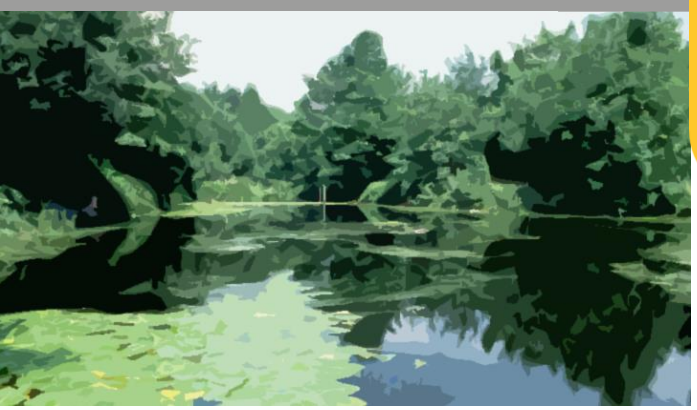
Bury Council




Bury Local Plan

Topic Paper 11:
Water and flood risk

March 2025





Contents

1. Introduction

1.1. This Topic Paper is one of a series that has been prepared as part of the process of evidence gathering to support Bury's emerging Local Plan. It sits alongside a range of other Topic Papers covering the following:

- Climate change and carbon reduction
- Housing
- Economy
- Centres
- Tourism and culture
- Communities
- Transport
- Built environment and design
- Green infrastructure
- Green Belt
- Air quality, pollution and hazards

1.2. The principal aim of the Topic Paper is to set out current key policies, plans and strategies relating to this topic area that forms the framework for the development of the Local Plan and to present a profile of the Borough that will highlight key issues, problems and challenges that the Local Plan should seek to address and which have helped to shape and influence the direction and focus of the Local Plan's policies and designations.

2. Background

2.1. Flooding is a natural process and does not respect political or administrative boundaries. It is principally influenced by natural elements of rainfall, tides, geology, topography, river and streams and manmade interventions such as flood defences, roads, buildings, sewers and other infrastructure.

2.2. In Bury, the presence of major rives, small watercourses, ageing infrastructure and the threat of surface water in some areas means flooding is a real issue and, when it occurs, it can seriously affect people's lives and businesses, as witnessed in December 2015.

3. Context

3.1. One of the key early stages in the process is to review other policies, plans and strategies which are of relevance to this particular topic area and which help to inform and influence the direction of the Local Plan. There is a need for the Local Plan to be consistent with planning policy at different levels.

3.2. The National Planning Policy Framework (NPPF) sets out Government policy in respect of planning matters and this is supported by Planning Practice Guidance (PPG). This sets out the broad planning framework within which development plans are produced.

3.3. Sub-regionally, the Places for Everyone Plan joint plan (PfE) establishes strategic policies and site allocations across nine of the ten Greater Manchester districts. Following its adoption in March 2024, PfE is now a key part of Bury's development plan that sits alongside the Local Plan.

3.4. There are also a range of other plans and strategies that, whilst not being policy, are of relevance to the Borough from a water management and flood risk perspective.

National Planning Policy

3.5. All development plans must be prepared within the context of the Government's planning policies. These are primarily set out within the National Planning Policy Framework (NPPF)[1] which sets out the Government's planning policies for England and how these should be applied. The NPPF provides a framework within which locally prepared plans for housing and other development can be produced.

3.6. The NPPF is supported by separate policy documents related to waste[2] and traveller sites[3] as well as more detailed information in Planning Practice Guidance[4].

3.7. Central to the NPPF is the Government's objective of achieving sustainable development and it highlights that achieving sustainable development means that the planning system has three overarching objectives, which are interdependent and need to be pursued in mutually supportive ways:

- **an economic objective** – to help build a strong, responsive and competitive economy, by ensuring that sufficient land of the right types is available in the right places and at the right time to support growth,

[1] National Planning Policy Framework
[2] National Planning Policy for Waste
[3] Planning policy for traveller sites
[4] Planning Practice Guidance

innovation and improved productivity; and by identifying and coordinating the provision of infrastructure;

- **a social objective** – to support strong, vibrant and healthy communities, by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations; and by fostering well-designed, beautiful and safe places, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being; and
- **an environmental objective** – to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.

3.8. The NPPF provides comprehensive guidance to Local Planning Authorities on mitigating flood risk. Paragraph 170 states:

"Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere.

3.9. The NPPF requires Local Plans to develop policies to manage flood risk from all sources and apply a sequential, risk-based approach (the Sequential Test) to the location of development to avoid where possible flood risk to people and property and mange any residual risk, taking account of the impact of climate change.

3.10. The Sequential Test is designed to steer new development to areas with the lowest probability of flooding.

3.11. If, following application of the Sequential Test, it is not possible, for development to be located in zones with a lower probability of flooding, the Exception Test may have to be applied. The application of the Exception Test should be informed by a strategic or site specific flood risk assessment, depending on whether it is being applied during plan production of at the application stage. To pass the exception test it should be demonstrated that:

- the development would provide wider sustainability benefits to the community that outweigh the 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.

3.12. Paragraph 181 of the NPPF states:

"When determining planning applications, local planning authorities should ensure flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site specific flood risk assessment[5]. Development should only be allowed in areas at risk of flooding where, in light of this assessment (and the sequential and exception tests, as applicable) it can be demonstrated that:

- Within the site, the most vulnerable development is located in areas at lowest risk unless there are overriding reasons to prefer a different location;
- The development is appropriately flood resilient and resistant, such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment
- It incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;
- Any residual risk can be safely managed;
- Safe access and escape routes are included where appropriate, as part of an agreed emergency plan.

3.13. Paragraph 182 requires major developments to incorporate sustainable drainage systems unless there is clear evidence that this would be inappropriate. The systems used should:

- take account of advice from the lead local flood authority;
- have appropriate proposed minimum operational standards; and
- have maintenance arrangements in place to ensure an acceptable standard of operation for the lifetime of the development;

Planning Practice Guidance

3.14. Flood risk is defined by the Planning Practice Guidance (PPG) on Flood Risk and Coastal Change as a combination of the probability and potential consequences of flooding from all sources. The Flood Zones refer to the current probability of river and sea flooding, ignoring the presence of defences.

[5] A site specific flood risk assessment should be provided for all development in Flood Zones 2 and 3. In Flood Zone 1 an assessment should accompany all proposals involving: sites of 1 hectare or more; land which has been identified by the Environment Agency as having critical drainage problems; land identified in a strategic flood risk assessment as being at increased flood risk in the future; or land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.

3.15. Table 1 of the NPPG defines the Flood Zones. It separates Flood Zone 3 into zones 3a and 3b. Flood Zone 3b, the functional floodplain is defined as land where water has to flow or be stored in times of flood.

3.16. Annex 3 of the NPPF classifies land uses according to their vulnerability to flood risk. Table 2 of the NPPG identifies which land uses are appropriate for which flood zones. It sets the requirement for more vulnerable development in Flood Zone 3 to pass the Exception Test. It also shows that all types of development other than water compatible uses and essential infrastructure (subject to the Exception Test) should not be permitted in Flood Zone 3b.

