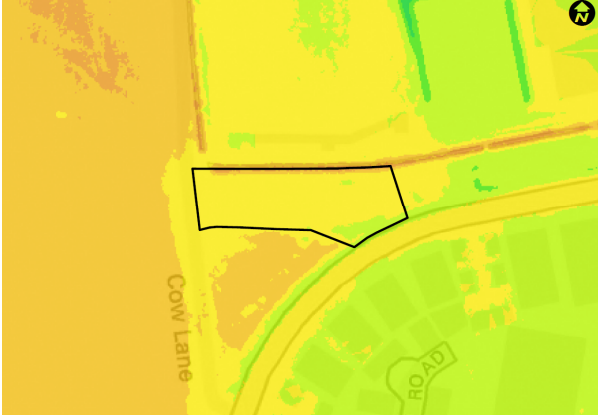
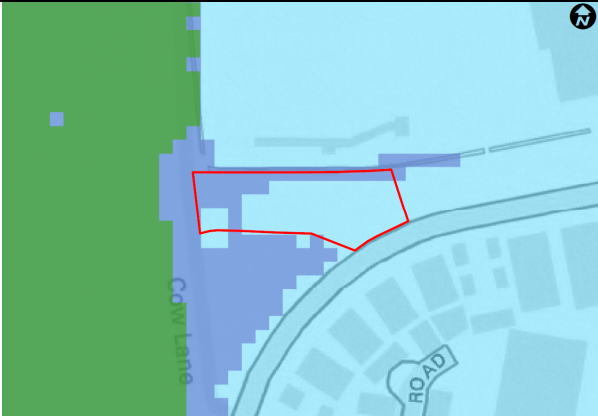
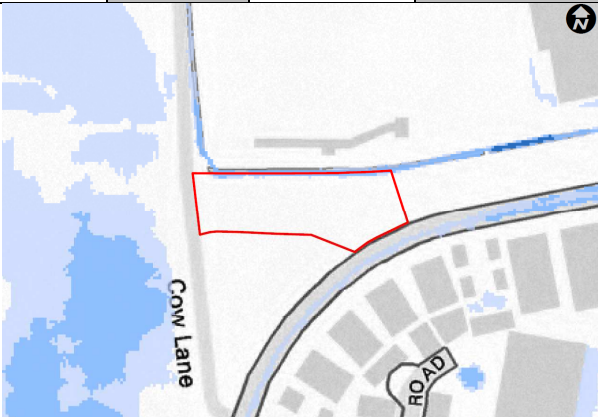


Reading Borough Council Level 2 Strategic Flood Risk Assessment

WR4 – Cow Lane (Local Plan ref: WR4)

Grid Reference	SU 70450 470450			Post Code	RG1 8JP																										
Topography					<p>Elevation</p> <table style="font-size: small;"> <tr> <td style="color: red;">■</td><td>< 35 mAOD</td> <td style="color: green;">■</td><td>40 - 41 mAOD</td> </tr> <tr> <td style="color: orange;">■</td><td>35 - 36 mAOD</td> <td style="color: teal;">■</td><td>41 - 42 mAOD</td> </tr> <tr> <td style="color: yellow;">■</td><td>36 - 37 mAOD</td> <td style="color: blue;">■</td><td>42 - 43 mAOD</td> </tr> <tr> <td style="color: lightyellow;">■</td><td>37 - 38 mAOD</td> <td style="color: darkblue;">■</td><td>43 - 44 mAOD</td> </tr> <tr> <td style="color: yellowgreen;">■</td><td>38 - 39 mAOD</td> <td style="color: navy;">■</td><td>44 - 45 mAOD</td> </tr> <tr> <td style="color: limegreen;">■</td><td>39 - 40 mAOD</td> <td style="color: black;">■</td><td>> 45 mAOD</td> </tr> </table> <p>The topography of the site is relatively flat, ranging between approximately 38.3m AOD and 39.1m AOD.</p>			■	< 35 mAOD	■	40 - 41 mAOD	■	35 - 36 mAOD	■	41 - 42 mAOD	■	36 - 37 mAOD	■	42 - 43 mAOD	■	37 - 38 mAOD	■	43 - 44 mAOD	■	38 - 39 mAOD	■	44 - 45 mAOD	■	39 - 40 mAOD	■	> 45 mAOD
■	< 35 mAOD	■	40 - 41 mAOD																												
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■	38 - 39 mAOD	■	44 - 45 mAOD																												
■	39 - 40 mAOD	■	> 45 mAOD																												
Flood Zone Map					<p>Legend</p> <ul style="list-style-type: none"> — River □ Site Boundary ■ Flood Zone 2 ■ Flood Zone 3 ■ Flood Zone 3b 																										
Flood Zone 1	0%	Flood Zone 2	70%	Flood Zone 3a	30%	Flood Zone 3b	0%																								
Surface Water					<p>Risk of Surface Water Flooding</p> <ul style="list-style-type: none"> — River □ Site Boundary ■ High - 1 in 30 annual probability ■ Medium - 1 in 100 annual probability ■ Low - 1 in 1000 annual Probability □ Very Low - > 1 in 1000 annual probability 																										



