "*A sequential risk-based approach should also be taken to individual applications in areas known to be at risk now or in future from any form of flooding, by following the steps set out below.*"

7.2.6 The aim of the Sequential Test is to steer new development to areas of the lowest risk of flooding from any source.

7.2.7 This Level 1 SFRA will provide the basis for applying this test. The sequential approach should be used in areas known to be at risk now or in the future from any form of flooding, except in situations where a site-specific flood risk assessment demonstrates that proposed built development, including access or escape routes, land raising or other potentially vulnerable elements, will be safe for the lifetime of development and will not exacerbate existing identified flood risk from any source, now or in the future, off-Site.

7.2.8 The Exception Test requires a demonstration that flood risk to people and property can be managed satisfactorily, while allowing necessary development to go ahead in situations where suitable Sites at lower risk of flooding are not available.

7.2.9 11Essentially, the Exception Test requires the proposed development to show that it will provide wider sustainability benefits to the community that outweigh flood risk, and that it will remain safe for its lifetime, without increasing flood risk elsewhere and where possible reduce flood risk overall.

7.3 The Sequential & Exception Test Application

Sequential Test

7.3.1 Given the above, it is the duty of the PDNPA and the Local Authorities within the PDNP to consider and apply the Sequential and Exception Tests through their Local Plans.

7.3.2 Diagram 2 of the PPG[6] sets out the process of how the information within this Level 1 SFRA should be applied to the Sequential and Exception Tests

[6] https://www.gov.uk/guidance/flood-risk-and-coastal-change#the-sequential-approach-to-the-location-of-development