Greater Manchester Strategy 2021-2031

3.17. The Strategy[6] is Greater Manchester's plan for all communities, neighbourhoods, towns and cities which make up the city-region. It is a plan for recovery and renewal following the pandemic.

3.18. The Strategy aims to achieve the shared vision of 'Good Lives for All: that Greater Manchester is a great place to grow up, get on and grow old; a great place to invest, do business, visit and study' and how this will be achieved.

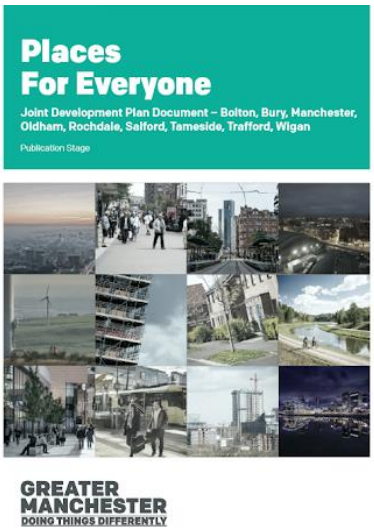
3.19. The Strategy builds on the work undertaken by the Greater Manchester Strategy - Our People, Our Place (2017), by ensuring that all the people in Greater Manchester have access to safe, decent and affordable transport, accelerate plans towards carbon neutrality, creation of greener homes and communities and better jobs and skills.

3.20. The Strategy focuses on three key themes of:

- A greener Greater Manchester – focusing on tackling climate change and working toward our carbon neutral aim;
- A fairer Greater Manchester – addressing inequality and levelling-up, from access to good jobs, to transport, health and housing.
- A more prosperous Greater Manchester – delivering economic growth which is more equitable and socially responsible, bringing opportunities and prosperity to all.

[6] https://aboutgreatermanchester.com/the-greater-manchester-strategy-2021-2031/

Places for Everyone



3.21. Places for Everyone (PfE) was prepared as a Joint Development Plan Document of nine of the ten Greater Manchester local planning authorities (Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Tameside, Trafford and Wigan). The plan was formally adopted in March 2024.

3.22. PfE is the strategic spatial plan that sets out a collective planning policy framework for the nine constituent boroughs. All policies within the plan are 'strategic policies' and it forms a key part of Bury's wider development plan and is used to determine individual planning applications. As such, Bury's Local Plan will need to be consistent with PfE.

3.23. As a strategic plan, Places for Everyone does not cover everything that Bury's Local Plan would. Therefore, Bury's Local Plan will set out more detailed policies reflecting local circumstances.

3.24. PfE seeks to ensure that an integrated catchment-based approach is taken to protect the quantity and quality of water bodies with reference to the North West River Basin Management Plan and managing flood risk.

Bury's 'Let's Do It!' Strategy

3.25. Bury's Let's Do It Strategy is a ten-year vision and strategy for the Borough. It seeks to build upon a shared sense of local pride and act as a call to arms for progressing the local vision of achieving *'faster economic growth than the national average, with lower than national average levels of deprivation'*.

3.26. It is a single strategy for the council, police, health, other public services, the voluntary, community and faith sector and business communities and some of its key aims are to:

- Develop every township in the borough to be better and stronger than before the Covid-19 pandemic;
- Tackle the causes of inequality and ensure that our children have a better start in life, with access to improved education and broader horizons;
- Help every adult to have the opportunity to be their very best through access to high quality, local work and to help our older residents stay connected and independent;

- Support local businesses as they seek to recover and thrive; and
- Deliver net zero emissions and a cleaner environment for all.

3.27. Bury's Local Plan will play a key role in delivering the vision and aims of the Let's Do It Strategy and, as such, it is important that there is alignment between these two key local strategies.

North West SuDS Pro-Forma and Guidance

3.28. The pro-forma is a requirement for any planning application for major development, confirming how surface water from a development will be managed sustainably under current and future conditions. Sustainable drainage system should be designed in accordance with CIRIA The SuDS Manual C753 and any necessary adoption standards.

North West River Basin Management Plan, 2022

3.29. The North West River Basin Management Plan sets out measures to protect and improve the water environment. The Plan includes ecological and chemical objectives for surface water and quantitative and chemical objectives for groundwater.

Greater Manchester Strategic Flood Risk Management Framework, 2019

3.30. The aim of the framework is to manage current and future flood risks to enable the sustainable development of Greater Manchester by adopting a catchment-based approach and working with natural processes where possible. This will be achieved by several actions including:

- Avoiding development in areas that are most at risk of flooding now and in the future;
- Adopting a catchment-based approach to the development of flood risk management initiatives that focuses on working with natural processes.
- Focusing interventions in the areas of Greater Manchester that present the most significant risk now and in the future;
- Developing a consistent approach to the management of surface water flood risk.

Irwell Catchment Plan 2019-2027, 2019

3.31. The objective of the plan is to work collaboratively to make the water environment in the Irwell catchment, more adaptive and resilient to climate change, whilst addressing environmental inequalities. The plan seeks to:

- Create clean and plentiful water for wildlife and people;
- Resort rivers to improve their natural forms and function;
- Engage and connect more with their local water environment;
- Influence decision makers to ensure the natural environment is enhanced and protected; and
- Support and contribute to integrated waste management practice.

Bury Local Flood Risk Management Strategy and Action Plan

3.32. The Bury Local Flood Risk Management Strategy (LFRMS), 2018 focuses on local flood risk from surface water, groundwater and ordinary watercourses but also considers flooding from rivers. The Strategy includes an Action Plan which presents an overview of flood management activities within the Borough.

3.33. The objectives of the Strategy are to:

- Gain a strategic understanding of flood risk from all sources in Bury;
- Manage the likelihood of flooding within the Borough;
- Help Bury residents to manage their own risk;
- Ensure that new development in Bury reduces rather than increases flood risk;
- Improve flood preparation, warning and post flood recovery; and
- Endeavour to balance environmental, social and economic benefits.

Strategic Flood Risk Assessment

3.34. There are two types of Strategic Flood Risk Assessments (SFRAs) – Level 1 and Level 2, which refer to the amount of detail in the assessment. A **Level 1** SFRA is a desktop study which summarises the risks of flooding to a study area. It collates existing flood risk data into one document. It is sufficient enough to apply the Sequential Test to guide development to land outside of Flood Zone 3 (high probability of river flooding) and Flood Zone 2 (medium probability of flooding). Where Flood Zone 1 (low probability) cannot accommodate all new development, more detailed flood risk assessment

work is required to determine if new development can be made safe from flooding in higher flood risk areas. This more detailed work is a **Level 2** assessment and it informs the Exception Test.

3.35. A Greater Manchester Level 1 and Level 2 SFRA (2019 & 2020) was carried out to support PfE. The SFRA will be used to apply the sequential test and where necessary the exceptions test in accordance with the NPPF.

