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Flood Risk Assessment

Proposed Residential Development at

Barlestone Road, Newbold Verdon, Leicestershire, LE9 9PZ

November 2025

Preface

Property Address:	Land north of Barlestone Road, Newbold Verdon, Leicestershire. LE9 9PZ
NGR:	E: 445100 N: 304000
Existing Development	The site comprises an agricultural field, bounded by further greenspace and agricultural land to the north, west and east. Residential development borders the site to the south, with Barlestone Road running along the southern boundary of the site.
Proposed Development	Development of 67 new residential dwellings, including an access road, footways and landscaping.
Site Area:	Main development site – 2.99ha

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Project Number: 0528

Version Control:

Status:	Date:
Rev 2	November 2025

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Contents

Version Control

Version Control	
Date and Version	**Update**
October 2025 - Rev 0	Initial Issue
November 2025 – Rev 1	Report updated to new site layout
November 2025 – Rev 2	Site description updated.

1. Scope of Instruction and Brief

Objectives

1.1 Development Design Solutions (DDS) were commissioned by Wheeldon Brothers 1867 (the Client) to carry out a Flood Risk Assessment (FRA) to support a Outline planning application for the erection of up to 67 dwellings with associated landscaping, open space and drainage infrastructure (all matters reserved except for access). The purpose of the FRA is to demonstrate that this land is suitable for development in terms of flood risk.

Data Sources

1.2 This report is based upon a detailed review of the following readily available documentation:

- Leicestershire County Council, Preliminary Flood Risk Assessment (PFRA), June 2011;
- Leicestershire County Council, Local Flood Risk Management Strategy, Feb 2024;
- Hinckley & Bosworth Borough Council, Level 1 Strategic Flood Risk Assessment (SFRA), January 2025;
- Environment Agency (EA) online flood maps for planning;
- Severn Trent Water (STW) sewer record plans;
- Severn Trent Water (STW) Developer Enquiry response; and
- Codes for Adoption.

1.3 The findings and opinions conveyed in this report are based on information obtained from a variety of sources as detailed in the report and which DDS assumes to be reliable but have not been independently confirmed. Therefore, DDS cannot and does not guarantee the authenticity or reliability of third-party information it has relied upon.

Report Preparation

1.4 The revised National Planning Policy Framework published in Dec 2024 (NPPF) sets out the Government's planning policies on development in relation to flood risk. The Guidance on Flood Risk and Coastal Change provides advice on how to take account of and address the risks associated with flooding and coastal change in the planning process.

1.5 This FRA has been prepared in accordance with the requirements of the NPPF and the relevant guidance.

2. Site Description

Site Location

2.1 The proposed development site is situated off Barlestone Road, in Newbold Verdon, Leicestershire and comprises an agricultural field, bounded by further greenspace and agricultural land to the north, west and east. Residential development borders the site to the south. The site can be accessed from Barlestone Road which runs along the southern boundary of the site.

2.2 The site's general location is shown in Figure 1 below.

Figure 1: Site Location Plan

Site Description

2.3 At present, the site comprises an agricultural field. The site is generally a rectangular parcel of land with an approximate area of 2.99 hectares.

2.4 The proposed development site is located on the northern edge of the village of Newbold Verdon and is bounded by agricultural land to the north, east and west. Barlestone Road and residential development borders the south of the site. The wider area is predominantly agricultural fields and rural in character.

Topography

2.5 The topographical survey was carried out by BWB Consulting in July 2025 (drawing reference – 255555). The topographical survey shows that the site generally slopes from north to south. The existing ground level in the north west corner of the site is approximately 133.5mAOD, with levels falling away to approximately 132.0mAOD in the south-east corner of the site adjacent to Barlestone Road.

2.6 A copy of the topographical survey drawing can be found in **Appendix B.**

Geology

2.7 A Ground Investigation had not been undertaken for the development site at the time of writing, however, the Defra online 'Magic Map' identified that the site is located within a region of 'slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils'.

2.8 British Geological Survey (BGS) mapping indicates that the site is underlain by superficial Glaciofluvial deposits, comprising sand and gravel, which in turn are underlain by bedrock strata of the Edwalton Member comprising mudstone.

Hydrology and Hydrogeology

2.9 The Defra online 'Magic Map' identified that the site is located within a region designated as a 'Secondary – B' Aquifer.

2.10 "Secondary – B Aquifers" are mainly lower permeability layers that may store and yield limited amounts of groundwater through characteristics like thin cracks (called fissures) and openings or eroded layers**.**

2.11 The nearest surface water feature is the watercourse approximately 150m to the north of the site.

2.12 There are no existing ponds within the site.

Existing Site Drainage

2.13 Sewer records obtained from Severn Trent Water, show that there are no public sewers located within the site boundary. These records show that the residential development to the south is drained by separate foul and surface water sewers.

2.14 A CCTV survey of the existing public sewers was not made available at the time of writing this report.

2.15 The Severn Trent Water sewer records surrounding the site are included in **Appendix C**.

3. Development Proposals

3.1 The proposed development comprises 67 new residential houses, with associated roads, footways and landscaping. Highway access will be from a new junction on Barlestone Road.

3.2 The proposals include approximately 1.3ha total impermeable area (approximately 45% impermeable). The remainder of the site will be permeable surfacing, predominantly consisting of residential gardens and open landscaped areas with some areas of low-level shrub planting.

3.3 An extract of the illustrative masterplan is included in Figure 2 and the drawing is included in **Appendix A**.

Figure 2: Illustrative Masterplan

4. Flood Risk

4.1 This section identifies what potential sources of flooding could affect the site and includes further details on how flooding might occur.

Fluvial

4.2 The Environment Agency Statutory Main River Map indicates that the closest Main River to the subject site is Rothley Brook, approximately 2.6 km east of the development site.

4.3 The entirety of site is located within Environment Agency Flood Zone 1 (land having a less than 1 in 1,000 annual probability of river or sea flooding in any year). Refer to Figure 3 for the EA flood map.

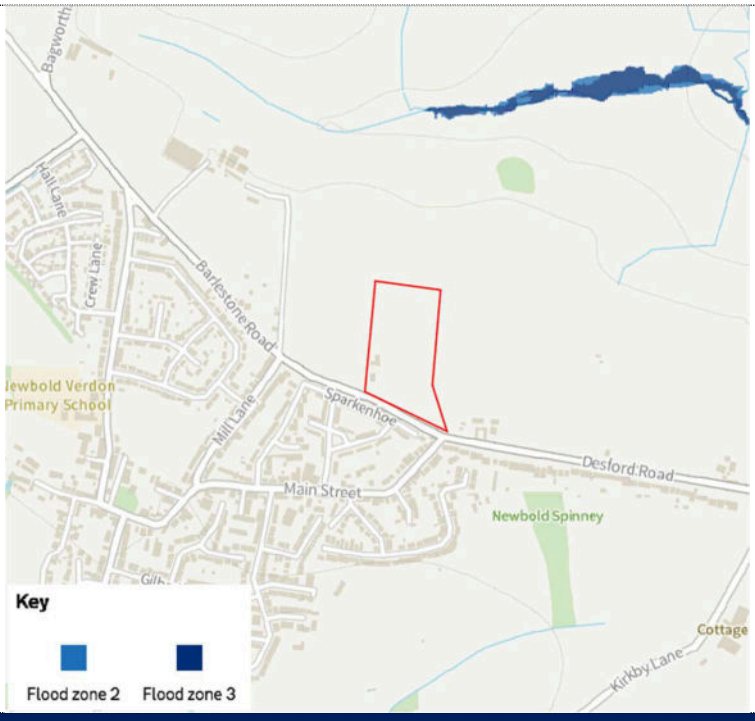

Figure 3: Environment Agency Flood Map

4.4 The Leicestershire County Council Preliminary Flood Risk Assessment and the Hinckley & Bosworth Borough Council Strategic Flood Risk Assessment do not have any records of flooding within the development site.

4.5 All development within the site will be located within Flood Zone 1, therefore, the risk of fluvial flooding to the development is 'low'.

Surface Water Flood Risk

4.6 The Government online flood warning information website on surface water flood risk (https://flood-warning-information.service.gov.uk/long-term-flood-risk/map) shows that the majority of the site is located within an area of ' low risk' of surface water flooding (see Figure 4).

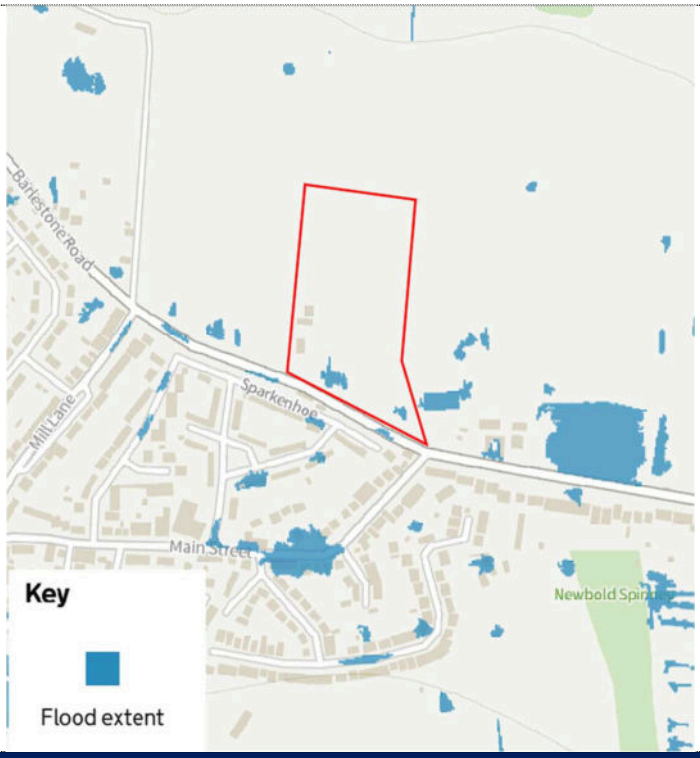

Figure 4: Surface Water Flood Map (source: https://flood-warning-information.service.gov.uk/long-term-flood-risk/map)

4.7 According to the surface water flood map, the isolated areas of flood risk identified along the southern boundary is associated with localised low spots. There are no other sources of surface water flooding other than these isolated low spots.

4.8 As per clause 175 of the new NPPF Dec 2024 (see below), this site-specific Flood Risk Assessment demonstrates that due to site levels being raised, no built development including the access, would be located within an area that would be at risk of flooding from any source, now and in the future. Therefore, we consider that the sequential test is not required.

