



Flood Risk Assessment

AEG11817_BN13_Worthing_01

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Site Address: Forest Barn
Forest Lane
Castle Goring
Worthing
BN13 3FD

UK Experts in Flood Modelling, Flood Risk Assessments, and Surface Water Drainage Strategies

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Document Issue Record

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Summary

Development Description	Existing	Proposed
Development Type	Barn previously used for residential use.	Householder extensions and alterations: front porch, front dormer, single-storey pitched-roof rear (south) extension replacing the former cart shed, flue and pergola
Environment Agency Vulnerability Classification	More Vulnerable	More Vulnerable (no change)
Ground Floor Level	Existing finished floor level (FFL) is at 18.43 metres Above Ordnance Datum (m AOD)	Existing barn FFL unchanged at 18.43m AOD. The drawings show the extension floor lowered to 18.10m AOD.
Level of Sleeping Accommodation	Existing barn dwelling.	No bedrooms in the extension. Bedroom 3 at ground floor of the existing barn (18.43m AOD); bedrooms 1 and 2 at first floor (Manorwood floor plan rev 002, 29/09/2026).
Surface Water Drainage	Roof water drains directly to the watercourse along the eastern boundary.	A Surface Water Drainage Strategy (SWDS) is being prepared separately by Aegaea to accompany the application.
Site Size	Redline boundary totals approximately 4,330m², comprising the barn plot and the private access track north to Castle Goring Way.	No change.
Risk to Development	**Summary**	**Comment**
Environment Agency Flood Zone	Flood Zone 1, treated as Flood Zone 3a	The site is located within Flood Zone 1. The whole building lies within the Flood Zones plus Climate Change extent, so the Flood Zone 3 precautionary approach requested by the Council is applied.

Development Description	Existing	Proposed
Flood Source	Fluvial (future, with climate change)	Design flood level 18.47m AOD from the Flood Zones plus Climate Change extent edge and 1m LiDAR. Groundwater risk is low to medium, surface water and other sources are low.
Strategic Flood Risk Assessment (SFRA) Available	Adur District Council and Worthing Borough Council Level 1 SFRA (JBA Consulting, July 2024).	
Management Measures	**Summary**	**Comment**
Ground floor level above extreme flood levels	N/A	The floor cannot be raised; flood resistance and resilience to 18.77m AOD, no bedrooms in the extension and first-floor refuge are provided.
Safe Access/Egress Route	No	Prior evacuation should be sought. If prior evacuation cannot be made then safe refuge is available on site at first floor level.
Flood Resilient Design	Yes	Flood resistance to the extension and barn openings and resilient construction and fit-out to at least 18.77m AOD, 300mm above the design flood level.
Flood Warning and Evacuation Plan	Yes	Recommended that occupiers monitor Met Office Weather Warnings for extreme weather events.
Offsite Impacts	**Summary**	**Comment**
Displacement of floodwater	Negligible	Minor developments are unlikely to raise significant flood risk issues as per Paragraph 051 of the NPPG.
Increase in surface run-off generation	Negligible	Surface water from the extended roof is to be managed through the separate SWDS (AEG11817_BN13_Worthing_05).
Impact on hydraulic performance of channels	Negligible	No works within a Main River. Any new outfall to the ordinary watercourse along the eastern boundary may require Ordinary Watercourse Consent (OWC).

1. Introduction

1.1. Aegaea were commissioned by Hogan Developments Ltd to undertake a Flood Risk Assessment (FRA) to facilitate a planning application for the proposed development. This FRA has been prepared in accordance with the requirements set out in the National Planning Policy Framework (NPPF, August 2026) and the associated Flood Risk and Coastal Change Planning Practice Guidance (PPG)

1.2. This FRA is intended to support a householder planning application (AWDM/0655/25) and as such the level of detail included is commensurate and subject to the nature of the proposals.

Site Overview

1.3. The site of the proposed development is Forest Barn, Forest Lane, Castle Goring, Worthing, BN13 3FD (Figure 1).



Figure 1: Site Location

1.4. The proposed development comprises a front (north) porch, a pitched-roof dormer to the front roof slope, a single-storey pitched-roof rear (south) extension replacing the former attached cart shed, a flue to the west elevation and a freestanding timber pergola in the rear garden. Following the Council's comments, the layout was revised (Manorwood floor plan rev 002, 29/09/2026) so that the extension contains a living room, WC, utility, study and living/dining/kitchen and no bedrooms. The proposed development plans are provided in Appendix A.

1.5. In the absence of a topographical survey, the site topography has been reviewed using the EA 1m LiDAR Digital Terrain Model (Figure 2). The redline boundary includes the barn plot and a long private access track, which rises northward from the barn towards Castle Goring Way. Key levels are:

- **Redline boundary**: approximately 16.68m AOD to 24.71m AOD, with the higher levels along the access track to the north.
- **Ground beneath the building:** approximately 17.89m AOD to 18.48m AOD.
- **Existing barn finished floor level (FFL):** 18.43m AOD.
- **Proposed extension FFL**: 18.10m AOD.

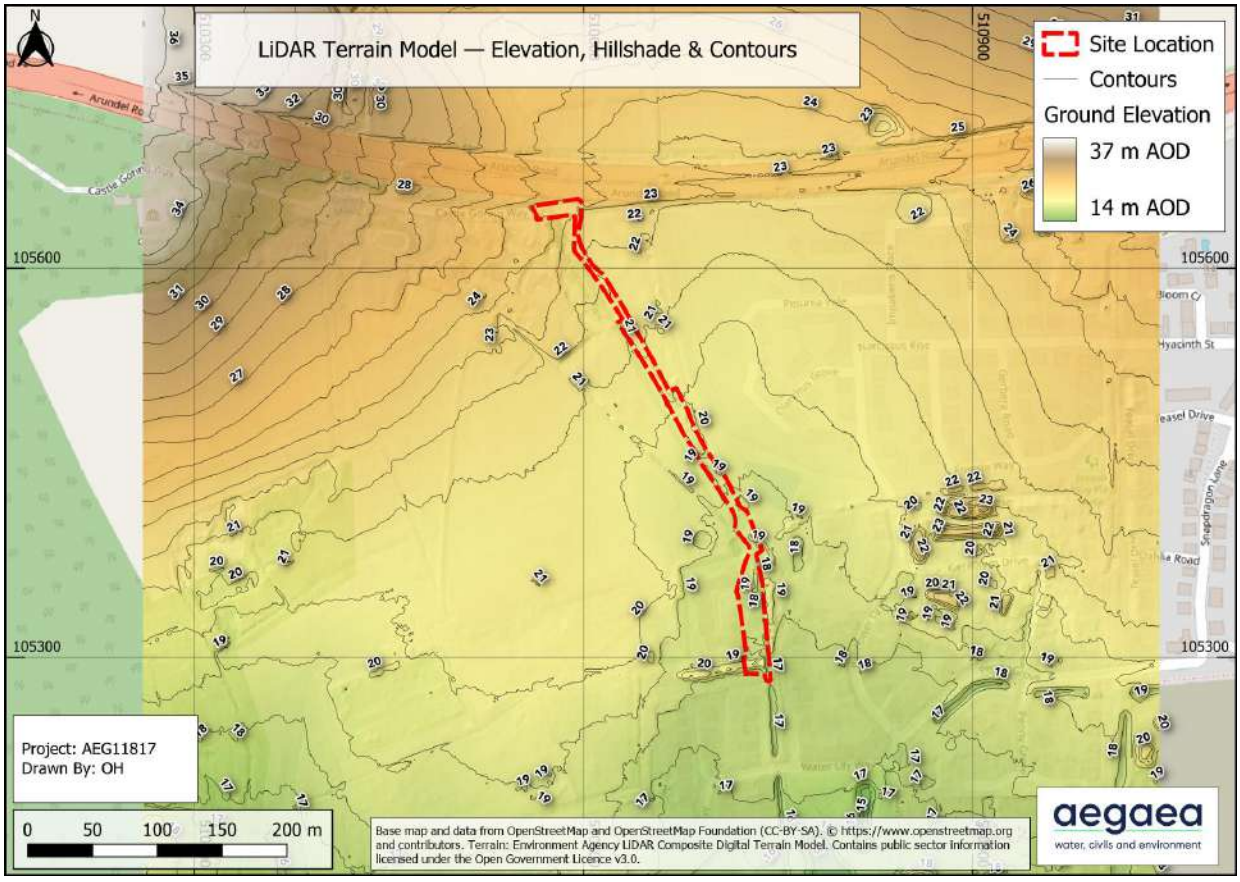


Figure 2: Site Topography (EA 1m LiDAR)

1.6. Worthing Borough Council is the Local Planning Authority (LPA) for the site and West Sussex County Council is the designated Lead Local Flood Authority (LLFA). The site sits within the EA's Solent and South Downs area.

Planning Policy and Guidance

1.7. Policy F4 of the NPPF sets out when a site-specific flood risk assessment is required:

> 1. *To inform the assessment of flood risk and, where relevant, appropriate mitigation, a site-specific flood risk assessment should accompany all development proposals in Flood Zones 2, 3a, and 3b as defined in Annex F, table 1.*
> 2. *In Flood Zone 1, a site-specific flood risk assessment should inform and accompany all development proposals involving:*
>
> *a) Sites of one hectare or more;*

b) Land which has been identified by the Environment Agency as having critical drainage problems; and

c) Land identified in a strategic flood risk assessment or the Flood Map for Planning as being at risk of flooding from any source, whether now or in the future.

