


South Staffordshire Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables	
Site details	
Site Code	SA-0617
Address	Land of Four Ashes Road, Brewood / 389123, 309142
Area	2.99ha
Current land use	Greenfield
Proposed land use	Residential
Sources of flood risk	
Location of the site within the catchment	The site is located to the west of the Shropshire Union Canal in the catchment area of the River Penk. The town of Brewood borders the site to the immediate west, with the town of Coven residing approximately 2.5km to the southeast of the site.
Existing drainage features	Topographical analysis indicates water drains from the site into an unnamed watercourse, located 40m southeast of the site. This watercourse flows northeast, where it joins with the larger River Penk, 350m downstream. There are no additional drainage features within the vicinity of the site.
Fluvial	<p>The proportion of site at risk (EA Flood Zones): FZ3 – 0.01% FZ2 – 0.1% FZ1 – 99.9%</p> <p>The proportion of site at risk (modelled outlines): 3.3% AEP – 0% 1% AEP – 0% 0.1% AEP – 0%</p> <p><i>The % Flood Zones quoted show the % of the site at flood risk from that particular Flood Zone/event, including the percentage of the site at flood risk at a higher risk zone, e.g. FZ2 includes the FZ3 %. FZ1 is the remaining area outside FZ2 (FZ2 + FZ1 = 100%). As there are no Flood Risk Management features or defences the flood risk defined by the zones is also the actual flood risk.</i></p> <p>Available data: The Environment Agency’s (EA) Flood Maps for Planning have been used within this assessment, which are believed to be based on broadscale modelling at this location. Generalised 2D modelling has also been undertaken for the unnamed watercourse to the south of the site. Percentages quoted above relate to Environment Agency Flood Zones.</p> <p>Flood characteristics: The site is adjacent to Flood Zones 2 & 3 along the southern border, associated with the unnamed watercourse to the south of the site. 2D modelling undertaken to inform this assessment indicates that the site is not at risk from flooding in the 0.1% AEP event, and the site is raised approximately 0.7m above the predicted 0.1% AEP flood level.</p>
Surface Water	<p>Proportion of site at risk (RoFfSW): 3.3% AEP – 0% Max depth: 0% Max velocity: 0m/s 1% AEP – 0.1% Max depth: 0.15-0.3m Max velocity: 0.5-1m/s</p>

	<p>0.1% AEP – 1.9% Max depth: 0.15-0.3m Max velocity: 1-2m/s</p> <p><i>The % SW extents quoted show the % of the site at surface water risk from that particular event, including the percentage of the site at flood risk at a higher risk zone (e.g. 100-year includes the 30-year %)</i></p> <p>Description of surface water flow paths: The site is not predicted to be at risk during the 3.3% AEP surface water event. During the 1% AEP event, there is some minor flooding along Four Ashes Road to the north which crosses into the site boundary, however depths are below 0.1m and velocities below 0.15m/s. During the 0.1% AEP event, a surface water flow path is predicted to cross the west of the site from Four Ashes Road towards the unnamed watercourse to the south. Depths on the flow path are below 0.3m, with velocities below 0.25m/s, giving a maximum flood hazard on site of 'caution'. To the south of the site, a significant surface water flow is predicted to form, associated with the unnamed watercourse to the south. Depths in the flow are greater than 1.2m with high velocities and a maximum flood hazard of danger for all, however the site is elevated approximately 0.7m above this flow path at the southern boundary.</p>
Reservoir	<p>The Environment Agency reservoir flood risk extent dataset provides insight into the extent of water inundation originating from reservoirs.</p> <p>The data shows that the site lies directly adjacent to the River Penk, where in the event local reservoirs should fail in combination with flooding from rivers, the flood extent will reach the southern boundary of the site.</p>
Canals	<p>The site resides approximately 1km to the east of the Shropshire Union Canal, as it passes the western boundary of Brewood, and is therefore unlikely to be affected in the event of a canal breach/overlapping incident.</p>
Groundwater	<p>The Environment Agency's "Areas Susceptible to Groundwater Flooding 2010 dataset, displayed as a 1km grid resolution, provides insight into the susceptibility of a flood event at the site, as well as the surrounding region.</p> <p>The site has been shown to have a moderately high likelihood of groundwater flooding of 25%-50% in any given year, originating from superficial deposits,.</p>
Flood history	<p>The site is not situated within the extent or in the immediate vicinity of recorded past flooding events.</p>
Flood risk management infrastructure	
Defences	<p>The site is not protected by any formal flood defences, although the River Penk to the east is recorded in AIMS as lined by natural high ground which provides some protection to the site.</p>
Residual risk	<p>There are no flood defences or structures in the vicinity of the site which could pose a residual risk to the site.</p>
Emergency planning	
Flood warning	<p>Flood alert areas are in place along the unnamed watercourse to the south of the site, and the River Penk, in addition to the situation of a flood warning area to the immediate northeast of the site.</p>
Access and egress	<p>The site can only be accessed from one main road, Four Ashes Road on the north boundary of the site. However, due to the small size of the site, the entire area can be accessed from this road alone. Flood estimations suggest the road will only be affected during 1% and 0.1% AEP surface water events, with partially flooded areas reaching peak depths of 0.15m and 0.3m respectively. Hazard remains low across the flooded area and access/egress are unlikely to be impacted.</p>
Climate change	
Implications for the site	<ul style="list-style-type: none"> Central and Higher climate change allowances for the 3.3%, 1%, and 0.1% AEP fluvial events have been prepared using generalised modelling as part of this assessment. The site is not shown to be at risk in the 0.1% AEP fluvial event in the Higher climate change scenario. Surface water climate change uplifts have been modelled for the 3.3% AEP and 1% AEP surface water events in the Central and Higher climate change scenarios. Surface water risk is not significantly greater to the site in any modelled scenario, with maximum depths on site remaining below 0.15m in the 1% AEP Higher Climate change scenario.