> **175.** The sequential test should be used in areas known to be at risk now or in the future from any form of flooding, except in situations where a site-specific flood risk assessment demonstrates that no built development within the site boundary, including access or escape routes, land raising or other potentially vulnerable elements, would be located on an area that would be at risk of flooding from any source, now and in the future (having regard to potential changes in flood risk).

4.9 Any proposed dwellings adjacent to these existing areas of surface water flood risk, will have finished floor levels set at least 600mm above adjacent existing ground levels. This will ensure that the properties are not at risk from surface water flooding in the future.

4.10 Therefore, the risk of surface water flooding to the development is considered as 'low'.

Groundwater Flood Risk

4.11 Groundwater Investigation had not been undertaken for the development site at the time of writing, however, groundwater monitoring from the adjacent site recorded groundwater depths between 2.00m and 2.60m bgl.

4.12 The Leicestershire County Council SFRA and PFRA identify that the site is not located within areas having risk of groundwater flooding and there is no record of historic groundwater flooding incidents within the site.

4.13 Therefore, the risk of groundwater flooding to the site is considered as 'low'.

Flood Risk from Sewers

4.14 There are no public sewers located within the site. The nearest public surface and foul water sewers are located within the Barlestone Road to the south of the site.

4.15 Severn Trent Water have not highlighted any issues with sewer flooding in the area of the development, and the SFRA indicates no known historic flooding events.

4.16 The risk of sewer flood water entering the site is 'low'.

Reservoirs and Lakes

4.17 The Environment Agency Reservoir Flood Map shows that the site is not at risk of flooding from reservoirs.

4.18 There are no lakes located within the proximity of the site.

4.19 The risk of flooding from reservoirs and lakes is 'low'.

Artificial Sources

4.20 There are no canals located within the proximity of the site.

4.21 Therefore, the risk of flooding from canals is considered to be 'low'.

5. Surface Water Drainage Proposals

Guidance

5.1 This drainage design will be developed in accordance with the following national standards for guidance:

- CIRIA C753, The SuDS Manual, 2015;
- Environment Agency, Report – SC030219, Rainfall runoff management for developments, 2013;
- Building Regulations 2010, Part H, Drainage and Waste Disposal
- Codes for Adoption.

Basis of Design

5.2 The site has historically been used for agriculture. There is no existing drainage information for the agricultural field. Therefore, overall, the site is considered as greenfield in drainage terms.

5.3 The proposed development will result in a total impermeable area of approximately 1.3ha (approximately 45% impermeable). The remainder of the site will be permeable surfacing, predominantly consisting of residential gardens and landscaped areas with some areas of low-level shrub planting.

5.4 Therefore, the development will increase the rate and volume of surface water run-off compared with its existing condition. Surface water from the proposed impermeable areas needs to be managed so that it does not exacerbate existing or create new flood risk elsewhere during their intended lifetime using SuDS.

Design Criteria

5.5 In line with the National Standards for SuDS guidance, for greenfield developments, the peak run-off rate from the development to any highway drain, sewer, or surface water body for the 1 in 1 year, 1 in 30 year and the 1 in 100 year rainfall event should not exceed the peak greenfield runoff rates for the same events.

5.6 The LCC Highways design guide and National Standards for SuDS considers that any proposed surface water drainage system should consider flood risk to the development in the following flood events:

- The 1 in 30-year event – water should be stored in areas designated to hold and/or convey water;
- The 1 in 100-year event – no surface flooding, all flows are to be fully contained within the sewer network.
- Exceedance flow – events exceeding the 1 in 100-year event – So far as is reasonably practicable, flows are managed in exceedance routes that minimise the risks to people and property.

Discharge Hierarchy

5.7 The proposed surface water drainage system should follow the 'discharge hierarchy' as stated in the Buildings Regulations (Part H). The surface run-off should be disposed of as high up the hierarchy as is reasonably practicable:

- Infiltration and reuse;
- Surface water body;
- Surface water sewer, highway drain, or another drainage system; and
- Combined sewer.

Surface Water Strategy

5.8 Considering the site's geology to be predominantly underlain by Made Ground, Glacial Deposits and Mercia Mudstone, it is considered that the site soil condition is unlikely to be suitable for infiltration techniques as the preferred surface water discharge method.

5.9 Infiltration testing to BRE digest 365 has not been carried out to date on the scheme and comprehensive testing must be carried out to determine whether infiltration is viable to dispose of surface water.

5.10 In the absence of infiltration testing results, it is proposed to discharge all surface water flows from the site to the STW surface water network located within Barlestone Raod to the south.

5.11 Flows leaving the site will be restricted to a combined peak discharge rate of 5.75 l/s via a flow control device and attenuation will be provided by a detention basin.

5.12 A connection to an existing Severn Trent Water manhole will require S106 connection agreement with STW.

Estimate of Greenfield Rates

5.13 The greenfield run off rate for the site has been calculated using uksuds.com (by Wallingford) online calculator. Based on the proposed impermeable areas as part of the development, the Qbar rate calculated is **5.75 l/s** and is shown at **Appendix D**. The development should be restricted to this rate for all return periods up to the 100 year plus 40% for climate change.

Surface Water Attenuation

5.14 The proposed drainage strategy has been modelled using Causeway 'Flow' design software. A climate change allowance of 40% for peak rainfall intensity has been used and a 10% allowance of additional impermeable area to allow for the effects of Urban Creep on private areas.

5.15 The 'Flow' model has been run for the recommended return periods with various rainfall duration events to ensure that the proposed drainage system is adequate to safely drain the proposed development site.

5.16 Based on a peak discharge rate of 5.74 l/s, the 'Flow' model shows that, approximately 1,321m^3 of attenuation will be required for the 1 in 100 year event plus 40% allowance for climate change.

5.17 The results of the hydraulic calculations are included in **Appendix E**.

Proposed Surface Water Drainage System

5.18 Rainwater that falls on the roofs of the houses will be initially collected in high level rainwater gutters and rain water pipes and discharge to a below ground private drainage network.

5.19 Shared drives and private drives will be drained via gullies and channels and will be connected to a below ground drainage network.

5.20 The main adoptable roads will be drained by a traditional kerb and gully arrangement. The road gullies will be connected to the below ground carrier drain.

5.21 The proposed drainage strategy has been included in **Appendix F**.

Design for Exceedance

5.22 The surface water drainage design will take into consideration the potential for 'exceedance flows' in its formulation. Flood events up to the 100 year plus climate change event will be drained by the proposed drainage system reducing the hazard to people and the risk of property flooding.

5.23 The proposed levels of the buildings and the roads will be carefully designed to contain any overland flow within the highway corridor and routed away from buildings.

Water Quality

5.24 For the sustainable drainage assessment the pollution indices approach for discharge to surface water has been used, as outlined in Chapter 26 of the CIRIA SuDS Manual (C753).

5.25 This approach is used to select suitable SuDS components to ensure water quality of the surface water discharge effluents. Pollution hazards are given indices ranging from 0 (no pollution risk) to 1 (high pollution risk) for three key contaminant types. SuDS components are also given indices relative to the level of treatment they provide against each contaminant type. A drainage network is considered to provide adequate levels of water treatment if the SuDS mitigation indices are greater or equal to the pollution hazard indices for each contaminant type.

5.26 Based on the Table 26.2 CIRIA SuDS Manual (C753), the pollution hazard indices for residential roofs are 'very low' and the access roads and driveways are considered as 'low' (see table below). The levels of pollution risk from residential developments is relatively low, as outlined below. The guidance stipulates that where multiple sources of pollution apply, the land type with the highest pollution index should be considered.

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Residential Roofs	**Very Low**	0.2	0.2	0.05
Individual property driveways, general access roads	**Low**	0.5	0.4	0.4

5.27 As described above, Runoff from the development will initially be captured by trapped gullies installed in areas of private and adoptable hardstanding. These will provide pre-treatment prior to runoff reaching the SuDS features downstream, by capturing sediment that can be easily removed during periodic maintenance. SuDS mitigation indices are not given for trapped gullies, and for the purposes of this exercise they will not be considered in the following calculations.

Runoff will then be collected by the attenuation basin, the basin should be constructed using an engineered soil mix and planted with vegetation, to provide a water polishing effect as flows are conveyed through it.

SuDS Component	SuDS Mitigation Indices as per Table 26.3, SuDS Manual C753		
	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Detention Basin	**0.5**	**0.5**	**0.6**

5.28 We consider that the detention basin will capture silts, sediments and any accidental spillages. However, it is recommended that trapped road gullies and catch pits at the upstream of the attenuation basin are installed to capture silts, sediments and any accidental spillages.

5.29 The SIA assessment is therefore as follows;

	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Pollution Indices	0.5	0.4	0.4
Mitigation Indices	0.5	0.5	0.6
Outcome	**PASS**	**PASS**	**PASS**

5.30 The Simple Index Approach review confirms that the proposed SuDS components exceed the requirements for pollution control, based on the levels of pollution expected from the development. As such the drainage network is considered fit for purpose from a water quality standpoint.

5.31 It should be noted that the water quality performance of the surface water network is heavily dependent on maintenance; a robust maintenance regime should be put in place to ensure that all SuDS components are regularly inspected, cleaned of sediment and kept in good working order. It is proposed that the detention basin will be offered for adoption to STW under a S104 agreement.

Maintenance

5.32 The new surface water drainage system should be designed to reduce the need for maintenance as far as is reasonably practicable. To facilitate maintenance and repair of drainage features, consideration should be given to the provision of appropriate access routes for maintenance staff, plant and equipment.

5.33 It is recommended that the proposed surface and foul water drainage network/system is adopted and maintained by Severn Trent Water.

5.34 The following maintenance regime should be implemented for all on-site drainage structures/sewers.

- Gutters, rainwater pipes, outlets and gullies should be inspected and thoroughly cleaned once a year;
- All manholes should be inspected once a year and where necessary cleaned out at the same time. Any defects to the brickwork, benching or cover/frame should be made good. Attention should be made to the Confined Spaces Regulations 1997 and the provisions contained therein for access to confined spaces. Details for entering manholes are contained in the above legislation;
- The flow control device should be maintained as per the supplier's recommendations. In addition, this feature should be inspected after prolonged rainfall periods or after any extreme storm events; and

5.35 To maintain optimal performance of the attenuation features and reduce future risk of flooding, it is recommended that a management company is appointed to carry out a regular and robust maintenance regime for the balancing pond and the outfalls. The following maintenance regime should be implemented for these features, monthly or as required;

- Remove litter and debris.
- Cut grass, manage other vegetation and remove nuisance plants.
- Inspect inlets, outlets and overflows for blockages, and clear if required.
- Inspect inlets and facility surface for silt accumulation, establish appropriate silt removal frequencies.
- Remove and dispose of oils or petrol residues using safe standard practices.

