Hallam Land Management Limited, St Albans School and St Albans School Woollam Trust

Woollam Park, St Albans

Sequential Test

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Purpose

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The conclusions and recommendations contained herein are limited by the availability of background information and the planned use for the Site.

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CDM

The revised Construction (Design and Management) Regulations 2015 (CDM Regulations) came into force in April 2015 to update certain duties on all parties involved in a construction project, including those promoting the development. One of the designer's responsibilities under clause 9 (1) is to ensure that the client organisation, in this instance Hallam Land Management Limited, St Albans School and St Albans School Woollam Trust, is made aware of their duties under the CDM Regulations.

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Contents

1 Introduction

1.1.1 PJA Civil Engineering Ltd (PJA) has been commissioned by Hallam Land Management Limited, St Albans School and St Albans School Woollam Trust, to undertake a site-specific Sequential Test for the land at 'Woollam Park, St Albans'.

1.1.2 This site-specific Sequential Test has been undertaken with the purpose of supporting the proposed planning permission for the following development:

1 Relocation and replacement of existing playing fields and erection of pavilion annex; and

2 Construction of up to 1000 new homes (Use Class C3) to include a mix of market housing, affordable housing, age restricted specialist accommodation for the elderly, adult disability service units; a care home (Use Class C2); a local centre (Use Classes E and F); a primary school (Use Class F); the laying out of green infrastructure including habitat creation; drainage infrastructure; earthworks; pedestrian and cycle routes; new means of access and alterations to existing accesses.

1.1.3 The application is submitted as a "hybrid" application. Part (1) is submitted as a full application. Part (2) is submitted as an outline application with approval of means of access sought at the present time, and all other reserved matters to be approved at a later date.

1.1.4 The purpose of the Sequential Test is to ensure that a sequential, risk based approach is followed to steer new development to areas with the lowest risk of flooding, taking all sources of flood risk and climate change into account.

1.1.5 On this basis, a site specific Sequential Test has been undertaken to assess how the Proposed Development Site sequentially compares to other 'reasonably available' sites in flood risk terms and considers whether alternative sites are available to come forward for development in order to meet housing need (as set out in the emerging St Albans City and District Development Plan) in the same timeframe as the Proposed Development.

1.1.6 This report has been jointly produced with LRM who have advised on the planning aspects of the Sequential Test and proposed scheme and should be read alongside the FRA prepared by PJA dated December 2024

1.1.7 It has been prepared as part of the required information for the outline planning validation list to address any questions in relation to the flood risk and the Sequential Test.

2 Proposed Site and Proposal

2.1 Proposed Site

2.1.1 The Site primarily comprises of undeveloped land and is currently used for agricultural purposes. A small percentage of the site, adjacent to Harpenden Road, is currently used for recreational purposes, as Rugby Football playing fields. The Site extends to an area of approximately 50.17 ha, located to the east of A1081 (Harpenden Road), with agricultural fields bounding the north of the Proposed Development, with an existing railway line running along the northeastern boundary. An existing commercial development is south of the development, beyond which is existing residential development. The. Site's OS co-ordinates are 515676, 210075.

2.1.2 The Proposed Development has been designed to incorporate Sustainable Drainage Systems (SuDS) features across the site, as well as significant landscaped areas and other open space typologies, to sustainably drain surface water runoff and manage exceedance flows through the Site.

2.1.3 The anticipated timeline for the Proposed Development is within the period encompassed by the emerging St Albans and District Council Local Plan, which covers October 2024 – March 2041.

2.2 Flood Risk

2.2.1 To support the outline planning application a Flood Risk Assessment ('FRA') (Woollam Park, St Albans, Flood Risk Assessment and Drainage Strategy (Document Ref: 05920-FRA-002), December 2024 by PJA has been undertaken, in accordance National and Local Policy and Guidance, which identifies the Site to be at low or very low risk of flooding from fluvial, tidal sources, reservoirs and sewers. This report should be read alongside the FRA prepared by PJA dated December 2024 for a detailed assessment of flood risk from all sources to and from the Site.

2.2.2 The 'Groundwater Flood Risk Mapping' contained within the South West Hertfordshire Level 1 Strategic Flood Risk Assessment (SFRA) indicates groundwater flood risk to be approximately 5.0m below ground level (bgl) to the west and between 0.5-5.0m (bgl) to the east. Due to the varying levels of groundwater predicted to be present at the Site, the risk of groundwater flooding is considered to be low to medium.

2.2.3 The publicly available Long-Term Flood Risk Information, Flood Risk from Surface Water map identifies that the Site is predominantly at very low flood risk from surface water flooding. However, low, medium and high surface water flow routes bisect the Site centrally, before ponding along the eastern boundary.

2.2.4 The FRA robustly assesses flood risk from all sources to and from the Site and demonstrates how flood risk will be managed now and over the development's lifetime, taking climate change into account, with regard to the vulnerability of its users.

