

# REPORT

## **Flood Risk Assessment**

54 Bracklesham Road, Hayling Island, PO11 9SJ

Client: Jo Hewitson

Reference: 6850-AEA-ZZ-XX-RP-Z-2500

Status: S3/P01.01

Date: 11 November 2022

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## Revision History

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|          |            |                              |               |              |               |
|          |            |                              |               |              |               |
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## Glossary

| Term                          | Definition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AP                            | Annual Probability is the probability of a rainfall or tidal event occurring within any one year. For example, an event of a 1 in 100 year return period has an AP of 1:100 or 1%.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Flood Defences                | Artificial structures maintained to a set operational level designed to protect land people and property from tidal and fluvial flood sources to an established chance of happening in any year threshold.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Flood Source: Fluvial (River) | When flows within watercourses exceed the capacity of the watercourse causing out of bank flows.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Flood Source: Groundwater     | Groundwater flooding is usually the result of prolonged wet weather causing groundwater levels to rise sufficiently to either emerge at surface or to cause flooding of below ground infrastructure, such as basements.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Flood Source: Surface Water   | When rainfall causes overland flows which exceed the capacity of the drainage network, causing flooding to land that is normally dry.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Flood Source: Tidal           | When high tide events overtop the shoreline to cause flooding to land behind.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Flood Zone 1                  | Low Probability. Land having a less than 0.1% annual probability of river or sea flooding                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Flood 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.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Flood Zone 3 (A)              | 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.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Flood Zone 3 (B)              | <p>Functional Floodplain. According to the Planning Practice Guidance (2022) 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:</p> <ul style="list-style-type: none"> <li>land having a 3.3% or greater annual probability of flooding, with any existing flood risk management infrastructure operating effectively; or</li> <li>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).</li> </ul> <p>Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map)</p> |
| Flood Zone Map                | The Environment Agency has produced a mapping data set which covers England and provides the general extents of Flood Zones 1, 2, and 3. However the national data set available online does not differentiate between Flood Zone 3 (A) and 3 (B).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Freeboard                     | In flood risk management Freeboard is a term used to identify the vertical difference between the design flood level, and the design height of any flood mitigation measures. For instance, if a pond had bank heights of 9.0m and the water level was at 8.6m the freeboard would be 0.4m (9.0-8.6)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| LiDAR                         | Light Detection and Ranging (LIDAR) is an airborne mapping technique, which uses a laser to measure the distance between the aircraft and the ground. Up to 500,000 measurements per second are made of the ground, allowing highly detailed terrain models to be generated at spatial resolutions of between 25cm and 2 metres.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Major Development             | <p>Means development involving any one or more of the following:</p> <ol style="list-style-type: none"> <li>the winning and working of minerals or the use of land for mineral-working deposits</li> <li>waste development</li> <li>the provision of dwellinghouses where –             <ol style="list-style-type: none"> <li>the number of dwellinghouses to be provided is 10 or more; or</li> </ol> </li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

