BWB
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ENVIRONMENT

Welcome Break Ltd
Stretton Court
Hinkley
Sustainable Drainage Statement

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Stretton Court
Hinkley
Sustainable Drainage Statement

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1. INTRODUCTION

1.1 A Sustainable Drainage Statement (SDS) sets out the principles of drainage design for a Proposed Development and summarises the reasoning behind the chosen design. This includes consideration of national and local guidance, justification of specific flow rates, volumes of attenuated storage, as well as the appropriate level of treatment to be provided to surface water runoff.

1.2 This SDS has been produced by BWB Consulting on behalf of Welcome Break Ltd in respect of a planning application for the Proposed Development of a new Motorway Services Area (MSA) at Stretton Court, Hinckley.

1.3 A Flood Risk Assessment (FRA) has been produced for the Site (reference: SCH-BWB-ZZ-XX-RP-YE-0001_FRA) and this SDS accompanies this overarching document.

1.4 This SDS is intended to support a full planning application and as such the level of detail included is commensurate and subject to the nature of the Proposed Development.

1.5 The Site was previously granted planning permission in June 2020 (reference: 20/00531/HYB). A SDS was completed by BWB Consulting Ltd (reference: STP-BWB-ZZ-XX-RP-CD-0001_SDS) in May 2020 in support of this application.

1.6 The Site location is illustrated within **Figure 1.1**, with contextual information provided within **Table 1.1**. A Proposed Development layout plan is included as **Appendix 1**.