2.2.5 The findings of the FRA are summarised in the table below.

Table 1: Summary Table of Site Characteristics

Overview	
Site Location	Woollam Park, Land off Harpenden Road, St Albans
Development Proposal	Residential-led development
Environment Agency Flood Zone(s)	Flood Zone 1
Vulnerability Classifications(s)	More Vulnerable and Less Vulnerable
Fluvial Flood Risk	Very Low
Tidal Flood Risk	Very Low
Surface Water Flood Risk	Medium
Groundwater Flood Risk	Low to Medium
Sewer Flood Risk	Low
Canal Flood Risk	Very Low
Reservoir Flood Risk	Very Low
Surface Water Drainage	The surface water drainage strategy will sustainably manage all storm events up to and including the 1 in 100-year plus 40% climate change event. This will be achieved via a network of SuDS, before discharging via infiltration at a rate of $1.88x10^{-5}$ m/s.
Foul Water Drainage	Foul water flows will drain via gravity to the proposed pumping station within the Site. Foul water will then be pumped from the proposed Type 3 pumping station to the north west of the Site into Thames Water Manhole MH8702.

2.3 Sequential Test

2.3.1 The purpose of the Sequential Test is to ensure that a sequential, risk based approach is followed to steer new development to areas with the lowest risk of flooding, taking all sources of flood risk and climate change into account.

2.3.2 Given that the Site is affected by areas of surface water flood risk, the Sequential Test needs to be satisfied in accordance with the National Planning Policy Framework Planning Practice Guidance (paragraph 023), even where it can be demonstrated that the Proposed Development 'can be made safe throughout its lifetime without increasing risk elsewhere'.

2.3.3 On this basis, a site specific Sequential Test has been undertaken to assess how the Proposed Development Site sequentially compares to other 'reasonably available' sites in flood risk terms and considers whether alternative sites are available to come forward for development in order to

meet housing need (as set out in the emerging St Albans City and District Development Plan) in the same timeframe as the Proposed Development.

2.3.4 This report has been jointly produced with LRM who have advised on the planning aspects of the Sequential Test and proposed scheme. It has been prepared as part of the required information for the outline planning validation list to address any questions in relation to the flood risk and the Sequential Test.

3 Planning Policy Context

3.1 National Planning Policy Framework (NPPF)

3.1.1 Chapter 14 of the National Planning Policy Framework (NPPF) discusses the challenges posed by climate change and flooding. The key paragraphs of the NPPF which specifically address the Sequential Test are 165 to 174.

3.1.2 Paragraph 165 of the Framework sets out the key principals of the Sequential Test and states that:

3.1.3 '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 168 outlines the aim of the sequential test and states the following:

3.1.5 ''The aim of the sequential test is to steer new development to areas with the lowest risk of flooding from any source. Development should not be allocated or permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower risk of flooding. The strategic flood risk assessment will provide the basis for applying this test. The sequential approach should be used in areas known to be at risk now or in the future from any form of flooding.''

3.1.6 Paragraph 169 relates to the exception test. It states: Chapter 14 of the National Planning Policy Framework (NPPF) discusses the challenges posed by climate change and flooding. The key paragraphs which the NPPF are 165 to 175.

3.1.7 ''If it is not possible for development to be located in areas with a lower risk of flooding (taking into account wider sustainable development objectives), the exception test may have to be applied. The need for the exception test will depend on the potential vulnerability of the site and of the development proposed, in line with the Flood Risk Vulnerability Classification set out in Annex 3.''

3.1.8 Paragraph 173 sets out what evidence should be provided as part of a planning application and what should be demonstrated as part of that evidence in flood risk terms. It states:

3.1.9 '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 assessment. Development should only be allowed in areas at risk of flooding where, in the light of this assessment (and the sequential and exception tests, as applicable) it can be demonstrated that:

3.1.10 (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;

3.1.11 (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;

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

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

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

3.2 Planning Practice Guidance (PPG)

3.2.1 The PPG, which was last updated on 25th August 2022, provides guidance on flooding and coastal change in the context of the planning process which 'advises how to take account of and address the risks associated with flooding and coastal change in the planning process'.

3.2.2 In relation to how the sequential test can be applied to the location of development, paragraph 24 of the PPG states the following:

3.2.3 ''The Sequential Test ensures that a sequential, risk-based approach is followed to steer new development to areas with the lowest risk of flooding, taking all sources of flood risk and climate change into account. Where it is not possible to locate development in low-risk areas, the Sequential Test should go on to compare reasonably available sites:

- *Within medium risk areas; and*
- *Then, only where there are no reasonably available sites in low and medium risk areas, within high-risk areas.*

3.2.4 Initially, the presence of existing flood risk management infrastructure should be ignored, as the long-term funding, maintenance and renewal of this infrastructure is uncertain. Climate change will also impact upon the level of protection infrastructure will offer throughout the lifetime of development. The Sequential Test should then consider the spatial variation of risk within medium and then high flood risk areas to identify the lowest risk sites in these areas, ignoring the presence of flood risk management infrastructure.

3.2.5 It may then be appropriate to consider the role of flood risk management infrastructure in the variation of risk within high and medium flood risk areas. In doing so, information such as flood depth, velocity, hazard and speed-of-onset in the event of flood risk management infrastructure

exceedance and/or failure, should be considered as appropriate. Information on the probability of flood defence failure is unsuitable for planning purposes given the substantial uncertainties involved in such long-term predictions.''