1.8. The site is located within Flood Zone 1 on the EA Flood Map for Planning, but the building lies within the Flood Zones plus Climate Change extents, so it is land identified as being at risk of flooding in the future and an FRA is required in accordance with policy F4(2)(c) of the NPPF.

1.9. The LPA have asked for the site to be assessed as though in Flood Zone 3, and that precautionary approach is applied throughout this report.

1.10. The objective of this FRA is to demonstrate that the proposals are acceptable in terms of flood risk. This report summarises the findings of the study and specifically addresses the following issues in the context of the current legislative regime:

- Fluvial/tidal flood risk
- Surface water flood risk
- Risk of flooding from other sources

2. Planning Policy

2.1. Inappropriate development in a flood risk area could pose significant risk in terms of personal safety and damage to property for the occupiers of the development or for people elsewhere. The approach taken in the assessment of flood risk at the planning stage is set out in national, regional, and local planning policy and associated guidance. This section summarises the key policies and guidance relevant to the proposed development.

National Planning Policy Framework (NPPF)

2.2. The NPPF (Ministry of Housing, Communities and Local Government, August 2026) which includes UK Government policy on development and flood risk states:

2.3. The objective of Chapter 18 (Managing flood risk and coastal change) is stated as:

> *The objective of the policies in this chapter is to minimise risks to development arising from all sources of flooding and coastal change, taking into account the impacts of climate change, by steering development away from areas of risk, ensuring that development will be safe for its lifetime without increasing flood risk elsewhere, and incorporating sustainable drainage systems where appropriate.*

National decision-making policies

> *F4: Assessing flood risk for decision-making*
>
> 1. *To inform the assessment of flood risk and, where relevant, appropriate mitigation, a site-specific flood risk assessment should accompany all development proposals in Flood Zones 2, 3a, and 3b as defined in Annex F, table 1.*
> 2. *In Flood Zone 1, a site-specific flood risk assessment should inform and accompany all development proposals involving:*
>
> *a) Sites of one hectare or more;*
>
> *b) Land which has been identified by the Environment Agency as having critical drainage problems; and*

c) *Land identified in a strategic flood risk assessment or the Flood Map for Planning as being at risk of flooding from any source, whether now or in the future.*

3. *Site-specific flood risk assessments should be appropriate to the scale, nature, and location of development and should, where relevant, support an assessment of whether a development proposal satisfies the sequential and exception tests set out in policies F5 and F6.*

F7: Ensuring development is safe from flooding

1. *Development proposals should not present a risk from flooding to potential occupiers, users, or visitors, and should not increase flood risk elsewhere.*

2. *Where development is proposed in a location known to be at risk from any form of flooding, now or in the future, it should be refused unless:*

a) *Within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons which justify a different arrangement;*

b) *The development will be safe throughout its lifetime taking account of the vulnerability of its users;*

c) *Any residual risk can be safely managed, and safe access and escape routes are included where appropriate, as part of an agreed emergency plan;*

d) *The development is appropriately flood resistant and resilient such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment; and*

e) *It can be demonstrated that flood risk will not be increased elsewhere.*

F8: Sustainable drainage systems and watercourses

1. *Development proposals which could affect drainage on or around the development site should incorporate sustainable drainage systems to control flow rates and reduce volumes of runoff, in ways which are proportionate to the nature and scale of the proposal. The systems employed should provide multifunctional benefits where possible, facilitating improvements in water quality, biodiversity and amenity.*

2. *Sustainable Drainage Systems should:*

   a) *Be designed in accordance with the National Standards for Sustainable Drainage Systems;*

   b) *Have maintenance arrangements in place to ensure an acceptable standard of operation for the anticipated lifetime of the development; and*

   c) *In the case of proposals for major development, take account of advice from the Lead Local Flood Authority.*

3. *Development proposals should not enclose existing watercourses where this is not already the case, unless there are compelling reasons to do so; and should where possible remove existing culverts and renaturalise existing river channels, unless to do so would increase flood risk, result in other environmental harm or cause harm to heritage assets.*

2.4. Flood Zones in England are defined as follows (Table 1):

Table 1: Flood Zone Definitions (NPPF Annex F, table 1)

Flood Zone	Definition
Zone 1 Low probability	Land having a less than 0.1% annual probability of river or sea flooding (all land outside Zones 2, 3a and 3b).
Zone 2 Medium probability	Land having between a 1% and 0.1% annual probability of river flooding; or land having between a 0.5% and 0.1% annual probability of sea flooding (land shown in light blue on the Flood Map for Planning).
Zone 3a High probability	Land having a 1% or greater annual probability of river flooding; or Land having a 0.5% or greater annual probability of sea flooding (land shown in dark blue on the Flood Map for Planning).
Zone 3b Functional floodplain	This zone comprises land where water from rivers or the sea has to flow or be stored in times of flood. The identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. Functional floodplain will normally comprise: • Land having a 3.3% or greater annual probability of flooding, with any existing flood risk management infrastructure operating effectively; or • Land that is designed to flood (such as a flood attenuation scheme), even if it would only flood in more extreme events (such as 0.1% annual probability of flooding). Local planning authorities should identify in their strategic flood risk assessments areas of functional floodplain and their boundaries accordingly, in agreement with the Environment Agency (not separately distinguished from Zone 3a on the Flood Map).

Note: Flood Zones 2 and 3, shown on the Environment Agency's Flood Map for Planning, only account for river and sea flooding, and do not account for the benefits of flood defences or the possible effects of climate change. Reference should therefore also be made to the Environment Agency's other data on the Flood Map for Planning, and any current strategic flood risk assessment(s), when considering potential future flood risks to developments and land uses.

2.5. An FRA should be appropriate to the scale, nature, and location of the development. It should identify and assess the risk from all sources of flooding to and from the development and demonstrate how any flood risks will be managed over the lifetime of the development.

2.6. An assessment of hydrological impacts should be undertaken, including to surface water runoff and impacts to drainage networks in order to demonstrate how flood risk to others will be managed following development and taking climate change into account.

Local Plan

2.7. The Local Plan prepared by the LPA, Worthing Borough Council, sets out the policies for development in the local area.

2.8. Policy DM20 'Flood Risk and Sustainable Drainage' of the Worthing Local Plan 2020-2036 (Worthing Borough Council, adopted March 2023)[1] outlines the requirements for new development within the borough. It states:

> *a) The Council will work with relevant bodies to ensure that flood risk in Worthing is managed and reduced. Development should be directed away from areas of highest risk of flooding from any source and opportunities should be taken to reduce flooding through sustainable drainage systems and natural flood management to deliver multi-functional benefits for people and wildlife.*
>
> *Flood Risk Assessment*
>
> *b) A site specific Flood Risk Assessment must be submitted with planning applications for:*
>
> *i. sites of 1 hectare or greater in Flood Zone 1;*
>
> *ii. all new development (including minor development and change of use) in Flood Zones 2 and 3;*
>
> *iii. development that would introduce a more vulnerable class on land at increased flood risk in future or subject to other sources of flooding identified by the Strategic Flood Risk Assessment.*
>
> *c) The Flood Risk Assessment should be proportionate to the degree of flood risk and appropriate to the scale, nature and location of development. It will need to demonstrate that:*

[1] **https://www.adur-worthing.gov.uk/media/Media,169486,smxx.pdf**

i. the site has passed the sequential test (this has already been undertaken for all sites allocated in the Local Plan) and within the site the most vulnerable development is located in areas at lowest flood risk from any source unless there are overriding reasons for not doing so;

ii. Where required by national policy, demonstrate both parts of the exception test have been passed: the development would provide wider sustainability benefits to the community that outweigh the 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.

iii. current and future flooding from all sources including in-combination and cumulative effects, and any residual risk can be safely managed;

iv. ensure safe access and egress to and from the development, where necessary as part of an agreed flood warning and evacuation plan;

v. development will not increase flood risk elsewhere, and where possible will reduce the overall level of flood risk; and

vi. development should be appropriately flood resistant and resilient so in the event of a flood it can be quickly brought back into use without significant refurbishment.

Surface Water Drainage

d) The surface water drainage scheme should use Sustainable Drainage Systems, unless there is clear evidence that this would be inappropriate, and be designed to:

i. limit runoff to greenfield 1 year rates for events up to and including the 100 year plus climate change event where possible, and always ensure no increase in flows as a result of development;

ii. follow natural drainage flow paths and work with existing site topography;

iii. provide adequate capacity for the 30 year plus climate change event to be contained within the drainage system, and demonstrate that the

development is safe for the 100 year plus climate change event scenario and does not increase in flood risk off site;

iv. incorporate green infrastructure and maximise multi-functional benefits ensuring adequate treatment of surface water prior to discharge to ensure that the quality of local water is not adversely affected;

v. be sensitively located and designed to promote an enhanced landscape/ townscape and good quality spaces that improve public amenity;

vi. discharge run-off according to the following hierarchy: (1) into the ground (infiltration), (2) to a surface water body, (3) to a surface water sewer, (4) to a combined sewer. Surface water connections to the public sewerage network should only be made with prior agreement of the relevant sewerage undertaker and where it can be demonstrated that there are no feasible alternatives (this applies to new developments and redevelopments) and where there is no detriment to existing users.

e) Clear management arrangements and funding for their ongoing maintenance over the lifetime of the development should be proposed. Planning conditions or obligations will be used to secure these arrangements.