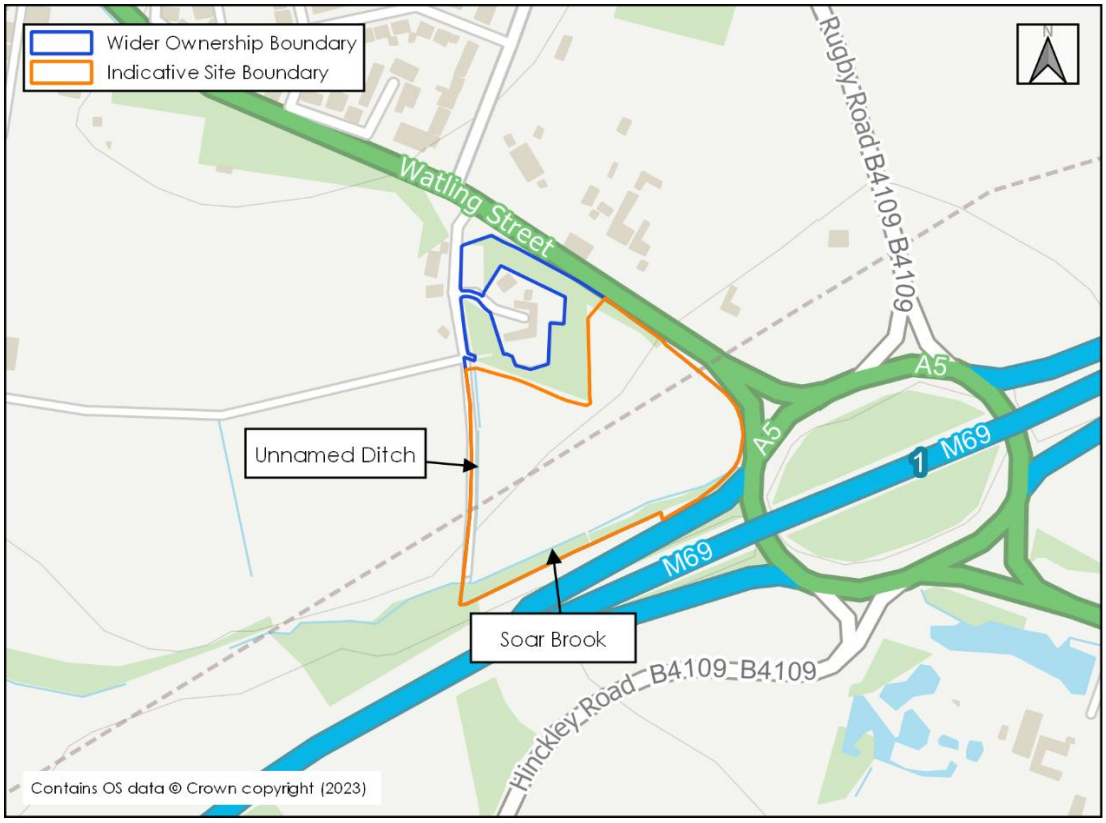

Figure 1.1: Site Location

Table 1.1: Site Details

Site Name	Stretton Court
Location	Hinckley
NGR (approx.)	SP 43173 91034
Application Site Area (ha)	4.20 (approx.)
Development Area (ha)	2.53 (approx.)
Development Type	Motorway Services Area
Lead Local Flood Authority	Warwickshire County Council/Leicestershire County Council
Local Planning Authority	Rugby Borough Council/Hinckley & Bosworth Borough Council
Environment Agency Area	West Midlands/East Midlands
Sewerage Undertaker	Severn Trent Water

1.7 The Site is indicated to lie across county boundaries which impacts the drainage and planning policies that require consideration. The southwest area of the Site is located within Warwickshire and the northeast area of the Site is located within Leicestershire. From a planning authority perspective, the Local Planning Authority (LPA) designation also lies over two authorities, Rugby Borough Council in the southwest and Hinckley and Bosworth Borough Council in the northeast. This is shown within **Figure 1.2**.

