

Melton Borough Council Level 2 Strategic Flood Risk Assessment

Final Report

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**Melton
Borough
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Abbreviations

1D	One Dimensional (modelling)
2D	Two Dimensional (modelling)
AEP	Annual Exceedance Probability
AIMS	Asset Information Management System
BGS	British Geological Survey
CC	Climate Change
CCTV	Closed Circuit Television
CIA	Cumulative Impact Assessment
DWMP	Drainage and Wastewater Management Plan
EA	Environment Agency
ELS	Employment Land Study
FMfP	Flood Map For Planning
FRA	Flood Risk Assessment
FRMP	Flood Risk Management Plan
FWA	Flood Warning Area
GIS	Geographical Information System
JBA	Jeremy Benn Associates
LiDAR	Light Detection And Ranging
LLFA	Lead Local Flood Authority
LPA	Local Planning Authority
mAOD	metres Above Ordnance Datum
MBC	Melton Borough Council
NaFRA2	National Flood Risk Assessment 2
NFM	Natural Flood Management
NPPF	National Planning Policy Framework
OS	Ordnance Survey
PFRA	Preliminary Flood Risk Assessment
PPG	Planning Policy Guidance
RBMP	River Basin Management Plan
SFRA	Strategic Flood Risk Assessment
SSN	South Sustainable Neighbourhood
UKCP18	United Kingdom Climate Projections 2018
WFD	Water Framework Directive

Definitions

1D model: one-dimensional hydraulic model

2D model: two-dimensional hydraulic model

Annual Exceedance Probability: the probability (expressed as a percentage) of a flood event occurring in any given year.

Brownfield: previously developed parcel of land

Climate Change: long term variations in global temperature and weather patterns caused by natural and human actions.

Dry island: Land which may not be at risk of flooding itself but is surrounded by flood risk and therefore may become cut off during a flood event.

Exception test: Set out in the NPPF, the exception test is a method used to demonstrate that flood risk to people and property will be managed appropriately, where alternative sites at a lower flood risk are not available. The exception test is applied following the sequential test.

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

Flood Map for Planning: The EA Flood Map for Planning (Rivers and Sea) (FMfP) is an online mapping portal which shows the Flood Zones in England. The FMfP shows river and sea flooding across different flood zones (Flood Zones 1, 2 and 3 (being split in to 3a and 3b)) and includes modelled and historic flood outlines. The FMfP does not however take in to account the presence of flood defences or the impacts of climate change.

Flood Risk Area: An area determined as having a significant risk of flooding in accordance with guidance published by Defra and WAG (Welsh Assembly Government).

Flood Risk Regulations: Transposition of the EU Floods Directive into UK law. The EU Floods Directive is a piece of European Community (EC) legislation to specifically address flood risk by prescribing a common framework for its measurement and management.

Fluvial Flooding: Flooding resulting from water levels exceeding the bank level of a river (main river or ordinary watercourse).

Flood Risk Assessment: a site-specific assessment of all forms of flood risk to the site and the impact of development of the site to flood risk in the area.

Green Infrastructure: a network of natural environmental components and green spaces that intersperse and connect the urban centres, suburbs, and urban fringe.

Greenfield: undeveloped parcel of land

Lead Local Flood Authority: the unitary authority for the area or if there is no unitary authority, the county council for the area.

Main river: a watercourse shown as such on the statutory main river map held by the Environment Agency. They are usually the larger rivers and streams. The Environment

Agency has permissive powers (not duties) to carry out maintenance and improvement works on main rivers).

Major development: defined in the NPPF as a housing development where 10 or more homes will be provided, or the site has an area of 0.5 hectares or more, or as a non-residential development with additional floorspace of 1,000m² or more, or a site of 1 hectare or more, or as otherwise provide in the [Town and Country Planning \(Development Management Procedure\) \(England\) Order 2015](#).

Ordinary watercourse: any river, stream, ditch, drain, cut, dyke, sluice, sewer (other than a public sewer) and passage through which water flows but which does not form part of a main river. The local authority or internal drainage board has permissive powers (not duties) on ordinary watercourses.

Pluvial flooding: see surface water flooding.

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

Resistance measures: Measures designed to keep flood water out of properties and businesses; could include flood guards for example.

Return period: Is an estimate of the interval of time between events of a certain intensity or size, in this instance it refers to flood events. It is a statistical measurement denoting the average recurrence interval over an extended period of time.

Risk: In flood risk management, risk is defined as a product of the probability or likelihood of a flood occurring, and the consequence of the flood.

Risk Management Authority: The Environment Agency; a lead local flood authority; a district council in an area where there is no unitary authority; an internal drainage board; a water company and a highway authority.

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

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

Standard of Protection: Defences are provided to reduce the risk of flooding from a river and within the flood and defence field standards are usually described in terms of a flood event return period. For example, a flood embankment could be described as providing a 1% AEP (1 in 100 year) standard of protection.

Surface water flooding: Flooding as a result of surface water runoff as a result of high intensity rainfall when water is ponding or flowing over the ground surface before it enters the underground drainage network or watercourse or cannot enter it because the network is full to capacity.

Sustainable Drainage Systems: SuDS are methods of management practices and control structures that are designed to drain surface water in a more sustainable manner than some conventional techniques, such as grates, gullies, and channels.

Water Framework Directive: Under the WFD, all waterbodies have a target to achieve Good Ecological Status (GES) or Good Ecological Potential (GEP) by a set deadline. River Basin Management Plans (RBMPs) set out the ecological objectives for each water body and give deadlines by when objectives need to be met.

Windfall site: a site which becomes available for development unexpectedly and therefore not included as allocated land in a planning authority's local plan.

Executive Summary

Introduction and context

This Level 2 Strategic Flood Risk Assessment (SFRA) document was prepared with the purpose of providing part of the evidence base for the Local Plan for Melton Borough Council (MBC). It follows on from the MBC Level 1 SFRA produced in 2024 and should be read in conjunction.

The primary purpose of the Level 2 SFRA is to provide an appropriate understanding of the level of actual risk affecting development included in the updated Local Plan. The assessment takes into account all sources of flooding, including possible failure of the Grantham Canal, and considers other factors affecting flood risk such as residual risk. The information provided as part of the Level 2 SFRA enables Melton Borough Council to apply the exception test to sites in accordance with the National Planning Policy Framework (NPPF).

SFRA objectives

The Government's PPG on Flood Risk and Coastal Change advocates a tiered approach to risk assessment involving Level 1 and Level 2 assessments.

After undertaking the sequential test, MBC have shortlisted sites which cannot be relocated outside of flood risk areas due to the benefits of these employment-based options outweighing potential flood risk issues. The Level 2 assessment aims to build on identified risks from the Level 1 in order to provide a greater understanding of fluvial, surface water, groundwater, sewer, and reservoir related flooding risks to these shortlisted sites. From this, MBC and developers can make more informed decisions regarding future development. The Level 2 assessment also identifies sites requiring further risk analysis at the site-specific Flood Risk Assessment (FRA) stage.

Level 2 SFRA outputs

The Level 2 assessment includes detailed assessments of the proposed development sites which include:

- An assessment of all sources of flooding including fluvial flooding, surface water flooding, groundwater flooding, and the potential increases in fluvial and surface water flood risk due to climate change, and how these may be mitigated.
- Reporting on conditions of flood defence infrastructure, where applicable.
- An assessment of existing flood warning and emergency planning procedures, including an assessment of safe access and egress during an extreme event.
- Advice and recommendations on the likely applicability of Sustainable Drainage Systems (SuDS) for managing surface water runoff.
- Advice on whether the sites are likely to pass the second part of the exception test and sequential test with regards to flood risk and on the requirements for a site-specific FRA, and outline measures or objectives required to manage flood risk.

As part of the Level 2 SFRA, detailed site summary tables have been produced for the sites proposed to be taken forward by the council, covering the above. Flood risk mapping at these sites can be viewed on [MBC's Mapping Portal](#).

Summary of Level 2 SFRA

MBC provided 28 sites which were subject to initial screening through the use of the 'overlap analysis' tool in GIS. Using this tool, the site boundaries were screened against flood risk datasets to assess the potential viability of the sites and provide flood risk recommendations. Of these 28 sites, 15 were identified as having significant flood risk and a further 10 had minor flooding within the site and/or access and egress problems. Therefore, based on flood risk alone, there are three sites which could be developed outside of flood risk areas.

