

ENVIRONMENT

Richborough Estates Limited
Brascote Lane, Newbold Verdon
Leicestershire
Flood Risk Assessment

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Flood Risk Assessment

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EXECUTIVE SUMMARY

This Flood Risk Assessment (FRA) has been prepared in accordance with the requirements set out in the National Planning Policy Framework (NPPF) and the associated Planning Practice Guidance. It has been produced on behalf of Richborough Estates Limited in respect of a planning application for proposed residential-led development off Brascote Lane, Newbold Verdon (approximate grid reference: SK 4468 0320).

This report demonstrates that the proposed development is not at significant flood risk, subject to the recommended flood mitigation strategies being implemented.

Following review of the Environment Agency (EA) Flood Map for Planning, the site is shown to be located wholly in Flood Zone 1. At the location of the site, no Flood Zones are associated with the length of the Thurlaston Brook that flows parallel to the northern boundary of the site from east to west. This is believed to be due to the national flood mapping tool being limited to representing watercourses with a catchment above 3km². Subsequently, a bespoke detailed hydraulic modelling study has been undertaken to inform this FRA and provide a robust understanding of the fluvial flood risk posed from the nearby local watercourse network.

Following review of the illustrative masterplan, all residential units are shown to be located outside of all modelled flood extents. This includes larger simulated return periods such as the 1 in 100-year +28%CC and 1 in 1000-year events. As such, the proposed development could be considered safe for its lifetime without displacing flood water and increasing flood risk elsewhere. The proposed residential development is also shown to be raised sufficiently above the modelled flood levels.

The risk of surface water flooding has also been assessed following a review of available data. The surface water flood extents show similar patterns to the modelled fluvial extents with flows largely contained to the Thurlaston Brook channel. A review of the illustrative masterplan demonstrates that all proposed residential plots are located outside of the 1 in 30-year, 1 in 100-year and 1 in 1000-year surface water flood extents.

The site is located atop of mudstone bedrock with superficial deposits present that are comprised of diamicton, sand and gravel. Third party data sources identify the site as located within a region that is considered to be susceptible to groundwater flooding. This risk is typically negated by the raising of finished floor levels relative to adjacent ground levels. It is subsequently recommended that Finished Floor Levels are set a minimum of 150mm above the surrounding ground level. Further recommendations have been made in relation to encountering groundwater during the construction phase, such as appropriate dewatering.

The FRA also demonstrates that the site is at a low level of risk from other sources: canals, reservoirs, and sewers.

In compliance with the requirements of NPPF, and subject to the mitigation measures proposed, the development could proceed without being subject to significant flood risk. Moreover, the development will not increase flood risk to the wider catchment area subject to suitable management of surface water runoff discharging from the site. A separate Sustainable Drainage Statement (SDS) (Ref: **BLN-BWB-ZZ-XX-RP-YE-0001_SDS**) has been provided to demonstrate this.

CONTENTS

EXECUTIVE SUMMARY	III
1. INTRODUCTION.....	1
Sources of Data	1
Existing Site	2
Local Watercourses.....	4
Proposed Development.....	5
2. FLOOD RISK PLANNING POLICY	6
National Planning Policy Framework	6
Flood Map for Planning	6
The Design Flood.....	8
Climate Change.....	8
Strategic Flood Risk Assessment.....	9
Preliminary Flood Risk Assessment	10
Local Flood Risk Management Strategy	10
Other Relevant Policy and Guidance.....	10
3. POTENTIAL SOURCES OF FLOOD RISK	12
Fluvial Flood Risk.....	13
Flood Risk from Canals.....	18
Groundwater Flood Risk	18
Flood Risk from Reservoirs & Large Waterbodies.....	19
Pluvial Flood Risk	20
Flood Risk from Sewers.....	22
Effect of Development on Wider Catchment	22
4. FLOOD RISK MITIGATION.....	24
Sequential Arrangement.....	24
Development Levels	24
Groundwater and Construction	24
Safe Access and Egress.....	25
Flood Contingency Plan and Evacuation Procedures	25
Surface Water Drainage	25
Foul Water Drainage.....	25
5. CONCLUSIONS AND RECOMMENDATIONS	27

FIGURES

Figure 1.1: Site Location Map

Figure 1.2: Topography Across the Site and Wider Area

Figure 1.3: Local Watercourse Network

Figure 2.1: Flood Map for Planning

Figure 3.1: Modelled Fluvial Flood Extents

Figure 3.2: Proposed Development Relative to Modelled Flood Extents

Figure 3.3: Proposed Development Divided into Assessment Areas

Figure 3.4: Reservoir Failure Flood Risk Map

Figure 3.5: Surface Water Flood Map

TABLES

Table 1.1: Site Summary

Table 2.1: Flood Zone Classifications

Table 2.2: Peak River Flow Allowance for the Soar Management Catchment within the Humber River Basin District

Table 2.3: Application of the Appropriate Climate Change Allowance

Table 2.4: Hazard to People

Table 3.1: Pre-Mitigation Sources of Flood Risk

Table 3.2: Maximum Modelled Flood Levels

Table 5.1: Summary of Flood Risk Assessment

APPENDICES

Appendix 1: Topographic Survey

Appendix 2: Illustrative Masterplan

Appendix 3: Hydraulic Modelling Study

Appendix 4: Severn Trent Sewer Records

1. INTRODUCTION

- 1.1 This Flood Risk Assessment (FRA) has been prepared in accordance with the requirements set out in the National Planning Policy Framework (NPPF) and the associated Planning Practice Guidance. The FRA has been produced on behalf of Richborough Estates Limited in respect of a planning application for a proposed residential-led development. The site is located off Brascote Lane, Newbold Verdon.
- 1.2 This FRA is intended to support an outline planning application and as such the level of detail included is commensurate and subject to the nature of the proposals. Summary information is included as **Table 1.1**.

Table 1.1: Site Summary

Site Name	Brascote Lane
Location	Newbold Verdon
NGR (approx.)	SK 4468 0320
Application Site Area (ha)	15.2 (approx.)
Development Type	Residential
Flood Zone Classification	Flood Zone 1
NPPF Vulnerability	More Vulnerable
Environment Agency Office	East Midlands
Lead Local Flood Authority	Leicestershire County Council
Local Planning Authority	Hinckley and Bosworth Borough Council

Sources of Data

- Hydraulic Modelling Study of the Thurlaston Brook by BWB Consulting (Ref: **BLN-BWB-ZZ-XX-RP-YE-0004**¹)
- Topographical Survey by BWB Consulting (Ref: **BLN-BWB-00-ZZ-M3-G-001**²)
- OS Explorer Series mapping
- Environment Agency (EA) consultation³
- Leicestershire County Council (LLFA) Consultation⁴

¹ Brascote Lane, Newbold Verdon. Hydraulic Model Report, Document no. BLN-BWB-ZZ-XX-RP-YE-0004_HMR, September 2021.

² Brascote Lane, Newbold Verdon. Topographical Survey, BWB Consulting, DWG ref. BLN-BWB-00-ZZ-M3-G-001 August 2021.

³ Request for Product 4 (Detailed Flood Risk Data) for Land off Brascote Lane, Newbold Verdon. Issued 20th July 2021. Ref. EMD-228971.

⁴ Information supplied by Jack Harriman, Flood Risk Management Team, Leicestershire County Council, 5th August 2021.

- vi. Hinckley and Bosworth Borough Council Level 1 and Level 2 Strategic Flood Risk Assessments⁵
- vii. Leicestershire and Leicester City Level 1 Strategic Flood Risk Assessment⁶
- viii. Leicestershire County Council Preliminary Flood Risk Assessment⁷
- ix. Hinckley and Bosworth Borough Council Local Plan⁸
- x. Severn Trent Sewer Records⁹
- xi. Sustainable Drainage Statement completed by BWB Consulting (Ref: **BLN-BWB-ZZ-XX-RP-CD-0001**)¹⁰
- xii. British Geological Survey (BGS) Drift & Geology Maps¹¹
- xiii. Web Based Soil Mapping¹²

Existing Site

- 1.3 The site is located off Brascote Lane, immediately south of the residential setting of Newbold Verdon. Leicester city centre is located approximately 1.5km east of the site and the village of Newbold Verdon. Brascote Lane forms the western and southern boundaries of the site. The northern site boundary is bordered by the Thurlaston Brook which flows from east to west. The east of the site is surrounded by farmland. The site's location is illustrated within **Figure 1.1**.
- 1.4 The site is currently comprised of an agricultural field and is therefore considered to be greenfield land.
- 1.5 The primary points of existing access to the application site are via Brascote Lane to the west and south.

⁵ Hinckley and Bosworth Borough Council. Level 1 and 2 Strategic Flood Risk Assessment. Final Report. July 2019 and May 2020 respectively. JBA Consulting.

⁶ Leicestershire and Leicester City Level 1 Strategic Flood Risk Assessment. October 2017.

⁷ Leicestershire County Council Preliminary Flood Risk Assessment. June 2011.

⁸ Local Plan 2006 – 2026. Hinckley and Bosworth Borough Council. July 2016.

⁹ Severn Trent Water. Sewer Record. May 2021. Ref. 554856-3.

¹⁰ Brascote Lane, Newbold Verdon. Sustainable Drainage Statement. Document no. BLN-BWB-ZZ-XX-RP-YE-0001_SDS. September 2021.

¹¹ Geology of Britain Viewer. British Geological Survey. Accessed September 2021. Available at: <https://mapapps.bgs.ac.uk/geologyofbritain/home.html>

¹² Cranfield Soil and Agrifood Institute. Soilscales Map. Accessed September 2021. Available at: <https://landis.org.uk/soilscales/#.html>

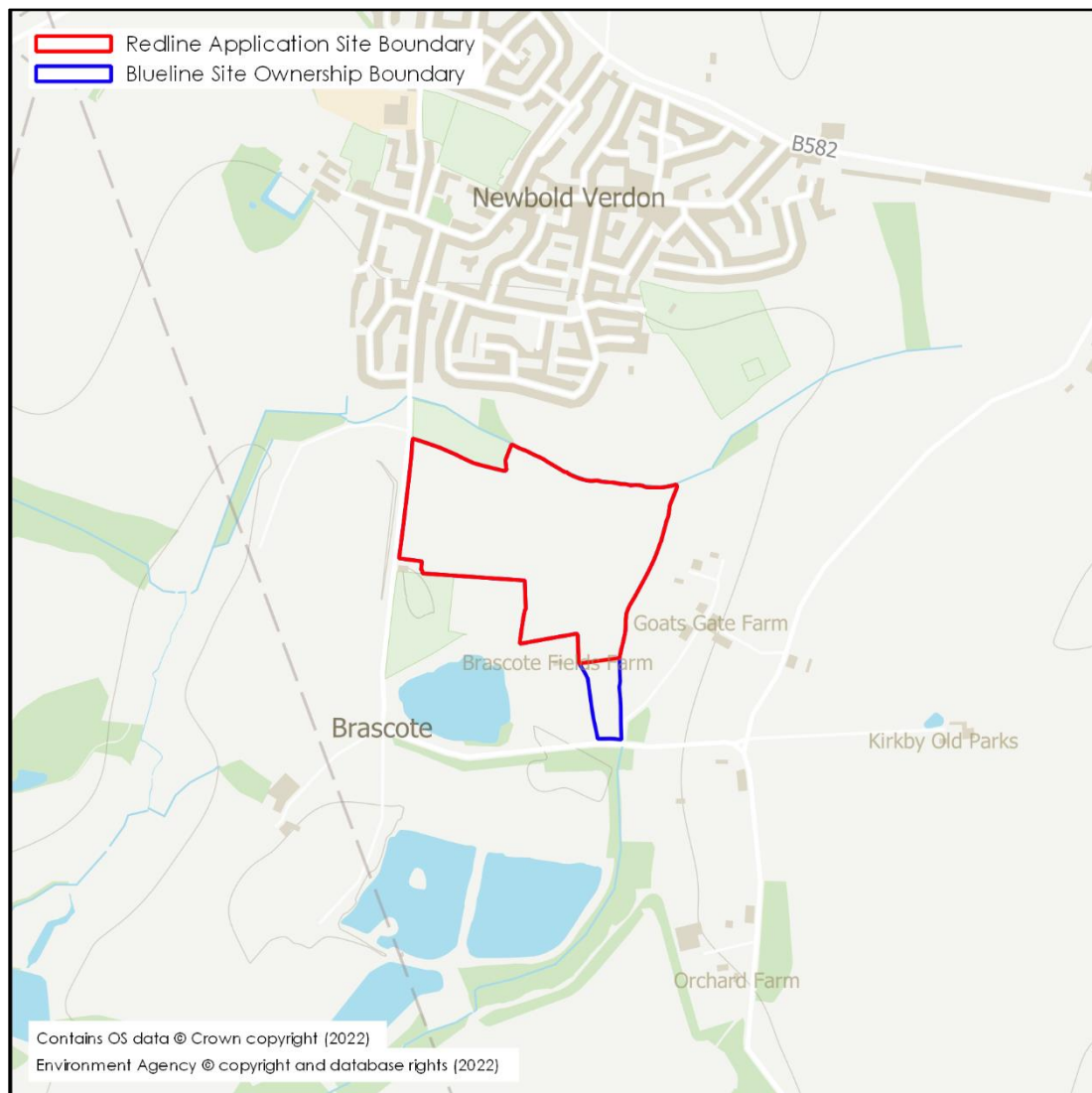


Figure 1.1: Site Location Map

- 1.6 According to the topographical survey presented within **Appendix 1**, ground levels generally fall from south to north. Levels across the southern perimeter of the site boundary range between 128m Above Ordnance Datum (AOD) and 130mAOD. The levels then fall towards the Thurlaston Brook which forms the northern perimeter of the site boundary. Levels along the northern boundary generally range between 123mAOD and 125mAOD. In the wider area, levels to the north are also seen to drain towards the Thurlaston Brook. The site contours are shown in **Figure 1.2**.

