Flood Risk Assessment
& Drainage Strategy

Land West of Buntingford (South of A507), Hertfordshire

Jubb

PREPARED BY:
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Hallam Land Management

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1 Project Information

1.1 Project Information

Client	Hallam Land Management

1.2 Project Details

Project Name	Land West of Buntingford (South of A507)
Location	Buntingford, Hertfordshire
Jubb Project Number	23161

1.3 Report Details

Version	Three
Status	For Submission
Date	14th June 2024

1.4 Project Authorisation

ISSUE HISTORY: AUTHORISATION:

Version	Date	Detail	Prepared By	Approved By
v1	19.02.24	First Draft	MD	LE
V2	22.02.24	Second Draft – Masterplan included	LE	LE
V3	14.06.24	For Submission – Masterplan Update	LE	LE

2 Introduction

2.1 Instruction

2.1.1 This Flood Risk Assessment has been commissioned on behalf of Hallam Land Management to support an outline planning application for the development of the site known as Land West of Buntingford (South of A507) in Buntingford, Hertfordshire.

2.1.2 This report may not be relied upon or reproduced by any third party for any use without the written agreement of Jubb Consulting Engineers Ltd.

2.2 Brief

2.2.1 This flood risk assessment has been prepared in accordance with the requirements of the National Planning Policy Framework (NPPF) published by the Department of Levelling Up, Housing and Communities. Section 14 of the NPPF and the associated Planning Practice Guidance sets out the framework for planning decisions made by the local, regional, and national governments and the Environment Agency (EA). In order for planning authorities to make informed decisions on the development of sites in areas at risk of flooding, NPPF requires the developer to carry out an assessment of flood risk.

2.2.2 This report addresses the requirements set out in Section 14 of the NPPF and other issues, which are deemed relevant to flood risk. These requirements include the following:

- Assessment of the magnitude and severity of flood risk to the site.
- Assess suitability of the site and development through the use of the Sequential Test & Exception Test (if required).
- Consider flood risk due to overtopping of existing flood defences.
- Assess the impact of the proposed development on flood risk to adjacent developments.
- Determine the ability of existing and proposed drainage to accommodate development flows with respect to surface flooding.
- Demonstrate the appropriate mitigation measure have been taken to prevent flooding.
- Demonstrate the appropriate emergency situations have been considered e.g. overland flow paths and evacuation routes.

2.2.3 This report also considers the disposal of foul water from the proposed development. Existing local infrastructure will be reviewed to identify potential options for the disposal of foul and surface water run-off. A strategy will be presented for the preferred option.

3 Site Description

3.1 Site Location

3.1.1 The proposed site is located to the west of the A10 and south of Baldock Road (A507), directly west of the town of Buntingford, Hertfordshire. The site is approximately 13.28Ha in area with a National Grid reference of 535256E, 229382N.

3.1.2 The site boundaries are formed by the A507 (Baldock Road) to the north, the A10 to the east, adjacent arable farmland to the west, with a small woodland and further agricultural land to the south.

3.1.3 Beyond the site boundaries, the surrounding land is predominantly used for agricultural purposes to the north, west and south, with the existing residential area of Buntingford located immediately to the east.

3.1.4 A Site Location plan is included in Appendix A.

3.2 Existing Site Use

3.2.1 The existing site currently comprises of a large open field which is used for agricultural purposes.

3.3 Site Topography

3.3.1 A detailed topographical survey has been undertaken on the proposed site.

3.3.2 The survey shows there is a crest running centrally through the western region of the site from the north in a southeasterly direction.

3.3.3 From this crest, levels fall away to the east and west towards the A10 and field boundary respectively. The high point of the parcel is shown to be at an approximate level of 125.5mAOD along the top of the crest, with levels falling to a low point of approximately 113.4mAOD and 122.5mAOD on the eastern and western site boundaries respectively.

3.3.4 A copy of the topographical survey is included in Appendix B.

3.4 Site Geology

Geology

3.4.1 The British Geological Survey (BGS) maps indicate that the site is underlain with bedrock of the Lewes Nodular Chalk Formation and Seaford Chalk Formation.

3.4.2 Superficial deposits of Lowestoft Formation are also shown to be present within the site area. This strata is described as an extensive sheet of chalky till, together with outwash sands and gravels, silts and clays. Nearby archived BGS borehole records and historic ground investigations indicate that these soils are likely to exceed 20m in thickness.

