

Forest Farm, Chippenham

Environmental Statement

July 2026

Technical appendix H:
Flood risk assessment





**GLEESON LAND
LAND AT FOREST FARM
CHIPPENHAM**

**FLOOD RISK ASSESSMENT AND
DRAINAGE STRATEGY**

JUNE 2026



the journey is the reward

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**Gleeson Land
Land at Forest Farm
Chippenham
Flood Risk Assessment and Drainage Strategy**

List of Contents

Sections

1	Introduction	1
2	Existing Site	2
3	Proposed Development.....	4
4	Wiltshire Council SFRA and Local Planning Policy	6
5	Flood Risk	7
6	Surface Water Drainage	13
7	Foul Drainage.....	20
8	Conclusion	22

Figures

Figure 3.1: Proposed Layout	4
Figure 5.1: Surface Water Flood Risk Areas and Features	8
Figure 5.2: Upstream side of ditch culvert underneath existing access	10
Figure 6.2: Typical Permeable Block Paving Construction.....	18

Tables

Table 5.1: Flood Risk Summary	12
Table 6.1: Discharge Rates for each Catchment	17
Table 8.1: Flood Risk Summary	22

Appendices

APPENDIX A: EA Flood Zones Map	
APPENDIX B: EA Surface Water Flood Risk Map	
APPENDIX C: Topographic Survey	
APPENDIX D: Site Investigation Report	
APPENDIX E: Wessex Water Sewer Records	

APPENDIX F: Proposed Layout

APPENDIX G: Wiltshire Council Local Plan Extract

APPENDIX H: SFRA Groundwater Flood Risk Map

APPENDIX I: SFRA Sewer Flood Risk Map

APPENDIX J: Surface Water Drainage Strategy

APPENDIX K: Network Model Calculations

APPENDIX L: Q1 Year Greenfield Run-off Rate

APPENDIX M: FSR Network Model Calculations

APPENDIX N: Overland Exceedance Flow Route Plan

APPENDIX O: Wessex Water Response

APPENDIX P: LLFA Correspondence

1 Introduction

- 1.1 Mayer Brown Limited have been commissioned by Gleeson Land to produce a Flood Risk Assessment and Drainage Strategy to support an outline application with all matters reserved except access from the A4/London Road for up to 600 dwellings, land for a local centre (Class E / Class F), open space, landscape and provision of associated infrastructure.
- 1.2 According to the Environment Agency's (EA) indicative flood map (see Appendix A) the site is located in a low risk Flood Zone 1 and has areas at medium and high risk of surface water flooding according to the EA's Surface Water Flood Map (Appendix B).
- 1.3 As outlined in the National Planning Policy Framework (NPPF), for sites in a Flood Zone 1, a Flood Risk Assessment should be carried out for all proposals involving sites of one hectare or more.
- 1.4 This Flood Risk Assessment and Drainage Strategy has been compiled in accordance with "National Planning Policy Framework (NPPF)" published by Ministry of Housing, Communities and Local Government in December 2024, "Technical Guidance to the National Planning Policy Framework", 'CIRIA C624: Development and Flood Risk Guidance' and Wiltshire Council's Drainage and Betterment Strategy.

2 Existing Site

- 2.1 The site is located to the east of Pewsham Way, which lies to the southeast of Chippenham in Wiltshire.
- 2.2 The site falls under the administrative boundary of Wiltshire Council. The postcode is SN15 3RP and the approximate co-ordinates to the centre of the site are E393854, N171774.
- 2.3 The approx. 39.630ha site currently consists of greenfield agricultural land.
- 2.4 The area surrounding the application site is mostly greenfield land with residential properties to the west. The site is bordered by the A4 London Road to the north and Pewsham Way to the west.

Topography

- 2.5 A topographic survey has been undertaken by Healer Surveys in June 2022 and can be found in Appendix C.
- 2.6 There is an ordinary watercourse that runs from east to west through the site which reaches a low point of 51.80m AOD on the southern boundary. In general, the areas either side of the ordinary watercourse fall towards it with the highest point on the west side being 65.54m AOD and the highpoint on the southeast side being 57.90m AOD. The site consists of hedge-lined fields with an access track from London Road to the centre of the site.

Geology

- 2.7 British Geological Survey online geological records show that most of the site is underlain by a bedrock of 'Oxford Clay Formation – mudstone'. The southern part of the site is underlain by 'Kellaways Formation – sandstone, siltstone and mudstone'.
- 2.8 However, site investigation works carried out by BRD Environmental Ltd in November 2023 (see Appendix D) found Kellaways Formation (comprising of Kellaways Sand Member and Kellaways Clay Member) across the entire site.
- 2.9 Groundwater monitoring was also undertaken as part of the site investigation works in October and November 2023. This measured shallow groundwater levels of less than 1m below ground level in most of the monitoring wells across the three dates.

Hydrology

- 2.10 There is an existing ditch network within the site boundary that drains towards the ordinary watercourse in the south of the site. There is also an existing ditch network on the south side of the A4 London Road, serving the highway.

Hydrogeology

- 2.11 With reference to Environment Agency data, the site is not located within a Source Protection Zone.

Existing Drainage

- 2.12 The topographic survey undertaken (Appendix C) identifies an existing ditch network that runs to the south. There is also a ditch that runs adjacent to London Road and is culverted underneath the access into the site.
- 2.13 The Wessex Water sewer records (Appendix E) show a rising main that runs across the site from east to west. There is also a public foul sewer and surface water sewer that runs along Pewsham Way to the west of the site.

3 Proposed Development

- 3.1 The proposed development is for an outline planning application with all matters reserved except for access from the A4/London Road for up to 600 dwellings, together with land for a local centre (Use Classes E and F), areas of open space and landscaping, and associated infrastructure. Refer to Figure 3.1 below and Appendix F for the Proposed Layout.