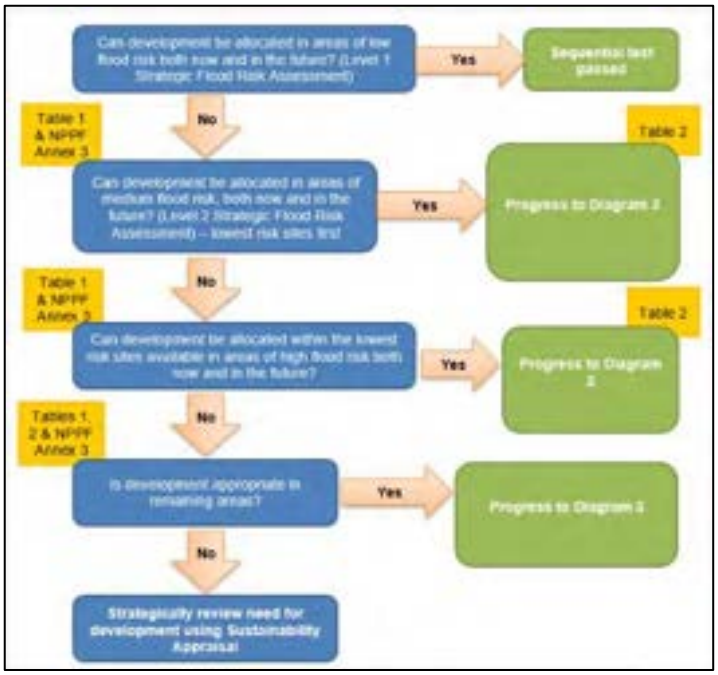

Figure 7-1: Flood Risk & Coastal Change PPG Diagram 2 Extract

7.3.1 Diagram 3 of the supporting PPG identifies how the Exception Test can be applied to Local Plan preparation.

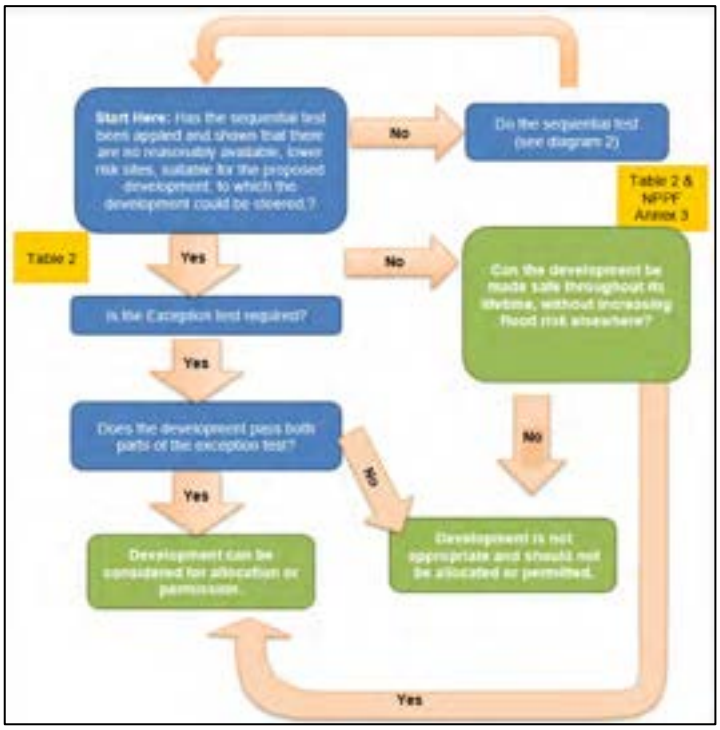

Figure 7-2: Application of the Exception Test to Plan Preparation PPG Diagram 3 Extract

7.3.2 For development not allocated in the Local Plan, it is the duty of the applicant to complete a Sequential Test. This should be applied to both 'Major' and 'Non-Major' developments proposed in areas identified to be at risk from flooding, from any source, now or in the future.

7.3.3 The publicly available Flood Risk Assessment Standing Advice note states that the development types listed below are exempt from the Sequential Test[7].

"Development is exempt from the Sequential Test if it is a:

- *householder development like residential extensions, conservatories or loft conversions*
- *small non-domestic extensions with a footprint of less than 250 square metres*
- *change of use (except changes of use to a caravan, camping or chalet site, or to a mobile home or park home site)*

Development is also exempt from the Sequential Test if it is a development on a site allocated in the development plan through the sequential test and:

- *the proposal is consistent with site's allocated use*
- *there have been no significant changes to the known level of flood risk to the site, now or in the future, which would have affected the outcome of the test"*

7.3.4 In applying paragraph 175 of the NPPF (December 2024 with minor amendments in February 2025), a proportionate approach should be taken. Where a site-specific flood risk assessment demonstrates clearly that the proposed layout, design, and mitigation measures would ensure that occupiers and users would remain safe from current and future surface water flood risk for the lifetime of the development (therefore addressing the risks identified e.g. by mapping contained in this Level 1 SFRA Report), without increasing flood risk elsewhere, then the Sequential Test need not be applied.

7.3.5 Further guidance on the Sequential Test is available in the supporting Flood Risk and Coastal Change PPG: https://www.gov.uk/guidance/flood-risk-and-coastal-change#the-sequential-approach-to-the-location-of-development

7.3.6 The flow diagram in Figure 7-3 identifies how developers should carry out a Sequential Test for Proposed Development, where required.

[7] https://www.gov.uk/guidance/flood-risk-assessment-standing-advice#sequential-and-exception-tests

Figure 7-3: How to Complete a Sequential Test

7.3.7 Parameters of a search should include; scale, context and location of a development to ensure it is assessed against other similar development for all sources of flood risk.

7.3.8 Further guidance on the search area for 'reasonably available sites' is contained within Paragraph 027a of the supporting Flood Risk and Coastal Change PPG. The catchment area should always be appropriate to the nature and scale of the proposal and the settlement it is proposed for.

7.3.9 For some developments this may be clear, for example, the catchment area for a school. For a non-major housing development, it would not usually be appropriate for the area of search to extend beyond the specific area of a town or city in which the proposal is located, or beyond an individual village and its immediate neighbouring settlements.

7.3.10 Reasonably available sites should be identified in conjunction with the Local Planning Authority to ensure all relevant development is captured within the assessment.

7.3.11 Paragraph 028 states:

"Sites should be considered 'reasonably available' for the purposes of the sequential test if their location is suitable for the type of development proposed, they are able to meet the same development needs and they have a reasonable prospect of being developed at the same time as the proposal.

In considering whether alternative lower-risk sites (which could, where relevant, be a series of two or more smaller sites) would be capable of accommodating the proposed development, such alternative sites do not need to be owned by the applicant to be considered 'reasonably available'."

Exception Test

7.3.12 The Exception Test requires two elements to be satisfied (as set out in paragraph 164 of the National Planning Policy Framework) before allowing development to be allocated or permitted in situations where suitable sites at lower risk of flooding are not available following application of the sequential test.

7.3.13 It should be demonstrated that:

- development that has to be in a flood risk area will provide wider sustainability benefits to the community that outweigh flood risk; and
- the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

7.3.14 The Exception Test is not a tool to justify development in flood risk areas when the Sequential Test has already shown that there are reasonably available, lower risk sites, appropriate for the proposed development. It would only be appropriate to move onto the Exception Test in cases where, accounting for wider sustainable development objectives, application of relevant local and national policies would provide a clear reason for refusing development in any alternative locations identified.

