# LEAD LOCAL FLOOD AUTHORITY, HERTFORDSHIRE COUNTY COUNCIL PROOF OF EVIDENCE IN SUPPORT OF ST ALBANDS CITY AND DISTRICT COUNCIL

EVIDENCE OF KATHERINE WATERS (MSC, BSC, C.WEM, MCIWEM), ON BEHALF OF HERTFORDSHIRE COUNTY COUNCIL

DEALING WITH MATTERS RELATING TO FLOOD RISK & SUSTAINABLE DRAINAGE

BRICKET WOOD SPORTS AND COUNTRY CLUB, PAINTBALL SITE & BRICKET LODGE, LYE LANE, BRICKET WOOD, HERTFORDSHIRE, AL2 3TF

APPEAL BY JK RUDKIN BUILDERS LTD

PINS REFERENCE: APP/B1930/W/24/3338501
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MAY 08, 2024

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*FIGURES*

# 1 INTRODUCTION

## 1.1 QUALIFICATIONS AND EXPERIENCE

1.1.1 My name is Katherine Waters, I am a Technical Director within the Sustainable Water Management team at WSP, one of the world's leading engineering professional services consultancies. I oversee and lead the team that delivers WSPs Lead Local Flood Authority (LLFA) support services which includes supporting Hertfordshire County Council Flood Risk Management team in delivering the LLFA function and assessing statutory planning consultations.

1.1.2 I hold a Masters degree in Flood Risk Management from Newcastle University and hold a Bachelor of Science degree (with Honours) in geography with sports studies from the University of Liverpool. I am a member of the Chartered Institute of Water and Environmental Management (MCIWEM) and a Chartered Water and Environmental Manager (C.WEM).

1.1.3 I have 20 years of professional experience working in the sustainable water management industry and have been with WSP since September 2022. Prior to this I worked at Woking Borough Council (from December 2013 to September 2022) leading the Flood Risk Management Team with the responsibility of assessing and responding to Planning consultations, Development of Flood Alleviation schemes for both fluvial and pluvial flooding, Flood Investigations, flood emergency response, ordinary watercourse consenting, SuDS Designs, SuDS retrofitting and surface water modelling using industry standard software. Whilst at Woking, I was also a founding member of the Association of SuDS Authorities (ASA) which was created to help ensure a consistent approach to sustainable water flood risk and drainage across the country helping to enable sustainable development. I was the Chair of this National Organisation from January 2022 and was a member of the Sustainable Drainage Approval Body (SAB) advisory group for DEFRA and have also presented to numerous bodies on surface water flood risk and SuDS including to the All-Party Parliamentary Group.

1.1.4 Prior to joining Woking Borough Council in 2013 I worked for an Engineering consultancy for 7 years and undertook the development of SuDS Drainage Strategies, Suds Designs, Hydraulic Modelling of watercourse, Flood Risk Assessments, strategic Flood Risk Assessment, Local flood Risk management Strategies and ordinary water course consenting for a variety of developments. I started my career in the Environment Agency in 2004 and was responsible for assessing planning applications, Flood Defence Consents and analysing the flood risk from all sources of flooding that future developments may be affected by in accordance with National and Local policy.

*1.1.5* The purpose of my evidence to this Inquiry is to assist the Planning Inspector to consider the Appeal, based on the evidence and relevant planning considerations at this time in relation to Flood Risk and Drainage matters that arise at the site.

1.1.6 I confirm that my evidence to this Inquiry has been prepared and is given in accordance with the guidance of my Professional Institutions and I confirm that the opinions expressed are my true and professional opinions.

# 2 SITE CONTEXT

## 2.1 SITE DESCRIPTION

2.1.1 The site is located north of the M25, on the outskirts of Bricket Wood, near St Albans, in a setting of commercial and residential land use at National Grid Reference TL 13473 02814. A site location plan is included as Figure 2.1.

2.1.2 The Site is 3.2 Hectares in size and is currently used within a mixed-use capacity. The Site is brownfield land and comprises a number of dwellings, a former sports clubhouse and associated buildings, and a paintball centre, including associated access, car parking and landscaping. To the south of the Site there is approximately 3.3 ha of woodland.

