

# To Telford and Wrekin Level 2 Strategic Flood Risk Assessment Final

January 2025

Prepared for: Telford and Wrekin Council



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This report describes work commissioned by Telford and Wrekin Council, by a Purchase Order instruction dated 10th October 2024. The Client's representative for the contract was Harriett Broster of Telford and Wrekin Council. Jordane Bates, Martha Gurney and Jake Williams of JBA Consulting carried out this work.

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## Contents

Exe	cutive Summa	ary	7
1	Introductio	n	12
	1.1	Purpose of the Strategic Flood Risk Assessment	12
	1.2	SFRA Objectives	12
	1.3	How to Use This Report	13
	1.4	SFRA Study Area	15
2	The Plannii	ng Framework and Flood Risk Policy	18
	2.1	National Planning Policy Framework and Guidance	18
	2.2	Roles and Responsibilities for Flood Risk Management	21
	2.3	Relevant Legislation	22
	2.4	Relevant Flood Risk Policy and Strategy Documents	23
	2.5	LLFAs, Surface Water and SuDS	24
	2.6	Updated Strategic Flood Risk Assessment Guidance	24
3	Sources of	Information Used in Preparing the Level 2 SFRA	25
	3.1	Use of SFRA Data	25
	3.2	Historic Flooding	26
	3.3	Fluvial Flood Risk	27
	3.4	Flooding from Rivers	28
	3.5	Surface Water Flooding	33
	3.6	Sewer Flooding	35
	3.7	Groundwater	35
	3.8	Statutory Reservoirs	37
	3.9	Residual Risk	38
	3.10	Minewater Flooding	38
	3.11	Cumulative Impact Assessment	39
	3.12	Topography, Geology, Soils, and Watercourses	39
	3.13	Note on SuDS Sustainability	40
4	Level 2 Ass	sessment Methodology	41
	4.1	Site Screening	41
	4.2	Sites Taken Forward to a Level 2 Assessment	41
	4.3	Recommendations for Sites Not Taken Forward to a Level 2 Assessment	42

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	4.4	Site Summary Tables	46
5	Summary o	f Level 2 Assessment and Recommendations	50
	5.1	Assessment Methods	50
	5.2	Summary of Key Site Issues	50
	5.3	Requirements for Developers	55
	5.4	Planning Policy Recommendations	57
	5.5	Guidance for Windfall Sites and Sites Not Assessed in the L2 SFRA	58
	5.6	Use of SFRA Data and Future Updates	59
6	Flood Risk	Management Requirements for Developers	60
	6.1	Principles for New Developments	60
	6.2	Site-Specific Flood Risk Assessments	60
	6.3	Local Requirements for flood mitigation measures	61
	6.4	Reducing flood risk from other sources	61
	6.5	Duration and onset of Flooding	63
	Flood	I Warning	64
	6.6	and Emergency Planning	64
7	Surface Wa	ter Management and SuDS	67
	7.1	Roles of the Lead Local Flood Authority and Local Planning	
		Authority in surface water management	67
	7.2	Sources of SuDS Guidance	67
	7.3	Other surface water drainage design considerations	68
	7.4	SudS Suitability	69
Α	Site Summa	ary Tables	70
В	Site Mappir	ng	71
С	Site Screen	ing	72
List of Figures			
Figure	e 1-1 Study a	rea with neighbouring authorities	16
Figure	e 1-2 Main Riv	vers and ordinary watercourses in Telford and Wrekin Council area	a 17
Figure 2-1 The Sequential Test 12			
Figure 2-2 The Exception Test			

Figure 3-1 Flood extents of hydraulic models covering Telford and Wrekin	30
Figure 3-2 Environment Agency Management Catchments in Telford and Wrekin	31
Figure 3-3 Coal Mining Reporting Area	39
List of Tables	
Table 1-1: Outline of each section of this report	13
Table 2-1 Roles and responsibilities of different organisations for Flood Risk Manager	nent
	21
Table 3-1: Overview of data used for Telford and Wrekin Council Level 2 SFRA	25
Table 3-2: Definition of the Flood Zones as per the Planning Practice Guidance	27
Table 3-3: Summary of fluvial models for the Telford and Wrekin Council area	28
Table 3-4: Climate change allowances for peak river flows in the Severn Middle Shrop Management Catchment	oshire 32
Table 3-5: Climate change allowances for peak river flows in the Severn Middle Worcestershire Management Catchment	32
Table 3-6: Climate change allowances for peak rainfall intensity in the Severn Middle Shropshire Management Catchment	34
Table 3-7: Climate change allowances for peak rainfall intensity in the Severn Middle Worcestershire Management Catchment	34
Table 3-8: Defra's FD2321/TR1 "Flood Risks to People" classifications (March 2006)	35
Table 3-9: JBA Groundwater Risk Emergence Mapping data classifications	36
Table 3-10: Summary of SuDS categories	40
Table 4-1 Site categories used for site flood risk assessment	43
Table 4-2: 'Green' Sites - Sites flagged at lower flood risk	44
Table 4-3: 'Amber' Sites - Sites flagged at medium flood risk	45
Table 4-4: Sites requiring site summary table	46
Table 5-1: Sites in Flood Zones 2 and 3, with >50% of site area in Flood Zone 1	50
Table 5-2: Sites with significant proportions of the site at surface water flood risk	51
Table 5-3: Sites with access and egress issues	52
Table 5-4: Sites most sensitive to climate change	53
Table 5-5: Sites at high risk of groundwater emergence	54
Table 5-6: Sites at risk from reservoir flooding	54
Table 5-7 Sites in high risk catchments	55
Table 6-1: Guidelines on the duration and onset of flooding	64

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### Abbreviations

1D	1 Dimensional
2D	2 Dimensional
AEP	Annual Exceedance Probability
BGS	British Geological Survey
CIRIA	A company that provides research and training in the construction industry
Defra	Department of the Environment, Food and Rural Affairs
DTM	Digital Terrain Model
DWMP	Drainage and Wastewater Management Plan
EA	Environment Agency
FRA	Flood Risk Assessment
GSPZ	Groundwater Source Protection Zone
IDB	Internal Drainage Boards
LFRMS	Local Flood Risk Management Strategy
Lidar	Light Detection and Ranging
LLFA	Lead Local Flood Authority
LPA	Local Planning Authority
NaFRA	National Flood Risk Assessment
NAVs	New Approvals and Variations
NPPF	National Planning Policy Framework
PPG	Planning Policy Guidance
RBMP	River Basin Management Plans
RMA	Risk Management Authority
RoFSW	Risk of Flooding from Surface Water
SFRA	Strategic Flood Risk Assessment
SIDB	Strine Internal Drainage Board
SuDS	Sustainable Drainage Systems
SWMP	Surface Water Management Plan



**1D model:** One-dimensional hydraulic model, typically representing a watercourse and structures within the channel (for example bridges and culverts).

2D model: Two-dimensional hydraulic model, typically representing the floodplain flows.

Brownfield: Previously developed parcel of land.

Annual Exceedance Probability (AEP): The probability that a given rainfall total accumulated over a given duration will be exceeded in any one year.

**Design flood:** This is a flood event of a given annual flood probability, which is generally taken as:

- river flooding likely to occur with a 1% annual probability (a 1 in 100 chance each year); or
- tidal flooding with a 0.5% annual probability (1 in 200 chance each year); or
- surface water flooding likely to occur with a 1% annual probability (a 1 in 100 chance each year),
- plus, an appropriate allowance for climate change.

**Exception Test:** Set out in the NPPF, the Exception Test is a method used to demonstrate that flood risk to people and property will be managed appropriately. The Exception Test is applied following the Sequential Test.

**Flood defence:** Infrastructure used to protect an area against floods such as floodwalls and embankments; they are designed to a specific standard of protection (design standard).

**Flood Map for Planning (FMfP):** The Environment Agency Flood Map for Planning (Rivers and Sea) is an online mapping portal which shows the Flood Zones in England. The Flood Zones refer to the probability of river and sea flooding, ignoring the presence of defences and do not account for the possible impacts of climate change.

**Flood and Water Management Act (2010):** Part of the UK Government's response to Sir Michael Pitt's Report on the Summer 2007 floods, the aim of which is to clarify the legislative framework for managing surface water flood risk in England.

Fluvial Flooding: Flooding resulting from water levels exceeding the bank level of a river.

Functional Floodplain: The land where water has to flow or be stored in times of flood.

Greenfield: Undeveloped parcel of land.

**Lead Local Flood Authority (LLFA):** County councils and unitary authorities which lead in managing local flood risks (risks of flooding from surface water, groundwater and ordinary (smaller) watercourses). The Telford and Wrekin Council is a lead local flood authority.

**Local Planning Authority (LPA):** The local government body which is responsible by law to exercise planning functions for a particular area. The Telford and Wrekin Council is the local planning authorities.

**Main River:** A watercourse shown as such on the Main River Map, and for which the Environment Agency has responsibilities and powers.

**New Appointments and Variations (NAVs):** limited companies which provide a water and/or sewerage service to customers in an area which was previously provided by the monopoly provider.

**Ordinary Watercourse:** All watercourses that are not designated Main River. Local Authorities or, where they exist, IDBs have similar permissive powers as the Environment Agency in relation to flood defence work. However, the riparian owner has the responsibility of maintenance.

**Resilience Measures:** Measures designed to reduce the impact of water that enters property and businesses; could include measures such as raising electrical appliances.

**Riparian owner:** A landowner who owns land or property next to a river stream or ditch or with one flowing through it. **Risk:** In flood risk management, risk is defined as a product of the probability or likelihood of a flood occurring, and the consequence of the flood.

**Risk Management Authority (RMA):** Operating authorities who's remit and responsibilities concern flood and/or coastal risk management.

**Sequential Test:** Set out in the NPPF, the Sequential Test is a method used to steer new development to areas with the lowest probability of flooding.

**Sewer flooding:** Flooding caused by a blockage or overflowing in a sewer or urban drainage system.

**Standard of Protection (SoP):** Defences are provided to reduce the risk of flooding (typically from a river, sea or surface water). A Standard of Protection is usually described in terms of an AEP flood event. For example, a flood embankment could be described as providing a 1% AEP Standard of Protection.

**Statutory Reservoir:** A reservoir is a raised body of water designed to hold back and store water. When the body of water is over 25,000m<sup>2</sup> it is classed as a Statutory Reservoir.

Sustainable Drainage Systems (SuDS): Methods of management practices and control structures that are designed to drain surface water in a more sustainable manner than some conventional techniques.

**Surface water (pluvial) flooding:** Flooding that results from high intensity rainfall when water is ponding or flowing over the ground surface before it enters the underground drainage network or watercourse or cannot enter it because the network is full to capacity.



## **Executive Summary**

This Level 2 Strategic Flood Risk Assessment (SFRA) document was created with the purpose of supporting New Local Plan for Telford and Wrekin Council. This document supersedes the Level 2 SFRA published by the Council in 2009 and follows on from the Level 1 SFRA (published in 2021). This Level 2 SFRA incorporates recent changes to national and local planning policy.

A detailed assessment carried out on 58 sites in the Telford and Wrekin Council area and identified that 21 sites have a significant risk of flooding from fluvial and surface water sources and/or access and egress issues - these sites have been assessed in individual site summary tables. The assessment also highlighted that 17 sites are at medium risk of flooding, whilst these sites will not have individual summary tables, further information is provided in the body of this report.

The Planning Practice Guidance (PPG) (2022) on Flood Risk and Coastal Change advocates a tiered approach to flood risk assessment involving Level 1 and Level 2 assessments. The aim of the Level 2 assessment is to build on identified risks from the Level 1 SFRA for proposed development sites, to provide a greater understanding of fluvial, surface water, groundwater, and reservoir related flooding risks to the site. The Level 2 assessment also helps Telford and Wrekin Council fulfil part B of the Exception Test to ensure the development is safe for its lifetime. From this, the Council and Developers can make more informed decisions and pursue development in an effective and efficient manner. The Level 2 assessment also identifies sites for further risk analysis at the sitespecific Flood Risk Assessment (FRA) stage.

- The Level 2 assessment includes detailed assessments of the proposed site options, including:
- An up-to-date Strategic Flood Risk Assessment, taking into account the most recent policy and legislation in the National Planning Policy Framework (NPPF) (2024).
- An assessment of all sources of flooding including fluvial flooding, surface water flooding, groundwater flooding, minewater flooding and the potential increase in fluvial and surface water risk due to climate change, and how these may be mitigated.
- An assessment of existing flood warning and emergency planning procedures, including an assessment of safe access and egress during an extreme event.
- Advice and recommendations on the likely applicability of sustainable drainage systems for managing surface water runoff.
- A comprehensive set of maps presenting flood risk from all sources that can be used as evidence base for use in the emerging Local Plan.
- Advice on whether the sites are likely to pass the second part of the Exception Test and the Sequential Test with regards to flood risk and on the requirements for a site-specific FRA and outline specific measures or objectives that are required to manage flood risk.

As part of the Level 2 SFRA, detailed site summary tables have been produced for the proposed sites identified as being at high risk of flooding. The site summary tables detail the flood risk to each site, the NPPF requirements, and guidance for site-specific FRAs. A broadscale assessment of suitable SuDS options have been provided, giving an indication where there may be constraints to certain types of SuDS techniques. To accompany the site summary tables, there are mapped flood risk outputs for each site for all sources of flood risk.

The following points summarise the Level 2 assessment:

- Fluvial Flooding: Fluvial flood risk from Main Rivers is concentrated in the north of the Telford and Wrekin Council area, due to the presence of a number of watercourses, including the River Tern, River Roden, River Strine and the Strine Brook. In the south of the area, sites are at fluvial flood risk from the River Severn and the Coalbrook. The sites that are at risk of fluvial flooding are 126, 237, 274, 408 and 718.
- Surface Water: Surface water flow routes tend to follow the topography of a site, for example, along ordinary watercourses or isolated pockets of ponding where there are topographic depressions, including the built-up area of Telford. The majority of the sites with a detailed Level 2 Summary Table have areas at risk of surface water flooding, the degree of flood risk varies with some sites being only marginally affected along their boundaries, whilst other sites are more significantly affected within the site. The sites which are more affected by surface water flooding are Sites 398, 707, 717 and 718.
- Access and Egress:17 out of the 21 sites at high risk of flooding have been identified to have access and egress issues due to surface water flooding. Consideration should be made to these sites as to how safe access and egress can be provided during flood events, both to people and emergency vehicles. Also, consideration should be given to the nature of the risk, for example whether the flooding forms a flow path or bisects the site where access from one side to another may be compromised.
- Effects of Climate Change: Fluvial and surface water climate change mapping indicates that flood extents are predicted to increase. As a result, the flood depths, velocities, and hazard of flooding may also increase. The significance of the increase tends to be dependent on the topography of the site and the climate change percentage allowance used.
  - Surface water: The 3.3% AEP plus 25% and the 1% AEP plus 45% climate change surface water events have been derived from the Risk of Flooding from Surface Water (RoFSW) dataset. The extent of the RoFSW 1% AEP plus 45% climate change surface water events are larger than their respective present day 1% AEP events, in many cases reaching the extents of their respective present day 0.1% AEP events. This shows that the Telford and Wrekin Council area is relatively sensitive to increases in surface water flooding due to climate change.