4. Local Profile

4.1. This section sets out a broad profile of the Borough in terms of flood risk. It provides an examination of the main influences on, and challenges associated with flood risk to assist in identifying the key issues that the Local Plan will need to address. The most fundamental and challenging features are considered to centre around the following:

- River (fluvial) flooding
- Surface water (pluvial) flooding
- Ground water flooding
- Sewer flooding
- Canal flooding
- Reservoir flooding
- Water resources
- Water efficiency
- Public Water Supply Catchment Areas
- Waste water infrastructure

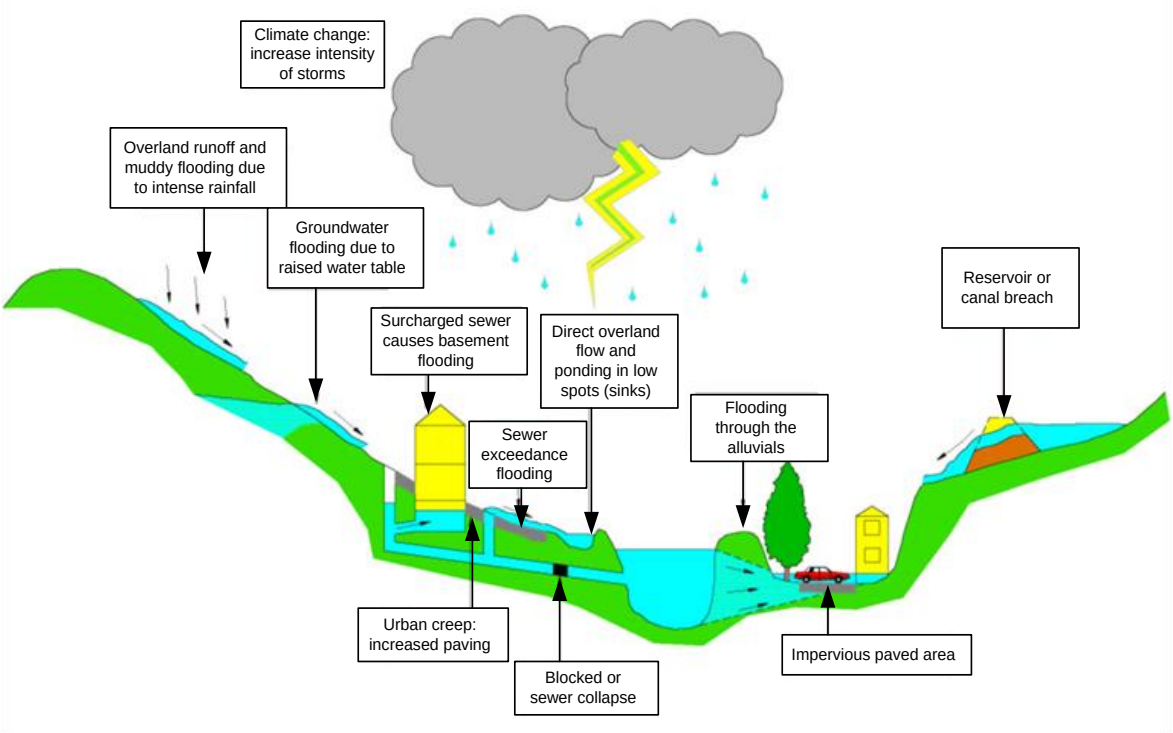
4.2. Bury is located within the centre of the River Irwell catchment area where river gradients are less but the landscape is still hilly. Much of the Bury area grew rapidly during the industrial revolution with the development of mill buildings and commercial and residential properties on the floodplain. Today, most of the watercourses are heavily modified and contain a large number of culverts and weirs.

4.3. The major watercourses in the Borough are the River Irwell and River Roch which originate outside the administrative boundary. Smaller watercourses such as the Rivers Beal and Spodden, or other tributaries of the River Roch originate within Rochdale and Oldham and flow into the Borough.

4.4. Flooding can occur from a range of sources as highlighted in Figure 1. Often a flood event is caused by a combination of sources, highlighting the

complex nature of flooding and the importance of understanding the risk of flooding.

Figure 1 – Sources of flooding



Source: Strategic Flood Risk Assessment, 2009

River flooding

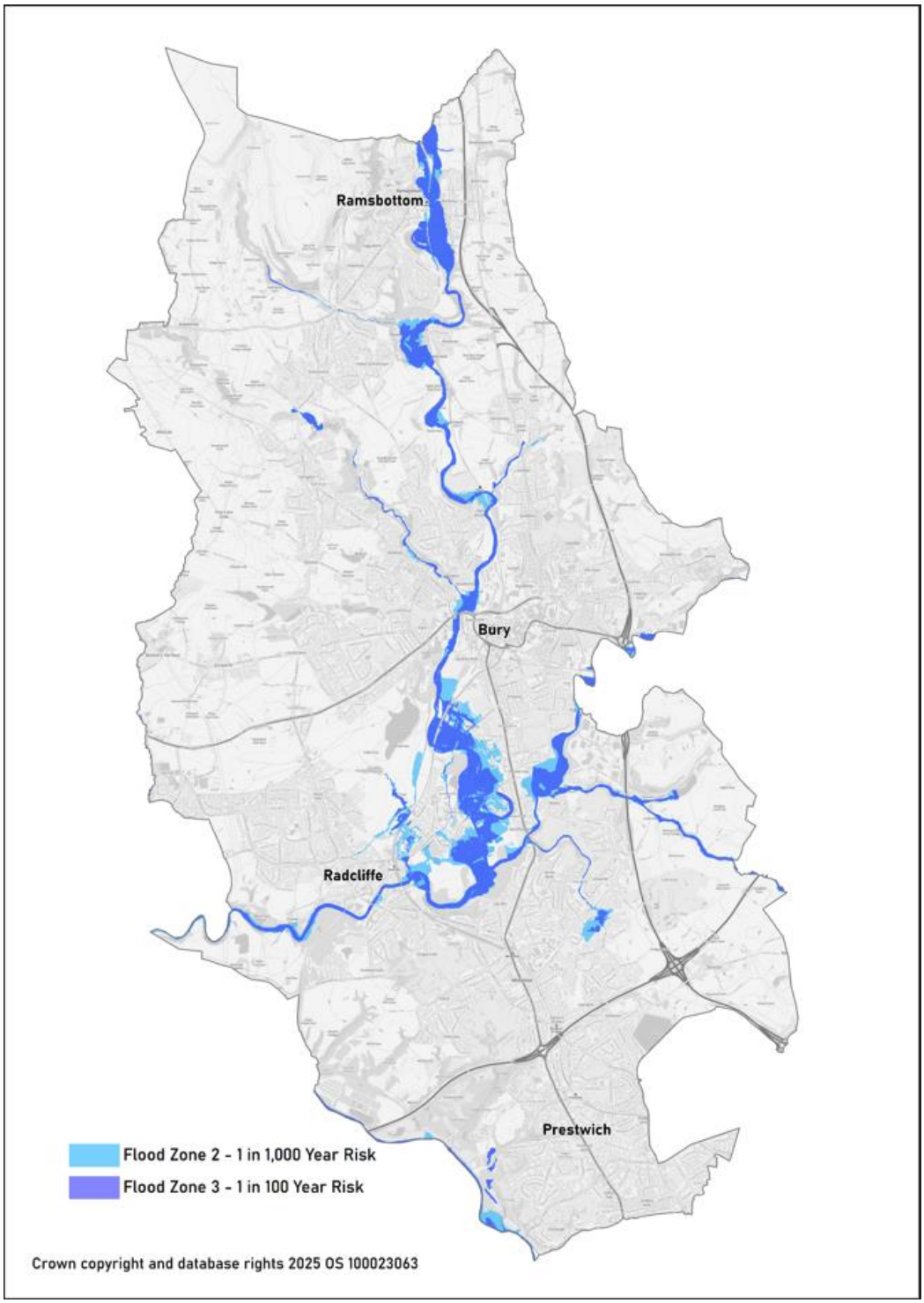
4.5. River flooding occurs when the capacity of the river or stream is reached, causing water to spill out of the channel into nearby areas – for example when heavy rain falls on ground that is already water logged and the watercourse cannot cope with the water draining into it from the surrounding land. In some areas the surrounding floodplain of the river may be undeveloped or have flood compatible uses, but in some areas development has occurred within these floodplains.