Health and Safety Requirements

5.36 The new surface water drainage system should be designed with consideration to minimise health and safety risk to the public and to the maintenance staff. The depths of the chambers should be kept to a minimum and the need for man entry should be as minimum as reasonably practicable.

Foul Water Strategy

5.37 The proposed development will be drained by a separate foul water drainage system. Foul water connection pipes from each residential house will discharge to a below ground carrier drain. This carrier drain will discharge into the STW foul manhole 1901 located within Barlestone Road to the south.

5.38 The developer enquiry response from STW confirmed the flows from the site can be accommodated within the existing foul network. And the invert levels provided suggest that a gravity connection from the site will be possible.

Severn Trent Water Requirements

5.39 A Severn Trent Water Developer Enquiry has been applied for and is shown at **Appendix C.**

5.40 The proposed foul water connections into public sewers will require applications to Severn Trent Water under Section 106 of the Water Industry Act 1991.

6. Conclusions

6.1 Development Design Solutions (DDS) were commissioned by Wheeldon Brothers 1867 (the Client) to carry out a Flood Risk Assessment (FRA) to support an Outline planning application for the erection of up to 67 dwellings with associated landscaping, open space and drainage infrastructure (all matters reserved except for access). The purpose of the FRA is to demonstrate that this land is suitable for development in terms of flood risk.

6.2 The Flood Risk Assessment has been prepared in accordance with the National Planning Policy Framework and local and national policies on SuDS in respect of the proposed scheme of development.

6.3 Following the completion of this assessment, the following conclusions can be drawn:

- The Environment Agency Flood Maps show that the entire site is located within Flood Zone 1 (less than 1 in 1000 annual probability of river flooding in any given year).
- The Environment Agency Surface Water Flood Maps show that there are isolated areas of the site with low to high risk of surface water flooding. These are associated with localise low spots adjacent to the southern boundary. Any dwellings located adjacent these areas will have finished floor levels set a minimum of 600mm above existing ground levels.
- The risk of flooding to the site from other sources is low.

6.4 Overall it is deemed that with careful design of site levels and surface water drainage the flood risk to the site is low.

6.5 Surface water from the proposed development will be drained by a SuDS scheme with peak discharge limited to greenfield rates and on-site attenuation provided to accommodate flood water within the site for storm events up to 1 in 100 year plus 40% allowance for climate change. The limited peak flow from the development of 5.75l/s will be discharged to the existing STW surface water sewer located to the south of the site within Barlestone Road.

6.6 Foul water from the proposed development will be drained by a separate drainage network that will discharge to the existing STW foul sewer located within Barlestone Road to the south.

6.7 The foul and storm water connections into the public sewers will require a Section 106 application to Severn Trent Water under the Water Industry Act 1991.

6.8 This Flood Risk Assessment report should be submitted to support the planning application.

Appendix A – Illustrative Masterplan

0 10 20 metres

N

- Site Boundary: **Aprx. 3.0ha**
- Proposed new homes: **Aprx. 1.99ha Up to 67 dwellings @ 33.5dph**
- Tree-lined primary street
- Secondary street
- Lanes & Private drives
- Natural Play Trail features
- Children's Play Space **LAP |** 'Local Area for Play'
- Existing vegetation
- New native tree, thicket and species-rich wildflower planting
- SuDS Basins
- Public Footpaths
- Proposed vehicular/ pedestrian/cycle access
- Potential pedestrian link
- Proposed footway/cycleway
- Proposed drop curb crossing
- Toucan crossing proposed by adjacent appplication (24/01061/OUT)

Rev	Date	By	Description

CSA environmental

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Project	Land north of Barlestone Road **NEWBOLD VERDON**
Drawing Title	Illustrative Masterplan
Client	Wheeldon 1867
Scale @ A1 1:500	Drawing No. 7625_109
Date Oct 2025	Rev B
Drawn DF	Checked RC

Appendix B – Topographical Survey

Station Coordinates

Station Name	Eastings (m)	Northings (m)	Height (m)
BWB01	445180.789	303870.927	131.890
BWB02	445287.879	303840.807	131.731
BWB03	444901.499	303990.006	132.439

Notes

1. Do not scale this drawing. All dimensions must be checked/ verified on site. If in doubt ask.
2. This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.
3. All dimensions in metres unless noted otherwise. All levels in metres unless noted otherwise.
4. Any discrepancies noted on site are to be reported to the engineer immediately.
5. 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.
6. 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.
7. All manhole data is collected from ground level therefore discrepancies may occur. More accurate data is only achievable via confined space entry.
8. 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
0.25 Flow direction and pipe diameter
1 Station and Name
BH 1 Monitoring Borehole
Tree / Bush / Sapling
Area of Vegetation/ Extent of Tree Canopy
Hedge
Body of Water
Body of Water from OS
+50.00 Spot Level
Assumed Surface Water Drainage Line
Surface Water Drainage Line

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 Post	FPW	Fence Post & Wire	SP	Sign Post
		FSP	Fence Steel Palisade	ST	Stop Tap
CCTV	Security Camera	FWM	Fence Wire Mesh	SV	Stop Valve
CTV	Cable TV	FFL	Finished Floor Level	TCB	Telephone Call Box
DC	Drainage Channel	FP	Flagpole		
		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

Rev	Date	Details of issue / revision	Drw	Rev
P1	03.07.25	First Issue	SDS	PQ

Issues & Revisions

BWB
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- ☐ London | 020 7407 3879
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Client

Fisher German LLP

Project Title

North of Barlestone Road, Newbold Verdon

Drawing Title

Existing Site Plan Sheet 1 of 2

Drawn:	S. D. Shreeves	Reviewed:	P. Quelch
BWB Ref:	255555	Date: 03.07.25	Scale@A1: 1:500

Drawing Status

INFORMATION

Project - Originator - Zone - Level - Type - Role - Number	Status	Rev
255555-BWB-00-01-DR-G-001	S2	P1

Station Coordinates			
Station Name	Eastings (m)	Northings (m)	Height (m)
BWB01	445180.789	303870.927	131.890
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BWB03	444901.499	303990.006	132.439

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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
0.25 / 1 — Flow direction and pipe diameter
Station and Name
BH 1 — Monitoring Borehole
Tree / Bush / Sapling
Area of Vegetation/ Extent of Tree Canopy
Hedge
Body of Water
Body of Water from OS
+50.00 — Spot Level
Assumed Surface Water Drainage Line
Surface Water Drainage Line

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 Post	FPW	Fence Post & Wire	SP	Sign Post
		FSP	Fence Steel Palisade	ST	Stop Tap
CCTV	Security Camera	FWM	Fence Wire Mesh	SV	Stop Valve
CTV	Cable TV	FFL	Finished Floor Level	TCB	Telephone Call Box
DC	Drainage Channel	FP	Flagpole	THL	Threshold Level
DK	Drop Kerb	Gas	Gas	TL	Traffic Light
DP	Down Pipe	GV	Gas Valve	TP	Telegraph Post
Elec	Electric	GY	Gully	TS	Traffic Signal
EP	Electricity Post	Ht	Height	UTS	Unable to Survey
ER	Earth Rod	IC	Inspection Chamber	WL	Water Level
FH	Fire Hydrant	IFL	Internal Floor Level	WM	Water Meter
FL	Floodlight	IL	Invert Level (as a reduced level)	WO	Wash Out

Rev	Date	Details of issue / revision	Drw	Rev
P1	03.07.25	First Issue	SDS	PQ

Issues & Revisions

BWB A CAF GROUP COMPANY
Birmingham | 0121 233 3322
Leeds | 0113 233 8000
London | 020 7407 3879
Manchester | 0161 233 4260
Nottingham | 0115 924 1100
www.bwbconsulting.com

Client
Fisher German LLP

Project Title
North of Barlestone Road, Newbold Verdon

Drawing Title
Existing Site Plan Sheet 2 of 2

Drawn:	S. D. Shreeves		Reviewed:	P. Quelch	
BWB Ref:	255555	Date:	03.07.25	Scale@A1:	1:500

Drawing Status
INFORMATION

Project - Originator - Zone - Level - Type - Role - Number	Status	Rev
255555-BWB-00-02-DR-G-001	**S2**	**P1**

C:\Surveys\Surveys\2025\NEWBOLD VERDON\255555-BWB-00-ZZ-M2-G-001-Existing-Site-2D-Model.dwg

Appendix C – Severn Trent Water Correspondence

WONDERFUL ON TAP

SEVERN TRENT

Severn Trent Water Ltd
Oxley Moor Road
Wolverhampton
WV9 5HN

www.stwater.co.uk
network.solutions@severntrent.co.uk

Contact: Michael Taylor
Tel. 07769881839
Reference: 1156393

Nick Nenadovic
Unit 19 Greenbox
Westonhall Road
Stoke Prior
Bromsgrove
B60 4AL

8th August 2025

Dear Nick

Proposed Development: - 60 Dwelling -Barleston Rd Newbold Verdon

X-445100 Y-304000

I refer to your 'Development Enquiry Request' for the proposed 60 dwelling development in respect of the above-named site. Please find enclosed the sewer records that are included in the fee together with the Supplementary Guidance Notes (SGN) which refer to surface water disposal from development sites.

Public Sewers in Site – Required Protection

Due to a change in legislation on 1 October 2011 there may be former private sewers on the site which have transferred to the responsibility of Severn Trent Water Ltd, which are not shown on the statutory sewer records, but are in your client's land.

Foul Water Drainage

The proposed development would create additional flows of approx. 0.94l/s 2xdwf gravity flows.
The nearest suitable foul sewer is located to the south east of the site connection to m/h m/h 1801 225mm foul sewer .

The network would be suitable with sufficient capacity to receive the additional flows, with no adverse effect on the existing network.
All connections, via new or existing connections are subject to S106 sewer connection applications.

WONDERFUL ON TAP

SEVERN TRENT

Surface Water Drainage

Under the terms of Section H of the Building Regulations 2000, the disposal of surface water by means of soakaways should be considered as the primary method. If these are found to be unsuitable, satisfactory evidence will need to be submitted. The evidence should be either percolation test results or by the submission of a statement from the SI consultant (extract or a supplementary letter).