Figure 3.1: Proposed Layout

- 3.2 In terms of hard landscaping, below is an approximate breakdown of how the 40.1ha site will be divided, split into the various catchments that relate to the proposed outfalls to the existing ordinary watercourse:
- Catchment 01: 7.690ha
 - Catchment 02 (allowance made for the hardstanding area, approx.1600m² associated with the future spine road when brought forward): 1.148ha
 - Catchment 03: 0.374ha
 - Catchment 04: 0.765ha
 - Catchment 05: 1.290ha

- Total hardstanding: 11.267ha
- Total soft landscaping: 28.833ha
- Site boundary: 40.100ha

4 Wiltshire Council SFRA and Local Planning Policy

- 4.1 A Strategic Flood Risk Assessment (SFRA) for Wiltshire Council was undertaken by JBA Consulting in November 2024.
- 4.2 The SFRA sets out the following:
- Flood risk policy and strategy,
 - Planning policy for flood risk management,
 - Sources of information used in preparing the SFRA,
 - Flood risk in Wiltshire,
 - Impacts of climate change,
 - Flood defences,
 - Flood risk management requirements for developers,
 - Surface water management and SuDS,
 - Flood warning and emergency planning and strategic flood risk solutions

Sequential Test

- 4.3 The aim of the sequential test is to steer new development to areas with the lowest probability of flooding and to demonstrate that there are no suitable alternative development sites located in the lower risk flood zones.
- 4.4 The site was included in the Wiltshire Council Local Plan as a strategic site for development, and was assessed as being suitable, available, achievable, deliverable and developable for residential uses (refer to Appendix G). The Wiltshire Council assessment identified the site as suitable for development with 100% of the site considered suitable and noted no flood risk constraints that would preclude development.
- 4.5 Therefore, it is considered that the site has passed the sequential test.

5 Flood Risk

5.1 In theory, there are five principal types/sources of flooding that could affect the proposed development. These are described below with proposed mitigation measures outlined where necessary.

- **Fluvial** – Whilst ordinary watercourses and ditches are present within the site, the EA flood map for planning confirms the site lies within Flood Zone 1 (see Appendix A). The ditches and ordinary watercourses form part of the sites drainage regime and are connected to the downstream sections of ordinary watercourse which ultimately discharges to the River Avon.
- **Tidal** – The site is geographically remote from tidal influences. Therefore, there are no mitigation measures required, and it will not be addressed further in this report.
- **Groundwater** – The Wiltshire Council Strategic Flood Risk Assessment provides a map showing the site is within an area described as having ‘negligible risk’ of groundwater flooding (Appendix H). However, groundwater was found to be shallow at the site during site investigations by BRD Environmental Ltd (see Appendix D). It is therefore proposed that floor levels of buildings are set above existing ground levels, and the detailed design of the drainage features will consider the groundwater levels and mitigate groundwater ingress as required.
- **Surface Water Runoff** – The EA Surface Water Flood Map (Appendix B) indicates there are areas in the centre and to the east with areas at medium and high risk. A review of the EA’s surface water flood information in conjunction with the topographic survey has been undertaken and is discussed in the surface water flood risk section below. The drainage strategy for the development is discussed in Section 6.
- **Infrastructure Failure** – The Wiltshire Council SFRA from 2024 presents a record of sewer flooding incidents (Appendix I), which shows there have been between 1-10 incidents of sewer flooding within area. The mapping covers a broad area, and there is no evidence that any of these incidents affected the application site. Noting there are no public sewers located on or immediately next to the application site, it is considered the risk of sewer flooding is low.

Surface Water Flood Risk

5.2 The EA surface water flood maps show significant areas of surface water flood risk in the flatter section of the site adjacent to the ordinary watercourse / ditch network.

- 5.3 The EA state that *“the RoFSW map is an assessment of where surface water flooding may occur. This happens when rainfall lies on or flows over the ground, instead of draining away through the normal drainage systems or soaking into the ground”*.
- 5.4 The site generally falls at a gradient of around 1in50 until it reaches the land adjacent to the ordinary watercourse where the gradient flattens to around 1in250 to the top of the bank.
- 5.5 The flow paths represented on the EA surface water mapping to the ordinary watercourse are therefore considered represent the topographic features (e.g. flatter gradient and undulations) along the flow paths from the surrounding agricultural land to the ordinary watercourse.
- 5.6 A review of the EA’s surface water flood risk mapping in conjunction with the Topographic Survey has been undertaken and is discussed below.
- 5.7 Figure 5.1 below shows the areas identified by the EA surface water flood maps as being at a medium and high risk of surface water flooding (with references) and the key sections of the existing ordinary watercourse and ditch network shown in a thick magenta line (for full details refer to the Topographic Survey in Appendix C).



Figure 5.1: Surface Water Flood Risk Areas and Features

Area A

- 5.8 Area A is identified as being at risk of surface water flooding because the existing access track is slightly elevated (approx. 340mm) above the land to the immediate west/north.
- 5.9 The catchment area for the identified extents of surface water flood risk is limited by the existing ditch network (shown by the thick magenta line in Figure 5.1) and topography. The existing ditch network bounds the northern, western and southern boundaries and would intercept overland flows from beyond the ditch network. The only exception to this is a break in the ditch on the western field boundary (as illustrated in Figure 5.1), however the existing topography and levels direct overland flows from beyond the site boundary to Pewsham Way and/or the London Road ditch that runs adjacent to the north eastern boundary.
- 5.10 Therefore, the only flows that can contribute to the surface water flood risk shown on the EA flood maps at Area A is the field itself, which will be managed by the proposed surface water drainage strategy that will capture, control and gradually release the surface water generated on site. Therefore, despite the identified area of surface water flood risk, once the development is implemented and the contributing area is positively drained, this area will be at a low risk of surface water flooding.
- 5.11 The London Road ditch begins approximately 200m to the south of the London Road / Pewsham Way roundabout and continues for approximately 630m running parallel with London Road before turning south and then west flowing back through the application site, which is recorded on the Topographic Survey and illustrated in Figure 5.1 above. Figure 5.2 below shows a photograph of the London Road ditch crossing underneath the existing access.