4.6. The main source of fluvial flood risk in the Borough is from the River Irwell and its tributaries, including Holcombe Brook, Pigslee Brook, Kirklees Brook and the River Roch.

4.7. Due to the urbanised nature of the Borough, many of the main river channels have been straightened and canalised to accelerate the flow of water and have been culverted over significant lengths. Many now have a limited hydraulic capacity and are prone to blockages which can lead to flooding. These blockages are often caused by silt deposition from the rural upstream sections of the Borough, vegetation falling into the watercourse and through fly tipping where debris is dumped into the river channels.

4.8. The Environment Agency is responsible for managing the risk of flooding from rivers. To assist with this, the agency produce a Flood Map for Planning (Rivers and Sea), which identify flood zones[7]. These zones refer to the probability of river and sea flooding, ignoring the presence of defences[8].

Figure 2 – Environment Agency Flood Zones



Source: Environment Agency, September 2024

[7] For more detail on Flood Zones, see paragraphs 2.12 and 2.13 and Table 1.
[8] The flood zones on the EA's Flood Map do not take account of the possible impacts of climate change and consequent changes in the future probability of flooding.

4.9. Figure 2 identifies that the following areas are particularly at risk of flooding from the river:

Ramsbottom

- Stubbins Lane, Kenyon Street, Athos Street, Crow Lane;
- Nuttall Park, Ramsbottom Cricket Ground and Football Club

Summerseat

Bury

- Bury Ground
- Bridge Trading Estate

Redvales

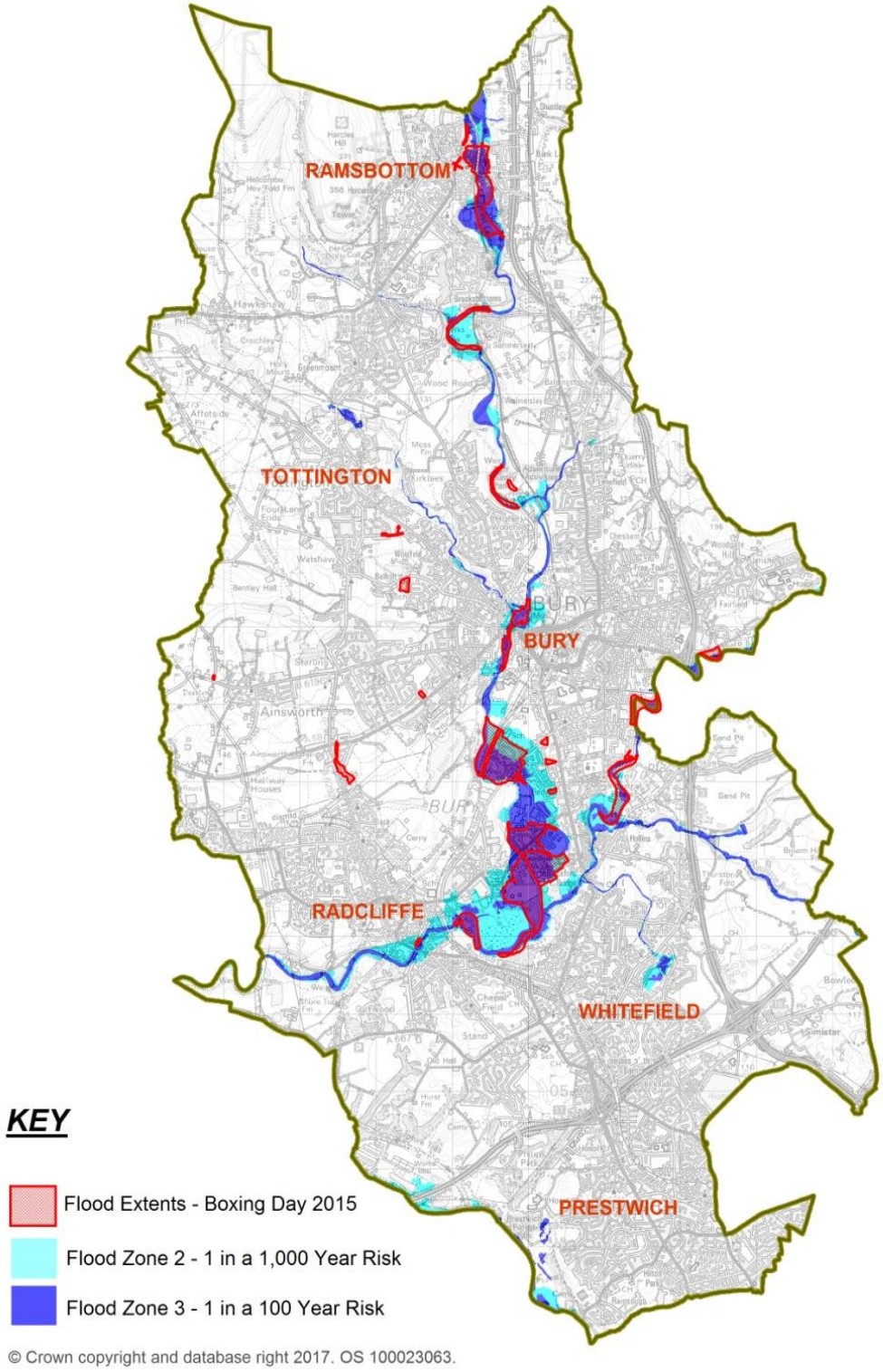
- Warth Industrial Park
- Warth Road, Openshaw Fold Road, Bealey Drive, Inglewhite Close, Ribchester Drive
- Radcliffe Road, Central Avenue, Keswick Drive

Radcliffe

- York Street, Ripon Close, Selby Close, Seddon Avenue, Borough Avenue
- Dumers Lane, Morris Street
- Close Park, Parkside Close, Riverside Road, Waterside Close
- United Utilities Sewage Works
- Pioneer Mills

4.10. The severe flooding experienced on Boxing Day 2015 verified these modelled flood extents as identified in Figure 3.

Figure 3 – Known extent of 2015 Boxing Day flooding



Source: Bury Council
Note: Figure 3 only presents those areas where the flood risk was reported to the Council, either during the evening or afterwards.