2.9. Policy DM21 'Water Quality and Sustainable Water Use' of the Worthing Local Plan 2020-2036 states:

a) Development should protect and enhance groundwater, surface water features and control aquatic pollution. Development will be permitted provided that it does not have an unacceptable impact on the quality and potential yield of local water resources, the water environment and its ecology.

b) The Council will support proposals to replace existing traditional drainage systems with suitable Sustainable Drainage Systems to further reduce water pollution and improve water quality.

c) Potentially polluting development should be steered away from the most sensitive areas. As a minimum a preliminary risk assessment will be required for any development where there is potential risk of contamination of controlled waters. New development within Groundwater Source Protection

Zones will only be permitted provided that it has no adverse impact on the quality of the groundwater source or a risk to its ability to maintain a public water supply.

d) Development must be phased to take into account the timing of any water and/or wastewater infrastructure required which must be in place prior to the occupation of development.

e) All new residential development must achieve as a minimum the optional requirement set through Building Regulations for water efficiency that requires an estimated water use of no more than 110 litres per person per day.

Sequential and Exception Tests

2.10. The Sequential and Exception Tests are applied in specific cases defined by UK Government policy. Their purpose is to drive development to areas of low flood risk and to support developments which improve flood risk for developments in areas at risk of flooding.

2.11. Under the NPPF all new planning applications should undergo a Sequential Test in accordance with Policy F5. This test should be implemented by local planning authorities with a view to take a risk-based approach when identifying suitable locations for development, taking into account all sources of flood risk and the current and future impacts of climate change.

2.12. Policy F5(2) of the NPPF states:

2. The sequential test should be used in areas known to be at risk now or in the future from any form of flooding, other than for:

a) Sites allocated in the development plan which were subject to the sequential test during plan preparation;

b) Sites where a site-specific flood risk assessment demonstrates clearly that:

i. 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); or

> *ii. Where the site would be at risk of surface water flooding only, the proposed layout, design, and mitigation measures would ensure that occupiers and users would remain safe from current and future surface water flood risk for the lifetime of the development without increasing flood risk elsewhere in accordance with policy F7.*
>
> *c) For the following types of development:*
>
> *i. Householder development;*
>
> *ii. Small non-residential extensions (with a footprint of less than 250m2); and*
>
> *iii. Changes of use, other than changes of use to a caravan, camping or chalet site, or to a mobile home or park home site.*

2.13. Furthermore, Policy F6(2) of the NPPF states:

> *2. The application of the exception test should be informed by a site-specific flood risk assessment. The exception test does not need to be applied:*
>
> *a) To those forms of development, or in those circumstances, where the sequential test is not required, as set out in policy F5; or*
>
> *b) Where development is proposed on a site allocated in the development plan to which the exception test was applied at the plan-making stage, unless there has been a significant increase in the risk of flooding to the site subsequently, or the nature of the development itself has changed significantly from that which was allocated so as to introduce a more vulnerable use (having regard to Annex F, table 2).*

2.14. The proposal constitutes a minor development (Householder development) under the NPPF. Policy F5(2)(c) provides that the Sequential Test is not applied to householder development, small non-residential extensions with a footprint of less than 250m^2, and policy F6(2)(a) disapplies the Exception Test in the same circumstances. The FRA is still required to demonstrate that the development can be designed to be safe and that there is adequate emergency planning provision.

3. Consultation and Document Review

3.1. Following submission of householder application AWDM/0655/25, the Council's case officer (21/09/2026) and WSP, the Council's drainage consultant (letter of 15/09/2026), asked for further flood risk information before the application is determined. Each request is addressed in this FRA:

- Modelled flood levels compared with site levels: the Ferring 2020 Fluvial Model and the design flood level are compared with the LiDAR ground levels and the drawing floor levels in Section 4.
- Flood depths compared with the proposed FFLs: Section 4 and Section 5.
- Sleeping accommodation in the lowered extension: the layout has been revised so that the extension contains no bedrooms (Manorwood floor plan rev 002, 29/09/2026).
- Drainage detail and the small area of surface water risk noted by WSP: the surface water risk is assessed in Section 4, and the drainage detail is provided in the separate SWDS (AEG11817).

Documents and Online Mapping

3.2. Local Governments and Lead Local Flood Authorities provide documents which contain data and policies on flood risk and new development in their areas. These documents are introduced and briefly summarised below. For the purposes of this FRA, these documents have been reviewed for relevant information and any relevant data is discussed within the appropriate sub heading of this report.

3.3. The following sources of information have been reviewed for this assessment.

- EA Flood Map for Planning
- EA Flood Map for Planning – Surface Water (Surface Water Spatial Planning Extents and Depths, May 2026)[2]
- EA Flood Map for Planning – Flood Zones plus Climate Change[3]
- EA Recorded and Historical Flood Outlines[4]

[2] **https://environment.data.gov.uk/dataset/cf8d4e8f-99b6-4e5d-bf56-7f80e93d0931**

[3] **https://environment.data.gov.uk/spatialdata/flood-zones-plus-climate-change**

[4] **https://www.data.gov.uk/dataset/16e32c53-35a6-4d54-a111-ca09031eaaaf/recorded-flood-outlines1**

- EA Risk of Flooding from Reservoirs mapping[5]
- EA Spatial Flood Defences (AIMS) dataset[6]
- Canal & River Trust (CRT) maintained canal mapping[7]
- British Geological Survey (BGS) GeoIndex Onshore and Borehole Records[8]
- Adur and Worthing Level 1 SFRA (JBA Consulting, July 2024)[9]
- West Sussex Preliminary Flood Risk Assessment (West Sussex County Council, 2011)[10]
- West Sussex Local Flood Risk Management Strategy (LFRMS) (West Sussex County Council, 2025)[11]
- Worthing Local Plan 2020-2036 (Worthing Borough Council, 2023)
- NPPF (Ministry of Housing, Communities and Local Government, August 2026)[12] and Flood Risk and Coastal Change PPG (last revised 17/09/2025)[13].
- Ferring 2020 Fluvial Model (JBA Consulting for the EA), supplied under EIR2026/45798

[5] **https://check-long-term-flood-risk.service.gov.uk/**

[6] **https://environment.data.gov.uk/dataset/8e5be50f-d465-11e4-ba9a-f0def148f590**

[7] **https://canalrivertrust.org.uk/canals-and-rivers**

[8] **https://www.bgs.ac.uk/map-viewers/geoindex-onshore/**

[9] **https://www.adur-worthing.gov.uk/media/Media,171789,smxx.pdf**

[10] **https://www.westsussex.gov.uk/media/1626/west_sussex_pfra.pdf**

[11] **https://www.westsussex.gov.uk/media/zxfdrox1/westsussex_lfrms.pdf**

[12] **https://www.gov.uk/government/publications/national-planning-policy-framework--2**

[13] **https://www.gov.uk/guidance/flood-risk-and-coastal-change**

4. Sources of Flood Risk

4.1. The following sources of flood risk have been assessed in relation to the site and proposed development.

Fluvial / Tidal

4.2. Flooding from watercourses arises when flows exceed the capacity of the channel, or where a restrictive structure is encountered, resulting in water overtopping the banks into the floodplain. Tidal flooding occurs when a high tide and high winds combine to elevate sea levels. An area behind coastal flood defences can still flood if waves overtop the defences or break through them.

4.3. Tidal flooding can also occur a long way from the coast by raising river levels, where water may overtop the river bank or river defences when tide levels are high. The flood zones nearest the site are attributed to river flooding and the site is not within any tidal flood extent, so tidal risk is assessed with fluvial risk below.

Main Rivers and Ordinary Watercourses

4.4. The nearest main river reach on the EA Statutory Main River Map is the Ferring Rife which lies c. 1.4km south of the southern site boundary. The nearest ordinary watercourse is a small tributary of the Ferring Rife, which runs along the eastern site boundary.

4.5. Works within or affecting the Ferring Rife tributary, including any new outfall proposed in the SWDS, may require Ordinary Watercourse Consent from West Sussex County Council.

EA Flood Map for Planning

4.6. According to the EA Flood Map for Planning, the site lies wholly within Flood Zone 1 (Figure 3).

4.7. The EA Flood Map for Planning Flood Zones plus Climate Change extent covers c. 38% of the redline boundary and the whole of the building footprint (Figure 3). The building is therefore at risk of fluvial flooding in the future, and the Flood Zone 3 precautionary approach requested by the Council is applied in this assessment.