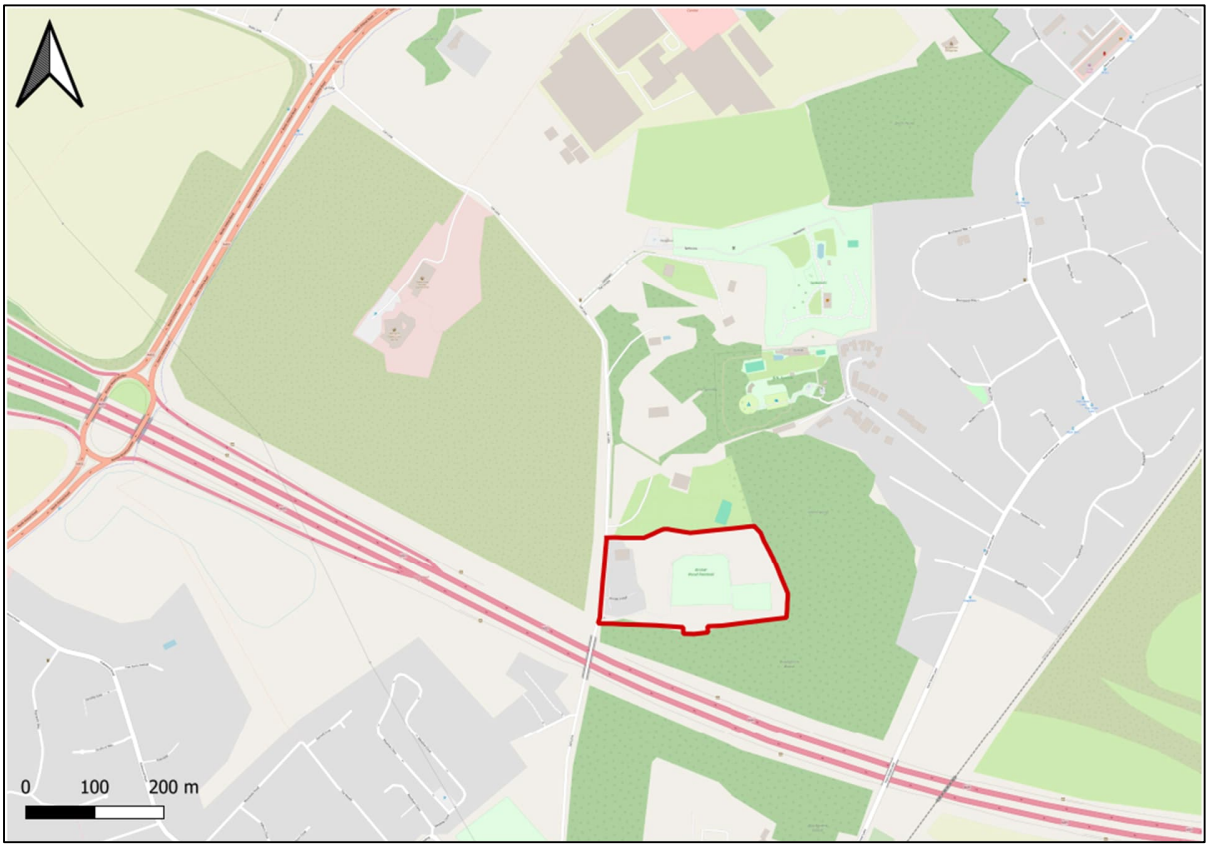


**Figure.2-1: Site Location Plan**

2.1.3 The FRA states in Section 3 that ‘The general ground levels on the Site are between 80.6 and 86.9 m AOD with the Site falling gradually in an easterly direction. This is based on EA elevation data obtained for the Site to a 1 m resolution with a vertical accuracy of ±0.15 m (Figure 2.2 is an extract of the lidar contained within the submitted FRA).

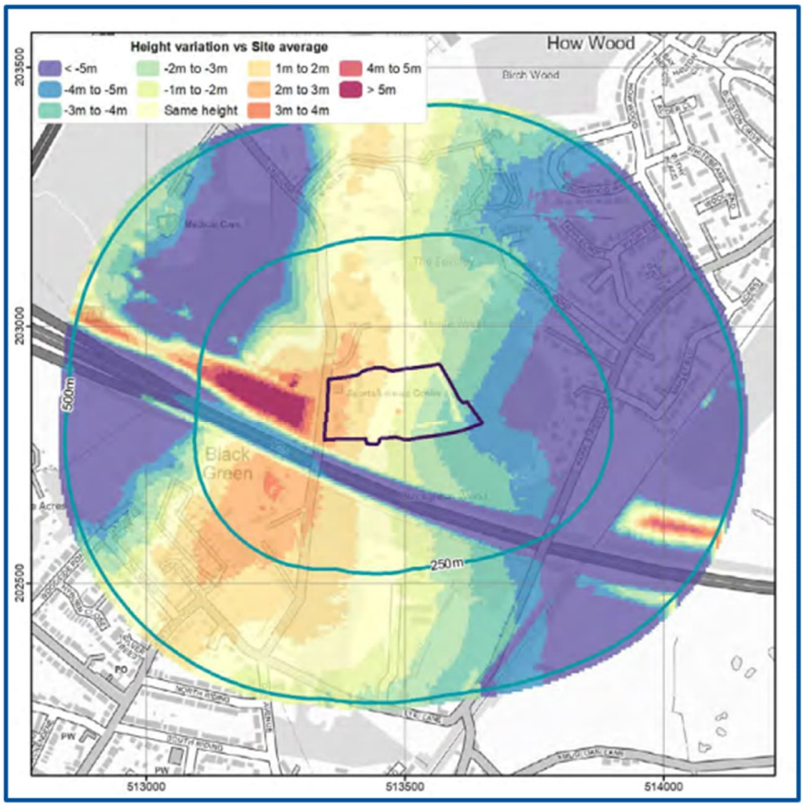


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**Figure 2-2 Extract of the lidar contained within the submitted FRA**

