

Hinckley and Bosworth Borough Level 2 Strategic Flood Risk Assessment: Detailed Site Summary Tables



Site details	Site Code	Site AS58 – Land at Stapleton Lane, Barwell			
	Area	133.3 hectares			
	Current land use	Predominantly greenfield with some existing development at Stapleton Lane			
	Proposed land use	Mixed Use			
Sources of flood risk	Existing drainage features	Two unnamed tributaries of the Tweed River flow along the south-eastern boundary of the site before meeting in the centre and flowing westwards through the site towards the A447. Another tributary of the Tweed River flows along the north-western boundary of the site along the A447. An unnamed watercourse leaves the site at its northern boundary.			
	Fluvial	Proportion of site at risk			
		FZ3b	FZ3a	FZ2	FZ1
		3%	4%	5%	95%
	The fluvial flood risk at this site is associated with the watercourse that flow across the centre of the site westwards and another along the south-eastern boundary with all Flood Zones confined to the areas of lowest topography surrounding the unnamed watercourses. The largest area of Flood Zone 2 extends approximately 125m into the site boundary backing onto the housing development along Hereford Close. Two of the watercourses flowing along the western and eastern site boundaries are not included in the Flood Zones but could still pose a fluvial flood risk to the site.				
	Surface Water	Proportion of site at risk (RoFfSW)			
		30-year	100-year	1,000-year	
3%		6%	13%		
Surface water flood risk at the site is mostly associated with runoff from higher ground towards the watercourses running through the site and along the site boundaries and the topographically low areas surrounding these channels in 30-year and 100-year events. For the 1,000-year surface water event, there are some isolated areas of ponding at the southern end of the site and in the north-eastern corner of the site. There is risk of surface water flooding extending along Stapleton Lane during 30-year and 100-year events and extending outwards from the road in 1,000-year event. Surface water flooding towards the watercourse flowing parallel to the A447 encroaches on the western site boundary during 100-year and 1,000-year surface water events.					
Reservoir	The site is not shown to be at risk of reservoir flooding.				
Flood history	There are no records of historic flooding at the site from the Environment Agency. A flood incident was recorded by Leicestershire County Council in 2013 at Waterfall Way, approximately 90m from site boundary in the south eastern corner.				
Flood risk management infrastructure	Defences	Defence Type	Standard of Protection	Condition	
		-	-	-	
This site is not protected by any formal flood defences.					

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	Residual risk	Surface water flooding in the adjacent Barwell housing development concentrates along roadways and into the watercourses along the site boundaries. Significant surface water flooding in these areas could lead to increased flooding on the site.			
Emergency planning	Flood warning	The western section of the watercourse flowing through the middle of the site is covered by the River Anker and River Sence Flood Alert Area (033WAF307).			
	Access and egress	<p>Dry access and egress is available from the south-western side of the site along the A447 in all surface water and fluvial events. Access via the A447 from the north is impacted by all surface water and flooding events; however, depths of flooding reach a maximum of 0.3m in the 1,000-year event, therefore access for emergency vehicles may still be possible.</p> <p>Stapleton Lane offers dry access and egress in all fluvial flooding events; however, this is a notable surface water flow path. Due to the depth of flooding, access could still potentially be obtained along Stapleton Road via the A447 to the north of the site.</p> <p>Dry access and egress is available via Kirkby Road and Charnwood Road in all fluvial events, however some minor surface water flow paths and ponding exist along these roads, the depths and hazards of the flow paths however are low.</p> <p>The depths, velocities, hazards, durations and speeds of onset of surface water and fluvial flooding along access/ egress routes should be investigated further in a site-specific assessment, to confirm whether access for emergency vehicles could still be obtained.</p>			
Climate Change	Climate change allowances for '2080s'	River Basin District	Central	Higher Central	Upper End
		Humber	20%	30%	50%
	Implications for the site	Fluvial extents from climate change did not increase significantly when compared with FZ3a. A small increase in flooding can be seen close to the watercourse across the middle of the site. As the site is affected by surface water flooding from the 100-year event, climate change may also increase the extent, depth and frequency of surface water flooding. The 1,000-year surface water extent can be used as an indication of surface water climate change extents.			