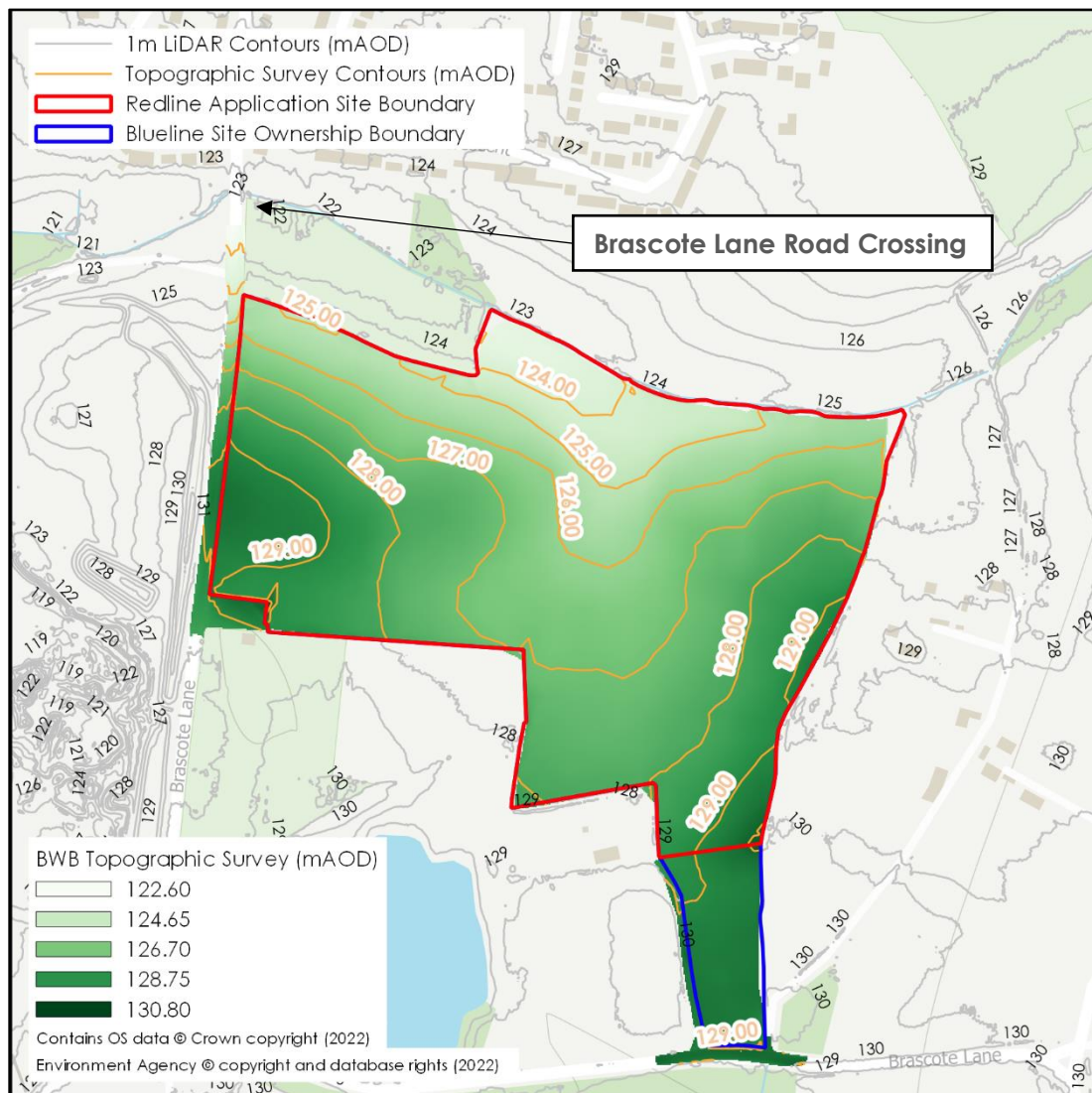


Figure 1.2: Topography Across the Site and Wider Area

Local Watercourses

- 1.7 The Thurlaston Brook is a tributary of the River Soar with a total catchment area of approximately 37.5km². The proposed development site is located at the very upstream limit of the catchment. The watercourse has a catchment area of approximately 2.1km² upstream of the Brascote Lane road crossing.
- 1.8 The watercourse flows from east to west parallel to the northern extent of the site boundary. **Figure 1.3** shows the local watercourse network.

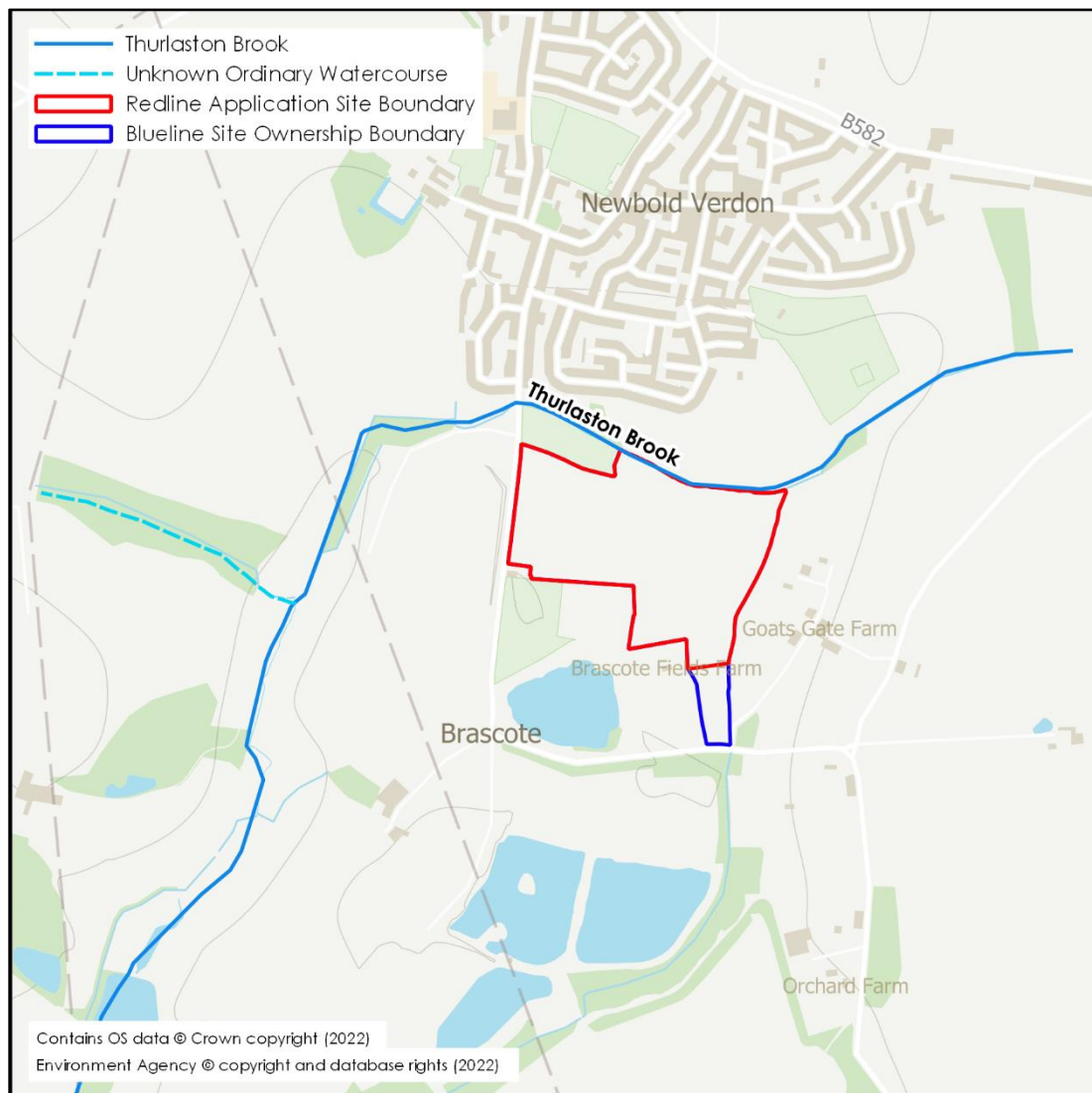


Figure 1.3: Local Watercourse Network

Proposed Development

- 1.9 The proposed development is predominantly comprised of residential development. The illustrative masterplan, which can be found in **Appendix 2**, also includes a community hall and country park.
- 1.10 There are to be two primary access points to the site, both of which are from Brascote Lane. These are shown to be located at the western boundary of the site.

2. FLOOD RISK PLANNING POLICY

National Planning Policy Framework

- 2.1 The NPPF¹³ sets out the Government's national policies on different aspects of land use planning in England in relation to flood risk. Planning Practice Guidance is also available online¹⁴.
- 2.2 The Planning Practice Guidance sets out the vulnerability to flooding of different land uses. It encourages development to be located in areas of lower flood risk where possible and stresses the importance of preventing increases in flood risk off site to the wider catchment area.
- 2.3 The Planning Practice Guidance also states that alternative sources of flooding, other than fluvial (river flooding), should be considered when preparing an FRA.
- 2.4 The Planning Practice Guidance includes a series of tables that define Flood Zones (Table 1), the flood risk vulnerability classification of development land uses (Table 2) and 'compatibility' of development within the defined Flood Zones (Table 3).
- 2.5 This FRA is written in accordance with the NPPF and the Planning Practice Guidance.

Flood Map for Planning

- 2.6 With particular reference to planning and development, the Flood Map for Planning identifies Flood Zones in accordance with Table 1 of the Planning Practice Guidance. Further details on the Flood Zone classifications are outlined in **Table 2.1**.

Table 2.1: Flood Zone Classifications

Flood Zone	Description
Flood Zone 1 (Low Probability)	Land having less than a 1 in 1000 annual probability of river or sea flooding (<0.1% Annual Exceedance Probability).
Flood Zone 2 (Medium Probability)	Land having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% - 0.1% AEP); or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% - 0.1% AEP).
Flood Zone 3a (High Probability)	Land having a 1 in 100 or greater annual probability of river flooding (>1% AEP); or land having a 1 in 200 or greater annual probability of flooding from the sea (>0.5% AEP). This is represented by "Flood Zone 3" on the Flood Map for Planning.
Flood Zone 3b (The Functional Floodplain)	Flood Zone 3b (The Functional Floodplain) is defined as land where water must flow or be stored in times of

¹³ Revised National Planning Policy Framework, Ministry of Housing, Communities & Local Government, amended 2021

¹⁴ Planning Practice Guidance: <https://www.gov.uk/government/collections/planning-practice-guidance>

Flood Zone	Description
	flood. This is not identified or separately distinguished from Zone 3a on the Flood Map for Planning.

- 2.7 The site is shown to be located wholly within Flood Zone 1, as shown in **Figure 2.1**. This is believed to be due to the national flood mapping tool being limited to representing watercourses with a catchment above 3km².
- 2.8 As per the map below, the Thurlaston Brook is not defined as a Main River. There are no formal spatial flood defences at the site or in the wider area and subsequently no areas are identified as benefitting from the presence of defences.

