Consulting Civil Engineers

Flood Risk Assessment

Portshole Barn, Siddlesham, PO20 7NY

Rev -

Reference: **C2691**

Date **13.03.2024**

REVISION

Revision	**Status**	**Description**	**Date**	**Issued**	**Checked**
-	Final v1	Issued for Approval	13.03.2024	RH	RH

1 SITE AND DEVELOPMENT OVERVIEW

DEVELOPMENT DESCRIPTION	EXISTING (PRE-DEVELOPMENT)	PROPOSED (POST-DEVELOPMENT)
Site Use	Commercial/Agricultural (report ref: existing site coverage)	Residential
Development Use	Agricultural Barns (report ref: existing site use)	Residential (report ref: proposed site use)
Use Design Life		100 years (epoch 2124)
Number of Dwellings		1
EA Vulnerability Classification	Less Vulnerable (ref: existing site vulnerability)	More Vulnerable (ref: proposed site vulnerability)
Development Class		Minor
County Planning Authority	West Sussex County Council (ref: Country Council)	
District Planning Authority	Chichester District Council	
Local Sewer Authority	Southern Water (ref: Local Sewer Authority)	
SITE CATCHMENT CHARACTERISTICS	**DESCRIPTION**	**SOURCE**
Management Catchment	Arun and Western Streams Management Catchment (report ref: River Basin Catchment)	https://environment.data.gov.uk/catchment-planning
Nearest EA Main River	Earnley rife (western boundary) (report ref: EA Main River)	https://environment.maps.arcgis.com/apps/MapSeries/
Nearest Ordinary watercourse or surface waters	Minor ditches and land-drainage associated with historic site use (report ref: local water features)	Online Mapping and topography
KEY FLOOD RISK AND DATA SOURCES	**DATA TYPE**	**SOURCE**
EA Fluvial and Tidal Planning Data	UK Government Flood Maps for Planning (ref: FMP)	https://flood-map-for-planning.service.gov.uk/
EA Surface Water Data	DEFRA Risk of Flooding from Surface Water Sources GIS Data (ref: RoFSW)	https://environment.data.gov.uk/DefraDataDownload/?Mode=rofsw
EA Long term Flood Risk	UK Government Long term Flood Risk Maps (ref: LTFRM)	https://www.gov.uk/check-long-term-flood-risk
Environment Agency Product 4/5 Data	Appendix 2 (report ref: EA Product Data)	Environment Agency
Historic Flood Risk Data	DEFRA Historic Flood Outlines GIS Data	https://environment.data.gov.uk/DefraDataDownload/?mapService=EA/HistoricFloodMap&Mode=spatial
Strategic Flood Risk Assessment Data	CDC SFRA 2022 (ref SFRA)	
Local Flood Risk Assessment Data	(refer to SFRA)	
Topographic Information	DEFRA Opensource LIDAR Data	https://environment.data.gov.uk/DefraDataDownload/?Mode=survey
River or Sea Flood Risk present within site boundary	High	Refer Section 3: Table 3
Surface Water Flood Risk present within site boundary	Very Low	Refer Section 3: Table 3
DESIGNATION	**FLOOD RISK DESIGNATION**	**NOTE**
Critical Design Flood Event (DFE)	Proposed dwellings affected by tidal flooding	*Designation based on highest flood risk between River, Sea or Surface Water - Refer Section 3: Table 3

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2 INTRODUCTION

2.1 The following report is a Flood Risk Assessment (FRA) for the proposed residential dwelling located at Portshole Barn, Siddlesham, PO20 7NY (see site location map, Figure 1).

2.2 This assessment is required under the National Planning Policy Framework (NPPF) and Local and District Councils planning policy given the location, scale and associated flood risks.

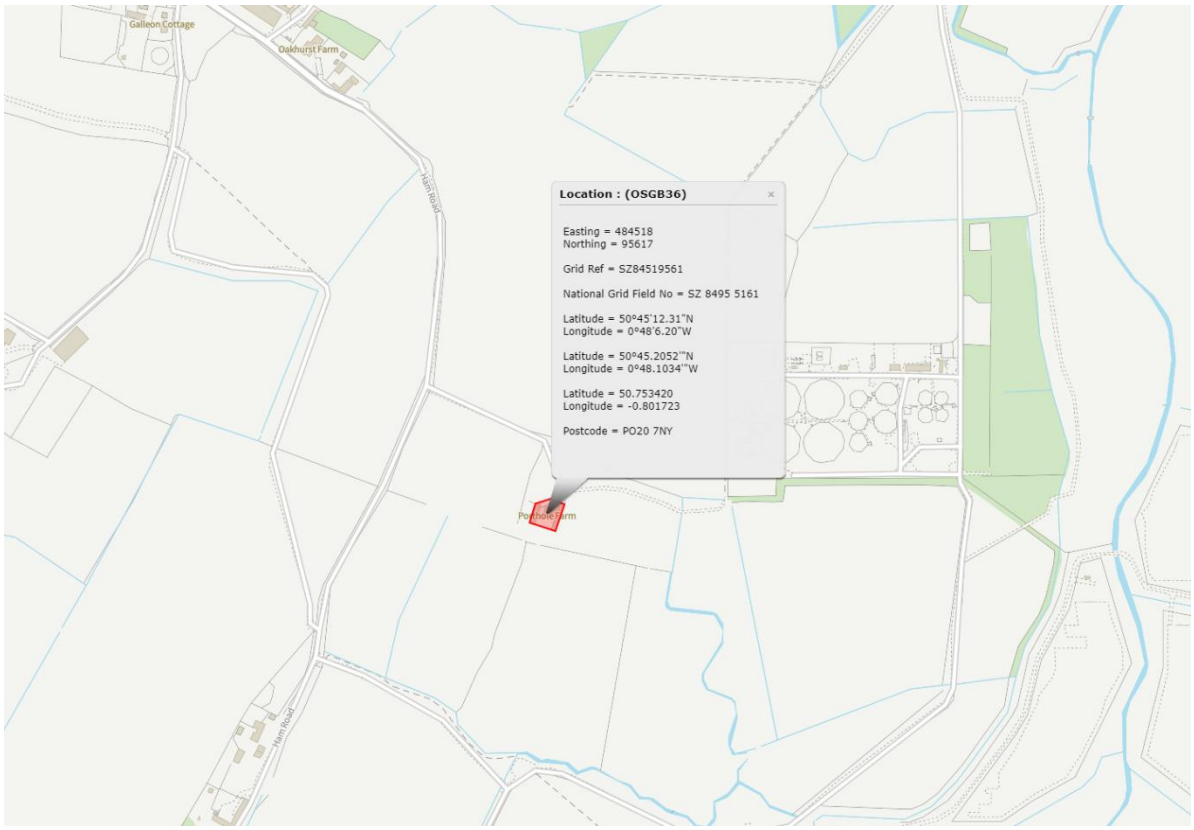


Figure 1 - Site Location Plan (site bordered red) Source: Location Map

2.3 This FRA has been written in general accordance with the National Planning Policy Framework (NPPF) and its Planning Practice Guidance (PPG), Environment Agency (EA) Standing Advice, LFRMS, County SFRA and associated guidance.

2.4 This FRA has relied upon publicly available information and data provided from the EA (where relevant and available at the time of writing). The interpretation of this data has been undertaken with the understanding of its accuracy and to a detail deemed suitable for this development type, location and relevant flood risk.

2.5 Where required, assumptions or extrapolation of the available data may have been undertaken to estimate (in particular) climate change impacts or extreme flood extents. This is only undertaken where up-to date climate change modelling is not available.

DEVELOPMENT PROPOSALS

2.6 The development proposals are for the change of use of agricultural building and adjoining land to C3 single dwellinghouse with associated parking. Replacement roof including part-increase in roof ridge height, and addition of ten conservation-style rooflights to facilitate the creation of a first floor. Part infilling of southern wing. Raising of existing floor level, and insertion/enlargement of windows to all elevations. Architectural Plans are included in Appendix 1.

FLOOD RISK VULNERABILTY

2.7 This FRA has been undertaken with due regard to the statutory requirements of the NPPF (2022) and with reference to the Planning Practice Guidance (PPG) in relation to development and flood risk. This FRA has been undertaken to inform on the current flood risk to the site. Therefore, this FRA aims to ensure that the development proposals take into account the site-specific flood risk and to **avoid** inappropriate development in areas potentially at risk of flooding.

2.8 Annex 3 of the NPPF Flood Risk Vulnerability Classification provides guidance on assigning development vulnerability. A summary of this information is provided in Table 1.

Table 1 – Extract from Annex 3 of the National Planning Policy Framework and Table 2: Flood risk vulnerability classification of PPG detailing Flood Risk Vulnerability Classification by use. (Existing Site Classification is Shaded Gray, Proposed Site specific classification shaded blue).

ESSENTIAL INFRASTRUCTURE	HIGHLY VULNERABLE	MORE VULNERABLE	LESS VULNERABLE	WATER-COMPATIBLE
Essential transport infrastructure	Police and ambulance stations; fire stations and telecom installations	Hospitals	Police, ambulance and fire stations which are not required to be operational during flooding.	Flood control infrastructure.
Essential utility infrastructure which has to be located in a flood risk area for operational reasons	Emergency dispersal points.	Residential institutions such as residential care homes, prisons and hostels.	Buildings used for commercial purposes and of a non-residential nature	Water transmission infrastructure and pumping stations.
Wind turbines.	Basement dwellings.	Buildings used for dwelling houses and sleeping, drinking establishments	Land and buildings used for agriculture and forestry.	Sewage transmission infrastructure and pumping stations.
Solar farms.	Caravans, mobile homes and park homes intended for permanent residential use.	Non–residential uses for health services, nurseries and educational uses	Waste treatment (except landfill* and hazardous waste facilities).	Sand and gravel working.
	Installations requiring hazardous substances consent.	Landfill* and sites used for waste management facilities for hazardous waste.	Minerals working and processing (except for sand and gravel working).	Docks, marinas and wharves and Navigation facilities.
		Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan.	Water treatment and Sewage treatment works which do not need to remain operational during times of flood.	Ministry of Defence installations.

2.9 The site is presently considered 'Less Vulnerable' in accordance with the NPPF. The development proposals are considered to increase vulnerability post development to 'More Vulnerable', being for residential use.

3 FLOOD RISK ASSESSMENT SCOPE

3.1 Flood risk as defined by the NPPF, is a combination of the probability and the potential consequences of flooding. Areas at risk of flooding are those at risk of flooding from any source, now or in the future. Sources include rivers and the sea, direct rainfall on the ground surface, rising groundwater, overwhelmed sewers and drainage systems, reservoirs, canals and lakes and other artificial sources. Flood risk also accounts for the interactions between these different sources. This term is key to the application of the presumption in favour of sustainable development in paragraph 11 of the National Planning Policy Framework (NPPF).

3.2 The NPPF requires flood risk to be considered on all sites, however more detailed site-specific FRA's are required when one or more of the following criteria apply to the site:

- Where a site is affected by the **Design Flood Event** (DFE) from any source (typically the 1% AEP) for all proposals of any new development (including minor development and change of use); or
- Greater than 1 ha in size and located in Flood Zone 1; or
- Located in Flood Zone 1 where there are critical drainage problems or within a designated Critical Drainage Area (CDA) as notified to the LPA by the Environment Agency; or
- Subject to a change of use to a higher vulnerability classification which may be subject to other sources of flooding; or
- A Major planning application (i.e. more than 10 residential dwellings).

3.3 The NPPF designates that the **'Design Flood Event'** (DFE) is used to assess the suitability of a development proposal against the criteria of the NPPF. The design flood, is a flood event of a given annual flood probability, but is generally taken as:

- River flooding likely to occur with a 1% annual probability (a 1 in 100 chance each year), typically shown as Flood Zone 3a as designated on the EA's Flood Map for Planning; or
- Tidal flooding with a 0.5% annual probability (1 in 200 chance each year), typically shown as Flood Zone 3a as designated on the EA's Flood Map for Planning; or
- Surface water flooding likely to occur with a 1% annual probability (a 1 in 100 chance each year), typically shown as the Medium Risk of Surface Water flooding as designated on the EA's Long Term Flood Risk mapping,

3.4 In addition to assessing present day risk, the DFE also must be assessed to include and appropriate allowance for climate change where possible (refer to Section 5 for climate change allowances), based on the site's geographical location, vulnerability and design life.

3.5 For the purpose of this FRA, the worst case DFE (whether this be from tidal, river or surface water sources), has been used to steer the recommendations of this report. Consideration of extreme events above that of the DFE have not been considered further beyond identifying these as residual risks and providing mitigation measures where appropriate.

3.6 Table 1 of the NPPF provides definitions of the Flood Zones, from low to high probability of river and sea flooding and also in regards to surface water flood risk. These Flood Zone Classification for the purpose of this FRA are:

- Flood Zone 1 - land assessed as having a less than a 1 in 1,000 annual probability (<0.1%);
- Flood Zone 2 - land assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river (1% – 0.1%), 1:100 year or greater of surface water flooding (1% – 0.1%), or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5% – 0.1%) in any year;
- Flood Zone 3 - land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year. Flood Zone 3b is land have greater than 1 in 20 to 1 in 30 year annual probability of flooding.

3.7 Following an assessment from the various sources of flood risk for the DFE, this site-specific FRA has applied the key principles for decision making when flood risk is a consideration and includes in order of importance:

1. **Avoid –** This is to physically locating the development proposals to areas of lowest flood risk within the site and/or determined how to vertically place the proposals to such that more vulnerable uses are positioned above the design flood level (such as raising floor levels or placing more vulnerable uses on upper levels). Developers should refer to the BS 85500:2012-Flood resistant and resilient construction. Guide to improving the flood performance of buildings for applicable strategies);

2. **Control -** Planning authorities and developers can investigate measures to control the risk of flooding affecting the site (this may be through flood defences, flood gates, flood storage or other engineered solutions such as SUDS). This is rarely applied at the site level, and is mostly address through strategic and county level flood defence strategies. At this site level, typically this will be through applying a Water Exclusion or Water Entry strategy when design a building a or space.

3. **Mitigate –** Is the use of flood resistance and resilience measures to address any residual risks remaining after the use of the avoidance and control measures described above. Passive measures should be prioritised over active measures as they are likely to be more effective and more reliable. Flood Resilience is an approach to building design which aims to reduce flood damage and speed recovery and reoccupation following a flood. It uses a combination of flood resistance and recovery measures (referred to here as resilience measures), and is described in the industry-developed CIRIA Property Flood Resilience Code of Practice, which provides advice for both new-build and retrofit.

4. **Managing Residual Risk –** this will usually involve ensuring either safe access and egress is available from the safe in a DFE, Flood Warning Systems/Evacuation Plans are in place, safe refuge is on site during a DFE, the building is designed to account for flood loadings etc.

