

Central Bedfordshire Council Local Plan (2015-2035)

Level 2 Strategic Flood Risk Assessment

Vol 1

(January 2018)

Central Bedfordshire Council

Level 2 Strategic Flood Risk Assessment

Volume I

January 2018

Central Bedfordshire Council
Priory House
Monks Walk
CHICKSANDS
Bedfordshire
SG17 5TQ

**Central
Bedfordshire**



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JBA Project Manager

Joanne Chillingworth
The Library
St Philip's Courtyard
Church End
COLESHILL
B46 3AD

Revision History

Revision Ref / Date Issued	Amendments	Issued to
Volume I (January 2018)		Pru Khimasia, Central Bedfordshire Council

Contract

This report describes work commissioned by Central Bedfordshire Council. The Council's representative for the contract was Pru Khimasia.

Prepared by Thomas Allen BA MSc
Assistant Analyst

Reviewed by Joanne Chillingworth BSc MSc MCIWEM C.WEM
Chartered Senior Analyst

Purpose

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1 Introduction

1.1 Purpose of the L2 Strategic Flood Risk Assessment

This Level 2 Strategic Flood Risk Assessment (SFRA) Volume I document has been prepared for the purpose of presenting the Level Two SFRA assessment of Strategic Site options identified for allocation within the emerging Central Bedfordshire Council Local Plan. ***The findings of this document are currently under review and are potentially subject to change following refinements in some of the processes used to determine flood risk.***

This document should be considered in conjunction with the Level 1 SFRA (2017).

1.2 Levels of SFRA

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

- **Level One:** where flooding is not a major issue in relation to potential development sites and where development pressures are low. The assessment should be sufficiently detailed to allow application of the Sequential Test.
- **Level Two:** where land outside Flood Zones 2 and 3 cannot appropriately accommodate all the necessary development creating the need to apply the NPPF's Exception Test. In these circumstances, the assessment should consider the detailed nature of the flood characteristics within a Flood Zone and assessment of other sources of flooding.

1.3 SFRA objectives

The objectives of this Level 2 SFRA update are to:

1. Provide individual flood risk analysis for site options using the latest available flood risk data, thereby assisting the Council in applying the Exception Tests to its proposed site options in preparation of its Local Plan.
2. Where available, re-run existing hydraulic modelling to account for the effects of climate change and any residual risk. Where flood risk information is unavailable or limited, conduct appropriate hydraulic modelling where possible to determine the flood risks to the proposed site options.
3. Using available data, provide information and a comprehensive set of maps presenting flood risk from all sources for each proposed site options.
4. Where the Exception Test is required provide recommendations for making the site safe throughout its lifetime.
5. Take into account the most recent policy and legislation in the NPPF, PPG, and other relevant national and local policy and guidance documents. Using the documents provided, updating information on the requirements for site-specific FRAs, considerations for suitable surface water management methods and opportunities to reduce flood risk to the existing communities.

1.4 Level 2 SFRA outputs

The Level Two assessment includes detailed assessments of the proposed site options. These include:

- An assessment of all sources of flooding including fluvial flooding, surface water flooding, groundwater flooding, mapping of the functional floodplain and the potential increase in fluvial flood risk due to climate change and blockage scenarios.
- Reporting on 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 for managing surface water runoff.

- Advice on appropriate policies for sites which could satisfy the first part of the Exception Test and on the requirements necessary for a site-specific FRA, supporting a planning application to pass the second part of the Exception Test.

2 Level 2 assessment methodology

2.1 Introduction

Strategic sites have been provided by the Council for assessment. This Level 2 SFRA assessment helps to determine variations in flood risk across the potential development sites, identifying site-specific FRA requirements and helping guide local policies to provide sustainable developments, as well as reducing flood risk to existing communities.

2.2 Site summary tables

As part of the Level 2 SFRA, detailed site summary tables have been produced for each of the eight Strategic Sites identified. These sites are ones which are shown to be at risk of fluvial flood risk from watercourses running either through or adjacent to the site.

The summary tables set out the following information:

Basic site information

- Area, type of site, current land use (greenfield/ brownfield), proposed site use

Sources of flood risk

- Existing drainage features
- IDB watercourse
- Fluvial – proportion of site at risk including description from mapping/ modelling
- Surface Water – proportion of site at risk including description from RoFfSW mapping
- Reservoir
- Canal
- Flood History

Climate change

- Summary of climate change allowances and increase in flood extent compared to Flood Zones
- Description of implications to the site

Flood risk management infrastructure

- Defences – type, Standard of Protection and condition (if known), and description
- Description of any residual risk identified

Emergency Planning

- Flood Warning Areas
- Access and egress

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 Zone
- Historic Landfill Site

NPPF Planning implications

- Development vulnerability classification
- Exception Test requirements
- Requirements and guidance for site-specific FRA (including consideration of opportunities for strategic flood risk solutions to reduce flood risk)

Mapping information – description of data sources for the following mapped outputs:

- Flood Zones
- Climate change
- Surface water

- Depth, velocity and hazard mapping

2.3 Interactive Geo-PDF mapping

To accompany each site summary table, there is an Interactive Geo-PDF map, with all the mapped flood risk outputs per site. This is displayed centrally, with easy-to-use 'tick box' layers down the right-hand side and bottom of the mapping, to allow navigation of the data.

Flood risk information in the Geo-PDFs include:

- Site boundary and Council boundary
- Title bar showing area, grid reference, site name, proposed development use (e.g. residential/ employment) and percentage Flood Zone coverage
- Flood Zones 2, 3a and 3b (functional floodplain)
- Modelled 100-year fluvial depth, velocity and hazard rating (if available)
- Climate change extents – Central, Higher Central and Upper End allowances
- Flood risk from surface water dataset (30-years, 100-years and 1,000-years)
- Areas Susceptible to Groundwater Flooding
- Flood Warning and Flood Alert Areas
- Historic Landfill
- Defences
- Main Rivers/ Ordinary watercourses

2.4 Hydraulic modelling undertaken at sites

Where detailed Environment Agency hydraulic models are available, outputs from these have been used as part of this Level 2 assessment. Existing models include the River Ivel (2011) and its tributaries and the 2011 Upper, Mid and Lower Great Ouse (of which there are numerous models available).

It should be noted that no site visits or channel survey work has been undertaken as part of this assessment given the high-level nature of the assessment. It is recommended that developers undertake the necessary detailed site-specific work as part of a site-specific FRA.

2.4.1 Use of 2D generalised modelling

Where the Environment Agency's Flood Map for Planning Flood Zones are not informed by detailed hydraulic modelling, they are based on 2D generalised modelling to provide an indication of flood risk. Where there are no Environment Agency detailed hydraulic models covering the sites in this study, updated 2D generalised modelling was undertaken using Jflow, to determine the coverage of Flood Zone 2, Flood Zone 3a and Flood Zone 3b, as well as simulating the effects of climate change, for a number of ordinary watercourses flowing through or adjacent to the sites.

Jflow is the modelling technique which was used to produce the National-scale Environment Agency Flood Zones, but the extents mapped as part of this study may differ as more up-to-date data has been used (for example model software version, ground terrain data, hydrological parameters etc), since those published on the Environment Agency's website. This also then ensures consistency with the rest of the Jflow modelled outputs at sites, for example climate change.

The EA's Flood Zones are not provided for land where the catchment of the watercourse falls below 3km². Therefore, where drains are shown to flow through or adjacent to the site on OS mapping, but no existing Flood Zones or hydraulic models are present, 2D generalised modelling has been undertaken in this Level 2 SFRA.

These drains are defined in the LIDAR and are represented on the FEH CD-ROM to allow hydrological inflows to be derived. An appropriate reach of these drains has been modelled, rather than the whole watercourse, to ensure sufficient coverage and representation of hydraulics in the local vicinity of the sites being assessed. The channel capacity is assumed to be QMED; this is subtracted from the inflow hydrographs derived at defined point locations, and water is then allowed to spread across the LIDAR from these points, following topographic flow routes.

Jflow is suitable for providing an indication of flood risk for decision-making purposes at a strategic scale. It is recommended that developers construct detailed hydraulic models at these sites using channel and structure topographic survey, to confirm flood risk at a site.

3 Sources of flood risk mapping information

It is important to recognise that for the SFRA, several different sets of data have been used to inform the extent, depth, hazard and velocity for each site.

3.1 Flood Zones

The data used to prepare the fluvial mapping for this study is based on Flood Zones and the results from hydraulic models, either provided by the Environment Agency, or prepared for the purposes of this Strategic Flood Risk Assessment (SFRA).

