SFRA Update 2022

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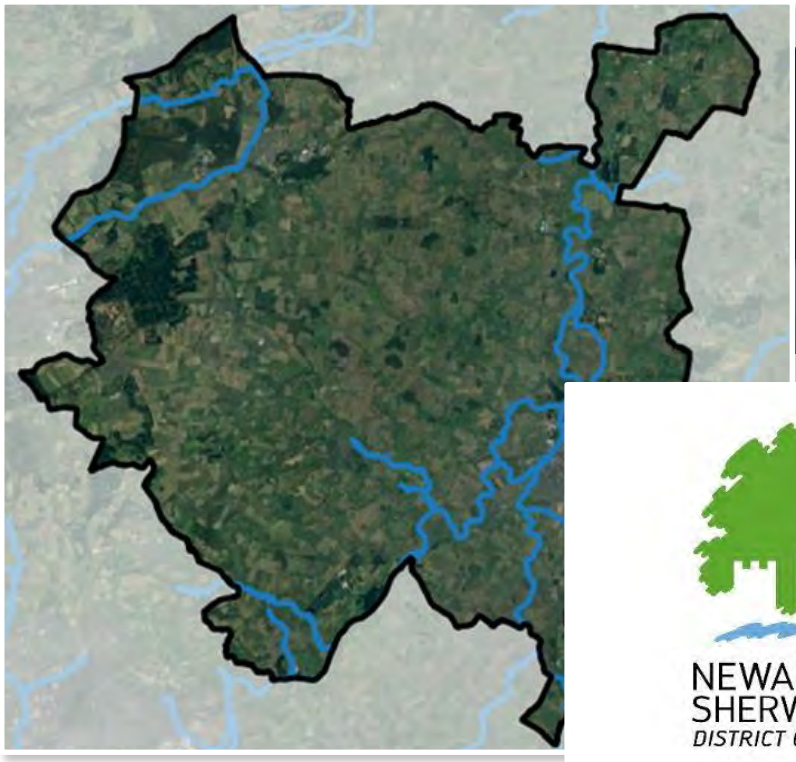

Level 2

NEWARK & SHERWOOD DISTRICT COUNCIL

Final Report

Newark and Sherwood District Council

19/12/22

Document prepared on behalf of Tetra Tech Limited. Registered in England number: 01959704

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APPENDICES

ACRONYMS/ABBREVIATIONS

Acronyms/Abbreviations	Definition
AEP	Annual Exceedance Probability
EA	Environment Agency
FRA	Flood Risk Assessment
NPPG-FRCC	National Planning Practice Guidance - Flood Risk and Coastal Change
LFRMS	Local Flood Risk Management Strategy
LLFA	Lead Local Flood Authority
LPA	Local Planning Authorities
N&SDC	Newark and Sherwood District Council
NPPF	National Planning Policy Framework
SFRA	Strategic Flood Risk Assessment

1.0 INTRODUCTION

1.1 OVERVIEW

The Level 2 Strategic Flood Risk Assessment (SFRA) Update 2022 is provided to Newark and Sherwood District Council (N&SDC), the designated Local Planning Authority (LPA). The Level 2 SFRA is used to assess those sites screened in the Level 1 SFRA Update (2022), as being in areas of flood risk, in more detail.

40 sites were put forward by the Level 1 SFRA for further assessment in the Level 2 SFRA. The Level 2 SFRA assessment builds upon the Level 1 SFRA data with an enhanced understanding of fluvial, surface water, groundwater, and reservoir related flooding to provide enough information for the Exception Test to be applied where applicable. Where necessary, sites requiring further Flood Risk Assessment (FRA) are noted. Across Newark and Sherwood District there are incidences where several sites are in close proximity to each other. For the purpose of this Level 2 assessment the sites are grouped together into a larger scale development and assessed as one singular unit, with each site assumed to be a development parcel within the wider development.

A SFRA is a live document that is intended to be periodically updated. This Level 2 assessment has been undertaken in accordance with the information available at time of publishing. When newly available guidance and or data is made available, the user should endeavour to use that. Updating of an SFRA is recommended by the Environment Agency (EA) every 3 -4 years unless there is a substantial change in guidance or a significant flood event. A SFRA is not a spatial plan or a planning policy, but it informs the planning process of:

- Present and future flood risks (without new development)
- Residual flood risks, both present and future (with new development for the life-time of that development).

1.2 REPORT STRUCTURE

A SFRA has multiple end users, including but not limited to the LPA, EA, Developers, and Flood Risk Consultants. Therefore, the report structure is set out below to aid navigation and use.

- Section 1- Overview and Report Structure
- Section 2 - Level 2 Scope
- Section 3 - Sites for Screening
- Section 4 – Screening report

1.3 DATA POLICY

Within the SFRA data is utilised under the following data agreements:

- Contains OS data © Crown copyright and database right 2022
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1.4 LIMITATIONS OF THIS REPORT

This report has been prepared by Tetra Tech on behalf of Newark and Sherwood District Council in connection with the scope of the report as described in Section 1 and takes into account the particular instructions and requirements set out in our fee proposal and the acceptance.

It is not intended for and should not be relied on by any third party and no responsibility is undertaken to any third party.

Tetra Tech accepts no duty or responsibility (including in negligence) to any party other than Newark and Sherwood District Council and disclaims all liability of any nature whatsoever to any such party in respect of this report.

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2.0 LEVEL 2 SCOPE

A Level 2 SFRA is designed to build upon that of the Level 1 SFRA assessment, examining development areas put forward by the LPA that are at high risk from flooding. The aim is to provide a more detailed examination of the sites with regards to flood risk.

The Level 2 SFRA uses data from these sources of flooding which were identified in the Level 1 SFRA:

- Main rivers
- Ordinary watercourse
- Surface water
- Reservoir inundation
- Groundwater

Within the Level 2 SFRA the following more detailed datasets are also used to assess the risk from flooding:

- Modelled fluvial flood extents (where a model is available)
- Modelled fluvial depth, hazard, and level data (where a model is available)

Using this information each site is assessed and aims to:

- Support the Sequential Test
- Identify whether the Exception Test, where applicable, might pass
- Identify flood risk indicators
- Suggest appropriate mitigation measures where required

The “How to prepare a strategic flood risk assessment” produced by the EA in March 2022 sets out what is to be included within a Level 2 SFRA:

- Published online
- Different set of maps from the Level 1 SFRA
- Supporting report for the additional maps
- User guide
- Be detailed enough to identify which development allocation sites have the least risk of flooding
- Contain the information needed to apply the exception test, if relevant
- Enable the decision of whether the development can be made safe without increasing flood risk elsewhere
- Enable application of the sequential test by identifying the severity and variation in risk within medium and high flood risk areas
- Establish whether proposed allocations or windfall sites, on which the local plan will rely, are capable of being made safe throughout their lifetime without increasing flood risk elsewhere.

3.0 LEVEL 2 SITES SCOPING

The 40 sites carried forward from the Level 1 SFRA Update 2022 have an associated risk of flooding. However, the risk of flooding in some case is minimal and not warranting of a detailed Level 2 Site Assessment.

Sites that are deemed to have limited requirement for a detailed Level 2 assessment are scoped out of the Level 2 assessment and further investigation. The details of the Site scoping exercise are detailed in Section 3.1 and Table 3-1.

3.1 SCOPING

Scoping the Level 2 SFRA sites allows for the assessment to consider risk realistically for each site, and devote the given time required to aid in the N&SDC Local Plan. Sites that are at a designated lower risk of flooding are based upon the following criteria:

- Flood risk is at a low level on site in which development can be easily mitigate against through flood risk management.
- Flood risk is part of the boundary of the site and able to be mitigated against through site design.

A site is scoped forward for a Level 2 site specific detailed assessment when the following is found:

- Flood Risk Vulnerability is at a level in which an Exception Test is deemed necessary as per the NPPG-FRCC guidance.
- The site is primarily situated within Flood Zone 2/3a/3b.
- The site is at risk of flooding from surface water from which the site will be adversely affected.

The scoped list has been subjectively evaluated and therefore sites not brought forward to the full screening report will need to be individually evaluated with a FRA when put forward for development. The list of sites that have been scoped in and out from the Level 2 SFRA are shown in Table 3.1.

Level 2 SFRA Site Scoping

Table 3-1- Level 2 SFRA Site Scoping

					Fluvial				Risk of Flooding from Surface Water			Other Source of Flooding		Site Suitability		
Local Plan Reference	**SFRA Map ID**	**Site Name and Address**	**Site Area (ha)**	**Flood Vulnerability**	**Flood Zone 1 (%)**	**Flood Zone 2 (%)**	**Flood Zone 3a (%)**	**Flood Zone 3b (%)**	**3.3% AEP (%)**	**1% AEP (%)**	**0.1% AEP (%)**	**Reservoir ✓/ X**	**Groundwater susceptibility**	**FRA Required ✓/ X**	**Scoped ✓/ X**	**Comments**
NUA/HO/2	1	Land south of Quibells Lane	1.065	More Vulnerable	39	61	0	0	6	15	34	✓	>75%	✓	✓	Details found in site specific report
NUA/HO/5		Land north of Beacon Hill Road and the northbound A1 Coddington slip road	5.185	More Vulnerable	100	0	0	0	0	0	4	X	25-50%	✓	X	Site is greater than 1 ha. Surface Water flooding risk identified as a flowpath through the centre of the site. Groundwater flooding susceptibility at 25-50%. Recommended that a site specific FRA to identify the best measures to mitigate surface water flooding and manage runoff to prevent increasing risk elsewhere.
NUA/HO/6		Land between 55 and 65 Millgate	0.325	More Vulnerable	100	0	0	0	8	8	38	X	25-50%	✓	X	Surface Water flooding risk identified in the east of the site, with a potential flow path linking to Edward Avenue. Groundwater flooding susceptibility at 25-50%. Recommended that a site specific FRA to identify the best measures to mitigate surface water flooding and prevent increasing risk elsewhere.
NUA/HO/9		Land on Bowbridge Road	4.256	More Vulnerable	100	0	0	0	1	4	18	X	25-50%	✓	X	Site is greater than 1 ha Surface Water flooding risk identified occurring through the north of the site, with a potential flow path. Groundwater flooding susceptibility at 25-50%. Recommended that a site specific FRA to identify the best measures to mitigate surface water flooding and manage runoff to prevent increasing risk elsewhere.
NUA/HO/10		Land north of Lowfield Lane	6.393	More Vulnerable	99	1	0	0	1	3	14	X	>75%	✓	X	Site is greater than 1 ha. Surface Water flooding risk identified occurring through the south of the site, with a potential flow path from

					Fluvial				Risk of Flooding from Surface Water			Other Source of Flooding		Site Suitability		
Local Plan Reference	SFRA Map ID	Site Name and Address	Site Area (ha)	Flood Vulnerability	Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)	3.3% AEP (%)	1% AEP (%)	0.1% AEP (%)	Reservoir ✓/ X	Groundwater susceptibility	FRA Required ✓/ X	Scoped ✓/ X	Comments
																Lowfield Lane. Groundwater susceptible to flooding at >75%. Recommended that a site specific FRA to investigate all sources of flooding and identify the best measures to mitigate flooding and manage runoff to prevent increasing risk elsewhere. Small section of site found in Flood Zone 2 from Lowfield Lane. Design at planning stage to steer development away from this zone.
SO/HO/5		Land off Lower Kirklington Road	3.251	More Vulnerable	100	0	0	0	2	5	20	X	0%	✓	X	Site is greater than 1 ha. Surface Water flooding risk identified occurring through the north of the site and west, with a potential flow path from cycle path. Recommended that a site specific FRA to identify the best measures to mitigate surface water flooding and manage runoff to prevent increasing risk elsewhere.
SO/HO/7		Southwell Depot	0.571	More Vulnerable	100	0	0	0	0	0	12	X	50-75%	✓	X	Surface Water flooding risk identified occurring through the west of the site with a potential flow path from Upton Road. Groundwater susceptibility to flooding at 50 -75%. Recommended that a site specific FRA to investigate all sources of flooding and identify the best measures to mitigate flooding and manage runoff to prevent increasing risk elsewhere.
NUA/GRT/15		Land at Appleby Lodge	1.73	Highly Vulnerable	100	0	0	0	1	3	27	X	50-75%	✓	X	Site is greater than 1 ha. Surface Water flooding risk identified occurring through the centre of the site with a potential flow path from the railway line and footpath. Groundwater susceptibility to flooding at 50-75%. Recommended that a site specific FRA to investigate all sources of flooding and identify the best measures to mitigate