3.4.3 In addition to this BGS show a small region of sandy Glaciofluvial deposits in the south-east corner of the site.

Hydrogeology

3.4.4 The BGS and Environment Agency hydrogeology maps indicate that the chalk bedrock underlying the site is classified as a Principal Aquifer.

3.4.5 Principal aquifers are defined as providing significant quantities of water and support water supply and/or baseflow to rivers, lakes and wetlands on a strategic scale. They typically have a high intergranular and/or fracture permeability meaning they usually provide a high level of water storage.

3.4.6 The superficial Lowestoft Formation Deposits beneath the site are classified as a Secondary (undefined) Aquifer.

3.4.7 Secondary aquifers are defined as providing modest amounts of water, but the nature of the rock or the aquifer structure limits their use. They support water supplies at a local rather than strategic scale and remain important for rivers, wetlands and lakes. They have a wide range of water permeability and storage.

3.4.8 The Environment Agency Source Protection Zone map indicates the entirety of the subject site is within a Zone 3 Total Catchment groundwater source protection zone.

Hydrology

3.4.9 The proposed site falls within the catchment of the River Rib (upper stretches, above confluence with the Quin).

3.4.10 The nearest EA designated 'main river' in the vicinity of the site is the Thistley Vale Brook and the River Rib, which are located approximately 165m to the west and 0.9km to the east of the site respectively.

3.4.11 The River Rib runs from the north, in a southerly direction through the centre of Buntingford before continuing on to the south.

3.4.12 The Thistley Vale Brook runs in a southeasterly direction from its source near the village of Throcking, as it reaches Baldock Road it flows in a southerly direction, before continuing to flow towards the south-east where it converges with the River Rib to the east of Aspenden.

3.4.13 An ordinary watercourse has also been identified within the subject site. In the south-east corner of the site an existing drainage ditch runs within an area of dense vegetation, before being culverted beneath the A10, where it is anticipated it continues to flow to the east before converging with the River Rib.

3.5 Existing Drainage

3.5.1 The existing public sewer networks serving the local area are owned and maintained by Thames Water.

3.5.2 Thames Water asset plans show there is no public drainage infrastructure located within the site. However, existing networks of public foul and surface water sewers have been identified within the surrounding area of Buntingford to the north-east of the site. A copy of Thames Water asset plans is included in Appendix C.

3.5.3 To the north-east of the site, a large network of public and private foul water sewers run throughout the existing residential area of Buntingford.

3.5.4 The closest public sewers to the site are found within the Buntingford Business Park located immediately to the north of the site. These sewers convey flows to the east where a large network of existing public surface water and foul sewers are present within Baldock Road from the roundabout with the A10, running in an easterly direction.

4 Flood Risk to the Existing Site

This section explores the primary sources of flood risk to the site.

4.1 Tidal & Fluvial

4.1.1 The proposed site is identified as lying outside of the fluvial and tidal flood risk zone according to the Environment Agency's (EA) published flood map (See Figure 1.0). This estimate of the extent of flooding is based on the absence or failure of all existing flood defences currently protecting the site.



Figure 1.0 – Extract from Environment Agency Flood Map for Planning

4.1.2 The EA flood map indicates that the site lies within Flood Zone 1 – Low Probability in Table 1 of the NPPF Planning Practice Guidance. This zone has less than a 1 in 1000-year annual probability of flooding.

4.1.3 The NPPF Planning Practice Guidance states that all types of development are suitable for this flood zone.

4.1.4 An area of Flood Zone 2 and 3 is located to the west of the site which is associated with the Thistley Vale Brook. The NPPF classifies Flood Zone 3 (high probability) as an area with greater than a 1 in 100-year annual probability of flooding. With Flood Zone 2 (medium probability) classified as an area with greater than a 1 in 1000-year annual probability of flooding.

4.1.5 A comparison between the EA Flood Zone 2 and 3 extent and the topographical survey shows that the flood zone extents are constrained to the watercourse channel, with the extents corresponding to a level of approximately 114 – 108mAOD as the watercourse flows to the south.

4.1.6 The flood zone extents are constrained to the watercourse channel due to the steeply rising topography either side of the watercourse in an easterly and westerly direction.

4.1.7 The full extents of the site are located within Flood Zone 1, with a significant level difference between the flood zone extents and the development parcel. The flood zones extents are shown to correspond to a level between approximately 108 - 114mAOD, however, the western edge of the development corresponds to a level of approximately 125mAOD. Consequently, there is at minimum a 11m level difference between the development proposals and the flood zone extents.

4.1.8 A detailed assessment of the risk of fluvial flooding to the subject site and the development proposals has been undertaken, which has concluded that the risk of flooding to the development is low.

