

North West Leicestershire SFRA

SFRA Report (2024 Update)

North West Leicestershire District Council

March 2024



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Glossary

Term	Definition
AEP	Annual Exceedance Probability
BGS	British Geological Survey
FDGiA	Flood Defence Grant in Aid
FRAs	Flood Risk Assessments
LFRMS	Local Flood Risk Management Strategy
LLFAs	Lead Local Flood Authorities
LPAs	Local Planning Authorities
MTP	Medium-Term Plan
NPPF	National Planning Policy Framework
NWLDC	North West Leicestershire District Council
PLR	Property Level Resilience
PPG	Planning Practice Guidance
RMA	Risk Management Authority
SAB	SuDS Advisory Board
SFRA	Strategic Flood Risk Assessment
SHLAA	Strategic Housing Land Availability Assessment
SoP	Standard of Protection
SuDS	Sustainable Drainage Systems
RoFSW	Risk of Flooding from Surface Water
UKCP18	UK Climate Projection 2018
WCS	Water Cycle Study
WFD	Water Framework Directive

Executive Summary

In 2015 Atkins produced a Strategic Flood Risk Assessment (SFRA) for NWLDC. Following a review of this SFRA in April 2023, it was confirmed that this SFRA should be updated. This SFRA provides an update to the previous SFRA completed in 2015 and is required to inform the new Local Plan for North West Leicestershire. This SFRA provides an overview of the planning context in relation to flood risk and development within North West Leicestershire. SFRAs are considered live documents and should be revised periodically when updated information becomes available, following policy changes or when it is required to inform Local Plans.

The information assessed within this SFRA identifies that the main source of flood risk in the district is fluvial (river flooding) although areas are also at risk from surface water, sewer, canal or groundwater flooding.

A total of 36 potential sites have been assessed in relation to flood risk. Of these, 26 are potential housing sites, 8 for employment and 2 for mixed development. The results of this assessment have identified that 28 of the potential sites are at low risk of flooding and therefore considered sequentially acceptable in relation to flood risk. North West Leicestershire planners are required to take into account this determined flood risk as part of the Sequential Test, which is one of many factors taken into consideration when allocating potential sites for development in the Local Plan. Not all sites assessed in this SFRA will be allocated in the Local Plan. Sites not assessed within this SFRA could still be considered for development, although they would be treated as windfall applications. This SFRA provides a windfall site review flow chart to be used by planners in determining the appropriateness of individual windfall applications in relation to the Sequential Test.

As well as assessing flood risk at potential development sites and guidance for reviewing windfall sites, this SFRA also provides guidance on surface water management for new development. This is owing to surface water flood risk becoming more of a focus in the assessment of planning applications due to the increased knowledge and understanding associated with this source of risk, and specifically the potential flood risk impacts of insufficient surface water management.

Given the driver of this SFRA update is to inform the emerging Local Plan for North West Leicestershire, the recommendations of this report should be considered when setting the Local Plan Policies. The recommendations for the Local Plan Policies are:

- The flood risk to, and impact of, new development should be promoted through careful planning and where possible locating new development in the lowest flood risk areas, from all sources;
- Where development cannot be proposed in the lowest flood risk area, but where development would provide benefits that outweigh flood risk, suitable mitigation must be provided. This will ensure an acceptable level of risk to the new development whilst not increasing risk elsewhere. This would normally be demonstrated through the application of the Exception Test and must be agreed with relevant statutory consultees;
- There is an increased focus on surface water management and new development must ensure the drainage system serves to reduce runoff to agreed standards over the lifetime of the development. It is also necessary that the design of new surface water drainage systems follow the Sustainable Drainage Systems (SuDS) hierarchy. The runoff rate is normally the pre-development rate for greenfield sites or as recommended in the Leicestershire County Council SuDS emerging guidance¹ for brownfield sites. Where possible a strategic approach to surface water management should also be considered; and
- Where possible, redundant watercourse crossings and culverted reaches are removed to provide flood risk and ecological benefits. However, the downstream impacts should be carefully considered to prevent an increased flood risk elsewhere.
- The other recommendations from this SFRA are that:
- This SFRA should support the completion of site-specific Flood Risk Assessments (FRAs). FRAs are required for all proposed development that goes through the planning system located within areas at risk from fluvial flooding and those covering sites greater than 1 hectare;

¹ Lead Local Flood Authority - Statutory Consultation Checklist Guidance (leicestershire.gov.uk)

- The Sequential Test should be carried out for all proposed windfall development and the flow chart provided in this SFRA should be used to aid planners with this process. It is recommended that the flow chart is updated, if necessary, following its use in assessing proposed development and following changes in policy or flood risk information; and
- It is recommended that this SFRA is considered as a live document, which is based on current understanding and available data. As further flooding occurs, as policy changes and as there are advances in flood risk studies this SFRA should be reviewed and updated as appropriate.

1. Introduction

1.1. Overview

North West Leicestershire is a largely rural area with population concentrated in the principal settlements of Coalville and Ashby de la Zouch and a number of villages including Castle Donington, Kegworth, Ibstock and Measham. Flooding is one of the most widespread and frequently occurring of natural hazards and, therefore flood risk is one of the main factors that influences the spatial planning process. All forms of flooding and their impact on the natural and built environment are material planning considerations.

North West Leicestershire District Council (NWLDC) lies wholly within the catchment of the River Trent. There is a watershed within the District at Coalville where watercourses either flow approximately north or south. The north of the District drains to the Lower River Trent either directly or via the River Soar, whilst the south of the District flows via the River Mease or the River Sence to the Upper River Trent. The Lower River Trent is considered to be the catchment contributing to the River Trent downstream of the confluence with the River Dove in Derbyshire.

It is also important to recognise that the District of North West Leicestershire is situated immediately upstream of the Boroughs of Erewash and Rushcliffe to the north and Hinckley and Bosworth, South Derbyshire and North Warwickshire Districts to the south and west. North West Leicestershire District is adjacent to Charnwood through which the River Soar flows before entering North West Leicestershire. There are a large number of properties within the adjoining Boroughs that are susceptible to flooding from the River Trent and the River Soar, and future development within North West Leicestershire District must be carefully managed to ensure that this risk of flooding is not exacerbated.

Under existing planning law, most applications for proposed development should be assessed in accordance with the development plan. NWLDC are currently (August 2023) in the process of updating their Local Plan to inform future development within this area, and this Local Plan will take into account the National Planning Policy Framework² (NPPF). The NPPF states that *‘inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk, but where development is necessary, making it safe without increasing flood risk elsewhere’*. The NPPF also requires that the Local Plan is supported by a SFRA. In 2015 NWLDC commissioned Atkins to complete a SFRA for North West Leicestershire³. A SFRA review⁴ concluded that since the completion of the 2015 SFRA, there have been updates to flood mapping, guidance, and modelling. It was therefore considered by NWLDC and the Environment Agency that the 2015 SFRA required revisions to make use of the available updated information and to correctly inform the draft Local Plan.

1.2. Future development within North West Leicestershire District

North West Leicestershire District has a long history of mineral extraction, with coal, brick clay, gravel and granite amongst the products. All the deep coal mines are now closed, but opencast extraction continues. The District has undergone a transformation in recent years from the old employment base of deep mining to new jobs within the industrial and service sectors. North West Leicestershire District has good transport links through the M1, A42, A50 and A511 which can assist in further economic regeneration of the area through employment growth and new housing areas.

In August 2023, NWLDC are currently preparing a new Local Plan for the District that will set out the locations at which development should take place up to 2040. The Local Plan will guide future development and will look at various issues such as housing and economic needs, as well as measures to protect the environment and the effects of climate change.

² National Planning Policy Framework (publishing.service.gov.uk)

³ 71_DG_001 North West Leicestershire SFRA Refresh V3.0.pdf

⁴ Strategic Flood Risk Assessment Review_v3.pdf

This SFRA will be used to inform the Local Plan and will form part of the evidence base. This SFRA has only included sites for the application of the Sequential Test which NWLDC are considering allocating, all other sites would need to be treated as windfall.

1.3. Objectives

The objectives of this SFRA are:

- To provide sufficient data and information to enable NWLDC to apply the Sequential Test for potential land allocations, and where necessary the Exception Test. The SFRA has only included sites which NWLDC are considering allocating, all other sites would need to be treated as windfall;
- To enable NWLDC to prepare appropriate policies for the management of flood risk within the Local Plan;
- To identify the level of detail required for site specific FRAs; and
- Enable NWLDC to determine whether the flood risk is acceptable in relation to emergency planning capability.

1.4. Scope of this document

This SFRA report has been prepared in accordance with the NPPF to summarise the findings of the data collection phase and to provide a basis for the application of the Sequential Test in respect to potential development areas/sites identified so far through the planning process.

The SFRA report builds upon the previous 2015 SFRA, updating information that has now been superseded or was not previously available. This includes updating reference to flood risk policy, reviewing recent flood events and updating flood risk mapping. Where alterations were not necessary for the SFRA update the text has been taken directly from the previous SFRA. This updated SFRA can then be used to refresh the Sequential Test and complete new Sequential testing for land allocations as appropriate.

This report provides an overview of the planning context in relation to flood risk and development within North West Leicestershire (Section 2). A summary of the data collected, and a review of this data is provided (Section 3) which then forms a basis for the assessment of flood risk in North West Leicestershire (Section 4). The Sequential Test is outlined for the potential sites for development (Section 5). Sustainable flood risk management is discussed for future development in North West Leicestershire (Section 6) and an assessment of potential mitigation has been provided (Section 7).

2. Review of planning policy

This section provides an overview of the planning context in relation to flood risk and development within North West Leicestershire.

2.1. National planning policy

National planning policy plays a key role in shaping the direction in which Local Planning Authorities prepare their Local Plans for development.

2.1.1. National Planning Policy Framework (NPPF) and Planning Practice Guidance (PPG)

The National Planning Policy Framework⁵ and Planning Practice Guidance⁶ have both been updated since 2015, as outlined below. It should be noted that both documents are classed as live documents and therefore the most relevant and up to date versions can be found on the relevant websites.

- In 2021, updates were made to the NPPF to update a number of environment related sections, including amendments on flood risk, and also climate change; and
- In 2022, the PPG was updated. Key changes were made to reflect alterations in functional floodplain (Flood Zone 3b), vulnerability classifications, design flood level for developments, and surface water management requirements, amongst other changes.

The aims of the NPPF are to ensure that flood risk is taken into account at all stages in the planning process to avoid inappropriate development in areas at risk from flooding and to direct development away from areas at highest risk. By exception, where new development is necessary in high-risk areas, policy aims to make it safe without increasing flood risk elsewhere and where possible, reducing flood risk overall.

Sequential testing, and in some cases Exception testing, is required for new development and land use. As outlined within the technical guidance, the aim of the Sequential Test is “*to steer new development to areas with the lowest risk of flooding, taking all sources of flood risk and climate change into account*”. The flood zones (see Section 3.3) are the starting point for this sequential approach.

Whilst the overall aim of the Sequential Test is to steer new development to the lowest area at risk there are likely to be instances where development cannot be located in the lowest risk area and as such the Exception Test would be required (for Essential Infrastructure, Highly Vulnerable and More Vulnerable development classifications as shown in Appendix A).

2.2. Local planning policy

The local planning authorities that are responsible for planning on a district scale, such as NWLDC, are required to prepare and maintain an up-to-date Local Plan for their respective area.

To ensure that the Local Plan remains effective it must be kept up to date and will generally require either full or partial update every five years, with reviews proportionate to reasons for the update. In line with the online Planning Practice Guidance⁷ “*A 5 year land supply is a supply of specific deliverable sites sufficient to provide 5 years’ worth of housing (and appropriate buffer) against a housing requirement set out in adopted strategic policies, or against a local housing need figure, using the standard method, as appropriate in accordance with paragraph 73 of the National Planning Policy Framework*”. The North West Leicestershire Local Plan (2011 to 2031)⁸ was adopted in 2017, and slightly amended before being adopted again in 2021. The local plan sets out planning policies to ‘help secure sustainable development’.

⁵ <https://www.gov.uk/guidance/national-planning-policy-framework>

⁶ <https://www.gov.uk/government/collections/planning-practice-guidance>

⁷ <https://www.gov.uk/government/collections/planning-practice-guidance>

⁸ Adopted Written Statement 2021 - public copy (4).pdf (nwleics.gov.uk)

The Local Plan is required to clearly set out the strategic priorities for the District and the policies outlined within the plan must address these priorities. Further details regarding the creation of the Local Plan are provided within the Planning Practice Guidance.

To support the Local Plan for NWLDC there is a wide range of documents being considered. These cover numerous topics, and those which address flood risk specifically are the SFRA and the Water Cycle Study (WCS). Therefore, this SFRA should be read in conjunction with other relevant documents provided on the NWLDC website⁹ to form the evidence based for the Local Plan.

⁹ http://www.nwleics.gov.uk/pages/evidence_base_documents

3. Data Collection and review

3.1. Introduction

The purpose of the data collection and review phase of the SFRA is to identify and obtain information regarding flood risk. It is during this phase that existing knowledge is collated with regards to the sources and extent of flood risk; existing flood management measures; and the land use and development opportunities within the North West Leicestershire area.

Consultation has been undertaken with NWLDC, Leicestershire County Council, the Environment Agency and Severn Trent Water. The information gathered during this phase has been used to assess the potential extent and frequency of flood risk, the implications of this flood risk for development opportunities and the opportunities for flood management practices which may help mitigate or reduce future flood risk.

3.2. Overview of the district area

North West Leicestershire District covers an area of approximately 280 km² and is situated within the River Trent catchment. Within any catchment the hydrology is intrinsically linked to the geology and topography. The geology of the District is dominated by Triassic Mercia Mudstone which is relatively soft and has been eroded over thousands of years to form the wide flat valleys of the River Trent and the River Soar which bound the north and east of the district.

Carboniferous Coal Measures underlie much of the south of North West Leicestershire and forms part of the Leicestershire and South Derbyshire Coalfield. The Coalfield consists of a northern section where the Lower, Middle and Upper Carboniferous Coal Measures are exposed, and a southern section where they are beneath Mercia Mudstone and Sherwood Sandstone which, in turn, are overlain by glacial till.

The Coalfield landform is one of gentle ridges and shallow valleys. The undulations become particularly shallow towards the south where there are locally thick deposits of glacial till which form the Mease/Sence Lowlands and the Leicestershire Vales. To the north the land falls away, often quite steeply, to the River Trent. The Coalfield forms part of the watershed between the Mease and Sence to the south and the River Soar to the east, with numerous brooks draining the generally undulating land.

Geology has a very strong influence on a catchment's response to rainfall. The degree to which water can percolate through rock, (described as permeability), influences the extent of overland flow and therefore the response of a watercourse to a rainfall event. The Mercia Mudstone has a high clay content and is relatively impermeable resulting in rapid surface runoff. The Sherwood Sandstone and Coal Measures, whilst more permeable, can promote rapid surface runoff where they form steep slopes.

Historically, the watercourses in North West Leicestershire have experienced many man-made changes, particularly where mining has been carried out. This has disturbed the natural processes of erosion and accretion and increased sediment movement, resulting in localised flooding from culvert, sluice gates and channel blockages. Farming practices and land use affect soil structure and vegetation cover and can impact on run-off rates and soil erosion. From the elevated area around Coalville a number of small fast flowing streams transfer sediment into the relatively flat River Soar. This river requires regular silt removal, carried out by Canal and River Trust, to maintain the channel capacity and allow navigation.

3.3. Flood Zone definition

3.3.1. The NPPF Flood Zones

The NPPF makes use of four separate Flood Zones that should be considered when determining if proposed development is at an acceptable level of flood risk through the Sequential Test based on the land use vulnerability classification (see Appendix A). These Flood Zones represent flooding without flood defences in place and are defined as follows:

- **Flood Zone 1** is defined as having a 'Low Probability' of flooding and incorporates areas where the annual probability of flooding is lower than 1 in 1,000 (0.1%). The NPPF imposes no constraints upon the type of development within this Flood Zone.
- **Flood Zone 2** is defined as having a 'Medium Probability' with an annual probability of flooding between 1 in 1,000 and 1 in 100 (0.1% and 1%) for fluvial flooding and between 1 in 1,000 and 1 in 200 (0.1% and 0.5%) for tidal flooding. The NPPF recommends that this area is acceptable for most types of development with the exception of Highly Vulnerable land uses, as listed within Table 2: 'Flood risk vulnerability and flood zone 'incompatibility'' taken from the NPPF flood risk planning practice guidance and included within Appendix A of this SFRA update.
- **Flood Zone 3a** is defined as having a 'High Probability' of flooding and incorporates areas with an annual probability of flooding of 1 in 100 (1%) or more frequent for fluvial flooding or 1 in 200 (0.5%) or more frequent for tidal flooding. There are greater constraints associated with development in these areas, as described in Appendix A of this SFRA update.
- **Flood Zone 3b** is defined as the functional floodplain. This is the areas where water has to be stored during times of flooding and is defined as land with an annual probability of flooding of 1 in 30 (3.3%) or more frequent, or land that is designed to flood. The NPPF identifies that local planning authorities should identify in their SFRA areas of functional floodplain and its boundaries. Only water compatible development is allowed in this area.

3.3.2. The Environment Agency flood maps

The Environment Agency's flood maps (2023) were used to identify the Flood Zones for this study. These flood maps are the Environment Agency's best estimate of the areas at risk from fluvial flooding (not taking into account the presence of flood defences) for the 1 in 100 annual probability (1%) and 1 in 1,000 annual probability (0.1%) events. The flood map is updated on a quarterly basis as the Environment Agency's knowledge of flooding is improved through detailed modelling studies, recent flood events and data from river level and flow monitoring stations.

The Environment Agency's flood map outlines are based on a combination of specific detailed hydraulic modelling and generalised river modelling and mapping method carried out nationally, to provide an indication of flood risk. The flood map outlines produced through generalised river modelling are the result of the macro modelling techniques, and whilst they are generally accurate on a large scale, they are not provided for specific sites or land where the catchment of the watercourse is less than 3km².

For the above reasons the flood map is not deemed sufficiently accurate to resolve the details of possible flooding for individual properties or sites. To provide site specific flood risk information, or in catchment areas smaller than the 3km² cut-off, a more precise local assessment of flood risk is required.

Furthermore, because the Flood Zone outlines are not definitive and do not include all minor watercourse flood plains, they should not be assumed to be correct where a minor watercourse (ditch, brook, drain, dyke, etc.) is shown with no flood outlines, within or adjacent to a site.

The detailed hydraulic modelling makes use of more accurate catchment and channel topography to provide flood extents and depths with a greater degree of confidence. It is normal to use the detailed hydraulic modelling flood extents in preference to those estimated through generalised river modelling.

The flood map outlines provided for this SFRA have been derived using a combination of a generalised model derived as part of a high-level national mapping programme, more detailed hydraulic modelling and historical flooding outlines. The Flood Map outlines, therefore, have a varying degree of accuracy dependent on the quality of the inputs and, in particular, the availability of detailed hydraulic modelling.

The Flood Map presents flood risk in accordance with the NPPF Flood Zones 1, 2 and 3 (see section 4.1.1). Whilst this Flood Map should be used as a starting point for allocating land for development, any sites that

contain watercourses, or where a watercourse is adjacent to the site boundary, require further detailed assessment by the applicant to confirm flood risk.

3.4. Hydraulic modelling

The Environment Agency provided two updated climate change models for Black Brook and Derbyshire Trent.

- The Black Brook model was improved as part of a study undertaken by the Environment Agency in 2018. This update incorporated new topographic and channel surveys undertaken in 2015.
- The Derbyshire Trent model was developed by Jacobs in 2018 with some data taken from previous models. The extent of the model covers 33 km of the River Trent, 11km of the River Derwent, 3 km of the River Dove and 3 km of the River Soar.

The models provided climate change scenarios as percentage increases, in this instance 1 in 100-year flood extent with 20% climate change and 1 in 100-year flood extent with 50% climate change were provided. The extent of this model in the North West Leicestershire District is highlighted in Figure 3-1 (see Appendix B for larger scale). The climate change outlines are indicative only and do not represent the full range of peak river climate change allowances for each catchment as outlines in Defra guidance¹⁰.

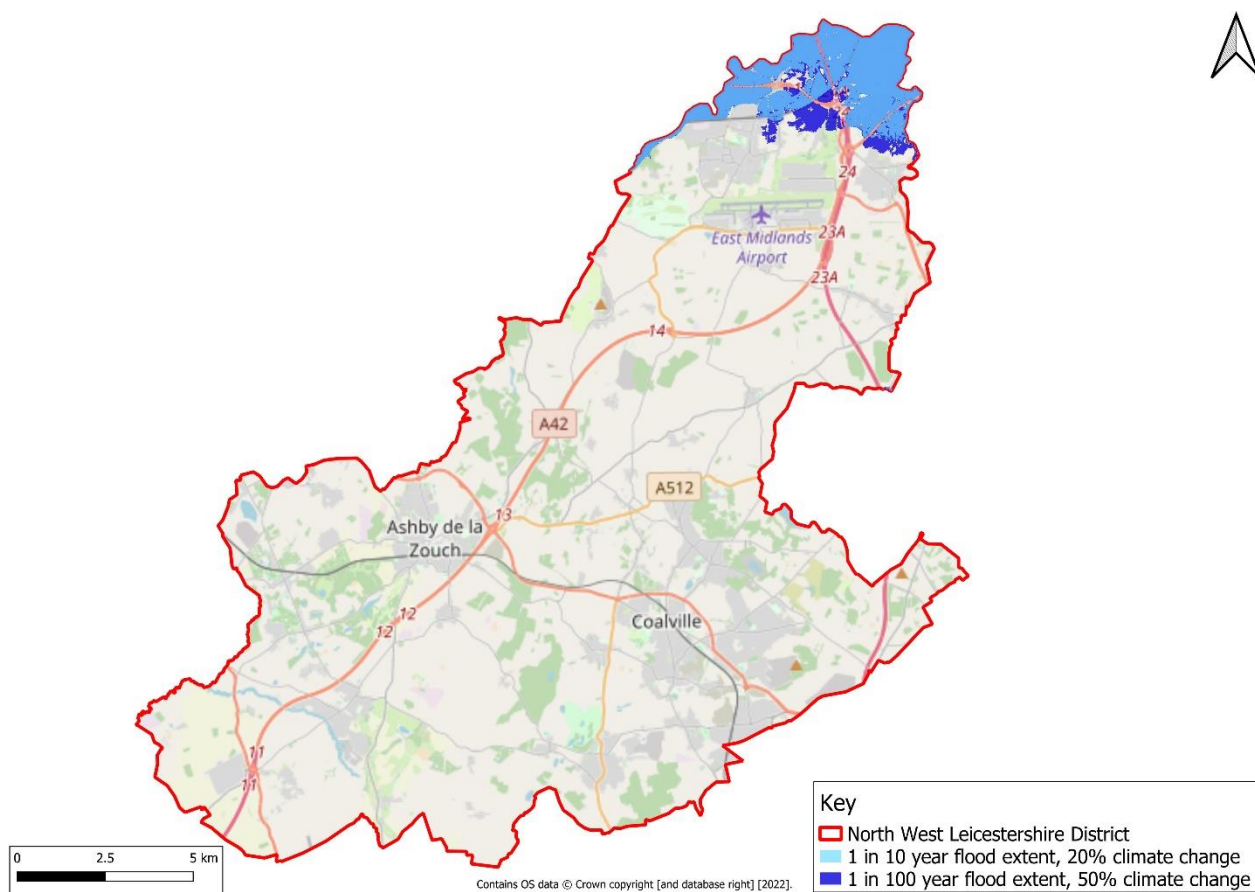


Figure 3-1 - 1 in 100-year flood extent with 20% and 50% climate change

To provide outlines representative of functional floodplain, defined as 3.3% (1in 30) AEP modelled data was requested from the Environment Agency, with the results from the following models / studies provided: Black Brook (2018), Derbyshire Trent, Loughborough and Measham & Packington (2012). Out of these models, only

¹⁰ Flood risk assessments: climate change allowances - GOV.UK (www.gov.uk)

the Derbyshire Trent had 3.3% (1 in 30) AEP extents, and these are provided, with comparison to the 5% (1 in 20) AEP in Figure 3-2.