	Local Plan Reference	SFRA Map ID	Site Name and Address	Site Area (ha)	Flood Vulnerability	Fluvial: Flood Zone 1 (%)	Fluvial: Flood Zone 2 (%)	Fluvial: Flood Zone 3a (%)	Fluvial: Flood Zone 3b (%)	Risk of Flooding from Surface Water: 3.3% AEP (%)	Risk of Flooding from Surface Water: 1% AEP (%)	Risk of Flooding from Surface Water: 0.1% AEP (%)	Other Source of Flooding: Reservoir ✓/ X	Other Source of Flooding: Groundwater susceptibility	Site Suitability: FRA Required ✓/ X	Site Suitability: Scoped ✓/ X	Comments
																	flooding and manage runoff to prevent increasing risk elsewhere.
GROUP 1	OB/GRT/1		Shannon Caravan Site, Ollerton	1.72	Highly Vulnerable	100	0	0	0	3	5	15	X	<25%	✓	✓	The proposed use is highly vulnerable and although in Flood Zone 1 there is a risk of surface water flooding via a flow path from Wellow Road. Assessed in more detailed as part of Group 1 – Shannon Caravan Site detailed site assessment.
	OB/GRT/BL/1		Shannon Caravan Site Extension, Ollerton	0.27	Highly Vulnerable	100	0	0	0	2	11	39	X	<25%	✓	✓	The proposed use is highly vulnerable and although in Flood Zone 1 there is a risk of surface water flooding via a flow path from Upton Road. Assessed in more detailed as part of Group 1 – Shannon Caravan Site detailed site assessment.
	OB/GRT/2	2	The Paddock, Ollerton	0.56	Highly Vulnerable	100	0	0	0	0	0	0	X	<25%	✓	✓	No flooding risk identified but as it is part of a larger development is kept in the Level 2 SFRA. Assessed in more detailed as part of Group 1 – Shannon Caravan Site detailed site assessment.
	OB/GRT/3	2	The Stables, Ollerton	0.3	Highly Vulnerable	100	0	0	0	0	0	0	X	<25%	✓	✓	No flooding risk identified but as it is part of a larger development is kept in the Level 2 SFRA. Assessed in more detailed as part of Group 1 – Shannon Caravan Site detailed site assessment.
	OB/GRT/4	2	Dunromin, Ollerton	0.19	Highly Vulnerable	100	0	0	0	2	43	82	X	<25%	✓	✓	The proposed use is highly vulnerable and although in Flood Zone 1 there is a significant Surface Water flooding risk associated with a flow path from Newark Road. Assessed in more detailed as part of Group 1 – Shannon Caravan Site detailed site assessment.

	Local Plan Reference	SFRA Map ID	Site Name and Address	Site Area (ha)	Flood Vulnerability	Fluvial: Flood Zone 1 (%)	Fluvial: Flood Zone 2 (%)	Fluvial: Flood Zone 3a (%)	Fluvial: Flood Zone 3b (%)	Risk of Flooding from Surface Water: 3.3% AEP (%)	Risk of Flooding from Surface Water: 1% AEP (%)	Risk of Flooding from Surface Water: 0.1% AEP (%)	Other Source of Flooding: Reservoir ✓/ X	Other Source of Flooding: Groundwater susceptibility	Site Suitability: FRA Required ✓/ X	Site Suitability: Scoped ✓/ X	Comments
	OB/GRT/5	2	Greenwood, Ollerton	0.13	Highly Vulnerable	100	0	0	0	1	24	77	X	<25%	✓	✓	The proposed use is highly vulnerable and although in Flood Zone 1 there is a significant Surface Water flooding risk associated with a flow path from Newark Road. Assessed in more detailed as part of Group 1 – Shannon Caravan Site detailed site assessment.
	NUA/GRT/13		Belvoir Ironworks, Newark	2.35	Highly Vulnerable	100	0	0	0	1	1	12	✓	50-75%	✓	X	Site is greater than 1 ha. Surface Water flooding risk identified occurring through the east of the site with ponding. Reservoir Flooding is seen to the western extent of the site by less than 1 m. Groundwater susceptible to flooding at 50-75%, Recommended that a site specific FRA to investigate all sources of flooding and identify the best measures to mitigate flooding and manage runoff to prevent increasing risk elsewhere.
	NUA/GRT/14	3	Land Northwest of Winthorpe Road, Newark	0.31	Highly Vulnerable	0	100	0	0	0	0	21	✓	>75%	✓	✓	Details found in site specific report
Group 2	NUA/GRT/1	4	Park View, Tolney Lane, Newark	0.39	Highly Vulnerable	0	0	0	100	0	1	18	✓	>75%	✓	✓	Proposed use is highly vulnerable and entire Site is located in Flood Zone 3b. Assessed in more detailed as part of Group 2 – East Tolney Lane detailed site assessment.
	NUA/GRT/2	4	Bowers Caravan Park, Tolney Lane, Newark	0.38	Highly Vulnerable	0	0	0	100	5	12	37	✓	>75%	✓	✓	Proposed use is highly vulnerable and entire Site is located in Flood Zone 3b. Assessed in more detailed as part of Group 2 – East Tolney Lane detailed site assessment.
	NUA/GRT/10	4	Church View, Tolney Lane, Newark	1.07	Highly Vulnerable	0	0	0	100	0	0	0	✓	>75%	✓	✓	Proposed use is highly vulnerable and entire Site is located in Flood Zone 3b. Assessed in more detailed as part of Group 2 – East Tolney Lane detailed site assessment.

						Fluvial				Risk of Flooding from Surface Water			Other Source of Flooding		Site Suitability		
	Local Plan Reference	SFRA Map ID	Site Name and Address	Site Area (ha)	Flood Vulnerability	Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)	3.3% AEP (%)	1% AEP (%)	0.1% AEP (%)	Reservoir ✓/ X	Groundwater susceptibility	FRA Required ✓/ X	Scoped ✓/ X	Comments
GROUP 3	NUA/GRT/4	5	Land opposite Ropewalk Farm, Tolney Lane, Newark	0.64	Highly Vulnerable	0	53	45	2	0	0	2	✓	>75%	✓	✓	Proposed use is highly vulnerable, and Site is located in Flood Zone 2, and 3. Assessed in more detailed as part of Group 3 – West Tolney Lane detailed site assessment.
	NUA/GRT/5	5	Sandhill Sconce, Tolney Lane, Newark	1.31	Highly Vulnerable	0	57	33	0	0	1	6	✓	>75%	✓	✓	Proposed use is highly vulnerable, and Site is located in Flood Zone 2, and 3. Assessed in more detailed as part of Group 3 – West Tolney Lane detailed site assessment.
	NUA/GRT/7	5	Hirram's Paddock, Tolney Lane, Newark	2.68	Highly Vulnerable	0	33	57	0	0	1	8	✓	>75%	✓	✓	Proposed use is highly vulnerable, and Site is located in Flood Zone 2, and 3. Assessed in more detailed as part of Group 3 – West Tolney Lane detailed site assessment.
	NUA/GRT/3	5	Hose Farm, Tolney Lane, Newark	0.75	Highly Vulnerable	0	95	2	3	0	0	6	✓	>75%	✓	✓	Proposed use is highly vulnerable, and Site is located in Flood Zone 2, and 3. Assessed in more detailed as part of Group 3 – West Tolney Lane detailed site assessment.
	NUA/GRT/11	5	Riverside Park, Tolney Lane, Newark	0.57	Highly Vulnerable	0	98	2	0	0	0	2	✓	>75%	✓	✓	Proposed use is highly vulnerable, and Site is located in Flood Zone 2, and 3. Assessed in more detailed as part of Group 3 – West Tolney Lane detailed site assessment.
	NUA/GRT/6	5	The Paddocks, Tolney Lane, Newark	0.32	Highly Vulnerable	0	99	0	1	0	0	0	✓	>75%	✓	✓	Proposed use is highly vulnerable, and Site is located in Flood Zone 2, and 3. Assessed in more detailed as part of Group 3 – West Tolney Lane detailed site assessment.
	NUA/GRT/8	5	Taylor's Paddock, Tolney Lane, Newark	0.03	Highly Vulnerable	0	100	0	0	0	0	0	✓	>75%	✓	✓	Proposed use is highly vulnerable, and Site is located in Flood Zone 2, and 3. Assessed in more detailed as part of Group 3 – West Tolney Lane detailed site assessment.

						Fluvial				Risk of Flooding from Surface Water			Other Source of Flooding		Site Suitability		
	Local Plan Reference	SFRA Map ID	Site Name and Address	Site Area (ha)	Flood Vulnerability	Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)	3.3% AEP (%)	1% AEP (%)	0.1% AEP (%)	Reservoir ✓/ X	Groundwater susceptibility	FRA Required ✓/ X	Scoped ✓/ X	Comments
	NUA/GRT/9	5	Price's Paddock, Tolney Lane, Newark	0.19	Highly Vulnerable	0	94	6	0	0	0	0	✓	>75%	✓	✓	Proposed use is highly vulnerable, and Site is located in Flood Zone 2, and 3. Assessed in more detailed as part of Group 3 – West Tolney Lane detailed site assessment.
	NUA/E/2		Land west of the A1 on Stephenson Way	9.311	Less Vulnerable	100	0	0	0	2	5	15	✓	50-75%	✓	X	Site is greater than 1 ha. Surface Water flooding risk identified occurring through the south of the site with a potential flow path from Brunel Drive. Reservoir Flood on a 'wet' day on the western extent of the site. Groundwater susceptibility to flooding at 50-75%. Recommended that a site specific FRA to investigate all sources of flooding and identify the best measures to mitigate flooding and manage runoff to prevent increasing risk elsewhere.
	NUA/E/3	6	Land off Telford Drive	0.503	Less Vulnerable	100	0	0	0	1	20	60	✓	50-75%	✓	✓	Details found in site specific report
	NUA/E/4	7	Land at the former Nottinghamshire County Council Highways Depot	2.067	Less Vulnerable	0	66	34	0	0	3	3	✓	>75%	✓	✓	Details found in site specific report
	SO/E/2	8	Land to the east of Crew Lane	2.34	Less Vulnerable	86	14	0	0	6	23	53	X	50-75%	✓	✓	Details found in site specific report
GROUP 4	OB/E/1	9	Boughton Industrial Estate North Policy Area	25.505	Less Vulnerable	96	1	3	0	3	7	27	X	<25%	✓	✓	Site has Flood Zone 3a and 2 on its western border from the Boughton Dyke and a surface water flow path through the site. Assessed in more detailed as part of Group 4 – Boughton Industrial Estate detailed site assessment.
	OB/E/2	9	Boughton Industrial Estate (South) Policy Area	31.483	Less Vulnerable	97	0	3	0	2	4	16	X	<25%	✓	✓	Site has Flood Zone 3a and 2 on its western border from the Boughton Dyke and a surface water flow path through the site. Assessed in more detailed as part of Group 4 –