Figure 5.2: Upstream side of ditch culvert underneath existing access

- 5.12 This evidence has been presented to Wiltshire Council as the LLFA in the form of a DRAFT version of this Flood Risk Assessment, who have confirmed they agree with these conclusions (refer to Appendix P).

Area's B, C and D

- 5.13 The surface water flood extents shown in Areas B, C and D on Figure 5.1 are caused by the topographic features on the surface water flow paths from the surrounding agricultural land to the ordinary watercourse, however at all 3 locations there are existing flow paths into the existing ordinary watercourse, meaning only localised ponding of water would be expected with the water travelling overland to the ordinary watercourse.
- 5.14 The existing runoff reaches these areas via uncontrolled overland flow. In the post-development scenario, significant parts of the contributing catchment will become positively drained, and this runoff will be attenuated within the SuDS system with the discharge restricted to 70% QBAR (refer to Section 6 of this report), providing a significant reduction in flows reaching the watercourse for critical events, and reducing the surface water flood extents.

- 5.15 No buildings are proposed in areas B, C or D, however the implementation of the proposed access road has the potential to create a barrier that water could not pass through. Therefore, interception swales/drainage features are provided on the upstream side of the road to maintain existing hydraulic connectivity and prevent the road forming a barrier to overland flow. The proposed interception drainage features are shown on the proposed drainage drawing located in Appendix J. The principle of this approach was discussed and agreed with Wiltshire LLFA during the Pre-Application discussions (refer to meeting minutes in Appendix P).
- 5.16 Sections of the attenuation system are located within existing flow paths identified by the EA surface water flood risk mapping, which is considered appropriate as these areas already act as preferential flow routes to the existing ordinary watercourse / ditch network. The proposed attenuation features formalise and manage this existing function whilst providing controlled storage and discharge.
- 5.17 The access road forms part of the strategic infrastructure required to facilitate a potential future link road and associated wider development proposals. Therefore, the road levels are proposed to be raised to allow sufficient clearances over the crossing points of the ordinary watercourse and to ensure the access road remains dry, always providing a dry means of access to the site. A minimum 1m clearance is proposed at the crossing points from the top of the existing bank and the finished road surface to ensure the crossings can be sized to accommodate the 1in100yr+climate change flows. The detailed culvert sizing, crossing design and ordinary watercourse consent matters will be addressed at reserved matters and detailed design stages.
- 5.18 The proposed development is therefore expected to reduce the extent and severity of the existing surface water flooding mechanism whilst maintaining the established drainage regime without increasing flooding elsewhere.

Flood Risk Summary

- 5.19 The flood risk to the development is summarised in Table 5.1.

Flood Mechanism	Source	Flood Risk to the Development	Mitigation Required?
Fluvial	N/A	Low	No
Tidal	N/A	Low	No
Groundwater	Underlying geology and groundwater levels	Low	Floor levels set above existing ground levels.
Surface Water / Overland Flow	Runoff from surrounding elevated land.	Low	Proposed SuDS drainage system to capture and control on-site surface water flows to 70% QBAR providing betterment.

			Interception drainage proposed adjacent access roads to re-direct flows into the watercourse – mimicking the existing situation. Suitable vertical clearance provided above the top of bank at any ditch / ordinary watercourse crossing locations to ensure design flows can be accommodated.
Infrastructure Failure	Surface water systems, water mains and reservoirs	Low	No

Table 5.1: Flood Risk Summary

6 Surface Water Drainage

Existing Surface Water Drainage

- 6.1 The topographic survey (Appendix C) identifies a number of existing ditch networks and the ordinary watercourse that run through the site and along the boundaries.
- 6.2 The Wessex Water sewer records (Appendix E) show a surface water sewer that runs along Pewsham Way to the west of the site.
- 6.3 The existing site forms one large catchment that discharges overland to the existing ordinary watercourse flowing westwards through the site.

Infiltration & Underlying Geology

- 6.4 Site investigation works carried out by BRD Environmental Ltd in November 2023 (see Appendix D) found Kellaways Formation (comprising of Kellaways Sand Member and Kellaways Clay Member) across the entire site.
- 6.5 Groundwater monitoring and soakage testing were also undertaken as part of the site investigation works. Shallow groundwater levels of less than 1m below ground level were measured in most of the monitoring wells across the three dates in October and November 2023. This means that 1m freeboard between groundwater levels and the base of any infiltration features cannot be achieved.
- 6.6 In the four trial pits for soakage testing, permeability was too low to calculate the soil infiltration rate which the report attributes to the clayey nature of the soils.
- 6.7 Therefore, formal infiltration drainage has been discounted as a method of discharge, although interception drainage will be provided by the SuDS features throughout the proposals where groundwater levels permit.

Sustainable Drainage (SuDS) and Drainage Hierarchy

- 6.8 Wiltshire Council, as the Lead Local Flood Authority (LLFA), are predominantly concerned about the quantity, rate and quality of surface water run-off leaving the development site, as well as the potential effects of drainage proposals on local amenity and biodiversity.
- 6.9 Sustainable Urban Drainage Systems (SuDS) are a range of techniques that aim to mimic the way rainfall drains in natural systems and so reduces the hydraulic and hydrological impact on the local area and downstream catchments. There are a number of options available to impose surface water restrictions on proposed development plots

such as oversized sewers, below ground storage tanks, attenuation ponds and basins, swales, permeable paving, or infiltration systems.