5. **Flood Risk is not increased elsewhere –** assuming all the above items can be address, it is critical that the development does not increase flood risk elsewhere as a result. Typically this is addressed by ensuring flood waters are not displaced (in surface water or river flood affected areas, the loss of floodplain storage is less likely to be a concern in areas benefitting from appropriate flood risk management infrastructure or where the source of flood risk is **solely** tidal.) or appropriate hydraulic modelling is provided in support of an application to demonstrate that flood risk is not increased outside of a site (such as through on site flood compensation or detailed site specific hydraulic modelling).

3.8 It should be noted, where up-to date flood risk or climate change models are not available, best efforts have been made to assess these risks and extrapolate the available data where necessary. However, this approach may require further detailed modelling if deemed necessary by the reviewing authorities. Detailed 2D hydraulic modelling is deemed outside the scope of this report.

SEQUENTIAL TEST/EXCEPTION TEST

3.9 For the purpose of this assessment, the application of the Sequential Test has been broken down into three levels. Passing the Sequential Test at the strategic level is a weighting of the risks versus benefit of a development against a wider criterion (such as meeting other sustainability targets, housing needs or other strategic planning goals) than just purely avoiding flood risk issues. However, the Sequential Test can also be applied at the site level, where development is steered towards lower areas of flood risk within a site boundary, and is much more objective in its assessment. For the purpose of this FRA, the assessment 'Level' of the Sequential Test are considered to be:

Level 1 - At the high-level, this test is first implemented by local planning authorities (LPA) at the strategic planning scale. The Sequential Test is applied to steer local planning policy by directing particularly vulnerable new developments (e.g., residential, hospitals, mobile homes etc.) outside of the floodplain and for designating new land uses and future development areas.

Level 2 - At the second instance, the Sequential Test is implemented for a specific development at the request of the LPA to assess other sites within an area defined by the LPA, this type of Sequential Test is present where there is a significant conflict between a proposed development and flood risk.

Level 3 - The third instance, is where the Sequential Test is applied with the confines of the site, namely by steering development proposals to **avoid** areas of flood risk within a site itself.

3.10 Application of the first and second level of the Sequential Test is deemed outside the scope of this report.

3.11 Table 2 below presents a helpful guide in identifying the suitability of a site prior to applying Level 1 and 2 of the Sequential Tests and identifies when the Exception Test is required.

Table 2 - The Sequential Test: Flood Risk Vulnerability and Flood Zone 'Compatibility' Table as specified by NPPF. Shaded cells denote the proposed re-development. Please note: ✓means development is appropriate; x means the development should not be permitted and should be subject to a full sequential test. Refer to Table 2 for selected Flood Zone Designation

FLOOD RISK VULNERABILITY CLASSIFICATION		ESSENTIAL INFRASTRUCTURE	WATER COMPATIBLE	HIGHLY VULNERABLE	MORE VULNERABLE	LESS VULNERABLE
Flood Zone	**Zone 1**	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test Required	✓	✓
	Zone 3a	Exception Test Required	✓	x	Exception Test Required	✓
	Zone 3b *Functional Floodplain*	Exception Test Required	✓	x	x	x

3.12 Based on the principles above, a development of this nature is considered appropriate in its current location. However, the LPA may still consider that full application of the Sequential Test is required, although this FRA does not believe further application of the sequential test is necessary. Therefore, this FRA presents the findings of the Exception Test and recommendations for incorporation of flood resilient measures to improve long term flood resilience of the proposals. The following sections undertakes further analysis of the data available from the Local and District Council and EA data sets relating to flooding from a number of sources.

3.13 Table 3 summarises the sites primary flood risk classifications and the source for the DFE. This designation is based on the EA's Flood Map for Planning (extract provided in Figure 2 below) and the EA's Long Term Flood Risk Maps (LTFRM): Risk of Flooding from Surface Water (RoFSW) (extract provided in Figure 3).

3.14 Based on the EA data, the primary source of flood risk appears to be from tidal flooding, but may also be affected by some fluvial flows (although this is considered to be minor in comparison to the dominant tidal flood risk at the site). The EA mapping shows that the proposed location of the dwellings is presently wholly located in Flood Zone 1 for surface water flood risk, although the site is shown to be located within Flood Zone 3 for tidal flooding. Because surface water and fluvial flood risk to the site is very low or minor, flooding from these sources are not considered further within this report.

3.15 Section 5 and 6 below looks further at potential climate change impacts to flood risk from this source. Other sources of flooding have been considered in Section 6 below (such as Groundwater and sewer flooding), but these are typically considered to be 'minor' sources of flood risk.

Table 3 - Summarises the overall Flood Zone designation based on the highest rated flood risk from either rivers and sea or surface water.

FLOOD ZONE AND DFE SOURCE IDENTIFICATION SUMMARY			
	FLOOD ZONES AFFECTING THE SITE		**DOMINANT SOURCE FOR THE DESIGN FLOOD EVENT (DFE)**
	Flood Zone 2 (medium risk)	**Flood Zone 3 (high risk)**	**Source**
River Or Sea	Yes	Yes	Tidal
Surface Water	No	No	

**Flood Zone Designation for assessment is based on the highest flood risk from river, sea or surface water flooding taken from EA's Flood Map for Planning and EA's LTFRM:RoFSW*

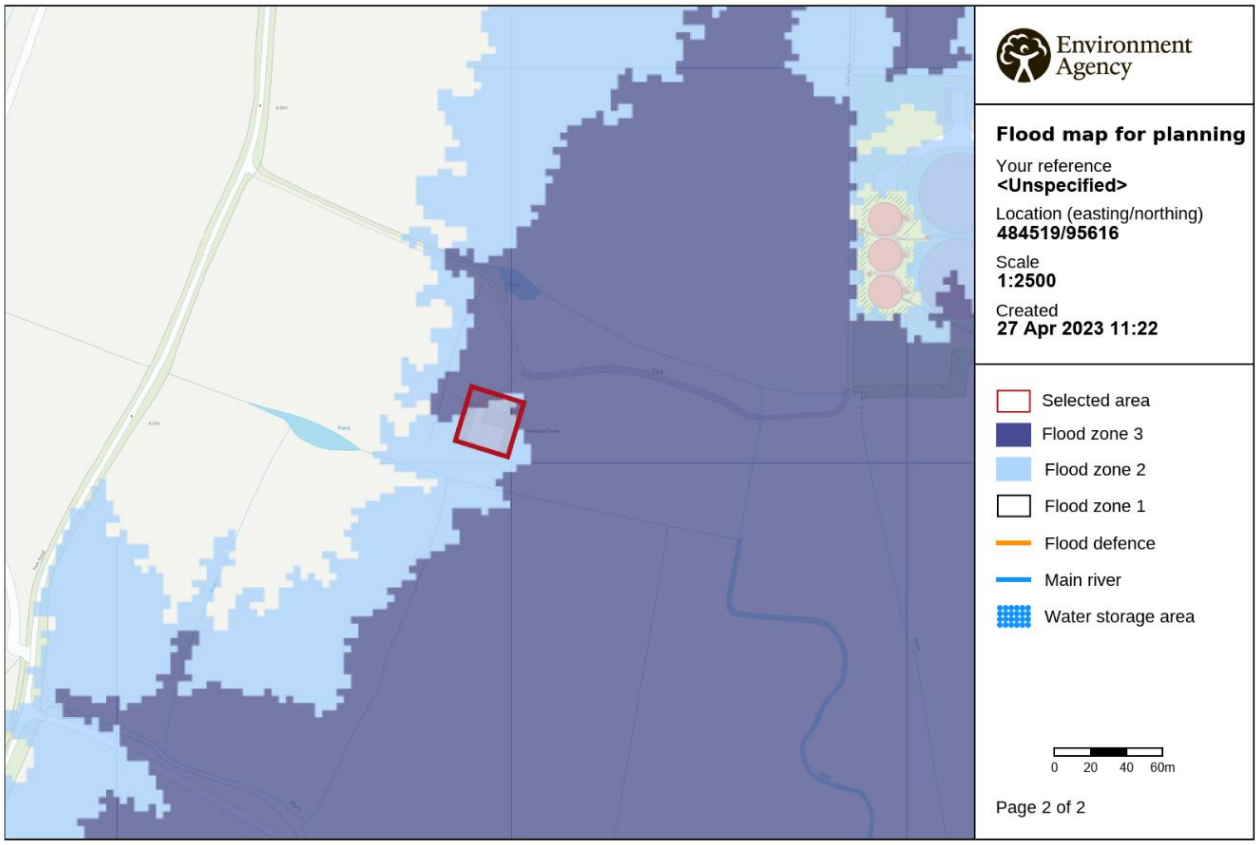


Figure 2 extract from EA Flood Maps for Planning (Source: DEFRA)

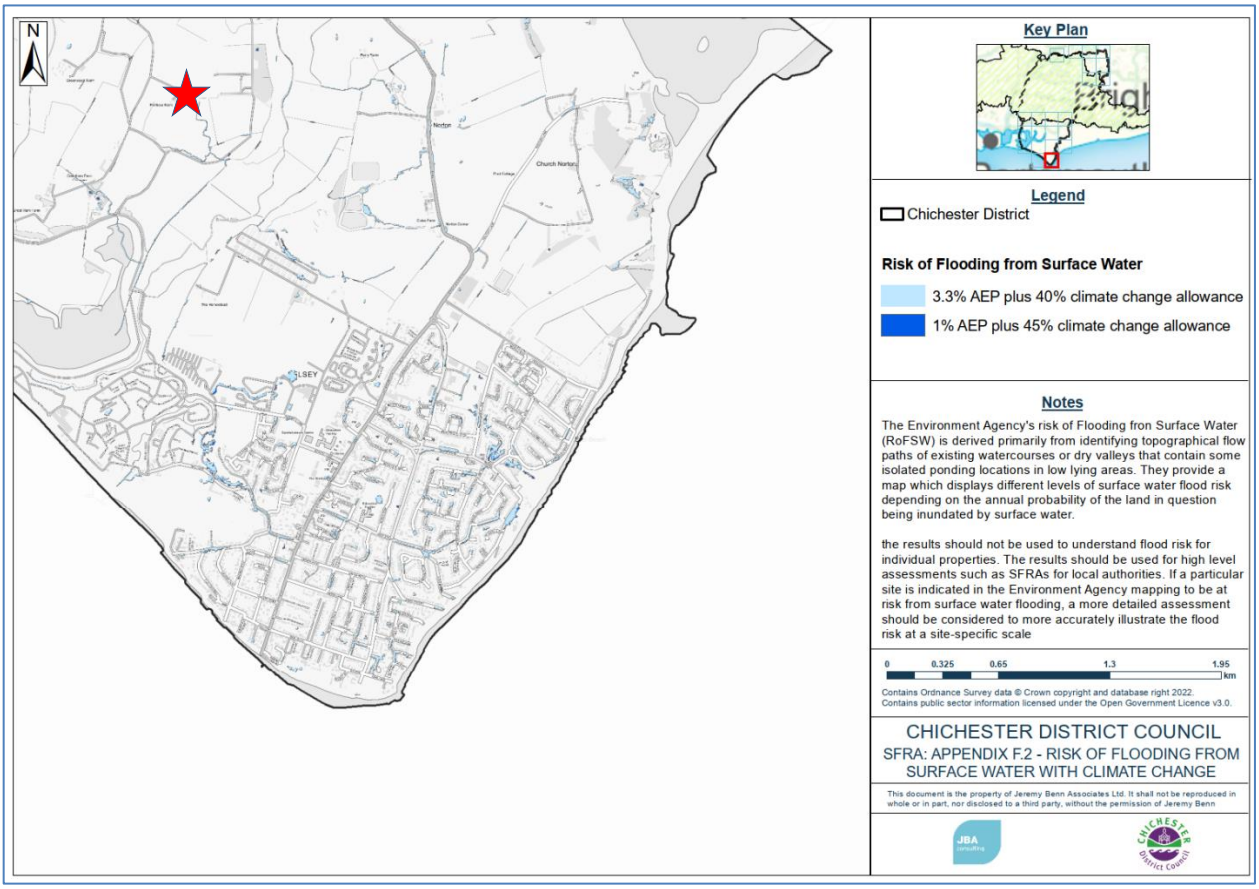


Figure 3 - extract from the CDC SFRA Appendix F.2, showing surface water flood risk with climate change (site marked by star)

4 LOCAL FEATURES

RIVERS AND WATERCOURSES.

3.16 The site is located within a predominantly agricultural area. This area is largely flat and has a number of land-drainage systems criss-crossing the existing fields.

3.17 There nearest EA main rivers are the Broad Rife c600m to the east of the site and the Grange Rife c800m to the west. Both of these rivers flow to the south, where they discharge into Bracklesham Bay c2.5km to the south.

TOPOGRAPHY

3.18 The client has provided a topographic survey for the site. This is included in Appendix 1. This shows that the larger of the two barns has a finish floor level (FFL) of 3.88mAOD, with the smaller barn having a FFL of 3.43mAOD. The surrounding ground levels are marginally lower than these levels and appears to fall towards the north and west slightly.

GEOLOGY & HYDROGEOLOGY

3.19 The online British Geological Survey (BGS) shows the site to be underlain by 1:50 000 scale bedrock geology description Earnley Sand Formation - Sand, silt and clay, with superficial deposits of River Terrace Deposits - Sand, silt and clay recorded.

3.20 BGS borehole data at BGS ID: 456076: BGS Reference: SZ89NW2 located at the nearby treatment works and appears to be at an elevation slightly lower than the site, shows that groundwater was recorded at c.2m below ground level (c2.3mAOD).

3.21 Table 4 below present a summary of the site hydrogeological classifications and considerations.

Table 4 - Summary of Hydrogeology Classifications (source Magic Map, BGS) – applicable classification shaded Blue

HYDROGEOLOGY CLASSIFICATIONSDAF			
Aquifer Designation (Bedrock)	Principle	Secondary	Unproductive
Aquifer Designation (Superficial)	Principle	Secondary	Unproductive
Groundwater Vulnerability	High	Medium	Low
Located within Source Protection Zone	Yes	No	N/A
Soluble Rock Risk	Present	Not Present	N/A

3.22 The design permeability should be investigated further for the purpose of surface water management on the site. It is likely that infiltration will be suitable based on the expected ground conditions and location. However careful design will be required to ensure that the bottom of any infiltration system is kept 1m above the highest recorded level to protect the underlying groundwater.

FLOOD DEFENCES

3.23 The Environment Agency releases a range of flood asset information as Open Data through their AIMS Defence (Spatial Flood Defences) GIS mapping. They are the only comprehensive and up-to-date group of datasets in England that show flood defences currently owned, managed or inspected by the EA.

3.24 EA AIMS Defence data (2021) indicates that there are no formal flood defences raised in the immediate vicinity of the site. However, there are defences along the Broad Rife and Grange Rife to the east and west of the site

respecitively. These primarily are of raised ground and provide minimal protection against fluvial flooding through these watercourse.