						Fluvial				Risk of Flooding from Surface Water			Other Source of Flooding		Site Suitability		
	Local Plan Reference	SFRA Map ID	Site Name and Address	Site Area (ha)	Flood Vulnerability	Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)	3.3% AEP (%)	1% AEP (%)	0.1% AEP (%)	Reservoir ✓/ X	Groundwater susceptibility	FRA Required ✓/ X	Scoped ✓/ X	Comments
																	Boughton Industrial Estate detailed site assessment.
	OB/E/3	9	Land to the south of Boughton Industrial Estate	3.864	Less Vulnerable	95	1	4	0	2	4	15	X	<25%	✓	✓	Site has Flood Zone 3a and 2 on its western border from the Boughton Dyke and a surface water flow path through the site. Assessed in more detailed as part of Group 4 – Boughton Industrial Estate detailed site assessment.
	BI/E/1	10	Land on the southern side of Brailwood Road	2.692	Less Vulnerable	100	0	0	0	33	48	81	X	0%	✓	✓	Details found in site specific report
	RA/E/1	11	Land West of Colliery Lane	5.502	Less Vulnerable	92	1	7	0	4	7	15	X	0%	✓	✓	Details found in site specific report
	BL/E/1		Land on Blidworth Industrial Park	0.327	Less Vulnerable	100	0	0	0	8	8	8	X	0%	✓	X	Surface Water flooding risk identified occurring through the east of the site with a potential flow path from a dyke in the tree plantation. Recommended that a site specific FRA to identify the best measures to mitigate surface water flooding and prevent increase in risk elsewhere.
	NUA/MU/1		Land North of the A17	21.808	Less Vulnerable	100	0	0	0	0	0	16	X	>75%	✓	X	Site is greater than 1 ha. Surface Water flooding risk identified occurring through the southeast of the site with a potential flow path from a dyke. Groundwater susceptible to flooding at >75%. Recommended that a site specific FRA to investigate all sources of flooding and identify the best measures to mitigate flooding and manage runoff to prevent increasing risk elsewhere.
	OB/MU/2		Land between Kirk Drive, Stepnall Heights and Hallam Road	12.966	More Vulnerable	100	0	0	0	1	1	7	X	<25%	✓	X	Site is greater than 1 ha. Surface Water flooding risk identified occurring through the east of the site with a potential flow path from Bentinck Close and railway bridge.

					Fluvial				Risk of Flooding from Surface Water			Other Source of Flooding		Site Suitability		
Local Plan Reference	**SFRA Map ID**	**Site Name and Address**	**Site Area (ha)**	**Flood Vulnerability**	**Flood Zone 1 (%)**	**Flood Zone 2 (%)**	**Flood Zone 3a (%)**	**Flood Zone 3b (%)**	**3.3% AEP (%)**	**1% AEP (%)**	**0.1% AEP (%)**	**Reservoir ✓/ X**	**Groundwater susceptibility**	**FRA Required ✓/ X**	**Scoped ✓/ X**	**Comments**
																Groundwater susceptible to flooding at <25%. Recommended that a site specific FRA to investigate all sources of flooding and identify the best measures to mitigate flooding and manage runoff to prevent increasing risk elsewhere.
Cl/MU/1	12	Land at the former Clipstone Colliery	27.656	More Vulnerable	96	2	2	0	2	5	19	X	<25%	✓	✓	Details found in site specific report

4.0 DETAILED SITE ASSESSMENT

The following is used to assess the scoped in sites.

Site Description

- Local Plan Reference
- Site Name and Address
- SFRA Map ID
- Area
- Allocation type (Housing, Employment, Retail or Mixed)

Fluvial Flood Risk

- Watercourse where fluvial risk is identified from
- Flood Zone
- Modelled Flood Risk (Defended) at 1% AEP and 1% AEP with 29% Climate Change
- Impact of Climate Change
- Historic Flooding
- Fluvial Risk Summary

Surface Water

- Source of surface water flooding
- Risk of Flooding from Surface Water
- Impact of Climate Change
- Historic Flooding
- Surface Water Risk Summary

Other Sources of Flooding

- Reservoir Inundation
- Groundwater
- Sewer

Site Suitability

- Highest Flood Zone
- Flood Vulnerability
- Dry access for occupants and emergency vehicles
- Flood Warning coverage
- Policy Recommendations
- Passing Exception Test
- Recommendations

Each Level 2 site detailed assessment is accompanied by a set of maps which includes the following to ascertain flood risk:

Map A

- EA Flood Extent Maps (Including flood defences and areas benefitting from defences)
- Modelled Functional Floodplain (2% AEP)
- EA Historic Flooding Extents
- EA Risk of Flooding from Surface Water
- Risk of Flooding from Surface Water with Climate Change
- Reservoir Inundation

Map B

- Modelled 1% AEP Fluvial Flood Depth
- Modelled 1% AEP Fluvial Hazard
- Modelled 1% AEP + 29% Climate Change allowance Fluvial Flood Depth
- Modelled 1% AEP + 29% Climate Change allowance Fluvial Hazard
- Surface Water with Climate Change Depth
- Surface Water with Climate Change Hazard

Map C (where required)

- Modelled 1% AEP + 39% Climate Change allowance Fluvial Flood Depth
- Modelled 1% AEP + 39% Climate Change allowance Fluvial Hazard
- Modelled 0.1% AEP Fluvial Flood Depth
- Modelled 0.1% AEP Fluvial Hazard

MODELLED FLUVIAL FLOODING

River Trent

The River Trent model (2011) was supplied by the EA for the SFRA. It was updated as part of the Level 1 SFRA update (2022). The defended model was updated to include more recent LiDAR topography data. The hydrology associated with the Trent model has not been updated and therefore it was not possible to run the suggested 3.3% AEP functional floodplain (Flood Zone 3b) event. Therefore, for the purposes of spatial planning the defended 2% AEP event has been run through the model and it is suggested that this more conservative event be adopted as the functional floodplain for the purposes of this SFRA. If necessitated a more detailed fluvial model would need to be ran to account for a 3.3% AEP event.

Where there is no detailed fluvial model, either due to the nearest watercourse being beside an ordinary watercourse or that the EA model does not run to the site, it is recommended that a model is created for the purpose of the site at the detailed FRA stage in the future.

RISK OF FLOODING FROM CLIMATE CHANGE

Climate change allowances supplied by the EA are used in the Trent model for the Central 29% uplifts for the 2080s epoch. Where required, additional mapping of a 39% uplift have been made to relevant sites. For all other watercourses where no detailed fluvial modelling of the 1% AEP plus 29% allowance for climate change exists, and for the purposes of spatial planning, Flood Zone 2 should be used as a proxy for a future Flood Zone 3 with climate change in lieu of any detailed model data.

To understand the impact of climate change on the risk of flooding from surface water, a 0.1% AEP event is used as a proxy to a 1% AEP plus climate change allowance. If a site is under threat from surface water it is therefore recommended that a direct rainfall model is used to test the site for the required 1% AEP plus the climate change uplift as found in the Level 1 SFRA 2022 or at the EA[1].

MODELLED FLOOD HAZARD

Flood hazard maps consider, water depth, velocity, and debris. With either caution, danger for some/most/ all depending on the severity. Table 4-1 shows the matrix used for classification of risk based upon the Flood Risk Assessment Guidance[2].

Table 4-1- Hazard Matrix

Designation	Hazardous to
0.5- 0.75	Caution required for all
0.75-1.25	Danger for some- Includes children, the elderly and the infirm
1.25-2.00	Danger for most- Includes the general public
>2.00	Danger for all- Includes emergency services

[1] https://environment.data.gov.uk/hydrology/climate-change-allowances/rainfall
[2] https://assets.publishing.service.gov.uk/media/602d040fd3bf7f721a23a993/Flood_risk_assessment_guidance_for_new_development_-_phase_2_technical_report_Full_Documentation_and_Tools.pdf

GROUNDWATER

Groundwater susceptibility is taken from the LLFA Local Flood Risk Management Strategy (LFRMS) Figure A5[3]. With no detailed groundwater assessments for each site, a further assessment will be required when groundwater is expected to be a risk on site.

SITE SUITABILITY

Within the reporting section of the screening, the following aspects of flood risk are examined:

- Can the site be developed sequentially to avoid vulnerable uses on areas with high probability?
- Will the development result in offsite impacts?
- Is there dry access and egress to the site during a flood for occupants and emergency access?
- Is the site covered by flood warnings?
- Is compensatory flood storage required?
- What is the likelihood of the Exceptions Test being passed?
- Recommendations/ Future data needs

[3] https://www.nottinghamshire.gov.uk/media/119303/figure-a5.pdf

NUA/Ho/2 Site Description			
Local Plan Reference	NUA/HO/2	Site Name and Address	Land south of Quibells Lane
SFRA Map ID	1	Area (ha)	1.07
Allocation Type	Housing- 25 dwellings		
Fluvial Flood Risk			
Watercourse	River Trent		
Flood Zone			
Flood Zone 1	39%	Flood Zone 3a	0%
Flood Zone 2	61%	Flood Zone 3b	0%
Modelled Flood Risk (defended)			
1% AEP Flood Level (mAOD)	No modelled flood risk	1% AEP +29% Flood Level (mAOD)	No modelled flood risk
1% AEP Flood Level (mAOD)	No modelled flood risk	1% AEP + 29% Flood Depth (m)	No modelled flood risk
1% AEP Max Hazard	No modelled flood risk	1% AEP + 29% Max Hazard	No modelled flood risk
Impact of Climate Change	No modelled flood risk at the site as the extent of the 1% AEP + CC does not extend to near the site. The closest point to the modelled extent is around 90 m away from the West.		
Historic Flooding	No known risk but future development should check with LLFA for up to date data.		
Fluvial Risk Summary	Flood Zone mapping indicates that the site is primarily in Flood Zone 2, with the eastern extent being in Flood Zone 1. The risk of fluvial flooding comes from the River Trent, with natural high ground acting as a flood defence to the west. Modelled results indicate that the site will not experience flooding up to a 1% AEP + 29% Climate change event. The modelled 0.1% AEP event also does not approach the site. With the site in Flood Zone 2 there is a potential residual risk from the flood defence Further investigation would be required.		

Surface Water			
Source	Quibell's Lane/ Railway Line		
Risk of Flooding from Surface Water			
3.3% AEP	6%	0.1% AEP	34%
1% AEP	15%	No mapped risk	45%
CC Max depth	0.6 – 0.9 m	CC Max hazard	1.25 – 2.00
Impact of Climate Change	Using the 0.1% AEP RoFSW, as a proxy for future climate change flood risk, the impact of climate change on the 1% AEP extent can be undertaken. Ponding in the centre of the site increases in its extent with a potential flowpath originating from the north at Quibell's Lane and running around Seven Hills. With a maximum depth of 0.6 – 0.9 m expected for a large area of that extent, a hazard rating of Danger for Most is shown.		
Historic Flooding	No known risk but future development should check with LLFA for up to date data.		
Surface Water Risk Summary	From a 3.3% AEP event there is a risk of surface water flooding onsite, with ponding starting at the centre. There is no obvious flowpath at that level of event. A 1% AEP event shows an increase to the ponding, with when at a 0.1% AEP a flowpath occurring from Seven Hills.		
Other Sources of Flooding			
Reservoir Inundation	There is a risk to the whole site from reservoir inundation on a 'wet' day.		
Groundwater	There is a greater than 75% susceptibility to groundwater flooding.		
Sewerage	No known risk but future development should check with Severn Trent Water and the LLFA for up to date data.		
Site Suitability			
Highest Flood Zone	Flood Zone 2	Flood Vulnerability	More vulnerable
Is there dry access and egress to the site during a flood for occupants?	Yes, from Hatchet's Lane	Is there dry access and egress to the site during a flood for emergency vehicles?	Yes, from Hatchet's Lane

Area covered by Flood Warning?	Yes	Flood Warning Code	306168
Policy Recommendations			
It is recommended from guidance found in the NPPF (shown in Annex 3) that housing developments are classed as More Vulnerable. As the sites highest Flood Zone is 2, development is permitted, and an Exception Test does not need to be applied. As the site is over 1 ha and in Flood Zone 2, a site specific FRA is carried out to ensure appropriate management of surface water runoff.			
Passing Exception Test			
No Exception Test required.			
Recommendations			
The site is primarily in Flood Zone 2; therefore, an FRA is required and should be undertaken following the EA's standing advice. Site design should seek to reduce the risk of fluvial flooding, while not increasing risk elsewhere. A 1% AEP + CC event is not modelled to reach the site, therefore keeping it in line with the life expectancy for development. The site specific FRA will need to consider the sequential approach. Surface water needs to be managed through the design stage to allow the risk to be mitigated against, such as using SuDS. Any changes will require that there are no adverse effects to other areas. With a groundwater susceptibility of >75%, further analysis will be required to assess the risk.			