3.2.6 Paragraph 028 also provides clarity on the definition of 'reasonably alternative sites':

3.2.7 *''Reasonably available sites' are those in a suitable location for the type of development with a reasonable prospect that the site is available to be developed at the point in time envisaged for the development. These could include a series of smaller sites and/or part of a larger site if these would be capable of accommodating the proposed development. Such lower-risk sites do not need to be owned by the applicant to be considered 'reasonably available'. The absence of a 5-year land supply is not a relevant consideration for the sequential test for individual applications.''*

4 Methodology

4.1.1 This site-specific Sequential Test has been undertaken using only publicly available data within the evidence base for the emerging St Albans City and District Local Plan 2041.

4.2 Site Selection

JBA Level 2 Strategic Flood Risk Assessment Site Selection

4.2.1 The potential or reasonably available list of sites, which have been selected for inclusion within this site-specific Sequential Test, have been taken from the St Albans Level 1 and 2 Strategic Flood Risk Assessments (SFRAs undertaken by JBA. These assessments have been prepared as part of the evidence base to inform the emerging St Albans City and District Local Plan 2041.

4.2.2 The initial site selection process within the St Albans Level 1 FRA by JBA (Addendum July 2024), is based on the following assessments and studies:

- Strategic Housing Land Availability Assessment (SHLAA) – 2018
- Housing and Economic Land Availability Assessment (HELAA) – 2021
- Urban Capacity Study (UCS)
- Sites classified as previously developed land (PDL) in the Green Belt

4.2.3 Utilising the above assessments, 102 sites were allocated within the Regulation 18 Draft Local Plan that was published for consultation in 2023 and a further 15 potential sites were identified following the Regulation 18 stage which were assessed within the Level 1 SFRA.

4.2.4 JBA assessed all of the sites identified within the Level 1 SFRA against all sources of flood risk in accordance with the NPPF, which as set out in Paragraph 167, requires that 'all sources of flood risk and the current and future impacts of climate change' should be considered when applying a 'sequential, risk-based approach to the location of development'.

4.2.5 The following selection criteria was then used by JBA to determine which sites would not need to be taken forward as part of a further detailed assessment in the Level 2 SFRA:

4.2.6 'The criteria below which is set out in the Level 1 SFRA was applied to the sites on the basis that the sites that did not satisfy the threshold for any source of flood risk qualifies for a detailed Level 2 assessment. The conditions for a site to be at low risk of flooding are as outlined below:

- *Site is within Flood Zone 1*
- *Site is not within Flood Zone 3a plus climate change*
- *Site is <10% at risk from surface water flooding in the 1 in 1000-year event*

- *Site is <10% within highest risk category in JBA Groundwater map (groundwater is <0.025m below the surface in the 1 in 100-year event).*
- *Site is <25% within second highest risk category in JBA Groundwater map (groundwater is between 0.025m and 0.5m below the surface in the 1 in 100-year event)*
- *Site is not within the Historic Flood Map*
- *Site is not at risk of reservoir flooding*
- *Site is not at risk of breach from canal flooding*
- *Site does not contain an Ordinary Watercourse*

4.2.7 Sites which were within 5% of the threshold for low risk of flooding but showed nonnegligible risk were further assessed on a site-by-site basis. Sites with the presence of any significant surface water flood risk issues at either the 3.33%, 1% or 0.1% AEP were also taken forward.

4.2.8 In order to assess whether a site was deemed to have significant surface water risk, professional judgment was used based on the extent and location of the surface water issues relative to the site and access and egress.'

4.2.9 This process produced a list of 36 sites which were analysed by JBA within the Level 2 SFRA.

4.2.10 However, Woollam Park was not included within the sites selected to take forward to the Level 2 assessment. It is understood that JBA has assessed the Site to be at 15% risk of surface water flooding in the 1 in 1000 year event and as such was considered for inclusion in a more detailed assessment as part of the Level 2 SFRA. However, JBA undertook a visual assessment of the surface water risk within the Site to determine whether the Site remained developable. Due to the confined corridor and marginal extents of surface water flood risk through the Site, JBA considered the Site to be developable, providing a sequential approach was applied to the layout of the development. On this basis JBA did not progress this Site as part of the Level 2 SFRA.

Site-specific Sequential Test – Site Selection

4.2.11 In order to include Woollam Park within the site-specific Sequential Test, all sites which were at surface water flooding identified within the Level 1 SFRA site selection process were proposed to be included within this assessment.

4.2.12 The initial site sifting process included the 36 sites analysed within the Level 2 SFRA and the 33 sites which were not taken forward for assessment in the Level 2 SFRA, despite having greater than 5% surface water flood risk for the 1 in 1000 year event, it was considered that these sites were still developable and therefore did not require further assessment as part of the Level 2 SFRA.

4.2.13 However, in line with the definition of 'Reasonably available sites' as set out in paragraph 028 of the PPG, a further sifting process has been carried out where those sites which were not greater than or equal to 5ha have been removed as they are unlikely to be comparable to Woollam Park either on their own or combined with other reasonably available alternative sites.

4.2.14 Through this sifting process, 16 alternative sites have been selected as being potentially comparable or considered to be a reasonable alternative site, to the Woollam Park Site.