	<ul style="list-style-type: none"> • Developers should consider SuDS strategies to reduce the impacts of climate change from surface water in a detailed site-specific FRA. • To appropriately define the extent of the flood risk to the south of the site a site-specific FRA, with the most up-to-date climate change allowances, should be undertaken to investigate the implications of climate change on the site.
--	--

Requirements for drainage control and impact mitigation

<p>Broad-scale assessment of possible SuDS</p>	<p>Geology & Soils</p> <ul style="list-style-type: none"> • Geology at the site consists of: <ul style="list-style-type: none"> ○ Bedrock- Mercia mudstone group comprising of mudstone and halite-stone. ○ Superficial- Till and Diamicton • Soils at the site consist of: <ul style="list-style-type: none"> ○ Slightly acid loamy and clayey soils with impeded drainage <p>SuDS</p> <ul style="list-style-type: none"> • The site is considered to have a low susceptibility to groundwater flooding, this should be confirmed through additional site investigation work. Below ground development such as basements may still be susceptible to groundwater flooding. Groundwater monitoring is recommended to determine the seasonal variability of groundwater levels, as this may affect the design of the surface water drainage system. Below ground development such as basements may not be appropriate at this site. • BGS data indicates that the underlying geology is mudstone and is likely to be poorly draining. Any proposed use of infiltration should be supported by infiltration testing. Off-site discharge in accordance with the SuDS hierarchy is required to discharge surface water runoff. • The site is not located within a historic landfill site. • The entire site is mostly located within Groundwater Source Protection Zone 1 (SPZ) and infiltration techniques may not appropriate for anything other than clean roof drainage. If infiltration is proposed for anything other than clean roof drainage a hydrogeological risk assessment should be undertaken, to ensure that the system does not pose an unacceptable risk to the source of supply. Proposed SuDS should be discussed with relevant stakeholders (LPA, LLFA and EA) at an early stage to understand possible opportunities and constraints. • Surface water discharge rates should not exceed the existing greenfield runoff rates for the site. Opportunities to further reduce discharge rates should be considered and agreed with the LLFA. It may be possible to reduce site runoff by maximising the permeable surfaces on site using a combination of permeable surfacing and soft landscaping techniques. • The Risk of Flooding from Surface Water (RoFSW) mapping indicates the presence of surface water flow paths during the 0.1% AEP event. Existing flow paths should be retained and integrated with blue-green infrastructure and public open space. • If it is proposed to discharge runoff to a watercourse or sewer system, the condition and capacity of the receiving watercourse or asset should be confirmed through surveys and the discharge rate agreed with the asset owner.
<p>Opportunities for wider sustainability benefits and integrated flood risk management</p>	<ul style="list-style-type: none"> • Implementation of SuDS at the site could provide opportunities to deliver multiple benefits including volume control, water quality, amenity and biodiversity. This could provide wider sustainability benefits to the site and surrounding area. Proposals to use SuDS techniques should be discussed with relevant stakeholders (LPA, LLFA and EA) at an early stage to understand possible constraints. • Development at this site should not increase flood risk either on or off site. The design of the surface water management proposals should take into account the impacts of future climate change over the projected lifetime of the development. • Opportunities to incorporate filtration techniques such as filter strips, filter drains and bioretention areas must be considered. Consideration should be made to the existing condition of receiving waterbodies and their Water Framework Directive objectives for water quality. The use of multistage SuDS treatment will clean improve water quality of surface water runoff discharged from the site and reduce the impact on receiving water bodies. • Opportunities to incorporate source control techniques such as green roofs, permeable surfaces and rainwater harvesting must be considered in the design of the site. • The potential to utilise conveyance features such as swales to intercept and convey surface water runoff should be considered. Conveyance features should be located on common land or public open space to facilitate ease of access. Where slopes are >5%, features should follow contours or utilise check dams to slow flows.

