

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	ALC.12 [ALC.A]			
	Address	Alcester			
	Area	3.32 hectares			
	Current land use	Greenfield			
	Proposed land use	Residential			
Sources of flood risk	Location of site within catchment	This site is located in the south west of Alcester, just west of the urbanised area. Spittle Brook flows just beyond the southern boundary and then joins the River Arrow just south of Alcester. Alcester and the site are located in the western half of the Stratford-on-Avon district, in a topographic low area, as part of the River Arrow catchment. The site is in part of the lower catchment for both Spittle Brook and within the lower catchment of the River Arrow.			
	Existing drainage features	The Environment Agency's Detailed River Network shows an unnamed drain joining Spittle Brook 250m west of the site. Spittle Brook then flows slightly south east, flowing within 10m of the southern boundary before flowing south after Evesham Street to join the River Arrow, 1.2km south east of the site. There are no further drainage features within the site.			
	Fluvial	Proportion of site at risk			
		FZ3b	FZ3a	FZ2	FZ1
		6%	6%	7%	93%
		Highest zone of risk (Risk of Flooding from Rivers and Sea)			
Medium					
<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%)</i>					

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	Proposed land use	Residential		
		<p>Available data: The Environment Agency's (EA) Flood Zone mapping has been used in this assessment, which is based on 2D generalised modelling as no detailed models are available for the site.</p> <p>Flood characteristics: The Flood Zone data for this site indicates flood risk at this site is as a result of Spittle Brook. Fluvial Flood Zones 2 and 3 are all present within the site, Flood Zone 3b is indicative whereby Flood Zone 3a is used as an indication. Flood Zone 2 and 3a reach across the entire width of the lower end of the site, with Flood Zone 2 reaching on average a further 10m beyond Flood Zone 3a. The extent of the Flood Zones appear to be restricted by the topography as the site slopes upwards away from the bank of Spittle Brook/ southern boundary of the site. As there is no detailed hydraulic model of the Spittle Brook and the broadscale modelled extent does not account for the channel dimensions or A435 structure, the Flood Zone extents may be refined in a detailed site-specific study.</p>		
	Surface Water	Proportion of site at risk (RoFfSW)		
		30-year	100-year	1,000-year
		1%	1%	3%
		Max depths (m)		
		Below 0.3m	0.3m-0.9m	Over 0.9m
		Max velocity (m/s)		
		Over 0.25m/s	Over 0.25m/s	Over 0.25m/s
	<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>			

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		<p>Description of surface water flow paths:</p> <p>Risk of surface water flooding is present during every event at the site. The extents for these vary as do depths; however, the maximum velocity of surface water flow paths is constant over the events, being greater than 0.25m/s. In the 30-year event there is localised ponding just beyond the bank of Spittle Brook, along the eastern boundary. In the 100-year event, the extent of surface water flow extends in the floodplain, through the southern boundary and towards the eastern boundary, extending 5m further into the site than the location of ponding experienced during the 30-year event. During this event, surface water depths are generally between 0.3m-0.9m. In the 1,000-year event, surface water flows extend across the entire width of the site and largely reach to the same point within the site (approximately 50m as measured from the south eastern corner). The majority of the site experiences surface water depths between 0.3m-0.9m during this event, the highest depths being over 0.9m closest to the boundary. At the maximum extent the flows are below 0.3m. Generally, the surface water flood extents align with the fluvial flood extents, following the topography of the Spittle Brook floodplain.</p> <p>There is some further isolated ponding in the centre of the site during the 1,000-year event.</p>
	Reservoir	The site is not shown to be at risk of reservoir flooding from the available online maps.

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	Groundwater	<p>The EA's Areas Susceptible to Groundwater Flooding dataset, provided as 1km grid squares, shows the susceptibility of an area to groundwater flood emergence. The following comments can be made about groundwater flood risk:</p> <ul style="list-style-type: none"> The entire site is shown to have between 50% and 75% susceptibility to groundwater flood emergence <p>JBA's Groundwater Mapping dataset shows for the majority of the lower third groundwater is very close to the surface, less than 0.025m below the surface. A third of the site, in a semi-oval shape from the north eastern corner to the centre of the site, at a higher topography, has groundwater levels between 0.5m and 5m below the surface. This suggests groundwater can emerge locally within the site. In the remaining third of the site, groundwater is between 0.025m and 0.5m below the surface.</p> <p>This assessment does not negate the requirement that an appropriate assessment of the groundwater regime should be carried out at the site-specific Flood Risk Assessment (FRA) stage.</p>		
	Flood history	This Environment Agency's Historic Flood Map shows one incidence of recorded flooding in 2012 at 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	There is a culvert under the A435 road, within 25m of the site. However, this road is embanked as so if it were to block, it is unlikely that the impacts would be felt at the site, rather it would pond on the upstream side of the road embankment. Shortly downstream of the site, the watercourse goes into a culvert under Hadrian's Walk. As this is a short reach between two topographic constraints (the raised A435 and the raised land at the culvert, there could be potential for backwater effects here in the event of a blockage. A site-specific risk assessment is recommended to investigate these potential risks further.		

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	Address	Alcester
	Area	3.32 hectares
	Current land use	Greenfield
	Proposed land use	Residential
Emergency planning	Flood warning	<p>The site is partially covered by the Environment Agency's Flood Warning Service.</p> <p>The site is covered by the 'River Arrow and River Alne' Flood Alert. This flood alert covers the lower third of the site, along the southern boundary, and is attributed to the site being on the banks of the Spittle Brook. There are no flood warning areas present at the site.</p>
	Access and egress	<p>Access and egress at this site are possible via Allimore Lane, which makes up the northern boundary of the site. This road has not been shown to be vulnerable to surface water or fluvial flooding, therefore is accessible.</p> <p>Consideration is needed however to the east due to wider flood risk in Alcester, where vehicles would approach the site from. A site-specific Flood Risk Assessment should be undertaken to evaluate accessibility to pedestrians and vehicles at this access point.</p>

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Site details	Site Code	ALC.12 [ALC.A]
	Address	Alcester
	Area	3.32 hectares
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Climate Change	Implications for the site	<ul style="list-style-type: none"> • 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 flood risk from climate change. This extends across the southern boundary. A detailed modelling study should test the 2080s climate change allowances, which may refine risk across the site. • At a detailed assessment stage, the impacts of climate change on the functional floodplain may need to be considered. This is likely to resemble the increase in extent from Flood Zone 3b (20-year extent) to Flood Zone 3a (100-year extent), for the purposes of a strategic assessment. • Climate change should also be considered for surface water events; at the site-specific stage, the 100-year +40% should be considered as part of surface water drainage strategies, or surface water modelling. • The current day 1,000-year surface water flooding extent provides an indication of the likely increase in extent of the more frequent surface water events. 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.

<p>Requirements for drainage control and impact mitigation</p>	<p>Broad scale assessment of possible SuDS</p>	<ul style="list-style-type: none"> • Geology at the site consists of: <ul style="list-style-type: none"> ○ Bedrock – Mercia mudstone group - mudstone ○ Superficial – Boundary • 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. Mapping also suggests that slopes may be unsuitable for selective source control techniques. • Mapping suggests that there is a high risk of groundwater flooding at this location, therefore it is likely infiltration techniques will not be suitable. This should be confirmed via site investigations to assess the potential for infiltration. • "This option is unlikely to be feasible as mapping suggests mean site slopes are > 5%. Feasibility of such options should be assessed as part of a site specific assessment. If this feature is feasible a liner maybe required to prevent the egress of groundwater. • The site is considered to have a moderate susceptibility to groundwater. Detention and attenuation features should be designed to prevent groundwater ingress from impacting hydraulic capacity and structural integrity. Additional site investigation work may be required to support the detailed design of the drainage system. This may include groundwater monitoring to demonstrate that a sufficient unsaturated zone has been provided above the highest occurring groundwater level. Below ground development such as basements are not appropriate at this site." • This option is unlikely to be feasible as mapping suggests mean site slopes are > 5%. Feasibility of such options should be assessed as part of a site specific assessment. If this feature is feasible it should be located where the depth to the water table is >1m, additionally a liner maybe required to prevent the egress of groundwater. • 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. A liner maybe required to prevent the egress of groundwater. • 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 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. • The site is not located within a Groundwater Source Protection Zone and there are no restrictions over the use of infiltration techniques with regard to groundwater quality.
	<p>Exception Test requirements</p>	<p>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.</p>

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NPPF and planning implications		<p>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. Development should not be placed in the southern third of the site where the Flood Zones are present.</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.

	<p style="text-align: center;">Requirements and guidance for site-specific Flood Risk Assessment</p>	<p>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 or is greater than one hectare. This site falls under these requirements. • Consultation with the Local Authority, Local Lead Flood Authority and the Environment Agency should be undertaken at an early stage. • All sources of flooding, particularly the risk of fluvial, surface water and groundwater flooding, should be considered as part of a site-specific Flood Risk Assessment. • Flood risk needs to be considered for the lifetime of the development, accounting for climate change. • Residual risk from the culvert under Hadrian's Walk will need to be investigated and modelled in a FRA to confirm impacts and help inform finished flood levels. • A more detailed hydraulic model may be required at Flood Risk Assessment stage, to confirm flood risk and flow paths, FZ3b and climate change extents as the site does not have current modelling. • Any FRA should be carried out in line with the National Planning Policy Framework; Flood Risk and Coastal Change Planning Practice Guidance, Stratford on Avon District Council's Local Plan policies, the LLFA's (Warwickshire County Council) 'Surface Water Management Plan' and 'Stratford on Avon District Core Strategy 2011 to 2031'. • The development should be designed using a sequential approach. Development should be steered away from areas of fluvial flood risk flow routes on the southern boundary, preserving this as green infrastructure. Development must be in line with Table 3: flood risk vulnerability and flood zone compatibility of the NPPG. • Development in FZ3b along the boundaries should be avoided unless appropriate use can be demonstrated in line with NPPF. • Development in FZ3 along the boundaries may require floodplain compensation and this should be confirmed with the EA at FRA 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). • 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 on Salford Road (access point). • Resilience measures will be required if buildings are situated in the flood risk area. Raising Finished Floor
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		<p>Levels above the design event may remove the need for resilience measures.</p> <ul style="list-style-type: none"> • 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 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 Warwickshire County Council's 'Surface Water Management Plan', Stratford on Avon District's 'Core Strategy 2011 to 2031' and the Level 1 SFRA for information on SuDS. • All development should adopt source control SuDS techniques to reduce the risk of frequent low impact flooding due to post development runoff. • SuDS should be designed to deliver multiple benefits including water quality, biodiversity, amenity, green infrastructure etc. Example features include swales, attenuation features, green roofs, rainwater capture and reuse and permeable paving. • Efforts should be made to limit runoff to greenfield rates and discharge rates from the site should not increase downstream flood risk. • 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. • 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.
<p>Key messages</p>		<p>The flood risk element of the Exception Test is likely to be passed subject to:</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. <p>The site is likely to be suitable for development if:</p> <ul style="list-style-type: none"> • Further detailed modelling is undertaken at site-specific FRA stage to verify flood risk, though it would still be confined to the southern portion of the site due

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		<p>to the topography sloping away from the watercourse to the north.</p> <ul style="list-style-type: none"> Residual risk from the culvert at Hadrian's Walk is investigated and mitigated against. 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. A site-specific FRA 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 on the site and to neighbouring properties. <p>Refer to the detailed 'guidance for developers' section for further information on the measures that are appropriate for this site</p>
Mapping Information		
<p>The key datasets used to make planning recommendations regarding this site were 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.</p>		
Flood Zones	<p>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.</p>	
Climate change	<p>Climate change mapping was unavailable for this area. In the absence of Flood Zone 2 as an indication of fluvial climate change, the 1,000-year surface water flooding event was used as an indicative climate change scenario. 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.</p>	

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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 small 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 100-year event (considered to be medium risk) is taken Environment Agency's Risk of Flooding from Surface Water.

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Site details	Site Code	ALC.13 [ALC.B]			
	Address	Alcester			
	Area	6.26 hectares			
	Current land use	Greenfield			
	Proposed land use	Residential			
Sources of flood risk	Location of site within catchment	This site is located in the south west of Alcester, just west of the urbanised area. The site's southern boundary is largely made up of Spittle Brook, which joins the River Arrow just south of Alcester. Alcester and the site are located in the western half of the Stratford-on-Avon district, in a topographic low area, as part of the River Arrow catchment. The site is in part of the lower catchment for both Spittle Brook and within the lower catchment of the River Arrow.			
	Existing drainage features	The Environment Agency's Detailed River Network shows an unnamed drain joining Spittle Brook 320m west of the site. Spittle Brook then flows slightly south east, flowing directly along most of the south western facing boundary of the site before flowing south after Evesham Street to join the River Arrow, 900m south east of the site. There are no further drainage features within the site.			
	Fluvial	Proportion of site at risk			
		FZ3b	FZ3a	FZ2	FZ1
		26%	26%	29%	71%
		Highest zone of risk (Risk of Flooding from Rivers and Sea)			
Medium					
<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%)</i>					

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	Address	Alcester		
	Area	6.26 hectares		
	Current land use	Greenfield		
	Proposed land use	Residential		
		<p>Available data: The Environment Agency's (EA) Flood Zone mapping has been used in this assessment, which is based on 2D generalised modelling as no detailed models are available for the site.</p> <p>Flood characteristics: The Flood Zone data for this site indicates flood risk at this site is as a result of Spittle Brook. Fluvial Flood Zones 2 and 3 are all present within the site, Flood Zone 3b is indicative using Flood Zone 3a as a proxy. Flood Zone 2 and 3a reach across the entire width of the lower third of the site, with Flood Zone 3a reaching on average a further 10m beyond Flood Zone 2. The extent of the Flood Zones appear to be restricted by the topography as the site slopes upwards away from the bank of Spittle Brook/ southern boundary of the site.</p> <p>As there is no detailed hydraulic model of the Spittle Brook and the broadscale modelled extent does not account for the channel dimensions or A435 structure, the Flood Zone extents may be refined in a detailed site-specific study.</p>		
	Surface Water	Proportion of site at risk (RoFfSW)		
		30-year	100-year	1,000-year
		5%	7%	18%
		Max depths (m)		
		0.3m-0.9m	0.3m-0.9m	Over 0.9m
		Max velocity (m/s)		
		Over 0.25m/s	Over 0.25m/s	Over 0.25m/s
		<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>		

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		<p>Description of surface water flow paths:</p> <p>Risk of surface water flooding is present at all events at the site. The extents for these vary as do depths; however, the maximum velocity of surface water flow paths is constant over every event, being greater than 0.25m/s. Maximum depths are highest along the eastern half of the southern boundary and the central dip in the site. In the 30-year event surface water flooding paths are present in the site where the boundary is within 5m of the banks of Spittle Brook. This extent is largest in the centre of this southern boundary where both the boundary and the Brook meander south east before flowing back north east and finally east again. In the 100-year event, the extent of surface water flows follow the same trend as the 30-year event and do not appear in new locations in the site. These instead extend further into the site, particularly at the point of Spittle Brook meandering back north east. During this event, surface water flows are generally between 0.3m-0.9m. In the 1,000-year event, surface water flows extend across the entire width of the site and largely reach to the same point within the site (approximately 50m as measured from the south eastern corner). The majority of the site experiences surface water depths between 0.3m-0.9m during this event, the highest depths being over 0.9m closest to the boundary. At the maximum extent the flows are below 0.3m.</p> <p>Generally, the surface water flood extents align with the fluvial flood extents, following the topography of the Spittle Brook floodplain.</p>
	Reservoir	The site is not shown to be at risk of reservoir flooding from the available online maps.

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	Address	Alcester		
	Area	6.26 hectares		
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	Groundwater	<p>The EA's Areas Susceptible to Groundwater Flooding dataset, provided as 1km grid squares, shows the susceptibility of an area to groundwater flood emergence. The following comments can be made about groundwater flood risk:</p> <ul style="list-style-type: none"> The entire site is shown to have between 50% and 75% susceptibility to groundwater flood emergence <p>JBA's Groundwater Mapping dataset shows there is no risk from ground water in the dip at the southern boundary. For the majority of the lower third however, groundwater is very close to the surface, less than 0.025m below the surface. There is a small 25m stretch of the site beyond this where across the entire width of the site groundwater is between 0.025m and 0.5m below the surface. In the remaining majority of the site, at a higher topography, groundwater is between 0.5m and 5m below the surface. This suggests groundwater can emerge locally within the site.</p> <p>This assessment does not negate the requirement that an appropriate assessment of the groundwater regime should be carried out at the site-specific Flood Risk Assessment (FRA) stage.</p>		
	Flood history	This Environment Agency's Historic Flood Map shows one incidence of recorded flooding in 2012 at 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	There is a culvert under the A435 road. However, this road is embanked as so if it were to block, it is unlikely that the impacts would be felt at the site, rather it would pond on the upstream side of the road embankment. Shortly downstream of the site, the watercourse goes into culvert under Hadrian's Walk. As this is a short reach between two topographic constraints (the raised A435 and the raised land at the culvert, there could be potential for backwater effects here in the event of a blockage. A site-specific risk assessment is recommended to investigate these potential risks further.		

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	Current land use	Greenfield
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Emergency planning	Flood warning	<p>The site is partially covered by the Environment Agency's Flood Warning Service.</p> <p>The site is covered by the 'River Arrow and River Alne' Flood Alert. This flood alert covers the lower third of the site, along the southern boundary, and is attributed to the site being on the banks of the Spittle Brook. There are no flood warnings present at the site.</p>
	Access and egress	<p>Access and egress at this site is possible via Allimore Lane, which makes up the northern boundary of the site. This road has not been shown to be vulnerable to surface water or fluvial flooding, therefore is accessible.</p> <p>Consideration is needed however to the east due to wider flood risk in Alcester, where vehicles would approach the site from.</p> <p>A site-specific Flood Risk Assessment should be undertaken to evaluate accessibility to pedestrians and vehicles at this access point.</p>

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	Proposed land use	Residential
Climate Change	Implications for the site	<ul style="list-style-type: none"> • 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 flood risk from climate change. This extends across the southern boundary. A detailed modelling study should test the 2080s climate change allowances, which may refine risk across the site. • At a detailed assessment stage, the impacts of climate change on the functional floodplain may need to be considered. This is likely to resemble the increase in extent from Flood Zone 3b (20-year extent) to Flood Zone 3a (100-year extent), for the purposes of a strategic assessment. • Climate change should also be considered for surface water events; at the site-specific stage, the 100-year +40% should be considered as part of surface water drainage strategies, or surface water modelling. • The current day 1,000-year surface water flooding extent provides an indication of the likely increase in extent of the more frequent surface water events. 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.

<p>Requirements for drainage control and impact mitigation</p>	<p>Broad scale assessment of possible SuDS</p>	<ul style="list-style-type: none"> • Geology at the site consists of: <ul style="list-style-type: none"> ○ Bedrock – Mercia Mudstone - mudstone ○ Superficial – Boundary • 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. Mapping also suggests that slopes may be unsuitable for selective source control techniques. • Mapping suggests that there is a high risk of groundwater flooding at this location, therefore it is likely infiltration techniques will not be suitable. This should be confirmed via site investigations to assess the potential for infiltration. • "This option is unlikely to be feasible as mapping suggests mean site slopes are > 5%. Feasibility of such options should be assessed as part of a site specific assessment. If this feature is feasible a liner maybe required to prevent the egress of groundwater. • The site is considered to have a moderate susceptibility to groundwater. Detention and attenuation features should be designed to prevent groundwater ingress from impacting hydraulic capacity and structural integrity. Additional site investigation work may be required to support the detailed design of the drainage system. This may include groundwater monitoring to demonstrate that a sufficient unsaturated zone has been provided above the highest occurring groundwater level. Below ground development such as basements are not appropriate at this site." • This option is unlikely to be feasible as mapping suggests mean site slopes are > 5%. Feasibility of such options should be assessed as part of a site specific assessment. If this feature is feasible it should be located where the depth to the water table is >1m, additionally a liner maybe required to prevent the egress of groundwater. • 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. A liner maybe required to prevent the egress of groundwater. • The site is not designated by the Environment Agency as previously being a landfill site. • The site is not located within a Groundwater Source Protection Zone and there are no restrictions over the use of infiltration techniques with regard to groundwater quality.
<p>NPPF and planning implications</p>	<p>Exception Test requirements</p>	<p>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. Development should not be placed in the southern third of the site where the Flood Zones are present. 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.

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	ALC.13 [ALC.B]
	Address	Alcester
	Area	6.26 hectares
	Current land use	Greenfield
	Proposed land use	Residential
		<ul style="list-style-type: none"> • Highly Vulnerable infrastructure should not be permitted within FZ3a and FZ3b. • More Vulnerable and Less Vulnerable Infrastructure should not be permitted within FZ3b.

	<p style="text-align: center;">Requirements and guidance for site-specific Flood Risk Assessment</p>	<p>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 or is greater than one hectare. This site falls under these requirements. • Consultation with the Local Authority, Local Lead Flood Authority and the Environment Agency should be undertaken at an early stage. • All sources of flooding, particularly the risk of fluvial, surface water and groundwater flooding, should be considered as part of a site-specific Flood Risk Assessment. • Flood risk needs to be considered for the lifetime of the development, accounting for climate change. • Residual risk from the culvert under Hadrian's Walk will need to be investigated and modelled in a FRA to confirm impacts and help inform finished flood levels. • A more detailed hydraulic model may be required at Flood Risk Assessment stage, to confirm flood risk and flow paths, FZ3b and climate change extents as the site does not have current modelling. • Any FRA should be carried out in line with the National Planning Policy Framework; Flood Risk and Coastal Change Planning Practice Guidance, Stratford on Avon District Council's Local Plan policies, the LLFA's (Warwickshire County Council) 'Surface Water Management Plan' and 'Stratford on Avon District Core Strategy 2011 to 2031'. • The development should be designed using a sequential approach. Development should be steered away from areas of fluvial flood risk flow routes on the southern boundary, preserving this as green infrastructure. Development must be in line with Table 3: flood risk vulnerability and flood zone compatibility of the NPPG. • Development in FZ3b along the boundaries should be avoided unless appropriate use can be demonstrated in line with NPPF. • Development in FZ3 along the boundaries may require floodplain compensation and this should be confirmed with the EA at FRA 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). • 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 on Salford Road (access point). • 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.
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		<ul style="list-style-type: none"> • 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 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 Warwickshire County Council's 'Surface Water Management Plan', Stratford on Avon District's 'Core Strategy 2011 to 2031' and the Level 1 SFRA for information on SuDS. • All development should adopt source control SuDS techniques to reduce the risk of frequent low impact flooding due to post development runoff. • SuDS should be designed to deliver multiple benefits including water quality, biodiversity, amenity, green infrastructure etc. Example features include swales, attenuation features, green roofs, rainwater capture and reuse and permeable paving. • Efforts should be made to limit runoff to greenfield rates and discharge rates from the site should not increase downstream flood risk. • 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. • 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.
<p>Key messages</p>		<p>The flood risk element of the Exception Test is likely to be passed subject to:</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. <p>The site is likely to be suitable for development if:</p> <ul style="list-style-type: none"> • Further detailed modelling is undertaken at site-specific FRA stage to verify flood risk, though it would still be confined to the southern portion of the site due to the topography sloping away from the watercourse to the north.

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	ALC.13 [ALC.B]
	Address	Alcester
	Area	6.26 hectares
	Current land use	Greenfield
	Proposed land use	Residential
		<ul style="list-style-type: none"> Residual risk from the culvert at Hadrian's Walk is investigated and mitigated against. 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. A site-specific FRA 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 on the site and to neighbouring properties <p>Refer to the detailed 'guidance for developers' section for further information on the measures that are appropriate for this site</p>
Mapping Information		
The key datasets used to make planning recommendations regarding this site were 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; 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.	
Climate change	Climate change mapping was unavailable for this area. In the absence of Flood Zone 2 as an indication of fluvial climate change, the 1,000-year surface water flooding event was used as an indicative climate change scenario. 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.	

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	ALC.13 [ALC.B]
	Address	Alcester
	Area	6.26 hectares
	Current land use	Greenfield
	Proposed land use	Residential
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 small 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 100-year event (considered to be medium risk) is taken Environment Agency's Risk of Flooding from Surface Water.

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	BID.8A [BID.A]			
	Address	Bidford-on-Avon, B50 4EZ			
	Area	1.31 hectares			
	Current land use	Greenfield			
	Proposed land use	Residential			
Sources of flood risk	Location of site within catchment	This site is located close to the south western boundary of the Stratford-on-Avon district, near the right bank of the River Avon. The northern boundary of the site lies on Salford Road/B139, directly opposite Howard Close and to the west of The Crawford Hall. This site is just to the west of the main roundabout on Salford Road out of Bidford-on-Avon towards the A46. At its closest point, the River Avon is less than 250m away from the south eastern corner of the site. This site is located in the middle of the River Avon catchment, as it does not reach its confluence with the Severn for some distance beyond the district.			
	Existing drainage features	The Environment Agency's Detailed River Network shows no ordinary watercourses, canals or smaller drains within the site. The closest drainage feature is the River Avon itself, which at its closest point is less than 250m south east of the site. The river flows towards the site before meandering south west so that it is then over 500m away from the south western corner. The Avon continues in this south westerly direction towards its confluence with the River Severn. Small Brook also flows directly west of the site, just under 500m away at its closest point, in a southerly direction until it meets the Avon.			
	Fluvial	Proportion of site at risk			
		FZ3b	FZ3a	FZ2	FZ1
		0%	0%	7%	93%
		Highest zone of risk (Risk of Flooding from Rivers and Sea)			
Low					
<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%)</i></p>					

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	BID.8A [BID.A]		
	Address	Bidford-on-Avon, B50 4EZ		
	Area	1.31 hectares		
	Current land use	Greenfield		
	Proposed land use	Residential		
		<p>Available data: The Environment Agency's (EA) Flood Zone mapping has been used in this assessment, which incorporates the River Avon modelling.</p> <p>Flood characteristics: The Environment Agency's fluvial Flood Zone 2 is present along the western boundary of the site. This covers a relatively small proportion of the site and no other Flood Zones are shown to impact the site. The extent of Flood Zone 2 at the site is at its outer extremity, governed by the meander of the River Avon, in so much that the flood risk is modelled to extend north west from the bank at the point of the river flowing south west. The only point at which the flood extent does cross into the site is at the western boundary. This extent is restricted by higher topography at the southern boundary and the south western corner of the site, diverting flow along the western boundary to a low point, at which point Flood Zone 2 is present in the site. Flood Zones 3a and 3b do not reach the site. This site is therefore at marginal risk of flooding.</p>		
	Surface Water	Proportion of site at risk (RoFfSW)		
		30-year	100-year	1,000-year
		0%	0%	0%
		Max depths (m)		
		N/A	N/A	N/A
		Max velocity (m/s)		
		N/A	N/A	N/A
		<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: There are no modelled surface water flows at this site. There is only some ponding on land to the west where Flood Zone 2 enters the site, and on the B439 to the north-east of the site.</p>		
	Reservoir	The site is not shown to be at risk of reservoir flooding from the available online maps; however, the maximum extent from reservoir flooding does reach within 10m of the site.		

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	BID.8A [BID.A]		
	Address	Bidford-on-Avon, B50 4EZ		
	Area	1.31 hectares		
	Current land use	Greenfield		
	Proposed land use	Residential		
	Groundwater	<p>The EA's Areas Susceptible to Groundwater Flooding dataset, provided as 1km grid squares, shows the susceptibility of an area to groundwater flood emergence. The following comments can be made about groundwater flood risk:</p> <ul style="list-style-type: none"> The entire site is shown to have a 75% or greater susceptibility to groundwater flood emergence <p>JBA's Groundwater Mapping dataset shows that the whole site has groundwater levels just below the ground surface, up to a maximum of 0.025m below. This suggests groundwater is likely to emerge at the surface locally.</p> <p>This assessment does not negate the requirement that an appropriate assessment of the groundwater regime should be carried out at the site-specific Flood Risk Assessment (FRA) stage.</p>		
	Flood history	This site is not shown to be within the reaches of the Environment Agency's Historic Flood Map. There is one incidence of recorded flooding within 200m, just to the east 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	There are no obvious residual risks present at the site. A site-specific risk assessment is recommended to investigate potential risks further.		
Emergency planning	Flood warning	<p>The site is partially covered by the Environment Agency's Flood Warning Service.</p> <p>The site is covered by the 'Middle Avon Rugby to Bidford' Flood Alert. This flood alert covers part of the site, along the south western and western boundary, and is attributed to low-lying land and roads in the area between Rugby and Bidford. There are no flood warnings present at the site.</p>		

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	BID.8A [BID.A]
	Address	Bidford-on-Avon, B50 4EZ
	Area	1.31 hectares
	Current land use	Greenfield
	Proposed land use	Residential
	Access and egress	Access and egress at this site are possible via a gateway along Salford Road/B439, which bounds the northern boundary. Entry can be made at any point along this northern boundary; however, it is worth noting that the 1,000-year event does impact the eastern portion of this northern boundary although this is a low risk event and the impact is minimal. A site-specific Flood Risk Assessment should be undertaken to evaluate the overall accessibility to pedestrians and vehicles.
Climate Change	Implications for the site	<ul style="list-style-type: none"> • Increased storm intensities due to climate change may increase the extent, depth, velocity, hazard and frequency of both fluvial and surface water flooding. • Detailed fluvial modelling available at the site as part of climate change models for the River Avon, indicate flooding to the site as part of the Upper End scenario. The flow extends northwards towards the southern boundary of the site from the River Avon, although does not surpass the boundary at this point. Instead, the it flows west and at crosses the boundary along the entire length of the western boundary. The extent is minimal in the south western corner however, increases further north so that the northern quarter of the site is entirely inundated. • Climate change should also be considered for surface water events; at the site-specific stage, the 100-year +40% should be considered as part of surface water drainage strategies, or surface water modelling. • The current day 1,000-year surface water flooding extent provides an indication of the likely increase in extent of the more frequent surface water events. 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.

