

**Hat2**

<b>OSNGR:</b>	520453,209329	Area: 56.57ha		Greenfield	
<b>Flood Zone Coverage:</b>	<b>FZ3b</b>	<b>FZ3a</b>	<b>FZ2</b>	<b>FZ1</b>	
	0.6%	5%	9.1%	90.9%	

**Proposed Development Details:**  
Residential development.

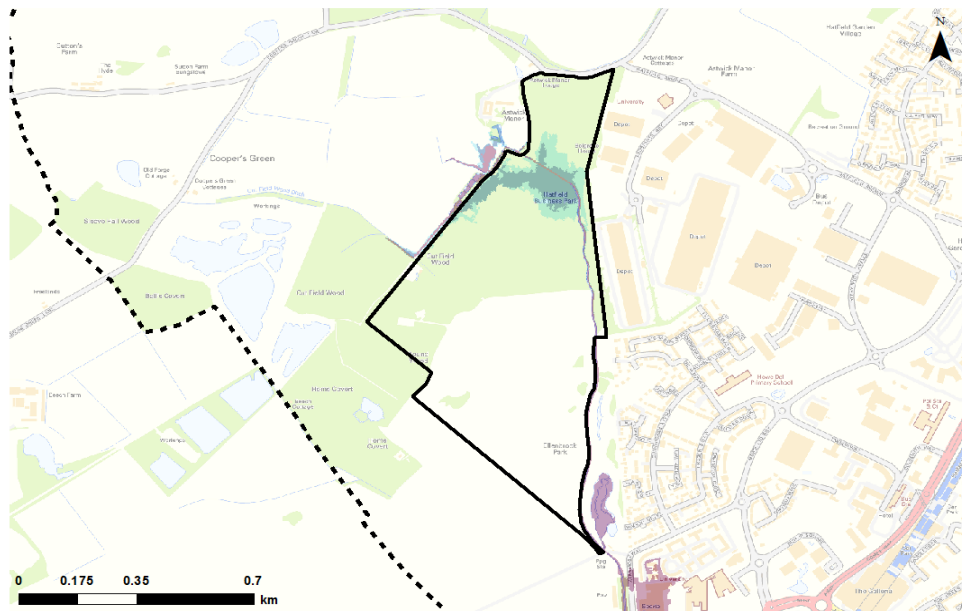
**Sources of Flood Risk:**  
The primary flood risk to the site is fluvial, from the Ellen Brook, which flows along the eastern boundary of the site, and a number of the Ellen Brook's tributaries. It should be noted that there appears to be a number of culverts in this area which could exacerbate flood risk with blockage and these should be examined in further detail as part of a detailed site-specific Flood Risk Assessment (FRA). There is surface water flood risk but this is predominately located in the northern portion of the site.

**Exception Test Required?**  
Yes, if "More Vulnerable" and "Essential Infrastructure" development is located in FZ3a and for "Highly Vulnerable" development located in FZ2. "Essential Infrastructure" in FZ3b will require the Exception Test.  
"Highly Vulnerable" development should not be permitted within FZ3a and FZ3b.  
"More Vulnerable" and "Less Vulnerable" development should not be permitted within FZ3b.

**NPPF Guidance:**

- A site-specific Flood Risk Assessment (FRA) will be required for all developments in Flood Zone 2 or 3. Additionally a FRA will be required if the development is greater than 1ha but in Flood Zone 1, less than 1ha in Flood Zone 1 but involves a change to a more vulnerable classification or where the development could be affected by sources of flooding other than rivers and the sea. Finally an FRA will be required if the development is in an area highlighted by the Environment Agency as having critical drainage problems in which the vulnerability to flooding from other sources should be considered.
- The majority of the site is shown to be located within Flood Zone 1. If development is located outside of Flood Zones 2 and 3, the Exception Test will not be required.
- If development is placed in Flood Zones 2 or 3 then, depending on the type of the development, the Exception Test may be required. To pass Part 'b' of the Exception Test, a FRA should demonstrate that the development will be safe, will avoid increasing flood risk elsewhere, and will reduce flood risk overall.
- Consultation with the Local Authority and the Environment Agency should be undertaken at an early stage to understand how a development can best comply with current regional and national guidance.

