

Flood Risk Assessment & Drainage Strategy
Land at Little Meadow, Bilsham Road,
Yapton, BN18 0JYX

Ross Hymas

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1 INTRODUCTION

1.1 Background

- 1.1.1 BP Civils is instructed by Ross Hymas to prepare a flood risk assessment and drainage strategy to accompany a planning application for 1 no. residential property at Little Meadow, Bilsham Road, Yapton, West Sussex, BN18 0JY.
- 1.1.2 This report has been undertaken in accordance with National Planning Policy Framework (NPPF) and The Planning Practice Guidance Flood Risk and Coastal Change.
- 1.1.3 The surface water drainage strategy has been developed in view of the National Standards for Sustainable Drainage System (June 2025) and The SuDS Manual (CIRIA C753).
- 1.1.4 The proposed development will comprise 1 No. residential property. The architectural development proposal is contained within **Appendix A**.
- 1.1.5 In preparing this report, BP Civils has referred to the following documents and information:
- Environment Agency Flood Maps for Planning
 - Environment Agency Product 4 Data
 - Long Term Flood Risk Maps for Rivers or the Sea, Surface Water and Reservoirs
 - British Geological Survey (BGS) Information and Records
 - Land Science Site Investigation Site-Specific Intrusive Works
 - Arun District Council Strategic Flood Risk Assessment
 - West Sussex County Council Strategic Flood Risk Assessment
 - Southern Water Public Sewer Records
- 1.1.6 This report has been prepared to assess flood risk at the site, and to advise of any mitigation which may be required in order to ensure that the proposed development remains safe for its design life in accordance with current design standards.
- 1.1.7 This report has been prepared for the benefit of the named client only.

2 SITE LOCATION AND DESCRIPTION

- 2.1.1 A site location plan is included within this report.
- 2.1.2 The National Grid Reference is SU 97635 01939.
- 2.1.3 The site is located on the north of Bilsham Road, Yapton in the Arun district of West Sussex.
- 2.1.4 The site measures c. 1790m² (0.2Ha) and is located adjacent residential dwellings to the northwest and east, the south is grassed open space either side of the main road.
- 2.1.5 A topographical survey has been undertaken by J Brotherton & Partners, dated November 2025. The survey is contained within **Appendix B**.
- 2.1.6 The topographical survey identifies levels in the range of 3.5 to 4.5mAOD, being fairly flat but falling southerly towards the ordinary watercourse.
- 2.1.7 Drawing **PL002** has been prepared to demonstrate the general trends in topography at the site.

3 GROUND CONDITIONS

3.1.1 Review of British Geological Survey (BGS) mapping shows the site with a Bedrock geology of 'Lewes Nodular Chalk, Seaford Chalk, Newhaven Chalk, Culver Chalk Formation And Portsdown Chalk Formation (Undifferentiated)-Chalk. These sedimentary rocks are shallow-marine in origin. They are biogenic and detrital, generally comprising carbonate material (coccoliths), forming distinctive beds of chalk' bedrock **Figure 1)** and River Terrace Deposits (**Figure 2)**.

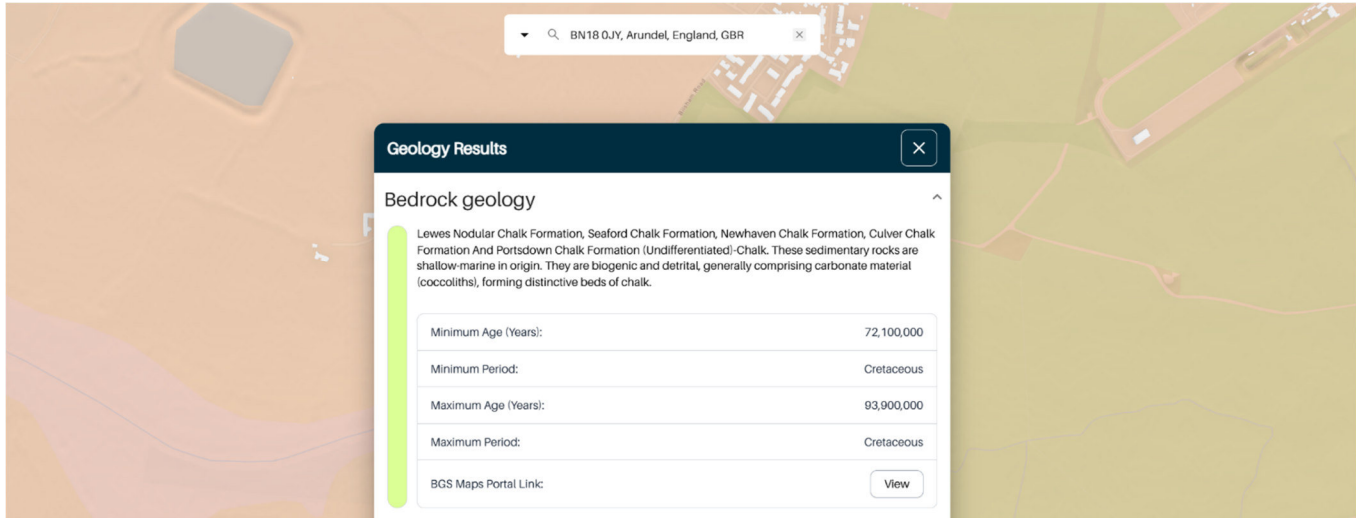


Figure 1. Bedrock Geology (BGS Viewer)

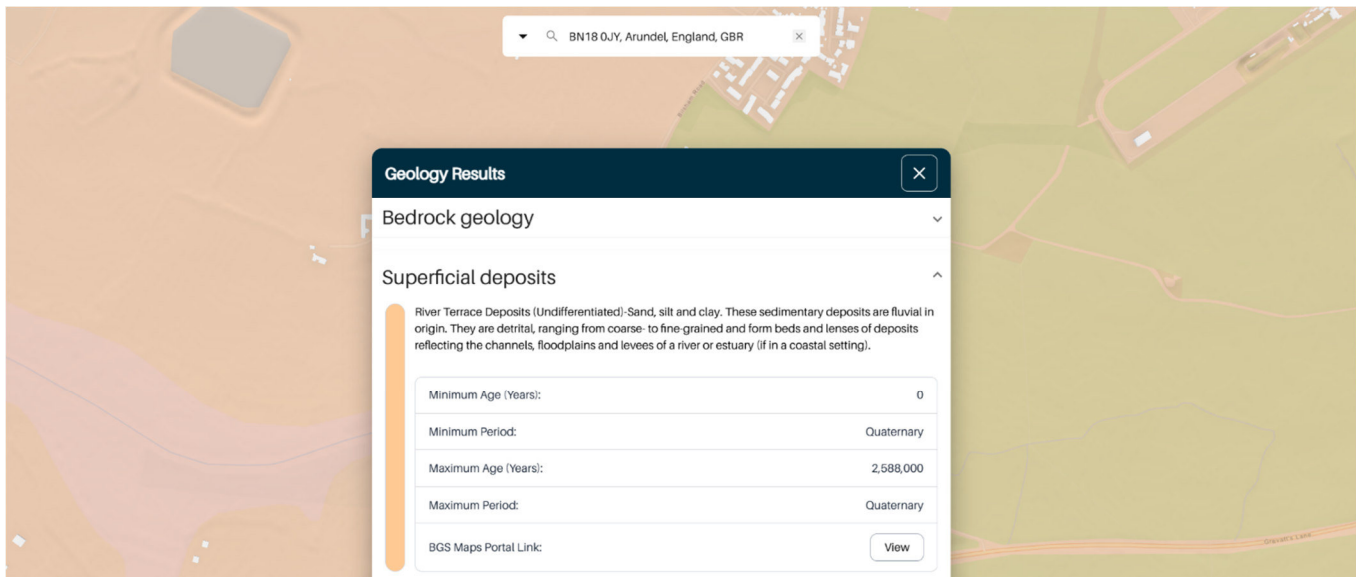


Figure 2. Superficial Deposits Geology (BGS Viewer)

3.1.2 A preliminary ground investigation was undertaken by Land Science advises the following strata:

Strata	Description	Base Depth (mbgl)
Topsoil	Brown slightly sandy slightly gravelly CLAY, with flint	0.30
River Terrace Deposits	Brown mottled grey sandy CLAY.	3.30
Chalk	Grey mottled white slightly sandy slightly gravelly SILT, with chalk clasts.	5.00

3.2 Groundwater

- 3.2.1 Groundwater monitoring was undertaken from January to March 26, once a week, and confirmed depths ranging from 0.7mbgl to 1.8mbgl; the peak of 0.7mbgl was recorded on 12/02/2026.
- 3.2.2 The Arun District Council Strategic Flood Risk Assessment contains groundwater mapping which identifies groundwater levels 'between 0.025m and 0.5m below the ground surface.' This mapping identifies the site as being in an area which is susceptible to groundwater flooding. Extracts from the Arun District Council Strategic Flood Risk Assessment can be found within **Appendix D**.
- 3.2.3 Mapping managed by MAGIC (magic.defra.gov.uk) provides geographic information concerning the natural environment from across government. This mapping tool has been referred to in order to confirm aquifer designations, as well as whether the site is located within any groundwater source protection zones, groundwater vulnerability zones, drinking water protected areas or drinking water safeguard zones.
- 3.2.4 The site falls within an area designated an 'Principal' bedrock aquifer, as well as a 'Secondary A' superficial drift aquifer.



Figure 4. Bedrock Aquifer Designation Map (DEFRA)

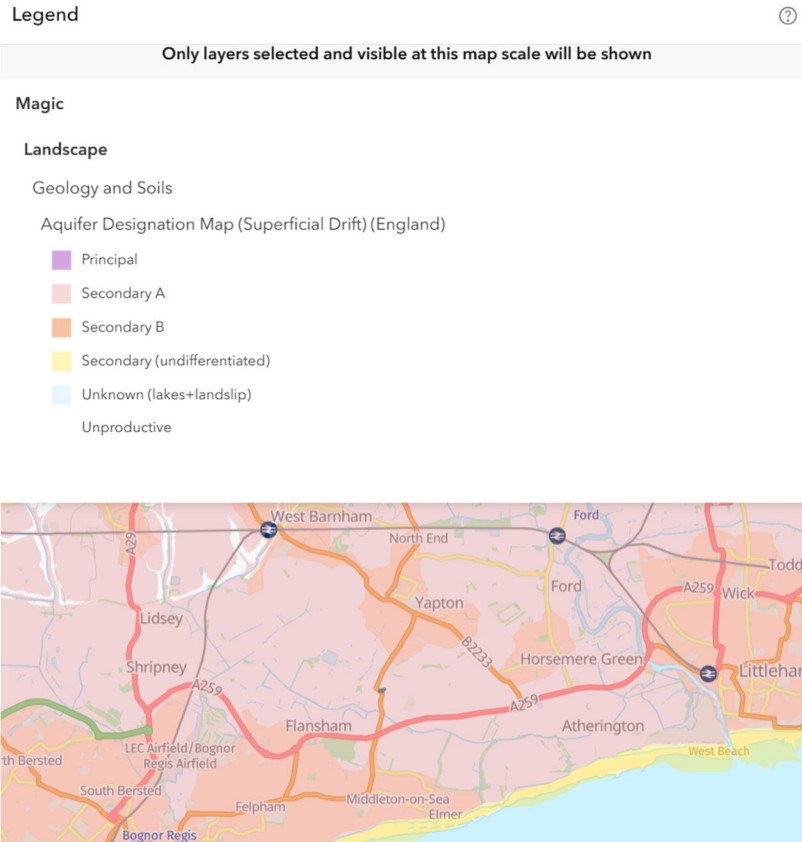


Figure 5. Superficial Drift Aquifer Designation Map (DEFRA)

3.2.5 The site in falls within a 'Medium - High' groundwater vulnerability zone.

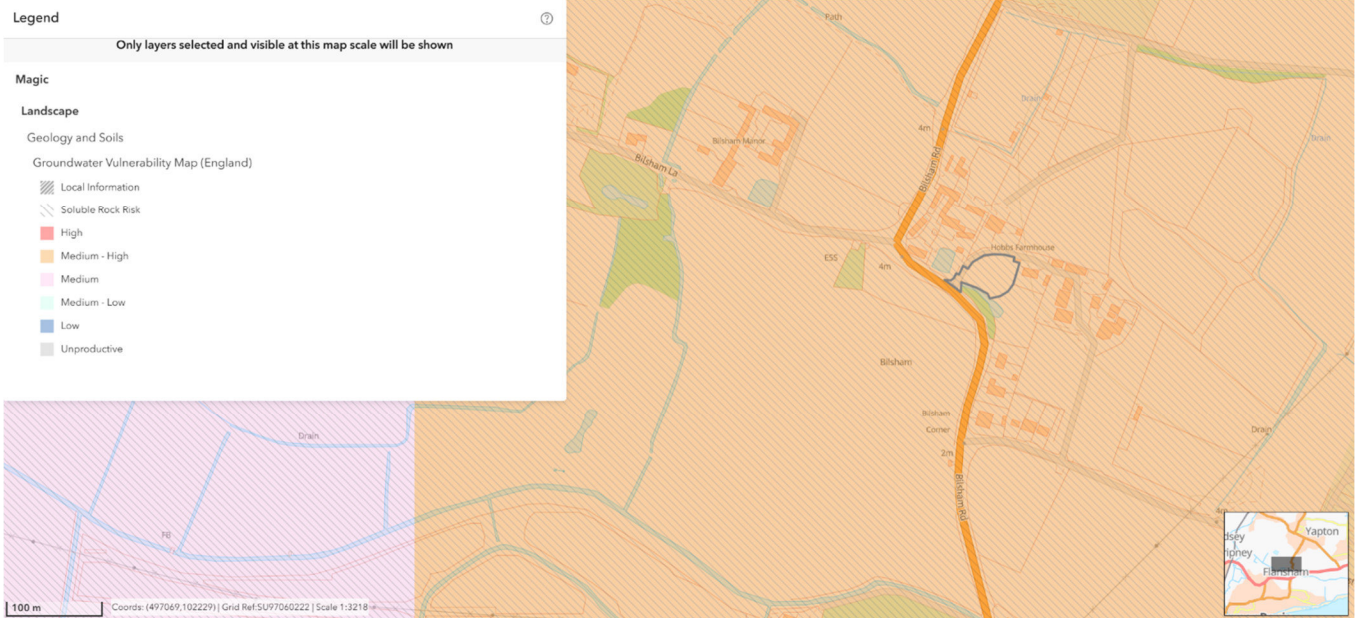
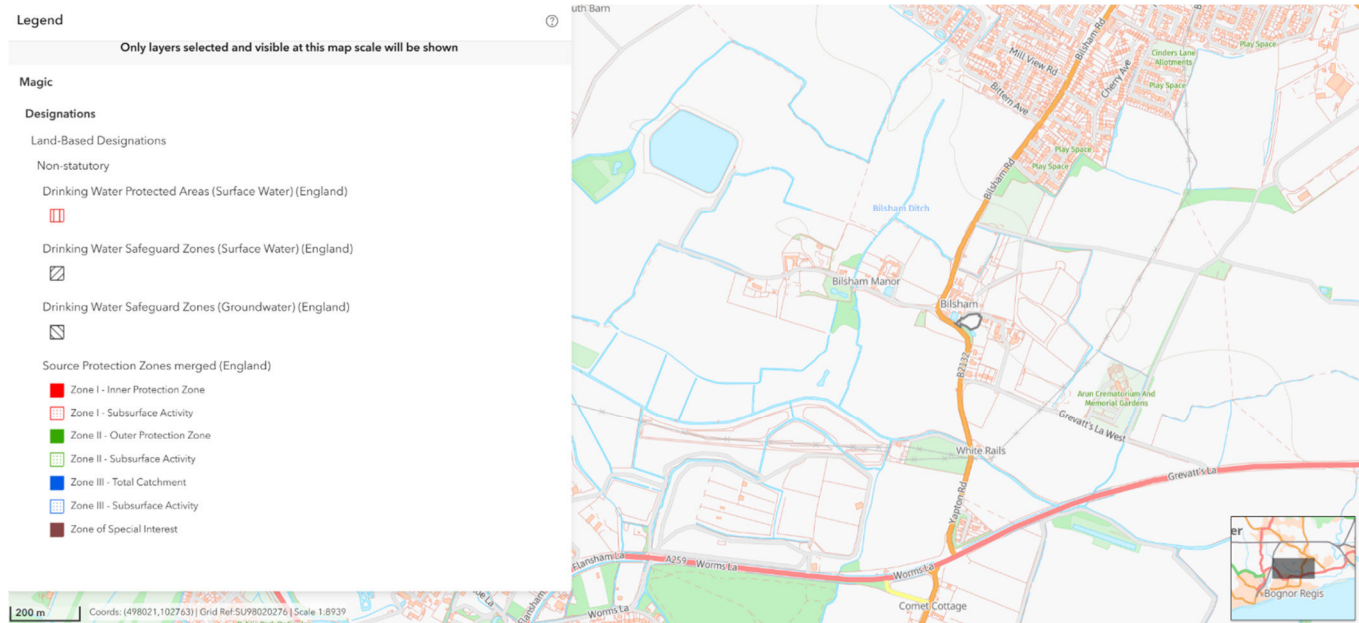


Figure 6. Groundwater Vulnerability Map (DEFRA)

3.2.6 The site is not indicated as within or in the vicinity of any drinking water protected areas, or any Source Protection Zones.



4 EXISTING DRAINAGE

4.1 Surface Water

- 4.1.1 The Southern Water public sewer records (**Appendix E**) show no public surface water sewers within the vicinity of the site. It is evident that there were no surface water or combined sewers in the vicinity that would support connection of private surface water runoff (and that a connection to the foul network would not be accepted).
- 4.1.2 There are no Environment Agency designated Main Rivers within the immediate vicinity of the site.
- 4.1.3 There is an ordinary watercourse running in parallel with Bilsham Road along the southern boundary of the site.
- 4.1.4 The existing site, which is greenfield, does not have any formal drainage, and drain via a combination of infiltration and runoff. The topographical survey however has identified an existing 225mm diameter pipe outfall within the watercourse. It is recommended that this is investigated further to establish connectivity.
- 4.1.5 Infiltration testing has not been completed noting that groundwater peak levels were less than 1.0mbgl.
- 4.1.6 A greenfield run-off rate has been established in relation to the site area (0.2 Ha.) using HR Wallingford's 'Greenfield run-off rate estimation' tool, included in **Appendix F**. The rate has been established as 0.41l/s (QBAR) (1yr – 0.4, 2yr – 0.4, 10yr – 0.7, 30yr – 1.0, 100yr – 1.3 200yr 1.6).

4.2 Foul Water

- 4.2.1 The Southern Water public sewer records (**Appendix E**) show no public foul water sewers within the vicinity of the site

4.3 Highway Drainage

- 4.3.1 Bilsham Road Avenue appears to be drained by highway gullies. It is understood that there is a highway drainage network in the public carriageway, but that this cannot support private runoff connections. It is anticipated that these road gullies discharge to the ordinary watercourse network.

5 PROBABILITY

5.1 Sources of Information

- 5.1.1 The NPPF requires that all sources of flooding are considered being tidal, fluvial, pluvial, groundwater, sewers and man-made reservoirs/canals.
- 5.1.2 The likelihood of the site flooding has been established by reviewing the following information:
- Environment Agency Flood Maps for Planning
 - Long-Term Flood Risk Map for Rivers or the Sea
 - Long-Term Flood Risk Map for Surface Water
 - Long-Term Flood Risk Map for Reservoirs
 - Consultation with the Environment Agency (Product 4)
 - Chichester District Council Strategic Flood Risk Assessment

5.2 Flood Maps and Modelling

- 5.2.1 The Environment Agency's (EA) revised Product 4 Response provided flood maps for rivers, sea and surface water as seen in **Appendix G**. The Product 4 response confirmed the site is in Flood Zone 1 (0.1% (1:1000 chance of flooding)), but within approximately 235m of Flood Zones 2 & 3 to the south of the site. Therefore, the likelihood of flooding from rivers and sea in this area is estimated as 'low'.

Flood Zone	Definition
Zone 1 Low Probability	Land having a less than 1 in 1,000 annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map – all land outside Zones 2 and 3)
Zone 2 Medium Probability	Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. (Land shown in light blue on the Flood Map)
Zone 3a High Probability	Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding. (Land shown in dark blue on the Flood Map)
Zone 3b The Functional Floodplain	This zone comprises land where water has to flow or be stored in times of flood. Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map)

- 5.2.2 The modelled food outlines show the site to be wholly outside the 0.5% AEP defended and undefended scenarios.
- 5.2.3 The site is identified as being at future flood risk in respect of climate change (2070 to 2125). The Environment Agency has advised that they 'do not hold any suitable model data for use in a Flood Risk Assessment.' In view of the above, it is not possible to ascertain an accurate flood level in respect of Flood Zones 2 and 3, or the areas identified as being at future flood risk in respect of climate change

(2070 to 2125).

5.2.4 The EA also confirmed in their response the site is at very low risk of surface water flooding. The accompanying surface water flood map shows there are no immediate risks within the confines of the site.