Climate Change

4.1.9 The EA 'Flood Risk Assessments – Climate Change Allowances' guidance provides support to the NPPF on the impacts of climate change on flooding from the land, rivers and sea as part of a flood risk assessment.

4.1.10 In accordance with the NPPF and supporting planning practice guidance, flood risk assessments should demonstrate how flood risk will be managed now and over the developments lifetime, taking climate change into account.

4.1.11 The NPPF Flood Risk and Coastal Change Planning Practice Guidance states that for commercial development it is reasonable to assume a typical lifespan of 75 years.

4.1.12 Despite the site being within Flood Zone 1, a review of the risk of flooding taking into account the development lifespan and climate change has been undertaken.

4.1.13 The subject site is located within the Upper Lee Management Catchment which has the following EA climate change allowances.

	Central	Higher	Upper
2020s	3%	9%	23%
2050s	-1%	7%	27%
2080s	10%	22%	59%

4.1.14 In accordance with Planning Practice Guidance, the vulnerability category of the employment aspect of the development is classified as 'less vulnerable' under Table 2 of the NPPF.

4.1.15 Despite the site not being impacted by the Flood Zone 2 and 3 extents, for this exercise we have followed EA guidance which states that flood risk assessments on sites which are affected by Flood Zone 2 and 3a and with a 'less vulnerable' flood risk classification should consider the central allowance.

4.1.16 The EA have confirmed that detailed flood modelling information is not available for the Thistley Vale Brook.

4.1.17 As previously discussed, the levels of the current flood zone extents with a 1% chance of occurring for fluvial flooding along with the extreme flood outline representing the extent of a flood with a 0.1% chance of occurring in any year has been considered in relation to the existing site levels.

4.1.18 Due to the existing topography, the flood zone extents are constrained to the watercourse channel, with a significant level difference of between the flood zone extents and the proposed development.

4.1.19 It is therefore considered that the relevant climate change allowances will have a negligible impact on the anticipated flood zone extents and hence due to the significant level difference between the anticipated flooding extents and the development, the flood risk to the site over the lifetime of the development is low.

4.1.20 A detailed assessment of the risk of fluvial flooding to the subject site and the development proposals has been undertaken. It is concluded that the risk of flooding to the development is low.

4.2 Overland & Surface Water Flooding

4.2.1 As shown on the EA risk of flooding from surface water map (refer to Figure 2.0), the proposed site is almost entirely identified as being in an area of very low risk of overland and surface water flooding.



Figure 2.0 - Environment Agency Flooding from Surface Water Map

4.2.2 It is considered that the risk of surface water flooding impacting the proposed development is low, due to the topography of the site.

4.2.3 Within the site, several small, isolated areas of low-high risk are shown in the north-east and south-eastern parts of the site. However, these areas do not impact the development proposals and it is anticipated that flows in these areas will be conveyed away from the site by the local topography.

4.2.4 Due to the topography of the site and the surrounding area, the risk of flooding from overland flows is considered low.

4.2.5 There are no historical records of surface water or overland flooding impacting the site.

4.2.6 Based on further investigation and the factors described above, it is considered that flooding from surface water or overland flows does not pose a significant risk to the proposed development, with additional mitigation measures suggested in Section 9 to further manage the risk to the site.

4.3 Flooding from Sewers

4.3.1 There is a very low risk of flooding from the existing public sewerage infrastructure impacting the proposed site due to the location of the existing apparatus and the topography of the site and surrounding area.

4.3.2 In the event of sewer incapacity or blockages occurring to the existing sewer network, flows will be conveyed away from the site due to the topography of the surrounding area and will therefore not impact the site.

4.3.3 There are no historical records of flooding caused by local sewer infrastructure impacting the site. Consequently, it is not considered that flooding from sewers poses a significant risk to the site.

4.4 Groundwater Flooding

4.4.1 The underlying bedrock beneath the proposed site has been identified as Lewes Nodular and Seaford Chalk with superficial deposits of Lowestoft Formation.

4.4.2 The BGS groundwater flooding susceptibility map (refer to Figure 3.0) shows that the entirety of the site area is classified as having limited potential for groundwater flooding to occur.