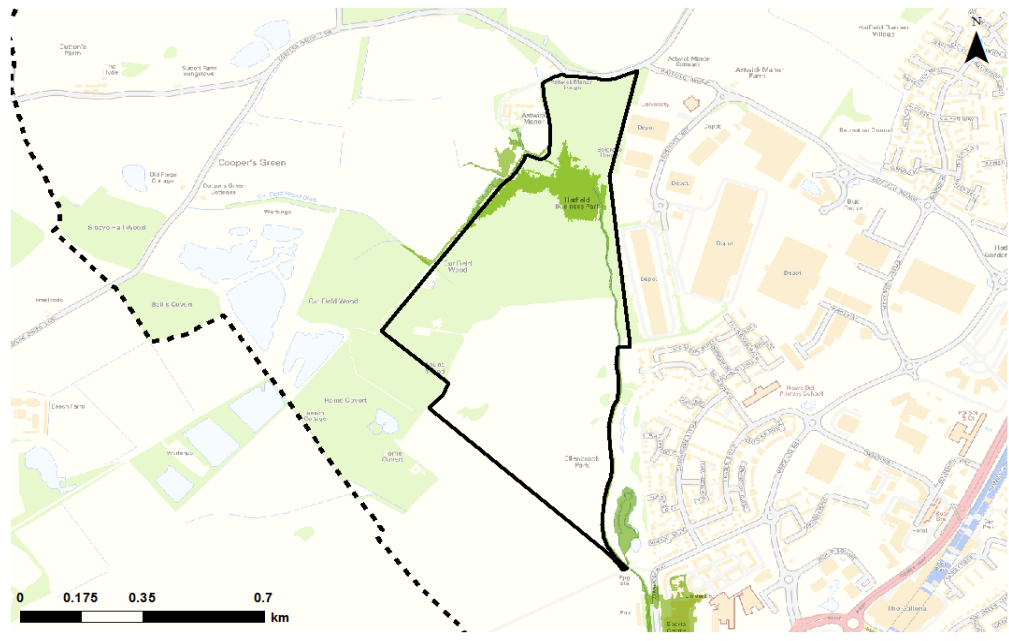
**Flood Zone Map**



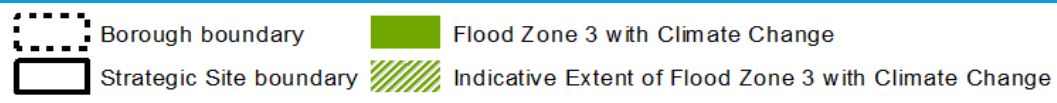
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Note: Indicative flood extents may have been used to represent FZ3b in certain locations.

Borough boundary	Flood Zone 3b	Flood Zone 3a
Strategic Site boundary	Indicative Extent of Flood Zone 3b	Flood Zone 2