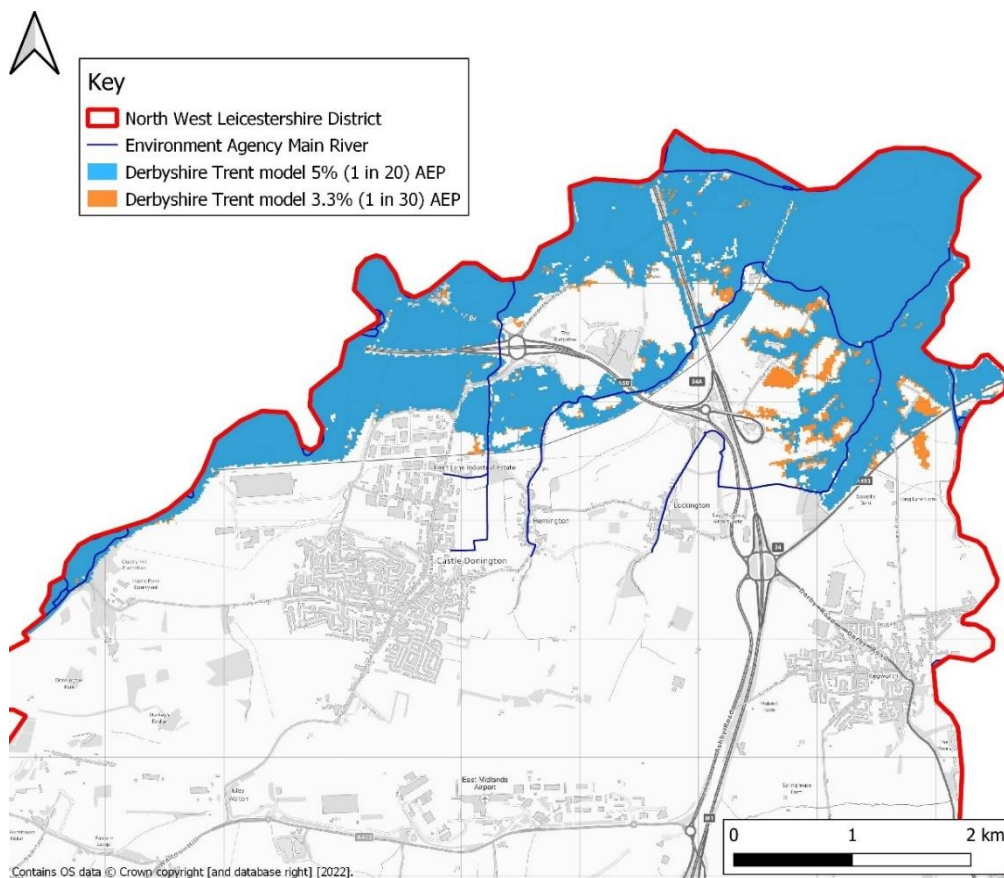


Figure 3-2 - Functional floodplain for the Derbyshire Trent

3.5. Historical flood events

Information on historical flood events can supplement the understanding of flooding mechanisms and flood extents determined through hydraulic modelling. The Environment Agency holds a publicly available data source of historical flood extents. This has been mapped for the district as shown in Figure 3-3 (see Appendix B for larger scale).

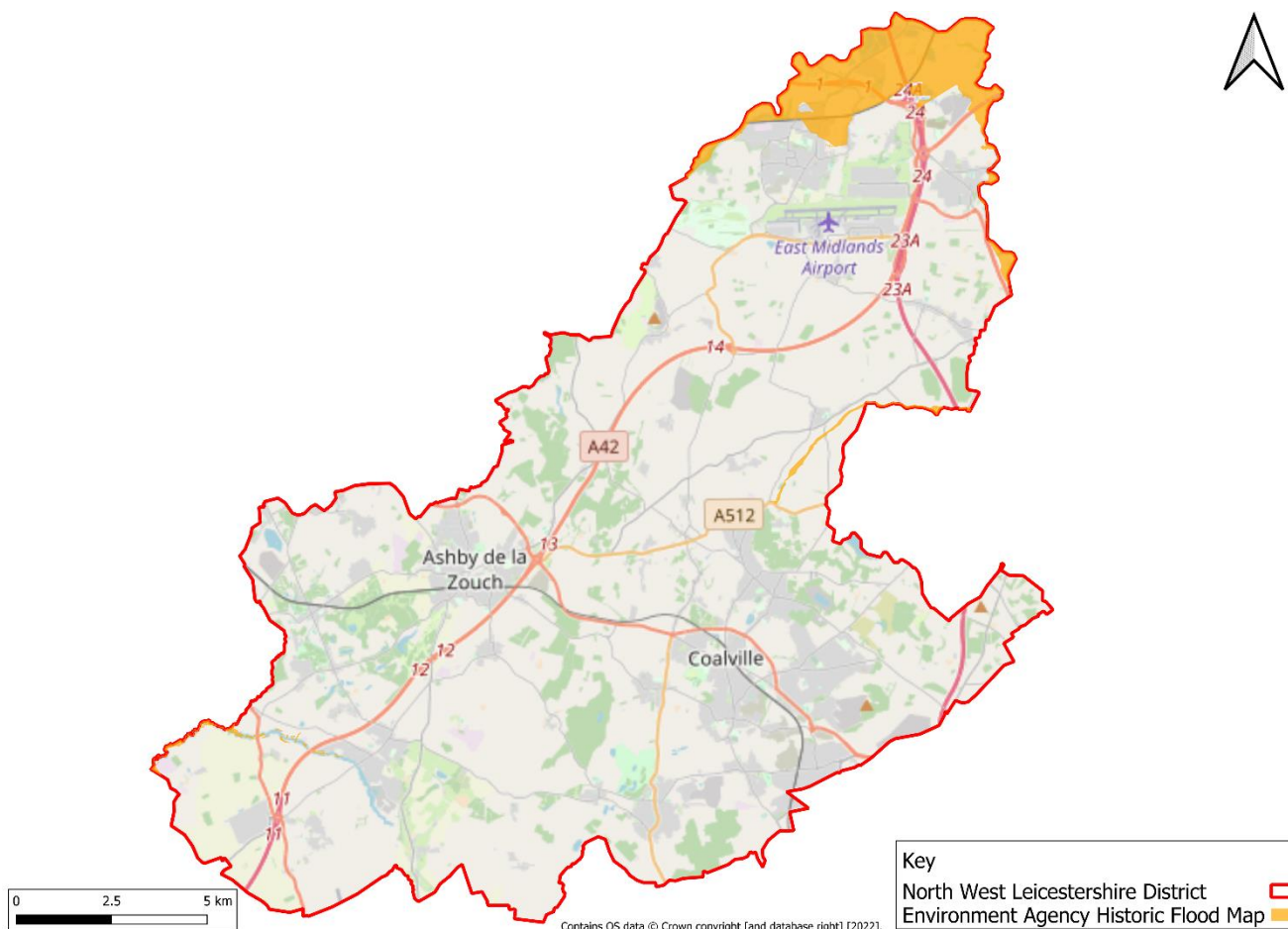


Figure 3-3 - Historic flood events in North West Leicestershire District

3.5.1. Fluvial flood history

Significant flood events affecting the whole of the River Trent basin occurred in 1932, 1947, 1960, 1998 and 2000. Individual catchments have also experienced severe flooding at other times.

River Trent / River Soar

The 1947 event was caused by snowmelt following prolonged rainfall and affected many locations in England and Wales. The event was notable for its prolonged duration and significant flood volumes. This event remains the highest recorded at several locations on the River Soar and Lower River Trent. In recent years, the largest events on the Lower River Trent were in Autumn 1998 and October/November 2000. However, the Easter 1998 event was significant on the River Soar.

In the Autumn 1998 event flooding on the lower River Soar overtopped the defences at Kegworth that offer protection during the 1 in 10 annual probability (10%) flood event. However, the defences at Ratcliffe on Soar, which offer protection during the 1 in 100 annual probability (1%) event were not breached or overtopped.

The October/November 2000 floods had a widespread impact throughout the River Trent catchment with an approximate annual probability of between 1 in 25 (4%) and 1 in 50 (2%). The worst affected areas were the lower reaches of the River Soar and the middle reaches of the River Trent from upstream of Nottingham to Newark, both affecting property within North West Leicestershire. Environment Agency defences failed or were overtopped along the River Soar. No properties flooded between Kegworth and the River Trent confluence from the River Soar; however there were a significant number of properties flooded within North West Leicestershire, including:

- Burton to Castle Donington – 18 properties flooded from the River Trent and received a severe flood warning.
- Castle Donington to Long Eaton – 6 properties flooded from the River Trent and received a severe flood warning.
- Cotes to Kegworth – 15 properties flooded from the River Soar and received a flood warning; 13 properties not flooded but received a flood warning.

The River Soar suffered severe flooding in 1932 and 1954 which led to the construction of flood management schemes in the 1960s mainly through Leicester. However, there are still considerable areas at risk of flooding from the River Soar and a strategy study has been undertaken recently for future flood risk management of the reach from Sharnford to the River Trent confluence.

Grace Dieu Brook

There has been significant flooding of roads and properties from Grace Dieu Brook, including in Thringstone and Belton in 1987 and in the village of Osgathorpe during 1955.

The most significant recent event was in July 2002 when 105mm of precipitation was recorded at Mount St. Bernards raingauge over a 9 hour period. This rainfall is 91% more than the monthly average for July and equates to about one seventh of the average annual precipitation recorded at the gauge. The rainfall resulted in an extreme event on Black Brook and Grace Dieu Brook and there was significant flooding with the residents of 58 properties requesting assistance from North West Leicestershire District Council to remove flood damaged household items. There was also significant flooding of roads which resulted in major disruption to residents of Whitwick. Many other properties along the course of the Brook suffered damage to their gardens.

Gilwiskaw Brook

Significant flooding of roads has occurred in Packington and Ashby de la Zouch from Gilwiskaw Brook. 1 property and 5 gardens were flooded following heavy rainfall in July 2001. The flooding of Mill Street during the July 2001 event caused disruption to the residents of Packington. Several other heavy rainfall events have resulted in flooding of roads and gardens in Packington with the most recent events in June 2007.

Minor Watercourses

Flooding occurs frequently in Hemington Village from Hemington Brook. In February 1977, 9 houses, a post office, 2 public houses and a road were flooded. The cause of flooding is considered to be the inadequate capacity of brook, culverts and access bridges. Hemington Brook is also affected by backing up from the River Soar and River Trent.

Flooding of roads and properties has been reported in Lockington caused by the inadequate capacity of Lockington Brook and the culvert in the centre of the village.

Other reported flooding includes houses and the road in Hallgate and Ladygate in Diseworth from Diseworth Brook and Hall Brook which carry runoff from Nottingham East Midlands Airport and flooding of an access road from B5401 in Long Whatton from Long Whatton Brook. However, these are thought to be the result of local issues regarding channel maintenance.

Flooding has been reported in Appleby Magna and at three separate locations, Church Street, Black Horse Hill and A444/Bowleys Lane. It is reported that the flooding has occurred from overtopping from the ordinary watercourse and culverted reaches, as well as from surface water.

3.5.2. Fluvial flood history

Since the previous SFRA was issued in 2015, seven Section 19 flood incident reports have been undertaken and published by Leicestershire County Council for flooding within North West Leicestershire. A summary of each is provided below in Table 3-1 and the locations shown on Figure 3-4.

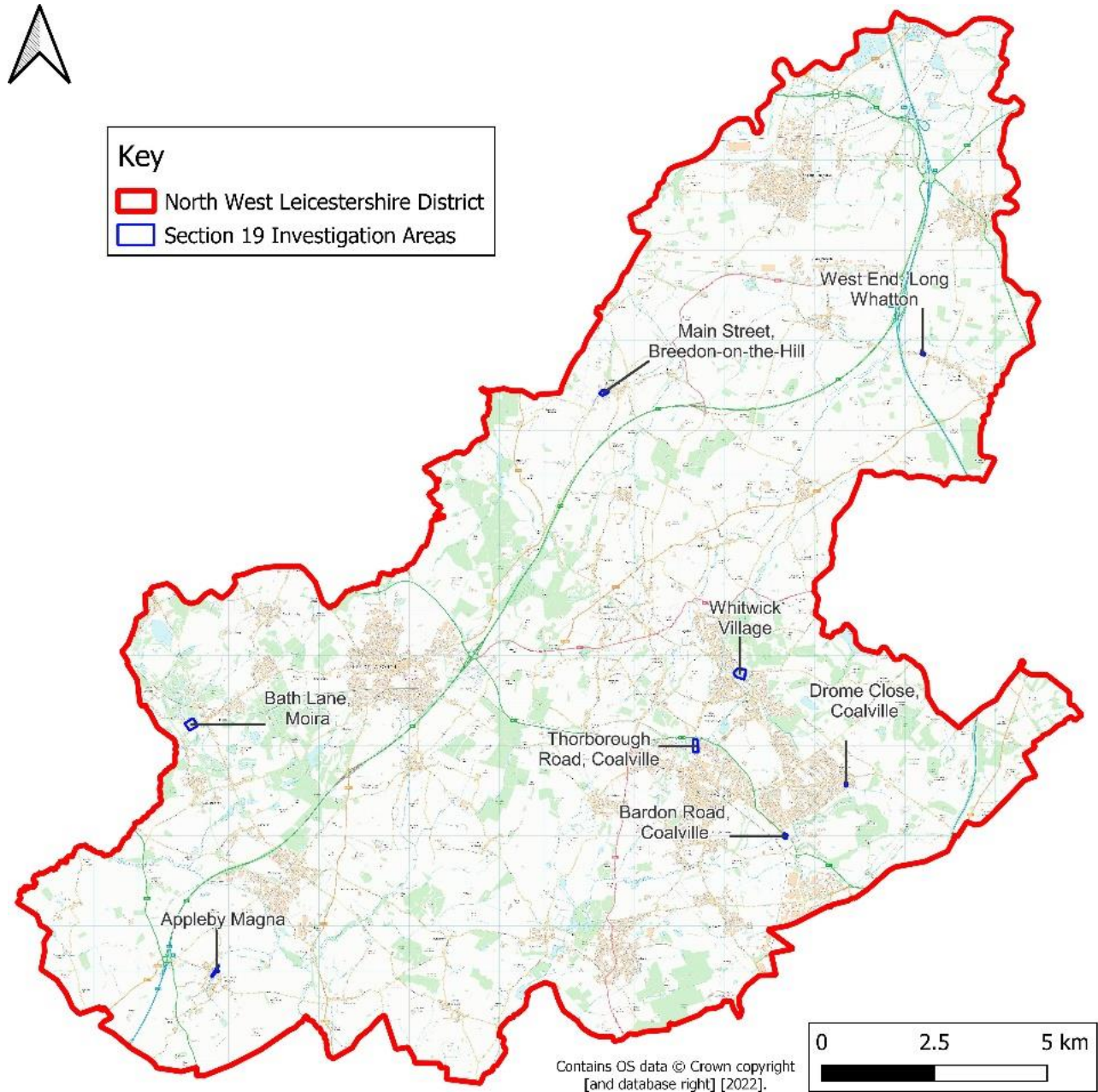


Figure 3-4 - Section 19 report locations

Table 3-1 - Section 19 report summary

Flood Event	Dates	Cause	Damage	Outcome
Appleby Manga	14/11/2019 16/02/2020	<p>This was due to intense rainfall falling onto an already waterlogged catchment causing the local drainage, highway, and public sewer networks to become rapidly inundated.</p> <p>This caused high volumes of surface water to enter the Meadow Brook (also known locally as the 'Appleby Brook'). This volume of water quickly overwhelmed the brook's capacity and caused extensive fluvial and foul water flooding which subsequently entered residential properties</p>	Internal damage to at least 16 residential properties.	<p>Followed up by Severn Trent.</p> <p>Actions agreed by Risk Management Authorities (RMAs) and recorded in the Appleby Magna Flood Investigation Report.</p>
Breedon on the Hill	15/06/2016	<p>Due to intense rainfall falling onto an already waterlogged catchment.</p> <p>The inability of the sloping ground to absorb the surface water, the rapid inundation of the local drainage network and other factors led to the ordinary watercourse breaching its banks in several places and entering properties as well as excess surface water flowing overland onto various parts of the local highway (including Main Street and Worthington Lane) which subsequently entered a number of properties.</p>	Internal flooding to at least 20 residential and commercial properties as well as widespread flooding to the local highway network.	<p>Continued investigation into flooding.</p> <p>Actions agreed by Risk Management Authorities (RMAs) and recorded in the Breedon on the Hill Flood Investigation Report.</p>
Coalville, Drome / Vercor Close	28/06/2012	Due to intense rainfall and an inability of water to enter a culvert (piped watercourse) due to an accumulation of debris on the inlet grill. This, combined with the intense rainfall exceeding the capacity of the highway drainage system and public sewer, resulted in flood water following natural contours to low points on Vercor and Drome Close.	Water flowed around the houses on Vercor Close, and via the rear gardens onto Drome Close, where the water continued to flow into two properties.	Actions agreed by Risk Management Authorities (RMAs) and recorded in the Coalville, Drome / Vercor Close Flood Report.
Moira, Bath Lane	25/11/2012	Due to intense rainfall and an inability of the existing drainage systems to collect and carry rainwater effectively meant excess surface water flowed over ground following natural contours to low points in the area. During the flooding incident water ponded at the junction of Bath Lane and Via Devana.	Flooding of the highway with contaminated water.	Actions agreed by Risk Management Authorities (RMAs) and recorded in the Moira, Bath Lane Flood Report.

Flood Event	Dates	Cause	Damage	Outcome
West End, Long Whatton	14/11/2019	Due to intense rainfall which fell upon an already saturated catchment following a prolonged period of wet weather. The impermeable nature of the ground, the rapid inundation of the local drainage network and restrictions within the local drainage network contributed towards a situation that led to water internally entering at least one residential property.	At least one residential property suffered internal flooding at West End, Long Whatton; the local highway network (West End and Sherwood Court) was also impacted.	Continued investigation into flooding. Actions agreed by Risk Management Authorities (RMAs) and recorded in the West End, Long Whatton Flood Investigation Report.
Thornborough Road, Coalville	27/12/2017	Due to prolonged rainfall and the inability of the ground to absorb the surface water as it was already waterlogged. An obstructed connecting pipe in a trench running alongside the affected property was unable to capture the large volume of surface water which led to excess surface water flowing overland into the residential property.	Internal damage to a residential property on Thornborough Road, Coalville.	Consideration of adding asset to flood risk asset register. Actions agreed by Risk Management Authorities (RMAs) and recorded in the Thornborough Road, Coalville Flood Investigation Report. .
Whitwick	15/06/2016	Due to high intensity localised rainfall which fell over a short period of time (approximately 43.6mm of rain fell within a two hour period, source: Mt St Bernard's Rain Gauge – located approximately 2km east of Whitwick). One location anecdotally reported flooding due to overland surface water flows from adjacent fields causing water ingress to the back of residential properties, which then flowed through to the front of the residential properties onto the adjacent highway. The second location anecdotally reported surface water flowing from adjacent fields on to the highway. The surface water then used the highway as a conduit, overwhelming the capacity of the local highway networks, and followed the natural land levels	Three residential properties in Whitwick village were internally flooded at two locations. On the same date, the Environment Agency identified internal flooding to ten residential and commercial properties from Main River flooding (Grace Dieu Brook). The impact of this flooding was not considered	Councils giving guidance to residents improve resilience. Actions agreed by Risk Management Authorities (RMAs) and recorded in the Whitwick Flood Investigation Report.

Flood Event	Dates	Cause	Damage	Outcome
		before entering the front of one residential property.	as part of the report.	

3.6. Flood risk studies

3.6.1. Leicestershire Local Flood Risk Management Strategy

Leicestershire County Council has completed a Local Flood Risk Management Strategy (LFRMS) to fulfil their duties under the Flood and Water Management Act 2010. The LFRMS has been developed to understand and manage flood risk within the county and focusses on the management of local flood risk from surface water, ground water and ordinary watercourses. The Strategic Environmental Assessment (SEA)¹¹ was completed to assess the potential environmental effects of implementing the LFRMS and has been used to inform this SFRA.

3.6.2. Surface Water Management Plans

Following consultation with Leicestershire County Council, it was confirmed that there are currently no Surface Water Management Plans (which outline preferred strategies for surface water management) for North West Leicestershire, and during this consultation there were no plans to complete one. Therefore, there are no SWMPs that can be used to inform this SFRA.

3.6.3. Humber River Basin District Flood Risk Management Plan

In December 2022 the Environment Agency issued a second cycle Flood Risk Management Plan (FRMP) to manage significant flood risks in the Flood Risk Areas (FRAs) identified within the Humber River Basin District (RBD)¹². This updated river basin management plan covers the period 2021 to 2027. No Flood Risk Areas from rivers and sea or from surface water have been identified within the second cycle FRMP within North West Leicestershire.

The aim of the FRMP is to “help deliver the requirements of the National Flood and Coastal Erosion Risk Management Strategy in England by setting out the measures to manage flood risk now and in the future”. The FRMP recognises that maintaining hard defences will become uneconomical in many cases and therefore not sustainable in the future. The approach outlined within the FRMP is a move towards systems that work with nature and through a catchment-based approach. The catchment that covers the North West Leicestershire is the River Soar. The FRMP outlines the current and proposed measures to manage risk in the River Soar and Trent catchment which includes catchment wide measures such as preparedness through investigating flood resilience to site specific measures along discrete watercourses to provide flood risk benefits to a set number of properties.

The River Soar Management Catchment summary¹³ of the wider Humber River Basin District FRMP first cycle in 2015 outlined 29 actions for managing flood risk within the Soar catchment. The Environment Agency has put together a six-year plan for proposed future flood risk management ambitions. These ambitions attempt to look beyond traditional flood defence schemes and to identify environmental enhancements and Water Framework Directive (WFD) improvements that reduce flood risk in Leicester and Leicestershire.

3.6.4. Diseworth and Long Whatton Catchment Study¹⁴

Diseworth and Long Whatton villages are at risk of fluvial flooding and have historically flooded on numerous occasions. The risk to the villages is from the Diseworth Brook, the Long Whatton Brook and associated

¹¹ [flooding_strategy_plan.pdf \(leicestershire.gov.uk\)](#)

¹² Humber River Basin District Flood Risk Management Plan 2021 to 2027 (publishing.service.gov.uk)

¹³ Environment Agency, 2014. The Soar Management Catchment - a summary of information about the water environment in the Soar management catchment.

¹⁴ Diseworth and Long Whatton Catchment Study (leicestershire.gov.uk)

tributaries to both brooks. This study, completed in 2014, was an investigation into the flood mechanisms associated with the flooding, and any impact that runoff from the East Midlands Airport has on the catchment.

The report summarises that the fluvial flood risk to the villages is due to three separate sources: the Hall Brook; the Diseworth Brook; and Long Whatton (small watercourse). It was concluded that the airport did not contribute to the 2012 flood event. The recommendation of this 2014 study was that a detailed assessment was completed, which is discussed below.

3.6.5. Long Whatton and Diseworth Flood Risk Mitigation and Resilience Study¹⁵

Following on from the 2014 study, discussed above, further assessment was commissioned, to use a more detailed approach (for example use of a 1D-2D hydraulic model) to look at flood mechanisms in the area and appraise flood mitigation measures.

The report summarises that the primary cause of flooding within Diseworth is due to 'limited conveyance capacity of the Diseworth Brook and lack of functional floodplain.' In Long Whatton, flood risk to properties is caused due to 'runoff from the rural upstream landscape and discharge from the M1.' As a result of the study, it was found that there were cost effective options within Long Whatton to improve the channel conveyance and provide attenuation, which would reduce flood risk, however for Diseworth, investment in Property Level Resilience (PLR)- is 'considered a cost-beneficial and practical approach to provide flood protection'.

3.7. Existing flood risk management

3.7.1. Definition of flood risk management

Information on existing flood risk management is required to indicate areas where there is protection from fluvial flood risk, the level of protection provided and predicted life of the flood risk management option. Flood risk management is normally in the form of either formalised flood defences or other approaches such as flood storage or flood resilience.

Flood defences

Flood defences are raised structures that prevent floodwater from flooding surrounding areas by altering the natural flood flow paths from a watercourse or retaining flood water. Flood defences are categorised as 'formal' defences or 'informal' defences. A 'formal' defence is a structure that was built separately to defend land or property from flooding and is maintained for this purpose by the Environment Agency, Local Authority or riparian landowner. An 'informal' defence is a structure that has not been specifically built to retain flood water and is not maintained for this specific purpose but may afford some protection against flooding. 'Informal' defences include boundary walls, industrial buildings and railway and road embankments.

The extent, condition and standard of protection of the defences owned and maintained by the Environment Agency are recorded within the Asset Information Management System (AIMS). To determine the standard of protection provided by the defence, the following information is essential:

- Location of the defence; and
- Defence crest level.

Where available the following information is also collated:

- Condition of the defence (based on the AIMS scale of 1 to 5, good to poor);
- Residual life; and
- Type of defence.

Other flood risk management

Other flood risk management solutions may involve schemes to increase flood water storage in upstream areas, with gradual release. This will reduce the chance of river channel overtopping and flooding in the downstream

¹⁵ Long Whatton Diseworth Flood Risk Mitigation Resilience Study Public Report (2020) (lwdpc.org.uk)

protected areas. This can be achieved either through the construction of formalised flood storage reservoirs or providing increased “natural” floodplain storage through reduced bank levels. Additional flood storage could be provided by de-culverting areas and creating new floodplain, especially where redevelopment is being proposed. This would have the potential added benefit of restoring the channel for amenity and wildlife as well as enhanced water quality fulfilling requirements of Water Framework Directive.

The removal of other in channel structures (such as watercourse crossings) may provide some additional flood risk benefit to upstream areas as it could improve flow conveyance. This may also improve ecology including fish and eel migration. However downstream flood risk impacts would need to be considered carefully for this type of flood risk management.

Sewer separation, i.e. separating surface water and foul water within sewer systems could also reduce flood risk, as well as limiting associated pollution incidents.