7.3.15 The Exception Test should only be applied, following application of the Sequential Test, when it has been demonstrated that it is not possible for development to be located in areas with a lower risk of flooding (taking into account wider sustainable development objectives). The applicant will need to provide the Local Planning Authority with evidence to demonstrate how both elements of the Exception Test will be satisfied.

7.3.16 Where a development proposal is in accordance with an allocation made in a Plan, following the application of the Sequential and Exception Tests, it should not be necessary to repeat aspects of the Sequential and Exception Tests unless:

- Elements of the development that were key to it satisfying the Exception Test at the plan-making stage (such as wider sustainability benefits to the community or measures to reduce flood risk overall) have changed or are not included in the proposed development; or
- The understanding of current or future flood risk has changed significantly.

7.3.17 The Tests only need to be repeated to the extent necessary to validate its conclusions and secure any measures necessary. In all cases, a suitable site-specific flood risk assessment should be provided at application stage, where prescribed in footnote 63 of the NPPF (December 2024).

7.3.18 Further guidance on the Exception Test is available in the supporting Flood Risk & Coastal Change PPG: https://www.gov.uk/guidance/flood-risk-and-coastal-change#the-exception-test

7.4 Finished Floor Levels

7.4.1 It is required that development proposals in Flood Zones 2, 3 and areas of surface water flood risk to provide the:

- average ground level of a site
- ground level of the access road(s) next to a building
- finished floor level of the lowest room in a building

7.4.2 Advice from the Environment Agency should be sought to determine FFLs where development proposals are in Flood Zones 2 or 3 or in future climate change extents from these Flood Zones.

7.4.3 Where a development is in Flood Zone 2 or 3, or in an area of high surface water flood risk finished floor levels should be a minimum of whichever is higher of 300mm above the:

- average ground level of the site
- adjacent road level to the building
- estimated flood level

7.4.4 Where not in an area of flood risk, finished floor levels should be a minimum of 150mm above ground level.

7.4.5 If there is a particularly high level of uncertainty of the flood levels, it may need to be increased. It is recommended that the LLFA and / or Environment Agency are consulted to confirm this.

7.4.6 Construction materials should be used that have low permeability up to at least the same height as finished floor levels.

7.5 Flood Resilient and Resistance Measures

7.5.1 The PDNPA recommends that additional flood resistance and resilience measures be included where development is located in Flood Zone 2 or 3, or in areas of high surface water flood risk and finished floor levels cannot be raised to the required heights[8], this should:

- Prioritise excluding flood water where possible; and
- Speed recovery if water enters.

7.5.2 A competent flood risk consultant or specialist should be used to inform any flood resilient and resistance measures.

7.6 Sustainable Drainage Systems (SuDS)

7.6.1 The PDNPA require a foul and surface water drainage assessment as part of a sustainable drainage strategy to support a planning application when a development could:

- Affect the drainage on or around a Site, or
- The Site is in Flood Zones 2 or 3, or at risk from surface water flooding

7.6.2 By mimicking natural hydraulic regimes, SuDS aim to reduce surface water flooding, improve water quality and enhance the amenity and biodiversity value of the environment. SuDS achieve this by increasing water storage capacity and reducing the transport of pollutants into the existing water environment.

7.6.3 The need for alternative drainage such as SuDS is likely to increase to meet environmental challenges such as climate change, population growth and water quality deterioration. Provision for SuDS and the national standards required for their design, construction, maintenance and operation is included in the Flood and Water Management Act 2010.

7.6.4 The National Standards for Sustainable Drainage Systems (SuDS) are available here:

https://www.gov.uk/government/publications/national-standards-for-sustainable-drainage-systems/national-standards-for-sustainable-drainage-systems-suds

7.6.5 Local Planning Authorities and Lead Local Flood Authorities within the PDNP may have additional guidance and requirements. Additional guidance can also be found in CIRIA C753 'The SuDS Manual' (2016). A competent drainage engineer or specialist should be used to complete a drainage strategy to support a planning application.

[8] https://www.gov.uk/guidance/flood-risk-assessment-standing-advice

7.7 Natural Flood Management

7.7.1 Natural flood management (NFM) uses natural processes to reduce the risk of flooding. These processes protect, restore, and mimic the natural functions of catchments, floodplains and the coast to slow and store water[9]. NFM measures can include:

- Soil and land management;
- River and floodplain management and restoration;
- Woodland management;
- Maintaining and enhancing natural drainage features;
- Run-off management; and
- Promoting green infrastructure and natural flood management

7.7.2 NFM can also provide wider benefits including:

- Enhancing habitats and biodiversity;
- Improving water quality and availability of drinking water;
- Improving carbon capture; and
- Boosting health and wellbeing.