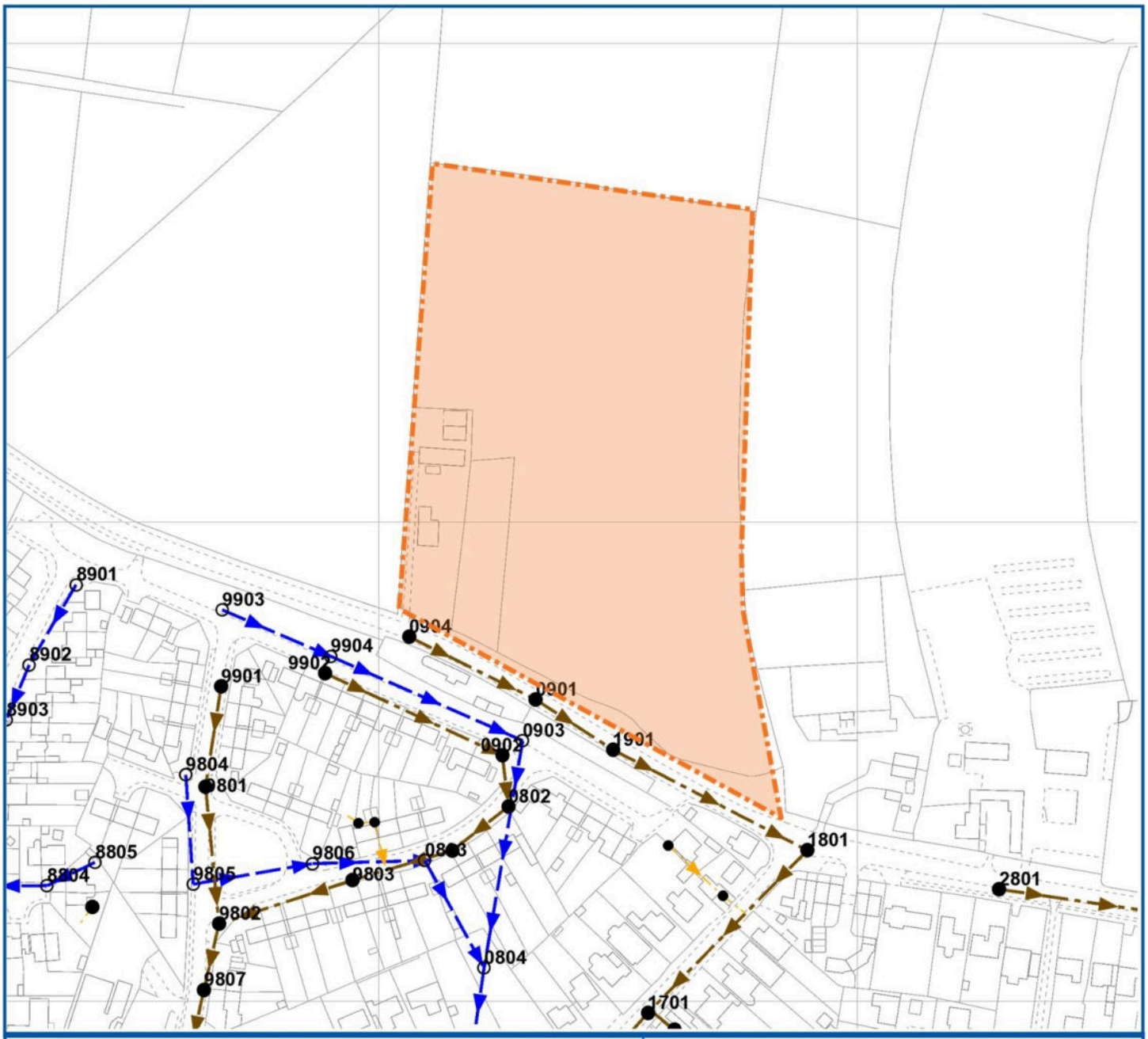
Should Soakaways prove to be unfeasible for the development, then a connection to a watercourse /ditch course would be appropriate as the next option. @ 5l/s/ha greenfield rates would be acceptable, with flows to be agreed with the LLFA, If all these options are proven not possible then a connection to the 150mm surface water sewer to the south m/h 0903 would be considered, dependant on required flows and the limited capacity of the sewer in question, it maybe , that modelling maybe required to understand the level of impact the proposals may have on the downstream network.

For any new connections (including the re-use of existing connections) to the public sewerage system, the developer will need to submit a Section 106 application form. Our Developer Services department are responsible for handling all new connections enquiries and applications. To contact them for an application form and associated guidance notes please call 0800 7076600 or download from www.stwater.co.uk.

Please quote reference 1156393 in any future correspondence (including e-mails) with STW Limited. Please note that Developer Enquiry responses are only valid for 6 months from the date of this letter.

Yours sincerely

Michael Taylor
Senior Evaluation Technician
Network Solutions



LEGEND

Operational Site

Waste Water Pump
- Transferred Asset
- S24
- S104
- S102
- Null Private
- Null
- None
- Highway Drain
- Adopted Sewer

Storage
- Disposal Site
- Off-Line Waste Water Storage
- On-Line Waste Water Storage
- Wet Well

Waste Water Process Structure
- Sewage Treatment Point
- Sewage Treatment Structure
- Sludge Treatment Point
- Sludge Treatment Structure

Manhole
- Foul Bifurcation Manhole
- Combined Bifurcation Manhole
- Surface Water Bifurcation Manhole
- Dual Manhole
- Foul Single Manhole
- Combined Single Manhole
- Surface Water Single Manhole
- Twin Manhole
- Foul Adopted Manhole
- Combined Adopted Manhole
- Surface Adopted Manhole
- Transferred Manhole
- Unsurveyed Manhole

Gravity Sewer Pipe
- Foul Gravity Sewer
- Combined Gravity Sewer
- Surface Water Gravity Sewer
- S104 Surface Water Gravity Sewer
- S104 Combined Gravity Sewer
- S104 Foul Gravity Sewer
- Private Surface Water Gravity Sewer
- Private Combined Gravity Sewer
- Private Foul Gravity Sewer
- Surface Water Unsurveyed Pipe
- Combined Unsurveyed Pipe
- Foul Unsurveyed Pipe
- Transferred Surface Water Sewer
- Transferred Combined Sewer
- Transferred Foul Sewer
- Disposal Pipe
- Overflow Pipe
- Culverted Water Course
- Waste Internal Site Pipe
- Sewer Service Connection
- Gravity Sewer Others

Pressure Sewer Pipe
- Surface Water Pressure Sewer
- Combined Pressure Sewer
- Foul Pressure Sewer
- S104 Surface Water Pressure Sewer
- S104 Combined Pressure Sewer
- S104 Foul Pressure Sewer
- Private Surface Water Pressure Sewe
- Private Combined Pressure Sewer
- Private Foul Pressure Sewer
- Surface Water Vacuum Sewer
- Foul Vacuum Sewer
- Combined Vacuum Sewer
- S104 Surface Water Vacuum Sewer
- S104 Combined Vacuum Sewer
- S104 Foul Vacuum Sewer
- Private Surface Water Vaccum Sewer
- Private Combined Vacuum Sewer
- Private Foul Vacuum Sewer
- Surface Water Siphon
- Combined Siphon
- Foul Siphon
- Private Surface Water Siphon
- Private Combined Siphon
- Private Foul Siphon
- S104 Surface Water Siphon
- S104 Combined Siphon
- S104 Foul Siphon
- Surface Water Unsurveyed Pipe
- Combined Unsurveyed Pipe
- Foul Unsurveyed Pipe
- Disposal Pipe

Service Pipe
- Surface Water Lateral Drain
- Combined Lateral Drain
- Foul Lateral Drain
- S104 Surface Water Lateral Drain
- S104 Combined Lateral Drain
- S104 Foul Lateral Drain
- Private Surface Water Lateral Drain
- Private Combined Lateral Drain
- Private Foul Lateral Drain
- Transferred Surface Water Lateral Dra
- Transferred Combined Lateral Drain
- Transferred Foul Lateral Drain

Pressure Sewer Annotation

Gravity Sewer Annotation

Service Sewer Annotation

Ancillary
- Balancing Lagoon
- Grease Trap
- Interceptor
- Screen

Chamber
- Flushing Chamber
- Soakaway
- Overflow

Fitting
- Blind Shaft
- Facility Connector
- Head Node
- Lamphole
- Sewerage Air Valve
- Sewerage Chemical Injection Point
- Sewerage Hatch Box
- Sewerage Pressure Washout
- Vent Column
- Waste Water Outfall

Control Valve
- Hydrobrake
- Penstock
- Sewerage Isolation Valve
- Sewerage Non Return Valve

Manhole Annotation

Print200mLine

Severn Trent Water Limited
Asset Data Management
PO Box 5344
Coventry
CV3 9FT
Telephone: 0345 601 6616

SEWER RECORD

O/S Map Scale: 1:2,500

This map is centred upon:

Date of Issue: 08-08-25

X: 445080.75 **Y:** 304001.65

Disclaimer Statement:

1 Do not scale off this Map.

2 This plan and any information supplied with it is furnished as a general guide, is only valid at the date of issue and no warranty as to its correctness is given or implied. In particular this plan and any information shown on it must not be relied upon in the event of any development or works (including but not limited to excavations) in the vicinity of SEVERN TRENT WATER assets or for the purposes of determining the suitability of a point of connection to the sewerage or distribution systems.

3 On 1 October 2011 most private sewers and private lateral drains in Severn Trent Water's sewerage area, which were connected to a public sewer as at 1 July 2011, Transferred to the ownership of Severn Trent Water and became public sewers and public lateral drains. A further transfer takes place on 1 October 2012. Private pumping stations, which form part of these sewers or lateral drains, will transfer to ownership of Severn Trent Water on or before 1 October 2016. Severn Trent Water does not possess complete records of these assets. These assets may not be displayed on the map.

5 Ordnance Survey licence number: **AC0000808122**

6 Document users other than SEVERN TRENT WATER business users are advised that this document is provided for reference purpose only and is subject to copyright, therefore, no further copies should be made from it.