6.10 To determine the most sustainable method of surface water disposal the hierarchy from approved document part H was used, see below:

- **Collection of water for reuse**
 - Slow drain down water butts will be included in the gardens of houses. The slow drain down type is proposed to provide interception storage benefits, reduce peak surface water runoff rates and facilitate the reuse of rainwater.
- **An adequate soakaway or some other adequate infiltration system –**
 - Soakage testing carried out by BRD Environmental Ltd found that soil permeability was too low to calculate the soil infiltration rate.
 - Groundwater levels were found to be shallow, and the bedrock of Kellaways Clay Member was found across the whole site.
- **A Watercourse –**
 - There are existing ordinary watercourse and ditches within the site boundary.
- **A Sewer –**
 - There is an existing Wessex Water surface water sewer that runs along Pewsham Way (see Appendix E).

6.11 Therefore, it is proposed that surface water from the site will discharge into the existing ordinary watercourse on site.

Surface Water Disposal

6.12 A surface water drainage strategy has been undertaken for the site and can be seen in Appendix J.

6.13 The proposed SuDS features will reduce the rate of discharge by providing storage during heavy rainfall events, reducing the risk of flooding. The SuDS features will also be unlined wherever groundwater levels permit to provide interception drainage/losses for everyday rainfall events. The SuDS features that are included that will provide interception drainage include swales, permeable paving and attenuation basins.

6.14 The proposed drainage strategy splits the existing one catchment into five catchments based on the contributing developable area and outfall locations. The catchments are detailed on the proposed surface water drainage drawing in Appendix J, and all continue to discharge to the existing ordinary watercourse, ensuring no catchment transfer.

- Catchment Area 01, located across the north of the site, will drain into two attenuation basins (01A and 01B) before discharging at 70% QBAR into the existing watercourse that flows westwards through the site.
 - Catchment Area 02, to the southeast, will similarly drain to two attenuation basins (02A and 02B), and then discharge at 70% QBAR into the existing watercourse that flows westwards through the site.
 - Catchment Areas 03, 04 and 05 to the south and west of the site, will drain southwards to Attenuation Basin 03 and discharge into the ordinary watercourse on the southern boundary at 70% QBAR.
- 6.15 The proposed surface water drainage calculations (Appendix K) for all outfalls are shown to be less than the corresponding Q1 year greenfield run-off rates (Appendix L) for each catchment area based on the extent of hardstanding within each catchment. This confirms that the proposed drainage strategy also provides betterment over the Q1 greenfield run-off rate by applying 30% betterment to the Qbar greenfield run-off rates.
- 6.16 The existing site discharges entirely to the existing ordinary watercourse. In the proposed development scenario, surface water will continue to discharge to the same receiving watercourse, with no changes to catchment boundaries. Therefore, there will be no catchment transfer as a result of the development.
- 6.17 It should be noted that the greenfield runoff rates for each catchment have been calculated based on the hardstanding areas only within each development parcel (not the entire catchment area) to remain conservative with the proposed discharge rates.
- 6.18 Sections of the attenuation system are located within existing flow paths identified by the EA surface water flood risk mapping, which is considered appropriate as these areas already act as preferential flow routes to the existing ordinary watercourse / ditch network. The proposed attenuation features formalise and manage this existing function whilst providing controlled storage and discharge.
- 6.19 Runoff from dwellings/buildings will be directed through rainwater downpipes into the underground pipe network and/or swales, and into the respective attenuation basins, where the flows will be attenuated back to 70% QBAR rates and discharge to the existing ditch network.
- 6.20 The surface water drainage calculations (Appendix K) include an allowance for approximately 1,600m² of hardstanding associated with the potential future spine road, with the resulting runoff routed to Attenuation Basin 02A. To facilitate a future connection, surface water manhole SW142 has been incorporated within the Proposed Drainage

Strategy (Appendix J) at a suitable location to receive runoff from the potential spine road should it be brought forward.

- 6.21 The driveways will consist of permeable paving which will collect the rainwater falling on these areas while the external rainwater downpipes of the dwellings will discharge into the piped network below and be conveyed to the attenuation basins.
- 6.22 The entire site currently discharges to the existing ordinary watercourse running through the site, which is maintained by the proposals, ensuring there will be no catchment transfer from existing.
- 6.23 Ordinary Watercourse Consent will need to be obtained for the new outfalls into the existing ditch at the detailed design stage.
- 6.24 Sections of the existing ditch network will require culverting / bridging at the locations where an access road and cycleway cross the existing ditch networks, which will require Ordinary Watercourse Consent. For culvert / bridging locations, refer to the surface water drainage strategy in Appendix J. A 1 m+ clearance from the top of bank to the road surface has been provided to allow for culvert embedment, freeboard and sedimentation in line with CIRIA C786 guidance. In addition to this, culverting is required to sections of the existing ditch adjacent to London Road to facilitate the roundabout junction, which will require Ordinary Watercourse Consent. The London Road ditch begins approximately 200m to the south of the London Road / Pewsham Way roundabout and continues on the southern side of the road, only collecting water from the adjacent highway via existing gully connections. The detailed culvert sizing, crossing design and ordinary watercourse consent matters will be addressed at reserved matters and detailed design stages.
- 6.25 To maintain the existing flow paths through the site, interception drains have been proposed adjacent to the access road to intercept runoff and discharge it to the existing ordinary watercourse, mimicking the existing situation. For interception drain locations, refer to the surface water drainage strategy in Appendix J.

Calculations & Results

- 6.26 The existing greenfield runoff rates for each catchment have been calculated using Causeway Flow.
- 6.27 Wiltshire Council's Drainage and Betterment Strategy states that 30% betterment over pre-development discharges must be provided for greenfield sites. Therefore, it is proposed to discharge surface water at 70% of the QBAR rate calculated.

- 6.28 The discharge rates for each catchment using FEH-22 data has been used and are provided in Table 6.1 below.