4.2.15 A table of the 16 alternative sites, is provided in Appendix A.

4.3 Quantitative Analysis of Flood Risk

4.3.1 Following the finalisation of the site sifting process, the assessment of the various types of potential flood risk to each of the sites undertaken by JBA has been utilised to quantify the flood risk to each of the sites.

4.3.2 Any information relating to the sites has been collated from the publicly available data sources, including but not limited to:

- St Albans Level 1 Strategic Flood Risk Assessment
- St Albans Level 2 Strategic Flood Risk Assessment

Sources of Flood Risk

4.3.3 As outlined previously, the NPPF requires in Paragraph 167 that 'all sources of flood risk and the current and future impacts of climate change' should be considered when applying a 'sequential, risk-based approach to the location of development'.

4.3.4 Within JBA's assessment, the following sources of flood risk have been assessed:

- Historic Fluvial (EA Data Source)
- Historic – All sources (Hertfordshire County Council)
- Sewer Flood Risk (Thames Water)
- Fluvial Flooding (EA Data Source)
- Pluvial Flooding (EA Data Source)
- Reservoir Flood Risk (EA Data Source)
- Groundwater Flood Risk (JBA Groundwater Emergence Map)

Methodology for Site Assessments

4.3.5 Each of the sites identified within the initial site selection process outlined in Section 4.2, have been assessed as part of the site-specific sequential test.

Flood Risk Vulnerability

4.3.6 Each of the above sources of flood risk have been assessed by JBA within the Level 1 and 2 SFRAs for each of the selected sites. The percentage coverage of each type of flood risk is provided in Appendix B.

4.3.7 The table below sets out how the vulnerability of each type of flood risk for each site has been assessed and weighted:

Table 4-1: Flood Risk Vulnerability Rating

Type of Flood Risk	Level of Risk	None	Low	Medium	High	Weighting Factor
Fluvial	Flood Zone 1	None				0
	Flood Zone 2			Medium		7
	Flood Zone 3				High	10
Pluvial	1 in 1,000 Year		Low			1
	1 in 100 Year			Medium		7
	1 in 30 Year				High	10
Historic Flooding	No	None				0
	Yes				High	10
Reservoir Flooding	Dry Day		Low			1
	Wet Day		Low			1
Groundwater Flood Risk	0.025 – 0.5m			Medium		7
	0 – 0.025m				High	10

Limitations of the Assessment

4.3.8 It should be noted that there are some limitations with regard to the methodology adopted for the site-specific Sequential Test assessment, including but not limited to reliance on the methodology adopted by JBA when undertaking the site selection/ranking process as part of the Level 1 and 2 SFRAs. The key limitations of the assessment have been outlined below:

- JBA has only included sites with 'high' groundwater flood risk. This has resulted in any area of the assessed sites, which have mapping indicating a groundwater flood risk between 0.5m and 5.0m bgl (generally defined as medium risk by JBA), to have not been considered as part of their assessment. Further to this there is a discrepancy in how JBA categorise the level of groundwater flood risk where, within the Level 2 SFRA site specific factsheets, groundwater flood risk between 0.5 – 5.0m bgl is considered to be a low or moderate risk as opposed to medium as per their

original classification in the Level 1 SFRA. Moreover, it is considered that sites that are assessed as having groundwater flood risk ranging 0.5 – 1.0m bgl should be incorporated in the Sequential Test as it may have an impact on the efficacy of any proposed surface water attenuation basins at the site and may still emerge at the surface.

- Reliant on the percentage assessments which have been undertaken by JBA.
- Reliant on the accuracy of the publicly available mapping at the time of the Level 1 and 2 SFRA's respectively. JBA noted within the Level 1 SFRA that there are limitations to the publicly available Long Term Flood Risk Surface Water Flood Risk Mapping which should be noted. The report states *"RoFSW should be interpreted with adequate consideration given to the limitations of this dataset.".*
- Reliant on the accuracy and robustness of the 'JBA Groundwater Emergence Mapping', for assessing the risk of groundwater flooding for all the sites.
- The North St Albans site within the JBA SFRAs has been assessed with a site area of 46.75ha, whereas the proposed development at Woollam Park is 50.17ha.
- Reliant that the site selection process has reviewed all reasonably available sites within the SFRA's.
- Reliant on JBA having accurately captured the historical flooding information from Thames Water and Hertfordshire County Council.

5 Sequential Ranking

5.1 Quantitative Analysis

5.1.1 As outlined above each of the comparison sites have been analysed against the percentage coverage of each type of flood risk, produced by JBA. This quantity of flooding has been weighted against the level of flood risk for each type of flood risk as set out in Table 4-1 of the report.

5.1.2 The detailed analysis of the Sequential Test calculation is available in Appendix B.

5.1.3 Table 5-1 below ranks the reasonable alternative sites selected in order of flood risk vulnerability and summarises the final ranking of the site selected for the Sequential Test including the proposed Woollam Park (B1) Site, through the use of a sequential approach to flood risk. The table also identifies whether each selected site has draft allocation status within the emerging St Albans City and District Council Local Plan.