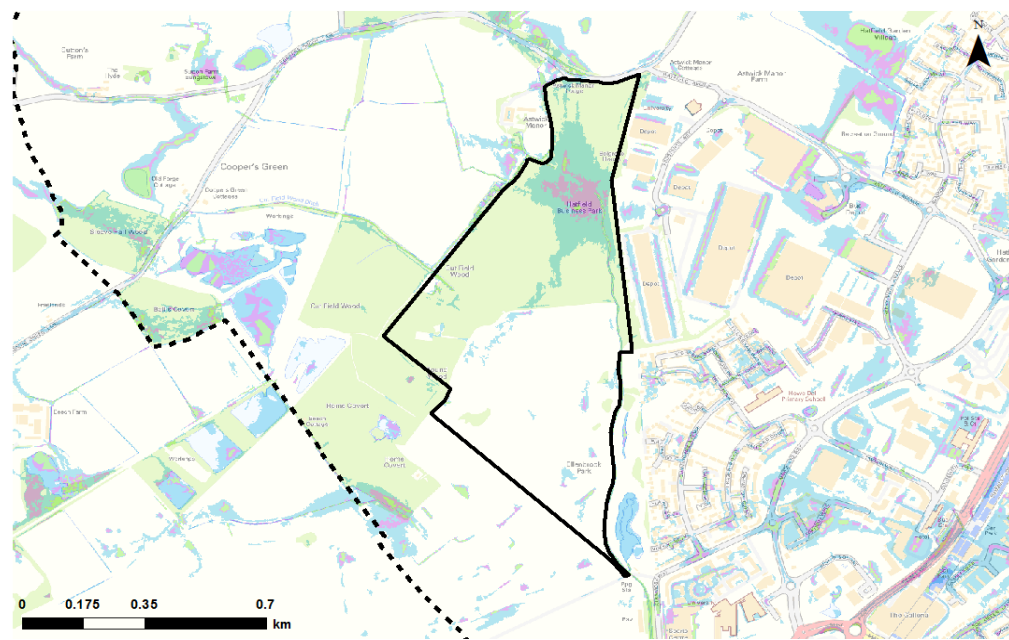
**Climate Change Map**



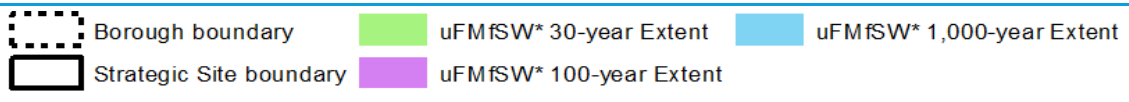
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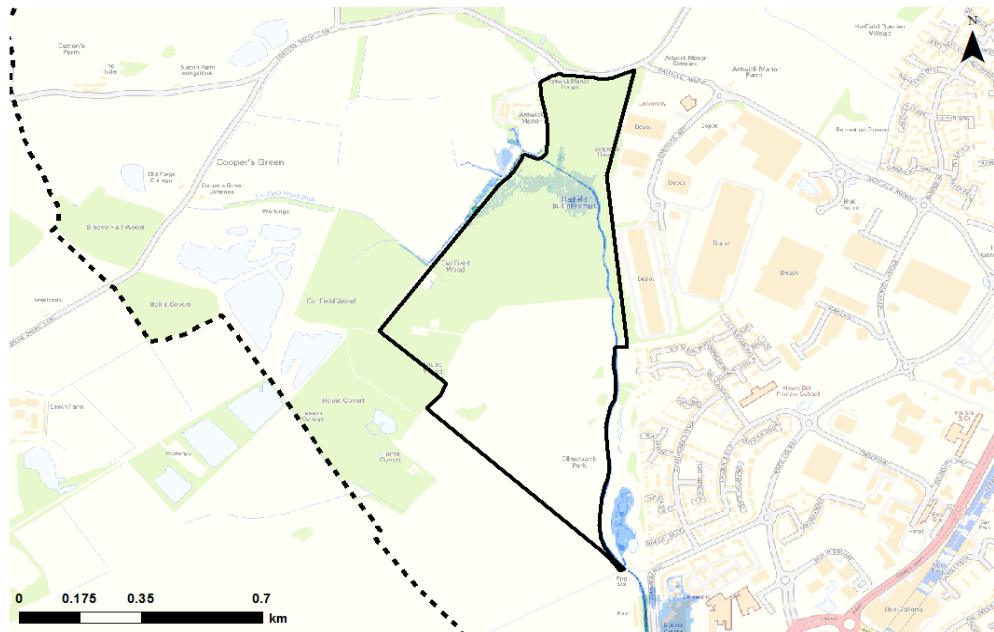
**Surface Water Map**



