Shropshire Council Strategic Flood Risk Assessment Level 2 Detailed Site Summary Tables

<table>
<tr><td rowspan="5">Site details</td><td>Site Code</td><td colspan="4">MIN018</td></tr>
<tr><td>Address</td><td colspan="4">Land west of A488, Little Minsterley, Minsterley</td></tr>
<tr><td>Area</td><td colspan="4">1.05 hectares</td></tr>
<tr><td>Current land use</td><td colspan="4">Greenfield</td></tr>
<tr><td>Proposed land use</td><td colspan="4">Residential</td></tr>
<tr><td rowspan="11">Sources of flood risk</td><td>Location of site within catchment</td><td colspan="4">The site is located on an unnamed watercourse whose source is at Callow Hill approximately 1.2km upstream of the site. The unnamed watercourse joins the Minsterley Brook shortly downstream of the site, and the Minsterley Brook then joins the Rea Brook approximately 1km downstream of this confluence. The site lies on sloping topography with higher ground located to the east of the site and lower ground to the west.</td></tr>
<tr><td>Existing drainage features</td><td colspan="4">An unnamed watercourse flows from south to north along the site's western boundary, shortly joining the Minsterley Brook approximately 200m to the north of the site.</td></tr>
<tr><td rowspan="6">Fluvial</td><td colspan="4">Proportion of site at risk</td></tr>
<tr><td>FZ3b</td><td>FZ3a</td><td>FZ2</td><td>FZ1</td></tr>
<tr><td>0%</td><td>0%</td><td>6%</td><td>94%</td></tr>
<tr><td colspan="4">Highest zone of risk (Risk of Flooding from Rivers and Sea)</td></tr>
<tr><td colspan="4">Medium</td></tr>
<tr><td colspan="4">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%)</td></tr>
<tr><td colspan="4">Available data:
The Environment Agency's Flood Zone mapping has been used in this assessment. This is based on 2D generalised modelling data.
Flood characteristics:
Flood Zone 2 encroaches onto the northwest corner of the site; this flooding is associated with the Minsterley Brook which lies to the northwest of the site.
The unnamed watercourse running along the site's western boundary is unmodelled as it lies in a small catchment which is not covered by the Environment Agency's Flood Zone mapping. Fluvial flood risk to the site from this watercourse therefore remains largely unknown.
The Environment Agency's Risk of Flooding from Rivers and Sea mapping partially covers this site. The northwest corner of the site is designated to be at medium risk of flooding, with an annual probability of 1%-3.3% that flooding will occur in a given year.</td></tr>
<tr><td rowspan="5">Surface Water</td><td colspan="4">Proportion of site at risk (RoFfSW)</td></tr>
<tr><td colspan="2">30-year</td><td>100-year</td><td>1,000-year</td></tr>
<tr><td colspan="2"><1%</td><td>3%</td><td>20%</td></tr>
<tr><td colspan="4">Max depths (m)</td></tr>
<tr><td colspan="2"><0.3</td><td><0.3</td><td><0.3</td></tr>
<tr><td colspan="4">Max velocity (m/s)</td></tr>
<tr><td colspan="2"><0.25</td><td>>0.25</td><td>>0.25</td></tr>
</table>

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		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: There is minimal risk to the site during the 30-year surface water flow event. In the 100-year event an area of ponding is present close to the western boundary. During the 1,000-year event a surface water flow route follows closely to the watercourse along the entire western boundary from south to north, originating from flow routes along the A488 at higher elevation to the east of the site. Another flow route runs close to the northeast boundary of the site, running down the slope from the A488 to join the larger area of ponding directly to the north of the site. This encroaches slightly into the northeast corner of the site.		
	Reservoir	The site is not shown to be at risk of reservoir flooding from the available online maps.		
	Flood history	There are no records of historic flooding at the site from the Environment Agency or Shropshire Council.The Shropshire Council Level 1 SFRA details a historic flood incident along The Grove, Minsterley in July 2012 which is located 550m to the west of the site. Data shows that there are no historic incidents of flooding within 200m of the site.		
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 meets the Minsterley Brook at a confluence approximately 1.2km downstream of the site. If there is flooding or high flows along the Minsterley Brook there is potential for water to back up, potentially increasing flood risk at the northern end of the site. The unnamed watercourse is culverted underneath the A488, 90m upstream and to the south of the site. If this structure were to block, the risk of surface water flooding on the site could increase as a major flow route of surface water towards the site originates from the A488.		
	Flood warning	The site is not covered by the Environment Agency's Flood Warning Service.		