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Development Proposal	Traveller transit site	Vulnerability Classification	More Vulnerable (“Sites used for ...short-let caravans and camping, subject to a specific warning and evacuation plan”)		
Applicable Climate Change Allowances	The +35% and +70% peak river flow climate change allowances should be used to assess a range of climate change scenarios. The +35% allowance should be used to provide a benchmark flood level against which mitigation measures should be set, and the +70% allowance used to assess residual risk.				
Climate Change Extents				Legend Site Boundary 1 in 100 annual probability +35% Climate Change 1 in 100 annual probability +70% Climate Change	
1 in 100 annual probability +25%	N/A	1 in 100 annual probability +35%	85%	1 in 100 annual probability +70%	95%
Description of Flood Risk	<p>Flood Depth The maximum flood depths in the present day 1 in 100 annual probability flood event typically vary between 50mm to 170mm in the western part of the site affected by this event.</p> <p>The flood depths in the 1 in 1000 annual probability flood event vary from 70mm to 860mm over the site, with the shallowest depths in the south-east corner (adjacent to the main access point).</p> <p>Flood depths in the climate change scenarios are typically 200mm in the +35% scenario and 600mm in the +70% scenario.</p> <p>Flood Warning and Period of Inundation The River Thames is a large catchment with flooding typically the result of sustained regional-scale rainfall events. The response time – i.e. the period between the rainfall over the catchment and the rising river levels downstream – can be significant, and this ensures there is typically a significant period of advance warning (i.e. a period of days) before flooding occurs in the area.</p> <p>The EA issue flood warnings for the area via their ‘Flood Information Service’ and considerable advance warning of a flood event can typically be provided to allow the Council, emergency services residents and businesses to take appropriate action.</p> <p>Velocity of Flood Waters The site is located a significant distance from the main river, and is impacted in the relevant climate change allowance scenarios. When flooding does occur, the rate of rise and fall in water level is slow and velocities will correspondingly be slow, with the direction of flow from west to east (subject to further interrogation of the EA modelling).</p>				