However, MBC have other criteria that must be met for allocation of employment sites, and through their [Employment Land Study \(ELS\) 2024](#) and [Strategic Economic Land Availability Assessment \(SELAA\) 2023](#), MBC identified six sites to be taken forward for Level 2 assessment, plus the South Sustainable Neighbourhood (SSN) Masterplan which has been treated as two separate sites for the purposes of this Level 2 assessment. These were identified by MBC as strong candidates for inclusion in the Local Plan to meet local employment needs. Based on the initial site screening undertaken, four of these eight sites were identified to be at significant flood risk and the other four were identified to have minor flooding within the site and/or access and egress problems. It is not expected that the remaining allocations identified in the site screening exercise will advance; however, the site screening demonstrates that many of these would need flood risk to be assessed in more detail if they were to progress.

The following eight sites were therefore assessed as part of this Level 2 SFRA:

- MBC/003/23: Land at Hudson Road Industrial Estate, Melton Mowbray
- MBC/009/23: Site A, Burrough Court, Burrough on the Hill
- Site MBC/010/23: Land west of Normanton Lane, north of Normanton
- Site MBC/015/23: Airfield Farm, Dalby Road, Melton Mowbray
- Site MBC/020/23: Melton Airfield, Dalby Road, Melton Mowbray
- Site MBC/021/23: Land north of Leicester Road, Melton Mowbray.
- South Sustainable Neighbourhood (SSN)
- South Sustainable Neighbourhood (SSN) plus 400m buffer

The sites have been assessed in eight site summary tables within Appendix A where multiple sources of flood risk were considered. Each table sets out the flood risk analysis and NPPF requirements for the site, as well as guidance for site-specific FRAs and flood risk recommendations. A broadscale assessment of suitable SuDS options has been provided to give an indication of potential constraints to surface water drainage and where additional information may be required. To accompany each site summary table, flood risk mapping can be viewed on [MBC's Mapping Portal](#).

The following points summarise the Level 2 assessment:

- Fluvial flooding - the main watercourses associated with fluvial risk to the sites within the Level 2 assessment are the River Wreake, River Eye, Great Dalby Brook, and the Thorpe Brook. There are also other smaller watercourses and drainage channels presenting a fluvial risk to sites across Melton borough. The sites with the most significant area and severity of fluvial risk are the SSN and SSN plus 400m buffer sites.
- Flood Warning Areas (FWAs) - the sites MBC/003/23, MBC/021/23, SSN and SSN plus 400m buffer are located within existing EA FWAs. For proposed development within existing EA FWAs, developers should consult the EA to ensure that adequate flood warning procedures and evacuation processes are in place and that Risk Management Authorities (RMAs) are not put under any additional burden.
- Surface water flooding - surface water tends to follow topographic flow routes, for example, along watercourses or isolated pockets of ponding where there are topographic depressions. The majority of sites with a detailed Level 2 summary table are at surface water risk. The degree of flood risk varies with some sites being only marginally affected along their boundaries, whilst other sites are more significantly affected within the site. The sites at most significant surface water risk are MBC/010/23, MBC/020/23, SSN and SSN plus 400m buffer.
- Access and egress - whilst not at significant flood risk within the site boundary, sites MBC/003/23, MBC/020/23, the SSN site, and the SSN site plus 400m buffer, have potential access and egress issues as a result of fluvial and surface water flooding of the surrounding roads. At these sites, consideration should be made as to how safe access and egress can be provided during flood events, both for people and emergency vehicles. Consideration should also be given to the nature of the risk, for example whether the flooding forms a flow path or bisects the site where access across the site from one side to another may be compromised.
- Climate change - fluvial and surface water climate change mapping indicates that flood extents are predicted to increase. As a result, the depths, velocities, and hazard of flooding may also increase. The significance of the increase will depend on the topography of the site and the climate change percentage allowance used; fluvial extents would be larger than Flood Zone 3, but maximum extents are likely to be similar to Flood Zone 2. Site-specific FRAs should confirm the impact of climate change using latest guidance. The sites most at risk from increased risk due to climate change are MBC/009/23, MBC/010/23, the SSN site, and the SSN plus 400m buffer. It is recommended that MBC work with other RMAs to review the long-term sustainability of existing and new development in these areas when developing climate change plans and strategies for the Borough.

- Historic flooding - 2 sites, MBC/003/23 and MBC/021/23, are shown to fall partially within the EA Historic Flood Map dataset. The EA Recorded Flood Outlines dataset and MBC recorded flooding incidences also show further historic flooding both on and surrounding several sites.
- Sewer flooding - 7 sites across Melton borough have recorded sewer flooding incidents from Severn Trent Water located in the same postcode as the site. However, no sites have any incidences within their boundaries.
- Groundwater flooding - a large number of sites across Melton borough are shown by the Areas Susceptible to Groundwater flooding (AStGWF) map to have a high susceptibility to groundwater flooding with corresponding high ground water levels shown in the JBA emergence map. An appropriate assessment of the groundwater regime for a site should be carried out at the site-specific FRA stage. Sites with the greatest risk are MBC/009/23, the SSN site, and the SSN site plus 400m buffer.
- Reservoirs - there are 3 sites assessed within the site summary tables that are shown to be at risk of reservoir flooding during a 'Wet Day' and/or 'Dry Day' scenario. The level and standard of inspection and maintenance required under the Reservoirs Act means that the risk of flooding from reservoirs is very low. However, there is a residual risk of a reservoir breach and this risk should be considered in any site-specific FRA (where relevant). The sites at risk are MBC/021/23, the SSN site, and the SSN plus 400m buffer.
- Main Rivers - any sites located where there is Main River (including culverted reaches of Main River) will require an easement of 8m either side of the watercourse from the top of the bank. In Melton borough, this applies to the SSN and SSN plus 400m buffer sites at the upstream end of Edendale Brook. This may introduce constraints regarding what development will be possible and consideration will need to be given to access and maintenance at locations where there are culverts. Developers will be required to apply for appropriate permits so the activity being carried out over easements does not increase flood risk.
- SuDS - a strategic assessment was conducted of SuDS options using regional datasets. A detailed site-specific assessment of suitable SuDS techniques would need to be undertaken at site-specific level to understand which SuDS option would be best.

1 Introduction

1.1 Purpose of the Strategic Flood Risk Assessment

Paragraph 166 of the NPPF states that “Strategic policies should be informed by a strategic flood risk assessment and should manage flood risk from all sources. They should consider cumulative impacts in, or affecting, local areas susceptible to flooding, and take account of advice from the EA and other relevant flood RMAs, such as lead local flood authorities and internal drainage boards.”

1.2 Levels of SFRA

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

- A Level 1 assessment is required where flooding is not a significant constraint in relation to potential site allocations and where development pressures are low. The assessment should be of sufficient detail to enable application of the sequential test.
- A Level 2 assessment is required where land in Flood Zone 1 cannot appropriately accommodate all necessary development, creating the need to apply the NPPF’s exception test. In these circumstances the assessment should consider the detailed nature of the flood characteristics within a Flood Zone and assessment of other sources of flooding.

This SFRA report fulfils the requirements for a Level 2 assessment of development sites identified for potential allocation within the Melton borough, and has been prepared in accordance with the NPPF (2023) and PPG (2022).

This report should be read alongside the MBC Level 1 SFRA (2024) and builds upon information presented within the Level 1.

1.3 SFRA objectives

The objectives of this Level 2 SFRA are to:

- Provide individual flood risk analysis for the eight development sites selected by MBC (six potential employment allocations, plus the South Sustainable Neighbourhood and its 400m buffer which have already been allocated) using the latest available flood risk data, thereby assisting MBC in applying the exception test to their proposed development sites through the new Local Plan.
- Use available data to provide information and a comprehensive set of maps presenting flood risk from all sources for each site option.
- Where the exception test is required, provide recommendations for making the site safe throughout its lifetime.

- Take into account the most recent policy and legislation in the NPPF, PPG and LLFA SuDS guidance.

1.4 Consultation

In addition to MBC LPA, the following parties were consulted during the preparation of the Level 1 SFRA (which also informed this Level 2 assessment) through data requests or draft report reviews:

- Leicestershire County Council (LCC) as LLFA
- Environment Agency (EA)
- Severn Trent Water
- Anglian Water
- Internal MBC departments, including drainage and engineering teams, emergency planners, and technical services
- Neighbouring authorities including:
 - Rushcliffe Borough
 - Newark and Sherwood District
 - South Kesteven District
 - Rutland County
 - Harborough District
 - Charnwood Borough
- Parish Councillors and Ward Members
- Canal and River Trust

During the preparation of this Level 2 SFRA, LCC and the EA reviewed the Level 2 Main Report and Site Assessment Tables (Appendix A).

1.5 How to use this report

Table 1-1 below outlines the contents of this report and details how different users can apply this information. Hyperlinks to external guidance documents/websites are provided in [blue](#) through the SFRA.