| Term                 | Definition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                      | <p>ii. the development is to be carried out on a site having an area of 0.5 hectares or more and it is not known whether the development falls within sub-paragraph (c) (i)</p> <p>d) the provision of a building or buildings where the floor space to be created by the development is 1,000 square metres or more; or</p> <p>e) development carried out on a site having an area of 1 hectare or more.</p> <p>As defined by the Town and Country Planning (Development Management Procedure) (England) Order 2015 (Article 2)<br/> <a href="https://www.legislation.gov.uk/uksi/2015/595/article/2/made">https://www.legislation.gov.uk/uksi/2015/595/article/2/made</a></p>                                                                                                                                                                                                                                                                                                                                                                       |
| Main River           | Defined on the Main River map and relate to rivers where the Environment Agency has the powers to carry out flood defence works.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Minor Development    | <p>Minor development means:</p> <ul style="list-style-type: none"> <li>• minor non-residential extensions (industrial/commercial/leisure etc): extensions with a floorspace not in excess of 250 square metres.</li> <li>• alterations: development that does not increase the size of buildings, e.g. alterations to external appearance.</li> <li>• householder development: for example, sheds, garages, games rooms etc. within the curtilage of the existing dwelling, in addition to physical extensions to the existing dwelling itself. This definition excludes any proposed development that would create a separate dwelling within the curtilage of the existing dwelling (e.g. subdivision of houses into flats) or any other development with a purpose not incidental to the enjoyment of the dwelling.</li> </ul> <p>Paragraph: 051 Reference ID: 7-051-20220825 Revision date: 25 08 2022<br/> <a href="https://www.gov.uk/guidance/flood-risk-and-coastal-change">https://www.gov.uk/guidance/flood-risk-and-coastal-change</a></p> |
| m AOD                | Metres Above Ordnance Datum                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| OS                   | Ordnance Survey                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Ordinary Watercourse | A watercourse which does not form part of a Main River. Works on Ordinary Watercourses usually require consent from either the Lead Local Flood Authority or the Internal Drainage Board (where one exists).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| QBAR                 | QBAR is the mean annual maximum flow rate, for a catchment which has an equivalent return period of 1 in 2.3 years                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Return Period        | The return period of a flood might be 100 years; otherwise expressed as its probability of occurring being 1 in 100, or 1% in any one year. If a flood with such a return period occurs, then this does not mean the next will occur in about one hundred years' time - instead, it means that, in any given year, there is a 1% chance that it will happen, regardless of when the last similar event was. Or, put differently, it is 10 times less likely to occur than a flood with a return period of 10 years (or a probability of 10%).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| SuDS                 | Sustainable Drainage Systems, which are designed to manage surface water flows and mimic the Greenfield runoff from an undeveloped site.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Urban Creep          | Urban creep is the conversion of permeable surfaces to impermeable over time e.g. surfacing of front gardens to provide additional parking spaces, extensions to existing buildings, creation of large patio areas.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

## Executive Summary

Ambiental Environmental Assessment (AEA), a company of Royal HaskoningDHV UK Ltd, has been appointed by Jo Hewitson to undertake a National Planning Policy Framework (NPPF) [1] compliant Flood Risk Assessment (FRA) for the Development Proposals located at 54 Bracklesham Road, Hayling Island, PO11 9SJ.

The Development Proposals are for renovations and extensions to the existing residential dwelling. This is considered a Minor Development (householder development).

According to the Flood Risk and Coastal Change Planning Policy Guidance, the Development Proposal would be classified as a Minor Extension (Standing Advice).

On the basis that the development proposals are for a minor extension in Flood Zone 2 or 3, the Environment Agency's Standing Advice will apply [2].

According to Annex 3 of the NPPF, the Development Proposal's Vulnerability Classification is "More Vulnerable", which consists of the following uses:

*"Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels."*

The key findings of the Flood Risk Assessment are as follows:

- The Application Site is in Flood Zone 3, as defined by the Environment Agency's Flood Map for Planning. The risk of tidal flooding at the site is **high**.
- The risk of groundwater flooding is **medium**.
- The risk of fluvial flooding to the site is **low**.
- There is **no risk** of surface water flooding to the site.
- There is a residual risk of flooding at the site from sewer flooding.
- As the development proposals are for the extension of the existing use, it is proposed to re-use the existing surface water drainage discharge, and to retrofit in appropriate Sustainable Drainage Systems (SuDS).
- Due to the high tidal flood risk to the Application Site, the proposed extension should be constructed using flood resilient construction methods, where possible.

A summary of the flood risk for the Application Site for each source requiring consideration under the NPPF is presented as Table 1, overleaf.

The Surface Water Drainage Strategy outlined as part of this Flood Risk Assessment will reduce the peak rate of surface water discharge to a state that should not adversely impact third party properties.

The Flood Risk Assessment has been undertaken in accordance with the requirements of the NPPF and it can be demonstrated that the Development Proposals are compatible with the predicted flood risk profile, including climate change allowance over the development lifetime.

It should be noted that the Development Proposals are not predicted to increase the risk of flooding to others over the development lifetime. Consequently, it is concluded that, with regards to the Flood Risk requirements of the NPPF, the Development Proposals are acceptable.