3.1.1 Flood Zones 2 and 3a

Flood Zones 2 and 3a have been taken from the Environment Agency's Flood Zone 2 and 3, as shown on their long term flood risk information [website](#).

3.1.2 Flood Zone 3b

Flood Zone 3b has been identified as land which would flood with an annual probability of 1 in 20 years (5% AEP). It has been derived from the 20-year defended modelled flood extent where detailed hydraulic models exist, and where no detailed models exist, this uses generalised 2D hydraulic modelling undertaken for this SFRA.

There may be some minor discrepancies between Flood Zone 3b and Flood Zone 3a in places as the generalised 2D hydraulic modelling has not yet been used to update Environment Agency Flood Zones.

3.2 Depth, velocity and hazard

Depth, velocity and hazard mapping for the 1 in 100-year event (Flood Zone 3a) has been taken from the Environment Agency's detailed defended hydraulic models, where models are present. Where no models exist, these were produced from the 100-year event of the 2D generalised modelling outputs.

For 1D-only models, velocity and hazard data are unable to be presented as these are not available outputs from 1D-only models.

3.3 Climate change

The three climate change allowances for the '2080s' were modelled by re-running the Environment Agency's detailed models, and running the 2D generalised modelling in areas where detailed modelling was unavailable, and where it was technically possible to do so. For the Anglian basin, these allowances are 100-year flow + 25% (Central), +35% (Higher Central) and +65% (Upper End) respectively.

Watercourses covered by Environment Agency Flood Zones but not by the detailed models provided, were modelled for climate change as part of this SFRA using generalised 2D generalised modelling.

The mapping provides a strategic assessment of climate change risk; developers should undertake detailed modelling of climate change allowances as part of a site-specific FRA, following the guidance set out in the SFRA Level 1 main report.

3.4 Surface Water

Mapping of surface water flood risk in authority has been taken from the Risk of Flooding from Surface Water (RoFFSW) published online by the Environment Agency.

Category	Definition
High	Flooding occurring as a result of rainfall with a greater than 1 in 30 chance in any given year (annual probability of flooding 3.3%)
Medium	Flooding occurring as a result of rainfall of between 1 in 100 (1%) and 1 in 30 (3.3%) chance in any given year.
Low	Flooding occurring as a result of rainfall of between 1 in 1,000 (0.1%) and 1 in 100 (1%) chance in any given year.
Very Low	Flooding occurring as a result of rainfall with less than 1 in 1,000 (0.1%) chance in any given year.

The RoFfSW is derived primarily from identifying topographical flow paths of existing watercourses or dry valleys that contain some isolated ponding locations in low lying areas.

Although the RoFfSW offers improvement on previously available datasets, the results should not be used to understand flood risk for individual properties. The results should be used for high level assessments such as SFRAs for local authorities. If a particular site is indicated in the Environment Agency mapping to be at risk from surface water flooding, a more detailed assessment should be required to more accurately illustrate the flood risk at a site-specific scale. Such an assessment will use the RoFfSW in partnership with other sources of local flooding information to confirm the presence of a surface water risk at that particular location.

3.5 Groundwater

Mapping of groundwater flood risk has been based on the Areas Susceptible to Groundwater (ASStGWF) dataset. The ASStGWF dataset is a strategic-scale map showing groundwater flood areas on a 1km square grid. It shows the proportion of each 1km grid square, where geological and hydrogeological conditions indicate that groundwater might emerge. It does not show the likelihood of groundwater flooding occurring and does not take account of the chance of flooding from groundwater rebound. This dataset covers a large area of land, and only isolated locations within the overall susceptible area are actually likely to suffer the consequences of groundwater flooding.

The ASStGWF data is indicative and should only be used in combination with other information, for example local data or historical data. It should not be used as sole evidence for any specific flood risk management, land use planning or other decisions at any scale. However, the data can help to identify areas for assessment at a local scale where finer resolution datasets exist.

3.6 River networks

Main Rivers are represented by the Environment Agency's Statutory Main River layer. Ordinary Watercourses are represented by the Environment Agency's Detailed River Network Layer.

3.7 Sewer flooding

Due to licencing and confidentiality restrictions, sewer flooding data has not been represented on the mapping.

3.8 Note on SuDS suitability

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

The assessment is based on catchment characteristics and additional datasets such as the ASStGWF map and British Geological Survey (BGS) Soil maps of England and Wales which allow for a basic assessment of the soil characteristics on a site by site basis. LIDAR data was used as a basis for determining the topography and average slope across each development site. Other datasets were used to determine other influencing factors on potential SuDS. These datasets include the following:

- Historic landfill sites
- Groundwater Source Protection Zones
- Detailed River Network
- Flood Zones derived as part of this L2 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 3-1. 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 utilised on a particular development.

Table 3-1: 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, Underdrained Swale, Wet Swale

The suitability of each SuDS type for the site options has been described in the summary tables, where applicable. The assessment of suitability is broadscale and indicative only; more detailed assessments should be carried out during the site planning stage to confirm the feasibility of different types of SuDS. The LLFA should be consulted at an early stage to ensure SuDS are implemented and designed in response to site characteristics and policy factors.



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Appendices

A Appendix - Level 2 Assessment


A.1 L2 Site Summary Tables and Geo-PDF Mapping


Mapping


Central Bedfordshire Strategic Flood Risk Assessment - Level 2 Detailed Strategic Site Summary Tables




Site details	Site Name	East of Biggleswade – Phase One			
	Area (ha)	105.5			
	Current land use	Predominantly Greenfield			
	Proposed land use	Residential			
Sources of flood risk	Existing drainage features	<ul style="list-style-type: none">• An unnamed Ordinary Watercourse (OW A) flows towards the site from the south, flows westwards along the southern boundary for approximately 435m before flowing generally north west across the site. Upon reaching the site’s western boundary, the watercourse flows north along the boundary for approximately 730m before flowing in a north-west direction away from the site.• Another unnamed Ordinary Watercourse (OW B) has its source along the site eastern boundary. It initially flows north away from the site boundary before its confluence with another watercourse, at which point it flows in a western direction back towards the site. It continues to flow along the entirety of the site’s northern boundary before its confluence with OW A.• A further unnamed Ordinary Watercourse (OW C) flows towards the site from the south and reaches the site boundary on the south west corner. It continues to flow down the western boundary until its confluence with OW A.• Several small drains and ditches are located across the site.			
	IDB watercourse present?	The site is largely located within the IDB district of the Bedfordshire and River Ivel Board. The IDB coverage includes the watercourse that flows through the site in addition to those that flow along the site boundary.			
	Fluvial	Proportion of site at risk			
		FZ3b	FZ3a	FZ2	FZ1
		TBC	TBC	TBC	TBC
		Flood Zones show the site to be at risk along its northern, eastern and western boundary areas, with a sizable portion of the south west of the site shown to be affected. There is a limited increase in the extent of FZ2 compared with FZ3a. The greatest area at risk is in the south west of the site, correlating with a depression in the topography.			
	Surface Water	Proportion of site at risk (RoFfSW)			
		30-year	100-year	1,000-year	
		TBC	TBC	TBC	
		Sporadic pockets of pooling surface water begin to affect the site in the 30-year event. Flow routes meanwhile follow the path of existing watercourse channels. The extent of surface water flooding continues to increase in the 100-year and 1,000-year event. In the latter event much of the south of the site is shown to be affected by surface water flooding.			
Canal	No canal infrastructure is present in the vicinity of the site.				
Reservoir	The site is not shown to be at risk of reservoir flooding.				
Flood history	The Environment Agency’s historic flood map does not show the site as having flooded in the past.				

Mapping		Central Bedfordshire Strategic Flood Risk Assessment - Level 2 Detailed Strategic Site Summary Tables				
Site details	Site Name	East of Biggleswade – Phase One				
	Area (ha)	105.5				
	Current land use	Predominantly Greenfield				
	Proposed land use	Residential				
Climate Change	Climate change allowances for ‘2080s’	River Basin District	Central	Higher Central	Upper End	
		Anglian	25%	35%	65%	
	Rainfall – Upper end allowances	All England	10%	20%	40%	
	Future implications for the site	Climate change is predicted to increase storm intensities and frequencies in the UK. Flood extents associated with the unnamed ordinary watercourses show an increase in the climate change extents with the Upper allowance being comparable to the FZ2 extent. Climate change is predicted to increase storm intensities and frequencies in the UK. Considering the site is already at risk of surface water flooding climate change may increase in the extent, depth and frequency of surface water flooding to the site.				
Existing flood risk management infrastructure	Defences	Defence Type	Standard of Protection	Condition		
		-	-	-		
	This site is not protected by any formal flood defences.					
	Residual risk	-				
Emergency planning	Flood warning	The site is not located within an Environment Agency Flood Warning Area.				
	Access and egress	Dry access and egress is available along parts of Baden-Powell Way; the south-western corner of the site encroaches onto the road in fluvial flooding. This is the main road serving the site currently, though access may be possible from parts of the B1040. A smaller road also traverses the site through the middle, which may offer access to the eastern side of the site where flood risk is lower. Surface water flooding events show a similar pattern to the fluvial flood risk.				