Table 1-1: Outline of the contents of each section of this report

Section	Contents	How to use
1. Introduction	Outlines the purpose and objectives of the Level 2 SFRA	For general information and context.

Section	Contents	How to use
2. The Planning Framework and Flood Risk Policy	Includes information on the implications of recent changes to planning and flood risk policies and legislation, as well as documents relevant to the study.	Users should refer to this section and the relevant sections of the Level 1 SFRA for any relevant policy which may underpin strategic or site-specific assessments.
3. Information used in the Level 2 SFRA	Summarises the data used in the Level 2 assessment and interactive mapping.	Users should refer to this section in conjunction with the site summary tables and interactive mapping on MBC's Mapping Portal to understand the data presented. Developers should refer to this section when understanding the requirements for a site-specific FRA.
4. Level 2 Assessment Methodology	Summarises the sites taken forward to a Level 2 assessment and the outputs produced for each of these sites. Includes an assessment of flood risk at the 'amber sites' (those sites identified at a lower but still notable flood risk than those requiring a full Level 2 assessment).	This section should be used in conjunction with the site summary tables and interactive mapping on MBC's Mapping Portal to understand the data presented. Developers of 'amber sites' should use this section to understand the flood risk and associated recommendations for their sites.
5. Flood Risk Management Requirements for Developers	Identifies the scope of the assessments that must be submitted in FRAs supporting applications for new development. Refers to relevant sections in the L1 SFRA for mitigation guidance.	Developers should use this section alongside the relevant sections of the L1 SFRA to understand requirements for FRAs, what conditions/ guidance documents should be followed, and information on flood mitigation options.
6. Summary of Level 2 assessment and recommendations	Summarises the results and conclusions of the Level 2 assessment, and signposts to the L1 SFRA for planning policy recommendations.	Developers and planners should use this section to see a summary of the Level 2 assessment and understand the key messages from the site summary tables. Developers should refer to the Level 1 SFRA recommendations when considering requirements for site-specific assessments.

Section	Contents	How to use
Appendix A: Site Summary Tables	Provides a detailed summary of flood risk for sites requiring a more detailed assessment, which considers flood risk, emergency planning, climate change, broadscale assessment of possible SuDS, exception test requirements and requirements for site-specific FRAs.	Planners should use this section to inform the application of the sequential and exception tests, as relevant. Developers should use these tables to understand flood risk, access and egress requirements, climate change, SuDS, and FRA requirements for site-specific assessments.
Appendix B: Summary of site screening for sites carried forward to a Level 2 assessment	Provides a table which lists all the sites that were carried forward to a Level 2 assessment. The table details fluvial and surface water flood risk from EA datasets (FMfP and RoFSW) as well as hydraulic modelling. The table also details groundwater and reservoir flood risk, historic flooding, and whether or not the sites are within 100m of the OS Open Watercourse GIS layer.	Developers should use this table to understand flood risk for site-specific assessments.

1.6 SFRA study area

The Borough of Melton is located in the north-east of Leicestershire, England, to the north-east of Leicester. It is largely rural, with one urban area, Melton Mowbray, which is situated in the centre of the local authority area. Other smaller villages include Asfordby, Waltham on the Wolds, Long Clawson, and Bottesford.

Melton borough is bounded by six other authorities:

- Rushcliffe Borough
- Newark and Sherwood District
- South Kesteven District
- Rutland
- Harborough District
- Charnwood Borough

The main watercourses which flow through Melton borough, according to the Environment Agency's Main River Map, are as follows:

- Asfordby Relief Channel
- Edendale Brook
- Gaddesby Brook
- River Devon
- River Eye
- River Wreake
- Scalford Brook
- Thorpe Brook; and
- Welby Brook.

For further details and mapping of the Melton study area see Section 1.5 of the Level 1 SFRA report.

2 The Planning Framework and Flood Risk Policy

The Flood Risk Management roles and responsibilities for different organisations and relevant legislation, policy and strategy are detailed within the Melton Borough Council Level 1 Strategic Flood Risk Assessment (2024).

This contains details on:

- Flood risk policy and strategy
- Roles and responsibilities for Flood Risk Management in Melton borough
- Relevant legislation
- Relevant Flood Risk Policy and Strategy Documents
- Key legislation for flood and water management
- Key national, regional, and local policy documents and strategies

2.1 National Planning Policy Framework and Guidance

The NPPF sets out Government's planning policies for England and how these are expected to be applied. The Framework is based on core principles of sustainability and forms the national policy framework in England, also accompanied by a number of Planning Practice Guidance (PPG) notes. It must be taken into account in the preparation of local plans and is a material consideration in planning decisions. [Annex 3 of the NPPF](#) provides a 'Flood Risk Vulnerability Classification' for different types of land use. Sites within this Level 2 SFRA which are intended for employment use are considered 'Less Vulnerable'. The SSN sites have a range of uses including residential, open space and educational; therefore, the vulnerability classification for these sites range from 'Less Vulnerable' to 'More Vulnerable'. In this case, the highest vulnerability classification ('More Vulnerable') should be considered when assessing flood risk.

The National Planning Policy Framework (NPPF) was last updated in December 2023. At the time of writing this report, the Government is consulting on a revised NPPF; if any changes are needed to policy for managing flood risk to improve its effectiveness, this could result in updates to the flooding considerations covered in the 2023 NPPF.

2.1.1 Planning Practice Guidance (PPG)

An [updated version of the PPG](#) was published in August 2022. This advises on 'how to take account of and address the risks associated with flooding and coastal change in the planning process'. The guidance outlines the steps required when preparing strategic policies. Further details regarding the PPG can be found in the Level 1 SFRA.

2.1.2 The Sequential Test

The sequential test aims to ensure that areas at lower risk of flooding are prioritised for development over areas at a higher risk of flooding. This means areas at a medium or high risk of flooding from any source, now or in the future, should be avoided for development where possible. As outlined in the guidance '[Preparing a flood risk assessment: standing advice](#)', the sequential test is required for major and non-major development if any proposed building, access and escape route, land-raising or other vulnerable element will be:

- in flood zone 2 or 3;
- in flood zone 1 and the LPA's SFRA shows it will be at increased risk of flooding during its lifetime; or
- subject to sources of flooding other than rivers or sea.

This is the case for all development sites, unless the site is a:

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

Development is also exempt from the sequential test if it is on a site allocated in the development plan through the sequential test and the proposal is consistent with site's allocated use, or there have been no significant changes to the known level of flood risk to the site, now or in the future, which would have affected the outcome of the test.

2.1.3 The Exception Test

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

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

- More vulnerable development in Flood Zone 3a (this is NOT permitted in Flood Zone 3b);
- Essential infrastructure in Flood Zone 3a or 3b;
- Highly vulnerable development in Flood Zone 2 (this is NOT permitted in Flood Zone 3a or 3b); and/or
- Locations where surface, groundwater, sewer, or reservoir flood risk materially affect the safety of proposed development or where development proposals potentially affect existing land or property.

For information on what types of development constitute more vulnerable, essential infrastructure and highly vulnerable refer to Annex 3 of the NPPF. It should also be noted that 'less vulnerable' development should not be permitted within Flood Zone 3b, which applies to six of the eight sites as they have been allocated for employment land use.

The significance of flood risk issues has been determined as part of this Level 2 assessment for sites allocated within the Local Plan, using the best available data and a level of professional judgement. The information included in this Level 2 SFRA provides a good starting point to inform the application of part B of the exception test, however, does not guarantee that all the information to pass part B of the exception test is included. For example, new modelling may be required to inform flood risk at specific sites, or the EA may release new modelling.

For sites allocated within the Local Plan, the Local Planning Authority should use the information in this SFRA to inform the exception test. At planning application stage, the Developer must design the site such that it is appropriately flood resistant and resilient as well as adopting the sequential approach in line with the recommendations in national and local Planning Policy and supporting guidance and those set out in this SFRA. This should demonstrate that the site will still pass the flood risk element of the exception test based on the detailed site level analysis.

For developments that have not been allocated in the Local Plan, developers must undertake the sequential test followed by the exception test (if required) and present this information to the Local Planning Authority for approval. The Level 2 SFRA can be used to scope the flooding issues that a site-specific FRA should investigate in more detail to inform the exception test for windfall sites.

3 Information used in the Level 2 SFRA

This section outlines the datasets used in assessing the Local Plan sites in the Level 2 SFRA.

3.1 Historic flooding

EA's Historic Flood Map and Recorded Flood Outlines datasets have been used to understand whether historic flooding has been recorded at the sites.