- Fluvial: Climate change allowances for the 1% AEP events have been derived from hydraulic modelling of the River Severn, River Tern, River Roden, Wesley Brook and Coalbrookdale. The models show the 1% AEP plus upper climate change allowance to be predominantly larger than the modelled present day 1% AEP fluvial events but smaller than the modelled present day 0.1% AEP fluvial events.
- There are 7 sites which show the greatest sensitivity to changes in surface water and fluvial flood risk due to climate change. These are predominantly located in areas to the north of Telford, with the exception of Site 718, to the south of Telford on the Coalbrook.
- Site-specific FRAs and surface water drainage plans should confirm the impact of climate change using the latest guidance.
- Groundwater: The area identified as at highest risk of groundwater flooding are to the north of Telford and south of Newport. The JBA groundwater emergence mapping show that no sites are were shown to be at high risk of groundwater flooding, there are 5 sites indicated to be at medium risk of groundwater flooding.
- Reservoirs: There are approximately 20 reservoirs in and around the council area. There are 6 sites assessed within the site summary tables that are shown to be at risk of reservoir flooding during a 'Dry Day' scenario and 3 sites in a 'Wet Day' scenario. The level and standard of inspection and maintenance required under the Reservoirs Act means that the risk of flooding from reservoirs is very low. However, there is a residual risk of a reservoir breach, and this risk should be considered in any site-specific FRA (where relevant). Where development is proposed downstream of a reservoir, developers should consult the Environment Agency and reservoir owner, as this may affect the risk designation of the reservoir.
- Historic Flooding: Historic data provided by Telford and Wrekin Council shows that Sites 126, 408 and 424 are in areas with the most recorded flood incidents.
- Cumulative impact: As part of the Level 1 SFRA an assessment of the cumulative impact of development on flood risk across the Council area was undertaken, there are 8 proposed sites in catchments at relative high risk.

### **Requirements for Developers**

The requirements and guidance for developers set out in this report are set out below:

- It is recommended that as part of the early discussions relating to development proposals, developers discuss requirements relating to site-specific FRA and drainage strategies with both the Local Planning Authority and the Lead Local Flood Authority (LLFA), to identify any potential issues that may arise from the development proposals.
- For sites allocated within the Local Plan, the Local Planning Authority should use the information in this SFRA to inform the Exception Test. At planning application stage, the developer must adopt the sequential approach when assessing the

feasibility of site allocations. This will ensure that appropriate flood resistance and resilience measures are put in place, which align with the recommendations in National and Local Planning Policy and supporting guidance as well as those set out in this SFRA.

- For developments that have not been allocated in the Local Plan, developers must undertake the Sequential Test followed by the Exception Test (if required) and present this information to the Local Planning Authority for approval.
  Developers will need to apply the Exception Test and use information in a sitespecific Flood Risk Assessment to inform this test at planning application stage. The Exception Test should be applied where there is development which is classed as;
  - More vulnerable in Flood Zone 3a
  - Highly vulnerable in Flood Zone 2 (this is NOT permitted in Flood Zone 3a or 3b)
  - o Essential infrastructure in Flood Zone 3a or 3b
  - Any development with significant\* risk in the surface water 1% AEP event plus 40% climate change allowance flood extent. (\*Flood risk issues are not always black and white the significance of issues requires professional judgement, based on the location, topography and nature (including depth, velocity and hazard) of flooding, rather than simply whether part of a site is within a given flood extent. This is determined as part of a Level 2 assessment.)
- Any sites located where there is a Main River (including culverted reaches of Main River) will require an easement of 8m either side of the watercourse from the top of the bank. This may introduce constraints regarding what development will be possible and consideration will also need to be given for access and maintenance at locations where there are culverts. Developers will be required to apply for appropriate permits so the activity being carried out over easements does not increase flood risk.
- Any sites located where there is an ordinary watercourse, or a surface water flow route, should maintain and enhance these natural features.
- Where a culverted watercourse crosses a development site, it should be reverted back to open channel. In such a case the natural conditions deemed to have existed prior to the culverting taking place should be re-instated.
- Land Drainage Consent must be applied for and permission sort before any works that would alter or affect the ability of an ordinary watercourse to pass flow during flood events, can be completed. Information regarding the types of work that require Land Drainage Consent from Telford and Wrekin Council can be found on their website. If the site falls within the Stine IDB (SIDB) permission for works to ordinary watercourses must be sought from the SIDB.
- At the planning application stage, developers may need to undertake more detailed hydrological and hydraulic assessments of unmodelled watercourses so that the potential effects of proposals can be evaluated at site level and ensure there is no increase in risk off-site as result of development. The modelling

should evidence flood extents, depths, velocities, and hazard (including latest climate change allowances), inform development zoning within the site and prove, if required, whether the Exception Test can be passed.

- A strategic assessment of SuDS options has been undertaken using regional datasets. A detailed site-specific assessment of suitable SuDS techniques should be undertaken at site-specific level to understand which SuDS options are most appropriate.
- For sites located in a catchment which has been identified as being at high risk of development impacting flood risk, surface water drainage schemes should be designed with long-term storage of the Qbar restrictions to mitigate volumetric increases to the catchment.

'Highly vulnerable' development should not be permitted within Flood Zone 3a or Flood Zone 3b. 'More vulnerable' and 'Less vulnerable' development should not be permitted within Flood Zone 3b. Based on site assessments, the only site required to pass the exception test is Site 718. Whilst the Exception Test is only explicitly required for sites within fluvial/tidal flood zones, where sites are at significant risk from other sources of flooding, LPAs should carefully weigh up the benefits of development against the risks, and it will still need to be demonstrated through a site-specific FRA that site users will be safe throughout the lifetime of the development.

Flood risk issues can be complex, and the significance of issues requires professional judgement, based on the location, topography and nature (including depth, velocity and hazard) of flooding, rather than simply whether part of a site falls within a given flood extent. This is determined as part of this Level 2 assessment for sites allocated within the Local Plan.

This report can be used to scope the flooding issues that a site-specific FRA should investigate in more detail to inform the Exception Test for windfall sites.

It is recommended that as part of the early discussions relating to development proposals, developers discuss requirements relating to site-specific FRA and drainage strategies with both the Local Planning Authority and the Lead Local Flood Authority (LLFA), to identify any potential issues that may arise from the development proposals.

## 1 Introduction

### 1.1 Purpose of the Strategic Flood Risk Assessment

Paragraph 171 of the National Planning Policy Framework (NPPF) (2024) states that "strategic policies should be informed by a Strategic Flood Risk Assessment (SFRA) 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."

The Planning Practice Guidance (PPG) (2022) advocates a staged approach to risk assessment and identifies two levels of SFRA:

- Level 1 SFRA: where flooding is not a major issue and where development pressures are low. The assessment should be sufficiently detailed to allow application of the Sequential Test. Level 1 is completed first to understand whether a Level 2 assessment is required.
- Level 2 SFRA: where land outside the EA's Flood Zones 2 and 3 (and land outside areas affected by other sources of flooding as per the Sequential Test requirements) cannot accommodate all the necessary development creating the need to apply the NPPF's Exception Test. In these circumstances, the assessment should consider the detailed nature of the flood characteristics within a Flood Zone and assessment of other sources of flooding.

This SFRA report fulfils the requirements for a Level 2 assessment of strategic sites identified for potential allocation within Telford and Wrekin Council and has been prepared in accordance with the NPPF (2024) and PPG (2022).

This report should be read alongside the Telford and Wrekin Council Level 1 SFRA (2021) and builds upon the information presented in the Level 1 SFRA.

### 1.2 SFRA Objectives

The objectives of this Level 2 SFRA are to:

- Provide individual flood risk analysis for site options using the latest available flood risk data, thereby assisting the Council in applying the Exception Test to their proposed site options in preparation of the Local Plan for Telford and Wrekin Council.
- Using available data to provide information and a comprehensive set of maps presenting flood risk from all sources for each site.
- Where the Exception Test is required, provide recommendations for making the site safe throughout its lifetime.
- Take into account most recent policy and legislation in the NPPF, PPG and LLFA Sustainable Drainage Systems (SuDS) guidance.

### 1.3 How to Use This Report

Table 1-1 below outlines the contents of this report and how different users can apply this information.

Section	Contents	How to use
1. Introduction	Outlines the purpose and objectives of the Level 2 SFRA	For general information and context.
2. The National Planning Policy Framework and Flood Risk Policy	Includes information on the implications of recent changes to planning and flood risk policies and legislation, as well as documents relevant to the study. For more detail, please refer to Section 2 of the Level 1 SFRA.	Users should refer to this section for any relevant policy which may underpin strategic or site-specific assessments.
3. Sources of Information Used in Preparing the Level 2 SFRA	Summarises the data used in the Level 2 assessments and site mapping. Outlines the latest climate change guidance published by the Environment Agency and how this was applied to the SFRA. Sets out how developers should apply the guidance to inform site-specific Flood Risk Assessments.	Users should refer to this section in conjunction with the summary tables and associated mapping to understand the data presented. This section should be used to understand the climate change allowances for a range of epochs and conditions, linked to the vulnerability of a development. Developers should refer back to this section when understanding requirements for a site-specific Flood Risk Assessment (FRA).
4. Level 2 Assessment Methodology	Summarises the sites taken forward to a Level 2 assessment and the outputs produced for each of these sites.	This section should be used in conjunction with the site summary tables and site mapping to understand the data presented.
5. Summary of Level 2 Assessment and Recommendations	Summarises the results and conclusions of the Level 2 assessment, and updates planning policy recommendations. from the L1 SFRA.	Developers and planners should use this section to see a summary of the Level 2 assessment and understand the key messages from the site summary tables.

### Table 1-1: Outline of each section of this report

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Section	Contents	How to use
6. Flood Risk Management Requirements for Developers	Identifies the scope of the assessments that must be submitted in FRAs supporting applications for new development.	Developers should use this section to understand requirements for FRAs and what conditions/ guidance documents should be followed.
7. Surface Water Management and SuDS	Provides updated information on SuDS and surface water management.	Developers should use this section to understand the suitability of SuDS across the study area and refer to the Level 1 SFRA for further information on types of SuDS, the hierarchy and management trains information.
Appendix A: Site Summary Tables	Provides a detailed summary of flood risk for sites requiring a more detailed assessment. The section considers flood risk, emergency planning, climate change, broadscale assessment of possible SuDS, exception test requirements and requirements for site-specific FRAs.	Planners should use this section to inform the application of the Sequential and Exception Tests, as relevant. Developers should use these tables to understand flood risk, access and egress requirements, climate change, SuDS, and FRA requirements for site-specific assessments.
Appendix B: Site Mapping	Provides static mapping for each Level 2 assessed site displaying flood risk at and around the site.	Planners and developers should use these maps in conjunction with the site summary tables to understand the nature and location of flood risk.
Appendix B: Sites Carried Forward to a Level 2 Assessment	Provides a table which lists all the sites that were screened for the Level 2 assessment and have been deemed as having significant flood risk. The table details fluvial and surface water flood risk from EA datasets (FMfP and RoFSW) and hydraulic modelling.	Developers should use this table to understand flood risk for site-specific assessments.

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### 1.4 SFRA Study Area

Telford and Wrekin Council is unitary authority, whose administrative area covers approximately 290km<sup>2</sup> and has a population of approximately 185,600; more than 84% of which reside within the Telford conurbation.

Telford and Wrekin Council is bounded by Shropshire Council, South Staffordshire District Council and Stafford Council authority areas. Figure 1-1 shows the study area and the neighbouring Local Authorities.

Telford and Wrekin's land use varies with the town of Telford significantly urbanised and the remainder of the council area is predominantly rural. The major settlement is Telford, a new town designated in the 1960s incorporating the existing towns of Dawley, Ironbridge, Ketley, Madeley, Oakengates and Wellington. The town of Newport is in the north-west of the council area and the town of Ironbridge is to the south.

The Telford and Wrekin Council area is predominantly covered by Severn Trent Water as a water and sewerage provider. However, some newer housing estates in the Council area are covered by NAVs (New Approvals and Variations).

The Main Rivers that flow through Telford and Wrekin are:

- River Meese
- River Strine/Strine Brook
- River Roden
- River Tern
- River Severn
- Coalbrook (also referred to on some maps as Loamhole/Lyde Brook)

Figure 1-2 shows the location of these watercourses.



### Figure 1-1 Study area with neighbouring authorities



Figure 1-2 Main Rivers and ordinary watercourses in Telford and Wrekin Council area



## 2 The Planning Framework and Flood Risk Policy

### 2.1 National Planning Policy Framework and Guidance

The <u>National Planning Policy Framework</u> (NPPF) was updated in December 2024. The NPPF sets out Government's planning policies, based on core principles of sustainability, and how these are expected to be applied in England. The <u>Planning Practice Guidance</u> (PPG) accompanies the NPPF providing guidance on the policies. The NPPF must be accounted for in the preparation of local plans and is a material consideration in planning decisions.

### 2.1.1 Planning Practice and Guidance (PPG)

The flood risk and costal change section of the PPG was updated in August 2022. This advises on 'how to take account of and address the risks associated with flooding and coastal change in the planning process'. The guidance outlines the steps required when preparing strategic policies. Further details regarding the PPG can be found in section 3 of the Level 1 SFRA.

### 2.1.2 The Sequential Test

The Sequential Test aims to ensure that areas of little or no flood risk are prioritised for development over areas at a higher risk of flooding. This means areas at a medium or high risk of flooding from any source, now or on the future should be avoided for development where possible. Figure 2-1 summarises the approach with respect to using the available Flood Map for Planning mapping for fluvial flood risk. The Strategic Test does not apply to minor developments and change of use. For all other developments, developers must supply evidence to the LPA, that proposed development has passed the test.



### Figure 2-1 The Sequential Test

The following parameters have been used to define if a site is at low risk of flooding:

- Site is within Flood Zone 1.
- Site is not within Flood Zone 3a plus climate change.
- Site is <10% at risk from surface water flooding in the 1 in 1,000-year event.
- Site is <10% within highest risk category in JBA Groundwater map (groundwater is <0.025m below the surface in the 1 in 100-year event).
- Site is not within the Historic Flood Map.
- Site is not at risk of statutory reservoir flooding.
- Site is not at risk of breach from canal flooding.
- Site does not contain an Ordinary Watercourse.

Whether any further work is needed to decide if the land is suitable for development will depend on both the vulnerability of the development and the fluvial Flood Zone it is proposed for. <u>Annex 3 of the NPPF</u> defines the vulnerability of different development types to flooding with respect to fluvial flood risk. <u>Table 2 within paragraph 079 of the PPG</u> shows whether, having applied the Sequential Test first, if vulnerability of development is suitable for that Flood Zone and where further work is needed.