<div>Mapping</div>		Central Bedfordshire Strategic Flood Risk Assessment - Level 2 Detailed Strategic Site Summary Tables	
Site details	Site Name	East of Biggleswade – Phase One	
	Area (ha)	105.5	
	Current land use	Predominantly Greenfield	
	Proposed land use	Residential	
Requirements for drainage control and impact mitigation	Groundwater Source Protection Zone	The majority of the site is located within Groundwater Source Protection Zone 3. Infiltration techniques should only be used following the granting of any required environmental permits from the Environment Agency, although it is possible that infiltration may not be permitted. Proposed SuDS should be discussed with relevant stakeholders (LPA, LLFA and EA) at an early stage to understand possible opportunities and constraints.	
	Historic Landfill Site	This site has areas within its boundary designated by the Environment Agency as being a landfill site. A thorough ground investigation will be required as part of a detailed site-specific FRA to determine the extent of the contamination and the impact this may have on SuDS. As such proposed SuDS should be discussed with the relevant stakeholders (LPA, LLFA and EA) at an early stage to understand possible constraints.	
	Broadscale assessment of possible SuDS	<ul style="list-style-type: none"> Geology at the site consists of: <ul style="list-style-type: none"> Bedrock – Sandstone and Mudstone Superficial –Diamicton, Clay, Silt and Sand Source control techniques are likely to be suitable for this site. Mapping suggest groundwater flooding may be an issue at the site, furthermore the presence of historic landfill and parts of the site being within a Groundwater Source Protection Zone mean infiltration techniques at least in parts of the site may not be suitable. Further site investigation should be carried out to assess potential for drainage by infiltration. Detention features may be feasible providing site slopes are <5% at the location of the detention feature. If groundwater / contamination is a risk to or from the site, then a liner may be required to mitigate against potential contamination issues. Filtration systems are probably suitable providing site slopes are <5% and the depth to the water table is >1m. If the site has contamination issues, or is at risk from groundwater, then a liner will be required. All forms of conveyance features are likely to be suitable. Where slopes are >5%, features should follow contours or utilise check dams to slow flows. The site is not designated by the Environment Agency as previously being a landfill site. 	
NPPF and planning implications	Development Vulnerability Classification to Flooding	Under NPPF developments associated with residential uses (i.e. dwellings and residential institutions) are considered 'More Vulnerable'.	

<div>Mapping</div>		Central Bedfordshire Strategic Flood Risk Assessment - Level 2 Detailed Strategic Site Summary Tables	
Site details	Site Name	East of Biggleswade – Phase One	
	Area (ha)	105.5	
	Current land use	Predominantly Greenfield	
	Proposed land use	Residential	
	Exception Test requirements	<p>A sequential approach to site layout is encouraged, to steer development away from areas of flood risk on the site (i.e. where surface water is prevalent, especially in the 30-year event).</p> <p>The Exception Test will need to be applied if:</p> <ul style="list-style-type: none"> • More Vulnerable and Essential Infrastructure development is located in FZ3a and for Highly Vulnerable development located in FZ2. • Highly Vulnerable infrastructure should not be permitted within FZ3a and FZ3b. • More Vulnerable and Less Vulnerable Infrastructure should not be permitted within FZ3b. • Essential Infrastructure in Flood Zone 3b will require the Exception Test. 	

	<p>Requirements and guidance for site-specific Flood Risk Assessment</p>	<ul style="list-style-type: none"> • At the planning application stage, a site-specific Flood Risk Assessment will be required if any development is located within Flood Zones 2 or 3, is greater than one hectare, is located within 20m of a watercourse, or is identified as being at significant surface water flood risk by the Council. Other sources of flooding should also be considered. • Consultation with the Local Authority, Local Lead Flood Authority, and the Environment Agency should be undertaken at an early stage. • Flood risk extents may need to be confirmed by developers at the site-specific FRA stage using detailed hydraulic modelling. • To reduce flood risk to development, the following hierarchy should be followed by developers, as per Local Plan policy: <ol style="list-style-type: none"> 1. Flood Avoidance - A sequential approach to site layout is applied, directing the most vulnerable uses to the areas at lowest risk from all sources of flooding (i.e. Flood Zone 1). 2. Raising Floor Levels - Where it is not possible to develop outside of flood risk areas, development should raise Finished Floor Levels to reduce the risk of flooding. 3. Flood Resistance - Where it is not possible to raise floor levels, development should incorporate Resistance measures into the building design to prevent the ingress of water. 4. Flood Resilience - Resilience measures may be implemented, often in conjunction with Resistance measures, with the aim that in the event of flooding damage is limited and occupancy/use can resume quickly and efficiently. • Sustainable drainage (SuDS) should be used on all new development as detailed through Policy CC5 (Climate change and sustainability document) and in accordance with the The SuDS Manual (C753) and 'Central Bedfordshire Sustainable Drainage guidance: May 2015'. • Discharge methods for surface water runoff should comply with Planning Practice Guidance paragraph 80 and Building Regulations Approved Document H and should ease pressure of the development downstream, by reducing the impact of surface runoff entering a receiving waterbody or drainage network. • SuDS should ensure that post-development surface water run-off rates are attenuated to achieve a reduction in greenfield run-off rates and reduce existing downstream risk. This may include consideration of "off-site" solutions. • The design of SuDS should also take into consideration: biodiversity enhancement, mitigation of visual landscape impacts, maintenance and safety. • Onsite attenuation schemes would need to be tested against the hydrographs of the watercourses discharged into to ensure flows are not exacerbated downstream within the catchment. • Assessment for runoff should include allowance for climate change effects. • Safe access and egress will need to be demonstrated. • Development in the near vicinity of a watercourse within an IDB area will require the consent of the relevant IDB. • The developer should contact the relevant IDB to determine the risk of flooding from IDB watercourses to the site. • Wherever possible, developers should seek to reduce flood risk and provide wider sustainability benefits by undertaking or contributing towards the following: <ul style="list-style-type: none"> ○ reconnection of rivers to the floodplain, ○ betterment of existing discharge rates and volumes, ○ removal of redundant in channel structures,
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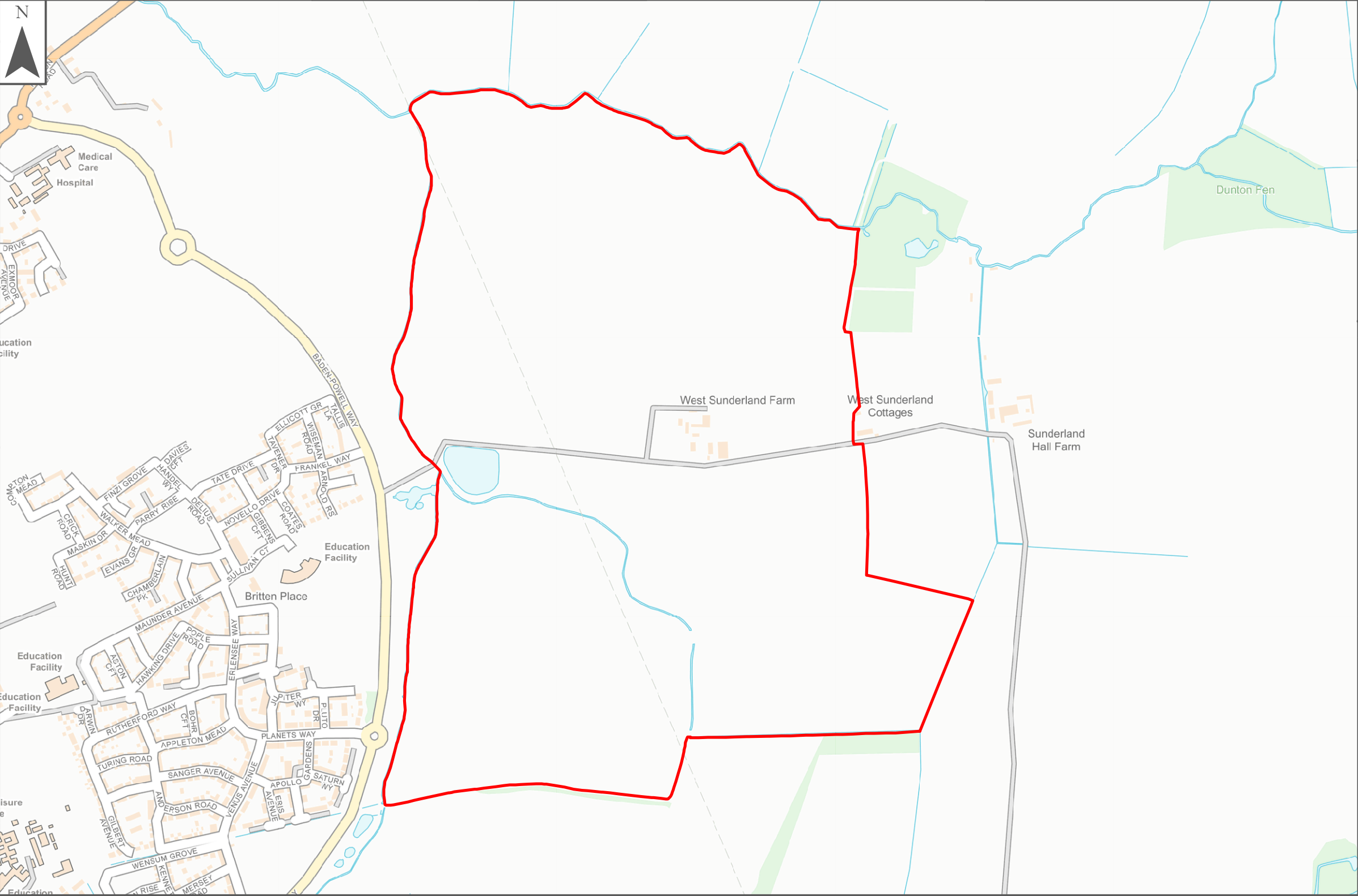
Mapping		Central Bedfordshire Strategic Flood Risk Assessment - Level 2 Detailed Strategic Site Summary Tables	
Site details	Site Name	East of Biggleswade – Phase One	
	Area (ha)	105.5	
	Current land use	Predominantly Greenfield	
	Proposed land use	Residential	
		<ul style="list-style-type: none">○ integrating or retrofitting surface water measures to replace and/or augment an existing drainage system in a developed catchment• Green infrastructure should be considered within the mitigation measures for surface water runoff from potential development and consider using Flood Zones 2 and 3 as public open space.	
Mapping Information			
Flood Zones		Flood Zones 2, 3a and 3b re based on 2D generalised modelling, because the watercourses were not represented on the Environment Agency's Flood Map for Planning Flood Zones. Developers should confirm the Flood Zone extents as part of a site-specific FRA, using detailed hydraulic modelling and channel topographic survey.	
Climate change		The climate change allowances for the '2080s' scenario were modelled using 2D generalised modelling. Developers should confirm the climate change flood extents as part of a site-specific FRA, using detailed hydraulic modelling and channel topographic survey.	
Surface Water		The Risk of Flooding from Surface Water has been used to define areas at risk from surface water flooding.	
Groundwater		The risk of groundwater flooding to the site has been assessed using the Areas Susceptible to Groundwater Flooding dataset.	
Depth, velocity and hazard mapping		Depth, velocity and hazard mapping for the 1 in 100-year event (Flood Zone 3a) have been taken from the 2D generalised modelling conducted as part of this Level 2 assessment. Developers should confirm the depth, velocity and hazard to the site as part of a site-specific FRA, using detailed hydraulic modelling and channel topographic survey.	
Reservoir		The Environment Agency's online 'Long term flood risk information, Flood risk from reservoirs, Extent of flooding' viewer was used to define areas at risk from reservoirs.	