Table 5-11: Sequential Test Ranking

Ranking	Site Code	Site Name	Draft Allocation in emerging Local Plan	Proposed number of dwellings	Flood Risk Score
1	BUR5	104 High Street London Colney, AL2 1QL	Y	21	0.08
2	B7	North West Harpenden, AL5 3NP	Y	293	0.09
3	B2	North East Harpenden, AL5 5EG	Y	738	0.19
4	B8	Harper Lane, north of Radlett, WD7 7HU	Y	274	0.20
5	B6	West of London Colney, AL2 1LN	Y	293	0.36
6	L1	Burston Nurseries, North Orbital Road, St Albans, AL2 2DS	Y	180	0.37
7	B3	West Redbourn, Redbourn, AL3 7HZ	Y	545	0.40
8	**B1**	**North St Albans, AL3 6DD**	**Y**	**1,097**	**0.68**
9	H3	East Hemel Hempstead (Central), HP2 7LF	Y	Employment	0.69
10	H2	East Hemel Hempstead (North), HP2 7HT	Y	1,600	0.84
11	H1	North Hemel Hempstead, AL3 7AU	Y	1,500	1.27
12	N/A	Griffiths Way Retail Park, St Albans AL1 2RJ	N	Retail Park	1.42
13	B4	East St Albans, AL4 9JJ	Y	475	2.44
14	OS1	Land to the North of Bricket Wood, bounded by the M25 and A405 North Orbital	Y	Community Use	5.07
15	BH1	East of Kay Walk, St Albans, AL4 0XH	N	N/A	5.30
16	B5	Glinwell, Hatfield Road, St Albans, AL4 0HE	Y	484	5.62
17	M6	South of Harpenden Lane, Redbourn, AL3 7RQ	Y	68	12.37

5.2 Planning Review

5.2.1 Following the Sequential Test ranking exercise set out in Section 5.1 of this report, the assessment identifies other sites with a lesser extent of flood risk than the Proposed Development at Woollam Park.

5.2.2 However, due to the housing supply requirement of St Albans City and District Council, none of sequentially preferable sites represent reasonably available sites that would displace the important role of the North St Albans Site in contributing towards the District's housing need and the spatial strategy.

5.2.3 The 2024 Sustainability Appraisal undertaken by AECOM on behalf of the District Council acknowledges firstly that, "as the District's primary town, there is a clear need to direct a good proportion of growth to St Albans, with no clear case for a low growth strategy (with commensurately higher growth elsewhere)" and secondly that there is a "a clear strategic case for Green Belt release at St Albans". For these reasons, directing new development to other locations rather than St Albans would run counter to the spatial strategy.

5.2.4 Moreover, St Albans is defined as a Tier 1 settlement within the emerging Local Plan and the alternative sites are located in areas defined as lower settlement tiers.

5.2.5 Highlighting the importance of North St Albans (Woollam Park) in contributing towards housing needs within the spatial strategy to achieve sustainable development. The table below provides further planning commentary around the comparability of the sequentially preferable sites to Woollam Park.

Table 5-2: Sequential Test Planning Review

Ranking	Site Code	Site Name	Flood Risk Score	Planning Commentary
1	BUR5	104 High Street London Colney, AL2 1QL	0.08	Allocation for 21 dwellings – not sufficient in size to deliver the quantum of development of Woollam Park.
2	B7	North West Harpenden, AL5 3NP	0.09	Outline planning permission submitted by Legal & General – not considered to be reasonably available as applicant is a house builder.
3	B2	North East Harpenden, AL5 5EG	0.19	EIA Scoping submitted by Crest Nicholson in November 2024 – not considered to be reasonably available as applicant is a house builder.
4	B8	Harper Lane, north of Radlett, WD7 7HU	0.20	Radlett is located south of the M25 and separate from the main settlement in the District and is a lower order in the spatial strategy.

Ranking	Site Code	Site Name	Flood Risk Score	Planning Commentary
5	B6	West of London Colney, AL2 1LN	0.36	London Colney is located in the south east of the District, separate from the main settlement in the District and is a lower order settlement in the spatial strategy.
6	L1	Burston Nurseries, North Orbital Road, St Albans, AL2 2DS	0.37	A substantial part of Burston Nurseries is subject to planning permission for care accommodation (ref: 5/20/3022) which is not comparable with residential dwellings.
7	B3	West Redbourn, Redbourn, AL3 7HZ	0.40	Redbourn is located in the north west of the District, separate from the main settlement in the District and is a lower order settlement in the spatial strategy.

5.2.6 The seven sites (as listed above) that are ranked above the North St Albans Site as being at a lesser extent of flood risk, are already identified sites to meet the District's future development needs together with North St Albans. The site specific sequential test has not identified any genuine sequentially preferable sites at or adjacent to St Albans, that are otherwise considered suitable for development and would therefore be an appropriate alternative to the Proposed Development.

6 Site Specific Flood Risk & Mitigation Measures

6.1.1 The FRA prepared by PJA (December 2024), which should be read in conjunction with this Sequential Test, assesses in detail the existing flood risk to the Site.

6.1.2 Site specific hydrological analysis and hydraulic modelling of the Site has been undertaken to refine and further understand the potential pluvial flood risk to the Site under the existing (baseline) conditions. The baseline modelling demonstrates the key flood risk characteristics of the Site which is reflective of the public mapping.