The Local Plan sequential approach is a stepwise process, but one that requires nuance as several of the criteria used are not strictly quantitative and require experienced judgement. Each step in the process must be documented, and evidence used to support decisions recorded. In addition, the NPPF states that the risk of flooding from other sources and the impact of climate change must be considered when considering which sites are suitable for site allocation. Section 3 provides further information on considering climate change.

### 2.1.3 The Exception Test

It may not always be possible for all new development to be allocated on land that is not at any risk from flooding. To further inform whether land should be allocated or planning permission granted, a greater understanding of the scale and nature of the flood risks is required. In these instances, the Exception Test will be required.

The Exception Test should only be applied following the application of the Sequential Test. It applies in the following instances, where it is not possible for development to be located in areas with a lower risk of flooding:

- More vulnerable in Flood Zone 3a
- Highly vulnerable in Flood Zone 2 (this is NOT permitted in Flood Zone 3a or 3b)
- Essential infrastructure in Flood Zone 3a or 3b
- Any development with significant risk of flooding from surface water in the 1% Annual Exceedance Probability (AEP) event plus 40% climate change allowance flood extent.

Whilst the Exception Test is only required for sites within Flood Zones 2 or 3, the Sequential Test requires consideration of all sources, and the LPA should carefully weigh up the benefits of development against the risk where sites are identified to be at significant risk from other sources of flooding. In any case, developers will still need to demonstrate that

users of any site will be safe throughout the lifetime of the development. Figure 2-2 summarises the Exception Test.



### Figure 2-2 The Exception Test

For sites allocated within the Local Plan, the Local Planning Authority should use the information in this SFRA to inform the Exception Test. At planning application stage, the Developer must design the site such that is appropriate flood resistant and resilient in line with the recommendations in National and Local Planning Policy and supporting guidance and those set out in this SFRA. This should demonstrate that the site will still pass the flood risk element of the Exception Test based on the detailed site level analysis.

There are two parts to demonstrating a development passes the Exception Test:

## 1. Demonstrating that the development would provide wider sustainability benefits to the community that outweigh the flood risk

Local planning authorities will need to consider what criteria they will use to assess whether this part of the Exception Test has been satisfied and give advice to enable applicants to provide evidence to demonstrate that it has been passed. If the application fails to prove this, the Local Planning Authority should consider whether the use of planning conditions and/or planning obligations could allow it to pass. If this is not possible, this part of the Exception Test has not been passed and planning permission should be refused.

At the stage of allocating development sites, Local Planning Authorities should consider wider sustainability objectives, such as those set out in Local Plan Sustainability Appraisals. These generally consider matters such as biodiversity, green infrastructure, historic environment, climate change adaptation, flood risk, green energy, pollution, health, transport etc.



2. Demonstrating that 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.

In circumstances where the potential effects of proposed development are material, assessment in the Level 2 SFRA is needed to provide evidence that the principle of development can be supported. At Planning Application stage, a site-specific Flood Risk Assessment will be needed. Both would need to consider the actual and residual risk and how this will be managed over the lifetime of the development.

### 2.2 Roles and Responsibilities for Flood Risk Management

Risk Management Authorities (RMAs) are comprised of different organisations that have responsibilities for flood risk management. The RMAs in and around Telford and Wrekin Council area are displayed below in Table 2-1, alongside a summary of their responsibilities.

Risk Management Authority	Strategic Level	Operational Level	Planning Role
Environment Agency	Strategic overview for all sources of flooding, national strategy, reporting and general supervision.	Main rivers, statutory reservoirs and tidal flooding.	Statutory consultee for development in Flood Zones 2 and 3 for coastal and fluvial extents.
Telford and Wrekin Council as Lead Local Flood Authority (LLFA)	Preliminary Flood Risk Assessment and Local Flood Risk Management Strategy.	Surface water, groundwater and ordinary watercourses (consenting, enforcement and works).	Statutory consultee for all major developments.
Telford and Wrekin Council as Local Planning Authority (LPA).	Local Plan production.	Determination of Planning Applications and managing open spaces under Council ownership.	Determination of Planning Applications and managing open spaces under Council ownership.

Table 2-1 Roles and responsibilities of different organisations for Flood Risk Management

Risk Management Authority	Strategic Level	Operational Level	Planning Role
Severn Trent Water and NAVs	Asset Management Plans supported by Periodic Reviews (business cases) and Develop Drainage and Wastewater Management Plans (DWMPs).	Public sewers.	Non-statutory consultee for all major developments.
Highways Authorities: National Highways (for motorways and trunk roads - M54) Telford and Wrekin Council as Local Highway Authority (for other adopted roads).	Highway drainage policy and planning.	Highway drainage Local Highway Authority can adopt some highway drainage features.	Internal planning consultee regarding highways and design standards and options.
Strine Internal Drainage Board (IDB)	IDB ordinary watercourse consenting.	Maintenance of all ordinary watercourses within the Strine IDB boundary.	Non-statutory consultee for any alterations to ordinary watercourses within the Strine IDB area.

### 2.3 Relevant Legislation

The following legislation is relevant to development and flood risk:

- <u>Town and Country Planning Act (1990)</u>, <u>Water Industry Act (1991)</u>, <u>Land</u> <u>Drainage Act (1991)</u>, <u>Environment Act (1995)</u>, <u>Flood and Water Management Act</u> (2010) – as amended and implemented via secondary legislation. These set out the roles and responsibilities for organisations that have a role in flood risk management.
- The <u>Land Drainage Act (1991, as amended)</u> and <u>Environmental Permitting</u> <u>Regulations (2018)</u> also set out where developers will need to apply for additional permission (as well as planning permission) to undertake works to an Ordinary Watercourse or Main River.
- <u>The Water Environment Regulations (2017)</u> these transpose the European Water Framework Directive (2000) into law and require the Environment Agency to produce River Basin Management Plans (RBMPs). These aim to ensure that the water quality of aquatic ecosystems, riparian ecosystems and wetlands

reaches 'good' status. Note that this secondary UK legislation, which implements EU Directives, is subject to repeal/amendment following the UK exit from the EU. At the time of publishing this report the references here were correct.

• Other environmental legislation such as the Habitats Directive (1992), Environmental Impact Assessment Directive (2014) and Strategic Environmental Assessment Directive (2001) also apply as appropriate to strategic and sitespecific developments to guard against environmental damage.

### 2.4 Relevant Flood Risk Policy and Strategy Documents

This section highlights policies and other relevant documents for the Telford and Wrekin Council area at the time of writing. Hyperlinks are provided to external documents:

- <u>Severn River Basin Catchment Flood Management Plan (2009)</u> the Environment Agency's overview of flood risk across the River Severn catchment and recommended ways of managing it.
- <u>Severn River Basin District Management Plan (2022)</u> the Environment Agency have set out how land management techniques can impact flood risk as well as improving water quality by reducing sediment loss.
- <u>Severn River Basin District Flood Risk Management Plan (2022)</u> the flood risk management plan sets out how flood risk within the Severn River Basin District will be managed. Telford and Wrekin Council area does not fall within any defined Flood Risk Area.
- <u>Severn Trent Drainage and Wastewater Management Plan (2023)</u> a 25-year plan that sets out how Severn Trent intend to extend, improve, and maintain robust and resilient drainage and wastewater systems. Severn Trent published their first DWMP in March 2023, which covers the period from 2025 through to 2050.
- <u>Severn Trent Water Draft Resources Management Plan (2024)</u> sets out how Severn Trent Water intend to achieve a secure supply of water for their customers and a protected and enhanced environment.
- <u>Climate change guidance for flood risk assessment (2022)</u> the Environment Agency's guidance on climate change allowances was last updated in 2022. New UK Climate Projections (UKCP18) were used to update peak river flow allowances, and these are now based on management catchments rather than River Basin Districts. There has also been a change in how peak river flow allowances should be applied, with a greater focus placed on the 'central' allowance. In May 2022 peak rainfall allowances were updated and are now based on management catchments rather than the previous flat rates for the whole country.
- <u>Telford and Wrekin LLFA Local Flood Risk Management Strategy (2015)</u> provides information on significant historic and predicted local flood risk. Over 1400 properties have been identified to be at risk from fluvial sources in the

council area and over 2600 properties at risk from surface water in the 1% AEP event.

• <u>Telford and Wrekin Water Cycle Study (2015)</u> - This supports the Council in selecting and developing sustainable development allocations where there is minimal impact on the environment, water quality, water resources, infrastructure, and flood risk.

Further details relating to these policies and documents can be found in Section 2 of the Level 1 SFRA report.

### 2.5 LLFAs, Surface Water and SuDS

Paragraph 182 of the NPPF (2024) states 'Applications which could affect drainage on or around the site should incorporate sustainable drainage systems to control flow rates and reduce volumes of runoff, and which are proportionate to the nature and scale of the proposal. These should provide multifunctional benefits wherever possible, through facilitating improvements in water quality and biodiversity, as well as benefits for amenity.

When considering planning applications, LPAs should consult the LLFA on the management of surface water to satisfy that:

- The proposed minimum standards of operation are appropriate.
- Through planning conditions or planning obligations there are clear arrangements for on-going maintenance over the development's lifetime.

For proposed development in the Telford and Wrekin Council area, reference should be made to the Sustainable Drainage Systems (SuDS) Handbook which are set out standards to ensure that Surface Water Drainage Assessments or Flood Risk Assessments satisfy national planning policy as well as the LLFAs SuDS requirements. The <u>SuDS Handbook</u> can be downloaded from the Council's website.

The NPPF states within paragraph 172 "All plans should apply a sequential, risk-based approach to the location of development" and should achieve this by "using opportunities provided by new development... to reduce causes and impacts of flooding".

As such, Telford and Wrekin Council expects SuDS to be incorporated on all developments and, where possible, development in areas at material risk of flooding should be avoided. Masterplans should be designed to ensure that space is made for above ground SuDS features and that the requirements of existing surface water flow paths and storage volumes are appropriately accommodated.

### 2.6 Updated Strategic Flood Risk Assessment Guidance

There have been several updates (the latest being in May 2024) to the <u>'How to prepare a</u> <u>Strategic Flood Risk Assessment'</u> guidance which includes new sections on assessing residual risks, mapping the functional floodplain and addressing statutory reservoir flood risk. It also includes links to various nature strategies, management plans and design guidance. Where possible, this Level 2 assessment is undertaken in accordance with this guidance.



## 3 Sources of Information Used in Preparing the Level 2 SFRA

### 3.1 Use of SFRA Data

This SFRA has been developed using the best available information, supplied at the time of preparation and presented in Table 3-1. This relates both to the current risk of flooding from rivers, surface water and groundwater and, where available, the potential impacts of future climate change.

Datasets used to inform this SFRA may be updated following the publication of this SFRA and new information on flood risk may be produced by Risk Management Authorities. This new information (such as updated mapping and modelling) may supersede the information included in this SFRA. Guidance should be sought from Telford and Wrekin Council and the Environment Agency as appropriate to check the most up to date source of information is used for future flood risk assessment.

Source of flood risk	Data used	Data source
Historic (fluvial)	Historic flood map Recorded flood outlines	Environment Agency
Historic (all sources)	Historic flooding incident reports	Telford and Wrekin Council
Fluvial (including climate change)	Flood Map for Planning (Rivers and Seas) dataset	Environment Agency
	Abermule – Worcester River Severn Model (2012)	JBA
	River Tern (2004)	Environment Agency
	River Roden (2011)	Hyder
	Coalbrookdale (2012)	Royal Haskoning
	River Roden (2010)	Edenvale
	Crow Brook (2008)	Halcrow Group
	Hurley Brook (2008)	Halcrow Group
	Hurley Brook Tributary (2008)	Halcrow Group
	Mad Brook (2008)	Halcrow Group
	Wall Brook (2008)	Halcrow Group
	Wesley Brook (2008)	Halcrow Group
Surface water (including climate change)	Risk of Flooding from Surface Water dataset	Environment Agency

Table 3-1: Overview of data used for Telford and Wrekin Council Level 2 SFRA

Source of flood risk	Data used	Data source
Sewers	Comments made by Severn Trent Water regarding the impact of proposed site upon the surface water sewerage infrastructure	Severn Trent Water
Groundwater	Groundwater Risk Emergence Mapping	JBA Consulting
Statutory Reservoirs	Reservoir Flood Extents - Dry Day Reservoir Flood Extents - Wet Day	Environment Agency
Flood defences	AIMS Spatial Flood Defences dataset	Environment Agency
Mine Water Flooding	Probable Shallow Coal Mine Workings Shallow Coal Workings	Coal Authority
Other datasets	Source Protection Zones Detailed River Network Flood Alert and Flood Warning areas Groundwater Vulnerability Risk of Flooding from Rivers and Sea National Receptor Dataset	Environment Agency
	BGS Geology 625K datasets (Bedrock Geology and Superficial Deposits)	British Geological Survey
	Coalbrookdale flood alert	Telford and Wrekin Council

### 3.2 Historic Flooding

The historic flood risk within the Telford and Wrekin Council administrative area has been assessed using the following:

- The Environment Agency's <u>'Recorded Flood Outlines'</u> have been used to understand whether historic flooding has been recorded at all sites. The dataset takes into account the presence of defences, structures and other infrastructure, where they existed at the time of flooding.
- Recorded flooding incidents provided by the Telford and Wrekin Council LLFA the number of flooding records within a 1km square across the Council area was provided.

It is important to note that the absence of historic flood records does not mean than an area has never flooded, only that records are not held. For previously undeveloped sites, it is likely that historic flooding incidents may have gone unreported due to a lack of site use or interest. In addition, it is also possible that flooding mechanisms have changed since the date of a recorded flooding incident, making it more or less likely for flooding to occur on site. More information on historic flooding can be found in Section 5.1 of the Level 1 SFRA.

### 3.3 Fluvial Flood Risk

### 3.3.1 Flood Zones from the EA's Flood Map for Planning

Flood Zones are discrete areas of land identified to be at risk from flooding from rivers and sea. They represent the undefended scenario. Table 3-2 outlines the definition of Flood Zones as per the PPG.

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Flood Zone	Definition
Zone 1 – Low probability	Land having a less than 0.1% annual probability of river or sea flooding.
Zone 2 – Medium probability	Land having between a 1% and 0.1% annual probability of river flooding; or land having between a 0.5% and 0.1% annual probability of sea flooding.
Zone 3a – High probability	Land having a 1% or greater annual probability of river flooding; or Land having a 0.5% or greater annual probability of sea.
Zone 3b - Functional floodplain	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.

Flood Zones 1, 2 and 3a have been taken from the Environment Agency's <u>'Flood Map for</u> <u>Planning'</u> and do not take into account flood defences. The Flood Map for Planning is based on generalised modelling to provide an indication of flood risk. Whilst the generalised modelling is typically suitable for use on a large scale, they are not provided for specific sites or for land where the catchment of the watercourse is less than 3km<sup>2</sup>.