Information relating to flooding incidences was obtained from LCC, as LLFA. Parish Councillors and Ward Members also provided local knowledge of flood events across the borough. As specified in the Level 1 SFRA, there is a history of documented events within the Borough, with the main sources identified as being fluvial, surface water, sewer, and groundwater flooding.

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

3.2 Fluvial Flood Zones

As part of the Level 1 SFRA, existing fluvial hydraulic modelling was incorporated into the SFRA. At the time of writing this was considered more up to date than the Flood Map for Planning; however, over time the online Flood Map for Planning is likely to be updated with hydraulic modelling more often than the SFRA.

In places where no detailed modelling is available, Flood Zones are derived from the Flood Map for Planning. This is the 'best available data' at the time this SFRA was prepared, although may not provide a comprehensive understanding of flood risk. It is important to note that the Flood Map for Planning does not identify the functional floodplain (Flood Zone 3b) which would normally comprise land having a 3.3% AEP or greater annual probability of flooding. The SFRA takes the best available information to identify the function floodplain. In locations where there is no detailed modelling available, as part of the Level 1 SFRA, a precautionary approach was adopted by considering the maximum extent of Flood Zone 3a as an 'indicative' functional floodplain. In these locations, detailed modelling will be required to identify the extent of the functional floodplain to inform development at certain locations, where appropriate.

Of the eight site summary tables in Appendix A, the sites which are impacted the most by Flood Zones 2 and 3 are the SSN and the 400m buffer sites which have a tributary (Great Dalby Brook) of the River Wreake flowing through them.

The current Flood Map for Planning will be superseded by the National Flood Risk Assessment 2 (NaFRA2) evidence assessment which is currently being undertaken by the Environment Agency. This is due to be published in 2025.

Further details on the Flood Zones can be found within the Level 1 Strategic Flood Risk Assessment.

3.3 Flood defences

For sites where existing flood defences provide a reduction in the flood risk to the site, it is important to understand the standard of protection these structures and measures provide. It is also necessary to understand how this level of protection changes over time, considering the implications of climate change.

If flood defences are required to protect a development site, evidence will be required to show that the new development does not adversely impact and increase flood risk to other areas, for example that there is no net loss in floodplain storage in circumstances where this is a material consideration. It will need to be established that these defences can be appropriately managed and maintained during the lifetime of the development. In some cases, it will be a requirement to demonstrate that there is an appropriate level of commitment to the maintenance of the standard of protection afforded by existing defences, where reliance is placed on the standard they provide.

Current flood defence information has been taken from the Environment Agency's Asset Information Management System (AIMS) Spatial Defences dataset. This dataset includes all flood defences currently owned, managed or inspected by the Environment Agency and includes information pertaining to their current condition and standard of protection.

'Natural high ground' and 'engineered high ground' is present along sections of the left and right banks of the Rivers Eye, Wreake, and Devon. There are also walls and embankments located along some sections of the Rivers Eye and Wreake, and their tributaries, at Melton Mowbray. Of the eight site summary tables completed, these defences may provide some protection to sites MBC/021/23, MBC/003/23 and the SSN sites.

3.4 Surface water

Mapping of surface water flood risk in the Melton borough has been taken from the EA's Risk of Flooding from Surface Water (RoFSW) mapping. Surface water flood risk is subdivided into the following four categories:

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

- **Very Low:** An area has a chance of flooding of less than 0.1% AEP (1 in 1,000) each year.

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

Of the eight site summary tables completed, the sites which are at particularly high risk of surface water flooding are MBC/020/23, MBC/021/23, the SSN site and the SSN plus 400m buffer site. Here, surface water flow paths are channelled by topography into the banks of the tributaries of the River Wreake which flow through these sites, including Great Dalby Brook, Edendale Brook and an unnamed ordinary watercourse.

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

3.5 Climate change

The interactive mapping for this SFRA on [MBC's Mapping Portal](#) provides an assessment of climate change risk for fluvial and surface water flooding using modelled outputs with the latest climate change uplifts where available.

Developers should undertake detailed modelling of climate change allowances as part of a site-specific FRA, following the [climate change guidance](#) set out by the EA.

3.5.1 Impact of climate change on fluvial flood risk

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

Peak river flow climate change allowances developed by the Environment Agency are divided into a series of Management Catchments. Melton borough is covered by four Management Catchments, the details of which are shown in Table 3-1.

Table 3-1: Peak river flow allowances for the Management Catchments which cover Melton borough.

Management Catchment	Allowance category	Total potential change (%) anticipated for '2020s' (2015 to 2039)	Total potential change (%) anticipated for '2050s' (2040 to 2069)	Total potential change (%) anticipated for '2080s' (2070 to 2115)
Lower Trent and Erewash	Upper end	29	38	62
Lower Trent and Erewash	Higher central	18	23	39
Lower Trent and Erewash	Central	13	17	29
Soar	Upper end	28	35	60
Soar	Higher central	18	21	37
Soar	Central	14	16	28
Welland	Upper end	22	26	53
Welland	Higher central	10	10	28
Welland	Central	5	4	17
Witham	Upper end	27	32	57
Witham	Higher central	14	15	32
Witham	Central	9	8	21

The following model and allowances were used to represent the 2080s Central and Higher Central climate change estimate:

- River Devon - 1% AEP plus 29% climate change (Central)
- River Devon - 1% AEP plus 39% climate change (Higher Central)

There were no 3.3% AEP plus climate change outputs available for the River Devon hydraulic model.

For all other watercourses, a proxy approach was implemented as follows:

- 3.3% AEP (Flood Zone 3b) plus climate change scenario
 - the 1% AEP outline was used as an indicative climate change extent. Where not available, the EA's Flood Map for Planning Flood Zone 3a was used.
- 1% AEP (Flood Zone 3a) plus climate change scenario
 - the 0.1% AEP outline was used as an indicative climate change extent. Where not available, the EA's Flood Map for Planning Flood Zone 2 was used.
- 0.1% AEP (Flood Zone 2) plus climate change scenario

- there is currently no available flood extent which could be used as a proxy. It is therefore recommended that developers undertake detailed modelling when carrying out their site assessment as part of the planning application process when preparing FRAs.

Extents are presented in the interactive mapping for the L1 SFRA which can be viewed on [MBC's Mapping Portal](#). Appendix B of the L1 SFRA details all models used in this assessment.

3.5.2 Impacts of climate change on surface water flooding

Climate change is predicted to result in wetter winters and increased summer storm intensity in the future. This increased rainfall intensity will affect land and urban drainage systems, resulting in surface water flooding, due to the increased volume of water entering the systems. The potential impacts of surface water plus climate change will likely need to be considered at site-specific assessment stage.

Peak rainfall climate change allowances developed by the Environment Agency are divided into the same Management Catchments as peak river flows. The details of Melton borough Management Catchments, all of which have the same climate change allowances, are shown below in Table 3-2.

For more information on which climate change allowances should be used, please refer to the Level 1 SFRA. The following uplifts have been applied to the Risk of Flooding from Surface Water data across the entire borough:

- 3.3% AEP with 25% and 35% uplifts (2070s epoch)
- 1% AEP with 25% and 40% uplifts (2070s epoch)

In addition, the 0.1% AEP surface water extent can be used as an indication of the impact of climate change on surface water flood risk from smaller watercourses which are too small to be covered by the EA's Flood Zones.

Table 3-2: The Melton borough Management Catchment peak rainfall climate change allowances

Management Catchment	Allowance category	Total potential change (%) anticipated for '2050s' (2022 to 2060) for 3.3% AEP	Total potential change (%) anticipated for '2050s' (2022 to 2060) for 1% AEP	Total potential change (%) anticipated for '2070s' (2061 to 2125) for 3.3% AEP	Total potential change (%) anticipated for '2070s' (2061 to 2125) for 1% AEP
Lower Trent and Erewash	Upper end	35	40	35	40

Management Catchment	Allowance category	Total potential change (%) anticipated for '2050s' (2022 to 2060) for 3.3% AEP	Total potential change (%) anticipated for '2050s' (2022 to 2060) for 1% AEP	Total potential change (%) anticipated for '2070s' (2061 to 2125) for 3.3% AEP	Total potential change (%) anticipated for '2070s' (2061 to 2125) for 1% AEP
Lower Trent and Erewash	Central	20	20	25	25
Soar	Upper end	35	40	35	40
Soar	Central	20	20	25	25
Welland	Upper end	35	40	35	40
Welland	Central	20	20	25	25
Witham	Upper end	35	40	35	40
Witham	Central	20	20	25	25

3.6 Groundwater

In general, less is known about groundwater flooding than other sources and availability of data is limited. It can last for days, weeks, or even months and is much harder to predict and warn for. Monitoring does occur in certain areas, for example where there are major aquifers or when mining stops. Groundwater flooding can be caused by:

- High water tables, influenced by the type of bedrock and superficial geology.
- Seasonal flows in dry valleys, which are particularly common in areas of chalk geology.
- Rebounding groundwater levels, where these have been historically lowered for industrial or mining purposes.
- Where there are long culverts that prevent water easily getting into watercourses.