<p>Requirements for drainage control and impact mitigation</p>	<p>Broad scale assessment of possible SuDS</p>	<p>Geology:</p> <ul style="list-style-type: none"> • Bedrock – Mercia Mudstone – mudstone • Superficial – Bretford Sand and Gravel member - sand and gravel. <ul style="list-style-type: none"> • 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. • Mapping suggests that there is a high risk of groundwater flooding at this location, therefore it is likely infiltration techniques will not be suitable. This should be confirmed via site investigations to assess the potential for infiltration. • "This option is unlikely to be feasible as mapping suggests mean site slopes are > 5%. Feasibility of such options should be assessed as part of a site specific assessment. If this feature is feasible a liner maybe required to prevent the egress of groundwater. • The site is considered to be highly susceptible to groundwater flooding. Groundwater flooding could occur at the surface which may flow to and pool within topographic low spots during very wet winters. Detention and attenuation features should be designed to prevent groundwater ingress from impacting hydraulic capacity and structural integrity. Additional site investigation work may be required to support the detailed design of the drainage system. This may include groundwater monitoring to demonstrate that a sufficient unsaturated zone has been provided above the highest occurring groundwater level. Below ground development such as basements are not appropriate at this site." • This feature is probably suitable provided site slopes are <5% and the depth to the water table is >1m. A liner maybe required to prevent the egress of groundwater. <ul style="list-style-type: none"> • 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. A liner maybe required to prevent the egress of groundwater. • The site is not designated by the Environment Agency as previously being a landfill site. • The site is not located within a Groundwater Source Protection Zone and there are no restrictions over the use of infiltration techniques with regard to groundwater quality.
<p>NPPF and planning implications</p>	<p>Exception Test requirements</p>	<p>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:</p> <ul style="list-style-type: none"> • Highly Vulnerable development is located in FZ2.
	<p>Requirements and guidance for site-specific</p>	<p>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 or is greater than one hectare. This site falls under these requirements.

	<p>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. • All sources of flooding, particularly the risk of fluvial, surface water and groundwater flooding, should be considered as part of a site-specific Flood Risk Assessment. • Flood risk needs to be considered for the lifetime of the development, accounting for climate change. • Any FRA should be carried out in line with the National Planning Policy Framework; Flood Risk and Coastal Change Planning Practice Guidance, Stratford on Avon District Council's Local Plan policies, the LLFA's (Warwickshire County Council) 'Surface Water Management Plan' and 'Stratford on Avon District Core Strategy 2011 to 2031'. • The development should be designed using a sequential approach. Development should be steered away from areas of fluvial flood risk flow routes on the western boundary, preserving this as green infrastructure. Development must be in line with Table 3: flood risk vulnerability and flood zone compatibility of the NPPG. <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). • 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 on Salford Road (access point). • 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 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.
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Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	BID.8A [BID.A]
	Address	Bidford-on-Avon, B50 4EZ
	Area	1.31 hectares
	Current land use	Greenfield
	Proposed land use	Residential
		<ul style="list-style-type: none"> • Developers should refer to Warwickshire County Council's 'Surface Water Management Plan', Stratford on Avon District's 'Core Strategy 2011 to 2031' and the Level 1 SFRA for information on SuDS. • All development should adopt source control SuDS techniques to reduce the risk of frequent low impact flooding due to post development runoff. • SuDS should be designed to deliver multiple benefits including water quality, biodiversity, amenity, green infrastructure etc. Example features include swales, attenuation features, green roofs, rainwater capture and reuse and permeable paving. • Efforts should be made to limit runoff to greenfield rates and discharge rates from the site should not increase downstream flood risk. • 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. • 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.

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	BID.8A [BID.A]
	Address	Bidford-on-Avon, B50 4EZ
	Area	1.31 hectares
	Current land use	Greenfield
	Proposed land use	Residential
Key messages		<p>The flood risk element of the Exception Test is likely to be passed subject to:</p> <ul style="list-style-type: none"> Highly vulnerable development is located in Flood Zone 2. <p>The site is likely to be suitable for development if:</p> <ul style="list-style-type: none"> Safe access and egress need to be considered and the impacts of surface water flooding to Salford Road are assessed. If flood mitigation measures are implemented then they are tested to ensure that they will not displace water elsewhere. Space for green infrastructure should be considered in the areas of highest flood risk. A site-specific FRA 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 on the site and to neighbouring properties. <p>Refer to the detailed 'guidance for developers' section for further information on the measures that are appropriate for this site</p>
Mapping Information		
The key datasets used to make planning recommendations regarding this site were 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; this is based on the 2010 River Avon hydraulic model.	
Climate change	Climate change mapping was available as part of a detailed River Avon hydraulic model.	
Fluvial depth, velocity and hazard mapping	The hydraulic model is 1D-only and therefore there is no available fluvial depth, velocity or hazard data; therefore, the Risk of Flooding from Surface Water mapping has been used as this represents the floodplains of small watercourses. This should be explored further at site-specific stage	

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	BID.8A [BID.A]
	Address	Bidford-on-Avon, B50 4EZ
	Area	1.31 hectares
	Current land use	Greenfield
	Proposed land use	Residential
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 100-year event (considered to be medium risk) is taken Environment Agency's Risk of Flooding from Surface Water.

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	BID.9 [BID.C]			
	Address	North of Salford Road, Bidford-on-Avon			
	Area	5.88 hectares			
	Current land use	Greenfield			
	Proposed land use	Residential			
Sources of flood risk	Location of site within catchment	The site is located on the western edge of Bidford-on-Avon in the western half of the Avon - Tramway Bridge Stratford to Workman Bridge Evesham catchment. The River Avon is approximately 500m southeast of the site, flowing through the catchment in a south westerly direction towards its confluence with the River Severn.			
	Existing drainage features	A watercourse named Small Brook flows southwards along the western boundary of the site. At the southern point of the site, it flows under Salford Road and continues southwards for approximately 1km, where it joins the River Avon.			
	Fluvial	Proportion of site at risk			
		FZ3b	FZ3a	FZ2	FZ1
		0%	0%	0%	100%
		Highest zone of risk (Risk of Flooding from Rivers and Sea)			
		Very Low			
<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%)</i>					
<p>Available data: The Environment Agency's (EA) Flood Zone mapping has been used in this assessment. The River Avon modelling is 500m south of the site. In this location, the catchment is <3km², and hence is not represented in the EA's Flood Zones. Having said that, there is a small reach of the Small Brook from Broom Court Lodge to the northern tip of the site that has been included in the Flood Zones. This is likely to be due to a flood event which occurred here in 1998 according to the EA's Recorded Flood Outlines dataset.</p> <p>Flood characteristics: The site is not shown to be currently at risk of flooding from fluvial sources. This is because the drain along the western boundary has a catchment <3km², and hence is not represented in the EA's Flood Zones. However, the section of Small Brook immediately upstream from the site, stretching approximately 600m up to Jacksons Meadow, is represented in the EA's Flood Zones; this appears to be derived from a historic flood event which affected</p>					

		<p>a localised reach only and hence has not continued south past this site.</p> <p>This site has been flagged for its marginal risk and potential for climate change impacts to extend further into the site. It could be inferred from the Flood Zone extents further upstream and the similar terrain, that Flood Zones at the site could look similar.</p>						
	Surface Water	Proportion of site at risk (RoFfSW)						
		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 33%; text-align: center;">30-year</th> <th style="width: 33%; text-align: center;">100-year</th> <th style="width: 33%; text-align: center;">1,000-year</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0%</td> <td style="text-align: center;">1%</td> <td style="text-align: center;">13%</td> </tr> </tbody> </table>	30-year	100-year	1,000-year	0%	1%	13%
30-year		100-year	1,000-year					
0%		1%	13%					
		Max depths (m)						
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td style="width: 33%; text-align: center;">N/A</td> <td style="width: 33%; text-align: center;"><0.3</td> <td style="width: 33%; text-align: center;">0.3-0.9</td> </tr> </tbody> </table>	N/A	<0.3	0.3-0.9			
N/A		<0.3	0.3-0.9					
		Max velocity (m/s)						
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td style="width: 33%; text-align: center;">N/A</td> <td style="width: 33%; text-align: center;"><0.25</td> <td style="width: 33%; text-align: center;">>0.25</td> </tr> </tbody> </table>	N/A	<0.25	>0.25				
N/A	<0.25	>0.25						
	<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:</p> <p>The main surface water flow path is associated with Small Brook, a watercourse that flows along the western boundary of the site. This does not pose a flood risk to the site during the 30-year event. During the 100-year event, surface water accumulates around the Small Brook and its floodplain, to depths between 0.3m and 0.9m but remains confined to the area around the channel, having a minimal impact on the site. During the 1,000-year event, flood depths remain the same; however, water extends out onto the site, flooding part of the field to the north of the access road which leads to Marriage Hill Farm. A small amount of isolated flooding also occurs in the northern corner of the site, to depths of 0.3m. In the southwest corner of the site, surface water flooding of Small Brook is more significant, reaching depths between 0.3m and 0.9m with velocities reaching more than 0.25m/s. This encroaches onto the site affecting the western part from Salford Road up to where the access road turns onto the farm.</p>							
	Reservoir	The site is not shown to be at risk of reservoir flooding from the available online maps.						
	Groundwater	<p>The EA's Areas Susceptible to Groundwater Flooding dataset, provided as 1km grid squares, shows the susceptibility of an area to groundwater flood emergence. The following comments can be made about groundwater flood risk:</p> <ul style="list-style-type: none"> • The western half of the site is shown to have between a 50% and 75% susceptibility to groundwater flood emergence. • The eastern half of the site has a 75% or greater susceptibility to groundwater flood emergence. <p>JBA's Groundwater Mapping dataset shows that the majority of the site down towards the western boundary has groundwater levels between 0.025m and 0.5m below the ground surface, suggesting groundwater may emerge at the surface locally. The western boundary is designated as no risk.</p> <p>This assessment does not negate the requirement that an appropriate assessment of the groundwater regime should be carried out at the site-specific Flood Risk Assessment (FRA) stage.</p>						
	Flood history	This site is not shown to be within the EA's Historic Flood Map, however the stretch of Small Brook immediately upstream is included from Broom Court Lodge to the northern tip of the site. The EA's Recorded Flood Outlines dataset shows this stretch						

		flooded in April 1998 due to the channel capacity being exceeded. This event does not appear to have affected the site.
Flood risk management infrastructure	Defences	The site is not protected by any formal flood defences.
	Residual risk	At the southwest corner of the site, Small Brook flows under Salford Road. It is unclear whether this is via a culvert or bridge; however, if this structure became blocked, flooding could extend upstream and onto the development site. A site-specific FRA should investigate the impacts of a blockage here on the climate change scenario and confirm risk to the site, as well as help inform finished floor levels in-site.
Emergency planning	Flood warning	The southwest corner of the site is covered by the Environment Agency's Middle Avon Rugby to Bidford Flood Alert Area (033WAF204).
	Access and egress	Access and egress for the site can occur via an access road which runs northwards from Salford Road, just outside the western boundary of the site. This access road crosses Small Brook into the site approximately half-way up the site boundary. The site may also be accessed from the southeast corner, through a gate that leads off Salford Road. Access and egress are not likely to be affected by fluvial flooding, though as this watercourse is not modelled and the access route may cross it, this should be confirmed in a detailed site-specific assessment. In terms of surface water flood risk, the access road remains unaffected by flooding during the 30-year and 100-year events. During the 1,000-year event, most of the access road along the western boundary of the site is flooded to between 0.3m and 0.9m with velocities reaching more than 0.25m/s in some places.
Climate Change	Implications for the site	<ul style="list-style-type: none"> Whilst the site is not currently shown to be at risk of flooding due to lack of data in this small catchment, the site's close proximity to the unmodelled watercourse poses potential risk. LiDAR data at the site shows the topography around Small Brook is fairly flat, which may indicate that increased flooding resulting from climate change could extend further onto the western side of the site. It is recommended that developers undertake further modelling at the site-specific FRA stage to determine whether the site may be at risk of flooding in the future. The detailed modelling study should test the 2080s climate change allowances in a hydraulic model, to ascertain the impact at 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. Climate change should also be considered for surface water events; at the site-specific stage, the 100-year +40% should be considered as part of surface water drainage strategies, or surface water modelling. The current day 1,000-year surface water flooding extent provides an indication of the likely increase in extent of the more frequent surface water events. 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.
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 – Mercia Mudstone Group - Mudstone. Superficial – Wasperton Sand And Gravel Member - Sand And Gravel. Alluvium - Clay, Silt, Sand And Gravel. The site is considered to have a moderate to high susceptibility to groundwater. Detention and attenuation

		<p>features should be designed to prevent groundwater ingress from impacting hydraulic capacity and structural integrity.</p> <ul style="list-style-type: none"> • 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. • Mapping suggests that there is a high risk of groundwater flooding at this location, therefore it is likely infiltration techniques will not be suitable. This should be confirmed via site investigations to assess the potential for infiltration. • Detention options may be feasible provided site slopes are < 5% at the location of the detention feature. A liner maybe required to prevent the egress of groundwater. Detention and attenuation features should be designed to prevent groundwater ingress from impacting hydraulic capacity and structural integrity. • Filtration features is probably suitable provided site slopes are <5% and the depth to the water table is >1m. A liner maybe required to prevent the egress of groundwater. • 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. A liner maybe required to prevent the egress of groundwater. • 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. A liner maybe required to prevent the egress of groundwater. • The site is not designated by the Environment Agency as previously being a landfill site, however the site neighbours a historic landfill site near its southern boundary. • The site is not located within any Environment Agency designated Source Protection Zone.
<p>NPPF and planning implications</p>	<p>Exception Test requirements</p>	<p>The Local Authority have carried out the Sequential Test in line with national guidance. The Sequential Test must be passed before the Exception Test is applied.</p> <p>Residential development is classified as 'More Vulnerable'. As the entire site is shown to be in Flood Zone 1, the Exception Test is not required for the site. However, development should be steered away from the western boundary by the Small Brook where there is a risk of fluvial and surface water flooding.</p> <p>If detailed modelling of the Small Brook shows the site to be in Flood Zone 3, 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.</p> <p>Development will not be permitted for the following scenarios:</p> <ul style="list-style-type: none"> • Highly Vulnerable Infrastructure within FZ3a and FZ3b. • More Vulnerable and Less Vulnerable Infrastructure within FZ3b.
	<p>Requirements and guidance for site-specific Flood Risk Assessment</p>	<p>Flood Risk Assessment:</p> <ul style="list-style-type: none"> • At the planning application stage, a site-specific Flood Risk Assessment will be required for this site as development borders a watercourse and may be subject to other sources of flooding and the development may introduce a more vulnerable use. It will also be required where development sites:

		<ul style="list-style-type: none"> ○ are 1 hectare or more in size; ○ contain land which has been identified by the EA as having critical drainage problems; or ○ contain land identified in the strategic flood risk assessment as being at increased flood risk in future. <ul style="list-style-type: none"> • A detailed hydraulic model may be required at FRA stage, to confirm flood risk, flow paths and climate change extents. • Consultation with the Local Authority, Local Lead Flood Authority and the Environment Agency should be undertaken at an early stage. • All sources of flooding, particularly the risk of fluvial, surface water and groundwater flooding, should be considered as part of a site-specific FRA. • Flood risk needs to be considered for the lifetime of the development, accounting for climate change. • Blockage residual risk will need to be investigated and modelled in a FRA to confirm impacts and help inform finished flood levels. • The development should be designed using a sequential approach. Development should be steered away from areas of surface water flood risk in the Small Brook, preserving this space as green infrastructure. Development must be in line with Table 3: flood risk vulnerability and Flood Zone compatibility of the NPPG. • Any FRA should be carried out in line with the National Planning Policy Framework; Flood Risk and Coastal Change Planning Practice Guidance, Stratford on Avon District Council's Local Plan policies, the LLFA's (Warwickshire County Council) 'Surface Water Management Plan' and 'Stratford on Avon District Core Strategy 2011 to 2031'. • If a detailed model shows the western boundary to be in Flood Zone 3, development in FZ3b should be avoided unless appropriate use can be demonstrated in line with NPPF. Development in FZ3 may require floodplain compensation and this should be confirmed with the EA at FRA 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. Whilst the site is not currently at risk of flooding, no assessment of future flood risk with regard to climate change has been made. 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
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		<p>layout and design to ensure there is no increase in runoff beyond the current greenfield rates.</p> <ul style="list-style-type: none"> • On site attenuation schemes would need to be tested against the watercourse to ensure flows are not exacerbated downstream within the catchment. • All 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. • Developers should refer to Warwickshire County Council's 'Surface Water Management Plan', Stratford on Avon District's 'Core Strategy 2011 to 2031' and the Level 1 SFRA for information on SuDS. • SuDS should be designed to deliver multiple benefits including water quality, biodiversity, amenity, green infrastructure etc. Example features include swales, attenuation features, green roofs, rainwater capture and reuse and permeable paving. • Efforts should be made to limit runoff to greenfield rates and discharge rates from the site should not increase downstream flood risk. • 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. • Green infrastructure should be considered within the mitigation measures for surface water runoff from potential development.
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<p>Key messages</p>	<p>The site is likely to be suitable for development subject to:</p> <ul style="list-style-type: none"> • A detailed hydraulic model may be needed at site-specific stage to confirm the flood risk to the impacts of climate change in the Small Brook catchment. • Safe access and egress need to be considered as the main access point is significantly affected by surface water flooding in the 1,000-year event. • 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. • A site-specific FRA 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 surface water flooding on the site and to neighbouring properties. <p>Refer to the detailed 'guidance for developers' section for further information on the measures that are appropriate for this site.</p>
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Mapping Information

The key datasets used to make planning recommendations regarding this site were 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.

<p>Flood Zones</p>	<p>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</p>
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	model is constructed at the site-specific FRA stage, to confirm flood risk.
Climate change	Climate change mapping was unavailable for this area. In the absence of Flood Zone 2 as an indication of fluvial climate change, the 1,000-year surface water flooding event was used as an indicative climate change scenario. It is recommended that the latest EA's climate change allowances are modelled in a detailed hydraulic model as part of a site-specific FRA.
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 small watercourses. This should be explored further at site-specific stage.
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, velocity and hazard mapping for the 1 in 100-year event (considered to be medium risk) is taken from Environment Agency's Risk of Flooding from Surface Water.

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	BID.11[BID.D]			
	Address	East of Victoria Road, Bidford-on-Avon			
	Area	5.43 hectares			
	Current land use	Greenfield			
	Proposed land use	Residential			
Sources of flood risk	Location of site within catchment	The site is located on the northern edge of Bidford-on-Avon in the western half of the Avon - Tramway Bridge Stratford to Workman Bridge Evesham catchment. The River Avon is approximately 900m south of the site, flowing through the catchment in a south westerly direction towards its confluence with the River Severn.			
	Existing drainage features	A watercourse named Small Brook flows westwards along the northern boundary of the site. Downstream of the site, it bends slightly southwards and flows approximately 2km before it joins the River Avon.			
	Fluvial	Proportion of site at risk			
		FZ3b	FZ3a	FZ2	FZ1
		0%	0%	0%	100%
		Highest zone of risk (Risk of Flooding from Rivers and Sea)			
Very Low					
<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%)</i>					

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	BID.11[BID.D]		
	Address	East of Victoria Road, Bidford-on-Avon		
	Area	5.43 hectares		
	Current land use	Greenfield		
	Proposed land use	Residential		
		<p>Available data: The Environment Agency's (EA) Flood Zone mapping has been used in this assessment. The River Avon modelling is 900m south of the site. In this location, the catchment is <3km², and hence is not represented in the EA's Flood Zones. Having said that, there is a small reach of Small Brook, stretching approximately 600m downstream of the site, that has been included in the Flood Zones. This is likely to be due to a flood event which occurred here in 1998 according to the EA's Recorded Flood Outlines dataset.</p> <p>Flood characteristics: The site is not shown to be currently at risk of flooding from fluvial sources. This is because the drain along the northern boundary had a catchment <3km², and hence is not represented in the EA's Flood Zones. However, there is likely to still be some risk along the northern boundary, and the section of Small Brook immediately downstream of the site, stretching approximately 600m down to Marriage Hill Farm, is represented in the EA's Flood Zones; this appears to be derived from a historic flood event which affected a localised reach only and hence did not affect the site. This site has been flagged for its marginal risk and potential for climate change impacts to extend further into the site.</p>		
	Surface Water	Proportion of site at risk (RoFfSW)		
		30-year	100-year	1,000-year
		0%	0%	1%
		Max depths (m)		
		N/A	N/A	0.3-0.9
		Max velocity (m/s)		
		N/A	N/A	>0.25
	<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>			

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	BID.11[BID.D]
	Address	East of Victoria Road, Bidford-on-Avon
	Area	5.43 hectares
	Current land use	Greenfield
	Proposed land use	Residential
		<p>Description of surface water flow paths:</p> <p>The main surface water flow path is associated with Small Brook which flows along the northern boundary of the site. During the 30-year and 100-year events, surface water accumulates around Small Brook to depths between 0.3m and 0.9m, along the eastern half of the northern boundary of the site. During the 1,000-year event, depths remain the same, but surface water accumulates along the entirety of Small Brook along the northern boundary. For all scenarios, surface water remains confined to the area around the channel, having a minimal impact on the site.</p>
	Reservoir	The site is not shown to be at risk of reservoir flooding from the available online maps.
	Groundwater	<p>The EA's Areas Susceptible to Groundwater Flooding dataset, provided as 1km grid squares, shows the susceptibility of an area to groundwater flood emergence. The following comments can be made about groundwater flood risk:</p> <ul style="list-style-type: none"> The entire site is shown to have a 75% or greater susceptibility to groundwater flood emergence. <p>JBA's Groundwater Mapping dataset shows that the majority of the site has groundwater levels between 0.025m and 0.5m below the ground surface, suggesting groundwater may emerge at the surface locally. The eastern point is designated as no risk.</p> <p>This assessment does not negate the requirement that an appropriate assessment of the groundwater regime should be carried out at the site-specific Flood Risk Assessment (FRA) stage.</p>
	Flood history	This site is not shown to be within the reaches of the Environment Agency's Historic Flood Map, however the stretch of Small Brook immediately downstream is included from Broom Court Lodge to Marriage Hill Farm. The EA's Recorded Flood Outlines dataset shows this stretch flooded in April 1998 due to the channel capacity being exceeded. This event does not appear to have affected the site.
	Defences	The site is not protected by any formal flood defences.

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	BID.11[BID.D]
	Address	East of Victoria Road, Bidford-on-Avon
	Area	5.43 hectares
	Current land use	Greenfield
	Proposed land use	Residential
Flood risk management infrastructure	Residual risk	Near the west corner of the site, Small Brook flows under Jacksons Meadow road through a culvert. If this structure became blocked, flooding could extend upstream and onto the development site. A site-specific FRA should investigate the impacts of blockage to this culvert on the climate change scenario and confirm risk to the site as well as help inform finished floor levels in-site.
Emergency planning	Flood warning	The site is not located in an Environment Agency Flood Warning or Alert Area.
	Access and egress	There is one point of access and egress for the site which is an access road that leads on from Jacksons Meadow, running approximately halfway along the northern boundary of the site, adjacent to Small Brook. Access and egress are not likely to be significantly affected by fluvial flooding along Small Brook, although as this watercourse is not modelled and the access road is very close, this should be confirmed in a detailed site-specific assessment. Access and egress may be impeded by fluvial flooding of Jacksons Meadow road and the adjoining Victoria Road, which are in Flood Zone 3. Surface water flooding may also impact access and egress along these roads, with a 1,000-year event causing flooding to depths between 0.3m and 0.9m at velocities above 0.25m/s.

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	BID.11[BID.D]
	Address	East of Victoria Road, Bidford-on-Avon
	Area	5.43 hectares
	Current land use	Greenfield
	Proposed land use	Residential
Climate Change	Implications for the site	<ul style="list-style-type: none"> • Whilst the site is not currently shown to be at risk of flooding due to lack of data in this small catchment, the site's close proximity to the unmodelled watercourse poses potential risk. It is recommended that developers undertake further modelling at the site-specific FRA stage to determine whether the site may be at risk of flooding in the future. A detailed modelling study should test the 2080s climate change allowances in a hydraulic model, to ascertain the impact at the site. • At a detailed assessment stage, the impacts of climate change on the functional floodplain may need to be considered. This is likely to resemble the increase in extent from Flood Zone 3b (20-year extent) to Flood Zone 3a (100-year extent), for the purposes of a strategic assessment. • Increased storm intensities due to climate change may increase the extent, depth, velocity, hazard and frequency of both fluvial and surface water flooding. • Climate change should also be considered for surface water events; at the site-specific stage, the 100-year +40% should be considered as part of surface water drainage strategies, or surface water modelling. • The current day 1,000-year surface water flooding extent provides an indication of the likely increase in extent of the more frequent surface water events. 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.

<p>Requirements for drainage control and impact mitigation</p>	<p>Broad scale assessment of possible SuDS</p>	<p>Geology at the site consists of:</p> <ul style="list-style-type: none"> • Bedrock – Mercia Mudstone Group - Mudstone. • Superficial – Wasperton Sand and Gravel Member - Sand And Gravel. <ul style="list-style-type: none"> • 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. Mapping also suggests that slopes may be unsuitable for selective source control techniques. • Mapping suggests that there is a high risk of groundwater flooding at this location, therefore it is likely infiltration techniques will not be suitable. This should be confirmed via site investigations to assess the potential for infiltration. • This option is unlikely to be feasible as mapping suggests mean site slopes are > 5%. Feasibility of such options should be assessed as part of a site specific assessment. If this feature is feasible a liner maybe required to prevent the egress of groundwater. The site is considered to be highly susceptible to groundwater flooding. Groundwater flooding could occur at the surface which may flow to and pool within topographic low spots during very wet winters. Detention and attenuation features should be designed to prevent groundwater ingress from impacting hydraulic capacity and structural integrity. Additional site investigation work may be required to support the detailed design of the drainage system. This may include groundwater monitoring to demonstrate that a sufficient unsaturated zone has been provided above the highest occurring groundwater level. Below ground development such as basements are not appropriate at this site. • This option is unlikely to be feasible as mapping suggests mean site slopes are > 5%. Feasibility of such options should be assessed as part of a site specific assessment. If this feature is feasible it should be located where the depth to the water table is >1m, additionally a liner maybe required to prevent the egress of groundwater. • 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. A liner maybe required to prevent the egress of groundwater. • The site is not designated by the Environment Agency as previously being a landfill site. • The site is not located within a Groundwater Source Protection Zone and there are no restrictions over the use of infiltration techniques with regard to groundwater quality.
<p>NPPF and planning implications</p>	<p>Exception Test requirements</p>	<p>The Local Authority have carried out the Sequential Test in line with national guidance. The Sequential Test must be passed before the Exception Test is applied.</p> <p>Residential development is classified as 'More Vulnerable'. As the entire site is shown to be in Flood Zone 1, the Exception Test is not required for the site. However, development should be steered away from the northern boundary by Small Brook where there is a risk of fluvial and surface water flooding.</p> <p>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.</p>

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	BID.11[BID.D]
	Address	East of Victoria Road, Bidford-on-Avon
	Area	5.43 hectares
	Current land use	Greenfield
	Proposed land use	Residential
		<p>Development will not be permitted for the following scenarios:</p> <ul style="list-style-type: none"> • Highly Vulnerable Infrastructure within FZ3a and FZ3b. • More Vulnerable and Less Vulnerable Infrastructure 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 for this site as the development borders a watercourse and may be subject to other sources of flooding and the development may introduce a more vulnerable use. It will also be required where development sites:
 - are 1 hectare or more in size;
 - contain land which has been identified by the EA as having critical drainage problems; or
 - contain land identified in the strategic flood risk assessment as being at increased flood risk in future.
- A detailed hydraulic model may be required at FRA stage, to confirm flood risk, flow paths and climate change extents from the unmodelled Small Brook watercourse along the northern boundary, using channel topographic survey.
- Consultation with the Local Authority, Local Lead Flood Authority and the Environment Agency should be undertaken at an early stage.
- All sources of flooding, particularly the risk of fluvial, surface water and groundwater flooding, should be considered as part of a site-specific FRA.
- Flood risk needs to be considered for the lifetime of the development, accounting for climate change.
- Blockage residual risk will need to be investigated and modelled in a FRA to confirm impacts and help inform finished flood levels.
- The development should be designed using a sequential approach. Development should be steered away from areas of surface water flood risk and Small Brook along the northern boundary, preserving this space as green infrastructure. Development must be in line with Table 3: flood risk vulnerability and Flood Zone compatibility of the NPPG.
- Any FRA should be carried out in line with the National Planning Policy Framework; Flood Risk and Coastal Change Planning Practice Guidance, Stratford on Avon District Council's Local Plan policies, the LLFA's (Warwickshire County Council) '[Surface Water Management Plan](#)' and '[Stratford on Avon District Core Strategy 2011 to 2031](#)'.
- If a detailed model shows the northern boundary to be in Flood Zone 3, development in FZ3b should be avoided unless appropriate use can be demonstrated in line with NPPF. 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. Whilst the site is not currently shown to be at risk of flooding, no assessment of future flood risk with regard to climate change has been made. 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

		<p>maintained effectively through the lifetime of the development (Para 048 Flood Risk and Coastal Change PPG).</p> <ul style="list-style-type: none"> • 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 watercourse to ensure flows are not exacerbated downstream within the catchment. • All 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. • Developers should refer to Warwickshire County Council's 'Surface Water Management Plan', Stratford on Avon District's 'Core Strategy 2011 to 2031' and the Level 1 SFRA for information on SuDS. • SuDS should be designed to deliver multiple benefits including water quality, biodiversity, amenity, green infrastructure etc. Example features include swales, attenuation features, green roofs, rainwater capture and reuse and permeable paving. Efforts should be made to limit runoff to greenfield rates and discharge rates from the site should not increase downstream flood risk. • 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. • Green infrastructure should be considered within the mitigation measures for surface water runoff from potential development.
<p>Key messages</p>		<p>The site is likely to be suitable for development subject to:</p> <ul style="list-style-type: none"> • Development is avoided near the northern boundary where Small Brook poses a potential fluvial and surface water flood risk. A detailed hydraulic model may be needed at site-specific stage to confirm the flood risk to the site and the impacts of climate change. • Safe access and egress need to be considered as the access road is located along the Small Brook.