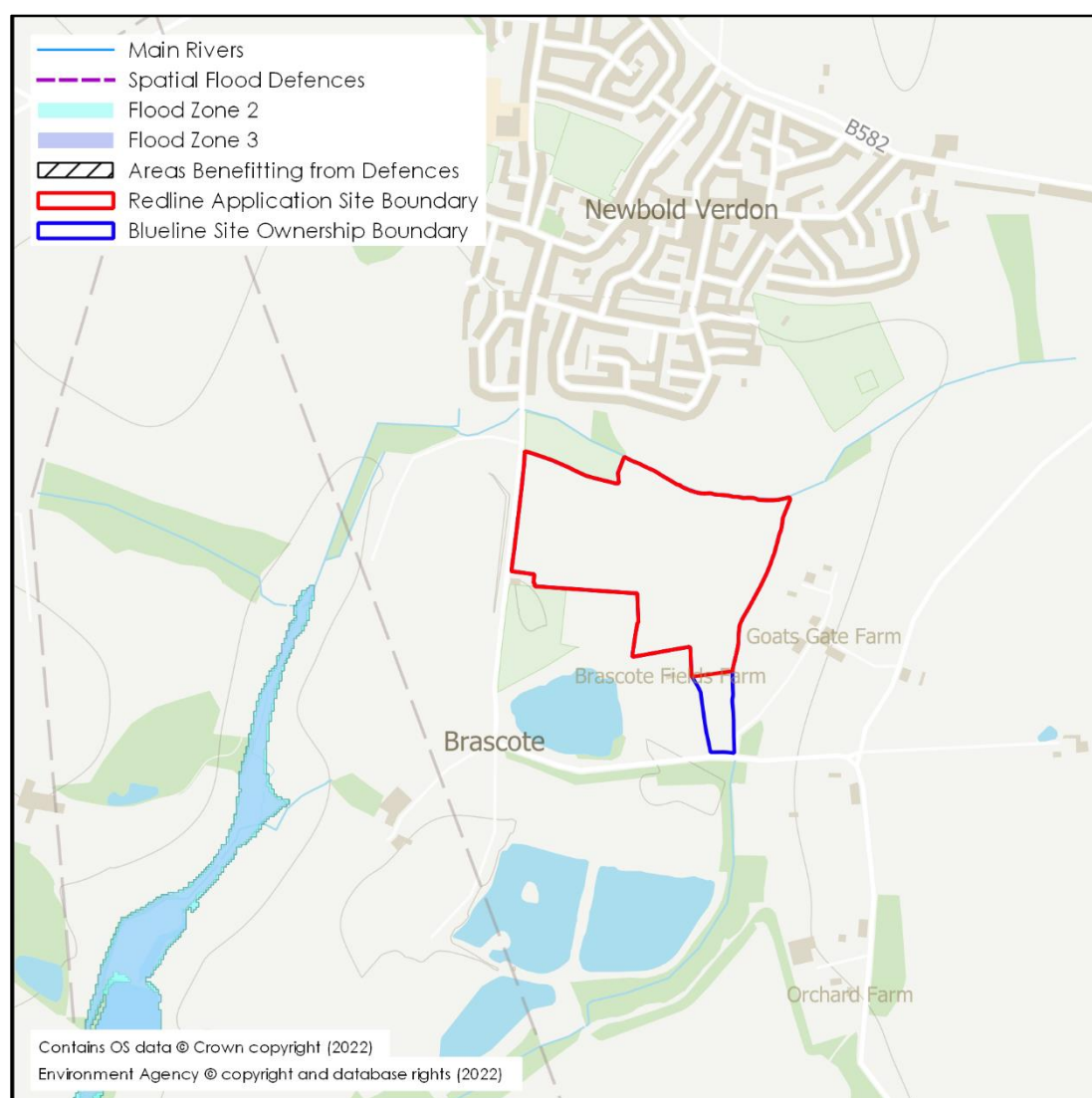


Figure 2.1: Flood Map for Planning

The Design Flood

- 2.9 The Planning Practice Guidance identifies that new developments should be designed to provide adequate flood risk management, mitigation, and resilience against the 'design flood' for their lifetime.
- 2.10 This is a flood event of a given annual flood probability, which is generally taken as fluvial (river) flooding likely to occur with a 1% annual probability (a 1 in 100 chance each year), or tidal flooding with a 0.5% annual probability (1 in 200 chance each year), against which the suitability of a proposed development is assessed and mitigation measures, if any, are designed.

Climate Change

- 2.11 Predicted future changes in peak river flows caused by climate change are provided by the EA¹⁵, with a range of projections applied to regionalised 'River Basin Districts', which are further subdivided into 'Management Catchments'.
- 2.12 The site falls within the Soar Management Catchment of the Humber River Basin District. **Table 2.2** identifies the relevant peak river flow allowances from this Management Catchment.

Table 2.2: Peak River Flow Allowance for the Soar Management Catchment within the Humber River Basin District

Allowance Category	Total potential change anticipated for the '2020s' (2015 to 2039)	Total potential change anticipated for the '2050s' (2040 to 2069)	Total potential change anticipated for the '2080s' (2070 to 2115)
Upper End	28%	35%	60%
Higher Central	18%	21%	37%
Central	14%	16%	28%

- 2.13 When determining the appropriate allowance for use in an FRA the Flood Zone classification, flood risk vulnerability and the anticipated lifespan of the development should be considered. **Table 2.3** provides a matrix summarising the EA's guidance on determining the appropriate allowance(s).

¹⁵ Environment Agency, Flood risk assessments: climate change allowances: <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#table-1>

Table 2.3: Application of the Appropriate Climate Change Allowance

Flood Zone	Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
1	Use the central allowance where a location may fall within Flood Zone 2 or 3 in the future.				
2	Use the higher central allowance	Use the central allowance			
3a	Use the higher central allowance	Development should not be permitted	Use the central allowance		
3b	Use the higher central allowance	Development should not be permitted			Use the central allowance
If development is considered appropriate by the local authority when not in accordance with Flood Zone vulnerability categories, then it would be appropriate to use the higher central allowance.					

- 2.14 The site is located entirely within Flood Zone 1, however the Thurlaston Brook forms the northern boundary of the site. No Flood Zones have been defined for this reach of the watercourse due to their small catchment size. The proposed development is for a residential-led scheme and would therefore likely be classified as 'More Vulnerable'. Residential development has an anticipated lifespan of at least 100 years. Therefore, the central allowance for the '2080s' epoch will be considered.
- 2.15 Therefore, to ensure the development is designed adequately for its lifetime an allowance of 28% will be applied to the design flood to identify minimum development levels.
- 2.16 The higher central and upper end allowances have also been simulated as an informative.

Strategic Flood Risk Assessment

- 2.17 An SFRA is a study carried out by one or more local planning authorities to assess the risk to an area from flooding from all sources, now and in the future.
- 2.18 The Leicestershire and Leicester City Level 1 SFRA has been reviewed in the production of this FRA. Furthermore, the Hinckley and Bosworth Borough Council Level 1 SFRA¹⁶ has also been assessed. The SFRAs provide information specific to the site location in the form of fluvial, surface water and groundwater flood risk mapping, as well as records of

¹⁶ Level 1 Strategic Flood Risk Assessment (JBA Consulting, July 2019)

historical flooding. Information from these sources will be referenced within **Section 3** where applicable.

- 2.19 The Hinckley and Bosworth Borough Council Level 2 SFRA was produced to facilitate the application of Sequential and Exception Tests to screen allocated development sites. The proposed application site is not referenced within the Level 2 SFRA. Information from the Level 2 SFRA will be referenced within **Section 3** where applicable.

Preliminary Flood Risk Assessment

- 2.20 A Preliminary Flood Risk Assessment (PFRA) is an assessment of floods that have taken place in the past and floods that could take place in the future. It generally considers flooding from surface water runoff, groundwater and ordinary watercourses, and is prepared by the Lead Local Flood Authorities.
- 2.21 The Leicestershire County Council PFRA considers flooding from surface water runoff, groundwater, ordinary watercourses and canals. It also references historical river flooding within the wider county. No records are reported at the site or in Newbold Verdon. Information from the PFRA will be referenced within this report where applicable.

Local Flood Risk Management Strategy

- 2.22 A Local Flood Risk Management Strategy (LFRMS) is prepared by a Lead Local Flood Authority to help understand and manage flood risk at a local level.
- 2.23 The LFRMS aims to ensure that the knowledge of local flood risk issues is communicated effectively so that they can be better managed. The LFRMS also aims to promote sustainable development and environmental protection.
- 2.24 The Leicestershire County Council LFRMS¹⁷ has been reviewed and will be referenced within this report where applicable.

Other Relevant Policy and Guidance

Flood Risk to People and New Developments

- 2.25 The Flood Risk to People (FD2321/TR1)¹⁸ document was prepared as a research project considering flood hazard and factors that affect it.
- 2.26 Flood Risk Assessment Guidance for New Development (FD2320/TR2)¹⁹ provides a framework and guidance for assessing and managing flood risks for new developments and sets flood hazard thresholds.

¹⁷ Leicestershire County Council Local Flood Risk Management Strategy (2015)

¹⁸ Flood Risk to People Methodology (FD2321/TR1), Defra/Environment Agency, 2006

¹⁹ Flood Risk Assessment Guidance for New Development (FD2320/TR2), Defra/Environment Agency, 2005

2.27 Hazard ratings are derived using the following equation in line with the above:

$$\text{Hazard Rating} = D * (V+0.5) + DF$$

Where:

D = depth

V = velocity

DF = debris factor

2.28 A supplementary note²⁰ provides clarification of the hazard rating thresholds which should be used for development planning and control use. **Table 2.4** identifies the thresholds of the flood hazard categories.

Table 2.4: Hazard to People²¹

Threshold for Flood Hazard Rating	Degree of Flood Hazard	Description
< 0.75	Low	Caution "Flood zone with shallow flowing water or deep standing water"
0.75 - 1.25	Moderate	Danger for some (i.e.: children, the elderly and the infirm) "Danger: Flood Zone with deep or fast flowing water"
1.25 - 2.0	Significant	Danger for most (includes the general public) "Danger: Flood Zone with deep fast flowing water"
> 2.0	Extreme	Danger for all (includes the emergency services) "Extreme Danger: Flood Zone with deep fast flowing water"

²⁰ Supplementary Note on Flood Hazard Ratings and Thresholds for Development Planning and Control Purpose – Clarification of the Table 13.1 of FD2320/TR2 and Figure 3.2 of FD2321/TR1. (http://randd.defra.gov.uk/Document.aspx?Document=FD2321_7400_PR.pdf)

²¹ 2008, DEFRA. Supplementary Note on Flood Hazard Ratings and Thresholds for Development Planning and Control Purposes.

3. POTENTIAL SOURCES OF FLOOD RISK

- 3.1 Flooding can occur from a variety of sources, or combination of sources, which may be natural or artificial. **Table 3.1** below identifies the potential sources of flood risk to the site in its current condition, and the impacts which the development could have in the wider catchment, prior to mitigation. These are discussed in greater detail in the forthcoming section. The mitigation measures proposed to address flood risk issues and ensure the development is appropriate for its location are discussed within **Section 4**.

Table 3.1: Pre-Mitigation Sources of Flood Risk

Flood Source	Potential Risk				Description
	High	Medium	Low	None	
Fluvial			X		The site is located in Flood Zone 1 of the Thurlaston Brook.
			X		Hydraulic modelling, undertaken by BWB, has confirmed that all proposed residential units are located outside of all modelled flood extents.
Canals				X	The Ashby-de-la-Zouch canal is located approximately 5.3km west of the site. Levels at the canal are set approximately 30m below the site.
Groundwater		X			SFRA mapping reports the site as being located across several grid tiles, whereby 50-75% of the area is considered to be susceptible to groundwater flooding.
Reservoirs and waterbodies			X		The site is shown to fall outside of the area at risk of reservoir failure. There are nearby waterbodies, such as Brascote Carp Fishery that could pose a residual risk to the site if breached.
Pluvial runoff			X		The surrounding area generally falls to the Thurlaston Brook. The site remains unaffected for the 1 in 30-year and 1 in 100-year rainfall events. A small proportion of the site is affected during the 1 in 1000-year event, however the illustrative masterplan shows there to be no properties located in these areas.

Flood Source	Potential Risk				Description
	High	Medium	Low	None	
Sewers			X		Severn Trent records do not display any sewer networks along the immediate southern or western boundary of the site. Ground levels at the site drain towards the Thurlaston Brook and therefore any surcharged water would be directed away from the proposed development.
Effect of Development on Wider Catchment			X		The proposed development will not result in impendance or loss of the Thurlaston Brook channel capacity. Furthermore, there will be no loss of floodplain storage. The proposed development would not be expected to displace flood water.
	X				The development will increase the area of impermeable surfaces at the site. Without the consideration of Sustainable Drainage Systems, this could lead to a potential increase in surface water runoff rates.

Fluvial Flood Risk

- 3.2 Flooding from watercourses occurs when flows exceed the capacity of the channel, or where a restrictive structure is encountered, which leads to water overtopping the banks into the floodplain. This process can be exacerbated when debris is mobilised by high flows and accumulates at structures.
- 3.3 The Thurlaston Brook is an ordinary watercourse and flows from east to west parallel to the northern site boundary. Approximately 17km downstream of the site, the Thurlaston Brook outfalls to the River Soar, which is classified as an EA main river.
- 3.4 At the site's location, the Thurlaston Brook has not been represented on the EA Flood Map for Planning, due to its small catchment. The national flood mapping tool is limited to representing watercourses with a catchment above 3km². The Thurlaston Brook catchment east of Brascote Lane road crossing is 2.1 km².