Sewer Node Sewer Pipe Data

Reference	Cover Level	Invert Level Upstream	Invert Level Downstream	Purpose	Material	Pipe Shape	Max Size	Min Size	Gradient	Year Laid
SK44038901	132.3899	130.81	<UNK>	S	VC	C	225	<UNK>	0	31/12/1899 00:00:00
SK45031702	131.0599	129.87	<UNK>	S	VC	C	225	<UNK>	0	31/12/1899 00:00:00
SK44039609	131.4499	129.42	<UNK>	F	VC	C	150	<UNK>	0	31/12/1899 00:00:00
SK45031752	<UNK>	0	0	F	VC	C	<UNK>	<UNK>	0	31/12/1899 00:00:00
SK45030804	<UNK>	<UNK>	<UNK>	S	<UNK>	<UNK>	<UNK>	<UNK>	0	31/12/1899 00:00:00
SK45031703	<UNK>	<UNK>	<UNK>	F	<UNK>	<UNK>	<UNK>	<UNK>	<UNK>	30/05/2016 00:00:00
SK44039610	131.1999	130.26	<UNK>	S	VC	C	150	<UNK>	0	31/12/1899 00:00:00
SK44038802	132.2799	130.73	<UNK>	F	VC	C	<UNK>	<UNK>	0	31/12/1899 00:00:00
SK45031750	<UNK>	<UNK>	<UNK>	F	VC	C	<UNK>	<UNK>	<UNK>	30/05/2016 00:00:00
SK45031757	<UNK>	<UNK>	<UNK>	F	VC	C	<UNK>	<UNK>	0	31/12/1899 00:00:00
SK44039703	130.7599	129.79	<UNK>	S	VC	C	225	<UNK>	0	31/12/1899 00:00:00
SK44039801	131.1399	129.85	<UNK>	F	VC	C	225	<UNK>	0	31/12/1899 00:00:00
SK45030701	130.15	128.43	<UNK>	F	VC	C	<UNK>	<UNK>	0	31/12/1899 00:00:00
SK44038903	132.32	130.72	<UNK>	S	VC	C	225	<UNK>	0	31/12/1899 00:00:00
SK44039702	130.58	128.95	<UNK>	F	VC	C	225	<UNK>	0	31/12/1899 00:00:00
SK44038701	131.16	129.37	<UNK>	F	VC	C	225	<UNK>	0	31/12/1899 00:00:00
SK45031701	131.2899	<UNK>	<UNK>	F	VC	<UNK>	<UNK>	<UNK>	0	31/12/1899 00:00:00
SK45031801	131.7299	129.89	<UNK>	F	VC	C	<UNK>	<UNK>	0	31/12/1899 00:00:00
SK45030904	132.0399	130.36	<UNK>	F	VC	C	225	<UNK>	0	31/12/1899 00:00:00
SK44039805	131.0299	129.99	<UNK>	S	VC	C	150	<UNK>	0	31/12/1899 00:00:00
SK45030902	131.8	130.45	<UNK>	F	VC	C	150	<UNK>	0	31/12/1899 00:00:00
SK45030802	131.49	130.33	<UNK>	F	VC	C	225	<UNK>	0	31/12/1899 00:00:00
SK44039901	131.61	130.06	<UNK>	F	VC	C	150	<UNK>	0	31/12/1899 00:00:00
SK44039601	131.47	130.51	<UNK>	S	VC	C	150	<UNK>	0	31/12/1899 00:00:00
SK45030801	131.3099	130.12	<UNK>	F	VC	C	225	<UNK>	0	31/12/1899 00:00:00
SK45031901	131.7899	129.92	<UNK>	F	VC	C	225	<UNK>	0	31/12/1899 00:00:00
SK44039701	130.63	129.12	<UNK>	F	VC	C	225	<UNK>	0	31/12/1899 00:00:00
SK44039807	130.86	129.42	<UNK>	F	VC	C	225	<UNK>	0	31/12/1899 00:00:00
SK44039704	131	129.23	<UNK>	F	VC	C	150	<UNK>	0	31/12/1899 00:00:00
SK45030803	131.1699	129.64	<UNK>	S	VC	C	150	<UNK>	0	31/12/1899 00:00:00
SK44038902	132.22	130.79	<UNK>	S	VC	C	225	<UNK>	0	31/12/1899 00:00:00
SK45030903	131.85	130.16	<UNK>	S	VC	C	150	<UNK>	0	31/12/1899 00:00:00
SK44039804	131.21	130.32	<UNK>	S	VC	C	150	<UNK>	0	31/12/1899 00:00:00
SK44039802	131.0299	129.58	<UNK>	F	VC	C	225	<UNK>	0	31/12/1899 00:00:00
SK44039904	131.85	130.62	<UNK>	S	VC	C	150	<UNK>	0	31/12/1899 00:00:00
SK44039603	131.4299	130.36	<UNK>	S	VC	C	150	<UNK>	0	31/12/1899 00:00:00
SK45030703	130.1999	129.12	<UNK>	S	CO	C	375	<UNK>	0	31/12/1899 00:00:00
SK44039903	131.88	131.08	<UNK>	S	VC	C	150	<UNK>	0	31/12/1899 00:00:00
SK44038805	132.07	131.16	<UNK>	S	VC	C	225	<UNK>	0	31/12/1899 00:00:00
SK44039803	131.11	129.94	<UNK>	F	VC	C	225	<UNK>	0	31/12/1899 00:00:00
SK44039902	131.91	130.91	<UNK>	F	VC	C	150	<UNK>	0	31/12/1899 00:00:00

Sewer Node Sewer Pipe Data

Reference	Cover Level	Invert Level Upstream	Invert Level Downstream	Purpose	Material	Pipe Shape	Max Size	Min Size	Gradient	Year Laid
SK44039602	131.42	129.62	<UNK>	F	VC	C	<UNK>	<UNK>	0	31/12/1899 00:00:00
SK45030702	130.36	128.573	<UNK>	F	VC	C	<UNK>	<UNK>	0	31/12/1899 00:00:00
SK44038801	132.2599	130.51	<UNK>	F	VC	C	<UNK>	<UNK>	0	31/12/1899 00:00:00
SK44039806	131.0599	129.71	<UNK>	S	VC	C	150	<UNK>	0	31/12/1899 00:00:00
SK44038804	132.07	130.95	<UNK>	S	VC	C	225	<UNK>	0	31/12/1899 00:00:00
SK44039705	130.77	129.88	<UNK>	S	VC	C	150	<UNK>	0	31/12/1899 00:00:00
SK45030901	132	130.07	<UNK>	F	VC	C	225	<UNK>	0	31/12/1899 00:00:00
SK45032801	131.82	130.28	<UNK>	F	CO	C	225	<UNK>	0	31/12/1899 00:00:00
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<UNK>	<UNK>	<UNK>	<UNK>	F	VC	<UNK>	<UNK>	<UNK>	<UNK>	17/08/2019 00:00:00
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Appendix D – Greenfield Runoff Rate Estimation

Greenfield runoff rate estimation tool

www.uksuds.com | Greenfield runoff rate estimation tool (https://www.uksuds.com/)

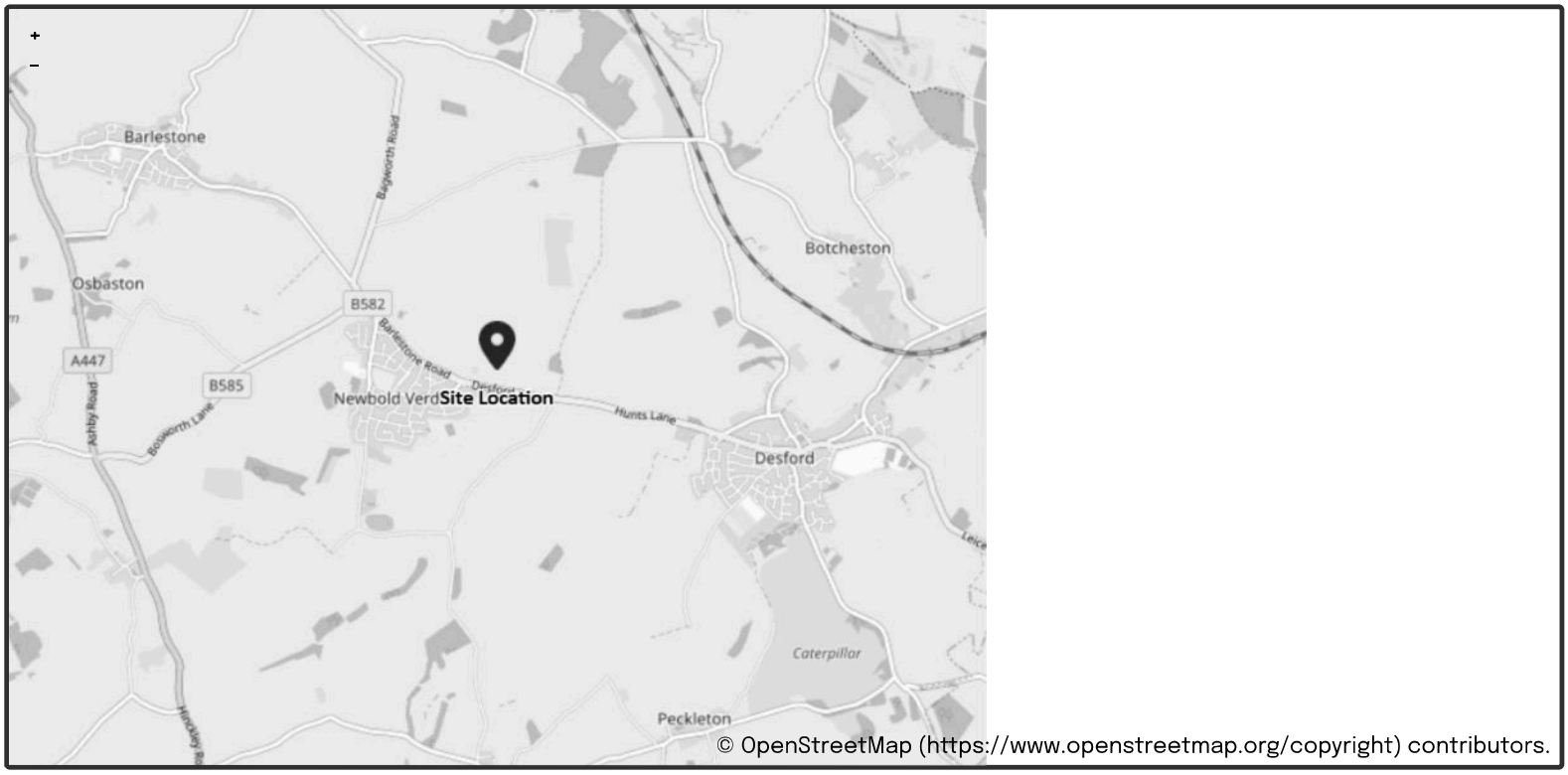
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Project details

Date	13/08/2025
Calculated by	
Reference	
Model version	2.1.2

Location

Site name	Barlestone Road
Site location	Newbold Verdon



Site easting (British National Grid)	445455
Site northing (British National Grid)	303794

Site details

Total site area (ha)	1.3 ha

Greenfield runoff

Method

Method	IH124

IH124

	My value		Map value
SAAR (mm)	649 mm		649
How should SPR be derived?	WRAP soil type		
WRAP soil type	4		4
SPR	0.47		
QBar (IH124) (l/s)	5.74 l/s		

Growth curve factors

	My value		Map value
Hydrological region	4		4
1 year growth factor	0.83		
2 year growth factor	0.89		
10 year growth factor	1.49		
30 year growth factor	2		
100 year growth factor	2.57		
200 year growth factor	3.04		

Results

Method	IH124	
Flow rate 1 year (l/s)	4.8	l/s
Flow rate 2 year (l/s)	5.1	l/s
Flow rate 10 years (l/s)	8.6	l/s
Flow rate 30 years (l/s)	11.5	l/s
Flow rate 100 years (l/s)	14.8	l/s
Flow rate 200 years (l/s)	17.5	l/s

Please note runoff estimation is subject to significant uncertainty. Results are therefore normally reported to only 1 decimal place. Where 2 decimal places are provided, this does not indicate accuracy to this level, it has been adopted to prevent 'zero' figures from being reported. Outputs less than 0.01 l/s are reported as 0.01 l/s.