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	BID.11[BID.D]
	Address	East of Victoria Road, Bidford-on-Avon
	Area	5.43 hectares
	Current land use	Greenfield
	Proposed land use	Residential
		<ul style="list-style-type: none"> • If flood mitigation measures are implemented then they are tested to ensure that they will not displace water elsewhere. • Space for green infrastructure should be considered in the areas of highest flood risk. • A site-specific FRA 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 surface water flooding on the site and to neighbouring properties. <p>Refer to the detailed 'guidance for developers' section for further information on the measures that are appropriate for this site.</p>
Mapping Information		
The key datasets used to make planning recommendations regarding this site were 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; 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 FRA stage, to confirm flood risk.	
Climate change	Climate change mapping was unavailable for this area. In the absence of Flood Zone 2 as an indication of fluvial climate change, the 1,000-year surface water flooding event was used as an indicative climate change scenario. It is recommended that the latest EA's climate change allowances are modelled in a detailed hydraulic model as part of a site-specific FRA.	
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 small watercourses. This should be explored further at site-specific stage.	
Surface Water	The Risk of Flooding from Surface Water map has been used to define areas at risk from surface water flooding.	

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	BID.11[BID.D]
	Address	East of Victoria Road, Bidford-on-Avon
	Area	5.43 hectares
	Current land use	Greenfield
	Proposed land use	Residential
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 from Environment Agency's Risk of Flooding from Surface Water.

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	BID.13 [BID.B]			
	Address	Bidford-on-Avon			
	Area	2.85 hectares			
	Current land use	Greenfield			
	Proposed land use	Residential			
Sources of flood risk	Location of site within catchment	The site is located on the south-western edge of Bidford-on-Avon in the western half of the Avon - Tramway Bridge Stratford to Workman Bridge Evesham catchment. It lies on the eastern bank of Small Brook, approximately 950m upstream of its confluence with the River Avon. The ridge of high ground passing from north to south through the centre of the site acts as a drainage boundary. The western side of the site will drain into the topographically confined Small Brook whilst lower ground sloping onto the eastern part of the site will drain directly onto the wider floodplain of the River Avon which lies approximately 250m to the southeast, flowing through the catchment in a south westerly direction towards its confluence with the River Severn.			
	Existing drainage features	The Small Brook flows from north to south along the site's western boundary. Approximately 950m downstream of the site the Small Brook reaches a confluence with the River Avon.			
	Fluvial	Proportion of site at risk			
		FZ3b	FZ3a	FZ2	FZ1
		0%	4%	15%	85%
		Highest zone of risk (Risk of Flooding from Rivers and Sea)			
Medium					
<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%)</i></p>					

		<p>Available data: The Environment Agency’s Flood Zone mapping has been used in this assessment. The Small Brook catchment is <3km², and hence is not represented in the EA’s Flood Zones. There is a small reach of the Small Brook from Broom Court Lodge to a location 630m upstream of the site that has been included in the Flood Zones. This is likely to be due to a flood event which occurred here in 1998 according to the EA’s Recorded Flood Outlines dataset. The site is however affected by the River Avon’s flood extents, for which there is a 2010 1D hydraulic model incorporated into the Flood Zones.</p> <p>Flood characteristics: The centre of the site is a topographic ridge, sloping downhill to the east and west towards the watercourse floodplains. Flood Zones 2 and 3, associated with fluvial flooding from the River Avon, encroach onto the low-lying topography at the eastern edge of the site. Flood Zone 3a remains confined to an area in the southeast corner of the site and Flood Zone 2 extends across the entire length of the eastern boundary, reaching a maximum distance of approximately 42m into the site from the border. Flood Zone 3b does not reach the site from the River Avon. Fluvial flood risk from Small Brook along the western boundary is not included in the EA’s Flood Zones as the catchment is <3km² in size. A section upstream of the site is represented in the EA’s Flood Zones; this appears to be derived from a historic flood event which affected a localised reach only and hence has not continued south along the whole watercourse. It could be inferred from the Flood Zones further upstream and the similar terrain that the Flood Zones at the site could look similar with flood risk confined mostly to the low-lying areas directly surrounding the channel which would pose minimal risk to this site. At a site-specific Flood Risk Assessment stage, a detailed hydraulic model of this watercourse should be developed to confirm fluvial flood risk to the site from the Small Brook. In the absence of any detailed models along the Small Brook, the surface water flood risk datasets can be used as an indication of extents, depths and velocities for smaller ordinary watercourses.</p>																											
	Surface Water	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="3" style="text-align: center;">Proportion of site at risk (RoFfSW)</th> </tr> <tr> <th style="text-align: center;">30-year</th> <th style="text-align: center;">100-year</th> <th style="text-align: center;">1,000-year</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0%</td> <td style="text-align: center;">0%</td> <td style="text-align: center;">5%</td> </tr> <tr> <td colspan="3" style="text-align: center;">Max depths (m)</td> </tr> <tr> <td style="text-align: center;">N/A</td> <td style="text-align: center;">N/A</td> <td style="text-align: center;"><0.3</td> </tr> <tr> <td colspan="3" style="text-align: center;">Max velocity (m/s)</td> </tr> <tr> <td style="text-align: center;">N/A</td> <td style="text-align: center;">N/A</td> <td style="text-align: center;">>0.25</td> </tr> <tr> <td colspan="3"> <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> </td> </tr> <tr> <td colspan="3"> <p>Description of surface water flow paths: There is minimal surface water flood risk at this site, and this is confined to the western and eastern boundaries. A flow path encroaches onto the site into low-lying ground at the western boundary in the 1,000-year event, in the Small Brook floodplain. Velocity of surface water flow in this location is estimated to be >0.25m/s; however, maximum depth is</p> </td> </tr> </tbody> </table>	Proportion of site at risk (RoFfSW)			30-year	100-year	1,000-year	0%	0%	5%	Max depths (m)			N/A	N/A	<0.3	Max velocity (m/s)			N/A	N/A	>0.25	<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>Description of surface water flow paths: There is minimal surface water flood risk at this site, and this is confined to the western and eastern boundaries. A flow path encroaches onto the site into low-lying ground at the western boundary in the 1,000-year event, in the Small Brook floodplain. Velocity of surface water flow in this location is estimated to be >0.25m/s; however, maximum depth is</p>		
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Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	BID.13 [BID.B]		
	Address	Bidford-on-Avon		
	Area	2.85 hectares		
	Current land use	Greenfield		
	Proposed land use	Residential		
		estimated to be <0.3m and therefore shallow. A very small area of surface water flooding is present on the eastern boundary in the 1,000-year event.		
	Reservoir	The floodplain of the River Avon is indicated to be at risk from flooding from overtopping of reservoirs. The area at risk encroaches into the eastern boundary of the site, remaining in the areas of lowest-lying topography.		
	Groundwater	<p>The EA's Areas Susceptible to Groundwater Flooding dataset, provided as 1km grid squares, shows the susceptibility of an area to groundwater flood emergence. The following comments can be made about groundwater flood risk:</p> <ul style="list-style-type: none"> • The majority of the site is shown to have >75% susceptibility to groundwater emergence. • A small section of the site at the western edge has a 50-75% susceptibility to groundwater emergence. <p>JBA's Groundwater Mapping dataset shows that the low-lying areas of the site at the eastern and western edges of the site are designated as at no risk of groundwater flooding. The higher ground through the centre of the site mostly has groundwater levels 0.025-0.5m below the ground surface with small areas showing groundwater levels estimated to be within 0.025m of the ground surface. This shows that there is potential for groundwater to emerge at the surface locally within the site.</p> <p>This assessment does not negate the requirement that an appropriate assessment of the groundwater regime should be carried out at the site-specific Flood Risk Assessment (FRA) stage.</p>		
	Flood history	The site is shown to be largely unaffected by historic flood incidents. The Environment Agency's Historic Flood Map extends across the River Avon floodplain and encroaches onto the eastern edge of the site. The Recorded Flood Outlines associate this historic extent with flooding that occurred in July 2007.		
Flood risk management infrastructure	Defences	Defence Type	Standard of Protection	Condition
		-	-	-
		This site is not protected by any formal flood defences.		

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	BID.13 [BID.B]
	Address	Bidford-on-Avon
	Area	2.85 hectares
	Current land use	Greenfield
	Proposed land use	Residential
	Residual risk	<p>Mapping does not indicate the presence of any hydraulic structures in the vicinity of the site that could pose additional risk if they were to become blocked. It is likely that a bridge or culvert is present along the western boundary in order to allow site access from the unnamed track across the Small Brook and onto the site.</p> <p>If there are any hydraulic structures within the site or directly downstream, a site-specific Flood Risk Assessment should investigate the impacts of blockage in the climate change scenario and confirm risk to the site to help inform finished floor levels.</p>
Emergency planning	Flood warning	<p>The site is partially covered by the Environment Agency's Middle Avon Rugby to Bidford Flood Alert Area (033WAF204). The site does not fall within the Environment Agency Flood Warning Areas.</p>
	Access and egress	<p>Access to the site can be gained from the unnamed road at the western boundary of the site which is connected to Salford Road to the north. An alternative access route could be gained from Arrow Way in the centre of the northern boundary.</p> <p>Access and egress to the site is possible in all surface water events. There is a surface water flow path running from north to south close to the western boundary in the 1,000-year event, but maximum depths are estimated to be 0.3m therefore it is likely that emergency services vehicles will be able to gain access to the site.</p> <p>Available mapping data indicates that it is possible to gain access to the site in all fluvial flood events. The route along Salford Road from the northeast does not fall within the EA Flood Zones and therefore access should be steered eastwards away from the A46 junction which is flooded by the Avon and Arrow. A detailed hydraulic model should be developed at the site-specific Flood Risk Assessment stage to investigate the potential flooding from Small Brook which could hinder access along the unnamed roadway if it were to indicate severe flood risk in this area.</p>

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	BID.13 [BID.B]
	Address	Bidford-on-Avon
	Area	2.85 hectares
	Current land use	Greenfield
	Proposed land use	Residential
Climate Change	Implications for the site	<ul style="list-style-type: none"> • 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 modelling data currently available for the Small Brook; usually Flood Zone 2 would be used as an indication of climate change but as this is not covered by Flood Zones, the 1,000-year surface water extent may be used to infer risk from climate change at the western boundary. • Detailed fluvial modelling available in the eastern half of the site as part of climate change models for the River Avon. This indicates flooding to the site in all scenarios (Central, Higher Central and Upper End). The flow extends westward and increases with worsening scenarios. The Upper End extent is limited by the topography of the site and does not reach further than 75m into the site. • At a detailed assessment stage, the impacts of climate change on the functional floodplain may need to be considered. This is likely to resemble the increase in extent from Flood Zone 3b (20-year extent) to Flood Zone 3a (100-year extent), for the purposes of a strategic assessment. • Climate change should also 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 1,000-year surface water extent covers 5% of the site, indicating a flow route through the low topography on the western boundary. • Developers should consider SuDS strategies to reduce the potential impacts of climate change from surface water in a detailed site-specific FRA which would be required to assess the site layout and design. • A detailed fluvial model should be developed as part of a site-specific Flood Risk Assessment to investigate the fluvial flood risk along the Small Brook in climate change scenarios.

<p>Requirements for drainage control and impact mitigation</p>	<p>Broad scale assessment of possible SuDS</p>	<ul style="list-style-type: none"> • Geology at the site consists of: <ul style="list-style-type: none"> ○ Bedrock – Mercia Mudstone group - mudstone ○ Superficial – Boundary • 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. Mapping also suggests that slopes may be unsuitable for selective source control techniques. • Mapping suggests that there is a high risk of groundwater flooding at this location, therefore it is likely infiltration techniques will not be suitable. This should be confirmed via site investigations to assess the potential for infiltration. • "This option is unlikely to be feasible as mapping suggests mean site slopes are > 5%. Feasibility of such options should be assessed as part of a site specific assessment. If this feature is feasible a liner maybe required to prevent the egress of groundwater. • The site is considered to be highly susceptible to groundwater flooding. Groundwater flooding could occur at the surface which may flow to and pool within topographic low spots during very wet winters. Detention and attenuation features should be designed to prevent groundwater ingress from impacting hydraulic capacity and structural integrity. Additional site investigation work may be required to support the detailed design of the drainage system. This may include groundwater monitoring to demonstrate that a sufficient unsaturated zone has been provided above the highest occurring groundwater level. Below ground development such as basements are not appropriate at this site." • This option is unlikely to be feasible as mapping suggests mean site slopes are > 5%. Feasibility of such options should be assessed as part of a site specific assessment. If this feature is feasible it should be located where the depth to the water table is >1m, additionally a liner maybe required to prevent the egress of groundwater. • 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. A liner maybe required to prevent the egress of groundwater. • The site is not designated by the Environment Agency as previously being a landfill site, however the site borders a historic landfill site along the northern boundary. • The site is not located within a Groundwater Source Protection Zone and there are no restrictions over the use of infiltration techniques with regard to groundwater quality.
<p>NPPF and planning implications</p>	<p>Exception Test requirements</p>	<p>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.</p> <p>Residential development is classified as 'More Vulnerable'. It is recommended that proposed development will be</p>

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	BID.13 [BID.B]
	Address	Bidford-on-Avon
	Area	2.85 hectares
	Current land use	Greenfield
	Proposed land use	Residential
		<p>sequentially located within Flood Zone 1 areas of the site, and therefore away from the eastern and western boundaries.</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.

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.
- The development may introduce a more vulnerable use. A detailed site-specific FRA will also be required where development sites:
 - Contain land which has been identified by the EA as having critical drainage problems; or
 - Contain land identified in the strategic flood risk assessment as being at increased flood risk in the future.
- Consultation with the Local Authority, Local Lead Flood Authority and the Environment Agency should be undertaken at an early stage.
- Flood risk needs to be considered for the lifetime of the development, accounting for climate change.
- A detailed model for the Avon exists for the eastern boundary however, the western boundary which falls within the Small Brook catchment is not modelled. At the site-specific level, a detailed fluvial model is recommended to ascertain flooding risk to this side of the site. All sources of flooding, particularly the risk of fluvial, surface water and groundwater flooding, should be considered as part of a site-specific FRA.
- Developers should refer to Warwickshire County Council's '[Surface Water Management Plan](#)', Stratford on Avon District's '[Core Strategy 2011 to 2031](#)' and the [Level 1 SFRA](#) for information on SuDS.
- 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, particularly in the low-lying topography at the east and west boundary of the site, 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 in the southeast of the site 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.

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	BID.13 [BID.B]
	Address	Bidford-on-Avon
	Area	2.85 hectares
	Current land use	Greenfield
	Proposed land use	Residential
		<ul style="list-style-type: none"> • 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 and no increase in downstream discharge from the site. • On site attenuation schemes would need to be tested against the watercourses 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. • Developers should refer to Warwickshire County Council's 'Surface Water Management Plan', Stratford on Avon District's 'Core Strategy 2011 to 2031' and the Level 1 SFRA for information on SuDS. • SuDS should be designed to deliver multiple benefits including water quality, biodiversity, amenity, green infrastructure etc. Example features include swales, attenuation features, green roofs, rainwater capture and reuse and permeable paving. • 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. • 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.

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	BID.13 [BID.B]
	Address	Bidford-on-Avon
	Area	2.85 hectares
	Current land use	Greenfield
	Proposed land use	Residential
Key messages	<p>The site is likely to be suitable for development subject to:</p> <ul style="list-style-type: none"> • Development is preferentially located in areas at lower risk of fluvial flood risk. Flood risk across this site is primarily located in areas of lower-lying topography at the east and west boundaries. Development should be steered towards land at a higher elevation in the centre of the site which is less susceptible to fluvial and surface water flood risk. • 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) and will not be detrimental to flood risk downstream of the site. • Space for green infrastructure or storage of flood water should be considered in the areas of highest flood risk. <p>Refer to the detailed 'guidance for developers' section for further information on the measures that are appropriate for this site</p>	
Mapping Information		
<p>The key datasets used to make planning recommendations regarding this site were 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.</p>		
Flood Zones	<p>Flood Zones 2 and 3 have been taken from the Environment Agency's Flood Map for Planning. This incorporates 1D modelling from the River Avon.</p> <p>It is recommended that a more detailed hydraulic model is constructed at the site-specific FRA stage, to confirm flood risk from the Small Brook at the western boundary.</p>	
Climate change	<p>Climate change was modelled for the River Avon using the 3no. 2080s allowances on the 100-year event. Climate change mapping was unavailable for the Small Brook area. In areas that are not covered by Flood Zone 2, the 1,000-year surface water flooding event was used as an indicative climate change scenario. It is recommended that the latest EA's climate change allowances are modelled in a detailed hydraulic model as part of a site-specific FRA.</p>	

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	BID.13 [BID.B]
	Address	Bidford-on-Avon
	Area	2.85 hectares
	Current land use	Greenfield
	Proposed land use	Residential
Fluvial depth, velocity and hazard mapping		There is no available fluvial modelling data as the River Avon model is 1D-only, therefore the Risk of Flooding from Surface Water mapping has been used. This should be explored further at site-specific stage.
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, velocity and hazard mapping for the 1 in 100-year event (considered to be medium risk) is taken from Environment Agency's Risk of Flooding from Surface Water.

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	BISH.1 [BISH.A]			
	Address	Bishop's Itchington			
	Area	2.27 hectares			
	Current land use	Greenfield			
	Proposed land use	Residential			
Sources of flood risk	Location of site within catchment	The site is located on the north-eastern edge of Bishop's Itchington. It lies on the western bank of the River Itchen in the middle reaches of the catchment as it flows approximately northwards to its confluence with the River Leam. In this area, the floodplain of the River Itchen is relatively narrow and entrenched into the surrounding landscape, flanked by higher ground on both banks.			
	Existing drainage features	The River Itchen flows from south to north close to the eastern boundary of the site. The site slopes steeply down from higher ground on its western boundary towards the river in the east.			
	Fluvial	Proportion of site at risk			
		FZ3b	FZ3a	FZ2	FZ1
		8%	8%	11%	89%
		Highest zone of risk (Risk of Flooding from Rivers and Sea)			
		Medium			
<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%)</i>					
<p>Available data: The Environment Agency's Flood Zone mapping has been used in this assessment. In the absence of a detailed model along this part of the River Itchen, the Flood Zones are based on 2D generalised modelling.</p> <p>Flood characteristics: The EA mapping datasets indicate that fluvial flood risk is confined to the areas of the site at low topography close to the River Itchen. Flood Zones 3a and 2 extend across Ladbroke Road and encroach onto the eastern edge of the site. Flood Zone 2 extends slightly further onto the site than Flood Zone 3, which shows similar extents. Flood Zone 3b is based on Flood Zone 3a as an indication of risk, as there is no detailed modelling of the 20-year flood event.</p> <p>The current mapping is also misaligned downstream of Ladbroke Road, where it follows lower topography rather than the channel alignment. A more detailed model in a site-specific FRA would help refine flood risk.</p>					

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	BISH.1 [BISH.A]		
	Address	Bishop's Itchington		
	Area	2.27 hectares		
	Current land use	Greenfield		
	Proposed land use	Residential		
Surface Water	Proportion of site at risk (RoFfSW)			
	30-year	100-year	1,000-year	
	4%	8%	20%	
	Max depths (m)			
	>0.9	>0.9	>0.9	
	Max velocity (m/s)			
	<0.25	>0.25	>0.25	
	<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: Surface water flooding is primarily associated with the River Itchen floodplain, encroaching onto the eastern boundary of the site and ponding into the areas of lowest topography in the northeast. The deepest area of surface water flooding occurs in the northeast corner of the site, with depths of >0.9m estimated in the 30-year, 100-year and 1,000-year events. Deeper water encroaches further onto the site in the larger return period events. There are two isolated surface water flow paths flowing from west to east across the site; one is located at the northern end of the site and the other at the southern end. These are only present in the 1,000-year event and have an estimated depth of <0.3m so fairly shallow. Surface water flow paths are also present in the 1,000-year event running along Ladbroke Road on the southern boundary and extending along the northern boundary.</p>			
	Reservoir	The site is not at risk of flooding from reservoirs according to available online mapping .		

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	BISH.1 [BISH.A]		
	Address	Bishop's Itchington		
	Area	2.27 hectares		
	Current land use	Greenfield		
	Proposed land use	Residential		
	Groundwater	<p>The EA's Areas Susceptible to Groundwater Flooding dataset, provided as 1km grid squares, shows the susceptibility of an area to groundwater flood emergence. The following comments can be made about groundwater flood risk:</p> <ul style="list-style-type: none"> The entire site is shown to have less than 25% susceptibility to groundwater flood emergence <p>JBA's Groundwater Mapping dataset shows for the entire site there is 'no risk', indicating that groundwater is more than 5m below the surface. This suggests groundwater is unlikely to emerge locally within the site.</p> <p>This assessment does not negate the requirement that an appropriate assessment of the groundwater regime should be carried out at the site-specific Flood Risk Assessment (FRA) stage.</p>		
	Flood history	<p>The Environment Agency's historic flood map does not indicate any evidence of flooding on the site.</p> <p>Warwickshire County Council hold a dataset that indicates the number of flooding events within a 500m grid square. This site is located within a grid square where 1 historic incident has occurred.</p>		
Flood risk management infrastructure	Defences	Defence Type	Standard of Protection	Condition
		-	-	-
		This site is not protected by any formal flood defences.		
	Residual risk	<p>There is minimal residual risk from flood risk management infrastructure at this site. Mapping does not indicate the presence of any hydraulic structures in the vicinity of the site that could pose additional risk. Although, just north east of the site, the River Itchen flows under Ladbroke Grove therefore, it is possible that changes to this area could pose a risk to the low lying eastern quarter of the site. A site-specific Flood Risk Assessment is recommended to ascertain this and further potential risks.</p>		
Emergency planning	Flood warning	<p>The River Leam and River Itchen Flood Alert Area (033WAF203) encroaches across the eastern boundary of the site and covers the low-lying area of the site. The site is not covered by the Environment Agency's Flood Warning Areas.</p>		

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	BISH.1 [BISH.A]
	Address	Bishop's Itchington
	Area	2.27 hectares
	Current land use	Greenfield
	Proposed land use	Residential
	Access and egress	<p>Access and egress to the site can be gained from Ladbroke Road which runs along the southern and eastern boundary of the site or alternatively can be gained from an unnamed single-track lane along the western boundary of the site.</p> <p>In all surface water and fluvial flooding events, the section of Ladbroke Road along the eastern site boundary is inundated due to the proximity to the River Itchen. However, more detailed modelling may refine the flood extents in this area of the road, as the current mapping is also misaligned downstream of Ladbroke Road, where it follows lower topography rather than the channel alignment. Surface water ponding in this area is >0.9m even in the 30-year event which is quite deep.</p> <p>In all fluvial and surface water events, access to the site can be gained from the west where access routes originate from areas of higher elevation. There are isolated areas of surface water ponding through Bishop's Itchington in the 30-year and 100-year surface water events, extending into flow paths in the 1,000-year event. However, maximum depths are estimated to be <0.3m in all events on key access routes so it is likely that emergency services will still be able to gain access.</p> <p>A site-specific Flood Risk Assessment should be undertaken to evaluate accessibility to pedestrians and vehicles to this site in all surface water and fluvial events. It is advised that access to the site should be preferentially gained from the west.</p>

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	BISH.1 [BISH.A]
	Address	Bishop's Itchington
	Area	2.27 hectares
	Current land use	Greenfield
	Proposed land use	Residential
Climate Change	Implications for the site	<ul style="list-style-type: none"> 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 currently available at the site, therefore Flood Zone 2 has been used as a conservative indication of fluvial flood risk from climate change. This extends into the eastern area of the site, confined within the areas of lowest topography, but is not significantly different to Flood Zone 3a. It is recommended that developers undertake further modelling at the site-specific Flood Risk Assessment stage to determine whether the site may be at risk of flooding in the future. The detailed modelling study should test the 2080s climate change allowances in a hydraulic model to ascertain the impact at the site. At a detailed assessment stage, the impacts of climate change on the functional floodplain may need to be considered. This is likely to resemble the increase in extent from Flood Zone 3b (20-year extent) to Flood Zone 3a (100-year extent), for the purposes of a strategic assessment. Climate change should also 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 flooding extent provides an indication of the likely increase in extent of the more frequent surface water events due to climate change. The 1,000-year surface water extent covers 20% of the site with the majority of the risk caused by ponding on low topography at the eastern boundary. Developers should consider SuDS strategies to reduce the impacts of climate change from surface water in a detailed site-specific FRA.

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	BISH.1 [BISH.A]
	Address	Bishop's Itchington
	Area	2.27 hectares
	Current land use	Greenfield
	Proposed land use	Residential
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 – Rugby Limestone member-mudstone and limestone, interbedded ○ Superficial – None recorded • Most source control techniques are likely to be suitable. Mapping suggests that slopes may be unsuitable for selective source control techniques. 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. • 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. • This option is unlikely to be feasible as mapping suggests mean site slopes are > 5%. Feasibility of such options should be assessed as part of a site specific assessment. If this feature is feasible a liner maybe required to prevent the egress of groundwater. • This option is unlikely to be feasible as mapping suggests mean site slopes are > 5%. Feasibility of such options should be assessed as part of a site specific assessment. If this feature is feasible it should be located where the depth to the water table is >1m. • 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. • The site is not designated by the Environment Agency as previously being a landfill site. • The site is not located within a Groundwater Source Protection Zone and there are no restrictions over the use of infiltration techniques with regard to groundwater quality.

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	BISH.1 [BISH.A]
	Address	Bishop's Itchington
	Area	2.27 hectares
	Current land use	Greenfield
	Proposed land use	Residential
NPPF and planning implications	Exception Test requirements	<p>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:</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.

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.
- The development may introduce a more vulnerable use. A detailed site-specific FRA will also be required where development sites:
 - Contain land which has been identified by the EA as having critical drainage problems; or
 - Contain land identified in the strategic flood risk assessment as being at increased flood risk in the future.
- Consultation with the Local Authority, Local Lead Flood Authority and the Environment Agency should be undertaken at an early stage.
- All sources of flooding, particularly the risk of fluvial, surface water and groundwater flooding, should be considered as part of a site-specific Flood Risk Assessment.
- Flood risk needs to be considered for the lifetime of the development, accounting for climate change.
- A more detailed hydraulic model may be required at Flood Risk Assessment stage, to confirm flood risk and flow paths, and climate change extents associated with the River Itchen.
- Developers should refer to Warwickshire County Council's '[Surface Water Management Plan](#)', Stratford on Avon District's '[Core Strategy 2011 to 2031](#)' and the [Level 1 SFRA](#) for information on SuDS.
- 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 primarily in low lying topography along the eastern boundary, 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 in the eastern area of the site 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.

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	BISH.1 [BISH.A]
	Address	Bishop's Itchington
	Area	2.27 hectares
	Current land use	Greenfield
	Proposed land use	Residential
		<ul style="list-style-type: none"> • 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 and that discharge rates from the site do not increase downstream flood risk. • On site attenuation schemes would need to be tested against the 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. • SuDS should be designed to deliver multiple benefits including water quality, biodiversity, amenity, green infrastructure etc. Example features include swales, attenuation features, green roofs, rainwater capture and reuse and permeable paving. • 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. • 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.

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	BISH.1 [BISH.A]
	Address	Bishop's Itchington
	Area	2.27 hectares
	Current land use	Greenfield
	Proposed land use	Residential
Key messages	<p>The site is likely to be suitable for development subject to:</p> <ul style="list-style-type: none"> • Development is preferentially located in areas at lower risk of fluvial flood risk. Flood risk across the site is located at the eastern boundary in low lying topography close to the River Itchen. Development should be steered onto the 89% of the site located in FZ1, lying at higher elevation on the western side of the site. This area is less susceptible to fluvial and surface water flood risk. • 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) and will not be detrimental to flood risk downstream of the site. • Space for green infrastructure or storage of flood water should be considered in the areas of highest flood risk. • Access to the site is preferentially gained from the west. <p>Refer to the detailed 'guidance for developers' section for further information on the measures that are appropriate for this site.</p>	
Mapping Information		
<p>The key datasets used to make planning recommendations regarding this site were 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.</p>		
Flood Zones	<p>Flood Zones 2 and 3 have been taken from the Environment Agency's Flood Map for Planning. It is recommended that a more detailed hydraulic model is constructed at the site-specific Flood Risk Assessment stage, to confirm flood risk.</p>	
Climate change	<p>Climate change mapping was unavailable for this area. Flood Zones 2 was used as an indicative climate change extent, in addition to the 1,000-year surface water flood extent. It is recommended that the latest EA's climate change allowances are modelled in a detailed hydraulic model as part of a site-specific FRA.</p>	
Fluvial depth, velocity and hazard mapping	<p>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 small watercourses. This should be explored further at site-specific stage.</p>	

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	BISH.1 [BISH.A]
	Address	Bishop's Itchington
	Area	2.27 hectares
	Current land use	Greenfield
	Proposed land use	Residential
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 100-year event (considered to be medium risk) is taken Environment Agency's Risk of Flooding from Surface Water.