Catchment	Catchment Area (ha)	Hardstanding Area (ha)	Proposed Discharge Rate (l/s)	No. of Outfalls	Discharge Rate per Outfall (l/s)
01	22.030	7.690	25.41	2	12.70
02	2.980	1.148	3.85	2	1.92
03	0.910	0.374	1.26	1 (shared between Catchment 03, 04, 05)	8.19
04	2.140	0.765	2.59		
05	2.470	1.290	4.34		

Table 6.1: Discharge Rates for each Catchment

- 6.29 The rainfall data used in the model is from the Flood Estimation Handbook (FEH). For comparison purposes the model has been re-run using the Flood Studies Report (FSR) rainfall data, which is contained in Appendix M and demonstrates that the FEH data is more conservative.
- 6.30 The proposed drainage network has been modelled using Causeway Flow. The calculations demonstrate that the site is designed for up to and including the 1in100yr+45%CC storm event, refer to Appendix K. A 10% allowance for urban creep has been included in the calculations.

Exceedance Flows

- 6.31 In the event the capacity of the proposed surface water drainage network is exceeded, the excess water will follow the topography of the ground and flow overland into soft landscaping, greenfield land surrounding the site or towards the existing ditch network at an unrestricted rate, leaving properties unaffected.
- 6.32 An Overland Exceedance Flow Route plan has been produced and can be found in Appendix N.

Surface Water Treatment

- 6.33 Table 26.2 of the SuDS Manual identifies the pollution hazard level associated with the land uses within the Proposed Development as being 'Low'. On a scale from 0-1 a 'Low' pollution hazard level relates to the following pollution hazard indices (See table 26.2 of the SuDS Manual). This is applicable to individual property driveways and low traffic roads:
- Total Suspended Solids = 0.5
 - Metals = 0.4
 - Hydrocarbons = 0.4

- 6.34 Table 26.3 of the SuDS Manual sets out the indicative mitigation indices provided by different SuDS features for discharges to surface water.

Permeable Paving

- 6.35 The driveways will be constructed using permeable paving allowing the rainwater falling onto permeable areas to be treated by the microorganisms as it passes through drainage medium, see Figure 6.2 below.
- 6.36 Permeable paving provides sufficient pollution mitigation for runoff from low hazard land uses and provides mitigation indices of 0.7, 0.6 and 0.7, which are in excess of the requirement set out in paragraph 6.33.

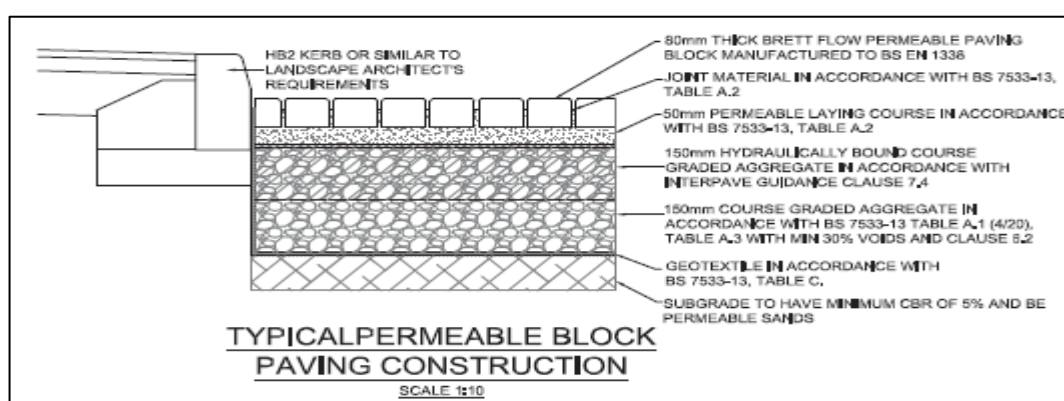


Figure 6.2: Typical Permeable Block Paving Construction

Swales

- 6.37 The swales help to improve the water quality through the removal of polluting suspended solids through filtration and sedimentation.
- 6.38 Swales provide adequate pollution mitigation for runoff from low hazard land uses and provides mitigation indices of 0.5, 0.6 and 0.6, which are also in excess of the hazard requirements set out in paragraph 6.33.

Attenuation Basins

- 6.39 The attenuation basins will provide treatment by retaining run-off from small events reducing contaminant load via volumetric control. Residual runoff is also treated through the settling of particulates at the bottom of the pond and some filtration will occur through the vegetation in the basin.
- 6.40 Residence time in the basins will be provided in accordance with CIRIA C753 guidance, and therefore, the attenuation basins provide mitigation indices of 0.5, 0.5 and 0.6 which are also in excess of the hazard requirements set out in paragraph 6.33.

Adoption and Maintenance

- 6.41 The proposed surface water network will be offered for adoption, which should enable tight control over the operation and maintenance of the drainage/SuDS systems on site.

Design Criteria

- 6.42 The positive drainage will be designed in accordance with Design and Construction Guidance, BS EN 752 – Drain and Sewer Systems Outside Buildings and the Building Regulations - Part H (2015).
- 6.43 The surface water network design and rate of surface water run-off is based on the Flood Estimation Handbook data downloaded from the FEH Web Services.
- 6.44 All Attenuation Basins provide a minimum of 300mm freeboard, refer to Appendix K for the Causeway Flow calculations.
- 6.45 The positive surface water system would be designed such that:
- The pipes remain unsurcharged during the 1 in 2 year design storm;
 - The system should not flood during the worst case 1 in 30 year storm with a free outfall;
 - The surface water run-off from the proposed development would be contained on site for up to and including the worst case 1 in 100 year storm event, plus an additional 45% increase in peak rainfall intensity for climate change;
 - The pipe velocities are such that self-cleansing is achieved at lesser more moderate storm intensities: -
 - Pipe roughness (ks) = 0.6
 - Minimum pipe velocity at full flow = 0.75m/s
 - Percentage Impermeable areas:
 - Buildings = 100%
 - Carriageways, footpaths and parking = 100%
 - Private and Communal Parking = 100%
 - Soft Landscaping = 0%
- 6.46 Cross sections and long section drawings of the attenuation / drainage features will be provided at the reserved matters stage.