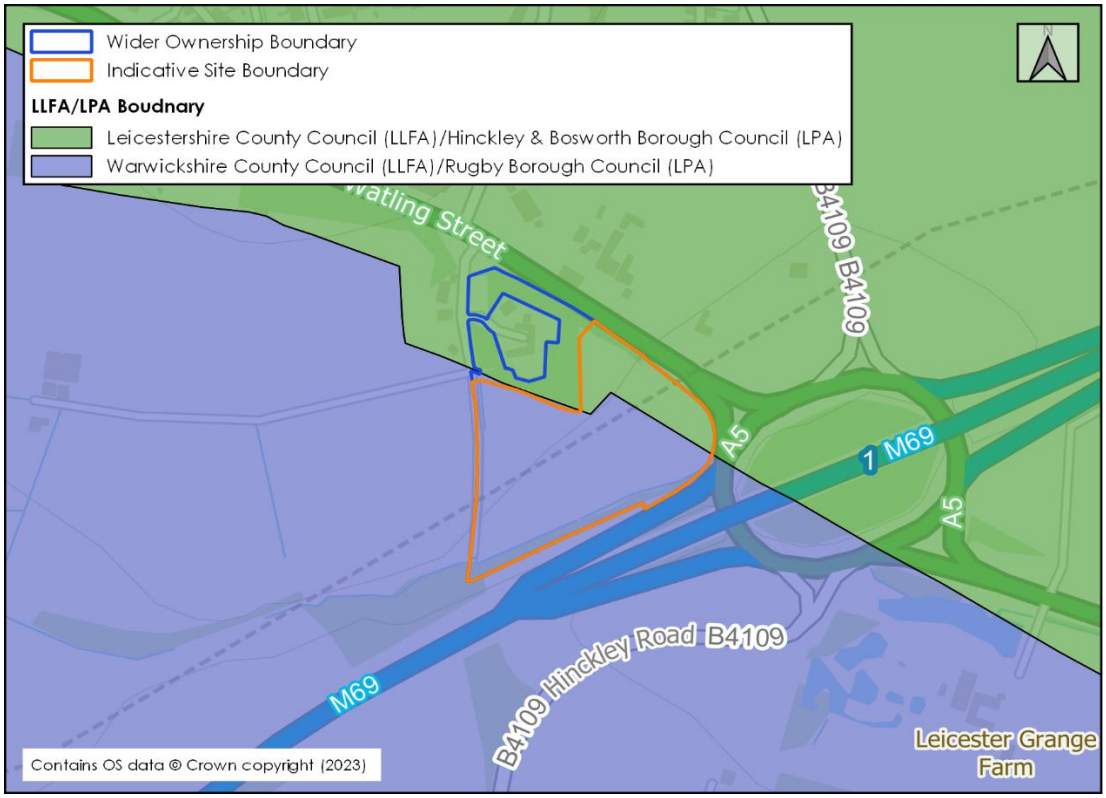

Figure 1.2: LLFA/LPA Boundaries

Sustainable Drainage Guidance

1.8 Sustainable Drainage Systems (SuDS) aim to reduce the impact of the Proposed Development by replicating the natural runoff regime in a sustainable, cost-effective manner, whilst protecting water quality and reducing pollution. The four key objectives of SuDS design are to achieve improvements in water quantity, water quality, amenity provision and biodiversity.

1.9 The Proposed Development spans the LPA boundaries of Rugby Borough District Council and Hinckley & Bosworth District Council. In terms of a LLFA perspective this means that the Site is under consideration by both Warwickshire County Council and Leicestershire County Council.

1.10 Warwickshire County Council have produced a local guidance document, Flood Risk & Sustainable Drainage Local Guidance for Developers[1], which provides information on the relevant policies and guidance for sustainable drainage for new developments. Warwickshire County Council have a SuDS feature appraisal pro-forma which is required to be submitted to the LLFA as part of the planning application submission documents. This has been completed and is included for reference as **Appendix 2.**

[1] Flood Risk & Sustainable Drainage Local Guidance for Developers (WCC, January 2023)

1.11 Leicestershire County Council have also published online SuDS guidance for new developments which includes a Statutory Consultation Checklist[2] and Interim LLFA Guidance Note[3].

1.12 LLFA guidance from both Warwickshire County Council and Leicestershire County Council has been reviewed in the production of this SDS.

1.13 Predicted future changes in peak rainfall intensity caused by climate change are provided by the EA. Table 2 from the EA's 'Flood risk assessments: climate change allowances'[4], included as **Table 1.2** shows the anticipated changes in peak rainfall intensity for the Site.

Table 1.2: Peak Rainfall Climate Change Allowances for the Soar Management Catchment

Soar Management Catchment Allowance	Total Potential Change Anticipated for the '2050s' (Lifetime up to 2060)	Total Potential Change Anticipated for the '2070s' (2061 to 2125)
1 in 30-Year (3.3% Annual Exceedance) Rainfall Event		
Upper End	35%	35%
Central	20%	25%
1 in 100-Year (1% Annual Exceedance) Rainfall Event		
Upper End	40%	40%
Central	20%	25%

1.14 Given the Proposed Development, a climate change allowance of 40% has been made for the 1 in 100-year return period and a 35% allowance has been made for the 1 in 30-year return period.

1.15 Local guidance has been considered in conjunction with the Non-statutory Technical Standards for Sustainable Drainage Systems[5] and The SuDS Manual[6] as part of the following document.

[2] Lead Local Flood Authority Statutory Consultation Checklist (Leicestershire County Council, October 2018)
[3] Interim LLFA Guidance Note: Planning and Development in Leicestershire (Leicestershire County Council, October 2018)
[4] https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances
[5] Non-Statutory Technical Standards for Sustainable Drainage Systems, DEFRA (2015)
[6] The SuDS Manual, CIRIA (2015)

2. EXISTING CONDITIONS

2.1 The existing Site is greenfield and is located on the junction between the A5 and M69. The wider ownership boundary encircles an existing residential area in the north-west part of the Site known as Stretton Croft. The Soar Brook is located to the south of the Site and flows from west to east through the Site. A minor unnamed ditch is also located adjacent to the western side boundary.