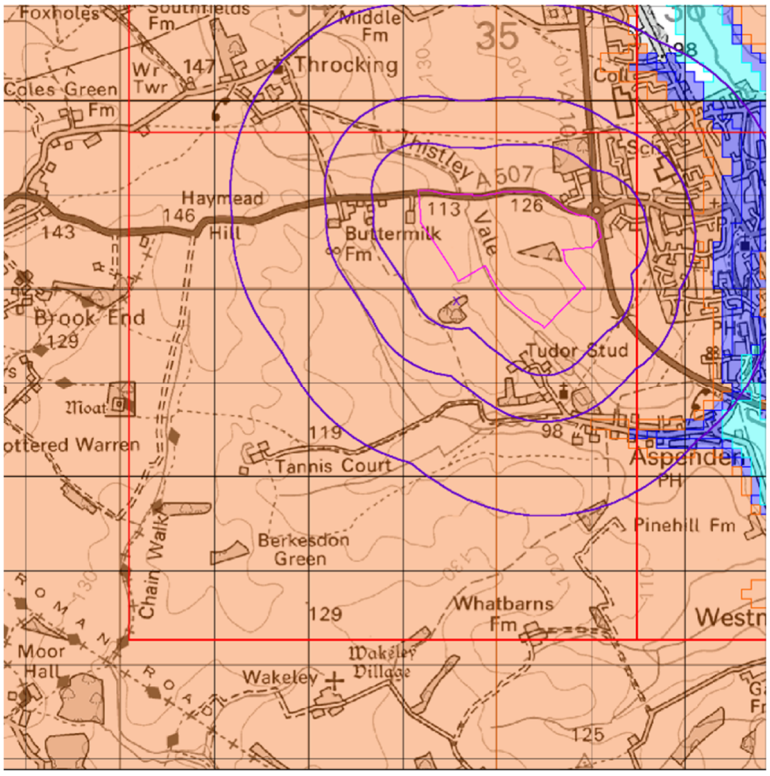


Figure 3.0 - BGS Groundwater Flooding Susceptibility Map

4.4.3 The East Hertfordshire District Council Strategic Flood Risk Assessment (SFRA) completed by JBA in 2016 includes a strategic-scale map showing areas susceptible to groundwater flooding based on the proportion of a 1km square grid where geological and hydrogeological flooding may occur. This data identifies the full extents of the site being at very low risk of groundwater flooding.

4.4.4 There are no historical records of groundwater flooding occurring within the site or in the nearby vicinity.

4.4.5 Historical borehole data shows a water strike within a borehole located in close proximity to the site encountering water at 11.8m below ground level, with standing water rising to 3.8m below ground level.

4.4.6 Further onsite testing should be undertaken across the subject site to obtain further details on the underlying ground conditions and the groundwater regime. However, from the available information it appears that groundwater levels may be at a significant depth and consequently groundwater flooding is unlikely to occur.

4.4.7 No detailed on-site geotechnical investigation works have been undertaken on the proposed site. However, based on the currently available information discussed above it is considered that flooding from groundwater does not pose a significant risk to the site.

4.5 Flooding from Artificial Sources

4.5.1 There are no artificial bodies of water located within or around the proposed site. Therefore, it is not expected that flooding from artificial sources poses a risk to the proposed site.

5 Proposed Development

5.1 Development Description

5.1.1 The proposals consist of an outline planning application for development of employment land (flexible use B2, B8, E9c) and E(g)), informal open space, associated works and infrastructure including a new access from A507, with all matters reserved save for access.

5.1.2 A copy of the illustrative concept masterplan is included in Appendix D.

5.2 Development Suitability

5.2.1 The NPPF aims to direct developments to suitable areas with low probability of flooding. The table below shows the acceptable classification of development within each flood zone.

Flood Risk Vulnerability Classification	Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone 1 **(<1 in 1000)**	✓	✓	✓	✓	✓
Flood Zone 2 **(Up to 1 in 1000)**	✓	✓	Exception Test	✓	✓
Flood Zone 3a **(1 in 100 fluvial)** **(1 in 200 tidal)**	Exception Test	✓	X	Exception Test	✓
Flood Zone 3b **(Functional floodplain)**	Exception Test	✓	X	X	X

5.2.2 The development, the proposals are considered to be classified as a 'less vulnerable' development under Table 2 of the NPPF.

5.2.3 As the entirety of the site is within Flood Zone 1, all vulnerability classes are suitable and thus the proposed scheme is deemed acceptable.

5.2.4 The site will not be subject to a Sequential Test by the Local Planning Authority (LPA) in respect of the appropriateness of the proposed development in this location, as the site is located wholly within Flood Zone 1, with no other sources of flooding shown to pose a significant risk to the site.