5.2.5 The Product 4 response made no mention of groundwater or artificial flood risk to the site.

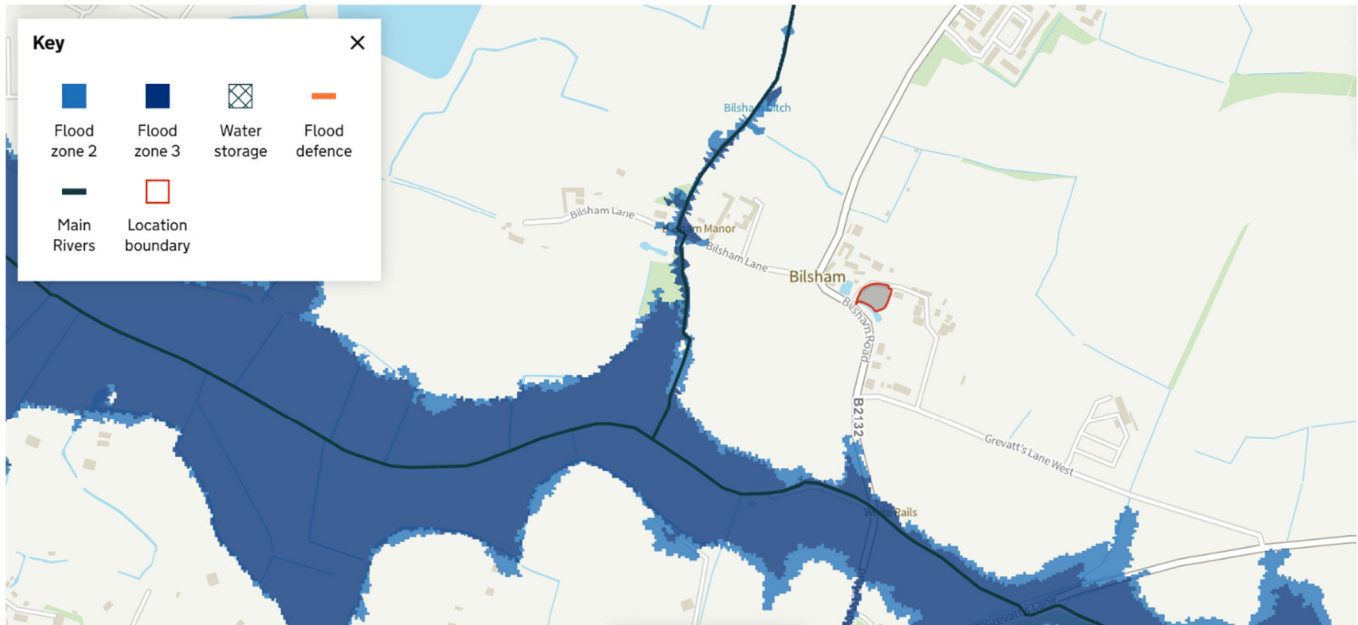


Figure 8a. Flood Map for Planning – Flood Zones (Present Day)

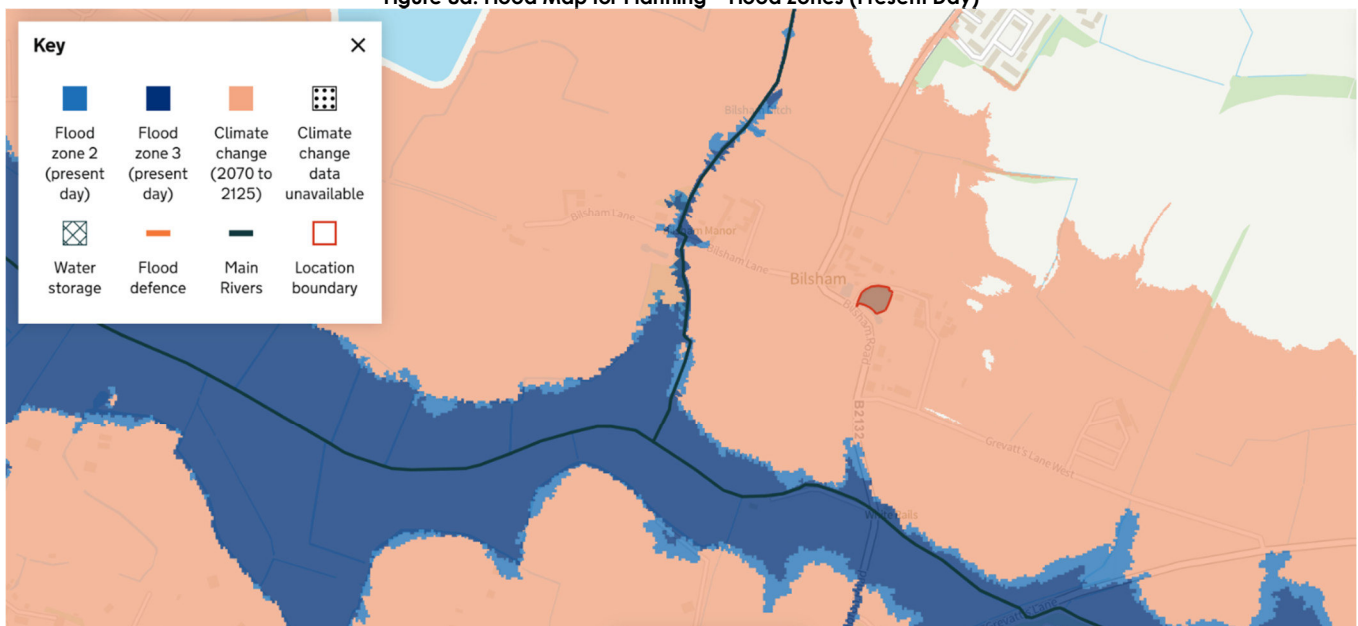


Figure 8b. Flood Map for Planning – Flood Zones (Climate Change)

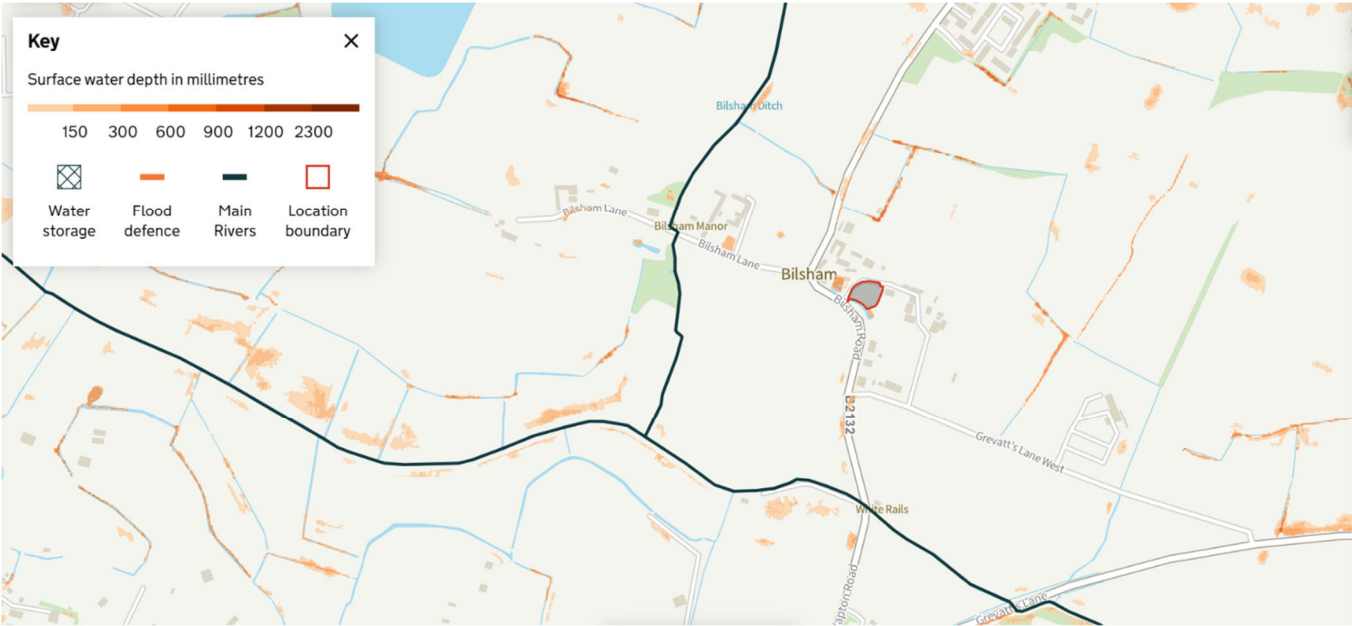


Figure 9. Flood Map for Planning – Surface Water 1:30yr

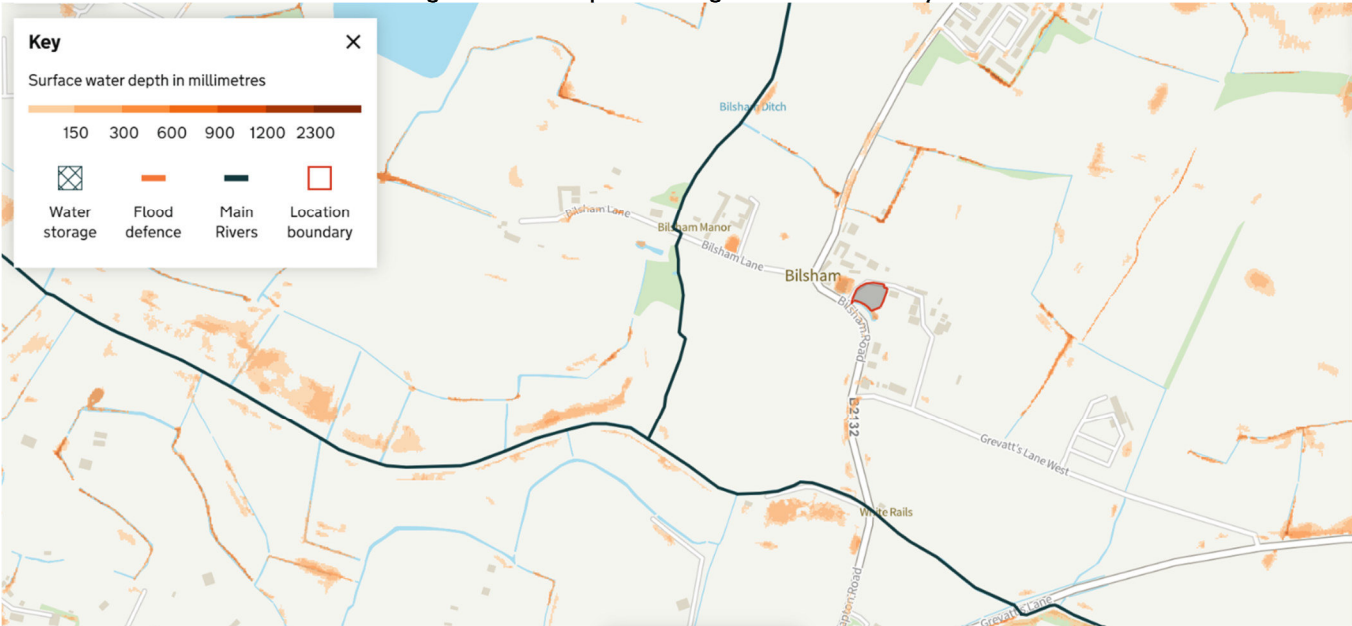


Figure 10. Flood Map for Planning – Surface Water 1:100yr

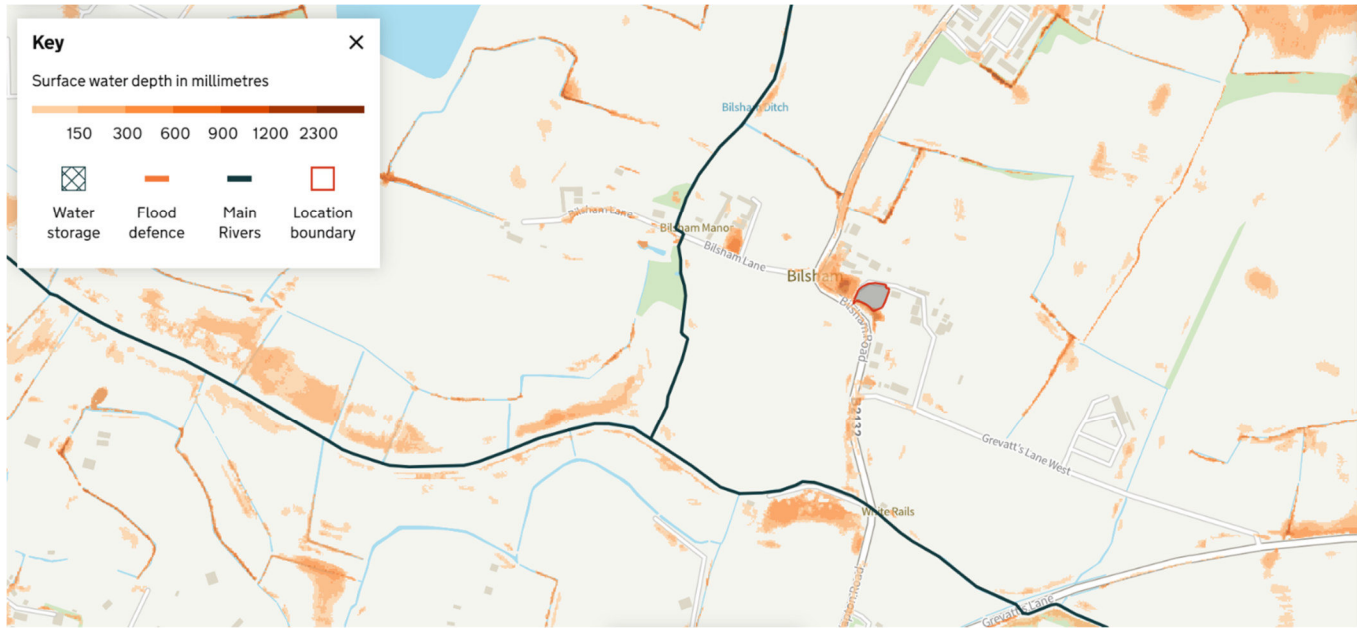


Figure 11. Flood Map for Planning – Surface Water 1:1000yr

5.3 Strategic Flood Risk Assessment

- 5.3.1 The Arun District Council SFRA shows that there has not been any historic flooding in the site vicinity, with the only identified flood events in the area due to drainage failure. The climate change flood mapping demonstrates the same findings of the EA Product 4 data.
- 5.3.2 The SFRA does not show the site to be vulnerable to surface water flooding, either in the present or as a result of climate change. The site is however shown to be in an area with groundwater levels 'between 0.025m and 0.5m' below the ground surface, which would limit infiltration drainage strategy potential.

5.4 Historic Flooding

- 5.4.1 No instances of historic flooding have been identified from the sources of information reviewed in the preparation of this flood risk assessment within the bounds of the site.
- 5.4.2 The Environment Agency did not identify any historic flood events in the vicinity of the site.

5.5 Summary of Flood Risk

5.5.1 The potential sources of flooding are:

Source of Flooding	Level of Risk
Rivers and Coastal	Medium The site is essentially located within Flood Zone 1 in the present, and an increased risk of flooding in the future (climate change).
Surface Water	Very Low The long-term flood risk for surface water is classified as 'very low' across the site location.
Groundwater	Low Although groundwater levels are expected to be shallow, the site is not considered to be at risk of groundwater flooding.
Sewers	Low There are no surface water sewers within the vicinity of the site, no previous reports of sewer flooding found and no areas of surface water flooding that would indicate areas of highway drainage at risk of being surcharged. In view of this information the risk of flooding from this source is deemed to be 'Low'.
Artificial Sources	None The site is not shown to be at risk of flooding due to artificial sources.

5.5.2 The site has been assessed as being at 'Very Low' or 'Low' risk of flooding in respect of the above potential sources of flood risk.

5.5.3 Mitigation shall be afforded to ensure that the proposed development remains safe for its design life, in view of current day information available.

6 PROPOSED DEVELOPMENT

6.1 Description of Development

- 6.1.1 The proposed development will involve the construction of 1 No. residential property. Development proposals are contained within **Appendix A**.
- 6.1.2 The type of development falls within the 'More Vulnerable' classification (Flood Risk and Coastal Change Table 2) and requires an Exception Test within Flood Zone 1 (Flood Risk and Coastal Change Table 3).

Flood Zones	Flood Risk Vulnerability Classification				
	Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
Flood Zone 1	✓	✓	✓	✓	✓
Flood Zone 2	✓	Exception Test Required	✓	✓	✓
Flood Zone 3a†	Exception Test Required †	✗	Exception Test Required	✓	✓
Flood Zone 3b*	Exceptions Test Required *	✗	✗	✗	✓*
✓ = Development is appropriate ✗ = Development should not be permitted					

- 6.1.3 The proposed development will result in the introduction of new impermeable areas at the site.
- 6.1.4 The post-development impermeable area (**PL003**) has been determined to be 293m² (0.029Ha).
- 6.1.5 The proposals will include a permeable pavement to capture, treat and slow runoff from the site and will discharge the surface water to an ordinary watercourse.
- 6.1.6 The specific surface water and foul water drainage proposals are detailed in **Section 8** of this report.

7 SEQUENTIAL AND EXCEPTION TESTS

7.1 Sequential Test

- 7.1.1 Paragraph 024 of Flood Risk and Coastal Change confirms that 'The Sequential Test ensures that a sequential, risk-based approach is followed to steer new development to areas with the lowest risk of flooding, taking all sources of flood risk and climate change into account. Where it is not possible to locate development in low-risk areas, the Sequential Test should go on to compare reasonably available sites; within medium risk areas; and then, only where there are no reasonably available sites in low and medium risk areas, within high-risk areas.'
- 7.1.2 Paragraph 175 of the National Planning Policy Framework (NPPF) states that '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).'
- 7.1.3 The proposed development is located within Flood Zone 1 for the purposes of the proposed development scheme and mitigated by SuDS design, the Sequential Test is not required to be undertaken.

7.2 Exception Test

- 7.2.1 Paragraph 031 of Flood Risk and Coastal Change states 'The Exception Test requires two additional elements to be satisfied (as set out in paragraph 164 of the National Planning Policy Framework) before allowing development to be located or permitted in situations where suitable sites at lower risk of flooding are not available following application of the sequential test. It should be demonstrated that; development that has to be in a flood risk area will provide wider sustainability benefits to the community that outweigh flood risk; and the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.'
- 7.2.2 In light of the above therefore application of the exception test is not required.

8 PROPOSED SURFACE WATER DRAINAGE STRATEGY

8.1.1 The National Standards for Sustainable Drainage Systems (June 2025) detail principles and standards for the management of surface water run-off for new infrastructure and development.

8.1.2 There are two types of standards:

- i. The hierarchy standard (Standard 1) gives criteria for prioritising the choice of final run-off destination
- ii. Fixed standards (Standards 2 to 7) state the minimum design criteria that all surface water drainage systems should satisfy and how they should be built, maintained and operated.

Both types of standards have accompanying requirements which provide details on how to interpret, deliver and evaluate each standard.

8.1.3 The seven standards are complementary, and the delivery of each standard should support delivery of the other standards. A surface water drainage system design that delivers multiple benefits will include a range of features and each of these should contribute to the delivery of several, if not all, of the standards.

8.1.4 There may be specific circumstances or constraints, such as the type or size of a development that mean it is not possible to deliver one or more of the standards. In these circumstances the opportunity to meet the standard shall be maximised and justification be developed in consultation with the approving body, who may agree to a departure unless regulatory controls prohibit such a departure.

8.1.5 The National Standards for Sustainable Drainage Systems can be viewed at <https://www.gov.uk/government/publications/national-standards-for-sustainable-drainage-systems/national-standards-for-sustainable-drainage-systems-suds>

8.2 Standard 1: Run-off Destinations

A 'SuDS approach' shall be adopted to address the management of surface water by the development and where it should be discharged. Runoff shall be treated as a resource and managed in a way that avoids negative impacts of the development on flood risk, the morphology and water quality of receiving waters and the associated ecology.

Runoff from the development shall be discharged to the following final destinations, to the maximum extent practicable, in accordance with the below hierarchy:

- Collected for non-potable use
- Infiltrated to ground
- Discharged to an above ground surface water body
- Discharged to a surface water sewer, or another piped surface water drainage system
- Discharged to a combined sewer
- To utilise a lesser priority final destination, appropriate evidence shall be provided that demonstrates all higher priority final destinations have been utilised to the maximum extent practicable.

Note 1: priority 1 is the highest priority and priority 5 is the lowest.

Note 2: for the purposes of this standard, a combined sewer is a sewer intended to receive both foul sewage and surface runoff and does not include a sewer intended to receive only foul sewage, even if it has the capacity to accommodate additional flows or has an element of surface water in it already.

To utilise a lesser priority final destination, appropriate evidence shall be provided that demonstrates all higher priority final destinations have been utilised to the maximum extent practicable. Higher cost alone shall not be a reason to utilise lower priority final destinations.

Where more than one final destination is utilised, each final destination's ability to accept runoff shall be maximised in order of priority.

- 8.2.1 Potential run-off destinations have been considered, in accordance with the hierarchy detailed within the National Standards for Sustainable Drainage Systems (June 2025), in respect of the proposed development:

Run-off Destination	Viable?	Justification
Collected for non-potable use	Yes	Standard 1 states that rainwater harvesting shall be considered where there is a demand for non-potable water, as well as if there is a need for landscape irrigation. The site is suitable for rainwater re-use and will be proportionate to the scale of development. Traditional rainwater butts are to be provided in conjunction with SuDS Planters. Other features will be considered at detailed design stage in coordination with the landscaping plan.
Infiltrated to ground	No	Shallow groundwater levels have been recorded on site. West Sussex County Council (Lead Local Flood Authority) accepts that infiltration is not viable, as confirmed through the pre-application advice service utilised.
Discharged to an above ground surface water body	Yes	Highest ranking potential run-off destination.
Discharged to a surface water sewer, or another piped surface water drainage system	No	No surface water sewers exist within the vicinity of the site.

Discharged to a combined sewer	No	No combined sewers exist within the vicinity of the site.
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- 8.2.2 Rainwater re-use can be incorporated into the proposed design. Rainwater butts are to be provided in conjunction with SuDS Planters.
- 8.2.3 Shallow groundwater levels have been encountered on site, therefore infiltration is not viable as a means of draining the site (which has been acknowledged / agreed by WSCC LLFA in Pre-App consultations).
- 8.2.4 It is proposed that collected run-off will be attenuated on site, with a restricted discharge to the ordinary watercourse network within the vicinity of the site as demonstrated by drawing **PL007**.
- 8.2.5 Attenuation will be provided in the form of a tanked permeable paving for the hardstanding area.
- 8.2.6 Run-off will be simulated storm events, up to and including the 1 in 100-year event, inclusive of climate change allowances.
- 8.2.7 Consideration has also been afforded as to the SuDS methods and techniques which can be introduced to support the development:

SuDS Method / Technique	Suitable	Comments
Green roofs or walls	No	Not suited to existing building being retained.
Rainwater harvesting systems	TBC	The level of rainwater harvesting / re-use is to be confirmed by client.
Soakaway or infiltrations systems	No	Ground conditions dictate the infiltration methods and techniques are not viable.
Permeable surfaces	Yes	Permeable paving is appropriate to provide attenuated storage in addition to water quality benefits.
Swales and filter strips	No	Not suited to scale of development.
Basins and ponds (such as wetlands, balancing ponds, detention basins, retention ponds)	No	Not suited to scale of development.
Tanked systems	No	Not suited to scale of development. (Depth restrictive)

8.3 Standard 2: Management of Everyday Run-off (Interception)

Apply a 'SuDS approach' so that at least the first 5mm of rainfall for the majority of rainfall events does not result in run-off from the site to surface waters or piped drainage systems.