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Emergency planning	**Access and egress**	Safe access and egress to the site is available via the A488 from Pontesbury to the northwest in all fluvial events. Flood zones 2 and 3 extend across the A488 to the southwest of the site so access and egress from this direction is not recommended. In all surface water events access and egress to the site is also possible via the A488 along the eastern boundary. In the 100-year and 1,000-year events there are some isolated areas of ponding along this roadway to the north and south of the site. However, maximum depths are estimated to be <0.3m therefore it is likely that emergency vehicles will be able to pass through. 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.

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Climate Change	**Implications for the site**	• Increased storm intensities due to climate change may increase the extent, depth, velocity, hazard and frequency of both fluvial and surface water flooding. • There is no detailed fluvial modelling available at the site, and therefore Flood Zone 2 has been used as a conservative indication of fluvial flood risk from climate change. This extends slightly into the northwest corner of the site, but it should be noted that the unnamed watercourse has not yet been modelled. As part of a site-specific Flood Risk Assessment, latest EA climate change allowances will need to be considered in a detailed hydraulic model, to confirm the impact in the site. • Climate change also needs to be considered for surface water events; at the site-specific stage, the 100-year +40% event is considered as part of surface water drainage strategies, or surface water modelling. • The current day 1,000-year surface water extent provides an indication of the likely increase in extent of the more frequent surface water flooding events. Surface water flood risk extends along the site's western boundary. This would require a detailed FRA to assess the site layout and design. • Developers should consider SuDS strategies to reduce the impacts of climate change from surface water in a detailed site-specific FRA.
Cumulative Impact of development within the catchment	**Level of risk**	**Catchment** / **Level of risk** Rea Brook / High This development site covers lies in the middle reaches of the Rea Brook catchment. This catchment has been identified as one of those that is more sensitive to the cumulative impact of any development within the catchment, particularly in the downstream areas close to the catchment outlet into the River Severn. Communities within this catchment are at risk of surface water flooding in the 100-year event and there has been historic flooding.
	Recommendations	At this site there is potential to install online storage ponds along watercourses downstream of the site to ensure that any additional surface water runoff can be accommodated as well as providing a wider flood management benefit to the existing community. Refer to Section 9 of the main SFRA report for information regarding the cumulative impact assessment and recommended policies within this catchment.

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Requirements for drainage control and impact mitigation	**Broad scale assessment of possible SuDS**	• Geology at the site consists of:
		  ○ Bedrock: Trewer Brook Mudstone Formation - Mudstone.
		  ○ Superficial: Till - Diamicton (East) and Glaciofluvial Fan Deposits – sand and Gravel (west).
		• The site is not located within any Environment Agency designated Source Protection Zone.
		• Most source control techniques are likely to be suitable. Mapping suggests that permeable paving may have to use non-infiltrating systems given the possible risk from groundwater.
		• Infiltration may be suitable. Mapping suggests a medium risk of groundwater flooding and underlying soils may be permeable. Further site investigation should be carried out to assess potential for drainage by infiltration. If infiltration is suitable it should be avoided in areas where the depth to the water table is <1m. Additionally, proposed SuDS should be discussed with relevant stakeholders (LPA, LLFA and EA) at an early stage to understand possible constraints given that the site is located with a Source Protection Zone.
		• Detention features may be feasible provided site slopes are < 5% at the location of the detention feature. If the site has contamination or groundwater issues; a liner will be required.
		• Filtration systems are probably suitable provided site slopes are <5% and the depth to the water table is >1m. If the site has contamination or groundwater 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 or groundwater issues; a liner will be required.
		• The site is not designated by the Environment Agency as previously being a landfill site.
		• Developers should refer to Shropshire Council's 'Surface Water Management: Interim Guidance for Developers' and 'SuDS requirements for new developments' webpage 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.

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NPPF and planning implications	**Exception Test requirements**	The Local Authority have carried out the Sequential Test in line with national guidance. The Sequential Test will need to be passed before the Exception Test is applied. Residential development is classified as 'More Vulnerable'. It is recommended that proposed development will be sequentially located within Flood Zone 1 areas of the site. The Exception test will need to be applied if: • 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.