Group 1- Shannon Caravan Park Site Description			
Local Plan Reference	OB/GRT/BL/1 and OB/GRT/1,2,3,4,5	Site Name and Address	Shannon Caravan Site
SFRA Map ID	2	Total Area (ha)	5.69
Allocation Type	Pitches		

Fluvial Flood Risk			
Watercourse	N/A		
Flood Zone			
Flood Zone 1	100%	Flood Zone 3a	0%
Flood Zone 2	0%	Flood Zone 3b	0%

Modelled Flood Risk (defended)				
No detailed model available				
Historic Flooding	No known risk but future development should check with LLFA for up to date data.			
Fluvial Risk Summary	Sites are within Flood Zone 1 and therefore at very low risk from fluvial flooding.			
Surface Water				
Source	Newark Road/ Wellow Road/ Potential Farmland Dyke			
Risk of Flooding from Surface Water				
Site	3.3% AEP	1% AEP	0.1% AEP	No mapped risk
OB/GRT/BL/1	2%	11%	39%	61%
OB/GRT/1	3%	5%	15%	85%
OB/GRT/2	0%	0%	0%	100%
OB/GRT/3	0%	0%	0%	100%
OB/GRT/4	2%	43%	82%	18%
OB/GRT/5	1%	24%	77%	23%
CC Max depth	0.3 – 0.6 m		CC Max hazard	1.25 – 2.00
Impact of Climate Change	Using the 0.1% AEP RoFSW the impact of climate change on the 1% AEP extent can be undertaken. There is an increase in the extent of surface water flooding in the site area as well as depth and hazard of flooding. OB/GRT/BL/1, OB/GRT/1,4,5 see the most impact from climate change with OB/GRT/4,5 becoming inundated and a hazard rating of Danger for Most, with depths of ponding up to 0.6 m. OB/GRT/BL/1 ties into a flowpath for surface water coming from Bluebird Avenue, leading to Newark Road.			
Historic Flooding	No known risk but future development should check with LLFA for up to date data.			
Surface Water Risk Summary	EA RoFSW mapping shows that the site is at risk from surface water flooding from a 3.3% AEP, with increasing risk as AEP is reduced. Surface Water appears to be tracking from a farmland dyke through OB/GRT/BL/1's northern boundary. A flow path then links through			

	OB/GRT/4 and 5 to join a larger flow path past Newark Road with deep areas of ponding onsite.

Other Sources of Flooding

Reservoir Inundation	There is currently no recorded or modelled risk of reservoir flooding.
Groundwater	There is a less than 25% susceptibility to groundwater flooding.
Sewerage	No known risk but future development should check with Severn Trent Water and the LLFA for up to date data.

Site Suitability

Highest Flood Zone	Flood Zone 1	Flood Vulnerability	Highly vulnerable
Is there dry access and egress to the site during a flood for occupants?	Yes, from Wellow Road.	Is there dry access and egress to the site during a flood for emergency vehicles?	Yes, from Wellow Road.
Area covered by Flood Warning?	No	Flood Warning Code	N/A

Policy Recommendations

It is recommended from guidance found in the NPPF (shown in Annex 3) that caravans, mobile homes, and park homes intended for permanent residential use are classed as highly vulnerable. As the sites highest Flood Zone is 1, development is permitted, and an Exception Test does not need to be applied.

It is required that since of the sites are over 1 ha, that site specific FRAs are carried out to ensure surface water runoff is managed.

Passing Exception Test

No Exception Test required.

Recommendations

The group of sites are in Flood Zone 1, therefore at very low risk of fluvial flooding.

There is a risk of surface water flooding, and this would need to be managed at the design stage to allow the risk to be mitigated against through the application of sequential site design, making space for water, preserving the surface water flow path and SuDS. Development will need to be safe from surface water and ensure no increase in risk elsewhere.

NUA/GRT/14 Site Description			
Local Plan Reference	NUA/GRT/14	Site Name and Address	Land Northwest of Winthorpe Road, Newark
SFRA Map ID	3	Total Area (ha)	0.31
Allocation Type	Pitches		

Fluvial Flood Risk				
Watercourse	River Trent			
Flood Zone				
Flood Zone 1	0%	Flood Zone 3a	0%	
Flood Zone 2	100%	Flood Zone 3b	0%	
Modelled Flood Risk (defended)				
	1% AEP	1% AEP+ 29%	1% AEP + 39%	0.1% AEP
Flood Level (mAOD)	9.61 mAOD	9.98 mAOD	10.22 mAOD	11.18 mAOD
Flood Depth (m)	0.00- 0.75 m	0.00- 1.14 m	0.00- 1.36 m	0.20- 2.32 m
Max Hazard	1.25- 2.00	1.25- 2.00	1.25- 2.00	> 2.00
Impact of Climate Change	In the 1% AEP + CC fluvial model, both the extent and depth of the flood increases. The flood extends further from the north, southerly into the site, covering approximately a quarter of the upper site. Flood depth increases by around 0.4 m, which is more uniform across the site. Although the hazard rating remains the same at Danger for Most, it is now in effect across most of the flood extent, with a Danger for All across from the eastern boundary of the site.			
Historic Flooding	No known risk but future development should check with LLFA for up to date data.			
Fluvial Risk Summary	Flood Zone mapping indicates that the site is primarily in Flood Zone 2. The risk of fluvial flooding comes from the River Trent, with natural high ground acting as a flood defence to the west. Modelled results indicate that the northern half of the site will experience a depth of up to 0.75 m			

	during a 1% AEP flood, increasing to 1.14 m including 29% Climate Change.		
Surface Water			
Source	A1		
Risk of Flooding from Surface Water			
3.3% AEP	0%	0.1% AEP	21%
1% AEP	0%	No mapped risk	79%
CC Max depth	0.3 – 0.6 m	CC Max hazard	0.75- 1.25
Impact of Climate Change	Using the 0.1% AEP RoFSW the impact of climate change on the 1% AEP extent can be undertaken. With Climate Change the site is expected to experience surface water flooding across the northern extent. With depths of around 0.3 – 0.6 m occurring int two ponding areas, coming from the A1. With a hazard rating of Danger for Some expanding across much of the surface water extent. The southern half of the site is not expected to see surface water flooding.		
Historic Flooding	No known risk but future development should check with LLFA for up to date data.		
Surface Water Risk Summary	EA RoFSW mapping shows that the northern half of the site is at risk from surface water flooding from a 0.1% AEP event. Flooding is showing to be coming from the A1. The site expects surface water flooding due to climate change, with it expanding across the northern extent.		
Other Sources of Flooding			
Reservoir Inundation	There is a risk to the whole site from reservoir inundation on a ‘wet’ day.		
Groundwater	There is a greater than 75% susceptibility to groundwater flooding.		
Sewerage	No known risk but future development should check with Severn Trent Water and the LLFA for up to date data.		
Site Suitability			
Highest Flood Zone	Flood Zone 2	Flood Vulnerability	Highly vulnerable
Is there dry access and egress to the site	Yes, from Winthorpe Road.	Is there dry access and egress to the site	Yes, from Winthorpe Road

during a flood for occupants?		during a flood for emergency vehicles?	
Area covered by Flood Warning?	Yes	Flood Warning Code	306168

Policy Recommendations

It is recommended from guidance found in the NPPF (shown in Annex 3) that caravans, mobile homes, and park homes intended for permanent residential use are classed as highly vulnerable. As the sites highest Flood Zone is 2, development is permitted on condition that the Exception Test is passed.

It is required that since the site is in Flood Zone 2, that a site specific FRA is carried out.

Passing Exception Test

According to the NPPG-FRCC guidance, an Exception Test needs to demonstrate the following:

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

When applying the Exception Test the following needs to be considered:

- Design to manage and mitigate flood risk
- Finished Floor Levels
- Safe access and egress
- Operation and maintenance
- Flood Warnings
- Evacuation procedures

It is noted that previous planning applications to use this site for this purpose have failed to provide sufficient evidence to pass both parts of the exception test.

For Part 1: it will be necessary to prove that there are wider sustainability benefits of this development being located here. N&SDC have confirmed that the site in in an area of 'Open Break' where according to N&SD Planning Policy NUA/OB/1, planning permission will not normally be granted for built development, but given the significant local need for Traveller accommodation this could be argued as suitable. Future applications should be mindful of the previous objections and work with N&SDC to ensure a robust argument is put forward to prove the development provides wider sustainability benefits.

For Part 2: the new modelling undertaken for this SFRA demonstrates the majority of the site remain dry in a 1% AEP event plus higher central climate change allowance of 39%. Given the vulnerability of the development it is prudent to use the higher central climate change allowance. The area of the site that is inundated in the 1% AEP +39% should remain free of development or be protected from inundation through construction of flood defences or land raising. Noting that if the site is protected against flooding compensatory flood storage will need to be provided nearby to offset the risk so as not to increase risk elsewhere.

The finished floor levels of the accommodation to be sited should be set in accordance with standing advice: FFLs should be a minimum of whichever is higher of 300mm above the:

- average ground level of the site
- adjacent road level to the site
- estimated 1% AEP + 39% flood level

In addition, the site will need a detailed emergency plan linked to flood warnings to establish safe access and egress from the site to prove people can remain safe in the event of a flood.

Recommendations

In addition to those recommendation outlined above regarding passing the Exception Test this section provides some addition recommendations of what an FRA will need to consider.

The site is in Flood Zone 2, and the development is highly vulnerable. It is therefore recommended that the site is sequentially designed to avoid known areas of fluvial and surface water flood risk. The most at risk areas are to the north of the site, extending 20 m inwards, for both surface water and fluvial flooding. Avoiding that area would allow development to not be at risk from flooding including a 1% AEP + 39% Climate Change allowance.

Where risk cannot be avoided development should be made resistant or resilient to flooding such as being at a level 300mm greater than 10.22 m AOD.

Safe access and egress are available and should be preserved via Winthorpe Road.

An emergency plan, including flood warning should be signed up to for the inhabitants. This could entail that when water is seen entering the site at the norther quarter, that plans are made to move to higher ground for the period of the flood.

The risk of reservoir flooding should be included in any site emergency plan, although the risk of flooding is limited.

If development / land raising is proposed in the area associated with the 1% AEP + CC event compensatory level-for-level storage will need to be provided to ensure no increase in risk elsewhere. This would need to be modelled using a detailed hydraulic model.

The risk of surface water and any changes to surface runoff would need to be managed through the design stage to allow it to be mitigated against, through sequential site design and SUDS. To ensure no increase in risk elsewhere.