6 Development Drainage

6.1 Foul Drainage

6.1.1 A new foul water drainage network will be required to service the proposed development. The new network will collect and convey foul water discharge from the development to a new point of connection on the existing Thames Water foul sewer network.

6.1.2 Thames Water asset plans have identified an existing public sewer network running throughout the town of Buntingford directly to the east of the development. The existing site is not positively drained, consequently the proposed development will increase flows to the public sewerage system.

6.1.3 The new foul sewerage network will be designed to accommodate the anticipated peak development flows without flooding.

6.1.4 Thames Water have been instructed to undertake an initial assessment of the existing public foul sewer network, to confirm if sufficient capacity is available to accommodate the additional flows from the development.

6.1.5 Thames Water have confirmed that the existing sewer network is not currently able to meet the needs of the full development, with further detailed network modelling required to determine any off-site improvement works required to serve the full scale of the development.

6.1.6 However, Thames Water are obligated to accept flows from new developments with the benefit of planning permission. Therefore, it is considered that through further liaison with Thames Water, any off-site improvement works will be co-ordinated and delivered to ensure the existing network is capable of accommodating the development proposals.

6.1.7 The proposed point of connection to the existing public network is to be confirmed through further co-ordination with Thames Water. However, due to the topography of the site and local area, along with the location of the existing infrastructure, it is anticipated that a gravity connection from the development to the proposed point of connection will be feasible. If this is not the case, a pumped solution will need to be considered via an onsite pump station.

6.1.8 If the timeframes for completion of any necessary network upgrade works do not align with the delivery of the development, discharging flows via a private wastewater treatment works could be considered subject to environmental permits.

6.2 Surface Water Drainage

6.2.1 Current legislation and guidance require developers to manage surface water run-off from new developments to mitigate flood risk to the site and the surrounding area, and also provide a sustainable means of disposing of run-off from impermeable areas.

6.2.2 Off-site surface water discharge must be managed to ensure that it does not exceed the predevelopment flow rate. Sustainable drainage systems (SuDS) should be used to attenuate flows and ensure that run-off from the new hardstanding areas receives the appropriate water quality treatment before being discharged.

6.2.3 The proposals aim to provide a new sustainable surface water drainage strategy to dispose of surface water run-off in an effective manner. In accordance with the drainage hierarchy, the possible drainage options considered for the proposed site include:

- Infiltration via the use of soakaways or infiltration basins
- Attenuation and discharge to local watercourse
- Attenuation and discharge to a public sewer network

6.2.4 Initial BGS survey information identified that the site area is underlain by Lewes Nodular and Seaford Chalk. However, this bedrock strata is overlaid by significant superficial deposits consisting of chalky til, together with outwash sands and gravels, silts and clays.

6.2.5 No intrusive ground investigation works have been undertaken on the subject site. However, based on currently available information it is anticipated that the discharge of surface water via infiltration techniques will not be feasible and an alternative attenuation option is preferred.

6.2.6 Further ground investigation works should be undertaken on the proposed site as the site is taken forward to confirm the assumption that infiltration is not a viable option.

6.2.7 The proposed development will create areas prevented by impervious surfacing from draining to the ground by natural processes. Surface water run-off will be directed to a new onsite surface water drainage network that will be designed to appropriately control the offsite discharge and prevent flooding within the site and downstream areas.

6.2.8 It is proposed that generated surface water run-off from the development will be discharged at a restricted pre-development greenfield rate to the existing drainage ditch within the south-east corner of the site, with flows attenuated onsite via SuDS features including an attenuation basin.

6.2.9 Using the FEH statistical method, a Qbar greenfield rate of 15.7l/s has been calculated. This rate will be used as the maximum offsite discharge rate for storm events up to the 1 in 100-year plus 40% climate change scenario.

6.2.10 Restricting the offsite surface water discharge rate to Qbar, an estimated storage volume of 2550m^3 is required to accommodate the 1 in 100-year plus 40% climate change scenario.

6.2.11 It is proposed to provide the required storage primarily through an attenuation basin which will be sized and located specifically for the individual catchments. A Hydrobrake unit placed downstream of the basins will control the discharge rate ensuring that it does not exceed the agreed rate.

6.2.12 It is proposed that the development drainage strategy will utilise the integration of SuDS features throughout the development proposals. This includes the use of a variety of source control features to enhance the SuDS management train. Further details of the proposed sustainable drainage systems are provided in Chapter 7 and 8.

6.2.13 To accommodate the development proposals and drainage strategy it is anticipated that the localised adjustment of existing onsite levels may be necessary across certain parts of the site.