7.7.3 Given the topographical rural nature of the PDNP, it is the ideal location for NFM measures to be incorporated through the upper catchments of watercourses to 'slow the flow' and provide betterment to downstream catchments, both within and outside the PDNP boundary which are typically more populated. These measures could include:

- Leaky dams;
- Wet woodlands;
- Increasing tree and hedgerow planting;
- River restoration and floodplain management;
- Ponds and wetlands;
- Re-opening culverted watercourses and resisting future culverting; and
- Improved soil and land management.

[9] http://www.gov.uk/guidance/natural-flood-management-programme

8 Conclusions, Recommendations & Next Steps

8.1.1 This Level 1 SFRA provides a strategic assessment of risk from all known sources of identified flooding in the Peak District National Park. It also provides an overview of national and local policy and guidance for both planners and developers.

8.1.2 A summary of flood risk from all assessed sources is contained in Table 1-1.

8.1.1 Flood risk mapping is available at the SFRA Mapping Portal, by scanning the following QR Code:

8.1.2 The SFRA Mapping Portal can also be found at the following web address: https://arcg.is/1P1bD42

8.2 Recommendations

8.2.1 Key strategy-level recommendations comprise:

- Should the PDNPA wish to allocate development, this should be guided to the lowest areas of flood risk through the application of the Sequential Test. If a Sequential Test is undertaken and a site at flood risk is identified as the only appropriate site for development, the Exception Test shall be undertaken, where deemed necessary.
- A Level 2 SFRA should be conducted for site allocations where an Exception Test is required and also for any site where the ability to provide adequate floodplain compensation is questionable, i.e. employment sites largely affected by Flood Zone 3.
- Caravans, mobile homes and park homes with permanent residential use should not be permitted in the Functional Floodplain or Flood Zone 3 and opportunities should be taken to relocate these developments to lower flood risk areas.
- Safeguard functional floodplain from future development.
- Identify opportunities to help fund future flood risk management through developer contributions to reduce risk for surrounding areas.
- Adopt a catchment partnership working approach to promote green infrastructure and natural flood management

- Identify opportunities for river restoration/enhancement to make space for water.
- Natural drainage features should be maintained and enhanced.
- Culverted watercourses should be opened up and new culverting resisted. De-culverting should be considered at the earliest stage of development proposals/planning to avoid financial constraints.
- Seek opportunities to make space for water to accommodate climate change.
- Positively contribute towards wider visions for flood risk management and drainage in the Peak District National Park, including those targets set out by LLFAs and Water Companies present within the PDNP area.

8.2.2 When considering specific development, the strategic recommendations should be adhered to with the following additional site-specific recommendations:

- Where a site is not allocated development, a Sequential Test may be required to demonstrate it is at the most appropriate location for development. The criteria set out for this should align with the principles set out in 7.2.
- A sequential approach to site design should be used to reduce risk, by placing the least vulnerable parts of the site in the highest flood risk areas.
- Both the actual and residual risk of flooding should be taken into account, by ensuring that appropriate mitigation measures are put in place and that in an extreme event, the users of the development will be safe from flooding.
- Contribute to reducing flood risk off site wherever practicable.
- All developments should incorporate SuDS. Preference will be given to systems that contribute to the conservation and enhancement of biodiversity and green infrastructure in the wider area where practicable.
- New developments should not increase the resource burden on emergency responders during an event and should seek betterment for brownfield sites e.g. by providing safe access and egress during a flood/a safe place of refuge.
- Emergency (Flood Warning and Evacuation) Plans may be needed as part of a Flood Risk Assessment for sites within Flood Zone 2 or 3. The key elements of these plans should be communicated to future users of the site. This includes raising awareness of the risk of flooding (even if it is residual) and what to do in the event of a flood.

8.3 Level 2 SFRA

8.3.1 A Level 2 SFRA is required when a local authority needs to assess flood risk in more detail because development proposals are located in flood risk areas, and land outside these areas is insufficient to accommodate all necessary development. This could be used to:

- Apply the Sequential and Exception Test
- Review potential for surface water flood mitigation measures
- Consider residual flood risk on a site-specific basis
- Explore flood hazard ratings (depth and velocities) should sites be located in areas of flood risk
- Explore climate change in greater detail
- Undertake further surface water drainage strategy work to understand whether an impact on reducing flood risk downstream could be provided by the Site

8.3.2 Given no development is currently proposed to be allocated in the PDNP, a Level 2 SFRA has been deemed to not be required.