3.25 However, the EA flood maps show that the primary risk to the site is from tidal flooding from the English Chanel to the south and south east. There are tidal defences located to south known as the Medmerry Scheme and are formed by an embankment. This embankment which provides protection to a significant area (including the site) from tidal incursion from the Bracklesham Bay direction, does not appear to provide protection from tidal incursion from the eastern side of Selsey (East Beach). So although the crest hieght of the Medmerry Scheme exceeds the DFE height of 4.72mAOD, tidal flooding in both the defended and undefended scenario is still likely to affect the site in the DFE (1 in 200 year event plus climate change).

3.26 As such, this FRA has ignored the presence of the existing defences. Although they will offer some protection, they do not fully protect the site. In addition, considering the undefended scenario as the DFE, allows the worst case event to be designed and accounted for to mitigate the risk from these flood events.

5 CLIMATE CHANGE

4.1 In 2022, the EA issued updated guidance on the impacts of climate change on flood risk in the UK15 to support the NPPF. This guidance sets out that peak rainfall intensity, sea level, peak river flow; offshore wind speed and extreme wave heights are all expected to increase in the future as a result of climate change.

4.2 The guidance acknowledges that in relation to certain factors there is considerable uncertainty with respect to the absolute level of change that is likely to occur. As such, in these instances, the guidance provides estimates of possible changes that reflect a range of different emission scenarios (Table 5).

Table 5 - Extract from NPPF designating Flood Risk Climate Change Allowances by Flood Zone and Use. Sites required climate change probability scenario highlighted blue

FLOOD ZONE	ESSIENTIAL INFRASTRUCTURE	HIGHLY VULNERABLE	MORE VULNERABLE	LESS VULNERABLE	WATER COMPATIBLE
1/2	Higher Central and Upper End	Higher Central and Upper End	Central and Higher Central	Central	None of these allowances
3a	Upper End	Development should not be permitted	Higher Central and Upper End	Central and Higher Central	Central
3b	Upper End	Development should not be permitted	Development should not be permitted	Development should not be permitted	Central

INCREASES IN SEA AND TIDAL LEVELS

4.3 There are a range of allowances for each river basin district and epoch for sea level rise. They are set out in *Table 1: sea level allowances by river basin district for each epoch in mm for each year (based on a 1981 to 2000 baseline) – the total sea level rise for each epoch is in brackets* of *the NPPF: Flood risk assessments: climate change allowances* and are based on percentiles. A percentile describes the proportion of possible scenarios that fall below an allowance level.

4.4 The allowances in the NPPF account for slow land movement. This is due to 'glacial isostatic adjustment' from the release of pressure at the end of the last ice age. The northern part of the UK is slowly rising and the southern part is slowly sinking. This is why net sea level rise is less for the north-west and north-east than the rest of the country.

4.5 For flood risk assessments and strategic flood risk assessments, sites should assess both the higher central and upper end allowances for more vulnerable developments.

4.6 The EA's Product 4 data is understood to include the most up to date tidal related sea level rise, undertaken in 2022. The EA data presented in Section 6 is considered to be suitable for advising on the DFL for the site.

4.7 The EA data is included in Appendix 2 for reference.

INCREASES IN SURFACE WATER FLOODING AND RAINFALL ALLOWANCES

4.8 When considering climate change impacts to surface water (pluvial) flooding, The DEFRA peak climate change rainfall allowances detail predicted rainfall increase due to climate change in different regions around England. For all developments with a design epoch up to (and presently beyond) 2070, the NPPF states developments should adopt the Upper End and Central allowances. The site specific climate change allowances based on the DEFRA data is summarised in Table 6 below, and should also be adopted for the purposes of surface water drainage design.

Table 6 - Summary of Table 2: peak rainfall intensity allowance in small catchments (less than 5km2) or urban drainage

Management Catchment peak rainfall allowances 2070's	3.3% Annual Exceedance Probability Event	1% Annual Exceedance Probability Event
Central	25%	25%
Upper End	40%	45%

4.9 Based on the SFRA data which includes climate change surface water flood risk mapping up to 45%, the site remains wholly unaffected in the 1% AEP plus climate change. Therefore surface water flood risk to the site is considered to be low and is not reviewed further within this FRA.

4.10 Nevertheless, current planning policy dictates that the sites surface water drainage systems are designed to accommodate the 1% AEP plus climate change, to account for future climate change risks associated with flooding from this source.

6 SOURCES OF FLOOD RISK

6.1 In order to assist the implementation of the Governments NPPF, the EA has undertaken national scale flood risk mapping. This mapping takes into account a range of sources including flooding from rivers, sea, surface water and reservoir breach. Furthermore, each Council produces a Strategic (county scale) Flood Risk Assessments (SFRA) that aim to specifically identify local flood risk issues (such as critical drainage areas and local groundwater flooding).

6.2 The following section reviews both the EA data as well as the relevant information available from the SFRA.

TIDAL (SEA)

6.3 The EA have undertaken fluvial and tidal modelling of the nation's main rivers in flood to support and ensure developments are steered away from flood prone areas or are designed to ensure risk to people is not increased as a result.

6.4 The EA's Flood Maps for Planning shows that the site is unaffected in the undefended event (see Figure 5 below). However, the EA's (defended) Product 4 data shows that the site could be affected by flooding towards the end of its design life (see Figure 7 below).

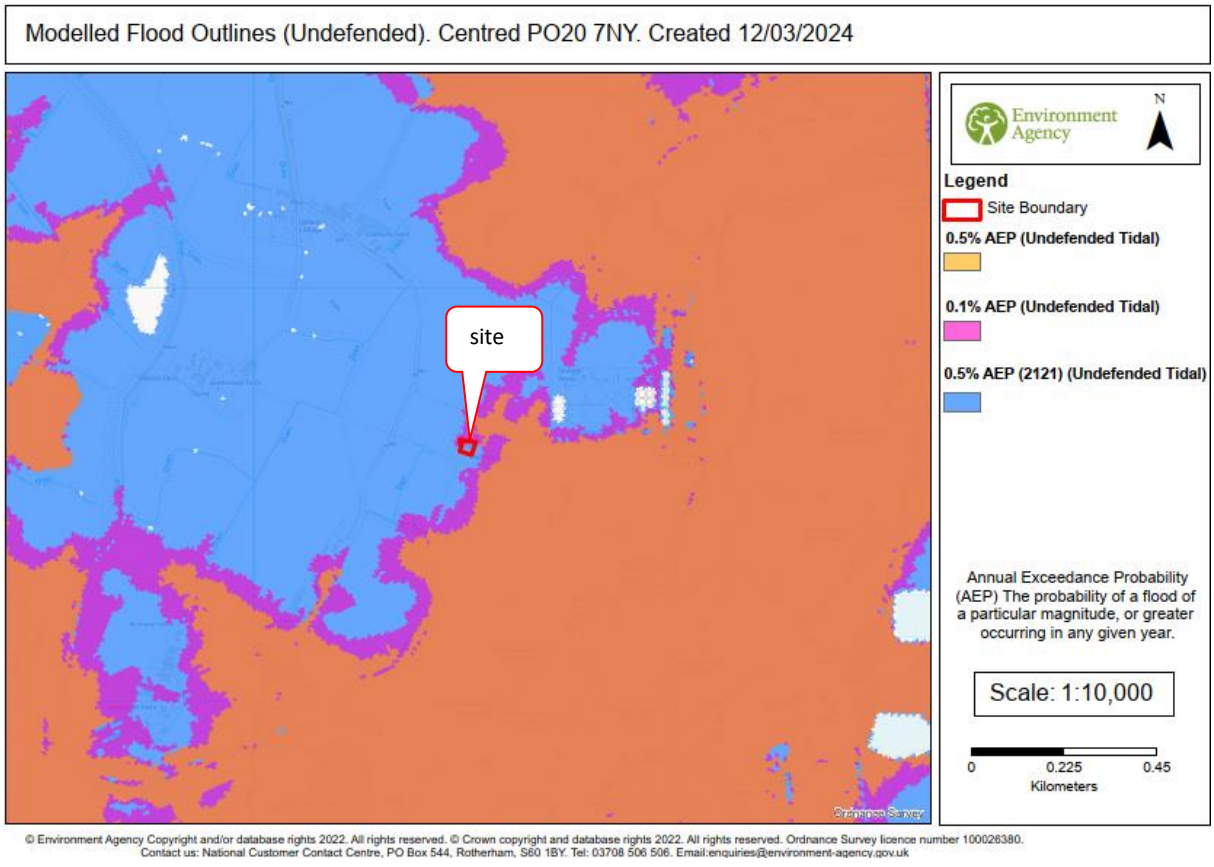


Figure 4 – extract from EAs Product 4 data set (source Environment Agency Flood Maps)

6.5 Figure 5 shows an extract from the EA's Product 4 requested for the purpose of this FRA. The EA has provided data relating to a number of nodal points across the site to assess flood depths from a number of return periods. The EA have also provided climate change impacts to the 0.5% AEP (that is Flood Zone 3 extents for tidal flood risk) to the 2121 design event.

6.6 The undefended scenario has been used, as these present the worst scenario in terms of flooded depths affecting the proposed dwelling at the end of its design life.

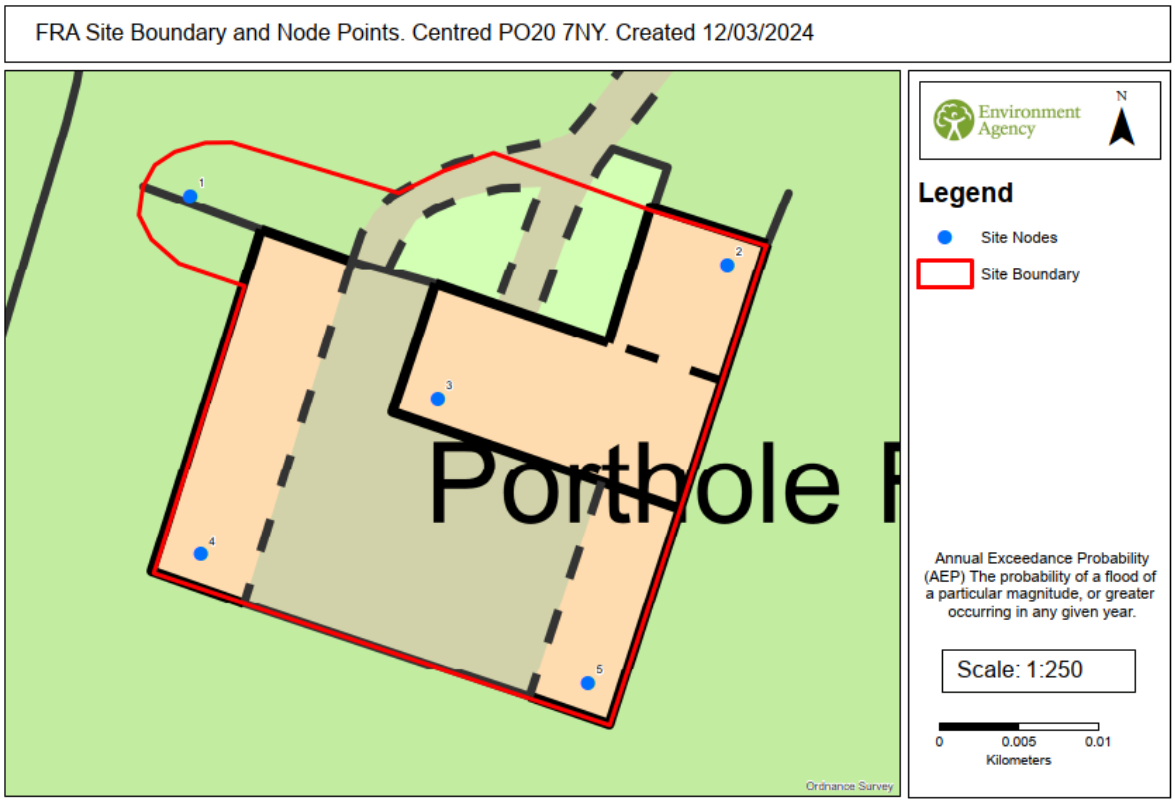


Table 1: Water Levels: Tidal Undefended

	NGR		Modelled Flood Levels in Metres AOD Undefended Annual Exceedance Probability		
Node Ref	Eastings	Northings	0.5%	0.5% (2121)	0.1%
1	484502	95630	-	4.89	3.37
2	484536	95626	-	4.89	3.37
3	484518	95618	-	4.89	-
4	484503	95602	-	4.89	-
5	484527	95600	-	4.89	-

Table 2: Water Levels: Tidal Defended

	NGR		Modelled Flood Levels in Metres AOD Defended Annual Exceedance Probability		
Node Ref	Eastings	Northings	0.5%	0.5% (2121)	0.1%
1	484502	95630	-	4.04	-
2	484536	95626	-	4.04	-
3	484518	95618	-	4.04	-
4	484503	95602	-	4.04	-
5	484527	95600	-	4.04	-

Figure 5 - extract from the JFLOW Model 2006, with updated climate change runs completed by JBA Consulting in 2016.

6.7 The EA data shows that at the location of the site is wholly affected in the undefended and defended DFL (2121). With maximum flood depths (at node 1) up to 4.89mAOD or 1.66m.

Impacts of Climate Change

6.9 Therefore, based on the EA data, this will require that the most vulnerable parts of the site (such as sleeping accommodation) is raised to 5.29mAOD (including a 300mm freeboard allowance), or approximately 2m above existing ground level in order to be above the expected Flood Zone 3 plus climate change event.

RESERVOIR FLOODING (BREACH)

6.10 Reservoirs with an impounded volume greater than 25,000 cubic metres are governed by the Reservoirs Act 1975 and are listed on a register held by the Environment Agency. The level and standard of inspection and maintenance required under the Act means that the risk of flooding from reservoirs is relatively low. Recent changes to legislation under the Flood and Water Management Act require the Environment Agency to designate the risk of flooding from these reservoirs. The Environment Agency is currently progressing a 'Risk Designation' process so that the risk is formally determined.

6.11 Reservoir flooding is very different from other forms of flooding. It may happen with little or no warning and evacuation will need to happen immediately. The likelihood of such flooding is difficult to estimate, but it is less likely than flooding from rivers or surface water. It may not be possible to seek refuge upstairs from floodwater as buildings could be unsafe or unstable due to the force of water from the reservoir breach or failure. The risk of inundation to the study area as a result of reservoir breach or failure of a number of reservoirs within the area was assessed as part of the National Inundation Reservoir Mapping (NIRIM) study.

6.12 Maps of the flood extent can be found on the Government's Long term flood risk information website, Figure 6 shows that the site is at very low risk of flooding from any reservoir failures.