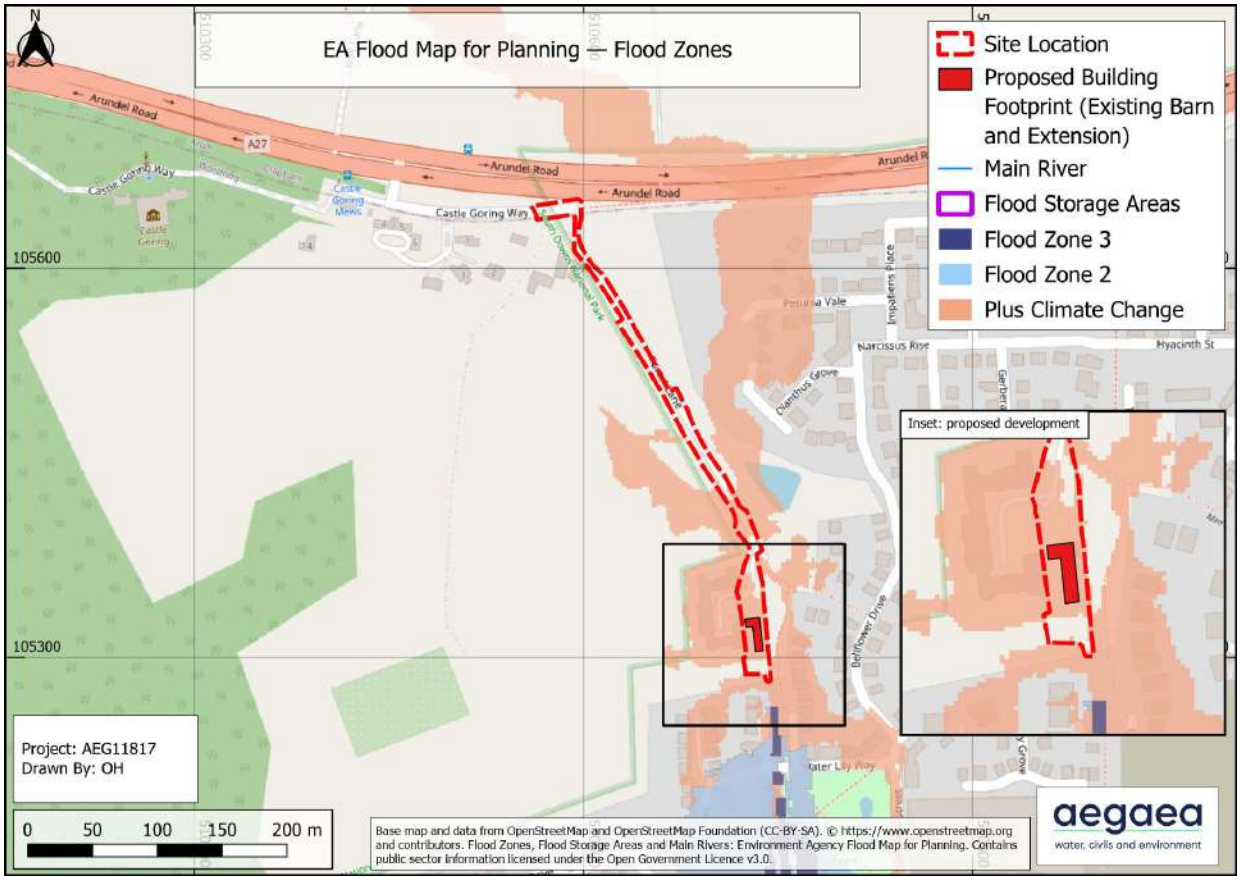


Figure 3: EA Flood Map for Planning – Flood Zones and Flood Zones plus Climate Change

Historical Fluvial / Tidal Flooding

4.8. Based on the EA Recorded and Historical Flood Outlines dataset, there are no recorded flood outlines at or adjacent to the site (Figure 4). The SFRA (section 6.1) records fluvial flood events along the River Adur, Teville Stream and Ferring Rife across the Local Plan areas, and none at the site.



Figure 4: EA Recorded and Historical Flood Outlines

Ferring Rife Modelling Study, 2020

4.9. Aegaea have been provided with a Product 5 and Product 6 (raw data) for this area by the EA which has been used to inform this FRA. This information is based on the Ferring Rife Fluvial Model, dated 2020. This is understood to be the best available information for this area.

4.10. Design events simulated were the 50%, 20%, 10%, 5%, 2%, 1.33%, 1%, 1% (plus 35%, 45% & 105% increase to flows as an allowance for climate change), 0.4% and 0.1% Annual Exceedance Probability (AEP) events. These events were simulated for both defended and undefended scenarios.

4.11. The detailed modelling starts c. 20m south of the redline boundary and c. 45m south of the building, at the point where flow enters the model (the upstream one-dimensional channel node FR3_0687) (see the 1D node locations on Figure 5). None of the defended or undefended runs places any modelled cell on the site.

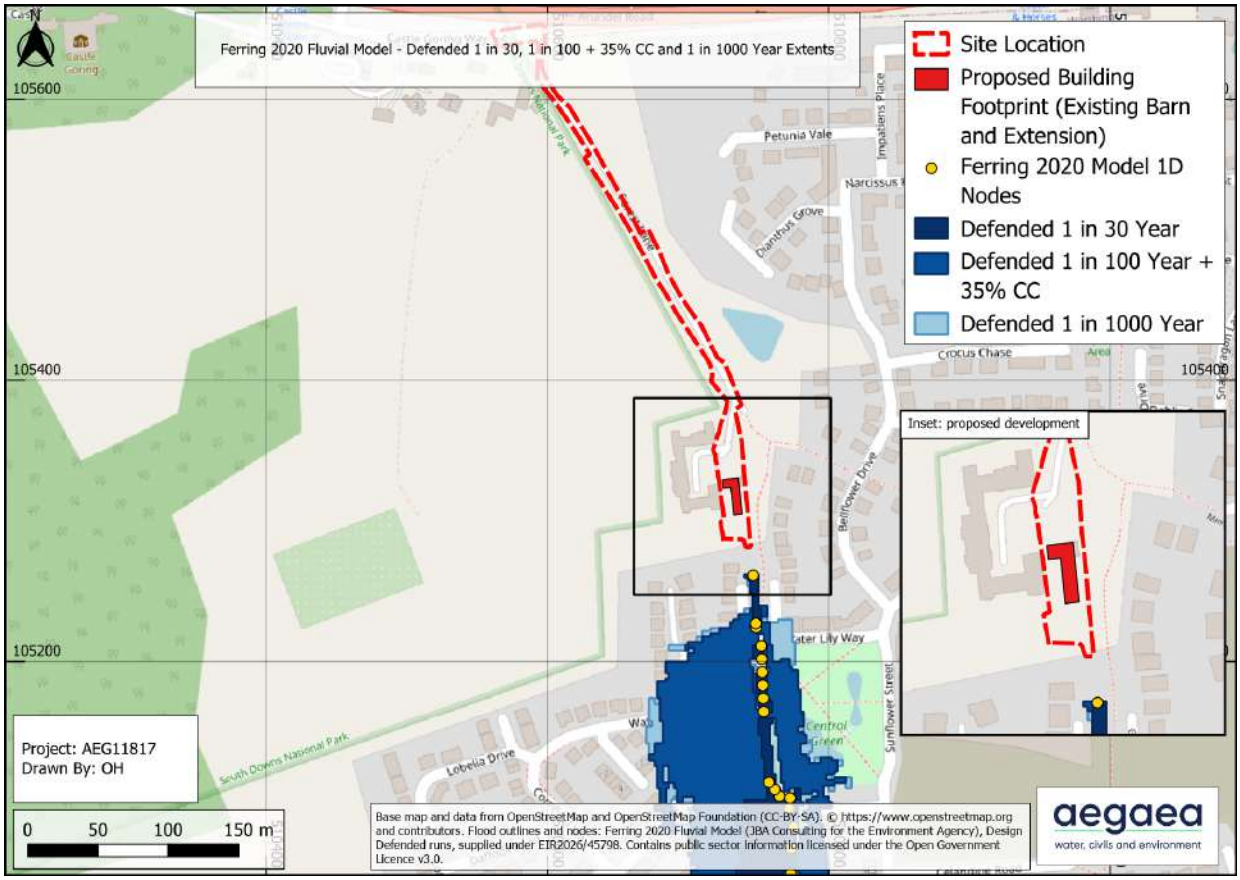


Figure 5: Ferring 2020 Fluvial Model – Defended 1 in 30, 1 in 100 plus 35% Climate Change and 1 in 1000 Year Extents