Evidence shall be provided that the approach to managing run-off from 'everyday' rainfall has been developed alongside and in support of the management of run-off quality (Standard 4) and the delivery of amenity and biodiversity benefits (Standards 5 and 6).

- 8.3.1 Rainwater re-use can be incorporated into the proposed design. Rainwater butts are to be provided in conjunction with SuDS Planters.
- 8.3.2 All permeable surfaces, whether lined or not, shall be assumed to comply provided there is no additional area drained to the permeable pavement.
- 8.3.3 In view of the above factors, including site constraints, a relaxation is requested in respect of Standard 2: Management of Everyday run-off (Interception).

8.4 Standard 3: Management of Extreme Rainfall and Flooding

A 'SuDS approach' shall be adopted to address the management of development run-off during extreme rainfall, including allowances for climate change and urban creep to:

- protect people and property on the development from flooding of the surface water drainage system
- mitigate any increased flood risk to people and property adjacent to or downstream of the development
- protect the receiving water body from morphological damage or minimise the impact on sewer capacity

When discharging to an infiltration feature, the system shall be appropriately sized to accommodate the design event based on ground conditions and contributing areas.

When discharging to an above ground surface water body, sewer or other piped drainage system, the surface water run-off (rate and volume) for the 1% annual exceedance probability (AEP) event shall be controlled to ensure the run-off from the development does not increase flood risk elsewhere.

When discharging to an above ground surface water body, sewer or other piped drainage system, the surface water run-off rate for the 50% AEP event shall be controlled to ensure development run-off from an event of this magnitude has no negative impact.

Any flooding from the surface water drainage system for events up to the 1% AEP event shall be managed within the development.

Any flooding from off-site sources for the 1% AEP event should be managed on site or safely routed through the site, ensuring any downstream risks are not increased compared to the pre-development scenario.

The risks (both on and off the development) associated with flooding from the surface water drainage

system for exceedance events greater than the 1% AEP event shall be appropriately managed.

- 8.4.1 It is proposed that the site will drain, post development, to the ordinary watercourse located at the southern boundary of the site.
- 8.4.2 Run-off will be restricted to greenfield rates, relative to the proposed positively drained catchment.
- 8.4.3 Standard 3 states that 'The peak allowable discharge rate from the development to surface waters or sewers for the 50% AEP event shall be limited to the equivalent greenfield run-off rate, or 3 l/s/ha, whichever is greater.'
- 8.4.4 Additionally, 'Where the volume of run-off discharged from the development to surface waters or sewers for the 1% AEP, 6-hour rainfall event is greater than the volume of greenfield runoff for the same rainfall event, the peak allowable discharge rate from the development for the 1% AEP event shall be limited to the 50% AEP greenfield runoff rate or 3l/s/ha, whichever is the greater.'
- 8.4.5 Furthermore, 'Where the volume of runoff discharged from the development to surface waters or sewers for the 1% AEP, 6-hour rainfall event is less than or equivalent to the volume of greenfield runoff for the same event, the peak allowable discharge rate from the development for the 1% AEP event shall be limited to the 1% AEP greenfield runoff rate or 3l/s/ha, whichever is the greater.'
- 8.4.6 Based on the proposed positively drained catchment in relation to the indicative site layout 270m2) greenfield run-off rates have been established, with QBAR being 2.1 l/s, would inform a flow rate of 0.05l/s. In order to comply with minimum suitable operating requirements the flow restriction shall be set to 0.5l/s.
- 8.4.7 The surface water drainage system for the proposed refurbished building has been designed to accommodate a 1 in 100-year storm event, inclusive of allowances for climate change and urban creep.
- 8.4.8 In respect of climate change, Gov.uk provides guidance for local planning authorities preparing strategic flood risk assessments and developers and their agents preparing flood risk assessments for planning applications, and development consent orders for nationally significant infrastructure projects.
- 8.4.9 Climate change allowances are predictions of anticipated change for peak river flow, peak rainfall intensity, sea level rise and offshore wind speed and extreme wave height.
- 8.4.10 Allowance for climate change shall be provided in the undertaking of site-specific flood risk assessments where new development is proposed to minimise vulnerability and provide resilience to flooding and coastal change.
- 8.4.11 The 'Peak Rainfall Allowances Map' shows anticipated changes in peak rainfall intensity.
- 8.4.12 Based on the latest allowances, for the 3.3% annual exceedance rainfall event, an increase of 40% should be applied to peak rainfall in relation to the proposed development.
- 8.4.13 For the 1% annual exceedance rainfall event, an increase of 45% should be applied to peak rainfall in relation to the proposed development.

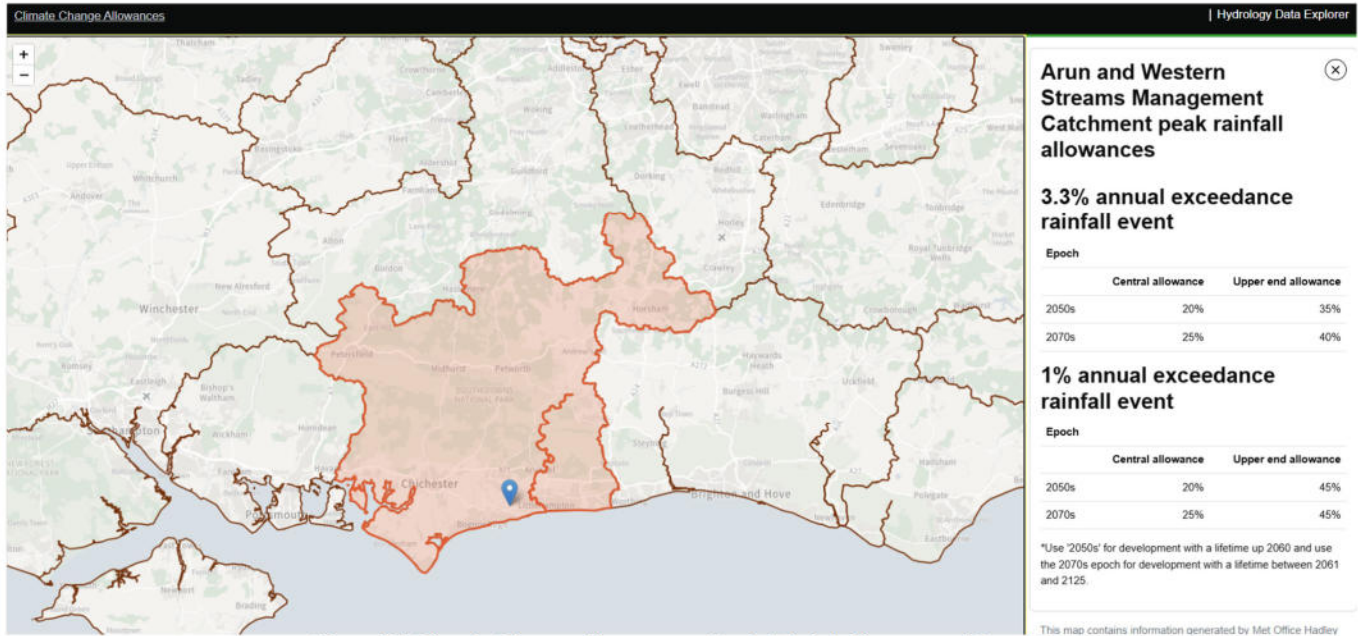


Figure 14. Climate Change Allowances – Peak Rainfall Allowances (Gov.uk)

8.4.14 An allowance has been made in respect of urban creep, applied to the proposed roof catchment of the proposed dwelling.

8.5 Standard 4: Water Quality

Apply a 'SuDS approach' that protects surface waters, groundwater and coastal waters by managing the quality of the surface water run-off to adequately address water quality risks from development.

The proposed SuDS management train(s) shall be based on robust water quality risk assessment, appropriate to the pollution hazard and sensitivity of receiving waters, reflecting industry recognised guidance or other quantitative assessment as agreed with the approving body and permitting requirements.

- 8.5.1 In accordance with the SuDS Manual (CIRIA C753) regarding methods for managing pollution risks, the risk posed by surface water run-off to the receiving environment depends on the pollution hazard at the site (the source), SuDS treatment techniques (the pathway), and the sensitivity of the environment (the receptor).
- 8.5.2 The simple index approach considers whether SuDS techniques are appropriate for the site. The states that for SuDS components to deliver adequate treatment, the total pollution mitigation index for each contaminant type should equal or exceed the pollution hazard index.
- 8.5.3 The SuDS Manual outlines three categories of pollution hazard identification, which vary depending on proposed land use, which are as follows:
- Total Suspended Solids (TSS).
 - Metals (M).
 - Hydrocarbons (H).

8.5.4 In accordance with C753 Table 26.2, the proposed land uses at the site are categorised as follows:

- Residential roofs – Low/TSS=0.2/M=0.2/H=0.05
- Individual property driveways, low traffic roads – Low/TSS=0.5/M=0.4/H=0.4

8.5.5 In accordance with C753 Table 26.3, the values of SuDS Mitigation indices are provided for permeable paving:

- Permeable Pavement – TSS=0.7/M=0.6/H=0.7

8.5.6 As the pollution hazard index does not exceed any pollution mitigation index for any contaminant type, the proposed SuDS methods will provide sufficient treatment for the proposed development.

8.6 Standard 5: Amenity

A 'SuDS approach' shall be adopted that maximises benefits for amenity through the creation of multi-functional places and landscapes.

- 8.6.1 The proposed surface water drainage design is able to demonstrate multifunctional solutions to water management on site, positively contributing towards placemaking and environmental enhancement by keeping surface water run-off at or close to the ground surface.
- 8.6.2 The surface water drainage design has considered the site topography whilst BP Civils has worked with the client's architect and other consultants to develop a scheme that sympathetic to other constraints and requirements.
- 8.6.3 Permeable paving is also proposed which provides a useable multi-purpose surface.
- 8.6.4 Landscaping proposals are to be co-ordinated with the proposed surface water drainage design to increase visual amenity and landscape character.
- 8.6.5 In view of the above factors, it is demonstrated that the proposed surface water drainage design provides amenity benefits, whilst also serving its primary purpose of providing a means and method of draining the site.

8.7 Standard 6: Biodiversity

A 'SuDS approach' shall be adopted to ensure the surface water drainage system maximises biodiversity benefits throughout the development lifecycle.

The surface water drainage system shall add biodiversity value by:

- creating diverse, self-sustaining, resilient local ecosystems which contribute to net gains in biodiversity
- supporting and promoting natural local habitat and species, for example, through local nature recovery strategies
- contributing to the delivery of local biodiversity strategies

- contributing to habitat connectivity

- 8.7.1 The consideration and inclusion of biodiversity in respect of the proposed surface water drainage system must be proportionate to the scale and ecological sensitivity of the site, and also consider site constraints and opportunities.
- 8.7.2 A biodiversity assessment has been undertaken by the client's ecologist. The proposed SuDS features have been included as part of this assessment.
- 8.7.3 The proposed surface water drainage design includes the following features, which provide biodiversity benefits:
- Permeable Pavement

8.8 Standard 7: Design of Drainage for Construction, Operation, Maintenance, Decommissioning and Structural Integrity

A 'SuDS approach' shall be adopted to ensure that surface water drainage systems are designed so they can be easily and safely constructed, operated and maintained taking account of the need to minimise negative impacts on natural resources and the environment.

The designer shall provide a management and maintenance plan that supports the design objectives detailed in standards 1 to 6 and ensures the performance of the surface water drainage system with regards to run-off destinations, everyday and extreme rainfall, water quality, amenity and biodiversity is maintained throughout the lifetime of the development.

Surface water drainage design shall examine for the likelihood and consequences of potential failure scenarios that may occur during the operation phase and safely manage the associated risks.

The surface water drainage system shall be designed to ensure structural integrity of all components under anticipated loading conditions for the design life of the development so that it does not affect the structural integrity of any existing or proposed components within, or adjacent to, the development.

- 8.8.1 Maintenance is required to ensure the long-term operational performance of the proposed surface water drainage system.
- 8.8.2 This document has been prepared to accompany a planning application for the developed detailed within. At this stage, the proposed development has not been granted planning permission.
- 8.8.3 It is accepted that details relating to the construction, operation and maintenance of the proposed surface water drainage system will be required, although it is suggested that this detail can be secured through appropriately worked planning conditions.

9 PROPOSED FOUL WATER DRAINAGE STRATEGY

9.1.1 Foul water disposal should adhere to the following hierarchy;

- Connection to a Public Foul Sewer
- Private Sewage Treatment Plant (Package Plant)
- Septic Tank Discharging to a Drainage Field
- Cesspool

9.1.2 The local sewerage authority is Southern Water. Public sewer records have been obtained from Southern Water, as contained within this report in **Appendix E**.

9.1.3 Southern Water's public sewer records indicate that there are no public foul water sewers within the bounds of the site, or within the vicinity of the site.

9.1.4 In accordance with the Environment Agency 'Foul Drainage Assessment Form', review of an approx. 30m connection distance, it can be seen that there are no available Public Sewers in close vicinity to the site when considering off site routing based on scale of development.

9.1.5 Post development, there will be an estimated increase in peak foul water flows to 0.05l/s (based on Water UK's Design & Construction Guidance).

9.1.6 In accordance with drainage hierarchy cited above, a foul sewage treatment plant is proposed to cater for the whole site. An open space area has been provided to locate a treatment plant to the south of the developments proposals, away from residential areas, and also ensuring suitable access is achieved alongside the estate road for maintenance.

9.1.7 The treatment plant will be sized to cater for a total population of 7 (based on Flows & Loads, latest version).

9.1.8 The treatment plant will discharge treated effluent to the ordinary watercourse.

9.1.9 A FRAP permit may be required, subject to appraisal of the general binding rules at the detailed design stage.

10 RESIDUAL RISK AND MITIGATION

10.1 Residual Risk

10.1.1 The following residual risks have been identified in relation to the proposed development:

- i. Increased flow through the off-site ordinary watercourse as a result of climate change causing flooding to the site
- ii. Blockage of the off-site ordinary watercourse as a result of debris or otherwise, causing flooding to the site
- iii. Extreme rainfall events that exceed the design criteria used for the drainage system causing surface water flooding
- iv. Blockage/failure of the proposed drainage system causing flooding to the site
- v. Surface water flooding of proposed buildings
- vi. Surcharged outfall scenario, resulting in flooding at the site

10.2 Mitigation

10.2.1 Consideration has been taken to the residual risks stated in Section 10.1, and the following mitigation measures are proposed:

- i. Flood Map for Planning identifies that the site falls within Flood Zone 1 in the present day. The site are identified as being at future flood risk in respect of climate change (2070 to 2125). The outline development layout has been set out sequentially to avoid the areas identified as being at risk of flooding. Accurate modelled flood level data from the Environment Agency is not available. The site is elevated significantly higher than the lower lying levels where the watercourse is located – in relation to the southern extent of the site. Development has been set out sequentially, avoiding areas of the site identified as being at potential future flood risk in view of climate change (2070-2125), as per Flood Map for Planning.
- ii. As referenced in the above point, the proposed development is elevated higher than levels corresponding to the ordinary watercourse, therefore as a result of blockage it is considered unlikely that flooding would occur. Maintenance plays a significant role in reducing flood risk. Riparian owners should ensure that they undertake routine maintenance to reduce the risk of blockage by removing potential debris and obstructions from the watercourse.

- iii. The proposed drainage system has been developed to current day standards, accommodating a 1 in 100-year design event, with a 45% allowance for climate change in addition to an allowance for the potential impacts of urban creep. However, should a more extreme rainfall event occur, there is the potential for the drainage system to be exceeded. In exceedance events, run-off would follow the natural topography of the site, falling commonly towards the site boundaries to the south towards the ordinary watercourse. Proposed finished floor levels are to be raised above the adjacent external ground level to mitigate potential flooding of the properties. Exceedance routes are demonstrated on the surface water drainage strategy drawings included within this report.
- iv. As in the event of exceedance, should blockage of the on-site drainage system occur, run-off would follow the existing topography of the site, falling towards ordinary watercourse beyond the northern, eastern and south-eastern boundaries. As the proposed dwelling will be elevated above the adjacent external ground level, this helps to mitigate a potential risk of flooding occurring. Maintenance plays an important role in managing and reducing flood risk. Maintenance activities will need to be detailed as part of a reserved matters application.
- v. The site is not identified as being at risk of surface water flooding in the 1 in 30, 1 in 100 and 1 in 1000 annual exceedance probability events, in the present day. In view of climate change (2061 to 2125) the site is also not identified as being at risk of flooding in the 1 in 30 or 1 in 100 annual exceedance probability events. Negligible extents are identified as being susceptible to surface water flooding in view of climate change (2061 to 2125) in the 1 in 1000 annual exceedance probability, with anticipated depths being less than 150mm. Finished floor levels are to be set above existing ground level, providing mitigation in relation to the very low risk of surface water flooding identified.
- vi. A surcharged outfall has been modelled in respect of the proposed surface water drainage system with calculations demonstrating that flooding would not occur in such an event, based on the current design parameters.

11 FLOOD RISK MANAGEMENT

11.1 Safe Access and Egress

- 11.1.1 Access to the development will be at the southern boundary, via an existing vehicular access.
- 11.1.2 The proposed point of access is located within Flood Zone 1 (present day) and is at risk of flooding in respect of climate change (2070-2125).
- 11.1.3 Additionally, the proposed access point is not identified as being at risk of surface water flooding in the 1:30, 1:100 or 1:1000 annual exceedance probability events, including in respect of climate change (2069-2125).
- 11.1.4 The site has been assessed as being at 'Very Low' or 'Low' risk of flooding from all of the potential sources of flood risk considered in the undertaking of this flood risk assessment.
- 11.1.5 In view of the above factors, safe access and egress is available.

11.2 Flood Warning

- 11.2.1 Given the proximity of Flood Zones 2 and 3, as well as the areas identified as being at future flood risk in respect of climate change (2070 to 2125) it is recommended that occupants register for any available flood alert and/or warning systems or services available, such as through the Environment Agency.

12 OFFSITE IMPACTS

- 12.1.1 Surface water will discharge to the local ordinary watercourse network, not exceeding greenfield run-off rates.
- 12.1.2 The effects of climate change have been considered in the design of the proposed site flood mitigation and surface water drainage, with an allowance made for up to 45%.
- 12.1.3 Foul water generated by the development will drain to Sewage treatment plant discharging to the ordinary watercourse.

13 SUMMARY

- 13.1.1 The proposed development will involve the construction of 1 No. residential property, as demonstrated by the development proposals contained within **Appendix A**.
- 13.1.2 The topographical survey identifies levels in the range of 3.50 to 4.50mAOD, being fairly flat but falling slightly southerly to the ordinary watercourse. Existing drainage is a combination of infiltration and runoff.
- 13.1.3 Groundwater testing has been undertaken between January to March 2026. Peak groundwater was observed at approx. 0.70mbgl.
- 13.1.4 The site is shown to be located in Flood Zone 1 (present) but within the extents identified as being at potential future flood risk in respect of climate change (2070-2125), however the Environment Agency are not able to provide evidence for this simulation.
- 13.1.5 The proposed driveway will be permeable pavement to provide treatment and slow runoff from the surface, and will discharge to the ground. Calculations demonstrate the proposed system will discharge runoff up to the design event without exceedance.
- 13.1.6 The completion of the development will not increase flood risk on or off the site.
- 13.1.7 In conclusion, this development is suitable with regards to flood risk and surface water drainage.