6.1.3 However, to ensure that the pluvial (surface water) flood risk is actively managed to ensure vulnerable development remains safe throughout the Proposed Development, further hydraulic modelling will be undertaken. The following are an example of the type of strategic control measures which are proposed throughout the development,:

- flood routing conveyance channels
- strategically located re-profiling through earthworks to create depressions or scrapes;
- culverts to connect the proposed conveyance channels where crossings are required;
- and the utilisation of freeboard within the proposed surface water attenuation basins to accommodate and store exceedance flows.

6.1.4 This will aim to demonstrate that the flood risk will be retained and controlled within the landscape corridors, public open spaces and strategic SuDS network throughout the Proposed Development. These measures and the masterplanning approach to the layout of the Proposed Development is in accordance with the latest standing advice to LPA's in relation to the sequential test which states 'You may not need a sequential test if development can be laid out so that only elements such as public open space, biodiversity and amenity areas are located in areas at risk of any source of current or future flooding'.

6.1.5 On this basis, the Proposed Development is considered to be compliant with current standing advice and supports the sequential approach, where vulnerable development has been steered toward areas of the Site at a very low risk of flooding and areas known to or predicted to flood now and in the future will be actively managed and controlled within undeveloped areas of the Site.

6.1.6 However it should be noted that flooding, of all forms, is a natural process which is inherently arbitrary . As such, the outputs which will be produced by the site-specific hydraulic model, cannot be considered to be a definitive representation of a single flood event. Fluid flow on floodplains is governed by a set of complex physical processes. Hydraulic modelling requires the necessary

simplification of these processes into mathematical models, thereby it may only be considered to be a simplified representation of a single flood event and should not be conclusively relied upon.

7 Conclusion

7.1.1 This site specific Sequential Test has been prepared to support the proposed development of up to 1,000 residential dwellings and a 80 bed care home at Woollam Park and to demonstrate how the Site performs sequentially in flood risk terms when compared to other reasonable available sites. The purpose of the Sequential Test is to ensure that a sequential, risk based approach is followed to steer new development to areas with the lowest risk of flooding, taking all sources of flood risk and climate change into account.

7.1.2 To support the outline planning application a Flood Risk Assessment ('FRA') has been undertaken, in accordance National and Local Policy and Guidance, which identifies the Site to be at low or very low risk of flooding from fluvial, tidal sources, reservoirs and sewers. The Woolham Park, North St Albans FRA, prepared by PJA December 2024, should be read alongside this site-specific sequential test report.

7.1.3 The 'Groundwater Flood Risk Mapping' contained within the South West Hertfordshire Level 1 Strategic Flood Risk Assessment (SFRA) indicates groundwater flood risk at the Site to be approximately 5.0m below ground level (bgl) to the west and between 0.5-5.0m (bgl) to the east. Due to the varying levels of groundwater predicted to be present at the Site, the risk of groundwater flooding is considered to be low to medium.

7.1.4 The publicly available Long-Term Flood Risk Information, Flood Risk from Surface Water map identifies that the Site is predominantly at very low flood risk from surface water flooding. However, low, medium and high surface water flow routes bisect the Site centrally, before ponding along the eastern boundary.

7.1.5 Site-specific hydraulic modelling is proposed to be undertaken, to refine the existing surface water flood extents, ensuring that development is steered away from areas at risk.

7.1.6 Given that the Site is affected by areas of surface water flood risk, the Sequential Test needs to be satisfied in accordance with the National Planning Policy Framework Planning Practice Guidance (paragraph 023), even where it can be demonstrated that the Proposed Development 'can be made safe throughout its lifetime without increasing risk elsewhere'.

7.1.7 On this basis, a site specific Sequential Test has been undertaken to assess how the Proposed Development Site sequentially compares to other 'reasonably available' sites in flood risk terms and considers whether alternative sites are available to come forward for development in order to meet housing need (as set out in the emerging St Albans City and District Development Plan) in the same timeframe as the Proposed Development.

7.1.8 The site-specific sequential test has produced a list of 16 potential alternative sites which have been assessed within the Level 2 SFRA, in addition to alternative sites with surface water flood risk which have not been taken forward for further assessment as part of the Level 2 SFRA. The 16 alternative sites along with Woollam Park were then ranked according to their level of risk, taking into account all sources of flood risk in accordance with the NPPF and PPG (paragraph 027).

7.1.9 The results of the site specific sequential test show that Woollam Park is ranked eighth when compared to the 16 other sites. This demonstrates that the Site, is sequentially preferable to nine of the reasonable alternative sites.

7.1.10 As set out within the planning review, due to the housing supply requirement of the St Albans City and District Council, in planning terms none of the seven sequentially preferable sites represent reasonably available sites that would displace the important role of North St Albans in contributing towards the District's housing need and the spatial strategy to achieve sustainable development.

7.1.11 A collaborative approach between the developing masterplan and flood risk aspects of the scheme has been taken to demonstrate how the Proposed Development will implement a sequential approach, where surface water flood risk routes will be actively managed and retained within undeveloped areas of the Site, steering vulnerable development toward areas at lowest risk flooding.

7.1.12 The surface water drainage strategy within the FRA (PJA, December 2024) sets out how pluvial flood risk will be retained and controlled within the landscaped corridors, public open spaces and a strategic SuDS network throughout the Proposed Development where possible.