Group 2- East of Tolney Lane Site Description			
Local Plan Reference	NUA/GRT/1,2,10	Site Name and Address	East of Tolney Lane
SFRA Map ID	4	Total Area (ha)	1.86
Allocation Type	Pitches/Traveller site		

Fluvial Flood Risk				
Watercourse	River Trent			
Flood Zone				
Site	Flood Zone 1	Flood Zone 2	Flood Zone 3a	Flood Zone 3b
NUA/GRT/1	0%	0%	0%	100%

NUA/GRT/2	0%	0%	0%	100%
NUA/GRT/10	0%	0%	0%	100%
Modelled Flood Risk (defended)				
Site	Flood Level			
	1% AEP	1% AEP + 29%	1% AEP + 39%	0.1% AEP
NUA/GRT/1	11.73 mAOD	12.16 mAOD	12.26 mAOD	12.43 mAOD
NUA/GRT/2	11.74 mAOD	12.16 mAOD	12.26 mAOD	12.43 mAOD
NUA/GRT/10	11.75 mAOD	12.18 mAOD	12.29 mAOD	12.46 mAOD
	Flood Depth			
	1% AEP	1% AEP + 29%	1% AEP + 39%	0.1% AEP
NUA/GRT/1	0.66-1.61 m	1.11- 2.01 m	1.22- 2.14 m	1.41- 2.26 m
NUA/GRT/2	0.86- 1.61 m	1.29- 2.05 m	1.39- 2.15 m	1.55- 2.35 m
NUA/GRT/10	0.49- 0.94 m	0.71- 1.33 m	0.87- 1.52 m	1.37- 1.71 m
	Max Hazard			
	1% AEP	1% AEP + 29%	1% AEP + 39%	0.1% AEP
Group 2	1.25- 2.00	>2.00	>2.00	>2.00
Impact of Climate Change	With Climate Change the depth of the flood waters increases across the entire site. There is no increase in extent as from the 1% AEP event, the entire site is flooded. A depth of up to 2.05 m is expected towards the north in NUA/GRT/2, extending southwards until reaching the south boundary. The east of the group of sites is expected to see the greatest increase of flood depth. With the increased depths, hazard increases across most of the site to Danger for All, meaning that emergency services are not permitted to enter the site.			
Historic Flooding	Group of sites is within EA Historic Flood Map for the River Trent. Limited recent flooding history.			
Fluvial Risk Summary	Flood Zone mapping indicates that the site is primarily in Flood Zone 3b. The risk of fluvial flooding comes from the River Trent, with natural high ground acting as a flood defence to the south. Modelled results indicate that the site will experience a depth of up to 1.61 m during a 1% AEP flood, increasing to 2.05 including 29% Climate Change.			

	For the 1% AEP modelled event, a hazard rating of Danger for Most is in effect for most of the site.			
Surface Water				
Source	Railway Track			
Risk of Flooding from Surface Water				
Site	3.3% AEP	1% AEP	0.1% AEP	No mapped risk
NUA/GRT/1	0%	1%	18%	82%
NUA/GRT/2	5%	12%	37%	63%
NUA/GRT/10	0%	0%	0%	100%
CC Max depth	0.3 – 0.6 m		CC Max hazard	1.25 – 2.00
Impact of Climate Change	Using the 0.1% AEP RoFSW the impact of climate change on the 1% AEP extent can be undertaken. There is an increase in the extent of surface water flooding around NUA/GRT/2.With depths of up to 0.6 m, there is a hazard rating of Danger for Some, with a small section of Danger for Most at the most northern extent. The ponding is expected to be coming from the railway embankment which runs parallel to the site boundary.			
Historic Flooding	No known risk but future development should check with LLFA for up to date data.			
Surface Water Risk Summary	EA RoFSW mapping shows that the group of sites is at risk from surface water flooding from a 3.3% AEP. Flooding is showing to be adjacent to the railway embankment, spreading in from the north of the site. With increasing extent to the 1% and 0.1% AEP event. The group of sites expect surface water flooding due to climate change, with it expanding across the northern extent.			
Other Sources of Flooding				
Reservoir Inundation	There is a risk to the whole group of sites from reservoir inundation on a ‘wet’ day.			
Groundwater	There is a greater than 75% susceptibility to groundwater flooding.			
Sewerage	No known risk but future development should check with Severn Trent Water and the LLFA for up to date data.			

Site Suitability			
Highest Flood Zone	Flood Zone 3b	Flood Vulnerability	Highly vulnerable
Is there dry access and egress to the site during a flood for occupants?	No. Site entirely cut off	Is there dry access and egress to the site during a flood for emergency vehicles?	No. Site entirely cut off
Area covered by Flood Warning?	Yes	Flood Warning Code	306187

Policy Recommendations

It is recommended from guidance found in the NPPF (shown in Annex 3) that caravans, mobile homes, and park homes intended for permanent residential use are classed as highly vulnerable. As the sites highest Flood Zone is 3b, development is not permitted, and an Exception Test cannot be applied.

However, N&SDC are currently in the process of designing a Flood Protection Scheme for the site which will involve raising the road, Tolney Lane. The scheme is still in an early design stage but currently aims to protect the site against a 1% AEP event. Early discussions with the Environment Agency indicate that the road raising has the potential to not be considered a flood defence. As such the topographic change could be used to support a challenge to the existing Flood Zone designation, taking the site into Flood Zone 2 (inundated in between a 1% AEP and 0.1% AEP event). With this scheme in place, and following a successful challenge of the flood map, moving the site to Flood Zone 2, it would be deemed suitable for development subject to passing the Exception Test.

Passing Exception Test

Assuming the Flood Protection Scheme goes ahead, and the flood map is successfully challenged there will remain a need for the Exception Test to be passed. According to the NPPG-FRCC guidance, an Exception Test needs to demonstrate the following:

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

When applying the Exception Test the following needs to be considered:

- Design to manage and mitigate flood risk
- Finished Floor Levels
- Safe access and egress

- Operation and maintenance
- Flood Warnings
- Evacuation procedures

For Part 1: it will be necessary to prove that there are wider sustainability benefits of this development being located here. Future applications should work with N&SDC to ensure a robust argument is put forward to prove the development provides wider sustainability benefits.

For Part 2: to ensure the safety of the site the proposed new flood protection scheme would ideally protect the site against a 1% AEP plus climate change event. Given the vulnerability of the development it would be prudent to use the higher central climate change allowance of 39%. If the site cannot be protected entirely against the 1% AEP +39% by the changes to Tolney lane then alterative options to maintain the safety of the site should be investigated such as onsite land raising or raised finished floor levels of properties.

The site will also need a detailed emergency plan linked to flood warnings prove residents can remain safe in the event of a flood.

Note that if the site is protected against flooding compensatory flood storage will need to be provided nearby to offset the risk so as not to increase risk elsewhere, this is being looked into as part of the Flood Protection Scheme.

Recommendations

It is acknowledged that this site is already, in part, being used for this type of development. However, according to NPPF no further development or extensions to the development in this area of this type should not be permitted without additional intervention. The proposed Tolney Lane Flood Protection Scheme could assist in allowing development on site

In addition to those points discussed above regarding passing the Exception Test this section provides some addition recommendations of what an FRA will need to consider.

All sources of flooding should be assessed including groundwater and surface water. The risk of surface water and any changes to surface runoff would need to be managed through the design stage to allow it to be mitigated against, through sequential site design and SUDS. To ensure no increase in risk elsewhere.

An emergency plan, including flood warning should be developed for inhabitants to sign up to. This should include an assessment of safe access and egress. The risk of reservoir flooding should also be included in any site emergency plan, although the risk of flooding is limited.

If development / land raising is proposed in the area associated with the 1% AEP + CC event compensatory level-for-level storage will need to be provided to ensure no increase in risk elsewhere. This would need to be modelled using a detailed hydraulic model.

Group 3- West of Tolney Lane Site Description			
Local Plan Reference	NUA/GRT/3,4,5,6,7,8,9, and 11	Site Name and Address	West of Tolney Lane
SFRA Map ID	5	Total Area (ha)	6.49
Allocation Type	Pitches		

Fluvial Flood Risk				
Watercourse	River Trent			
Flood Zone				
Site	Flood Zone 1	Flood Zone 2	Flood Zone 3a	Flood Zone 3b
NUA/GRT/4	0%	53%	47%	0%

NUA/GRT/5	0%	57%	33%	0%
NUA/GRT/7	0%	33%	57%	0%
NUA/GRT/3	0%	95%	5%	0%
NUA/GRT/11	0%	98%	2%	0%
NUA/GRT/6	0%	99%	1%	0%
NUA/GRT/8	0%	100%	0%	0%
NUA/GRT/9	0%	94%	6%	0%
Modelled Flood Risk (defended)				
Site	1% AEP Depth	1% AEP Level	1% AEP + 29% Depth	1% AEP + 29% Level
NUA/GRT/4	0.00- 0.28 m	11.70 mAOD	0.00- 0.23 m	12.34 mAOD
NUA/GRT/5	NMFR	NMFR	0.00- 0.38 m	12.40 mAOD
NUA/GRT/7	0.00- 0.50 m	12.09 mAOD	0.00-0.78 m	12.40 mAOD
NUA/GRT/3	0.00- 0.32 m	11.84 mAOD	0.00- 0.70m	12.27 mAOD
NUA/GRT/11	0.00- 0.19 m	12.10 mAOD	0.00-0.21 m	12.34 mAOD
NUA/GRT/6	NMFR	NMFR	0.00- 0.25m	12.34 mAOD
NUA/GRT/8	NMFR	NMFR	NMFR	NMFR
NUA/GRT/9	NMFR	NMFR	0.00-0.35 m	12.16 mAOD
1% AEP Max Hazard	0.75- 1.25	1% AEP + 29% Max Hazard	1.25-2.00	
Impact of Climate Change	At a 1% AEP event the site is not inundated by flood water. However, with Climate Change the site is expected to see fluvial flooding towards the south of the site, extending into the northern half. Flood water depth is up to 0.78 m in places towards the west, but is mainly less than 0.4 m across the flooded extent. With the site now at risk of flooding, the hazard rating is no in force for the flooded areas, with Danger for Most being in a ponding section to the centre of the site at NUA/GRT/7. Danger for Some extends across the site from west to east, and caution surrounding that.			
Historic Flooding	Group of sites is within EA Historic Flood Map for the River Trent. Limited recent flooding history.			

Fluvial Risk Summary	Flood Zone mapping indicates that the site is primarily in Flood Zone 2 and 3a. The risk of fluvial flooding comes from the River Trent, with natural high ground acting as a flood defence to the south. Modelled results indicate that the site will experience a depth of up to 0.5 m during a 1% AEP flood around the fringes of the site, increasing to 0.78 m including 29% Climate Change across the southern halves of the sites.

Surface Water

Source	Onsite ponding			
Risk of Flooding from Surface Water				
Site	3.3% AEP	1% AEP	0.1% AEP	No mapped risk
NUA/GRT/4	0%	0%	2%	98%
NUA/GRT/5	0%	1%	6%	94%
NUA/GRT/7	0%	1%	8%	92%
NUA/GRT/3	0%	0%	6%	94%
NUA/GRT/11	0%	0%	2%	98%
NUA/GRT/6	0%	0%	0%	100%
NUA/GRT/8	0%	0%	0%	100%
NUA/GRT/9	0%	0%	0%	100%
CC Max depth	0.3 – 0.6 m		CC Max hazard	0.75-1.25
Impact of Climate Change	Using the 0.1% AEP RoFSW the impact of climate change on the 1% AEP extent can be undertaken. There is a minimal increase to surface water flooding across the site, with some ponding in NUA/GRT/7 and 3. The unnamed roads that run perpendicular to Tolney Lane are acting as flowpaths and causing localised ponding on them. Danger for Some is expected around these ponding sections.			
Historic Flooding	No known risk but future development should check with LLFA for up to date data.			
Surface Water Risk Summary	EA RoFSW mapping shows that the group of sites is at risk from surface water flooding from a 1% AEP. Flooding is showing to be coming from onsite ponding, with increasing extent to the 0.1% AEP. Overall surface water risk is coming from ponding which is being amplified through flowpaths from local access roads from Tolney Lane.			