2.2 A topographical survey has been undertaken, included for reference as **Appendix 3**. The survey shows the Site generally falls in a south-easterly direction, falling from a high point of 114.1 metres Above Ordnance Datum (mAOD) in the northwest, to a low point of 106.9mAOD in the southeast. An isolated topographical highpoint is shown to be located to the northeast with an elevation of 115.5mAOD.

2.3 There is some existing drainage shown to enter the Site from the north, these are assumed to serve Stretton Croft, levels suggest the flows would enter the Site and fall south, the full connectivity is not understood. It is recommended that the existing site drainage is fully surveyed to confirm its use and connectivity. It is assumed that the existing drainage combines surface and foul water flows from Stretton Croft.

2.4 A Phase II Geo-Environmental Assessment undertaken by BWB Consulting Ltd in February 2020 (reference: SPH-BWB-ZZ-00-RP-YE-0001-PH2_P2), indicates that ground conditions are known to comprise of approximately 1.0m depth of Made Ground overlying soft stiff clay, silt, and sands. The Site is entirely underlain by Mercia Mudstone Group bedrock, with superficial deposits of Oadby Member to the south, Wolston Sand and Gravel through the centre of the Site, and Bosworth Clay Member to the east. Site investigation results concluded that the Site geology is largely cohesive in nature with groundwater encountered at shallow depths.

2.5 Therefore, the existing drainage regime is expected to be limited infiltration into the ground, with surface water runoff directed towards the Soar Brook when infiltration is exceeded.

Existing Runoff Rates

2.6 An assessment of the existing surface water runoff rates from the Proposed Development area (2.53ha) has been undertaken and is summarised within **Table 2.1**. Calculations are included within **Appendix 4**.

2.7 The runoff rates have been estimated using the IH124 method, with appropriate prorated adjustments for a site of less than 50ha, as recommended in Interim Code of Practice for Sustainable Drainage[7]. This was undertaken within Micro Drainage, which makes the necessary adjustments for small sites automatically.

[7] The National SUDS Working Group (2004), Interim Code of Practice for Sustainable Drainage

Table 2.1: Existing Runoff Rate from the Site

Return Period (Yrs.)	Runoff Rate (l/s)
1	9.2
Mean Annual Flow Rate (QBAR)	11.1
30	21.8
100	28.6

Existing Runoff Volume

2.8 An assessment of the existing surface water runoff rates from the Proposed Development area has been made for a 1 in 100-year, 6 hour storm.

2.9 As the existing Site is permeable, the runoff volume has been calculated using the Source Control module within Micro Drainage to be 675m^3, results are included within **Appendix 4**.

3. SURFACE WATER DRAINAGE STRATEGY

3.1 The Proposed Development is understood to comprise a motorway services area with a drive thru coffee shop, fuelling stations, and associated car parking areas. The proposed Site layout plan is included as **Appendix 1**.

Drainage Hierarchy

3.2 The Planning Policy Guidance[8] and the SuDS Manual[9] identify that surface water runoff from a development should be disposed of as high up the following hierarchy as reasonably practicable:

i. into the ground (infiltration).
ii. to a surface water body.
iii. to a surface water sewer, highway drain, or another drainage system.
iv. to a combined sewer.

3.3 The aim of this is approach is to manage surface water runoff close to where it falls and mimic natural drainage as closely as possible.

3.4 Findings of the Phase II Geo-Environmental Assessment conclude that the Made Ground and surrounding cohesive ground across the Site area not considered suitable for soakaways.

3.5 The Soar Brook flows west to east through the southern Site extent and a minor unnamed ditch flows adjacent to the western Site boundary. As the natural Site topography falls from the north to the south towards the Soar Brook, it is understood that the current surface water regime outfalls to the Soar Brook.

3.6 Therefore, it is proposed that flows from the Proposed Development will outfall to the south to the Soar Brook, at a suitably restricted rate. The proposed method of surface water disposal will therefore be in keeping with the current surface water regime to watercourse.