Disclaimer

Appendix E – Drainage Calculations

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	1.000
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S1	0.100	5.00	133.347	1200	445089.754	304126.827	1.572
S2	0.100	5.00	133.140	1200	445083.111	304084.291	1.618
S3	0.100	5.00	133.045	1350	445076.506	304067.546	1.673
S14	0.100	5.00	133.234	1200	445028.253	304061.038	1.547
S4	0.100	5.00	132.990	1500	445075.732	304058.067	1.883
S15	0.100	5.00	133.266	1200	445136.966	304024.959	1.525
S16	0.100	5.00	133.080	1350	445138.232	304048.813	1.555
S17	0.100	5.00	132.901	1350	445091.911	304050.352	1.644
S5	0.100	5.00	132.939	1800	445080.426	304047.137	2.032
S6	0.100	5.00	132.851	1800	445078.268	304006.592	2.025
S7	0.100	5.00	132.783	1800	445076.286	303966.096	2.038
S8	0.100	5.00	132.740	1800	445073.458	303955.725	2.016
S9	0.100	5.00	132.368	1800	445086.719	303946.865	1.758
S10		5.00	132.380	1800	445083.683	303940.175	1.780
S11			132.259	3000	445077.974	303935.248	1.674
S12			132.070	1200	445064.818	303922.323	1.669
S13			131.850	1200	445058.827	303908.444	1.600

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	S1	S2	43.052	0.600	131.775	131.522	0.253	170.0	300	5.60	50.0
1.001	S2	S3	18.000	0.600	131.522	131.447	0.075	240.0	300	5.89	50.0
1.002	S3	S4	9.511	0.600	131.372	131.332	0.040	240.0	375	6.03	50.0
2.000	S14	S4	47.572	0.600	131.687	131.407	0.280	170.0	300	5.66	50.0
1.003	S4	S5	11.895	0.600	131.107	131.057	0.050	240.0	600	6.16	50.0
3.000	S15	S16	23.887	0.600	131.741	131.600	0.141	170.0	300	5.33	50.0
3.001	S16	S17	46.347	0.600	131.525	131.332	0.193	240.0	375	5.99	50.0
3.002	S17	S5	11.926	0.600	131.257	131.207	0.050	240.0	450	6.15	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.203	85.0	18.1	1.272	1.318	0.100	0.0	93	0.961
1.001	1.010	71.4	36.1	1.318	1.298	0.200	0.0	151	1.013
1.002	1.165	128.7	54.2	1.298	1.283	0.300	0.0	170	1.116
2.000	1.203	85.0	18.1	1.247	1.283	0.100	0.0	93	0.961
1.003	1.567	443.1	90.4	1.283	1.282	0.500	0.0	183	1.242
3.000	1.203	85.0	18.1	1.225	1.180	0.100	0.0	93	0.961
3.001	1.165	128.7	36.1	1.180	1.194	0.200	0.0	135	1.004
3.002	1.308	208.0	54.2	1.194	1.282	0.300	0.0	156	1.106

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.004	S5	S6	40.603	0.600	130.907	130.826	0.081	500.0	750	6.70	50.0
1.005	S6	S7	40.545	0.600	130.826	130.745	0.081	500.0	750	7.24	50.0
1.006	S7	S8	10.749	0.600	130.745	130.724	0.021	500.0	750	7.39	50.0
1.007	S8	S9	15.948	0.600	130.724	130.692	0.032	500.0	750	7.60	50.0
1.009	S10	S11	7.541	0.600	130.600	130.585	0.015	500.0	750	5.10	50.0
1.010	S11	S12	18.442	0.600	130.585	130.401	0.184	100.0	150	5.41	50.0
1.011	S12	S13	15.118	0.600	130.401	130.250	0.151	100.0	150	5.66	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.004	1.244	549.7	162.6	1.282	1.275	0.900	0.0	278	1.090
1.005	1.244	549.7	180.7	1.275	1.288	1.000	0.0	295	1.121
1.006	1.244	549.7	198.8	1.288	1.266	1.100	0.0	311	1.148
1.007	1.244	549.7	216.8	1.266	0.926	1.200	0.0	326	1.174
1.009	1.244	549.7	0.0	1.030	0.924	0.000	0.0	0	0.000
1.010	1.005	17.8	0.0	1.524	1.519	0.000	0.0	0	0.000
1.011	1.005	17.8	0.0	1.519	1.450	0.000	0.0	0	0.000

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	43.052	170.0	300	Circular	133.347	131.775	1.272	133.140	131.522	1.318
1.001	18.000	240.0	300	Circular	133.140	131.522	1.318	133.045	131.447	1.298
1.002	9.511	240.0	375	Circular	133.045	131.372	1.298	132.990	131.332	1.283
2.000	47.572	170.0	300	Circular	133.234	131.687	1.247	132.990	131.407	1.283
1.003	11.895	240.0	600	Circular	132.990	131.107	1.283	132.939	131.057	1.282
3.000	23.887	170.0	300	Circular	133.266	131.741	1.225	133.080	131.600	1.180
3.001	46.347	240.0	375	Circular	133.080	131.525	1.180	132.901	131.332	1.194
3.002	11.926	240.0	450	Circular	132.901	131.257	1.194	132.939	131.207	1.282
1.004	40.603	500.0	750	Circular	132.939	130.907	1.282	132.851	130.826	1.275
1.005	40.545	500.0	750	Circular	132.851	130.826	1.275	132.783	130.745	1.288
1.006	10.749	500.0	750	Circular	132.783	130.745	1.288	132.740	130.724	1.266
1.007	15.948	500.0	750	Circular	132.740	130.724	1.266	132.368	130.692	0.926
1.009	7.541	500.0	750	Circular	132.380	130.600	1.030	132.259	130.585	0.924

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S1	1200	Manhole	Adoptable	S2	1200	Manhole	Adoptable
1.001	S2	1200	Manhole	Adoptable	S3	1350	Manhole	Adoptable
1.002	S3	1350	Manhole	Adoptable	S4	1500	Manhole	Adoptable
2.000	S14	1200	Manhole	Adoptable	S4	1500	Manhole	Adoptable
1.003	S4	1500	Manhole	Adoptable	S5	1800	Manhole	Adoptable
3.000	S15	1200	Manhole	Adoptable	S16	1350	Manhole	Adoptable
3.001	S16	1350	Manhole	Adoptable	S17	1350	Manhole	Adoptable
3.002	S17	1350	Manhole	Adoptable	S5	1800	Manhole	Adoptable
1.004	S5	1800	Manhole	Adoptable	S6	1800	Manhole	Adoptable
1.005	S6	1800	Manhole	Adoptable	S7	1800	Manhole	Adoptable
1.006	S7	1800	Manhole	Adoptable	S8	1800	Manhole	Adoptable
1.007	S8	1800	Manhole	Adoptable	S9	1800	Manhole	Adoptable
1.009	S10	1800	Manhole	Adoptable	S11	3000	Manhole	Adoptable

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.010	18.442	100.0	150	Circular	132.259	130.585	1.524	132.070	130.401	1.519
1.011	15.118	100.0	150	Circular	132.070	130.401	1.519	131.850	130.250	1.450

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.010	S11	3000	Manhole	Adoptable	S12	1200	Manhole	Adoptable
1.011	S12	1200	Manhole	Adoptable	S13	1200	Manhole	Adoptable

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Additional Storage (m³/ha)	0.0
Summer CV	1.000	Skip Steady State	x	Check Discharge Rate(s)	x
Winter CV	1.000	Drain Down Time (mins)	1440	Check Discharge Volume	x

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
30	35	0	0

Node S11 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	130.585	Product Number	CTL-SHE-0110-5800-1200-5800
Design Depth (m)	1.200	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	5.8	Min Node Diameter (mm)	1200

Node S10 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	10.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	130.600	Main Channel Slope (1:X)	1000.0
Safety Factor	2.0	Time to half empty (mins)	1380	Main Channel n	0.030

Inlets

S9

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	899.0	0.0	1.600	1574.0	0.0	1.601	0.0	0.0