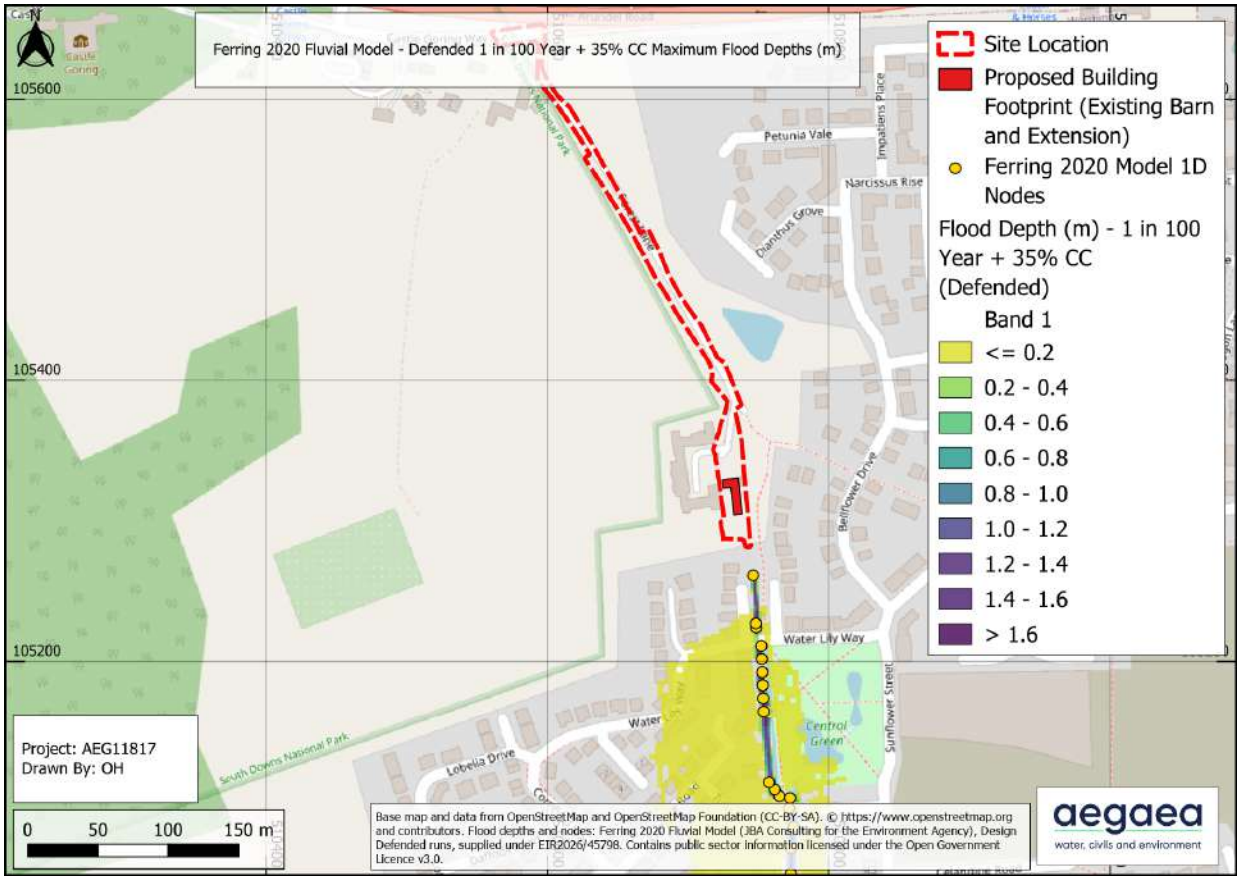


Figure 6: Ferring 2020 Fluvial Model – Defended 1 in 100 Year plus 35% Climate Change Maximum Flood Depths

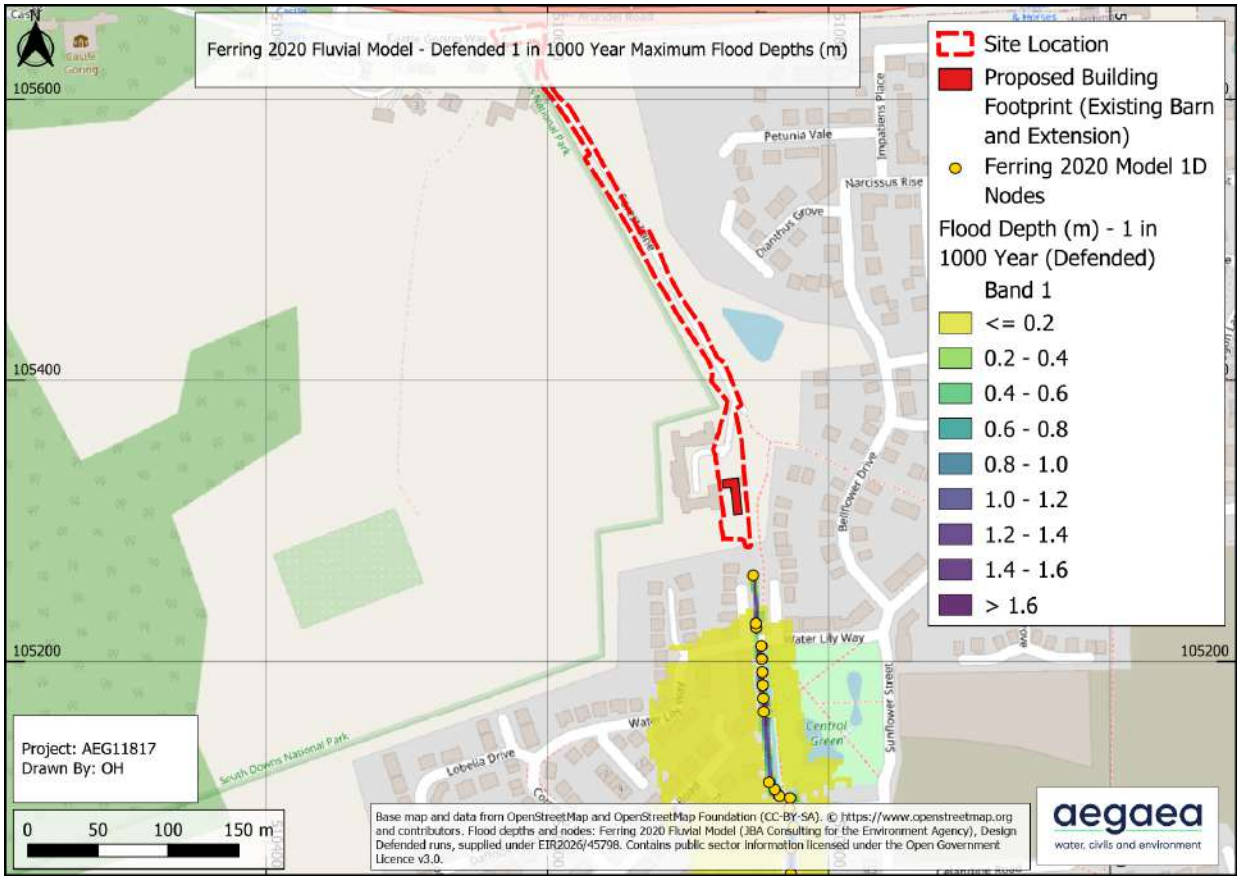


Figure 7: Ferring 2020 Fluvial Model – Defended 1 in 1000 Year Maximum Flood Depths

4.12. No detailed hydraulic modelling covers the site, so there is insufficient information to determine a modelled flood level directly. Given the size and scale of the proposed development, site-specific hydraulic modelling is not considered proportionate. An approximate design flood level has instead been determined by extrapolating topographic data across the edge of the Environment Agency's Flood Zone 3 plus climate change extent.

4.13. Ground levels were sampled from EA 1m LiDAR at 25 points along the edge of the extent within 15m of the building. These give a median level of 18.47m AOD. A design flood level of 18.47m AOD has therefore been adopted. As the extent includes an allowance for climate change, it is considered an appropriate design event, and as it represents undefended conditions, the resulting level is considered conservative.

4.14. It should be noted that the design flood level of 18.47m AOD is conservative. It is taken from an undefended extent that includes the 1 in 1000 year event with climate change, and it is the upper end of the sampled range.

4.15. For context, the nearest cells of the Ferring (2020) defended model show levels of 16.60m AOD to 17.00m AOD. As these lie downstream of the site, where flood levels are lower, they represent a lower bound and support the adopted level as precautionary.

4.16. The existing barn FFL is 18.43m AOD (Manorwood drawing 2602FO_101), and the proposed south section (Manorwood drawing 2602FO_202 rev 003) shows the extension floor lowered to 18.01m AOD, however all sleeping accommodation is to be retained within the existing barn building at a higher level. The levels are compared in Table 2.

Table 2: Flood Levels Compared with the Existing Barn and Extension FFL

Scenario	Flood level (m AOD)	Basis	Existing Barn FFL 18.43m AOD
Ferring 2020 defended 1 in 30 year	16.60	Nearest modelled cell, c. 45m south of the building	+1.83m (FFL above flood level)
Ferring 2020 defended 1 in 100 year	16.78	Nearest modelled cell, c. 45m south of the building	+1.65m (FFL above flood level)
Ferring 2020 defended 1 in 100 year plus 35% climate change	16.92	Nearest modelled cell, c. 45m south of the building	+1.51m (FFL above flood level)
Ferring 2020 defended 1 in 100 year plus 105% climate change (worst modelled event)	17.00	Nearest modelled cell, c. 45m south of the building	+1.43m (FFL above flood level)
Adopted design flood level	18.47	Flood Zones plus Climate Change extent edge × EA 1m LiDAR within 15m of the building	-0.04m (flood level above FFL)

Fluvial / Tidal Risk Summary

4.17. The dominant source of flooding at the site is fluvial and therefore, tidal flood risk is considered low.

4.18. According to the EA Flood Map for Planning the site is in Flood Zone 1. However, the whole building lies within the Flood Zones plus Climate Change extent, and the design flood level of 18.47m AOD lies 0.04m above the existing barn FFL.

4.19. The design flood level of 18.47m AOD is conservative. It is taken from an undefended extent that includes the 1 in 1000 year event with climate change, and it is the upper end of the sampled range.

4.20. Given the More Vulnerable use, the fluvial flood risk to the development is considered low in the present day and moderate in the future, and is managed through the measures in Section 5.

Canals

4.21. The CRT generally maintains canal levels using reservoirs, feeders, and boreholes and manages water levels by transferring it within the canal system.

4.22. According to the CRT mapping there are no canals within 750m of the site.

4.23. The risk of flooding to this site from canals is considered to be low.

Pluvial (Surface Water)

4.24. Pluvial flooding can occur during prolonged or intense storm events when the infiltration potential of soils, or the capacity of drainage infrastructure is overwhelmed leading to the accumulation of surface water and the generation of overland flow routes.

4.25. The EA Flood Map for Planning Service in relation to Surface Water was published in May 2026. The Surface Water Spatial Planning Extents and Depths have been used within this FRA to assess the surface water flood risk to the site and proposed development.

4.26. These datasets show the extent of land at risk of flooding from surface water to a defined annual exceedance probability (AEP) or chance of flooding each year, taking into account the possible effects of climate change. These datasets include the following scenarios:

- 0.1% AEP (1 in 1000); 1% AEP (1 in 100) and 3.3% AEP (1 in 30)

4.27. Alongside the following depth bands:

- Up to 150mm; 150 – 300mm; 300 – 600mm; 600 – 900mm; 900 – 1200mm; 1200 – 2300mm and over 2300mm.