7.1.13 These measures and masterplanning approach to the layout of the Proposed Development is in accordance with the latest standing advice to LPA's in relation to the sequential test which states 'You may not need a sequential test if development can be laid out so that only elements such as public open space, biodiversity and amenity areas are located in areas at risk of any source of current or future flooding'.

Appendix A Sites included within the Sequential Test

Table1: Sites included within the Sequential Test

Site code	Site Name	Area (ha)
B3	West Redbourn, Redbourn, AL3 7HZ	27.02
M6	South of Harpenden Lane, Redbourn, AL3 7RQ	12.56
B5	Glinwell, Hatfield Road, St Albans, AL4 0HE	20.85
B8	Harper Lane, north of Radlett, WD7 7HU	11.40
B4	East St Albans, AL4 9JJ	21.69
OS1	Land to the North of Bricket Wood, bounded by the M25 and A405 North Orbital	6.52
N/A	Griffiths Way Retail Park, St Albans AL1 2RJ	6.44
B1	**North St Albans, AL3 6DD**	**46.75**
B2	North East Harpenden, AL5 5EG	43.24
B6	West of London Colney, AL2 1LN	13.50
B7	North West Harpenden, AL5 3NP	12.19
BH1	East of Kay Walk, St Albans, AL4 0XH	77.65
BUR5	104 High Street London Colney, AL2 1QL	28.16
H1	North Hemel Hempstead, AL3 7AU	88.83
H2	East Hemel Hempstead (North), HP2 7HT	169.38
H3	East Hemel Hempstead (Central), HP2 7LF	143.68
L1	Burston Nurseriess, North Orbital Road, St albans, AL2 2DS	14.33

Appendix B Sequential Test Ranking Table

Table: Sequential Test Percentage Coverage

Site code	Site Name	Area (ha)	Flood Risk										
			Flood Map for Planning			ROSW Mapping			% within Historic Flood Map	Reservoir		JBA Groundwater Flood Map (depth of water level below ground surface in 100 year event)	
			Total % within FZ3	% in FZ 2 only	% in FZ 1 only	Total % at surface water risk up to 30-yr	Total % at surface water risk up to 100-yr	Total % at surface water risk up to 1000 yrs		% within Risk of Flooding from Reservoirs (Dry Day)	% within Risk of Flooding from Reservoirs (Wet Day)	% within 0 to 0.025m category	% within 0.025 to 0.5m category
B3	West Redbourn, Redbourn, AL3 7HZ	27.02	0%	0%	100%	1%	2%	6%	0%	1%	1%	0%	1%
M6	South of Harpenden Lane, Redbourn, AL3 7RQ	12.56	13%	16%	84%	17%	22%	41%	0%	0%	34%	51%	12%
B5	Glinwell, Hatfield Road, St Albans, AL4 0HE	20.85	11%	2%	98%	2%	5%	26%	0%	0%	0%	29%	8%
B8	Harper Lane, north of Radlett, WD7 7HU	11.40	1%	1%	99%	0%	0%	2%	0%	0%	0%	0%	0%
B4	East St Albans, AL4 9JJ	21.69	0%	0%	100%	0%	2%	9%	0%	0%	0%	0%	31%
OS1	Land to the North of Bricket Wood, bounded by the M25 and A405 North Orbital	6.52	0%	0%	100%	1%	4%	13%	0%	0%	0%	7%	55%
N/A	Griffiths Way Retail Park, St Albans AL1 2RJ	6.44	0%	0%	100%	5%	10%	26%	0%	0%	0%	0%	0%

Site code	Site Name	Area (ha)	Flood Risk										
			Flood Map for Planning			ROSW Mapping			% within Historic Flood Map	Reservoir		JBA Groundwater Flood Map (depth of water level below ground surface in 100 year event)	
			Total % within FZ3	% in FZ 2 only	% in FZ 1 only	Total % at surface water risk up to 30-yr	Total % at surface water risk up to 100-yr	Total % at surface water risk up to 1000 yrs		% within Risk of Flooding from Reservoirs (Dry Day)	% within Risk of Flooding from Reservoirs (Wet Day)	% within 0 to 0.025m category	% within 0.025 to 0.5m category
B1	North St Albans, AL3 6DD	46.75	0%	0%	100%	2%	4%	15%	0%	0%	0%	0%	0%
B2	North East Harpenden, AL5 5EG	43.24	0%	0%	100%	0%	1%	7%	0%	1%	0%	0%	0%
B6	West of London Colney, AL2 1LN	13.50	0%	0%	100%	1%	1%	6%	1%	0%	0%	0%	0%
B7	North West Harpenden, AL5 3NP	12.19	0%	0%	100%	0%	0%	9%	0%	0%	0%	0%	0%
BH1	East of Kay Walk, St Albans, AL4 0XH	77.65	11%	2%	86%	2%	0%	26%	0%	0%	0%	29%	8%
BUR5	104 High Street London Colney, AL2 1QL	28.16	0%	0%	100%	0%	0%	8%	0%	0%	0%	0%	0%
H1	North Hemel Hempstead, AL3 7AU	88.83	0%	0%	100%	3%	4%	12%	0%	2%	0%	0%	7%
H2	East Hemel Hempstead (North), HP2 7HT	169.38	0%	0%	100%	3%	5%	10%	0%	7%	0%	0%	0%