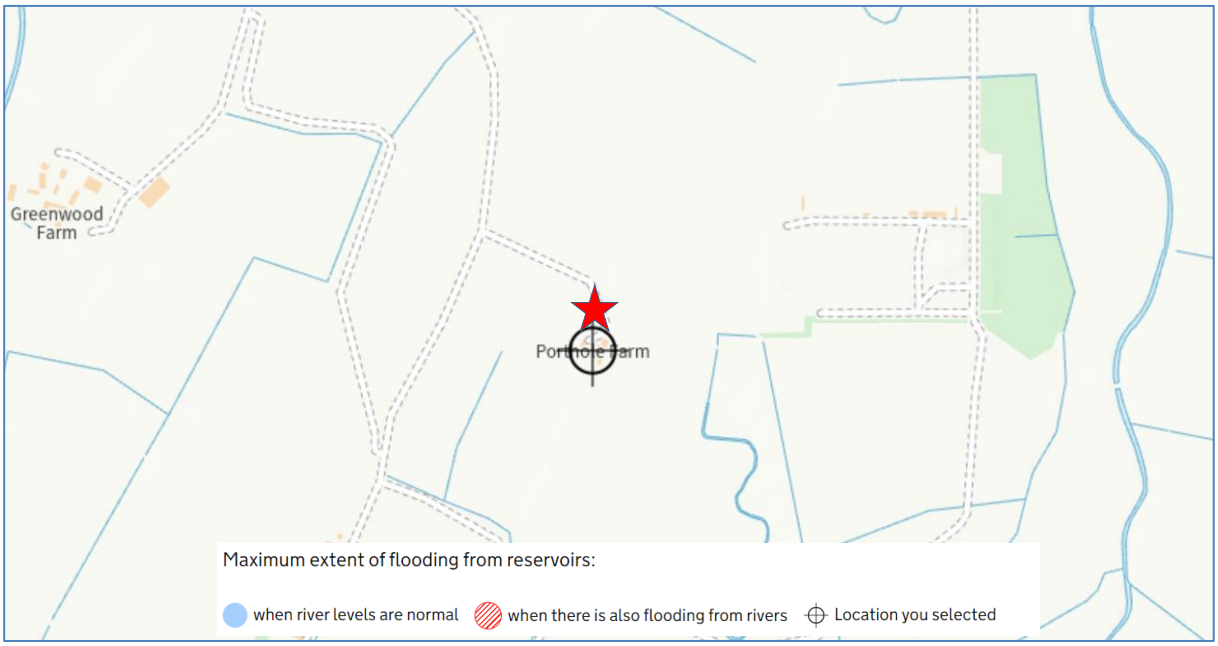


Figure 6 extract from EAs LTFRM Reservoir Flood Risk (star marks approximate site location)

HISTORICAL, SEWERS AND DRAINAGE

6.1 The EA have confirmed that there is no historical record of flooding to the site. There have been no other noted flood events in the area, or specifically at the site, however this does not directly indicate that the site has not flooded in the past or may flood in the future.

6.2 Appendix B of the CDC SFRA shows historic flood records. This shows there are no historical records of flooding affecting the site

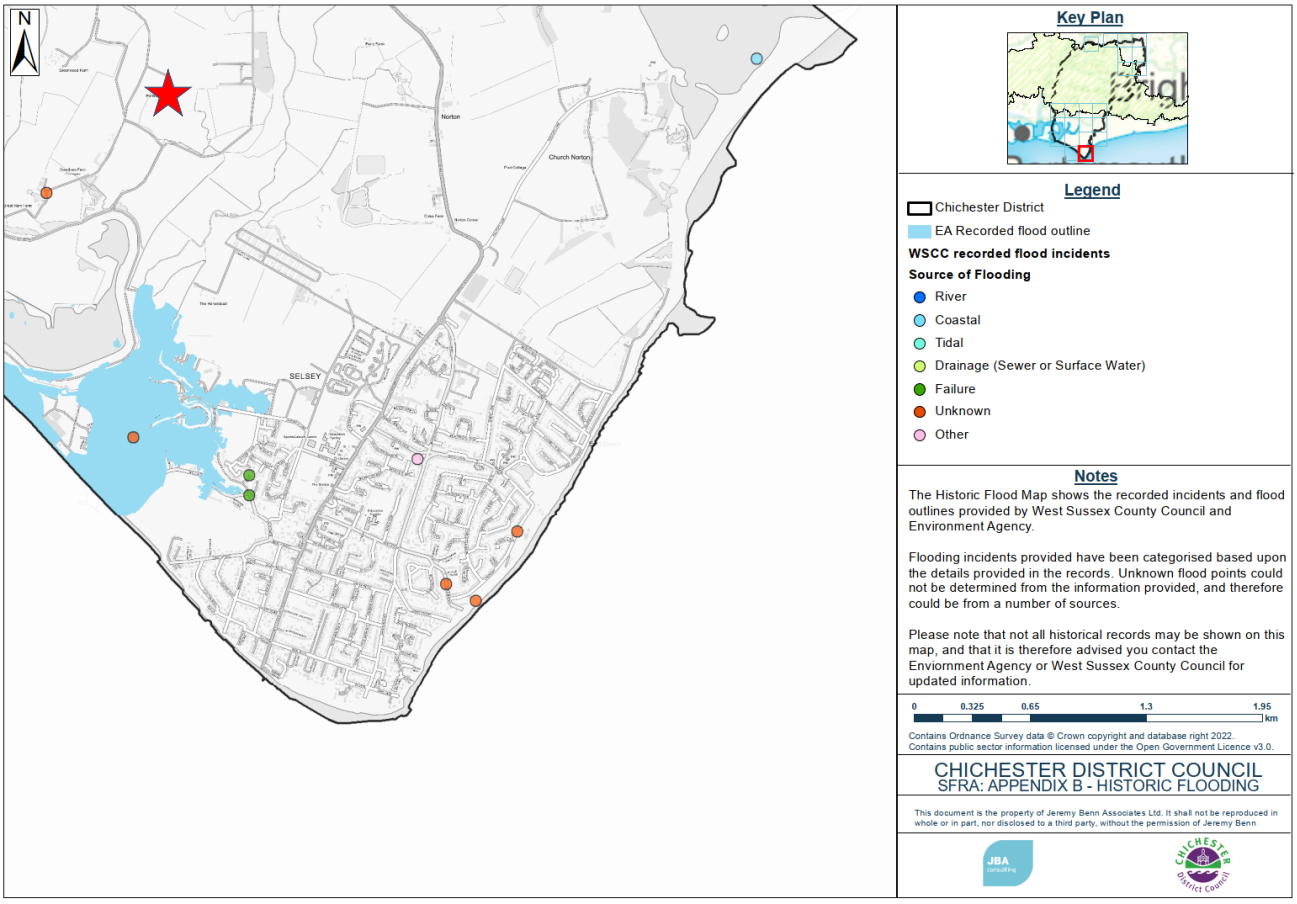


Figure 7 - extract from CDC SFRA Appendix G (star marks approximate site location).

GROUNDWATER

6.3 Groundwater flooding is the emergence of groundwater at the ground surface or into subsurface voids arising as a result of:

- ⇒ abnormally high groundwater heads or flows;
- ⇒ the introduction of an obstruction to groundwater flow; or
- ⇒ the rebound of previously depressed groundwater levels.

6.4 Groundwater flooding usually occurs following a prolonged period of low intensity rainfall. As groundwater flow is much slower than surface flow, the flooding may not recede for long periods of time, typically weeks or even months. It is important to recognise the risk of groundwater flooding is typically highly variable and heavily dependent upon local geology, topography and weather conditions, as well as local abstraction regimes. Groundwater flooding is hard to predict and challenging to mitigate.

6.5 Appendix G from the CDC SRFA, shows that the site is in an area that could be prone to groundwater emergence (see Figure 8). However, there have been no recorded incidences of groundwater flooding to the site, and it is notably difficult to predict where groundwater may emerge and cause damage. Nevertheless, groundwater flooding is typically low level in depth, and all but the worst cases can be managed through appropriate flood resilient designs.

6.6 Groundwater data from BGS boreholes nearby the showed that groundwater was recorded c.2m bgl. The fact that groundwater levels remained c.1.5m below surface levels and combined with the very low risk of surface water flooding on the site, suggests that overall groundwater flood risk will remain very low.

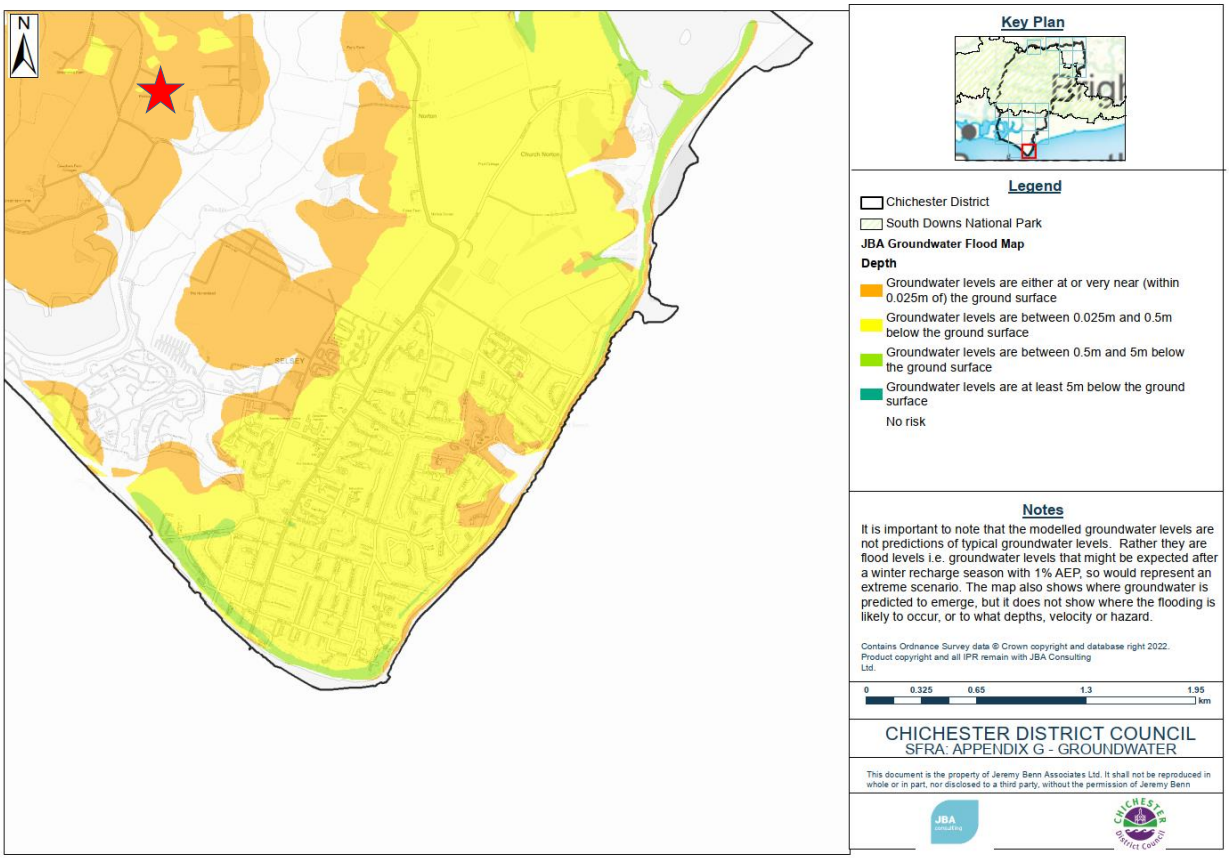


Figure 8 extract from WSCC Groundwater flood map risks (star marks approximate site location).

Impacts of Climate Change

6.7 The potential effects of climate change on groundwater levels are uncertain. Greater seasonality in groundwater level fluctuation is a potential outcome under a pattern of higher winter rainfall and less summer rainfall. Broad predictions of the impacts of climate change on groundwater levels are difficult to make at the present time

RESIDUAL RISKS

6.8 Residual risks are those remaining after applying the sequential approach to the location of development and taking mitigating actions. Examples of residual flood risk include:

- the failure of flood management infrastructure such as a breach of a raised flood defence, blockage of a surface water conveyance system, overtopping of an upstream storage area, or failure of a pumped drainage system;
- a severe flood event that exceeds a flood management design standard, such as a flood that overtops a raised flood defence, or an intense rainfall event which the drainage system cannot cope with.

6.9 There are no existing defences that provide protection above the DFE, therefore breach failure is not considered a residual risk.

6.10 Surface water drainage should be designed to account for the 1 in 100 year plus climate change, with external levels formed to direct site runoff around buildings and away from building thresholds to mitigate against flooding in an extreme rainfall event.

SUMMARY OF RISKS

6.11 Table 7 below summarises the generalised risk from the various sources of flooding assessed above, and if the site is at risk of a DFE from this source.

Table 7 - Summarising sources of flooding that affect the proposed dwelling up to the DFE. Critical DFE shaded blue

Source of Flooding	Flood Risk within the site	Are the dwelling at risk of a DFE
Fluvial	Very Low	No
Tidal/Sea	High	Yes
Surface Water	Very Low	No
Reservoir	Very Low	No
Groundwater	Very Low	No
Sewers and Drainage	Very Low	No

6.12 Based on Table 8, the site is shown to be affected by the Tidal DFE. In accordance with the PPG and NPPF, Section 7 below presents the proposed measures to avoid, control, mitigate, manage residual risk and ensure flood risk is not increased elsewhere.

7 FLOOD MITIGATION MEASURES

7.1 The proposals allow the opportunity to improve flood resilience of the site by incorporating a number of flood mitigation measures, both through the incorporation of flood resilient building materials, surface water drainage improvements and signing up to the EA Flood Warning/Alert System.

7.2 Table 8 presents the key flood mitigation measures based the DFE on the NPPF and PPG decision making principles:

Table 8 - Key Decision Making principles and measures applied to avoid, control, mitigate, and manage flood risk

DECISION MAKING: ORDER OF PRIORITY	PROPOSED MEASURES
1. Avoid	The proposed dwellings are shown to be located in Flood Zone 3. Although the site is defended in the present day Flood Zone 3 event, it is unlikely to remains so over its design life. Therefore, and assuming that the Sequential Test can be passed, the Exception Test advises that sleeping accommodation should be set at no lower than 5.29mAOD. However, ideally the FFL should be raised to bring the whole residential use above the DFE.
2. Control	Surface Water Drainage systems to incorporate SUDS and be designed to accommodate the 1 in 100 year plus climate change DFE.
3. Mitigate	The client and developer should also adopt the recommendations within BS 85500:2012-Flood resistant and resilient construction. Refer to Section 8 below for recommended Building Measures
4. Manage residual flood risk	At a minimum, all sleeping accommodation is raised above the DFE. Where possible, the entire dwellings should have an FFL above the same DFE. Refer to Section 9 for assessment of Access and Egress (Flood Evacuation Planning).
5. Flood Risk is not increased elsewhere	Any new drainage should be designed in accordance with Building Regulations Part H, SuDS Manual and 'DCG' guidance, ensuring drainage proposals include an allowance for climate change; Any additional flows to be directed into the Local Sewer Authorities public sewers or water courses to receive confirmation of capacity and connection approvals prior to detailed design and construction.