Flood Zone 3b has been re-created for this SFRA, which was defined in the Level 1 SFRA (2021) as the 5% AEP extent (in line with the NPPF recommendations at the time). The 2% AEP outputs were used as a proxy for the Coalbrook, Tern, Roden and Severn models. This is discussed in Section 3.44.

It is important to understand the limitations of the Flood Map for Planning, these are outlined below:

 For watercourses with smaller catchments, the Risk of Flooding from Surface Water (RoFSW) map provides an indication of the floodplain of small watercourses and ditches. It is more accurate in upper to mid river valley locations than lower valley locations near the coast. This is because it does not represent the floodplain for small watercourses as well in topographically flat areas where the flow routes are not as well defined.

- Even where more detailed models of Main Rivers have been used by the Environment Agency to inform the Flood Map for Planning, they will be largely based on remotely detected ground model data and not topographic survey.
- The Flood Map for Planning does not take into account surface water, sewer or groundwater flooding or the impacts of canal or reservoir (both statutory and not) failure or climate change. Hence there could still be a risk of flooding from other sources and the level of flood risk will change over time during the lifetime of a development.

For these reasons, the Flood Map for Planning is not of a resolution to be used as application evidence to provide the details of possible flooding for individual properties or sites and for any sites with watercourses on, or adjacent to the site. Accordingly, for sitespecific assessments it will be necessary to perform more detailed studies in circumstances where flood risk is an issue.

### 3.4 Flooding from Rivers

### 3.4.1 Hydraulic Modelling

Within the Telford and Wrekin Council area, hydraulic modelling has been completed for the following Main Rivers: River Severn, River Roden, River Tern and Coalbrookdale, information regarding the year created and who undertook the modelling can be found in Table 3-3. These hydraulic models provide a more accurate representation of fluvial flood risk within Telford and Wrekin than the Environment Agency's Flood Map for Planning, as it accounts for the presence of flood defence structures along these rivers.

Model	Year Created	Source
Abermule – Worcester River Severn Model	2012	JBA Consulting
River Tern	2004	Environment Agency
River Roden	2011	Hyder
Coalbrookdale	2012	Royal Haskoning

Table 3-3: Summary of fluvial models for Main Rivers within the Telford and Wrekin Council area

The following Annual Exceedance Probability events for the fluvial scenarios have been assessed:

- 3.3% AEP (1 in 30 year)
- 2% AEP (1 in 50 year)
- 1% AEP (1 in 100 year)
- 0.1% AEP (1 in 1000 year)

Functional floodplain (Flood Zone 3b) is identified as land which would flood with an annual probability of 3.3% AEP, where detailed hydraulic modelling exists. The 2% AEP outputs were used as a proxy for the Coalbrook, Tern, Roden and Severn models respectively.

### 3.4.1.1 2008 SFRA Modelling

As part of the Telford and Wrekin 2008 Level 2 SFRA, 2D hydraulic modelling was undertaken for some of the notable ordinary watercourses in the council area, including the Crow Brook, Hurley Brook & tributaries, Mad Brook, Wall Brook (also known as Donnington Drain) and Wesley Brook. The following outputs were produced:

- 5% (1 in 20 year) equivalent to Flood Zone 3b (functional floodplain)
- 1% (1 in 100 year) equivalent to Flood Zone 3a
- 1% plus 20% climate change allowance
- 0.1% (1 in 1000 year) equivalent to Flood Zone 2

The modelling software used was TUFLOW, however, it should be noted that all the input data has been superseded. Doesn't fully account for the channel capacity as they models are only 2D. As part of this Level 2 SFRA, only the model outputs were available, therefore updated climate change uplifts could not be applied.

Due to the limitations of the 2008 hydraulic modelling, the data was not used to make the initial assessment of the sites, however the outputs were compared to the fluvial Flood Zones and the Risk of Flooding from Surface Water extents. Only 4 of the proposed sites are within the flood extents, with 3 of them at high risk of being affected by flooding, however, the differences in the flood extents across these sites are minimal.

It is recommended that site specific hydraulic modelling is completed for the sites that are at high risk of being impacted by flooding.

The flood extents for all the hydraulic models reviewed as part of this SFRA are shown in Figure 3-1. The outputs have been used to assess the flood risk of each of the sites in the Site Summary Sheets in Appendix A. It should be noted that the outputs for the Main Rivers have been incorporated into the existing Environment Agency Flood Zones, whereas the outputs from the 2008 modelling are shown on a separate map.



Figure 3-1 Flood extents of hydraulic models covering Telford and Wrekin

### 3.4.2 Climate Change

Following the Government publishing new UK Climate Projections in 2018 (UKPC18), the Environment Agency published updated <u>climate change guidance</u> in 2021 on how allowances for climate change should be included in both strategic and site-specific FRAs. The guidance adopts a risk-based approach considering the vulnerability of the development.

The Environment Agency have further updated their climate change guidance for new developments with regards to updated fluvial, rainfall, and tidal allowances. The <u>new</u> <u>climate change allowances</u> were released in July 2021 for peak river flows and May 2022 for peak rainfall allowances. These should be used when undertaking a detailed Flood Risk Assessment.

To apply the climate change guidance, the following information needs to be known:

- The vulnerability of the development.
- The likely lifetime of the development in general at least 75 years is used for commercial development (depending on the development's characteristics) and 100 years for residential, but this needs to be confirmed in an FRA.
- The River Basin in which the site is located.

The Climate Change Act 2008 creates a legal requirement for the UK to put in place measures to adapt to climate change and to reduce carbon emissions by at least 80% below 1990 levels by 2050.

The NPPF sets out that flood risk from all sources should be managed over the lifetime of a development, taking climate change into account.

### 3.4.3 Impacts of Climate Change on Fluvial Flood Risk

Climate change is expected to increase the peak flows of rivers, meaning that flows which were previously thought to be extreme will now be considered far more possible. Areas benefiting from flood defences will find the standard of protection (SoP) changes over time with overtopping of defences more likely unless they are upgraded.

Peak river flow climate change allowances developed by the Environment Agency are divided into a series of Management Catchments. The study area is divided between two Management Catchments, the Severn Middle Shropshire Management Catchment and the Severn Middle Worcestershire Management Catchment to the north and south respectively as shown in Figure 3-2.



Figure 3-2 Environment Agency Management Catchments in Telford and Wrekin

Within Table 3-4 and Table 3-5 below the climate change allowances for fluvial flooding are set out. This information provides a strategic assessment of climate change risk; developers



should undertake detailed modelling of climate change allowances as part of a site-specific FRA, following the latest Climate Change Guidance set out by the Environment Agency (July 2021).

Table 3-4: Climate change allowances for peak river flows in the Severn Middle Shropshire Management Catchment

Allowance Category	Total potential chance anticipated for '2020s' (2015 to 2039)	Total potential change anticipated for '2050s' (2040 to 2069)	Total potential change anticipated for '2080s' (2070 to 2125)
Central	15%	18%	33%
Higher	20%	25%	44%
Upper	30%	42%	72%

## Table 3-5: Climate change allowances for peak river flows in the Severn Middle Worcestershire Management Catchment

Allowance Category	Total potential chance anticipated for '2020s' (2015 to 2039)	Total potential change anticipated for '2050s' (2040 to 2069)	Total potential change anticipated for '2080s' (2070 to 2125)
Central	12%	15%	30%
Higher	16%	21%	40%
Upper	25%	38%	67%

### 3.4.4 Climate Change Uplifts for Fluvial Hydraulic Modelling

The following model outputs were used to represent climate change:

- Coalbrookdale model (2012) 1% AEP events (+25%, +35% and +70%)
- River Tern model (2004) 1% AEP events (+25%, +35% and +70%)

Where the original climate change simulations for these models are within +/-5% of the latest climate change allowances, these have been deemed appropriate for use within this SFRA.

Figure 3-1 shows the coverage of hydraulic models in the Telford and Wrekin area. The source of climate change information and the impact on flood risk to the individual sites, is also noted on the summary sheets under 'Climate Change – Implications for the Site'.

Due to the absence of suitable modelling, Flood Zone 3a has been used as a conservative indication of Flood Zone 3b plus climate change. The potential impacts on Flood Zone 3b (3.3% AEP modelled extent) from climate change may need to be considered at site-specific assessment stage. Modelled flood extents can be compared to the Flood Zone 3a extent, and where no detailed modelling exists, Flood Zone 3a can be compared against Flood Zone 2, for an indication of areas most sensitive to climate change.

### 3.5 Surface Water Flooding

### 3.5.1 Present Day Risk of Flooding from Surface Water

Mapping of surface water flood risk in the Telford and Wrekin Council area has been taken from the Environment Agency's Risk of Flooding from Surface Water (RoFSW) mapping. Surface water flood risk is subdivided into the following four categories:

- **High**: An area has a chance of flooding greater than 3.3% AEP (1 in 30 year) each year.
- **Medium**: An area has a chance of flooding between 1% AEP (1 in 100year) and 3.3% AEP (1 in 30 year) each year.
- Low: An area has a chance of flooding between 0.1% AEP (1 in 1,000 year) and 1% AEP (1 in 100 year) each year.
- Very Low: An area has a chance of flooding of less than 0.1% AEP (1 in 1,000 year) each year.

The results should be used for high-level assessments. If a particular site is indicated in the Environment Agency mapping to be at risk from surface water flooding, a more detailed assessment should be required to illustrate the flood risk more accurately at a site-specific scale. Such an assessment should use the RoFSW in partnership with other sources of local flooding information to confirm the presence of a surface water risk at that location.

Detailed modelling based on site survey will be necessary where there is a significant risk of surface water flooding. It is the intention that the Environment Agency will prepare updated and improved surface water mapping in the course of updating the National Flood Risk Assessment 2 (NaFRA2). It is anticipated that this data will be available in 2025 and at that time it is recommended that the surface water risk assessment is reviewed. It is not anticipated that the updated mapping will fundamentally change the locations identified to be at risk from surface water flooding, but the improved analysis techniques will reduce some of the uncertainties associated with the assessment.

### 3.5.2 Impacts of Climate Change on Surface Water Flood Risk

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

The potential impacts of surface water plus climate change will likely need to be considered at site-specific assessment stage. In May 2022, the Environment Agency updated the surface water climate change projections. Table 3-6 and Table 3-7 show the peak rainfall intensity allowances that apply for each Management Catchment in the Telford and Wrekin Council area when considering surface water flood risk. Both the central and upper end allowances should be considered to understand the range of impact.
Table 3-6: Climate change allowances for peak rainfall intensity in the Severn Middle Shropshire Management Catchment

Allowance Category	Total Potential change anticipated for '2050s' (2040 to 69)	Total potential change anticipated for '2070s' (2061 to 2125)
3.3% AEP Central	20%	25%
3.3% AEP Upper end	35%	35%
1% AEP Central	20%	25%
1% AEP Upper end	40%	40%

Table 3-7: Climate change allowances for pe	ak rainfall intensity in the Severn Middle
Worcestershire Management Catchment	

Allowance Category	Total Potential change anticipated for '2050s' (2040 to 69)	Total potential change anticipated for '2070s' (2061 to 2125)
3.3% AEP Central	20%	25%
3.3% AEP Upper end	35%	40%
1% AEP Central	25%	30%
1% AEP Upper end	40%	45%

The Level 2 assessment of present-day surface water flood risk is based on the Risk of Flooding from Surface Water (RoFSW) map. The impact of climate change on surface water flood risk has been assessed by applying a 45% uplift ('Upper End' for 2060 to 2115) to the rainfall input of the 1% AEP Risk of Flooding from Surface Water mapping. The results show that the extents of the surface water flooding flow routes and areas of ponding increase to match the current 0.1% AEP extents.

# 3.5.3 Depth, Velocity, and Hazard to People

The Level 2 assessment seeks to map the probable depth and velocity of flooding as well as the hazard to people during a flood event. In the absence of detailed hydraulic models (or models with detailed 1D-2D outputs), the RoFSW dataset has been used. The depth, hazard, and velocity of the 1% and 0.1% AEP surface water flood events have also been mapped and considered in this assessment. Hazard to people has been calculated using the below formula as suggested in Defra's FD2321/TR2 "Flood Risk to People." The different hazard categories are shown in Table 3-8. Developers should also test the impact of climate change depths, velocities, and hazard on the site, at Flood Risk Assessment stage.

JBA consulting

Degree of Flood	Flood Hazard	Description
Hazard	Rating	
Low	< 0.75	Caution "Flood zone with shallow flowing water
		or deep standing water"
Moderate	0.75 – 1.25	Dangerous for some (i.e. children) "Danger:
		flood zone with deep or fast flowing water"
Significant	1.25 – 2.50	Danger for most people "Danger: flood zone
-		with deep fast flowing water"
Extreme	>2.50	Danger for all "Extreme danger: flood zone with
		deep fast flowing water"

#### Table 3-8: Defra's FD2321/TR1 "Flood Risks to People" classifications (March 2006)

As part of a site-specific FRA, developers will need to undertake more detailed hydrological and hydraulic assessments of the watercourses to verify flood depth, velocity and hazard based on the relevant 1% AEP plus climate change event, using the relevant climate change allowance based on the type of development and its associated vulnerability classification. Not all this information is known at the strategic scale and the level of resolution may not be appropriate to enable site scale assessment of proposed development schemes.

#### 3.6 Sewer Flooding

For this Level 2 SFRA, Severn Trent Water have provided a commentary on the proposed sites and scored them using a 'low, medium, high' rating for potential impact of the surface water sewerage infrastructure and the impact to sewerage infrastructure.

No records of sewer flooding have been provided, and therefore an assessment of this could not be made.

# 3.6.1 Impact of Climate Change on Sewers

Surface water and fluvial flooding with climate change have the potential to impact the sewerage system, so careful management of these is needed for development. Due to differing ages of settlements, there will be drainage systems consisting of different types of sewers. Increasing pressures from climate change, urban creep and infill development could impact the performance of the sewerage system.

# 3.7 Groundwater

In comparison to fluvial flooding, current understanding of the risks posed by groundwater flooding is limited and mapping of flood risk from groundwater sources is in its infancy. Groundwater level monitoring records are available for areas on Major Aquifers; however, for lower lying valley areas, which can be susceptible to groundwater flooding caused by a high-water table in mudstones, clays, and superficial alluvial deposits, very few records are available. Additionally, there is an increased risk of groundwater flooding where long reaches of watercourse are culverted as a result of elevated groundwater levels not being able to naturally pass into watercourses and be conveyed to less susceptible areas.

Groundwater levels can also be influenced by abstraction regimes, for example, if abstraction rates are reduced, this will lead to greater groundwater recharge.