As outlined within the Leicestershire Local Flood Risk Management Strategy: Habitats Regulations Assessment report¹⁶, the construction and operation of flood risk management options. In particular, the construction of flood defences has the potential to cause adverse impacts on habitat sites such as through the removal of habitat, damage (including through dredging), non-physical disturbance such as noise or vibration and through pollution. It is therefore necessary to carefully consider these potential environmental impacts when assessing flood risk management.

3.7.2. Location and description of flood defences

The severe flood event in 1947 acted as a catalyst for the construction of the existing flood defences through the River Trent catchment. Flood defence embankments are in place along the River Trent and the River Soar where the rivers form the northern and eastern parts of the North West Leicestershire District boundary. The flood defences were constructed in the 1960s and early 1970s and at the time provided protection from flooding with an annual probability of up to 1 in 100 (1%).

The main areas for flood defences along the River Trent are Cavendish Bridge, a large stretch of the eastern side of the M1 and Trentlock, at the confluence with the River Soar.

The River Soar has two sets of embankments. The first are small, raised earth embankments set close to the river (within 10 metres), to protect farmland against frequent flooding. The second much larger embankments are designed to protect inhabited areas and are generally set much further away from the river. This arrangement provides extensive areas of flood storage on the floodplain, whilst protecting the many villages and towns in the area.

There are formal defences along Hemington Brook, Lockington Brook and Grace Dieu Brook providing a standard of protection that ranges from the 1 in 10 annual probability (10%) to 1 in 50 annual probability (2%).

It is understood that there is formalised flood storage provided along Gilwiskaw Brook to protect downstream areas during flooding. However, the details of this potential flood storage reservoir are unknown, and its location is not shown in the flood defence details provided by the Environment Agency or as available on the Environment Agency website.

Data from the Environment Agency (2023) was used to identify the flood defences for this study. Table 3-2 provides the details of the flood defences including location and Standard of Protection (SoP).

¹⁶ Leicestershire Local Flood Risk Management Strategy - Habitats Regulations Assessment

Table 3-2 - Flood defence details

Watercourse	Location	Type of Raised Defence	Design SoP (Date asset built)	Comments	Approx. Grid Ref
Grace Dieu Brook	Abbott's Oak Drive/Meadow Lane, Coalville	Wall	Tbc (26/08/2011)	Wall is currently inspected and maintained by the Environment Agency.	SK 44842 14552 to SK 44817 14583
River Soar	The Osiers, Kegworth	Wall	10 year (26/08/2011)	Environment Agency does not have access to this wall. It is privately maintained.	SK 49112 26867 to SK 49212 26866
River Soar	Bridge Fields, Kegworth	Embankment	100 year (01/01/1998)	Currently inspected and maintained by the Environment Agency.	SK 49106 27074 to SK 49193 27134
River Soar	New Street, Kegworth	Wall	100 year (25/06/2012)	Currently inspected and maintained by the Environment Agency.	SK 49202 27148
River Soar	Bridge Farm, Kegworth to Trent confluence downstream of Ratcliffe on Soar	Minor Embankments	10 year (01/01/1988)	Currently inspected and maintained by the Environment Agency.	SK49348 27321 to SK49211 30811
River Trent	Railway to upstream of Soar confluence, Ratcliffe on Soar	Minor Embankments	10 year (01/01/1988)	Currently inspected and maintained by the Environment Agency.	SK47809 60386 to SK49179 30956
River Trent	Railway to Back Lane, Cavendish Bridge	Minor Embankments	5 - 10 year (01/01/1988/ 29/06/2012)	Currently Environment Agency inspected but privately maintained.	SK 43047 28444 to SK 44537 29870

3.8. Flood warning

In addition to flood defences to reduce the probability of flooding, flood warning has been in operation in the River Trent catchment for a number of years as a means of reducing the impacts of flooding. A range of systems have been in operation in various parts of the catchment operated by the Environment Agency and their predecessors, the National River Authority, the Water Authority and even as far back as the River Boards during the early 1960s. Although flooding in the upper parts of the catchment is difficult to predict because of the rapid response of the smaller urbanised catchments, the lower reaches of the River Trent benefit from relatively accurate forecasts with good lead-times based on upstream water levels.

Data from the Environment Agency (2023) has been used to identify the several flood warning services currently provided for areas at risk of flooding within North West Leicestershire. The location of the flood warning services are shown in Figure 3-5 (see Appendix B for larger scale) and are listed below:

- Grace Dieu Brook at Whitwick and Thringstone located to the north of Coalville;
- River Trent at Castle Donington including Hemington and Lockington;
- River Trent at Castle Donington Kings Mill area;
- River Trent at Hemington Ponds, Hole and Fields area;
- River Trent at Cavendish Bridge;
- River Trent at Sawley Marina, including Sawley Lock;
- River Soar at Redhill and Kegworth Bridge;
- Rier Soar at Kegworth;
- River Soar at Ratcliffe on Soar
- Gilwiskaw Brook at Packington; and
- River Mease at Measham and Netherseal.

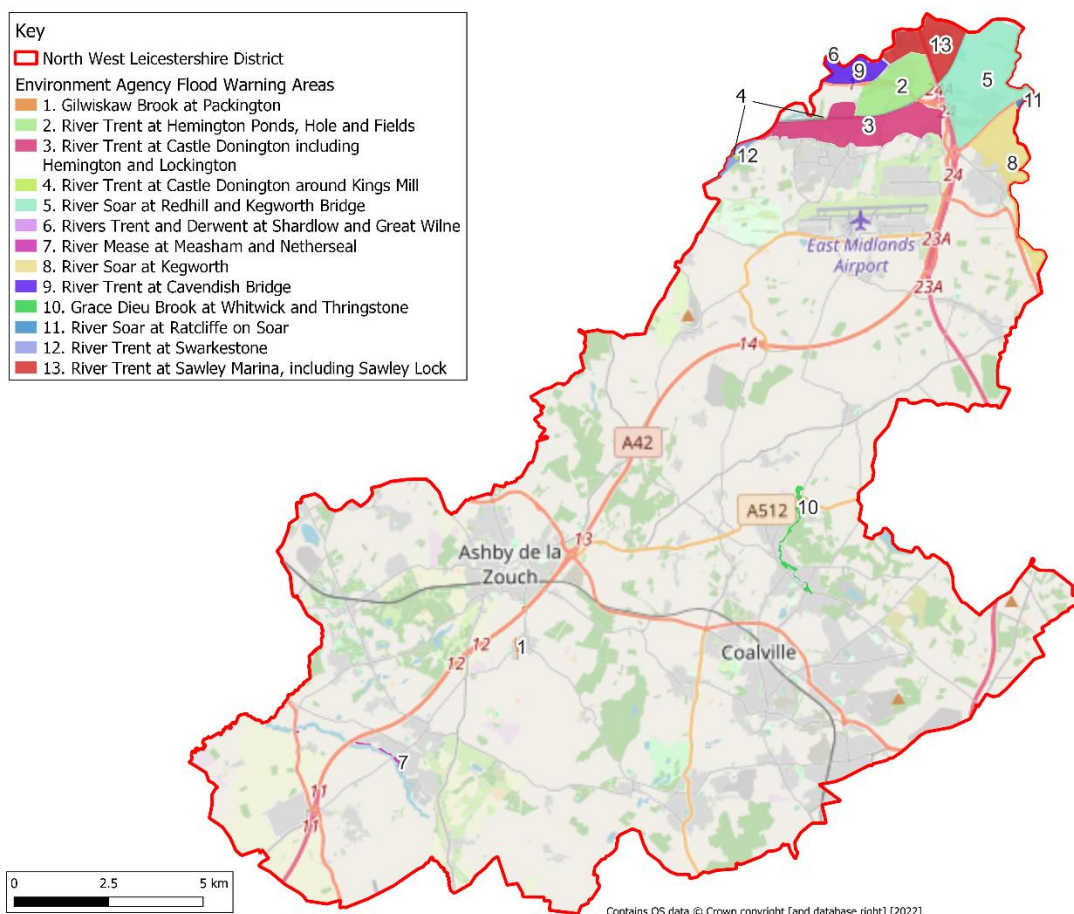


Figure 3-5 - Flood warning services currently provided for areas at risk of flooding within North West Leicestershire.

The above Flood Warning Areas are based on a combination of the Flood Zone 2 outline and the historic flood extent. This is because some known historic flooding has occurred outside of Flood Zone 2.

In addition to the above Flood Warning Areas, data from the Environment Agency (2023) highlights that North West Leicestershire is covered by general early alerts to possible flooding, known as Flood Alerts. The location of these alerts are listed below and shown in Figure 3-6 (see Appendix B for larger scale):

- River Trent in Nottinghamshire from Castle Donington to Cromwell Weir
- River Trent and tributaries in Derbyshire from Newton Solney to Castle Donington;
- Lower River Soar in Leicestershire including tributaries from Cossington to Redhill at the River Trent;
- Tributaries to the River Derwent and River Trent in South Derbyshire, including Black Brook, Coppice Brook, Markeaton Brook, Chaddeston Brook, Wilne Drain, Cuttle Brook, Doles Brook, Ramsley Brook and Carr Brook;
- River Anker and River Sence, low lying land and roads between Nuneaton and Tamworth on the River Anker and between Temple Mill and Ratcliffe Culey on the River Sence;
- River Mease, low lying land and roads between Ashby and Croxall; and
- Loughborough urban watercourses, specifically Black Brook, Wood Brook, Burleigh Brook, Grace Dieu Brook and other urban watercourses in Loughborough.

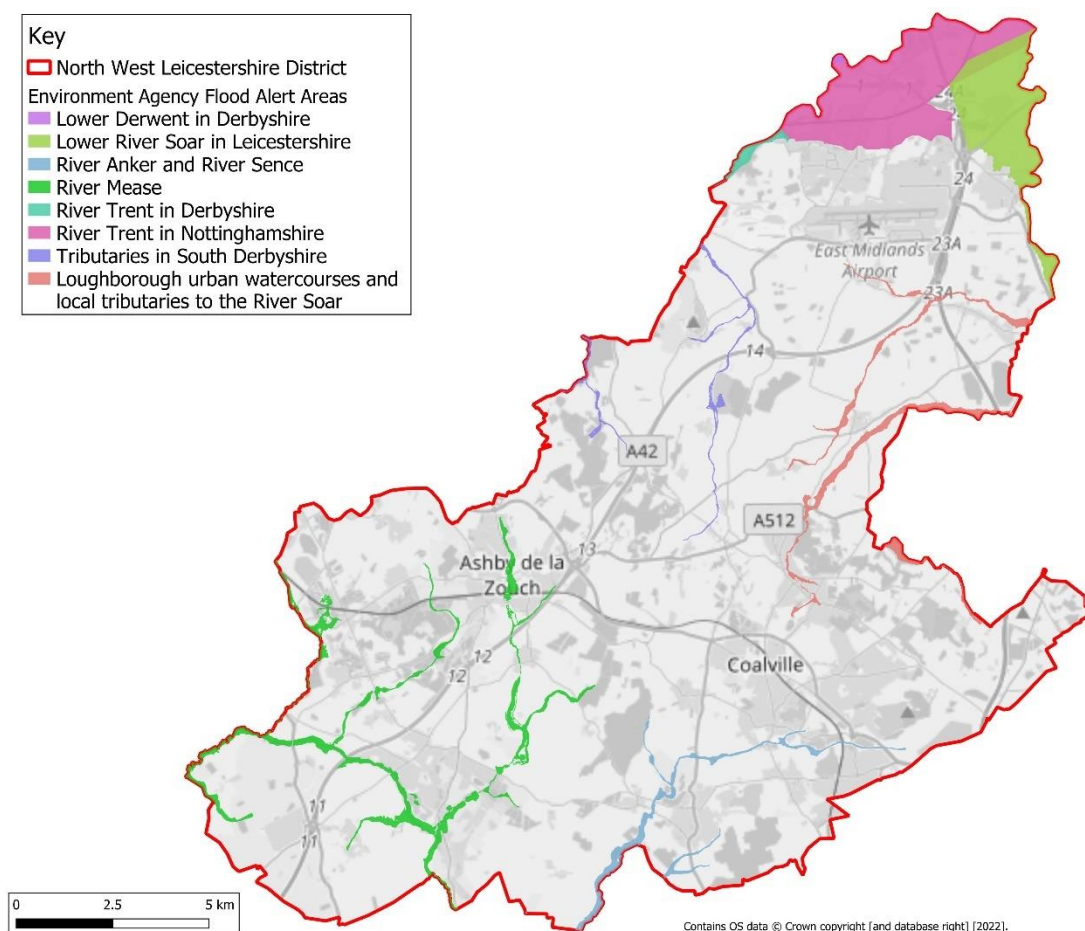


Figure 3-6 - Flood alerts within North West Leicestershire

4. Flood risk in North West Leicestershire

4.1. Sources of flooding

4.1.1. Fluvial

Fluvial flooding occurs when the flow within a watercourse exceeds the channel capacity causing out of bank flow.

The primary source of flood risk in North West Leicestershire is fluvial flooding. The north and east of the district is vulnerable from the River Trent and the River Soar, both independently and, in wider flood events, concurrently. The south and west of the district is at risk of fluvial flooding from the River Mease, a tributary of the Upper River Trent, the River Sence and a tributary of the River Soar.

Throughout North West Leicestershire there are several other tributaries of the River Trent and the River Soar which present a flood risk, most notably Gilwiskaw Brook and Grace Dieu Brook.

The most up to date (as of August 2023) Environment Agency flood risk layers have been used to map flood risk to the district. This is shown for fluvial risk in Figure 4-1 (see Appendix B for larger scale).

The figure shows the main urban areas at risk of flooding are:

- Castle Donington from the River Trent and Castle Donington Brook
- Hemington from the River Trent and Hemington Brook
- Lockington from the River Trent and Lockington Brook
- Kegworth from the River Soar
- Diseworth from Long Whatton Brook
- Osgathorpe from Westmeadow Brook
- Belton from Westmeadow Brook
- Thringstone from Grace Dieu Brook
- Whitwick from Grace Dieu Brook
- Ashby de la Zouch from Gilwiskaw Brook
- Packington from Gilwiskaw Brook
- Measham from the River Mease
- Appleby Magna from a minor ordinary watercourse
- Heather from the River Sence
- Donington le Heath from the River Sence

As outlined within Section 3.3 areas at risk from fluvial flooding are categorised into Flood Zone 1 (low probability), Flood Zone 2 (medium probability), Flood Zone 3a (high probability) and Flood Zone 3b (functional floodplain). For the purposes of the SFRA, functional floodplain represents land where the flow of water is not prevented by flood defences and is subject to flooding during the 1 in 20 annual probability (5%) event. It also includes areas of land which are designed for flood storage, e.g. washlands. However hydraulic model outputs are not provided for this event for the Black Brook or the River Trent and therefore the 1 in 25 annual probability (4%) extents have been used to represent the functional floodplain along these watercourses. Elsewhere hydraulic modelling is not available and therefore as a conservative approach the Environment Agency Flood Zone 3 should be used to represent the functional floodplain.

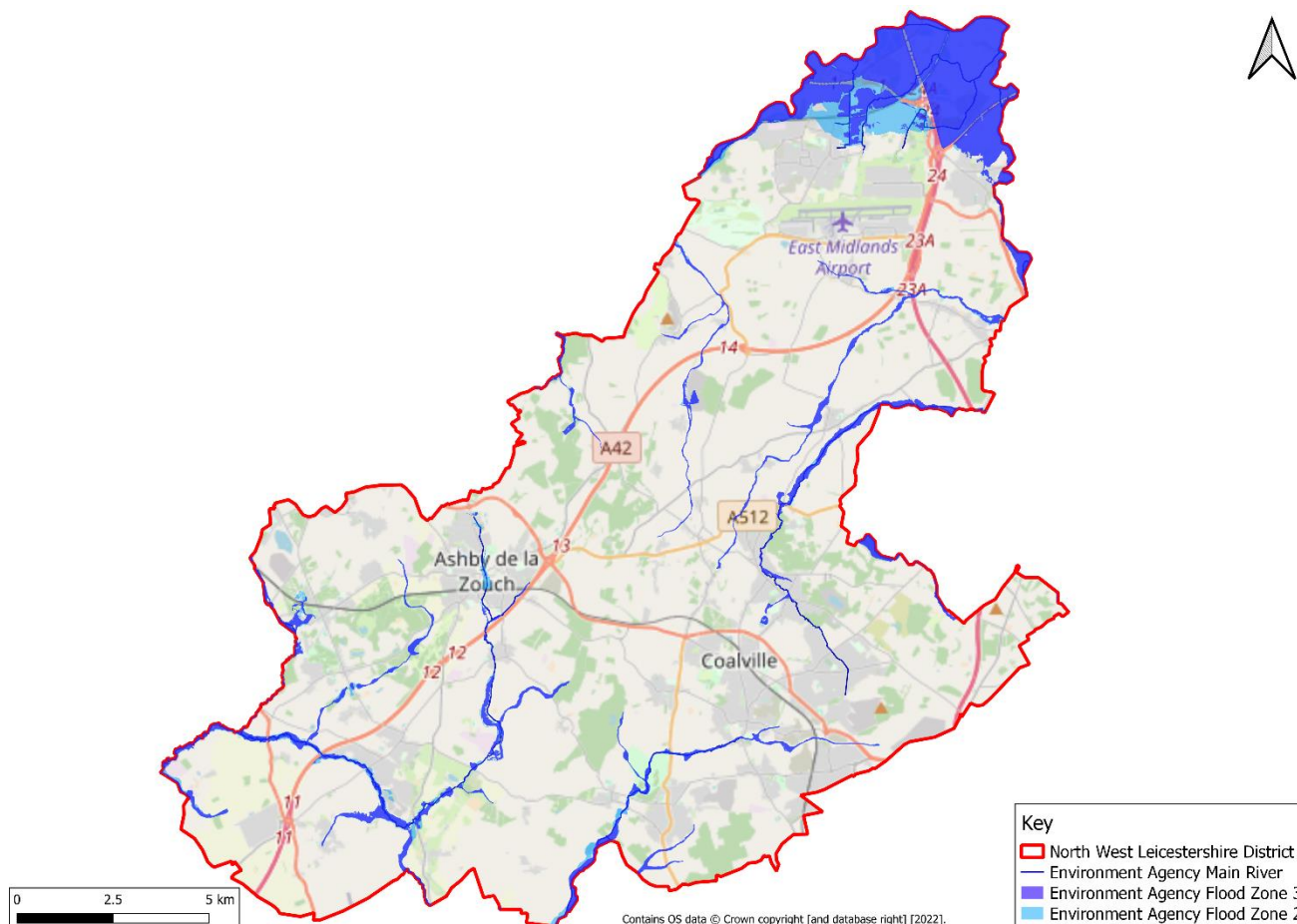


Figure 4-1 - Fluvial flood risk in North West Leicestershire District

4.1.2. Surface water

Surface water flooding occurs when rainfall intensities exceed the infiltration capacity such that water collects on the ground surface and has the potential to cause significant urban flood risk through rapid runoff rates. Developed land, specifically with large areas of impermeable surfacing, can be vulnerable to surface water flooding where an adequate drainage system is not present. Surface water flooding can also result from run-off associated with various agricultural practices. Certain arable farming practices in particular are likely to increase this risk of surface water flooding and excessive loss of top soil; however this is considered to only be a minor problem within the district.

In recent years surface water flooding has become more problematic within North West Leicestershire. Flood investigation reports have been completed by Leicestershire County Council that have identified high intensity rainfall has exceeded drainage system capacities causing surface water flooding along Bardon Road in Coalville.

Information in relation to known locations of surface water flooding has identified areas at risk from surface water flooding (although potentially in combination with other sources) include:

- Coalville;
- Measham;
- Blackfordby;
- Appleby Magna;
- Woolrooms. Coleorton;
- Castle Donington;

- Ashby de la Zouch;
- Breedon on the Hill;
- Long Whatton and,
- Hemington.

The information provided from the Environment Agency for this SFRA included the Risk of Flooding from Surface Water (RoFSW). These indicate areas at risk from surface water flooding during three annual exceedance events: the 1 in 30 annual probability (3.3%), the 1 in 100 annual probability (1%) and the 1 in 1000 annual probability (0.1%) event. The most up to date (as of August 2023) Environment Agency flood risk data has been used to map surface water flood risk to the district, this is shown in Figure 4-2 (see Appendix B for larger scale).

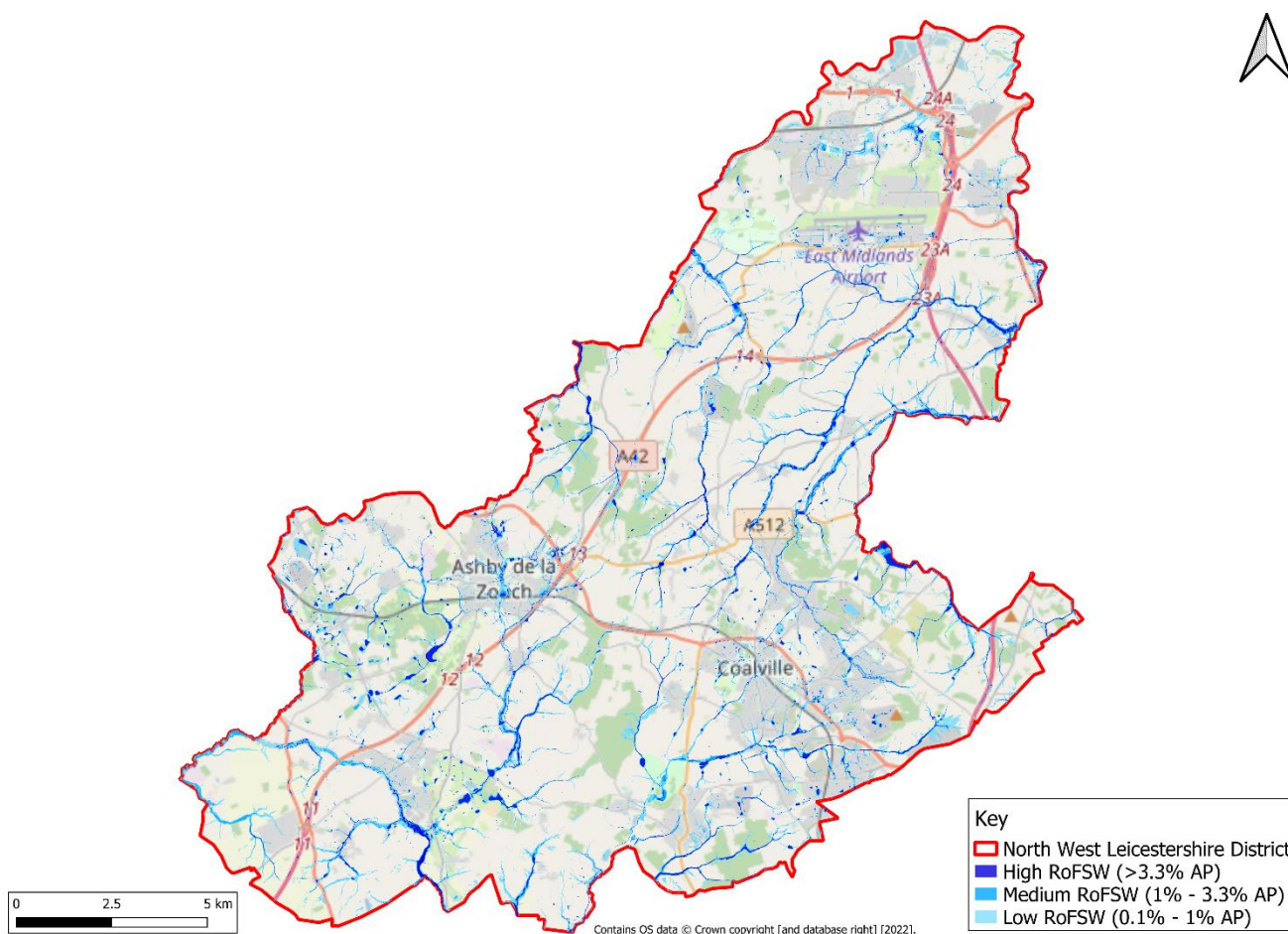


Figure 4-2 - Surface water flood risk in North West Leicestershire District

4.1.3. Groundwater

Groundwater flooding normally occurs where the water table meets the ground surface in low lying areas which are underlain by permeable rock known as aquifers. This tends to follow long periods of sustained rainfall but can also be caused as a result of local obstructions to groundwater flow (e.g. following the placement of engineering structures or buildings with foundations) or by the rebound of groundwater levels after a decrease in abstraction or dewatering.

It is important to recognise that the risk of groundwater flooding is typically highly variable and heavily dependent on local geological, topographical and weather conditions. Groundwater flooding is hard to predict and challenging to mitigate.

The majority of North West Leicestershire is underlain by Triassic Mercia mudstone consisting of a series of red clays and marls occasionally interbedded with sandstone. Superficial deposits consist of alluvium deposits in the floodplain interspersed with areas of sand and gravel. Where groundwater exists it flows through strata very slowly and in limited quantities.