Site ID: East of Biggleswade - Phase one

OSNGR: 521303.22 , 245432.07		Area: 105.5		Predominately Greenfield		Proposed Development Details: Residential
Flood Zone Coverage		FZ3b : TBC%	FZ3a: TBC%	FZ2 :TBC%	FZ1 : TBC%	
Surface Water Coverage		30-year :TBC%	100-year: TBC%	1,000-year: TBC%		

LEVEL 2 SITE SUMMARY TABLES

STRATEGIC FLOOD RISK ASSESSMENT



LEGEND

Flood Risk

Flood Zones

	Flood Zone 3b
	Flood Zone 3a
	Flood Zone 2

Fluvial 100-year event

	Depth (m)	0 - 0.10
		0.10 - 0.50
		0.50 - 1.00
		1.00 - 1.50
		1.50 - 2.00
		2.00 - 2.50
		2.50 - 3.00
		3.00 - 3.50
		3.50 - 4.00
		>4.00

Climate Change

	Climate Change Central
	Climate Change Higher Central
	Climate Change Upper End

Surface Water

	RoSWf 30-year Extent
	RoSWf 100-year Extent
	RoSWf 1,000-year Extent

Area Susceptible to Groundwater Flooding

	< 25%
	>= 25% < 50%
	>= 50% < 75%
	>= 75%

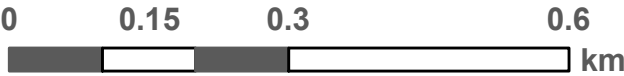
Velocity (m/s)

	0 - 0.2
	0.2 - 0.5
	0.5 - 1.0
	1.0 - 2.0
	> 2.0

Hazard Rating

	Very low hazard - caution
	Danger for some
	Danger for most
	Danger for all

Please refer to Main Report and Site Summary Table for further information on the datasets



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LEGEND

Authority Information

	Central Bedfordshire Council boundary
	Potential Site Allocations
	Main River
	Detailed River Network

Defences

	Defence
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Reservoir Inundation Map


	Reservoir Inundation
--	----------------------


Source Protection Zone


	Zone 1
	Zone 2
	Zone 3


Other

	Flood Warning Area
	Flood Alert
	Historic Landfill


Mapping		Central Bedfordshire Strategic Flood Risk Assessment - Level 2 Detailed Strategic Site Summary Tables			
Site details	Site Name	East of Arlesey			
	Area (ha)	205.7			
	Current land use	Greenfield			
	Proposed land use	Residential			
Sources of flood risk	Existing drainage features	<ul style="list-style-type: none">The River Hiz is located 475m to the west of the site flowing in a northerly direction.The Pix Brook is located 510m to the north of the site at the closest point. The Brook flows parallel with the eastern boundary before turning and flowing parallel with the northern boundary and having its confluence with the River Hiz.Three unnamed ordinary watercourses flow east to west across the site, one each across the south, centre and north. starts 30m to the west of the site flows in a western direction away from the site. Each enters into a culvert to the west of the site, under the village, and flows out of culvert shortly to join the River Hiz.Two ponds are located on the site, the larger of which is called the Blue Lagoon and located in the south; the other is located along the eastern boundary.Several small additional drains and ditches are located across the site.			
	IDB watercourse present?	The site is not located within an IDB district. However, watercourses that flow on the site drain into the Bedfordshire and River Ivel IDB to the west of the site.			
	Fluvial	Proportion of site at risk			
		FZ3b	FZ3a	FZ2	FZ1
		TBC	TBC	TBC	TBC
	Surface Water	EA Flood Zones show no fluvial flood risk to the site because the catchments are <3km ² . 2D generalised modelling techniques were undertaken on the three ordinary watercourses that flow across the site; however, due to the resolution of the DTM and the flat topography they flow across to the west, the modelling outputs were not representative or suitable. It did show however that they pose localised flood risk to the land immediately adjacent to them. The site is not at risk from the Hiz or the Pix Brook as the site's western boundary forms the watershed between these 2 catchments, and the drains flow under Arlesey and railway line.			
		Proportion of site at risk (RoFfSW)			
		30-year	100-year	1,000-year	
TBC		TBC	TBC		
Canal	No canal infrastructure is present in the vicinity of the site				