4.28. Alongside the present day scenarios, climate change scenarios have been produced by the EA to indicate the predicted impacts of climate change on future flood risk. These published scenarios incorporate an uplift based on the latest UK Climate Projections (UKCP18) from the Met Office, using the Representative Concentration Pathway (RCP) 8.5, applying the 'Upper End'

allowance for the 2070s epoch (2061–2125); the EA have chosen long-term epochs appropriate to support long-term planning and development decisions.

4.29. To provide a 'worst case' assessment, the climate change scenarios have been assessed below.

Flood Extents – Climate Change (2070's Epoch)

4.30. Examination of the EA's Surface Water Spatial Planning Climate Change dataset shows that the majority of the site is not located within the 1in30+CC year, 1in100+CC and 1in1000+CC year extents (Figure 8). There is a small part of the access road affected during the 1in30+CC event, however the existing building and proposed extension would remain unaffected during all modelled scenarios.

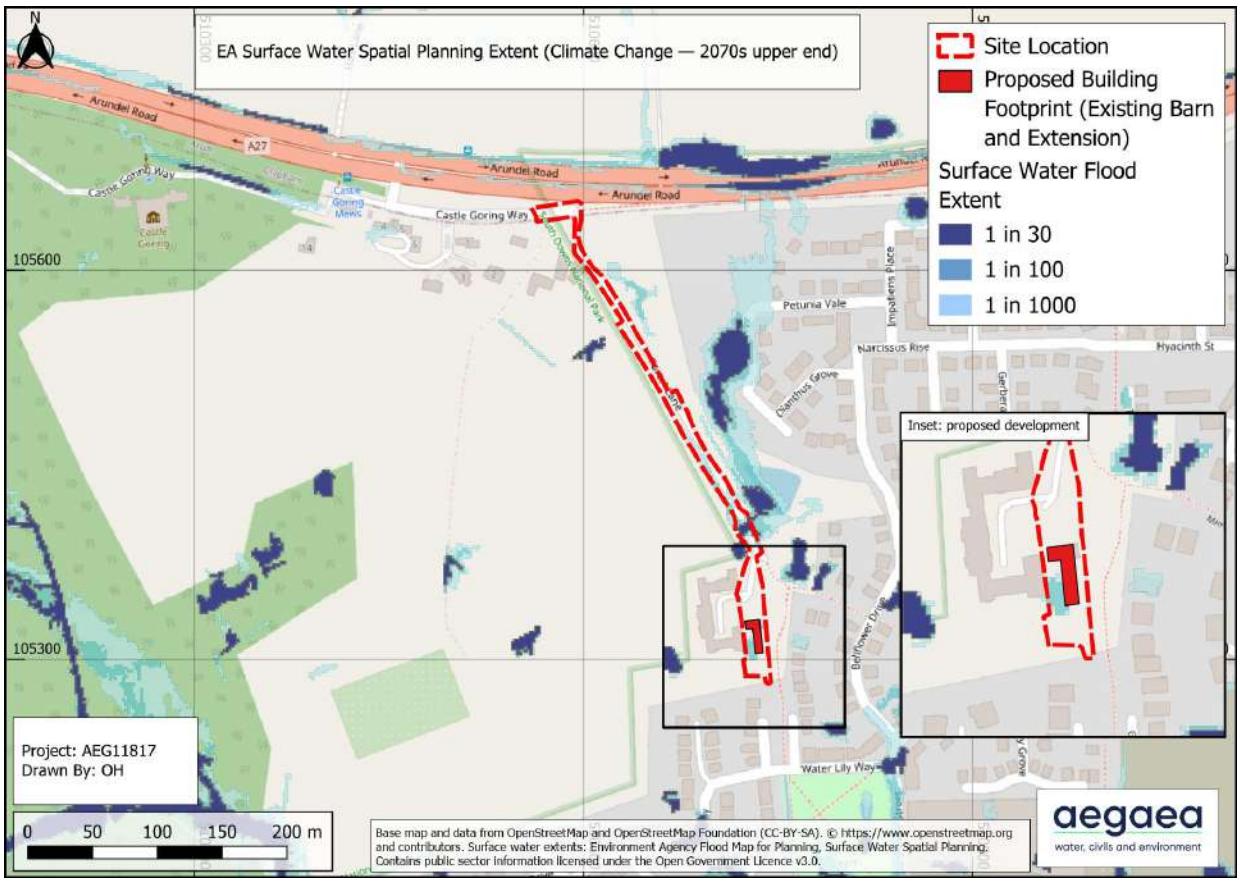


Figure 8: EA Flood Map for Planning – Surface Water Spatial Planning Extents with Climate Change (May 2026)

Flood Depths – Climate Change (2070's Epoch)

4.31. Analysis within this section focuses the 'design' event for pluvial flooding, which is considered to be the 100 year plus climate change (i.e. 2070's epoch) scenario.

4.32. Examination of the EA's Surface Water Spatial Planning Climate Change Depth dataset (Figure 9) shows the existing building is to remain largely unaffected by flooding. There is a small area to the west of the built footprint which could experience flooding however, depths would not exceed 150mm. The small area of flooding along the access road would not experience depths of between 150mm to 300mm.

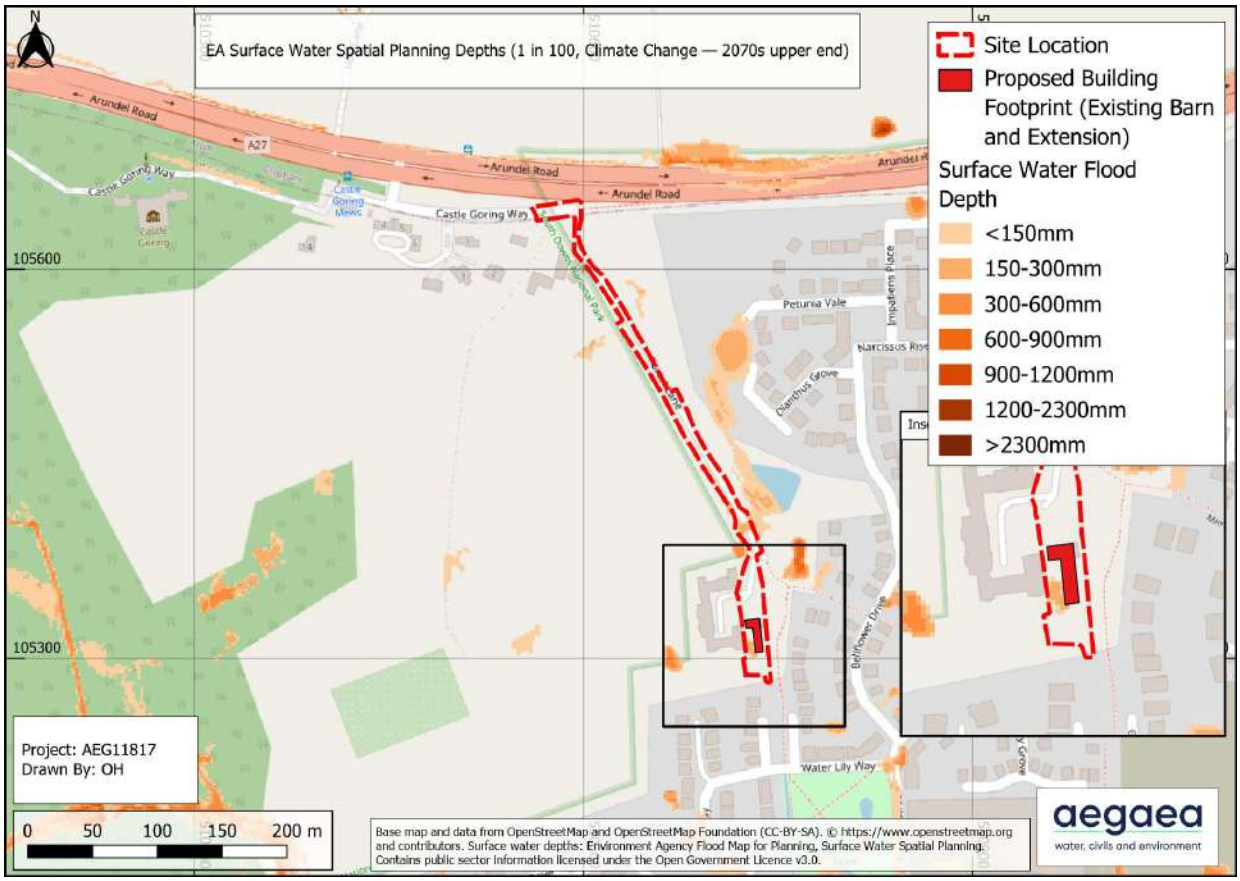


Figure 9: EA Surface Water Spatial Planning 1 in 100 Year plus Climate Change Depths (May 2026) with the Building Footprint

4.33. The SFRA (section 6.1) records surface water flooding as the most frequent cause of flooding in Adur District and Worthing Borough, with recorded incidents in Worthing, Goring, Durrington, Salvington, Lancing, Shoreham and Southwick; it records no incident at the site.

Pluvial Risk Summary

4.34. The risk of surface water flooding to the site and proposed development is considered low, and surface water from the development will be managed through the separate SWDS.