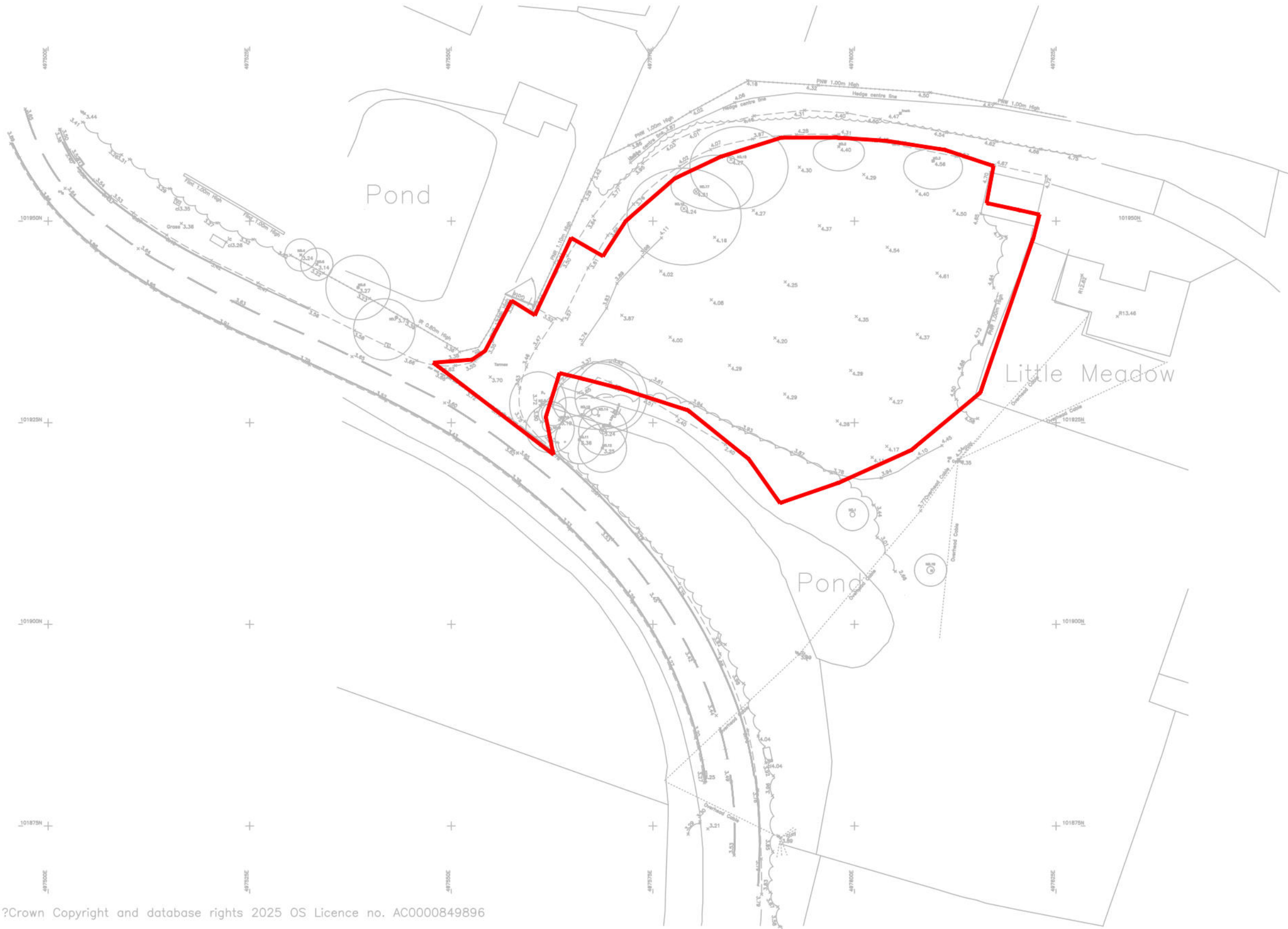
DRAWINGS

- PL001** Site Location Plan
- PL002** Topographic Survey with Contours
- PL003** Impermeable Area Assessment
- PL004** Constraints Plan
- PL006** Flood Zone Appraisal (Current)
- PL007** Flood Zone Appraisal (Climate Change)
- PL008** SWFM Appraisal
- PL009** Drainage Strategy



-SITE LOCATION PLAN KEY-

Site Boundary - 1970m² (0.20Ha)



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NOTES

A3

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P00	09.06.26	Original Issue
Rev.	Date	Amendments

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Drawing Status

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Client

Ross Hymas

Project

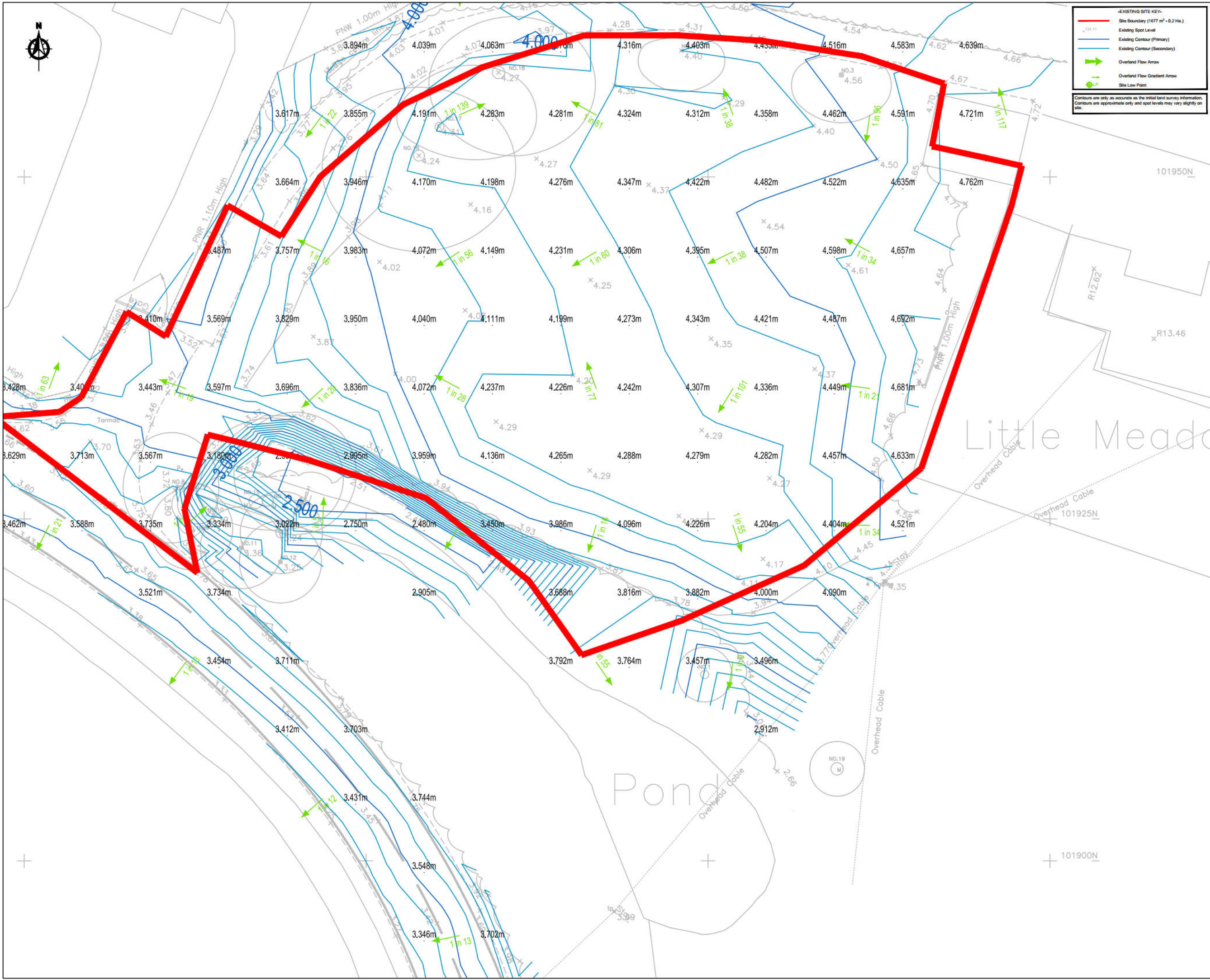
Land west of Little Meadow,
BN18 0JY

Drawing Title

Site Location Plan

Scale at A3	Date	Drawn By	Checked By	Project No.
1:500	APR 26	LM	MJA	D2411

Drawing Code	Drawing No.	Rev.
000-BPC-WD-ZZ-D-C	PL001	P00



— EXISTING SITE KEY —

Site Boundary (1677 m² - 0.2 Ha.)

Existing Spot Level

Existing Contour (Primary)

Existing Contour (Secondary)

Overland Flow Arrow

Overland Flow Gradient Arrow

Site Low Point

Contours are only as accurate as the initial land survey information. Contours are approximate only and spot levels may vary slightly on site.

- NOTES
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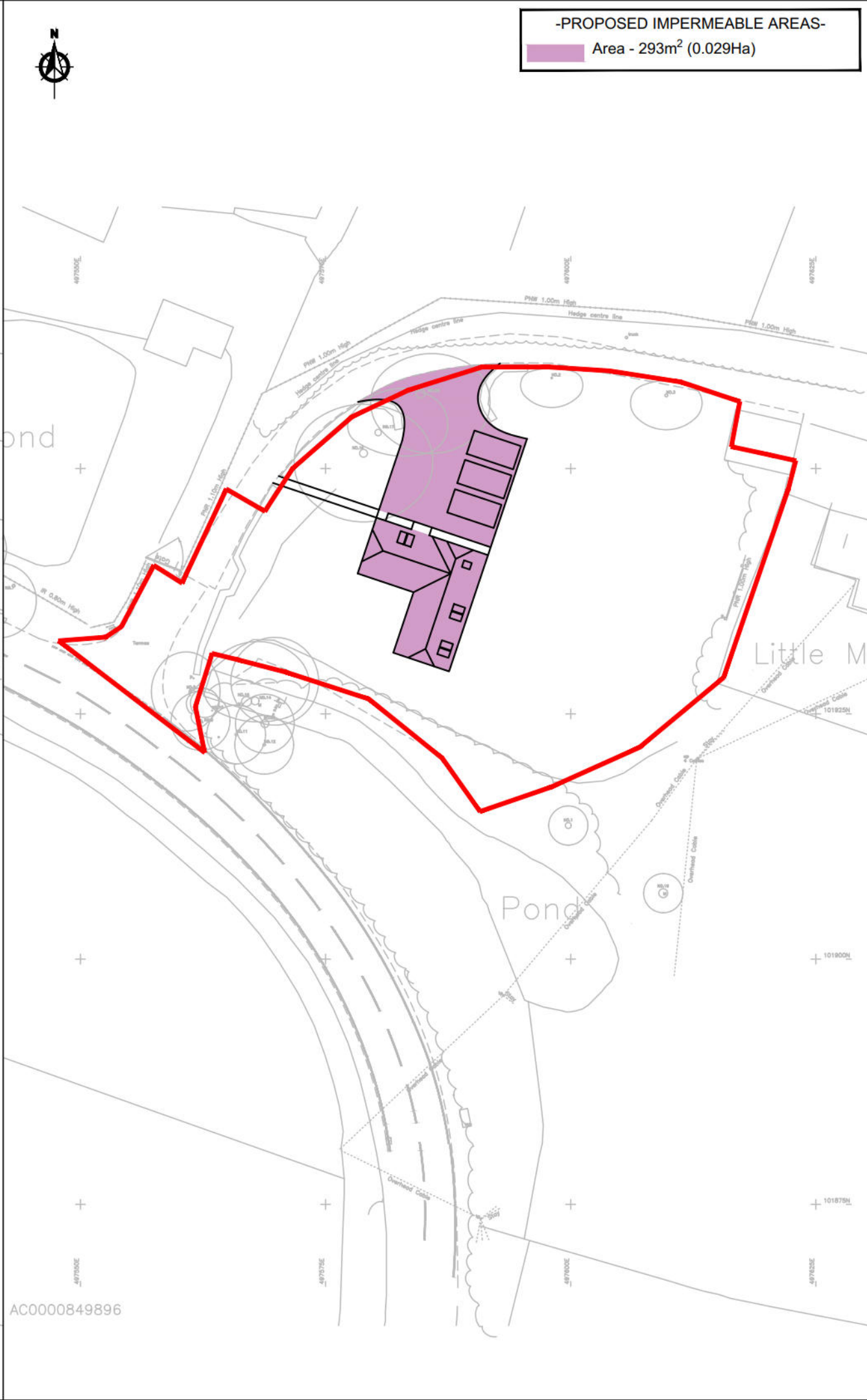
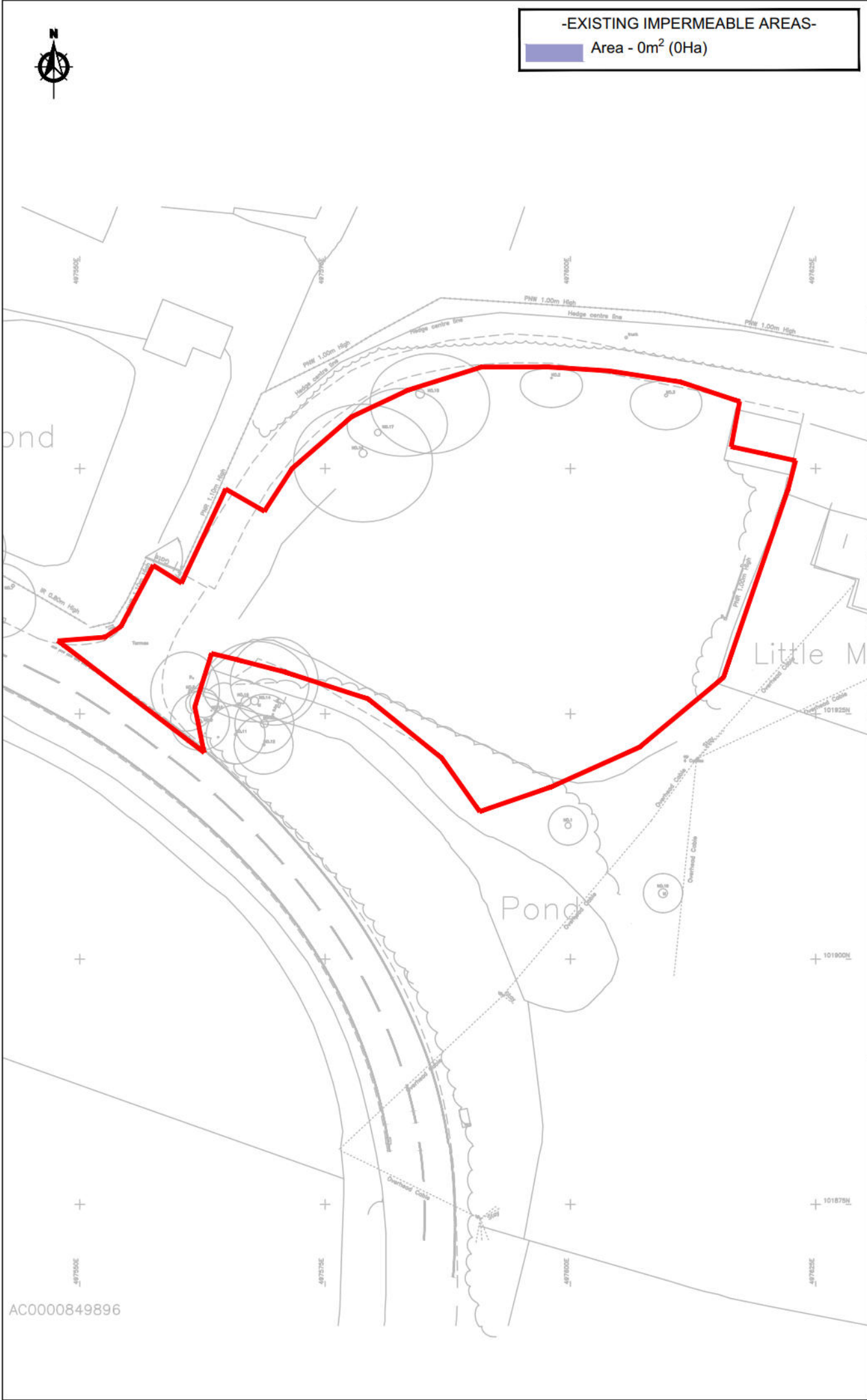
Land west of Little Meadow, BN18 0JY

Drawing Title

Topographic Survey with Contours

Scale at A3	Date	Drawn By	Checked By	Project No.
1:250	APR 26	LM	MJA	D2411

Drawing Code	Drawing No.	Rev.
000-BPC-WD-ZZ-D-C	PL002	P00



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P01	01.07.26	Layout updated
P00	11.06.26	Original Issue

Rev.	Date	Amendments

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Client
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Project
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Drawing Title
Impermeable Areas

Scale at A3	Date	Drawn By	Checked By	Project No.
1:500	APR 26	LM	MJA	D2411

Drawing Code	Drawing No.	Rev.
000-BPC-WD-ZZ-D-C	PL003	P02



-CONSTRAINTS KEY-

- Highway Boundary (based on OS)
- Existing Highway Gully/Highway Drain
- 3.0m Watercourse Buffer

GEOTECH KEY-

- Groundwater Monitoring Point

NOTES

A3

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P01	29.07.26	Layout updated
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Rev.	Date	Amendments
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Drawing Title
Constraints Plan

Scale at A3	Date	Drawn By	Checked By	Project No.
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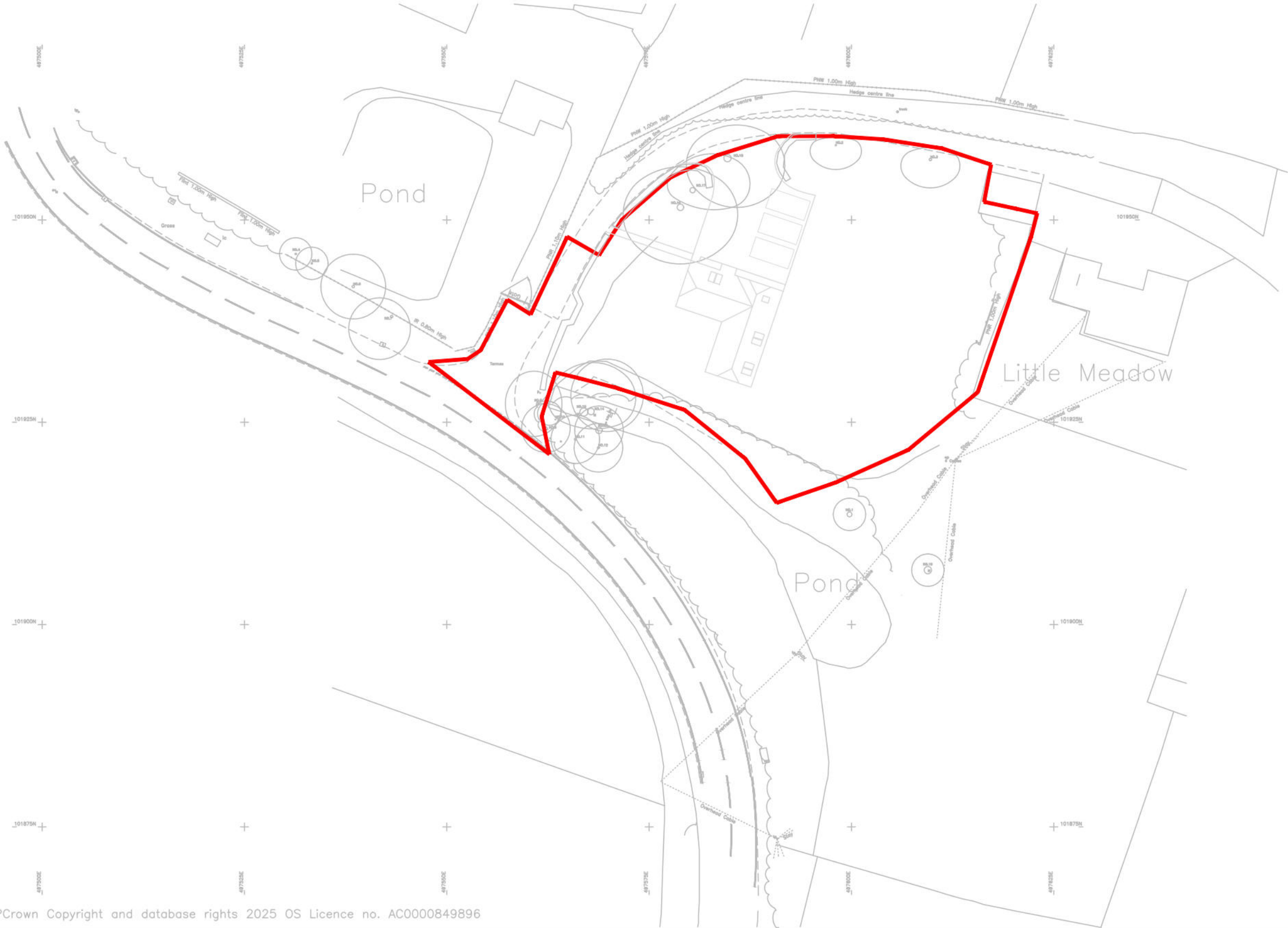
Drawing Code	Drawing No.	Rev.
000-BPC-WD-ZZ-D-C	PL004	P01



-FLOOD ZONE KEY-

Flood Zone 2

Flood Zone 3



NOTES

A3

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Civil Engineering and Transport Planning Consultants

2 West Barn, Norton Lane, Chichester, West Sussex PO20 3AF

Tel: 01243 210418

www.bpcivils.co.uk enquiries@bpcivils.co.uk

Drawing Status

PLANNING

NOT FOR CONSTRUCTION

Client

Ross Hymas

Project

Land west of Little Meadow, BN18 0JY

Drawing Title

Flood Zones (Present)

Scale at A3	Date	Drawn By	Checked By	Project No.
1:500	JUN 26	LM	MJA	D2411

Drawing Code	Drawing No.	Rev.
000-BPC-WD-ZZ-D-C	PL005	P01



-FLOOD ZONE KEY-

Flood Zones plus Climate Change

NOTES

A3

1. This drawing is to be read in conjunction with all other BP Civils drawings, and with all relevant Architect's and Engineer's drawings and specification. Any discrepancies found are to be reported immediately to the Engineer.
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4. Any information given regarding existing underground services is given in good faith after consultation with the relevant authority, however accuracy is not certain. The main contractor is responsible for checking all information on site prior to work commencing and taking due care whilst undertaking the works.
5. All dimensions to be checked on site. All details and dimensions relating to sub-contractors work must be checked and agreed between the sub-contractor or supplier and the general contractor.
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RESIDUAL HAZARDS

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1. Buried services. Contractor to refer to record drawings and use CAT to locate existing services and undertake necessary precautions and investigation prior to excavating.

2. Working in live traffic. Contractor to ensure traffic management is designed, erected and maintained to protect the workforce and the public. Contractor to undertake necessary precautions and ensure suitable traffic management is in place prior to commencement.

3. Working in live sewers. Contractor to ensure operatives are familiar and competent with the dangers of working in live sewers.

4. Excavations close to existing structures. Contractor to prepare method statement to ensure stability of existing structure.
- It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved risk assessment and method statement.