2.1.4 The Flood Risk from surface water map (Figure 2.3) indicates that the site is not at risk of surface water flooding however there is a flow path from the site which contributes to the flood risk of How Wood.

2.1.5 The risk categories from the Environment Agency's Mapping are as follows:

- Low which means it has a surface water flood risk of between a 1 in 100 and 1 in 1000 Annual Exceedance Probability of flooding in any given year (1% - 0.1%),
- Medium which means it has a chance of flooding between a 1 in 30 and 1 in 100 ( 3.3% - 1%) Annual Exceedance Probability in any given year, and
- High which means it has a great than a 1 in 30 (3.3%) Annual Exceedance Probability in any given year.

2.1.6 These maps however do not take account of the impact of climate change and therefore using the precautionary principal it is standard industry practice to use the low-risk extent as a proxy for the 1 in 100 (1%) plus Climate Change event when no other data exists.

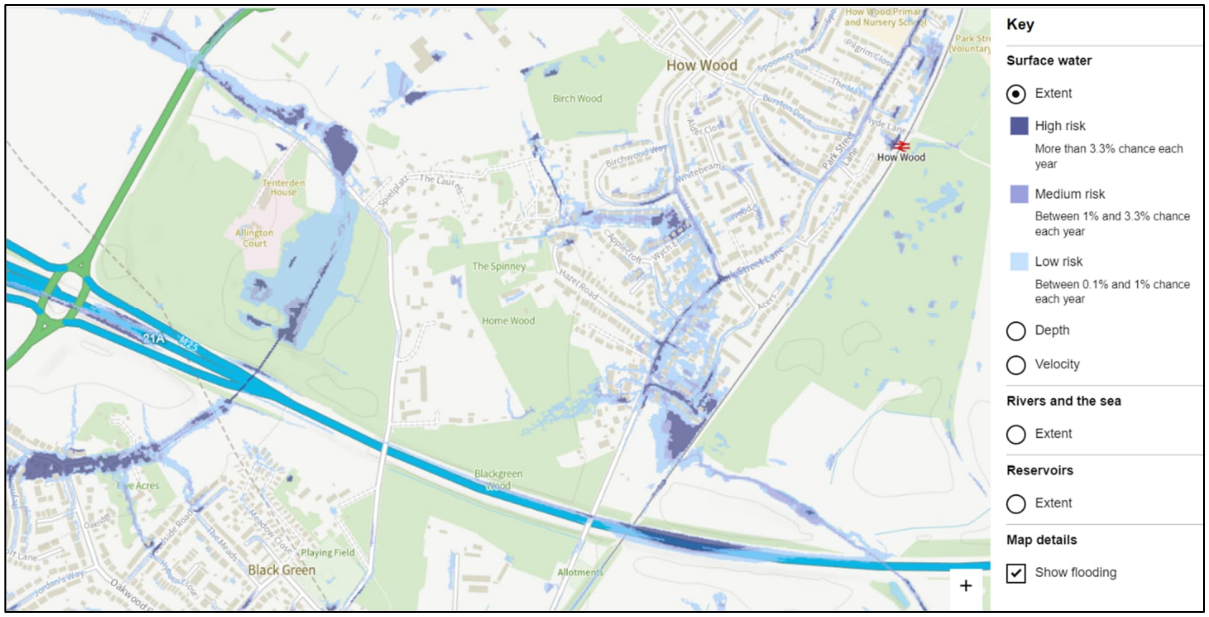


**Figure 2-3: EA Long Term Flood Risk Map**

2.1.7 Section 3 of the FRA continues to explain the hydrological context for the site and provides a map of the available watercourse (Extract in Figure 2.4).

2.1.8 The FRA explains that there are a number of drainage ditches located near the site. These include drainage ditches c. 110 m south, c. 190 m south, c. 240 m north-west, c. 350 m west, and c.360 m north-east of the Site. The M25 motorway (lower than the site and surrounding area) is located between the site and all the ditches to the south and therefore there is no current connection to these form this area. No other watercourses have been identified with the submitted FRA.