7 Foul Drainage

Existing Foul Drainage

- 7.1 The topographic survey does not identify any manholes associated with a foul network within the site boundary.
- 7.2 The Wessex Water sewer records (Appendix E) show a rising main that runs across the site from east to west. There is also a public foul sewer that runs along Pewsham Way to the west of the site.

Proposed Layout

- 7.3 With regard to the existing foul rising main which runs across the northern part of the site, it is proposed that this will be diverted under a S185 agreement with Wessex Water.
- 7.4 It is proposed that the development will discharge foul water to the existing Wessex Water foul sewer that runs along Pewsham Way.
- 7.5 The foul flows will drain via gravity to a pump station on site. The foul effluent will then be pumped to a demarcation chamber before discharging to the Wessex Water foul sewer.
- 7.6 The location of the wet well of each foul pump station will be located at least 15m from any habitable building.

Proposed Discharge Rates

- 7.7 The proposals are for up to 600 residential properties and a local centre with a building footprint of 262m².
- 7.8 Using the Design and Construction Guidance calculation method for residential development, 4000 litres per dwelling per day, a peak flow of up to 27.78l/s will be generated:
- Peak flow: $(600 \times 4000) / 86,400 = 27.78\text{l/s}$
- 7.9 The foul flows from the local centre have been calculated using the design flows in the Design and Construction Guidance:
- 0.6 litres per second per hectare: $0.6 \times 0.0262 = 0.016\text{l/s}$
- 7.10 This generates a total peak foul flow rate from the development of approximately 27.80l/s.

- 7.11 A capacity check has been submitted to Wessex Water to confirm there is sufficient capacity within their network to accept the flow from the development. The response from Wessex Water is located in Appendix O.
- 7.12 A section 106 application to connect will be made to Wessex Water at the detailed design stage in order to gain permission to connect to the public sewer.

Design Criteria

- 7.13 The proposed foul sewers will be designed in accordance with the Design and Construction Guidance, BS EN 752 – Drain and sewer systems outside buildings and Building Regulations - part H (2015).

Adoption and Maintenance

- 7.14 The proposed foul network will be offered for adoption. This should enable tight control over the operation and maintenance of the drainage systems on site.

8 Conclusion

- 8.1 The EA flood maps indicate that the site is located in a low risk Flood Zone 1 area so the proposed levels will be dictated by boundary and engineering constraints as opposed to a predicted fluvial or tidal flood level.
- 8.2 Following the introduction of mitigation measures, the development is at a low risk from flooding from the following sources: Fluvial, Tidal, Groundwater, Surface Water and Infrastructure Failure (see Table 8.1):

Flood Mechanism	Source	Flood Risk to the Development	Mitigation Required?
Fluvial	N/A	Low	No
Tidal	N/A	Low	No
Groundwater	Underlying geology and groundwater levels	Low	Floor levels set above existing ground levels.
Surface Water / Overland Flow	Runoff from surrounding elevated land.	Low	Proposed SuDS drainage system to capture and control on-site surface water flows to 70% QBAR providing betterment. Interception drainage proposed adjacent access roads to re-direct flows into the watercourse – mimicking the existing situation. Suitable vertical clearance provided above the top of bank at any ditch / ordinary watercourse crossing locations to ensure design flows can be accommodated.
Infrastructure Failure	Surface water systems, water mains and reservoirs	Low	No

Table 8.1: Flood Risk Summary

- 8.3 It is proposed to discharge surface water into the existing ditch network at 70% QBAR greenfield runoff rates, resulting in betterment.
- 8.4 The SuDS features will ensure excess water will be safely contained within the site boundary for all storm events up to and including the 1 in 100-year event plus 45% Climate Change.
- 8.5 In the event the capacity of the proposed surface water drainage network is exceeded, the excess water will follow the topography of the ground and flow overland into soft

landscaping, greenfield land surrounding the site or towards the existing ditch network at an unrestricted rate, leaving properties unaffected.

- 8.6 It is proposed to discharge foul effluent from the development to the existing Wessex Water foul sewer that runs along Pewsham Way via a new rising main.
- 8.7 Therefore, having completed this Flood Risk Assessment and Drainage Strategy, the conclusion is that the proposed development at Land at Forest Farm, Chippenham, can be safely implemented without increasing the risk of flooding to downstream/surrounding properties.

APPENDIX A: EA Flood Zones Map

ENVIRONMENT AGENCY FLOOD MAP

(June 2026)

Forest Farm, Chippenham



Wiltshire Council, Post code: SN15 3RP Co-ords: E393854, N171774

1. Floodplain

A floodplain is the area that would naturally be affected by flooding if a river rises above its banks, or high tides and stormy seas cause flooding in coastal areas.

There are two different kinds of area shown on the Flood Map. They can be described as follows:

- **Flood Zone 3**  shows the area that could be affected by flooding, either from rivers or the sea, if there were no flood defences. This area could be flooded:
 - from the sea by a flood that has a 0.5% (1 in 200) or greater chance of happening each year;
 - or from a river by a flood that has a 1% (1 in 100) or greater chance of happening each year.
- **Flood Zone 2**  shows the additional extent of an extreme flood from rivers or the sea. These outlying areas are likely to be affected by a major flood, with up to a 0.1% (1 in 1000) chance of occurring each year.

These two colours show the extent of the natural floodplain if there were no flood defences or certain other manmade structures and channel improvements.