6.2.14 A plan of the proposed drainage strategy and associated calculations is included in Appendix E.

7 Sustainable Drainage Systems & Water Quality

7.1.1 Surface water management systems should incorporate sustainable drainage techniques to restrict surface water discharge from the site and improve the water quality of the run-off. There are a variety of techniques that can be applied including source control, online systems and outlet controls. Ciria have published a SuDS manual, which details a number of systems along with guidance on their application and design.

7.1.2 SuDS systems typically rely on either infiltration or attenuation to reduce peak flows and discharge volume and filtration systems to remove pollutants or solids from the effluent.

7.1.3 The existing ground conditions appear to suggest that infiltration methods will be unsuitable for the discharge of surface water flows from the proposed development. It is therefore proposed that an attenuation option is the preferred strategy.

7.1.4 As a means of analysing whether SuDS measures utilised for the site will provide adequate water treatment to the surface water runoff, the Ciria SuDS manual specifies a simple index approach. This approach gives different land uses certain pollution hazard indices (Table 26.2 Ciria Manual), while SuDS features are given mitigation indices (Table 26.3 Ciria Manual). If the SuDS indices equate or surpass the pollution hazard indices, the water treatment within the system is deemed adequate.

7.1.5 The impermeable hardstanding areas of the site can be split into three distinct areas:

- Carparking/driveways
- Building roof areas
- Carriageways/footways

7.1.6 The building roof areas collect rainfall from the structure and runoff will be predominantly clean. Individual property driveways and low traffic roads also have low hazard indices. The hazard and mitigation indices for each impermeable area type have been summarised in the table below.

Impermeable Region	Hazard Indices			Treatment	Mitigation Indices		
	TSS	Metals	Hydro		TSS	Metals	Hydro
Car Parking /Driveways	0.5	0.4	0.4	Attenuation Basin	0.5	0.5	0.6
Building Roof	0.2	0.2	0.05				
Roadways /Footways	0.5	0.4	0.4				

Table 1 – Ciria Simple Index Approach Analysis

7.1.7 As shown in Table 1, the provision of an attenuation basin is deemed adequate to meet water quality requirements for the site.

7.1.8 It is proposed to incorporate a variety of SuDS features as part of the site wide drainage strategy. This will include attenuation basins with additional features such as permeable paving, raingardens/swales and water butts etc to supplement the overall drainage strategy for the site.

7.1.9 These sustainable drainage features will provide ecological benefits as well as amenity and water quality benefits through the dilution, filtration and settlement of solid particles.

7.1.10 Throughout the construction phase of the development the contractor will be required to ensure that appropriate provisions are put into place to ensure that the water quality of the surface water discharge from the site is being maintained. This will involve measures to prevent silts and other construction waste being conveyed offsite through surface water runoff.

7.1.11 The proposed site has been identified within a Zone 3 groundwater source protection zone, atop a principal bedrock aquifer and within a Water Framework Directive Groundwater water body with 'poor' overall classification. However, as the preferred strategy is an attenuation option it is considered that the development proposals or drainage strategy will not impact the sensitive underlying groundwater, with SuDS features providing adequate treatment to ensure the water quality of any downstream features is not affected.

8 SuDS Management & Maintenance

8.1.1 To ensure that the proposed SuDS features operate effectively for their lifetimes a detailed management plan for the operation and maintenance of the SuDS will be produced prior to construction, in accordance with Chapter 32 of Ciria C753.

8.1.2 It is anticipated that proposed surface water and foul water drainage networks will be offered to Thames Water for adoption. Where Thames Water will not accept certain sections of pipework, these will be the responsibility of a site management company.

8.1.3 Drainage for buildings, access roads, car parks, landscaping, and all other features under private ownership will be managed and maintained privately.

8.1.4 Proposed SuDS features such as permeable paved driveways will remain private and be maintained by the homeowner or the site management company.

8.1.5 Proposed SuDS features located in public spaces such as the attenuation basins will be offered to the local authority or Thames Water for adoption.

8.1.6 If SuDS features in public spaces remain under private ownership, a private management company will be responsible for the regular inspection and maintenance of these features, with a contractor on standby for emergency reactive maintenance.

8.1.7 As the scheme is progressed the management and maintenance practices for the SuDS and drainage infrastructure will be reviewed and updated with a final confirmed plan to be detailed and agreed with the Local Authority prior to construction.