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Requirements for drainage control and impact mitigation	Broad scale 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 – Sand and gravel (north-eastern part of site) and diamicton (west of the site). The north-eastern most corner of the site is not covered. The site is not located within a Groundwater Source Protection Zone. All forms of source control are likely to be suitable. Infiltration likely to be suitable. Mapping suggests a low risk of ground water flooding however, site investigations should be carried out to assess potential for drainage by infiltration. Mapping suggests that the site slopes are suitable for all forms of detention. All filtration techniques are likely to be suitable. If the site has contamination issues; a liner will be required. All forms of conveyance are likely to be suitable. Where the slopes are >5% features should follow contours or utilise check dams to slow flows. If the site has contamination issues; a liner will be required. The site is not designated by the Environment Agency as previously being a landfill site. There is a previous landfill site directly adjacent to the eastern boundary (Barwell Landfill Site, Stapleton Lane). Developers should refer to latest SuDS guidance on Leicestershire County Council's website and Environmental Best Practice notes as well as the Level 1 SFRA, for information on suitable types of SuDS, the management train and opportunities and constraints in site master-planning.
NPPF and planning implications	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>Residential development is classified as 'More Vulnerable', employment development is classified as 'Less Vulnerable'.</p>

	<p>Requirements and guidance for site-specific Flood Risk Assessment</p>	<ul style="list-style-type: none"> • Consultation with the Local Authority, Local Lead Flood Authority and the Environment Agency should be undertaken at an early stage. • 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 or is greater than one hectare. A Flood Risk Assessment must consider the entire lifetime of the development and consider all sources of flooding. • The site area includes the Flood Zone 2 extents. Most development types are appropriate for this flood risk zone but must take into account the flood risk (1% to 0.1% annual exceedance probability). • The site area includes the Flood Zone 3a extents. Future development must take into account the flood risk in this area (5% to 1% annual exceedance probability). More vulnerable and critical infrastructure development is possible within Flood Zone 3a but is required to pass the Exception Test. Highly vulnerable development is not permitted within Flood Zone 3a. • The site area includes the extents of Flood Zone 3b, also known as the functional floodplain. Only essential infrastructure passing the Exception Test is permitted within Flood Zone 3b. Should there be any development within Flood Zone 3b flood storage lost by the development must be offset. • The site extents include the modelled 100-year + 50% climate change flood outline. Any development should consider the future flood risk impacts onsite and the impacts the development may have upon future flood flows. • More detailed hydraulic modelling using channel survey may be required as part of a site-specific Flood Risk Assessment, to confirm flood risk shown in the 2D generalised modelling. • Two of the watercourses flowing along the western and eastern site boundaries are not included in the Flood Zones but could still pose a fluvial flood risk to the site, these should be modelled as part of a site-specific FRA. • Resilience measures will be required if buildings are situated in the flood risk area through the centre of the site's boundary. Raising Finished Floor Levels above the design event may remove the need for resilience measures. • Onsite attenuation schemes would need to be tested against the watercourse through the centre of the site and along the site boundaries to ensure flows are not exacerbated downstream within the catchment. • New or re-development should adopt exemplar source control SuDS techniques to reduce the risk of frequent low impact flooding due to post-development runoff. • Water quality requirements for sustainable development should comply with current SuDS guidance. • Assessment for runoff should include allowance for climate change effects. • Safe access and egress will need to be demonstrated. • New development must seek opportunities to reduce overall level of flood risk at the site, for example by: <ul style="list-style-type: none"> ○ Reducing volume and rate of runoff ○ Relocating development to zones with lower flood risk ○ Creating space for flooding.
Mapping Information		
Flood Zones	The Flood Zones have been derived from 2D generalised modelling techniques.	
Climate change	The climate change allowances for the '2080s' epoch were modelled using 2D generalised modelling techniques.	
Surface Water	The Environment Agency's Risk of Flooding from Surface Water has been used to define areas at risk from surface water flooding.	

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Fluvial depth, velocity and hazard mapping		Depth, velocity and hazard mapping for the 1 in 100-year event (Flood Zone 3a) have been taken from 2D generalised modelling techniques.
Surface water depth, velocity and hazard mapping		The surface water depth, velocity and hazard mapping for the 1 in 100-year event (considered to be medium risk) is taken Environment Agency's Risk of Flooding from Surface Water.