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	BISH.02[BISH.B]			
	Address	North of Hambridge Road			
	Area	2.21 hectares			
	Current land use	Greenfield			
	Proposed land use	Residential			
Sources of flood risk	Location of site within catchment	The site is located to the east of Bishop's Itchington, in the western part of the Itchen – source to confluence with River Stowe catchment. The River Itchen flows northwards through the catchment, meandering around to the east of the site.			
	Existing drainage features	The River Itchen passes approximately 100m to the southeast of the site. It then meanders eastwards up to 400m away from the site, passing under Hambridge Road, before bending back to within 10m of the northern tip of the site. As it heads northwards away from the site, it passes under Ladbroke Road.			
	Fluvial	Proportion of site at risk			
		FZ3b	FZ3a	FZ2	FZ1
		0%	0%	0%	100%
		Highest zone of risk (Risk of Flooding from Rivers and Sea)			
		Very Low			
		<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%)</i>			
	Available data: The Environment Agency's Flood Zone mapping has been used in this assessment. Where there is no detailed hydraulic model available, the Flood Zones are based on 2D generalised modelling.				
	Flood characteristics: The site is not shown to currently be at risk of flooding from fluvial sources. However, the site is in close proximity to Flood Zones associated with the River Itchen which passes to the east of the site. The Flood Zone data indicates flood risk is restricted by the river valley of the River Itchen, which rises away towards the site. Fluvial Flood Zones 2 and 3 are all present within the same confined topographic extents, passing close to the very northern tip of the site, which is the lowest topographic point in the site, close to the channel.				
Surface Water	Proportion of site at risk (RoFfSW)				
	30-year	100-year	1,000-year		

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	BISH.02[BISH.B]		
	Address	North of Hambridge Road		
	Area	2.21 hectares		
	Current land use	Greenfield		
	Proposed land use	Residential		
		0%	1%	8%
		Max depths (m)		
		N/A	0.3-0.9	0.3-0.9
		Max velocity (m/s)		
		N/A	>0.25	>0.25
		<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>		
		Description of surface water flow paths:		
		Risk of Flooding from Surface Water data for this site shows a flow path in the 100-year and 1,000-year event. This flows through the middle of the site from west to east as water drains from a residential area of the village into the River Itchen. During the 100-year event, the extent is small and disconnected with depths mostly below 0.3m. During the 1,000-year event, the extent increases, forming a continuous and wider flow path across the site. Depths largely remain below 0.3m with just a small area reaching up to 0.9m. Flood velocities are greater than 0.25m/s.		
		For all scenarios, surface water accumulates around the River Itchen and its floodplain to depths above 0.9m. During the 1,000-year event, this encroaches onto the northern tip of the site.		
		Reservoir	The site is not shown to be at risk of reservoir flooding from the available online maps.	
	Groundwater	<p>The EA's Areas Susceptible to Groundwater Flooding dataset, provided as 1km grid squares, shows the susceptibility of an area to groundwater flood emergence. The following comment can be made about groundwater flood risk:</p> <ul style="list-style-type: none"> The entire site is shown to have less than a 25% susceptibility to groundwater flood emergence. <p>JBA's Groundwater Mapping dataset shows that the entire site has been designated as no risk.</p> <p>This assessment does not negate the requirement that an appropriate assessment of the groundwater regime should be carried out at the site-specific Flood Risk Assessment (FRA) stage.</p>		

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	BISH.02[BISH.B]
	Address	North of Hambridge Road
	Area	2.21 hectares
	Current land use	Greenfield
	Proposed land use	Residential
	Flood history	This site is not shown to be within the reaches of the EA's Historic Flood Map. Warwickshire County Council may hold additional records which are not available at this time. These records detail historical flood incidents from all sources, whereas the EA dataset only records incidents of fluvial, tidal or coastal flooding. The Lead Local Authority should be contacted to obtain further details.
Flood risk management infrastructure	Defences	The site is not protected by any formal flood defences.
	Residual risk	Just to the north of the site, the River Itchen flows under a bridge for Ladbroke Road. If this became blocked, flooding could extend upstream and onto the development site. The impact would likely be low because the site's topography rises quite steeply away from this northern corner, and the River Itchen floodplain is also very wide, which would dissipate some of the effect before rising into the site. A site-specific FRA should investigate the impacts of a blockage here on the climate change scenario and confirm risk to the site, as well as help inform finished floor levels in-site for this northern corner.
	Flood warning	The northern tip of the site is covered by the EA's River Leam and River Itchen Flood Alert Area (033WAF203).

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	BISH.02[BISH.B]
	Address	North of Hambridge Road
	Area	2.21 hectares
	Current land use	Greenfield
	Proposed land use	Residential
Emergency planning	Access and egress	<p>Access and egress at the site are possible via Hambridge Road on the southern boundary of the site, or via Ladbroke Road on the northern boundary of the site.</p> <p>For both Hambridge Road and Ladbroke Road, the roads to the east are covered by the EA's Flood Zone mapping, therefore consideration is needed for access and egress in this direction during a fluvial flood event. This is likely because the 2D generalised modelling does not account for channel survey or structures, so in reality it may not flood over the roads as much. Until more detailed modelling is available, caution should be applied to considering the risk posed by the River Itchen to these roads.</p> <p>In terms of surface water flood risk, there is Very Low risk in the vicinity of the gate off Hambridge Road. On Ladbroke Road, there is surface water ponding around the gateway to the site during a 1,000-year event, but depths are below 0.3m so are unlikely to significantly impact access and egress. As with fluvial risk, the surface water flood extents are shown to cross these roads in all events. During the 30-year, 100-year and 1,000-year events, flood depths across both roads to the east are over 0.9m and velocities are greater than 0.25m/s, so may cause access and egress issues. It would therefore be preferential for access and egress to be in the opposite direction along Ladbroke Road and Hambridge Road, to the west.</p>

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	BISH.02[BISH.B]
	Address	North of Hambridge Road
	Area	2.21 hectares
	Current land use	Greenfield
	Proposed land use	Residential
Climate Change	Implications for the site	<ul style="list-style-type: none"> • Developers may need to undertake further modelling at the site-specific FRA stage to determine whether the site may be at risk of flooding in the future. • There is no detailed fluvial modelling available at the site, and therefore Flood Zone 2 has been used as a conservative indication of flood risk from climate change. This touches the northern tip of the site, suggesting the potential impact from climate change would only affect this small area of the site, given the constrained topography. The detailed modelling study should test the 2080s climate change allowances in a hydraulic model, to ascertain the impact at the site. • At a detailed assessment stage, the impacts of climate change on the functional floodplain may need to be considered. This is likely to resemble the increase in extent from Flood Zone 3b (20-year extent) to Flood Zone 3a (100-year extent), for the purposes of a strategic assessment. As the topography is confined in the northern corner, this is likely to have minimal impact on 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. • Climate change should also 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 flooding extent provides an indication of the likely increase in extent of the more frequent surface water events. 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.

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	BISH.02[BISH.B]
	Address	North of Hambridge Road
	Area	2.21 hectares
	Current land use	Greenfield
	Proposed land use	Residential
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 – Rugby Limestone Member - Mudstone and Limestone, Interbedded. Charmouth Mudstone Formation - Mudstone. ○ Superficial – none recorded • Most source control techniques are likely to be suitable. Mapping suggests that slopes may be unsuitable for selective source control techniques. 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. • 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. • This option is unlikely to be feasible as mapping suggests mean site slopes are > 5%. Feasibility of such options should be assessed as part of a site specific assessment. If this feature is feasible a liner maybe required to prevent the egress of groundwater. • This option is unlikely to be feasible as mapping suggests mean site slopes are > 5%. Feasibility of such options should be assessed as part of a site specific assessment. If this feature is feasible it should be located where the depth to the water table is >1m. • 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. • The site is not designated by the Environment Agency as previously being a landfill site. • The site is not located within a Groundwater Source Protection Zone and there are no restrictions over the use of infiltration techniques with regard to groundwater quality.

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	BISH.02[BISH.B]
	Address	North of Hambridge Road
	Area	2.21 hectares
	Current land use	Greenfield
	Proposed land use	Residential
NPPF and planning implications	Exception Test requirements	<p>The Local Authority have carried out the Sequential Test in line with national guidance. The Sequential Test must be passed before the Exception Test is applied.</p> <p>Residential development is classified as 'More Vulnerable'. As the entire site is shown to be in Flood Zone 1, the Exception Test is not required for the site. However, development should be steered away from the northeast corner by the River Itchen where there is a risk of fluvial and surface water flooding.</p> <p>If detailed modelling of the River Itchen shows the northern tip of the site to be in Flood Zone 3, 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.</p> <p>Development will not be permitted for the following scenarios:</p> <ul style="list-style-type: none"> • Highly Vulnerable Infrastructure within FZ3a and FZ3b. • More Vulnerable and Less Vulnerable Infrastructure 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 for this site as development is in close proximity to a watercourse and may be subject to other sources of flooding and the development may introduce a more vulnerable use. It will also be required where development sites:
 - are 1 hectare or more in size;
 - contain land which has been identified by the EA as having critical drainage problems; or
 - contain land identified in the strategic flood risk assessment as being at increased flood risk in future.
- A detailed hydraulic model may be required at FRA stage, to confirm flood risk and climate change extents from the River Itchen at the northern tip of the site, using channel topographic survey.
- Consultation with the Local Authority, Local Lead Flood Authority and the Environment Agency should be undertaken at an early stage.
- All sources of flooding, particularly the risk of fluvial, surface water and groundwater flooding, should be considered as part of a site-specific FRA.
- The development should be designed using a sequential approach. Development should be steered away from areas of fluvial flood risk near the north east corner, and the surface water flow path bisecting the site in the 1,000-year event, preserving these spaces as green infrastructure.
- Flood risk needs to be considered for the lifetime of the development, accounting for climate change .
- Development must be in line with Table 3: flood risk vulnerability and flood zone compatibility of the NPPG.
- Any FRA should be carried out in line with the National Planning Policy Framework; Flood Risk and Coastal Change Planning Practice Guidance, Stratford on Avon District Council's Local Plan policies, the LLFA's (Warwickshire County Council) '[Surface Water Management Plan](#)' and '[Stratford on Avon District Core Strategy 2011 to 2031](#)'.
- If a detailed model shows the north east corner to be in Flood Zone 3, development in FZ3b should be avoided unless appropriate use can be demonstrated in line with NPPF.

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

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	BISH.02[BISH.B]
	Address	North of Hambridge Road
	Area	2.21 hectares
	Current land use	Greenfield
	Proposed land use	Residential
		<p>Levels above the design event may remove the need for resilience measures.</p> <ul style="list-style-type: none"> • 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 watercourse to ensure flows are not exacerbated downstream within the catchment. • All 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. • Developers should refer to Warwickshire County Council's 'Surface Water Management Plan', Stratford on Avon District's 'Core Strategy 2011 to 2031' and the Level 1 SFRA for information on SuDS. • SuDS should be designed to deliver multiple benefits including water quality, biodiversity, amenity, green infrastructure etc. Example features include swales, attenuation features, green roofs, rainwater capture and reuse and permeable paving. Efforts should be made to limit runoff to greenfield rates and discharge rates from the site should not increase downstream flood risk. • 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. • Green infrastructure should be considered within the mitigation measures for surface water runoff from potential development.

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	BISH.02[BISH.B]
	Address	North of Hambridge Road
	Area	2.21 hectares
	Current land use	Greenfield
	Proposed land use	Residential

Key messages

The site is likely to be suitable for development subject to:

- Development is avoided near the north east corner where the River Itchen poses a potential fluvial and surface water flood risk. A detailed hydraulic model may be needed at site-specific stage to confirm the flood risk to the site and the impacts of climate change.
- Safe access and egress need to be considered as the two access points are affected by fluvial and surface water flooding from the east. Access would be better directed to the west.
- If flood mitigation measures are implemented then they are tested to ensure that they will not displace water elsewhere.
- Space for green infrastructure should be considered in the areas of highest flood risk.
- A site-specific FRA 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 surface water flooding on the site and to neighbouring properties.

Refer to the detailed 'guidance for developers' section for further information on the measures that are appropriate for this site.

Mapping Information

The key datasets used to make planning recommendations regarding this site were 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; 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.

Climate change

Climate change was based on Flood Zone 2 to serve as an indication of possible extents. It is recommended that the latest EA's climate change allowances are modelled in a detailed hydraulic model as part of a site-specific FRA.

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	BISH.02[BISH.B]
	Address	North of Hambridge Road
	Area	2.21 hectares
	Current land use	Greenfield
	Proposed land use	Residential
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 small 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 100-year event (considered to be medium risk) is taken from Environment Agency's Risk of Flooding from Surface Water.

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	CLIF.1 [CLIF.C]			
	Address	Clifford Chambers			
	Area	2.06 hectares			
	Current land use	Greenfield			
	Proposed land use	Residential			
Sources of flood risk	Location of site within catchment	This site is located north west of the urbanised area of Clifford Chambers. Campden Road/ the B4632 makes up the western boundary for the site. The site is in the lower catchment of the River Stour, 2.5km south east of where the Stour meets the River Avon. The site is 2 miles south of Stratford-upon-Avon town and centrally located within the district. This area is within the middle Avon catchment.			
	Existing drainage features	The Environment Agency's Detailed River Network shows River Stour flowing to the north east of the site. Just south east of the site at Riverbank House, the river splits in two, with one channel meandering north east for Clifford Mill before re-joining the main channel north of the site at the B4632. At the point of bifurcation, the main channel continues to flow north west, close to the north eastern corner of the site. The Stour then flows west for 2.5km to join the River Avon which flows south west from this confluence towards the Severn. There are no existing drainage features within the site.			
	Fluvial	Proportion of site at risk			
		FZ3b	FZ3a	FZ2	FZ1
		18%	21%	29%	71%
		Highest zone of risk (Risk of Flooding from Rivers and Sea)			
Medium					
<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%)</i>					

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	CLIF.1 [CLIF.C]		
	Address	Clifford Chambers		
	Area	2.06 hectares		
	Current land use	Greenfield		
	Proposed land use	Residential		
		<p>Available data: The Environment Agency's (EA) Flood Zone mapping has been used in this assessment, which incorporates the River Stour 1D-2D 2010 modelling.</p> <p>Flood characteristics: Flood Zone data for this site indicates flood risk through this site is as a result of the River Stour, the banks of which are near to the north east corner of boundary of site. Flood Zones 2 and 3 are shown to be in the northern quarter of the site, spanning the entire breadth of the site, and are restricted by the topography which slopes upwards away from the Stour floodplain. Flood Zone 3b is shown to reach into the site for up to 85m, from the banks of the Stour. Flood Zone 3a has a slightly larger extent and Flood Zone 2 larger still but is limited by a sudden increase in topography. Flood Zone 3 does not extend much further east or south beyond its extent in the site; however, Flood Zone 2 extends along the eastern border on Campden Road, with a very small re-entry into the site further south.</p> <p>Risk of Flooding from Rivers and Sea data shows that a similar area to Flood Zone 3a is modelled as being at medium risk. The 100-year modelled flood extent as Flood Zone 3a. Depths vary and are highest in the north eastern corner, are between 2-3m. This depth decreases both east and south from the corner. The majority of the site has depths between 0.5-1.5m. The 100-year velocities, however, are low between 0-0.35m/s. The resulting hazard varies, following the depth pattern and is highest in the north eastern corner.</p>		
	Surface Water	Proportion of site at risk (RoFfSW)		
		30-year	100-year	1,000-year
		0%	0%	2%
		Max depths (m)		
		N/A	N/A	Below 300mm
		Max velocity (m/s)		
	N/A	N/A	Over 0.25m/s	

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	CLIF.1 [CLIF.C]		
	Address	Clifford Chambers		
	Area	2.06 hectares		
	Current land use	Greenfield		
	Proposed land use	Residential		
		<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: Surface water flows only impact the site in the 1,000-year events. In these, there is two areas with minimal localised ponding. The first is in the north eastern corner and the second area is near the lower western boundary. There are, however, surface water flows in all events on the B4532. In the 30-year event this extends for half the length of the site; however, in both the 100-year and 1,000 year these flows extend the entire length of the site.</p>		
	Reservoir	The site is shown to be at risk of reservoir flooding from the available online maps. The extent from this flooding reaches to the same point as the fluvial 100-year modelled risk and Flood Zone 2, again being limited by the topography of the site.		
	Groundwater	<p>The EA's Areas Susceptible to Groundwater Flooding dataset, provided as 1km grid squares, shows the susceptibility of an area to groundwater flood emergence. The following comments can be made about groundwater flood risk:</p> <ul style="list-style-type: none"> The entire site is shown to have greater than 75% susceptibility to groundwater flood emergence <p>JBA's Groundwater Mapping dataset shows that the southern third of the site has no risk from groundwater flooding. The remaining two thirds have groundwater between 0.5m and 5m below the surface. This suggest groundwater flooding risk is not as high as suggested by the EA's Areas Susceptible to Groundwater Flooding dataset.</p> <p>This assessment does not negate the requirement that an appropriate assessment of the groundwater regime should be carried out at the site-specific Flood Risk Assessment (FRA) stage.</p>		
	Flood history	This Environment Agency's Historic Flood Map, provided as 1km square grids, show the southern quarter to have 1 recorded incident of flooding. The majority of the site has no history of flooding.		
Defences	Defence Type	Standard of Protection	Condition	
	-	-	-	

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	CLIF.1 [CLIF.C]
	Address	Clifford Chambers
	Area	2.06 hectares
	Current land use	Greenfield
	Proposed land use	Residential
Flood risk management infrastructure		This site is not protected by any formal flood defences. However, there are some flood defences present on the right bank of the right-hand channel bifurcation adjacent to Clifford Mill, but the area benefitting from this defences is the Mill, from the sluice to the road.
	Residual risk	<p>The flood defence mentioned above may have an effect of flood levels at the site if flood water is then spread over a reduced width in this part of the floodplain, up to the B4632, but it is not anticipated that the site is at residual risk from these flood defences.</p> <p>There is a chance that blockage of the B4632 could increase water levels and depths upstream, and therefore at the site. It is deemed unlikely to have a significant impact due to the site being located on the outer edge of the wide floodplain, and the structure is likely to be a suitable size given the width of the channel as the 2 branches re-merge and the function of the Mill directly upstream, but a site-specific FRA is recommended to investigate potential risks further.</p>
Emergency planning	Flood warning	The site is not covered by the Environment Agency's Flood Warning Service.
	Access and egress	<p>Access and egress at this site are possible via the B4632, Campden Road which makes up the western boundary for the site. This road is affected by fluvial flooding and is covered by Flood Zone 2 for the majority of the western boundary extent therefore, this should be considered. The road is also vulnerable to surface water flows in all events, though the 30-year extent is negligible. The 100-year and 1,000-year events spread the full length of the site boundary. For most of the 100-year event, the depth of these flows are below 0.3m although some areas are up to 0.6m deep. This may still be suitable for emergency vehicles.</p> <p>A site-specific Flood Risk Assessment should be undertaken to evaluate accessibility to pedestrians and vehicles at this access point.</p>

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	CLIF.1 [CLIF.C]
	Address	Clifford Chambers
	Area	2.06 hectares
	Current land use	Greenfield
	Proposed land use	Residential
Climate Change	Implications for the site	<ul style="list-style-type: none"> Increased storm intensities due to climate change are modelled for the 2080s epoch in the Stour model (100-year +25%, 35% and 70%). Results show no increase in the extent of fluvial flooding to the site, due to the confined topography at the edge of the floodplain, although this may affect depth, velocity and therefore the hazard. Climate change may also affect surface water and groundwater related vulnerability. At a detailed assessment stage, the impacts of climate change on the functional floodplain may need to be considered. This is likely to resemble the increase in extent from Flood Zone 3b (20-year extent) to Flood Zone 3a (100-year extent), for the purposes of a strategic assessment. Climate change should also be considered for surface water events; at the site-specific stage, the 100-year +40% should be considered as part of surface water drainage strategies, or surface water modelling. The current day 1,000-year surface water flooding extent provides an indication of the likely increase in extent of the more frequent surface water events. 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.

<p>Requirements for drainage control and impact mitigation</p>	<p>Broad scale assessment of possible SuDS</p>	<ul style="list-style-type: none"> • Geology at the site consists of: <ul style="list-style-type: none"> ○ Bedrock – Mercia Mudstone Group - mudstone ○ Superficial – Boundary • 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. Mapping also suggests that slopes may be unsuitable for selective source control techniques. • Mapping suggests that there is a high risk of groundwater flooding at this location, therefore it is likely infiltration techniques will not be suitable. This should be confirmed via site investigations to assess the potential for infiltration. • "This option is unlikely to be feasible as mapping suggests mean site slopes are > 5%. Feasibility of such options should be assessed as part of a site specific assessment. If this feature is feasible a liner maybe required to prevent the egress of groundwater. • The site is considered to be highly susceptible to groundwater flooding. Groundwater flooding could occur at the surface which may flow to and pool within topographic low spots during very wet winters. Detention and attenuation features should be designed to prevent groundwater ingress from impacting hydraulic capacity and structural integrity. Additional site investigation work may be required to support the detailed design of the drainage system. This may include groundwater monitoring to demonstrate that a sufficient unsaturated zone has been provided above the highest occurring groundwater level. Below ground development such as basements are not appropriate at this site." • This option is unlikely to be feasible as mapping suggests mean site slopes are > 5%. Feasibility of such options should be assessed as part of a site specific assessment. If this feature is feasible it should be located where the depth to the water table is >1m, additionally a liner maybe required to prevent the egress of groundwater. • 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. A liner maybe required to prevent the egress of groundwater. • The site is not designated by the Environment Agency as previously being a landfill site • The site is not located within a Groundwater Source Protection Zone and there are no restrictions over the use of infiltration techniques with regard to groundwater quality.
<p>NPPF and planning implications</p>	<p>Exception Test requirements</p>	<p>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. Development should be steered away from the northern quarter of the site where the Flood Zones are present. The Exception test will need to be applied if:</p>

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	CLIF.1 [CLIF.C]
	Address	Clifford Chambers
	Area	2.06 hectares
	Current land use	Greenfield
	Proposed land use	Residential
		<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.

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. This site falls under these requirements.
- Consultation with the Local Authority, Local Lead Flood Authority and the Environment Agency should be undertaken at an early stage.
- All sources of flooding, particularly the risk of fluvial, surface water and groundwater flooding, should be considered as part of a site-specific Flood Risk Assessment.
- Flood risk needs to be considered for the lifetime of the development, accounting for climate change.
- Residual risk from potential structure blockages may need to be investigated and modelled in a FRA to confirm impacts and help inform finished flood levels.
- Any FRA should be carried out in line with the National Planning Policy Framework; Flood Risk and Coastal Change Planning Practice Guidance, Stratford on Avon District Council's Local Plan policies, the LLFA's (Warwickshire County Council) '[Surface Water Management Plan](#)' and '[Stratford on Avon District Core Strategy 2011 to 2031](#)'.
- The development should be designed using a sequential approach. Development must be in line with Table 3: flood risk vulnerability and Flood Zone compatibility of the NPPG.
- Development in FZ3 should be avoided and may require floodplain compensation; 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 and fluvial risk on Campden Road.
- 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.

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	CLIF.1 [CLIF.C]
	Address	Clifford Chambers
	Area	2.06 hectares
	Current land use	Greenfield
	Proposed land use	Residential
		<ul style="list-style-type: none"> • On site attenuation schemes would need to be tested against the 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 Warwickshire County Council's 'Surface Water Management Plan', Stratford on Avon District's 'Core Strategy 2011 to 2031' and the Level 1 SFRA for information on SuDS. • All development should adopt source control SuDS techniques to reduce the risk of frequent low impact flooding due to post development runoff. • SuDS should be designed to deliver multiple benefits including water quality, biodiversity, amenity, green infrastructure etc. Example features include swales, attenuation features, green roofs, rainwater capture and reuse and permeable paving. • Efforts should be made to limit runoff to greenfield rates and discharge rates from the site should not increase downstream flood risk. • 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. • 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.

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	CLIF.1 [CLIF.C]
	Address	Clifford Chambers
	Area	2.06 hectares
	Current land use	Greenfield
	Proposed land use	Residential
Key messages		<p>The site is likely to be suitable for development subject to:</p> <ul style="list-style-type: none"> • Development is steered to Flood Zone 1, away from the northern quarter of the site where there is Flood Zone 3 risk and areas of deep flooding in the lower topography of the floodplain. • Flood mitigation measures are implemented then they are tested to ensure that they will not displace water elsewhere. • Access should be considered along the B4632 as there is surface water risk in all events, although depths during these events are largely below 0.3m. • Space for green infrastructure should be considered in the areas of highest flood risk. • A site-specific FRA 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 on the site and to neighbouring properties. <p>Refer to the detailed 'guidance for developers' section for further information on the measures that are appropriate for this site</p>
Mapping Information		
The key datasets used to make planning recommendations regarding this site were 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; this is based on detailed modelling from the 1D-2D hydraulic modelling of the River Stour.	
Climate change	Climate change extents were available for the 2080s central, higher central and upper end scenarios uplifted from the 100-year event, from the River Stour model..	
Fluvial depth, velocity and hazard mapping	There is fluvial depth, velocity and hazard data available for the River Stour model as it is a 1D-2D model. The 100-year outputs are shown in the interactive mapping.	

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	CLIF.1 [CLIF.C]
	Address	Clifford Chambers
	Area	2.06 hectares
	Current land use	Greenfield
	Proposed land use	Residential
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 100-year event (considered to be medium risk) is taken Environment Agency's Risk of Flooding from Surface Water.

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	CLIF.2 [CLIF.D]			
	Address	Clifford Chambers			
	Area	3.41 hectares			
	Current land use	Greenfield			
	Proposed land use	Residential			
Sources of flood risk	Location of site within catchment	This site is located south of the urbanised area of Clifford Chambers. The site is in the lower catchment of the River Stour, just over 2.5km south east of where the Stour meets the River Avon. The site is 2 miles south of the Stratford-upon-Avon town and centrally located within the district. This area is in the middle of the Avon catchment.			
	Existing drainage features	The Environment Agency's Detailed River Network shows the River Stour flowing to the north of Clifford Chambers. At its closest point the river is 330m north of the site. It flows north west, diverging into two flows for several hundred meters before re-joining at Campden Road. The Stour then flows east for 2.5km to join the River Avon which flows south west from this confluence towards the Severn. There are no existing drainage features within the site.			
	Fluvial	Proportion of site at risk			
		FZ3b	FZ3a	FZ2	FZ1
		0%	0%	0%	100%
		Highest zone of risk (Risk of Flooding from Rivers and Sea)			
		N/A			
		<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%)</i>			
	Available data: The Environment Agency's (EA) Flood Zone mapping has been used in this assessment, which incorporates the River Stour modelling.				
	Flood characteristics: Modelling and Flood Zone data for this site show no fluvial risk to the site. This site is assessed in the L2 SFRA based on surface water flood risk.				
Surface Water	Proportion of site at risk (RoFfSW)				
	30-year	100-year	1,000-year		
	10%	18%	57%		
	Max depths (m)				
Below 0.3m	Below 0.3m	Between 0.3-0.9m			

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	CLIF.2 [CLIF.D]		
	Address	Clifford Chambers		
	Area	3.41 hectares		
	Current land use	Greenfield		
	Proposed land use	Residential		
		Max velocity (m/s)		
		Over 0.25m/s	Over 0.25m/s	Over 0.25m/s
		<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>Description of surface water flow paths: This site has been highlighted by the Parish Council for surface water flooding concerns. Risk of surface water flooding is present during every event at the site. The extents for these vary; however, the maximum velocity and depths of surface water flow paths is constant over the events, being greater than 0.25m/s and over 0.9m. For each event, flows get larger as does the proportion of the depth which is over 0.9m and flowing over 0.25m/s. For the 30-year event, the surface water flows are localised, in streams of ponding or smaller ponds across the north of the site. The greatest area of ponding is in the northern corner. The maximum depth is below 0.3m on the 30-year event, so fairly shallow. Overall, the 100-year extent and velocity are only slightly increased than the 30-year event, and the depth remains similar. The 1,000-year event, however, shows that the majority of the site will experience surface water flows below 0.3m in depth, with the entire western half being vulnerable to surface water flows, from a flow path originating to the south-west. The deepest point of these flows are shown in the northern corner.</p>		
	Reservoir	The site is not shown to be at risk of reservoir flooding from the available online maps.		

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	CLIF.2 [CLIF.D]		
	Address	Clifford Chambers		
	Area	3.41 hectares		
	Current land use	Greenfield		
	Proposed land use	Residential		
	Groundwater	<p>The EA's Areas Susceptible to Groundwater Flooding dataset, provided as 1km grid squares, shows the susceptibility of an area to groundwater flood emergence. The following comments can be made about groundwater flood risk:</p> <ul style="list-style-type: none"> • The majority of the site has greater than 75% susceptibility to groundwater flood emergence. • The south eastern quarter of the site has less than 25% susceptibility to groundwater flood emergence. <p>JBA's Groundwater Mapping dataset provides a more detailed understanding of groundwater risk. At this site, it shows for the entire site to have groundwater between 0.5m and 5m below the surface. This suggest groundwater flooding risk is not as high as suggested by the EA's Areas Susceptible to Groundwater Flooding dataset.</p> <p>This assessment does not negate the requirement that an appropriate assessment of the groundwater regime should be carried out at the site-specific Flood Risk Assessment (FRA) stage.</p>		
	Flood history	<p>The main risk from this site and the driver for a Level 2 assessment is historic flooding at the site and nearby. The Environment Agency's Historic Flood Map, provided as 1km grid squares, shows one incidence of recorded flooding in the eastern portion of the site and 7 in the western half. Only the lower south east quarter has no recorded history of flooding.</p>		
Flood risk management infrastructure	Defences	Defence Type	Standard of Protection	Condition
		-	-	-
		This site is not protected by any formal flood defences.		
	Residual risk	There are no obvious residual risks to the site. A site-specific risk assessment is recommended to investigate these potential risks further.		
	Flood warning	The site is not covered by the Environment Agency's Flood Warning Service as it is not at fluvial risk.		

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	CLIF.2 [CLIF.D]
	Address	Clifford Chambers
	Area	3.41 hectares
	Current land use	Greenfield
	Proposed land use	Residential
Emergency planning	Access and egress	Access and egress at this site are possible via The Nashes (a residential road). This road is shown to have some vulnerability to surface water flows during the 1,000-year event (low risk). Consideration should be given to crossing the surface water flow path from the east of the site to reach the access roads, though this is most severe in the 1,000-year extreme event. A site-specific Flood Risk Assessment should be undertaken to evaluate accessibility to pedestrians and vehicles at this access point.
Climate Change	Implications for the site	<ul style="list-style-type: none"> Climate change modelling shows that there is no effect on fluvial flooding to the site. Climate change should also be considered for surface water events; at the site-specific stage, the 100-year +40% should be considered as part of surface water drainage strategies, or surface water modelling. The current day 1,000-year surface water flooding extent provides an indication of the likely increase in extent of the more frequent surface water events. This shows that a significant proportion of the site could be susceptible to surface water flood risk accounting for climate change. 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.