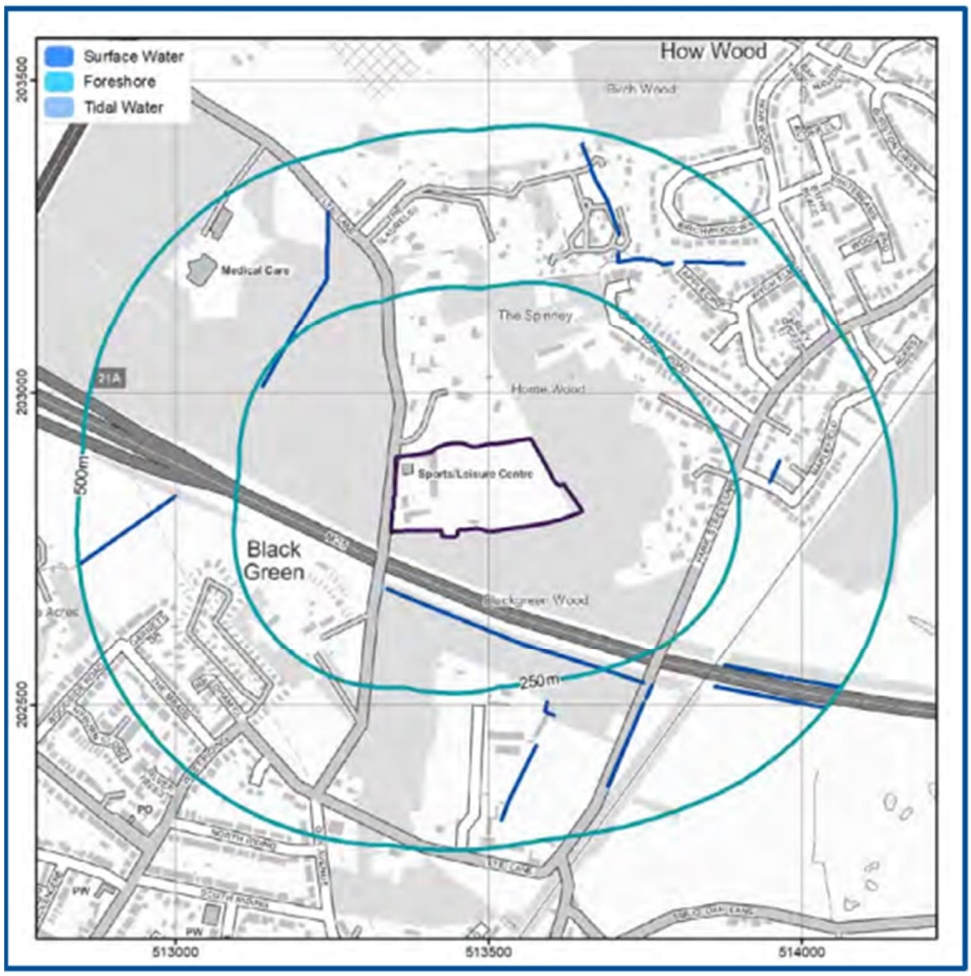


**Figure 2-4: extract of watercourse locations from FRA**

## 2.2 PROPOSED DEVELOPMENT

2.2.1 Proposals comprise the development of the Site, with the demolition of some existing buildings on-Site and the construction of approximately 113 dwellings, including associated access, car parking and landscaping.

2.2.2 The effect of the overall development will result in an increase in number of occupants and/or users of the building and will result in the change of use, nature or times of occupation from mixed use to residential. The development will also increase the impermeable area of the site.