Surface water flooding

4.11. Surface water flooding is caused by overland flow during period of sustained or heavy rainfall, causing ponding of water where it becomes obstructed or collects in low lying areas. Local drainage capacity and infiltration is unable to cope with the volume of water experienced. The risk of surface water flooding increases as the amount of built up area and the volume of impermeable hard surfacing increases within the Borough.

4.12. Due to the steep topography of Bury, the Borough has narrow and shallow surface water flow paths. This has the potential to lead to rapid inundation with higher velocities and hazards.

4.13. A number of flow paths have been identified in Borough as surface water flows off the hillsides, collecting in small drains, before flowing to the valley bottom. Run off directly from rural land is also an issue particularly in Ramsbottom, causing flooding to major road networks and individual properties.

4.14. There are also many modified small streams, brooks and culverts which are hidden below ground and their condition is deteriorating, they have become blocked with debris and are the cause of much localised flooding following heavy rain.

4.15. Highway drains connect the highway gullies to surface water sewers. In some instances, the highway drains outfall into a watercourse such as rivers, ponds, soakaways etc. Heavy rainfall can often result in more water on the road than the highway gullies can cope with. During a severe rainfall event, the capacity of drainage system can be overwhelmed by the amount of water trying to run off from the road and flooding can occur.

4.16. Bury Council, as Lead Local Flood Authority is responsible for identifying and managing flood risk from surface water. To assist with this, the Environment Agency produce surface water flood maps, which identify areas at risk from surface water flooding. However, operational staff within the Council know where to target resources in the event of heavy rainfall, in an effort to reduce surface water flooding.

4.17. Figure 4 identifies the main areas within the Borough which suffer from surface water flooding. These include:

Ramsbottom

- Manchester Road/Whitelow Brow, Crow Lane, Carr Street, Moor Road, Branch Road, Longsight Road

Summerseat

- Railway Street, Wood Road Lane

Tottington/Greenmount

- Watling Street, Turton Road, Harwood Road, Bradshaw Road, Holcombe Road (Old Kays Park), Hollymount Lane, Moorside Road, Sunny Bower Street, Scobell Street.

Bury

- Ferngrove, A58 Bolton Road (Three Arrows)

Radcliffe

- Higher Ainsworth Road, St Andres Close, Close Park, Parkside Close, Riverside Road, Waterside Close, Openshaw Fold, Ripon Close, Bealey's Goit.

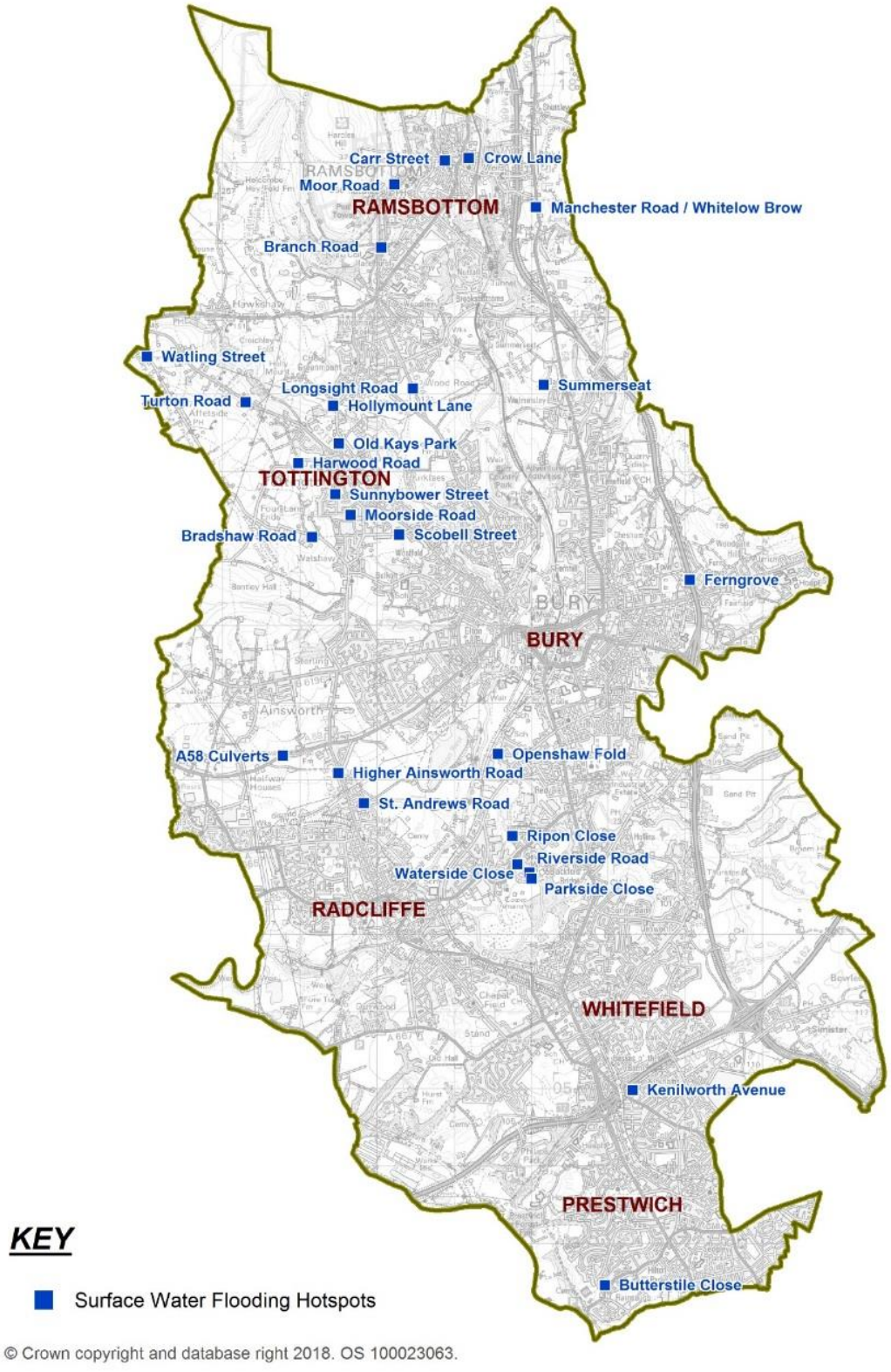
Whitefield

- Kenilworth Avenue

Prestwich

- Agecroft Road West, Butterstile Close

Figure 4 – Surface Water Flooding



Source: Bury Council

Groundwater flooding

4.18. Groundwater flooding occurs when the water held underground rises to a level where it breaks the surface in areas away from usual channels and drainage pathways. It is generally as a result of exceptional extended periods of heavy rain but can also occur as a result of reduced abstraction, underground leaks or the displacement of underground flows. Once groundwater flooding has occurred, the water can be in situ for a lengthy period of time.

4.19. Local knowledge of groundwater flooding is limited and often groundwater is not identified as a distinct event.

4.20. Bury lies over an aquifer with geology consisting predominately of sands and gravels which have high permeability. There are a number of flood defences along the River Irwell through Ramsbottom which elevate river levels above the flood plain. There is the possibility that alluvial groundwater flooding could occur in these areas. However, there are relatively few reported incidents of groundwater flooding in Bury.