<p>Requirements for drainage control and impact mitigation</p>	<p>Broad scale assessment of possible SuDS</p>	<ul style="list-style-type: none"> • Geology at the site consists of: <ul style="list-style-type: none"> ○ Bedrock – Mercia Mudstone – Mudstone ○ Superficial – Boundary • 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. • Mapping suggests that there is a high risk of groundwater flooding at this location, therefore it is likely infiltration techniques will not be suitable. This should be confirmed via site investigations to assess the potential for infiltration. • "This option is unlikely to be feasible as mapping suggests mean site slopes are > 5%. Feasibility of such options should be assessed as part of a site specific assessment. If this feature is feasible a liner maybe required to prevent the egress of groundwater. • The site is considered to be highly susceptible to groundwater flooding. Groundwater flooding could occur at the surface which may flow to and pool within topographic low spots during very wet winters. Detention and attenuation features should be designed to prevent groundwater ingress from impacting hydraulic capacity and structural integrity. Additional site investigation work may be required to support the detailed design of the drainage system. This may include groundwater monitoring to demonstrate that a sufficient unsaturated zone has been provided above the highest occurring groundwater level. Below ground development such as basements are not appropriate at this site." • This feature is probably suitable provided site slopes are <5% and the depth to the water table is >1m. A liner maybe required to prevent the egress of groundwater. • 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. A liner maybe required to prevent the egress of groundwater. • The site is not designated by the Environment Agency as previously being a landfill site. • The site is not located within a Groundwater Source Protection Zone and there are no restrictions over the use of infiltration techniques with regard to groundwater quality.
<p>NPPF and planning implications</p>	<p>Exception Test requirements</p>	<p>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. There is no Exception Test requirement as there are no Flood Zones present at the site. The Council should consider the surface water risk posed to the site though, in the sequential approach to site planning.</p>
	<p>Requirements and guidance for site-specific</p>	<p>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 or is greater than one hectare. This site falls under these requirements.

	<p>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. • 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. • Flood risk needs to be considered for the lifetime of the development, accounting for climate change. • Any FRA should be carried out in line with the National Planning Policy Framework; Flood Risk and Coastal Change Planning Practice Guidance, Stratford on Avon District Council's Local Plan policies, the LLFA's (Warwickshire County Council) 'Surface Water Management Plan' and 'Stratford on Avon District Core Strategy 2011 to 2031'. • The development should be designed using a sequential approach. Development must be in line with Table 3: flood risk vulnerability and flood zone compatibility of the NPPG. <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). • Safe access and egress will need to be demonstrated in the 1 in 100-year plus climate change 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 risk on The Nashes. • 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 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 Warwickshire County Council's 'Surface Water Management Plan', Stratford
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Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	CLIF.2 [CLIF.D]
	Address	Clifford Chambers
	Area	3.41 hectares
	Current land use	Greenfield
	Proposed land use	Residential
		<p>on Avon District's 'Core Strategy 2011 to 2031' and the Level 1 SFRA for information on SuDS.</p> <ul style="list-style-type: none"> • All development should adopt source control SuDS techniques to reduce the risk of frequent low impact flooding due to post development runoff. • SuDS should be designed to deliver multiple benefits including water quality, biodiversity, amenity, green infrastructure etc. Example features include swales, attenuation features, green roofs, rainwater capture and reuse and permeable paving. • Efforts should be made to limit runoff to greenfield rates and discharge rates from the site should not increase downstream flood risk. • 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. • Green infrastructure should be considered within the mitigation measures for surface water runoff from potential development and consider using as public open space.

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	CLIF.2 [CLIF.D]
	Address	Clifford Chambers
	Area	3.41 hectares
	Current land use	Greenfield
	Proposed land use	Residential
Key messages	<p>The site is likely to be suitable for development subject to:</p> <ul style="list-style-type: none"> • Development can be steered away from the northern portion of the site, which is at risk in all surface water events, and is the deepest part of the site for ponding. • Consideration is given to the 1,000-year surface water extent representing climate change impacts. • Access and egress is investigated where surface water affects all nearby small roads and half of the site in the 1,000-year event, though the 30-year and 100-year event show access to be more suitable. • Flood mitigation measures are implemented then they are tested to ensure that they will not displace water elsewhere. • Space for green infrastructure should be considered in the areas of highest flood risk. • A site-specific FRA 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 on the site and to neighbouring properties. <p>Refer to the detailed 'guidance for developers' section for further information on the measures that are appropriate for this site</p>	
Mapping Information		
<p>The key datasets used to make planning recommendations regarding this site were 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.</p>		
Flood Zones	<p>Flood Zones 2 and 3 have been taken from the Environment Agency's Flood Map for Planning; this is based on detailed modelling 1D-2D hydraulic modelling of the River Stour. This site is not at fluvial flood risk.</p>	
Climate change	<p>Climate change extents were available for the 2080s central, higher central and upper end scenarios using the River Stour model. The site is not at fluvial flood risk. The 1,000-year surface water flood extent has been used as an indication of climate change impacts.</p>	

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	CLIF.2 [CLIF.D]
	Address	Clifford Chambers
	Area	3.41 hectares
	Current land use	Greenfield
	Proposed land use	Residential
Fluvial depth, velocity and hazard mapping		There is fluvial depth, velocity and hazard data available for the River Stour model as it is a 1D-2D model, though this does not affect the site.
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 100-year event (considered to be medium risk) is taken Environment Agency's Risk of Flooding from Surface Water.

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	FEN.2			
	Address	Fenny Compton			
	Area	0.69 hectares			
	Current land use	Greenfield			
	Proposed land use	Residential			
Sources of flood risk	Location of site within catchment	This site is located close to the south eastern boundary of the Stratford-on-Avon District, south west of the Oxford Canal. The site lies between the M40 and A423, to the north of Fenny Compton's urbanised area. The site falls within the middle of the River Avon catchment.			
	Existing drainage features	The Environment Agency's Detailed River Network shows an ordinary watercourse flowing 100m from the eastern border of the site. This flows north to join another unnamed watercourse before flowing north west. There are no further drainage features in the site.			
	Fluvial	Proportion of site at risk			
		FZ3b	FZ3a	FZ2	FZ1
		0%	0%	0%	100%
		Highest zone of risk (Risk of Flooding from Rivers and Sea)			
		N/A			
		<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%)</i>			
	Available data:	The Environment Agency's (EA) Flood Zone mapping has been used in this assessment. There are no Flood Zones at the site as the catchment is <3km ² .			
	Flood characteristics:	There are no Flood Zones present at the site. It is currently unknown whether the ordinary watercourse to the east of the site would affect the site in terms of fluvial flood risk. The floodplain elevations are lowest in the eastern end of the site. A detailed hydraulic model, assessing the fluvial risk from the unnamed ordinary watercourse is recommended as part of the site-specific Flood Risk Assessment.			
Surface Water	Proportion of site at risk (RoFfSW)				
	30-year	100-year	1,000-year		
	2%	12%	52%		
	Max depths (m)				
0.3-0.9m	0.3-0.9m	0.3-0.9m			

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	FEN.2		
	Address	Fenny Compton		
	Area	0.69 hectares		
	Current land use	Greenfield		
	Proposed land use	Residential		
		Max velocity (m/s)		
		Over 2.5m/s	Over 2.5m/s	Over 2.5m/s
		<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>Description of surface water flow paths:</p> <p>This site has been evaluated as part of the Level 2 assessment due to surface water related risk concerns as brought forward by the Parish Council.</p> <p>Risk of Flooding from Surface Water data for this site shows flow paths in all 30, 100 and 1,000-year extents. Surface water risks are largely in the 1,000-year extents only. In the 30-year event, surface water risks only exist along the eastern boundary and extend beyond the boundary line towards the north eastern corner, which is a flow path from the confluence of two drains shortly upstream (south-west of the site) flowing along a narrow topographic route north-east towards the watercourse meander at Station Road. In the 100-year event, this flow path extends slightly further into the site in the north-eastern and southern corners. In the 1,000-year event most the of the site is at risk, with a central section and a section in the north west not having any risk.</p> <p>In all events the highest velocity is over 2.5m/s. For the 1,000-year event, this is across the entire site, the proportion decreases for the 100-year events and in the 30-year event only parts of the flow along the boundary have this velocity. The maximum depths follow a similar trend, as the majority of the site has depths between 0.3-0.9m in the 1,000-year event and the proportion of this decreases to a very small section of ponding in the 30-year events.</p>		
	Reservoir	The site is not shown to be at risk of reservoir flooding from the available online maps.		

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	FEN.2								
	Address	Fenny Compton								
	Area	0.69 hectares								
	Current land use	Greenfield								
	Proposed land use	Residential								
	Groundwater	<p>The EA's Areas Susceptible to Groundwater Flooding dataset, provided as 1km grid squares, shows the susceptibility of an area to groundwater flood emergence. The following comment can be made about groundwater flood risk:</p> <ul style="list-style-type: none"> The entire site is shown to have no susceptibility to groundwater flood emergence <p>JBA's Groundwater Mapping dataset shows that the whole site has 'no risk' and therefore, groundwater is more than 5m below the surface. This suggests groundwater is unlikely to emerge at the surface locally.</p> <p>This assessment does not negate the requirement that an appropriate assessment of the groundwater regime should be carried out at the site-specific Flood Risk Assessment (FRA) stage.</p>								
	Flood history	This site has been highlighted for its flood history and risk of surface water flooding concerns. There are 10 incidents recorded at the site in the Environment Agency's Historic Flood Map, provided as 1km squares.								
Flood risk management infrastructure	Defences	<table border="1"> <thead> <tr> <th>Defence Type</th> <th>Standard of Protection</th> <th>Condition</th> </tr> </thead> <tbody> <tr> <td>-</td> <td>-</td> <td>-</td> </tr> </tbody> </table>	Defence Type	Standard of Protection	Condition	-	-	-	This site is not protected by any formal flood defences.	
		Defence Type	Standard of Protection	Condition						
-	-	-								
Residual risk	There are several culverts on the unnamed watercourse just east of the site, with several further upstream. As the topography of the site is very low from the culverts at Memorial Road and Brook Street and the surface water flow path shows a low route along these roads to the site boundary, if these were to block, there could be an impact at the site. A site-specific flood risk assessment is recommended to firstly understand fluvial flood risk posed to the site from the watercourse, and secondly to investigate potential residual risks further.									
	Flood warning	The site is not covered by the Environment Agency's Flood Warning Service.								

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	FEN.2
	Address	Fenny Compton
	Area	0.69 hectares
	Current land use	Greenfield
	Proposed land use	Residential
Emergency planning	Access and egress	<p>Access and egress at this site is possible via two unnamed road that lead off of Northend Road towards a commercial area. These roads form the eastern and western boundary for the site. Northend Road itself is affected by surface water flows in the 100-year and 1,000-year events; however, the unnamed road on the western border remains unaffected in all events. The eastern boundary should be avoided as this is the main surface water flow path in all events and access should be steered to the north west. A site-specific Flood Risk Assessment should be undertaken to evaluate accessibility from Northend Road.</p>
Climate Change	Implications for the site	<ul style="list-style-type: none"> 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 the catchment is not represented by the EA's Flood Zones due to its small size. This would need to be investigated in a site-specific FRA. For this assessment, the 1,000-year surface water extent can be used as an indication. Climate change should also be considered for surface water events; at the site-specific stage, the 100-year +40% should be considered as part of surface water drainage strategies, or surface water modelling. The current day 1,000-year surface water flooding extent provides an indication of the likely increase in extent of the more frequent surface water events. This shows that a large proportion of the site could be susceptible to risk with climate change. 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.

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	FEN.2
	Address	Fenny Compton
	Area	0.69 hectares
	Current land use	Greenfield
	Proposed land use	Residential
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 – Charmouth Mudstone formation – mudstone ○ Superficial – None recorded • All forms of source control are likely to be suitable. 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. • 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. • The site is not located within a Groundwater Source Protection Zone and there are no restrictions over the use of infiltration techniques with regard to groundwater quality.

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	FEN.2
	Address	Fenny Compton
	Area	0.69 hectares
	Current land use	Greenfield
	Proposed land use	Residential
NPPF and planning implications	Exception Test requirements	<p>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'.</p> <p>It is recommended that proposed development will be sequentially located within Flood Zone 1 areas of the site, which at present allows the site to pass the Exception Test as there is no data available. Fluvial flood risk to the site will need to be confirmed in a detailed hydraulic model, to determine whether the site would actually be at risk. The Council should also consider the surface water risk to the site given this is potentially the higher risk.</p>

	<p>Requirements and guidance for site-specific Flood Risk Assessment</p>	<p>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 or is greater than one hectare. This site does not fall under these requirements. • Consultation with the Local Authority, Local Lead Flood Authority and the Environment Agency should be undertaken at an early stage. • All sources of flooding, particularly the risk of fluvial, surface water and groundwater flooding, should be considered as part of a site-specific Flood Risk Assessment. • Flood risk needs to be considered for the lifetime of the development, accounting for climate change. • Fluvial flood risk to the site should be confirmed at the site-specific FRA stage, by detailed hydraulic modelling. This would confirm the Flood Zones, impacts from climate change and any residual risks from blockages to nearby culverts, given the nature of the specific topographic flow routes around the site. • Any FRA should be carried out in line with the National Planning Policy Framework; Flood Risk and Coastal Change Planning Practice Guidance, Stratford on Avon District Council's Local Plan policies, the LLFA's (Warwickshire County Council) 'Surface Water Management Plan' and 'Stratford on Avon District Core Strategy 2011 to 2031'. • The development should be designed using a sequential approach. Development must be in line with Table 3: flood risk vulnerability and flood zone compatibility of the NPPG. <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). • 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 on Northend Road (access point). • 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.
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Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	FEN.2
	Address	Fenny Compton
	Area	0.69 hectares
	Current land use	Greenfield
	Proposed land use	Residential
		<ul style="list-style-type: none"> • On site attenuation schemes would need to be tested against the 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 Warwickshire County Council's 'Surface Water Management Plan', Stratford on Avon District's 'Core Strategy 2011 to 2031' and the Level 1 SFRA for information on SuDS. • All development should adopt source control SuDS techniques to reduce the risk of frequent low impact flooding due to post development runoff. • SuDS should be designed to deliver multiple benefits including water quality, biodiversity, amenity, green infrastructure etc. Example features include swales, attenuation features, green roofs, rainwater capture and reuse and permeable paving. • Efforts should be made to limit runoff to greenfield rates and discharge rates from the site should not increase downstream flood risk. • 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. • 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.

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	FEN.2
	Address	Fenny Compton
	Area	0.69 hectares
	Current land use	Greenfield
	Proposed land use	Residential
Key messages		<p>The site is likely to be suitable for development subject to:</p> <ul style="list-style-type: none"> • Fluvial flood risk is confirmed in a hydraulic model, and the development is steered away from any risk shown to the site, likely to be around the eastern boundary. • Development should be steered towards the centre and west fo the site, away from the main surface water flow path along the eastern boundary. If development is placed within a flow path/ conveyance route, this can displace water elsewhere in the site or to third party land. • The 1,000-year extents are an indication of climate change impacts. • Safe access and egress needs to be considered and the impacts of surface water flooding to Bridge Street and Brook Street (steering access to Northend Road from the western/ northern ends of the site). • If flood mitigation measures are implemented then they are tested to ensure that they will not displace water elsewhere. • Space for green infrastructure should be considered in the areas of highest flood risk. • A site-specific FRA 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 on the site and to neighbouring properties. <p>Refer to the detailed 'guidance for developers' section for further information on the measures that are appropriate for this site</p>
Mapping Information		
<p>The key datasets used to make planning recommendations regarding this site were 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.</p>		
Flood Zones	<p>Flood Zones 2 and 3 have been taken from the Environment Agency's Flood Map for Planning; there are no Flood Zones at the site as the catchment is <3km2. A detailed model should be constructed at site-level FRA stage to confirm risk.</p>	

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	FEN.2
	Address	Fenny Compton
	Area	0.69 hectares
	Current land use	Greenfield
	Proposed land use	Residential
Climate change		Climate change mapping was unavailable for this area. In the absence of Flood Zone 2 as an indication of fluvial climate change, the 1,000-year surface water flooding event was used as an indicative climate change scenario. 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 data; therefore, the Risk of Flooding from Surface Water mapping has been used as this represents the floodplains of small 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 100-year event (considered to be medium risk) is taken Environment Agency's Risk of Flooding from Surface Water.

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	FEN.4			
	Address	Fenny Compton			
	Area	0.31 hectares			
	Current land use	Greenfield			
	Proposed land use	Residential			
Sources of flood risk	Location of site within catchment	This site is located close to the south eastern boundary of the Stratford-on-Avon District, south west of the Oxford Canal. The site lies between the M40 and A423, to the north of Fenny Compton's urbanised area. The site falls within the middle of the River Avon catchment.			
	Existing drainage features	The Environment Agency's Detailed River Network shows an ordinary watercourse forming the western border of the site. This flows north to join another unnamed water course before flowing north west. There are no further drainage features in the site.			
	Fluvial	Proportion of site at risk			
		FZ3b	FZ3a	FZ2	FZ1
		0%	0%	0%	100%
		Highest zone of risk (Risk of Flooding from Rivers and Sea)			
		N/A			
		<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%)</i>			
	Available data:	The Environment Agency's (EA) Flood Zone mapping has been used in this assessment. There are no Flood Zones at the site as the catchment is <3km ² .			
	Flood characteristics:	There are no Flood Zones present at the site as the catchment is smaller than those represented in the EA's Flood Zones; however, as the ordinary watercourse's right bank flows along the site's western boundary, there will be some flood risk associated with this. A small drain also feeds into this channel's left bank along the boundary of the site. A detailed hydraulic model, assessing the fluvial risk from the unnamed ordinary watercourse is recommended as part of the site-specific Flood Risk Assessment. The surface water dataset can be used as an indication of risk in the absence of any data.			
Surface Water	Proportion of site at risk (RoFfSW)				
	30-year	100-year	1,000-year		

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	FEN.4		
	Address	Fenny Compton		
	Area	0.31 hectares		
	Current land use	Greenfield		
	Proposed land use	Residential		
		5%	11%	43%
		Max depths (m)		
		0.3-0.9m	0.3-0.9m	0.3-0.9m
		Max velocity (m/s)		
		Over 2.5m/s	Over 2.5m/s	Over 2.5m/s
		<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>		
		Description of surface water flow paths:		
		This site has been evaluated as part of the Level 2 assessment due to surface water related risk concerns.		
		Risk of Flooding from Surface Water data for this site shows flow paths in all 30, 100 and 1,000-year extents. Surface water risks are largely of the 1,000-year extents only.		
		In the 30-year event, surface water risks only exist along the northern boundary and extend beyond the boundary line in the north eastern corner, which is from High Street and the watercourse floodplain. In the 100-year event, these flow paths are slightly extended but remain around the boundaries. In the 1,000-year event a significantly larger proportion of the site is at risk, with surface water flows extending eastwards into the site from the western boundary where the channel bounds, flooding the western half of the site.		
	In all events the highest velocity is over 2.5m/s as the site is bounded by the channel. For the 1,000-year event, this is across the entire site, the proportion decreases for the 100-year event and in the 30-year event only parts of the flow along the boundary have this velocity. The maximum depths follow a similar trend, as the majority of the site has depths between 0.3-0.9m in the 1,000-year event and the proportion of this decreases to a very small section of ponding in the 30-year events.			
	Reservoir	The site is not shown to be at risk of reservoir flooding from the available online maps.		

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	FEN.4								
	Address	Fenny Compton								
	Area	0.31 hectares								
	Current land use	Greenfield								
	Proposed land use	Residential								
	Groundwater	<p>The EA's Areas Susceptible to Groundwater Flooding dataset, provided as 1km grid squares, shows the susceptibility of an area to groundwater flood emergence. The following comment can be made about groundwater flood risk:</p> <ul style="list-style-type: none"> The entire site is shown to have no susceptibility to groundwater flood emergence <p>JBA's Groundwater Mapping dataset shows that the whole site has 'no risk' and therefore, groundwater is more than 5m below the surface. This suggests groundwater is unlikely to emerge at the surface locally.</p> <p>This assessment does not negate the requirement that an appropriate assessment of the groundwater regime should be carried out at the site-specific Flood Risk Assessment (FRA) stage.</p>								
	Flood history	This site has been highlighted for its flood history. There is one incident of recorded flooding at the site in the Environment Agency's Historic Flood Map, provided as 1km squares.								
Flood risk management infrastructure	Defences	<table border="1"> <thead> <tr> <th>Defence Type</th> <th>Standard of Protection</th> <th>Condition</th> </tr> </thead> <tbody> <tr> <td>-</td> <td>-</td> <td>-</td> </tr> </tbody> </table>	Defence Type	Standard of Protection	Condition	-	-	-		
		Defence Type	Standard of Protection	Condition						
-	-	-								
		This site is not protected by any formal flood defences.								
	Residual risk	<p>There is a small culvert on the south western corner of the site. As the topography of the site is very low and adjacent to the channel, a blockage to this culvert could increase flood risk in the site in the south-western corner.</p> <p>A site-specific risk assessment is recommended to investigate potential risks further.</p>								
Emergency planning	Flood warning	The site is not covered by the Environment Agency's Flood Warning Service.								
	Access and egress	Access and egress at this site are possible via High Street, which forms the eastern border of the site. High Street is affected by surface water flows to differing extents in all events. A site-specific Flood Risk Assessment should be undertaken to evaluate accessibility from High Street.								

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	FEN.4
	Address	Fenny Compton
	Area	0.31 hectares
	Current land use	Greenfield
	Proposed land use	Residential
Climate Change	Implications for the site	<ul style="list-style-type: none"> • 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 the catchment is not represented by the EA's Flood Zones due to its small size. This would need to be investigated in a site-specific FRA. For this assessment, the 1,000-year surface water extent can be used as an indication. • Climate change should also be considered for surface water events; at the site-specific stage, the 100-year +40% should be considered as part of surface water drainage strategies, or surface water modelling. • The current day 1,000-year surface water flooding extent provides an indication of the likely increase in extent of the more frequent surface water events. This shows risk to the western half of the site. 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.

<p>Requirements for drainage control and impact mitigation</p>	<p>Broad scale assessment of possible SuDS</p>	<ul style="list-style-type: none"> • Geology at the site consists of: <ul style="list-style-type: none"> ○ Bedrock – Charmouth mudstone formation - mudstone ○ Superficial – none recorded • Most source control techniques are likely to be suitable. Mapping suggests that slopes may be unsuitable for selective source control techniques. 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. • 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. • "This option is unlikely to be feasible as mapping suggests mean site slopes are > 5%. Feasibility of such options should be assessed as part of a site specific assessment. If this feature is feasible a liner maybe required to prevent the egress of groundwater. • The site is considered to be highly susceptible to groundwater flooding. Groundwater flooding could occur at the surface which may flow to and pool within topographic low spots during very wet winters. Detention and attenuation features should be designed to prevent groundwater ingress from impacting hydraulic capacity and structural integrity. Additional site investigation work may be required to support the detailed design of the drainage system. This may include groundwater monitoring to demonstrate that a sufficient unsaturated zone has been provided above the highest occurring groundwater level. Below ground development such as basements are not appropriate at this site." • This option is unlikely to be feasible as mapping suggests mean site slopes are > 5%. Feasibility of such options should be assessed as part of a site specific assessment. If this feature is feasible it should be located where the depth to the water table is >1m. • 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. • The site is not designated by the Environment Agency as previously being a landfill site. • The site is not located within a Groundwater Source Protection Zone and there are no restrictions over the use of infiltration techniques with regard to groundwater quality.
<p>NPPF and planning implications</p>	<p>Exception Test requirements</p>	<p>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, which at present allows the site to pass the Exception Test as there is no data available. Fluvial flood risk to the site will need to be confirmed in a detailed hydraulic model, to determine the Flood</p>

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	FEN.4
	Address	Fenny Compton
	Area	0.31 hectares
	Current land use	Greenfield
	Proposed land use	Residential
		Zones and impacts given the western site boundary is a watercourse. The Council should also consider the surface water risk to the site given this is potentially the higher risk in the 1,000-year event.

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. This site does not fall under these requirements.
- Consultation with the Local Authority, Local Lead Flood Authority and the Environment Agency should be undertaken at an early stage.
- All sources of flooding, particularly the risk of fluvial, surface water and groundwater flooding, should be considered as part of a site-specific Flood Risk Assessment.
- Flood risk needs to be considered for the lifetime of the development, accounting for climate change.
- Fluvial flood risk to the site should be confirmed at the site-specific FRA stage, by detailed hydraulic modelling. This would confirm the Flood Zones, impacts from climate change and any residual risks from blockages to nearby culverts, given the nature of the specific topographic flow routes around the site.
- Any FRA should be carried out in line with the National Planning Policy Framework; Flood Risk and Coastal Change Planning Practice Guidance, Stratford on Avon District Council's Local Plan policies, the LLFA's (Warwickshire County Council) '[Surface Water Management Plan](#)' and '[Stratford on Avon District Core Strategy 2011 to 2031](#)'.
- The development should be designed using a sequential approach. Development must be in line with Table 3: flood risk vulnerability and flood zone compatibility of the NPPG.
- If a detailed model shows the western boundary to be in Flood Zone 3, development in FZ3b should be avoided unless appropriate use can be demonstrated in line with NPPF. 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 on High Street (access point).
- 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

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	FEN.4
	Address	Fenny Compton
	Area	0.31 hectares
	Current land use	Greenfield
	Proposed land use	Residential
		<p>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.</p> <ul style="list-style-type: none"> • On site attenuation schemes would need to be tested against the 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 Warwickshire County Council's 'Surface Water Management Plan', Stratford on Avon District's 'Core Strategy 2011 to 2031' and the Level 1 SFRA for information on SuDS. • All development should adopt source control SuDS techniques to reduce the risk of frequent low impact flooding due to post development runoff. • SuDS should be designed to deliver multiple benefits including water quality, biodiversity, amenity, green infrastructure etc. Example features include swales, attenuation features, green roofs, rainwater capture and reuse and permeable paving. • Efforts should be made to limit runoff to greenfield rates and discharge rates from the site should not increase downstream flood risk. • 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. • 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.

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	FEN.4
	Address	Fenny Compton
	Area	0.31 hectares
	Current land use	Greenfield
	Proposed land use	Residential
Key messages		<p>The site is likely to be suitable for development subject to:</p> <ul style="list-style-type: none"> • Fluvial flood risk is confirmed in a hydraulic model, and the development is steered away from any risk shown to the site, which will be along the western side where the channel forms the boundary. • Development should be steered towards the eastern half of the site, away from the watercourse and surface water flood risk. • The 1,000-year extents are an indication of climate change impacts. • Safe access and egress need to be considered and the impacts of surface water flooding to High Street. • If flood mitigation measures are implemented, then they are tested to ensure that they will not displace water elsewhere. • Space for green infrastructure should be considered in the areas of highest flood risk. • A site-specific FRA 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 on the site and to neighbouring properties. <p>Refer to the detailed 'guidance for developers' section for further information on the measures that are appropriate for this site</p>
Mapping Information		
<p>The key datasets used to make planning recommendations regarding this site were 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.</p>		
Flood Zones	<p>Flood Zones 2 and 3 have been taken from the Environment Agency's Flood Map for Planning; there are no Flood Zones at the site as the catchment is <3km². A detailed model should be constructed at site-level FRA stage to confirm risk.</p>	

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	FEN.4
	Address	Fenny Compton
	Area	0.31 hectares
	Current land use	Greenfield
	Proposed land use	Residential
Climate change	Climate change mapping was unavailable for this area. In the absence of Flood Zone 2 as an indication of fluvial climate change, the 1,000-year surface water flooding event was used as an indicative climate change scenario. 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 data; therefore, the Risk of Flooding from Surface Water mapping has been used as this represents the floodplains of small 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 100-year event (considered to be medium risk) is taken Environment Agency's Risk of Flooding from Surface Water.	

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	FEN.6			
	Address	Fenny Compton			
	Area	1.46 hectares			
	Current land use	Greenfield			
	Proposed land use	Residential			
Sources of flood risk	Location of site within catchment	This site is located close to the south eastern boundary of the Stratford-on-Avon District, south west of the Oxford Canal. The site lies between the M40 and A423, to the north of Fenny Compton's urbanised area. The site falls within the middle of the River Avon catchment.			
	Existing drainage features	The Environment Agency's Detailed River Network shows an ordinary watercourse forming the western border of the site. This flows north to join another unnamed watercourse before flowing north west. There are no further drainage features in the site.			
	Fluvial	Proportion of site at risk			
		FZ3b	FZ3a	FZ2	FZ1
		0%	0%	0%	100%
		Highest zone of risk (Risk of Flooding from Rivers and Sea)			
		N/A			
		<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%)</i>			
	Available data:	The Environment Agency's (EA) Flood Zone mapping has been used in this assessment. There are no Flood Zones at the site as the catchment is <3km ² .			
	Flood characteristics:	There are no Flood Zones present at the site as the catchment is smaller than those represented in the EA's Flood Zones; however, as the ordinary watercourse's right bank flows along the site's western boundary, there will be some flood risk associated with this. The channel meanders in the south-western corner, before turning to flow straight in a northerly direction. A detailed hydraulic model, assessing the fluvial risk from the unnamed ordinary watercourse is recommended as part of the site-specific Flood Risk Assessment. The surface water dataset can be used as an indication of risk in the absence of any data.			
Proportion of site at risk (RoFfSW)					

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	FEN.6		
	Address	Fenny Compton		
	Area	1.46 hectares		
	Current land use	Greenfield		
	Proposed land use	Residential		
Surface Water		30-year	100-year	1,000-year
		5%	8%	49%
		Max depths (m)		
		0.3m-0.9m	0.3m-0.9m	Over 0.9m
		Max velocity (m/s)		
		Over 2.5m/s	Over 2.5m/s	Over 2.5m/s
		<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>		
		Description of surface water flow paths:		
		<p>This site has been evaluated as part of the Level 2 assessment due to surface water related risk concerns.</p> <p>Risk of Flooding from Surface Water data for this site shows flow paths in all 30, 100 and 1,000-year extents. Surface water risks are largely of the 1,000-year extents only.</p> <p>In the 30-year event, surface water risks exist along the entire western boundary/ unnamed watercourse. An overland flow path from the south west joins the watercourse at the south-western boundary of the site. In the 100-year event, there is further localised ponding in the centre of the site.</p> <p>In the 1,000-year event, a large proportion of the site is at risk, with the largest flow extending from the south west across the site. A smaller flow extends from the south eastern corner but does not meet the main central flow. Only the northern quarter and south-eastern corner of the site remains unaffected in these events.</p> <p>In all events, the highest velocity is over 2.5m/s as the western boundary is along the channel. For all events this is true for all areas that experience surface water flows. The maximum depths decrease in proportion from the 1,000-year event to the 30-year event. The majority of the site has depths between 0.3-0.9m in the 1,000-year event, with a small area in the north western corner having depths over 0.9m. The proportion of flows being between 0.3-0.9m decreases to a very small section of ponding in the 30-year events.</p>		
		Reservoir	The site is not shown to be at risk of reservoir flooding from the available online maps.	