Mapping		Central Bedfordshire Strategic Flood Risk Assessment - Level 2 Detailed Strategic Site Summary Tables				
Site details	Site Name	East of Arlesey				
	Area (ha)	205.7				
	Current land use	Greenfield				
	Proposed land use	Residential				
	Reservoir	The site is not shown to be at risk of reservoir flooding.				
	Flood history	The Environment Agency's historic flood map does not show the site as having flooded in the past.				
Climate Change	Climate change allowances for '2080s'	River Basin District	Central	Higher Central	Upper End	
		Anglian	25%	35%	65%	
	Rainfall – Upper end allowances	All England	10%	20%	40%	
	Future implications for the site	Climate change is predicted to increase storm intensities and frequencies in the UK. Flood extents associated with the three ordinary watercourses showed slight increases in flooding, with the extents of the upper allowance being comparable with the FZ2. However, in general the 2D modelling technique was not suitable for these small drains, so climate change impacts should be confirmed at the site-specific level by detailed hydraulic modelling. Considering the site is already at risk of surface water flooding, climate change may increase the extent, depth and frequency of surface water flooding to the site.				
Existing flood risk management infrastructure	Defences	Defence Type	Standard of Protection	Condition		
		-	-	-		
		This site is not protected by any formal flood defences.				
	Residual risk	The three watercourses that flow east to west across the site and enter into culverts to the west of the site may present an increased risk to the site in the event of a blockage. Developers should confirm the flood risk to the site's western boundary posed by the potential blockage of these culverts.				
Emergency planning	Flood warning	The site is not located within an Environment Agency Flood Warning Area.				
	Access and egress	Dry access and egress is available via all surrounding roads in all return periods in the event of fluvial flooding. In the event of surface water flooding, the following roads lose access in the following return period, i.e. road name (return period access lost) <ul style="list-style-type: none">• Unnamed road (north-west corner) (100-year)• West Drive (1,000-year)• A507 (1,000-year) Hitchin Road is accessible in all surface water events. Flooding of surrounding roads however, may limit evacuation beyond the immediate site.				

<div>Mapping</div>		Central Bedfordshire Strategic Flood Risk Assessment - Level 2 Detailed Strategic Site Summary Tables	
Site details	Site Name	East of Arlesey	
	Area (ha)	205.7	
	Current land use	Greenfield	
	Proposed land use	Residential	
Requirements for drainage control and impact mitigation	Groundwater Source Protection Zone	The site is not located within a Groundwater Source Protection Zone.	
	Historic Landfill Site	This site has areas within its boundary designated by the Environment Agency as being a landfill site. A thorough ground investigation will be required as part of a detailed site-specific FRA to determine the extent of the contamination and the impact this may have on SuDS. As such, proposed SuDS should be discussed with the relevant stakeholders (LPA, LLFA and EA) at an early stage to understand possible constraints.	
	Broadscale assessment of possible SuDS	<ul style="list-style-type: none"> Geology at the site consists of: <ul style="list-style-type: none"> Bedrock – Chalk Superficial – Largely areas of no deposits with some of diamicton Source control techniques are likely to be suitable for this site. Mapping suggest groundwater flooding may be an issue at the site, providing the site is not at medium to high risk from groundwater flooding infiltration techniques may be suitable. As areas of the site have been designated as historic landfill, further site investigation should be carried out to assess potential for drainage by infiltration. Detention features may be feasible providing site slopes are <5% at the location of the detention feature. If groundwater / landfill contamination is a risk to the site, then a liner may be required to mitigate against potential contamination issues. Filtration systems are probably suitable providing site slopes are <5% and the depth to the water table is >1m. If the site has contamination issues, or is at risk from groundwater, then a liner will be required. All forms of conveyance features are likely to be suitable. Where slopes are >5%, features should follow contours or utilise check dams to slow flows. SuDS should ensure that post-development surface water run-off rates are attenuated to achieve a reduction in greenfield run-off rates and reduce existing downstream risk. This may include consideration of “off-site” solutions. 	
NPPF and planning implications	Development Vulnerability Classification	Under NPPF, developments associated with residential uses (i.e. dwellings and residential institutions) are considered ‘More Vulnerable’.	

<div>Mapping</div>		Central Bedfordshire Strategic Flood Risk Assessment - Level 2 Detailed Strategic Site Summary Tables	
Site details	Site Name	East of Arlesey	
	Area (ha)	205.7	
	Current land use	Greenfield	
	Proposed land use	Residential	
	Exception Test requirements	<p>The Sequential Test will need to be passed before the Exception Test is applied.</p> <p>The Exception Test will need to be applied if:</p> <ul style="list-style-type: none"> • More Vulnerable and Essential Infrastructure development is located in FZ3a and for Highly Vulnerable development located in FZ2. • Highly Vulnerable infrastructure should not be permitted within FZ3a and FZ3b. • More Vulnerable and Less Vulnerable Infrastructure should not be permitted within FZ3b. • Essential Infrastructure in Flood Zone 3b will require the Exception Test. 	

	<p>Requirements and guidance for site-specific Flood Risk Assessment</p>	<ul style="list-style-type: none"> • At the planning application stage, a site-specific Flood Risk Assessment will be required if any development is located within Flood Zones 2 or 3, is greater than one hectare, is located within 20m of a watercourse, or is identified as being at significant surface water flood risk by the Council. Other sources of flooding should also be considered. • Consultation with the Local Authority, Local Lead Flood Authority, and the Environment Agency should be undertaken at an early stage. • Developers should confirm the flood risk to the site posed by a potential blockage of the three ordinary watercourses that enter into culverts to the west of the site. • To reduce flood risk to development, the following hierarchy should be followed by developers, as per Local Plan policy: <ol style="list-style-type: none"> 1. Flood Avoidance - A sequential approach to site layout is applied, directing the most vulnerable uses to the areas at lowest risk from all sources of flooding (i.e. Flood Zone 1). 2. Raising Floor Levels - Where it is not possible to develop outside of flood risk areas, development should raise Finished Floor Levels to reduce the risk of flooding. 3. Flood Resistance - Where it is not possible to raise floor levels, development should incorporate Resistance measures into the building design to prevent the ingress of water. 4. Flood Resilience - Resilience measures may be implemented, often in conjunction with Resistance measures, with the aim that in the event of flooding damage is limited and occupancy/use can resume quickly and efficiently. • Sustainable drainage (SuDS) should be used on all new development as detailed through Policy CC5 (Climate change and sustainability document) and in accordance with The SuDS Manual (C753) and 'Central Bedfordshire Sustainable Drainage guidance: May 2015'. • Discharge methods for surface water runoff should comply with Planning Practice Guidance paragraph 80 and Building Regulations Approved Document H and should ease pressure of the development downstream, by reducing the impact of surface runoff entering a receiving waterbody or drainage network. • SuDS should ensure that post-development surface water run-off rates are attenuated to achieve a reduction in greenfield run-off rates and reduce existing downstream risk. This may include consideration of "off-site" solutions. • The design of SuDS should also take into consideration: biodiversity enhancement, mitigation of visual landscape impacts, maintenance and safety. • Onsite attenuation schemes would need to be tested against the hydrograph of the River Hiz and Pix Brook to ensure flows are not exacerbated downstream within the catchment. • Assessment for runoff should include allowance for climate change effects. • Safe access and egress will need to be demonstrated. • As watercourses on the site drain into an IDB district the IDB should be consulted. • Wherever possible, developers should seek to reduce flood risk and provide wider sustainability benefits by undertaking or contributing towards the following: <ul style="list-style-type: none"> ○ reconnection of rivers to the floodplain, ○ betterment of existing discharge rates and volumes, ○ removal of redundant in channel structures, ○ integrating or retrofitting surface water measures to replace and/or augment an existing drainage system in a developed catchment
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Mapping		Central Bedfordshire Strategic Flood Risk Assessment - Level 2 Detailed Strategic Site Summary Tables	
Site details	Site Name	East of Arlesey	
	Area (ha)	205.7	
	Current land use	Greenfield	
	Proposed land use	Residential	
		<ul style="list-style-type: none">Green infrastructure should be considered within the mitigation measures for surface water runoff from potential development and consider using Flood Zones 2 and 3 as public open space.	
Mapping Information			
Flood Zones		The site is not represented in the EA's Flood Zones. 2D generalised modelling was attempted to provide Flood Zones 2, 3a and 3b; however, the outputs were not deemed suitable, and therefore developers should confirm the Flood Zone extents as part of a site-specific FRA, using detailed hydraulic modelling and channel topographic survey.	
Climate change		The climate change allowances for the '2080s' scenario were modelled using 2D generalised modelling. Developers should confirm the climate change flood extents as part of a site-specific FRA, using detailed hydraulic modelling and channel topographic survey.	
Surface Water		The Risk of Flooding from Surface Water has been used to define areas at risk from surface water flooding.	
Groundwater		The risk of groundwater flooding to the site has been assessed using the Areas Susceptible to Groundwater Flooding dataset.	
Depth, velocity and hazard mapping		Depth, velocity and hazard mapping for the 1 in 100-year event (Flood Zone 3a) was produced from 2D generalised modelling; however, as stated for the Flood Zones, the outputs were not suitable for drains so small, and therefore developers should confirm the depth, velocity and hazard to the site as part of a site-specific FRA, using detailed hydraulic modelling with channel topographic survey.	
Reservoir		The Environment Agency's online 'Long term flood risk information, Flood risk from reservoirs, Extent of flooding' viewer was used to define areas at risk from reservoirs.	