P01	29.07.26	Layout updated
P00	09.06.26	Original Issue

Rev.	Date	Amendments
------	------	------------

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Drawing Status

PLANNING

NOT FOR CONSTRUCTION

Client

Ross Hymas

Project

Land west of Little Meadow,
BN18 0JY

Drawing Title

Flood Zones
(Climate Change)

Scale at A3	Date	Drawn By	Checked By	Project No.
1:500	JUN 26	LM	MJA	D2411

Drawing Code	Drawing No.	Rev.
000-BPC-WD-ZZ-D-C	PL006	P01



-SURFACE WATER FLOOD RISK KEY-

High Risk

Medium Risk

Low Risk



NOTES

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P01	29.07.26	Layout updated
P00	09.06.26	Original Issue

Rev.	Date	Amendments
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Drawing Status

PLANNING
NOT FOR CONSTRUCTION

Client

Ross Hymas

Project

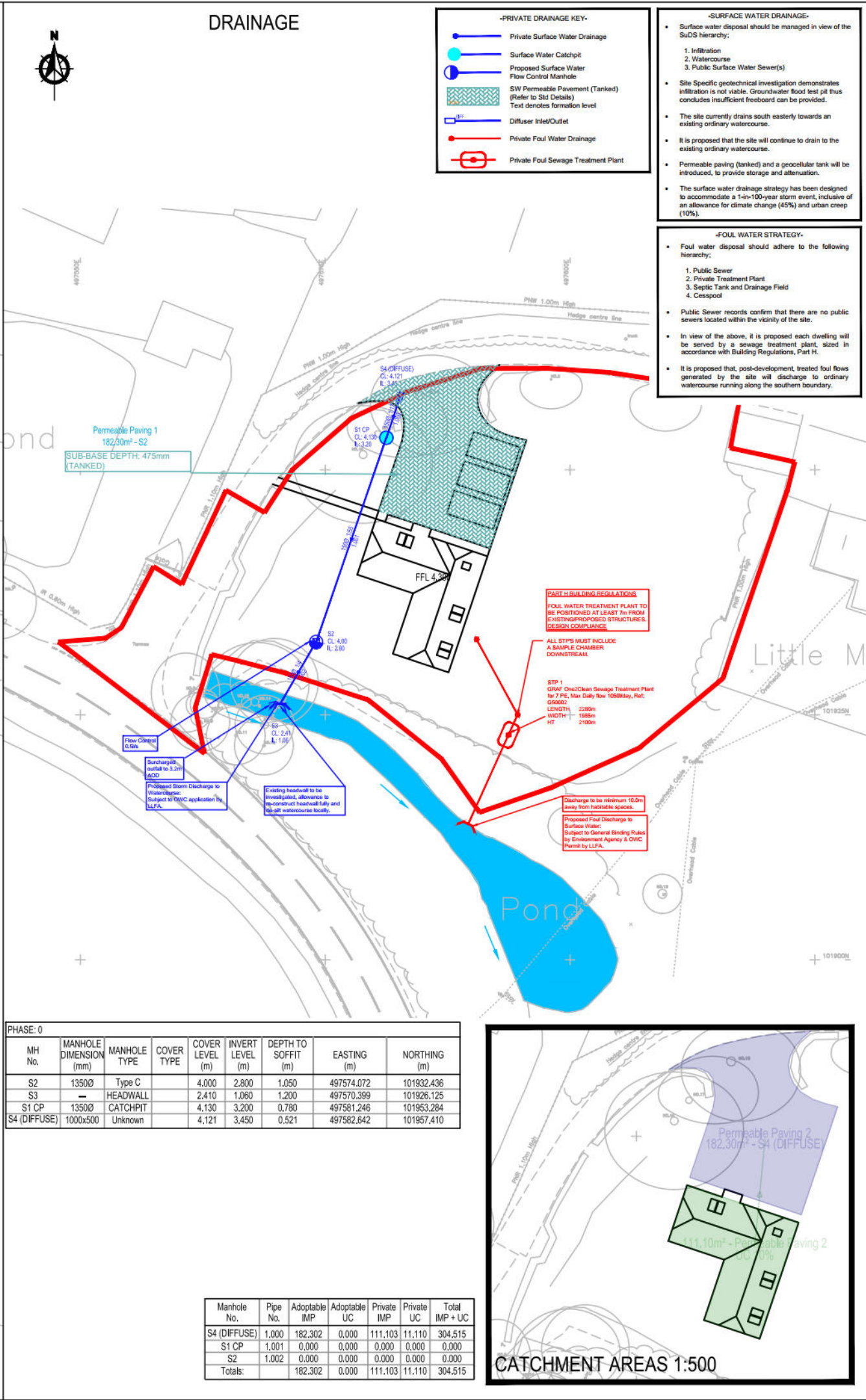
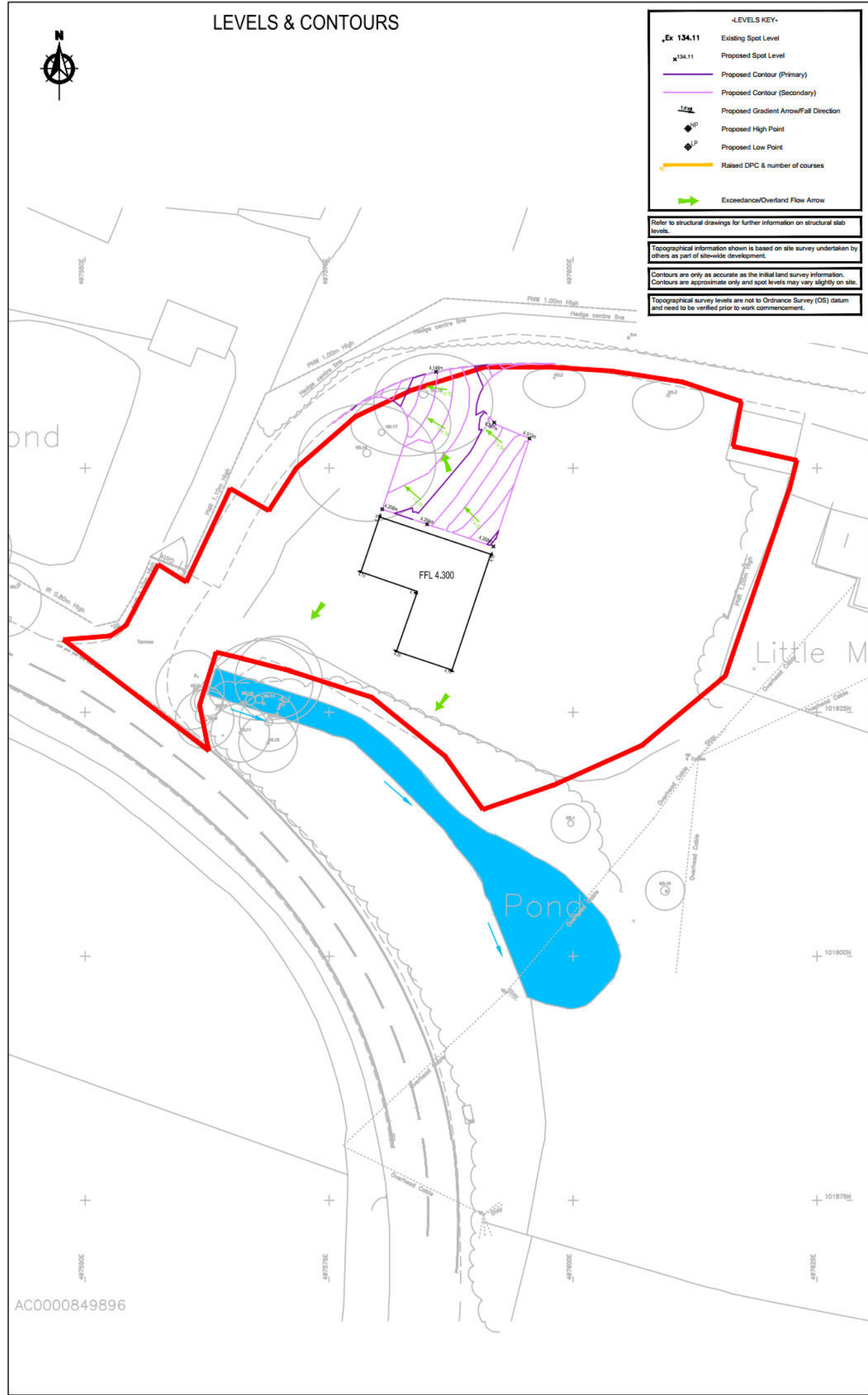
Land west of Little Meadow,
BN18 0JY

Drawing Title

Surface Water Flood Risk
Map Appraisal

Scale at A3	Date	Drawn By	Checked By	Project No.
1:500	JUN 26	LM	MJA	D2411

Drawing Code	Drawing No.	Rev.
000-BPC-WD-ZZ-D-C	PL007	P01



NOTES

A3

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Rev.	Date	Amendments
P02	30.07.26	Layout updated
P01	01.07.26	Layout updated
P00	11.06.26	Original Issue

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Drawing Status: **PLANNING**
NOT FOR CONSTRUCTION

Client: Ross Hymas

Project: Land west of Little Meadow, BN18 0JY

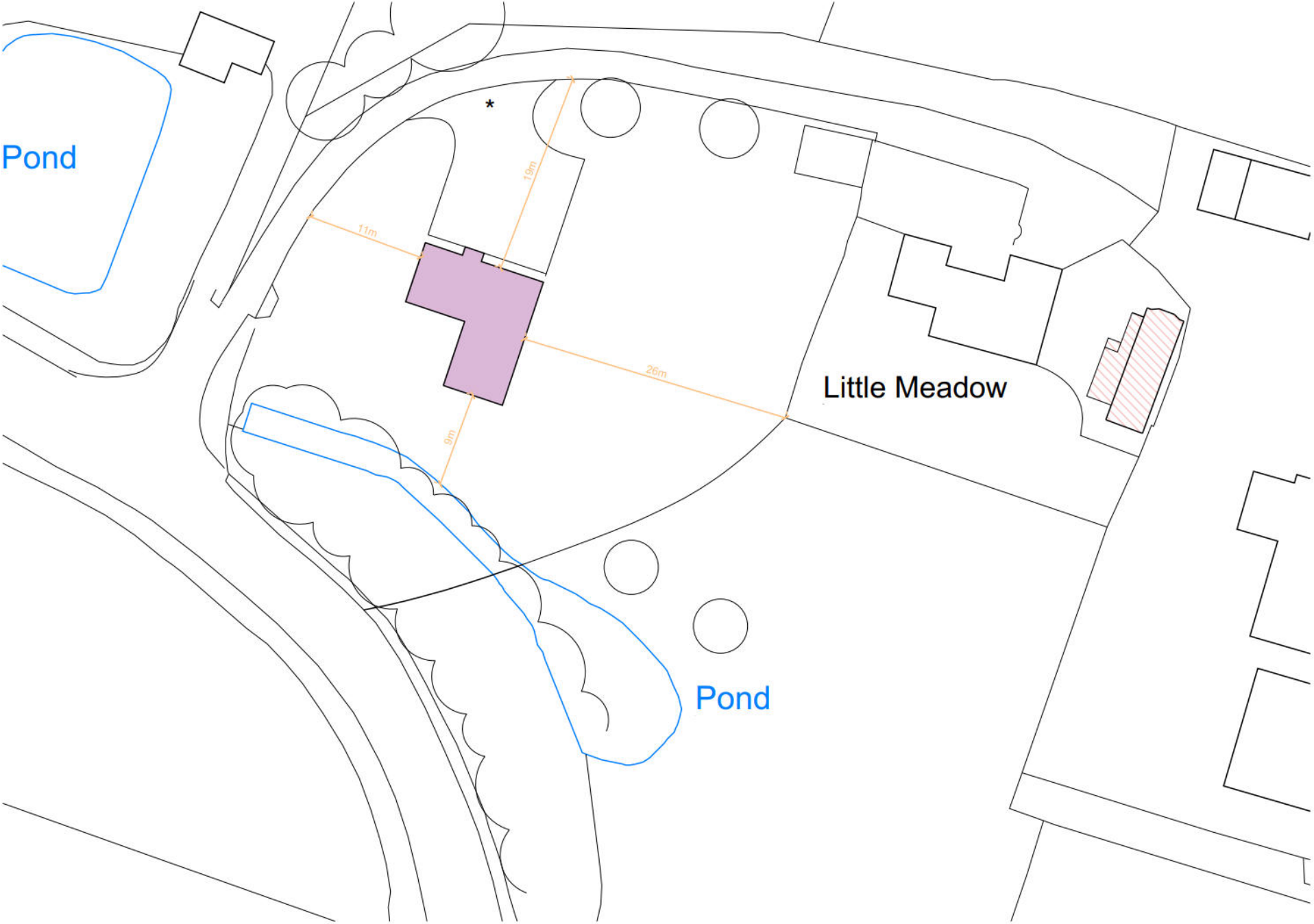
Drawing Title: Preliminary Drainage GA

Scale at A3	Date	Drawn By	Checked By	Project No.
1:500	APR 26	LM	MJA	D2411

Drawing Code	Drawing No.	Rev.
000-BPC-WD-ZZ-D-C	PL008	P02

APPENDICES

Appendix A Development Proposals



-  Proposed replacement dwelling
-  New access off private drive
-  Existing dwelling removed

Block Plan

0 10 25m
Scale 1:500 @ A3

- PLANNING -





1. Proposed drive and parking
2. Proposed store and bin collection point
3. Proposed path
4. All existing trees retained
5. Proposed garden

 Proposed native hedge and post & rail fence

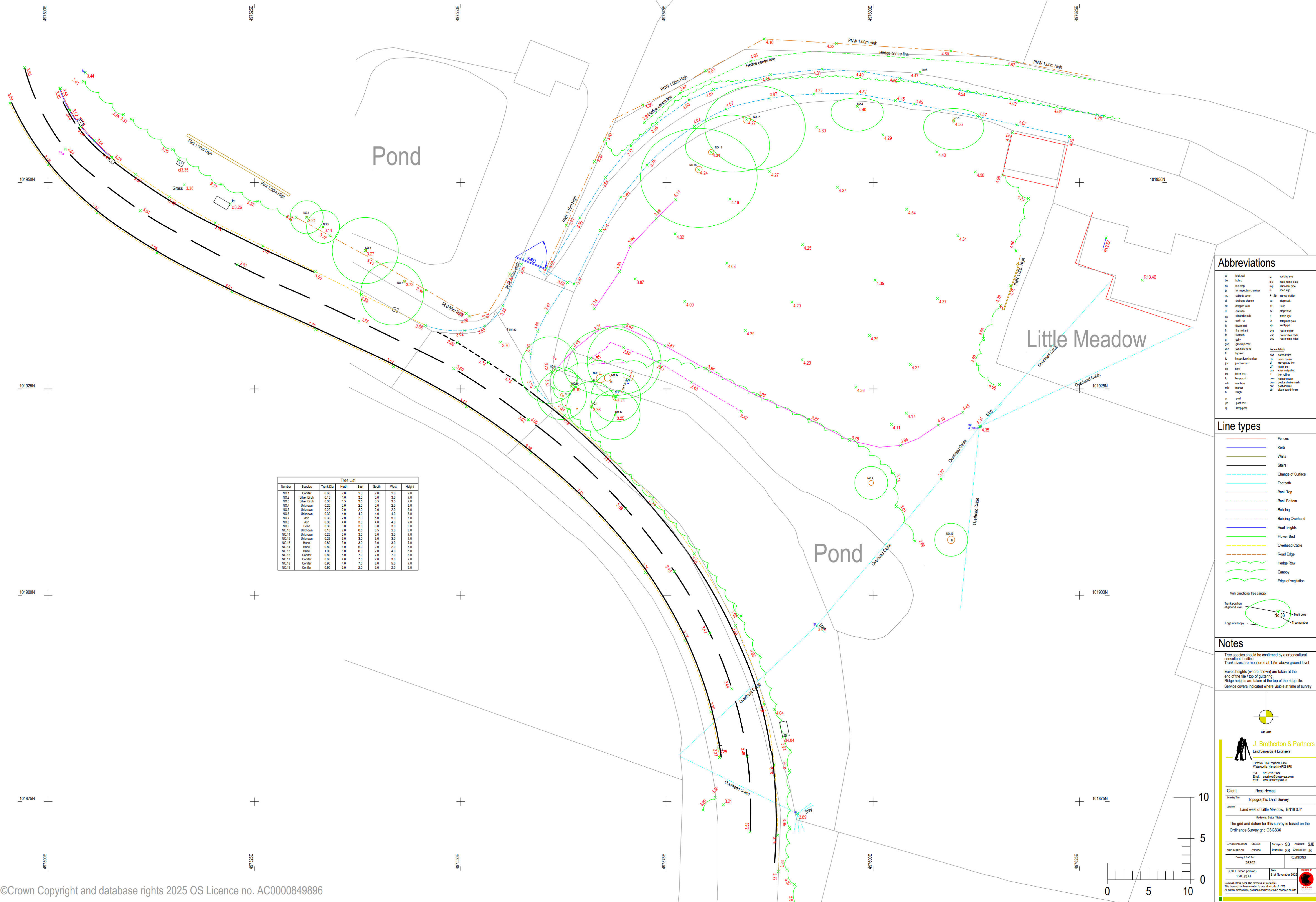
Proposed Site and Roof Plan

0 2 4 12m

Scale 1:250 @ A3

- PLANNING -

Appendix B Topographic Survey



Tree List							
Number	Species	Trunk Dia	North	East	South	West	Height
NO1	Conifer	0.60	2.0	2.0	2.0	2.0	7.0
NO2	Silver Birch	0.15	1.0	3.0	3.0	3.0	7.0
NO3	Silver Birch	0.15	1.5	3.0	3.0	3.0	7.0
NO4	Unknown	0.20	2.0	2.0	2.0	2.0	5.0
NO5	Unknown	0.20	2.0	2.0	2.0	2.0	5.0
NO6	Unknown	0.30	4.0	4.0	4.0	4.0	6.0
NO7	Ash	0.30	2.0	2.0	5.0	6.0	6.0
NO8	Ash	0.30	4.0	4.0	4.0	3.0	7.0
NO9	Ash	0.30	3.0	3.0	3.0	3.0	7.0
NO10	Unknown	0.50	2.0	2.0	6.0	6.0	6.0
NO11	Unknown	0.25	3.0	3.0	3.0	3.0	7.0
NO12	Unknown	0.25	3.0	3.0	3.0	3.0	7.0
NO13	Hazel	0.80	6.0	6.0	6.0	6.0	6.0
NO14	Hazel	0.80	6.0	6.0	2.0	2.0	5.0
NO15	Hazel	0.80	6.0	6.0	6.0	6.0	6.0
NO16	Conifer	0.80	5.0	7.0	7.0	7.0	8.0
NO17	Conifer	0.65	4.0	7.0	6.0	6.0	7.0
NO18	Conifer	0.65	4.0	7.0	6.0	6.0	7.0
NO19	Conifer	0.90	2.0	2.0	2.0	2.0	6.0

[illegible]

Line types

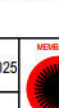
The diagram illustrates various line types used in field notes for vegetation analysis. It consists of two columns. The left column shows 15 different line styles, and the right column lists their corresponding uses. The line styles include solid lines of various colors (orange, blue, green, black, red, yellow), dashed lines, wavy lines, and a multi-directional tree canopy line. The uses listed are: Fences, Kerb, Walls, Stairs, Change of Surface, Footpath, Bank Top, Bank Bottom, Building, Building Overhead, Roof heights, Flower Bed, Overhead Cable, Road Edge, Hedge Row, Canopy, Edge of vegetation, Multi directional tree canopy, Trunk position at ground level, Multi bole, and Tree number.

Line Type	Use
Solid orange line	Fences
Solid blue line	Kerb
Solid brown line	Walls
Solid black line	Stairs
Solid black line	Change of Surface
Solid cyan line	Footpath
Solid magenta line	Bank Top
Solid purple line	Bank Bottom
Solid red line	Building
Solid red dashed line	Building Overhead
Solid blue line	Roof heights
Solid green line	Flower Bed
Solid yellow line	Overhead Cable
Solid red line	Road Edge
Solid green wavy line	Hedge Row
Solid green wavy line	Canopy
Solid green wavy line	Edge of vegetation
Multi directional tree canopy line	Multi directional tree canopy
Trunk position at ground level line	Trunk position at ground level
Multi bole line	Multi bole
Tree number line	Tree number

Notes

Tree species should be confirmed by an arboricultural consultant if critical
Trunk sizes are measured at 1.5m above ground level

Eaves heights (where shown) are taken at the end of the tile / top of guttering.
Ridge heights are taken at the top of the ridge tile.
Service covers indicated where visible at time of survey

	J. Brotherton & Partners Land Surveys & Engineers						
 Grid North							
Fixed-Net 113 Foggings Lane Waterlooville, Hampshire PO8 9SD Tel: 013 058 9918 Email: enquiries@jbrotherton.co.uk Web: www.jbrotherton.co.uk							
Client	Ross Hyman						
Drawing Title	Topographic Land Survey						
Location	Lander's Field Little Meadow, BN18 0JY						
(Inserted / Status / Notes) The grid and datum for this survey is based on the Ordnance Survey grid OSGB36							
LEVELS BASED ON GRID BACKS ON:	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%; border-bottom: 1px solid black;">OSGB36</td> <td style="width: 33%; border-bottom: 1px solid black;">Surveyor: SB</td> <td style="width: 33%; border-bottom: 1px solid black;">Assistant: SJB</td> </tr> <tr> <td style="border-bottom: 1px solid black;">OSGB36</td> <td style="border-bottom: 1px solid black;">Drawn by: SB</td> <td style="border-bottom: 1px solid black;">Checked by: JB</td> </tr> </table>	OSGB36	Surveyor: SB	Assistant: SJB	OSGB36	Drawn by: SB	Checked by: JB
OSGB36	Surveyor: SB	Assistant: SJB					
OSGB36	Drawn by: SB	Checked by: JB					
Drawing Scale:	REVISIONS						
25/392							
SCALE (when printed) 1:200 @ A1	Date 21st November 2025						
Release of this block also removes all warranties. This drawing has been controlled for an expiry of 20 years All critical dimensions, positions and levels to be checked on site							
							

Appendix C BGS Records & Site Groundwater Monitoring

BY EMAIL ONLY

30th March 2026

Our Ref: LS9190

Your Ref:

FAO: Ross Hyams

Dear Sir



Unit 10, 19 Albert Drive, Burgess Hill,
West Sussex, RH15 9TN



Re: LAND WEST OF LITTLE MEADOW – WINTER GROUNDWATER MONITORING

Introduction

In December 2025 Constructive Evaluation Ltd was commissioned by Ross Hyams (the Client) to carry out a site investigation at Land West of Little Meadow, Bilsham Road, Yapton, Arundel BN18 0JY, hereafter referred to as the "site". Following a company merge Land Science Ltd have continued this project. The intent of this report is to present a factual summary of the site investigation and winter groundwater monitoring results.

Site Proposal

The proposed development consists of the removal of an existing outbuilding, and the construction of a new replacement structure with new driveway access and parking. The Proposed Site Plan is provided within Figure 3.

Previous Investigations

The following previous investigation relevant to the site was made available:

- Stage 1: Environmental Risk Assessment – Desk Study, Constructive Evaluation Ltd, report ref. CE25.2089

The phase II ground investigation has been carried out in accordance with the recommendations of the previous report and all reports must be read in conjunction with each other.

The Scope of Works

The scope of works was specified by the Client to include one windowless sampling borehole (BH01) to a target depth of 5.00mbgl with a 50mm diameter standpipe installation within the borehole for purposes of groundwater monitoring over the winter months to March 2026.

Site Description

The subject site has an approximate grid reference of SU 97577 01940 and has an approximate area of 0.10ha. The site occupies an irregular shaped plot, with maximum dimensions of ~35m east to west, and ~40m north to south. Topography across the site gently dips toward the south/southwest from ~4.5m AOD around the northeastern perimeter to ~3.0m AOD to the southern perimeter. The site is currently used as a grassy field/garden. The site is surrounded by residential properties and commercial properties with a pond to the south. The Site Location Plan is provided as Figure 1.

Site Investigation

The site investigation comprised one windowless sampling borehole (BH01) to a depth of 5.00mbgl, with a standpipe installation for the purpose of winter groundwater monitoring to March 2026. The Site Investigation Plan is provided within Figure 2.