Reservoirs

4.35. Large waterbodies or reservoirs that have walls built above the surrounding ground level pose a risk of flooding. Walls could fail due to old age, accident, or because excess flood water has been added to the reservoir. Although a breach is unlikely the consequences would be significant, leading to rapid inundation of the downstream floodplain.

4.36. The EA's Risk of Flooding from Reservoirs dataset has been reviewed. The site is not within either the modelled reservoir Wet Day or Dry Day inundation extent, and no reservoir extent lies within 2km of the site (Figure 10). The SFRA (section 6.9) states that national reservoir breach mapping does not affect Adur and Worthing.



Figure 10: EA Risk of Flooding from Reservoirs

4.37. As such, the risk to the site from reservoir flooding is considered to be low.

Groundwater

4.38. Groundwater flooding occurs in areas where underlying geology is permeable and water can rise within the strata sufficiently to breach the surface.

4.39. The BGS mapping shows mapped superficial deposits of Head (clay, silt, sand and gravel) underlying the site. The bedrock geology is mapped as the Lambeth Group, comprising clay, silt and sand.

4.40. Two BGS borehole records lie within 250m of the site. The nearest, TQ10NW75, records a rest water level on completion of 25.50m below the borehole datum. It is an EA monitoring borehole at Holt Farm, c. 160m from the site, drilled in December 2001 to 50.2m through clays of the Reading Beds to 17m over the Upper Chalk. The second, TQ10NW70, is a 99.15ft well at Holt Farm, c. 250m from the site, recorded in 1893 and filled in by 1959. Its 1893 water level entry does not state its units and is not used in this assessment.

4.41. A review of the Adur and Worthing Level 1 SFRA (JBA Consulting, July 2024) indicates that groundwater flooding has been recorded in Sompting, North Lancing and Durrington (section 6.1), and not at the site.

4.42. The SFRA's JBA Groundwater Emergence Flood Risk map places the site in the band where groundwater is within 0.025m of the ground surface, which the SFRA classes as high risk. The JBA map is a borough-scale susceptibility map. The deep rest water level in TQ10NW75 lies in the Upper Chalk below the Reading Beds clays, so it does not rule out shallow groundwater: water can perch in the Head deposits over the Lambeth Group clays and would be highest in winter and after prolonged rain, which is consistent with the JBA band.

4.43. Given that the development proposals do not include a basement or other below-ground accommodation, the risk of flooding is considered to be low to medium.

Sewers

4.44. Foul or surface water sewers can be a cause of flooding if the drainage network becomes overwhelmed, either by blockage or due to local development beyond the designed capabilities of the drainage system.

4.45. The site is in the area served by Southern Water, whose wastewater asset plan for the site (ref. 2222504, 29/09/2026) shows no public sewer within the barn plot. The applicant advises that

there is no foul connection at the barn and that roof water discharges to the Ferring Rife tributary. The Adur and Worthing Level 1 SFRA (2024) references Southern Water's Sewer Incident Report Form (SIRF) database of capacity-related sewer flooding between Jan 2013 and May 2023, which records 2 incidents in the BN13 3 postcode sector; the SFRA reports these by postcode sector only and does not locate them.

4.46. The risk from sewer flooding is considered to be low.

5. Flood Risk Mitigation

5.1. The assessment in Section 4 identifies fluvial flooding under future climate change conditions, represented by the EA Flood Zones plus Climate Change extent, as the governing source requiring mitigation at this site.

Fluvial

5.2. Section 8.4.2 of the SFRA sets the local FFL requirement. It states:

> *Minimum finished floor levels for development that does not include sleeping accommodation on the ground floor should normally be set to whichever is higher of the following:*
>
> - *a minimum of 300mm above the design flood event level*
> - *if finished floor levels cannot be raised in this way, additional flood resistance and resilience measures should be added to the property to protect it to at least 300mm above the estimated flood level.*
>
> *Please note that the design flood level should be estimated as part of a site specific Flood Risk Assessment.*
>
> *Finished floor levels for vulnerable developments (e.g., dwellings and for sleeping accommodation) should be a minimum of whichever is higher of 300mm above the:*
>
> - *average ground level of the site*
> - *adjacent road level to the building*
> - *estimated flood event level (1% AEP fluvial plus climate change or the 0.5% AEP tidal plus climate change)*

5.3. The applicant has advised that the floors cannot be raised, because the eaves height of the existing barn fixes the floor levels. The EA standing advice for minor extensions (last updated 28 May 2026)[14] states:

[14] **https://www.gov.uk/guidance/flood-risk-assessment-standing-advice**

We recommend floor levels are set at least 600 millimetres (mm) above the estimated flood level. You may be able to reduce this to 300mm if there is a high level of certainty about your estimated flood level.

5.4. All sleeping accommodation is retained within the existing building, which has an FFL of 18.43m AOD. The new extension provides habitable accommodation only, with no sleeping accommodation, and will have a lowered FFL of 18.10m AOD. This is 0.37m below the design flood level (considered a conservative estimate). As the extension contains no sleeping accommodation, flood resistance and resilience measures have been incorporated up to 18.77m AOD, as set out below.

5.5. The following measures are therefore recommended:

- No sleeping accommodation in the extension: the layout has been revised so that the extension contains only living, study, utility and WC space (floor plan rev 002, 29/09/2026).
- Sealed service entries and non-return valves, to at least 18.77m AOD, 300mm above the design flood level.
- Solid (i.e. concrete) floor. This form of construction is effective at resisting forces generated by floodwater and will provide an adequate barrier to water ingress (provided service ducts and other openings into the building are adequately sealed.
- Damp Proof Membranes (d.p.m.) should be included in any design to minimise the passage of water through ground floors to at least 18.77m AOD, 300mm above the design flood level.
- Special care should be taken to ensure adequate sealing of any PVC window/door sills to the fabric of the house. Specifically, waterproof seals on windows/doors are recommended.
- Water resistant internal render and screed.,
- Cavity insulation should preferably incorporate rigid closed cell materials as these retain integrity and have low moisture take-up. Other common types are not generally recommended as they can remain wet several months after exposure to flood water which slows down the wall drying process. Blown-in insulation can slump due to excessive moisture uptake, and some types can retain high levels of moisture for long periods of time (under natural drying conditions).
- Wiring and sockets raised to at least 19.07m AOD, 0.6m above the fluvial design flood level.

- Incorporating non-return valves to prevent surcharge flooding from the sewer system during intense storm events.

5.6. Within the site the most vulnerable use, sleeping, is kept to the first floor and the existing barn, and none is placed in the extension, in accordance with Policy DM20(c)(i) and policy F7(2)(a) of the NPPF. In this way the extension, which contains no sleeping accommodation, is protected to the level the SFRA sets for a floor that cannot be raised, and the occupiers have refuge above the design flood level for the More Vulnerable use.

Access / Egress and Flood Warnings

5.7. The design flood level of 18.47m AOD lies above part of the ground around the building, by up to 0.38m on the access track immediately north of it as a still-water depth. The median ground level along the track rises above the design flood level c. 20m north of the building, and the track continues to rise to Castle Goring Way. Defra and EA guidance on flood risk assessment for new development (FD2320) treats depths above 250mm as unsafe for pedestrian or vehicular movement.

5.8. Measured against that threshold, dry access and egress cannot be maintained from the building for the duration of the design flood event. The site is not covered by an EA flood warning, so prior evacuation should be triggered by a Met Office amber or red warning for heavy rain, by an EA Flood Warning for the Ferring on the Ferring Rife area, or by water seen rising in the Ferring Rife tributary beside the building, whichever comes first.

5.9. Occupiers should then leave north along the private access track to Castle Goring Way; where prior evacuation cannot be made, safe refuge is available on site at first floor level.

Flood Warnings

5.10. The site is not within an EA Flood Alert or Flood Warning Area, so no EA flood warning is issued for the building itself. Residents may register with the EA Floodline service for the nearest area, the 'Ferring on the Ferring Rife' Flood Warning Area, as an early indication of high flows in the catchment.

5.11. Residents of the dwelling should monitor Met Office Weather Warnings as a precautionary approach, to be prepared for extreme weather events.

5.12. The Met Office issues weather warnings up to 5 days in advance, through the National Severe Weather Warning Service, when severe weather has the potential to bring impacts to the UK.

5.13. Flood warnings/alerts can be issued at any time of the day or night. Signing up for this service provides residents some notice before a flood event.

Increase to Flood Risk Elsewhere

5.14. The proposal constitutes a minor development (Householder development) under the NPPF. Paragraph: 051 of the NPPG states that minor developments are unlikely to raise significant flood issues unless:

- they would affect the flow of flood water (possibly redirecting it elsewhere);
- the cumulative impact of such developments would have a significant effect on local flood storage capacity or flood flows; or
- they include habitable accommodation located at ground floor level, where residents would be at risk during a flood event.

5.15. The development of this scale is unlikely to have a significant effect on flood storage or flood flows, and the site lies outside the present-day Flood Zones 2 and 3, within the Flood Zones plus Climate Change extent only.

6. Conclusions

6.1. This FRA has been undertaken with reference to the requirements of NPPF and Planning Practice Guidance with respect to the development at Forest Barn, Forest Lane, Castle Goring, Worthing, BN13 3FD. It has been written to support a planning application and prepared with due consideration to the nature of the proposed householder extension to provide the appropriate level of detail.