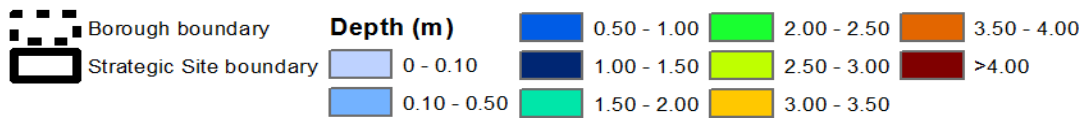
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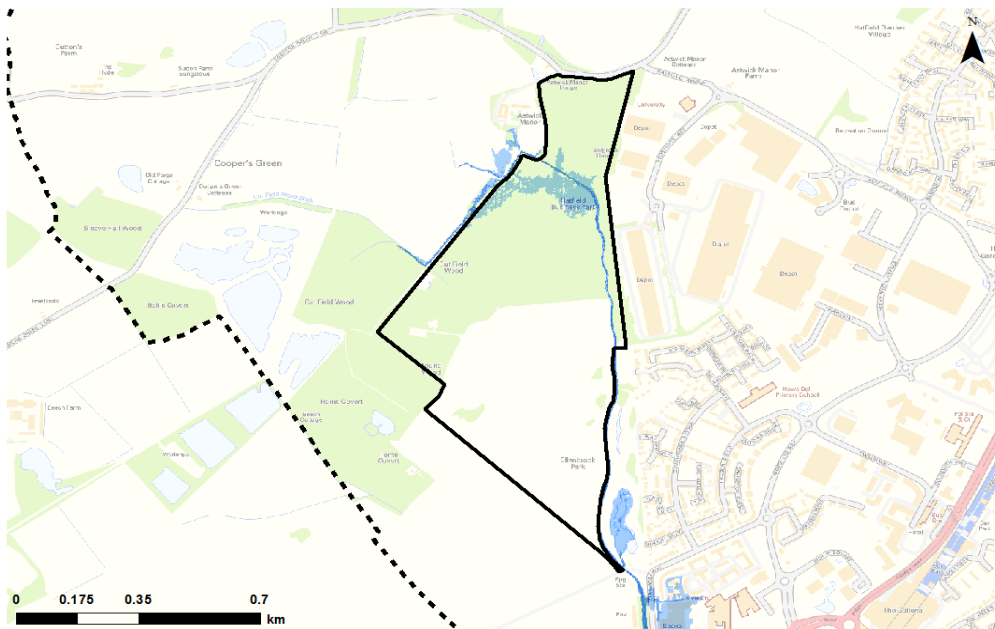
### Depth Map



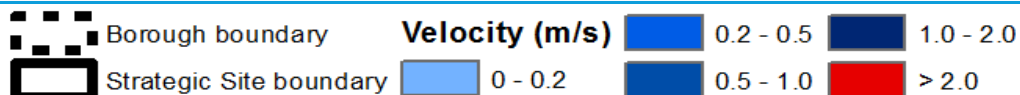
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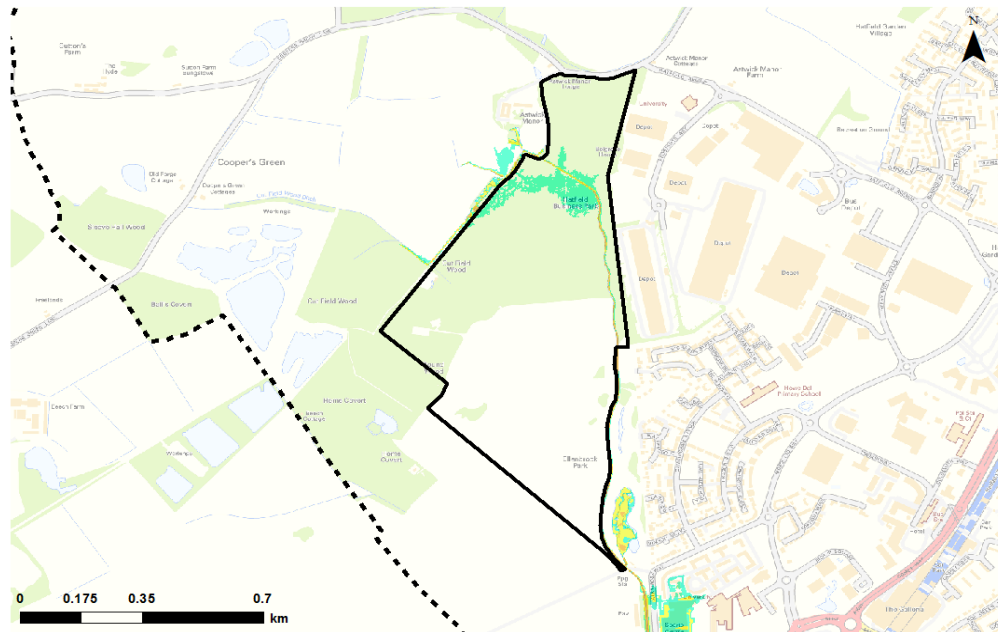
### Velocity Map