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	10	131.869	0.094	18.7	0.1061	0.0000	OK
15 minute summer	S2	11	131.683	0.161	37.1	0.1822	0.0000	OK
15 minute summer	S3	11	131.558	0.186	54.3	0.2668	0.0000	OK
15 minute summer	S14	11	131.782	0.095	18.7	0.1079	0.0000	OK
15 minute summer	S4	11	131.306	0.199	90.6	0.3522	0.0000	OK
15 minute summer	S15	10	131.839	0.098	18.7	0.1111	0.0000	OK
15 minute summer	S16	11	131.665	0.139	37.1	0.1996	0.0000	OK
15 minute summer	S17	11	131.426	0.169	54.5	0.2424	0.0000	OK
15 minute summer	S5	11	131.213	0.306	163.5	0.7783	0.0000	OK
15 minute summer	S6	11	131.150	0.324	180.9	0.8241	0.0000	OK
15 minute summer	S7	12	131.093	0.348	192.5	0.8862	0.0000	OK
15 minute summer	S8	12	131.047	0.323	206.7	0.8227	0.0000	OK
360 minute winter	S9	352	130.878	0.268	40.3	0.6831	0.0000	OK
360 minute winter	S10	352	130.878	0.278	23.1	0.7086	0.0000	OK
360 minute winter	S11	352	130.878	0.293	5.9	2.0740	0.0000	SURCHARGED
360 minute winter	S12	352	130.462	0.061	5.8	0.0690	0.0000	OK
360 minute winter	S13	352	130.309	0.059	5.8	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S1	1.000	S2	18.4	0.650	0.216	1.2284	
15 minute summer	S2	1.001	S3	36.5	1.002	0.511	0.6562	
15 minute summer	S3	1.002	S4	54.6	1.069	0.424	0.4856	
15 minute summer	S14	2.000	S4	18.2	0.962	0.214	0.9014	
15 minute summer	S4	1.003	S5	91.0	1.193	0.205	0.9078	
15 minute summer	S15	3.000	S16	18.4	0.950	0.216	0.4631	
15 minute summer	S16	3.001	S17	36.7	1.006	0.285	1.6896	
15 minute summer	S17	3.002	S5	54.7	1.067	0.263	0.6119	
15 minute summer	S5	1.004	S6	163.1	0.948	0.297	7.1178	
15 minute summer	S6	1.005	S7	174.9	0.923	0.318	7.7411	
15 minute summer	S7	1.006	S8	192.0	1.007	0.349	2.0508	
15 minute summer	S8	1.007	S9	208.3	1.269	0.379	2.6196	
360 minute winter	S9	Flow through pond	S10	23.1	0.015	0.000	261.7210	
360 minute winter	S10	1.009	S11	5.9	0.190	0.011	1.1621	
360 minute winter	S11	Hydro-Brake®	S12	5.8				
360 minute winter	S12	1.011	S13	5.8	0.880	0.324	0.0990	342.6

Results for 30 year +35% CC Critical Storm Duration. Lowest mass balance: 99.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	11	132.293	0.518	61.6	0.5854	0.0000	SURCHARGED
15 minute summer	S2	11	132.157	0.635	121.6	0.7179	0.0000	SURCHARGED
15 minute summer	S3	11	131.879	0.507	182.3	0.7261	0.0000	SURCHARGED
15 minute summer	S14	10	131.882	0.195	61.6	0.2201	0.0000	OK
15 minute summer	S4	11	131.740	0.633	305.9	1.1179	0.0000	SURCHARGED
15 minute summer	S15	10	131.949	0.208	61.6	0.2357	0.0000	OK
15 minute summer	S16	11	131.878	0.353	122.6	0.5052	0.0000	OK
15 minute summer	S17	11	131.746	0.489	180.9	0.7001	0.0000	SURCHARGED
15 minute summer	S5	11	131.691	0.784	515.4	1.9952	0.0000	SURCHARGED
15 minute summer	S6	11	131.591	0.765	574.8	1.9457	0.0000	SURCHARGED
15 minute summer	S7	11	131.470	0.725	633.4	1.8462	0.0000	OK
15 minute summer	S8	11	131.375	0.651	690.1	1.6558	0.0000	OK
720 minute winter	S9	720	131.360	0.750	57.0	1.9088	0.0000	OK
720 minute winter	S10	720	131.360	0.760	31.6	1.9344	0.0000	SURCHARGED
720 minute winter	S11	720	131.360	0.775	6.3	5.4791	0.0000	SURCHARGED
360 minute summer	S12	176	130.462	0.061	5.8	0.0692	0.0000	OK
480 minute winter	S13	224	130.309	0.059	5.8	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S1	1.000	S2	60.0	0.852	0.706	3.0317	
15 minute summer	S2	1.001	S3	120.8	1.715	1.691	1.2675	
15 minute summer	S3	1.002	S4	182.0	1.663	1.414	1.0490	
15 minute summer	S14	2.000	S4	62.3	1.237	0.733	2.7398	
15 minute summer	S4	1.003	S5	294.4	1.252	0.664	3.3506	
15 minute summer	S15	3.000	S16	61.0	1.145	0.717	1.4152	
15 minute summer	S16	3.001	S17	119.4	1.260	0.928	5.0502	
15 minute summer	S17	3.002	S5	170.0	1.341	0.818	1.8896	
15 minute summer	S5	1.004	S6	516.0	1.173	0.939	17.8702	
15 minute summer	S6	1.005	S7	574.6	1.307	1.045	17.7603	
15 minute summer	S7	1.006	S8	631.3	1.493	1.148	4.5235	
15 minute summer	S8	1.007	S9	685.1	1.869	1.246	5.7969	
720 minute winter	S9	Flow through pond	S10	31.6	0.006	0.000	798.9999	
720 minute winter	S10	1.009	S11	6.3	0.269	0.011	3.3190	
720 minute winter	S11	Hydro-Brake®	S12	5.8				
360 minute summer	S12	1.011	S13	5.8	0.881	0.327	0.0995	560.2

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	1.000
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S1	0.100	5.00	133.347	1200	445089.754	304126.827	1.572
S2	0.100	5.00	133.140	1200	445083.111	304084.291	1.618
S3	0.100	5.00	133.045	1350	445076.506	304067.546	1.673
S14	0.100	5.00	133.234	1200	445028.253	304061.038	1.547
S4	0.100	5.00	132.990	1500	445075.732	304058.067	1.883
S15	0.100	5.00	133.266	1200	445136.966	304024.959	1.525
S16	0.100	5.00	133.080	1350	445138.232	304048.813	1.555
S17	0.100	5.00	132.901	1350	445091.911	304050.352	1.644
S5	0.100	5.00	132.939	1800	445080.426	304047.137	2.032
S6	0.100	5.00	132.851	1800	445078.268	304006.592	2.025
S7	0.100	5.00	132.783	1800	445076.286	303966.096	2.038
S8	0.100	5.00	132.740	1800	445073.458	303955.725	2.016
S9	0.100	5.00	132.368	1800	445086.719	303946.865	1.758
S10		5.00	132.380	1800	445083.683	303940.175	1.780
S11			132.259	3000	445077.974	303935.248	1.674
S12			132.070	1200	445064.818	303922.323	1.669
S13			131.850	1200	445058.827	303908.444	1.600

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	S1	S2	43.052	0.600	131.775	131.522	0.253	170.0	300	5.60	50.0
1.001	S2	S3	18.000	0.600	131.522	131.447	0.075	240.0	300	5.89	50.0
1.002	S3	S4	9.511	0.600	131.372	131.332	0.040	240.0	375	6.03	50.0
2.000	S14	S4	47.572	0.600	131.687	131.407	0.280	170.0	300	5.66	50.0
1.003	S4	S5	11.895	0.600	131.107	131.057	0.050	240.0	600	6.16	50.0
3.000	S15	S16	23.887	0.600	131.741	131.600	0.141	170.0	300	5.33	50.0
3.001	S16	S17	46.347	0.600	131.525	131.332	0.193	240.0	375	5.99	50.0
3.002	S17	S5	11.926	0.600	131.257	131.207	0.050	240.0	450	6.15	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.203	85.0	18.1	1.272	1.318	0.100	0.0	93	0.961
1.001	1.010	71.4	36.1	1.318	1.298	0.200	0.0	151	1.013
1.002	1.165	128.7	54.2	1.298	1.283	0.300	0.0	170	1.116
2.000	1.203	85.0	18.1	1.247	1.283	0.100	0.0	93	0.961
1.003	1.567	443.1	90.4	1.283	1.282	0.500	0.0	183	1.242
3.000	1.203	85.0	18.1	1.225	1.180	0.100	0.0	93	0.961
3.001	1.165	128.7	36.1	1.180	1.194	0.200	0.0	135	1.004
3.002	1.308	208.0	54.2	1.194	1.282	0.300	0.0	156	1.106

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.004	S5	S6	40.603	0.600	130.907	130.826	0.081	500.0	750	6.70	50.0
1.005	S6	S7	40.545	0.600	130.826	130.745	0.081	500.0	750	7.24	50.0
1.006	S7	S8	10.749	0.600	130.745	130.724	0.021	500.0	750	7.39	50.0
1.007	S8	S9	15.948	0.600	130.724	130.692	0.032	500.0	750	7.60	50.0
1.009	S10	S11	7.541	0.600	130.600	130.585	0.015	500.0	750	5.10	50.0
1.010	S11	S12	18.442	0.600	130.585	130.401	0.184	100.0	150	5.41	50.0
1.011	S12	S13	15.118	0.600	130.401	130.250	0.151	100.0	150	5.66	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.004	1.244	549.7	162.6	1.282	1.275	0.900	0.0	278	1.090
1.005	1.244	549.7	180.7	1.275	1.288	1.000	0.0	295	1.121
1.006	1.244	549.7	198.8	1.288	1.266	1.100	0.0	311	1.148
1.007	1.244	549.7	216.8	1.266	0.926	1.200	0.0	326	1.174
1.009	1.244	549.7	0.0	1.030	0.924	0.000	0.0	0	0.000
1.010	1.005	17.8	0.0	1.524	1.519	0.000	0.0	0	0.000
1.011	1.005	17.8	0.0	1.519	1.450	0.000	0.0	0	0.000

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	43.052	170.0	300	Circular	133.347	131.775	1.272	133.140	131.522	1.318
1.001	18.000	240.0	300	Circular	133.140	131.522	1.318	133.045	131.447	1.298
1.002	9.511	240.0	375	Circular	133.045	131.372	1.298	132.990	131.332	1.283
2.000	47.572	170.0	300	Circular	133.234	131.687	1.247	132.990	131.407	1.283
1.003	11.895	240.0	600	Circular	132.990	131.107	1.283	132.939	131.057	1.282
3.000	23.887	170.0	300	Circular	133.266	131.741	1.225	133.080	131.600	1.180
3.001	46.347	240.0	375	Circular	133.080	131.525	1.180	132.901	131.332	1.194
3.002	11.926	240.0	450	Circular	132.901	131.257	1.194	132.939	131.207	1.282
1.004	40.603	500.0	750	Circular	132.939	130.907	1.282	132.851	130.826	1.275
1.005	40.545	500.0	750	Circular	132.851	130.826	1.275	132.783	130.745	1.288
1.006	10.749	500.0	750	Circular	132.783	130.745	1.288	132.740	130.724	1.266
1.007	15.948	500.0	750	Circular	132.740	130.724	1.266	132.368	130.692	0.926
1.009	7.541	500.0	750	Circular	132.380	130.600	1.030	132.259	130.585	0.924