Peak Flow Control

3.7 Both Warwickshire County Council and Leicestershire County Council guidance request that peak flow should seek to mimic the greenfield runoff rate as closely as possible. Warwickshire County Council guidance specifies that discharge rates should not exceed the calculated QBAR rate for greenfield sites, as such this has been used to determine the maximum allowable discharge rate for the Proposed Development.

3.8 It is proposed to restrict flows leaving the Proposed Development to the equivalent QBAR rate for the Site for all storm events up to and including the 1 in 100-year plus climate change event. This is summarised within **Table 3.1**.

[8] Planning Practice Guidance. http://planningguidance.planningportal.gov.uk/.
[9] The SuDS Manual (C753). CIRIA 2015.

Table 3.1: Existing & Proposed Runoff Rates

Return Period (Yr.)	Existing Runoff Rate (l/s)	Proposed Discharge Rate (l/s)
1	9.2	11.1
QBAR	11.1	
30	21.8	
100	28.6	
100 + 40%	-	

3.9 For the approximate Proposed Development impermeable area of 2.53ha an equivalent QBAR greenfield rate of 11.1l/s has been calculated. This equates to a rate of 4.4l/s/ha. This approach fulfils the necessary peak runoff control criteria.

Drainage Strategy

3.10 An indicative surface and foul water layout for the Proposed Development is shown on BWB Dwg No. SCH-BWB-ZZ-XX-DR-CD-0001 an accompanying levels strategy and impermeable areas plan is provided on BWB dwgs. No. SCH-BWB-ZZ-XX-DR-CD-0002 & 0003. All drawings are included within **Appendix 5** and should be read in conjunction with the supporting MicroDrainage Network Calculations, included as **Appendix 6**.

3.11 As the Proposed Development requires a restricted runoff rate (11.1 l/s), it will be necessary to provide attenuated storage to balance the excess volume in a safe manner within the Site. Sufficient storage for events up to the 1 in 100-year storm with an allowance for climate change should be provided. It is proposed to drain surface water from the Site via three separate networks before discharging each to the Soar Brook, at a rate of 3.7 l/s for each network.

3.12 For each network, a simulation has been run using Micro Drainage 'Network' module to identify the necessary storage provision. FEH rainfall data has been used and in line with local guidance no MADD factor has been applied. Storage has been sized for the 1 in 100 year + 40% climate change storm events. The pipe network has been designed to accommodate the 30 year + 35% climate change storm events. A summary of each network is summarised in **Table 3.2,** the volumes stated below are the attenuation provided within the proposed cellular storage tanks only and do no account for the storage provided within the permeable paving, manholes, pipes etc.

Table 3.2: Network Summary

Network	Impermeable Area (ha)	Proposed Discharge Rate (l/s)	Geo-cellular Storage Requirement (m^3)
A	0.763	3.7	532
B	0.879	3.7	650
C	0.806	3.7	570

3.13 Permeable paving and rain gardens are proposed throughout the Proposed Development which will provide treatment to surface water flows. Where this is not possible or appropriate (HGV loaded areas, for example) by-pass separators will be used to treat flows leaving the Site. While permeable paving is modelled within the calculations, it is assumed these can be optimised through detailed design to provided additional storage which will reduce the geo-cellular requirements.

3.14 Runoff from the re-fuelling areas should be isolated by channel drainage and discharged via a forecourt separator to the foul drainage to mitigate the pollution risk.

3.15 It is envisaged that the final required attenuated storage volume will be determined during the detailed design stage, once the Proposed Development layout, drainage areas and external levels designs are fixed.