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	FEN.6		
	Address	Fenny Compton		
	Area	1.46 hectares		
	Current land use	Greenfield		
	Proposed land use	Residential		
	Groundwater	<p>The EA's Areas Susceptible to Groundwater Flooding dataset, provided as 1km grid squares, shows the susceptibility of an area to groundwater flood emergence. The following comment can be made about groundwater flood risk:</p> <ul style="list-style-type: none"> The entire site is shown to have no susceptibility to groundwater flood emergence <p>JBA's Groundwater Mapping dataset shows that the whole site has 'no risk' and therefore, groundwater is more than 5m below the surface. This suggests groundwater is unlikely to emerge at the surface locally.</p> <p>This assessment does not negate the requirement that an appropriate assessment of the groundwater regime should be carried out at the site-specific Flood Risk Assessment (FRA) stage.</p>		
	Flood history	<p>This site has been highlighted for its flood history. There is one incident of recorded flooding in the half of the site along the western boundary/ ordinary watercourse, as shown in the Environment Agency's Historic Flood Map, provided as 1km squares.</p>		
Flood risk management infrastructure	Defences	Defence Type	Standard of Protection	Condition
		-	-	-
	Residual risk	<p>This site is not protected by any formal flood defences.</p> <p>There are several culverts on the unnamed watercourse just south of the site. Although, these culverts are not directly on the boundary itself and appear to have a low impact on the site, a site-specific risk assessment is recommended to investigate potential risks further.</p>		
Emergency planning	Flood warning	<p>The site is not covered by the Environment Agency's Flood Warning Service.</p>		
	Access and egress	<p>Access and egress at this site are possible on the corner of High Street/Station Road and from Berry Meadow, in the south eastern corner of the site. Risk is largely confined to the 1,000-year event here, and if access is steered to the east along Station Road, this avoids an area at risk in the 30-year event on the bend of High Street/ Station Street. A site-specific Flood Risk Assessment should be undertaken to evaluate accessibility from High Street/Station Road and Berry Meadow.</p>		

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	FEN.6
	Address	Fenny Compton
	Area	1.46 hectares
	Current land use	Greenfield
	Proposed land use	Residential
Climate Change	Implications for the site	<ul style="list-style-type: none"> • 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 the catchment is not represented by the EA's Flood Zones due to the small catchment size. This would need to be investigated in a site-specific FRA. For this assessment, the 1,000-year surface water extent can be used as an indication. • Climate change should also be considered for surface water events; at the site-specific stage, the 100-year +40% should be considered as part of surface water drainage strategies, or surface water modelling. • The current day 1,000-year surface water flooding extent provides an indication of the likely increase in extent of the more frequent surface water events. This shows risk to a large proportion of the middle of the site and western edge. 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.

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	FEN.6
	Address	Fenny Compton
	Area	1.46 hectares
	Current land use	Greenfield
	Proposed land use	Residential
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 – Charmouth Mudstone Formation - Mudstone. ○ Superficial – None recorded • All forms of source control are likely to be suitable. 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. • 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. • The site is not located within a Groundwater Source Protection Zone and there are no restrictions over the use of infiltration techniques with regard to groundwater quality.

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	FEN.6
	Address	Fenny Compton
	Area	1.46 hectares
	Current land use	Greenfield
	Proposed land use	Residential
NPPF and planning implications	Exception Test requirements	<p>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'.</p> <p>It is recommended that proposed development will be sequentially located within Flood Zone 1 areas of the site, which at present allows the site to pass the Exception Test as there is no data available. Fluvial flood risk to the site will need to be confirmed in a detailed hydraulic model, to determine the Flood Zones and impacts given the western site boundary is a watercourse. The Council should also consider the surface water risk to the site given this is potentially the higher risk in the 1,000-year event.</p>

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. This site falls under these requirements due to its size.
- Consultation with the Local Authority, Local Lead Flood Authority and the Environment Agency should be undertaken at an early stage.
- All sources of flooding, particularly the risk of fluvial, surface water and groundwater flooding, should be considered as part of a site-specific Flood Risk Assessment.
- Fluvial flood risk to the site should be confirmed at the site-specific FRA stage, by detailed hydraulic modelling. This would confirm the Flood Zones, impacts from climate change and any residual risks from blockages to nearby culverts, given the nature of the specific topographic flow routes around the site.
- Flood risk needs to be considered for the lifetime of the development, accounting for climate change.
- Any FRA should be carried out in line with the National Planning Policy Framework; Flood Risk and Coastal Change Planning Practice Guidance, Stratford on Avon District Council's Local Plan policies, the LLFA's (Warwickshire County Council) '[Surface Water Management Plan](#)' and '[Stratford on Avon District Core Strategy 2011 to 2031](#)'.
- The development should be designed using a sequential approach. Development should be steered away from areas of fluvial flood risk flow routes on the western boundary, preserving this as green infrastructure. Development must be in line with Table 3: flood risk vulnerability and flood zone compatibility of the NPPG.
- If a detailed model shows the western boundary to be in Flood Zone 3, development in FZ3b should be avoided unless appropriate use can be demonstrated in line with NPPF. 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 on High Street/Station Road and Berry Meadow (access points).
- 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.

		<ul style="list-style-type: none"> • 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 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 Warwickshire County Council's 'Surface Water Management Plan', Stratford on Avon District's 'Core Strategy 2011 to 2031' and the Level 1 SFRA for information on SuDS. • All development should adopt source control SuDS techniques to reduce the risk of frequent low impact flooding due to post development runoff. • SuDS should be designed to deliver multiple benefits including water quality, biodiversity, amenity, green infrastructure etc. Example features include swales, attenuation features, green roofs, rainwater capture and reuse and permeable paving. • Efforts should be made to limit runoff to greenfield rates and discharge rates from the site should not increase downstream flood risk. • 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. • 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		<p>The site is likely to be suitable for development subject to:</p> <ul style="list-style-type: none"> • Fluvial flood risk is confirmed in a hydraulic model, and the development is steered away from any risk shown to the site, which will be along the western side where the channel forms the boundary. • Development should be steered towards the northern half of the site and to the south east, away from the watercourse and surface water flood risk. • The 1,000-year extents are an indication of climate change impacts. • Safe access and egress need to be considered and the impacts of surface water flooding to High Street/Station Road and Berry Meadow. • If flood mitigation measures are implemented then they are tested to ensure that they will not displace water elsewhere.

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	FEN.6
	Address	Fenny Compton
	Area	1.46 hectares
	Current land use	Greenfield
	Proposed land use	Residential
		<ul style="list-style-type: none"> Space for green infrastructure should be considered in the areas of highest flood risk. A site-specific FRA 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 on the site and to neighbouring properties. <p>Refer to the detailed 'guidance for developers' section for further information on the measures that are appropriate for this site</p>
Mapping Information		
The key datasets used to make planning recommendations regarding this site were 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; there are no Flood Zones at the site as the catchment is <3km ² . A detailed model should be constructed at site-level FRA stage to confirm risk.	
Climate change	Climate change mapping was unavailable for this area. In the absence of Flood Zone 2 as an indication of fluvial climate change, the 1,000-year surface water flooding event was used as an indicative climate change scenario. 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 data; therefore, the Risk of Flooding from Surface Water mapping has been used as this represents the floodplains of small 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 100-year event (considered to be medium risk) is taken Environment Agency's Risk of Flooding from Surface Water.	

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	FEN.12[FEN.A]			
	Address	Fenny Compton			
	Area	0.31 hectares			
	Current land use	Greenfield			
	Proposed land use	Residential			
Sources of flood risk	Location of site within catchment	This site is located close to the south eastern boundary of the Stratford-on-Avon District, south west of the Oxford Canal. The site lies between the M40 and A423, to the north of Fenny Compton's urbanised area. The site falls within the middle of the River Avon catchment.			
	Existing drainage features	The Environment Agency's Detailed River Network shows an ordinary watercourse flowing 300m from the western border of the site. This flows north to join another unnamed water course before flowing north west. There are no further drainage features in the site.			
	Fluvial	Proportion of site at risk			
		FZ3b	FZ3a	FZ2	FZ1
		0%	0%	0%	100%
		Highest zone of risk (Risk of Flooding from Rivers and Sea)			
		N/A			
		<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%)</i>			
	Available data: The Environment Agency's (EA) Flood Zone mapping has been used in this assessment. There are no Flood Zones at the site as the site is not at fluvial risk.				
	Flood characteristics: There are no Flood Zones present at the site but from inspecting mapping and topography, the site is not deemed to be at fluvial risk as it is situated far from the channel and up on higher than floodplain elevations, at the base of a hill. The site has been assessed based on surface water flood risk,				
Surface Water	Proportion of site at risk (RoFfSW)				
	30-year	100-year	1,000-year		
	0%	2%	52%		
	Max depths (m)				
	N/A	Below 0.3m	0.3m-0.9m		
Max velocity (m/s)					

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	FEN.12[FEN.A]		
	Address	Fenny Compton		
	Area	0.31 hectares		
	Current land use	Greenfield		
	Proposed land use	Residential		
		N/A	Over 2.5m/s	Over 2.5m/s
		<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>Description of surface water flow paths:</p> <p>This site has been evaluated as part of the Level 2 assessment due to surface water related risk concerns as brought forward by the Parish Council.</p> <p>Risk of Flooding from Surface Water data for this site shows flow paths in the 100 and 1,000-year extents. Surface water risks are largely in the 1,000-year extents only. In the 100-year event, there is a localised, small flow from the north western corner along the northern boundary of the site. This is largely below 0.3m, with some small areas having higher depths.</p> <p>In the 1,000-year event more than half of the site is at risk. Surface water flows extend from the south-west (along the north-western boundary) and from the hill to the south east, flowing in a north-westerly direction through the middle of the site bisecting it, converging at the northern tip, before continuing to flow down Ridge Way towards Station Road/ the floodplain. . These flows in the site are mostly below 0.3m, with only the north western corner having higher depths. All flows present in the site at both 100-year and 1,000-year events are over 2.5m/s.</p>		
	Reservoir	The site is not shown to be at risk of reservoir flooding from the available online maps.		

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	FEN.12[FEN.A]		
	Address	Fenny Compton		
	Area	0.31 hectares		
	Current land use	Greenfield		
	Proposed land use	Residential		
	Groundwater	<p>The EA's Areas Susceptible to Groundwater Flooding dataset, provided as 1km grid squares, shows the susceptibility of an area to groundwater flood emergence. The following comment can be made about groundwater flood risk:</p> <ul style="list-style-type: none"> The entire site is shown to have no susceptibility to groundwater flood emergence <p>JBA's Groundwater Mapping dataset shows that the whole site has 'no risk' and therefore, groundwater is more than 5m below the surface. This suggests groundwater is unlikely to emerge at the surface locally.</p> <p>This assessment does not negate the requirement that an appropriate assessment of the groundwater regime should be carried out at the site-specific Flood Risk Assessment (FRA) stage.</p>		
	Flood history	This site has been highlighted for its flood history and risk of surface water flooding concerns. There are 9 incidents recorded at the site in the Environment Agency's Historic Flood Map, provided as 1km squares.		
Flood risk management infrastructure	Defences	Defence Type	Standard of Protection	Condition
		-	-	-
		This site is not protected by any formal flood defences.		
	Residual risk	There are no obvious residual risks present at the site.		
Emergency planning	Flood warning	The site is not covered by the Environment Agency's Flood Warning Service.		
	Access and egress	Access and egress at this site are only currently possible via Ridge Way, just north of the site. This does not reach to the boundary of the site and is affected by surface water flooding in all events, as this street forms a flow path from the sites towards the floodplain.. Alternatively, access could be gained by joining up to The Lankett to the south-west. This would require access along the westerly surface water flow path, but this is only present in the 1,000-year event. In this event, consideration needs to be given to accessing both sides of the site where the flow path bisects the site. A site-specific Flood Risk Assessment should be undertaken to evaluate accessibility from Ridge Way.		

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	FEN.12[FEN.A]
	Address	Fenny Compton
	Area	0.31 hectares
	Current land use	Greenfield
	Proposed land use	Residential
Climate Change	Implications for the site	<ul style="list-style-type: none"> • 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 from the data available it has been found there is no risk. • Climate change should also be considered for surface water events; at the site-specific stage, the 100-year +40% should be considered as part of surface water drainage strategies, or surface water modelling. • The current day 1,000-year surface water flooding extent provides an indication of the likely increase in extent of the more frequent surface water events. This shows a significant amount of the site could be at risk, and the extent runs through the centre of the site. 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.

<p>Requirements for drainage control and impact mitigation</p>	<p>Broad scale assessment of possible SuDS</p>	<ul style="list-style-type: none"> • Geology at the site consists of: <ul style="list-style-type: none"> ○ Bedrock – Charmouth Mudstone formation - mudstone ○ Superficial – None recorded • All forms of source control are likely to be suitable. 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. • 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. • "This option is unlikely to be feasible as mapping suggests mean site slopes are > 5%. Feasibility of such options should be assessed as part of a site specific assessment. If this feature is feasible a liner maybe required to prevent the egress of groundwater. • The site is considered to be highly susceptible to groundwater flooding. Groundwater flooding could occur at the surface which may flow to and pool within topographic low spots during very wet winters. Detention and attenuation features should be designed to prevent groundwater ingress from impacting hydraulic capacity and structural integrity. Additional site investigation work may be required to support the detailed design of the drainage system. This may include groundwater monitoring to demonstrate that a sufficient unsaturated zone has been provided above the highest occurring groundwater level. Below ground development such as basements are not appropriate at this site." • This option is unlikely to be feasible as mapping suggests mean site slopes are > 5%. Feasibility of such options should be assessed as part of a site specific assessment. If this feature is feasible it should be located where the depth to the water table is >1m. • 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. • The site is not designated by the Environment Agency as previously being a landfill site. • The site is not located within a Groundwater Source Protection Zone and there are no restrictions over the use of infiltration techniques with regard to groundwater quality.
<p>NPPF and planning implications</p>	<p>Exception Test requirements</p>	<p>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. As such, this site passes the Exception Test. The Council should also consider the surface water risk to the site given this is potentially the higher risk.</p>

	<p style="text-align: center;">Requirements and guidance for site-specific Flood Risk Assessment</p>	<p>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 or is greater than one hectare. This site does not fall under these requirements. • Consultation with the Local Authority, Local Lead Flood Authority and the Environment Agency should be undertaken at an early stage. • All sources of flooding, particularly the risk of fluvial, surface water and groundwater flooding, should be considered as part of a site-specific Flood Risk Assessment. • Flood risk needs to be considered for the lifetime of the development, accounting for climate change. • Any FRA should be carried out in line with the National Planning Policy Framework; Flood Risk and Coastal Change Planning Practice Guidance, Stratford on Avon District Council's Local Plan policies, the LLFA's (Warwickshire County Council) 'Surface Water Management Plan' and 'Stratford on Avon District Core Strategy 2011 to 2031'. • The development should be designed using a sequential approach. Development should be steered away from areas of fluvial flood risk flow routes on the western boundary, preserving this as green infrastructure. Development must be in line with Table 3: flood risk vulnerability and flood zone compatibility of the NPPG. <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). • Safe access and egress will need to be demonstrated in the 1 in 100-year plus climate change 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 on Ridge Way (access point). • 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 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.
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Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	FEN.12[FEN.A]
	Address	Fenny Compton
	Area	0.31 hectares
	Current land use	Greenfield
	Proposed land use	Residential
		<p>Assessment for runoff should include allowance for climate change effects.</p> <ul style="list-style-type: none"> • 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 Warwickshire County Council's 'Surface Water Management Plan', Stratford on Avon District's 'Core Strategy 2011 to 2031' and the Level 1 SFRA for information on SuDS. • All development should adopt source control SuDS techniques to reduce the risk of frequent low impact flooding due to post development runoff. • SuDS should be designed to deliver multiple benefits including water quality, biodiversity, amenity, green infrastructure etc. Example features include swales, attenuation features, green roofs, rainwater capture and reuse and permeable paving. • Efforts should be made to limit runoff to greenfield rates and discharge rates from the site should not increase downstream flood risk. • 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. • 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.

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	FEN.12[FEN.A]
	Address	Fenny Compton
	Area	0.31 hectares
	Current land use	Greenfield
	Proposed land use	Residential
Key messages	<p>The site is likely to be suitable for development subject to:</p> <ul style="list-style-type: none"> • Development is steered away from the north-western boundary, and where possible, away from the central flow path which bisects the site. Whilst this is only present in the 1,000-year event, development in a flow conveyance route could displace water elsewhere in the site or to third party land. • The 1,000-year extents are an indication of climate change impacts. • Safe access and egress need to be considered and the impacts of surface water flooding to Ridge Way are assessed, and how both sides of the site may gain access in a 1,000-year event where the site is bisected. • If flood mitigation measures are implemented, then they are tested to ensure that they will not displace water elsewhere. • Space for green infrastructure should be considered in the areas of highest flood risk. • A site-specific FRA 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 on the site and to neighbouring properties. <p>Refer to the detailed 'guidance for developers' section for further information on the measures that are appropriate for this site</p>	
Mapping Information		
<p>The key datasets used to make planning recommendations regarding this site were 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.</p>		
Flood Zones	<p>Flood Zones 2 and 3 have been taken from the Environment Agency's Flood Map for Planning; there is no fluvial risk to this site.</p>	

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	FEN.12[FEN.A]
	Address	Fenny Compton
	Area	0.31 hectares
	Current land use	Greenfield
	Proposed land use	Residential
Climate change	Climate change mapping was unavailable for this area. In the absence of Flood Zone 2 as an indication of fluvial climate change, the 1,000-year surface water flooding event was used as an indicative climate change scenario. 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	The Risk of Flooding from Surface Water mapping has been used as this represents the floodplains of small 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 100-year event (considered to be medium risk) is taken Environment Agency's Risk of Flooding from Surface Water.	

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	GAY.3 [GAY.B]			
	Address	Gaydon			
	Area	1.22 hectares			
	Current land use	Greenfield			
	Proposed land use	Residential			
Sources of flood risk	Location of site within catchment	The site is located to the east of Gaydon in the northern corner of the Dene – source to Butlers Marston catchment. An unnamed tributary of the River Dene flows approximately 1km to the south of the site, flowing in a south westerly direction for about 3.5km where it joins the River Dene at Kineton.			
	Existing drainage features	There is a drainage channel approximately 250m south west of the site. This carries water southwards away from Gaydon, into the unnamed tributary of the River Dene. There are no drainage features at the site.			
	Fluvial	Proportion of site at risk			
		FZ3b	FZ3a	FZ2	FZ1
		0%	0%	0%	100%
		Highest zone of risk (Risk of Flooding from Rivers and Sea)			
		Very Low			
		<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%)</i>			
	Available data: The Environment Agency’s (EA) Flood Zone mapping has been used in this assessment. Where there is no detailed hydraulic model available, the Flood Zones are based on 2D generalised modelling.				
	Flood characteristics: The site is not shown to currently be at risk of flooding from fluvial sources. Flood Zones associated with the unnamed tributary of the River Dene are approximately 1km south of the site. The drainage channel approximately 250m to the south west of the site is unlikely to pose a risk as LiDAR data shows the local topography generally slopes down away from the site to the south and south west. This site is assessed based on surface water risk.				
Surface Water	Proportion of site at risk (RoFfSW)				
	30-year	100-year	1,000-year		
	27%	28%	30%		

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	GAY.3 [GAY.B]		
	Address	Gaydon		
	Area	1.22 hectares		
	Current land use	Greenfield		
	Proposed land use	Residential		
		Max depths (m)		
		0.3-0.9	0.3-0.9	0.3-0.9
		Max velocity (m/s)		
		<0.25	>0.25	>0.25
		<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>		
		Description of surface water flow paths:		
	Risk of Flooding from Surface Water data shows that surface water flooding poses a significant risk across the western part of the site, with ponding present in the 30-year, 100-year and 1,000-year events. The flood extent appears to be confined by topography, as there is only a marginal difference between the scenarios, with maximum depths remaining between 0.3m and 0.9m for all events. Ponding seems to be the result of surface water building up behind Banbury Road (B4100) as it drains south west towards the drainage channel on the opposite side of the road. This is causing flooding to the site, the houses and gardens to the north and a significant stretch of Banbury Road.			
	Reservoir	The site is not shown to be at risk of reservoir flooding from the available online maps.		
	Groundwater	<p>The EA's Areas Susceptible to Groundwater Flooding dataset, provided as 1km grid squares, shows the susceptibility of an area to groundwater flood emergence. The following comment can be made about groundwater flood risk:</p> <ul style="list-style-type: none"> The entire site is not shown to be within an area susceptible to groundwater flood emergence. <p>JBA's Groundwater Mapping dataset also shows that the entire site has been designated as no risk.</p> <p>This assessment does not negate the requirement that an appropriate assessment of the groundwater regime should be carried out at the site-specific Flood Risk Assessment (FRA) stage.</p>		

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	GAY.3 [GAY.B]
	Address	Gaydon
	Area	1.22 hectares
	Current land use	Greenfield
	Proposed land use	Residential
	Flood history	This site is not shown to be within the reaches of the EA's Historic Flood Map. Warwickshire County Council may hold additional records which are not available at this time. These records detail historical flood incidents from all sources, whereas the EA dataset only records incidents of fluvial, tidal or coastal flooding. The Lead Local Authority should be contacted to obtain further details.
Flood risk management infrastructure	Defences	The site is not protected by any formal flood defences.
	Residual risk	The site is considered to not be at a residual risk from flood risk management infrastructure.
Emergency planning	Flood warning	The site is not within any EA Flood Warning or Alert areas.
	Access and egress	Banbury Road runs along just outside the western boundary so it is likely that access and egress would be added from this side for the development. If this did happen, consideration would have to be given to the impact of surface water flooding which poses a risk to this side of the site, which spans the entire width of the boundary with the road. During the 30-year and 100-year events, surface water accumulates on Banbury Road in front of the site. Depths here remain below 0.3m and velocities below 0.25m/s so are unlikely to have a significant impact on access and egress. However, during the 1,000-year event, depths increase to between 0.3m and 0.9m and velocities increase to over 0.25m/s, which may impede access and egress. It would be preferential to gain access and egress from Banbury Road via the southern corner of the site, as the surface water flood risk is confined to the site with the road here at Very Low risk.

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	GAY.3 [GAY.B]
	Address	Gaydon
	Area	1.22 hectares
	Current land use	Greenfield
	Proposed land use	Residential
Climate Change	Implications for the site	<ul style="list-style-type: none"> • Increased storm intensities due to climate change may increase the extent, depth, velocity, hazard and frequency of both fluvial and surface water flooding. • The site is not shown to be at risk of fluvial flooding; however, climate change should also 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 flooding extent provides an indication of the likely increase in extent of the more frequent surface water events. This accounts for approximately a third of the site and 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.

<p>Requirements for drainage control and impact mitigation</p>	<p>Broad scale assessment of possible SuDS</p>	<ul style="list-style-type: none"> • Geology at the site consists of: <ul style="list-style-type: none"> ○ Bedrock – Charmouth Mudstone Formation - Mudstone. ○ Superficial – none recorded • Most source control techniques are likely to be suitable. Mapping suggests that slopes may be unsuitable for selective source control techniques. 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. • 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. • "This option is unlikely to be feasible as mapping suggests mean site slopes are > 5%. Feasibility of such options should be assessed as part of a site specific assessment. If this feature is feasible a liner maybe required to prevent the egress of groundwater. • The site is considered to be highly susceptible to groundwater flooding. Groundwater flooding could occur at the surface which may flow to and pool within topographic low spots during very wet winters. Detention and attenuation features should be designed to prevent groundwater ingress from impacting hydraulic capacity and structural integrity. Additional site investigation work may be required to support the detailed design of the drainage system. This may include groundwater monitoring to demonstrate that a sufficient unsaturated zone has been provided above the highest occurring groundwater level. Below ground development such as basements are not appropriate at this site." • This option is unlikely to be feasible as mapping suggests mean site slopes are > 5%. Feasibility of such options should be assessed as part of a site specific assessment. If this feature is feasible it should be located where the depth to the water table is >1m. • 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. • The site is not designated by the Environment Agency as previously being a landfill site. • The site is not located within a Groundwater Source Protection Zone and there are no restrictions over the use of infiltration techniques with regard to groundwater quality.
<p>NPPF and planning implications</p>	<p>Exception Test requirements</p>	<p>The Local Authority have carried out the Sequential Test in line with national guidance. The Sequential Test must be passed before the Exception Test is applied.</p> <p>Residential development is classified as 'More Vulnerable'. As the entire site is shown to be in Flood Zone 1, the Exception Test is not required for the site. However, as the site is at significant risk of surface water flooding, any developer should undertake a site-specific flood risk</p>

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	GAY.3 [GAY.B]
	Address	Gaydon
	Area	1.22 hectares
	Current land use	Greenfield
	Proposed land use	Residential
		assessment including surface water modelling to demonstrate that the change in land use does not increase the risk of surface water on the site and to nearby properties.

	<p style="text-align: center;">Requirements and guidance for site-specific Flood Risk Assessment</p>	<p>Flood Risk Assessment:</p> <ul style="list-style-type: none"> • Although the site is not located in a Flood Zone, there is a significant risk of surface water flooding. Therefore, at the planning application stage, it is recommended that a site-specific FRA is undertaken. This is a requirement where development sites: <ul style="list-style-type: none"> ○ are 1 hectare or more in size; ○ contain land which has been identified by the EA as having critical drainage problems; or ○ contain land identified in the strategic flood risk assessment as being at increased flood risk in the future. • Consultation with the Local Authority, Local Lead Flood Authority and the Environment Agency should be undertaken at an early stage. • All sources of flooding, particularly the risk of fluvial, surface water and groundwater flooding, should be considered as part of a site-specific Flood Risk Assessment. • Flood risk needs to be considered for the lifetime of the development, accounting for climate change. • The development should be designed using a sequential approach. Development should be steered away from the areas of most significant surface water flooding in the western part of the site, preserving this space as green infrastructure. Development must be in line with Table 3: flood risk vulnerability and Flood Zone compatibility of the NPPG. • Any FRA should be carried out in line with the National Planning Policy Framework; Flood Risk and Coastal Change Planning Practice Guidance, Stratford on Avon District Council's Local Plan policies, the LLFA's (Warwickshire County Council) 'Surface Water Management Plan' and 'Stratford on Avon District Core Strategy 2011 to 2031'. <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). • Safe access and egress will need to be demonstrated in the 1 in 100-year plus climate change 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
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**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	GAY.3 [GAY.B]
	Address	Gaydon
	Area	1.22 hectares
	Current land use	Greenfield
	Proposed land use	Residential
		<p>design to ensure there is no increase in runoff beyond the current greenfield rates.</p> <ul style="list-style-type: none"> • On site attenuation schemes would need to be tested against the watercourse to ensure flows are not exacerbated downstream within the catchment. • All 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. • Developers should refer to Warwickshire County Council's 'Surface Water Management Plan', Stratford on Avon District's 'Core Strategy 2011 to 2031' and the Level 1 SFRA for information on SuDS. • SuDS should be designed to deliver multiple benefits including water quality, biodiversity, amenity, green infrastructure etc. Example features include swales, attenuation features, green roofs, rainwater capture and reuse and permeable paving. • Efforts should be made to limit runoff to greenfield rates and discharge rates from the site should not increase downstream flood risk. • 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. • Green infrastructure should be considered within the mitigation measures for surface water runoff from potential development.

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	GAY.3 [GAY.B]
	Address	Gaydon
	Area	1.22 hectares
	Current land use	Greenfield
	Proposed land use	Residential
Key messages	<p>The site is likely to be suitable for development subject to:</p> <ul style="list-style-type: none"> • A carefully considered and integrated flood resilient and sustainable drainage design is put forward. • Safe access and egress need to be considered as the likely access route, Banbury Road, is significantly affected by surface water flooding in all surface water flood events. • 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). • 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 surface water flooding on the site and to neighbouring properties. • A drainage strategy should help inform site layout and design to ensure there is no increase in runoff beyond current greenfield rates. <p>Refer to the detailed 'guidance for developers' section for further information on the measures that are appropriate for this site</p>	
Mapping Information		
<p>The key datasets used to make planning recommendations regarding this site were 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.</p>		
Flood Zones	<p>Flood Zones 2 and 3 have been taken from the Environment Agency's Flood Map for Planning; there is no fluvial risk to this site.</p>	
Climate change	<p>As there is no fluvial flood risk, climate change impacts from surface water sources were assessed, using the 1,000-year surface water flooding event as an indicative climate change scenario.</p>	

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	GAY.3 [GAY.B]
	Address	Gaydon
	Area	1.22 hectares
	Current land use	Greenfield
	Proposed land use	Residential
Fluvial depth, velocity and hazard mapping		The Risk of Flooding from Surface Water mapping has been used as this represents the floodplains of small 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 100-year event (considered to be medium risk) is taken from Environment Agency's Risk of Flooding from Surface Water.