To assess the risk of groundwater emergence within the Telford and Wrekin Council area, the JBA Groundwater Risk Emergence Mapping (5m resolution) has been provided. This JBA licenced product shows areas of potential groundwater emergence during a 1% AEP flood event, and highlights areas where there is sufficient evidence to suggest that flooding may occur. This data cannot form part of the Sequential Test as it is not directly comparable to other datasets (e.g. Flood Zones), and therefore cannot categorise an area as high, medium or low risk on its own. The map should be interpreted as an initial indicative tool to assess groundwater flood risk at preliminary stages of planning/site allocation. Where mapping indicates a risk of groundwater flooding a detailed assessment should be undertaken to confirm the risk to the site as part of any planning application, which may require ground investigations.

The JBA Groundwater Risk Emergence Mapping data is categorised into 5 different classes, with a detailed description of the classes in Table 3-9 below.

Risk Class	Depth range	Description
0 - No risk	>5m	The zone is deemed as a having negligible risk from groundwater flooding due to the nature or local geological deposits
1	At least 5m	Flooding from groundwater is unlikely
2	Between 5m and 0.5m	Risk of flooding to subsurface assets but surface manifestation is unlikely
3	Between 0.5m and 0.025m	Risk of groundwater flooding to both surface and subsurface assets. Groundwater may emerge locally
4	<0.025m	Risk of groundwater flooding to surface and subsurface assets. Groundwater may emerge at significant rates and gas the capacity to flow overland and/or pond within any topographic low spots.

Table 3-9: JBA Groundwater Risk Emergence Mapping data classifications

For assessed sites that are deemed to be at risk from groundwater emergence (Risk Class 3), it is advised that on site investigations, including groundwater level monitoring, are conducted to determine the risk of groundwater flooding to the site. Areas to the north and centre of the council area are shown to be at moderate risk of groundwater flooding, including Newport and the floodplains of the River Tern and River Roden. Sites 419 and 703 to the north and east of Newport, site 689 to the south of Water Upton and two of the Sustainable Urban Expansion sites, 126 and 237 are at moderate risk of groundwater



# 3.7.1 Impact of Climate Change on Groundwater Flooding

The impact of climate change is uncertain for groundwater flooding associated with rivers and land catchments and those watercourses where groundwater has a large influence on winter flood flows. There is no technical modelling data available to assess climate change impacts on groundwater. It would depend on the flooding mechanism, historic evidence of known flooding and geological characteristics, for example prolonged rainfall in a chalk catchment. Flood risk could increase when groundwater is already high or emerged, causing additional overland flow paths or areas of still ponding.

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

#### 3.8 Statutory Reservoirs

The risk of inundation due to a statutory reservoir breach or failure of statutory reservoirs within the area has been assessed using the Environment Agency's Reservoir Flood Extents for Dry Day and Wet Day.

This dataset displays a prediction of the credible worst-case scenario. The dataset gives no indication of the likelihood or probability of statutory reservoir flooding. The Reservoir Flood Maps do not describe the risk of flooding (simply a credible worst case), and data includes layers for:

- 'Dry day' Individual flood extents for all large, raised reservoirs in the event that they were to fail and release the water held on a "dry day" when local rivers are at normal levels.
- 'Wet day' Individual flood extents for all large, raised reservoirs in the event that they were to fail and release the water held on a "wet day". A wet day is assumed to be a failure at the same time as experiencing a river flood with a 1 in 1000 chance of occurring in any year.

Areas of Telford and Wrekin are at residual risk of statutory reservoir flooding, especially in the area north of Telford. There are approximately 20 statutory reservoirs within and around the council area which would cause flooding in the event of breach or failure. A statutory reservoir is one that stores over 25,000m<sup>2</sup> of water, there are other reservoirs in the council area that are reservoirs, but do not stored over 25,000m<sup>2</sup>, and therefore are not covered by the Environment Agency Risk of Flooding from Reservoirs dataset.

The mapping suggests that statutory reservoir flooding would be confined within the watercourse channels, rather than causing extensive flooding to low-lying areas of settlements. The extents should be taken into consideration as part of the site-specific Flood Risk Assessment. Despite the risk being residual, in the very unlikely event that the statutory reservoirs fail, it is predicted that there is a risk to life. For sites at risk of statutory

reservoir flooding, developers will need to produce flood warning and evacuation plans in consultation with the LPA emergency planning team.

# 3.9 Residual Risk

The residual flood risk to sites is identified as where potential blockages or overtopping/ breach of defences could result in the inundation of a site, with the sudden release of water with little warning, including from statutory reservoirs as discussed above.

Reviewing the OS Mapping and the Environment Agency Detailed River Networks to determine where watercourses may flow through structures such as bridges or culverts in the vicinity of the sites. There have been 11 sites identified which may pose a residual risk in the event of blockage to a culvert, breach of a defence of failure of a statutory reservoir. The identified sites are:

- 126 Land North of A442 Wheat Leasows Sustainable Urban Expansion site
- 233 Land South of A518, Newport
- 237 Land North East of Muxton Sustainable Urban Expansion site
- 251 Land South of Holyhead Road, Wellington
- 274 Land off Church Road, Lilleshall
- 313 Land North of Middle Farm, Field Aston
- 398 Land north of A518, Newport
- 408 Land at Bratton Sustainable Urban Expansion site
- 462 Land Southeast of Newport Town Centre
- 473 Land east of Dawley Road, Lawley
- 718 AGA Site

Residual risk will need to be considered by the developer as part of a site-specific Flood Risk Assessment.

# 3.10 Minewater Flooding

Due to the study area's long history of coal mining, data downloaded from the Coal Authority via the data.gov.uk website was used to assess the risk of minewater flooding to each site. Of the 58 sites that were screened, 20 of them are in the <u>'Coal Mining Reporting Area'</u> meaning that they are in proximity to coal mining activities and therefore there is risk of minewater flooding. The <u>'Development High Risk Area'</u> identifies those locations where mining activities were shallow and the risk of mine water flooding is greater, 17 of the screened sites have been identified as being at greater risk from minewater flooding. The Coal Mining Reporting Area and the Development High Risk Area is shown in Figure 3-3 below, further information relating to minewater flooding can be found in section 5.9 of the Level 1 SFRA report.



Figure 3-3 Coal Mining Reporting Area and Development High Risk Area

# 3.11 Cumulative Impact Assessment

Add in section about the assessment and point the reader to section 7 of the Level 1 report.

#### 3.12 Topography, Geology, Soils, and Watercourses

Topography, geology, soils, and watercourses data were obtained from the following sources:

- Topography data was obtained from the Environment Agency's <u>1m LiDAR</u> <u>Composite Digital Terrain Model (DTM) 2022.</u>
- Bedrock Geology and Superficial Deposits data was procured from the <u>British</u> <u>Geological Society's (BGS) 50K mapping</u> dataset.
- Soils data was sourced from Cranfield University Soilscapes mapping.
- Watercourses data main rivers were mapped using the Environment Agency's <u>Statutory Main River Map</u> dataset (Note: Caution should be taken when using these layers to identify culverted watercourses which may appear as straight lines but in reality, are not).

# 3.13 Note on SuDS Sustainability

The hydraulic and geological characteristics of each site were assessed to determine the factors that potentially constrain schemes for surface water management. This assessment is designed to inform the early-stage site planning process and is not intended to replace site-specific detailed drainage assessments.

The assessment is based on catchment characteristics and additional datasets such as the JBA Groundwater Risk Emergence Mapping (5m resolution) and Cranfield University Soilscapes mapping which allow for a basic assessment of the soil characteristics on a siteby-site basis. LiDAR data was used as a basis for determining the topography and average slope across each development site. Other datasets were used to determine other factors. These datasets include:

- Historic landfill sites
- Groundwater Source Protection Zones
- Detailed River Network
- The Flood Map for Planning

This data was then collated to provide an indication of particular groups of SuDS systems which might be suitable at a site. SuDS techniques were categorised into five main groups, as shown in Table 3-10. This assessment should not be used as a definitive guide as to which SuDS would be suitable but used as an indicative guide of general suitability. Further site-specific investigation should be conducted to determine what SuDS techniques could be used on a particular development, informed by detailed ground investigations.

	· · · · · · · · · · · · · · · · · · ·
SuDS Type	Technique
Source Controls	Green Roof, Rainwater Harvesting, Pervious/Permeable Pavements,
	Rain Gardens
Infiltration	Infiltration Trench, Infiltration Basin, Soakaway
Detention	Pond, Wetlands, Detention Basin
Filtration	Bioretention area, Filter Strip, Filter Trench
Conveyance	Swales

#### Table 3-10: Summary of SuDS categories

The suitability of each SuDS type for the site options has been described in the summary tables, where applicable. The assessment of suitability is broadscale and indicative only; more detailed assessments should be carried out during the site planning stage to confirm the feasibility of different types of SuDS.

Due to concerns of ground instability Telford and Wrekin Council have a designated 'no soakaway zone' in and around the Ironbridge area, only Site 718, falls within this zone.

Further SuDS guidance and design requirements for the Telford and Wrekin Council are available in Section 7.

# 4 Level 2 Assessment Methodology

#### 4.1 Site Screening

As part of this Level 2 SFRA, **58** sites submitted as part of the Regulation 19 Consultation were screened. These sites were screened against available flood risk information and spatial data to provide a summary risk to each site including:

- The proportion of the site in each Flood Zone derived, which includes modelling data for the River Severn, River Roden, River Tern and Coalbrook
- The proportion of the site at risk from surface water flooding based on the RoFSW data set.
- If the site is at risk from groundwater emergence using the JBA groundwater emergence risk map.
- If the site is at risk from statutory reservoir flooding including the 'wet' and 'dry' extents.
- If the site is in an area at risk from minewater flooding.
- Other considerations such as safe access and egress to or from a site that affect the viability of development.

The Flood Zones are not provided for specific sites or land where the catchment of the watercourse falls below 3km<sup>2</sup>. For this reason, the Flood zones are not of a resolution to be used as application evidence to provide the details of possible flooding for individual properties or sites, and any sites with a watercourse in or adjacent to the site. The RoFSW has been used in these cases as it provides a reasonable representation of the floodplain of such watercourses to use for strategic assessment. Detailed modelling of such watercourses will be needed as part of a detailed FRA to support any planning application for such sites.

# 4.2 Sites Taken Forward to a Level 2 Assessment

A Red-Amber-Green system was applied to the sites on the basis, that:

- Red sites needed a Level 2 assessment and have significant obstacles or challenges for development which will need consideration going forward for development. These sites may need the Exception Test to show that the site can be developed safely from a flood risk perspective.
- Amber sites did not need a Level 2 assessment but are flagged in this report for developer considerations, but these are likely to be able to be addressed at the planning application stage. These sites are included within this report as they may have some surface water issues relative to access and egress to the site.
- Green sites that had no significant flooding obstacles for development. However, it is noted sites may need an FRA and drainage strategy depending on the location and size of the site.

In order to categorise the sites in this system, a flood risk criterion was applied to the ranking assessment as shown in Table 4-1.

This categorisation was based on professional judgement and categories, with the final selection of sites being agreed with the Telford and Wrekin Council. Groundwater flood risk should be considered as part of the site-specific assessments, but there is no equivalent national mapping or datasets to directly compare with fluvial/pluvial risk for allocation purposes. Rather, once sites have been assessed for other sources, a groundwater assessment should be undertaken. The same also applies to reservoir flooding.

It is noted that there are some sites that may be upgraded or downgraded in this assessment. For example, a site may show as 'amber', but if there was an area of deep ponding, a prominent flow route bisecting a site, immediate constraints to site access at the boundary, potential for highly vulnerable types of development to occupy a site, it may be moved up to the 'red' category.

Appendix C provides a detailed table with the results of the screening undertaken on all 58 sites.

#### 4.3 Recommendations for Sites Not Taken Forward to a Level 2 Assessment

The sites not taken forward for more detailed assessment, flagged as 'green' are shown in Table 4-2 below. The 'amber' sites identified as having flooding challenges to development, but not requiring a Level 2 assessment, are presented in Table 4-3. The risk posed to these sites are primarily from surface water flooding (or an ordinary watercourse that does not present in the Environment Agency's Flood Zones due to catchment size). These sites may also have some reservoir flooding and groundwater flooding and may also be at risk from minewater flooding. Sites identified as 'amber' may also have safe access and egress issues.



#### Table 4-1 Site categories used for site flood risk assessment

Site code	% of site in FMfP	% of site in FMfP FZ3	% of site in RofSW	% of site in RofSW	% of site in RofSW	At risk in 'Dry Day'	At risk in 'Wet Day'	JBA GW Risk classification	Cumulative Impact
	FZ2		3.3% AEP extent	1% AEP extent	0.1% AEP extent	reservoir extent	reservoir extent		Ranking
269	0%	0%	0%	0%	0%	No	No	1	High
303	0%	0%	0%	0%	0%	No	No	1	Medium
334	0%	0%	0%	0%	0%	No	No	3	High
341	0%	0%	0%	0%	2%	Yes	Yes	3	High
342	0%	0%	0%	0%	1%	No	No	2	High
350	0%	0%	0%	0%	0%	No	No	1	Medium
411	0%	0%	0%	0%	0%	No	No	1	Medium
443	0%	0%	0%	0%	0%	No	No	1	High
445	0%	0%	0%	0%	0%	No	No	1	High
471	0%	0%	0%	0%	0%	No	No	1	High
472	0%	0%	<1%	<1%	<1%	No	No	3	Medium
483	0%	0%	0%	0%	0%	No	No	2&3	Medium
516	0%	0%	0%	<1%	3%	No	No	1	Medium
665	0%	0%	0%	<1%	1	No	No	1	Medium
701	0%	0%	0%	0%	0%	No	No	1&3	Medium
705 (1)	0%	0%	0%	0%	4%	No	No	3	Medium
705 (2)	0%	0%	0%	0%	0%	No	No	3	Medium
714	0%	0%	0%	0%	0%	No	No	1	High
716	0%	0%	2%	2%	5%	No	No	1	High
720	0%	0%	0%	0%	0%	No	No	1	Medium

# Table 4-2: 'Green' Sites - Sites flagged at lower flood risk

Site	% of site in	% of site	% of site	% of site	% of site	At risk in	At risk in	JBA GW Risk	Cumulative
code	FMfP FZ2	in FMfP	in RofSW	in RofSW	in RofSW	'Dry Day'	'Wet Day'	classification	Impact
		FZ3	3.3% AEP	1% AEP	0.1% AEP	reservoir	reservoir		Ranking
			extent	extent	extent	extent	extent		
187	0%	0%	1%	3%	11%	No	No	1	High
337	0%	0%	<1%	<1%	7%	No	No	3	High
339	0%	0%	2%	3%	4%	No	No	1	High
347	0%	0%	1%	2%	6%	No	No	1	Medium
352	0%	0%	3%	4%	9%	No	No	1	Medium
378	0%	0%	0%	0%	3%	No	No	2&3	Medium
399	0%	0%	1%	1%	6%	Yes	Yes	3	Medium
410	0%	0%	2%	2%	4%	No	No	1	High
412	0%	0%	<1%	<1%	2%	No	No	1	High
419	1%	1%	<1%	1%	2%	Yes	Yes	3	Medium
422	0%	0%	2%	2%	5%	No	No	1	High
450	0%	0%	0%	1%	5%	No	No	1	Medium
498	0%	0%	0%	1%	5%	No	No	1	High
630	0%	0%	<1%	<1%	4%	No	No	1	Medium
685	0%	0%	2%	3%	6%	No	No	1	High
703	0%	0%	<1%	<1%	4%	Yes	Yes	3	Medium
719	0%	0%	3%	5%	14%	No	No	1	High

# Table 4-3: 'Amber' Sites - Sites flagged at medium flood risk

All of the 19 sites in Table 4-3 are shown to be at risk of surface water flooding during the 1% and 0.1% AEP events, apart from site 378 which is only at risk during the 0.1% AEP event. The RoFSW mapping shows that the surface water flood risk may also impact the safe access and egress of 7 of the sites. Raising of access routes should not impede surface water flows. If flows are likely to limit access/egress to the sites, this should be considered further as part of a site-specific flood-risk assessment. Developers will need to demonstrate safe access, and egress is possible during the 0.1% AEP surface water event, including an allowance for climate change.