Runoff Volume Control

3.16 The Non-Statutory Technical Standards for Sustainable Drainage Systems S4-S6[10] states that where reasonably practical the runoff volume from a development for the 1 in 100-year 6 hour rainfall event should not exceed the runoff volume prior to development or redevelopment. Additionally, if practicable on previously developed sites, the runoff volume should not exceed the equivalent greenfield runoff volume. Where it is not reasonably practicable to constrain the volume of runoff from a development at or below the existing volume, then the runoff must be discharged in a manner that does not adversely affect flood risk, i.e.:

i. The additional runoff volume resulting from the Proposed Development (the 'long term storage volume') should be discharged separately from the site at a rate of 2 l/s/ha or less. Or,

ii. All the runoff volume from the Proposed Development should be discharged at a rate equivalent to the mean annual flow rate (QBAR) rate under greenfield conditions or less. Or,

iii. All the runoff volume from the Proposed Development should be discharged at a rate of 2 l/s/ha or less.

3.17 The Proposed Development will result in an increase to the impermeable footprint within the Site, post-development. Therefore, the runoff volume during the 1 in 100-year 6-hour storm will increase following the Proposed Development of the Site.

3.18 Although the post-development runoff volume during the 1 in 100-year 6-hour storm will increase post-development, the maximum discharge rate from the Site will be limited to the equivalent greenfield QBAR rate for all events up to the 1 in 100-year +40% critical storm. Therefore, the runoff from the Site is managed in a controlled manner that does not adversely affect flood risk, as per the local and national SuDS guidance.

3.19 Based on the above assessment, long-term storage is not considered to be required within the Proposed Development.

[10] 2015, DEFRA. Non-statutory technical standards for sustainable drainage systems

Residual Risk and Designing for Exceedance

3.20 It is recommended that the final layout uses the proposed road infrastructure to provide drainage exceedance (overland flood flow) routes through the Proposed Development and towards the designated storage areas where possible for events more than the capacity of the drainage system.

3.21 A model network has been designed within Micro Drainage; the drainage has been designed such that there is no flooding during the 1 in 30-year + 35% climate change event. Some minor flooding occurs during the 1 in 100-year + 40% climate change event, however, this will be contained within the Site. Indicative exceedance routing is shown on the proposed drainage strategy.

3.22 If the capacity of the attenuated storage is exceeded, ground levels should be profiled to direct overland flows towards the Soar Brook to the south of the Site. Flood water will be directed away from buildings with an allowance for shallow pooling within the car parking areas.

3.23 While a network model has been designed, there will be capacity within pipes, manholes, channel drains, gullies which have not been accounted for at this stage and a further level of redundancy to the network is therefore provided.

4. MAINTENANCE

4.1 It is envisaged that the Site drainage will likely remain private and will therefore be maintained by a management company who will be responsible for provided routine checks and maintenance.

4.2 Requirements for ongoing maintenance of the drainage network should form part of the Operation and Maintenance manual for the Site and should be undertaken by the site management. Any specialist or proprietary products that are specified at detailed design should have a manufacturer specific maintenance regime which should be included within the document.

4.3 It is envisaged that the Operation and Maintenance manual will be developed prior to occupation, however, an indicative SuDS Operation and Maintenance Manual has been prepared which is included as **Appendix 7**.

5. FOUL WATER DRAINAGE

5.1 It is proposed to drain used water from the Proposed Development separately to surface water.

5.2 Severn Trent Water sewer records, included as **Appendix 8**, show a foul water pumping station to the north of the A5, with flows being pumped to the sewer within Berchwood Avenue, north of the Proposed Development.

5.3 Severn Trent Water have indicated that there is insufficient capacity within the existing pumping station to accept flows from the Proposed Development, however, would accept flows to the 225mm diameter public foul sewer within Rufford Close at manhole reference 9301. Their full response is included as **Appendix 8**.

5.4 Due to levels, foul flows will be pumped via a privately managed package pumping station to the Severn Trent Water sewerage system.

5.5 An indicative foul drainage strategy is provided within the drainage strategy drawings (dwg. Ref: SCH-BWB-ZZ-XX-DR-CD-0001), which is included as **Appendix 6**.