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	HAR.4			
	Address	Harbury			
	Area	1.92 hectares			
	Current land use	Greenfield			
	Proposed land use	Residential			
Sources of flood risk	Location of site within catchment	<p>This site is located in the north east of the Stratford-on-Avon district, just west of the upper catchment area for the River Itchen. This site is located in the middle of the River Avon catchment, as it does not reach its confluence with the Severn for some distance beyond the district.</p> <p>The southern boundary of the site is bounded by property and road on the northern side of Mill Street, just west of central Harbury.</p>			
	Existing drainage features	<p>The Environment Agency's Detailed River Network shows no ordinary watercourses, canals or smaller drains within the site. The closest drainage feature is an unnamed ordinary watercourse, directly north and downslope from the site.</p>			
	Fluvial	Proportion of site at risk			
		FZ3b	FZ3a	FZ2	FZ1
		0%	0%	0%	100%
		Highest zone of risk (Risk of Flooding from Rivers and Sea)			
		N/A			
	<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%)</i></p>				
	<p>Available data: The Environment Agency's (EA) Flood Zone mapping has been used in this assessment.</p>				
	<p>Flood characteristics: The site is not shown to be currently at risk of flooding from fluvial sources. This is because the drain south of the site has a catchment <3km², and hence is not represented in the EA's Flood Zones. Moreover, as the drain is downslope of the site, and there are no further drains upslope of the site it is unlikely the site will be affected by fluvial flooding.</p>				
Surface Water	Proportion of site at risk (RoFfSW)				
	30-year	100-year	1,000-year		
	2%	5%	21%		
Max depths (m)					

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	HAR.4		
	Address	Harbury		
	Area	1.92 hectares		
	Current land use	Greenfield		
	Proposed land use	Residential		
		Below 0.3m	Below 0.3m	0.3m-0.6m
		Max velocity (m/s)		
		Over 2.5m/s	Over 2.5m/s	Over 2.5m/s
		<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: This site has been flagged by the Parish Council for a history of flooding related to surface water flows. The site is shown to be impacted by surface water flows for all events. In the 30-year event, there is one flow path just near the eastern boundary of the site, travelling downslope northwards towards the drainage channel, which then uses the railway line as a conduit for flow, given this is incised between downward sloping embankments. The maximum depth of this flow on site is below 0.3m and therefore is shallow. In the 100-year event, this singular flow path is slightly wider. There is further localised ponding just south of the main flow and in the south eastern corner of the site. The maximum depth is again below 0.3m. In the 1,000-year event, a much larger proportion of the site is impacted by surface water flows. The main flow path in the eastern half of the site doubles in width and another flow is present through the centre of the site, flowing northwards too. There is further localised ponding along the northern boundary site and the maximum depth of between 0.3m-0.6m is seen in the south eastern corner. All flows present in the site, at any event, flow at over 2.5m/s. The flow paths originate from flooding on Binswood End/ Mill Street and from higher ground to the south. Mill Street is affected by surface water flooding in all events, the maximum depth for all events is below 0.3m. The extent of this increases from minimal in the 30-year event to across the entire length of the southern boundary in the 1,000-year event.</p>		
	Reservoir	The site is not shown to be at risk of reservoir flooding from the available online maps.		

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	HAR.4		
	Address	Harbury		
	Area	1.92 hectares		
	Current land use	Greenfield		
	Proposed land use	Residential		
	Groundwater	<p>The EA's Areas Susceptible to Groundwater Flooding dataset, provided as 1km grid squares, shows the susceptibility of an area to groundwater flood emergence. The following comments can be made about groundwater flood risk:</p> <ul style="list-style-type: none"> The entire site is shown to have between 25% and 50% susceptibility to groundwater flood emergence. <p>JBA's Groundwater Mapping dataset shows that the whole site has no risk, suggesting groundwater is more than 5m below the surface. This suggests groundwater is unlikely to emerge at the surface locally.</p> <p>This assessment does not negate the requirement that an appropriate assessment of the groundwater regime should be carried out at the site-specific Flood Risk Assessment (FRA) stage.</p>		
	Flood history	<p>This site is not shown to be within the reaches of the Environment Agency's Historic Flood Map; however, the Harbury Society has made several comments on historical flooding at the site:</p> <ul style="list-style-type: none"> This land has a history of flooding – a stream ran down what is now Heber Drive. It is the site of the Sewerage Pumping Station which has significantly overflowed in the past. In times of heavy rain, this can be overwhelmed by water flowing down Heber Drive. 		
Flood risk management infrastructure	Defences	Defence Type	Standard of Protection	Condition
		-	-	-
	This site is not protected by any formal flood defences.			
	Residual risk	There are no obvious residual risks present at the site from culverts, except for the Sewerage Pumping Station which is known to have overflowed in the past. A site-specific risk assessment is recommended to investigate potential risks further.		
	Flood warning	The site is not covered by the Environment Agency's Flood Warning Service.		

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	HAR.4
	Address	Harbury
	Area	1.92 hectares
	Current land use	Greenfield
	Proposed land use	Residential
Emergency planning	Access and egress	<p>Access and egress at this site are possible via Binswood End/ Mill Street, which bounds the southern boundary. There are other properties on this street, therefore entry can be made in the centre of the site or by the entrance to a footpath. It is worth noting that this road is affected by surface water in all events, although the depths of these flows in all events are below 0.3m. Furthermore, Harbury Society has made several points related to access and egress, regarding use as a through-road and congestion pinch points.</p> <p>A site-specific Flood Risk Assessment should be undertaken to evaluate the overall accessibility to pedestrians and vehicles.</p>
Climate Change	Implications for the site	<ul style="list-style-type: none"> • 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 fluvial flood risk at the site, and therefore climate change impacts are assessed based on surface water risk. • Climate change should also be considered for surface water events; at the site-specific stage, the 100-year +40% should be considered as part of surface water drainage strategies, or surface water modelling. • The current day 1,000-year surface water flooding extent provides an indication of the likely increase in extent of the more frequent surface water events. This shows risk to the eastern half of the site along the flow path running south to north. 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.

<p>Requirements for drainage control and impact mitigation</p>	<p>Broad scale assessment of possible SuDS</p>	<ul style="list-style-type: none"> • Geology at the site consists of: <ul style="list-style-type: none"> ○ Bedrock – Saltford Shale Member - Mudstone. ○ Rugby Limestone Member - Mudstone And Limestone, Interbedded. ○ Superficial – None recorded • Most source control techniques are likely to be suitable. Mapping suggests that slopes may be unsuitable for selective source control techniques. 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. • Mapping suggests that there is a medium risk of groundwater flooding at this location, therefore it is likely infiltration techniques will not be suitable. This should be confirmed via site investigations to assess the potential for infiltration. • "This option is unlikely to be feasible as mapping suggests mean site slopes are > 5%. Feasibility of such options should be assessed as part of a site specific assessment. If this feature is feasible a liner maybe required to prevent the egress of groundwater. • The site is considered to be highly susceptible to groundwater flooding. Groundwater flooding could occur at the surface which may flow to and pool within topographic low spots during very wet winters. Detention and attenuation features should be designed to prevent groundwater ingress from impacting hydraulic capacity and structural integrity. Additional site investigation work may be required to support the detailed design of the drainage system. This may include groundwater monitoring to demonstrate that a sufficient unsaturated zone has been provided above the highest occurring groundwater level. Below ground development such as basements are not appropriate at this site." • This option is unlikely to be feasible as mapping suggests mean site slopes are > 5%. Feasibility of such options should be assessed as part of a site specific assessment. If this feature is feasible it should be located where the depth to the water table is >1m, additionally a liner maybe required to prevent the egress of groundwater. • 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. A liner maybe required to prevent the egress of groundwater. • The site is not designated by the Environment Agency as previously being a landfill site. • The site is not located within a Groundwater Source Protection Zone and there are no restrictions over the use of infiltration techniques with regard to groundwater quality.
<p>NPPF and planning implications</p>	<p>Exception Test requirements</p>	<p>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 and therefore this site passes the Exception Test. The Council</p>

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	HAR.4
	Address	Harbury
	Area	1.92 hectares
	Current land use	Greenfield
	Proposed land use	Residential
		should consider the risk from surface water on the eastern portion of the site.

	<p>Requirements and guidance for site-specific Flood Risk Assessment</p>	<p>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 or is greater than one hectare. This site falls under these requirements. • Consultation with the Local Authority, Local Lead Flood Authority and the Environment Agency should be undertaken at an early stage. • All sources of flooding, particularly the risk of fluvial, surface water and groundwater flooding, should be considered as part of a site-specific Flood Risk Assessment. • Flood risk needs to be considered for the lifetime of the development, accounting for climate change. • Any FRA should be carried out in line with the National Planning Policy Framework; Flood Risk and Coastal Change Planning Practice Guidance, Stratford on Avon District Council's Local Plan policies, the LLFA's (Warwickshire County Council) 'Surface Water Management Plan' and 'Stratford on Avon District Core Strategy 2011 to 2031'. • The development should be designed using a sequential approach. Development should be steered away from areas of fluvial flood risk flow routes on the western boundary, preserving this as green infrastructure. Development must be in line with Table 3: flood risk vulnerability and flood zone compatibility of the NPPG. <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). • Safe access and egress will need to be demonstrated in the 1 in 100-year plus climate change 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 on Mill Street. • 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 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.
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Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	HAR.4
	Address	Harbury
	Area	1.92 hectares
	Current land use	Greenfield
	Proposed land use	Residential
		<p>Assessment for runoff should include allowance for climate change effects.</p> <ul style="list-style-type: none"> • 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 Warwickshire County Council's 'Surface Water Management Plan', Stratford on Avon District's 'Core Strategy 2011 to 2031' and the Level 1 SFRA for information on SuDS. • All development should adopt source control SuDS techniques to reduce the risk of frequent low impact flooding due to post development runoff. • SuDS should be designed to deliver multiple benefits including water quality, biodiversity, amenity, green infrastructure etc. Example features include swales, attenuation features, green roofs, rainwater capture and reuse and permeable paving. • Efforts should be made to limit runoff to greenfield rates and discharge rates from the site should not increase downstream flood risk. • 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. • 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.

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	HAR.4
	Address	Harbury
	Area	1.92 hectares
	Current land use	Greenfield
	Proposed land use	Residential
Key messages		<p>The site is likely to be suitable for development subject to:</p> <ul style="list-style-type: none"> • Development is steered away from the surface water flow path along the eastern side of the site. Developing in a flow path could displace flood water elsewhere on site or to third party land. • Consideration of the historic flooding at the site, in relation to the sewerage pumping station and flows down Heber Drive noted to have occurred. • Safe access and egress need to be considered and the impacts of surface water flooding to Mill Street are assessed. • If flood mitigation measures are implemented then they are tested to ensure that they will not displace water elsewhere. • Space for green infrastructure should be considered in the areas of highest flood risk. • A site-specific FRA 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 on the site and to neighbouring properties. <p>Refer to the detailed 'guidance for developers' section for further information on the measures that are appropriate for this site</p>
Mapping Information		
<p>The key datasets used to make planning recommendations regarding this site were 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.</p>		
Flood Zones	<p>Flood Zones 2 and 3 have been taken from the Environment Agency's Flood Map for Planning; this site is not at fluvial flood risk.</p>	
Climate change	<p>Climate change mapping was unavailable for this area. The 1,000-year surface water flooding event was used as an indicative climate change scenario.</p>	

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	HAR.4
	Address	Harbury
	Area	1.92 hectares
	Current land use	Greenfield
	Proposed land use	Residential
Fluvial depth, velocity and hazard mapping		The Risk of Flooding from Surface Water mapping has been used as this represents the floodplains of small 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 100-year event (considered to be medium risk) is taken Environment Agency's Risk of Flooding from Surface Water.

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	QUIN.8 [QUIN.D]			
	Address	Quinton			
	Area	2.19 hectares			
	Current land use	Greenfield			
	Proposed land use	Residential			
Sources of flood risk	Location of site within catchment	The site is located in Lower Quinton near the centre of the Marchfont Brook – source to conference River Avon catchment. Approximately 1km to the east of the site, Marchfont Brook flows northwards heading towards its confluence with the River Avon at the edge of the catchment.			
	Existing drainage features	Drainage channels flow along the west and east boundaries of the site, heading northwards through Lower Quinton and eventually joining Marchfont Brook.			
	Fluvial	Proportion of site at risk			
		FZ3b	FZ3a	FZ2	FZ1
		0%	0%	0%	100%
		Highest zone of risk (Risk of Flooding from Rivers and Sea)			
		Very Low			
		<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%)</i>			
	Available data: The Environment Agency’s (EA) Flood Zone mapping has been used in this assessment. Where there is no detailed hydraulic model available, the Flood Zones are based on 2D generalised modelling.				
	Flood characteristics: The site is not shown to currently be at risk of flooding from fluvial sources. Flood Zones associated with Marchfont Brook are 1km to the east of the site. There are small drainage channels flowing along the west and east boundaries of the site. These are not represented in the EA’s Flood Zones due to having catchments <3km ² in size, therefore the flood risk they may pose should be assessed at the site-specific Flood Risk Assessment (FRA) stage.				
Surface Water	Proportion of site at risk (RoFfSW)				
	30-year	100-year	1,000-year		
	21%	39%	94%		
Max depths (m)					

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	QUIN.8 [QUIN.D]		
	Address	Quinton		
	Area	2.19 hectares		
	Current land use	Greenfield		
	Proposed land use	Residential		
		<0.3	<0.3	<0.3
		Max velocity (m/s)		
		>0.25	>0.25	>0.25
		<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>Description of surface water flow paths:</p> <p>Risk of Flooding from Surface Water data shows that surface water flooding poses a significant risk to the site. During the 30-year event, a flow path from south to north bisects the site and this increases in extent on both sides for the 100-year event. For the 1,000-year event, there is a significant increase in extent with nearly the entire site covered. For all events, depths remain below 0.3m and therefore shallow, while velocities are over 0.25m/s.</p> <p>As this is a large flow path, i.e. conveyance route, rather than ponding, if development is placed in this flow path it could displace flood risk to other parts of the site or third party land. Much of the land surrounding the site is also at risk in this 1,000-year flow path, from the south, to the east and north. Only Goose Lane to the west is at lower risk.</p>		
	Reservoir	The site is not shown to be at risk of reservoir flooding from the available online maps.		
	Groundwater	<p>The EA's Areas Susceptible to Groundwater Flooding dataset, provided as 1km grid squares, shows the susceptibility of an area to groundwater flood emergence. The following comment can be made about groundwater flood risk:</p> <ul style="list-style-type: none"> The entire site is not shown to be within an area susceptible to groundwater flood emergence. <p>JBA's Groundwater Mapping dataset also shows that the entire site has been designated as no risk.</p> <p>This assessment does not negate the requirement that an appropriate assessment of the groundwater regime should be carried out at the site-specific Flood Risk Assessment (FRA) stage.</p>		

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	QUIN.8 [QUIN.D]
	Address	Quinton
	Area	2.19 hectares
	Current land use	Greenfield
	Proposed land use	Residential
	Flood history	The site is not shown to be within the reaches of the EA's Historic Flood Map. Warwickshire County Council (WCC) hold a record of flooding in the vicinity of the site, which occurred in June-July 2007. WCC may hold additional information on this event and further records for the area which are not available at this time. These records detail historical flood incidents from all sources, whereas the EA dataset only records incidents of fluvial, tidal or coastal flooding. The Lead Local Authority should be contacted to obtain further details.
Flood risk management infrastructure	Defences	The site is not protected by any formal flood defences.
	Residual risk	The site is considered to not be at a residual risk from flood risk management infrastructure, although potential risk from the drainage channels crossing beneath the Main Road to the north of site may need to be investigated for blockage risk in a FRA, if the watercourse is modelled.
	Flood warning	The site is not within any EA Flood Warning or Alert areas.

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	QUIN.8 [QUIN.D]
	Address	Quinton
	Area	2.19 hectares
	Current land use	Greenfield
	Proposed land use	Residential
Emergency planning	Access and egress	<p>Goose Lane runs just outside the site boundary to the west, so it is likely that access and egress would be added from this side for the proposed development.</p> <p>Consideration would have to be given to surface water flood risk as surface water accumulates along Goose Lane during the 30-year, 100-year and 1,000-year events. Although depths remain low at less than 0.3m for all events, velocities are greater than 0.25m/s so may have an impact on access and egress.</p> <p>Access may be possible from Corfield Drive which is part of a new housing estate to the north and runs along the northern boundary of the site. However, it is not possible to determine whether there is an access route from this side based on the available online imagery.</p> <p>Consideration is also needed for how the eastern portion of the site would gain safe access and egress, given the site is bisected by a large surface water flow route in all events.</p> <p>Access away from the site should be steered away from the north where Goose Lane meets the Main Road, as the flow path continues across this junction area and numerous other local streets.</p> <p>Therefore, a site-specific Flood Risk Assessment should be undertaken to evaluate accessibility to pedestrians and vehicles.</p>

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	QUIN.8 [QUIN.D]
	Address	Quinton
	Area	2.19 hectares
	Current land use	Greenfield
	Proposed land use	Residential
Climate Change	Implications for the site	<ul style="list-style-type: none"> • Whilst the site is not currently shown to be at risk of flooding, the site's close proximity to two unmodelled drainage channels poses potential risk. • It is recommended that developers undertake further investigations or modelling of the drainage channels at the site-specific FRA stage to determine whether the site may be at risk of flooding in the future. If a detailed model is constructed, this should test the 2080s climate change allowances in a hydraulic model, to ascertain the impact at 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. • Climate change should also 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 flooding extent provides an indication of the likely increase in extent of the more frequent surface water events. This shows a very significant risk in terms of flood extent, covering the majority of the site. A detailed FRA would be needed 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.

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	QUIN.8 [QUIN.D]
	Address	Quinton
	Area	2.19 hectares
	Current land use	Greenfield
	Proposed land use	Residential
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 – Blue Lias Formation And Charmouth Mudstone Formation (undifferentiated) - Mudstone. ○ Superficial – None recorded • All forms of source control are likely to be suitable. 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. • 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. • The site is not located within a Groundwater Source Protection Zone and there are no restrictions over the use of infiltration techniques with regard to groundwater quality.

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	QUIN.8 [QUIN.D]
	Address	Quinton
	Area	2.19 hectares
	Current land use	Greenfield
	Proposed land use	Residential
NPPF and planning implications	Exception Test requirements	<p>The Local Authority have carried out the Sequential Test in line with national guidance. The Sequential Test must be passed before the Exception Test is applied.</p> <p>Residential development is classified as 'More Vulnerable'. As the entire site is shown to be in Flood Zone 1, the Exception Test is not required for the site. However, development should be steered away from the surface water flow route through the centre of the site, which is significant.</p> <p>If detailed modelling of the drainage channels shows the site to be in Flood Zone 3, 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.</p> <p>Development will not be permitted for the following scenarios:</p> <ul style="list-style-type: none"> • Highly Vulnerable Infrastructure within FZ3a and FZ3b. • More Vulnerable and Less Vulnerable Infrastructure 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 for this site as development borders two drainage channels, may be subject to other sources of flooding and may introduce a more vulnerable use. It will also be required where development sites:
 - are 1 hectare or more in size;
 - contain land which has been identified by the EA as having critical drainage problems; or
 - contain land identified in the strategic flood risk assessment as being at increased flood risk in future.
- A detailed hydraulic model may be required at FRA stage, to confirm flood risk, flow paths and climate change extents from the unmodelled drainage channels along the west and east boundaries, using channel topographic survey.
- Consultation with the Local Authority, Local Lead Flood Authority and the Environment Agency should be undertaken at an early stage.
- All sources of flooding, particularly the risk of fluvial, surface water and groundwater flooding, should be considered as part of a site-specific Flood Risk Assessment.
- Flood risk needs to be considered for the lifetime of the development, accounting for climate change.
- The development should be designed using a sequential approach. Development should be steered away from the drainage channels along the west and east boundaries, but primarily where the central surface water flow path is, preserving this space as green infrastructure. Development must be in line with Table 3: flood risk vulnerability and Flood Zone compatibility of the NPPG.
- Any FRA should be carried out in line with the National Planning Policy Framework; Flood Risk and Coastal Change Planning Practice Guidance, Stratford on Avon District Council's Local Plan policies, the LLFA's (Warwickshire County Council) ['Surface Water Management Plan'](#) and ['Stratford on Avon District Core Strategy 2011 to 2031'](#).
- If a detailed model shows the west and/or east boundary to be in Flood Zone 3, development in FZ3b should be avoided unless appropriate use can be demonstrated in line with NPPF. 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. Whilst the site is not currently at risk of fluvial flooding, no assessment of the drainage channels and future flood risk with regard to climate change has been made. 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

		<p>effectively through the lifetime of the development. (Para 048 Flood Risk and Coastal Change PPG).</p> <ul style="list-style-type: none"> • 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 drainage channels to ensure flows are not exacerbated downstream within the catchment. • All 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. • Developers should refer to Warwickshire County Council's 'Surface Water Management Plan', 'Stratford on Avon District's Core Strategy 2011 to 2031' and the 'Level 1 SFRA' for information on SuDS. • SuDS should be designed to deliver multiple benefits including water quality, biodiversity, amenity, green infrastructure etc. Example features include swales, attenuation features, green roofs, rainwater capture and reuse and permeable paving. • Efforts should be made to limit runoff to greenfield rates and discharge rates from the site should not increase downstream flood risk. • 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. • Green infrastructure should be considered within the mitigation measures for surface water runoff from potential development.
<p>Key messages</p>		<p>The site is likely to be suitable for development subject to:</p> <ul style="list-style-type: none"> • Fluvial flood risk is confirmed in a hydraulic model, and the development is steered away from any risk shown to the site. • Development is avoided near the west and east boundary where the drainage channels pose a potential fluvial and surface water flood risk. A detailed hydraulic model may be needed at site-specific stage to confirm the flood risk to the site and the impacts of climate change.

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	QUIN.8 [QUIN.D]
	Address	Quinton
	Area	2.19 hectares
	Current land use	Greenfield
	Proposed land use	Residential

	<ul style="list-style-type: none"> • More significantly, the surface water flow path which bisects the site is significant in all three flood events, presents a larger flood risk than fluvial risk, and therefore development should be steered away from this central flow path. • Safe access and egress needs to be considered as the likely access route, which is along Goose Road, is affected by surface water flooding in the 30-year, 100-year and 1,000-year events. Also, consideration for the eastern portion of the site, where the surface water flow path bisects this and the Goose Road access route. • 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. • A site-specific FRA 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 surface water flooding on the site and to neighbouring properties. This is particularly important at this site given how large climate change impacts could be in a surface water event, and also that the flow route would act as a conveyance route, therefore development placed in the middle could displace the risk elsewhere in the site or to third party land. <p>Refer to the detailed 'guidance for developers' section for further information on the measures that are appropriate for this site.</p>
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Mapping Information

The key datasets used to make planning recommendations regarding this site were 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.

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	QUIN.8 [QUIN.D]
	Address	Quinton
	Area	2.19 hectares
	Current land use	Greenfield
	Proposed land use	Residential
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.
Climate change		Climate change mapping was unavailable for this area. In the absence of Flood Zone 2 as an indication of fluvial climate change, the 1,000-year surface water flooding event was used as an indicative climate change scenario. It is recommended that the latest EA's climate change allowances are modelled in a detailed hydraulic model as part of a site-specific FRA.
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 small 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 100-year event (considered to be medium risk) is taken from Environment Agency's Risk of Flooding from Surface Water.

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	SALF.17 [SALF.A]			
	Address	Salford Priors			
	Area	1.38 hectares			
	Current land use	Greenfield			
	Proposed land use	Residential			
Sources of flood risk	Location of site within catchment	The site is located near the south-west border of the Stratford-on-Avon District boundary on the northern edge of Salford Priors, directly north of Bomford Way. It is 500m west of the main roundabout on the A46, at the junction with Salford Road. At its closest point, the site is approximately 1300m north-west of the River Avon. A ridge which forms a topographic high towards the north-west of the site acts as a drainage boundary and a small watercourse to the north of the site named Ban Brook runs from northwest to southeast. Shortly downstream of the site, this watercourse joins the bottom end of the River Arrow, which then joins the River Avon south of the A46.			
	Existing drainage features	The Environment Agency's Detailed River Network shows no ordinary watercourses, canals or smaller drains within the site. The closest drainage feature is Ban Brook, which at its closest point is 80m from the northern boundary of the site. It flows eastwards from the topographic high northwest of the site before moving southwards directly of the site and then flows south-east to follow along the A46.			
	Fluvial	Proportion of site at risk			
		FZ3b	FZ3a	FZ2	FZ1
		0%	0%	30%	70%
		Highest zone of risk (Risk of Flooding from Rivers and Sea)			
Low					
<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%)</i>					

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	SALF.17 [SALF.A]		
	Address	Salford Priors		
	Area	1.38 hectares		
	Current land use	Greenfield		
	Proposed land use	Residential		
		Available data: The Environment Agency's Flood Zone mapping has been used in this assessment. No detailed modelled fluvial data is available for this site and therefore the Environment Agency's Flood Zones are based on 2D generalised modelling. Shortly downstream of the site there is a model for the River Avon and River Arrow.		
		Flood characteristics: Flood Zone 2, which is associated with fluvial flooding from the Ban Brook, is present towards the eastern extent of the site. Flood Zone 2 extends across approximately a third of the site area, reaching a maximum distance of 120m in from the most eastern point. The flood extent within the site is constrained by the low-lying topography and Flood Zone 2 reaches the widest extent in the surrounding region. The section of Ban Brook directly north of the site is represented within the Environment Agency's Flood Zones 2 and 3 which contributes to the Flood Zone 2 extent within the site. The flow path is topographically defined by the ridge to the north-west of the site, flowing in a south-easterly direction. Flood Zone 3a and b are shown to the north-east of the site outside of the extent of the site. The area around the A46 and Station Road roundabout seems to be an area of interaction between the downstream ends and confluences of the Ban Brook, the River Arrow and the wider River Avon floodplain. A detailed model of the Ban Brook would help to see if the Flood Zone 2 extent is indeed this wide from this watercourse (or the influence of the confluences) or if this is conservative, as the surface water 1,000-year flood extents which converge towards the watercourse do not reach the site.		
	Surface Water	Proportion of site at risk (RoFfSW)		
		30-year	100-year	1,000-year
		0%	0%	0%
		Max depths (m)		
		N/A	N/A	N/A
		Max velocity (m/s)		
N/A	N/A	N/A		

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	SALF.17 [SALF.A]		
	Address	Salford Priors		
	Area	1.38 hectares		
	Current land use	Greenfield		
	Proposed land use	Residential		
		<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: There are no modelled surface water flows within the extent of this site. During the 30, 100 and 1,000-year event, surface water accumulates around Ban Brook and its floodplain with no impact to the site. The flood risk extent from the 1,000-year event reaches 50m from the northern edge of the site.</p>		
	Reservoir	The site is not shown to be at risk of reservoir flooding from the available online maps.		
	Groundwater	<p>The EA's Areas Susceptible to Groundwater Flooding dataset, provided as 1km grid squares, shows the susceptibility of an area to groundwater flood emergence. The following comments can be made about groundwater flood risk:</p> <ul style="list-style-type: none"> The site is shown to have a 75% or greater susceptibility to groundwater flood emergence. <p>JBA's Groundwater Mapping dataset shows that the site has groundwater levels between 0 and 0.025m below the ground surface, suggesting groundwater may emerge at the surface locally and indicating some risk.</p> <p>This assessment does not negate the requirement that an appropriate assessment of the groundwater regime should be carried out at the site-specific Flood Risk Assessment (FRA) stage.</p>		
	Flood history	This site is shown to be within the reaches of the Environment Agency's Historic Flood Map. The Recorded Flood outlines dataset shows the site is located within 200m of 3 historic events.		
Flood risk management infrastructure	Defences	Defence Type	Standard of Protection	Condition
		-	-	-
		The site is not protected by any formal flood defences.		

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	SALF.17 [SALF.A]
	Address	Salford Priors
	Area	1.38 hectares
	Current land use	Greenfield
	Proposed land use	Residential
	Residual risk	The Ban Brook flows under Station Road, to the south-east of the site, but it is deemed that risk from blockage here would be minimal to the site, given the wide floodplain and interaction between the Arrow/ Avon confluence. Site-specific Flood Risk Assessments may need to investigate the impacts of blockages to these structures on the climate change scenario and confirm risk to the site and help inform finished floor levels in-site.
Emergency planning	Flood warning	The site is partially covered by the Environment Agency's Flood Warning Service. The site is covered by the 'River Arrow and River Alne' Flood Alert. Downstream of Ban Brook is a Flood Warning Area called 'River Arrow at Salford Bridge', which will receive flood warnings. This area lies directly east of the site.
	Access and egress	Access and egress at this site is possible via two of the side roads along the northern extent of Bomford Way which leads from Station Road. Access is limited due to few surrounding road networks, therefore this is the only existing point of road access for the site. Access may be made on foot via the footpath at the northern extent of the site but this is not designed for vehicle use. Further investigation on access from Station Road will have to be assessed. Access from Station Road to the east should be avoided where possible, due to the fluvial flood risk shown on the Station Road/ A46 roundabout area. Clearer access is possible along Station Road to the west or School Road to the north. A site-specific Flood Risk Assessment should be undertaken to evaluate accessibility to pedestrians and vehicles at these access points, as the northern footpath access point is within the 1,000-year surface flood risk modelled data.