The risk of groundwater flooding is considered to be relatively low within North West Leicestershire but can contribute to flooding from other sources.

Parts of North West Leicestershire are susceptible to rising groundwater due to the large-scale closure of the coal mines within the Leicestershire and South Derbyshire coalfield. The closure of a mine and the cessation of water pumping results in the resaturation of the mine void by water. The residual body of the Coal Board, the Coal Authority is responsible for monitoring rising groundwater and the Environment Agency reviews the results through a formal dialogue with the Authority. Groundwater level monitoring undertaken by the Coal Authority across the Coalfield indicates that the minewater is still rising and rebound is incomplete. Previous discussions with the LLFA identified that Leicestershire County Council are aware of the associated risks with the Coalfield minewater rising, specifically within Oakthorpe and Donisthorpe although have not received any reports of associated flooding. Whilst potential sites should not be ruled out for development in this area, the potential risk from this source should be considered during the design phases of associated development proposals.

The British Geological Survey (BGS) have developed a susceptibility to groundwater flooding dataset¹⁷. “Based on geological and hydrogeological information, the digital data can be used to identify areas where geological conditions could enable groundwater flooding to occur and where groundwater may come close to the ground surface. Note, it is a susceptibility set, it does not indicate hazard or risk, i.e. it does not provide any information on the depth to which groundwater flooding occurs or the likelihood of the occurrence of an event of a particular magnitude.”

Areas have been defined as not susceptible to groundwater flooding based on geological considerations, e.g. areas where non-aquifers are present at the ground surface. For areas geologically susceptible a national groundwater level surface was produced using data from published BGS groundwater level contours, groundwater levels in BGS’ WellMaster database and modelled using river base levels.

The gridded 50m by 50m dataset has been attributed with three classes of susceptibility to groundwater flooding:

- A - limited potential for groundwater flooding to occur
- B - potential for groundwater flooding of property situated below ground level
- C - potential for groundwater flooding to occur at surface.

The purpose of the data is to identify areas where further assessment and groundwater studies would be considered particularly useful. Whilst this dataset could be used in the assessment of flood risks for the Sequential Test), a site located within an area with susceptibility class B or C would not be considered sequentially unacceptable based on this source of risk alone. Rather, the site could be considered sequentially acceptable, although the potential risk of groundwater emergence should be specifically considered during the development design.

4.1.4. Sewers

The sewerage infrastructure of North West Leicestershire is largely based on Victorian sewers and there is a risk of localised flooding associated with the existing drainage and sewer system.

Flooding from sewers can occur when the artificial drainage system is overwhelmed hydraulically, becomes blocked or suffers structural failure or pump failure. Blockage and structural failure incidents tend to be isolated and unpredictable. Severn Trent Water is responsible for the management of the urban drainage system throughout North West Leicestershire including surface water and foul sewerage. Severn Trent Water has

¹⁷ <https://www.bgs.ac.uk/datasets/groundwater-flooding/>

procedures in place to respond to and rectify such incidents, which are also recorded on databases to inform maintenance and improvement plans.

A review of areas where the sewer system has been overwhelmed can potentially identify parts of the system that are under capacity. Severn Trent Water maintains an extensive database of flood events from sewers.

Severn Trent Water has the following target levels of protection against sewer flooding of properties:

- Foul and combined systems: 1 in 10 to 1 in 50 annual probability (depending on property type).
- Surface water system: 1 in 10 to 1 in 30 annual probability (depending on property type).

Wherever possible, Severn Trent Water seeks to promote the highest specified standard. However, this is dependent on the cost-benefit analysis of the improvement scheme. It is therefore not appropriate for the SFRA to recommend strategic options for managing sewer flooding where levels of protection to properties are inadequate as this is a fundamental part of Severn Trent Water’s existing asset management procedures.

It is essential to ensure that future development does not exacerbate known existing problems and conditions should be placed upon future development to ensure that these capacity issues are rectified before development is permitted. It is important, however, to consider that all hydraulic improvements to the systems, required due to new development, are subject to approval in line with the strategies and policies of Severn Trent Water.

Pipe leakage is a common and widespread problem throughout the UK and can contribute to basement flooding and more widespread surface water flooding in some areas. Pipe leakage within North West Leicestershire is managed by Severn Trent Water as a fundamental part of their asset management procedures.

Pipe bursts tend to be isolated and unpredictable incidents. Severn Trent Water has procedures in place to respond to and rectify such incidents.

Severn Trent have provided their flood risk register as correct July 2022. This has been assessed and summarised by postcode in Table 4-1 below.

As outlined by Severn Trent, the flood risk register is a register of properties and areas at risk of internal and external sewer flooding due to hydraulic overloading or where flows exceed the capacity of the system. It does not contain information about properties and areas at risk of sewer flooding caused by operational issues such as blockages.

Table 4-1 – Severn Trent DG5 summary

Post code area	Since 1986*		Since 2015**	
	Number of properties reported flooding (internal and external)	Number of flood incidents reported (internal and external)	Number of properties reported flooding (internal and external)	Number of flood incidents reported (internal and external)
DE11 8	5	5	1	1
DE12 6	4	10	2	6
DE12 7	39	78	14	41
DE73 8	3	3	1	1
DE74 2	33	43	16	22
LE12 5	15	29	13	29
LE12 9	7	12	6	10
LE65 1	28	65	9	13
LE65 2	20	31	5	8

LE67 1	1	1	0	0
LE67 2	11	23	1	2
LE67 3	23	26	2	2
LE67 4	55	77	17	31
LE67 5	26	76	12	19
LE67 6	32	41	3	3
LE67 8	36	90	15	24

*Where the date is unknown, this has been included as one flood incident.

**Where the date is unknown, this has not been included in the 'since 2015' data.

4.1.5. Canal Infrastructure

The Ashby Canal is about 22 miles long from Marston Junction on the Coventry Canal near Bedworth, through largely rural and remote countryside to its present terminus at Snarestone. Constructed mainly to carry coal, the canal opened in 1804 and was taken over by the Midland Railway company in 1846. Its railway owners did not invest sufficient money in the canal to maintain it properly and in 1918 a major breach caused by mining subsidence caused the last few miles of the canal near Ashby to be abandoned. Since this time a stretch of the canal near Moira has been restored and re-filled with water with further restoration planned. The Ashby Canal is owned and maintained by the Canal and River Trust. The Canal and River Trust have not reported any flooding incidents from the canal.

Part of the River Trent and River Soar are maintained as navigable sections by the Canal and River Trust. The River Trent is navigable from Shardlow to Trent Lock where it forms part of the boundary of North West Leicestershire.

Northwards from Leicester, the Grand Union Canal utilises the River Soar to provide a through route to the Trent Navigation. The route includes a number of artificial canals, canalised river sections and river navigations. The Canal and River Trust state that for this section of the River Soar “*flooding is comparatively common in winter*”. In July 2007 flooding was experienced at several locks along the River Soar, including Kegworth.

There are no connections between the Grand Union Canal and the River Soar in the form of overflows so the risk of flooding from the canal is only localised to the canal network. Flood risk to development (and potential development sites) is considered to be minor from canal infrastructure.

4.1.6. Reservoirs

There are two reservoirs which lie on the boundary of North West Leicestershire, Blackbrook Reservoir and Staunton Harold Reservoir. Black Brook Reservoir is a large body of water near Whitwick and was constructed in 1796 to feed the Charnwood Forest canal, which has long since become redundant. The first earth embankment dam failed in 1799 and was subsequently repaired in 1801. The present gravity dam was constructed in 1906. Black Brook is rarely used by its operators, Severn Trent Water, as a water supply source, and as such is maintained at, or close to, full capacity. With the exception of particularly dry periods, the reservoir continuously spills over six equal length weirs into a stilling pool which flows into the Black Brook. The reservoir spans across North West Leicestershire District and Charnwood Borough.

Staunton Harold Reservoir was created in 1964 to provide communities and businesses in Leicester and the East Midlands with drinking water and is currently owned and maintained by Severn Trent Water. The Reservoir spans across North West Leicestershire and South Derbyshire Districts with the majority of it being in South Derbyshire.

Flooding from reservoirs can occur when water retaining structures fail. All large reservoirs are covered by the Reservoirs Act and are subject, by law, to regular safety inspections. A very low residual risk of flooding from these reservoirs remains if they were to fail unexpectedly.

The most up to date (as of August 2023) Environment Agency flood risk data has been used to map reservoir breach flood risk to the district, this is shown in Figure 4-3. The reservoir flood map shows where water may go in the unlikely event of a dam or reservoir failure. The outlines in the figure present failure from 30 reservoirs, including Foremark, Church Wilne and Carsington reservoirs. The 'dry-day' scenario predicts the flooding that would occur if the dam or reservoir failed when rivers are at normal levels. The 'wet day' scenario predicts how much worse the flooding might be if a river is already experiencing an extreme natural flood. Due to regular inspection, survey, and maintenance by the operating authorities - and extremely good safety record of no reservoir failure incidents resulting in the loss of life in the UK since 1925, it is very unlikely that a reservoir would fail.

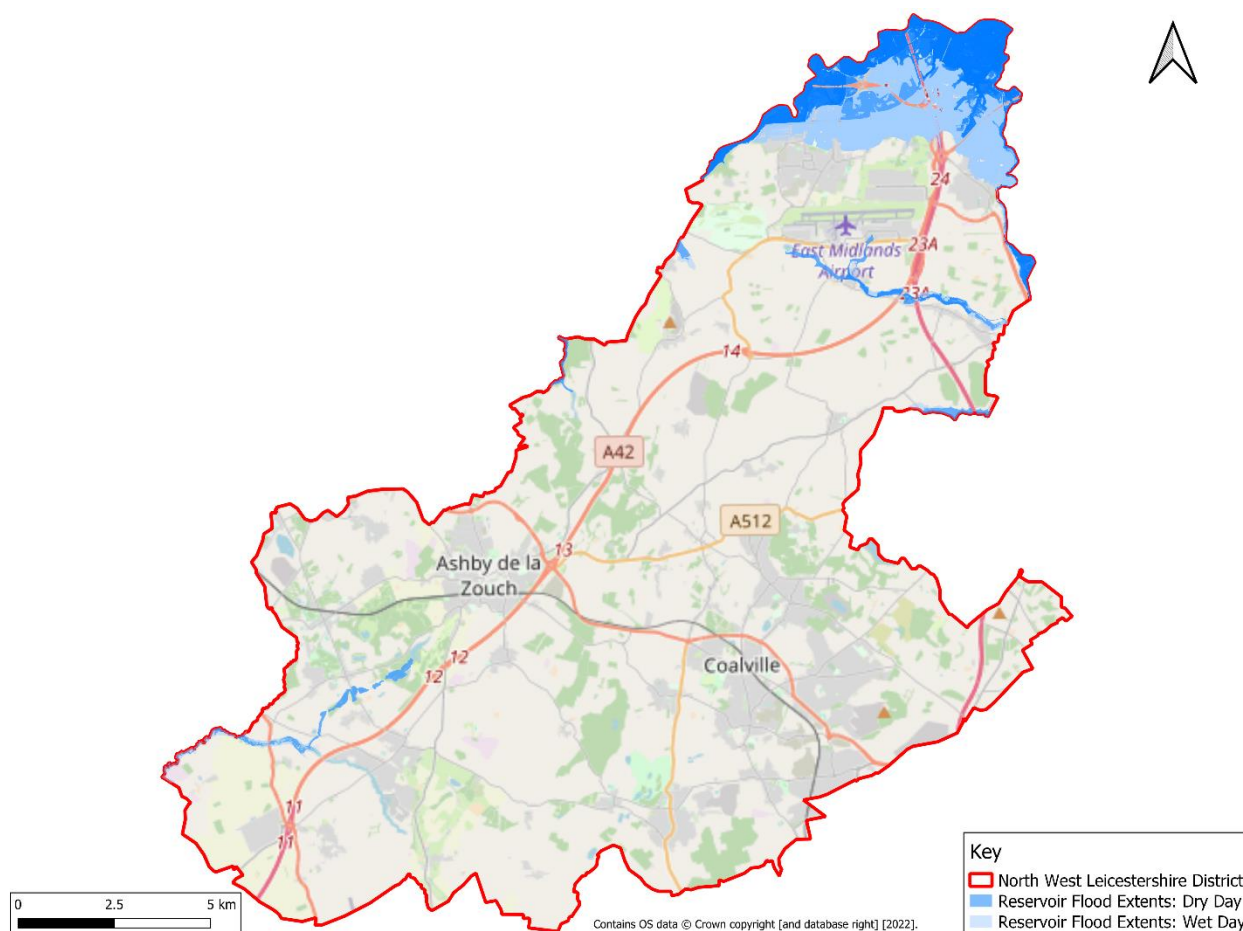


Figure 4-3 - Reservoir breach flood risk in North West Leicestershire District

4.1.7. Failure or blockage of critical assets

Flooding can result from the failure or blockage of critical assets, for example culverts or bridges. When trash screens become blocked due to the build-up of debris, or where blockages occur at the inlet to culverts, there is potential for localised flooding to result. The floodwater backs up and can flood nearby land or low-lying areas as it finds an alternative route around the culvert or structure.

The City of Dan culvert along Grace Dieu Brook through Whitwick is known to be susceptible to blockage. Water quickly accumulates upstream of the culvert, and this has historically led to overtopping of the structure and flooding along Castle Street. There is also a trash screen on Gilwiskaw Brook at Hood Park which may be susceptible to blockage, therefore leading to overtopping along this watercourse.

The risk of failure or blockage of critical assets is associated with ineffective maintenance. Therefore, proposed development (specifically design and layout) should be planned to ensure the provision of necessary access to

the watercourse for maintenance and hence to reduce the risk of flooding associated with failure or blockage of critical water assets.

4.2. Flood defences

The Environment Agency have a data set showing the Reduction in Risk of Flooding from Rivers and Sea due to defences and this is shown below in Figure 4-4 (see Appendix B for larger scale). Areas with a reduction in risk within the North West Leicestershire District include Ratcliffe Lock, the area north of Kegworth and a small area in Ashby de la Zouch.

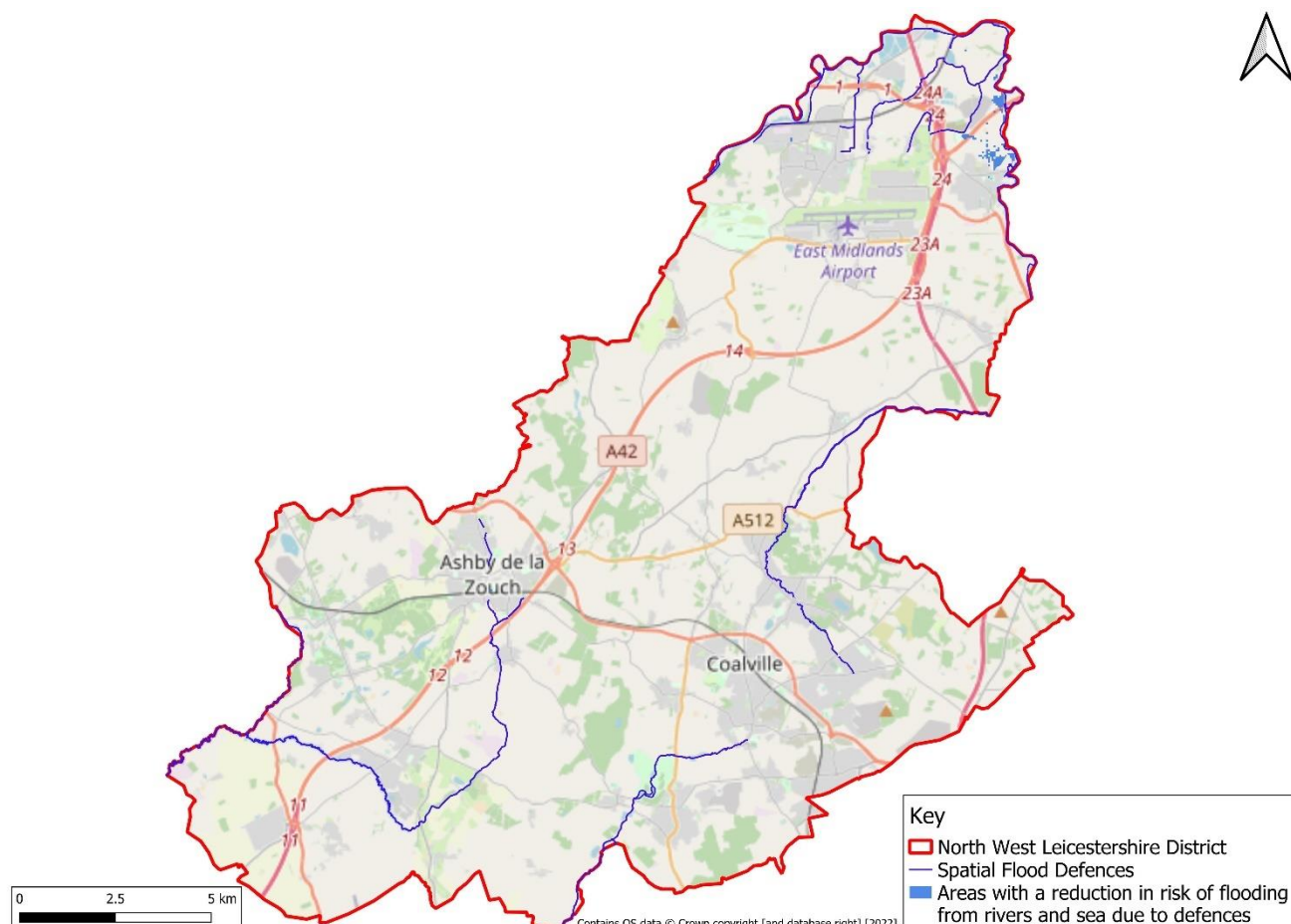


Figure 4-4 - Areas with a reduction in risk of flooding from rivers and sea due to flood defences

In addition, there are defences along the River Soar, which protect a small number (<20) of properties within Kegworth.

According to the flood and coastal risk management plan¹⁸, there are currently no proposed flood defence schemes within the North West Leicestershire District in the new investment period 2021 to 2027.

¹⁸ Flood and coastal erosion risk management investment plan for 2021 to 2027 (publishing.service.gov.uk)

4.3. Flood risk sensitivity

4.3.1. Flood sensitivity to climate change

Climate change is expected to have a major influence on future flood risk with the expectations that winter floods will happen more often and in urban areas flooding from thunderstorms will be more regular and more severe.

Whilst Section 3.4 outlines modelled climate change scenarios, these do not represent the peak river allowances for a range of climate change scenarios as outlined in Section 4.3.2. The sensitivity to climate change based on available data is discussed in the following sections.

Hydraulic modelling of the River Trent (see section 3.4) has considered the potential impact of climate change over the next 100 years, assuming a 20% increase in the 1 in 100 annual probability (1%) flow and outlines are available from previous studies undertaken for the Environment Agency.

For the remaining watercourses within the district, the Flood Zone 2 outline (1 in 1000 annual probability (0.1%) has been used to represent the possible impact of climate change. The impact of climate change for each of the main watercourses in North West Leicestershire are discussed further below.

River Trent

There would be no difference in the flood extent for the River Trent and no increase in the number of properties at risk.

River Soar

There is no significant difference in the flood extent for the River Soar except for at Kegworth where there would be an increase at Nottingham Road and Mill Lane.

Grace Dieu Brook

There would be an increase in risk from Grace Dieu Brook within Whitwick particularly around Cademan Street, Vicarage Street and Mossdale.

Gilwiskaw Brook

The effect of climate change on Gilwiskaw Brook is anticipated to increase the extent of flooding in Ashby de la Zouch town centre and the southern parts of the town around Western Park. Gilwiskaw Brook is also anticipated to increase the extent of flooding in Packington, especially along Mill Street.

River Mease

Climate change would also increase flood risk in Measham including the area at Westminster Industrial Estate.

Summary

The anticipated changes in climate have the potential to not only increase the risk of fluvial flooding but also, by increasing the frequency and intensity of localised storms, increase the occurrence of flash flooding in small catchments. This may exacerbate localised drainage problems and so any site-based detailed Flood Risk Assessment and the Drainage Impact Assessment prepared by a developer at the planning application stage should take due consideration of climate change.

4.3.2. Climate Change Allowance Guidance

Climate change allowances are predictions of anticipated change that should be considered for flood risk assessments to increase resilience to flooding and coastal change. As the NWLDC is not situated next to the coast, peak river flow and peak rainfall intensity will only be considered.

4.3.2.1. Peak river flow allowance

Peak river flow allowances show the anticipated changes to peak flow by management catchment. This is based on UK Climate Projection 2018 (UKCP18) data published by the Met Office.

The allowances are split by management catchment. NWLDC is situated within three management catchments:

- Tame Anker and Mease;
- Lower Trent and Erewash; and
- Soar.

These all have differing uplift allowances for the Central, Higher and Upper scenarios, for the 2020s, 2050s and 2080s epochs. The values are outlined in Table 4-2.

Table 4-2 - differing uplift allowances for the Central, Higher and Upper scenarios, for the 2020s, 2050s and 2080s epochs.

Uplift allowances for the three management catchments for the different epochs (%)									
Scenario	Tame Anker and Mease			Soar			Lower Trent and Erewash		
	2020s	2050s	2080s	2020s	2050s	2080s	2020s	2050s	2080s
Central	10	11	22	14	16	28	13	17	29
Higher	15	17	30	18	21%	37	18	23	39
Upper	24	30	51	28	35	60	29	38	62

The guidance outlines which allowance should be used in a Flood Risk Assessment based on Flood Zone, and property vulnerability classification, and what should be used for floodplain storage compensation and off-site impacts.

The guidance also outlines how the allowances should be applied, as follows, and as shown in Figure 4-5:

- Interpolate (adjust) the peak river flow allowance between the current year and 2030
- Apply the peak river flow allowance to the hydrological estimate for the 2050s and 2080s

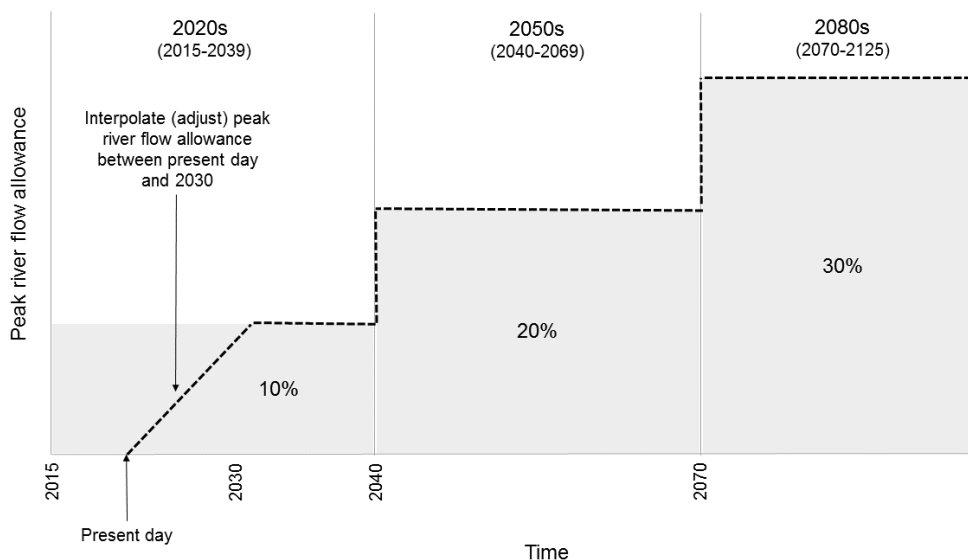


Figure 4-5 – Application of peak river flow allowances (Environment Agency, 2022)

4.3.2.2. Peak rainfall intensity allowances

Peak rainfall intensity allowances anticipate the impact of increased rainfall on surface water flood risk. This is based on UKCP18 data.

The allowances are split by management catchment as above.

These all have differing uplift allowances for the Central and Upper End scenarios, for the 2050s and 2080s epochs, and for both the 3.3% Annual Exceedance Probability (AEP) and the 1% AEP.

The guidance outlines which allowance should be used in a Flood Risk Assessment and Drainage Strategy.

5. NPPF and the Sequential Test

5.1. Background

The Government requires Local Planning Authorities (LPAs) to apply a risk-based approach to the preparation of development plans and their decisions on development control. The NPPF encourages LPAs to steer development away from areas affected by flood risk and recommends the application of a ‘Sequential Test’ that splits a local planning district into zones of high, medium or low risk. The NPPF is the key guidance for planners managing flood risk as it clearly defines the appropriateness of the development type for each of the defined flood risk zones.

As stated above, the Sequential Test splits the planning district into three distinct flood risk zones, furthermore, the high flood risk zone is split further into areas of Functional Floodplain and High Probability Floodplain as shown in Figure 5-1.