5.6 Further consultation with Severn Trent Water has been undertaken to confirm the viability of connecting the existing pumping station. However, at the time of writing, no response has been received.

6. SUMMARY

6.1 This statement and supporting appendices demonstrate that the drainage design for the Proposed Development will comply with the relevant local and national standards, specifically the hierarchy of discharge, runoff rate and volume criterion.

6.2 This SDS is intended to support a full planning application and as such the level of detail included is commensurate and subject to the nature of the Proposed Development.

Table 6.1: Sustainable Drainage Statement Summary

		Existing Site	Proposed Development
Site Area (ha)		4.2 (approx.)	
Impermeable Area (ha)		-	2.448
Outfall Location		Watercourse	Watercourse
Peak Runoff Rate (l/s)	**QBAR**	11.1	11.1
	1 in 30-Year	21.8	
	1 in 100-Year	28.6	
	1 in 100-Year + CC	-	
Infiltration Rate		N/A	N/A
Volume Control		-	Discharge rate limited to QBAR
Proposed Storage Volume		-	1,752m^3
Flow Control Type		-	Vortex flow control
SuDS Features		-	Permeable Block Paving Geo-cellular Storage Rain Gardens
Maintenance Responsibility		-	Management Company

6.3 It is envisaged that the final drainage strategy will be determined during the detailed design stage, as the Proposed Development layout is finalised.

APPENDICES

Appendix 1: Site Layout

Total Car Spaces - 269
inc:
DDA - 17 (inc EV)
EV- 36
Staff Parking - 11
Motorcycle Parking - 11

HGV Parking - 29
Coach Parking - 6
Caravan Parking - 8

Key

- Ownership boundary
- Site boundary Site Area 41,940.82sqm / 10.36acres
- Bitmac road finish
- Bitmac path finish
- Concrete paviours
- Concrete
- Concrete Apron
- Concrete Apron Double reinforced concrete to delivery stand
- Kerb
- Pin Kerb
- Trief Kerb
- DK Drop Kerb
- Stainless steel bollard
- Soft Landscaping
- Tree to be removed
- BWB Root Protection Area
- Tactile paving
- Timber knee rail
- 1.8m timber close boarded fence
- 2.0m timber acoustic fence
- Existing / proposed timber post and rail fence
- Suggested drainage route from Title Plan LT155479
- Non illuminated signage
- NE GW Non illuminated sign NO ENTRY / GIVE WAY
- 110.55 Proposed Level
- Pedestrian Route Tactile paving and dropped kerbs at all appropriate points along the route to DDA standards within site demise

0m 10 20 30 40 50
Scale Bar

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REVISIONS		
E	21.08.23	MOTORCYCLE SPACES ADDED
D	28.07.23	AREA FOR EXTERNAL COMPOUND INDICATED
C	18.07.23	PFS PUMP ISLANDS REVISED TO IMPROVE TRACKING. DISTANCE BETWEEN PUMPS AND PARKING INCREASED
B	21.07.23	ADDITIONAL PFS PARKING AND HGV BAY. LANDSCAPING ADDED. BUILDING UPDATED TREES TO BE REMOVED INDICATED
A	18.07.23	REVISIONS TO DT LANES AND PARKING

CLIENT	WELCOME BREAK
PROJECT	WELCOME BREAK LAND OFF THE A5 HINCKLEY, LE10 3JB
TITLE	PROPOSED SITE LAYOUT
DATE	12.07.2023
SCALE	1:500 @ A1
JOB ID	1415
DWG	26e

ADS DESIGN
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ADS-DESIGN.NET

Appendix 2: Drainage Pro-forma

12 APPENDIX A: SUDS FEATURE APPRAISAL PRO-FORMA

The LLFA expect all SuDS features to be considered as part of a holistic approach to surface water management. To this end, the below pro-forma should be used as a guide at all stages of the design. The LLFA will expect this to be completed as part of planning applications.