9 Development Flood Risk & Mitigation

9.1 Tidal & Fluvial

9.1.1 As discussed in section 4 – the site lies entirely within Flood Zone 1, with the risk of flooding from tidal & fluvial sources considered to be low. The development proposals do not increase the flood risk to the site or the surrounding area from tidal or fluvial sources.

9.1.2 The proposed use of the site is defined as 'less vulnerable' under the NPPF, which is deemed as suitable for a site in Flood Zone 1.

9.1.3 The proposed development includes a site wide drainage strategy which will collect, attenuate, treat, and discharge flows in a sustainable manner. It is proposed to discharge flows to the local watercourse at the greenfield rate, which will not increase the risk of flooding to the site or surrounding areas.

9.2 Overland & Surface Water Flooding

9.2.1 As previously discussed in Section 4.2, it is considered that the risk of flooding from surface water & overland flows is low.

9.2.2 Although the risk to the site is not considered significant, it is suggested that the following flood risk management measures are considered to further manage any potential risk.

- Finished floor levels should be set a minimum of 150mm above existing levels.
- Where possible, the existing ground profile should be designed to convey any potential flows away from buildings or vulnerable areas.

9.2.3 The development proposals will include a site wide drainage strategy which will be designed to accommodate all surface water flows from the new hardstanding areas of the development. This network will be designed to accommodate the 1 in 30-year event without flooding, with flow routes considered to prevent flooding onsite or downstream during extremely severe weather conditions.

9.2.4 Consequently, the proposed development will not have a detrimental impact on flood risk to the site or to the surrounding areas.

9.3 Flooding from Sewers

9.3.1 As discussed in Section 4.3 there is a very low risk to the site from the failure of existing drainage infrastructure within the region.

9.3.2 A new surface water drainage network will be constructed to serve the proposed development. This network will be designed to accommodate flows for the 1 in 30-year event, with exceedance flow routes considered to prevent flooding onsite or downstream during more severe weather.

9.3.3 A new foul water drainage network will also be constructed to service the site. This network will be designed to accommodate anticipated peak flows with no flooding.

9.3.4 Based on the information discussed above, it is considered that the proposed development does not increase the risk of flooding from sewers to the site or surrounding area.

9.4 Groundwater Flooding

9.4.1 As discussed in Section 4.4, the risk of flooding from groundwater is considered very low.

9.4.2 There are no historic records of groundwater flooding either on or in the nearby vicinity of the site, which suggests that groundwater re-emergence has not caused significant flooding issues in the past.

9.4.3 It is proposed to discharge surface water flows via an attenuation solution to a local watercourse. These proposals are not expected to affect the groundwater table and consequently will not increase the risk of flooding from groundwater related sources.

9.5 Flooding from Artificial Sources

9.5.1 As discussed in Section 4.5 there is no flood risk to the site from artificial sources. The development proposals will not cause an increase to this risk, either to the site or to the surrounding areas.

10 Conclusions & Recommendations

It is considered that this assessment represents a comprehensive and robust analysis of the flood impact of the development upon other adjacent properties and of the existing flood mechanisms on the development itself. It demonstrates that the proposed development is sustainable in terms of flood risk and can be summarised as follows.

Subject	Conclusions
Tidal and Fluvial Flood Risk	The development is located in Flood Zone 1 – low probability for tidal and fluvial flooding on the EA flood maps for planning.
Flood Risk from Other Sources	No significant flood risk to the site from surface water or overland flows, existing sewers, groundwater or artificial water bodies has been identified.
Development Suitability	The development use is considered suitable for the site, which lies within Flood Zone 1 – Low Probability, under Table 3 of the NPPF Planning Practice Guidance.
Existing Drainage	The existing local public foul and surface water networks are owned and operated by Thames Water. The closest public sewers to the site are found within Buntingford Business Park and Baldock Road to the north-east of the site.
Proposed Drainage	New surface and foul water sewer networks will be constructed to service the proposed development. Surface water run-off will be discharged via a sustainable drainage solution. It is proposed to discharge flows via an attenuation option to the existing watercourse located within the south-east corner of the site.
Surface Water Management	Due to the underlying ground conditions, it is anticipated that discharging flows via infiltration will not be viable. If infiltration rates are proven to be unfeasible, it is proposed to discharge flows via an alternative attenuation option, with flows discharged to the local watercourse. It is proposed to discharge surface water runoff at a restricted pre-development greenfield rate, with onsite attenuation storage provided. The attenuation features will be designed to accommodate flows for a range of storm events including the 1 in 100-year plus 40% climate change scenario. Additional SuDS features will also be considered as a means of providing additional ecological, amenity and water quality benefits.
Foul Water Disposal	It is proposed to discharge flows to a suitable point of connection on the existing public sewer network located to the east of the site. The existing site is not positively drained, consequently the development will increase foul loadings to the public sewer system.