	<ul style="list-style-type: none"> • Surface water discharge rates should not exceed the existing greenfield runoff rates for the site. Opportunities to further reduce discharge rates should be considered and agreed with the LLFA. It may be possible to reduce site runoff by maximising the permeable surfaces on site using a combination of permeable surfacing and soft landscaping techniques.
--	---

NPPF and planning implications

Exception Test requirements	<p>The Local Authority will need to confirm that the sequential test has been carried out in line with national guidelines. The Sequential Test will need to be passed before the Exception Test is applied.</p> <p>Since the entire site lies outside of Flood Zone 2 and 3 and is not predicted to be affected by surface water flood risk the Exception Test is not required, however, an FRA should be prepared to address part “b” of the Exception Test to appropriately define the extent of the flood risk at site scale.</p>
------------------------------------	---

Requirements and guidance for site-specific Flood Risk Assessment	<p>Flood Risk Assessment:</p> <ul style="list-style-type: none"> • Whilst the site lies entirely outside of Flood Zones 2 and 3, it is recommended that a site-specific Flood Risk Assessment is undertaken due to the close proximity to surface water/fluvial flood risk areas to the southeast of the site. • The site-specific FRA should be carried out in line with the National Planning Policy Framework; Flood Risk and Coastal Change Planning Practice Guidance; the South Staffordshire Local Development Scheme; and the Staffordshire County Council Lead Local Flood Authority’s Statutory Consultee for Planning Guidance Document. • Consultation with the Local Authority and the Lead Local Flood Authority should be undertaken at an early stage. <p>Guidance for site design and making development safe:</p> <ul style="list-style-type: none"> • The developer will need to show, through an FRA, that future users of the development will not be placed in danger from flood hazards throughout its lifetime. It is for the applicant to show that the development meets the objectives of the NPPF’s policy on flood risk. For example, how the operation of any mitigation measures can be safeguarded and maintained effectively through the lifetime of the development. (Para 048 Flood Risk and Coastal Change PPG). • The development should be designed using a sequential approach. Development should be steered away from areas of flood risk along the north and east of the site, preserving these spaces as green infrastructure. This is likely to significantly limit the area available for development. • Safe access and egress will need to be demonstrated in the 1% AEP event plus climate change fluvial and rainfall events, using the depth, velocity and hazard outputs. Ideally, the access route should be situated 300mm above the designed flood level and waterproofing techniques should be used where necessary. Raising of access routes must not impact on surface water flow routes or contribute to loss of floodplain storage. Consideration should be given to the siting of access points with respect to areas of surface water flood risk. • On site attenuation schemes would need to be tested to ensure flows are not exacerbated downstream within the catchment. • Surface water should be discharged at the pre-development (greenfield) runoff rate which presents wider opportunities to improve biodiversity and amenity as well as climate change adaptation. An integrated flood risk management and sustainable drainage scheme for the site is advised. • Developers should refer to Staffordshire County Council’s SUDS Handbook and the Level 1 SFRA for information on SuDS for guidance on the information required by the LLFA from applicants to enable it to provide responses to planning applications.
--	---

Key messages

<p>Despite close proximity to areas of flood risk, the site itself is at low risk of flooding and the principle of development can be supported by implementing practical schemes based on an appropriate understanding of the flood hazards. This will involve:</p> <ul style="list-style-type: none"> • A carefully considered and integrated flood resilient and sustainable drainage design is put forward, with development to be steered away from the north and east of the site. • Space for surface water to be stored on the site is provided and rainwater harvesting should be considered. 	
--	--

- A site-specific Flood Risk Assessment demonstrates that the site is not at an increased risk of flooding in the future as a result of climate change, and that the development of the site does not increase the risk of flooding both on the site and downstream.

Mapping Information

The key datasets used to make planning recommendations regarding this site were the broadscale 2D modelling outputs from the Environment Agency's Flood Map for Planning and the Risk of Flooding from Surface Water map. More details regarding data used for this assessment can be found below.

Flood Zones	Flood Zones 2 and 3 have been taken from the Environment Agency's Flood Map for Planning mapping.
Climate change	Climate change uplifts have been applied to the Environment Agency's Risk of Flooding from Surface Water dataset for the 3.3% and 1% AEP scenarios. Climate change allowances have also been applied to the site specific modelling undertaken as part of this assessment.
Fluvial depth, velocity and hazard mapping	Generalised 2D TUFLOW hydraulic models were built by JBA in May 2022 to inform the risk to sites as part of the Level 2 SFRA. Each model is comprised of a 2m DTM, material layers created from OS Vector mapping, upstream and downstream boundary conditions and a 2d_zsh line and elevation points representing the watercourse through the study area.
Surface Water	The Risk of Flooding from Surface Water map has been used to define areas at risk from surface water flooding.
Surface water depth, velocity and hazard mapping	The surface water depth, hazard and velocity mapping are taken from the Environment Agency's Risk of Flooding from Surface Water mapping.