Two datasets were used to assess potential areas that are likely to be at higher risk of groundwater flooding:

- The EA's AStGWF dataset, showing the degree to which areas are susceptible to groundwater flooding based on geological and hydrogeological conditions. It does not show the likelihood of groundwater flooding occurring, i.e., it is a hazard, not risk, based dataset.
- The JBA Groundwater Emergence map, showing the risk of groundwater flooding to both surface and subsurface assets, based on predicted groundwater levels.

The Groundwater Emergence map (5m resolution) shows areas of potential groundwater emergence during a 1% AEP flood event, and highlights areas where there is sufficient evidence to suggest that flooding may occur. Surface water mapping and topographic data

is used to gain an understanding of the overland flow routes which may be impacted by this emergence. The PPG states that all sources of flooding should be considered as part of the sequential test, including groundwater emergence risk. However, it should be noted that this data is not directly comparable to other datasets (for example Flood Zones), and therefore cannot categorise an area as high, medium, or low risk on its own. The map should be interpreted as an initial indicative tool to assess groundwater flood risk at preliminary stages of planning/site allocation. Where mapping indicates a risk of groundwater flooding a detailed assessment should be undertaken to confirm the risk to the site as part of any planning application, which may require ground investigations.

The JBA groundwater emergence mapping is categorised into five different classes; a detailed description of the classes is in Table 3-3 below. For more information, please refer to the Level 1 SFRA and the Level 2 site assessments.

Table 3-3: JBA Groundwater Emergence Map classifications

Risk Class	Depth range	Description
0 - Low risk	>5m	The zone is deemed as a having negligible risk from groundwater flooding due to the nature or local geological deposits
1	At least 5m	Flooding from groundwater is unlikely
2	Between 5m and 0.5m	Risk of flooding to subsurface assets but surface manifestation is unlikely
3	Between 0.5m and 0.025m	Risk of groundwater flooding to both surface and subsurface assets. Groundwater may emerge locally<0.0
4	<0.025m	Risk of groundwater flooding to surface and subsurface assets. Groundwater may emerge at significant rates and gas the capacity to flow overland and/or pond within any topographic low spots.

Of the eight site summary tables completed, site MBC/021/23, the SSN site and the SSN plus 400m buffer site contain areas where groundwater levels are between 0.5m and 5m below the ground surface. In these areas, there is a risk to subsurface assets, however, surface manifestation is unlikely. There are also minor areas within the SSN site and the SSN plus 400m buffer site where emergence risk is moderate and groundwater levels are between 0.025 and 0.5m below the ground surface. Here, there is a risk of groundwater flooding to both surface and subsurface assets. Groundwater may also emerge locally.

3.6.1 Impact of climate change on groundwater flooding

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

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

3.7 Reservoirs

The risk of inundation as a result of a breach or failure of a number of reservoirs within the area has been identified from the EA's Reservoir Flood Extents dataset. Although it is predicted that there is a risk to life if these reservoirs were to fail, such an event is rare.

This dataset consists of flood extents for two scenarios including 'Wet Day' and 'Dry Day', for all large, raised reservoirs. The Dry Day scenario shows flood extents in the event that reservoirs were to fail and release the water they hold when local rivers are at normal levels. The Wet Day scenario shows flood extents in the event that reservoirs were to fail and release the water they hold when local rivers are in flood.

Flood extents are not included for smaller reservoirs or for reservoirs commissioned after the reservoir modelling programme began in October 2016. Furthermore, only for those reservoirs with an impounded volume greater than 25,000 cubic metres are governed by the Reservoir Act 1975.

Of the eight site summary tables carried out for this Level 2 SFRA, three of these sites were assessed to be at residual risk of flooding from reservoirs included in the Environment Agency mapping. These sites are MBC/021/23, SSN, and SSN plus 400m buffer.

3.8 River networks

Main Rivers are represented by the EA's Statutory Main River layer. Ordinary Watercourses are represented by the EA's Detailed River Network layer. Caution should be taken when using these layers to identify culverted watercourses which may appear as straight lines but, in reality, are not. Developers should check if a Flood Risk Activity Permit (FRAP) or any other permits or permissions will be needed prior to any activities being carried out to any Main Rivers. In Melton borough, this applies to the SSN and SSN plus 400m buffer site at the upstream end of Edendale Brook.

Developers should be aware of the need to identify the route of, and flood risk associated with, culverts. CCTV condition survey will be required to establish the current condition of the culvert and hydraulic assessments will be necessary to establish culvert capacity of both culverts on site and those immediately offsite that could pose a risk to the site. The risk

of flooding should be established using site survey, including the residual risk of culvert blockage.

3.9 Sewer flooding

Historical incidents of flooding provided by Severn Trent Water through their records of flooding incidents relating to public foul, combined or surface water sewers from January 1990 until April 2024, were assessed. Data from Anglian Water was not available at the time of publication, however Anglian Water's remit within Melton borough is limited to Normanton in the north, Knossington in the south, and parts of Harston, Croxton Kerrial, Saltby, Sproxton, Buckminster, Sewstern and Wymondham at the eastern boundary. The only site partially within Anglian Water's remit is MBC/010/23 to the north of Normanton and it is not expected that the lack of data here would have an impact on the assessment of flood risk within this Level 2 SFRA. Due to licencing and confidentiality restrictions, sewer data has not been represented on the mapping, but incidents within the same postcode location as a site were referred to within specific site summary tables.

3.10 Residual risk

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

Residual risk from breaches of flood defences needs to be considered in site-specific FRAs. Considerations include the location of a breach, when it would occur and for how long, the depth of the breach (toe level), the loadings on the defence and the potential for multiple breaches. There are currently no national standards for breach assessments and there are various ways of assessing breaches using hydraulic modelling. Work is currently being undertaken by the EA to collate and standardise these methodologies. It is recommended that the EA are consulted if a development site is located near to a flood defence to understand the level of assessment required and to agree the approach for the breach assessment, if required.

Several sites assessed within the Melton borough are in close proximity to culverted sections of watercourses which flow beneath roads, railway lines, and footpaths, and present a residual flood risk should they become blocked or collapse. Potential culvert blockages that may affect a site were identified on OS Mapping and the EA's Detailed River Network layer to determine where watercourses flow into culverts or through structures (i.e. bridges) in the vicinity of the sites. Any potential locations were flagged in the site summary tables.

Sites potentially affected by residual risk of culvert blockages are:

- MBC/003/23
- MBC/021/23
- SSN
- SSN plus 400m buffer

The potential impacts of residual risk at sites will need to be considered by the developer as part of a site-specific FRA.

There are walls and embankments located along some sections of the Rivers Eye and Wreake, and their tributaries, at Melton Mowbray. These may provide some protection to sites situated in this vicinity. There are no sites that contain or are within the vicinity of any formal defences according to the EA's Reduction in [Risk of Flooding from Rivers and Sea due to Defences](#) dataset.

The SSN site, SSN plus 400m buffer site and the MBC/021/023 site are within close proximity to a railway embankment which presents a residual risk should it collapse. The Standard of Protection of these defences should be confirmed through detailed hydraulic modelling with an appropriate allowance for climate change added.

3.11 Depth, velocity, and hazard to people

The Level 2 assessment seeks to map the probable depth and velocity of flooding as well as the hazard to people and use this within the site summary tables.

Where detailed model outputs are available which have a 2D element representing the floodplain in detail, the 1% AEP plus climate change depth, velocity and hazard data can be used. This is the case for the River Devon (2021) model used in this SFRA. The River Wreake and Tributaries (2011 with 2021 update) model contains depth and extent outputs, but no velocity or hazard outputs.

In the absence of detailed hydraulic models, fluvial flood depth, velocity, and hazard are not available as part of the Flood Map for Planning dataset so have not been included as part of this Level 2 SFRA and may need to be considered further during a site-specific FRA.

The depth, hazard, and velocity of the 1% AEP plus upper end climate change surface water flood event, produced by uplifting the EA RoFSW map using the pluvial upper end allowance, has also been mapped and considered in this assessment.

Hazard to people has been calculated using the below formula as suggested in Defra's [FD2321/TR2 "Flood Risk to People"](#). The different hazard categories are shown in Table 3-4. Developers should also test the impact of climate change depths, velocities, and hazard on the site, as part of the site-specific FRA.