Other Sources of Flooding	
Other sources of flooding summary	There is a risk to the whole group of sites from reservoir inundation on a 'wet' day.
Groundwater	There is a greater than 75% susceptibility to groundwater flooding.
Sewerage	No known risk but future development should check with Severn Trent Water and the LLFA for up to date data.

Site Suitability			
Highest Flood Zone	Flood Zone 3a	Flood Vulnerability	Highly vulnerable
Is there dry access and egress to the site during a flood for occupants?	No. Site entirely cut off	Is there dry access and egress to the site during a flood for emergency vehicles?	No. Site entirely cut off
Area covered by Flood Warning?	Yes	Flood Warning Code	306187

Policy Recommendations
It is recommended from guidance found in the NPPF (shown in Annex 3) that caravans, mobile homes, and park homes intended for permanent residential use are classed as highly vulnerable. The sites are partially within Flood Zone is 3a, but the majority of the site is within Flood Zone 2. According to NPPF highly vulnerable development is not permitted in Flood Zone 3a, but in Flood Zone 2 can be permitted subject to passing the Exception Test. N&SDC are currently in the process of designing a Flood Protection Scheme in the vicinity of this site, which includes land raising and a flood storage area. It is possible that the scheme could be adapted to minimise the Flood Zone 3a extent across the site allowing more development subject to passing the Exception Test. The scheme is still in an early design stage. A detailed site specific FRA will be required.

Passing Exception Test
According to the NPPG-FRCC guidance, an Exception Test needs to demonstrate the following: • Development that has to be in a flood risk area will provide wider sustainability benefits to the community that outweigh flood risk. • The development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall. When applying the Exception Test the following needs to be considered:

- Design to manage and mitigate flood risk
- Finished Floor Levels
- Safe access and egress
- Operation and maintenance
- Flood Warnings
- Evacuation procedures

For Part 1: it will be necessary to prove that there are wider sustainability benefits of this development being located here. Future applications should work with N&SDC to ensure a robust argument is put forward to prove the development provides wider sustainability benefits.

For Part 2: it will be necessary to prove the new development on site can remain safe a 1% AEP plus climate change event. Given the vulnerability of the development it would be prudent to use the higher central climate change allowance of 39%.

Ideally areas of the site shown by modelling to be inundated in the 1% AEP +39% should remain free of development, if this is not possible then it will need to be protected from inundation through construction of flood defences or land raising. Noting that if the site is protected against flooding compensatory flood storage will need to be provided nearby to offset the risk so as not to increase risk elsewhere.

As mentioned above N&SDC are in the process of investigating in the process of designing a Flood Protection Scheme in the vicinity of this site, which includes a flood storage area, it could be possible that this storage area could also be used to compensate for any land raising or flood protection works applied to this site also.

The finished floor levels of the accommodation to be sited should be set in accordance with standing advice: FFLs should be a minimum of whichever is higher of 300mm above the:

- average ground level of the site
- adjacent road level to the site
- estimated 1% AEP + 39% flood level

In addition, the site will need a detailed emergency plan linked to flood warnings to establish safe access and egress from the site to prove people can remain safe in the event of a flood.

Recommendations

It is acknowledged that this site is already, in part, being used for this type of development. However, according to NPPF no further development or extensions to the development in this area of this type should not be permitted without additional intervention. The proposed Tolney Lane Flood Protection Scheme could assist in allowing development on site.

In addition to those points discussed above regarding passing the Exception Test this section provides some addition recommendations of what an FRA will need to consider.

All sources of flooding should be assessed including groundwater and surface water. The risk of surface water and any changes to surface runoff would need to be managed through the design stage to allow it to be mitigated against, through sequential site design and SUDS. To ensure no increase in risk elsewhere.

An emergency plan, including flood warning should be developed for inhabitants to sign up to. This should include an assessment of safe access and egress. The risk of reservoir flooding should also be included in any site emergency plan, although the risk of flooding is limited.

If development / land raising is proposed in the area associated with the 1% AEP + CC event compensatory level-for-level storage will need to be provided to ensure no increase in risk elsewhere. This would need to be modelled using a detailed hydraulic model.

NUA/E/3 Site Description			
Local Plan Reference	NUA/E/3	Site Name and Address	Land off Telford Drive
SFRA Map ID	6	Total Area (ha)	0.503
Allocation Type	Employment development		
Fluvial Flood Risk			
Watercourse	River Trent		
Flood Zone			
Flood Zone 1	100%	Flood Zone 3a	0%
Flood Zone 2	0%	Flood Zone 3b	0%
Modelled Flood Risk (defended)			
1% AEP Flood Level (mAOD)	No modelled flood risk	1% AEP +29% Flood Level (mAOD)	No modelled flood risk
1% AEP Flood Depth (m)	No modelled flood risk	1% AEP + 29% Flood Depth (m)	No modelled flood risk
1% AEP Max Hazard	No modelled flood risk	1% AEP + 29% Max Hazard	No modelled flood risk
Impact of Climate Change	No modelled flood risk at the site as the extent of the 1% AEP + CC does not extend to near the site. The closest point to the modelled extent is around 920 m away from the West.		
Historic Flooding	No known risk but future development should check with LLFA for up to date data.		
Fluvial Risk Summary	Flood Zone mapping indicates that the site is in Flood Zone 1. There is very low risk of fluvial flooding now and in the future.		
Surface Water			
Source	Telford Drive		
Risk of Flooding from Surface Water			

3.3% AEP	1%	0.1% AEP	60%
1% AEP	20%	No mapped risk	19%
CC Max depth	0.6 – 0.9 m	CC Max hazard	1.25 – 2.00
Impact of Climate Change	Using the 0.1% AEP RoFSW the impact of climate change on the 1% AEP extent can be undertaken. The site sees an increase in the extent and depth of surface water with climate change, with water spreading from ponding occurring offsite. Surface water expands across from the south and west towards the centre of the site. With depths of up to 0.9 m expected a hazard rating of Danger for Most is in effect for the west of the site. The other sections of surface water are classed as Danger for Some, or with caution.		
Historic Flooding	No known risk but future development should check with LLFA for up to date data.		
Surface Water Risk Summary	EA RoFSW mapping shows that the site is at risk from surface water flooding from a 1% AEP event increasing in extent in the 0.1% AEP event. Flooding is showing to be coming from Telford Drive and from land to the west. The site expects surface water flooding will increase with climate change, expanding across the western extent.		
Other Sources of Flooding			
Reservoir Inundation	There is a risk to the site from reservoir inundation on a ‘wet’ day.		
Groundwater	There is a 50-75% susceptibility to groundwater flooding.		
Sewerage	No known risk but future development should check with Severn Trent Water and the LLFA for up to date data.		
Site Suitability			
Highest Flood Zone	Flood Zone 1	Flood Vulnerability	Less vulnerable
Is there dry access and egress to the site during a flood for occupants?	Yes	Is there dry access and egress to the site during a flood for emergency vehicles?	Yes
Area covered by Flood Warning?	No	Flood Warning Code	N/A

Policy Recommendations
It is recommended from guidance found in the NPPF (shown in Annex 3) that employment developments are classed as less vulnerable. As the sites highest Flood Zone is 1, development is permitted, and an Exception Test does not need to be applied.
Passing Exception Test
No Exception Test required.
Recommendations
The site is in Flood Zone 1, therefore a very low risk to fluvial flooding is expected. Modelled results indicate that the site will not experience fluvial flood risk up to a 1% AEP + 29% Climate Change event. The main source of flood risk across the site is from surface water. The RoFSW being of concern at the site, a site specific FRA would be required to understand the risk in more detail. The surface water would need to be managed through the design stage to allow the risk to be managed. Surface water runoff from site will also need to be assessed and managed through the use of SuDS. Any changes will need to be assessed to ensure no increase in risk elsewhere. The site has a groundwater susceptibility of 50-75%, and will need to be assessed in more detail as part of a detailed FRA to understand the risk.

NUA/E/4 Site Description			
Local Plan Reference	NUA/E/4	Site Name and Address	Land at the former Nottinghamshire County Council Highways Depot
SFRA Map ID	7	Total Area (ha)	2.067
Allocation Type	Employment development		
Fluvial Flood Risk			
Watercourse	River Trent		
Flood Zone			
Flood Zone 1	0	Flood Zone 3a	34%
Flood Zone 2	66%	Flood Zone 3b	0%
Modelled Flood Risk (defended)			
1% AEP Flood Depth (m)	No modelled flood risk	1% AEP +29% Flood Depth (m)	0.00- 2.89 m
1% AEP Flood Level (mAOD)	No modelled flood risk	1% AEP + 29% Flood Level (mAOD)	12.03 mAOD
1% AEP Max Hazard	No modelled flood risk	1% AEP + 29% Max Hazard	1.25-2.00
Impact of Climate Change	The 1% AEP + CC fluvial model shows that the site is now at risk from flooding from the 1% AEP event. With climate change the 1% AEP plus 29% climate change floods the entire site, with a maximum depth of 2.89 m. The hazard rating for most of the site falls under Danger for Most. The flood defence has a standard of protection of 75 years, therefore with the 1% AEP + CC event the defence will be overtopped.		
Historic Flooding	Site has previously been flooded by the River Trent in 1977, with flood defences being built in 2012.		
Fluvial Risk Summary	Flood Zone mapping indicates that the site is primarily in Flood Zone 2 and 3a. The risk of fluvial flooding comes from the River Trent, with an embankment acting as a flood defence to the west. The site is partially in an area benefiting from the flood defence. Modelled results indicate that		

	the site will not experience flood risk with a 1% AEP event, with climate change allowing flooding to occur.		
Surface Water			
Source	Onsite Ponding		
Risk of Flooding from Surface Water			
3.3% AEP	0%	0.1% AEP	3%
1% AEP	3%	No mapped risk	94%
CC Max depth	> 1.2 m	CC Max hazard	1.25 – 2.00
Impact of Climate Change	Using the 0.1% AEP RoFSW the impact of climate change on the 1% AEP extent can be undertaken. There is a slight increase to surface water flooding along the western boundary, with new surface water ponding occurring in the centre of the site. Danger for Some is expected in the ponds, with Danger for Most on the boundary surface water ponds. Deep water greater than 1.2 m is shown on the western border.		
Historic Flooding	No known risk but future development should check with LLFA for up to date data.		
Surface Water Risk Summary	EA RoFSW mapping shows that the site is at risk from surface water flooding from mainly a 1% AEP. Flooding is showing to be coming from onsite ponding along the western site boundary, with increasing extent to the 0.1% AEP. Overall, the risk from surface water flooding is minimal and should be able to be mitigated. The site expects surface water flooding due to climate change, with it onsite ponding to the northern extent.		
Other Sources of Flooding			
Reservoir Inundation	There is a risk to the site from reservoir inundation on a ‘wet’ day.		
Groundwater	There is a greater than 75% susceptibility to groundwater flooding.		
Sewerage	No known risk but future development should check with Severn Trent Water and the LLFA for up to date data.		
Site Suitability			
Highest Flood Zone	Flood Zone 3a	Flood Vulnerability	Less vulnerable

Is there dry access and egress to the site during a flood for occupants?	No. Site is cut off.	Is there dry access and egress to the site during a flood for emergency vehicles?	No. Site is cut off
Area covered by Flood Warning?	Yes	Flood Warning Code	306169
Policy Recommendations			
It is recommended from guidance found in the NPPF (shown in Annex 3) that employment developments are classed as less vulnerable. As the sites highest Flood Zone is 3a, development is permitted, and an Exception Test does not need to be applied. With the site over 1 ha, a site specific FRA will need to be conducted.			
Passing Exception Test			
No Exceptions Test required.			
Recommendations			
The site is primarily in Flood Zone 2 and 3a, and therefore a less vulnerable land use would be acceptable. The site is also currently a Brown Field site, therefore can be used as local regeneration. However, there is an increased risk of flooding with future climate change. The existing defence offers a standard of protection that protects the site in the present day 1% AEP, but the defence is overtopped in a 1% AEP + 29% event, with the site will becoming inundated with up to 2.89 m depth and a hazard rating of Danger for All for a small section to the west. When considering the site for development the risk in the future over the lifetime of the development needs to be considered, either at the development design stage or through adaptive management. Any change in land levels may result in the need for compensatory storage as this has to be provided to mitigate increases in risk elsewhere in the 1% AEP plus 29% event. Changes in surface water runoff would need to be assessed and managed through the use of SuDS. With a groundwater susceptibility of >75% this should also be investigated further with in the FRA to better understand the risk.			