Site ID: East of Arlesey

OSNGR:519717.82 , 235197.20

Area:205.7

Greenfield

Proposed Development Details:

Flood Zone Coverage

FZ3b : TBC%

FZ3a: TBC%

FZ2 :TBC%

FZ1 : TBC%

Residential

Surface Water Coverage

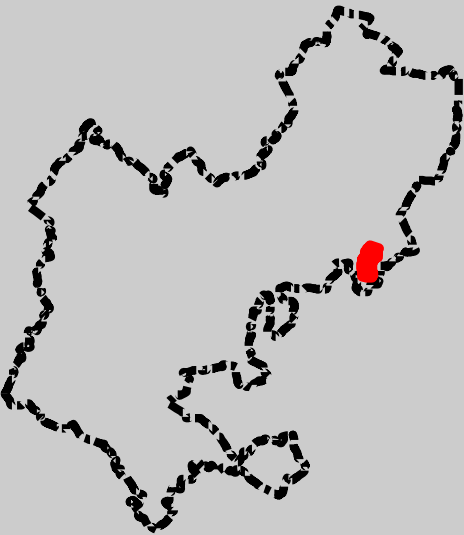
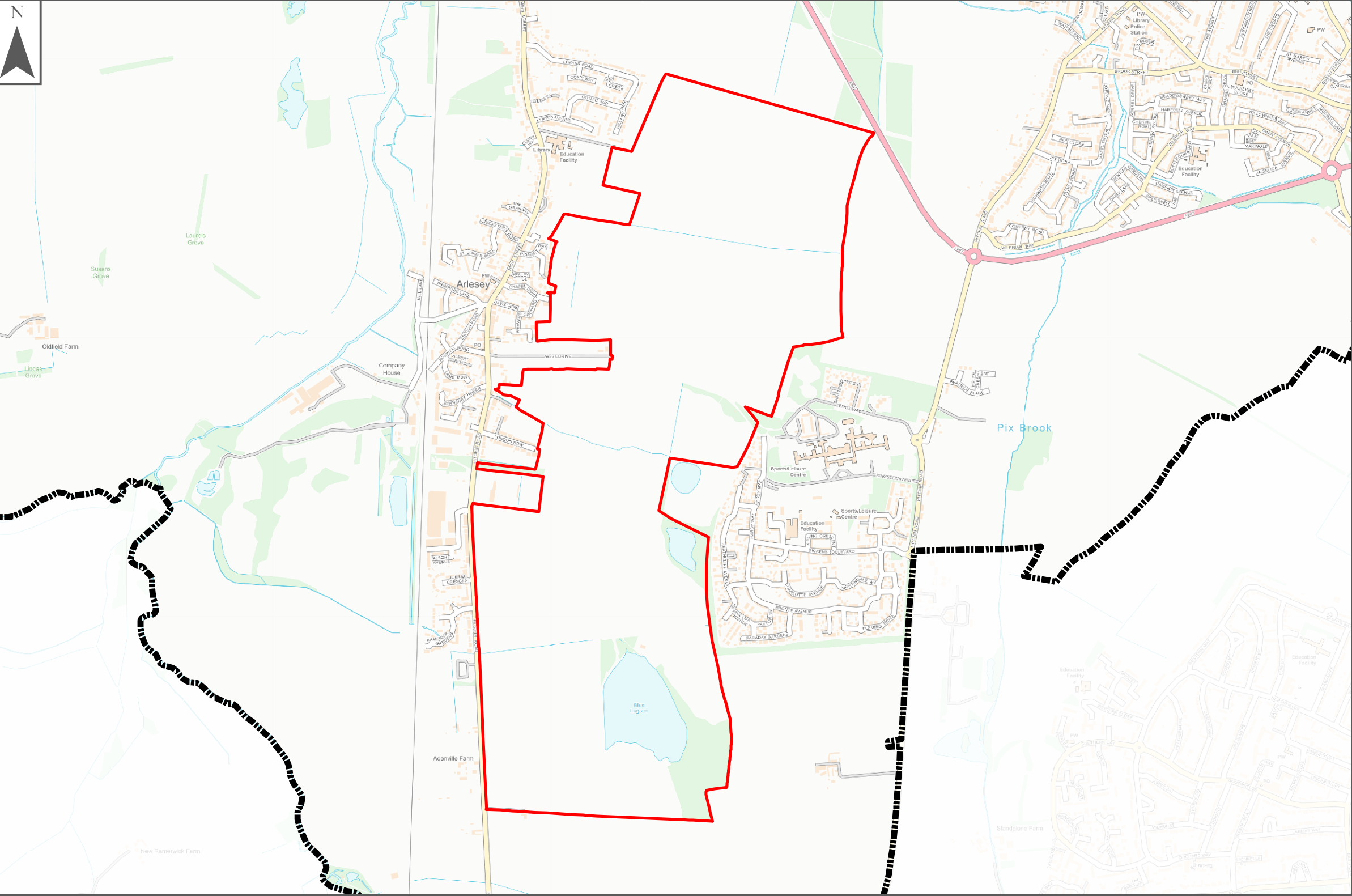
30-year :TBC%

100-year: TBC%

1,000-year: TBC%

LEVEL 2 SITE SUMMARY TABLES

STRATEGIC FLOOD RISK ASSESSMENT



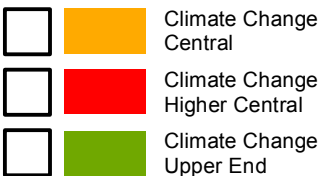
LEGEND

Flood Risk

Flood Zones



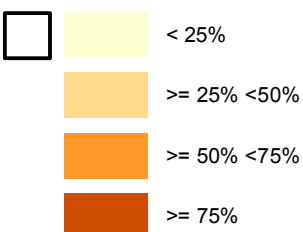
Climate Change



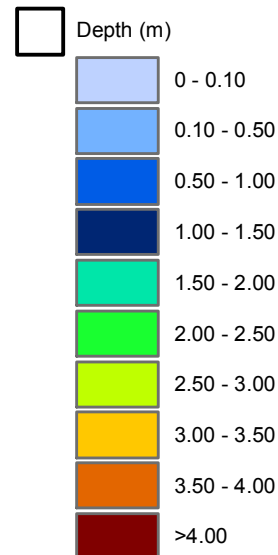
Surface Water



Area Susceptible to Groundwater Flooding

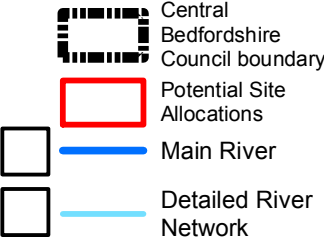


Fluvial 100-year event

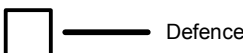


LEGEND

Authority Information



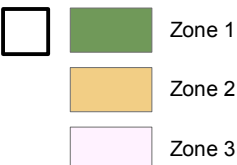
Defences



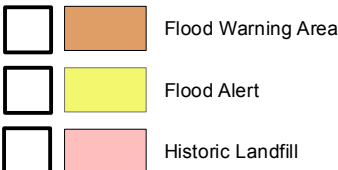
Reservoir Inundation Map



Source Protection Zone



Other

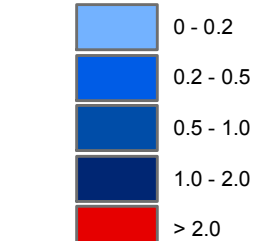


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Please refer to Main Report and Site Summary Table for further information on the datasets

Velocity (m/s)