Table 3-4: Defra's FD2321/TR2 "Flood Risks to People" classifications

Description of Flood Hazard Rating	Flood Hazard Rating	Classification Explanation
Very Low Hazard/ Caution	<0.75	"Flood zone with shallow flowing water or deep standing water"
Danger For Some (i.e. children)	0.75 - 1.25	"Danger: flood zone with deep or fast flowing water"
Danger For Most	1.25 - 2.00	"Danger: flood zone with deep fast flowing water"
Danger For All	>2.00	"Extreme danger: flood zone with deep fast flowing water"

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

3.12 SuDS suitability

The hydraulic and geological characteristics of each site have been assessed to determine the factors that potentially constrain schemes for surface water management. This assessment is designed to inform the early-stage site planning process and is not intended to replace site-specific detailed drainage assessments. A high-level assessment of suitability of SuDS is included in the site tables in Appendix A.

The assessment is based on catchment characteristics, JBA's Groundwater Emergence mapping and British Geological Survey (BGS) mapping. The permeability of the underlying soils can determine the infiltration capacity and percolation capacities. As such, a review of the soil characteristics has been undertaken. Soils in the northern region of the Borough are comprised of base-rich, freely draining soils, with some shallow lime-rich soils which are also freely draining. There are more lime-rich loamy and clayey soils present in the valleys in the west. In the east of the Borough, shallow lime rich soils over chalk or limestone are present. These more lime rich soils tend to impede drainage surfaces. Towards the south of the Borough, soils are primarily comprised of base-rich, loamy, and clayey soils that are seasonally wet. Where soils are slowly draining with reduced permeability, this may impact infiltration and would need to be considered within any SuDS design (see Section 9 of the Level 1 SFRA for further information on SuDS).

[The British Geological Survey website](#) provides data on soils across Melton borough; however, specific site investigations should be undertaken to determine soil types across the study area.

LiDAR data has been used as a basis for determining the topography and average slope across each development site. Other datasets used to determine factors such as potential water quality and flood constraints include:

- Historic landfill sites
- Groundwater Source Protection Zones
- Nitrate Vulnerable Zones
- Detailed River Network
- Risk of Flooding from Surface Water mapping
- Flood Zones derived as part of this Level 2 SFRA.

This data was then collated to provide an indication of particular groups of SuDS systems which might be suitable at a site. SuDS techniques were categorised into five main groups, as shown in Table 3-5. This assessment should not be used as a definitive guide as to which SuDS would be suitable but used as an indicative guide of general suitability. Further site-specific investigation should be conducted to determine what SuDS techniques could be used on a particular development, informed by detailed ground investigations.

Table 3-5: Summary of SuDS categories

SuDS Type	Technique
Source Controls	Green Roof, Rainwater Harvesting, Pervious Pavements, Rain Gardens
Infiltration	Infiltration Trench, Infiltration Basin, Soakaway
Detention	Pond, Wetland, Subsurface Storage, Shallow Wetland, Extended Detention Wetland, Pocket Wetland, Submerged Gravel Wetland, Wetland Channel, Detention Basin
Filtration	Surface Sand Filter, Sub-Surface Sand Filter, Perimeter Sand Filter, Bioretention, Filter Strip, Filter Trench
Conveyance	Dry Swale, Under-drained Swale, Wet Swale

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

Further site-specific investigation should be conducted to determine what SuDS techniques could be utilised at a particular development. The result of this assessment does not remove the requirements for geotechnical investigation or detailed infiltration testing.

SuDS in Melton borough should be designed in accordance with LCC's [SuDS guidance](#). The Surface Water Management roles and responsibilities for different organisations and relevant legislation, policy and strategy are detailed within Section 9 of the L1 SFRA.

This contains detail on:

- Role of the LLFA and Local Planning Authority in surface water management
- Sustainable Drainage Systems (SuDS)
- Sources of SuDS guidance
- Other surface water considerations: Groundwater Vulnerability Zones; Groundwater Source Protection Zones; Nitrate Vulnerable Zones; Critical Drainage Areas

3.13 Emergency Planning

Flood Warning Areas and Flood Alert Areas are detailed in the EA's GIS datasets and can be used to inform emergency planning. Flood Alert Areas inform the Environment Agency when there is flooding first in the catchment, irrespective of properties, hence this coverage tends to apply to whole watercourses or stretch of coastline. Flood Warning Areas are derived from the extreme flood outline (0.1% AEP event), focussed on communities, properties, and/or infrastructure. Areas covered by this would receive a Flood Warning in advance of flooding.

Modelled depth, velocity and hazard data can be used to understand safe access and egress around each site.

4 Level 2 Assessment Methodology

This section outlines how sites were screened against flood risk datasets to determine which sites required a Level 2 assessment. It also identifies other sites at lower risk with general recommendations for developers.

4.1 Site screening

MBC provided 28 sites for assessment. These sites were screened using a GIS tool against available flood risk information and spatial data to provide a summary of risk to each site, including:

- the proportion of the site in each Flood Zone derived from detailed hydraulic model outputs where available, and where detailed modelling was unavailable the information is taken from the EA's FMfP (see Section 3.2 for a summary of how the Flood Zones were derived for this SFRA).
- the proportion of the site affected by climate change within the central and higher central allowances for the 1% AEP fluvial event where available.
- whether the site is shown to be at risk from surface water flooding in the RoFSW mapping for the 3.3%, 1%, and 0.1% AEP events, and the 1% AEP event plus 40% climate change allowance.
- whether the site is within, or partially within, the reservoir 'Dry Day' or 'Wet Day' flood extents.
- whether the site is within, or partially within, the Environment Agency (EA) Historic Flood Map dataset.
- whether the site is within 100m of watercourses shown within the EA Detailed River Network dataset.
- whether the site is at risk from groundwater emergence using the JBA Groundwater Emergence Map, or susceptible to groundwater flooding using the EA's Groundwater Flooding Susceptibility map.
- whether there are any recorded sewer flooding incidents from Severn Trent Water within the site.

The screening was undertaken using the 'overlap analysis' tool in GIS. This analyses various flood risk datasets against the overlay site allocations layer and calculates the percentage cover for each flood risk dataset against each site. A RAG system was applied to the sites on the basis that:

- 'red' sites have significant obstacles or challenges for development which would need consideration if taken forward. These sites may need the exception test to show that the site can be developed safely, from a flood risk perspective.

- 'amber' sites are flagged for developer considerations, but these are likely to be able to be addressed at the planning application stage. These sites are flagged as they may have some surface water issues related to access and egress to the site.
- 'green' sites that have no significant obstacles for development. However, it is noted sites may need an FRA and drainage strategy depending on the location of the site.

The results of the screening provide a quick and efficient way of identifying sites that are likely to require a Level 2 Assessment, assisting MBC with sequential test decision-making so that flood risk is taken into account when considering allocation options.

The screening also provides an opportunity to identify sites which may show to be 100% in Flood Zone 1, but upon visual inspection in GIS, have an ordinary watercourse flowing through or adjacent to them but for which no Flood Zone information is currently available. Note: although there are no Flood Zone maps available for these watercourses, it does not mean the watercourse does not pose a risk, it just means no modelling has yet been undertaken to identify the risk. Of the eight sites requiring further assessment, the sites which have an unnamed ordinary watercourse that is not represented within the Flood Zones are as follows:

- MBC/015/23
- MBC/020/23
- MBC/021/23
- SSN site
- SSN plus 400m buffer site

Flood Zones are not provided for specific sites or land where the catchment of the watercourse falls below 3km². For this reason, the Flood Zones are not of a resolution to be used as application evidence to provide the details of possible flooding for individual properties or sites and for any sites with watercourses on, or adjacent to the site. The RoFSW has been used in these cases because it is comparable to fluvial flooding from smaller watercourses and is therefore a reasonable representation of the floodplain of such watercourses to use for a strategic assessment.

4.2 Sites taken forward to a Level 2 assessment

MBC provided 28 sites which were subject to initial screening through the use of the 'overlap analysis' tool in GIS. Using this tool, the site boundaries were screened against flood risk datasets to assess the potential viability of the sites and provide flood risk recommendations. Of these 28 sites, 15 were identified as having significant flood risk and a further 10 had minor flooding within the site and/or access and egress problems. Therefore, based on flood risk alone, there are three sites which could be developed outside of flood risk areas. However, MBC have other criteria that must be met for allocation of employment sites, and through their [Employment Land Study \(ELS\) 2024](#) and

Strategic Economic Land Availability Assessment (SELAA) 2023, MBC identified six sites to be taken forward for Level 2 assessment, plus the South Sustainable Neighbourhood (SSN) Masterplan which has been treated as two separate sites for the purposes of this Level 2 assessment. These were identified by MBC as strong candidates for inclusion in the Local Plan to meet local employment needs.