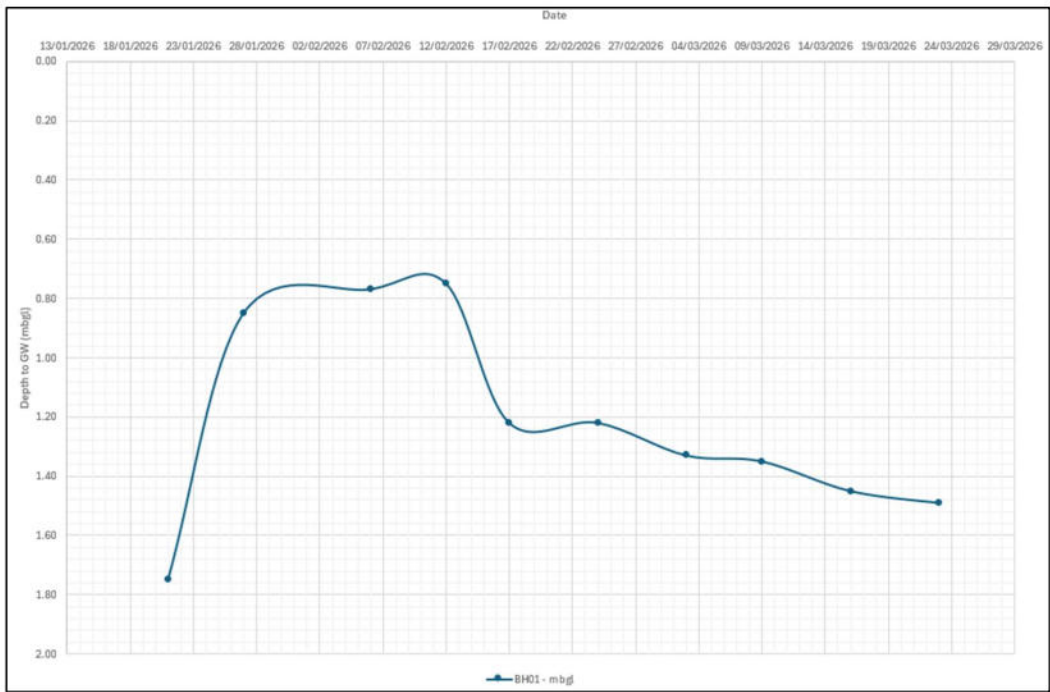


Summary of encountered soils:

Strata	Description	Base Depth (mbgl)
Topsoil	Brown slightly sandy slightly gravelly CLAY, with flint.	0.30
River Terrace Deposits	Brown mottled grey sandy CLAY.	3.30
Chalk	Grey mottled white slightly sandy slightly gravelly SILT, with chalk clasts.	5.00

Winter Groundwater Monitoring

The monitoring period extended from January to March 2026, monitoring once a week. The graph below shows the weekly monitoring results.



We trust the above information meets your requirements and should you require any further clarification or assistance please do not hesitate to contact Land Science Ltd.

Kind regards
For and on Behalf of Land Science

JOCELYN MIDDLETON MGeol FGS
Principal Geo-Environmental Consultant

Enclosed: figures and borehole log



TITLE:	Site Location Plan	REF:	LS9190	PREPARED:	JM
PROJECT:	Land West of Little Meadow, Bilsham Road, Yapton, Arundel BN18 0JY	FIGURE:	1	CHECKED:	MR
CLIENT:	Ross Hyams	DATE:	26/03/2026	VERSION	V1



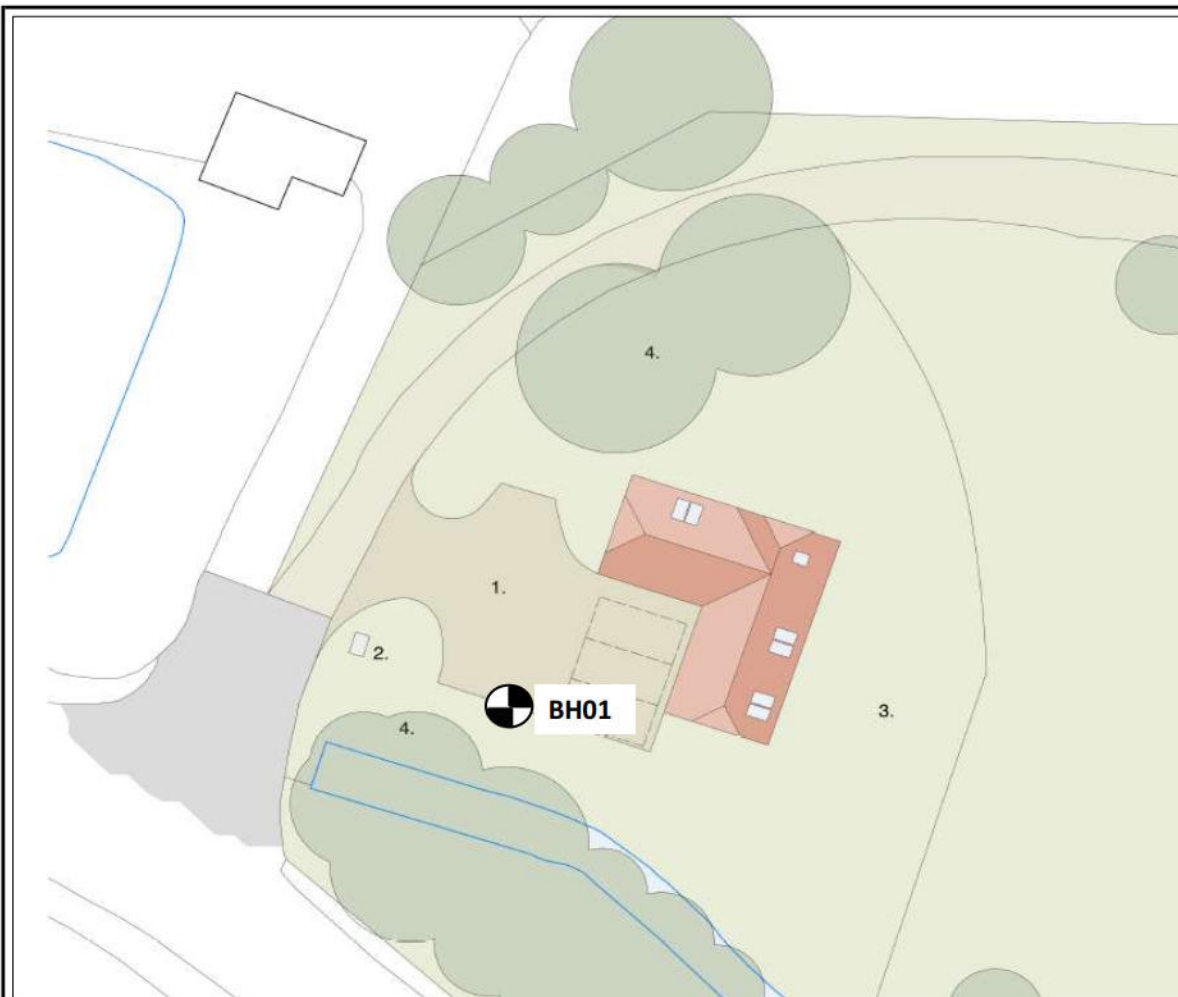
Site Border



Borehole with standpipe



TITLE:	Existing Site Plan	REF:	LS9190	PREPARED:	JM
PROJECT:	Land West of Little Meadow, Bilsham Road, Yapton, Arundel BN18 0JY	FIGURE:	2	CHECKED:	MR
CLIENT:	Ross Hyams	DATE:	26/03/2026	VERSION	V1



1. Proposed drive and parking
2. Proposed store and bin collection point
3. Proposed garden
4. All existing trees retained



Borehole with standpipe



TITLE:	Proposed Site Plan	REF:	LS9190	PREPARED:	JM
PROJECT:	Land West of Little Meadow, Bilsham Road, Yapton, Arundel BN18 0JY	FIGURE:	3	CHECKED:	MR
CLIENT:	Ross Hyams	DATE:	26/03/2026	VERSION	V1

Key to exploratory hole symbols and abbreviations

SAMPLE TYPES

ACM - Asbestos sample	AMAL - Amalgamated sample	B - Bulk disturbed sample
BLK - Block sample	C - Core sample	CBR - CBR test sample
D - Disturbed sample	ES - Environmental sample	EW - Environmental water sample
G - Gas sample	J - Jar sample	L - Liner sample
TW - Pushed thin wall sample	U - Undisturbed sample	UT - Undisturbed thin wall sample
W - Water sample		

IN-SITU TESTS

HV - Hand shear vane	HV(r) - Hand shear vane residual	PID - Photo ionisation detector
PP - Hand penetrometer	SPT - Standard penetration test	SPT(C) - SPT using cone

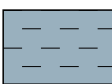
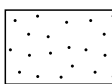
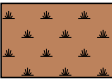
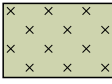
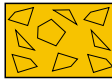
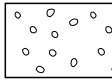
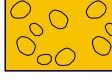
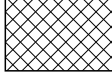
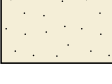
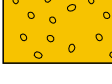
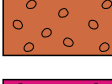
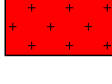
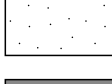
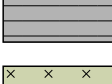
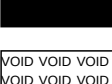
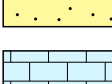
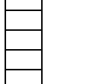
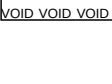
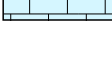
GROUNDWATER

 Groundwater strike	 Groundwater rest level
--	--

ROTARY CORE DETAILS

TCR - Total core recovery (%)	SCR - Solid core recovery (%)	RQD - Rock quality designation (%)
FI - Fracture index	NI - Non-intact core	AZCL - Assumed zone of core loss

LEGEND

 Topsoil	 Clay	 Chalk	 Sand backfill
 Peat	 Silt	 Breccia	 Gravel backfill
 Made ground [cohesive]	 Sand	 Conglomerate	 Arisings
 Concrete	 Gravel	 Metamorphic	 Bentonite
 Wood	 Cobbles	 Igneous	 Concrete
 Brick	 Boulders		 Grout
 Bituminous material	 Mudstone		 Plain pipe
 Gypsum	 Siltstone		
 Coal	 Sandstone		 Slotted pipe
 Void	 Limestone		

Dynamic Sampler

BH01

Sheet 1 of 1

Hole Type DS	Easting 497578.78	Northing 101934.32	Ground Level (m) 4.11	Scale 1:25
Project Name Land West of Little Meadows	Project No. CE26-0007	Start Date 2026-01-21	End Date 2026-01-21	

Client Ross Hyams	Consultant IB	Contractor
-----------------------------	-------------------------	-------------------

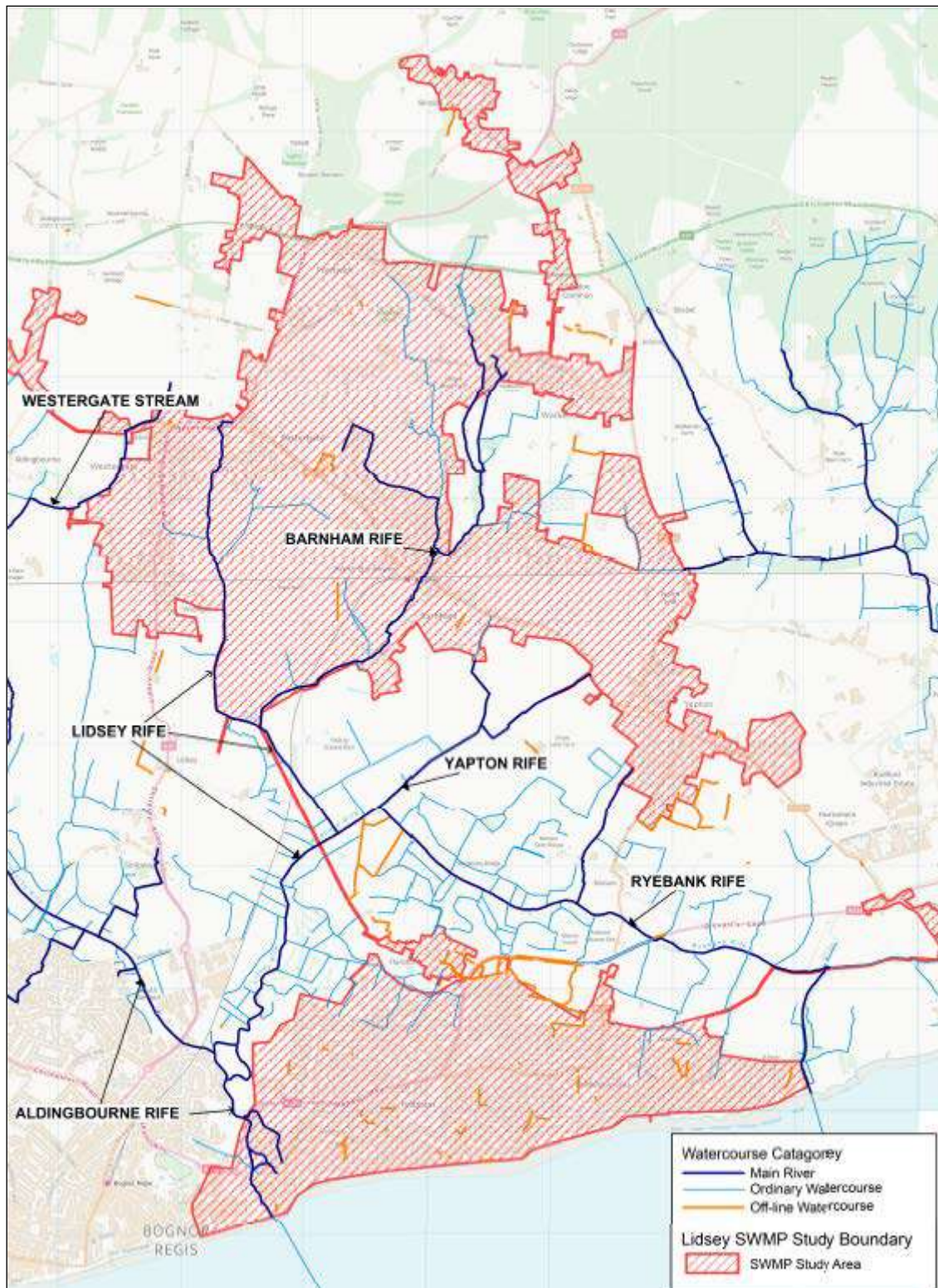
Inst/ Backfill	Water Levels	Samples and Tests		Level (m)	Depth (m)	Strata	
		Depth (m)	Type/ Ref			Legend	Description
				3.81	0.30		TOPSOIL: Soft brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is fine and medium angular to sub-rounded flint.
							Firm brown mottled grey sandy CLAY. Sand is fine to coarse.
					(3.00)		
				0.81	3.30		Structureless CHALK recovered as grey mottled white slightly sandy slightly gravelly SILT. Sand is fine to coarse. Gravel is fine sub-angular to rounded very weak low density chalk.
					(1.70)		
				-0.89	5.00		
							End of Borehole at 5.00m

Remarks 1. Location cleared using a CAT and Genny prior to breaking ground. 2. Groundwater strike at 1.75m bgl rising to 1.15m after 30 mins. 3. Borehole collapsed from 5.0m bgl to 3.35m bgl. 4. 50mm diameter HDPE pipe installed to a depth of 3.35m bgl.	Method, Plant, Stability, Dimensions 0.00 - 5.00m DS L = 0.30m W = 0.30m	Logger IB
---	--	---------------------

Checked By: LS Approved By: IB

Appendix D Arun District Council Strategic Flood Risk Assessment (SFRA)

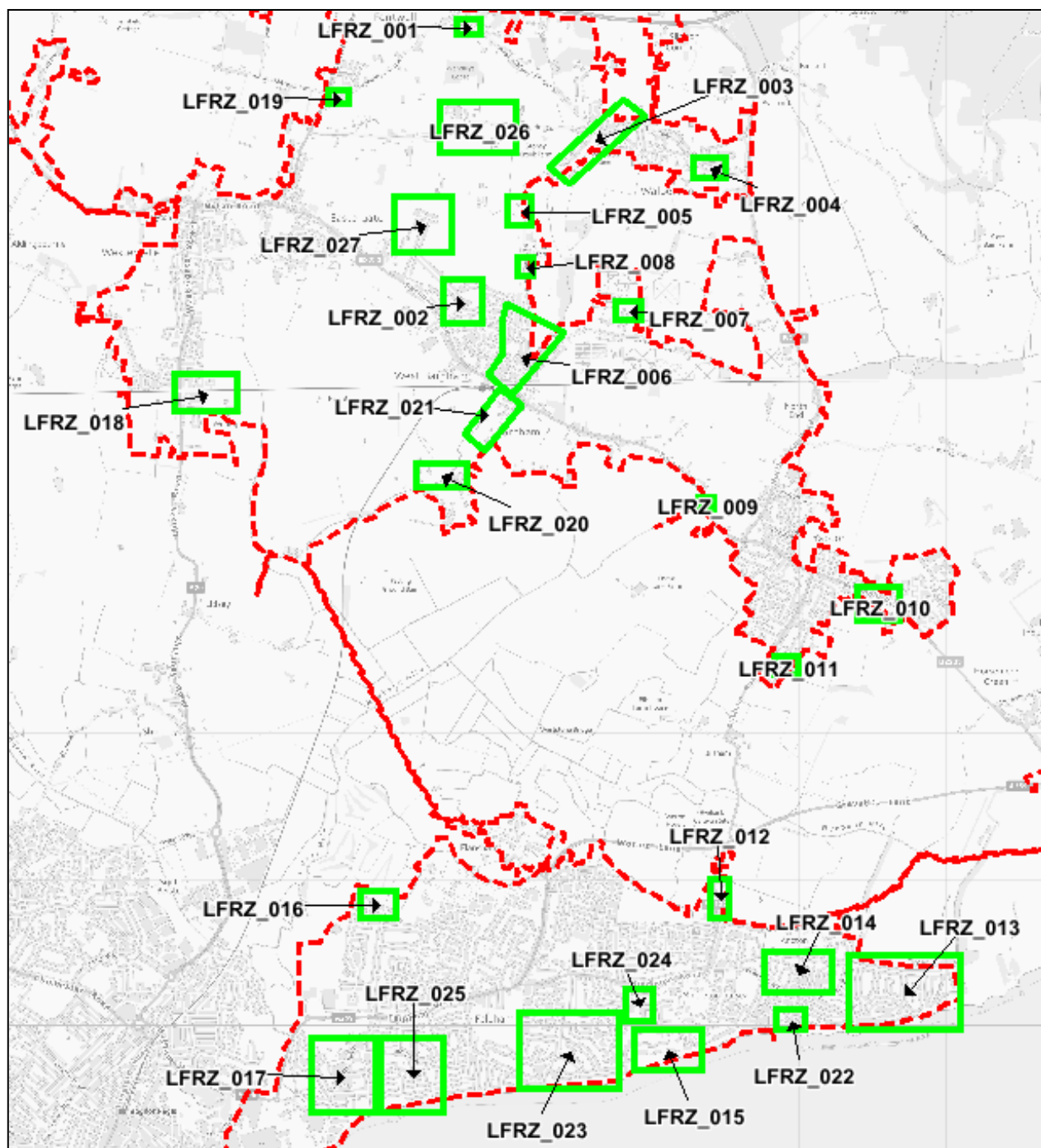
Figure 1.8 - Main Rivers in the study area



1.12. Public Sewer System (Southern Water Assets)

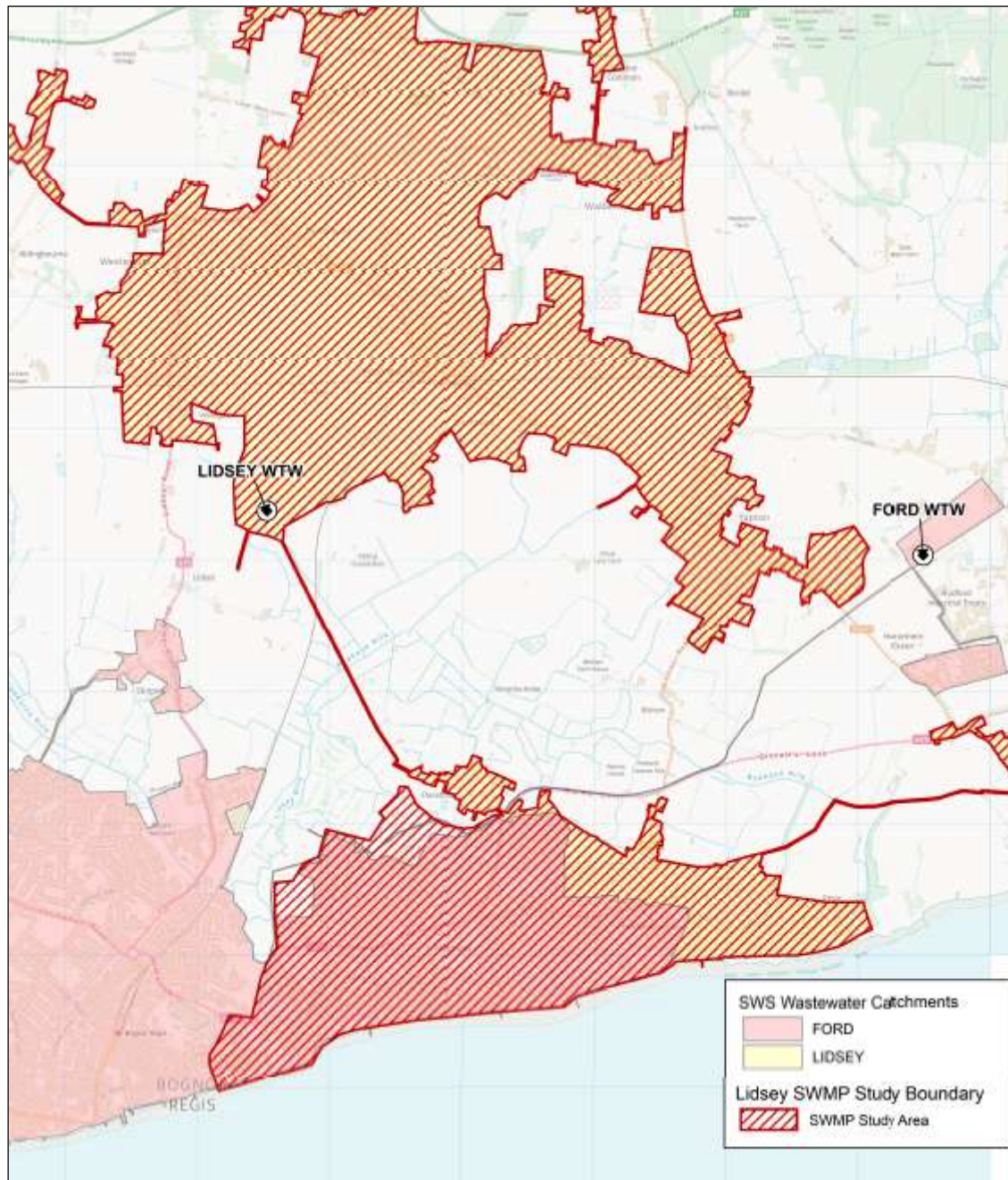
The public sewer system can comprise separate foul and surface water systems or a combined network. The majority of designated foul systems actually have some form of surface water response and so are considered combined.