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S1	1200	Manhole	Adoptable	S2	1200	Manhole	Adoptable
1.001	S2	1200	Manhole	Adoptable	S3	1350	Manhole	Adoptable
1.002	S3	1350	Manhole	Adoptable	S4	1500	Manhole	Adoptable
2.000	S14	1200	Manhole	Adoptable	S4	1500	Manhole	Adoptable
1.003	S4	1500	Manhole	Adoptable	S5	1800	Manhole	Adoptable
3.000	S15	1200	Manhole	Adoptable	S16	1350	Manhole	Adoptable
3.001	S16	1350	Manhole	Adoptable	S17	1350	Manhole	Adoptable
3.002	S17	1350	Manhole	Adoptable	S5	1800	Manhole	Adoptable
1.004	S5	1800	Manhole	Adoptable	S6	1800	Manhole	Adoptable
1.005	S6	1800	Manhole	Adoptable	S7	1800	Manhole	Adoptable
1.006	S7	1800	Manhole	Adoptable	S8	1800	Manhole	Adoptable
1.007	S8	1800	Manhole	Adoptable	S9	1800	Manhole	Adoptable
1.009	S10	1800	Manhole	Adoptable	S11	3000	Manhole	Adoptable

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.010	18.442	100.0	150	Circular	132.259	130.585	1.524	132.070	130.401	1.519
1.011	15.118	100.0	150	Circular	132.070	130.401	1.519	131.850	130.250	1.450

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.010	S11	3000	Manhole	Adoptable	S12	1200	Manhole	Adoptable
1.011	S12	1200	Manhole	Adoptable	S13	1200	Manhole	Adoptable

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Additional Storage (m³/ha)	0.0
Summer CV	1.000	Skip Steady State	x	Check Discharge Rate(s)	x
Winter CV	1.000	Drain Down Time (mins)	1440	Check Discharge Volume	x

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	40	0	0

Node S11 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	130.585	Product Number	CTL-SHE-0110-5800-1200-5800
Design Depth (m)	1.200	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	5.8	Min Node Diameter (mm)	1200

Node S10 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	10.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	130.600	Main Channel Slope (1:X)	1000.0
Safety Factor	2.0	Time to half empty (mins)		Main Channel n	0.030

Inlets

S9

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	899.0	0.0	1.600	1574.0	0.0	1.601	0.0	0.0

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.70%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	11	133.165	1.390	79.8	1.5719	0.0000	FLOOD RISK
15 minute summer	S2	11	132.917	1.395	153.3	1.5782	0.0000	FLOOD RISK
15 minute summer	S3	11	132.433	1.061	230.4	1.5183	0.0000	SURCHARGED
15 minute summer	S14	11	132.459	0.772	79.8	0.8736	0.0000	SURCHARGED
15 minute summer	S4	11	132.191	1.084	385.0	1.9146	0.0000	SURCHARGED
15 minute summer	S15	11	132.708	0.967	79.8	1.0931	0.0000	SURCHARGED
15 minute summer	S16	11	132.556	1.031	154.9	1.4759	0.0000	SURCHARGED
15 minute summer	S17	11	132.223	0.966	231.4	1.3816	0.0000	SURCHARGED
15 minute summer	S5	11	132.106	1.199	694.8	3.0506	0.0000	SURCHARGED
15 minute summer	S6	11	131.917	1.091	772.7	2.7776	0.0000	SURCHARGED
15 minute summer	S7	11	131.685	0.940	850.0	2.3913	0.0000	SURCHARGED
720 minute summer	S8	735	131.565	0.841	100.5	2.1401	0.0000	SURCHARGED
720 minute winter	S9	720	131.565	0.955	72.0	2.4308	0.0000	OK
720 minute winter	S10	705	131.565	0.965	39.0	2.4559	0.0000	SURCHARGED
720 minute winter	S11	720	131.565	0.980	6.3	6.9298	0.0000	SURCHARGED
15 minute summer	S12	14	130.462	0.061	5.8	0.0692	0.0000	OK
15 minute summer	S13	311	130.309	0.059	5.8	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S1	1.000	S2	77.1	1.096	0.907	3.0317	
15 minute summer	S2	1.001	S3	154.2	2.190	2.160	1.2675	
15 minute summer	S3	1.002	S4	231.5	2.099	1.799	1.0490	
15 minute summer	S14	2.000	S4	78.7	1.196	0.925	3.3500	
15 minute summer	S4	1.003	S5	386.2	1.371	0.872	3.3506	
15 minute summer	S15	3.000	S16	77.6	1.145	0.912	1.6821	
15 minute summer	S16	3.001	S17	155.2	1.407	1.206	5.1119	
15 minute summer	S17	3.002	S5	232.4	1.467	1.118	1.8896	
15 minute summer	S5	1.004	S6	696.5	1.583	1.267	17.8702	
15 minute summer	S6	1.005	S7	773.8	1.758	1.408	17.8447	
15 minute summer	S7	1.006	S8	850.6	1.933	1.547	4.7309	
720 minute summer	S8	1.007	S9	99.5	0.737	0.181	7.0190	
720 minute winter	S9	Flow through pond	S10	39.0	0.005	0.000	1057.3208	
720 minute winter	S10	1.009	S11	6.3	0.200	0.011	3.3190	
720 minute winter	S11	Hydro-Brake®	S12	5.8				
15 minute summer	S12	1.011	S13	5.8	0.881	0.327	0.0995	418.5

Appendix F – Drainage Strategy

NOTES:
1. DO NOT SCALE FROM THIS DRAWING. IF IN DOUBT CONTACT DDS LIMITED.
2. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS RELATING TO THIS PROJECT.
4. ALL DIMENSIONS SHOULD BE CHECKED ON SITE PRIOR TO CONSTRUCTION. ANY DISCREPANCIES SHOULD BE IMMEDIATELY NOTIFIED IN WRITING TO DDS LIMITED.
5. THE CONTRACTOR SHALL PRIOR TO CONSTRUCTION CHECK AND VERIFY THAT THE DETAILS SHOWN ON THIS DRAWING ARE FULLY COMPATIBLE WITH ANY AS CONSTRUCTED DIMENSIONS OR LEVELS. ANY DISCREPANCIES TO BE REPORTED IMMEDIATELY IN WRITING TO DDS LIMITED.
6. THIS DRAWING HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE COMMISSIONING PARTY AND UNLESS AGREED IN WRITING BY DDS LIMITED NO OTHER PARTY MAY USE OR RELY ON ITS CONTENTS. NO LIABILITY IS ACCEPTED BY DDS LIMITED FOR ANY USE OF THIS DRAWING OTHER THAN FOR THE PURPOSE FOR WHICH IT WAS ORIGINALLY PREPARED.
7. IT SHOULD BE NOTED THAT THIS DRAWING MAY INCLUDE DATA PROVIDED BY THIRD PARTIES. NO LIABILITY IS ACCEPTED BY DDS LIMITED AS TO THE ACCURACY OF THIS DATA.
8. THIS DRAWING SHALL NOT BE REPRODUCED IN ANY WAY WITHOUT THE WRITTEN PERMISSION OF DDS LIMITED.

KEY

- PROPOSED S104 SURFACE WATER DRAINAGE
- PROPOSED S104 FOUL WATER DRAINAGE
- PROPOSED S104 SURFACE WATER HEADWALL
- PROPOSED S104 FLOW CONTROL CHAMBER
- EXISTING SURFACE WATER SEWER
- EXISTING FOUL WATER SEWER
- SURFACE WATER FLOOD MAP 30 YEAR
- SURFACE WATER FLOOD MAP 100 YEAR
- DRAINAGE EASEMENT

Land North of Barlestone Road, NEWBOLD VERDON

PRIVATE

House Type	Description	Height	Sq.ft	No.	Total Sq.ft
A	1b ground floor maisonette	2	430	1	430
B	1b first floor maisonette	2	610	1	610
C	2 bedroom house	2	865	16	13840
D	3 bedroom house	2	1025	3	3075
E	3 bedroom house	2	1060	5	5300
F	3 bedroom house	2.5	1230	6	7380
G	4 bedroom house	2	1255	1	1255
H	4 bedroom house	2.5	1265	2	2530
I	4 bedroom house	2.5	1495	2	2990
J	4 bedroom house	2	1530	3	4590
SUB TOTAL				**40**	**41955**

AFFORDABLE (40%)

House Type	Description	Height	Sq.ft	No.	Total Sq.ft
1BF	1 bedroom, 2 person apartment	2	550		
2BF	2 bedroom, 3 person apartment	2	760		
U	2 bedroom, 4 person coach house	2	780		
V	2 bedroom, 4 person house	2	865		
W	3 bedroom, 5 person house	2	1070		
X	3 bedroom, 5 person house	2	1060		

PROPOSED FLOW CONTROL CHAMBER LIMITING FLOWS TO 5.75 l/s. SUBJECT TO APPROVAL FROM THE LLFA AND STW.

PROPOSED LINED ATTENUATION POND TO CATER FOR FLOWS UP TO THE 100 YEAR RETURN PERIOD PLUS 40% CLIMATE CHANGE AND 10% URBAN CREEP (URBAN CREEP APPLIED TO PRIVATE AREAS ONLY).

FREEBOARD LEVEL:	132.20m
MAXIMUM WATER LEVEL:	131.80m
BED LEVEL:	130.60m
STORAGE VOLUME:	1,321m^3
FREEBOARD:	400mm
BANK GRADIENT:	1:3

THE STORAGE CAPACITY IS BASED ON AN IMPERMEABLE AREA OF 1.3Ha.

DRAINAGE PARAMETERS:

RAINFALL METHODOLOGY =	FEH-22
GLOBAL Cv =	1.0
MADD FACTOR / ADDITIONAL STORAGE =	0.0
URBAN CREEP TO BE APPLIED TO NON ADOPTABLE AREAS =	10%
CLIMATE CHANGE APPLIED TO 1 in 100 YEAR STORM =	40%
1 IN 30 YEAR STORM =	35%

GREENFIELD RUN OFF RATES ARE BASED ON 65% OF THE DEVELOPED AREA BEING IMPERMEABLE

ASSUMPTIONS:

- ALL DETAILS ARE PRELIMINARY AND SUBJECT TO DETAILED DESIGN
- ALL ADOPTABLE DRAINAGE PROPOSALS TO BE APPROVED BY SEVERN TRENT WATER OR LEICESTERSHIRE COUNTY COUNCIL HIGHWAYS.

REV	DESCRIPTION	DATE	BY	AUTH

CLIENT
WHEELDON HOMES

PROJECT
BARLESTONE ROAD
NEWBOLD VERDON

TITLE
PRELIMINARY DRAINAGE STRATEGY

STATUS.
PRELIMINARY

DRAWN	AUTHORISED	SCALE	DATE
NN	CAO	1:500@A1	15.10.25

PROJECT NO.	DRAWING NO.	REV
0528	2	-

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