It is not expected that the remaining allocations identified in the site screening exercise will advance; however, the site screening demonstrates that many of these would need flood risk to be assessed in more detail if they were to progress.

Six of the selected sites are categorised as Strategic Employment Land Availability Assessment (SELAA) sites with four of these identified in the screening as 'amber' sites with minor flooding within the site and/or access and egress problems, and two identified as 'red' sites with significant flood risk. The two remaining sites (also identified as 'red' in the screening) are the South Sustainable Neighbourhood (SSN) masterplan, and the SSN masterplan with 400m buffered zone around the undeveloped borders of the SSN predominantly to the south and west.

According to the adopted Local Plan (Policy SS4), the SSN will provide 2,000 homes and 20 hectares of employment land to expand and enhance the existing Leicester Road Industrial Estate. The buffered zone around the SSN masterplan has been provided by MBC as they are currently gathering additional information to amend/produce a masterplan for the area. At the time of writing this SFRA, no decision had been taken regarding this buffered zone; however, it provides MBC with some room for manoeuvre in terms of site design/ allocation. Therefore, the masterplan and its 400m buffered zone have been treated as two separate sites for the purposes of this Level 2 assessment.

The following eight sites were therefore assessed as part of this Level 2 SFRA, with a detailed site summary table produced for each site:

- MBC/003/23: Land at Hudson Road Industrial Estate, Melton Mowbray
- MBC/009/23: Site A, Burrough Court, Burrough on the Hill
- Site MBC/010/23: Land west of Normanton Lane, north of Normanton
- Site MBC/015/23: Airfield Farm, Dalby Road, Melton Mowbray
- Site MBC/020/23: Melton Airfield, Dalby Road, Melton Mowbray
- Site MBC/021/23: Land north of Leicester Road, Melton Mowbray.
- South Sustainable Neighbourhood (SSN)
- South Sustainable Neighbourhood (SSN) plus 400m buffer

Appendix B summarises the results of the site screening for sites which have been taken forward to a Level 2 assessment.

4.3 Cumulative Impact Assessment (CIA)

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

Future development sites within the study area were provided by MBC. Predicted flood risk was assessed in the Level 1 SFRA using a variety of datasets and the catchments were then ranked to allow the categorisation of the catchment dependent on the sensitivity of the catchment to proposed levels of growth, historic flood risk and properties sensitive to growth. For more details on the CIA and catchment rankings please refer to Section 7 of the Level 1 SFRA report.

As part of the Level 2 assessment, the following site was found to be located in a medium-risk catchment:

- MBC/009/23

The following sites were located in a high-risk catchment:

- MBC/003/23
- MBC/010/23
- MBC/015/23
- MBC/020/23
- MBC/021/23
- SSN
- SSN plus 400m buffer

For sites found to be in catchments at risk as outlined above, developers should provide a construction surface water management plan to support the Construction Drainage Phasing Plan, the LLFA and LPA should consult with local non-profit organisations, and the LPA should work with the EA and LLFA to identify areas of land that should be safeguarded for future flood alleviation schemes and NFM features.

4.4 Site summary tables

As part of the Level 2 SFRA, detailed site summary tables have been produced for the eight sites. The summary tables can be found in Appendix A. Each summary table sets out the following information:

- Basic site information
- Location of the site in the catchment
- Area, current land use (greenfield/ brownfield), proposed site use
- Sources of flood risk
- Existing drainage features
- Fluvial – proportion of site at risk including description from mapping/modelling, utilising depth, hazard, and velocity information from detailed hydraulic models where available
- Surface Water – proportion of site at risk including description from RoFSW mapping using available depth, hazard, and velocity information
- Reservoir flood risk in both the 'Dry Day' and 'Wet Day' scenarios
- Flood history - historic incidents on or surrounding the site from the EA Recorded Flood Outline and Historic Flood Map datasets and historic incidences provided by LCC as LLFA
- Flood risk management infrastructure
- Description of residual risk
- Emergency Planning
- Flood Warning and Alert Areas
- Access and egress
- Fluvial climate change - summary of available climate change allowances and increase in flood extent compared to the 1% AEP event (Flood Zone 3a)
- Surface water climate change - summary of available climate change allowances and increase in flood extent compared to the 1% AEP event
- Requirements for drainage control and impact mitigation
- Broadscale assessment of possible SuDS to provide indicative surface water drainage advice for each site assessed for the Level 2 SFRA.
- Groundwater Source Protection Zones
- Historic landfill sites
- NPPF Planning implications
- Exception test requirements
- Requirements and guidance for site-specific FRA (including consideration of opportunities for strategic flood risk solutions to reduce flood risk)
- Key messages – summarising considerations if development proceeds

5 Flood Risk Management Requirements for Developers

The Environment Agency provides [guidance on FRAs](#). This section demonstrates to developers how to use this SFRA to inform an FRA. These are carried out by (or on behalf of) developers to assess flood risk to and from a site. They are submitted with Planning Applications and should demonstrate how flood risk will be managed over the development's lifetime, considering climate change and the vulnerability of users.

It is recommended that as part of the early discussions relating to development proposals, developers discuss requirements relating to site-specific FRAs and drainage strategies with both the LPA and the Lead Local Flood Authority (LLFA), to identify any potential issues that may arise from the development proposals. It is also recommended that developers should request the latest available flood risk data for site-specific FRAs as this SFRA only provides the most up to date data at the time of writing.

The Level 1 and Level 2 SFRA reports provide a strategic assessment of flood risk in Melton borough and at specific sites. Prior to any construction or development, site-specific assessments will need to be undertaken so all forms of flood risk, and any defences at a site, are considered in more detail. Developers should, where required, undertake more detailed hydrological and hydraulic assessments of the watercourse to verify flood extents (including latest climate change allowances), to inform the sequential approach within the site and prove, if required, whether the exception test can be satisfied.

A detailed FRA undertaken for a windfall site may find that the site is entirely inappropriate for development of a particular vulnerability, or even at all.

The EA advise that large development sites and associated new infrastructure may be able to deliver ways to reduce the risk of flooding (from all sources) on the site and also off the site where a stand-alone flood alleviation scheme is not viable. On these sites, early engagement with the EA is recommended. The EA also request that any development close to the edge of the floodplain is set back as much as possible leaving a development buffer, as a precautionary approach.

Developers should refer to the following sections of the Level 1 SFRA report for further information on the requirements for development.

- Section 8.1 - Principles for new developments
 - This section provides guidance for developers on applying the Sequential and Exception Tests, consulting with statutory consultees, considering the risk from all sources of flooding, ensuring development seeks to reduce flooding and is safe for future users, enhancing the natural river environment and floodplain, and contributing to wider flood mitigation strategies within the Melton borough.

- Section 8.2 - Requirements for site-specific Flood Risk Assessments
 - When is an FRA required?
 - Objectives of a site-specific FRA
 - Site layout and design
 - Modification of ground levels
 - Raised floor levels
 - Development and raised defences
 - Developer contributions
 - Buffer strips
 - Making space for water

5.1 Flood warning and emergency planning

Appendix D of the Level 1 SFRA details the EA Flood Warnings and Flood Alerts available within Melton borough at the time of publication. This Level 2 assessment has identified four proposed sites (MBC/003/23, MBC/021/23, SSN and SSN plus 400m buffer) located within existing EA FWAs. For proposed development within existing EA FWAs, developers should consult the EA to ensure that adequate flood warning procedures and evacuation processes are in place and that RMAs are not put under any additional burden.

Section 8.5 of the Level 1 SFRA report discusses NPPF requirements and what an emergency plan will need to consider and other relevant information on emergency planning. Further information is provided on the [Leicester, Leicestershire and Rutland Aware and Prepared flooding webpage](#).

5.2 Reservoirs

This Level 2 SFRA identified two sites (MBC/021/23 and SSN masterplan with 400m buffer) assessed within the site summary tables that are shown to be at risk of reservoir flooding during the 'Dry Day' and 'Wet Day' scenarios. The SSN masterplan site without the 400m buffer is at risk of reservoir flooding in the 'Wet Day' scenario only. The level and standard of inspection and maintenance required under the Reservoirs Act means that the risk of flooding from reservoirs is very low. However, there is a residual risk of a reservoir breach, and this risk should be considered in any site-specific FRA (where relevant).

Section 8.4.3 of the Level 1 SFRA report details considerations that developers should follow when allocating development downstream of a reservoir.