8 BUILDING MATERIAL MITIGATIONS

8.1 The national government produced guidance for improving the flood resilience of building in the Communities and Local Government (CLG) 2007 'Improving the Flood Performance of New Buildings' and BS 85500:2012-Flood resistant and resilient construction. This publication provides recommendations on how to protect buildings in the case of a flood event, and propose two scenarios based on maximum expected flooded depths:

> **Water exclusion strategy** – where emphasis is placed on minimising water entry whilst maintaining structural integrity, and on using materials and construction techniques to facilitate drying and cleaning. This strategy is favoured when low flood water depths are involved (not more than 0.3m). According to the definitions adopted in this Guidance, this strategy can be considered as a resistance measure but it is part of the aim to achieve overall building resilience
>
> **Water entry strategy** – where emphasis is placed on allowing water into the building, facilitating draining and consequent drying. Standard masonry buildings are at significant risk of structural damage if there is a water level difference between outside and inside of about 0.6m or more. This strategy is therefore favoured when high flood water depths are involved (greater than 0.6m) by utilising resilient materials, and construction methods.

8.2 Given the primary risk is related to surface water flooding from ponding in the driveway/turning area, or from an extreme event or failure of onsite drainage, it is considered that some key principles of the **Water Entry Strategy** should be adopted for the buildings on the site if the FFL can't be raised above the DFE. Some simple construction measures can greatly protect buildings during such an event without incurring large additional construction costs. Some recommendations include:

- The route of all electrical services will run from ceilings at ground floor (where possible), down toward sockets;
- All plumbing insulation to be of closed-cell design;
- Non-return valves to be fitted to all drain and sewer outlets;

8.3 Further detail can be found at https://assets.publishing.service.gov.uk/:

9 SITE ACCESS AND EGRESS (FLOOD EVACUATION PLANNING)

9.1 To comply with the NPPF, all occupants should be able to make their way, unassisted by the Emergency Services, to dry land. This is known as 'safe access to dry land' and does not have to be dry, just not ***hazardous*** at the peak of the predicted critical 1% (1 in 100 year) plus climate change storm.

9.2 Table 13.1 of FD2320 shows the maximum depths/velocity combinations that are safe for 3 categories of user (occupant). The methodology for calculating "Flood Hazard" is reproduced below according to the methodology stated within the "Supplementary Note on Flood Hazard Ratings and Thresholds for Development Planning and Control Purposes – Clarification of the Table 13.1 of FD2320/TR2 and Figure 3.2 of FD2321/TR1" (*Figure 9*).

9.3 For an access/egress route to be acceptable under the NPPF, the combination of flood depths, velocities and debris must be analysed.

HR	Depth of flooding - d (m)												
	DF = 0.5				DF = 1								
elocity - v (m/s)	0.05	0.10	0.20	0.25	0.30	0.40	0.50	0.60	0.80	1.00	1.50	2.00	2.50
0.0	0.03 + 0.5 = 0.53	0.05 + 0.5 = 0.55	0.10 + 0.5 = 0.60	0.13 + 0.5 = 0.63	0.15 + 1.0 = 1.15	0.20 + 1.0 = 1.20	0.25 + 1.0 = 1.25	0.30 + 1.0 = 1.30	0.40 + 1.0 = 1.40	0.50 + 1.0 = 1.50	0.75 + 1.0 = 1.75	1.00 + 1.0 = 2.00	1.25 + 1.0 = 2.25
0.1	0.03 + 0.5 = 0.53	0.06 + 0.5 = 0.56	0.12 + 0.5 = 0.62	0.15 + 0.5 = 0.65	0.18 + 1.0 = 1.18	0.24 + 1.0 = 1.24	0.30 + 1.0 = 1.30	0.36 + 1.0 = 1.36	0.48 + 1.0 = 1.48	0.60 + 1.0 = 1.60	0.90 + 1.0 = 1.90	1.20 + 1.0 = 2.20	1.50 + 1.0 = 2.50
0.3	0.04 + 0.5 = 0.54	0.08 + 0.5 = 0.58	0.15 + 0.5 = 0.65	0.19 + 0.5 = 0.69	0.23 + 1.0 = 1.23	0.30 + 1.0 = 1.30	0.38 + 1.0 = 1.38	0.45 + 1.0 = 1.45	0.60 + 1.0 = 1.60	0.75 + 1.0 = 1.75	1.13 + 1.0 = 2.13	1.50 + 1.0 = 2.50	1.88 + 1.0 = 2.88
0.5	0.05 + 0.5 = 0.55	0.10 + 0.5 = 0.60	0.20 + 0.5 = 0.70	0.25 + 0.5 = 0.75	0.30 + 1.0 = 1.30	0.40 + 1.0 = 1.40	0.50 + 1.0 = 1.50	0.60 + 1.0 = 1.60	0.80 + 1.0 = 1.80	1.00 + 1.0 = 2.00	1.50 + 1.0 = 2.50	2.00 + 1.0 = 3.00	2.50 + 1.0 = 3.50
1.0	0.08 + 0.5 = 0.58	0.15 + 0.5 = 0.65	0.30 + 0.5 = 0.80	0.38 + 0.5 = 0.88	0.45 + 1.0 = 1.45	0.60 + 1.0 = 1.60	0.75 + 1.0 = 1.75	0.90 + 1.0 = 1.90	1.20 + 1.0 = 2.20	1.50 + 1.0 = 2.50	2.25 + 1.0 = 3.25	3.00 + 1.0 = 4.00	3.75 + 1.0 = 4.75
1.5	0.10 + 0.5 = 0.60	0.20 + 0.5 = 0.70	0.40 + 0.5 = 0.90	0.50 + 0.5 = 1.00	0.60 + 1.0 = 1.60	0.80 + 1.0 = 1.80	1.00 + 1.0 = 2.00	1.20 + 1.0 = 2.20	1.60 + 1.0 = 2.60	2.00 + 1.0 = 3.00	3.00 + 1.0 = 4.00	4.00 + 1.0 = 5.00	5.00 + 1.0 = 6.00
2.0	0.13 + 0.5 = 0.63	0.25 + 0.5 = 0.75	0.50 + 0.5 = 1.00	0.63 + 0.5 = 1.13	0.75 + 1.0 = 1.75	1.00 + 1.0 = 2.00	1.25 + 1.0 = 2.25	1.50 + 1.0 = 2.50	2.00 + 1.0 = 3.00	3.50	4.75	6.00	7.25
2.5	0.15 + 0.5 = 0.65	0.30 + 0.5 = 0.80	0.60 + 0.5 = 1.10	0.75 + 0.5 = 1.25	0.90 + 1.0 = 1.90	1.20 + 1.0 = 2.20	1.50 + 1.0 = 2.50	1.80 + 1.0 = 2.80	3.40	4.00	5.50	7.00	8.50
3.0	0.18 + 0.5 = 0.68	0.35 + 0.5 = 0.85	0.70 + 0.5 = 1.20	0.88 + 0.5 = 1.38	1.05 + 1.0 = 2.05	1.40 + 1.0 = 2.40	1.75 + 1.0 = 2.75	3.10	3.80	4.50	6.25	8.00	9.75
3.5	0.20 + 0.5 = 0.70	0.40 + 0.5 = 0.90	0.80 + 0.5 = 1.30	1.00 + 0.5 = 1.50	1.20 + 1.0 = 2.20	1.60 + 1.0 = 2.60	3.00	3.40	4.20	5.00	7.00	9.00	11.00
4.0	0.23 + 0.5 = 0.73	0.45 + 0.5 = 0.95	0.90 + 0.5 = 1.40	1.13 + 0.5 = 1.63	1.35 + 1.0 = 2.35	1.80 + 1.0 = 2.80	3.25	3.70	4.60	5.50	7.75	10.00	12.25
4.5	0.25 + 0.5 = 0.75	0.50 + 0.5 = 1.00	1.00 + 0.5 = 1.50	1.25 + 0.5 = 1.75	1.50 + 1.0 = 2.50	2.00 + 1.0 = 3.00	3.50	4.00	5.00	6.00	8.50	11.00	13.50
5.0	0.28 + 0.5 = 0.78	0.60 + 0.5 = 1.10	1.10 + 0.5 = 1.60	1.38 + 0.5 = 1.88	1.65 + 1.0 = 2.65	3.20	3.75	4.30	5.40	6.50	9.25	12.00	14.75

Flood Hazard Rating (HR)	Colour Code	Hazard to People Classification
Less than 0.75		Very low hazard - Caution
0.75 to 1.25		Danger for some – includes children, the elderly and the infirm
1.25 to 2.0		Danger for most – includes the general public
More than 2.0		Danger for all – includes the emergency services

Figure 9: Extracts from the Supplementary Note to FD2320/TR2 and FD2321/TR1 describing the methodology for calculating 'Flood Hazard' under the NPPF (Source: EA)

9.4 Figure 10 below illustrates that Flood Hazard from surface water flooding within the site and at its access and egress from the site is very low.

9.5 However, in a fluvial or tidal event, it is likely that the site and its primary means of access and egress could be block/isolated. The site is located within an EA Flood Alert area, which residents should sign up to and closely follow. Fortunately, extreme tidal events mechanisms are well understood, so warning systems are relatively advanced and can provide residents substantial warnings so that there is typically more than adequate time to evacuate a site.

9.6 However, it is advised that if egress is not possible for whatever reason, that safe refuge is also provided on site above the DFE level of 5.29mAOD (including 300mm freeboard allowance).

9.7 In addition, because of the tidal nature of the DFE, flooding will be limited in duration due to the drain down effects of tidal regression. Therefore, it's unlikely that egress directly to the north will be impassable for more than 6 hours.

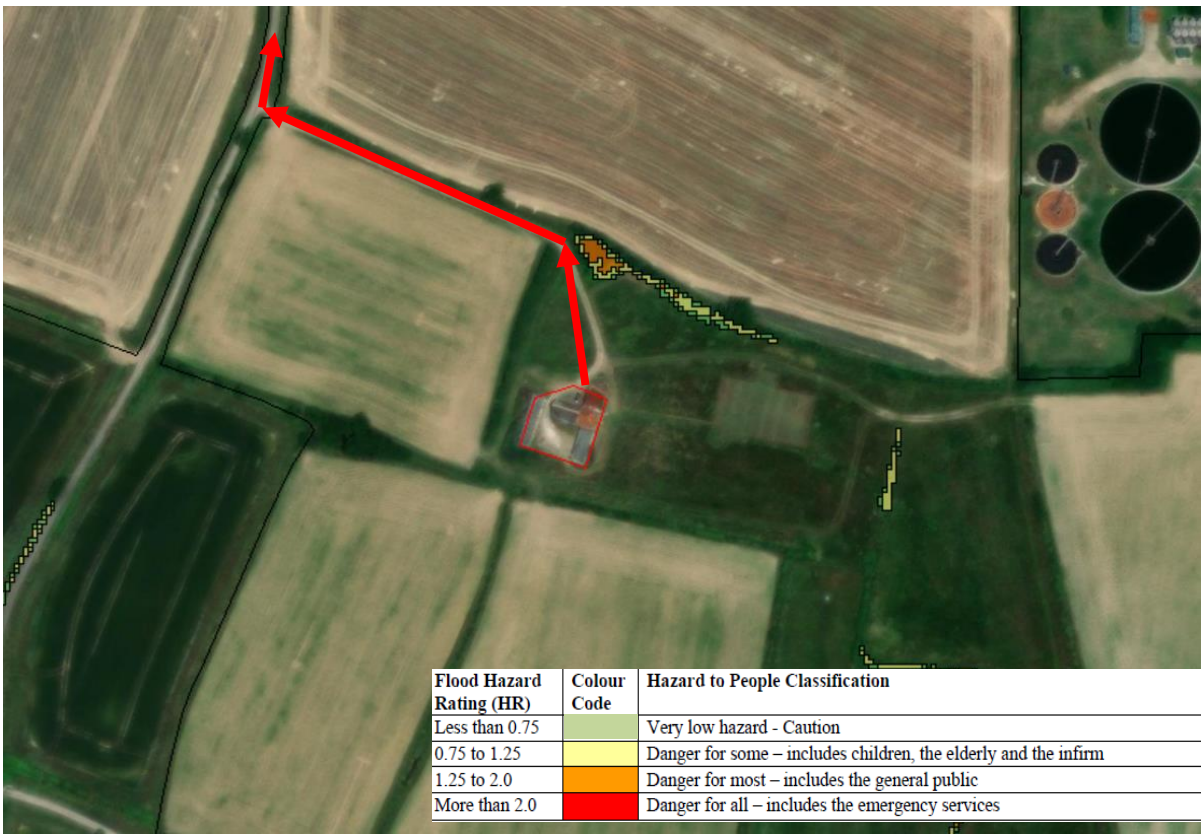


Figure 10 - EA RoFSW Hazard Mapping – Medium Risk of surface water flooding (source: Risk of Flooding from Surface Water (RoFSW)) - Red arrows designate suggested evacuation route.

9.8 Further information can be found on www.environment-agency.gov.uk/floodline. General advice includes:

On receipt of a FLOOD ALERT, the individual property owners and occupiers should:

⇒ Monitor the situation via local media;

⇒ Make themselves aware of forecast local weather conditions;

⇒ Alert both current visitors, and those scheduled to arrive, of the situation;

⇒ Prepare to evacuate if necessary.

On receipt of a FLOOD WARNING, the individual property owners and occupiers should:

⇒ Follow advice to "go in, stay in, and tune in";

⇒ Move all vehicles to an area outside of the potential flood extent, if safe to do so;

⇒ Alert scheduled visitors that they should seek alternative accommodation;

⇒ Be prepared to follow instruction from the Emergency Services.

On receipt of a SEVERE FLOOD WARNING, the individual property owners and occupiers should:

⇒ Follow advice to "go in, stay in, and tune in";

⇒ Remain attentive to local media forecasts and news bulletins;

⇒ Do not evacuate unless instructed to do so by the Emergency Services;

9.9 If flood waters along the proposed evacuation route have exceed 25cm, site users are advised to seek advice from emergency services.

10 CONCLUSION

10.1 This assessment is required under the National Planning Policy Framework (NPPF) and Local and District Councils given the location, scale, and associated flood risks.