Site Specific Hydraulic Modelling

- 3.5 To provide a detailed understanding of fluvial flooding at the site, BWB Consulting completed a hydraulic modelling study and associated hydrological assessment in August – September 2021. Further details with regards to the schematisation and the

data used within the hydraulic model is provided in **Appendix 3**, along with detailed floodplain maps.

- 3.6 The hydraulic model was simulated for several key return periods to inform the production of an FRA. Assessed return periods included the 1 in 20-year (5% AEP), 1 in 100-year (1% AEP) and 1 in 1000-year (0.1% AEP) events.
- 3.7 In accordance with the July 2021 climate change guidance, BWB Consulting also produced model outputs for the 1 in 100-year +28%CC ('central' allowance), 1 in 100-year +37%CC ('higher central' allowance) and the 1 in 100-year +60%CC ('upper end' allowance). The modelled flood outlines are presented in **Figure 3.1**.

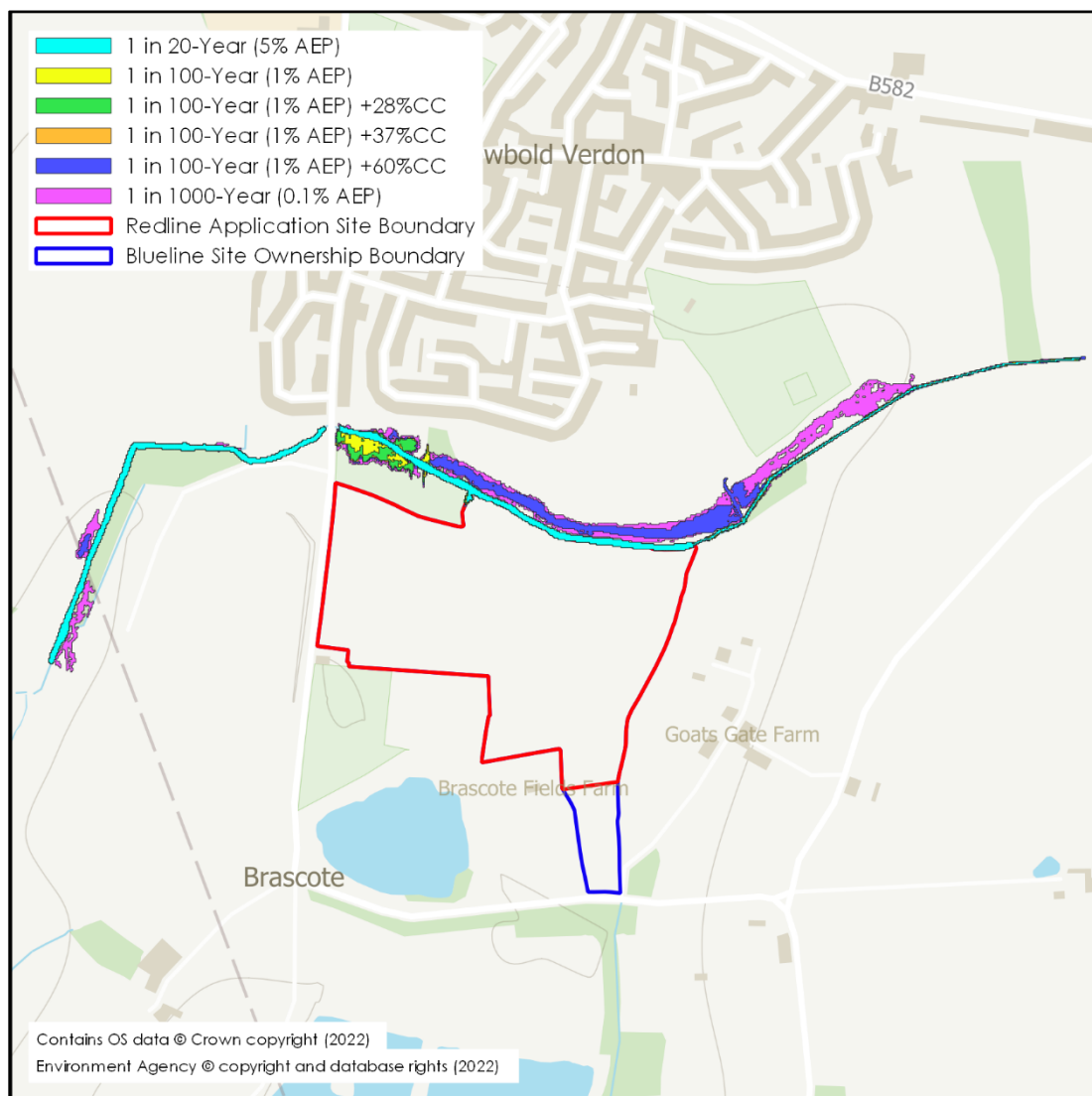


Figure 3.1: Modelled Fluvial Flood Extents

- 3.8 The illustrative masterplan has been overlaid onto the site boundary, as shown in **Figure 3.2**. The proposed plots are shown to remain wholly unaffected during all modelled events.

- 3.9 Several 2D nodes have been added to the map along the Thurlaston Brook and its modelled flood extent. Maximum flood levels for the modelled return periods are reported at these locations in **Table 3.2**.

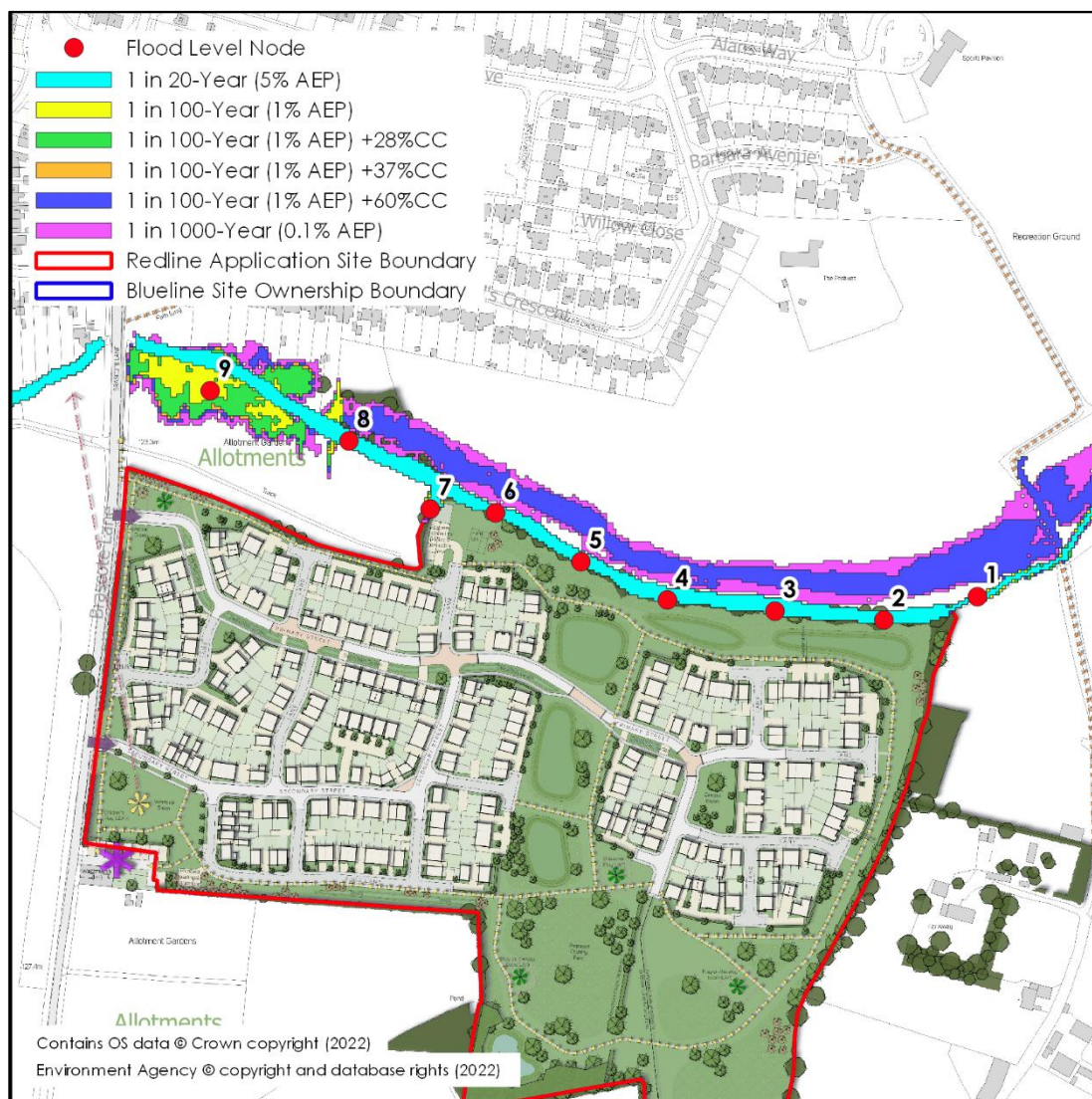


Figure 3.2: Proposed Development Relative to Modelled Flood Extents

Table 3.2: Maximum Modelled Flood Levels

Node	Maximum Modelled Flood Level (mAOD)					
	5% AEP	1% AEP	1% AEP +28%CC	1% AEP +37%CC	1% AEP +60%CC	0.1% AEP
1	125.46	125.56	125.65	125.67	125.75	125.75
2	124.82	124.92	124.99	125.01	125.04	125.04
3	124.41	124.52	124.58	124.60	124.62	124.62
4	123.88	123.98	124.04	124.06	124.09	124.09

5	123.46	123.54	123.61	123.61	123.64	123.64
6	122.92	123.01	123.08	123.09	123.11	123.12
7	122.68	122.78	122.83	122.83	122.83	122.84
8	122.35	122.46	122.51	122.51	122.51	122.56
9	-	122.12	122.32	122.36	122.40	122.50

3.10 Given the size of the site boundary, maximum flood levels differ by more than 2m from Node 2 to 7. Subsequently, the site has been split into four areas for analysis (**Figure 3.3**).

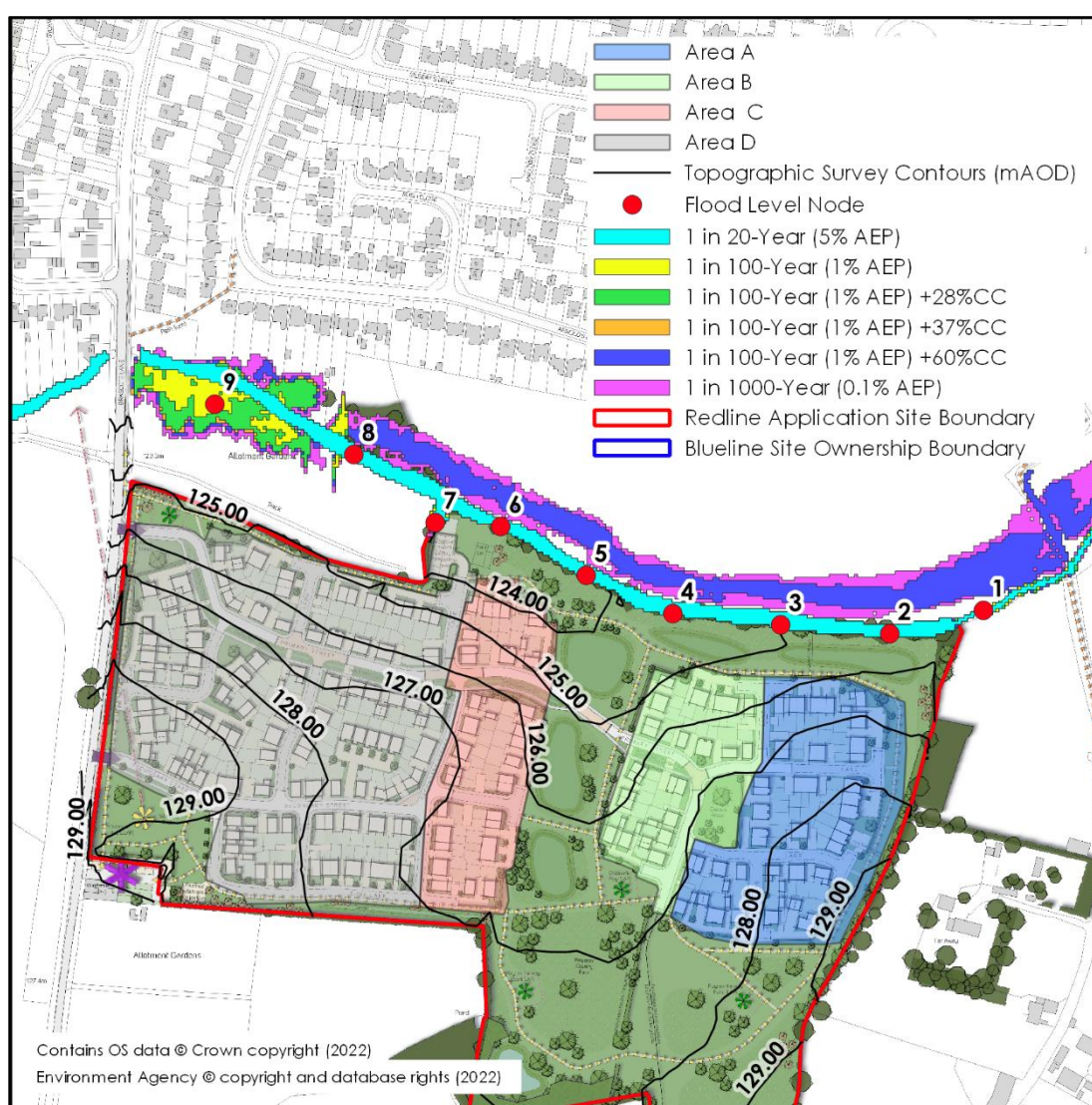


Figure 3.3: Proposed Development Divided into Assessment Areas

Area A

3.11 Flood level node 2 is the closest upstream node to properties within Area A. It is therefore considered to be the most representative node of fluvial flood risk.