- Where there is no blue shading, this shows the area where flooding from rivers and the sea is very unlikely. There is less than a 0.1% (1 in 1000) chance of flooding occurring each year.

2. Flood Defences

- The purple line  shows all flood defences built in the last five years to protect against river floods with a 1% (1 in 100) chance of happening each year, or floods from the sea with a 0.5% (1 in 200) chance of happening each year, together with some, but not all, older defences and defences which protect against smaller floods. Flood defences that are not yet shown, and the areas that benefit from them, will be gradually added.
- Hatched areas  benefit from the flood defences shown, in the event of a river flood with a 1% (1 in 100) chance of happening each year, or a flood from the sea with a 0.5% (1 in 200) chance of happening each year. If the defences were not there, these areas would be flooded.

3. Main Rivers

The blue line shows the main rivers, these are usually larger streams and rivers.

APPENDIX B: EA Surface Water Flood Risk Map

ENVIRONMENT AGENCY SURFACE WATER FLOOD MAP
(June 2026)
Forest Farm, Chippenham



Wiltshire Council, Post code: SN15 3RP Co-ords: E393854, N171774

Risk of Flooding from Surface Water

Surface water flooding happens when rainwater does not drain away through the normal drainage systems or soak into the ground, but lies on or flows over the ground instead.

The shading on the map shows the risk of flooding from surface water in this particular area.

There are four different kinds of area shown on the Flood Map. They can be described as follows:

- High Risk Area – Each year this area has a greater than 1in30 (3.3%) chance of flooding from surface water:
- Medium Risk Area – Each year this area has between a 1in100 and a 1in30 (1%-3.3%) chance of experiencing flooding from Surface Water:

APPENDIX C: Topographic Survey



Station Schedule:			
	394195.738	171808.953	56.468
	394193.364	171806.739	56.408
ASE	393887.970	171590.640	57.040
	394193.919	171807.372	56.407
	394421.067	171749.043	55.474
	393950.604	171980.898	58.696
	393542.578	172013.244	64.012
	393691.628	172188.835	64.716
	393584.644	172336.410	65.591
	393377.498	171851.648	59.321
	393329.279	171795.912	58.097
	393405.432	171821.385	58.198
	393426.675	171810.472	58.358

Notes:

GPS (OSGB36) Co-Ordinates & Levels Used.

GNSS Scale factor used 1.000

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LEGEND:

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Revisions:

A	Farm Buildings & Paddocks added. 19/08/2015 J.A.E
B	Highway Road Extents added along London Road, 28/08/2015 J.A.E
C	TRIAL PTS ADDED 28/8/2015 - JHP
D	Public footpath added 6th Jan 2025 - JHP
E	



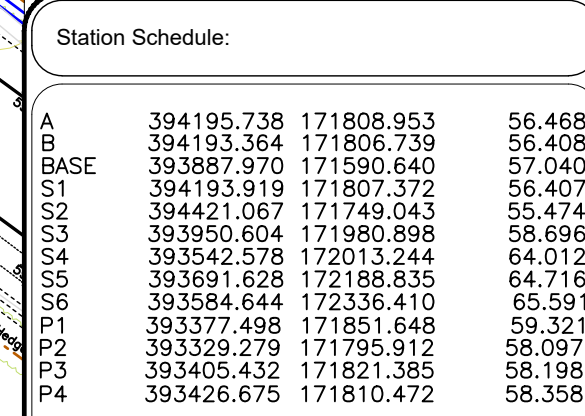
Land & Hydrographic Surveyors
8 Oldfield Road, Bocam Park, Pencoed, Bridgend, CF35 5LJ
Tel: 01656 865566
Web: www.healstersurveys.co.uk

Project:
Forest Farm, Chippenham

Site Survey

Date: 28th August 2015

AE	RE	P2378D
Head No. of 9	Sheet Size A0	



Notes:

GPS (OSGB36) Co-Ordinates & Levels Used.

GNSS Scale factor used 1.000

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LEGEND:

	→ Right		← Left
	↑ Up		↓ Down
	↗ Surface Edge		↘ Edge
	↖ Face		↙ Left Face
	↗ Ability		↘ Left Ability
	↖ Ability		↙ Right Ability
	↗ Experiment		↘ Electricity Path
	↖ Experiment		↙ Labeled
	↗ Crash Border		↘ Electricity Path
	↖ Crash Border		↙ Labeled
	↗ New Capacity		↘ New Capacity
	↖ New Capacity		↙ New Capacity
	↗ Stop Sign		↘ Stop Sign
	↖ Stop Sign		↙ Stop Sign
	↗ Newborn Road Rating		↘ Newborn Road Rating
	↖ Newborn Road Rating		↙ Newborn Road Rating
	↗ Bus Shelter		↘ Bus Shelter
	↖ Bus Shelter		↙ Bus Shelter
	↗ Road Sign		↘ Road Sign
	↖ Road Sign		↙ Road Sign
	↗ Road Sign		↘ Road Sign
	↖ Road Sign		↙ Road Sign
	↗ Front Face		↘ Side Wall
	↖ Front Face		↙ Side Wall
	↗ Back Wall		↘ Back Wall
	↖ Back Wall		↙ Back Wall
	↗ Newborn Sign		↘ Newborn Sign
	↖ Newborn Sign		↙ Newborn Sign
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Revisions:	
A	Farm Buildings & Paddocks added: 19/08/2015 J.A.E
B	Highway Road Extents added along London Road. 28/08/2015 J.A.E
C	TRIAL PITS ADDED 28/9/2015 - JHP
D	Public footpath added 6th Jan 2025 - JHP
E	



Client Gleeson Homes	
Project Forest Farm, Chippenham	
Drawing Site Survey	
Scale 1:500	Date 28th August 2015
Surveyed/Drawn J.A.E	Checked R.E.
Sheet No. 2 of 9	Sheet Title A0
P2378D	



Station Schedule:

A	394195.738	171808.953	56.468
B	394193.384	171806.739	56.405
BASE	393887.970	171790.640	57.040
S1	394193.919	171807.372	56.407
S2	393462.587	171790.893	56.474
S3	393500.804	171799.895	56.699
S4	393542.578	172013.244	64.072
S5	393597.625	172005.625	64.714
S6	393584.644	172136.410	60.591
S11	393377.498	171851.648	55.321
P1	393329.279	171750.912	58.097
P3	393405.432	171821.365	58.184
P4	393426.675	171810.472	58.358

Notes:

GPS (OSGB36) Co-Ordinates & Levels Used.
GNSS Scale factor used 1.000

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LEGEND:

Arch	BT British Telecom
Contour	Contour
Drainage	Drainage
Electricity	Electricity
Gas	Gas
Water	Water
Waste	Waste
Other	Other
...	...