2.2.3 As the site is 3.2ha and in Flood Zone 1 it is classified as 'Major Development'.

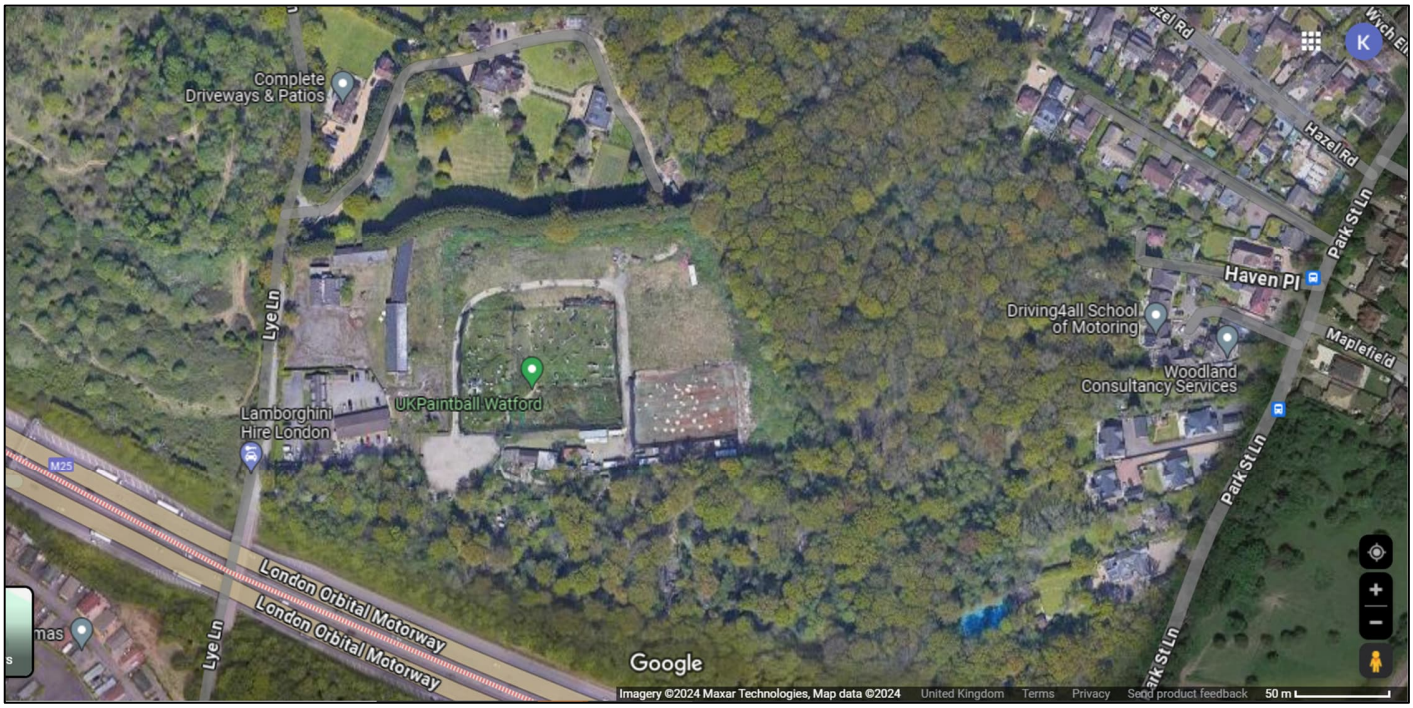


**Figure 2-5:Aerial view of site from google.com**


**Figure 2-6: Proposed Site Plan contained within the Drainage Strategy by Geosmart dated 18/02/22**

# 3 PLANNNG POLICY CONTEXT

## *NATIONAL PLANNING POLICY FRAMEWORK (NPPF)*

3.1.1 When assessing the flood risk information submitted to support planning applications, the information needs to assess the site against local sources of flood risk and its own impact on surface water flood risk.

3.1.2 A drainage strategy needs to be submitted that demonstrates the site does not increase flood risk to the site or surrounding area through the increase of impermeable surfaces. In relation to sustainable surface water drainage systems the LLFA uses NPPF its accompanying practice guide, local planning policies and the Non-Statutory Technical Standards for SuDS as a minimum.

*3.1.3 Paragraph 165 of NPPF states that 'inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made* ***safe for its lifetime without increasing flood risk elsewhere****.*

*3.1.4* Paragraph 173 of NPPF states '*when determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk* [(59)]*.*

*(a) within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location.*

***(b) the development is appropriately flood resistant and resilient such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment.***

***(c) it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate.***

***(d) any residual risk can be safely managed****; and*

*(e) safe access and* escape routes are included where appropriate, as part of an agreed emergency plan.

3.1.5 Footnote 59 mentioned in paragraph 173 clarifies that a site specific FRA is required for '…all development in Flood Zones 2 and 3. In Flood Zone 1, an assessment should accompany all proposals involving: **sites of 1 hectare or more**; land which has been identified by the Environment Agency as having critical drainage problems; land identified in a strategic flood risk assessment as being at increased flood risk in future; or land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.

3.1.6 Paragraph 175 states' Major developments should incorporate sustainable drainage systems unless there is clear evidence that this would be inappropriate. The systems used should:

a) take account of advice from the lead local flood authority;

b) have appropriate proposed minimum operational standards;

c) have maintenance arrangements in place to ensure an acceptable standard of operation for the lifetime of the development; and

d) where possible, provide multifunctional benefits

3.1.7 Therefore, the proposed development needs to be accompanied by a suitable Flood Risk Assessment and Drainage strategy that demonstrates the proposals will not increase flood risk to the site itself or the surrounding area for the design event.

## *NATIONAL PLANNING POLICY FRAMEWORK PLANNING PRACTICE GUIDE*

3.1.8 The NPPF Planning Practice Guide (PPG) was updated in August 2022 and provides guidance on the interpretation of the paragraph within the national planning policy framework.

3.1.9 A recent high court decision, Redrow Homes vs SoS LUHC (12 February 2024), states in paragraph 66, 'The PPG is planning policy which provides more specific guidance'. When discussing the interpretation of the planning practice guide, it gave it no less weighting than the NPPF in relation to policy.