3.12 The 1 in 100-year +28%CC flood level is 124.99mAOD at this location.

3.13 As per **Figure 3.3**, all plots are shown to be located above the surveyed level of 126.00mAOD. As such, a minimum freeboard of 1.01m will be provided during this event.

Area B

3.14 Flood level node 3 is the closest upstream node to properties within Area B.

3.15 The 1 in 100-year +28%CC flood level is 124.58mAOD at this location.

3.16 As per **Figure 3.3**, all plots are shown to be located above the surveyed level of 125.00mAOD. As such, a minimum freeboard of 0.42m will be provided during this event.

Area C

3.17 Flood level node 5 is the closest upstream node to properties within Area C.

3.18 The 1 in 100-year +28%CC flood level is 123.61mAOD at this location.

3.19 As per **Figure 3.3**, all plots are shown to be located above the surveyed level of 124.00mAOD. As such, a minimum freeboard of 0.39m will be provided during this event.

Area D

3.20 Flood level node 6 is the closest upstream node to properties within Area D.

3.21 The 1 in 100-year +28%CC flood level is 123.08mAOD at this location.

3.22 As per **Figure 3.3**, all plots are shown to be located above the surveyed level of 124.00mAOD. As such, a minimum freeboard of 0.92m will be provided during this event.

Summary of Whole Site

3.23 All properties across Areas A, B, C and D are shown to remain unaffected during all modelled events, including the 1 in 100-year +37%CC (higher central) and +60%CC (upper end) events. As such, the proposed development could be considered safe for its lifetime.

3.24 The primary access routes onto Brascote Lane remain wholly unaffected during all events. These are located at the western boundary of the site.

3.25 As part of the hydraulic modelling exercise, blockage testing was simulated of three hydraulic structures. To test a worst-case scenario, the structures were represented as 100% blocked. The site continued to remain unaffected during these scenarios. The results for which can be found in **Appendix 3**.

3.26 Neither the EA or Hinckley and Bosworth Borough Council have provided any evidence to suggest that the site has historically flooded from fluvial sources. The nearest recorded

EA fluvial flood extent is located approximately 6km northeast and is associated with the Rothley Brook at Ratby.

- 3.27 Based off the illustrative masterplan provided, the proposed development is considered to be at low risk of fluvial flooding. Suitable freeboard above the assessed modelled flood levels is provided due to existing topography. Therefore, no additional measures would be required to mitigate against the risk of fluvial flooding.

Flood Risk from Canals

- 3.28 The Canal and River Trust (CRT) generally maintains canal levels using reservoirs, feeders and boreholes and manages water levels by transferring it within the canal system.
- 3.29 Water in a canal is typically maintained at predetermined levels by control weirs. When rainfall or other water enters the canal, the water level rises and flows out over the weir. If the level continues rising it will reach the level of the storm weirs. The control weirs and storm weirs are normally designed to take the water that legally enters the canal under normal conditions. However, it is possible for unexpected water to enter the canal or for the weirs to become obstructed. In such instances the increased water levels could result in water overtopping the towpath and flowing onto the surrounding land.
- 3.30 Flooding can also occur where a canal is impounded above surrounding ground levels and the retaining structure fails.
- 3.31 The nearest canal is the Ashby-de-la-Zouch canal which is approximately 5.3km west of the site. Levels at the canal at this location are set approximately 30m lower than the site at 95mAOD. Therefore, the risk of flooding from canals is considered negligible.

Groundwater Flood Risk

- 3.32 Groundwater flooding occurs when the water table rises above ground elevations. It is most likely to happen in low lying areas underlain by permeable geology. This may be regional scale chalk or sandstone aquifers, or localised deposits of sands and gravels underlain by less permeable strata such as that in a river valley.
- 3.33 Following review of the BGS mapping, the bedrock geology across the entire site is made up of the Gunthorpe Member, which is comprised of Mudstone. With reference to the Defra Magic Maps, this is defined as a 'Secondary B' aquifer. These are typically lower permeability layers which may store and yield limited amounts of groundwater through localised features such as fissures and thin cracks.
- 3.34 The BGS mapping also identifies a mix of Superficial Deposits across the site. These include Glaciofluvial deposits (Sand and Gravel), Oadby Member deposits (Diamicton) and Alluvium deposits (Clay, Silt, Sand and Gravel) in immediate proximity to the Thurlaston Brook. These are largely considered to be 'Secondary A' aquifers at the site which are comprised of permeable layers that are capable of supporting local water supplies and may form an important source of base flows to some rivers.

- 3.35 No historic borehole records are available at the site. Soils data suggests that there are loamy soils with naturally high groundwater at the site. Soils that are considered to be 'naturally wet' are typically associated with either low-lying areas or areas with high groundwater that has drained from the surrounding landscape.
- 3.36 The Hinckley and Bosworth Borough Council SFRA includes mapping of the BGS's Areas Susceptible to Groundwater Flooding (ASGW) dataset. The site is shown to be located across several grid tiles, whereby 50-75% of the area is considered as being susceptible to groundwater flooding.
- 3.37 The site is shown to be located outside of all EA designated Groundwater Source Protection Zones.
- 3.38 Neither the EA nor Hinckley and Bosworth Borough Council have provided any evidence to suggest that the site has historically been affected by groundwater flooding.
- 3.39 Overall, the risk of flooding posed by groundwater is moderate and mitigation measures are discussed in **Section 4**.

Flood Risk from Reservoirs & Large Waterbodies

- 3.40 Flooding can occur from large waterbodies or reservoirs if they are impounded above the surrounding ground levels or are used to retain water in times of flood. Although unlikely, reservoirs and large waterbodies could overtop or breach leading to rapid inundation of the downstream floodplain.
- 3.41 To help identify this risk, reservoir failure flood risk mapping has been prepared by the EA. This shows the largest area that might be flooded if a reservoir were to fail and release the water it holds. The map displays a worst-case scenario and is only intended as a guide. An extract of the mapping is provided within **Figure 3.4**. Two scenarios are presented: a 'dry day' scenario occurs when rivers are at normal level, and a 'wet day' scenario occurs when rivers are in flood.
- 3.42 The site is located outside of all reservoir flood extents (for both scenarios). The nearest extent to the site is approximately 2.5km northeast of the site.
- 3.43 There are several large waterbodies to the southwest of the site, which can be seen in **Figure 3.4**. Two of which are located approximately 300-500m south of the site boundary. The road, Brascote Lane, spans from west to east between the site and these waterbodies. The road acts as a high point, set at approximately 130mAOD, with ground levels falling away towards these waterbodies. Ground levels at these lakes are set approximately 2m below the road levels at approximately 128mAOD. Ground levels continue to fall south of the waterbodies and subsequently, should a failure event occur, the study site would not be at risk of flooding from this specific source.
- 3.44 Closer to the site lies a lake associated with Brascote Carp Fishery. This is immediately southeast of the site boundary, located north of Brascote Lane road. The waterbody is bound by a steep embankment that reaches heights of 130mAOD. Levels fall from the top of the embankment towards the site, however, and subsequently there would be a

residual risk of flooding to the site in the unlikely event that this embankment fails or overtops. Due to the maintenance responsibilities associated with the ownership of waterbodies, the probability of such an event occurring is considered low. Therefore, the overall risk from this waterbody is considered low.

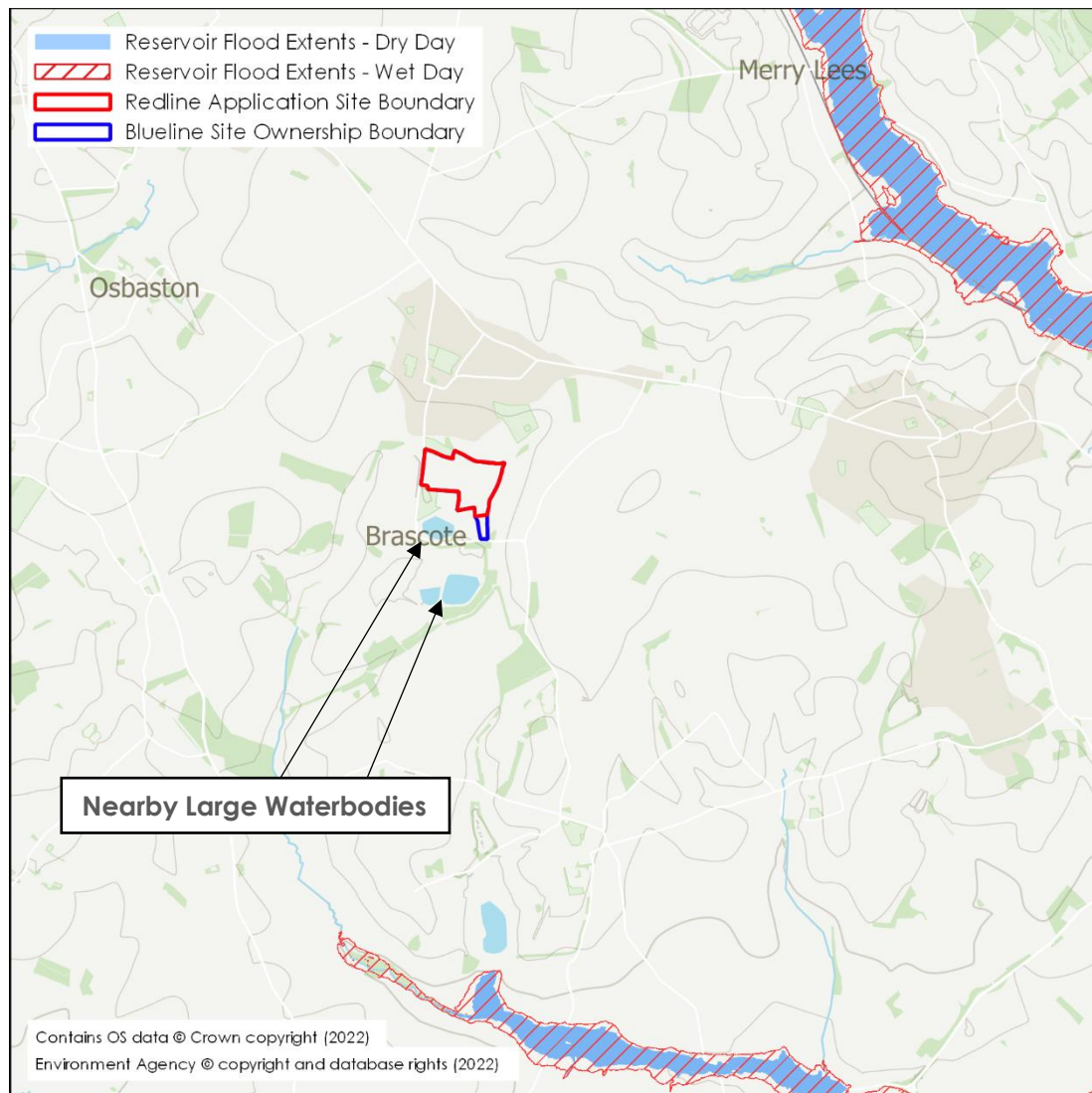


Figure 3.4: Reservoir Failure Flood Risk Map

Pluvial Flood Risk

- 3.45 Pluvial flooding can occur during prolonged or intense storm events when the infiltration potential of soils, or the capacity of drainage infrastructure is overwhelmed leading to the accumulation of surface water and the generation of overland flow routes.
- 3.46 Risk of flooding from surface water mapping has been prepared. This shows the potential flooding that could occur when rainwater does not drain away through the normal drainage systems or soak into the ground, but lies on or flows over the ground instead. An extract from the mapping is included as **Figure 3.5**.