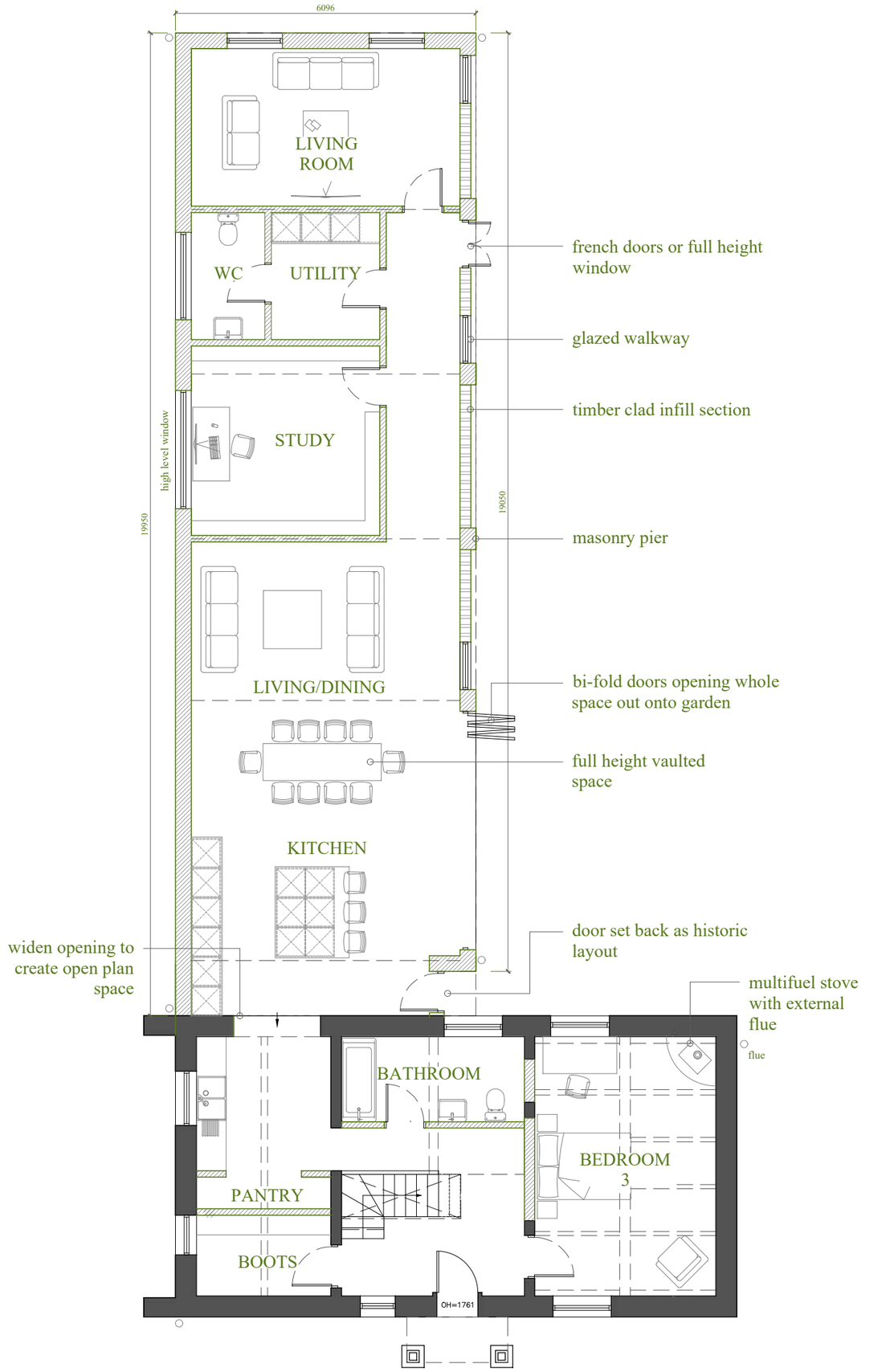
6.2. An assessment of the risk of flooding from all sources has been undertaken and is summarised in the table below:

Source of Flooding	Flood Risk Summary
Fluvial	Low in the present day (Flood Zone 1) and moderate in the future: with climate change the building lies within the Flood Zones plus Climate Change extent and below the 18.47m AOD design flood level. Dry access and egress cannot be maintained in the design event; the risk is managed by flood resistance and resilience.
Tidal / Pluvial / Canals / Reservoirs / Sewers	The site is considered to be at low risk from these sources.
Groundwater	Low to medium: the SFRA's JBA mapping places the site where groundwater is within 0.025m of the ground surface. No basement is proposed, and the risk is managed by the solid floor with damp proof membrane and the resilience measures.

6.3. The FRA supports the planning application and demonstrates that there is an acceptable level of flood risk to the site if the mitigation strategies recommended are implemented in the scheme. The development does not increase flood risk off site or to the wider area.

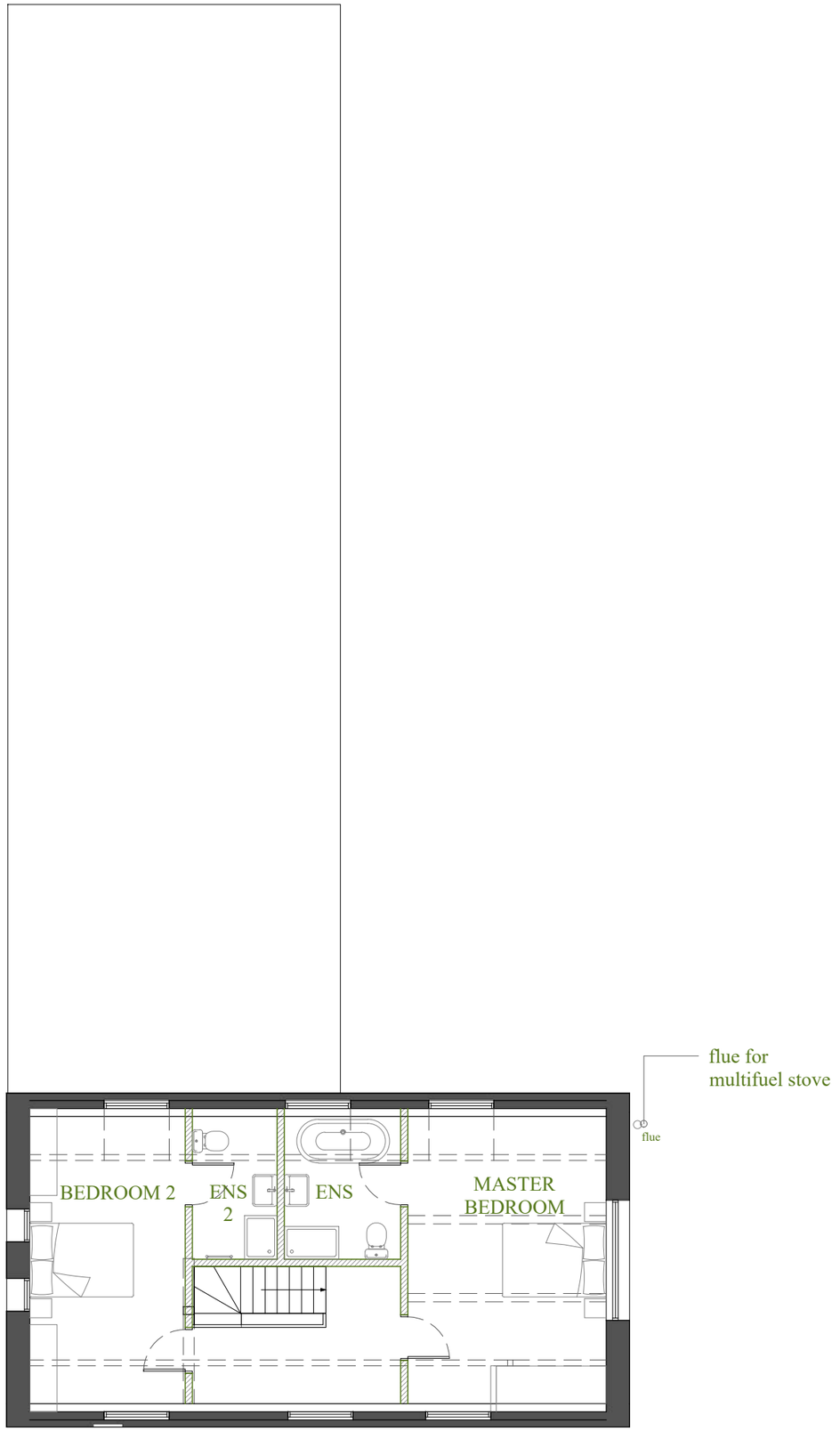
6.4. This Flood Risk Assessment should be submitted as part of the planning application to satisfy the requirements under NPPF.

Appendix A – Development Proposals



Ground Floor Plan

1:100 | PROPOSED



First Floor Plan

1:100 | PROPOSED

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This information can be provided on request; however, it is anticipated that the full extent of residual risks will be identified during the detailed Building Regulations or construction design Status and prior to construction works commencing on site.

All responsibilities and duties of Principle Designer as stated within the above regulations now revert to the client unless Manorwood are appointed to undertake Building Regulations or construction drawings.

MANORWOOD
building on tradition

Suite 114
26 The Hornet
Chichester
West Sussex
PO19 7BB

tel: 01243 201 102
email: enquiries@manorwood.co.uk
web: www.manorwood.co.uk

Address

Forest Barn, Forest Lane, Castle Goring, Worthing, BN13 3FD

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Revision	002

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