3.1.10 When reviewing a site-specific flood risk assessment that accompanies a planning application it is necessary to ensure that it is detailed enough for the type of application to demonstrate that flood risk is not increased to the site itself or to the surrounding area.

3.1.11 Paragraph 001 of the NPPF PPG defines flood risk as the probability of flooding multiplied by the consequences. Therefore, increasing the vulnerability of the site to flood risk through development increases the risk, in addition increasing the volume or discharge rates of surface water from the site to another area would increase the risk to others. The flood risk assessment therefore must demonstrate the risk from all sources of flooding is appropriately assessed both to the site and to the surrounding area, it must provide suitable mitigation to ensure flood risk from any source is not increased.

3.1.12 NPPF Practice guide paragraph 002 clarifies that the design flood for surface water is the 1 in 100 (1%) plus the appropriate allowance for climate change.

3.1.13 Paragraph 3 of the PPG also clarifies that when assessing flood risk that development must be made safe for its lifetime without increasing flood risk elsewhere and paragraph 4 continues in relation to the process of this including the requirement for the residual risk to be managed following the avoid, control and mitigate stages.

*3.1.14* Paragraph 005 of the PPG further states '*Where flood risk management infrastructure such as flood defences form part of the strategy for addressing flood risk, strategic and site-specific flood risk assessments should, where appropriate:*

- *identify how this infrastructure will be operated, funded and maintained;*
- *ensure there is space for future maintenance or new flood risk management infrastructure that is likely to be needed.*
- ***consider the consequences of flood risk management infrastructure failing or its design standard being exceeded……***

3.1.15 Paragraph 20 states '…the objectives of an FRA are to establish: …

- whether a proposed development is likely to be affected by current or future flooding from any source;
- **whether it will increase flood risk elsewhere;**
- **whether the measures proposed to deal with these effects and risks are appropriate;'**

3.1.16 Paragraph 021 of the PGG explains the level of detail required within an FRA and States '*...For a new development* ***comprising a greater number of houses in a similar location, or one where the flood risk is greater, the local planning authority would need a more detailed assessment****'.*

3.1.17 The proposed discharge to a different catchment area to the sites natural drainage catchment will increase the volumes and rates at which water enters the new catchment, and therefore the proposal will increase flood risk to others. This is therefore contrary to NPPF and the NPPF PPG.

3.1.18 The PPG further explains the requirements on surface water drainage in paragraph 055 that '…The layout and function of drainage systems needs to be considered at the start of the design process for new development, as integration with road networks and other infrastructure can maximise the availability of developable land'.

3.1.19 Paragraph 056 consider what sort of sustainable drainage systems can be considered and provides a hierarchy of discharge options as:

1) *Into the ground (infiltration);*
2) *To a surface water body*
3) *to a surface water sewer, highway drain or another drainage system*
4) *to a combined sewer*

3.1.20 Paragraph 057 states '*…Non-statutory technical standards are available to guide decisions about the design, maintenance and operation of sustainable drainage systems. Refer to the Environment Agency's approach to groundwater protection. Detailed industry guidance (for example CIRIA's SuDS Manual, the Institution of Civil Engineers' SuDS Route Maps, provide technical details for the suitability of sustainable drainage systems for a wide range of design characteristics*.

3.1.21 To help aid development proposals Paragraph 059 of the PPG also sets out the information that needs to be submitted with a planning application and clarifies that a **sustainable** drainage strategy contains proportionate information on the proposed sustainable drainage system as part of their planning application (including outline applications) having regard to the nature and scale of the development. It also highlights the need for the supporting information to describe the existing and proposed surface water management arrangements to ensure there **is no increase in flood risk to others off-site.**

*3.1.22* Having regard to all the above considerations, the National Planning Policy Framework and the accompanying PPG is clear that flood risk should not be increased elsewhere, including over the lifetime of the permission not just at the point of grant of permission.'

3.1.23 The submitted FRA and the Drainage Strategy, dated 18 February 2022 by Geosmart have not provided appropriate information in line with the requirements of NPPF and the PPG that demonstrates the flood risk will not be increased to others off site.

## *LOCAL PLANNING POLICY*

3.1.24 St Albans District and City Local Plan 2020-2036 contains the relevant local planning policies in terms of flood risk, watercourses and the environment. The policies relevant to this application is policy Policy L29 – Green and Blue Infrastructure, Countryside, Landscape and Trees Policy

3.1.25 Policy L29 – states… 'Watercourses and flood risk- Watercourses and their settings will be conserved for their biodiversity value (particularly as rare chalk stream habitats) and to improve water quality to meet the standards set out in Environment Agency River Basin Management Plans. River restoration, including naturalisation and the removal of culverts, is encouraged. The Council will seek to avoid development in areas at risk from flooding in accordance with national policy and **ensure that water management and flood risk issues are fully addressed by new development. Sustainable (Urban) Drainage Systems (SuDS) approaches should be taken for all new development schemes.** Flood and drainage storage areas may also be required. **They should be created and managed as part of a comprehensive approach to watercourses and biodiversity.**

- **Opportunities should be provided to support river restoration and enhancement within the catchment of the watercourse.**

3.1.26 This evidence is based on the review of the submitted information that accompanies the application, and which has assessed these details in accordance with the above local policies.