- 3.47 The pluvial flood mapping shows the 1 in 30-year and 1 in 100-year extents to be contained to the Thurlaston Brook channel.

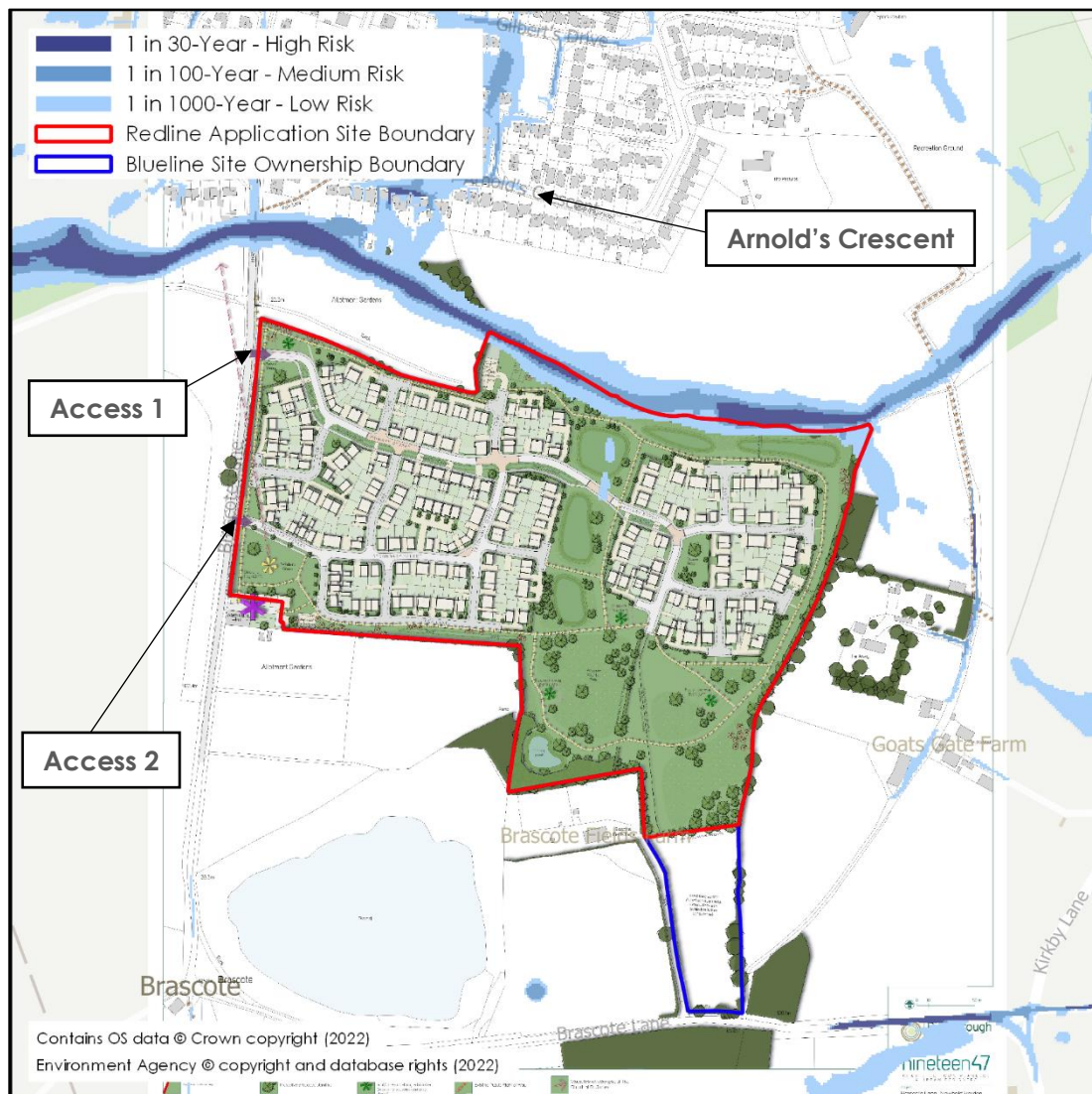


Figure 3.5: Surface Water Flood Map

- 3.48 The site boundary is shown to be partly affected during the 1 in 1000-year rainfall event with depths of less than 300mm predicted along the northern limit of the site boundary.
- 3.49 There are also two small areas of localised ponding in the northern centre and in the north east corner of the site boundary. Depths in these areas are predicted to remain below 300mm. As per the illustrative masterplan, no development is proposed in these locations. All residential plots are shown to remain unaffected for all surface water events.
- 3.50 The two access locations have been labelled on **Figure 3.5**. Brascote Lane is shown to be unaffected during all rainfall events and safe vehicular access and egress can subsequently be maintained during all pluvial events.

- 3.51 Neither the EA nor Hinckley and Bosworth Borough Council have provided any evidence to suggest that the site specifically has historically been affected by surface water flooding.
- 3.52 Following consultation with the LLFA, Leicestershire County Council, it has been reported that there are two records of flooding incidents within close proximity to the site. Specifically, these are referred to as:
- March 2016: Arnolds Crescent (labelled on **Figure 3.5**) Here, driveways were flooded from the highway. The source was not identified, but as this location is removed from the watercourse it is most likely associated with surface water flooding, as illustrated by the flood patterns north of the Thurlaston Brook.
 - September 2019: The corner of Brascote Lane and Luburnum Avenue. This incident was limited to the highway and was believed to be caused by localised surface water ponding due to the highway topography.
- 3.53 The risk of pluvial flooding to the proposed development is subsequently considered to be low.

Flood Risk from Sewers

- 3.54 Sewer flooding can occur when the capacity of the infrastructure is exceeded by excessive flows, or as a result of a reduction in capacity due to collapse or blockage, or if the downstream system becomes surcharged. This can lead to the sewers flooding onto the surrounding ground via manholes and gullies, which can generate overland flows.
- 3.55 Severn Trent records, included as **Appendix 4**, do not illustrate the presence of any public sewer networks within the site or along Brascote Lane to the west or south of the site. Subsequently, there is a low risk of a surcharged sewer exceedance event being directed onto the site.
- 3.56 Should such an event occur, the topography of the site naturally drains towards the Thurlaston Brook and subsequently flows would be directed away from the proposed development and towards the Thurlaston Brook.

Effect of Development on Wider Catchment

Displacement of Floodplain

- 3.57 The proposed development is shown to be located outside of all modelled fluvial flood extents. As such there would be no displacement of fluvial flood water as a result of the proposed development.
- 3.58 All proposed plots are also shown to be located outside of existing surface water extents at the site.

Impedance of Flood Flows

- 3.59 Given that the proposed development is located outside of all modelled fluvial and pluvial flood extents, no overland flow routes will be impeded or re-directed as a result of the development.

Development Land Use/Drainage Considerations

- 3.60 The proposed development is to result in an increase in impermeable surfaces at the site. This increase in hardstanding area will subsequently result in greater surface water runoff rates leaving the site and entering the nearby watercourses.
- 3.61 A separate Sustainable Drainage Statement (SDS) (Ref: **BLN-BWB-ZZ-XX-RP-CD-0001_SDS**) has been provided to demonstrate how surface water runoff rates can be attenuated on site and discharged at an appropriate rate, in accordance with the relevant local policy.

4. FLOOD RISK MITIGATION

- 4.1 **Section 3** has identified the sources of flooding which could potentially pose a risk to the site and the proposed development. This section of the FRA sets out the mitigation measures which are to be incorporated within the proposed development to address and reduce the risk of flooding to within acceptable levels.

Sequential Arrangement

- 4.2 The illustrative masterplan shows all residential plots are sequentially located outside of all modelled areas at risk of fluvial flooding.

Development Levels

- 4.3 Finished floor levels of “More Vulnerable” development should be set at a minimum of 600mm above maximum flood levels during the design event. In this case, this is taken as the 1 in 100-year +28% allowance for climate change (central allowance).
- 4.4 An assessment was conducted in **Section 3** whereby topographic levels at the development site were compared against the most representative 1 in 100-year +28%CC modelled flood levels and extents for that location. All residential plots are shown to located outside of the 1 in 100-year +28%CC flood level.
- 4.5 Plots in Area A and Area D will already be set a minimum of 1.01m and 0.92m above the 1 in 100-year +28CC flood level at the closest and most representative 1D in-channel node. Proposed plots within Areas B and C will be 0.42m and 0.39m above the 1 in 100-year +28CC flood level for their respective in-channel representative nodes.
- 4.6 To ensure that plots in Areas B and C can be deemed safe for their lifetime, it is recommended that finished floor levels are set no lower than 125.18mAOD (Area B) and 124.21mAOD (Area C), respectively.
- 4.7 As part of the hydraulic modelling exercise, blockage testing was simulated of three hydraulic structures. To test a worst-case scenario, the structures were represented as 100% blocked. The site continued to remain unaffected during these extents.
- 4.8 Third party data sources identify the site as located within a region that is considered to be susceptible to groundwater flooding. This risk is typically negated by the raising of finished floor levels relative to adjacent ground levels. It is subsequently recommended that Finished Floor Levels are set a minimum of 150mm above the surrounding ground level. This would also mitigate against the potential risk of a sewer exceedance event.

Groundwater and Construction

- 4.9 Groundwater has been highlighted as a risk to the site, particularly during the construction phase.

- 4.10 If groundwater is struck during excavations, any necessary dewatering should be carried out to ensure stable soil conditions on site. A groundwater specialist should be consulted.

Safe Access and Egress

- 4.11 The current proposals illustrate two primary access locations to the site. Both access locations are from the west via Brascote Lane.
- 4.12 Both access locations are located outside of all modelled fluvial flood extents, including an allowance for the projected impacts of climate change.
- 4.13 Furthermore, both access locations, and Brascote Lane, is shown to remain wholly unaffected during all surface water events.
- 4.14 Subsequently, safe access and egress will be achievable for the lifetime of the proposed development.

Flood Contingency Plan and Evacuation Procedures

Flood Warning and Evacuation

- 4.15 Due to the low risk of flooding to the site, the site is not located within an EA Flood Alert or Flood Warning service area.

Safe Refuge

- 4.16 In the unlikely event that a flood event was to affect the site, residents could seek safe refuge at upper floor levels of the proposed properties.
- 4.17 Alternatively, safe refuge could be sought by travelling to the proposed community hall, which is located at higher ground in the southwest corner of the site.

Surface Water Drainage

- 4.18 To mitigate the development's impact on the current runoff regime, it is proposed to incorporate surface water attenuation as part of the development proposals.
- 4.19 Further information on the drainage approach is provided within the accompanying Sustainable Drainage Statement (Ref: **BLN-BWB-ZZ-XX-RP-YE-0001_SDS**).
- 4.20 In brief, the development will continue to infiltrate into the ground or discharge surface water to the Thurlaston Brook at the greenfield QBAR rate. Attenuated surface water storage will be provided in the form of SuDS detention basins with capacity for the 1 in 100-year storm with an allowance for climate change.

Foul Water Drainage

- 4.21 It is proposed to drain foul water from the development separately to surface water.

4.22 Further information can be found within the accompanying Sustainable Drainage Statement, (Ref: **BLN-BWB-ZZ-XX-RP-YE-0001_SDS**).