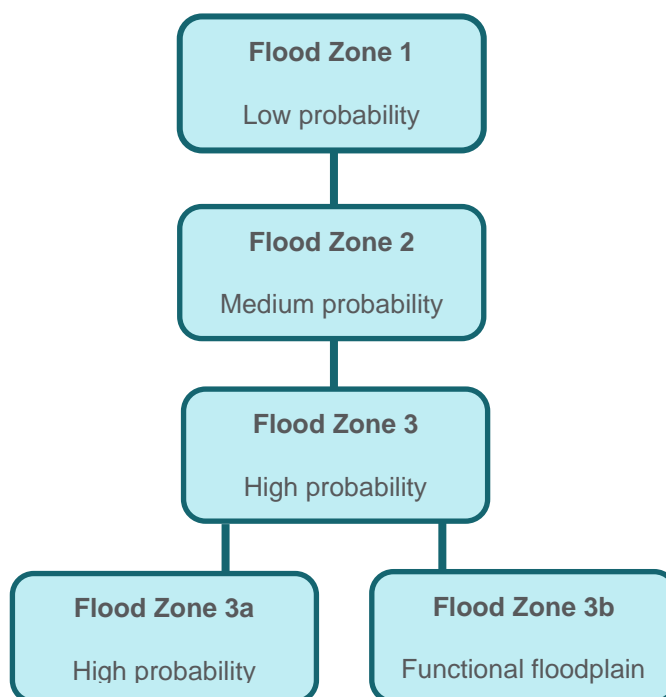


Figure 5-1 – Flood Zones

5.2. Sequential Test

Planning needs to be at the forefront of managing flood risk in a sustainable manner by steering development away from areas that are susceptible to flooding. The NPPF advocates a sequential approach that will guide the planning decision making process (i.e., the allocation of sites). The aim of the Sequential Test is to:

“Steer new development to areas with the lowest risk of flooding from any source. Development should not be allocated or permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower risk of flooding. The sequential approach should be used in areas known to be at risk now or in the future from any form of flooding.”

Therefore, in the first instance development should be located within Flood Zone 1. In circumstances when there are no reasonable sites available within Flood Zone 1 the development may be permitted within Flood Zone 2 depending on the land use vulnerability classification and applying the Exception Test if required. Only in circumstances when there are no suitable sites within Flood Zone 1 or 2 should development within Flood Zone 3 be considered. The acceptability of development within Flood Zone 3 will be dependent on land use vulnerability and evidence to meet the requirements of the Exception Test may be required. Where a site is located within a range of different Flood Zones, a sequential approach should be applied within the site boundary. This would help ensure that the most vulnerable areas of the development are located within the lowest areas of risk as possible.

The early stages of a Sequential Test approach have been undertaken for this SFRA on the potential land allocations for the new Local Plan. This Sequential Test assessment identifies:

- Those sites that are considered sequentially acceptable;
- Those for which further information is required to determine whether the Sequential Test could be considered passed; and
- Those for which a passed Sequential Test is unlikely to be demonstrated.

5.3. Assessing flood risk using the Sequential Test

The methodology adopted to undertake the Sequential Test for this SFRA has been provided in Figure 5-2.

Flood risk is just one consideration of many in the planning remit that needs to be considered when the site is ultimately allocated within the local plan. The planners need to take on all considerations, of which flood risk is just one.

In considering flood risk, Figure 5-2 identifies the steps undertaken to identify the Flood Zones that each of the proposed development sites reside within. These steps are outlined as follows:

1. Obtain the latest editions of the Environment Agency Flood Map and overlay within a Geographic Information System (GIS) for review.
2. Based upon catchment flood knowledge, historical flooding and hydraulic modelling update Flood Zones 2 and 3 if appropriate.
3. Identify Functional Floodplain using hydraulic model data where available. Assign this area as Flood Zone 3b.
4. Identify potential development sites to be incorporated into the Local Plan;
5. Incorporate the potential development sites and the flood risk maps (flood risk from all sources) within GIS.
6. Determine which Flood Zone each of the potential development sites are located and tabulate the results.
7. Identify a hierarchy of preferred sites based on flood risk using a traffic light colour coding system (i.e., green go, red no go, as outlined within section 5.4).

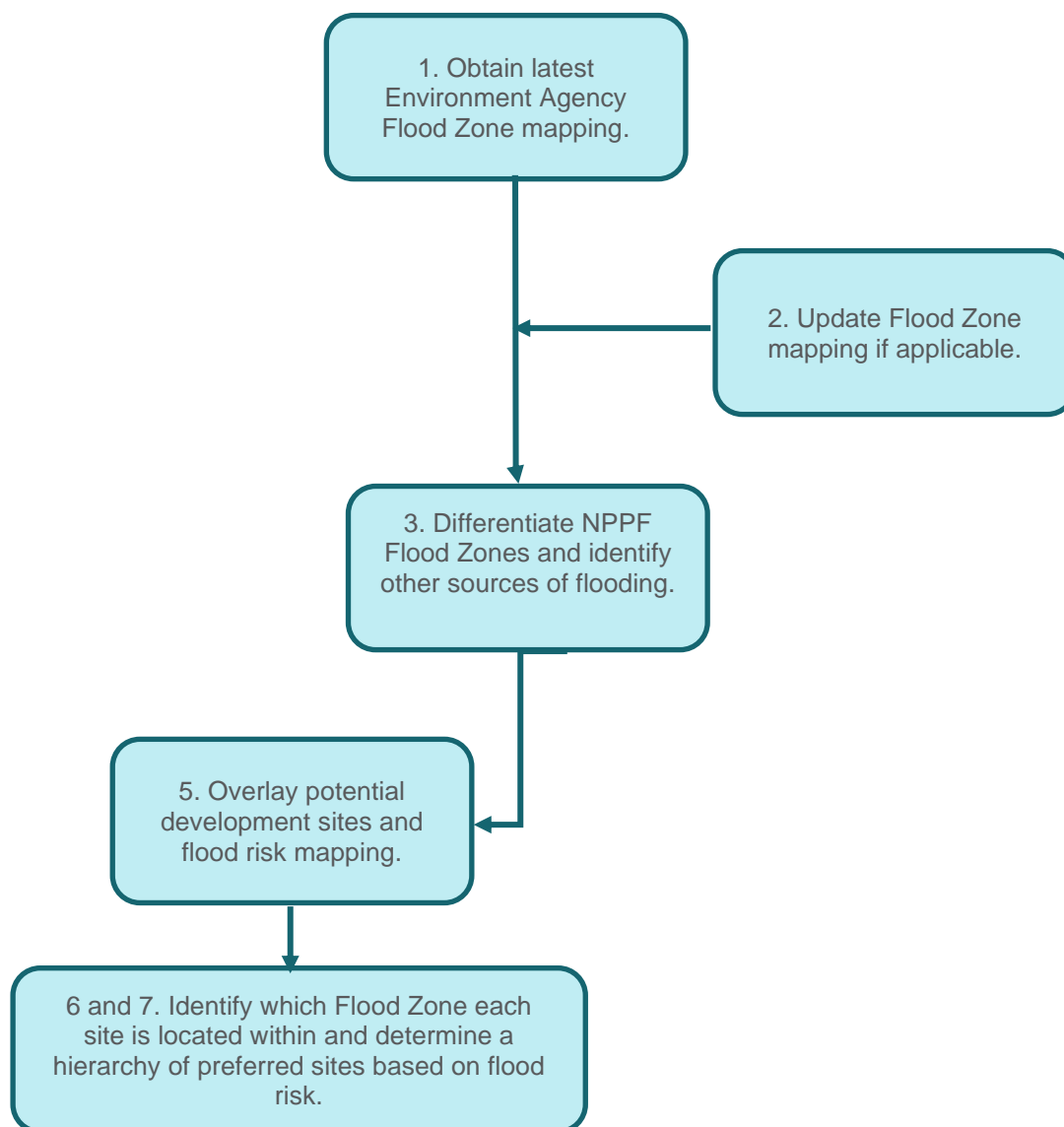


Figure 5-2 - Flow diagram of Sequential Test methodology

5.4. Potential Land allocations

The new Local Plan will identify sites for development. In July 2023, NWLDC provided a number of potential allocation sites that have been identified for both housing and employment. These potential sites have been assessed as part of this SFRA.

The potential land allocations that have been assessed within this SFRA are provided in Table 5-1, and Figure 5-3 shows where they are located across the North West Leicestershire District (see Appendix B for larger scale). Not all sites that have been assessed in this SFRA will definitely be allocated for development, as this SFRA will be used to identify those sites that are preferable for allocation based on flood risk considerations alone (i.e. those located in Flood Zone 1).

Table 5-1 - Potential land allocations

Site ID	Site	Category	Area (ha)
A27	Burton Road, Ashby	Housing	3.198
Ap17	Land north of Appleby Magna	Housing	1.321

C21	Land rear of 48 Bardon Road, Coalville	Housing	1.057
C46	Broom Leys Farm, Coalville	Housing	14.230
C47	Land at Redhill Farm, New Swannington	Housing	18.230
C48	South of Church Lane, New Swannington	Housing	15.165
C50	North of Standard Hill, Coalville	Housing	3.664
C61	Church View Rose Nursery, Grange Rd	Housing	0.553
C74	Land at Lily Bank	Housing	3.812
C77	Land off Talbot Lane	Housing	4.555
C78	Land to rear of 274 Church Lane	Housing	0.942
C81	Land at Church Lane, New Swannington	Housing	2.690
C83	186, 188 + 190 London Road, Coalville	Housing	2.700
C86	Land off Howe Road, Whitwick	Housing	0.933
CD10	Land north of Park Lane	Housing	50.525
CD10	Land south of Park Lane	Housing	30.665
D8	Land off Ramscliffe Avenue, Donisthorpe	Housing	1.340
E7	Land at Leicester Road, Ellistown	Housing	2.755
H3	Adj, Sparkenhoe Estate, Heather	Housing	1.312
Ib18	Melbourne Road/Leicester Road, Ibstock	Housing	29.619
Mo8	Sweethill Lodge Farm ,Moira	Housing	2.328
Oa5	School Lane, Oakthorpe	Housing	1.918
P4	Rear of Heather Lane, Packington	Housing	0.765
R12	Land at Heather Lane, Ravenstone	Housing	7.251
R17	Land East of Wash Lane, Ravenstone	Housing	8.195
EMP24	Land west of South Leics Ind Est, Ellistown	Employment	9.666
EMP60	Land at Burton Road	Employment	4.620
EMP73	Land north and south of A6	Employment	14.819
EMP73	Land north and south of A6	Employment	10.287
EMP73	South of Derby Road, Kegworth	Employment	14.542
EMP82	Land east of A444 and west of A42 Stretton en le Field	Employment	28.004
EMP89	Land to the west of Hilltop Farm, Castle Donington	Employment	6.038
EMP90	Land South of EMA	Employment	101.596
IW1	Land south of Isley Walton and EMA	Mixed	312.646
A7	Packington Nook, Ashby	Mixed	95.230
A5	Money Hill, Ashby	Housing	89.224

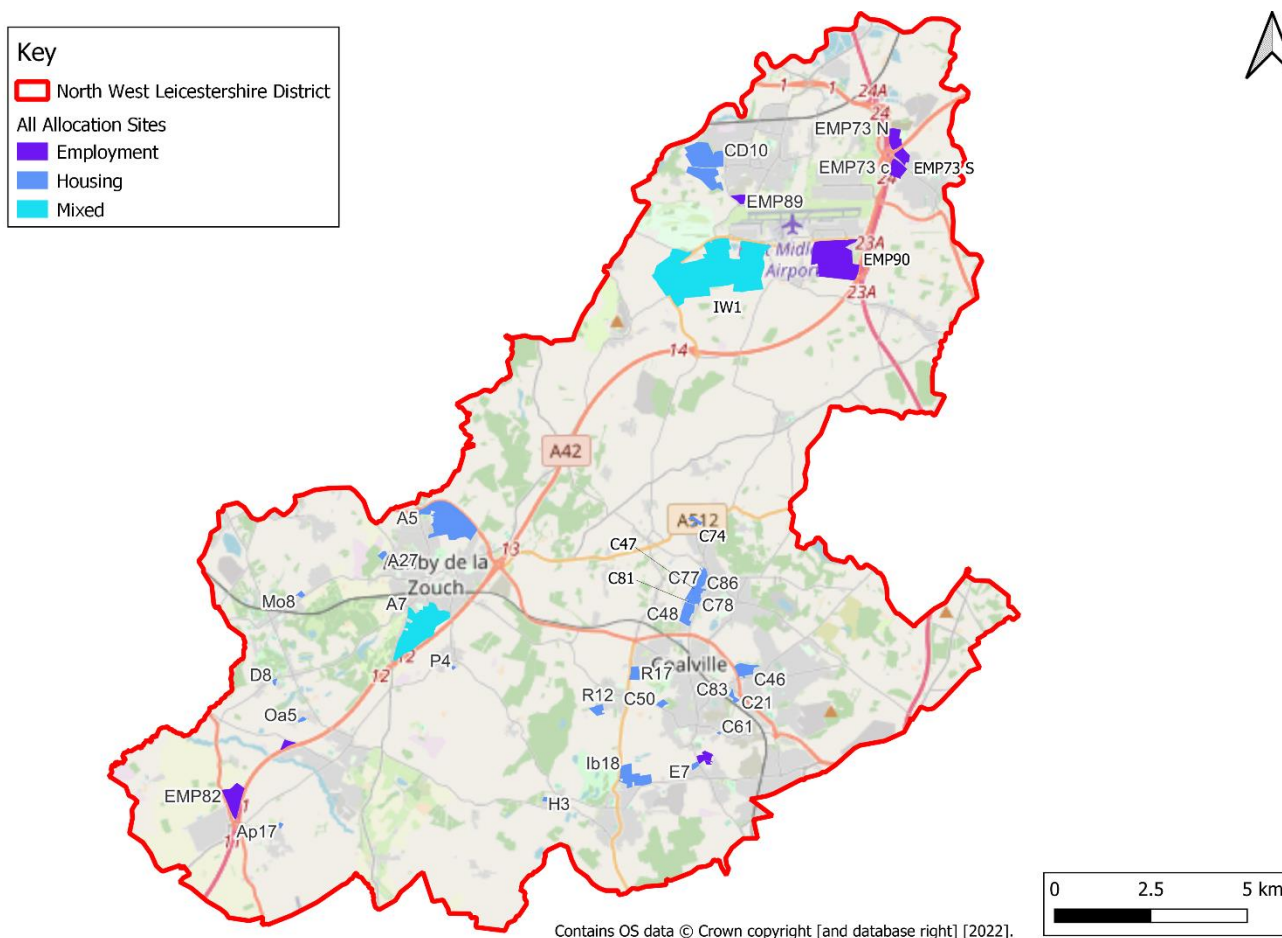


Figure 5-3 - Allocation sites within North West Leicestershire District

5.5. Results of the Sequential Test on potential land allocations

The results of the Sequential Test for proposed land allocations are provided in section 5.5.1. The location of these sites, together with the traffic light colour coding of the results are shown in Figure 5-4.

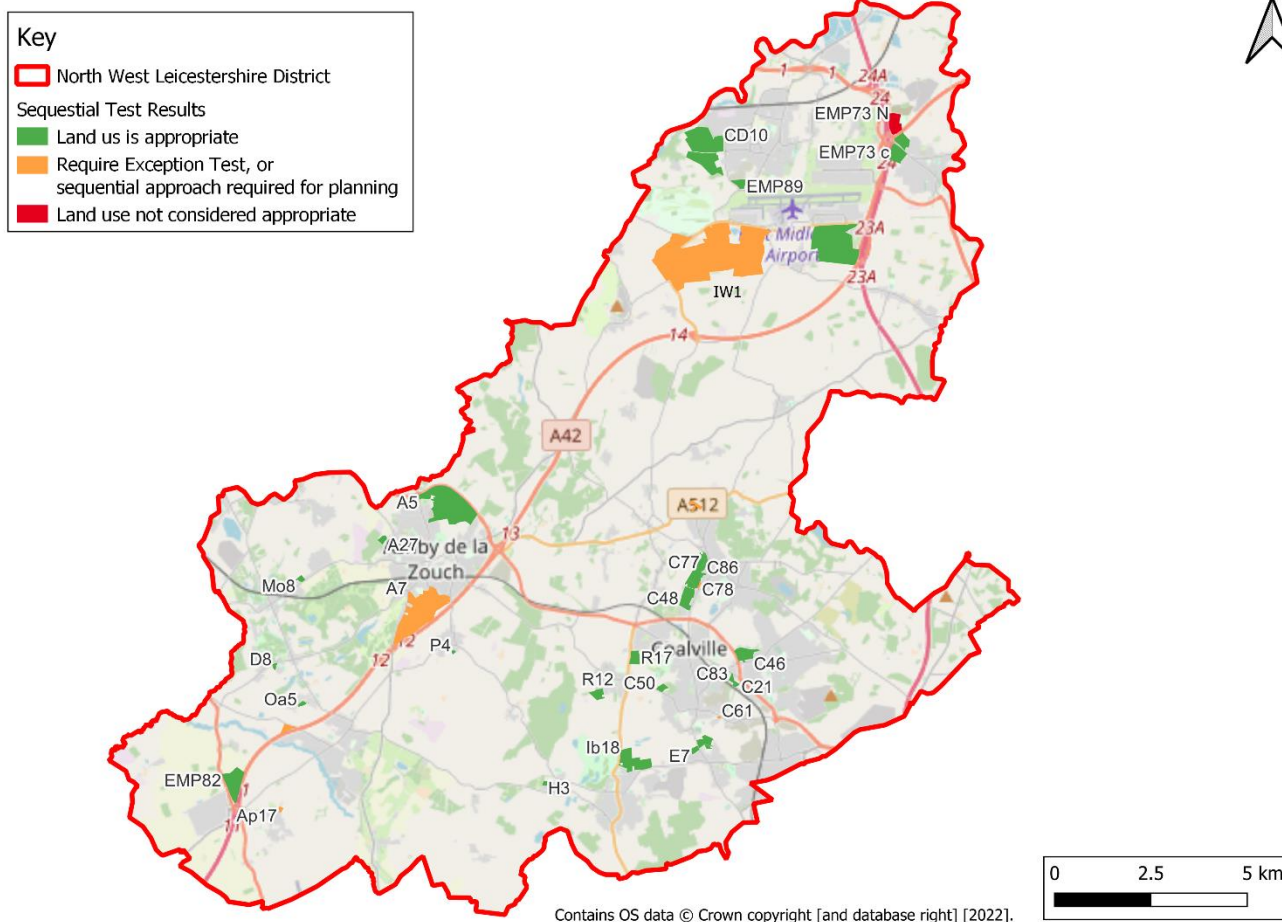


Figure 5-4 - Location of the allocated sites including the traffic light colour coding of the results from the Sequential test.

NWLDC have identified the most likely land uses for each of the potential development sites assessed within the SFRA. The application of the Sequential Test to each of these sites and the intended land uses has resulted in 3 groupings:

1. Sites where proposed land use is appropriate (highlighted green in Table 5-3);
2. Sites which require application of the Exception Test, or where the sequential approach should be applied for planning the layout of the site (highlighted amber Table 5-3); and
3. Sites where the intended land use is not considered appropriate at this stage and further justification as to why the development of the site would have benefits that outweigh the flood risk (highlighted red in Table 5-3).

5.5.1. Site specific results

Table 5-2 outlines the individual sites assessed for the Sequential Test, the associated results of the Sequential Test and an indication of flood risk considerations that should be made through the planning process. Fluvial flood risk is considered the main factor in determining whether a site is considered sequentially acceptable, although surface water flooding has been used as another flood risk consideration that should be taken into account during development design and through the planning process.

Table 5-2 - Site specific results

Site ID	Flood risk considerations
A27 Burton Road, Ashby	<p>This site is proposed for housing development and therefore is more vulnerable.</p> <p>The site is located within Flood Zone 1 and therefore considered sequentially acceptable. The site is larger than 1 hectare, therefore a Flood Risk Assessment is required.</p> <p>In general, the site is currently considered to be at a very low risk from surface water flooding.</p> <p>There is no groundwater data available.</p>
Ap17 Land north of Appleby Manga	<p>This site is proposed for housing development and therefore is more vulnerable.</p> <p>Less than 1% of the site is within a medium and high risk of flooding from surface water so in general, the site is currently considered to be at a low risk from surface water flooding.</p> <p>The site is larger than 1 hectare, therefore a Flood Risk Assessment is required.</p> <p>The north eastern boundary of the site is identified to be within Flood Zones 3a and Flood Zones 2 (Figure 5-5) however, the majority (97%) of the site is within Flood Zone 1. The site is assessed based on the highest risk element of the flood zone that is present on site. The highest risk for this site is 3a, therefore an exception test is required. It is suggested that development in this site is located in the lowest risk area (Flood Zone 1), i.e. not within the highest risk flood zone. The potential for this source of flooding should be considered within the design of the development and the Sequential approach can be applied to the development layout so that it all lies within Flood Zone 1.</p> <p>There is no groundwater data available.</p>
C21 Land rear of 48 Bardon Road, Coalville	<p>This site is proposed for housing development and therefore is more vulnerable.</p> <p>The site is located within Flood Zone 1 and therefore considered sequentially acceptable. The site is larger than 1 hectare, therefore a Flood Risk Assessment is required.</p> <p>In general, the site is currently considered to be at a very low risk from surface water flooding.</p> <p>There is no groundwater data available.</p>
C46 Broom Leys Farm, Coalville	<p>This site is proposed for housing development and therefore is more vulnerable.</p> <p>The site is located within Flood Zone 1 and therefore considered sequentially acceptable. The site is larger than 1 hectare, therefore a Flood Risk Assessment is required.</p> <p>In general, the site is currently considered to be at a low risk from surface water flooding.</p> <p>There is no groundwater data available.</p>
C47 Land at Redhill Farm, New Swannington	<p>This site is proposed for housing development and therefore is more vulnerable.</p> <p>The site is located within Flood Zone 1 and therefore considered sequentially acceptable. The site is larger than 1 hectare, therefore a Flood Risk Assessment is required.</p> <p>In general, the site is currently considered to be at a low risk from surface water flooding.</p> <p>There is no groundwater data available.</p>
C48 South of Church Lane, New Swannington	<p>This site is proposed for housing development and therefore is more vulnerable.</p> <p>The site is located within Flood Zone 1 and therefore considered sequentially acceptable. The site is larger than 1 hectare, therefore a Flood Risk Assessment is required.</p> <p>In general, the site is currently considered to be at a low risk from surface water flooding.</p> <p>There is no groundwater data available.</p>
C50 North of Standard Hill, Coalville	<p>This site is proposed for housing development and therefore is more vulnerable.</p> <p>The site is located within Flood Zone 1 and therefore considered sequentially acceptable. The site is larger than 1 hectare, therefore a Flood Risk Assessment is required.</p> <p>In general, the site is currently considered to be at a low risk from surface water flooding.</p> <p>There is no groundwater data available.</p>

<p>C61 Church View Rose Nursery, Grange Rd, Hugglescote</p>	<p>This site is proposed for housing development and therefore is more vulnerable. In general, the site is currently considered to be at a low risk from surface water flooding. The site is larger than 1 hectare, therefore a Flood Risk Assessment is required. 31% of the northern and western boundary of the site is identified to be within Flood Zones 3a, and 9% is within Flood Zone 2 (Figure 5-6). The site is assessed based on the highest risk element of the flood zone that is present on site. The highest risk for this site is 3a, therefore an exception test is required. It is suggested that development in this site is located in the lowest risk area (Flood Zone 1), i.e. not within the highest risk flood zone. If development is not viable within Flood Zone 1, alternative sites at lower flood risk should be considered. There is also a need to consider risk from climate change at this site. There is no groundwater data available</p>
<p>C74 Land at Lily Bank, Thringstone</p>	<p>This site is proposed for housing development and therefore is more vulnerable. The site is larger than 1 hectare, therefore a Flood Risk Assessment is required. There is an area at risk of surface water flooding in the north western area of the site (Figure 5-7). This area at risk appears to follow the flow paths of an unnamed watercourse. The majority of this area at risk is also covered by Flood Zones 3a and 2 and therefore consideration of fluvial flood risk for the development is likely to incorporate surface water flood risk in this area. As development may not be located in the lowest risk area, an Exception Test would be required for this site. The overall site is predominantly in Flood Zone 1 (94%), therefore, the potential for this source of flooding should be considered within the design of the development and the Sequential approach can be applied to development layout so that it all lies within Flood Zone 1. There is no groundwater data available</p>
<p>C77 Land off Talbot Lane, Whitwick</p>	<p>This site is proposed for housing development and therefore is more vulnerable. The site is located within Flood Zone 1 and therefore considered sequentially acceptable. The site is larger than 1 hectare, therefore a Flood Risk Assessment is required. In general, the site is currently considered to be at a low risk from surface water flooding. There is no groundwater data available.</p>
<p>C78 Land to rear of 274 Church Lane, Whitwick</p>	<p>This site is proposed for housing development and therefore is more vulnerable. The site is located within Flood Zone 1 and therefore considered sequentially acceptable. The site is larger than 1 hectare, therefore a Flood Risk Assessment is required. There is a large area at risk of surface water flooding running through the centre of the site (Figure 5-8). Judging from aerial mapping, this area at risk does not appear to follow the flow path of an unnamed watercourse, therefore it may be due to the topography of the land. Consideration of the layout of site, existing surface water flow routes and drainage strategy is necessary to ensure there is sufficient land to manage runoff from the development. There is no groundwater data available.</p>
<p>C81 Land at Church Lane, New Swannington</p>	<p>This site is proposed for housing development and therefore is more vulnerable. The site is located within Flood Zone 1 and therefore considered sequentially acceptable. The site is larger than 1 hectare, therefore a Flood Risk Assessment is required. In general, the site is currently considered to be at a low risk from surface water flooding. There is no groundwater data available.</p>
<p>C83 186, 188 + 190 London Road, Coalville</p>	<p>This site is proposed for housing development and therefore is more vulnerable. The site is located within Flood Zone 1 and therefore considered sequentially acceptable. The site is larger than 1 hectare, therefore a Flood Risk Assessment is required. In general, the site is currently considered to be at a low risk from surface water flooding. There is no groundwater data available.</p>