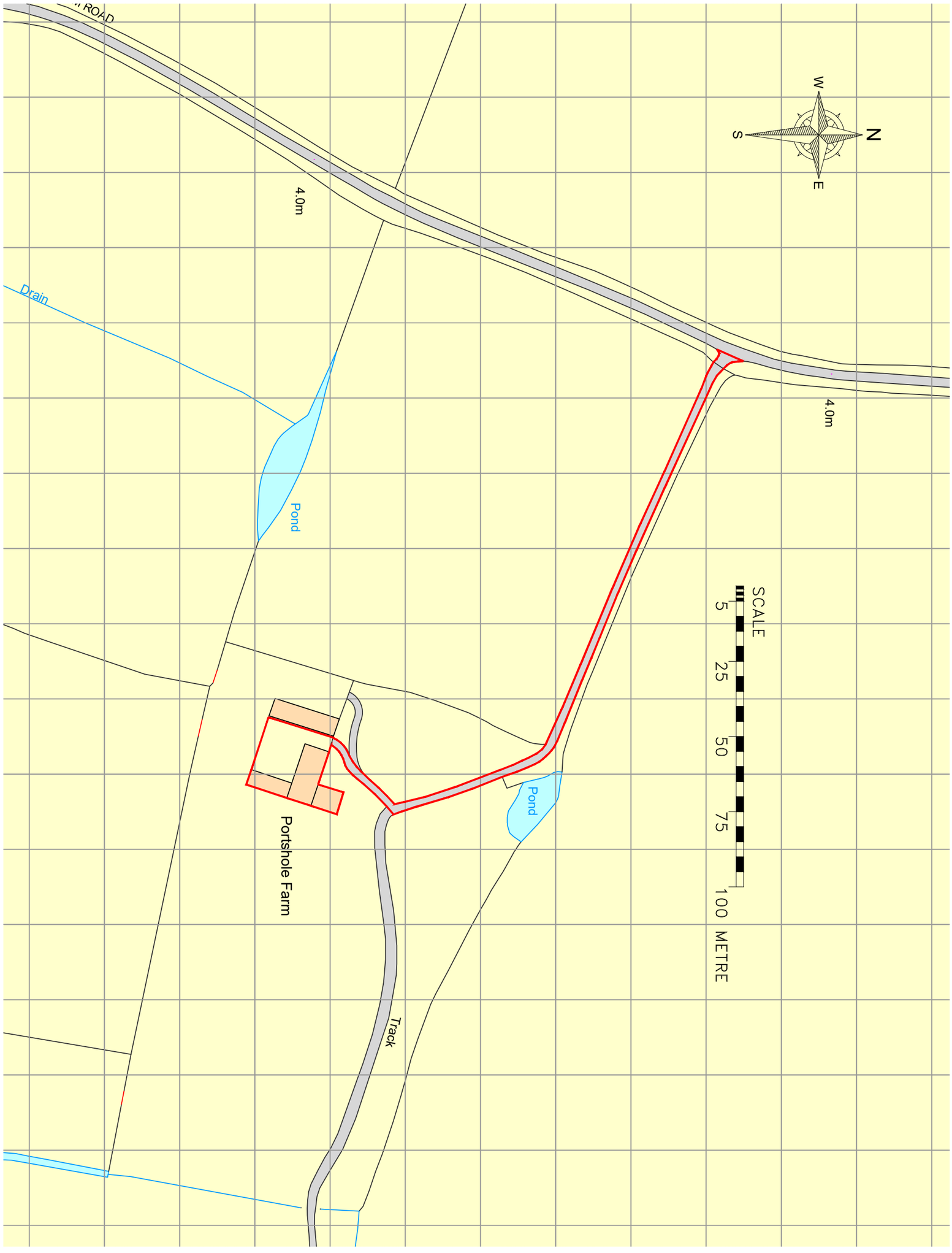
10.2 Table 3 summarises the sites primary flood risk classifications and the source for the DFE. This designation is based on the EA's Flood Map for Planning (extract provided in Figure 2 below) and the EA's Long Term Flood Risk Maps (LTFRM): Risk of Flooding from Surface Water (RoFSW) (extract provided in Figure 3). Based on this information, the site is at low risk of flooding from surface water and fluvial (river) sources. However, the site is at very high risk of flooding from tidal flooding.

10.3 Based on the information available at the time of writing, this FRA has determined that the location of the proposed dwelling is affected by the Tidal Design Flood Event (DFE). Given that the proposals will be changing site vulnerability within Flood Zone 3, the development proposals may be subject to a Sequential Test (considered outside the scope of this report). However, should a Sequential Test be passed, this report presents findings of the Exception Test and provided mitigation measures to protect a residential development on this site. The core of these recommendations is to ensure (at a minimum) that there is no sleeping below the DFE (5.29mAOD), with safe refuge made available above the DFE as well. Ideally, the FFL of the residential use should be above the DFE.

10.4 It is advised that SUDS and standard flood resilient construction are incorporated into the proposals to further mitigate and provide improvements to the development proposals overall flood resilience.

APPENDIX 1 – SUPPORTING INFORMATION

ORIGINAL SIZE OF THIS DRAWING IS A3



NOTES: 1. DO NOT SCALE FROM THIS DRAWING (EXCEPT FOR PLANNING APPLICATION PURPOSES). 2. ALL DIMENSIONS AND LEVELS TO BE CHECKED ON SITE BEFORE CARRYING OUT WORK. 3. ALL DISCREPANCIES TO BE REPORTED TO THE ARCHITECT BEFORE CARRYING OUT WORK. 4. READ WITH OTHER CONTRACT DOCUMENTS 5.IF IN DOUBT ASK.

E-mail michael@admarchitects.co.uk
web site www.admarchitects.co.uk

REV.	DATE	REVISIONS
A	21.03.23	Boundary red line indicated.

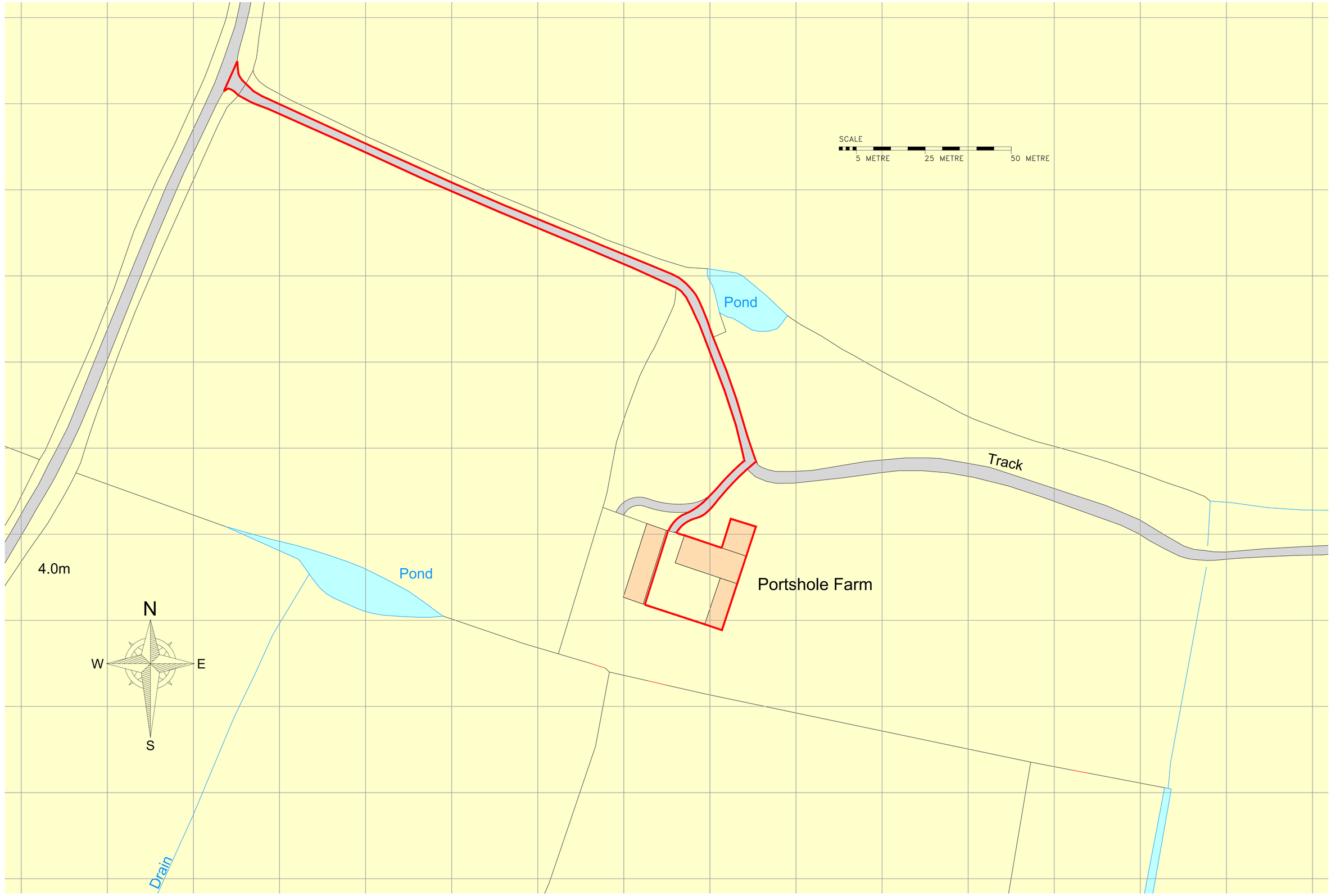
PROJECT	CLIENT
Portshole Barn	Robert Sadler
DRAWING TITLE: Location Plan	COMPUTER FILE NAME DWG.DWG
	ORIGINAL SIZE OF THIS DRAWING IS A3

DRAWN	CHECKED	DATE	SCALE – AS SCALE RODS	DRAWING NUMBER: PROJECT NUMBER	ACTUAL DRAWING NUMBER	REVISION
DH	MB	Feb '23	1:1250	1691	01	A

TRINITY, STRETTINGTON, CHICHESTER, WEST SUSSEX, PO18 0LA, UNITED KINGDOM. TEL. 01243 771166

ARCHITECTS DESIGN & MANAGEMENT

ORIGINAL SIZE OF THIS DRAWING IS A1



REV.	DATE	REVISIONS
A	21.03.23	Boundary red line and areas included.

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E-mail info@admarchitects.co.uk
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PROJECT: Portshole Barn

CLIENT: Robert Sadler

DRAWING TITLE: Block Plan as Existing & Proposed

COMPUTER FILE NAME: DWG.DWG

ORIGINAL SIZE OF THIS DRAWING IS A1

DRAWING NUMBER

DRAWN	CHECKED	DATE	SCALE – AS SCALE RODS	PROJECT NUMBER	ACTUAL DRAWING NUMBER	REVISION
DH	MB	Feb '23	1:500	1691	02	A

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ORIGINAL SIZE OF THIS DRAWING IS A1

SCALE

5 METRES 25 METRES

Area (GEA)

Existing Structure (Footprint) :	324.0m2	(3488.0ft2)
Site Curtilage :	318.0m2	(3423.0ft2)

REV.	DATE	REVISIONS
D	13.02.24	Title Block amended to indicate Class Q Application Approval
C	Nov '23	Amendments following revised GFL.
B	Sept '23	General Update.
A	April '23	General Update.

NOTES: 1. DO NOT SCALE FROM THIS DRAWING (EXCEPT FOR PLANNING APPLICATION PURPOSES). 2. ALL DIMENSIONS AND LEVELS TO BE CHECKED ON SITE BEFORE CARRYING OUT WORK. 3. ALL DISCREPANCIES TO BE REPORTED TO THE ARCHITECT BEFORE CARRYING OUT WORK. 4. READ WITH OTHER CONTRACT DOCUMENTS S.I.F IN DOUBT ASK.

E-mail michael@admarchitects.co.uk
web site www.admarchitects.co.uk

PROJECT: Portshole Barn

CLIENT: Robert Sadler

DRAWING TITLE: Site Plan as Approved Class Q Application

COMPUTER FILE NAME: DWG.DWG

ORIGINAL SIZE OF THIS DRAWING IS A1

DRAWN	CHECKED	DATE	SCALE – AS SCALE RODS	PROJECT NUMBER	ACTUAL DRAWING NUMBER	REVISION
DCH	MB	Feb' 23	1:100	1691	21	D

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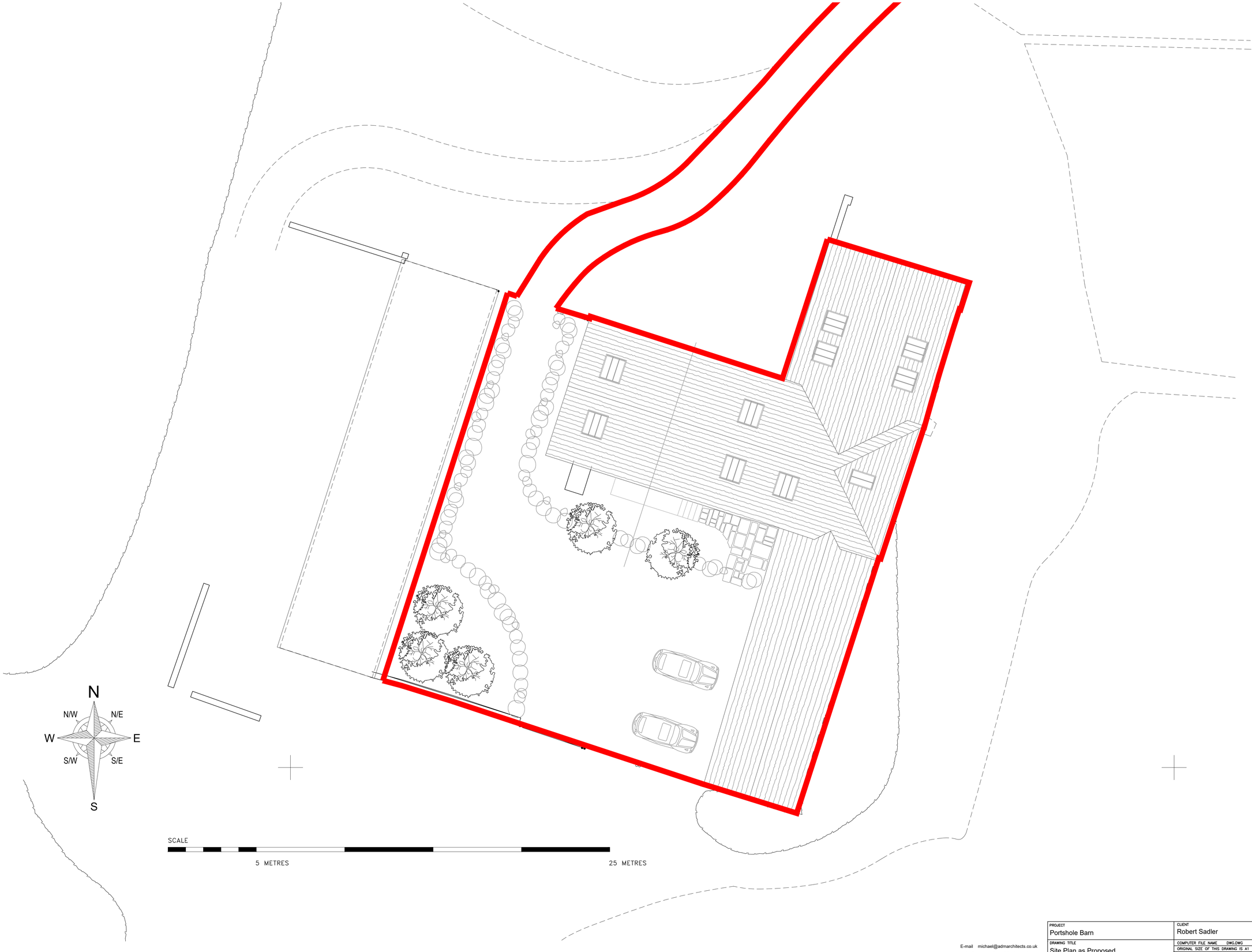
ORIGINAL SIZE OF THIS DRAWING IS A1



REV.	DATE	REVISIONS

NOTES: 1. DO NOT SCALE FROM THIS DRAWING (EXCEPT FOR PLANNING APPLICATION PURPOSES). 2. ALL DIMENSIONS AND LEVELS TO BE CHECKED ON SITE BEFORE CARRYING OUT WORK. 3. ALL DISCREPANCIES TO BE REPORTED TO THE ARCHITECT BEFORE CARRYING OUT WORK. 4. READ WITH OTHER CONTRACT DOCUMENTS S.I.F IN DOUBT ASK.