Sewer flooding

4.21. Sewer flooding is caused by excess surface water entering the sewer network, exceeding available capacity or when a blockage occurs. This generally occurs during periods of heavy rainfall when the drainage network becomes overwhelmed. Land and property can be flooded with water contained with raw sewage as a result. Sewers that overflow can also pollute rivers.

4.22. United Utilities (UU) is the water company responsible for the management of the drainage network in Bury.

4.23. The Environment Agency can designate Areas with Critical Drainage Problems (ACDPs). ACDPs may be designated where the EA is aware that development within a certain catchment/drainage areas could have detrimental impacts on fluvial flood risk downstream and/or where the EA has identified existing fluvial flood risk issues that could be exacerbated by upstream activities. No ACDP have been identified in Bury.

Canal flooding

4.24. Canals are rivers or manmade channels that were originally developed for transport. Canal flooding is caused by overtopping or breach of the canal network when the canal cannot cope with the water entering it or when a wall or embankment collapses.

4.25. The Manchester, Bury and Bolton Canal once started in Bury, running southwards through Radcliffe, before joining the River Irwell in Salford. The canal was closed in 1961 and is disused and discontinuous north of Salford.

4.26. The Preliminary Flood Risk Assessment (June 2011) identified a historic risk of broad canal flooding, however there is no modelled flood risk data available. Furthermore a number of factors suggest that the flood risk on the Manchester, Bury and Bolton Canal is low:

- Embankments are generally low and made from clay;
- The canal is discontinuous;
- The last major breach and location of many breaches was at Nob End downstream of Radcliffe in 1936. This stretch of the canal was not restored;
- Previous canal failures were caused by mining subsidence. It is assumed that mining activity in the area has now ceased, although some risk does still remain; and
- The canal intercepts some surface water from the catchments to the west. However, no detailed modelling has been undertaken and the impact of this is largely unknown.

Reservoir flooding

4.27. Reservoirs hold large volumes of water above ground level and are contained by walls or dams. Reservoir flooding occurs when a reservoir structure is overtopped or fails due to damage or collapse.

4.28. The Environment Agency maintains a Public Register of Large Raised Reservoirs. Table 1 identifies the reservoirs within Bury. The chance of reservoir failure is very unlikely as reservoirs are regularly inspected and there is an extremely good safety record in the UK with no loss of life due to reservoir flooding since 1925.

4.29. Elton Reservoir is considerably bigger than any other reservoir within the Borough.

4.30. The Generic Reservoir Off-Site Plan (December 2024) outlines the Greater Manchester emergency response to any reservoir failure. In addition, there are Specific Reservoir Off-Site Plans for those reservoirs within Greater Manchester which are in the top 100 reservoirs with the most serious consequences in a failure. Bury does not host any of these reservoirs, but a considerable number would impact upon the Borough, should they fail. The Generic and Specific plans have been tested at strategic, tactical and operational levels in the Borough and at a Greater Manchester level.

4.31. United Utilities has a programme of pro-active reduction which is reducing the risk of reservoir failure even further, on a year by year basis. The reservoirs operated by United Utilities in Bury are water storage reservoirs which are filled from the water mains. They are therefore not affected by river flooding and are intrinsically lower risk structures than the majority of reservoirs.

Figure 5 – Reservoirs in Bury

Reservoir	Physical Status	Construction	Year Built	Capacity	Surface Area
Elton	In Operation	Earthfill	1808	923,000	217,000
Elton Vale Lower	In Operation	Earthfill	1860	56,000	16,000
Lowercroft Lower	In Operation	Earthfill		40,000	19,800
Lowercroft Middle	In Operation	Earthfill	1800	127,000	25,000
Lowercroft Upper	In Operation	Earthfill	1890	183,000	30,000
Pilsworth	In Operation	Earthfill		25,000	30,000
Woodgate Hill 1	In Operation	Gravity	1958	64,000	10,400
Woodgate Hill 2	In Operation	Gravity	1961	269,000	47,000

Source: Environment Agency, 2025

Water resources

4.32. Bury's origin and development is heavily associated with its watercourses. Settlements grew up at bridging point and factories were built on sites where they could exploit water to power machinery and treat cloth. As a result, the Borough's watercourses have been much altered and have suffered from excessive pollution since the late 18th century.

4.33. The River Irwell is now protected and managed according to the principle of the European Water Framework Directive (WFD). Water quality is generally managed by the Environment Agency and United Utilities through their discharge consent systems.

4.34. As assessment is made in respect of the whole water environment to help direct action to where it is most needed and is based on the requirements of the WFD. The Directive requires consideration to be given to over 30 measures grouped into two key measures – ecological considerations and chemical assessment. For a water body to be in overall 'good' status both ecological considerations and chemical status must be at least good.

4.35. As assessment of chemical status is required in water bodies where priority substances and other specific pollutants are known to be discharged in significant quantities. In 2019, the method of assessing chemical status

changed and as a result all waterbodies since then now fail the chemical status assessment.

4.36. The Environment Agency (EA) produced River Basin Management Plans for England and Wales to ensure that these countries can meet the duties set out under the European Water Framework Directive. The plans identify a number of actions to improve water quality and fisheries and reduce flood risk but also note the need to restore, where feasible, natural bank form and flood plain through the removal of culverts, canalisation and weirs. At a local level, the EA commissioned a study identifies specific recommendations for the physical restoration of the River Irwell and Kirklees Brook. Recommendations included removal of weirs, reconnection of the Irwell to its natural flood plain and the need to install fish ladders on weirs that need to be retained for flood defence.

4.37. A similar study has been produced for the River Roch which identified opportunities for river restoration in order to comply with the Water Framework Directive (WFD) mitigation measures. To this effect, weirs, revetment works and potential flood storage areas have been identified and possible options for improving channel morphology, habitat creation and diversity and increasing fish passage.

Water efficiency

4.38. Water supply and sewerage is supplied by United Utilities to Bury. Most of the water supply to the Borough comes from the Haweswater reservoir via the Haweswater Aqueduct and Woodgate Hill Water Treatment Works and a variety of connections on the Manchester Ring Main. There are some supplies from the Wayoh Water Treatment Works which primarily feeds Tottington and parts of Ainsworth. The northern areas of the Borough such as Holcombe and Ramsbottom receive a mixture of Haweswater and Haslingden Grane Water Treatment works supplies.

4.39. Climate change and population and economic growth are putting increasing pressure on water availability for homes and businesses. As such, it is important that water is conserved and used efficiently as much as possible to help to secure future water supplies and adapt to climate change; to enable future growth; reduce carbon emissions from water treatment and disposal; and to protect river and wetland habitats from degradation.