C86 Land off Howe Road, Whitwick	<p>This site is proposed for housing development and therefore is more vulnerable.</p> <p>The site is located within Flood Zone 1 and therefore considered sequentially acceptable. The site is larger than 1 hectare, therefore a Flood Risk Assessment is required.</p> <p>In general, the site is currently considered to be at a low risk from surface water flooding.</p> <p>There is no groundwater data available.</p>
CD10 Land north of Park Lane, Castle Donington	<p>This site is proposed for housing development and therefore is more vulnerable.</p> <p>The site is located within Flood Zone 1 and therefore considered sequentially acceptable. The site is larger than 1 hectare, therefore a Flood Risk Assessment is required.</p> <p>In general, the site is currently considered to be at a low risk from surface water flooding.</p> <p>There is no groundwater data available.</p>
CD10 Land south of Park Lane, Castle Donington	<p>This site is proposed for housing development and therefore is more vulnerable.</p> <p>The site is located within Flood Zone 1 and therefore considered sequentially acceptable. The site is larger than 1 hectare, therefore a Flood Risk Assessment is required.</p> <p>In general, the site is currently considered to be at a low risk from surface water flooding.</p> <p>There is no groundwater data available.</p>
D8 Land off Ramscliffe Avenue, Donisthorpe	<p>This site is proposed for housing development and therefore is more vulnerable.</p> <p>The site is located within Flood Zone 1 and therefore considered sequentially acceptable. The site is larger than 1 hectare, therefore a Flood Risk Assessment is required.</p> <p>In general, the site is currently considered to be at a very low risk from surface water flooding.</p> <p>There is no groundwater data available.</p>
E7 Land at Leicester Road, Ellistown	<p>This site is proposed for housing development and therefore is more vulnerable.</p> <p>The site is located within Flood Zone 1 and therefore considered sequentially acceptable. The site is larger than 1 hectare, therefore a Flood Risk Assessment is required.</p> <p>In general, the site is currently considered to be at a low risk from surface water flooding.</p> <p>There is no groundwater data available.</p>
H3 Adj, Sparkenhoe Estate, Heather	<p>This site is proposed for housing development and therefore is more vulnerable.</p> <p>The site is located within Flood Zone 1 and therefore considered sequentially acceptable. The site is larger than 1 hectare, therefore a Flood Risk Assessment is required.</p> <p>In general, the site is currently considered to be at a low risk from surface water flooding.</p> <p>There is no groundwater data available.</p>
Ib18 Melbourne Road/Leicester Road, Ibstock	<p>This site is proposed for housing development and therefore is more vulnerable.</p> <p>The site is located within Flood Zone 1 and therefore considered sequentially acceptable. The site is larger than 1 hectare, therefore a Flood Risk Assessment is required.</p> <p>In general, the site is currently considered to be at a low risk from surface water flooding.</p> <p>There is no groundwater data available.</p>
Mo8 Sweethill Lodge Farm, Moira	<p>This site is proposed for housing development and therefore is more vulnerable.</p> <p>The site is located within Flood Zone 1 and therefore considered sequentially acceptable. The site is larger than 1 hectare, therefore a Flood Risk Assessment is required.</p> <p>In general, the site is currently considered to be at a low risk from surface water flooding.</p> <p>There is no groundwater data available.</p>
Oa5 School Lane, Oakthorpe	<p>This site is proposed for housing development and therefore is more vulnerable.</p> <p>The site is located within Flood Zone 1 and therefore considered sequentially acceptable. The site is larger than 1 hectare, therefore a Flood Risk Assessment is required.</p> <p>In general, the site is currently considered to be at a very low risk from surface water flooding.</p>

	The is no groundwater data available.
P4 Rear of Heather Lane, Packington	<p>This site is proposed for housing development and therefore is more vulnerable.</p> <p>The site is located within Flood Zone 1 and therefore considered sequentially acceptable. The site is larger than 1 hectare, therefore a Flood Risk Assessment is required.</p> <p>In general, the site is currently considered to be at a low risk from surface water flooding.</p> <p>There is no groundwater data available.</p>
R17 Land East of Wash Lane, Ravenstone	<p>This site is proposed for housing development and therefore is more vulnerable.</p> <p>The site is located within Flood Zone 1 and therefore considered sequentially acceptable. The site is larger than 1 hectare, therefore a Flood Risk Assessment is required.</p> <p>In general, the site is currently considered to be at a low risk from surface water flooding.</p> <p>There is no groundwater data available.</p>
R12 Land at Heather Lane, Ravenstone	<p>The site is located within Flood Zone 1 and therefore considered sequentially acceptable. The site is larger than 1 hectare, therefore a Flood Risk Assessment is required.</p> <p>In general, the site is currently considered to be at a low risk from surface water flooding.</p> <p>There is no groundwater data available.</p>
EMP24 Land west of South Leics Ind Est, Ellistown	<p>This site is proposed for employment development and therefore is less vulnerable.</p> <p>The site is located within Flood Zone 1 and therefore considered sequentially acceptable. The site is larger than 1 hectare, therefore a Flood Risk Assessment is required.</p> <p>In general, the site is currently considered to be at a low risk from surface water flooding.</p> <p>There is no groundwater data available.</p>
EMP60 Land at Burton Road, Oakthorpe	<p>This site is proposed for employment development and therefore is less vulnerable.</p> <p>The site is located within Flood Zone 1 and therefore considered sequentially acceptable. The site is larger than 1 hectare, therefore a Flood Risk Assessment is required.</p> <p>There is a large area at risk of surface water flooding in the eastern area of the site (Figure 5-9). Judging from aerial mapping, this area at risk does not appear to follow the flow path of an unnamed watercourse, therefore it may be due to the topography of the land. Consideration of the layout of site, existing surface water flow routes and drainage strategy is necessary to ensure there is sufficient land to manage runoff from the development.</p> <p>There is no groundwater data available.</p>
EMP73 Land north of A6, Kegworth	<p>This site is proposed for employment development and therefore is less vulnerable.</p> <p>In general, the site is currently considered to be at a low risk from surface water flooding.</p> <p>The site is located almost entirely within Flood Zone 3a (Figure 5-10), therefore alternative sites at lower flood risk should be considered. If the site passes the sequential test, flood mitigation measures are required for the proposed development and there is a need to consider climate change levels.</p> <p>There is no groundwater data available.</p>
EMP73 Land south of A6, Kegworth	<p>This site is proposed for employment development and therefore is less vulnerable.</p> <p>The site is located within Flood Zone 1 and therefore considered sequentially acceptable. The site is larger than 1 hectare, therefore a Flood Risk Assessment is required.</p> <p>In general, the site is currently considered to be at a low risk from surface water flooding.</p> <p>There is no groundwater data available.</p>
EMP73 South of Derby Road, Kegworth	<p>This site is proposed for employment development and therefore is less vulnerable.</p> <p>The site is located within Flood Zone 1 and therefore considered sequentially acceptable. The site is larger than 1 hectare, therefore a Flood Risk Assessment is required.</p> <p>In general, the site is currently considered to be at a low risk from surface water flooding.</p> <p>There is no groundwater data available.</p>

EMP82 Land east of A444 and west of A42 Stretton en le Field	<p>This site is proposed for employment development and therefore is less vulnerable.</p> <p>The site is located within Flood Zone 1 and therefore considered sequentially acceptable. The site is larger than 1 hectare, therefore a Flood Risk Assessment is required.</p> <p>In general, the site is currently considered to be at a low risk from surface water flooding.</p> <p>There is no groundwater data available.</p>
EMP89 Land to the west of Hilltop Farm, Castle Donington	<p>This site is proposed for employment development and therefore is less vulnerable.</p> <p>The site is located within Flood Zone 1 and therefore considered sequentially acceptable. The site is larger than 1 hectare, therefore a Flood Risk Assessment is required.</p> <p>In general, the site is currently considered to be at a very low risk from surface water flooding.</p> <p>The is no groundwater data available.</p>
EMP90 Land South of EMA	<p>This site is proposed for employment development and therefore is less vulnerable.</p> <p>The site is located within Flood Zone 1 and therefore considered sequentially acceptable. The site is larger than 1 hectare, therefore a Flood Risk Assessment is required.</p> <p>In general, the site is currently considered to be at a low risk from surface water flooding.</p> <p>There is no groundwater data available.</p>
IW1 Land south of Isley Walton and EMA	<p>This site is proposed for mixed development and therefore is more vulnerable.</p> <p>There are small areas across the site at low to high risk of flooding from surface water, however, in general the site is currently considered to be at a low risk from surface water flooding. Consideration of the layout of site, existing surface water flow routes and drainage strategy is necessary to ensure there is sufficient land to manage runoff from the development.</p> <p>The site is larger than 1 hectare, therefore a Flood Risk Assessment is required.</p> <p>The majority of the site (99.5%) is within Flood Zone 1, however 0.4% of the site is located within Flood Zone 3a (Figure 5-11).</p> <p>There is no groundwater data available.</p>
A7 Packington Nook, Ashby	<p>This site is proposed for mixed development and therefore is more vulnerable.</p> <p>In general, the site is currently considered to be at a low risk from surface water flooding.</p> <p>The site is larger than 1 hectare, therefore a Flood Risk Assessment is required.</p> <p>The north eastern section of the site is identified to be within Flood Zones 3a and Flood Zones 2 (Figure 5-12) however, the majority (91%) of the site is within Flood Zone 1. As development may not be located in the lowest risk area, an Exception Test would be required for this site. The potential for this source of flooding should be considered within the design of the development and the Sequential approach can be applied to the development layout so that it all lies within Flood Zone 1.</p> <p>There is no groundwater data available.</p>
A5 Money Hill, Ashby	<p>The site is located within Flood Zone 1 and therefore considered sequentially acceptable.</p> <p>The site is larger than 1 hectare, therefore a Flood Risk Assessment is required.</p> <p>In general, the site is currently considered to be at a low risk from surface water flooding.</p> <p>There is no groundwater data available.</p>



Figure 5-5 – Receptors in relation to the allocated site: Ap17 – Land north of Appleby Manga

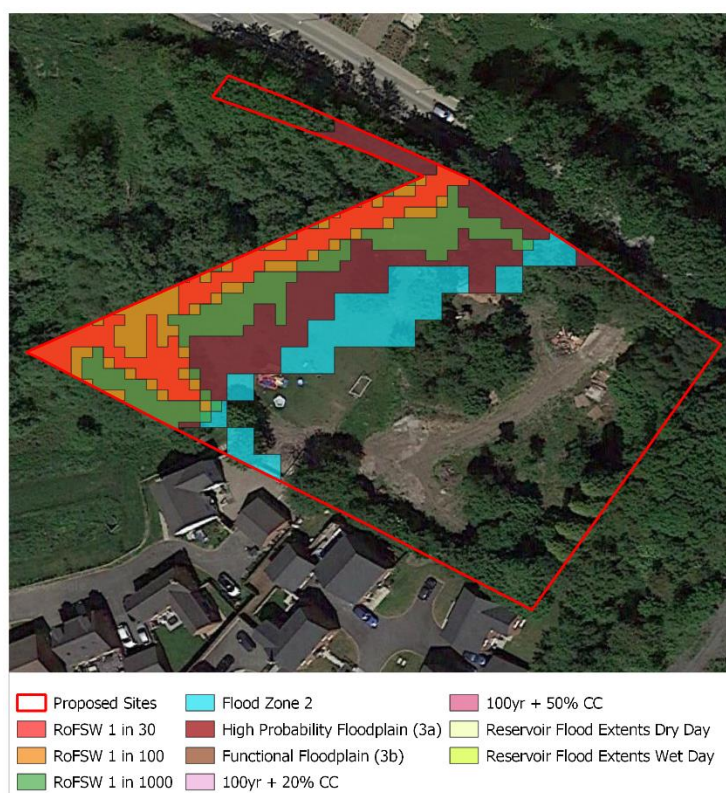


Figure 5-6 – Receptors in relation to the allocated site: C61 – Church View Rose Nursery, Grange Road



Figure 5-7 - Receptors in relation to the allocated site: C74 - Land at Lily Bank



Figure 5-8 - Receptors in relation to the allocated site: C78 - Land to rear of 274 Church Lane

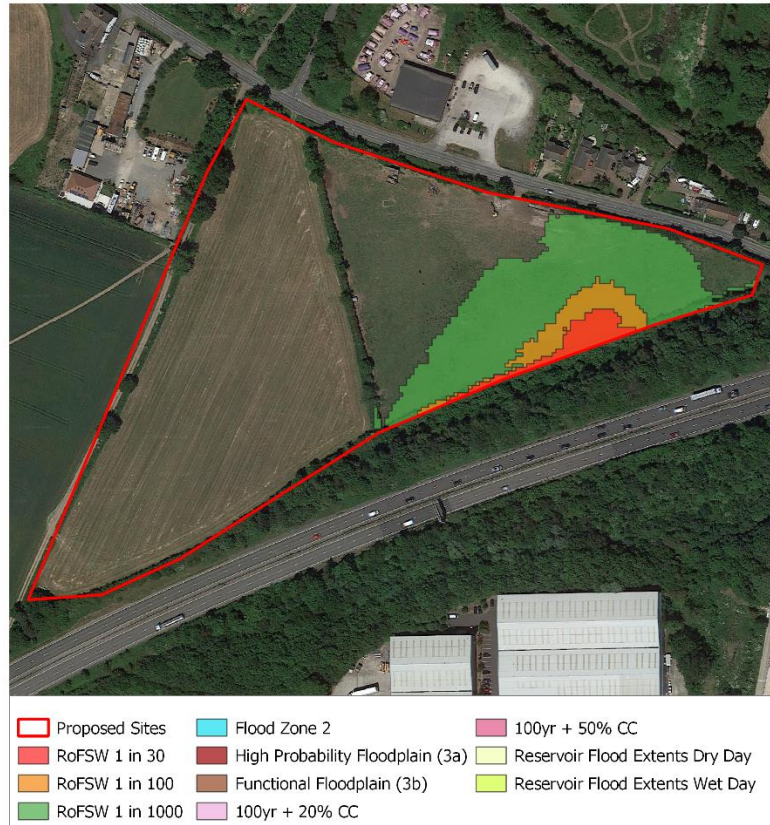


Figure 5-9 - Receptors in relation to the allocated site: EMP60 - Land at Burton Road

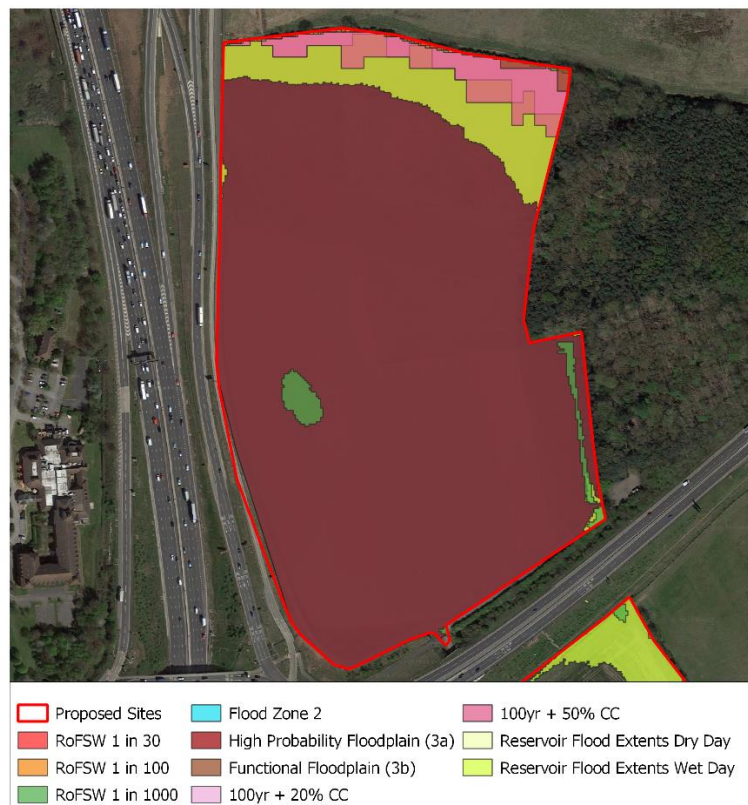


Figure 5-10 - Receptors in relation to the allocated site: EMP73 - Land north of A6

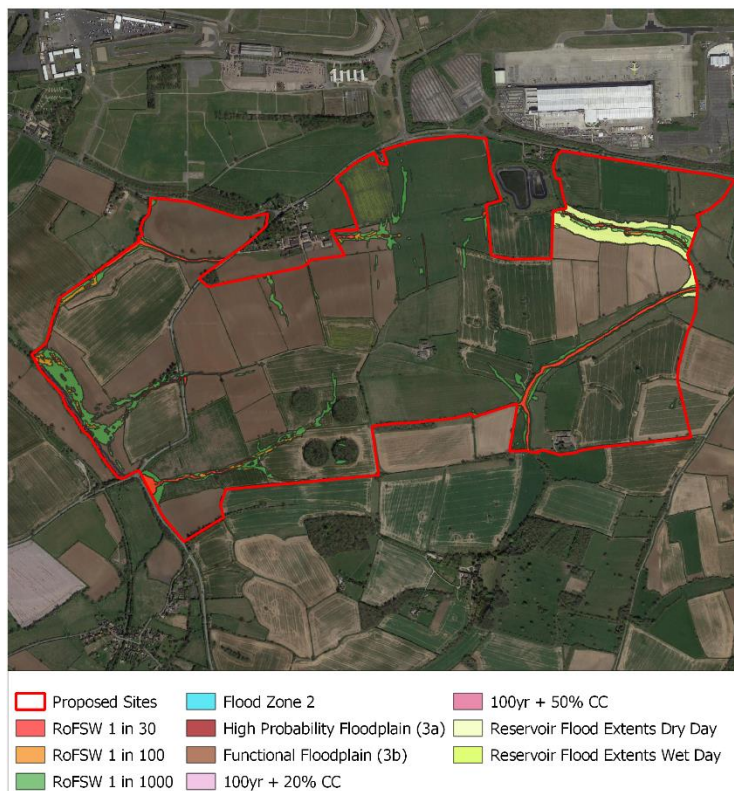


Figure 5-11 - Receptors in relation to the allocated site: IW1 - Land south of Isley Walton and EMA

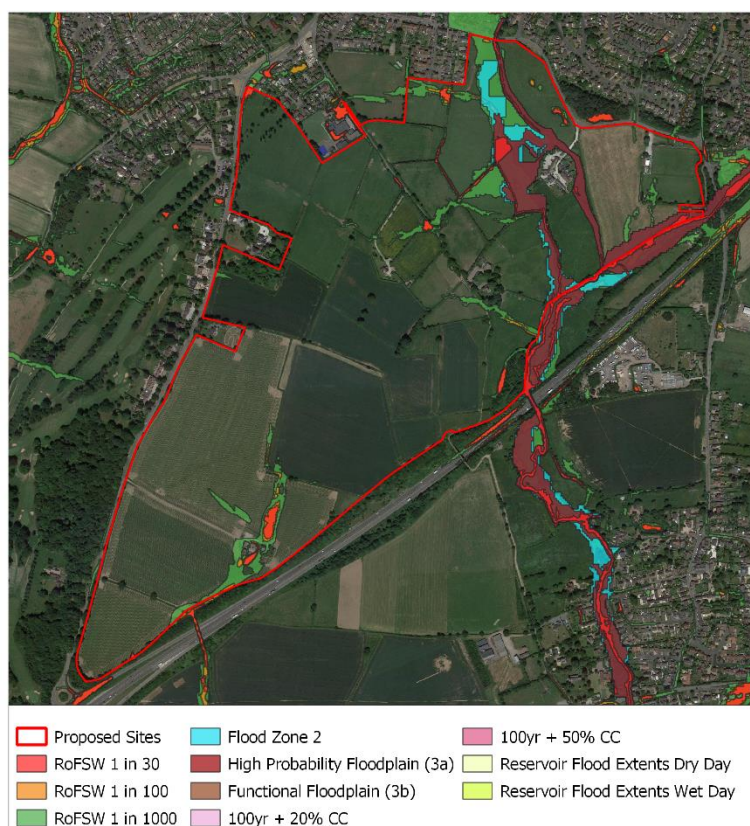



Figure 5-12 - Receptors in relation to the allocated site: A7, Packington Nook, Ashby

Table 5-3 - Results of the Sequential Test

Site Code	Proposed Use	% Coverage in FZ 1	% Coverage in FZ 2	% Coverage in FZ 3a	% Coverage in FZ 3b	% Coverage in Reservoir Extent (Dry)	% Coverage in Reservoir Extent (Wet)	% Coverage Very Low RoFSW	% Coverage Low RoFSW	Coverage Medium RoFSW	% Coverage High RoFSW	% Coverage 100 year +20% CC	% Coverage 100 year +50% CC	Result of Sequential Test**
A27	Housing	100.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	
Ap17	Housing	97.4	1.2	1.4	0.0	0.0	0.0	99.8	0.1	0.0	0.1	0.0	0.0	
C21	Housing	100.0	0.0	0.0	0.0	0.0	0.0	89.8	10.2	0.0	0.0	0.0	0.0	
C46	Housing	100.0	0.0	0.0	0.0	0.0	0.0	87.7	8.6	1.9	1.9	0.0	0.0	
C47	Housing	100.0	0.0	0.0	0.0	0.0	0.0	90.7	4.1	1.8	3.4	0.0	0.0	
C48	Housing	100.0	0.0	0.0	0.0	0.0	0.0	94.1	2.7	0.8	2.5	0.0	0.0	
C50	Housing	100.0	0.0	0.0	0.0	0.0	0.0	93.5	2.5	2.2	1.8	0.0	0.0	
C61	Housing	60.0	9.0	30.9	0.0	0.0	0.0	80.1	8.5	4.3	7.1	0.0	0.0	
C74	Housing	93.7	1.5	4.8	0.0	0.0	0.0	77.4	12.5	4.2	5.8	0.0	0.0	
C77	Housing	100.0	0.0	0.0	0.0	0.0	0.0	90.0	6.1	2.0	1.9	0.0	0.0	
C78	Housing	100.0	0.0	0.0	0.0	0.0	0.0	62.7	20.8	6.9	9.6	0.0	0.0	
C81	Housing	100.0	0.0	0.0	0.0	0.0	0.0	99.8	0.2	0.0	0.0	0.0	0.0	
C83	Housing	100.0	0.0	0.0	0.0	0.0	0.0	86.1	8.9	3.7	1.4	0.0	0.0	
C86	Housing	100.0	0.0	0.0	0.0	0.0	0.0	95.0	2.8	0.6	1.6	0.0	0.0	
CD10	Housing	100.0	0.0	0.0	0.0	0.0	0.0	98.6	1.3	0.0	0.0	0.0	0.0	
CD10	Housing	100.0	0.0	0.0	0.0	0.0	0.0	98.7	0.6	0.3	0.4	0.0	0.0	
D8	Housing	100.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	
E7	Housing	100.0	0.0	0.0	0.0	0.0	0.0	90.4	9.2	0.4	0.0	0.0	0.0	
EMP24	Employment	100.0	0.0	0.0	0.0	0.0	0.0	82.9	6.9	5.0	5.3	0.0	0.0	
EMP60	Employment	100.0	0.0	0.0	0.0	0.0	0.0	79.6	16.1	2.6	1.7	0.0	0.0	
EMP73	Employment	0.6	0.0	99.1	0.3	0.0	12.8	98.2	1.5	0.1	0.2	3.4	5.4	
EMP73	Employment	99.9	0.1	0.0	0.0	0.0	9.8	98.0	2.0	0.0	0.0	0.0	0.1	
EMP73	Employment	100.0	0.0	0.0	0.0	0.0	0.0	96.2	1.5	1.0	1.2	0.0	0.0	
EMP82	Employment	100.0	0.0	0.0	0.0	0.0	0.0	94.7	5.0	0.2	0.2	0.0	0.0	
EMP89	Employment	100.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	
EMP90	Employment	100.0	0.0	0.0	0.0	0.9	1.4	93.9	5.2	0.6	0.4	0.0	0.0	
H3	Housing	100.0	0.0	0.0	0.0	0.0	0.0	97.7	2.3	0.0	0.0	0.0	0.0	
Ib18	Housing	100.0	0.0	0.0	0.0	0.0	0.0	92.3	5.4	2.0	0.3	0.0	0.0	
IW1	Mixed	99.5	0.1	0.4	0.0	2.2	2.3	93.0	4.6	1.0	1.4	0.0	0.0	
Mo8	Housing	100.0	0.0	0.0	0.0	0.0	0.0	97.0	3.0	0.0	0.0	0.0	0.0	
Oa5	Housing	100.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	
P4	Housing	100.0	0.0	0.0	0.0	0.0	0.0	94.0	6.0	0.0	0.0	0.0	0.0	
R12	Housing	100.0	0.0	0.0	0.0	0.0	0.0	99.8	0.2	0.0	0.0	0.0	0.0	
R17	Housing	100.0	0.0	0.0	0.0	0.0	0.0	97.3	2.3	0.3	0.0	0.0	0.0	

A7	Mixed	91.0	5.1	3.9	0.0	0.0	0.0	89.2	7.8	1.9	1.1	0.0	0.0	
A5	Housing	99.7	0.2	0.1	0.0	0.0	0.0	90.9	5.5	2.1	1.5	0.0	0.0	

*Low groundwater risk is <25% of a 1km grid square at risk, medium groundwater risk is 25-75% of a 1km grid square at risk and a high groundwater risk is >75% of a 1km grid square at risk.