Hazard Rating




Mapping		Central Bedfordshire Strategic Flood Risk Assessment - Level 2 Detailed Strategic Site Summary Tables				
Site details	Site Name	Marston Gate				
	Area (ha)	42.7				
	Current land use	Greenfield				
	Proposed land use	Employment				
Sources of flood risk	Existing drainage features	<ul style="list-style-type: none">The Broughton Beck meanders to the south of the site flowing in a generally south to north west direction away from the south. At the closest point it is 345m from the site.An unnamed Ordinary Watercourse flows north to south down the site's eastern boundary before continuing towards its confluence with the Broughton Beck.Another unnamed Ordinary Watercourse has its source on site and flows westwards before exiting along the west site boundary and continuing south west until its confluence with the Broughton Beck.				
	IDB watercourse present?	The site is largely located within the IDB district of the Buckingham and River Ouzel Board. The IDB coverage includes the watercourse that flows through the site in addition to those that flow along the site boundary.				
	Fluvial	Proportion of site at risk				
		FZ3b	FZ3a	FZ2	FZ1	
		TBC	TBC	TBC	TBC	
	Surface Water	EA Flood Zones show no fluvial flood risk to the site; however, there are unmodelled field drains on and in close proximity to the site. 2D generalised modelling of the ordinary watercourse to the east the site show there to be flood risk in the vicinity of the channel.				
		Proportion of site at risk (RoFfSW)				
		30-year	100-year	1,000-year		
		TBC	TBC	TBC		
	Canal	No canal infrastructure is present in the vicinity of the site.				
	Reservoir	The site is not shown to be at risk of reservoir flooding.				
	Flood history	The Environment Agency's historic flood map does not show the site as having flooded in the past.				
Climate Change	Climate change allowances for '2080s'	River Basin District		Central	Higher Central	Upper End
		Anglian		25%	35%	65%

<div>Mapping</div>		Central Bedfordshire Strategic Flood Risk Assessment - Level 2 Detailed Strategic Site Summary Tables		<div>JBA consulting</div>	
Site details	Site Name	Marston Gate			
	Area (ha)	42.7			
	Current land use	Greenfield			
	Proposed land use	Employment			
	Rainfall – Upper end allowances	All England	10%	20%	40%
	Future implications for the site	Climate change is predicted to increase storm intensities and frequencies in the UK. Flood extents associated with the unnamed ordinary watercourses show an increase in the climate change extents with the Upper allowance being comparable to the FZ2 extent. Considering the site is already at risk of surface water flooding climate change may increase in the extent, depth and frequency of surface water flooding to the site.			
Existing flood risk management infrastructure	Defences	Defence Type	Standard of Protection	Condition	
		-	-	-	
	This site is not protected by any formal flood defences.				
	Residual risk	The unnamed watercourse along the site's eastern boundary enters a culvert under the A507 at the site's southern boundary. Detailed modelling may be required as part of a FRA to confirm blockage risk to the site.			
Emergency planning	Flood warning	The site is not located within an Environment Agency Flood Warning Area.			
	Access and egress	Dry access and egress is available via the A507 is available in all return periods in the event of fluvial flooding. In the event of surface water flooding the A507 is accessible until the 1,000-year event at which point access and egress is lost.			

<div>Mapping</div>		Central Bedfordshire Strategic Flood Risk Assessment - Level 2 Detailed Strategic Site Summary Tables	
Site details	Site Name	Marston Gate	
	Area (ha)	42.7	
	Current land use	Greenfield	
	Proposed land use	Employment	
Requirements for drainage control and impact mitigation	Groundwater Source Protection Zone	The site is not located within a Groundwater Source Protection Zone.	
	Historic Landfill Site	No historic landfill sites are underlying the site.	
	Broadscale assessment of possible SuDS	<ul style="list-style-type: none"> Geology at the site consists of: <ul style="list-style-type: none"> Bedrock – Mudstone, Siltstone and Sandstone Superficial – No deposits Source control techniques are likely to be suitable for this site. Mapping suggests groundwater flooding is an issue at the site however, providing the site is not at medium to high risk from groundwater flooding infiltration techniques may be suitable. Detention features may be feasible providing site slopes are <5% at the location of the detention feature. If groundwater is a risk to the site, then a liner may be required to mitigate against potential contamination issues. Filtration systems are probably suitable providing site slopes are <5% and the depth to the water table is >1m. If the site has contamination issues, or is at risk from groundwater, then a liner will be required. All forms of conveyance features are likely to be suitable. Where slopes are >5%, features should follow contours or utilise check dams to slow flows. The site is not designated by the Environment Agency as previously being a landfill site. 	
NPPF and planning implications	Development Vulnerability Classification to Flooding	Under NPPF developments associated with employment (i.e. offices, general industry, storage and distribution etc.) are considered 'Less Vulnerable'.	
	Exception Test requirements	<p>A sequential approach to site layout is encouraged, to steer development away from areas of flood risk on the site (i.e. where surface water is prevalent, especially in the 30-year event).</p> <p>The Exception Test will need to be applied if:</p> <ul style="list-style-type: none"> More Vulnerable and Essential Infrastructure development is located in FZ3a and for Highly Vulnerable development located in FZ2. Highly Vulnerable infrastructure should not be permitted within FZ3a and FZ3b. <p>More Vulnerable and Less Vulnerable Infrastructure should not be permitted within FZ3b.</p> <p>Essential Infrastructure in Flood Zone 3b will require the Exception Test.</p>	