5. CONCLUSIONS AND RECOMMENDATIONS

- 5.1 This FRA has been prepared in accordance with requirements set out in the National Planning Policy Framework (NPPF) and the associated Planning Practice Guidance. The FRA has been produced on behalf of Richborough Estates Limited in respect of a planning application for a proposed residential-led development. The site is located at the Land off Brascote Lane, Newbold Verdon.
- 5.2 This FRA is intended to support an outline planning application and as such the level of detail included is commensurate and subject to the nature of the proposals.
- 5.3 This report demonstrates that the proposed development is not at significant flood risk, subject to the recommended flood mitigation strategies being implemented. The identified risks and mitigation measures are summarised within **Table 5.1**:

Table 5.1: Summary of Flood Risk Assessment

Flood Source	Risk & Proposed Mitigation Measures
Fluvial	A bespoke hydraulic modelling exercise has been completed to determine representative fluvial flood extents for the upper catchment of the Thurlaston Brook. The proposed development is shown to be sequentially arranged to be located outside of all modelled flood events including the 1 in 100-year +28%CC, 1 in 100-year +37%CC and 1 in 100-year +60%CC events. Following review of the illustrative masterplan, all residential plots are shown to be located on surveyed topographic levels that are set suitably above the maximum modelled design flood level with climate change (+28%). It is proposed that all plots are set a minimum of 600mm above the 1 in 100-year +28%CC climate change flood level reported within their closest respective in-channel node. Both access locations to the site are also shown to remain unaffected during all modelled events. Subsequently, safe access and egress will remain achievable for the lifetime of the proposed development.
Groundwater	Third party data sources identify the site as located within a region that is considered to be susceptible to groundwater flooding. Finished floor levels should be raised a minimum of 150mm above surrounding ground. Any groundwater that is struck during excavations should be appropriately dewatered.
Reservoirs and waterbodies	The EA reservoir failure flood extent does not cover the site, with the nearest extent being located approximately 2.5km northeast. There is a waterbody located immediately south of the site which is set above the proposed development. In the unlikely event that the structure of this waterbody was to fail, the site could be at residual risk of flooding.
Pluvial runoff	The pluvial risk across the majority of the site is very low. The 1 in 30-year and 1 in 100-year events are contained to the channel. There are two areas of isolated ponding predicted on site during the 1 in 1000-year event. Depths of below 300mm are predicted in these areas. All proposed plots are shown to be located outside of all surface water extents including the 1 in 1000-year event.

Impact of the Development	The site has been located so as to not encroach or displace any floodplain. Surface water runoff from the development will be controlled appropriately and infiltrate into the ground or discharge to the local watercourse at the equivalent greenfield QBAR rate. The foul water from the development will be drained separately to clean water.
This summary should be read in conjunction with BWB's full report. It reflects an assessment of the Site based on information received by BWB at the time of production.	

- 5.4 In compliance with the requirements of National Planning Policy Framework, and subject to the mitigation measures proposed, the development could proceed without being subject to significant flood risk. Moreover, the development will not increase flood risk to the wider catchment area subject to suitable management of surface water runoff discharging from the site.

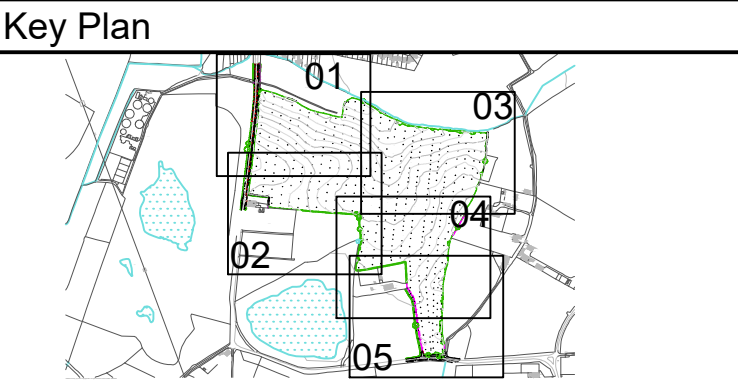
APPENDICES

Appendix 1: Topographic Survey



Station Coordinates			
Station Name	Eastings (m)	Northings (m)	Height (m)
BWB01	444426.770	303328.244	122.988
BWB02	444421.393	303216.789	127.180
BWB03	444415.262	303163.558	128.736

- Notes**
- Do not scale this drawing. All dimensions must be checked/ verified on site. If in doubt ask.
 - This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.
 - All dimensions in metres unless noted otherwise. All levels in metres unless noted otherwise.
 - Any discrepancies noted on site are to be reported to the engineer immediately.
 - No scale factor has been applied to this survey, therefore the os coordinates are to be treated as arbitrary. Please refer to survey station information below for on site control establishment.
 - All coordinates and height data relate to OSGB36(15). Control stations are coordinated by means of GPS receiving real time corrections via OS smart net.
 - All manhole data is collected from ground level therefore discrepancies may occur. More accurate data is only achievable via confined space entry.
 - OS license number: 100022432



- Legend**
- OS Buildings
 - Surveyed Buildings
 - Building
 - Wall
 - Kerb Channel Line
 - Top of Kerb
 - Edge of Surface
 - Top of Bank
 - Bottom of Bank
 - Canopy / Overhang
 - Line Marking
 - Centre Line
 - Watercourse
 - Centre Line
 - Barrier
 - Fence
 - Gate
 - Overhead Powerline
 - Overhead Utilities
 - Contour Lines
 - Inspection Chamber
 - Flow direction and pipe diameter
 - Station and Name
 - Monitoring Borehole
 - Tree / Bush / Sapling
 - Area of Vegetation/ Extent of Tree Canopy
 - Hedge
 - Body of Water
 - Body of Water from OS
 - Spot Level
 - Assumed Surface
 - Water Drainage Line

- AP Anchor Point
- BG Back Gully
- BO Bollard
- BS Bus Stop
- BT British Telecom
- C Crest
- CL Cover Level
- CMP Cable Marker
- Post
- CCTVSecurity Camera
- CTV Cable TV
- DC Drainage Channel
- DK Drop Kerb
- DP Down Pipe
- Elec Electric
- EP Electricity Post
- ER Earth Rod
- FH Fire Hydrant
- FL Floodlight
- FBW Fence Barbed Wire
- FCB Fence Closed Board
- FCL Fence Chain Link
- FEL Fence Electric
- FMP Fence Metal Panel
- FMB Fence Metal Railing
- FOB Fence Open Board
- FPW Fence Post & Wire
- FSP Fence Steel Palisade
- FWM Fence Wire Mesh
- FFL Finished Floor Level
- FP Flagpole
- GV Gas Valve
- GY Gully
- HL Height
- IC Inspection Chamber
- IFL Internal Floor Level
- IL Invert Level (as a reduced level)
- LB Litter Bin
- LP Lamp Post
- MH Manhole
- Mkr Service Marker
- PB Post Box
- PT Post
- RE Rodding Eye
- SP Sign Post
- ST Stop Tap
- SV Stop Valve
- TCB Telephone Call Box
- THL Threshold Level
- TL Traffic Light
- TP Telegraph Post
- TS Traffic Signal
- UTS Unable to Survey
- WL Water Level
- WM Water Meter
- WO Wash Out

P2	08.07.21	First Issue	SDS	Ds
Rev	Date	Details of issue / revision	Drw	Rev

Issues & Revisions

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□ Leeds | 0113 233 8000
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Client

Richborough Estates Ltd

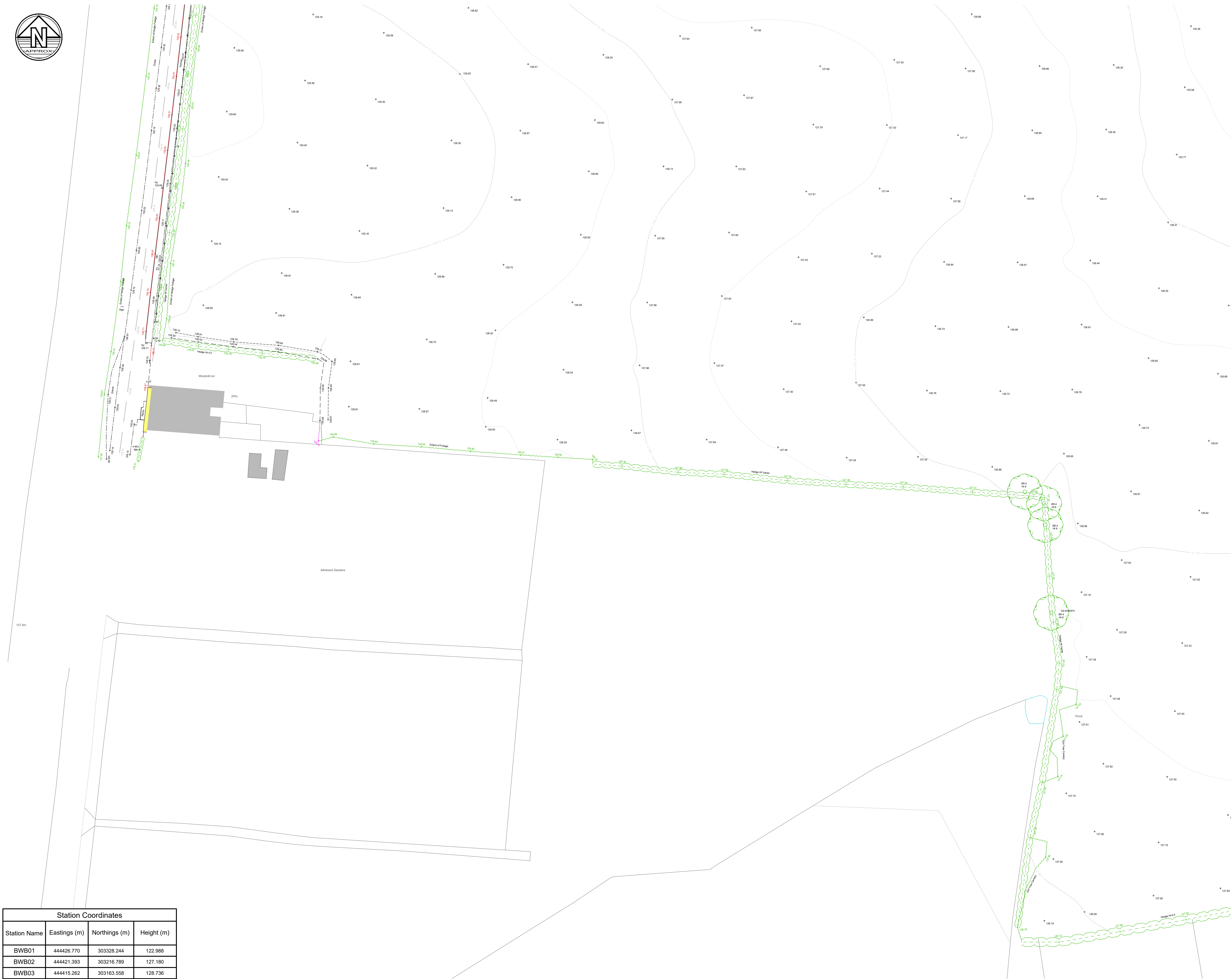
Project Title

**Brascote Lane
Newbold Verdon**

Drawing Title

**Existing Site 2D Plan
Sheet 1 of 5**

Drawn:	S.D.Shreeves	Reviewed:	D.Smith
BWB Ref:	BMW3175	Date:	08.07.21
Scale@A1:	1:500		
Drawing Status			
PRELIMINARY			
Project - Originator - Zone - Level - Type - Role - Number			Status Rev
BLN-BWB-00-01-DR-G-001			S2 P1

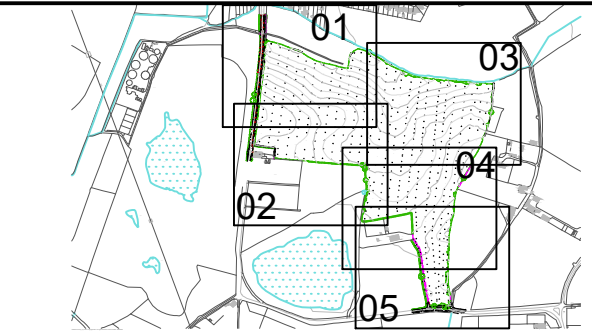


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Key Plan



Legend

OS Buildings										Contour Lines									
Surveyed Buildings										Inspection Chamber									
Wall										Station and Name									
Top of Kerb										Tree / Bush / Sapling									
										Area of Vegetation/ Extent of Tree Canopy									
Bottom of Bank										Hedge									
										Body of Water									
Line Marking										Body of Water from OS									
										Spot Level									
Watercourse										Assumed Surface									
										Water Drainage Line									
Fence										Surface Water Drainage Line									
AP Anchor Point										LB Litter Bin									
BG Back Gully										LP Lamp Post									
BO Bollard										MH Manhole									
BS Bus Stop										Mkr Service Marker									
BT British Telecom										PB Post Box									
C Crest										PT Post									
CL Cover Level										RE Rodding Eye									
CMP Cable Marker										SP Sign Post									
Post										ST Stop Tap									
CCTV Security Camera										SV Stop Valve									
CTV Cable TV										TCB Telephone Call Box									
DC Drainage Channel										THL Threshold Level									
DK Drop Kerb										TL Traffic Light									
DP Down Pipe										TP Telegraph Post									
Elec Electric Post										TS Traffic Signal									
EP Electricity Post										UTS Unable to Survey									
ER Earth Rod										WL Water Level									
FH Fire Hydrant										WM Water Meter									
FL Floodlight										WO Wash Out									

P2	08.07.21	First Issue	SDS	Ds
Rev	Date	Details of issue / revision	Drw	Rev

Issues & Revisions

	Birmingham 0121 233 3322
	Leeds 0113 233 8000
	London 020 7407 3879
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Client
Richborough Estates Ltd