**Colour coding as outlined within the bulleted list at the start of section 5.4.

5.6. Windfall sites

Not all proposed development will fall within areas allocated for development within the forthcoming Local Plan and therefore a Sequential Test should also be applied to windfall sites. To assist the LPA development control team a flow chart identifying how the Sequential Test should be applied to windfall sites has been created for this SFRA and is included in Appendix C.C.1. Developers should supply sufficient information to the LPA to be able to apply the process outlined within the flow chart. It is recommended that this flow chart is a 'live' document and is updated and evolves as feedback is received from development control officers and flood risk management policy changes such as the potential for Critical Drainage Areas to be established. Critical Drainage Areas are areas that have critical drainage problems, which have been notified to the local planning authority as such by the Environment Agency in line with the NPPF. In these locations, there is a need for surface water to be managed to a higher standard than normal to ensure any new development will contribute to a reduction in flooding risks in line with NPPF. These higher standards are determined by the Environment Agency. There are currently no Critical Drainage Areas defined for NWLD.

Although the proposal for a change of use to development is not subject to the Sequential Test it will still require a passed Exception Test if located in areas at risk from flooding. The Exception Test would be required to demonstrate that the development is at an acceptable risk of flooding, would not increase flood risk elsewhere, and/or wider development requirement outweigh flood risk. It is therefore recommended that the flow chart provided in Appendix C.C.1 is also utilised for change of use development proposals.

6. Sustainable flood risk management

6.1. Overview

Flood and coastal erosion risk management is clearly embedded across a range of Government policies, including planning, urban and rural development, agriculture, transport, nature conservation and conservation of the historic environment.

Recent flood events have showed the devastating impact that flooding can have on lives, homes and businesses. A considerable number of people live and work in areas susceptible to flooding, and the ideal scenario would be to relocate this development into areas not susceptible to flooding. However, it is recognised that this is not a practicable solution so measures should be put in place to minimise the risk to property and life posed by flooding. The NPPF requires flood risk mitigation measures to ensure that that new development is safe throughout the lifetime of any development.

In 2010 the Flood and Water Management Act was enacted, which implements the recommendations of the Pitt review, to promote a more consistent and co-ordinated approach to flood risk management.

Leicestershire County Council produced their first Local Flood Risk Management Strategy for Leicestershire in 2015. Since then, a revised version of the 'Strategy'¹⁹ was published in 2023 which includes an update to the principles, objectives, and measures by which the local flood risk sources of surface water, groundwater, and ordinary watercourses will be managed. The Strategy is focused around delivering five objectives in accordance with five key principles: Working in partnership, Working with communities, Delivering multiple benefits, Adapting to climate change and Taking a risk-based approach. As the Lead Local Flood Authority (LLFA), Leicestershire County Council are responsible for the monitoring, management and implementation of the Strategy.

6.2. Responsibility for flood risk management

An overview of the key responsibilities with respect to the management of flood risk is provided below.

6.2.1. Local Authority

The Local Planning Authority (LPA), which is part of the Local Authority, is responsible for carrying out a SFRA to inform the allocation of land for future development, development control policies and sustainability appraisal. LPAs have a responsibility to consult with the appropriate statutory consultees when making planning decisions and the specific consultees will vary based on development type.

The LPA has the responsibility to work with LLFAs, where appropriate to ensure that proposals for flood risk management in their area would effectively manage flood risks.

Local Authorities have certain permissive powers to undertake flood defence works under the Land Drainage Act 1991 on watercourses which have not been designated as Main Rivers and which are not within Internal Drainage Board areas. Local Authorities can control the culverting of watercourses under S263 of the Public Health Act 1936.

The LPA has a responsibility for setting the maintenance regime for SuDS systems. These systems include green roofs, permeable paving, swales, detention basins, ponds and wetlands. They aim to mimic the natural drainage processes whilst also removing pollutants from urban runoff at the source before entering a watercourse. The LPA should provide the promotion of SuDS within proposed developments where suitable and should consult with the LLFA in relation to major development that incorporate SuDS.

6.2.2. Lead Local Flood Authorities

The LLFA covering North West Leicestershire is Leicestershire County Council.

¹⁹ Leicestershire Local Flood Risk Management Strategy

LLFAs are responsible for managing flood risk from surface water, groundwater and ordinary watercourses through developing, maintaining and applying a strategy for local flood risk management in their area. An updated version of the Local Flood Risk Management Strategy for Leicestershire²⁰ outlines the LLFAs focus in better understanding the catchments response to flood risk with an aim of improving flood preparedness, response, and recovery. The Strategy encourages sustainable development and aims to manage local projects for at-risk communities.

The changes to statutory consultees have seen the LLFA become a statutory consultee on major developments that incorporate SuDS from April 2015. The LLFA has also become a statutory consultee for potential development sites that are subject to potential groundwater flooding, those in close proximity to ordinary watercourses and those where there are other known local flood risk issues.

The LLFA is also responsible for maintaining a register of flood risk assets in their area and undertaking flood investigations that fall within their locally defined criteria under Section 19 of the Flood and Water Management Act 2010. Schedule 3 provides a framework for the approval and adoption of drainage systems, an approving body, and national standards on the design, construction, operation, and maintenance of SuDS. In January 2023, the review for implementation of Schedule 3 to The Flood and Water Management Act 2010²¹ was published, the findings from this review may be implemented in 2024 after public consultation. This document outlines drainage approval from a SuDs approval body (SAB) is required before starting any construction work that has drainage implications. County councils and LPAs can assume SAB responsibilities. As LLFAs sit within county councils, their role is to undertake a statutory consultee position, providing technical advice on surface water drainage to LPAs' major developments.

6.2.3. Environment Agency

The Environment Agency has a statutory responsibility for flood management and flood defence in England. The Environment Agency supports the planning system through the provision of information and flood risk advice. At a strategic level, it provides the LLFA and the Local Planning Authority with advice on the preparation of SFRA's.

The Environment Agency is consulted by Local Planning Authorities on certain applications for development in flood risk areas and contributed to their consideration by providing advice. There is guidance for LPAs as to when to consult the Environment Agency at <https://www.gov.uk/flood-risk-assessment-local-planning-authorities>.

Under the Water Resources Act 1991, the Environment Agency has permissive powers for the management of flood risk arising from designated Main Rivers and the sea. The Environment Agency is also responsible for flood forecasting and flood warning dissemination, and for exercising a general supervision over matters relating to flood defence.

For planning purposes, the North West Leicestershire district falls within the Environment Agency area of Derbyshire, Nottinghamshire and Leicestershire, which is based at the Trentside offices located within Nottingham.

6.2.4. The Canal and River Trust

The Canal and River Trust is responsible for maintaining critical infrastructure on the River Soar and ensuring structures such as locks operate during flood events. The Canal and River Trust is also responsible for the Ashby Canal.

6.2.5. Water companies

Severn Trent Water is the sewerage undertaker for North West Leicestershire and is generally responsible for surface water drainage from development where this is through adopted sewers. Severn Trent Water is responsible for ensuring the maintenance of drainage infrastructure through removal of blockages and undertaking improvement works to ensure flooding does not result from capacity problems. This includes

²⁰ [Leicestershire Local Flood Risk Management Strategy](#)

²¹ [The review for implementation of Schedule 3 to The Flood and Water Management Act 2010 \(publishing.service.gov.uk\)](#)

ensuring that their systems incorporate an appropriate level of resilience to flooding and that they are able to maintain essential services during emergencies.

Water companies also have a responsibility to work with the LLFA to identify how their systems integrate with other local sources of flood risk, and to work with the LLFA, developers and landowners to understand the risk and manage the volume and rates of surface water entering the surface water sewer.

In areas that have suffered frequent or severe sewer flooding, the water companies have a responsibility to address these risks through their capital investment plans that are regulated by Ofwat.

6.2.6. Landowners and Developers

Landowners have the primary responsibility for safeguarding their land and other property against flooding. Riparian owners have the responsibility of maintenance of any watercourse which are within and/or bounds their property. Individual property owners and users are also responsible for managing the drainage of their land so that they do not adversely impact neighbouring land. Those proposing development are responsible for providing a site-specific FRA for submission with the planning application if the development is at risk from fluvial flooding or covers a site greater than 1 hectare.

6.3. Strategic flood risk management

Development along river corridors during the industrial age has resulted in large urban areas at risk of flooding. Historically, the management of flood risk was undertaken in a somewhat reactive manner, addressing problems on an 'as needed' basis in response to a flooding event through the construction of flood defence walls or embankments. It was recognised by Government that this approach was generally not a particularly cost-effective solution and often failed to consider individual problem areas within the 'bigger picture' of the wider river system. The Environment Agency is now moving towards a more sustainable management of flood risk by steering away from the construction of raised defences and favouring solutions which work with natural processes.

The Environment Agency also endeavours to take a strategic approach to managing flood risk by considering flood risk on a catchment wide basis. Within the context of effective flood risk management therefore, the importance of influencing both the strategic planning process and development control as an outcome of these strategies is widely recognised as a key Environment Agency objective. For this reason, it is vital that the recommendations of the SFRA are consistent with the long-term strategy(s) for flood risk management within the district (catchment).

A number of flood risk management strategies have been undertaken of the River Trent catchment encompassing North West Leicestershire District.

6.4. Planning and development control

The NPPF creates a policy framework for NWLDC, Leicestershire County Council and the Environment Agency to contribute to a more sustainable approach to managing flood risk through the planning process. Opportunities for sustainable flood risk management that exist within the planning and development control process include:

- Considering flood risk at the early stages of the spatial planning process
- Ensuring planning decisions consider the implications of climate change
- Providing greater clarity to developers regarding which sites are suitable for developments of different types
- Developing local authority, developer and community-led initiatives for reducing flood risk and providing enhancement to the environment
- Ensuring direct and cumulative impacts of development on flood risk are considered and mitigated appropriately
- Considering flood risk and development on a catchment wide basis
- Developing integrated and sustainable developments which can deliver multiple benefits

In addition, certain conditions are imposed on planning applications which contribute to sustainable flood risk management, for example limiting surface water runoff from the site to greenfield runoff rates.

6.5. Development management

NWLDC have staff dedicated to the control of development within North West Leicestershire.

The Town and Country Planning System is designed to regulate the development and use of land in the public interest. It is the means by which the environment can be enhanced and protected whilst enabling development to take place which is necessary for economic and social well-being. NWLDC's Development Control seeks to ensure the aims of the Town and Country Planning Act are achieved through the submission and determination of applications for planning permission for development.

The North West Leicestershire Local Plan will, once adopted, set out the vision, strategic objectives and spatial strategy for future developments within North West Leicestershire. Development Control Policies are a suite of criteria-based policies which are required to ensure that all development within the areas meets the spatial vision and spatial objectives set out in the Local Plan. These Development Control Policies include policies for development within floodplains and will be incorporated into the Local Plan.

The Environment Agency has a role in advising the Town and Country planning process and will object to inappropriate development within areas at risk of flooding as identified within the Flood Zone mapping. If planners are minded to go against Environment Agency advice and approve proposed development, they are required to refer the proposal to the Secretary of State²². This only applies to 'major developments' which are defined as a development where the number of dwellings to be constructed is 10 or more and/or the site area is greater than 0.5 hectares. For all other uses, a major development is one where the floor space to be built is 1,000 square metres or more, or where the site area is 1 hectare or more.

The Environment Agency has direct control over activities that may affect main river watercourses and the floodplain. According to the Water Resources Act 1991 and local byelaws, anyone wishing to carry out work in, over, under or within 8 metres from the top of bank of a main river needs consent from the Environment Agency.

Under the Land Drainage Act 1991 any proposal to construct works within any other watercourse also need Environment Agency consent if they relate to culverting or structures that resemble a mill, dam, weir or other like obstruction. However in 2012 this responsibility transferred to the LLFA (i.e. Leicestershire County Council for the study area) under the Flood and Water Management Act 2010.

The Environment Agency's Partnerships and Strategic Overview teams support the planning system through the provision of advice and information on fluvial flood risk to planning authorities and developers to enable full compliance with the NPPF. In April 2015 the Environment Agency's role in relation to comment on planning applications changed such that the Environment Agency will remain the statutory consultee for developments:

- *"In an area with flood zone 2 or flood zone 3;*
- *In an area within flood zone 1 identified as having critical drainage problems; and*
- *In the bed of, or within 20 metres of the top bank of, a main river which has been notified to the local planning authority by the Environment Agency".*

The Environment Agency will no longer be consulted on certain proposed developments including those that are over one hectare in size (without any other qualifying criteria as listed above) or development involving the culverting or control of flow of any river or stream (without any other quantifying criteria as listed above).

This change has led to the flood risk support in relation to surface water management being required from elsewhere. The LLFA is now a statutory consultee on planning application associated with major development with surface water flood risk. The LLFA may also be required to comment on development with groundwater

²² The Town and Country Planning (Consultation) Direction 2021 (publishing.service.gov.uk)

management implications, those in proximity to ordinary watercourses and those with any other local flood risk issues, depending on the size of the proposed development.

6.6. Mitigation measures

6.6.1. Overview

In the first instance, the primary aim of Strategic Flood Risk Management is to avoid new development in areas of flood risk. The mapping outputs of this SFRA will help NWLDC achieve this aim when planning for the future of new development within their authority.

The sequential approach should be applied within development sites to locate the most vulnerable elements of a development in the lowest risk areas. However, avoidance of flood risk areas may not always be achievable, or a policy of avoidance may prevent the economic and social regeneration of existing developments. In such instances, to meet the wider aims of sustainable development, it may be necessary to locate some development in areas at risk of flooding. In these circumstances careful consideration needs to be given to incorporating appropriate mitigation measures for managing and reducing the risk of flooding to the development. Approval of developments which include such measures should only be accepted providing the development passes the Sequential and Exception Tests (when required depending on development type) and is consistent with the sustainability policies of NWLDC.

6.6.2. Objectives of flood risk mitigation

The general objectives of flood risk mitigation measures are to:

- Reduce the probability of flooding to a development and consequently reduce the associated hazard to people occupying the development.
- Minimise the impact and damage that flood water may cause to a development and thus enable a faster recovery following a flood event.
- Ensure no adverse impacts resulting in increased flood risk to neighbouring sites.
- Wherever possible seek to provide an overall benefit in reducing flood risk for neighbouring sites.
- Be adaptable to future climate change scenarios.

6.6.3. Sources of Information on Flood Risk Response

There are several sources of information on potential flood risk response measures, as follows:

- Flood Risk Assessment Guidance for New Development, Environment Agency R&D²³
- Development and Flood Risk – Guidance for the Construction Industry, CIRIA 624 ²⁴
- Improving the flood performance of new buildings in flood risk areas²⁵
- Better flood protections for new homes²⁶
- Preparing for Floods, ODPM²⁷
- The SuDS Manual, CIRIA²⁸
- Code of Practice for Surface water management for development sites (BS8582:2013).

²³ Flood risk assessment guidance for new development - GOV.UK (www.gov.uk)

²⁴ c624 (3).pdf

²⁵ Improving the flood performance of new buildings in flood risk areas - GOV.UK (www.gov.uk)

²⁶ Better flood protections for new homes - GOV.UK (www.gov.uk)

²⁷ Prepare for flooding: Protect yourself from future flooding - GOV.UK (www.gov.uk)

²⁸ Update to the SuDS Manual - GOV.UK (www.gov.uk)

- The SuDS National Standards²⁹

6.6.4. Mitigation Measure Options

The Environment Agency R&D Guidance on Flood Risk Assessments for new development suggests that mitigation measures can be split into three types:

- Measures that reduce the physical hazard, e.g. through raised defences or flood storage.
- Measures that reduce the exposure to the hazard, e.g. raise properties above flood levels.
- Measures that reduce the vulnerability to the hazard, e.g. flood warning or emergency planning.

Consideration of mitigation measures can take place at a number of stages of the development process, these include:

- The Master Planning Stage.
- The Outline Design Stage.
- The Detailed and Internal Design Stage.
- Retrofitting after the development is already in place.

The selection of appropriate mitigation measures depends on the requirements of the development and its sensitivity to flooding. Any mitigation measure selected should be sustainable in the future by taking into consideration the impact of climate change on flood risk. The residual risk of developing an area vulnerable to flooding with mitigation measures in place should also be considered.

Table 6-1 summarises the types of mitigation measures, their limitations and the stage of the development process when they should be considered. If the whole of the development site cannot be located away from areas of flood risk, a sequential approach within the site boundary should always be considered as the first mitigation measure. Only if a sequential approach for the site layout cannot fully mitigate the risk of flooding, should the remaining mitigation measures be considered. SuDS however, should always be considered for every new development site.

It is important to note that mitigation measures are only effective up to the magnitude of the flood event for which they are designed. If the design flood event is exceeded, then mitigation measures may not be effective, and the mitigation measures must not increase flood risk during events that exceed the design event. Exceedance of the design flood is an important consideration when employing mitigation measures for new development sites. Therefore, in some instances a combination of mitigation measures may need to be considered for a site. For example, flood resilience options should normally be included for all developments where significant mitigation measures have been included. This will provide the added benefit of ensuring a building can be quickly returned to use after an extreme flood event.

²⁹ Sustainable Drainage Systems: Non-statutory technical standards for sustainable drainage systems (publishing.service.gov.uk)

Table 6-1 - Summary of mitigation measures

The information is based on that provided in previous SFRA versions with updates as required.

Mitigation option	Description	Examples	Development stage	Limitations
Site Zoning / Layout	The sequential approach can be applied within development site boundaries to locate the most vulnerable elements of the development in the areas of lowest risk.	Locating flood-compatible development, such as areas of open space and car parking in areas at higher risk and reserving lower risk areas for more vulnerable land use types such as housing.	Master Planning Stage	The spatial planning of developments sites may not always be achievable in line with a sequential approach for urban brownfield sites where the location of existing development and access routes can prevent zoning of development land use in line with flood risk probability.
Modification of Ground Levels	The probability of flooding can be mitigated through the modification of ground levels to raise developments above the flood level or at least reduce the depth of predicted flood water.	Land raising parts of a development site using material, either from other parts of the site or imported to the site from other locations.	Master Planning and Outline Design Stage	Raising ground levels may not be viable if existing buildings or access routes at ground level need to be maintained. Care is needed to avoid the formation of islands which would become isolated in flood conditions and to ensure there is safe access. Land raising must be accompanied by level-for-level compensatory provision of flood storage either on- or off-site. This option can prove costly if large volumes of material need to be moved or if fill material needs to be imported to the site from other locations.
Flood Walls & Embankments	Construction of engineered defences to prevent flood water entering a development site	Sheet pile walls, earth embankments, sea walls with wave return, revetments.	Master Planning and Outline Design Stage	New defences for developments should only be considered if fully funded and maintained by the developer and if the residual risk behind the development is appropriate to the land use proposed. Compensatory flood storage should be provided if new flood defences have been provided to allow development. Flood defence mitigation options can be costly and will require ongoing investment for maintenance. Developers proposing defences should also ensure that the defences can adapt to future climate change scenarios to maintain the minimum standard of protection required by NPPF for the life time of the development. New defences must not increase flood risk to offsite third parties, and must be clearly demonstrated.
Flood Storage	The provision of upstream flood storage, either on or off the line of a river or watercourse, may be an effective measure to manage water levels at and downstream of a development site.	Flood storage reservoirs, controlled washlands, flood storage wetlands. Such options can also provide ecological and habitat benefits.	Master Planning and Outline Design Stage	Such options can involve significant land take which will need to be secured by the developer. If operational controls are required for such options consideration needs to be given to how this will be managed over the lifetime of the development. The longer term maintenance of the flood storage options will also need to be addressed from both a funding and operational perspective.
Building Design	Buildings can be designed such that the ground floor comprises flood compatible uses which are resilient to flood water and the associated damage caused. Residential and other people intensive uses are then located on the first floor upwards. Single-storey residential development and basements should not be considered in flood risk areas as such developments are generally more vulnerable to flood damage and occupants do not have the opportunity to retreat to higher floor levels.	Water compatible uses for the ground floor can include open plan public spaces, car parking and or utility areas. Provision of private garages or other enclosed private spaces should be avoided due to possible vehicle damage, pollution from stored material and a reduction in flow conveyance.	Detailed Design Stage	Where developments incorporate open space beneath the occupied level, measures such as legal agreements need to be in place to prevent inappropriate use or alteration of the ground floor that would impede flood conveyance or reduce flood storage. Safe access to higher ground, above the flood level, should be made available for people to evacuate all buildings where the habitable level is raised above the flood level. In areas of high flood flow velocity buildings should be structurally designed to withstand the expected water pressures, potential debris impacts and erosion which may occur during a flood event.
Temporary, Demountable or Operational Defences	Flood defences which require human intervention to ensure successful operation during a flood event.	Flood barriers and gates	Detailed Design Stage	These measures are unlikely to be suitable as the only mitigation measure as it is not usually appropriate to design a new development to rely on demountable or temporary flood defences to manage flood risk, unless such measures are proposed solely to manage residual flood risk to individual properties. For water-compatible and less vulnerable land uses, such measures may be appropriate where temporary disruption is acceptable and appropriate flood warning to activate the defences is provided.

Flood Resilience	External and internal building design, fixtures and fittings which ensure that the building can be quickly returned to use after a flood.	Raising electrical sockets above the predicted flood level. Wet proofing wall and floor furnishings using materials such as tiles and paint.	Detailed and Internal Design Stage	Such measures are unlikely to be suitable as the only mitigation measure to manage flood risk, but they may be suitable where: disruption to water-compatible and less vulnerable uses is acceptable and appropriate flood warning is provided. there are instances where the use of an existing building is to be changed and it can be demonstrated that no other measure is practicable.
SuDS	A sequence of management practices and control structures, designed to drain water in a more sustainable manner than some conventional techniques. Typically these are used to attenuate run-off from development sites.	There are a number of engineered and landscape vegetated types of SuDS options.	Outline and Detailed Design Stage	Issues which require early consideration when proposing SuDS include: Land Take: is there sufficient land available for the options proposed? Adoption and Maintenance: Who will fund, own and maintain the systems once installed, for the operational lifetime? This issue can often be secured through a planning condition for simple schemes or through a Section 106 agreement.

6.6.5. Emergency planning

Planning for emergencies will promote an effective response to situations that threaten human welfare, the environment or the security of a community.

The Leicester, Leicestershire and Rutland Local Resilience Forum (LRF)³⁰ is responsible for developing emergency plans and does so in close liaison with its partner agencies.

A community risk register³¹ has been compiled by members of the LRF to identify the hazards, risks and threats which may be present. Its aim is to deliver a risk awareness framework which will improve the ability to prevent and plan for emergencies.

The LRF states that flooding is a priority risk in Leicester, Leicestershire and Rutland highlighting the need to plan and prepare. The LRF outlines both fluvial and pluvial flooding as two types of flooding risk to be aware of.

The purpose of the community risk register is:

- To ensure that local responders have an accurate understanding of the risks that they face and to provide a sound foundation for emergency planning;
- To provide a rational basis for the prioritisation of objectives, work programmes and allocation of resources;
- To enable local responders to assess the adequacy of their plans and identify any gaps;
- To facilitate joined up emergency planning, based on consistent assumptions;
- To provide an accessible overview of the emergency planning context for the public and officials; and
- To inform and reflect on national and regional risk assessments that support emergency planning and capability development at those levels.