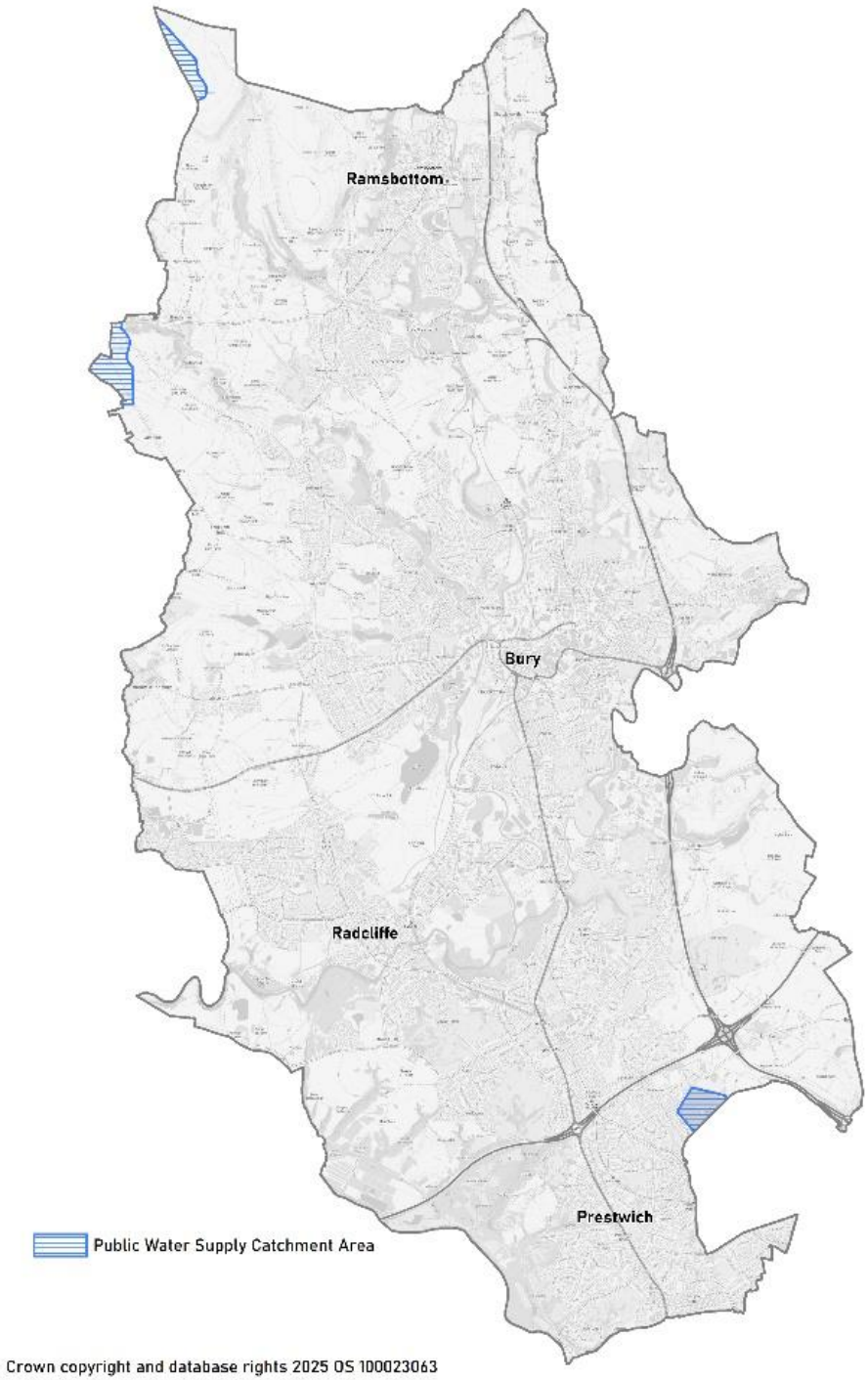
4.40. Criterion 7 of Places for Everyone Policy JP-S4 states that as a minimum, residential development should meet the mandatory water efficiency standard of 125 litres/person/day as set out in Building Regulations. District local plans may and should consider setting a tighter water efficiency standard of 110 litres/person/day where there is a clear local need with reference to national guidance on housing optional technical standards.

Public Water Supply Catchment Areas

4.41. Small parts of Bury are identified as public water supply catchment areas (see Figure 6). Development proposals on land identified as a public water catchment area can have an impact on water supply resources and applicants for development on such land will need to engage with the statutory undertaker for water to determine whether any proposal is on land used for public water supply catchment purposes.

4.42. In cases of wind energy proposals on water catchment land, the applicant should seek to locate development so that the impact on public water supply is minimised through the location of the development and through the undertaking of appropriate risk assessments and the inclusion of mitigation measures in the design and construction process. It is particularly important to avoid the location of new wind turbines on deep peat land.

Figure 6 – Public Water Supply Catchment Areas



Wastewater infrastructure

4.43. There are currently two wastewater treatment works operating within the administrative area of Bury (Bury and Bolton Wastewater Treatment Works). New development must ensure that the occupiers of new developments will enjoy an appropriate standard of amenity and will not be adversely affected by neighbouring uses and vice versa.

5. Future influences on flooding

Climate Change

5.1. Climate change is expected to significantly change rainfall patterns in the United Kingdom. This means that flooding in the UK is expected to be more frequent, to a greater extent, deeper and faster. In February 2016, the Environment Agency updated their advice[9] on climate change allowances for river flow modelling for planning. The new advice states, for the North West, river flows could increase by up to 35% and 70% in the long term. The Environment Agency previously advised that river flows may increase by 20% as a result of climate change.

5.2. The Bury, Oldham and Rochdale Level 2 SFRA (2009) projected the likely extent of a flood zone 3 under a climate change scenario (which assumed a 20% increase in the extent of the EA flood zone 3). In this scenario, Radcliffe overall appeared to be more affected by climate change, whilst Ramsbottom appeared to be more sensitive during more extreme rainfall events.

5.3. In the Surface Water Management Plan (January 2013), an assumption was made that climate change will lead to a 30% increase in rainfall intensities for the 1 in 200 year flood event. The modelling indicated that Ramsbottom, Bury Town Centre and Radcliffe will continue to be locations where future surface water flooding is likely to occur.

5.4. The floods experienced on Boxing Day 2015 confirmed this pattern less than 10 years after these reports were produced.

New Development

5.5. The location of future developments and flood defences within a catchment can heavily influence flood risk within an area and has the potential to further increase flood risk at areas downstream of such developments. Impacts could include the lowering of the Standard of Protection offered by flood defences and the capacity of culverts, drains, sewers and watercourse channels. This potentially leads to areas being at risk of flooding that were previously not at risk and highlights' the increasing conflicts and pressures that are emerging between climate change scenarios and future development aspirations.

[9] https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowance

5.6. There is also a risk that an increase in hard standing and impermeable surfaces associated with new development will increase surface water run-off and hence the risk of flooding.

5.7. Significant work was undertaken in relation to flood risk during production of PfE. This included a Level 1 and 2 SFRA, a GM Flood Risk Management Framework and a Flood Risk Sequential Test and Exception Test Evidence Paper. This information informed the PfE policies and the strategic allocations. As the Local Plan is not proposing to allocate any sites for development, the PfE evidence provides sufficient evidence to inform the local plan policies.

6. Flood risk management

6.1. Flood risk management aims to reduce the likelihood or impact of flooding. Often the most effective approach is through a combination of the following measures:

Flood risk management hierarchy

6.2. The hierarchy of principles identified in Table 2 should be applied to all development proposals within the Borough.