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	SALF.17 [SALF.A]
	Address	Salford Priors
	Area	1.38 hectares
	Current land use	Greenfield
	Proposed land use	Residential
Climate Change	Implications for the site	<ul style="list-style-type: none"> 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 flood risk from climate change. This extends across the eastern half of the site encompassing the lower incline ground. A detailed modelling study should test the 2080s climate change allowances, which may refine risk in the eastern extent of the site. Climate change should also 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 flooding extent provides an indication of the likely increase in extent of the more frequent surface water events. At this site, there is no surface water flood extents shown. <p>Developers should consider SuDS strategies to reduce the impacts of climate change from surface water in a detailed site-specific FRA.</p>

Requirements for drainage control and impact mitigation

Broad scale assessment of possible SuDS

- Geology at the site consists of:
 - Bedrock – Mercia mudstone ground - mudstone
 - Superficial – Boundary
- Most source control techniques are likely to be suitable. Mapping suggests that slopes may be unsuitable for selective source control techniques. 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.
- Mapping suggests that there is a high risk of groundwater flooding at this location, therefore it is likely infiltration techniques will not be suitable. This should be confirmed via site investigations to assess the potential for infiltration.
- "This option is unlikely to be feasible as mapping suggests mean site slopes are > 5%. Feasibility of such options should be assessed as part of a site specific assessment. If this feature is feasible a liner maybe required to prevent the egress of groundwater.
- The site is considered to be highly susceptible to groundwater flooding. Groundwater flooding could occur at the surface which may flow to and pool within topographic low spots during very wet winters. Detention and attenuation features should be designed to prevent groundwater ingress from impacting hydraulic capacity and structural integrity. Additional site investigation work may be required to support the detailed design of the drainage system. This may include groundwater monitoring to demonstrate that a sufficient unsaturated zone has been provided above the highest occurring groundwater level. Below ground development such as basements are not appropriate at this site."
- This option is unlikely to be feasible as mapping suggests mean site slopes are > 5%. Feasibility of such options should be assessed as part of a site specific assessment. If this feature is feasible it should be located where the depth to the water table is >1m, additionally a liner maybe required to prevent the egress of groundwater.
- 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. A liner maybe required to prevent the egress of groundwater.
- 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 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.
- The site is not located within a Groundwater Source Protection Zone and there are no restrictions over the use of infiltration techniques with regard to groundwater quality.

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	SALF.17 [SALF.A]
	Address	Salford Priors
	Area	1.38 hectares
	Current land use	Greenfield
	Proposed land use	Residential
NPPF and planning implications	Exception Test requirements	<p>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' than other forms of development such as Employment development. 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 Highly Vulnerable development is located in FZ2.</p> <ul style="list-style-type: none"> Highly Vulnerable infrastructure should not be permitted

	<p style="text-align: center;">Requirements and guidance for site-specific Flood Risk Assessment</p>	<p>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 or is greater than one hectare. The site falls under these conditions. • Consultation with the Local Authority, Local Lead Flood Authority and the Environment Agency should be undertaken at an early stage. • All sources of flooding, particularly the risk of fluvial, 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, flow paths and climate change extents. • Flood risk needs to be considered for the lifetime of the development, accounting for climate change . • Any FRA should be carried out in line with the National Planning Policy Framework; Flood Risk and Coastal Change Planning Practice Guidance, Stratford on Avon District Council’s Local Plan policies, the LLFA’s (Warwickshire County Council) ‘Surface Water Management Plan’ and ‘Stratford on Avon District Core Strategy 2011 to 2031’. • The development should be designed using a sequential approach. Development should be steered away from areas of fluvial flood risk to the east, preserving these spaces as green infrastructure. Development must be in line with Table 3: flood risk vulnerability and flood zone compatibility of the NPPG. <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). • 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. • 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 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.
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Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	SALF.17 [SALF.A]
	Address	Salford Priors
	Area	1.38 hectares
	Current land use	Greenfield
	Proposed land use	Residential
		<ul style="list-style-type: none"> • 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 Warwickshire County Council's 'Surface Water Management Plan', Stratford on Avon District's 'Core Strategy 2011 to 2031' and the Level 1 SFRA information on SuDS. • 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. • 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	<p>The site is likely to be suitable for development subject to:</p> <ul style="list-style-type: none"> • Development is limited to the western region of the site, outside of the Flood Zone 2. • Safe access and egress are considered as the likely vehicle access route via Bomford Way is limited. • A carefully considered and integrated flood resilient and sustainable drainage design is put forward. • If flood mitigation measures are implemented then they are tested to ensure that they will not displace water elsewhere. • Space for green infrastructure should be considered in the areas of highest flood risk in the eastern extent of the site. • A site-specific FRA 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 on the site and to neighbouring properties. <p>Refer to the detailed 'guidance for developers' section for further information on the measures that are appropriate for this site</p>	

Stratford on Avon District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables



Site details	Site Code	SALF.17 [SALF.A]
	Address	Salford Priors
	Area	1.38 hectares
	Current land use	Greenfield
	Proposed land use	Residential
Mapping Information		
<p>The key datasets used to make planning recommendations regarding this site were 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.</p>		
Flood Zones	<p>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. There is modelled data in the near vicinity from the River Arrow and River Avon. It is recommended that a more detailed hydraulic model is constructed at the site-specific Flood Risk Assessment stage, to confirm flood risk and understand the interactions between the 3 watercourses in the confluence area.</p>	
Climate change	<p>Climate change was based on Flood Zone 2 to serve as an indication of possible extents. 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.</p>	
Fluvial depth, velocity and hazard mapping	<p>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 small watercourses. This should be explored further at site-specific stage</p>	
Surface Water	<p>The Risk of Flooding from Surface Water has been used to define areas at risk from surface water flooding.</p>	
Surface water depth, velocity and hazard mapping	<p>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.</p>	

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	SOU.14			
	Address	Southam			
	Area	31.15 hectares			
	Current land use	Greenfield			
	Proposed land use	Residential			
Sources of flood risk	Location of site within catchment	The site is located to the north east of Southam on the western side of the Stowe – source to confluence River Itchen catchment. The River Stowe flows westwards through the catchment, passing to the south of the site and through Southam towards its confluence with the River Itchen.			
	Existing drainage features	The River Stowe flows along the southern boundary of the site from east to west. It then flows south west away from the site under Daventry Road (A425) and meanders through Southam. It then joins the River Itchen, which is approximately 2km downstream from the site.			
	Fluvial	Proportion of site at risk			
		FZ3b	FZ3a	FZ2	FZ1
		4%	4%	5%	95%
		Highest zone of risk (Risk of Flooding from Rivers and Sea)			
		Medium			
		<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%)</i>			
	Available data:	The Environment Agency's (EA) Flood Zone mapping has been used in this assessment. Where there is no detailed hydraulic model available, the Flood Zones are based on 2D generalised modelling.			
	Flood characteristics:	Most of the site is in Flood Zone 1 and at Very Low risk of fluvial flooding. However, Flood Zones 2 and 3, associated with fluvial flooding from the River Stowe, encroach onto the low-lying topography at the southern edge of the site. Almost the entire southern boundary of the site is covered by the Flood Zones, with Flood Zone 2 reaching up to 50m into the site from the boundary. The topography here is confined though, as the rest of the site rises away from the floodplain.			
Surface Water	Proportion of site at risk (RoFfSW)				
	30-year	100-year	1,000-year		
	4%	5%	10%		

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	SOU.14		
	Address	Southam		
	Area	31.15 hectares		
	Current land use	Greenfield		
	Proposed land use	Residential		
	Max depths (m)			
	>0.9	>0.9	>0.9	>0.9
	Max velocity (m/s)			
	>0.25	>0.25	>0.25	>0.25
	<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>			
	Description of surface water flow paths:			
	<p>There are two significant surface water flow paths affecting the site. The main one is associated with the River Stowe which flows along the southern boundary of the site. During the 30-year event, surface water accumulates around the river and its floodplain, to depths greater than 0.9m and velocities over 0.25m/s. The extent increases slightly for the 100-year event, and again for the 1,000-year event. A small flow path also develops during the 1,000-year event, running from the east side of the existing buildings down into the River Stowe.</p> <p>The other major flow route runs southwards along the eastern boundary of the site and into the River Stowe. Velocities along here are greater than 0.25m/s for all events. During the 30-year event, there is a narrow and disconnected extent of flooding along the north eastern and eastern boundaries, with flood depths largely remaining below 0.3m. There is a slight increase in extent for the 100-year event, but depths remain similar. During the 1,000-year event, a continuous flow route is formed, and the extent is no longer confined to the boundary of the site; it encroaches further into the north east corner and down the eastern edge of the site. Depths increase in some places to between 0.3 and 0.9m. There are also a few isolated areas of flooding towards the centre of the site, along small drainage ditches.</p>			
	Reservoir	The available online maps show that the maximum extent of flooding from reservoirs affects the southern edge of the site, where the River Stowe flows along the boundary. Reservoir risk is considered low, but this risk should be confirmed in a site-specific Flood Risk Assessment.		

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	SOU.14
	Address	Southam
	Area	31.15 hectares
	Current land use	Greenfield
	Proposed land use	Residential
	Groundwater	<p>The EA's Areas Susceptible to Groundwater Flooding dataset, provided as 1km grid squares, shows the susceptibility of an area to groundwater flood emergence. The following comment can be made about groundwater flood risk:</p> <ul style="list-style-type: none"> The entire site is shown to have less than a 25% susceptibility to groundwater flood emergence. <p>JBA's Groundwater Mapping dataset shows that the entire site has been designated as no risk.</p> <p>This assessment does not negate the requirement that an appropriate assessment of the groundwater regime should be carried out at the site-specific Flood Risk Assessment (FRA) stage.</p>
	Flood history	<p>The site is not shown to be within the reaches of the EA's Historic Flood Map. Warwickshire County Council (WCC) hold records of flooding in the vicinity of the site to the south west. These refer to flood events in 1999 and 2016. WCC may hold further details on these events and additional records which are not available at this time. These records detail historical flood incidents from all sources, whereas the EA dataset only records incidents of fluvial, tidal or coastal flooding. The Lead Local Authority should be contacted to obtain further details.</p>
Flood risk management infrastructure	Defences	The site is not protected by any formal flood defences.
	Residual risk	<p>By the south west corner of the site, the River Stowe flows under Daventry Road (A425). If this bridge became blocked, flooding could back up and extend upstream and onto the development site. As the floodplain topography is fairly constrained to the southern boundary, it is likely that flood depths would increase.</p> <p>A site-specific FRA should investigate the impacts of blockage to this bridge on the climate change scenario and confirm risk to the site as well as help inform finished floor levels in-site.</p>
Emergency planning	Flood warning	The southern edge of the site is covered by the River Leam and River Itchen Flood Alert Area (033WAF203). This site is not covered by a Flood Warning Area.

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	SOU.14
	Address	Southam
	Area	31.15 hectares
	Current land use	Greenfield
	Proposed land use	Residential
	Access and egress	<p>There are currently two access and egress points for the site. One is via an access road off Daventry Road which leads through a farm and into the fields on the site. However, there is a significant risk of fluvial and surface water flooding on Daventry Road around here, associated with the River Stowe and its floodplain. As depths and velocities are high for all scenarios, this could impede access and egress. It may be that with a detailed hydraulic model, flood risk is refined when channel and structure dimensions are accounted for, as the current Flood Zones used 2D generalised data.</p> <p>The alternative access and egress point is via a track off the A423 road, approximately two thirds of the way up the western boundary of the site. In terms of flood risk, this would be more suitable as there is Very Low risk of fluvial flooding near here, and there is just a small amount of surface water flooding on the road to depths below 0.3m during the 100-year and 1,000-year events, which are unlikely to significantly impact access and egress.</p>

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	SOU.14
	Address	Southam
	Area	31.15 hectares
	Current land use	Greenfield
	Proposed land use	Residential
Climate Change	Implications for the site	<ul style="list-style-type: none"> • 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 modelling data currently available at this site, therefore Flood Zone 2 has been used as a conservative indication of potential impacts of climate change on fluvial flooding for the River Stowe running along the southern edge of the site. Fluvial flood risk here does not significantly increase due to climate change due to the topography of the site which inclines away from the river channel. • It is recommended that developers undertake further modelling at the site-specific FRA stage to determine whether the site may be at risk of flooding in the future. The detailed modelling study should test the 2080s climate change allowances in a hydraulic model, to ascertain the impact at the site. • At a detailed assessment stage, the impacts of climate change on the functional floodplain may need to be considered. This is likely to resemble the increase in extent from Flood Zone 3b (20-year extent) to Flood Zone 3a (100-year extent), for the purposes of a strategic assessment. • Climate change should also 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 flooding extent provides an indication of the likely increase in extent of the more frequent surface water events, which poses some risk along the site's eastern 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.

<p>Requirements for drainage control and impact mitigation</p>	<p>Broad scale assessment of possible SuDS</p>	<ul style="list-style-type: none"> • Geology at the site consists of: <ul style="list-style-type: none"> ○ Bedrock – Rugby Limestone member – mudstone and limestone, interbedded ○ Superficial – None recorded • Most source control techniques are likely to be suitable. Mapping suggests that slopes may be unsuitable for selective source control techniques. 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. • 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. • "This option is unlikely to be feasible as mapping suggests mean site slopes are > 5%. Feasibility of such options should be assessed as part of a site specific assessment. If this feature is feasible a liner maybe required to prevent the egress of groundwater. • The site is considered to be highly susceptible to groundwater flooding. Groundwater flooding could occur at the surface which may flow to and pool within topographic low spots during very wet winters. Detention and attenuation features should be designed to prevent groundwater ingress from impacting hydraulic capacity and structural integrity. Additional site investigation work may be required to support the detailed design of the drainage system. This may include groundwater monitoring to demonstrate that a sufficient unsaturated zone has been provided above the highest occurring groundwater level. Below ground development such as basements are not appropriate at this site." • This option is unlikely to be feasible as mapping suggests mean site slopes are > 5%. Feasibility of such options should be assessed as part of a site specific assessment. If this feature is feasible it should be located where the depth to the water table is >1m. • 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. • The site is not designated by the Environment Agency as previously being a landfill site. • The site is not located within a Groundwater Source Protection Zone and there are no restrictions over the use of infiltration techniques with regard to groundwater quality.
<p>NPPF and planning implications</p>	<p>Exception Test requirements</p>	<p>The Local Authority have carried out the Sequential Test in line with national guidance. The Sequential Test must be passed before the Exception Test is applied. Residential development is classified as 'More Vulnerable'.</p> <p>It is recommended that proposed development will be sequentially located within Flood Zone 1 areas of the site.</p>

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	SOU.14
	Address	Southam
	Area	31.15 hectares
	Current land use	Greenfield
	Proposed land use	Residential
		<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. • Highly Vulnerable development is located in FZ2. <p>Development will not be permitted for the following scenarios:</p> <ul style="list-style-type: none"> • Highly Vulnerable Infrastructure within FZ3a and FZ3b. • More Vulnerable and Less Vulnerable Infrastructure within FZ3b.

	<p style="text-align: center;">Requirements and guidance for site-specific Flood Risk Assessment</p>	<p>Flood Risk Assessment:</p> <ul style="list-style-type: none"> • At the planning application stage, a site-specific Flood Risk Assessment will be required for this site as the southern edge is located within Flood Zones 2 and 3 and may be subject to other sources of flooding, and the development may introduce a more vulnerable use. It will also be required where development sites: <ul style="list-style-type: none"> ○ are 1 hectare or more in size; ○ contain land which has been identified by the EA as having critical drainage problems; or ○ contain land identified in the strategic flood risk assessment as being at increased flood risk in future. • A detailed hydraulic model may be required at FRA stage to confirm risk and flow paths, FZ3b and climate change extents from the River Stowe along the southern boundary, using channel topographic survey. • Consultation with the Local Authority, Local Lead Flood Authority and the Environment Agency should be undertaken at an early stage. • All sources of flooding, particularly the risk of fluvial, surface water and groundwater flooding, should be considered as part of a site-specific FRA. • Flood risk needs to be considered for the lifetime of the development, accounting for climate change. • Blockage residual risk will need to be investigated and modelled in a FRA to confirm impacts and help inform finished flood levels. • 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 along the southern and eastern boundaries, preserving these spaces as green infrastructure. Development must be in line with Table 3: flood risk vulnerability and flood zone compatibility of the NPPG. • Any FRA should be carried out in line with the National Planning Policy Framework; Flood Risk and Coastal Change Planning Practice Guidance, Stratford on Avon District Council's Local Plan policies, the LLFA's (Warwickshire County Council) 'Surface Water Management Plan' and 'Stratford on Avon District Core Strategy 2011 to 2031'. • Development in FZ3b should be avoided unless appropriate use can be demonstrated in line with NPPF. Development in FZ3 may require floodplain compensation and this should be confirmed with the EA at FRA 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). • 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
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		<p>water flow routes. Consideration should be given to the siting of access points with respect to areas of surface water flood risk.</p> <ul style="list-style-type: none"> • 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 watercourse to ensure flows are not exacerbated downstream within the catchment. • All 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. • Developers should refer to Warwickshire County Council's 'Surface Water Management Plan', Stratford on Avon District's 'Core Strategy 2011 to 2031' and the Level 1 SFRA for information on SuDS. • SuDS should be designed to deliver multiple benefits including water quality, biodiversity, amenity, green infrastructure etc. Example features include swales, attenuation features, green roofs, rainwater capture and reuse and permeable paving. • Efforts should be made to limit runoff to greenfield rates and discharge rates from the site should not increase downstream flood risk. • 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. • 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.
<p>Key messages</p>		<p>The site is likely to be suitable for development subject to:</p> <ul style="list-style-type: none"> • Development is preferentially located in areas at lower risk of fluvial flooding. Flood risk across this site is primarily located in areas of lower-lying topography along the southern boundary. Development should be steered towards land at a higher elevation which is less susceptible to fluvial and surface water flood risk. • Surface water risk along the eastern site boundary should also be considered and development steered away from. • 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) and will not be detrimental to flood risk downstream of the site.

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	SOU.14
	Address	Southam
	Area	31.15 hectares
	Current land use	Greenfield
	Proposed land use	Residential
		<ul style="list-style-type: none"> Space for green infrastructures or storage of flood waters should be considered in the areas of highest flood risk. <p>Refer to the detailed 'guidance for developers' section for further information on the measures that are appropriate for this site.</p>
Mapping Information		
<p>The key datasets used to make planning recommendations regarding this site were 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.</p>		
Flood Zones	<p>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.</p>	
Climate change	<p>Climate change was based on Flood Zone 2 to serve as an indication of possible extents. 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.</p>	
Fluvial depth, velocity and hazard mapping	<p>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 small watercourses. This should be explored further at site-specific stage</p>	
Surface Water	<p>The Risk of Flooding from Surface Water has been used to define areas at risk from surface water flooding.</p>	
Surface water depth, velocity and hazard mapping	<p>The surface water depth, velocity and hazard mapping for the 1 in 100-year event (considered to be medium risk) is taken from Environment Agency's Risk of Flooding from Surface Water.</p>	

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	SOU.15[SOU.B]			
	Address	Southam			
	Area	5.66 hectares			
	Current land use	Greenfield			
	Proposed land use	Residential			
Sources of flood risk	Location of site within catchment	The site is located to the south of Southam, at the northern edge of the Itchen – source to confluence with River Stowe catchment. The River Itchen flows northwards through the western half of the catchment, passing the site 1km to the west, before leaving the catchment and reaching its confluence with the River Stowe.			
	Existing drainage features	There is a drainage feature, which appears to be a SuDS retention pond, outside the north west boundary of the site. This has likely been added for the development to the north west of the site, to attenuate runoff from rainfall events. There is an unnamed watercourse approximately 200m south west from the site, which flows towards the River Itchen.			
	Fluvial	Proportion of site at risk			
		FZ3b	FZ3a	FZ2	FZ1
		0%	0%	0%	100%
		Highest zone of risk (Risk of Flooding from Rivers and Sea)			
		Very Low			
<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%)</i>					
Available data: The Environment Agency's (EA) Flood Zone mapping has been used in this assessment. Where there is no detailed hydraulic model available, the Flood Zones are based on 2D generalised modelling.					
Flood characteristics: The site is not shown to be currently at risk of flooding from fluvial sources. The site is approximately 100m from Flood Zones associated with the unnamed watercourse which flows into the River Itchen. The Flood Zones here also look to be 2D generalised modelling and appear very wide/ conservative for the size of the small channel, and therefore it is likely if this was modelled in detail using survey, that the flood extents would be refined. .					
Proportion of site at risk (RoFfSW)					

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	SOU.15[SOU.B]		
	Address	Southam		
	Area	5.66 hectares		
	Current land use	Greenfield		
	Proposed land use	Residential		
Surface Water		30-year	100-year	1,000-year
		26%	39%	60%
		Max depths (m)		
		0.3-0.9	0.3-0.9	0.3-0.9
		Max velocity (m/s)		
		>0.25	>0.25	>0.25
		<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>		
		Description of surface water flow paths:		
		The site is at significant risk from surface water flooding and lies in the middle of a valley/ topographic flow route for overland flows. A significant surface water flow path bisects the site, flowing from east to west. During the 30-year event, depths largely remain below 0.3m while velocities are greater than 0.25m/s. There is a small area of flooding to slightly higher depths (between 0.3m and 0.9m) along the western boundary. Although depths and velocities remain similar, the extent increases during the 100-year event and another flow path develops, flowing from the housing development to the north west of the site and down along the western boundary. During the 1,000-year event, a significant area of the site is covered by surface water flooding, with much of this area reaching depths between 0.3m and 0.9m. Only the top north-eastern corner and southern thirs of the site are free of surface water flood risk.		
		Reservoir	The site is not shown to be at risk of reservoir flooding from the available online maps.	

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	SOU.15[SOU.B]
	Address	Southam
	Area	5.66 hectares
	Current land use	Greenfield
	Proposed land use	Residential
	Groundwater	<p>The EA's Areas Susceptible to Groundwater Flooding dataset, provided as 1km grid squares, shows the susceptibility of an area to groundwater flood emergence. The following comment can be made about groundwater flood risk:</p> <ul style="list-style-type: none"> The entire site is not shown to be within an area susceptible to groundwater flood emergence. <p>JBA's Groundwater Mapping dataset also shows that the entire site has been designated as no risk. This assessment does not negate the requirement that an appropriate assessment of the groundwater regime should be carried out at the site-specific Flood Risk Assessment (FRA) stage.</p>
	Flood history	<p>The site is not shown to be within the reaches of the EA's Historic Flood Map. Warwickshire County Council may hold additional records which are not available at this time. These records detail historical flood incidents from all sources, whereas the EA dataset only records incidents of fluvial, tidal or coastal flooding. The Lead Local Authority should be contacted to obtain further details.</p>
Flood risk management infrastructure	Defences	The site is not protected by any formal flood defences.
	Residual risk	The site is considered to not be at a residual risk from flood risk management infrastructure.
Emergency planning	Flood warning	The site is not within any EA Flood Warning or Alert areas, but the unnamed watercourse to the south west is covered by the River Leam and River Itchen Flood Alert Area (033WAF203).

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	SOU.15[SOU.B]
	Address	Southam
	Area	5.66 hectares
	Current land use	Greenfield
	Proposed land use	Residential
	Access and egress	<p>Access and egress to the site can be gained off Banbury Road (A423) at two locations along the eastern boundary. One is at the north east corner of the site and the other is at the south east corner. There is negligible risk of fluvial flooding affecting these; however, surface water flooding poses a risk. During the 30-year, 100-year and 1,000-year events, surface water flooding covers Banbury Road outside the northern half of the eastern boundary of the site. As depths reach between 0.3m and 0.9m and velocities are greater than 0.25m/s for all scenarios, access and egress may be impeded around this area. It would therefore be preferential to use the alternative access and egress route, in the south east corner where there is a Very Low risk of surface water flooding on Banbury Road. Consideration is needed for how different parts of the site would access this road where surface water flow paths bisect the site. However, the road is along the full eastern boundary and the flow path is lateral east to west.</p>

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	SOU.15[SOU.B]
	Address	Southam
	Area	5.66 hectares
	Current land use	Greenfield
	Proposed land use	Residential
Climate Change	Implications for the site	<ul style="list-style-type: none"> • Whilst the site is not currently shown to be at risk of flooding, the site's proximity to Flood Zones associated with the unnamed watercourse to the south west poses potential risk. LiDAR data at the site shows the topography around the watercourse and most of the site is fairly flat, which may indicate that increased flooding resulting from climate change could extend towards and affect the south west side of the site (though this is deemed a low risk as the topography would still reduce slightly from the site towards to the watercourse). It is recommended that developers undertake further modelling at the site-specific FRA stage to determine whether the site may be at risk of flooding in the future. The detailed modelling study should test the 2080s climate change allowances in a hydraulic model, to ascertain the impact at 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. • Climate change should also 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 flooding extent provides an indication of the likely increase in extent of the more frequent surface water events. This indicates that much of the site could be at risk and 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.

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	SOU.15[SOU.B]
	Address	Southam
	Area	5.66 hectares
	Current land use	Greenfield
	Proposed land use	Residential
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 – Rugby Limestone Member - Mudstone And Limestone, Interbedded. ○ Superficial – None recorded • All forms of source control are likely to be suitable. 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. • 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. • The site is not located within a Groundwater Source Protection Zone and there are no restrictions over the use of infiltration techniques with regard to groundwater quality.

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	SOU.15[SOU.B]
	Address	Southam
	Area	5.66 hectares
	Current land use	Greenfield
	Proposed land use	Residential
NPPF and planning implications	Exception Test requirements	<p>The Local Authority have carried out the Sequential Test in line with national guidance. The Sequential Test must be passed before the Exception Test is applied. Residential development is classified as 'More Vulnerable'.</p> <p>As the entire site is shown to be in Flood Zone 1, the Exception Test is not required for the site. However, as the site is at significant risk of surface water flooding, developers may need to undertake a site-specific flood risk assessment including surface water modelling to demonstrate that the change in land use does not increase the risk of surface water on the site and to nearby properties. Furthermore, caution should be applied for development in the south west of the site due to the proximity of Flood Zones associated with the unnamed watercourse.</p> <p>If detailed modelling of the unnamed watercourse shows the site to be in Flood Zone 3, 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.</p> <p>Development will not be permitted for the following scenarios:</p> <ul style="list-style-type: none"> • Highly Vulnerable Infrastructure within FZ3a and FZ3b. • More Vulnerable and Less Vulnerable Infrastructure 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 for this site as development is in close proximity to a watercourse and may be subject to other sources of flooding and the development may introduce a more vulnerable use. It will also be required where development sites:
 - are 1 hectare or more in size;
 - contain land which has been identified by the EA as having critical drainage problems; or
 - contain land identified in the strategic flood risk assessment as being at increased flood risk in future.
- A detailed hydraulic model may be required at FRA stage, to confirm flood risk, flow paths and climate change extents from the watercourse to the south west of the site, using channel topographic survey.
- Consultation with the Local Authority, Local Lead Flood Authority and the Environment Agency should be undertaken at an early stage.
- All sources of flooding, particularly the risk of fluvial, surface water and groundwater flooding, should be considered as part of a site-specific FRA.
- Flood risk needs to be considered for the lifetime of the development, accounting for climate change.
- The development should be designed using a sequential approach. Development should be steered away from areas of greatest surface water flood risk, through the middle of the site, preserving this space as green infrastructure. Development must be in line with Table 3: flood risk vulnerability and Flood Zone compatibility of the NPPG.
- Any FRA should be carried out in line with the National Planning Policy Framework; Flood Risk and Coastal Change Planning Practice Guidance, Stratford on Avon District Council's Local Plan policies, the LLFA's (Warwickshire County Council) '[Surface Water Management Plan](#)' and '[Stratford on Avon District Core Strategy 2011 to 2031](#)'.
- If a detailed model shows the western boundary to be in Flood Zone 3, development in FZ3b should be avoided unless appropriate use can be demonstrated in line with NPPF.

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. Whilst the site is not currently at risk of fluvial flooding, no assessment of future flood risk with regard to climate change has been made. 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

		<p>siting of access points with respect to areas of surface water flood risk.</p> <ul style="list-style-type: none"> • 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 watercourse to ensure flows are not exacerbated downstream within the catchment. • All 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. • Developers should refer to Warwickshire County Council's 'Surface Water Management Plan', 'Stratford on Avon District's Core Strategy 2011 to 2031' and the 'Level 1 SFRA' for information on SuDS. • SuDS should be designed to deliver multiple benefits including water quality, biodiversity, amenity, green infrastructure etc. Example features include swales, attenuation features, green roofs, rainwater capture and reuse and permeable paving. • Efforts should be made to limit runoff to greenfield rates and discharge rates from the site should not increase downstream flood risk. • 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. • 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.
<p>Key messages</p>		<p>The site is likely to be suitable for development subject to:</p> <ul style="list-style-type: none"> • Development is steered to the north and south of the site, avoiding where possible the central surface water flow path, so as not to displace flows in this conveyance route. A carefully considered and integrated flood resilient and sustainable drainage design is put forward. A drainage strategy should help inform site layout and design to ensure there is no increase in runoff beyond current greenfield rates. • 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 surface water flooding on the site and to neighbouring properties.

**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	SOU.15[SOU.B]
	Address	Southam
	Area	5.66 hectares
	Current land use	Greenfield
	Proposed land use	Residential

	<ul style="list-style-type: none"> • Safe access and egress need to be considered as the road near to the access points is affected by surface water flooding in the 30-year, 100-year and 1,000-year events. The site is also bisected by a surface water flow path and so consideration is needed for all parts of the site to gain safe access. • 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. • A site-specific FRA 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 surface water flooding on the site and to neighbouring properties. <p>Refer to the detailed 'guidance for developers' section for further information on the measures that are appropriate for this site.</p>
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Mapping Information

The key datasets used to make planning recommendations regarding this site were 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; 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 of the unnamed watercourse 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 and the surface water 1,000-year flood extent to serve as an indication of possible extents. 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.
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**Stratford on Avon District Council Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**



Site details	Site Code	SOU.15[SOU.B]
	Address	Southam
	Area	5.66 hectares
	Current land use	Greenfield
	Proposed land use	Residential
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 small 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 100-year event (considered to be medium risk) is taken from Environment Agency's Risk of Flooding from Surface Water.