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Description of Flood Risk	<p>Flood Defences</p> <p>While not a 'formal' flood defence, the EA asset register does identify that the River Thames, located approximately 0.4km north of the site, includes bank protection on its right bank with a design standard of 1 in 5 years. The condition is currently at 3 (moderate), on a scale of 1 (very good) to 5 (very poor).</p>
	<p>Historic Records and Other Sources of Flooding</p> <p>The SFRA indicates that the site has been subject to historic river flooding in 1947, 1977 and 2013-2014. The site is not noted to have been impacted by flooding from other sources, however Cow Lane to the west of the site is noted to have been historically susceptible to flooding.</p> <p>Some areas adjacent to the minor watercourse on the northern boundary of the site are potentially at risk of surface water flooding which could result in ponding of water following heavy rainfall events. Any proposed site drainage must therefore be considered accordingly and must be assessed in accordance with Sections 13.4 and 13.5 of the Level 1 SFRA.</p> <p>The susceptibility to groundwater flooding varies between '25% to 50%'. The Thames Water DG5 information indicates that the site is within a postcode (RG1 8) that has 21-50 recorded sewer flood incidents, both internal and external.</p> <p>The site is not located within a maximum modelled breach extent of reservoir flooding and is therefore at negligible risk of flooding in the event of a reservoir breach.</p>
	<p>Overview of Flood Risk</p> <p>A summary of the flood risk to the site is provided below:</p> <ul style="list-style-type: none"> The site is classified as a combination of Flood Zone 2 'Medium Probability' (between 1 in 100 and 1 in 1000 annual probability of river flooding) and Flood Zone 3 'High Probability' (greater than 1 in 100 annual probability of river flooding). The western side of the site is impacted in the 1 in 100 annual probability event to maximum depths of between 50mm and 170mm. In the extreme 1 in 1000 annual probability event, flood depths across the site are between 70mm and 860mm; The site is impacted by the 1 in 100 annual probability +35% allowance for climate change flood event with maximum flood depths of approximately 200mm, rising to 600mm in the +70% climate change allowance scenario; The site is largely classified as at 'Very Low' risk of surface water flooding, with small areas adjacent to the minor watercourse classified as 'Low' to 'Medium' risk; The site is at negligible risk of flooding in the event of a reservoir breach; A continuous access route east via Richfield Avenue is available outside the 1 in 100 annual probability floodplain (the route south-west is impacted at the Cow Lane Bridges). Access is impacted in the 1 in 100 annual probability +35% climate change flood event. Due to the form of development, a Flood Management and Evacuation Plan would be required. <p>The site is shown to be at 'Medium' to 'High' probability of fluvial flooding, at a range of very low to medium risk of surface water flooding and may be susceptible to groundwater and sewer flooding. The site is therefore potentially at risk of flooding from a number of sources; however, it is considered feasible that the site could be developed safely and in accordance with the requirements of the NPPF to mitigate the potential risks of these sources of flooding.</p>



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Planning Recommendations	<p>Spatial Planning</p> <p>The western part of the site lies within Flood Zone 3a 'High Probability', affected by flooding from the River Thames in the 1 in 100 annual probability flood event. The majority of the site is shown to be in Flood Zone 2 'Medium Probability' and the majority of the site area is impacted by the 1 in 100 annual probability +35% and +70% allowances for climate change flood events.</p> <p>A review of flood risk within the site has been carried out, and it is considered feasible to utilise the site in such a way that it remains safe throughout the lifetime of the development, subject to provision of a Flood Management and Evacuation Plan.</p> <p>It is essential that the following recommendations are incorporated into the design process from the conceptual stage. A detailed site-based Flood Risk Assessment will be required as an integral part of the planning application stage, which should be carried out in accordance with Section 10.4 of the Level 1 SFRA.</p>
	<p>Design Recommendations</p> <ol style="list-style-type: none">1. Given the proposed nature of the development the usual floor level recommendations are not applicable. It should be recommended that pitches are located outside of the present day 1 in 100 annual probability flood extent to minimise residual risk;2. The proposed use of the site will not introduce permanent building footprint, and therefore flood storage during the 1 in 100 annual probability +35% climate change design event is not expected to be impacted through development of the site;3. Sustainable Drainage Systems (SuDS) should be incorporated into the site to address any changes in impermeable surfacing, aiming to achieve greenfield runoff rates, if feasible, in accordance with Section 13.4 of the Level 1 SFRA. It is important that SUDS are designed with due consideration to soil and groundwater conditions. Infiltration techniques should be sought wherever possible, however are likely to be unsuitable in areas of shallow groundwater and/or impermeable soils. Further guidance on designing for groundwater is provided in Section 6.5 of the Level 1 SFRA. Landscaping should be designed within the site to avoid locking overland flow routes;4. Safe access would be available in the current 1 in 100 annual probability flood event. The impacts on the route should be assessed for the 1 in 100 annual probability +35% climate change allowance as part of a 'Flood Management and Evacuation Plan', which should be prepared to ensure the development is in accordance with the requirements in Section 3.4 of the L2 SFRA. Future users of the site should be made aware of the potential risks of flooding, and the site operators should be registered with the EA's Flood Information Service to receive flood alerts, flood warnings and severe flood warnings well in advance of an event;