	A connection to the existing public sewer will be achievable, however, subject to hydraulic modelling network upgrades may be required to accommodate the additional flows from the development.

Based on the findings of this report, it is considered that there are no grounds for objecting to the proposed development in terms of flood risk.

Appendix A: Site Location Plan

Site Boundary (13.28ha)

Path (um)
FB
45 to 90
El Sub Sta
SKEPPS MEADOW
Pond
Mast
Reservoir (covered)
Buntingford Business Park
El Sub Sta
Tire Hill
125.9m
A 507
BALDOCK ROAD
BALDOCK ROAD
A10
Ivy House
Oak View
Fairview
The Old Farmhouse
B 1038
BALDOCK ROAD
A 507
The Thicket
Thistley Vale
Pond

Rev	Description	Date

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Client:

Hallam Land Management

Land West of Buntingford

Application Boundary Plan (South of Baldock Road)

Scale@ A3 :	Drawn:	Designed:	Approved:
1:2,500	ADW	SJP	SJP

0m 100m

Drawing Number:	Revision:	Date:
HLM082/020	C	30.05.24

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DAVID LOCK ASSOCIATES

Appendix B: Topographical Survey



Symbol & Abbreviation Key.

- BARBED WIRE FENCE
- POST & RAIL FENCE
- CLOSE BOARD FENCE
- RAILINGS
- CHAIN LINK FENCE
- OTHER FENCE
- KERB
- DROPPED KERB
- GULLY CHANNEL
- TOP / BOTTOM OF BANK
- FOLIAGE
- DITCH
- VERGE
- OVERHEAD CABLES
- GATE
- HEDGE
- TREE - BROAD LEAVED
- TREE - CONIFEROUS
- BUSH
- BUILDING
- BOREHOLE
- SURVEY STATION
- ORDNANCE SURVEY BENCH MARK

A/C	AIR CONDITIONING UNIT	KO	KERB OFFLET
AV	AIR VALVE	LC	LIGHTING COLUMN
BOL	BOLLARD	LP	LAMP POST
BH	BOREHOLE	NP	NAME PLATE
BL	BED LEVEL	NB	NOTICE BOARD
BM	BENCH MARK	PR	PIPE RISER
BT	BRITISH TELECOM	RP	RODDING POINT
CTV	CABLE TV	RS	ROAD SIGN
CL	COVER LEVEL	SP	SIGN POST
CR	CABLE RISER	SV	STOP VALVE
DP	DOWN PIPE	TL	TRAFFIC LIGHT
ER	EARTH ROD	TP	TELEGRAPH POLE
EP	ELECTRICITY POLE	TOF	TOP OF FENCE
EM	ELECTRICITY MARKER	TOH	TOP OF HEDGE
FB	FUSE BOX	TOR	TOP OF RAILINGS
FH	FIRE HYDRANT	TOS	SERVICE LEVEL
FP	FENCE POST	TOW	TOP OF WALL
FL	FLOOR LEVEL	UTL	UNABLE TO LIFT
GV	GAS VALVE	VM	VALVE MARKER
GM	GAS MARKER	VP	VENT PIPE
GU	GULLY	WL	WATER LEVEL
HM	HYDRANT MARKER	WM	WATER MARKER
IL	INVERT LEVEL	WO	WASH OUT

General.

This survey has been prepared with a scaling accuracy for a plot at a scale of 1:200.

All tree heights and spreads are approximate. We have tried to identify tree types, however if tree species are critical specialist advice should be gained.

Drainage pipe sizes have been measured from the surface. Chamber access has not been gained for safety reasons, therefore sizes should be regarded as approximate.

Some detail may have been omitted due to parked vehicles.

Notes.

Coordinates related to OS National Grid by GPS .
Levels related to GPS.
Scale Factor 0.99982581.

INDICATIVE ONLY

Rev	Details of Revision	Drawn	Date

Surveyed	Drawn	Date	Checked	Date	Approved	Date
AS	AS	31.01.23	GD	31.01.24	GD	31.01.24

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Title.

TOPOGRAPHICAL SURVEY

LAND TO THE NORTH AND SOUTH OF THE A507
BALDOCK ROAD
BUNTINGFORD
SG9 9ER

Dwg No. **230901 3D** Sheet **1 of 1**

Scale 1:2500 A0 Sheet Rev. -