## OTHER RELEVANT FLOOD GUIDANCE

### THE SUDS MANUAL

3.1.27 The Ciria SUDS Manual is the industry guidance on the design, construction and maintenance of SuDS. It sets out the philosophy of SuDS and the approach that should be taken.

3.1.28 In chapter 1.1 of the SuDS Manual, it clarifies the SuDS approach involves slowing down water and reducing the quantity of surface water runoff from a developed area to manage downstream flood risk and reducing the risk that runoff causes pollution. To maximise the benefit of SuDS, surface water management should be considered from the beginning of the development process and throughout – influencing site layout and design, and the use and characteristics of urban space.

3.1.29 In chapter 3.2.3 of the SuDS Manual (pg. 41) it explains the requirements to ensure the site does not have a detrimental impact on the downstream catchment (increasing flood risk or causing morphological or ecological issues). Point 1 is to prioritise where surface water runoff is discharges and puts them in the following order:

a) Infiltration
b) Discharge to surface waters
c) Discharge to a surface water sewer, highways drain or another drainage system.
d) Discharge to a combined sewer.

It also states, '***Discharge to a foul sewer should not be considered as a possible option'***.

# 4 PROPOSED DEVELOPMENT AND FLOOD RISK

## 4.1 PROPOSED DEVELOPMENT AND FLOOD RISK

4.1.1 When discussing Surface Water Flood Risk to the site, it is important to note the two different types of surface water flooding a site can be impacted by.

4.1.2 The first of these is overland surface water flow paths which are caused when rainfall exceeds the capacity of the infiltration rate of the soil within the drainage catchment, the surrounding catchment is saturated, or the storm exceeds the design standard of the catchments drainage system. The flow paths are caused from precipitation falling of site within the entire drainage catchment.

4.1.3 The second type of surface water flooding refers to the own site surface water run-off (precipitation that falls directly onto the site itself), this risk can be increased to the site and surrounding area if this is not suitable attenuated and controlled on site when impermeable areas are increased, and the drainage characteristic of the development site are altered.

4.1.4 The FRA demonstrates the site is not located within a flow path but contributes to a flow path to the east of the site.

4.1.5 The Drainage Strategy provided to support the application sets out the high-level strategy for the discharge of surface water.

4.1.6 Section 3 of the strategy looks at the hierarchy for the discharge of surface water, using desk-based information. The strategy rules out infiltration based on the GeoSmart SuDS infiltration Suitability Map. It finds there is a '**Low potential for infiltration across the site. Therefore, the strategy has ruled infiltration out.**

4.1.7 This level of detail is not normally acceptable in terms of ruling out infiltration and we would expect at least 1 site specific infiltration test undertake to BRE Digest 365, the industry standard in carrying out Infiltration testing for an Outline application. Detailed testing across the site would then be subject to conditions, if the initial test was found viable due to the variability of soil conditions and geology across large sites.

4.1.8 With the information based on desktop information alone we would expect to see an option 'B' to demonstrate surface water runoff can be suitably discharge from the site in the eventual situation the detailed infiltration testing confirmed the site could not infiltrate to a suitable rate. The Ciria guidance sets the lowest rate of infiltration to $10^{-6}$.

4.1.9 The infiltration rate has a substantial impact on the attenuation needed across the site and can involve large volumes of storage, other constraints such as being a minimum of 5m from any structure will also need to be taken into account with the future layout. This can affect the proposed density and housing numbers being proposed at a site to ensure suitable space has been allowed for.

4.1.10 The Strategy then assess the suitability of discharging to a watercourse based on OS mapping. It states 'a *drainage ditch 260 m north-west of the Site. Given that discharge to ground is unfeasible at the Site and there are no public surface water or combined sewers within the vicinity, it is recommended that discharge to watercourse is considered, and therefore this would be the most appropriate discharge location identified*.

4.1.1 The watercourse proposed within the strategy is located uphill to the northwest of the site and it would involve going through third party land, part of which is woodland. The site has no rights to connect to this watercourse and therefore this is not a feasible option.

4.1.2 Surface water runoff can not naturally flow to this watercourse. No detail on the impact to the watercourse have been provided, no survey of the watercourse has been undertaken. The increase in volumes and discharge rates has not been considered and therefore the FRA and drainage strategy fail to demonstrate the site would not increase flood risk to others. Any increase in Volumes and rates will increase flood risk downstream of this watercourse which already impacts the residential area of Bricket Wood.