Figure 7 - Flood risk management hierarchy

Step 1	Step 2	Step 3	Step 4	Step 5
Assess	Avoid	Substitute	Control	Mitigate
Appropriate flood risk assessment	Apply the sequential approach	Apply the sequential test at site level	e.g. SuDs, design, defences.	e.g. flood resilient construction

6.3. Where a proposed development involves a site that has been identified as being at risk of flooding, or where it is considered that it could affect flood risk elsewhere, the Council will need to be satisfied that issues of flood risk have been considered in advance of any development taking place. In such instances, the Council will require applications to be accompanied by a detailed Flood Risk Assessment. National policy and guidance on flood risk provide detailed information on the scope and content of Flood Risk Assessments.

Structural measures

6.4. Flood walls or embankments are designed to form physical barriers to stop water overflowing into the surrounding areas. Where flood banks are used, it is usually possible to incorporate footpaths or cycle paths along the top and link into a wider green infrastructure network.

Natural Flood Management measures

6.5. Natural Flood Management (NFM) or Working with Natural Processes (WwNP) is a type of flood risk management used to protect, restore and re-naturalise the function of catchments and rivers to reduce flood risk.

6.6. Work such as tree planting or changes to land or river management can slow or reduce how much water runs off the hills upstream, which can sometimes help reduce flood risk in downstream locations. This is known as Natural Flood Management and can help to increase society's resilience to floods.

6.7. However, natural flood management is not appropriate in every case and these measures can take a long time to establish and produce a change in river flows, so are usually only used in combination with other measures.

6.8. Natural flood management measures may include:

- Peatland and moorland restoration in upland catchment;
- Re-meandering rivers and streams;
- Targeted woodland planting;
- Reconnection and restoration of functional floodplains;
- Restoration of rivers and removal of redundant structures;
- Instalment or retainment of large woody material in river channels;
- Improvements in the management of soil and land use;
- Implementation of Rural and urban sustainable drainage systems (SUDS); and
- Encouraging land use changes to slow water.

6.9. The SFRA has provided maps to show where potential WwNP should be investigated further as a means of flood mitigation.

Sustainable Urban Drainage Systems (SUDS)

6.10. Paragraph 165 of the NPPF states that "major developments should incorporate sustainable drainage systems unless there is clear evidence that this would be inappropriate". Decisions on whether a sustainable drainage system would be inappropriate is a matter of judgement, based on guidance and advice from the Lead Local Flood Authority who will consider what type of sustainable drainage is reasonably practicable for a site.

6.11. The SFRA recommends the use of Green Infrastructure and SUDS, using the SFRA to inform where open space should be utilised for water in the areas of greatest flood risk. Examples include:

- Restoration of the natural character of floodplains;
- Keeping and preserving of areas of existing natural floodplain;
- Introduction of new areas and enhancing existing areas of greenspace whilst incorporating sustainable drainage within new development; and
- Reduction of downstream flood risk.

6.12. SUDS are often viewed as taking up large areas of land within development sites. This is not necessarily the case, as there are a number of different SUDS components that can be used. The following hierarchical approach should be used when considering drainage options:

- Into the ground (infiltration);
- To a surface water body;
- To a surface water sewer, highway drain, or other drainage system; and
- To a combined sewer.

6.13. Application of the hierarchy for managing surface water is a key requirement for all development sites to reduce flood risk and the impact on the environment. Clear evidence must be submitted to demonstrate why alternative preferable options in the surface water hierarchy are not available.

6.14. Foul and surface water drainage must be considered early in the design process. Sustainable drainage should be integrated with the landscaped environment and designed in accordance with the four pillars of sustainable drainage (water quantity, water quality, amenity and biodiversity). It should identify SuDS opportunities, such as green roofs; permeable surfacing; soakaways; filter drainage; swales; bioretention tree pits; rain gardens; basins; ponds; reedbeds and wetlands

Flood water storage areas

6.15. Flood water storage areas/basins are designed to hold back excess water during a flood. This would reduce the amount of water travelling downstream and reduce the risk of the river overflowing in downstream locations.

6.16. The starting point for identifying areas of possible flood storage is to look at potential green infrastructure because land that could slow water drainage could also have multiple benefits such as, improving water quality, wildlife and habitat conservation, recreation and carbon storage.

Radcliffe and Redvales Flood Management Scheme

6.17. The Radcliffe and Redvales Flood Risk Management Scheme (FRMS) was designed to reduce the flood risk from the River Irwell south of Bury and west of Radcliffe. There is a long history of flooding in the area from the river overtopping its banks. The Boxing Day 2015 event resulted in flood damage to over 700 residential buildings, multiple commercial properties and critical infrastructure such as Bury Wastewater Treatment Works (WwTW) and electricity substations. The area also experienced flooding during the storm Ciara flood event in February 2020.

6.18. The primary source of flood risk is fluvial flooding from the River Irwell with a 10% chance of it occurring in any one year. Surface water run-off, artificial drainage systems, reservoirs and a disused canal are also potential sources of flooding in what is a heavily urbanised part of the Irwell catchment.

6.19. The Radcliffe and Redvales scheme defences have been designed with a 100-year design life and will provide protection against a flood with a 1% chance of occurring in any one year, considering predicted climate change increases. The envisaged scheme will reduce flood risk tom more than 800 homes and local businesses from flooding, it will also help keep transport routes and infrastructure open during times of flood, maintaining vital links in an area.

6.20. The scheme includes:

- A 2.5 flood wall and 3m high earth embankment totalling 660m in length and the creation of new wildlife habitat and increased amenity areas for the public at Close Park;
- Sheet piled wall and embankments along Morris Street and Dumers Lane totalling 350m in length;
- Vertical piled retaining walls at Warth Road, totalling 310m in length;
- Vertical piled retaining walls and concrete retaining walls at Keswick Drive totalling 220m in length;

- Gravity retaining walls and sheet pile retaining walls at Redvales Business Park, totalling approximately 790m in length;
- L-shaped retaining walls, sheet piles and precast concrete units at York Street totalling 270m;
- Two sections of pre-cast concrete retaining walls and a demountable flood defence at Bury Point;
- Modifications to Hardy's Gate bridge to install flood gates;
- A combination of flood embankment and retaining wall at Lower Hinds, totalling 460m in length.

6.21. The majority of the Radcliffe and Redvales FRMS is now complete, and the community is benefitting from a much-increased standard of protection against flooding compared to 2015. New telemetry has now been installed at Warth Bridge to allow EA to monitor river levels on the River Irwell and operate the proposed flood gates. Works began to remove Hinds Weir in September 2024, taking the river back to a more natural state and enabling fish passage. The remaining works comprise of installation of flood gates at Hardy's Gate Bridge.

7. Summary of Key Issues

7.1. This Water and Flood Risk Topic Paper has highlighted a number of Key Issues that need to be considered in taking the Local Plan forward. These Key Issues are considered to be as follows:

- Significant areas of the Borough are at risk of river and surface water flooding. Development will need to be located away from areas of flood risk, ensure it is well protected from flood risk and does not increase flood risk elsewhere.
- Insufficient capacity in the sewer and drainage network to accommodate increasing amounts of surface water.
- Increasing conflict and pressures between climate change scenarios and future development aspirations.
- Land is required for new flood defences, natural flood management measures and flood water storage.

Bury Council