E-mail michael@admarchitects.co.uk
web site www.admarchitects.co.uk

PROJECT				CLIENT		
Portshole Barn				Robert Sadler		
DRAWING TITLE				COMPUTER FILE NAME DWG.DWG		
Site Plan as Proposed				ORIGINAL SIZE OF THIS DRAWING IS A1		
				DRAWING NUMBER		
DRAWN	CHECKED	DATE	SCALE – AS SCALE RODS	PROJECT NUMBER	ACTUAL DRAWING NUMBER	REVISION
DCH	MB	Feb' 24	1:100	1691	41	-

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ARCHITECTS DESIGN & MANAGEMENT

APPENDIX 2 – EA DATA

Flood risk assessment data

Location of site: Portshole Barn, Sidlesham, Chichester, PO20 7NY
Document created on: 8 March 2024
This information was previously known as a product 4.
Customer reference number: SSD350460

Map showing the location that flood risk assessment data has been requested for.

How to use this information

You can use this information as part of a flood risk assessment for a planning application. To do this, you should include it in the appendix of your flood risk assessment.

> **We recommend that you work with a flood risk consultant to get your flood risk assessment.**

Included in this document

In this document you'll find:

- how to find information about surface water and other sources of flooding
- information on the models used
- definitions for the terminology used throughout
- flood map for planning (rivers and the sea)
- flood defences and attributes
- information to help you assess if there is a reduced flood risk from rivers and the sea because of defences
- modelled data
- information about strategic flood risk assessments
- information about this data
- information about flood risk activity permits
- help and advice

Information that's unavailable

This document **does not** contain:

- historic flooding

We do not have historic flooding data for this location.

Please note that:

- flooding may have occurred that we do not have records for
- flooding can come from a range of different sources
- we can only supply flood risk data relating to floodng from rivers or the sea

You can contact your Lead Local Flood Authority or Internal Drainage Board to see if they have other relevant local flood information. Please note that some areas do not have an Internal Drainage Board.

There is not any modelled climate change data for this location. This is because detailed modelling hasn't been carried out in this area. You will need to consider the latest flood risk assessment climate change allowances and factor in the new allowances to demonstrate the development will be safe from flooding.

Surface water and other sources of flooding

Use the long term flood risk service to find out about the risk of flooding from:

- surface water
- ordinary watercourses
- reservoirs

For information about sewer flooding, contact the relevant water company for the area.

About the models used

Model name: Chichester District Council SFRA Coastal Modelling

Scenario(s): Defended tidal, Undefended tidal

Date: October 2022

This model contains the most relevant data for your area of interest.

Terminology used

Annual exceedance probability (AEP)

This refers to the probability of a flood event occurring in any year. The probability is expressed as a percentage. For example, a large flood which is calculated to have a 1% chance of occuring in any one year, is described as 1% AEP.

Metres above ordnance datum (mAOD)

All flood levels are given in metres above ordnance datum which is defined as the mean sea level at Newlyn, Cornwall.

Flood map for planning (rivers and the sea)

Your selected location is in flood zone 3.

Flood zone 3 shows the area at risk of flooding for an undefended flood event with a:

- 0.5% or greater probability of occurring in any year for flooding from the sea
- 1% or greater probability of occurring in any year for fluvial (river) flooding

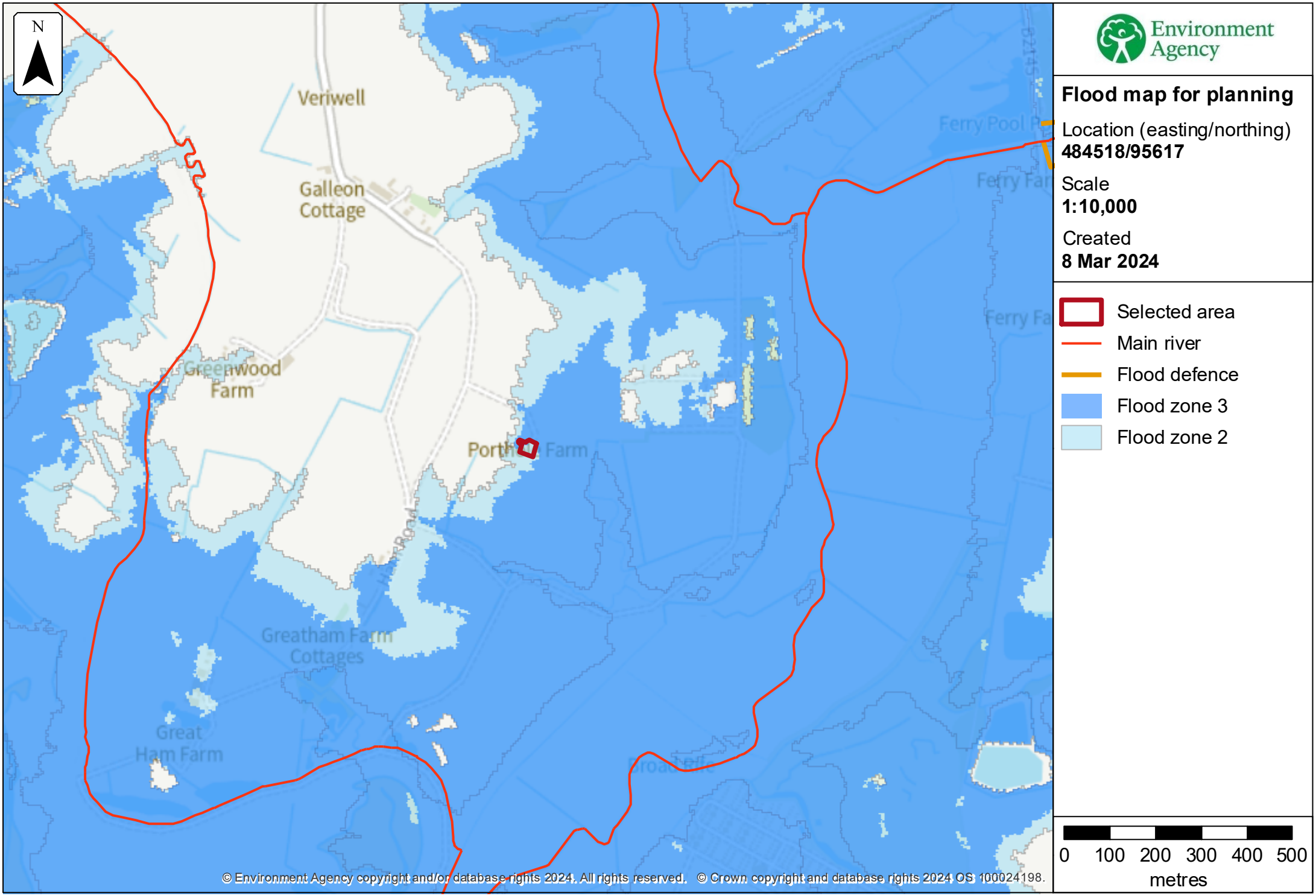
Flood zone 2 shows the area at risk of flooding for an undefended flood event with:

- between a 0.1% and 0.5% probability of occurring in any year for flooding from the sea
- between a 0.1% and 1% probability of occurring in any year for fluvial (river) flooding

It's important to remember that the flood zones on this map:

- refer to the land at risk of flooding and do not refer to individual properties
- refer to the probability of river and sea flooding, ignoring the presence of defences
- do not take into account potential impacts of climate change

The flood zones are not currently being updated. The last update was in November 2023. Some of the flood zones may have changed, however all source data is included in the models below.


N
Veriwell
Galleon Cottage
Greenwood Farm
Greatham Farm Cottages
Great Ham Farm
Ferry Pool
Ferry Farm
Flood map for planning
Location (easting/northing)
484518/95617
Scale
1:10,000
Created
8 Mar 2024
Selected area
Main river
Flood defence
Flood zone 3
Flood zone 2
0 100 200 300 400 500
metres
© Environment Agency copyright and/or database rights 2024. All rights reserved. © Crown copyright and database rights 2024 OS 100024198.

Flood defences and attributes

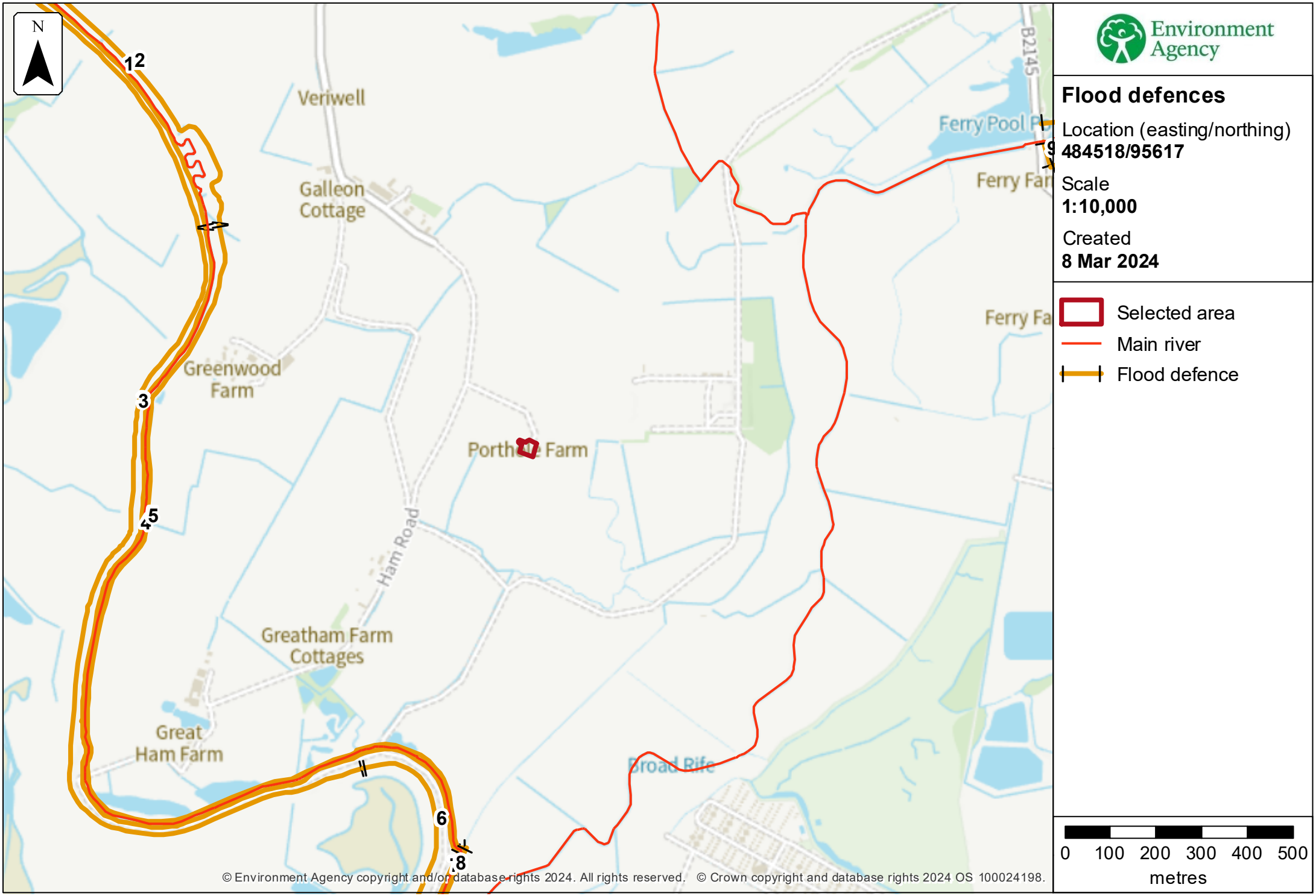
The flood defences map shows the location of the flood defences present.

The flood defences data table shows the type of defences, their condition and the standard of protection. It shows the height above sea level of the top of the flood defence (crest level). The height is In mAOD which is the metres above the mean sea level at Newlyn, Cornwall.

It's important to remember that flood defence data may not be updated on a regular basis. The information here is based on the best available data.

Use this information:

- to help you assess if there is a reduced flood risk for this location because of defences
- with any information in the modelled data section to find out the impact of defences on flood risk



Flood defences data

Label	Asset ID	Asset Type	Standard of protection (years)	Current condition	Downstream actual crest level (mAOD)	Upstream actual crest level (mAOD)	Effective crest level (mAOD)
1	412576	Engineered High Ground					
2	412578	Engineered High Ground					
3	390373	Embankment			5.40	5.0	
4	391283	Engineered High Ground					
5	412587	Engineered High Ground					
6	399014	Embankment			5.50	5.50	
7	412594	Engineered High Ground					
8	412595	Engineered High Ground					
9	145614	Beach	20				3.35

Any blank cells show where a particular value has not been recorded for an asset.