Figure 5.1 - LFRZ Location Plan



The Lidsey SWMP study area overlaps with two Southern Water Services (SWS) wastewater treatment catchments; Lidsey and Ford as shown in the Figure 1.9. The Lidsey wastewater catchment is fully encompassed within the SWMP study area. The majority of Middleton and Felpham are located within the Ford wastewater catchment area. Both the Lidsey and Ford public sewer networks comprise of a mixture of separate and combined sewerage assets.

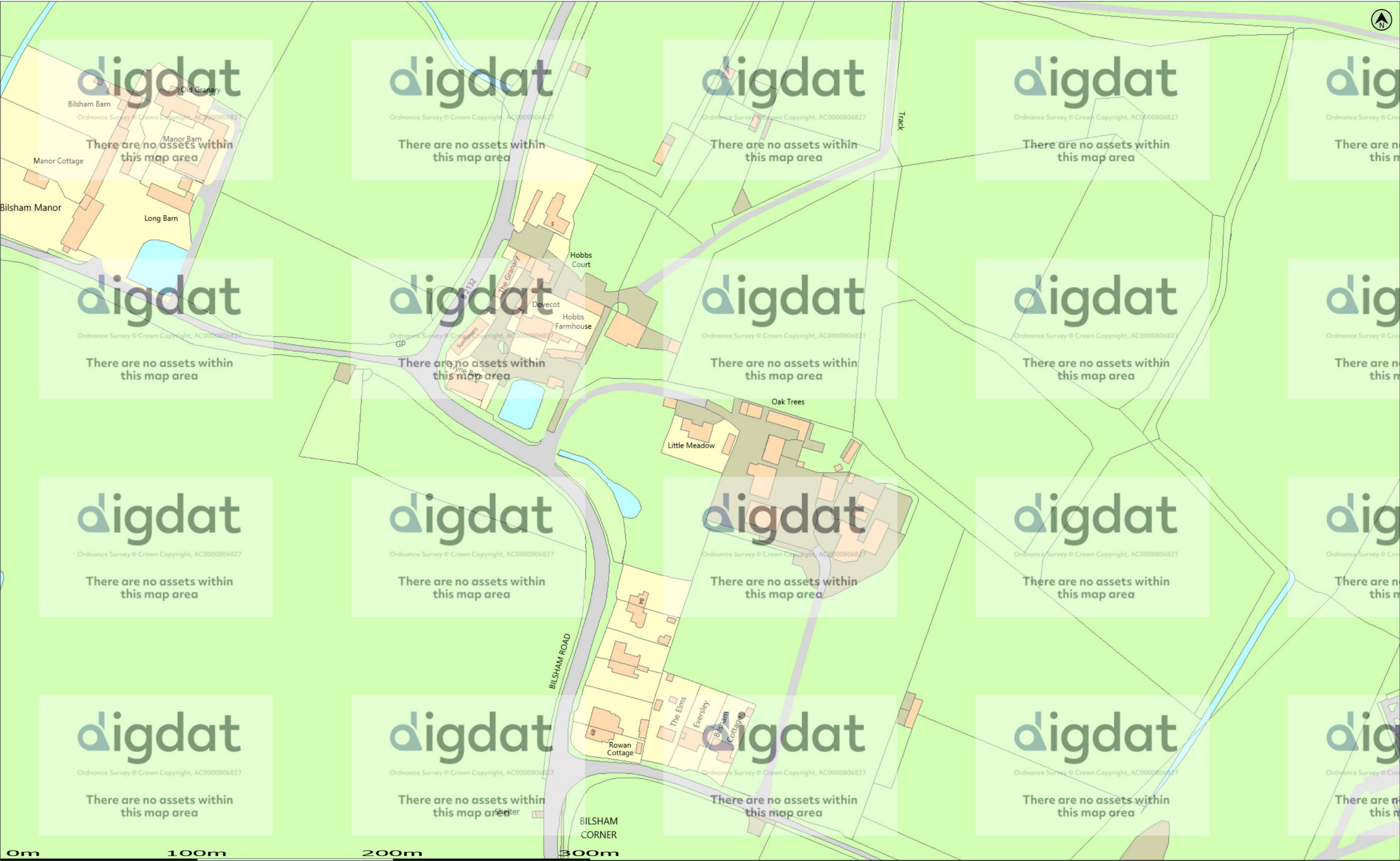
Figure 1.9 - SWMP and Wastewater Catchment Boundaries



Lidsey WTW is located approximately 800m south of Woodgate and 900m south west of Barnham. The public system is made up mostly of separate sewerage systems, with only very limited areas of combined sewer drainage. Flows arrive at the Lidsey WTW from three sources:

- Hoe Lane Wastewater Pumping Station (WPS) rising main;
- the 350mm and 375mm gravity sewers from Barnham; and
- a 450mm gravity sewer from Westergate.

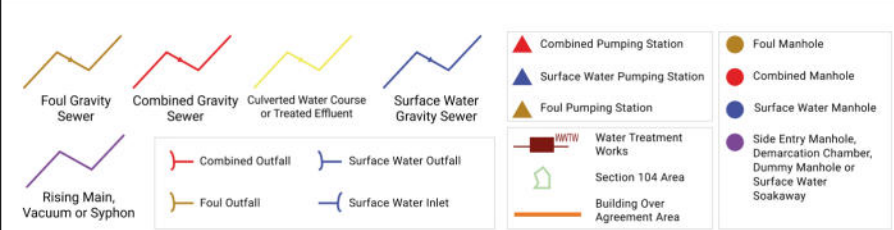
Appendix E Southern Water Public Sewer Records



(c) Crown copyright and database rights 2025 Ordnance Survey AC0000808122 Date: 12/08/25 Scale: 1:1250 Map Centre: 497635,101939 Data updated: 23/07/25 Our Ref: 1849772 - 1 Wastewater Plan A2 Powered by digdat

The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site. This plan is produced by Southern Water Services Ltd (c) Crown copyright and database rights 2025 Ordnance Survey AC0000808122. This map is to be used for the purposes of viewing the location of Southern Water plant only. Any other uses of the map data or further copies is not permitted.

WARNING: BAC pipes are constructed of Bonded Asbestos Cement.
WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement.



searches@bpcivils.co.uk

D2411 Little Meadow



Appendix F Wallingford Greenfield Run-off Calculations

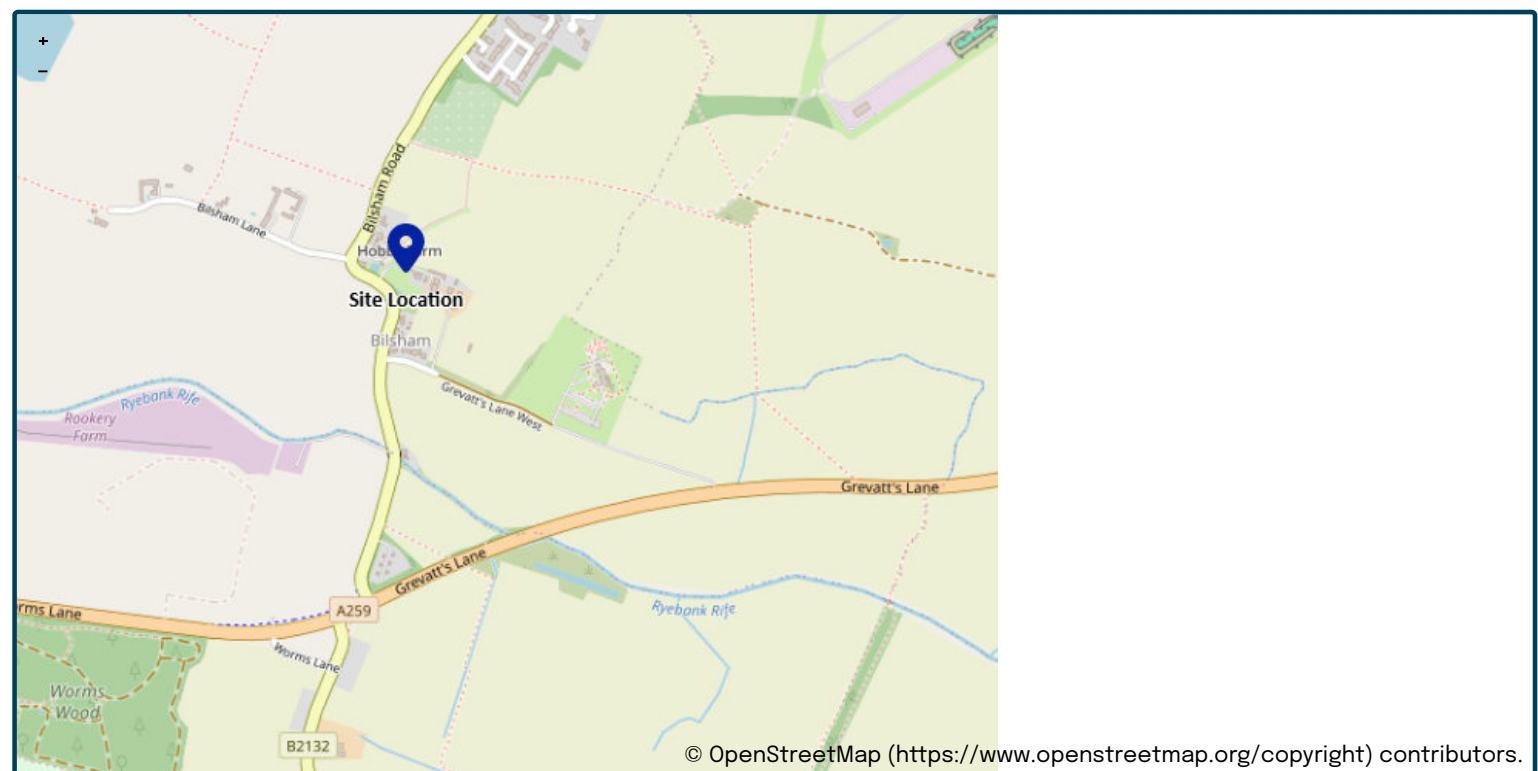
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). 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	09/06/2026
Calculated by	MJA
Reference	D2411
Model version	2.2.3

Location

Site name	Little Meadow
Site location	Yapton



Site easting (British National Grid)	497613
Site northing (British National Grid)	101903

Site details

Total site area (ha)	.2	ha
----------------------	----	----

Greenfield runoff

Method

Method	FEH statistical (2025)
--------	------------------------

FEH statistical (2025)

	<u>My value</u>	<u>Map value</u>
SAAR9120 (mm)	785 mm	
BFIHOST19scaled	.663	
QMed-QBar conversion	1.136	1.136
QMed (l/s)	0.4 l/s	
QBar (FEH statistical 2025) (l/s)	0.4 l/s	

Growth curve factors

	<u>My value</u>	<u>Map value</u>
Hydrological region	7	7
1 year growth factor	0.85	
2 year growth factor	0.88	
10 year growth factor	1.62	
30 year growth factor	2.3	
100 year growth factor	3.19	
200 year growth factor	3.74	

Results

Method	FEH statistical (2025)
Flow rate 1 year (l/s)	0.4 l/s
Flow rate 2 year (l/s)	0.4 l/s
Flow rate 10 years (l/s)	0.7 l/s
Flow rate 30 years (l/s)	1.0 l/s
Flow rate 100 years (l/s)	1.3 l/s
Flow rate 200 years (l/s)	1.6 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

This report was produced using the Greenfield runoff rate estimation tool (2.2.3) developed by HR Wallingford and available at uksuds.com (<https://www.uksuds.com/>). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at uksuds.com/terms-conditions (<https://www.uksuds.com/terms-conditions>). The outputs from this tool have been used to estimate Greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

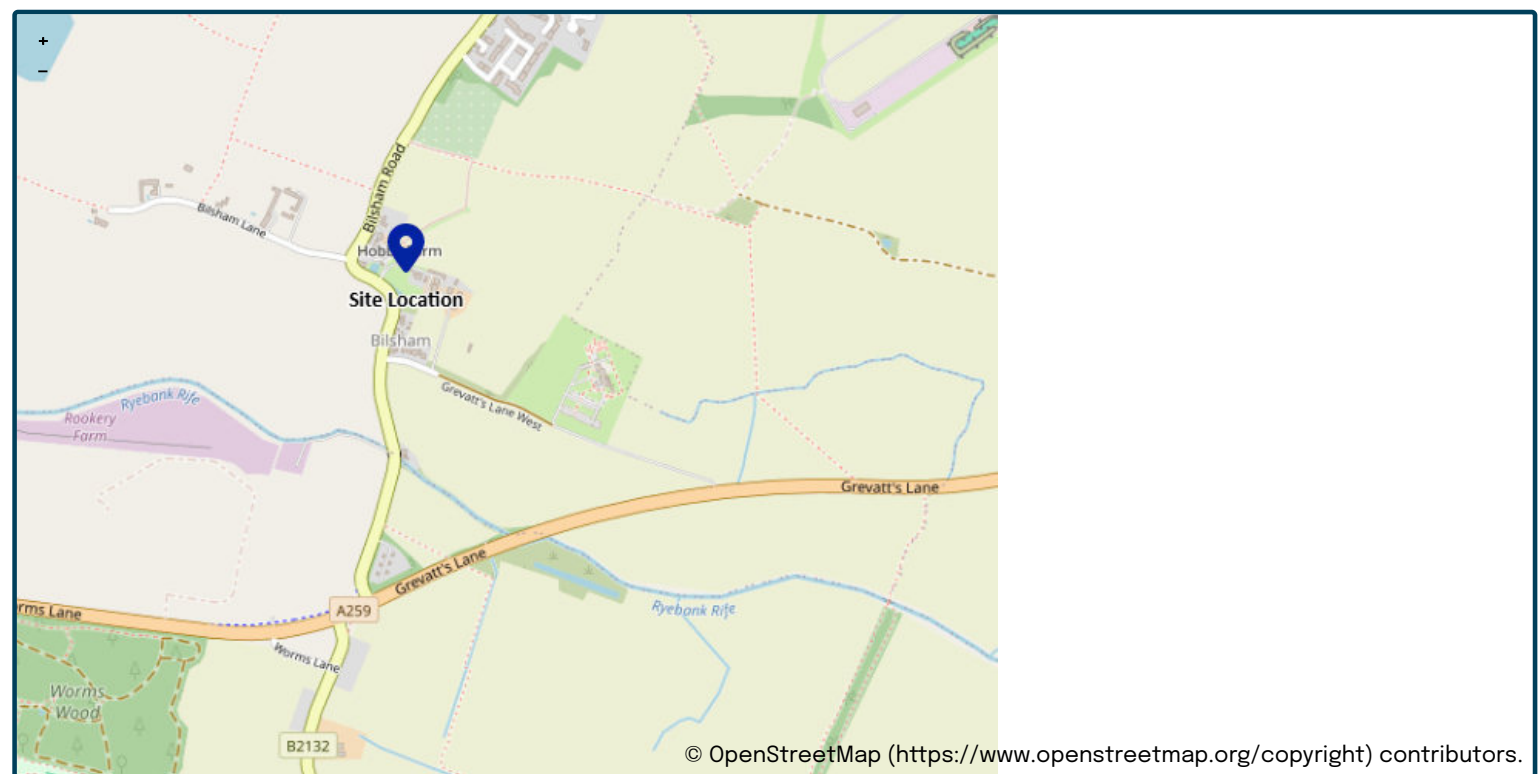
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). 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	09/06/2026
Calculated by	MJA
Reference	D2411
Model version	2.2.3

Location

Site name	Little Meadow
Site location	Yapton



Site easting (British National Grid)	497613
Site northing (British National Grid)	101903

Site details

Total site area (ha)	1	ha
----------------------	---	----

Greenfield runoff

Method

Method	FEH statistical (2025)
--------	------------------------

FEH statistical (2025)

	<u>My value</u>	<u>Map value</u>
SAAR9120 (mm)	785 mm	
BFIHOST19scaled	.663	
QMed-QBar conversion	1.136	1.136
QMed (l/s)	1.9 l/s	
QBar (FEH statistical 2025) (l/s)	2.1 l/s	

Growth curve factors

	<u>My value</u>	<u>Map value</u>
Hydrological region	7	7
1 year growth factor	0.85	
2 year growth factor	0.88	
10 year growth factor	1.62	
30 year growth factor	2.3	
100 year growth factor	3.19	
200 year growth factor	3.74	

Results

Method	FEH statistical (2025)
Flow rate 1 year (l/s)	1.8 l/s
Flow rate 2 year (l/s)	1.9 l/s
Flow rate 10 years (l/s)	3.4 l/s
Flow rate 30 years (l/s)	4.8 l/s
Flow rate 100 years (l/s)	6.7 l/s
Flow rate 200 years (l/s)	7.9 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

This report was produced using the Greenfield runoff rate estimation tool (2.2.3) developed by HR Wallingford and available at uksuds.com (<https://www.uksuds.com/>). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at uksuds.com/terms-conditions (<https://www.uksuds.com/terms-conditions>). The outputs from this tool have been used to estimate Greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

Appendix G Environment Agency Product 4 Data

Our reference: **EIR2025/15061**

Date: **08/09/2025**

Dear Stuart,

Thank you for your request of 12 August 2025 to use Environment Agency Product 4 data for **Little Meadow, Bilsham Road, Yapton, BN18 0JY**.

Response to your request

The Environment Agency's records indicate that the above site is located in Flood Zone 1 (land assessed as having less than 0.1% (1 in 1,000) chance of flooding in any given year from **rivers or the sea**). Therefore, the likelihood of flooding from rivers and sea in this area is estimated as 'very low'.

Proximity to Flood Zones 2 or 3

The above site is approximately 235 metres away from Flood Zone 2/3. We are therefore unable to provide data from our detailed fluvial or tidal models which is relevant to your site.

More information on Flood Zones can be found on the GOV.UK website:

<http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/flood-zone-and-flood-risk-tables/table-1-flood-zones/>

Surface water flooding

Our mapping indicates that this site is at **Very Low Risk** of surface water flooding.

For information on flooding from all other sources, such as surface water, please contact the Lead Local Flood Authority, which in this case is **West Sussex County Council**. A link to their information available online is shown below:

<https://www.westsussex.gov.uk/fire-emergencies-and-crime/dealing-with-extreme-weather/dealing-with-flooding/flood-risk-management/local-flood-risk-management-strategy/>

Please note that the above is a link to an external website which the Environment Agency does not control or maintain. Therefore, the link may not be the most up-to-date at the date of this letter. If the link does not work, and you are unable to find the information about surface water flooding on the relevant website, please contact the authority named above directly.

Where you can find further information

- Detailed long-term flood information and maps can be found on the GOV.UK website:
<https://flood-warning-information.service.gov.uk/long-term-flood-risk/>
- Flood maps for planning can be found on the GOV.UK website:
<https://flood-map-for-planning.service.gov.uk/>
- Please be aware that in February 2016 the Environment Agency updated its guidance on climate change allowances. The standard allowance of adding 20% to peak flows – as per previous guidance in the National Planning Policy Framework, may not be applicable for the purposes of informing development proposals. It is possible that our current modelling has under estimated flood risk when taking climate change into consideration. This does not however have an effect on Flood Zones 2 or 3. For further information please visit:
<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>
- Further details about the Environment Agency information supplied can be found on the GOV.UK website:
<https://www.gov.uk/browse/environment-countryside/flooding-extreme-weather>
- If you have requested this information to help inform a development proposal, then you should note the information on GOV.UK on the use of Environment Agency information for Flood Risk Assessments:
<https://www.gov.uk/planning-applications-assessing-flood-risk>
<https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion>

If you have any queries or would like to discuss the content of this letter further please call us on 03708 506 506, or reply to the email sent to you with this letter attached.

Please get in touch if you have any further queries or contact us within two (2) months if you would like us to review the information we have sent.