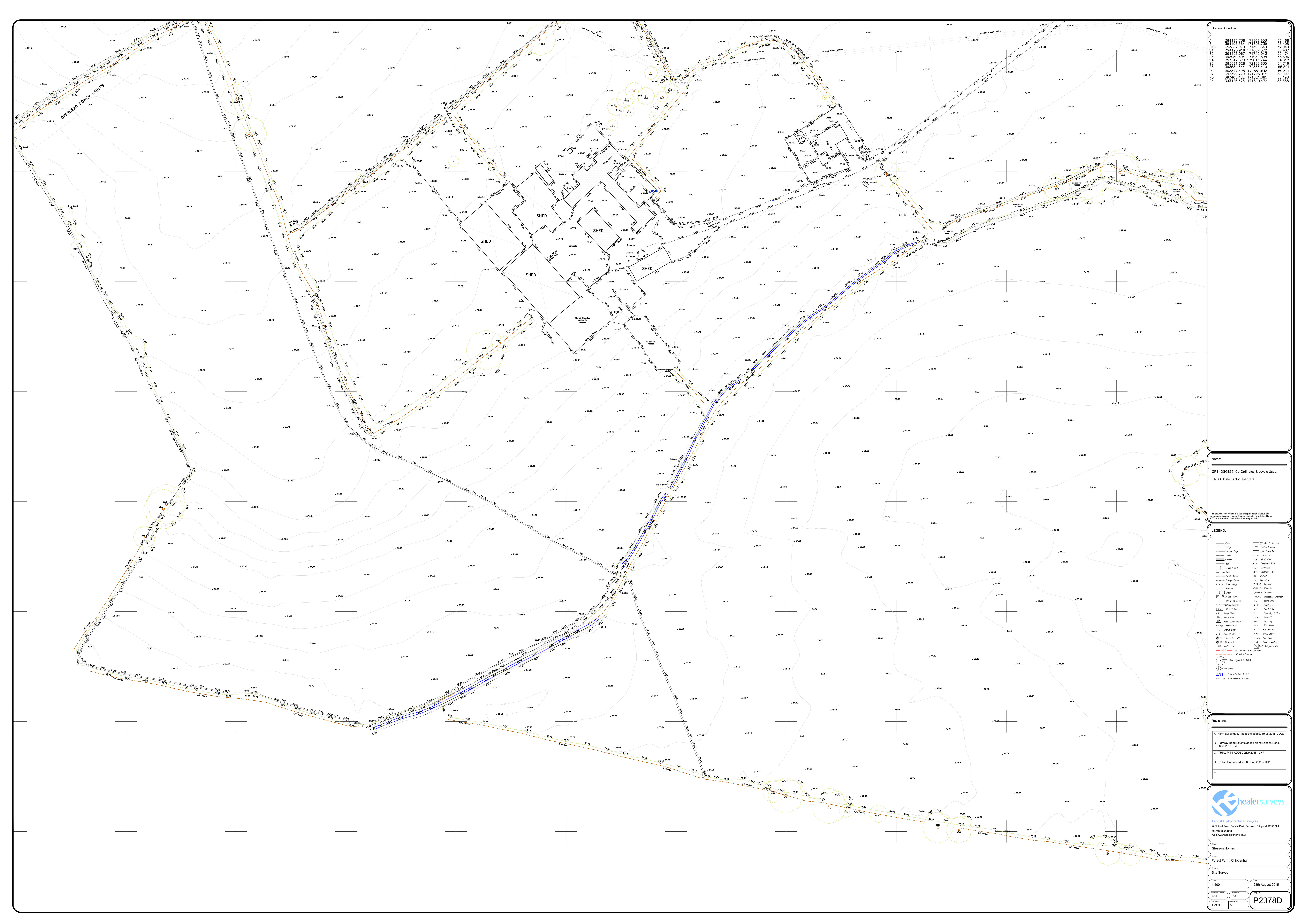
Revisions:

A	Form Buildings & Paddocks added. 19/08/2015 - J.A.E
B	Highway Road Scheme added along London Road. 26/08/2015 - J.A.E
C	TRIAL PITS ADDED 28/09/2015 - JHP
D	Public footpath added 6th Jan 2025 - JHP
E	

healersurveys

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Client: Gleeson Homes
Project: Forest Farm, Chippenham
Drawing: Site Survey
Scale: 1:500
Date: 28th August 2015
Drawn: J.A.E
Checked: J.P.E
3 of 9
P2378D



Station Schedule:			
A	394195.738	171808.953	56.468
BASE	394193.364	171806.739	56.408
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E	393950.804	171980.898	58.968
F	394202.478	172013.244	64.014
G	393691.628	172188.835	64.716
H	393584.644	172336.410	65.591
I	393377.498	171851.648	59.321
J	393329.279	171795.912	58.097
K	393405.432	171821.385	58.198
L	393426.675	171810.472	58.588

Notes:

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B	Highway Road Extents added along London Road. 26/08/2015 - J.A.E
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