	<p>Requirements and guidance for site-specific Flood Risk Assessment</p>	<ul style="list-style-type: none"> • At the planning application stage, a site-specific Flood Risk Assessment will be required if any development is located within Flood Zones 2 or 3, is greater than one hectare, is located within 20m of a watercourse, or is identified as being at significant surface water flood risk by the Council. Other sources of flooding should also be considered. • Consultation with the Local Authority, Local Lead Flood Authority, and the Environment Agency should be undertaken at an early stage. • Flood risk from the unnamed watercourses along the site's boundary should be confirmed by more detailed hydraulic modelling as part of a site-specific FRA. • To reduce flood risk to development, the following hierarchy should be followed by developers, as per Local Plan policy: <ol style="list-style-type: none"> 1. Flood Avoidance - A sequential approach to site layout is applied, directing the most vulnerable uses to the areas at lowest risk from all sources of flooding (i.e. Flood Zone 1). 2. Raising Floor Levels - Where it is not possible to develop outside of flood risk areas, development should raise Finished Floor Levels to reduce the risk of flooding. 3. Flood Resistance - Where it is not possible to raise floor levels, development should incorporate Resistance measures into the building design to prevent the ingress of water. 4. Flood Resilience - Resilience measures may be implemented, often in conjunction with Resistance measures, with the aim that in the event of flooding damage is limited and occupancy/use can resume quickly and efficiently. • Sustainable drainage (SuDS) should be used on all new development as detailed through Policy CC5 (Climate change and sustainability document) and in accordance with the The SuDS Manual (C753) and 'Central Bedfordshire Sustainable Drainage guidance: May 2015'. • Discharge methods for surface water runoff should comply with Planning Practice Guidance paragraph 80 and Building Regulations Approved Document H and should ease pressure of the development downstream, by reducing the impact of surface runoff entering a receiving waterbody or drainage network. • SuDS should ensure that post-development surface water run-off rates are attenuated to achieve a reduction in greenfield run-off rates and reduce existing downstream risk. This may include consideration of "off-site" solutions. • The design of SuDS should also take into consideration: biodiversity enhancement, mitigation of visual landscape impacts, maintenance and safety. • Onsite attenuation schemes would need to be tested against the hydrograph of the Broughton Beck to ensure flows are not exacerbated downstream within the catchment. • Assessment for runoff should include allowance for climate change effects. • Safe access and egress will need to be demonstrated. • Development in the near vicinity of a watercourse within an IDB area will require the consent of the relevant IDB. The developer should contact the relevant IDB to determine the risk of flooding from IDB watercourses to the site. • Wherever possible, developers should seek to reduce flood risk and provide wider sustainability benefits by undertaking or contributing towards the following: <ul style="list-style-type: none"> ○ reconnection of rivers to the floodplain, ○ betterment of existing discharge rates and volumes, ○ removal of redundant in channel structures,
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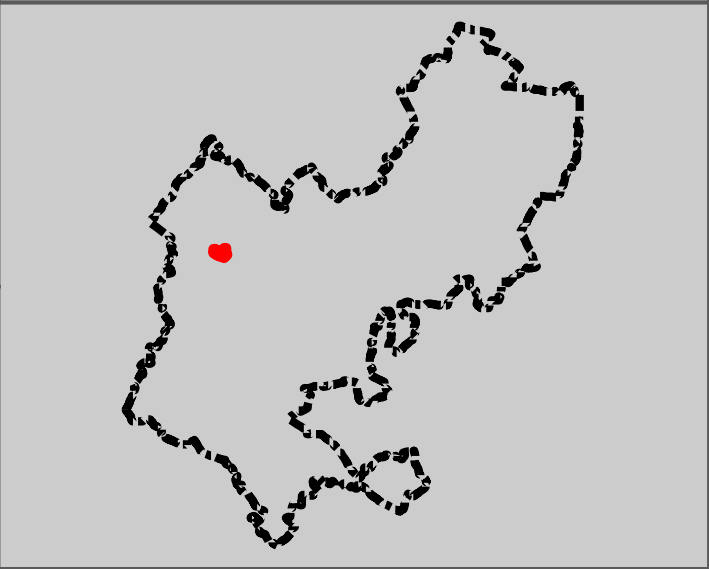
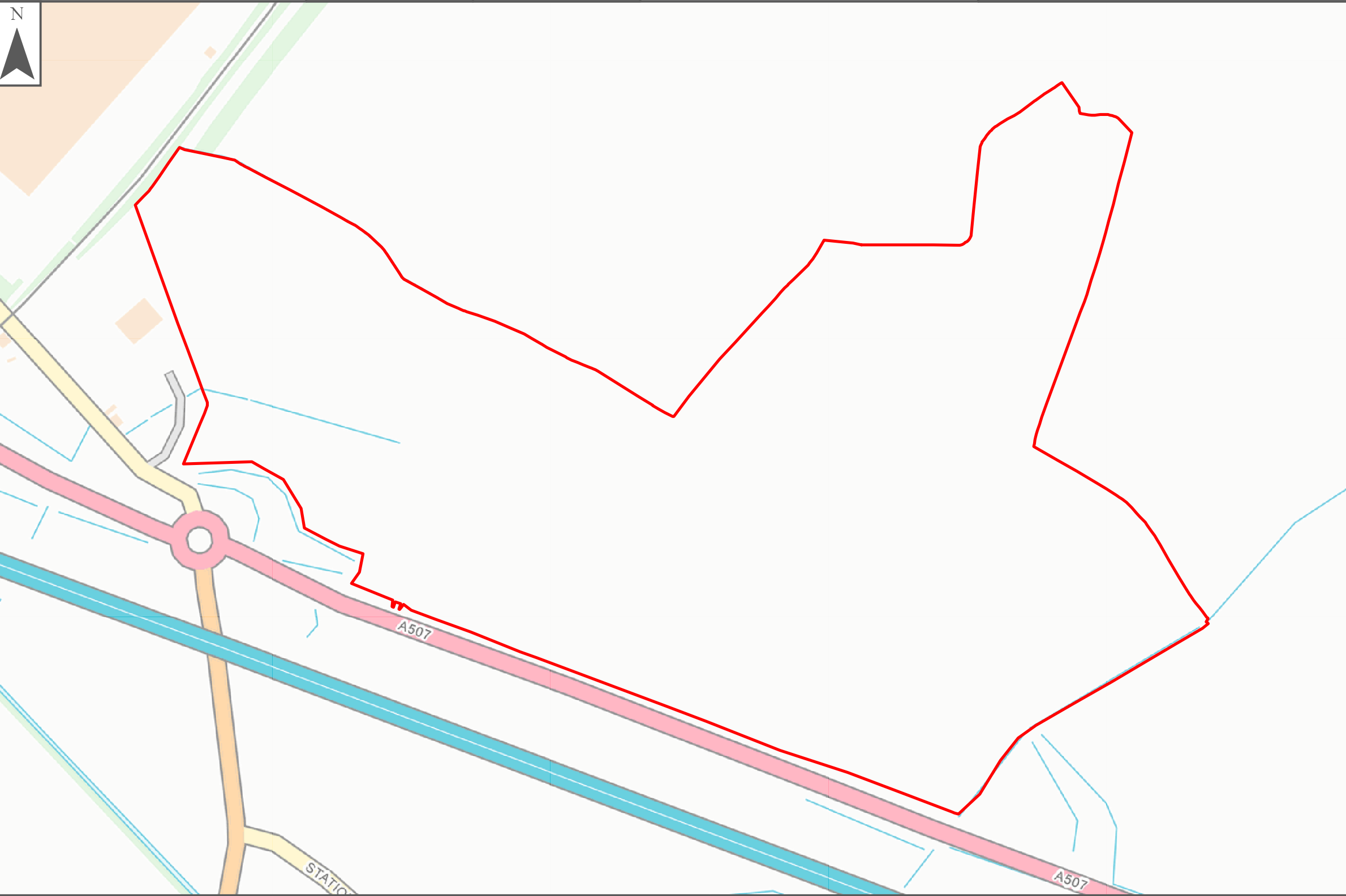
Mapping		Central Bedfordshire Strategic Flood Risk Assessment - Level 2 Detailed Strategic Site Summary Tables	
Site details	Site Name	Marston Gate	
	Area (ha)	42.7	
	Current land use	Greenfield	
	Proposed land use	Employment	
		<ul style="list-style-type: none">○ integrating or retrofitting surface water measures to replace and/or augment an existing drainage system in a developed catchment• Green infrastructure should be considered within the mitigation measures for surface water runoff from potential development and consider using Flood Zones 2 and 3 as public open space.	
Mapping Information			
Flood Zones		Flood Zones 2, 3a and 3b re based on 2D generalised modelling, because the watercourses were not represented on the Environment Agency's Flood Map for Planning Flood Zones. Developers should confirm the Flood Zone extents as part of a site-specific FRA, using detailed hydraulic modelling and channel topographic survey.	
Climate change		The climate change allowances for the '2080s' scenario were modelled using 2D generalised modelling. Developers should confirm the climate change flood extents as part of a site-specific FRA, using detailed hydraulic modelling and channel topographic survey.	
Surface Water		The Risk of Flooding from Surface Water has been used to define areas at risk from surface water flooding.	
Groundwater		The risk of groundwater flooding to the site has been assessed using the Areas Susceptible to Groundwater Flooding dataset.	
Depth, velocity and hazard mapping		Depth, velocity and hazard mapping for the 1 in 100-year event (Flood Zone 3a) have been taken from the 2D generalised modelling conducted as part of this Level 2 assessment. Developers should confirm the depth, velocity and hazard to the site as part of a site-specific FRA, using detailed hydraulic modelling and channel topographic survey.	
Reservoir		The Environment Agency's online 'Long term flood risk information, Flood risk from reservoirs, Extent of flooding' viewer was used to define areas at risk from reservoirs.	

Site ID: Marston Gate

LEVEL 2 SITE SUMMARY TABLES

OSNGR:497280.13 , 237248.73		Area:42.7		Greenfield		Proposed Development Details: Employment
Flood Zone Coverage	FZ3b : TBC%	FZ3a: TBC%	FZ2 :TBC%	FZ1 : TBC%		
Surface Water Coverage	30-year :TBC%	100-year: TBC%	1,000-year: TBC%			

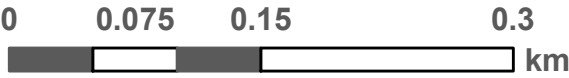
STRATEGIC FLOOD RISK ASSESSMENT



LEGEND

Flood Risk	
<u>Flood Zones</u>	<u>Fluvial 100-year event</u>
Flood Zone 3b	Depth (m)
Flood Zone 3a	0 - 0.10
Flood Zone 2	0.10 - 0.50
<u>Climate Change</u>	0.50 - 1.00
Climate Change Central	1.00 - 1.50
Climate Change Higher Central	1.50 - 2.00
Climate Change Upper End	2.00 - 2.50
<u>Surface Water</u>	2.50 - 3.00
RoSWf 30-year Extent	3.00 - 3.50
RoSWf 100-year Extent	3.50 - 4.00
RoSWf 1,000-year Extent	>4.00
<u>Area Susceptible to Groundwater Flooding</u>	<u>Velocity (m/s)</u>
< 25%	0 - 0.2
>= 25% <50%	0.2 - 0.5
>= 50% <75%	0.5 - 1.0
>= 75%	1.0 - 2.0
	> 2.0
	<u>Hazard Rating</u>
	Very low hazard - caution
	Danger for some
	Danger for most
	Danger for all

Please refer to Main Report and Site Summary Table for further information on the datasets



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LEGEND

Authority Information

	Central Bedfordshire Council boundary
	Potential Site Allocations
	Main River
	Detailed River Network

Defences

	Defence
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Reservoir Inundation Map

	Reservoir Inundation
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Source Protection Zone

	Zone 1
	Zone 2
	Zone 3

Other

	Flood Warning Area
	Flood Alert
	Historic Landfill