For information on what you can expect from us and our full service commitment to you, please click on this link:

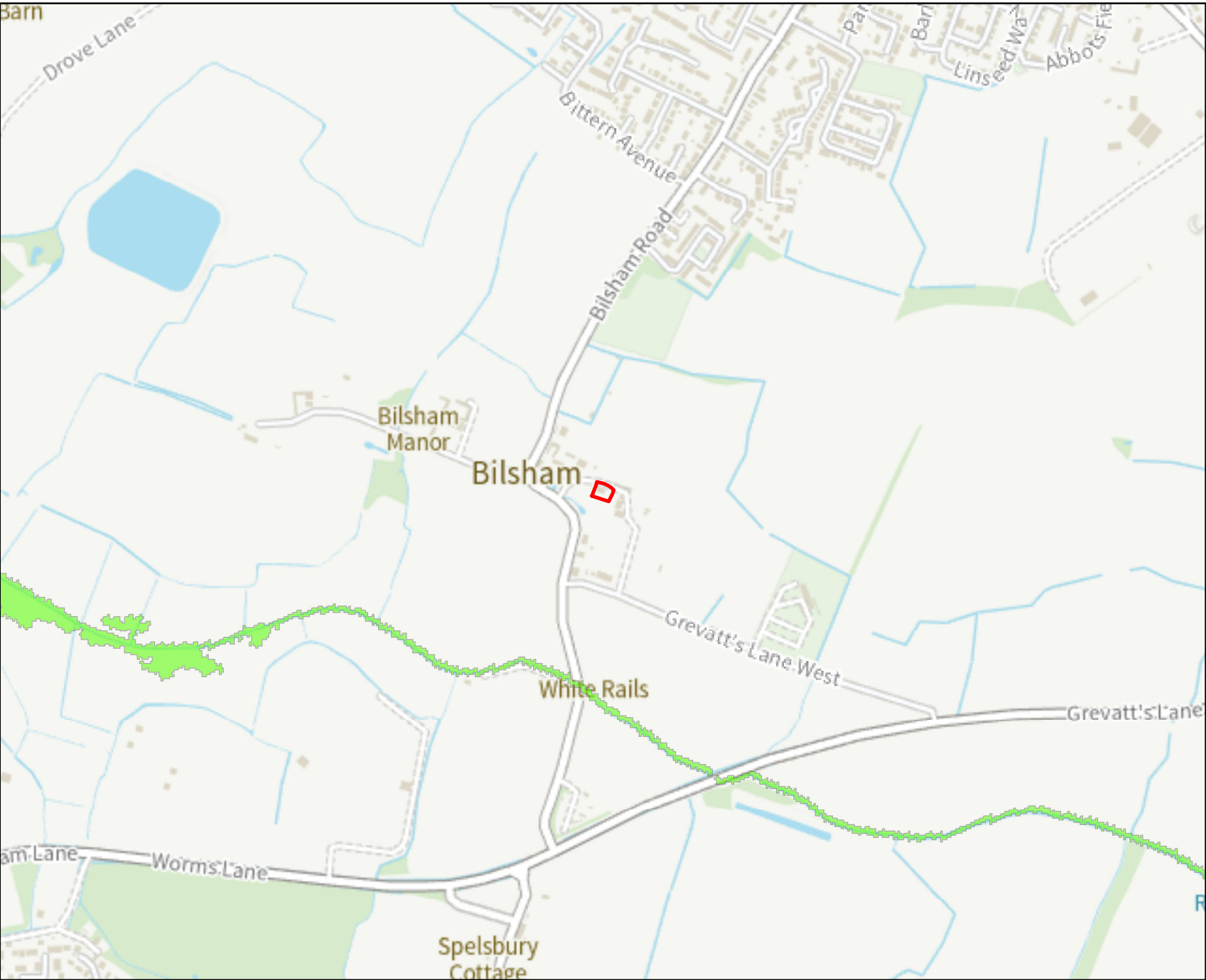
<https://www.gov.uk/government/publications/environment-agency-customer-service-commitment--2/environment-agency-customer-service-commitment>

Yours sincerely,

Amy O'Donnell

Partnership and Strategic Overview West Sussex, Solent and South Downs

Environment Agency | Teville Gate House, Teville Road, Worthing, West Sussex, BN11 1UR





Environment
Agency

N
▲

Legend

- Site Boundary
- 0.5% AEP (Defended Tidal)
- 0.5% AEP (2070) NPPF (Defended Tidal)
- 0.5% AEP (2115) NPPF (Defended Tidal)
- 0.1% AEP (Defended Tidal)

Annual Exceedance Probability (AEP) The probability of a flood of a particular magnitude, or greater occurring in any given year.

Scale: 1:10,000

0

0.225

0.45

Kilometers

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Contact us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506. Email:enquiries@environment-agency.gov.uk

Modelled Flood Outlines (Undefended Tidal). Centred BN18 0LA. Created 08/09/2025.

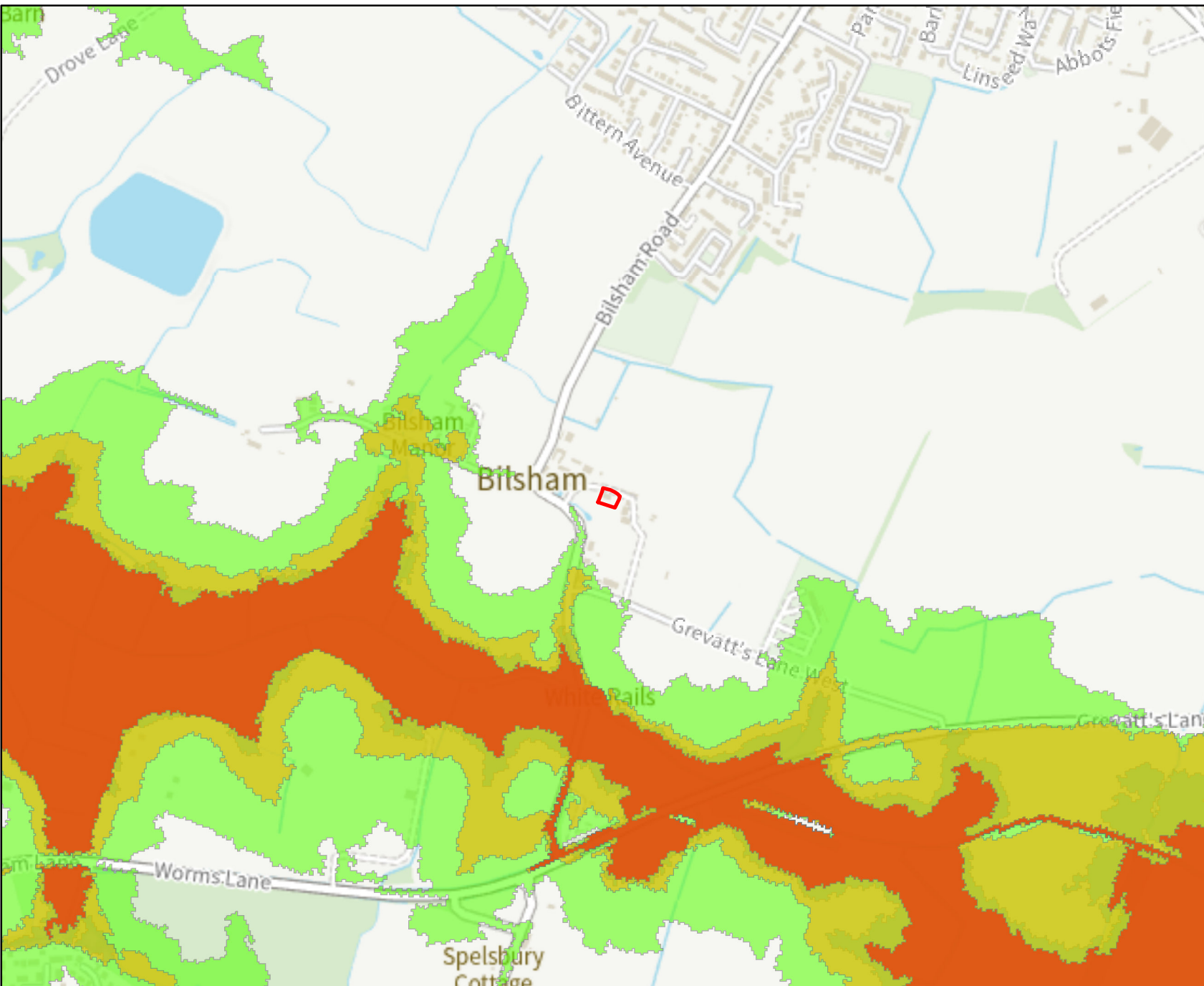
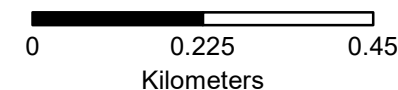


Legend

-  Site Boundary
-  0.5% AEP (Undefended Tidal)
-  0.5% AEP (2070) NPPF (Undefended Tidal)
-  0.5% AEP (2115) NPPF (Undefended Tidal)
-  0.1% AEP (Undefended Tidal)

Annual Exceedance Probability (AEP) The probability of a flood of a particular magnitude, or greater occurring in any given year.

Scale: 1:10,000



Appendix H Hydraulic Calculations

Network Details

Manhole Schedule

Manhole	Catchment Area (ha)	Size (mm)	Type	CL (m)	IL (m)	Depth To Soffit (m)	Easting (m)	Northing (m)
S4 (DIFFUSE)	0.030	1000x500	Unknown	4.121	3.450	0.521	497582.642	101957.410
S1 CP	0.000	1350	Type C	4.130	3.200	0.780	497581.246	101953.284
S2	0.000	1350	Type C	4.000	2.800	1.050	497574.072	101932.436
S3	0.000	---	Type C	2.410	1.060	1.200	497570.399	101926.125

Pipe Schedule

Pipe Number	US Manhole	US IL (m)	DS Manhole	DS IL (m)	Shape	Dimension (mm)	Length (m)	Gradient (1:x)	Roughness (mm)	US Depth To Soffit (m)	DS Depth To Soffit (m)
1.000	S4 (DIFFUSE)	3.450	S1 CP	3.200	Circ	150	4.356	17	0.600	0.521	0.780
1.001	S1 CP	3.200	S2	2.800	Circ	150	22.047	55	0.600	0.780	1.050
1.002	S2	2.800	S3	1.060	Circ	150	7.302	4	0.600	1.050	1.200

Permeable Paving Schedule

Permeable Paving	Assigned Manhole	Effective Storage Volume (m3)	CL (m)	IL (m)	Storage Infil Rate (m/hr)	Safety Factor	Easting (m)	Northing (m)
Permeable Paving 2	S4 (DIFFUSE)	34.637	4.121	3.516	0.00000000	2.00	497588.137	101949.659

Outfall Details

Outfall Manhole S3 : Surcharged (Constant Level)

Surcharged Constant

Water Elevation (m)	Water Depth (m)
3.200	2.140

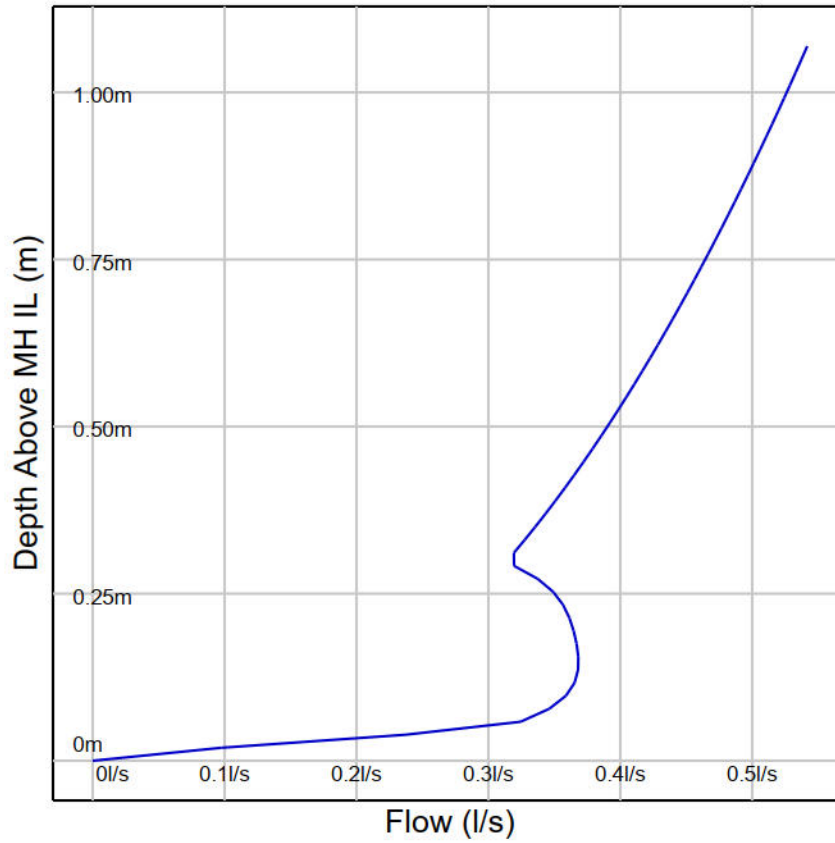
Flow Control Details

Controls within Manhole S2

Hydro-Brake® Optimum Control

Model Ref	Design Depth (m)	Design Flow (l/s)	Invert Offset (m)	FF Head (m)	FF Flow (l/s)	KF Head (m)	KF Flow (l/s)
SHE-0033-5000-0900-5000	0.900	0.500	0.000	0.147	0.368	0.297	0.313

Hydro-Brake® Optimum Control from S2 to S3



Simulation Settings

FEH2022 (point): Filename=FEH_Point_Descriptors_497580_101929_v5_1_0.xml

Summer (Cv: 1.00), Winter (Cv: 1.00)

Global Time of Entry: 5.0 mins

Durations (mins): 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440

Return Periods (yrs) + Climate Change: (2, +0%), (30, +10%), (100, +0%), (100, +45%)

Manhole Flood Risk Freeboard: 0.300m

Simulated Rainfall Events

Storm	Average Intensity (mm/hr)	Runoff Continuity %	Flow Continuity %	Item Volume Continuity Errors
2Yr 15Min Winter	32.800	0.00	7.38	S2 0.58m3
2Yr 15Min Summer	32.800	0.00	7.28	S2 0.59m3
2Yr 30Min Winter	21.200	0.00	5.66	S2 0.59m3
2Yr 30Min Summer	21.200	0.00	5.68	S2 0.59m3
2Yr 60Min Winter	13.400	0.00	4.38	
2Yr 60Min Summer	13.400	0.00	4.38	
2Yr 120Min Summer	9.250	0.00	3.15	
2Yr 120Min Winter	9.250	0.00	3.16	
2Yr 180Min Summer	7.303	0.00	2.68	
2Yr 180Min Winter	7.303	0.00	2.69	
2Yr 240Min Summer	5.942	0.00	2.47	
2Yr 240Min Winter	5.942	0.00	2.48	
2Yr 360Min Summer	4.445	0.00	2.20	
2Yr 360Min Winter	4.445	0.00	2.21	
2Yr 480Min Summer	3.598	0.00	2.03	
2Yr 480Min Winter	3.598	0.00	2.04	
2Yr 600Min Summer	3.027	0.00	1.93	
2Yr 600Min Winter	3.027	0.00	1.94	
2Yr 720Min Winter	2.616	0.00	1.86	
2Yr 720Min Summer	2.616	0.00	1.86	
2Yr 960Min Summer	2.088	0.00	1.75	
2Yr 960Min Winter	2.088	0.00	1.75	
2Yr 1440Min Summer	1.528	0.00	1.59	
2Yr 1440Min Winter	1.528	0.00	1.59	
30Yr+10% 15Min Summer	90.313	0.00	2.72	
30Yr+10% 15Min Winter	90.313	0.00	2.76	
30Yr+10% 30Min Summer	59.901	0.00	2.08	
30Yr+10% 30Min Winter	59.901	0.00	2.08	
30Yr+10% 60Min Summer	37.994	0.00	1.62	
30Yr+10% 60Min Winter	37.994	0.00	1.63	
30Yr+10% 120Min Winter	23.154	0.00	1.33	
30Yr+10% 120Min Summer	23.154	0.00	1.33	
30Yr+10% 180Min Summer	17.108	0.00	1.20	
30Yr+10% 180Min Winter	17.108	0.00	1.20	
30Yr+10% 240Min Summer	13.709	0.00	1.12	
30Yr+10% 240Min Winter	13.709	0.00	1.12	
30Yr+10% 360Min Summer	9.942	0.00	1.03	
30Yr+10% 360Min Winter	9.942	0.00	1.03	
30Yr+10% 480Min Summer	7.879	0.00	0.97	
30Yr+10% 480Min Winter	7.879	0.00	0.98	
30Yr+10% 600Min Winter	6.556	0.00	0.94	
30Yr+10% 600Min Summer	6.556	0.00	0.94	
30Yr+10% 720Min Summer	5.629	0.00	0.91	
30Yr+10% 720Min Winter	5.629	0.00	0.91	
30Yr+10% 960Min Summer	4.425	0.00	0.86	
30Yr+10% 960Min Winter	4.425	0.00	0.86	
30Yr+10% 1440Min Summer	3.159	0.00	0.78	
30Yr+10% 1440Min Winter	3.159	0.00	0.79	
100Yr 15Min Summer	102.896	0.00	2.40	
100Yr 15Min Winter	102.896	0.00	2.43	
100Yr 30Min Summer	68.906	0.00	1.81	
100Yr 30Min Winter	68.906	0.00	1.80	
100Yr 60Min Summer	44.041	0.00	1.40	
100Yr 60Min Winter	44.041	0.00	1.41	

Simulated Rainfall Events

Storm	Average Intensity (mm/hr)	Runoff Continuity %	Flow Continuity %	Item Volume Continuity Errors
100Yr 120Min Summer	26.354	0.00	1.17	
100Yr 120Min Winter	26.354	0.00	1.17	
100Yr 180Min Summer	19.309	0.00	1.06	
100Yr 180Min Winter	19.309	0.00	1.06	
100Yr 240Min Summer	15.512	0.00	0.99	
100Yr 240Min Winter	15.512	0.00	0.99	
100Yr 360Min Summer	11.263	0.00	0.91	
100Yr 360Min Winter	11.263	0.00	0.91	
100Yr 480Min Summer	8.933	0.00	0.86	
100Yr 480Min Winter	8.933	0.00	0.86	
100Yr 600Min Summer	7.446	0.00	0.82	
100Yr 600Min Winter	7.446	0.00	0.83	
100Yr 720Min Summer	6.404	0.00	0.80	
100Yr 720Min Winter	6.404	0.00	0.81	
100Yr 960Min Summer	5.042	0.00	0.76	
100Yr 960Min Winter	5.042	0.00	0.77	
100Yr 1440Min Summer	3.596	0.00	0.70	
100Yr 1440Min Winter	3.596	0.00	0.70	
100Yr+45% 15Min Summer	149.200	0.00	1.66	
100Yr+45% 15Min Winter	149.200	0.00	1.68	
100Yr+45% 30Min Summer	99.913	0.00	1.25	
100Yr+45% 30Min Winter	99.913	0.00	1.24	
100Yr+45% 60Min Summer	63.859	0.00	0.97	
100Yr+45% 60Min Winter	63.859	0.00	0.97	
100Yr+45% 120Min Summer	38.214	0.00	0.81	
100Yr+45% 120Min Winter	38.214	0.00	0.81	
100Yr+45% 180Min Summer	27.998	0.00	0.73	
100Yr+45% 180Min Winter	27.998	0.00	0.74	
100Yr+45% 240Min Summer	22.492	0.00	0.69	
100Yr+45% 240Min Winter	22.492	0.00	0.69	
100Yr+45% 360Min Summer	16.332	0.00	0.63	
100Yr+45% 360Min Winter	16.332	0.00	0.63	
100Yr+45% 480Min Summer	12.953	0.00	0.60	
100Yr+45% 480Min Winter	12.953	0.00	0.60	
100Yr+45% 600Min Summer	10.797	0.00	0.57	
100Yr+45% 600Min Winter	10.797	0.00	0.57	
100Yr+45% 720Min Summer	9.286	0.00	0.55	
100Yr+45% 720Min Winter	9.286	0.00	0.56	
100Yr+45% 960Min Summer	7.311	0.00	0.53	
100Yr+45% 960Min Winter	7.311	0.00	0.53	
100Yr+45% 1440Min Winter	5.215	0.00	0.50	
100Yr+45% 1440Min Summer	5.215	0.00	0.49	

Simulation Results

Return Period (yrs) + Climate Change (%):

2yr+0%

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S4 (DIFFUSE)	240 min Summer	171	3.548	0.098	0.335		OK
S1 CP	240 min Summer	171	3.548	0.348	0.335		Surcharged
S2	240 min Summer	171	3.548	0.748	0.335		Surcharged
S3	15 min Winter	0	3.200	2.140	0.352		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	240 min Summer	171	S4 (DIFFUSE)	S1 CP	0.124	0.449	1.566	0.037	OK
1.001	60 min Summer	58	S1 CP	S2	0.150	0.092	0.946	0.039	Surcharged
1.002	180 min Winter	311	S2	S3	0.150	0.021	0.368	0.004	Surcharged

Permeable Paving Storage

Permeable Paving	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Surface Runoff (m3)	Status
Permeable Paving 2	180 min Summer	106	3.549	0.033	1.335			OK

Return Period (yrs) + Climate Change (%):

30yr+10%

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S4 (DIFFUSE)	240 min Winter	235	3.653	0.203	0.000		Surcharged
S1 CP	240 min Winter	233	3.653	0.453	0.068		Surcharged
S2	240 min Winter	213	3.653	0.853	0.315		Surcharged
S3	15 min Summer	0	3.200	2.140	0.352		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	60 min Winter	47	S4 (DIFFUSE)	S1 CP	0.150	1.020	5.271	0.123	Surcharged
1.001	30 min Summer	26	S1 CP	S2	0.150	0.259	2.966	0.124	Surcharged
1.002	240 min Winter	213	S2	S3	0.150	0.021	0.374	0.004	Surcharged

Permeable Paving Storage

Permeable Paving	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Surface Runoff (m3)	Status
Permeable Paving 2	240 min Winter	226	3.652	0.136	0.372			OK

Return Period (yrs) + Climate Change (%):

100yr+0%

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S4 (DIFFUSE)	240 min Winter	229	3.680	0.230	0.000		Surcharged
S1 CP	240 min Winter	224	3.679	0.479	0.396		Surcharged
S2	240 min Winter	234	3.679	0.879	0.514		Surcharged
S3	15 min Summer	0	3.200	2.140	0.352		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	60 min Summer	41	S4 (DIFFUSE)	S1 CP	0.150	1.039	6.117	0.143	Surcharged
1.001	15 min Winter	20	S1 CP	S2	0.150	0.286	3.314	0.138	Surcharged
1.002	240 min Winter	234	S2	S3	0.150	0.022	0.383	0.004	Surcharged

Permeable Paving Storage

Permeable Paving	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Surface Runoff (m3)	Status
Permeable Paving 2	240 min Winter	231	3.678	0.162	0.377			OK

Return Period (yrs) + Climate Change (%):

100yr+45%

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S4 (DIFFUSE)	360 min Winter	342	3.783	0.333	0.019		Surcharged
S1 CP	360 min Winter	338	3.783	0.583	0.448		Surcharged
S2	360 min Winter	340	3.784	0.984	0.357		Flood Risk
S3	15 min Summer	0	3.200	2.140	0.352		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	15 min Winter	22	S4 (DIFFUSE)	S1 CP	0.150	1.312	6.127	0.143	Surcharged
1.001	15 min Winter	18	S1 CP	S2	0.150	0.319	3.741	0.156	Surcharged
1.002	360 min Winter	340	S2	S3	0.150	0.024	0.417	0.005	Surcharged

Permeable Paving Storage

Permeable Paving	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Surface Runoff (m3)	Status
Permeable Paving 2	360 min Winter	341	3.783	0.267	0.430			OK