Modelled data

This section provides details of different scenarios we have modelled and includes the following (where available):

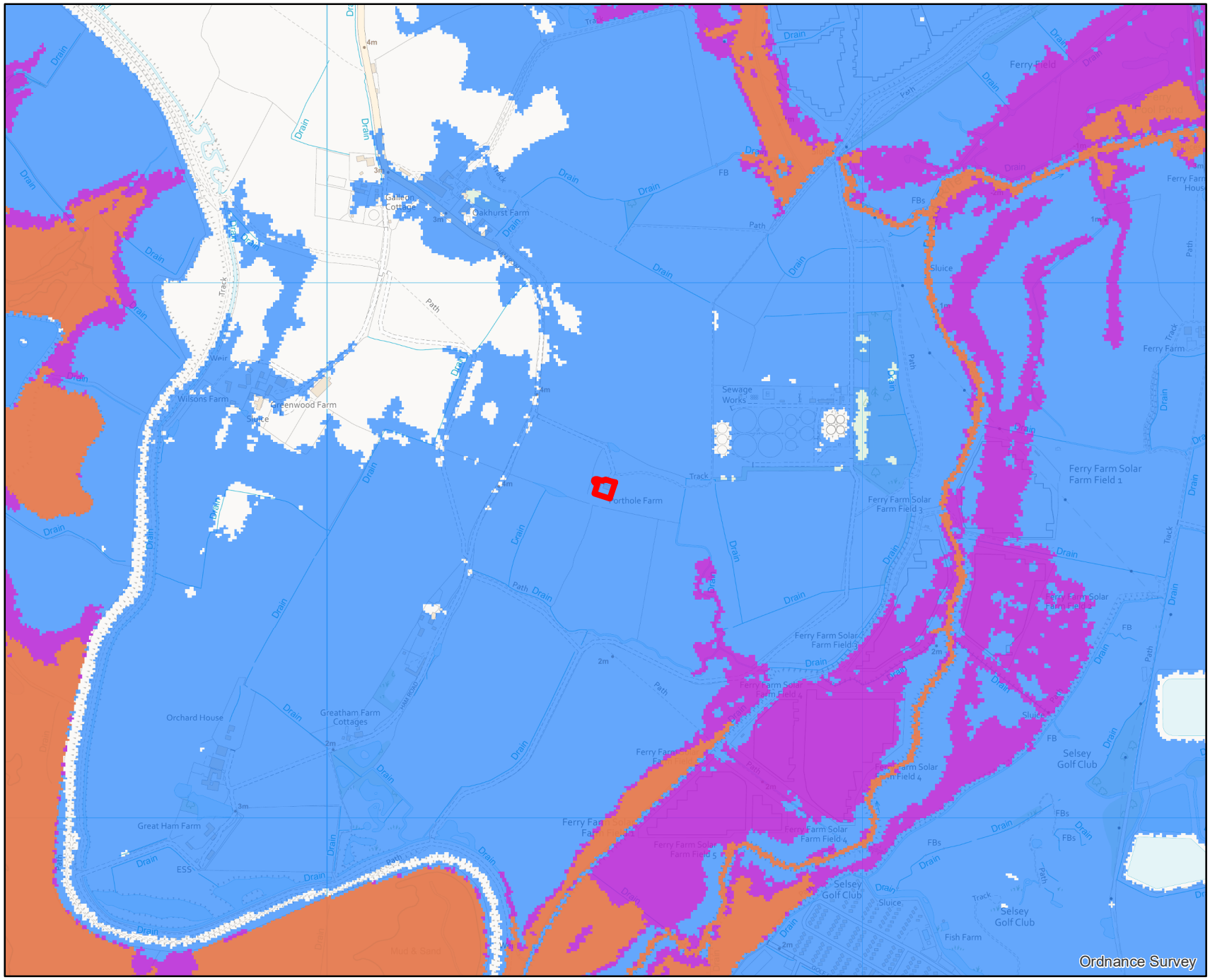
- outline maps showing the area at risk from flooding in different modelled scenarios

Modelled scenarios

The following scenarios are included:

- Defended modelled tidal: risk of flooding from the sea where there are flood defences
- Undefended modelled tidal: risk of flooding from the sea where flood defences have been removed

Modelled Flood Outlines (Defended). Centred PO20 7NY. Created 12/03/2024



Environment Agency

N

Legend

Site Boundary

0.5% AEP (Defended Tidal)

0.1% AEP (Defended Tidal)

0.5% AEP (2121) (Defended Tidal)

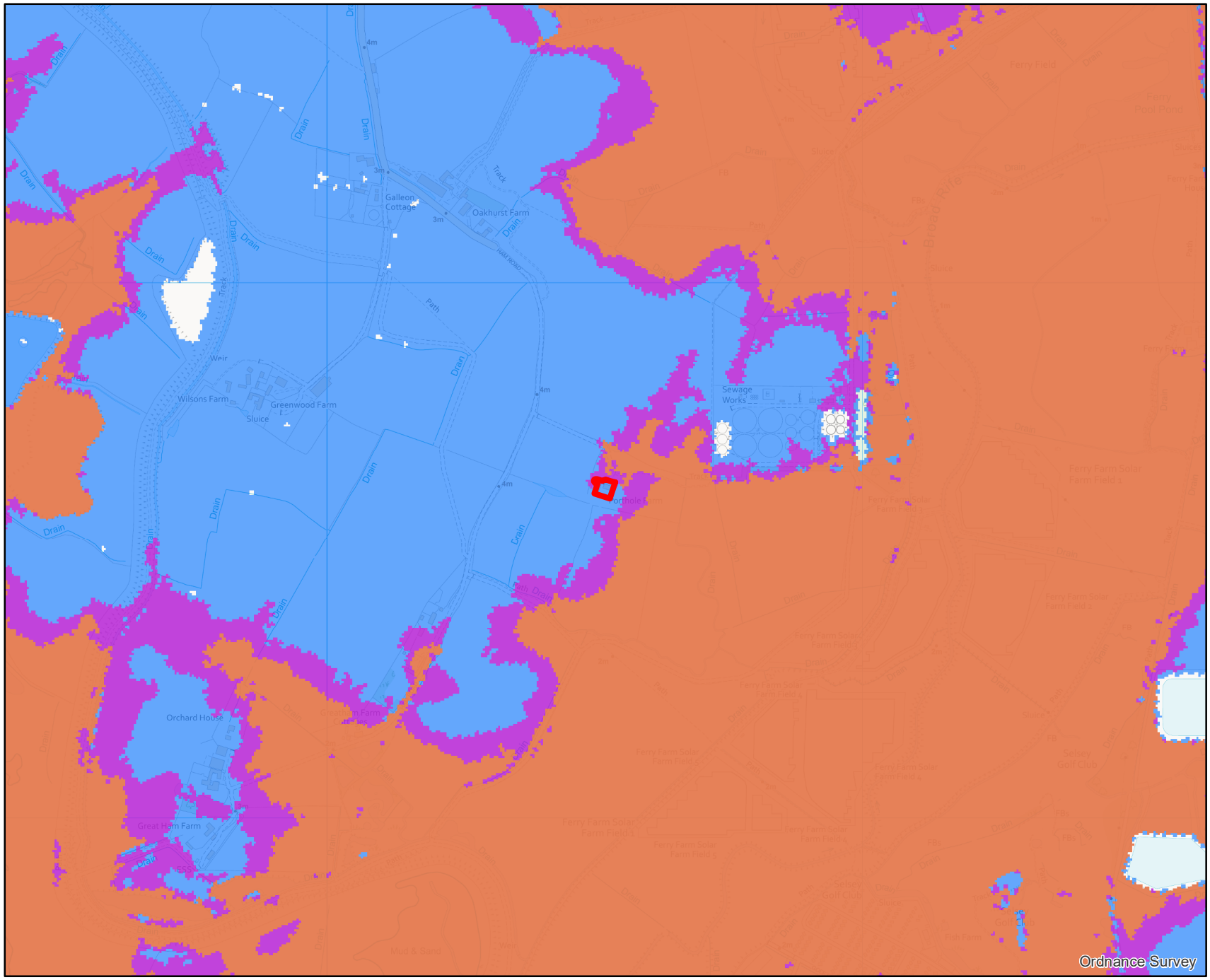
Annual Exceedance Probability (AEP) The probability of a flood of a particular magnitude, or greater occurring in any given year.

Scale: 1:10,000

0 0.225 0.45

Kilometers

Modelled Flood Outlines (Undefended). Centred PO20 7NY. Created 12/03/2024



Environment Agency

N

Legend

Site Boundary

0.5% AEP (Undefended Tidal)

0.1% AEP (Undefended Tidal)

0.5% AEP (2121) (Undefended Tidal)

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

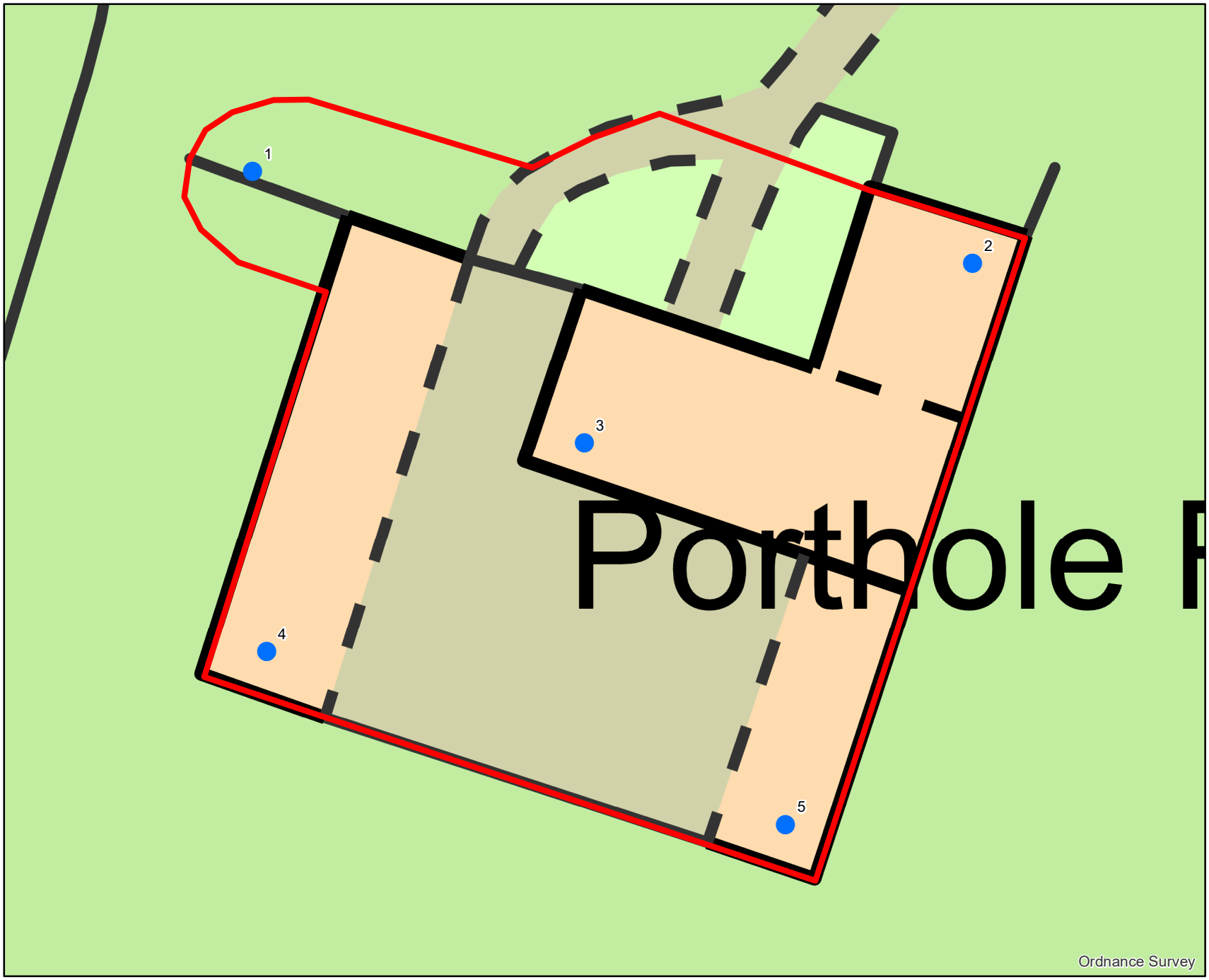
Scale: 1:10,000

0 0.225 0.45

Kilometers

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

FRA Site Boundary and Node Points. Centred PO20 7NY. Created 12/03/2024



Environment Agency

N

Legend

- Site Nodes
- Site Boundary

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

Scale: 1:250

0 0.005 0.01
Kilometers

Product 4 Flood Risk Data Requested by: Ryan Hofman

Site: Portshole Barn, Sidlesham, Chichester, PO20 7NY

Table 1: Water Levels: Tidal Undefended

	NGR		Modelled Flood Levels in Metres AOD Undefended Annual Exceedance Probability		
Node Ref	Eastings	Northings	0.5%	0.5% (2121)	0.1%
1	484502	95630	-	4.89	3.37
2	484536	95626	-	4.89	3.37
3	484518	95618	-	4.89	-
4	484503	95602	-	4.89	-
5	484527	95600	-	4.89	-

Table 2: Water Levels: Tidal Defended

	NGR		Modelled Flood Levels in Metres AOD Defended Annual Exceedance Probability		
Node Ref	Eastings	Northings	0.5%	0.5% (2121)	0.1%
1	484502	95630	-	4.04	-
2	484536	95626	-	4.04	-
3	484518	95618	-	4.04	-
4	484503	95602	-	4.04	-
5	484527	95600	-	4.04	-

Table 3: Water Depths: Tidal Undefended

	NGR		Modelled Flood Depths in Metres		
			Undefended Annual Exceedance Probability		
Node Ref	**Eastings**	**Northings**	**0.5%**	**0.5% (2121)**	**0.1%**
1	484502	95630	-	1.66	0.14
2	484536	95626	-	1.54	0.05
3	484518	95618	-	1.18	-
4	484503	95602	-	1.11	-
5	484527	95600	-	1.34	-

Table 4: Water Depths: Tidal Defended

	NGR		Modelled Flood Depths in Metres		
			Defended Annual Exceedance Probability		
Node Ref	**Eastings**	**Northings**	**0.5%**	**0.5% (2121)**	**0.1%**
1	484502	95630	-	0.81	-
2	484536	95626	-	0.69	-
3	484518	95618	-	0.33	-
4	484503	95602	-	0.26	-
5	484527	95600	-	0.49	-

All levels taken from: Chichester District Council SFRA Coastal Modelling (2022), by JBA Consulting

Produced on: 12/03/2024

*** Climate Change allowances for this model only show the superseded 20% increase in flows. The current allowances should be checked here: https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances.**

**** The flood risk data provided is based on existing EA hydraulic models for existing 0.5% annual probability events with an allowance for climate change. Please note the climate change allowances provided are not up to date. These were updated on 17 December 2019.**
You should refer to 'Flood risk assessments: climate change allowances' for the most up to date allowances. You will need to undertake further assessment of future flood risk using different allowances to ensure your assessment of future flood risk is based on best available evidence.

There is no additional information or health warnings for these levels/depths or the model from which they have been produced.

Strategic flood risk assessments

We recommend that you check the relevant local authority's strategic flood risk assessment (SFRA) as part of your work to prepare a site specific flood risk assessment.

This should give you information about:

- the potential impacts of climate change in this catchment
- areas defined as functional floodplain
- flooding from other sources, such as surface water, ground water and reservoirs

About this data

This data has been generated by strategic scale flood models and is not intended for use at the individual property scale. If you're intending to use this data as part of a flood risk assessment, please include an appropriate modelling tolerance as part of your assessment. The Environment Agency regularly updates its modelling. We recommend that you check the data provided is the most recent, before submitting your flood risk assessment.

Flood risk activity permits

Under the Environmental Permitting (England and Wales) Regulations 2016 some developments may require an environmental permit for flood risk activities from the Environment Agency. This includes any permanent or temporary works that are in, over, under, or nearby a designated main river or flood defence structure.

Find out more about flood risk activity permits

Help and advice

Contact the Solent and South Downs Environment Agency team at ssdenquiries@environment-agency.gov.uk for:

- more information about getting a product 5, 6, 7 or 8
- general help and advice about the site you're requesting data for