SO/E/2 Site Description			
Local Plan Reference	SO/E/2	Site Name and Address	Land to the east of Crew Lane
SFRA Map ID	8	Total Area (ha)	2.34
Allocation Type	Employment development		
Fluvial Flood Risk			
Watercourse	River Greet		
Flood Zone			
Flood Zone 1	86%	Flood Zone 3a	0%
Flood Zone 2	14%	Flood Zone 3b	0%
Modelled Flood Risk (defended)			
No detailed model available			
Historic Flooding	No known risk but future development should check with LLFA for up to date data.		
Fluvial Risk Summary	Flood Zone mapping indicates that the site is primarily in Flood Zone 1 and 2. The risk of fluvial flooding comes from the River Greet, with natural high ground acting as a flood defence to the north. No detailed model available with the EA as the provided model does not run up the Greet as far as the site.		
Surface Water			
Source	Racecourse Road		
Risk of Flooding from Surface Water			
3.3% AEP	6%	0.1% AEP	53%
1% AEP	23%	No mapped risk	18%
CC Max depth	> 1.2 m	CC Max hazard	1.25 – 2.00

Impact of Climate Change	Using the 0.1% AEP RoFSW the impact of climate change on the 1% AEP extent can be undertaken. There is a large increase in the extent of surface water flooding expected with Climate Change. Water is coming from Racecourse Road and Crew Lane, being connected as a flowpath with CC. A maximum depth of > 1.2 m is expected in the northeast corner, with most of the site experiencing less than that. A hazard rating of Danger for Most is across most of the north of the site, with Danger for Some extending southwards to Crew Lane.
Historic Flooding	No known risk but future development should check with LLFA for up to date data.
Surface Water Risk Summary	EA RoFSW mapping shows that the site is at risk from surface water flooding from mainly a 0.1% AEP event. A 3.3% AEP event has surface water flooding occurring at the northeast corner. Flooding is flowing across the site between Crew Lane and Racecourse Road. The site expects surface water flooding due to climate change, with the northern extent seeing an increase of extent the most, connecting to Crew Lane flowpath.

Other Sources of Flooding

Reservoir Inundation	There is currently no other recorded or modelled risk of flooding.
Groundwater	There is a 50-75% susceptibility to groundwater flooding.
Sewerage	No known risk but future development should check with Severn Trent Water and the LLFA for up to date data.

Site Suitability

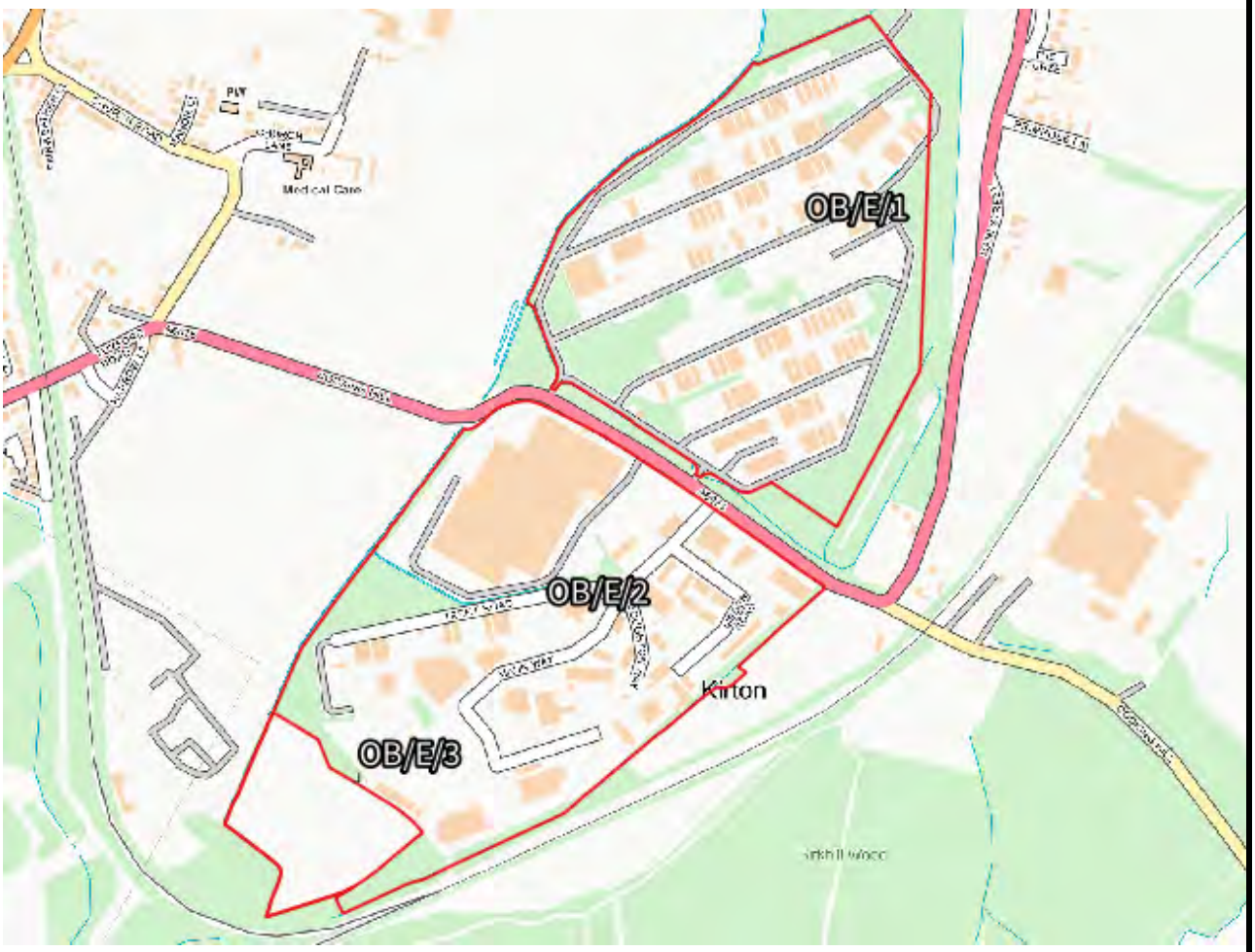
Highest Flood Zone	Flood Zone 2	Flood Vulnerability	Less vulnerable
Is there dry access and egress to the site during a flood for occupants?	Yes, from Crew Lane	Is there dry access and egress to the site during a flood for emergency vehicles?	Yes, from Crew Lane
Area covered by Flood Warning?	No	Flood Warning Code	N/A

Policy Recommendations
It is recommended from guidance found in the NPPF (shown in Annex 3) that employment developments are classed as less vulnerable. As the sites highest Flood Zone is 2, development is permitted, and an Exception Test does not need to be applied.

With the site over 1 ha, a site specific FRA will need to be conducted.
Passing Exception Test
No Exception Test required.
Recommendations
The site is primarily in Flood Zone 1 and 2, therefore through sequential design of the site areas of flood risk (flood zone 2 and those associated with surface water) could be avoided. A flood risk assessment will be required. The fluvial risk shown is from the River Greet. With no detailed model extending to the site, a detailed modelled assessment of fluvial flood risk will need to be undertaken to support the site specific FRA, specifically to understand the risk to the site with future climate change. The risk of surface water and any changes to surface runoff would need to be managed through the design stage to allow it to be mitigated against, through sequential site design and SUDS to ensure no increase in risk elsewhere. With a groundwater susceptibility of 50-75%, further assessment in the FRA will be required to understand the risk.

Group 4- Boughton Industrial Estate
Site Description

Local Plan Reference	OB/E1,2 and 3	Site Name and Address	Boughton Industrial Estate
SFRA Map ID	9	Total Area (ha)	56.98
Allocation Type	Employment development		



Fluvial Flood Risk

Watercourse	Boughton Dyke			
Flood Zone				
Site	Flood Zone 1	Flood Zone 2	Flood Zone 3a	Flood Zone 3b
OB/E/1	96%	1%	3%	0%

OB/E/2	97%	0%	3%	0%
OB/E/3	95%	1%	4%	0%
Modelled Flood Risk (defended)				
No detailed fluvial model				
Historic Flooding	No known risk but future development should check with LLFA for up to date data.			
Fluvial Risk Summary	Flood Zone mapping indicates that the site is primarily in Flood Zone 1, with 2 and 3a to the western border. The risk of fluvial flooding comes from the Boughton Dyke. No detailed model of the Boughton Dyke exists therefore will potentially need to be considered for future works.			

Surface Water

Source	Boughton Dyke and Onsite Ponding			
Risk of Flooding from Surface Water				
Site	3.3% AEP	1% AEP	0.1% AEP	No mapped risk
OB/E/1	3%	7%	27%	73%
OB/E/2	2%	4%	16%	84%
OB/E/3	2%	4%	15%	85%
CC Max depth	> 1.2 m	CC Max hazard	> 2.0	
Impact of Climate Change	Using the 0.1% AEP RoFSW the impact of climate change on the 1% AEP extent can be undertaken. New flowpaths form within the site leading towards Boughton Dyke and small onsite ponding occurs. Surface water depths at the western border are > 1.2 m, however, most of the onsite ponding is below 0.3 m. Onsite hazard is rated at Danger for Most in the deeper ponds, with the new flowpaths rated at caution only. Danger for All is rated at the western border at Boughton Dyke.			
Historic Flooding	No known risk but future development should check with LLFA for up to date data.			

Surface Water Risk Summary	EA RoFSW mapping shows that the site is at risk from surface water flooding from mainly a 0.1% AEP. Flooding is showing to be coming from Boughton Dyke and a potential flow path from Cocking Hill. The site expects surface water flooding due to climate change, with the eastern extent seeing an increase of extent the most. Some onsite ponding develops within the group of sites.

Other Sources of Flooding

Reservoir Inundation	There is currently no modelled risk of flooding.
Groundwater	There is a less than 25% susceptibility to groundwater flooding.
Sewerage	No known risk but future development should check with Severn Trent Water and the LLFA for up to date data.