5.3 Duration and onset of flooding

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

- The position of the site within a river catchment, with those at the top of a catchment likely to flood sooner than those lower down. The duration of flooding tends to be longer for areas lower in river catchments.
- Reservoirs in upper catchments will provide some online flood storage that reduces the flood risk downstream and delays the onset of flooding. At the confluence of the larger watercourses and smaller tributaries, there may be different timings of peak flows, for example smaller tributaries would peak much earlier than watercourses with larger catchments.
- The principal source of flooding: where this is surface water, depending on the intensity and location of the rainfall, flooding could be experienced within 30 minutes of the heavy rainfall event e.g., a thunderstorm. Typically, the duration of flooding for areas at risk of surface water flooding, or from flash flooding from small watercourses, is short (hours rather than days).
- The preceding weather conditions prior to the flooding: wet weather lasting several weeks will lead to saturated ground. Rivers respond much quicker to rainfall in these conditions.
- Whether a site is defended, noting that if the defences were to fail, a site could be affected by very fast flowing and hazardous water within 15 minutes of a breach developing (depending on the size of the breach and the location of the site in relation to the breach), causing danger to life.
- Catchment geology: the permeability of a catchment affects its response time, for example chalk catchments take longer to respond than clay catchments.

Table 5-1 provides guidelines on the typical response time that may be expected for fluvial and surface water flooding. However, these are only broad guidelines, and it is recommended that a site-specific FRA refines this information based on more detailed modelling work where necessary, and assessment within an emergency response plan.

Table 5-1: Guidelines on the duration and onset of flooding

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

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

6 Summary of Level 2 assessment

6.1 Overview

This Level 2 SFRA delivers site-specific guidance and recommendations for sites in the Melton Borough Council study area. As part of the Level 2 SFRA, 8 detailed site summary tables have been produced and can be found in Appendix A. Flood risk mapping at these sites can be viewed on [MBC's Mapping Portal](#). The Level 2 SFRA should be read in conjunction with the Level 1 SFRA which delivers a strategic assessment of all sources of flooding, including possible failure of the Grantham Canal, across the authority area.

6.2 Recommendations

6.2.1 Level 1 SFRA

Recommendations from this report should be considered in addition to recommendations from the Level 1 SFRA, which still stands for the site allocations and any windfall development that comes forward. Recommendations in the Level 1 SFRA were made regarding (but not limited to):

- Locating new development according to the sequential and exception test requirements, including adopting a sequential approach within the site.
- Considering long-term opportunities to remove development from the floodplain and to make space for water.
- Adequately assessing the risk where there is an unknown risk from an ordinary watercourse. This could include modelling the watercourse should the potential risk be found to be high.
- Ensuring development has safe, dry pedestrian egress and that emergency vehicular access is possible for all residential development.
- Considering flood resilience measures for new development.
- Demonstrating through SuDS design how site-specific constraints have been considered and how the design provides multiple benefits.
- Seeking opportunities for betterment where possible, where surface water flooding issues are present.

6.2.2 Level 2 SFRA

To pass the exception test, it must be shown that the development will provide wider sustainability benefits that outweigh the risk, and that the development will be safe throughout its lifetime without increasing risk elsewhere. The former is a planning-related consideration and the Level 2 SFRA helps to answer the latter part of the test.

Some of the sites assessed in this Level 2 SFRA are at greater risk and will require careful consideration and significant mitigation to pass the flood risk element of the exception test, while other sites are likely to pass the flood risk element of the exception test by:

- Undertaking a sequential approach to site planning so development is steered away from areas within the site at the highest risk.
- Considering safe access/ egress in the event of a flood (from all parts of the site, if say the site is severed by a flood flow path). If access and egress is affected, a Flood Response Plan may be required.
- Finished floor levels should be above the estimated flood level (Fluvial 1% AEP event with an allowance for climate change), including an allowance for freeboard.
- Using areas in Flood Zone 2 for the least vulnerable parts of the development in accordance with Table 2 in the PPG. No development should be permitted in Flood Zone 3b (aside from Essential Infrastructure).
- Considering space for green infrastructure in the areas of highest flood risk.

Consideration should be given to the surface water risk where this is high, with regards to the exception test. For example, sites MBC/009/23, MBC/010/23 may pass the test based on fluvial flood risk alone, but a greater risk may come from surface water. For sites MBC/015/23 and MBC/020/23, the fluvial flood extents do not affect the site in the present day or future scenarios, however there is risk from ordinary watercourses which is demonstrated in the surface water modelling.

If a settlement site is split in future into smaller land parcels for development, and some of those parcels are in areas of flood risk, the exception test may need to be re-applied by the Developer at the planning application stage. This is likely to be the case for the SSN masterplan site as well as the 400m buffered zone around this site.

In some cases, and following the application of the sequential test, it may be appropriate for the developer to contribute to the improvement of maintenance and provision of flood risk management assets, flood warning and the reduction of surface water flooding (i.e. SuDS).

Developers should, where required, undertake more detailed hydrological and hydraulic assessments of the watercourses, including latest climate change allowances, to verify flood extent in order to inform the sequential approach within the site and demonstrate, as required, that the exception test is satisfied.

6.3 Guidance for windfall sites and sites not assessed in the Level 2 SFRA

- Where no recent detailed hydraulic modelling is present, it is recommended that developers construct new, or update existing, detailed hydraulic models at these sites as part of a site-specific FRA using channel, structure, and topographic survey to confirm flood risk during the 1% AEP plus climate change 'design event'. Site-specific flood modelling will likely need to be developed in locations where it is necessary to understand the effects of proposed development schemes on the existing flood flow paths and flood volume storage, in the present day and in the future.
- If a site's boundary includes or borders an EA Main River (including a culverted reach of a Main River), an easement of 8m is required from both banks for access and maintenance. Any future development will require a flood risk permit for any activity within 8m of a Main River. Further information relating to this can be viewed on the government website [Flood risk activities: environmental permits](#).
- If an ordinary watercourse is within or immediately adjacent to the site area, consultation with the LCC as LLFA should be undertaken. If alterations or discharges are proposed to the watercourse, a land drainage consent will be required.
- Where necessary, blockages of nearby culverts may need to be simulated in a hydraulic model to confirm residual risk to the site.
- Surface water risk should be considered in terms of the proportion of the site at risk in the 3.3%, 1% and 0.1% AEP events (with an appropriate allowance for climate change), whether the risk is due to isolated minor ponding or deeper pooling of water, or whether the risk is due to a wider overland flow route.
- Surface water risk and mitigation should be considered as part of a detailed site-specific FRA and surface water drainage strategy.
- Access and egress should be considered at the site, but also in the vicinity of the site, for example, a site may have low surface water risk, but in the immediate locality, access/egress to and from the site could be restricted for vehicles and/ or people.
- If a site is located within 250m of a landfill site, there could be dirt and contamination issues. Sites could be sensitive from the perspective of controlled waters and therefore any redevelopment must ensure there is no pollution risk to the water environment.

6.4 Use of SFRA data and future updates

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

The SFRA should be a 'living document', and as a result should be updated when new information on flood risk, flood warning or new planning guidance or legislation becomes available. Additional guidance should be sought from MBC, LCC as LLFA, the Environment Agency, Severn Trent Water, and Anglian Water where relevant to ensure the most up to date information is considered within any new assessments. Such information may be in the form of:

- Policy/ legislation updates (provided by the Government, MBC, or LCC as LLFA)
- Flood event information following a flood event (provided by MBC or LCC as LLFA)
- New hydraulic modelling results (provided by the Environment Agency)
- Environment Agency flood map updates (provided by the Environment Agency)
- New flood defence or alleviation schemes (provided by MBC or LCC as LLFA)

The Environment Agency regularly reviews their flood risk mapping, and it is important that they are approached to determine whether updated information is available prior to commencing a detailed Flood Risk Assessment. The EA are currently undertaking new nationalised modelling (NaFRA2) which is due to go live in spring 2025, although these timescales are subject to change due to the complexities of this project.

It is recommended that the SFRA is reviewed in line with the EA's Flood Zone map updates to ensure latest data is still represented in the SFRA, allowing a cycle of review and a review of any updated data by checking with the above bodies for any new information.

6.5 Neighbourhood plans

Flood risk should be fully addressed in development plan preparation and in bringing forward policies for the allocation of land. Therefore, SFRA findings should be used in the production of Neighbourhood Plans.

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



A Site Summary Tables

B Site screening summary for Level 2 sites

Offices at

Bristol
Coleshill
Doncaster
Dublin
Edinburgh
Exeter
Glasgow
Haywards Heath
Leeds
Limerick
Newcastle upon Tyne
Newport
Peterborough
Portsmouth
Saltaire
Skipton
Tadcaster
Thirsk
Wallingford
Warrington

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