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**Hazard Map**



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	Borough boundary	<b>Hazard Rating</b>		Danger for some		Danger for all
	Strategic Site boundary		Very low hazard - caution		Danger for most	

**SuDS & the development site:**

SuDS Type	Suitability	Comments
Source Control		All forms of source control are likely to be suitable.
Infiltration		Due to the site being located in groundwater Source Protection Zone (SPZ) infiltration techniques should only be used where there are suitable levels of treatment, although it is possible that infiltration may not be permitted. Proposed SuDS should be discussed with relevant stakeholders (LPA, LLFA and EA) at an early stage to understand possible constraints.
Detention		This option may be feasible provided site slopes are <5% at the location of the detention feature. A liner maybe required if there any ground contamination issues.
Filtration		All filtration techniques are likely to be suitable. If the site has contaminated land issues, a liner will be required.
Conveyance		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 groundwater contamination issues, a liner will be required.

- Residential developments should provide at least two independent SuDS features in series to provide a suitable level of water quality treatment.
- The site is not located in an area designated by the Environment Agency as a landfill site.
- The site is partially located within Zone 2 and Zone 3 groundwater SPZs. As such infiltration techniques should only be used where there are suitable levels of treatment, although it is possible that infiltration may not be permitted. Proposed SuDS should be discussed with relevant stakeholders (LPA, LLFA and EA) at an early stage to understand possible constraints.

**Flood Defences:**

There are no flood defences at this site.

**Flood Warning:**

There are currently no flood warning areas covering this site.

**Access & Egress:**

Access to the site would be via Coopers Green Lane which is shown to be impacted by surface water adjacent to the site as well as to the west. Access from the east would remain largely unaffected.

**Climate Change:**

- Increased storm intensities.
- Increased water levels in the Ellen Brook and unnamed watercourses.

**Flood Risk Implications for Development:**

- At the planning application stage, a site-specific FRA will be required if any development is located within Flood Zones 2 or 3, or for any development greater than 1ha in Flood Zone 1.
- A detailed hydraulic model of the unnamed watercourses and the Ellen Brook may be required to demonstrate the flood risk posed to the development and to help establish a sequential approach to the overall site layout. This should include analysis of how blockage of culverts could impact flood risk to the site.
- Flood risk from the lake located to the north-east of the site should be investigated as part of a detailed FRA.
- Resilience measures will be required if buildings are situated in the flood risk area.
- The peak flows on the unnamed watercourses should be considered when considering drainage.
- It is important to ensure that any new connections to sewer systems or watercourses do not have a detrimental impact to third party land downstream.
- Assessment for runoff should include allowance for climate change effects.
- A drainage assessment should be conducted for all major developments (as defined by the LLFA) based on LLFA guidance. For all minor developments guidance on the scale and scope of a drainage strategy should be sought from the LPA.
- Development should adopt source control SuDS techniques to reduce the risk of frequent low impact flooding due to post-development runoff. There may be restrictions on the type of SuDS suitable within the site due to the site being located in a Zone 2 and 3 groundwater SPZs. The LLFA and relevant stakeholders should be consulted at an early stage to ensure SuDS are implemented and designed to overcome site-specific constraints.
- On-site attenuation schemes would need to be tested against the hydrographs of the unnamed watercourses to ensure flows are not exacerbated downstream within the catchment.
- Safe access and egress will need to be demonstrated.
- Development must seek opportunities to reduce overall level of flood risk at the site, for example by:
  - o Reducing volume and rate of runoff
  - o Relocating development to zones with lower flood risk
  - o Creating space for flooding.
- Green infrastructure should be considered as part of the mitigation measures for surface water runoff from potential development.
- Consultation with the LLFA, Local Authority and the Environment Agency should be undertaken at an early stage.