Site Suitability

Highest Flood Zone	Flood Zone 3a	Flood Vulnerability	Less vulnerable
Is there dry access and egress to the site during a flood for occupants?	Yes, from Cocking Hill	Is there dry access and egress to the site during a flood for emergency vehicles?	Yes, from Cocking Hill
Area covered by Flood Warning?	No	Flood Warning Code	N/A

Policy Recommendations
It is recommended from guidance found in the NPPF (shown in Annex 3) that employment developments are classed as less vulnerable. As the sites highest Flood Zone is 3a, development is permitted, and an Exception Test does not need to be applied With the site over 1 ha, a site specific FRA will need to be conducted.
Passing Exception Test
No Exception Test required.
Recommendations
The site is primarily in Flood Zone 1 with a small amount in 3a. As the risk is on the boundary of the site, sequential site design can be used to manage the fluvial flood risk through avoiding Flood Zones 2 and 3.

Similarly, a sequential approach to site design could be used to avoid and preserve existing surface water flow paths through placing lower risk aspects of the develop in these areas (such as car parks and recreation space).

An FRA will be required to demonstrate not increase in risk elsewhere, including from surface water runoff which should be managed through the use of SuDS.

Bi/E/1 Site Description			
Local Plan Reference	BI/E/1	Site Name and Address	Land on the southern side of Brailwood Road
SFRA Map ID	10	Total Area (ha)	2.69
Allocation Type	Employment development		
Fluvial Flood Risk			
Watercourse	Rainworth Water		
Flood Zone			
Flood Zone 1	100%	Flood Zone 3a	0%
Flood Zone 2	0%	Flood Zone 3b	0%
Modelled Flood Risk (defended)			
No detailed fluvial model			
Historic Flooding	No known risk but future development should check with LLFA for up to date data.		
Fluvial Risk Summary	Flood Zone mapping indicates that the site is primarily in Flood Zone 1, with very low risk of flooding. No detailed fluvial modelling exists for the nearest watercourse, Rainworth Water, 1.2 km away.		
Surface Water			
Source	Onsite Ponding		
Risk of Flooding from Surface Water			
3.3% AEP	33%	0.1% AEP	81%
1% AEP	48%	No mapped risk	19%
CC Max depth	0.6 – 0.9 m	CC Max hazard	1.25 – 2.00
Impact of Climate Change	Using the 0.1% AEP RoFSW the impact of climate change on the 1% AEP extent can be undertaken. There is an increase in the extent of surface water flooding in the site area as well as depth and hazard of flooding. Nearly all the site is now at risk from surface water flooding.		

	Water is ponding within the middle of the site at up to 0.9 m deep and a hazard rating of Danger for Most. A large part of the site is also under Danger for Some.
Historic Flooding	No known risk but future development should check with LLFA for up to date data.
Surface Water Risk Summary	EA RoFSW mapping shows that the site is at high risk from surface water flooding from the 3.3% AEP. Flooding is showing to be coming from onsite, with a potential flow path forming down Brailwood Road. The site expects surface water flooding due to climate change, with the centre of the site seeing ponding.

Other Sources of Flooding

Reservoir Inundation	There is currently no modelled risk of flooding.
Groundwater	There is a 0% susceptibility to groundwater flooding.
Sewerage	No known risk but future development should check with Severn Trent Water and the LLFA for up to date data.

Site Suitability

Highest Flood Zone	Flood Zone 1	Flood Vulnerability	Less vulnerable
Is there dry access and egress to the site during a flood for occupants?	Yes, from Kirklington Road	Is there dry access and egress to the site during a flood for emergency vehicles?	Yes, from Kirklington Road
Area covered by Flood Warning?	No	Flood Warning Code	N/A

Policy Recommendations
It is recommended from guidance found in the NPPF (shown in Annex 3) that employment developments are classed as less vulnerable. As the sites highest Flood Zone is 1, development is permitted, and an Exception Test does not need to be run With the site over 1 ha, a site specific FRA will need to be conducted.
Passing Exception Test
No Exception Test required.
Recommendations

The site is primarily in Flood Zone 1, therefore there is very low risk from fluvial flooding. However, the site is at high risk of surface water flooding.

A site specific FRA will need to assess the risk from surface water in more detail and determine whether it can be managed and mitigated against without increasing risk elsewhere.

The risk of surface water and any changes to surface runoff would need to be managed through the design stage to allow it to be mitigated against, through sequential site design and SUDS to ensure no increase in risk elsewhere.

Ra/E/1 Site Description			
Local Plan Reference	RA/E/1	Site Name and Address	Land West of Colliery Lane
SFRA Map ID	11	Total Area (ha)	5.5
Allocation Type	Employment development		
Fluvial Flood Risk			
Watercourse	Rainworth Water		
Flood Zone			
Flood Zone 1	92%	Flood Zone 3a	7%
Flood Zone 2	1%	Flood Zone 3b	0%
Modelled Flood Risk (defended)			
No detailed fluvial model			
Historic Flooding	No known risk but future development should check with LLFA for up to date data.		
Fluvial Risk Summary	Flood Zone mapping indicates that the site is primarily in Flood Zone1, with a section in 2 and 3a to the east. The risk of fluvial flooding comes from Rainworth Water. No detailed fluvial model exists for Rainworth Water; therefore, a detailed model will need to be conceived for future works.		
Surface Water			
Source	Rainworth Water		
Risk of Flooding from Surface Water			
3.3% AEP	4%	0.1% AEP	15%
1% AEP	7%	No mapped risk	85%
CC Max depth	> 1.2 m	CC Max hazard	> 2.0

Impact of Climate Change	Using the 0.1% AEP RoFSW the impact of climate change on the 1% AEP extent can be undertaken. There is an increase in the extent of surface water flooding in the site coming from Rainworth Water. With Danger for All coming from depth >1.2 m from Rainworth Water. Given the flowpath it is expected that this is more probably a fluvial feature over a surface water feature.
Historic Flooding	No known risk but future development should check with LLFA for up to date data.
Surface Water Risk Summary	EA RoFSW mapping shows that the site is at risk from surface water flooding from the 3.3% AEP. Flooding is showing to be coming from Rainworth Water, with a flow path coming from 'L' Lake. Given the flowpath it is expected that this is more probably a fluvial feature over a surface water feature. The site expects surface water flooding due to climate change, with the eastern extent at Rainworth Water.

Other Sources of Flooding

Reservoir Inundation	There is currently no other recorded or modelled risk of flooding.
Groundwater	There less than 25% susceptibility to groundwater flooding.
Sewerage	No known risk but future development should check with Severn Trent Water and the LLFA for up to date data.

Site Suitability

Highest Flood Zone	Flood Zone 3a	Flood Vulnerability	Less vulnerable
Is there dry access and egress to the site during a flood for occupants?	Yes, from lane off Churchfield Drive	Is there dry access and egress to the site during a flood for emergency vehicles?	Yes, from lane off Churchfield Drive
Area covered by Flood Warning?	No	Flood Warning Code	N/A

Policy Recommendations

It is recommended from guidance found in the NPPF (shown in Annex 3) that employment developments are classed as less vulnerable. As the sites highest Flood Zone is 3a, development is permitted, and an Exception Test does not need to be applied

With the site over 1 ha, a site specific FRA will need to be conducted.

Passing Exception Test
No Exception Test required.
Recommendations
The site is primarily in Flood Zone 1 with a small amount in Flood Zone 2 and 3. As the risk is contained to a topographically defined flow path along the watercourse sequential site design can be used to manage the fluvial flood risk through avoiding Flood Zones 2 and 3. Similarly, a sequential approach to site design could be used to avoid and preserve existing surface water flow paths through placing lower risk aspects of the develop in these areas (such as car parks and recreation space). An FRA will be required to demonstrate not increase in risk elsewhere, including from surface water runoff which should be managed through the use of SuDS.

CI/MU/1 Site Description			
Local Plan Reference	CL/MU/1	Site Name and Address	Land at the former Clipstone Colliery
SFRA Map ID	12	Total Area (ha)	27.65
Allocation Type	120 dwellings, employment development, retail and enhanced public open space		
Fluvial Flood Risk			
Watercourse	Vicar Water		
Flood Zone			
Flood Zone 1	96%	Flood Zone 3a	2%
Flood Zone 2	2%	Flood Zone 3b	0%
Modelled Flood Risk (defended)			
No detailed fluvial model			
Historic Flooding	No known historic flooding on group of sites. Check with LLFA for up to date data.		
Fluvial Risk Summary	Flood Zone mapping indicates that the site is primarily in Flood Zone 1, with a southern border being in 2 and 3a. The risk of fluvial flooding comes Vicar Water. At this stage no detailed modelling is available but the Flood Zone 2 offers an indication of increase in Flood Zone 3 extent you could experience in the future with climate change. No detailed fluvial model exists for Vicar Water; therefore, a model will may need to be developed to support future development.		
Surface Water			
Source	Vicar Water and Permanent Onsite Ponding		
Risk of Flooding from Surface Water			
3.3% AEP	2%	0.1% AEP	19%
1% AEP	5%	No mapped risk	81%

CC Max depth	> 1.2 m	CC Max hazard	> 2.0
Impact of Climate Change	Using the 0.1% AEP RoFSW extent the impact of climate change on the 1% AEP extent can be assessed. There is an increase in the extent of surface water flooding in the site area through the centre, linking Vicar Water to Mansfield Road. Onsite ponds exist in the area already, however, they are expected to merge into each other. Overall, the flowpaths are rated as cautionary only, with the onsite ponds being rated a Danger for All.		
Historic Flooding	No known historic flooding on group of sites. Check with LLFA for up to date data.		
Surface Water Risk Summary	EA RoFSW mapping shows that the site is at risk from surface water flooding from the 3.3% AEP. There is a flow path through the site and along its boundary aligned with the Vicar Water. Within the site there are permanent ponds at the southern edge along Vicar Water. There are also isolated areas of onsite ponding.		
Other Sources of Flooding			
Reservoir Inundation	There is currently no other recorded or modelled risk of flooding.		
Groundwater	There less than 25% susceptibility to groundwater flooding.		
Sewerage	No known risk but future development should check with Severn Trent Water and the LLFA for up to date data.		
Site Suitability			
Highest Flood Zone	Flood Zone 3a	Flood Vulnerability	More vulnerable
Is there dry access and egress to the site during a flood for occupants?	Yes, from lane Baulker Lane and Mansfield Road.	Is there dry access and egress to the site during a flood for emergency vehicles?	Yes, from lane Baulker Lane and Mansfield Road.
Area covered by Flood Warning?	No	Flood Warning Code	N/A
Policy Recommendations			
It is recommended from guidance found in the NPPF (shown in Annex 3) that housing developments are classed as More Vulnerable. As the sites highest Flood Zone is 3a, development is permitted, and an Exceptions Test does need to be run With the site over 1 ha, a site specific FRA will need to be conducted.			

Passing Exception Test
According to the NPPG-FRCC guidance, an Exception Test needs to demonstrate the following: • Development that has to be in a flood risk area will provide wider sustainability benefits to the community that outweigh flood risk. • The development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall. When applying the Exception Test the following needs to be considered: • Design to manage and mitigate flood risk • Finished Floor Levels • Safe access and egress • Operation and maintenance • Flood Warnings • Evacuation procedures
Recommendations
The site is primarily in Flood Zone 1 with a small amount in 3a. As the risk is on the boundary of the site, sequential site design can be used to manage the fluvial flood risk through avoiding Flood Zones 2 and 3 for the more vulnerable housing developments. An FRA is required and should be undertaken following the EA's standing advice. Where risk cannot be avoided development should be made resistant or resilient to flooding. Safe access and egress are available and should be preserved.. An emergency plan, including flood warning should be signed up to. If development / land raising is proposed in the area, compensatory level-for-level storage will need to be provided to ensure no increase in risk elsewhere. This would need to be modelled using a detailed hydraulic model. Surface water needs to be managed through the design stage to allow the risk to be mitigated against, such as using SuDS. Any changes will require that there are no adverse effects to other areas. With a groundwater susceptibility of <25%, further analysis will be required to assess the risk.

APPENDIX A: DETAILED SITE MAPS