During the 0.1% AEP surface water event flow routes are present at Sites 187, 339, 378, 410, 450 and 685. Where proposed development results in a change in the impermeable area of the site, the developer should ensure that it does not impact the conveyance of the flow route, and where possible it should be incorporated into the SuDS scheme.

Sites 337, 378, 399, 419 and 703 are at low to moderate risk of groundwater flooding, either the sites are completely within or have sections which are located within the low and moderate category. Levels are anticipated to be between 0.025 and 5m below ground level at these sites, which may have an impact on sub-surface assets such as basements. Further consideration of the local level of risk and mitigation, by a suitably qualified professional, is recommended in consultation with the LPA. This will impact which SuDS are appropriate for the sites, for example, liners will be needed on detention and conveyance SuDS to prevent the egress of groundwater.

Sites 399, 419 and 703 are at risk from statutory reservoir flooding during both the 'Dry Day' and 'Wet Day' scenarios. Despite the risk being residual, in the very unlikely event that the reservoirs fail, it is predicted that there is a risk to life. Developers will need to produce flood warning and evacuation plans for these sites in consultation with the LPA emergency planning team.

Whilst a section of Site 419 is within Flood Zone 3, due to the location of the flooding and the proportion of it (1%), it was not deemed necessary to complete a full Site Summary Table for this site. The site is at medium risk of groundwater flooding, as groundwater levels have been identified at between 0.025 and 0.5m below ground level, this must be investigated via groundwater level monitoring and be taken into account when designing the surface water drainage scheme.

# 4.4 Site Summary Tables

As part of the Level 2 SFRA, detailed site summary tables and site mapping have been produced for the sites listed in Table 4-4 below.

Site Code	Site Name	Justification for Site Summary Sheet
126	Land North of A442 Wheat Leasows (Wappenshall)	Site is within Flood Zone 2 and 3.

Table	4-4.	Sites	requiring	site	summarv	table
Iable	4-4.	OIIE2	requiring	SILE	Summary	เลมเฮ

Site	Site Name	Justification for Site Summary Sheet
Code		
233	Land South of A518, Newport	9% of site at risk from 1% AEP surface water event and 21% of site at risk during 0.1% AEP event. Also, at moderate risk of groundwater flooding.
237	Land North-East of Muxton	Site is within Flood Zone 2 and 3.
251	Land South of Holyhead Road, Wellington	Defined surface water flow routes.
274	Land off Church Road, Lilleshall	Site is within Flood Zone 2 and 3.
301	Land off Ironmasters Way	Defined surface water flow routes.
313	Land North of Middle Farm, Field Aston	Defined surface water flow routes and at moderate risk of groundwater flooding.
398	Land north of A518, Newport	Surface water flood risk during the 3.3%, 1% and 0.1% AEP events.
408	Land at Bratton	Site is within Flood Zone 2 and 3.
424	Brandon Avenue, Shawbirch	Defined surface water flow route.
449	Land East of Dawley Road, Lawley	Defined surface water flow route.
459	Malinslee Telford	Surface water flood risk during the 1% and 0.1% AEP events.
462	Land Southeast of Newport Town Centre	Defined surface water flow route and at moderate risk of groundwater flooding.
473	Employment site, Land east of Dawley Road, Lawley	Defined surface water flow route.
515	Blue Willow Car Park	Surface water flood risk during the 1% and 0.1% AEP events.
689	Land Southern Side of Waters Upton	Ordinary watercourse along site boundary and at moderate risk of groundwater flooding.
699	Tafs Salop Ltd, Gower Street, St Georges	Defined surface water flow routes.
702	Land South of Old Vicarage	Surface water flood risk during the 1% and 0.1% AEP events.
707	Little Dessert Shop	Surface water flooding during the 1% and 0.1% AEP event.
717	Telford Station	Large extent of surface water flooding during the 1% and 0.1% AEP event.

Site Code	Site Name	Justification for Site Summary Sheet
718	AGA Site	Flood Zone 2 and 3, including Flood Zone 3b. Main River flowing through site. Surface water flood risk during all AEP events and at risk of statutory reservoir flooding during the 'Wet Day' scenario.

The site summary sheets can be found in Appendix A, along with site specific mapping in Appendix B and the assessment from screening can be found in Appendix C.

The Environment Agency's Risk of Flooding from Surface Water mapping has also had Upper End climate change uplifts applied to it in order to indicate the future risk of surface water flooding during the 1% AEP event.

Using the model information combined with the Flood Zones, climate change, RoFSW extents and statutory reservoir mapping, detailed site summary tables have been produced for the site options (see Appendix A). Each table sets out the following information:

- Basic site information, including the site address, area, current land use (greenfield/ brownfield), proposed site use, plus a description of the topography and any existing drainage features.
- Assessment of flood risk for fluvial, surface water, reservoir, groundwater, sewers, minewater, plus:
  - o Flood history
  - Presence of flood defences
  - Description of residual risk
- Emergency Planning:
  - Flood Warning Areas
  - Access and egress
- Implications of climate change on fluvial and surface water flooding extents.
- Broadscale assessment of possible SuDS to provide indicative surface water drainage advice for each site assessed for the Level 2 SFRA.
- NPPF Planning implications including any Exception Test requirements.
- Requirements and guidance for site-specific FRA.
- Key messages summarising considerations for the Exception Test to be passed.
- Data sources of mapping information.

#### 4.4.1 Site mapping

To accompany the site summary tables, there are PDF maps, with all the mapped flood risk outputs per site. Flood risk information in the maps include:

• Environment Agency's Flood Map for Planning (Flood Zone 2 and 3)



- Environment Agency Flood Map for Planning (or fluvial flood extents where available) plus climate change uplifts
- Environment Agency's RoFSW with extent for the 3.3% AEP, 1% AEP and 0.1% AEP events
- Environment Agency's RoFSW with climate change uplifts
- JBA Groundwater Emergence Mapping
- EA's Reservoir Flood Extent Mapping 'wet day' and 'dry day'

For sites 126, 237 and 408, mapping will also show the flood extents of the modelling completed as part of the 2008 SFRA, as discussed in section 3.4.1.1.



# 5 Summary of Level 2 Assessment and Recommendations

# 5.1 Assessment Methods

The summary tables set out the flood risk to each site, including Flood Zone coverage, extent, depth, and velocity of surface water flooding as well as hazard mapping for the 1% AEP plus 45% to account for climate change. Climate change mapping has also been produced to indicate the impact which different climate change allowances may have on the sites (where models are available) or using Flood Zone 2 as an indication of climate change. Each table also sets out the NPPF requirements for the site as well as guidance for site-specific FRAs.

A broadscale assessment of suitable SuDS options has been provided giving an indication where there may be constraints to certain sets of SuDS techniques. This assessment is indicative and more detailed assessments should be carried out during the site planning stage to confirm the feasibility of different types of SuDS. It may be possible that those SuDS techniques highlighted as possibly not being suitable can be designed to overcome identified constraints.

Consideration has also been given to the safety implications for development with respect to surface water flood risk. This reflects the requirement to consider the application of the Exception Test in circumstances where flood risk cannot be avoided.

#### 5.2 Summary of Key Site Issues

#### 5.2.1 Sites within Flood Zone 2 and 3 and the Exception Test

Of the 58 sites considered in the Level 2 assessment, there are 5 sites where part of the site falls within Flood Zones 2 and 3. For 4 of the sites less than 50% of the site is within Flood Zone 2 (Table 5-1), it is expected that it will be possible to preserve Flood Zones 2 and 3 (subject to a detailed flood risk assessment) as public green space, with built development restricted to Flood Zone 1. For these sites, the Exception Test will only be required if development is proposed in Flood Zone 2 or 3 and will be dependent upon their vulnerability classification.

Site code	Site name	% of site in Flood Zone 1
126	Land North of A442 Wheat Leasows	91%
237	Land North East of Muxton	90%
274	Land off Church Road, Lilleshall	98%
408	Land at Bratton	84%

#### Table 5-1: Sites in Flood Zones 2 and 3, with >50% of site area in Flood Zone 1

Flood risk assessments must carry out detailed assessments where appropriate to define the Flood Zones and model the effect of climate change. Climate change assessments should be undertaken using the relevant allowances for the type of development and level of risk and in discussion with the Environment Agency. The requirements for flood risk assessments are set out in Section 6. Further detail is given on the relevant summary sheets.

Site 718 - AGA Site, is shown to have 85% of the site in Flood Zone 2, with 48% of the site in Flood Zone 3b. The proposed use of the site is for residential housing and therefore has a vulnerability of 'More Vulnerable'. If the Council wishes to take this site forward, the site will require application of the Exception Test. Development will not be permitted in the following scenarios:

- Highly Vulnerable infrastructure within FZ3a and FZ3b.
- More Vulnerable and Less Vulnerable Infrastructure within FZ3b.
- The site and building design will need to ensure that the development is safe and resilient to the modelled flood risk, and any residual risk in defended areas. A flood mitigation and adaptation approach is likely to be required. Development should be designed using a sequential approach, with built development / higher vulnerabilities located towards areas of lower risk and hazard. The functional Flood Zone 3b and areas of higher hazard should be preserved as public open space. Further detail is given on the relevant summary sheets.

# 5.2.2 Surface Water

In Telford and Wrekin surface water overland flow routes largely follow the topography and road networks in the urban areas. There are also isolated areas of ponding at topographic depressions. There are 4 sites where greater than 10% of the site is within the RoFSW 1% AEP event extent, with 1 of these sites with greater than 10% within the 3.3% AEP event extent. The sites at most significant surface water risk are shown in Table 5-2.

Site code	Site name	% of site at risk during 1% AEP surface water event
398	Land north of A518, Newport	29%
707	Little Dessert Shop	46%
717	Telford Station	18%
718	AGA Site	28%

Table 5-2: Sites with significant proportions of the site at surface water flood risk

These sites will still need to pass the Sequential Test, taking account of the non-fluvial source of flooding. The Exception Test is not required under the NPPF, but it must be shown that the development will be safe for its lifetime and the risk can be managed through a sequential approach to design.

Flood risk assessments should consider carrying out surface water modelling to define the level of surface water risk, and the risk areas / flow paths, including the effects of climate. Drainage designs should 'design for exceedance' and accommodate existing surface water flow routes.

Building design (such as raised finished floor levels, etc.) should ensure that development is safe from flooding. The requirements for surface water strategies and flood risk assessment are set out in the Section 7. Further detail is given on the relevant summary sheets. Liaison with the LLFA team at Telford and Wrekin Council is advised for sites within Flood Zone 1 that contain significant surface water flood risk.

# 5.2.3 Access and Egress

Whilst not at significant flood risk within the site boundary, the majority of the sites with detailed Level 2 summary tables have potential access and egress issues as a result of fluvial and surface water flooding on the surrounding roads. These sites are shown in Table 5-3.

Site code	Site name
126	Land North of A442 Wheat Leasows
237	Land North East of Muxton
251	Land South of Holyhead Road, Wellington
301	Land off Ironmasters Way
398	Land north of A518, Newport
408	Land at Bratton
424	Brandon Avenue, Shawbirch
449	Land East of Dawley Road. Lawley
459	Malinslee Telford
462	Land Southeast of Newport Town Centre
473	Employment site, Land east of Dawley Road, Lawley
515	Blue Willow Car Park
699	Tafs Salop Ltd, Gower Street, St Georges
702	Land South of Old Vicarage
707	Little Dessert Shop
717	Telford Station
718	AGA Site

Table J-J. Olles will access and egless issue	Table 5-3:	Sites	with	access	and	egress	issues
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Consideration should be made to these sites as to how safe access and egress can be provided during flood events, both to people and emergency vehicles. Also, consideration should be given to the nature of the risk, for example whether the flooding forms a flow path or bisects the site where access from one side to another may be compromised.

### 5.2.4 Effects of Climate Change

Fluvial and surface water climate change mapping indicates that flood extents are generally predicted to increase. As a result, the flood depths, velocities, and hazard of flooding may also increase. The significance of the increase tends to be dependent on the topography of the site and the climate change percentage allowance used.

- Surface water: The 1% AEP plus 45% climate change surface water events have been derived from the RoFSW dataset. The RoFSW modelled 1% AEP plus 40% climate change surface water events are larger than their respective present day 1% AEP events but are not as large as their respective present day 0.1% AEP events, showing that the Telford and Wrekin Council area to be relatively sensitive to increases in surface water flooding due to climate change.
- Fluvial: Climate change allowances for the 1% AEP events have been derived from hydraulic modelling of the River Severn, River Tern, River Roden, Wesley Brook and Coalbrookdale. The models show the 1% AEP plus upper climate change allowance to be predominantly larger than the modelled present day 1% AEP fluvial events but smaller than the modelled present day 0.1% AEP fluvial events.

Sites that are the most sensitive to changes in surface water and fluvial flood risk due to climate change are shown in Table 5-4.

Site code	Site name			
233	Land South of A518, Newport			
251	Land South of Holyhead Road, Wellington			
398	Land north of A518, Newport			
424	Brandon Avenue, Shawbirch			
707	Little Dessert Shop			
717	Telford Station			
718	AGA Site			

#### Table 5-4: Sites most sensitive to climate change

Site specific FRAs and site drainage and management plans should confirm the impact of climate change using the latest guidance. It is recommended that Telford and Wrekin Council work with other Risk Management Authorities (RMAs) to review the long-term sustainability of existing and new developments in these areas when developing climate change plans and strategies for the district.

#### 5.2.5 Groundwater

None of the sites with a site summary sheet are within a Zone 4 groundwater area, there are 5 sites which are within Zone 3, and therefore there is a risk of groundwater flooding to surface and subsurface assets. There is the possibility of groundwater emerging at the surface locally. The sites are shown in Table 5-5.