Site code	Site Name	Area (ha)	Flood Risk											
			Flood Map for Planning			ROSW Mapping			% within Historic Flood Map	Reservoir		JBA Groundwater Flood Map (depth of water level below ground surface in 100 year event)	
			Total % within FZ3	% in FZ 2 only	% in FZ 1 only	Total % at surface water risk up to 30-yr	Total % at surface water risk up to 100-yr	Total % at surface water risk up to 1000 yrs		% within Risk of Flooding from Reservoirs (Dry Day)	% within Risk of Flooding from Reservoirs (Wet Day)	% within 0 to 0.025m category	% within 0.025 to 0.5m category
H3	East Hemel Hempstead (Central), HP2 7LF	143.68	0%	0%	100%	3%	4%	11%	0%	0%	0%	0%	0%
L1	Burston Nurseriess, North Orbital Road, St albans, AL2 2DS	14.33	0%	0%	100%	1%	3%	8%	0%	0%	0%	0%	0%

Table: Sequential Test Analysis Table

Site code	Site Name	Flood Risk											Flood Risk Score
		Flood Map for Planning			ROSW Mapping			% within Historic Flood Map	Reservoir		JBA Groundwater Flood Map (depth of water level below ground surface in 100 year event)		
		Total % within FZ3	% in FZ 2 only	% in FZ 1 only	Total % at surface water risk up to 30-yr	Total % at surface water risk up to 100-yr	Total % at surface water risk up to 1000 yrs		% within Risk of Flooding from Reservoirs (Dry Day)	% within Risk of Flooding from Reservoirs (Wet Day)	% within 0 to 0.025 m category	% within 0.025 to 0.5m category	
B3	West Redbourn, Redbourn, AL3 7HZ	0.00	0.00	0.00	0.12	0.16	0.06	0.00	0.01	0.01	0.00	0.04	0.40
M6	South of Harpenden Lane, Redbourn, AL3 7RQ	1.30	1.09	0.00	1.65	1.56	0.41	0.00	0.00	0.34	5.15	0.86	12.37
B5	Glinwell, Hatfield Road, St Albans, AL4 0HE	1.11	0.17	0.00	0.25	0.35	0.26	0.00	0.00	0.00	2.90	0.57	5.62
B8	Harper Lane, north of Radlett, WD7 7HU	0.14	0.04	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.20
B4	East St Albans, AL4 9JJ	0.00	0.00	0.00	0.03	0.14	0.09	0.00	0.00	0.00	0.00	2.18	2.44
OS1	Land to the North of Bricket Wood, bounded by the M25 and A405 North Orbital	0.00	0.00	0.00	0.13	0.29	0.13	0.00	0.00	0.00	0.70	3.82	5.07
N/A	Griffiths Way Retail Park, St Albans AL1 2RJ	0.00	0.00	0.00	0.48	0.68	0.26	0.00	0.00	0.00	0.00	0.00	1.42

Site code	Site Name	Flood Risk											Flood Risk Score
		Flood Map for Planning			ROSW Mapping			% within Historic Flood Map	Reservoir		JBA Groundwater Flood Map (depth of water level below ground surface in 100 year event)		
		Total % within FZ3	% in FZ 2 only	% in FZ 1 only	Total % at surface water risk up to 30-yr	Total % at surface water risk up to 100-yr	Total % at surface water risk up to 1000 yrs		% within Risk of Flooding from Reservoirs (Dry Day)	% within Risk of Flooding from Reservoirs (Wet Day)	% within 0 to 0.025 m category	% within 0.025 to 0.5m category	
B1	North St Albans, AL3 6DD	0.00	0.00	0.00	0.23	0.30	0.15	0.00	0.00	0.00	0.00	0.00	0.68
B2	North East Harpenden, AL5 5EG	0.00	0.01	0.00	0.04	0.07	0.07	0.00	0.01	0.00	0.00	0.00	0.19
B6	West of London Colney, AL2 1LN	0.00	0.00	0.00	0.12	0.10	0.06	0.07	0.00	0.00	0.00	0.00	0.36
B7	North West Harpenden, AL5 3NP	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.09
BH1	East of Kay Walk, St Albans, AL4 0XH	1.11	0.17	0.00	0.25	0.03	0.26	0.00	0.00	0.00	2.90	0.57	5.30
BUR5	104 High Street London Colney, AL2 1QL	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.08
H1	North Hemel Hempstead, AL3 7AU	0.00	0.00	0.00	0.31	0.31	0.12	0.00	0.02	0.00	0.01	0.50	1.27
H2	East Hemel Hempstead (North), HP2 7HT	0.00	0.00	0.00	0.33	0.33	0.10	0.00	0.07	0.00	0.00	0.00	0.84
H3	East Hemel Hempstead (Central), HP2 7LF	0.00	0.00	0.00	0.27	0.31	0.11	0.00	0.00	0.00	0.00	0.00	0.69
L1	Burston Nurseries, North Orbital Road, St albans, AL2 2DS	0.00	0.00	0.00	0.09	0.19	0.08	0.00	0.00	0.00	0.00	0.00	0.37