	Requirements and guidance for site-specific Flood Risk Assessment	**Flood Risk Assessment:** • 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. • All sources of flooding, particularly the risk of surface water and groundwater flooding, should be considered as part of a site-specific flood risk assessment. • A more detailed hydraulic model may be required at Flood Risk Assessment stage, to confirm flood risk, FZ3b and climate change extents, using channel topographic survey. • Any FRA should be carried out in line with the National Planning Policy Framework; Flood Risk and Coastal Change Planning Practice Guidance; Shropshire Council's Local Plan policies, and the LLFA's SUDS guidance and Policy Statement. • Consultation with the Local Authority, Lead Local Flood Authority and the Environment Agency should be undertaken at an early stage. • The development should be designed using a sequential approach. Development should be steered away from areas of fluvial flood risk and surface water flow routes, preserving these spaces as green infrastructure. Development must be in line with Table 3: flood risk vulnerability and flood zone compatibility of the NPPG. • Development in FZ3 may require floodplain compensation and this should be confirmed with the EA at FRA 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). • Safe access and egress will need to be demonstrated in the 1 in 100-year plus climate change fluvial and rainfall events, using the depth, velocity and hazard outputs. Raising of access routes must not impact on surface water flow routes. Consideration should be given to the siting of access points with respect to areas of surface water flood risk. • Resilience measures will be required if buildings are situated in the flood risk area. Raising Finished Floor Levels above the design event may remove the need for resilience measures. • The risk from surface water flow routes should be quantified as part of a site-specific FRA, including a drainage strategy, to ensure that runoff from the development is not increased by placing development across any ephemeral surface water flow routes. A drainage strategy should help inform site layout and design to ensure there is no increase in runoff beyond the current greenfield rates. • On site attenuation schemes would need to be tested against the unnamed watercourse 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. Assessment for runoff should include allowance for climate change effects. • Betterment on the existing site runoff rate should be sought to ensure that there is no increase in surface water flood risk elsewhere. Ideally, surface water runoff should be fully attenuated to the greenfield rate. • Developers should refer to Shropshire Council's 'Surface Water Management: Interim Guidance for Developers' and 'SuDS requirements for new developments' webpage and the Level 1 SFRA for information on SuDS.

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		• New development must seek opportunities to reduce overall level of flood risk at the site, for example by:
		  ○ Reducing volume and rate of runoff
		  ○ Relocating development to zones with lower flood risk
		  ○ Creating space for flooding.
		• 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.

Key messages		The flood risk element of the Exception Test is likely to be passed if: • Development is limited to the 80% of the site that lies outside of the 1,000-year event outline from the Risk of Flooding from Surface Water mapping. Development should be steered away from the northern and western boundaries of the site, where there is flood risk. • The most vulnerable parts of the development should be located in the areas of least risk in accordance with Table 2 in the NPPF. • If flood mitigation measures are implemented then they are tested to ensure that they will not displace water elsewhere (for example, if land is raised to permit development on one area, compensatory flood storage will be required in another) • Space for green infrastructure should be considered in the areas of highest flood risk to the north. • The cumulative impacts of development within this catchment must be considered. Developers should ensure that surface water runoff rates are maintained at current greenfield rates through the implementation of attenuation and long-term storage. Refer to Section 9 of the main SFRA report for information regarding recommended policies within this catchment. Refer to the detailed 'guidance for developers' section for further information on the measures that are appropriate for this site

Mapping Information

The key dataset used to make planning recommendations regarding this site was the Environment Agency's Risk of Flooding from Surface Water mapping. 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; this is based on 2D generalised modelling in this area as there is no detailed hydraulic model available. It is recommended that a more detailed hydraulic model is constructed at the site-specific Flood Risk Assessment stage, to confirm flood risk.

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Climate change		Climate change was based on Flood Zone 2 to serve as an indication of possible extents in addition to the 1,000-year surface water flood extents to indicate the increase in extent of more frequent surface water flooding events. It is recommended that the latest EA's climate change allowances are modelled in a detailed hydraulic model as part of a site-specific Flood Risk Assessment.
Fluvial depth, velocity and hazard mapping		There is no available fluvial modelling data; therefore, the Risk of Flooding from Surface Water mapping has been used as this represents the floodplains of watercourses. This should be explored further at site-specific stage.
Surface Water		The Risk of Flooding from Surface Water has been used to define areas at risk from surface water flooding.
Surface water depth, velocity and hazard mapping		The surface water depth, velocity and hazard mapping for the 1 in 30-year (high risk), 1 in 100-year (medium risk) and 1 in 1,000-year (low risk) events is taken from the Agency's Risk of Flooding from Surface Water mapping.