Some developers and consultants also provide similar information as part of flood risk assessments or drainage strategy reports. The LLFA will accept this however it is important that such considers all features and provides suitable justification as to why features have or haven't been included.

It is recognised some features may only be considered later in the design as the layout/masterplan evolves alongside any landscape and planting plans. However, it is nonetheless important to ensure all features are considered early with this thinking recorded such that it can be returned to as the design evolves.

Feature:	Included: Yes / No
Green / Blue Roofs	To be considered at next stage of design: Yes / No
	Excluded: Yes / No
Reasons for & issues to be considered at next stage of design: • E.g. awaiting plot-level masterplan to determine location & quantum • E.g. awaiting detailed design levels	
Justification for exclusion: Cost prohibitive in structural design he character of the	

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Feature:	Included: Yes / No
Bio-Retention / Raingardens	To be considered at next stage of design: Yes / No
	Excluded: Yes / No
Reasons for & issues to be considered at next stage of design: • E.g. awaiting plot-level masterplan to determine location & quantum • E.g. awaiting detailed design levels	
Justification for exclusion: • E.g. Other planning constraints – would not be in keeping with the character of the area	

Feature:	Included: Yes / No
Filter Drains / Filter Strips	To be considered at next stage of design: Yes / No
	Excluded: Yes / No
Reasons for & issues to be considered at next stage of design: • Filter drains are currently not shown n the drainage drawing, however, following a detailed levels design such features should be considered if they can provide benefit •	
Justification for exclusion: • E.g. Other planning constraints – would not be in keeping with the character of the area	

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Feature:	Included: Yes / No
Tree Pits	To be considered at next stage of design: Yes / No
	Excluded: Yes / No

Reasons for & issues to be considered at next stage of design:

- If these can be successfully integrated within the external landscaping design (and also provide benefit) these should be considered
-

Justification for exclusion:

- E.g. Other planning constraints – would not be in keeping with the character of the area

Feature:	Included: Yes / No
Swales	To be considered at next stage of design: Yes / No
	Excluded: Yes / No

Reasons for & issues to be considered at next stage of design:

Site layout and levels are such that swales are not considered viable

Justification for exclusion:

- E.g. Other planning constraints – would not be in keeping with the character of the area

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Feature:	Included: Yes / No
Permeable Paving	To be considered at next stage of design: Yes / No
	Excluded: Yes / No

Reasons for & issues to be considered at next stage of design:

- E.g. awaiting plot-level masterplan to determine location & quantum
- E.g. awaiting detailed design levels

Justification for exclusion:

- E.g. Other planning constraints – would not be in keeping with the character of the area

Feature:	Included: Yes / No
Basins & Ponds	To be considered at next stage of design: Yes / No
	Excluded: Yes / No

Reasons for & issues to be considered at next stage of design:

Site layout and levels are such that ponds are not considered viable

Justification for exclusion:

- E.g. Other planning constraints – would not be in keeping with the character of the area

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Appendix 3: Topographical Survey

Not in scale

Appendix 4: Greenfield Calculations

ICP SUDS Mean Annual Flood

Input

Return Period (years)	2	Soil	0.450
Area (ha)	2.530	Urban	0.000
SAAR (mm)	700	Region Number	Region 4

Results	**l/s**
QBAR Rural	11.1
QBAR Urban	11.1
Q2 years	10.0
Q1 year	9.2
Q30 years	21.8
Q100 years	28.6

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Greenfield Runoff Volume

FSR Data

Return Period (years)	100
Storm Duration (mins)	360
Region	England and Wales
M5-60 (mm)	19.600
Ratio R	0.400
Areal Reduction Factor	1.00
Area (ha)	2.530
SAAR (mm)	700
CWI	95.280
Urban	0.000
SPR	47.000

Results

Percentage Runoff (%)	43.42
Greenfield Runoff Volume (m^3)	674.748

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Appendix 5: Drainage Drawings