South Staffordshire Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables	

Site details

Site Code	**SA-0463**
Address	Land between Billy Buns Lane and Smallbrook Lane, Wombourne / 387951, 293488
Area	9.05ha
Current land use	Road/greenfield
Proposed land use	Residential

Sources of flood risk

Location of the site within the catchment	The site is located in the greater catchment of the River Penk. Wom Brook is the nearest watercourse, flowing south of the site in a north-eastern direction, before joining Lyde Brook Coppice, and subsequently Penn Brook 1.1km downstream.
Existing drainage features	Wom Brook passes near the site's south-eastern corner, approximately 60m from the site. Wom Brook is a small watercourse, originating from a confluence point along the larger Smestow Brook located approximately 2.5km west of the site. As the watercourse passes the site, it discharges into the Lyde Brook Coppice 1.1km downstream, which forms Penn Brook.
Fluvial	**The proportion of site at risk (EA Flood Zones):** **FZ3b – 0%** **FZ3a – 0%** **FZ2 – 0%** **FZ1 – 100%** **The proportion of site at risk (modelled outlines):** **3.3% AEP – 0%** **1% AEP – 0%** **0.1% AEP – 0%** *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.* **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 Wom Brook to the south of the site. Percentages quoted above relate to Environment Agency Flood Zones. **Flood characteristics:** The site is not located within Flood Zones 2 or 3. Modelling of the Wom Brook suggests that the site will not be affected by fluvial flooding in the 0.1% AEP event.
Surface Water	**Proportion of site at risk (RoFfSW):** **3.3% AEP** – 1.2% Max depth: 0.15-0.3m Max velocity: 0.5-1m/s **1% AEP** – 2.2% Max depth: 0.3-0.6m Max velocity: 1-2m/s

	0.1% AEP – 9.6% Max depth: 0.3-0.6m Max velocity: 1-2m/s *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 %)* **Description of surface water flow paths:** Surface water flooding is predicted to affect the site in all modelled scenarios. In the 3.3% AEP and 1% AEP scenarios, flooding flows northward along Smallbrook Lane. In the 3.3% AEP event, predicted maximum velocities are between 0.5-1.0m/s, and maximum depths are below 0.3m, with a maximum hazard of 'caution'. In the 1% AEP event, predicted maximum velocities are between 1.0-2.0m/s, and maximum depths are between 0.3-0.6m, with a maximum hazard of 'danger for some'. In the 0.1% AEP event, the extent of surface water flooding increases significantly, with a surface water flow path forming across the northwest of the site, flowing from Meadow Lane and joining the flow along Smallbrook Lane. Predicted maximum depths are 0.3-0.6m, maximum velocities are between 1.0-2.0m/s and maximum hazard is 'danger for most'. The most hazardous area of flooding is located at the north of the site where Smallbrook Lane meets Billy Buns Lane.
Reservoir	The Environment Agency reservoir flood risk extent online dataset provides insight into the extent of water inundation originating from reservoirs. The data shows that the site is not at risk of flooding from reservoirs.
Canals	The Staffordshire and Worcestershire Canal is located approximately 1.2km east of the site, and the site is unlikely to be affected in the event of a breach or overtopping event.
Groundwater	The Environment Agency's "Areas Susceptible to Groundwater Flooding 2010 dataset, displayed as a 1km grid resolution, provides insight into the susceptibly of a flood event at the site, as well as the surrounding region. The north of the northern half and the south of the southern half are deemed to be at relatively low risk, with a likelihood of flooding at <25% in any given year.
Flood history	There are no records of historic flooding on or in the vicinity of the site.
Flood risk management infrastructure	
Defences	The site is not protected by any formal flood defences.
Residual risk	There are no flood defences or assets in the vicinity of the site which could pose a risk to the site in the event of failure.
Emergency planning	
Flood warning	Despite being no flood warning areas in the immediate area, flood alert areas are in place along the flow path of Wom Brook to the south of the site.
Access and egress	Access to the site can be obtained through three roads; Billy Buns Lane to the north, and School Road and Smallbrook Lane which run through the site. During the 1% AEP surface water event, Smallbrook Lane is affected by surface water flooding. Depths remain low, below 0.3m, whilst the other two road remain unaffected. During the 0.1% AEP event, Smallbrook lane is significantly impacted by surface water flooding and access is likely to be impeded. The south of the site remains accessible from High Street and the north remains accessible via Billy Buns Lane. 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.
Climate change	
Implications for the site	• Central and Higher climate change allowances for the 3.3%, 1%, and 0.1% AEP fluvial events as part of this assessment. The site is not predicted to be at risk in the 0.1% AEP fluvial event in the Upper End 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 predicted to be significantly greater to the site in any modelled scenario. In the 1% AEP

	Central and Higher climate change scenarios, a surface waterflow forms between Meadow Lane to the west and Smallbrook Lane, although the depths a low, below 0.15m, and the extent is smaller than in the 0.1% AEP Present Day event. • The preservation of existing and predicted future surface water flow routes and storage volumes should be considered when preparing the layout and site scheme. • Developers should consider SuDS strategies to reduce the impacts of climate change from surface water in a detailed site-specific FRA. A site-specific FRA, with the most up-do-date climate change allowances, should be undertaken to investigate the implications of climate change on the site.
Requirements for drainage control and impact mitigation	

Broad-scale assessment of possible SuDS	**Geology & Soils**
	• Geology at the site consists of:
	  ○ Bedrock- Wildmoor Sandstone
	  ○ Superficial- N/A
	• Soils at the site consist of:
	  ○ Freely draining slightly acid sandy soils
	SuDS
	• The site is considered to have very 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.
	• BGS data indicates that the underlying geology is sandstone which is likely to be free draining. This should be confirmed through infiltration testing, with the use of infiltration maximised as much as possible in accordance with the SuDS hierarchy.
	• The site is not located within a historic landfill site.
	• The entire site is 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.

Opportunities for wider sustainability benefits and integrated flood risk management	• 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. • 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	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. Since the entire site lies outside of Flood Zone 2 and 3 the Exception Test is not required for fluvial flood risk, however, since the site is potentially affected by surface water flood risk an FRA should be prepared to address part "b" of the Exception Test.
Requirements and guidance for site-specific Flood Risk Assessment	**Flood Risk Assessment:** • Whilst the site lies entirely outside of Flood Zones 2 and 3, a site-specific Flood Risk Assessment will be required as the site is greater than 1ha and the site is affected by surface water flood risk. • The site-specific FRA should be carried out in line with the National Planning Policy Framework; Flood Risk and Coastal Change Planning Practice Guidance. • Particular consideration should be given to the surface water flows which form on the site. • Consultation with the Local Authority and the Lead Local Flood Authority should be undertaken at an early stage. **Guidance for site design and making development safe:** • 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 the surface water flow paths in the north of the site, preserving these spaces as green infrastructure if appropriate. This is likely to significantly limit the area available for development. In particular, low-lying land in the north of the southern site portion should be left undeveloped and surface water flow routes should be preserved and integrated into blue-green infrastructure. • 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	
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: • The areas of greatest surface water risk (namely the flow path between Meadow Lane and Smallbrook Lane) are left undeveloped.	

- 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.