4.1.3 No other watercourses have been identified on or adjacent to the site and the FRA and drainage strategy highlight that through their investigations no other watercourses exist.

4.1.4 Currently there is a lack of "substantive evidence" to illustrate that the development would not increase surface water flood risk offsite. Without a discharge location the development will increase flood risk to the site itself.

# 5 SITE SURFACE WATER DRAINAGE AND SUDS

5.1.1 It is unclear from the information submitted which methodology has been used for the rainfall characteristics and whether they have used FEH 13 or the supersede FEH 1999 (FEH 2009 is based on FEH 1999) which underestimates flow from the site and therefore the volume of attenuation required. This needs clarification.

5.1.2 The approximate storage volumes are based on a pumped discharge rate to a separate catchment as mentioned in Section 4 of this evidence. They assume the entire site is impermeable and therefore use this as the proposed discharge rate. The correct calculation if the site was draining by gravity to its existing catchment would be following the assessment of the greenfield rate for the entire site is to pro-rata the rate for the proposed impermeable area that will be draining into the system. To calculate this for an outline application we would expect a reasonable estimate for the density and impermeable area (normally 60-70%) to demonstrate that enough area has been left for the required SuDS attenuation and source control features and to then condition the discharge rate to a rate per hectare of impermeable area. However, this has not been included and they are therefore increasing the discharge from the site.

5.1.3 When considering a pumped outfall to a new catchment event the greenfield run off rate from the site can increase flood risk and it may not be possible to connect due an increase in flood risk from the watercourse or the rate may be significantly reduced. This would require additional space for attenuation storage across the site.

5.1.4 Table 9 within the Drainage strategy based on a discharge rate of 5.1 l/s states the volume of storage required is 1409.5 $m^3$. However, the calculation provided in appendix B show that over 2000$m^3$ of attenuation would be required in the 1 in 100 (1%) plus 40% climate change storm when a discharge rate of 19.03 l/s has been allowed for. It is therefore not clear if enough attenuation has been allowed for on the site or the proposed discharge rate from the site as the text states 5.1 l/s within the Drainage Strategy but the calculations allow a substantially higher rate.

5.1.5 Therefore, currently we are unable to assess if the proposed areas allowed for site attenuation are sufficient to ensure flood risk is not increased to the site or surrounding area, and therefore house numbers may need to be significantly reduced to allow enough area to store the required volumes of water within the site.

# 6 UPDATED ARBORICULTURAL INFORMATION

## 6.1 FOOTPATH

6.1.1 Additional information has been submitted in relation to a proposed new footpath along Lye Lane to the south of the M25. The information submitted includes the culverting of over 370m of open ordinary watercourse. This proposal has never previously been raised with the LLFA and under the Land Drainage Act 1991 Land Drainage Consent would need to be applied for.

6.1.2 Under the Land Drainage Act there is a presumption against culverting of watercourses, due to the impact it has on the surrounding land drainage (in this location the highway freely drains overland to the watercourse), increase in flood risk, the impact on biodiversity and the increase in maintenance and inspection.

6.1.3 No assessment has been carried out to demonstrate the proposal will not increase flood risk to the surrounding area.

6.1.4 No assessment has been submitted that demonstrates how the increase in impermeable area for this proposal is to be attenuated to ensure flows are not increased from the area nor have any details been submitted on how the existing highway will be able to drain efficiently within this area.

6.1.5 As culverting of watercourses is only allowed for access and then it is only the minimum amount that would be consented, it is likely that Land Drainage Consent would be refused for this proposal by the Lead Local Flood Authority.

6.1.6 The information submitted also states that there is a watercourse adjacent to the site, however from the information we have seen as part of the submitted FRA and from an inspection of the area through google street view, no watercourse is shown to be located here. A depression in the ground existing where a hedge is located, but there is no evidence of an inlet or an outfall for this depression in the ground and therefore evidence will need to be submitted in relation to its connectivity.

# 7 CONCLUSION

7.1.1 The site-specific surface water drainage strategy and flood risk assessment are not sufficient to demonstrate the proposed development would not increase flood risk to the site or to others.

7.1.2 There is currently no acceptable or technically feasible surface water discharge location identified for the site within the current information submitted.

7.1.3 The proposed surface water drainage strategy currently underestimates the volume of storage required on site and it is unclear if the proposed discharge rate will increase flood risk to others.

7.1.4 The additional proposal for a footpath south of the M25 along Lye Lane fails to assess the impact on Flood Risk to the surrounding area and Land Drainage Consent will likely be refused as the proposal is contrary to the Land Drainage Act 1991.

7.1.5 It is therefore my opinion that the submitted information fails to meet the requirements of NPPF paragraph 165, 173 and 175, it does not meet the requirements of the NPPF practice guide and is contrary to local planning policy L29.