Project Title
Brascote Lane Newbold Verdon

Drawing Title
Existing Site 2D Plan Sheet 2 of 5

Drawn:	S.D.Shreeves	Reviewed:	D.Smith
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BWB Ref:	BMW3175	Date:	08.07.21	Scale@A1:	1:500
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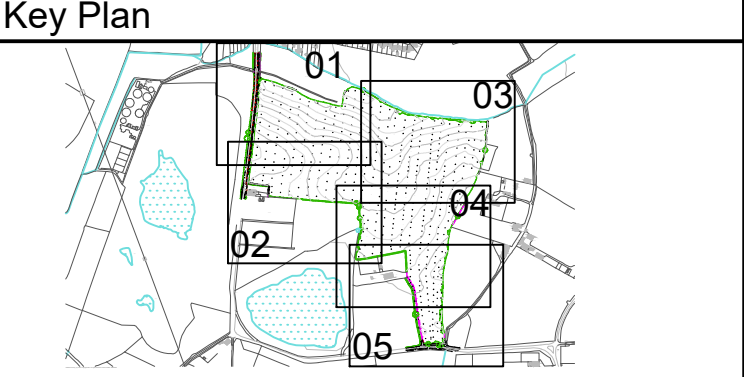
Drawing Status
PRELIMINARY

Project - Originator - Zone - Level - Type - Role - Number	Status	Rev
BLN-BWB-00-02-DR-G-001	S2	P1



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 - Kerb Channel Line
 - Top of Kerb
 - Edge of Surface
 - Top of Bank
 - Bottom of Bank
 - Canopy / Overhang
 - Line Marking
 - Centre Line
 - Watercourse
 - Centre Line
 - Barrier
 - Fence
 - Gate
 - Overhead Powerline
 - Overhead Utilities
 - Contour Lines
 - Inspection Chamber
 - Flow direction and pipe diameter
 - Station and Name
 - Monitoring Borehole
 - Tree / Bush / Sapling
 - Area of Vegetation/ Extent of Tree Canopy
 - Hedge
 - Body of Water
 - Body of Water from OS
 - Spot Level
 - Assumed Surface
 - Water Drainage Line
 - Surface Water Drainage Line

- AP Anchor Point
- BG Back Gully
- BO Bollard
- BS Bus Stop
- BT British Telecom
- C Crest
- CL Cover Level
- CMP Cable Marker
- Post
- CCTV Security Camera
- CTV Cable TV
- DC Drainage Channel
- DK Drop Kerb
- DP Down Pipe
- Elec Electric
- EP Electricity Post
- ER Earth Rod
- FH Fire Hydrant
- FL Floodlight
- FBW Fence Barbed Wire
- FCB Fence Closed Board
- FCL Fence Chain Link
- FEL Fence Electric
- FMP Fence Metal Panel
- FMB Fence Metal Railing
- FOB Fence Open Board
- FPW Fence Post & Wire
- FSP Fence Steel Palisade
- FWM Fence Wire Mesh
- FFL Finished Floor Level
- FP Flagpole
- GV Gas Valve
- GY Gully
- Ht Height
- IC Inspection Chamber
- IFL Internal Floor Level
- IL Invert Level (as a reduced level)
- LB Litter Bin
- LP Lamp Post
- MH Manhole
- Mkr Service Marker
- PB Post Box
- RE Rodding Eye
- SP Sign Post
- ST Stop Tap
- SV Stop Valve
- TCB Telephone Call Box
- THL Threshold Level
- TL Traffic Light
- TP Telegraph Post
- TS Traffic Signal
- UTS Unable to Survey
- WL Water Level
- WM Water Meter
- WO Wash Out

P2	08.07.21	First Issue	SDS	Ds
Rev	Date	Details of issue / revision	Drw	Rev

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Client
Richborough Estates Ltd

Project Title
**Brascote Lane
Newbold Verdon**

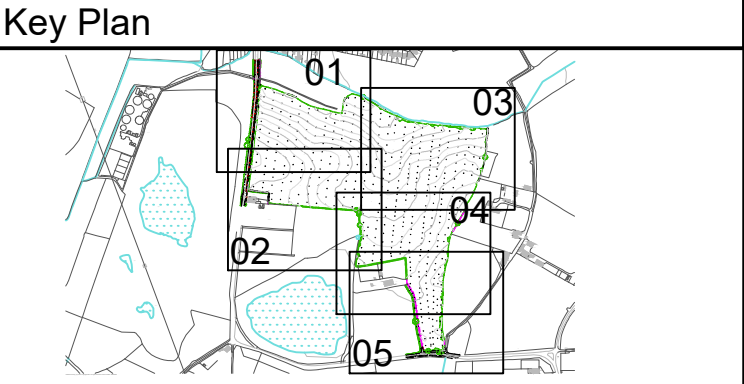
Drawing Title
**Existing Site 2D Plan
Sheet 3 of 5**

Drawn:	S.D.Shreeves	Reviewed:	D.Smith
BWB Ref:	BMW3175	Date:	08.07.21
Scale@A1:	1:500		
Drawing Status PRELIMINARY			
Project - Originator - Zone - Level - Type - Role - Number BLN-BWB-00-03-DR-G-001			Status S2
			Rev P1



Station Coordinates			
Station Name	Eastings (m)	Northings (m)	Height (m)
BWB01	444426.770	303328.244	122.988
BWB02	444421.393	303216.789	127.180
BWB03	444415.262	303163.558	128.736

- Notes**
- Do not scale this drawing. All dimensions must be checked/ verified on site. If in doubt ask.
 - This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.
 - All dimensions in metres unless noted otherwise. All levels in metres unless noted otherwise.
 - Any discrepancies noted on site are to be reported to the engineer immediately.
 - No scale factor has been applied to this survey, therefore the os coordinates are to be treated as arbitrary. Please refer to survey station information below for on site control establishment.
 - All coordinates and height data relate to OSGB36(15). Control stations are coordinated by means of GPS receiving real time corrections via OS smart net.
 - All manhole data is collected from ground level therefore discrepancies may occur. More accurate data is only achievable via confined space entry.
 - OS license number: 100022432



- Legend**
- | | |
|--------------------|---|
| OS Buildings | Contour Lines |
| Surveyed Buildings | Inspection Chamber |
| Building | Flow direction and pipe diameter |
| Wall | Station and Name |
| Kerb Channel Line | Monitoring Borehole |
| Top of Kerb | Tree / Bush / Sapling |
| Edge of Surface | Area of Vegetation/ Extent of Tree Canopy |
| Top of Bank | Hedge |
| Bottom of Bank | Body of Water |
| Canopy / Overhang | Body of Water from OS |
| Line Marking | Spot Level |
| Centre Line | Assumed Surface |
| Watercourse | Water Drainage Line |
| Centre Line | Surface Water Drainage Line |
| Barrier | |
| Fence | |
| Gate | |
| Overhead Powerline | |
| Overhead Utilities | |

- | | | | | | |
|---------------------|------------------|-----|-----------------------------------|----------|------------------|
| AP | Anchor Point | FBW | Fence Barbed Wire | LB | Litter Bin |
| BG | Back Gully | FCB | Fence Closed Board | LP | Lamp Post |
| BO | Bollard | FCL | Fence Chain Link | MH | Manhole |
| BS | Bus Stop | FEL | Fence Electric | Mkr | Service Marker |
| BT | British Telecom | FMP | Fence Metal Panel | PB | Post Box |
| C | Crest | FMR | Fence Metal Railing | PT | Post |
| CL | Cover Level | FOB | Fence Open Board | RE | Rodding Eye |
| CMP | Cable Marker | FPW | Fence Post & Wire | SP | Sign Post |
| Post | | FSP | Fence Steel Palisade | ST | Stop Tap |
| CCTVSecurity Camera | | FWM | Fence Wire Mesh | SV | Stop Valve |
| CTV | Cable TV | FFL | Finished Floor Level | TCB | Telephone |
| DC | Drainage | FP | Flagpole | Cell Box | |
| Channel | | Gas | Gas | THL | Threshold Level |
| DK | Drop Kerb | GV | Gas Valve | TL | Traffic Light |
| DP | Down Pipe | GY | Gully | TP | Telegraph Post |
| Elec | Electric | Ht | Height | TS | Traffic Signal |
| EP | Electricity Post | IC | Inspection Chamber | UTS | Unable to Survey |
| ER | Earth Rod | IFL | Internal Floor Level | WL | Water Level |
| FH | Fire Hydrant | IL | Invert Level (as a reduced level) | WM | Water Meter |
| FL | Floodlight | | | WO | Wash Out |

P2	08.07.21	First Issue	SDS	Ds
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Project Title

**Brascote Lane
Newbold Verdon**

Drawing Title

**Existing Site 2D Plan
Sheet 4 of 5**

Drawn:	S.D.Shreeves	Reviewed:	D.Smith
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BWB Ref:	BMW3175	Date:	08.07.21	Scale@A1:	1:500
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Drawing Status

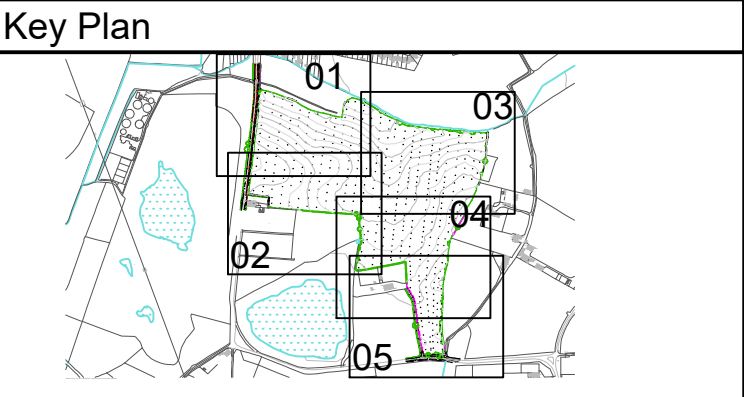
PRELIMINARY

Project - Originator - Zone - Level - Type - Role - Number	Status	Rev
BLN-BWB-00-04-DR-G-001	S2	P1



Station Coordinates			
Station Name	Eastings (m)	Northings (m)	Height (m)
BWB01	444426.770	303328.244	122.988
BWB02	444421.393	303216.789	127.180
BWB03	444415.262	303163.558	128.736

- Notes**
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 - OS license number: 100022432



Legend					
OS Buildings					
	Surveyed Buildings				
	Building				
	Wall				
	Kerb Channel Line				
	Top of Kerb				
	Edge of Surface				
	Top of Bank				
	Bottom of Bank				
	Canopy / Overhang				
	Line Marking				
	Centre Line				
	Watercourse				
	Centre Line				
	Barrier				
	Fence				
	Gate				
	Overhead Powerline				
	Overhead Utilities				
	Contour Lines				
	Inspection Chamber				
	Flow direction and pipe diameter				
	Station and Name				
	Monitoring Borehole				
	Tree / Bush / Sapling				
	Area of Vegetation/ Extent of Tree Canopy				
	Hedge				
	Body of Water				
	Body of Water from OS				
	Spot Level				
	Assumed Surface				
	Water Drainage Line				
	Surface Water Drainage Line				
AP	Anchor Point	FBW	Fence Barbed Wire	LB	Litter Bin
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BT	British Telecom	FMP	Fence Metal Panel	PB	Post Box
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CL	Cover Level	FOB	Fence Open Board	RE	Rodding Eye
CMP	Cable Marker	FPW	Fence Post & Wire	SP	Sign Post
Post		FSP	Fence Steel Palisade	ST	Stop Tap
CCTVSecurity Camera		FWM	Fence Wire Mesh	SV	Stop Valve
CTV	Cable TV	FFL	Finished Floor Level	TCB	Telephone
DC	Drainage	FP	Flagpole		Call Box
DK	Drop Kerb	GV	Gas Valve	THL	Threshold Level
DP	Down Pipe	GY	Gully	TL	Traffic Light
Elec	Electric	Ht	Height	TP	Telegraph Post
EP	Electricity Post	IC	Inspection Chamber	TS	Traffic Signal
ER	Earth Rod	IFL	Internal Floor Level	UTS	Unable to Survey
FH	Fire Hydrant	IL	Invert Level	WL	Water Level
FL	Floodlight		(as a reduced level)	WM	Water Meter
				WO	Wash Out

P2	08.07.21	First Issue	SDS	Ds
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Project Title
**Brascote Lane
Newbold Verdon**

Drawing Title
**Existing Site 2D Plan
Sheet 5 of 5**

Drawn:	S.D.Shreeves	Reviewed:	D.Smith
BWB Ref:	BMW3175	Date:	08.07.21
Scale@A1:	1:500	Status	Rev
PRELIMINARY			
Project - Originator - Zone - Level - Type - Role - Number			
BLN-BWB-00-05-DR-G-001			
S2 P1			

Appendix 2: Illustrative Masterplan