Partner agencies are either Category 1 or Category 2 responders. For a major flood event in North West Leicestershire the Category 1 responder is anybody in the UK that has specific duties as determined under the Civil Contingencies Act (2004) and includes:

- Local Authority – North West Leicestershire District
- Government Agency – Environment Agency
- Emergency Services - Leicestershire Constabulary, Leicestershire Fire & Rescue Service, East Midlands Ambulance Service NHS Trust
- Health Bodies - Health Protection Agency, Leicestershire Partnership NHS Trust

For a major flood event in North West Leicestershire the Category 2 responders are those who have a role in supporting Category 1 responders in their duties under the Civil Contingencies Act (2004) and include:

- Utilities – Electricity, Gas, Water and sewerage, public communications providers (landlines and mobiles)
- Transport - Network Rail, Train Operating Companies, Airports, Highways Agency
- Government - Health and Safety Executive
- Health Sector - Strategic Health Authority

Emergency planning for extreme flood events is a key consideration for new developments located in areas at risk from flooding that have passed the Sequential Test. When preparing planning applications for such developments, developers should consult with the Environment Agency, emergency services and local resilience forums when developing emergency and evacuation plans. This consultation should feed into the submitted

³⁰ Flooding – LLR Prepared

³¹ RISK TERMINOLOGY (llrprepared.org.uk)

supporting information i.e. Flood Risk Assessment and evidence for the Exception Test to determine whether the site users are at an acceptable level of risk. The outputs of the SFRA will provide a useful information base from which to initially consider viable routes for safe evacuation during flood events. At the site-specific level, a more detailed appraisal of proposed evacuation routes may be required to confirm that the route is safe for the lifetime of the development.

A key part of emergency planning also involves raising public awareness to the potential risks and providing comprehensive information regarding flood warning and evacuation routes for members of the public to follow during extreme flood events. Both developers and NWLDC should give particular consideration to communication of flood warnings and advice to people with impaired hearing and/or sight and with restricted mobility.

NWLDC can also use the outputs from this SFRA to facilitate the development of emergency planning policies for existing developments at risk within their local authority by considering the feasibility and sustainability of key access routes within their administrative boundary and across boundaries into neighbouring authorities.

6.6.6. Flood warning

Although NWLDC is responsible for developing emergency plans for their individual authority, the work undertaken by the Environment Agency in relation to flood warning is a key element which should be integrated into the process of developing such plans.

The Environment Agency's National Flood Warning Centre is currently responsible for co-ordinating and issuing flood warnings via 'Floodline'. The Environment Agency has developed a range of integrated catchment flood forecasting models for catchments which contain Flood Warning Areas. The main objective of this modelling is to improve the prediction of water levels at designated forecasting points and to assist in the process of issuing flood warnings. Consideration should be given to the estimated lead times which can be provided when developing strategies for emergency evacuation and response to flood events.

6.7. Surface water management

The planning system can act as an effective means of ensuring that all new developments manage surface water in a sustainable manner. Conventional surface water drainage systems have traditionally used underground pipe networks to efficiently convey water away from sites. In the past this has led to problems of downstream flooding, reductions in groundwater recharge and waste pollution incidents associated with surface water overwhelming combined sewers. Both 'Making Space for Water' and the Water Framework Directive have highlighted the need for an improved understanding and better management of how our urban environments are drained. The Flood and Water Management Act encourages the uptake of SuDS. Major development must consider the use of SuDS systems through applying the SuDS hierarchy:

1. Infiltration systems and soakaways;
2. Discharge to watercourse.
3. Discharge to sewers.

The hierarchy approach requires that infiltration and soakaway systems are considered in the first instance. Only if these SuDS approaches are not considered appropriate at the site, then discharge to watercourses can be considered. If neither these options are possible, in the final instance discharge to sewers would be assessed.

The NPPF promotes Local Plans to consider climate change in respect to flood risk management and develop local planning policies that facilitate the requirement of SuDS in new developments.

The Delivering Sustainable Drainage Systems document³² outlines the Governments approach to deliver effective sustainable drainage systems that will be maintained for the lifetime of the development they serve. Following the expected implementation of Schedule 3 in 2024, the LPA may be appointed and assume the responsibilities of SAB. A SAB would approve any construction work that has drainage implications before it is commenced and adopt drainage systems where applicable.

³² RFI7086_sud_consult_doc_final.pdf (publishing.service.gov.uk)

The NPPF requires that a site-specific flood risk assessment is undertaken for all sites including those in Flood Zone 1 with an area greater than one hectare to ensure that downstream flooding problems are not made worse by surface water runoff from the development.

Surface water drainage systems for a development should ensure that there is little or no residual risk of flooding for events in excess of the storm event for which the sewer system on the site is designed.

For previously undeveloped sites the rate of runoff from the development sites should be no greater than the existing (greenfield) rate of runoff from the site. For developments on previously developed (brownfield) sites the rate of runoff should not exceed the runoff of the site in its previously developed condition. However, developers are encouraged to manage runoff from these developments to targets set out in the forthcoming LCC SuDS guide wherever practicable and accommodate climate change.

As the upper part of several catchments are within North West Leicestershire, e.g. River Mease, River Sence and Grace Dieu Brook the District Council has responsibility to ensure development does not increase flows downstream in neighbouring authorities.

The different types of SuDS and where they can be used appropriately within North West Leicestershire are discussed in Section 7.2.

7. Flood risk management for North West Leicestershire

7.1. Funding of flood defence works

Where proposed developments include the provision of new flood mitigation measures, these should generally be funded wholly by the developer. Developers proposing new mitigation measures which solely benefit new development should not call on public resources as a means of funding. It should be noted that the construction of new flood defences to enable a development to proceed are not normally favoured or acceptable to the Environment Agency. The NPPF sets out an approach in placing development in lowest risk areas so the Environment Agency are not in favour of any development which needs its own flood defence scheme to manage the flood risk. In accordance with the Sequential Approach, the development should not be deemed appropriate irrespective of whether there is funding for defences.

NWLDC may wish to consider entering into an agreement under Section 106 of the Town and Country Planning Act 1990 to ensure that the developer carries out the necessary works and that future maintenance commitments are met. They may also apply planning conditions which would require completion of the necessary works before the rest of the development can proceed. Section 106 of the Town and Country Planning Act 1990 allows a local planning authority to enter into an agreement with a landowner or developer in association with the granting of planning permission. A Section 106 agreement is used to address issues that are necessary to make a development acceptable, such as supporting the provision of services and infrastructure. One of the recommendations of 'Making Space for Water' was that local planning authorities should make more use of Section 106 agreements to ensure that there is a strong planning policy to manage flood risk. This means that any flood risk which is caused by, or increased by new development should be resolved and funded by the developer.

Where the mitigation measures proposed provide benefit to the wider community, or where the proposed works include upgrade or replacement of existing defences or flood alleviation schemes, it may be reasonable for the developer to contribute a proportion of the funding in partnership with the operating authority responsible for the existing works. Potential sources of funding that could be explored for such schemes are:

1. Flood & Coastal Erosion Risk Management or Flood Defence Grant in Aid (FDGiA)
2. Local community contributions
3. Community Infrastructure Levy (CIL)
4. Local Enterprise Partnership (LEP)
5. Council revenue and capital budgets
6. European Union grants
7. Regeneration grants

Capital works can seek funding through the FDGiA funding stream. To qualify for funding through this source it is necessary to demonstrate that the proposed scheme is cost beneficial which should be determined in accordance with the Flood and Coastal Erosion Risk Management (FCERM) guidance³³.

The Environment Agency has developed a six-year capital programme (2021 to 2027)³⁴. For projects which are currently approved to receive Flood Defence Grant in Aid (FDGiA) funding. There are no proposed schemes within North Leicestershire for the six-year programme. The previous programme 2015-2021 included the Long Whatton and Diseworth scheme which is proposed to protect 30 properties. In order to submit any further North West Leicestershire schemes for inclusion in the Medium-Term Plan (MTP) significant benefits must be demonstrated, and a high partnership funding score identified. Therefore unless proposed flood risk mitigation schemes are considered very highly beneficial, protecting a significant number of properties, gaining full funding

³³ FCERM grant-in-aid: discount rates, price indices and capping - GOV.UK (www.gov.uk)

³⁴ Flood and coastal erosion risk management investment plan for 2021 to 2027 (publishing.service.gov.uk)

through this programme is unlikely. In addition to contributions from developers, another important funding mechanism will come from local fundraising from the local communities and businesses who benefit from the proposed flood defence schemes. Where FDGiA, local levy, developer contributions and the promoting authority's own funds are insufficient to fund flood risk management work, contributions may be sought from the local community.

Through resident engagement within areas that have suffered ongoing flooding problems, it may be possible to create a resident group that would help contribute to ongoing works.

There is also a potential to secure funding through the LLEP for NWLDC which is the Leicester and Leicestershire Enterprise Partnership.

There are other potential funding mechanisms available such as through NWLDC Revenue and Capital Budgets, there are also regeneration grants from the Ministry of Housing Communities and Local Government³⁵ for growth areas, growth points and housing market renewal pathfinders, grants linked to new housing through Homes England³⁶.

7.2. Sustainable drainage systems

Local Authorities should prepare and implement planning strategies that help to deliver sustainable development, by using opportunities offered by new development to reduce the causes and impacts of surface water flooding. By implementing policies to encourage developers to incorporate SuDS wherever possible, Local Authorities can help to mitigate the impacts that development has on surface water runoff rates and volumes.

Figure 7-1 provides information relating to the spatial variation of permeability across North West Leicestershire. This information can be used as a first estimate of the suitability of different types of SuDS within North West Leicestershire as shown in Table 7-1.

The general soil type within North West Leicestershire is 'loamy'. This soil type is moderately well drained, but it can be seasonally waterlogged. The catchment run-off can, therefore, be quite variable, and when waterlogged will result in a rapid response with high run-off rates.

It is important to note that the above assessment of the spatial suitability of SuDS is an indicative estimate and should be confirmed at the site-specific level, using ground investigation data.

Table 7-1 Suitability of SuDS

Permeability	Indicative suitability of SuDS techniques
High permeability	Infiltration and combined systems
Moderate permeability	Infiltration and combined systems
Low permeability	Attenuation systems

³⁵ Ministry of Housing, Communities & Local Government - GOV.UK (www.gov.uk)

³⁶ Homes and Communities Agency - GOV.UK (www.gov.uk)

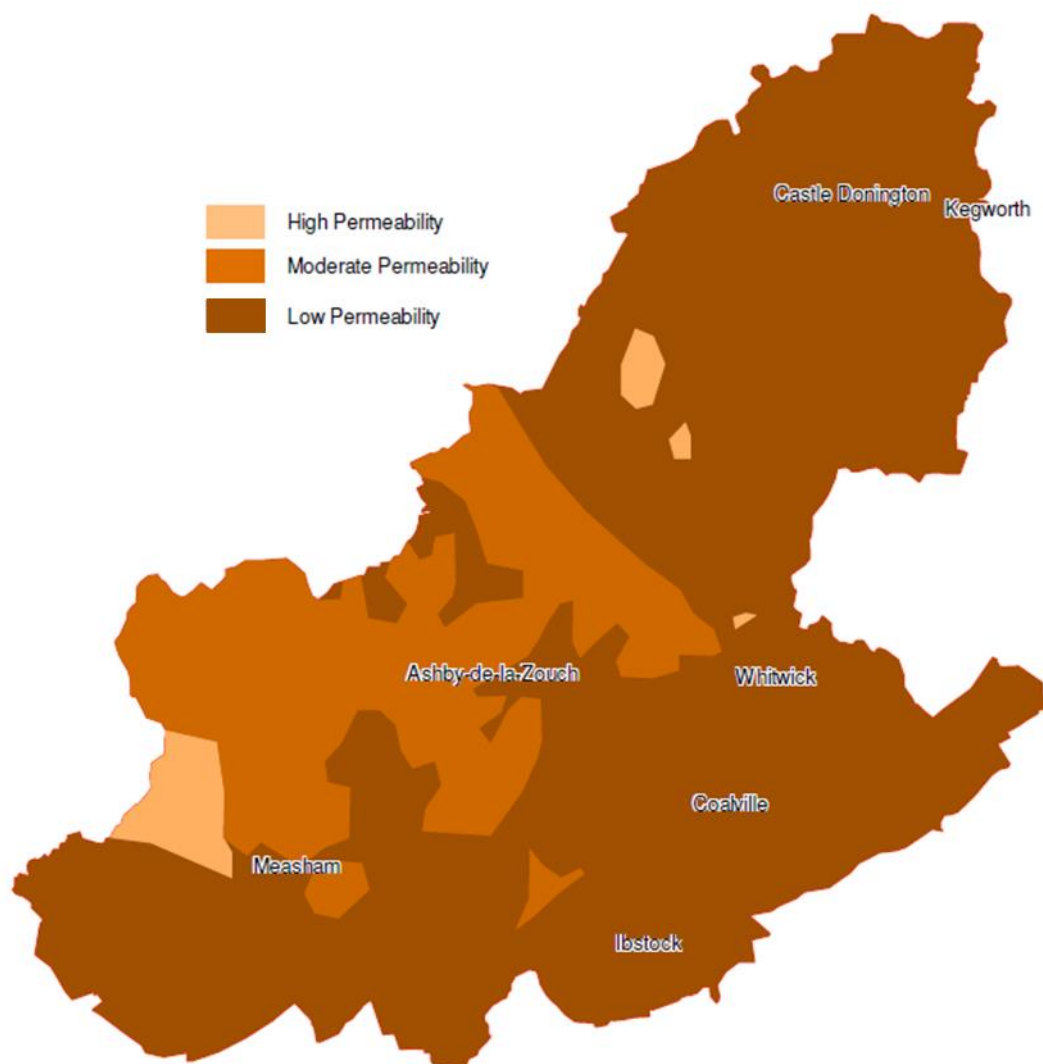


Figure 7-1 Permeability across North West Leicestershire

7.2.1. Infiltration Systems

Infiltration systems allow surface water to discharge directly into the ground. These systems are only appropriate where site conditions meet the following criteria:

1. Ground which has a suitable water acceptance potential and
2. Locations where groundwater recharge will not adversely affect drinking water aquifers as identified by the Environment Agency's source protection zones, available on their website <http://www.environmentagency.gov.uk>.

Such systems may include:

- Permeable surfaces
- Gravel
- Permeable Paving
- Block Paving with voids
- Grassed areas

Sub Surface Infiltration

- Filter Drains
- Geocellular Systems
- Soakaways

7.2.2. Attenuation Systems

If ground conditions cannot support infiltration systems, surface water may need to be attenuated using measures to store surface water. Attenuation systems, if designed at ground level, have the potential to take up large areas of development sites. Early consideration of such constraints is therefore essential to ensure that sufficient land is allocated to accommodate SuDS systems. Attenuation systems may include:

Landscaped

- Detention Basins
- Balancing Ponds
- Retention Ponds
- Wetlands
- Lagoons

Engineered

- Underground Tanks
- Ornate Water Features
- Green Roofs
- Oversized Pipes

Rainwater harvesting is another approach that can be considered to help attenuate surface water runoff, however this system cannot be considered as a formal attenuation system for planning purposes. This is because the system is likely to be already storing water during storm events, and the capacity of a rainwater harvesting system cannot be guaranteed during potential flood events.

7.2.3. Combined Systems

SuDS designs for most sites can include a combination of infiltration and attenuation systems and they have been categorised above according to the dominant process. Other forms of SuDS which can provide more balanced benefits of infiltration and attenuation include swales and filter strips.

7.2.4. SuDS Guidance

In January 2015 it was expected that the LPA would be responsible for approving SuDS systems with the LLFA being a statutory consultee on planning applications containing SuDS proposals. The review for implementation of Schedule 3 to The Flood and Water Management Act 2010³⁷ outlines that as of 2024 LPAs may be appointed and assume the responsibilities of SABs and LLFAs will undertake a statutory consultee position, providing technical advice on surface water drainage to LPAs' major developments.

The forthcoming SuDS guidance from Leicestershire County Council should be consulted when designing surface water management for proposed development within North West Leicestershire. The information provided by the applicant must include information for the ongoing maintenance of a drainage system.

³⁷ The review for implementation of Schedule 3 to The Flood and Water Management Act 2010 (publishing.service.gov.uk)

7.3. Development control

Advice notes for developers for undertaking site specific FRAs within North West Leicestershire is provided within the Government's online environmental management guidance³⁸. This guidance outlines when a site-specific FRA is required and the scope of the study that needs to be included within the FRA. Potential developers should consult this guidance early on in the development planning process to determine the flood risk implications.

³⁸ <https://www.gov.uk/planning-applications-assessing-flood-risk>

8. Conclusion and recommendations

8.1. Conclusions

This SFRA report provides an overview of the planning context in relation to flood risk and development within North West Leicestershire.

The data provided has been collated through consultation with NWLDC, Leicestershire County Council, the Environment Agency and Severn Trent Water. The information provided also builds upon the previous SFRA completed in 2015.

Sources of flood risk in NWLDC include: fluvial (arising from the River Trent, the River Soar, the River Mease, the River Sence and their tributaries), surface water, sewers, canal infrastructure and groundwater arising from former coal mining areas.

There are existing flood risk management schemes in place, including formalised flood defences and flood storage areas. These flood risk management schemes fall under a range of responsibilities including the Environment Agency and private land owners and provide varying levels of protection.

Climate change is predicted to cause an increase in flood risk in the future and therefore needs to be considered when designing flood risk mitigation and surface water management systems for new development.

A Sequential Test has been undertaken on potential sites for allocation. Of the 36 sites assessed, 28 sites are fully located within Flood Zone 1 and therefore within the lowest areas at risk from fluvial flooding. Of the remaining sites, 8 are partially located within Flood Zones 2, 7 partially in Flood Zone 3, and one is located within Flood Zone 3b and therefore at a high risk from fluvial flooding.

Windfall sites are potential development sites that are not allocated through the Local Plan and have not been individually sequentially tested for this SFRA. The Sequential Test will need to be applied to these sites, which can be informed by the Sequential Test flowchart provided in this SFRA. If necessary, evidence to meet the requirements of the Exception Test at the planning application stage would also be required.

8.2. Recommendations

The recommendations from this SFRA update are as follows. It is recommended that the list is considered when completing the Local Plan for North West Leicestershire.

8.2.1. Process

1. This SFRA should support the completion of site specific FRAs. FRAs are required for submission with the associated planning application for all development located within areas at risk from flooding as defined in the fluvial flood mapping provided in the Appendices to this report (and as shown on the Environment Agency's website) and those classed as major development.
2. The risk to and impact of new development should be minimised through careful planning considerations in relation to flood risk. This would be achieved through promoting development to be located within the lowest areas of flood risk, from all sources.
3. The Sequential Test will need to be carried out for windfall sites and applicants should provide sufficient information to the Local Planning Authority to be able to assess it. It is recommended that the flow chart provided in this SFRA for assessing windfall sites is a 'live' document. As a live document it should be updated and evolved as feedback is received from development control officers and flood risk management policy changes such as the potential for Critical Drainage Areas to be established.
4. All sources of flood risk need to be considered when assessing the risk to new and proposed development. These sources of flood risk include fluvial, surface water, sewers, canal infrastructure and groundwater, such as through rising from former coal mining measures.

8.2.2. Mitigation

5. It is recognised that not all development could be located in areas at lowest risk from flooding, as in some cases the need for the proposed development will outweigh the risks of flooding. Where development is required in areas at risk from flooding it is necessary that new development will incorporate flood risk mitigation measures to ensure that both the site is at an acceptable level of risk, whilst preventing an increase in risk elsewhere. This would need to be demonstrated through the application of the Exception Test.
6. Where flood risk mitigation measures are required to ensure an acceptable level of flood risk associated with new development, these mitigation measures need to be agreed with the LPA (and potentially other statutory consultees) as appropriate to the level and nature of the flood risk. Furthermore the measures need to be satisfactorily implemented and maintained.

8.2.3. SuDS

7. There is increased focus on suitable surface water management in new development, through the use of SuDS to prevent increased flood risk both on site and elsewhere. For development on greenfield sites surface water runoff from the site must be attenuated to the pre development rate. For development on brownfield sites, surface water runoff should be reduced as recommended by the Leicestershire County Council SuDS guide.
8. SuDS must be selected following the SuDS hierarchical approach and in accordance with national and local standards. The exception would only be if it can be clearly demonstrated that SuDS would not be technically, economically or operationally viable but other forms of surface water management would be possible, or in locations where SuDS would present health and safety concerns that could not be suitability addressed.
9. It is recommended that where appropriate, especially for larger development sites, SuDS should also be planned at a strategic scale and linked to wider sustainability benefits to enhance green infrastructure, improve water quality and provide wildlife and ecosystem benefits.
10. Development proposing SuDS needs to have a clear maintenance schedule outlining responsibilities for the management of the SuDS over the lifetime of the development to ensure the surface water drainage remains effective.

8.2.4. General

11. Where possible it is recommended that redundant watercourse crossings and culvert structures are removed to provide flood risk and ecological benefits. When proposing the removal of such structures, that have the potential to act as a constriction to flow, the downstream implications should be determined, and mitigation provided, to avoid detrimental downstream impacts.
12. It is recommended that this SFRA is considered to be a live document, which has been based on current understanding of flood risk and existing and available flood risk information. In the future as further flood events occur, as flood risk policy advances and as studies are completed to improve flood risk understanding, information in this SFRA will become outdated. To address these potential future changes, it is recommended that this SFRA is reviewed and updated as appropriate.

Appendices

Appendix A.

A.1. Flood risk vulnerability classification – taken from Annex 3 in the NPPF flood risk planning practice guidance.

<p>Essential Infrastructure</p> <ul style="list-style-type: none"> • Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk. • Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including electricity generating power stations and grid and primary substations; and water treatment works that need to remain operational in times of flood. • Wind turbines.
<p>Highly Vulnerable</p> <ul style="list-style-type: none"> • Police and ambulance stations; fire stations and command centres; telecommunications installations required to be operational during flooding. • Emergency dispersal points. • Basement dwellings. • Caravans, mobile homes and park homes intended for permanent residential use. • Installations requiring <u>hazardous substances consent</u>. (Where there is a demonstrable need to locate such installations for bulk storage of materials with port or other similar facilities, or such installations with energy infrastructure or carbon capture and storage installations, that require coastal or water-side locations, or need to be located in other high flood risk areas, in these instances the facilities should be classified as ‘Essential Infrastructure’).
<p>More Vulnerable</p> <ul style="list-style-type: none"> • Hospitals • Residential institutions such as residential care homes, children’s homes, social services homes, prisons and hostels. • Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels. • Non-residential uses for health services, nurseries and educational establishments. • Landfill* and sites used for waste management facilities for hazardous waste. • Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan.
<p>Less Vulnerable</p> <ul style="list-style-type: none"> • Police, ambulance and fire stations which are not required to be operational during flooding. • Buildings used for shops; financial, professional and other services; restaurants, cafes and hot food takeaways; offices; general industry, storage and distribution; non-residential institutions not included in the ‘More Vulnerable’ class; and assembly and leisure. • Land and buildings used for agriculture and forestry. • Waste treatment (except landfill* and hazardous waste facilities). • Minerals working and processing (except for sand and gravel working). • Water treatment works which do not need to remain operational during times of flood. • Sewage treatment works, if adequate measures to control pollution and manage sewage during flooding events are in place.
<p>Water-Compatible Development</p> <ul style="list-style-type: none"> • Flood control infrastructure.

- Water transmission infrastructure and pumping stations.
- Sewage transmission infrastructure and pumping stations.
- Sand and gravel working.
- Docks, marinas and wharves.
- Navigation facilities.
- Ministry of Defence defence installations.
- Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location.
- Water-based recreation (excluding sleeping accommodation).
- Lifeguard and coastguard stations.
- Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms.

Essential ancillary sleeping or residential accommodation for staff required by uses in this category, subject to a specific warning and evacuation plan.

*Information as of 08/08/2023. Please see <https://www.gov.uk/guidance/national-planning-policy-framework/annex-3-flood-risk-vulnerability-classification> for the live document.

A.2. Flood risk vulnerability and Flood Zone ‘compatibility’ – taken from Table 2 in the NPPF flood risk planning practice guidance

Flood Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Flood Zone 1	✓	✓	✓	✓	✓
Flood Zone 2	✓	Exception Test required	✓	✓	✓
Flood Zone 3a [†]	Exception Test required [†]	x	Exception Test required	✓	✓
Flood Zone 3b*	Exception Test required*	x	x	x	✓*

Key

✓ Development is appropriate

x Development is not appropriate

†In Flood Zone 3a essential infrastructure should be designed and constructed to remain operational and safe in times of flood.

*In Flood Zone 3b (functional floodplain) essential infrastructure must demonstrate a passed Exception Test. Water compatible development should be designed and constructed to remain operational and safe for users in times of flood; result in no net loss of floodplain storage; and not impede water flows and not increase flood risk elsewhere.

*Information as of 08/08/2023. Please see [Flood risk and coastal change - GOV.UK \(www.gov.uk\)](https://www.gov.uk/guidance/flood-risk-and-coastal-change) for the live document.

Appendix B.

B.1. 1 in 100-year flood extent with 20% and 50% climate change

B.2. Historic flood events in North West Leicestershire District

B.3. Flood warning services currently provided for areas at risk of flooding within North West Leicestershire

B.4. Flood alerts within North West Leicestershire

B.5. Fluvial flood risk in North West Leicestershire District

B.6. Surface water flood risk in North West Leicestershire District

B.7. Reservoir breach flood risk in North West Leicestershire District

B.8. Areas with a reduction in risk of flooding from rivers and sea due to flood defence

B.9. Allocation sites within North West Leicestershire District

B.10. Location of the allocated sites including the traffic light colour coding of the results from the Sequential test.

Appendix C.

C.1. Flowchart of the processes in applying the Sequential Test to windfall sites

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