#### Table 5-5: Sites at high risk of groundwater emergence

These sites will still need to pass the Sequential Test, taking into account the non-fluvial source of flooding, but will not require the Exception Test to be applied. Flood risk assessments should consider conducting further analysis of groundwater within the site to define the level of groundwater flood risk. Site design, including any SuDS features, should be resilient to groundwater flooding and building design (threshold levels etc.) should ensure the development is safe from flooding. Liaison with the LLFA at Telford and Wrekin Council is advised for sites within Flood Zone 1 that contain significant groundwater flood risk.

#### 5.2.6 Statutory Reservoirs

There are 6 sites assessed within the site summary tables that are shown to be at risk of statutory reservoir flooding during both the 'Dry Day' and 'Wet Day' scenario with an additional 3 sites at risk during only in a 'Wet Day' scenario. The sites at risk from statutory reservoir flooding are set out in Table 5-6.

Site code	Site name	Scenario
126	Land North of A442 Wheat Leasows	'Dry Day' and 'Wet Day'
251	Land South of Holyhead Road, Wellington	'Dry Day' and 'Wet Day'
313	Land North of Middle Farm, Field Aston	'Dry Day' and 'Wet Day'
398	Land north of A518, Newport	'Dry Day' and 'Wet Day'
408	Land at Bratton	'Dry Day' and 'Wet Day'
424	Brandon Avenue, Shawbirch	'Wet Day'
462	Land Southeast of Newport Town Centre	'Dry Day' and 'Wet Day'
707	Little Dessert Shop	'Wet Day'
718	AGA Site	'Wet Day'

Table 5-6	: Sites	at	risk	from	reservoir	flooding
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The sequential approach should be applied within the context of reservoir flood risk but will not require the Exception test. The level and standard of inspection and maintenance required under the Reservoirs Act means that the risk of flooding from reservoirs is very

low. However, there is a residual risk of a reservoir breach, and this risk should be evaluated in any site-specific FRA (where relevant).

# 5.2.7 Historic Flooding from all sources

None of the screened sites are shown to fall within the Environment Agency's Historic Flood Map and Recorded Flood Outlines datasets.

Flood records provided by Telford and Wrekin LLFA show instances of flooding in the area, Sites 126, 408 and 424 are within areas with the most amount of past flood events.

# 5.2.8 Cumulative Impact

As part of the Level 1 SFRA, an assessment of the cumulative impact of development on flood risk across the Council area was undertaken. The surface water flood risk in each catchment was assessed along with evidence of historic flooding incidents. The 8 sites located in catchments at relative high risk are listed in Table 5-7, 12 of the sites with site summary sheets are in a catchment at relative medium risk. Only 1 site, Site 689 - Land Southern Side of Waters Upton, is in a catchment at low risk. Further information regarding the cumulative impact assessment, including the process and outcomes can be found in section 7 of the Level 1 SFRA.

Site Code	Site name
126	Land North of A442 Wheat Leasows (Wappenshall)
237	Land North East of Muxton
274	Land off Church Road, Lilleshall
408	Land at Bratton
449	Land East of Dawley Road. Lawley
473	Employment site, Land east of Dawley Road, Lawley
699	Tafs Salop Ltd, Gower Street, St Georges
718	AGA Site

#### Table 5-7 Sites in high risk catchments

# 5.3 Requirements for Developers

Below are general requirements for developers of sites at high risk of flood risk, further information on Flood Risk Assessment and Surface Water Drainage Strategies can be found in section 6 and 7 respectively.

 It is recommended that as part of the early discussions relating to development proposals, developers discuss requirements relating to site-specific FRA and drainage strategies with both the Local Planning Authority and the Lead Local Flood Authority (LLFA), to identify any potential issues that may arise from the development proposals.

- For sites allocated within the Local Plan, the Local Planning Authority should use the information in this SFRA to inform the Exception Test. At planning application stage, the developer must adopt the sequential approach when assessing the feasibility of site allocations. This will ensure that appropriate flood resistance and resilience measures are put in place, which align with the recommendations in National and Local Planning Policy and supporting guidance as well as those set out in this SFRA.
- For developments that have not been allocated in the Local Plan, developers must undertake the Sequential Test followed by the Exception Test (if required) and present this information to the Local Planning Authority for approval.
   Developers will need to apply the Exception Test and use information in a sitespecific Flood Risk Assessment to inform this test at planning application stage. The Exception Test should be applied where there is development which is classed as;
  - o More vulnerable in Flood Zone 3a
  - Highly vulnerable in Flood Zone 2 (this is NOT permitted in Flood Zone 3a or 3b)
  - Essential infrastructure in Flood Zone 3a or 3b
  - Any development with significant\* risk in the surface water 1% AEP event plus 40% climate change allowance flood extent. (\*Flood risk issues are not always black and white the significance of issues requires professional judgement, based on the location, topography and nature (including depth, velocity and hazard) of flooding, rather than simply whether part of a site is within a given flood extent. This is determined as part of a Level 2 assessment.)
- Whilst the Exception Test is not explicitly required by the NPPF/PPG where a site is at significant risk from other sources of flooding, or where flooding impedes access/egress regardless of whether the site itself is at risk, the NPPF/PPG do require that all sources of flooding are considered both now and into the future. In these circumstances, the Council should carefully weigh up the benefits of developing such sites against the risk, and developers should demonstrate to the Council's satisfaction that the site can be developed in a way that ensures users of the site are safe in the event of a flood from any source, both now and throughout the lifetime of the development. The Level 1 SFRA and this SFRA can be used to scope the flooding issues that a site-specific FRA should investigate in more detail to inform the Sequential and Exception Tests for windfall sites.
- Any sites located where there is a Main River (including culverted reaches of Main River) will require an easement of 8m either side of the watercourse from the top of the bank. This may introduce constraints regarding what development will be possible and consideration will also need to be given for access and maintenance at locations where there are culverts. Developers will be required to apply for appropriate permits so the activity being carried out over easements does not increase flood risk.

- Any sites located where there is an ordinary watercourse, or a surface water flow route, should maintain and enhance these natural features.
- Where a culverted watercourse crosses a development site, it should be reverted back to open channel. In such a case the natural conditions deemed to have existed prior to the culverting taking place should be re-instated.
- Land Drainage Consent must be applied for and permission sort before any works that would alter or affect the ability of an ordinary watercourse to pass flow during flood events, can be completed. Information regarding the types of work that require Land Drainage Consent from Telford and Wrekin Council can be found on their website. If the site falls within the Stine IDB (SIDB) permission for works to ordinary watercourses must be sought from the SIDB.
- At the planning application stage, developers may need to undertake more detailed hydrological and hydraulic assessments of unmodelled watercourses so that the potential effects of proposals can be evaluated at site level and ensure there is no increase in risk off-site as result of development. The modelling should evidence flood extents, depths, velocities, and hazard (including latest climate change allowances), inform development zoning within the site and prove, if required, whether the Exception Test can be passed.
- A strategic assessment of SuDS options has been undertaken using regional datasets. A detailed site-specific assessment of suitable SuDS techniques should be undertaken at site-specific level to understand which SuDS options are most appropriate.
- For sites located in a catchment which has been identified as being at high risk of development impacting flood risk, surface water drainage schemes should be designed with long-term storage of the Qbar restrictions to mitigate volumetric increases to the catchment.

# 5.4 Planning Policy Recommendations

- Developers should consider flood resilience measures for new developments.
- For sites at risk of fluvial flooding, finished floor levels should be 600mm above the 1% AEP plus climate change peak flood level as per the Environment Agency's Flood Fisk Assessment Standing Advice.
- For sites at high risk from surface water flooding or groundwater flooding finished floor levels should be raised above the estimated flood depths, as per the Environment Agency's Flood Fisk Assessment Standing Advice.
- Combine infiltration (e.g. permeable surfaces) and attenuation (e.g. balancing ponds) SuDS techniques to overcome constraints to the area of a site set aside for infiltration systems caused by development pressures.
- Where appropriate, opportunities for betterment should be sought where surface water flooding issues are present, which could be implemented through Supplementary Planning documents for individual settlements.
- Encourage the use of permeable surfacing in gardens and use measures to optimise drainage and reduce runoff.



- Consider opportunities for water conservation through rainwater harvesting and water butts where appropriate for new and existing development.
- Promote land management practices where appropriate to attenuate runoff and alleviate potential issues downstream.

#### 5.5 Guidance for Windfall Sites and Sites Not Assessed in the L2 SFRA

- For sites not covered by the Environment Agency's Flood Zones, or where Flood Zones do exist, but no detailed hydraulic modelling is present, it is recommended that developers construct detailed hydraulic models at these sites as part of a site-specific FRA using channel, structure, and topographic survey, to confirm flood risk. Site-specific flood modelling will probably need to be developed in locations where it is necessary to understand the effects of proposed development schemes on the existing flood flow paths and flood volume storage.
- If a site's extents either include or borders with a Main River (including a culverted reach of Main River), an easement of 8m is required from either bank for access or maintenance. Any future development will require a flood risk permit from any activity within 8m of a Main River.
- If an ordinary watercourse is within or immediately adjacent to the site area, consultation with the Lead Local Flood Authority should be undertaken. If alterations or discharges are proposed to the watercourse, a land drainage consent will be required.
- Where necessary, blockages of nearby culverts may need to be simulated in a hydraulic model to confirm residual risk to the site.
- Surface water risk should be considered in terms of the proportion of the site at risk in the 3.3% AEP (30-year), 1% AEP (100-year) or 0.1% AEP (1,000-year) events, whether the risk is due to isolated minor ponding or deeper pooling of water, or whether the risk is due to a wider overland flow route.
- Surface water risk and mitigation should be considered as part of a detailed sitespecific Flood Risk Assessment and Surface Water Drainage Strategy.
- Access and egress should be considered at the site, but also in the vicinity of the site, for example, a site may have low surface water risk, but in the immediate locality, access/ egress to and from the site could be restricted for vehicles and/ or people.
- Sites where there is a canal within or immediately adjacent to the site area, developers should consult the Canals and Rivers Trust. Any proposed alterations to the canal or discharges must be agreed with the Canals and Rivers Trust.
- If a site is located within 250m of a landfill site, there could be amenity, dirt, and contamination issues. Sites could be sensitive from the perspective of controlled waters and therefore any redevelopment must ensure there is no pollution risk to the water environment.



#### 5.6 Use of SFRA Data and Future Updates

It is important to recognise that the SFRA has been developed using the best available information at the time of preparation. This relates both to the current risk of flooding from rivers, and the potential impacts of future climate change.

The SFRA should be a 'living document', and as a result should be updated when new information on flood risk, flood warning or new planning guidance or legislation becomes available. New information on flood risk may be provided by Telford and Wrekin Council, the Highways Authority, Severn Trent Water and the Environment Agency. Such information may be in the form of:

- New hydraulic modelling
- Flood event information following a future flood event
- Policy/legislation updates
- Environment Agency flood map updates
- New flood defence or alleviation schemes.

The Environment Agency regularly reviews their flood risk mapping, and it is important that they are approached to determine whether updated (more accurate) information is available prior to commencing a detailed Flood Risk Assessment. It is recommended that the SFRA is reviewed when there are significant updates to the Environment Agency's Flood Zone mapping. This will ensure the latest data is still represented in the SFRA, allowing a cycle of review and a review of any updated data by checking with the above bodies for any new information.

At time of writing the Environment Agency's updated fluvial and surface water mapping, NaFRA2, has not been published. The new data is due to be published in early 2025. At planning stage the most up-to-date information, data and mapping must be assessed and considered.

#### 5.6.1 Neighbourhood Plans

Flood risk should be fully addressed in the plan preparations and in bring forward policies for the allocation of land and therefore the SFRA findings should be used in production of Neighbourhood Plans.

Neighbourhood planners can use the information in the Level 1 and Level 2 SFRAs on the sources of flood risk across the district and the flood risk mapping, to assess the risk of flooding to sites within their community. The SFRA will also be helpful for developing community level flood risk policies in high flood risk areas.

This SFRA highlights on a broad scale where flood risk from fluvial, surface water, groundwater, and the effects of climate change are most likely. The maps are useful to provide a community level view of flood risk but may not identify if an individual property is at risk of flooding or model small scale changes in flood risk. Local knowledge of flood mechanisms will need to be included to complement the broadscale mapping.



# 6 Flood Risk Management Requirements for Developers

# 6.1 Principles for New Developments

Prior to development or construction, a site-specific flood risk assessment (FRA) may be required to assess all sources of flood risk, information of when an FRA is required can be found in section 6.2.1. Developers should, where required, undertake more detailed hydrological and hydraulic assessments of the watercourses to verify flood extent (including latest climate change allowances), to inform the sequential approach within the site and prove, if required, whether the Exception Test can be satisfied. Below is a list of principles for developers to follow, further information can be found in section 8 of the Level 1 SFRA.

- Apply the Sequential and Exception Tests
- Consult with statutory consultees
- Consider the risk from all sources of flooding and use the most up to date flood risk data and guidance
- Endure that development does not increase flood risk elsewhere
- Ensure development is safe for future users
- Enhance the natural river corridor and floodplain environment
- Consider and contribute to wider flood mitigation strategy and measures in the Telford and Wrekin Council area and apply the relevant local planning policies

# 6.2 Site-Specific Flood Risk Assessments

# 6.2.1 When is an FRA Required

Site-specific FRAs are required in the following circumstances:

- Proposals of 1 hectare or greater in Flood Zone 1.
- Proposals for all new development in Flood Zones 2 and 3 (including minor development such as non-residential extensions, alterations which do not increase the size of the building or householder developments and change of use).
- Proposals for new development (including minor development and change of use) in an area within Flood Zone 1 which has critical drainage problems (as notified to the LPA by the Environment Agency).
- Where proposed development or a change of use to a more vulnerable class may be subject to other sources of flooding.

An FRA may also be required for some specific situations:

- If the site may be at risk from the breach of a local defence (even if the site is actually in Flood Zone 1); the Environment Agency should be contacted to agree the breach assessment approach.
- Where evidence of historical or recent flood events have been passed to the LPA.

- In an area where surface water flood risk is a material consideration.
- Land identified in an SFRA as being at increased risk in the future.

# 6.2.2 Objectives of Site-specific FRAs

Site-specific FRAs should be proportionate to the degree of flood risk, as well as appropriate to the scale, nature, and location of the development. Site-specific FRAs should establish:

- whether a proposed development will be at risk of flooding, from all sources, both now and in the future, taking into account climate change
- whether a proposed development will increase flood risk elsewhere
- whether the measures proposed to deal with the effects and risks are appropriate
- the evidence, if necessary, for the local planning authority to apply the Sequential Test; and
- whether, if applicable, the development will be safe and pass the Exception Test.

FRAs should follow the approach recommended by the NPPF (and associated guidance) and guidance provided by the Environment Agency and Telford and Wrekin Council. Guidance and advice for developers on the preparation of site-specific FRAs include:

- Standing Advice on Flood Risk (Environment Agency);
- Flood Risk Assessment for Planning Applications (Environment Agency);
- <u>Site-specific Flood Risk Assessment</u> (Paragraphs 020, 021 and 022 of the PPG).

# 6.3 Local Requirements for flood mitigation measures

During design of a new development flood risk should be considered at an early stage, including how the future development and construction may impact the flood risk. The local requirements are set out in section 8.3 of the Level 1 SFRA, below is a list of considerations that must be taken into account:

- Site layout and design
- Changes in ground levels
- Finished floor levels
- Flood defences proposed as part of the development
- Developer contributions
- Making space for water including buffer strips
- Property Flood Resilience measures (PFR)

# 6.4 Reducing flood risk from other sources

# 6.4.1 Surface water and sewer flooding

Developers should discuss public sewerage capacity with Severn Trent Water or NAV at the earliest possible stage. It is important that a Surface Water Drainage Strategy (often undertaken as part of an FRA) shows that development will not increase flood risk

elsewhere, and that the drainage requirements regarding runoff rates and SuDS for new development are met.

If residual surface water flood risk remains, the likely flow routes and depths across the site should be modelled. The site should be designed so that these flow routes are preserved and building design should provide resilience against this residual risk.

When redeveloping existing buildings, the installation of some permanent or temporary floodproofing and resilience measures could protect against both surface water and sewer flooding. Non-return valves prevent water entering the property from drains and sewers and can be installed within gravity sewers or drains within a property's private sewer upstream of the public sewerage system. These need to be carefully installed and must be regularly maintained.

In the event of a submerged outfall, consideration must also be given to attenuation and flow ensuring that flows during the 1% AEP plus climate change storm event are retained within the site and that exceedance routes are directed through areas where risk to people and property are minimised. This should be demonstrated with suitable modelling techniques.

# 6.4.2 Groundwater

Groundwater flooding has a very different flood mechanism to any other and so many conventional flood mitigation methods are not suitable. The only way to fully reduce flood risk would be through building design (development form), ensuring floor levels are raised above the water levels caused by a 1% AEP plus climate change fluvial event which would exceed both a surface water or a groundwater flood event of the same probability. Site design would also need to preserve any flow routes followed by the groundwater overland so that flood risk is not increased downstream.

Infiltration SuDS can cause increased groundwater levels and subsequently may increase flood risk on or off a site. Developers should provide evidence that this will not be a significant risk. Other underground works, such as basements, may also need to be assessed as part of a site-specific FRA in certain prone areas susceptible to groundwater issues.

# 6.4.3 Reservoirs

The risk of reservoir flooding is extremely low. However, there remains a residual risk to development from statutory reservoirs and non-statutory reservoirs, the allocation of proposed new development downstream of a reservoir can have implications for the risk designation of a statutory reservoir. This can trigger the need for substantive investment in the reservoir assets so that a flood can be safely passed. Accordingly, care should be taken when allocating development downstream of a reservoir so that the implications with respect to risk designation and any necessary investment to improve the safety of the asset are appropriately addressed. In addition, developers should consider the following during the planning stage:



- Developers should contact the reservoir owner for information on:
  - the Reservoir Risk Designation
  - reservoir characteristics: type, dam height at outlet, area/volume, overflow location
  - o operation: discharge rates/maximum discharge
  - $\circ~$  discharge during emergency drawdown; and
  - o inspection/maintenance regime.
- The Long Term Flood Risk Mapping (Environment Agency) shows the extent of flooding caused by the unlikely breach or failure of a statutory reservoir in a 'Dry-Day' and 'Wet-Dry' scenario. Further information on reservoir flooding can be found in section 3.8.
- The GOV.UK website on <u>Reservoirs: owner and operator requirements</u> provides information on how to register reservoirs, appoint a panel engineer, produce a flood plan and report an incident.

Developers should use the above information to:

- Apply the sequential approach to locating development within the site.
- Consider the impact of a breach and overtopping, particularly for sites proposed to be located immediately downstream of a reservoir. This should consider whether there is sufficient time to respond, and whether in fact it is appropriate to place development immediately on the downstream side of a reservoir.
- Assess the potential hydraulic forces imposed by a sudden reservoir failure event and check that the proposed infrastructure fabric could withstand the structural loads.
- Develop site-specific Emergency Plans and/ or Off-site Plans if necessary and ensure that future users of the development are aware of these plans. This may need to consider emergency drawdown and the movement of people beforehand.

#### 6.5 Duration and onset of Flooding

The duration and onset of flooding affecting a site depends on a number of factors:

- The position of the site within a river catchment, with those at the top of a catchment likely to flood sooner than those lower down. The duration of flooding tends to be longer for areas in lower catchments.
- Upstream reservoirs in these catchments will provide some online flood storage that reduce the flood risk downstream and delays the onset of flooding. At the confluence of the larger watercourses and smaller tributaries, there may be different timings of peak flows, for example smaller tributaries would peak much earlier than the larger catchments.
- The principal source of flooding: where this is surface water, depending on the intensity and location of the rainfall, flooding could be experienced within 30 minutes of the heavy rainfall event e.g., a thunderstorm. Typically, the duration of



flooding for areas at risk of surface water flooding or from flash flooding from small watercourses is short (hours rather than days).

- The preceding weather conditions prior to the flooding: wet weather lasting several weeks will lead to saturated ground. Rivers respond much quicker to rainfall in these conditions.
- Whether a site is defended, noting that if the defences were to fail, a site could be affected by very fast flowing and hazardous water within 15 minutes of a breach developing (depending on the size of the breach and the location of the site in relation to the breach), causing danger to life.
- Catchment geology, for example chalk catchments take longer to respond than typical clay catchments.

Guidelines for onset and duration of flooding are shown in Table 6-1.

Principal source of flooding	Duration	Onset
Surface water	Up to 4 hours	Within 30 minutes
Fluvial	4 – 24* hours	Within 2 – 8 hours

# Table 6-1: Guidelines on the duration and onset of flooding

\*Depending on where in the catchment a site is located, flooding could be rapid and flashy in the upper catchment (e.g. small tributaries), and slower responding and longer in duration in the lower catchment.

It is recommended that a site-specific Flood Risk Assessment refines this information, based on more detailed modelling work where necessary.

# 6.6 Flood Warning and Emergency Planning

Emergency planning covers three phases: before, during and after a flood. Measures involve developing and maintaining arrangements to reduce, control or mitigate the impact and consequences of flooding and to improve the ability of people and property to react, respond to and recover from flooding. National Planning Policy takes this into account by seeking to avoid inappropriate development in areas of flood risk and considering the vulnerability of new developments to flooding.

The 2024 NPPF (paragraph 181) requires site level FRAs to demonstrate that

"d) any residual risk can be safely managed; and

e) safe access and escape routes are included where appropriate, as part of an agreed emergency plan."

- Certain sites will need emergency plans:
- Sites with vulnerable users, such as hospitals and care homes
- Camping and caravan sites
- Sites with transient occupants e.g. hostels and hotels
- Developments at a high residual risk of flooding from any source e.g. immediately downstream of a reservoir or behind raised flood defences

• Situations where occupants cannot be evacuated (e.g. prisons) or where it is safer to remain "in-situ" and / or move to a higher floor or safe refuge area (e.g. at risk of a breach).

Emergency Plans will need to consider:

- The characteristics of the flooding which includes the speed of onset, depth, velocity, hazard, likelihood, duration, historic flooding
- The vulnerability of site occupants.
- Structural safety of the proposed buildings
- The impact of the flooding on essential services e.g. electricity, drinking water
- Flood warning systems and how users will be encouraged to sign up for them.
- Safe route of access and egress for users and emergency services, set above the estimated flood level and connected to a site away from the flood level. This includes single storey buildings or ground floors without access to upper floors to provide safe refuge.
- How a development can be evacuated prior to extreme flood event (0.1% AEP plus climate change
- How the consequences of residual risks will be safely managed, including additional measures to ensure that people will not be exposed to hazardous flooding.
- A safe place of refuge above the design flood level in areas where safe access and egress and advance warning may not be possible, having discussed and agreed this first with emergency planners.

Proposed new development that places an additional burden on the existing response capacity of the local authority will not normally be appropriate.

It is advised that emergency plans should be provided to support developments ensuring that residual risk is covered. However, it will not be appropriate to rely solely on emergency plans to mitigate residual risk. Further information should be included to understand the approach where residual risk from flood risk management infrastructure affects large areas. This information should be covered in site-specific FRAs and the accepted approach in locating development in these areas to ensure that new development is not put at risk.

<u>Telford and Wrekin Council</u> and the <u>West Mercia Local Resilience Forum</u> provide Emergency Planning information about risks to the community, warn of hazardous conditions, such as flooding, snow, and drought, and provide information on preparing for emergency situations. Further information is available from the following documents / websites with hyperlinks provided:

- FloodRe
- 2004 Civil Contingencies Act
- Defra (2014) National Flood Emergency Framework for England
- The EA and Defra's Standing Advice for FRAs
- The Environment Agency's 'How to plan ahead for flooding'
- Sign up for Flood Warnings with the EA

- The National Flood Forum
- GOV.UK 'Prepare for flooding' page
- ADEPT Flood Risk Plans for new development

JBA consulting



# 7 Surface Water Management and SuDS

The Level 1 SFRA summarises guidance and advice on managing surface water runoff and flooding in Section 9. This section provides updated guidance on SuDS since the Level 1 SFRA was published in 2021.

# 7.1 Roles of the Lead Local Flood Authority and Local Planning Authority in surface water management

As a unitary authority Telford and Wrekin Council are both LLFA and LPA. As LPA, Telford and Wrekin Council should be satisfied that a development's proposed plans meet the minimum standard of operation and ensure through the use of planning conditions or planning obligations that there are clear arrangements for on-going maintenance over the lifetime of the development.

As LLFA they are a statutory planning consultee on the management of surface water. They provide technical advice on surface water drainage strategies and designs submitted to support major development proposals, to ensure that onsite drainage systems are designed in accordance with the current legislation and guidance. It is essential that developers consider sustainable drainage at an early stage of the development process – ideally at the master-planning stage. To further inform development proposals at the master-planning stage, pre-application advice is offered by Telford and Wrekin Council. This will assist with the delivery of well designed, appropriate and effective SuDS.

Schedule 3 of the FWMA 2010 was expected to be implemented in 2024 following a government review making SuDS mandatory for new developments in England. Schedule 3 will provide a framework for the approval and adoption of drainage systems, a SuDS Approving Body (SAB) within unitary and county councils, and national standards on the design, construction, operation, and maintenance of SuDS for the lifetime of the development. At the time of writing, there is no indication of when schedule 3 will be enacted.

# 7.2 Sources of SuDS Guidance

# 7.2.1 C753 CIRIA SuDS Manual (2015)

The <u>C753 CIRIA SuDS Manual</u> (2015) provides guidance on planning, design, construction and maintenance of SuDS. The manual is divided into five sections ranging from a high-level overview of SuDS, progressing to more detailed guidance with progression through the document.

# 7.2.2 Sustainable Drainage Non-Statutory Technical Standards, Defra (March 2015)

The Defra <u>Sustainable Drainage Non-Statutory Technical Standards</u> (March 2025) provides non-statutory standards on the design and performance of SuDS. It outlines peak flow



control, volume control, structural integrity, flood risk management and maintenance and construction considerations.

In 2021 the Association of SuDS Authorities (ASA) produced a <u>report</u> recommending the update of the Non-Statutory Technical Standards. At the time of writing this Level 2 report, no updates have been made.

# 7.2.3 Telford and Wrekin Council Sustainable Drainage Handbook (2019)

Telford and Wrekin have prepared Sustainable Drainage Handbook which can be downloaded from their <u>website</u>. The document builds on policies set out in the Local Plan and Local Flood Risk Management Strategy and provides developers with information on the planning process locally, local SuDS design standards, and the LLFA's requirements for Drainage Strategies supporting both major and minor developments.

# 7.3 Other surface water drainage design considerations

# 7.3.1 Groundwater Vulnerability Zones

The Environment Agency published groundwater vulnerability maps in 2015. These maps provide an assessment of the vulnerability of groundwater in overlying superficial rocks and those that comprise of the underlying bedrock. The map shows the vulnerability of groundwater at a location based on the hydrological, hydro-ecological and soil propertied within a one-kilometre grid square. The groundwater vulnerability maps should be considered when designing SuDS. Depending on the height of the water table at the location of the proposed development site, restrictions may be placed on the types of SuDS appropriate to certain areas. Groundwater vulnerability maps can be found within the Landscape section on <u>Defra's Interactive MagicMap</u> website.

# 7.3.2 Groundwater Source Protection Zones (GSPZ)

The Environment Agency also defines Groundwater Source Protection Zones (SPZs) near groundwater abstraction points. These protect areas of groundwater used for drinking water. The GSPZ requires attenuated storage of runoff to prevent infiltration and contamination. Groundwater Source Protection Zones can be viewed within the Land Designation - Non-Statutory section on the <u>Defra Interactive MagicMap</u> website. The mapping shows that there are multiple GSPZs within the Telford and Wrekin Council area.

# 7.3.3 Nitrate Vulnerable Zones

Nitrate Vulnerable Zones (NVZs) are areas designated as being at risk from agricultural nitrate pollution. Nitrate levels in waterbodies are affected by surface water runoff from surrounding agricultural land entering receiving waterbodies. The level of nitrate contamination will potentially influence the choice of SuDS and should be assessed as part of the design process. NVZs can be viewed in the Land Designation - Statutory section on the <u>Defra Interactive MagicMap</u>. The majority of the Telford and Wrekin area is shown to be

within a NVZ and developers should consult with the Environment Agency when developing their surface water drainage strategies.

# 7.4 SuDS Suitability

The suitability of SuDS techniques is dependent upon many variables, including the hydraulic and geological characteristics of the catchment.

The permeability of the underlying soils can determine the infiltration capacity and percolation capacities. As such, a high-level review of the soil characteristics has been undertaken using British Geological Survey (BGS) soil maps of England and Wales which allow for a basic assessment of the soil characteristics and infiltration capacity. A high-level assessment of the suitability of SuDS is included in the site tables in Appendix A. This is based on national datasets, and it should be assessed in more detail when designing SuDS.

This strategic assessment should not be used as a definitive site guide as to which SuDS would be suitable but rather as an indicative guide of general suitability based solely on soil type. Several other factors can determine the suitability of SuDS techniques including land contamination, the depth and fluctuation of the water table, the gradient of local topography and primary source of runoff. When considering NVZs and if areas have pollutants, infiltration may only be suitable where treatment measures are provided, prior to any discharge to surface or groundwaters.

Further site-specific investigation should be conducted to determine what SuDS techniques could be utilised at a particular development. The result of this assessment does not remove the requirements for geotechnical investigation or detailed infiltration testing in accordance with BRE Digest 365 and does not substitute the results of site-specific assessments and investigations. The LLFA should be consulted at an early stage to ensure SuDS are implemented and designed in response to site characteristics and policy factors.


# A Site Summary Tables



## **B** Site Mapping

### C Site Screening

JBA consulting





#### JBA consulting

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