Table 1: Flood Risk Overview

| Criteria                               | Summary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Site Setting</b>                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Site Address                           | 54 Bracklesham Road, , Hayling Island,                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Client Name                            | Jo Hewitson                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Redline Site Boundary                  | 403 m <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Development Classification</b>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Major, Non-Major or Minor Development? | Minor Extension (Standing Advice) (EA Standing Advice Applies)                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Vulnerability Classification           | More Vulnerable                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Development Proposals                  | The Development Proposals are for renovations and extensions to the existing residential dwelling. This is considered a Minor Development (householder development).                                                                                                                                                                                                                                                                                                                                        |
| Sequential Test and Exception Test     | The development proposals are for a Minor Extension. Consequently, the Sequential Test, and therefore the Exception Test, do not need to be applied                                                                                                                                                                                                                                                                                                                                                         |
| Topographic Levels (LiDAR)             | Average Topographic Level: 2.47 m AOD                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                                        | Lowest Topographic Level: 1.63 m AOD<br>Highest Topographic Level: 2.81 m AOD                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Flood Risk</b>                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Historic Records                       | There are no recorded instances of flooding on the Environment Agency's Historic or Recorded flood data, within 500m of the site.                                                                                                                                                                                                                                                                                                                                                                           |
| Flood Map for Planning Classification  | Flood Zone 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Tidal Flood Risk Analysis              | No tidal or fluvial flood data has been provided for the Application Site. Given that the Development Proposals are for a minor extension, the Environment Agency Standing Advice applies. Finished Floor Levels of the proposed extensions should be set no lower than those of the existing.                                                                                                                                                                                                              |
| Fluvial Flood Risk Analysis            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Surface Water Flood Risk               | The Environment Agency's surface water flood mapping has been used to assess flood risk at the Application Site.<br>1 in 30: None<br>1 in 100: None<br>1 in 1,000: None<br>Based on the EA's risk of flooding from surface water mapping, the site is classified as being at Very Low Risk of flooding from surface water.                                                                                                                                                                                  |
| Groundwater Flood Risk                 | Data from the British Geological Survey indicates that the Application Site is at Medium Risk of groundwater flooding.                                                                                                                                                                                                                                                                                                                                                                                      |
| Residual Risk: Sewer Flooding          | Where sewers exist, there is a residual risk of sewer flooding as a result of either a failure, usually a collapse or blockage, or as a result of the system's capacity being exceeded. Adopting a precautionary approach to the potential for sewer flooding or other events that exceed the design standard of infrastructure, appropriate mitigation measures should be included in the design of all new buildings and, where practicable, in the refurbishment or change of use of existing buildings. |
| Residual Risk: Flood Defence Breach    | The site is indicated to not be located in an area that benefits from the presence of flood defences. Therefore, the site is not indicated to be at risk as consequence of a breach of flood defences.                                                                                                                                                                                                                                                                                                      |
| Residual Risk: Reservoir Failure       | The Environment Agency risk of reservoir flooding indicates that the site is not at risk as a result of a modelled reservoir failure.                                                                                                                                                                                                                                                                                                                                                                       |
| Residual Risk: Canal Failure           | According to the CEH Canals data, there are no canals within 500m of the site, therefore it is not anticipated that the site is at risk as a result of a canal breach.                                                                                                                                                                                                                                                                                                                                      |
| <b>Offsite Impacts</b>                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Surface Water Management               | As the development proposals are for the extension of the existing use, it is proposed to re-use the existing surface water drainage discharge, and to retrofit in appropriate Sustainable Drainage Systems (SuDS).                                                                                                                                                                                                                                                                                         |
| Floodplain Displacement                | As the Application Site is not shown to be at risk from fluvial flooding, floodplain displacement is unlikely to occur. Therefore, floodplain compensation is not anticipated to be required.                                                                                                                                                                                                                                                                                                               |

## 1 Introduction

Royal HaskoningDHV has been appointed by Jo Hewitson to undertake a National Planning Policy Framework (NPPF) [1] compliant Flood Risk Assessment (FRA) for the Development Proposals located at 54 Bracklesham Road, Hayling Island, PO11 9SJ. The site will hereafter be referred to as the Application Site.

### 1.1 Requirement for Flood Risk Assessment

Under Section 14 of the NPPF, a Flood Risk Assessment (FRA) is required for Development Proposals which meet a range of conditions<sup>1</sup>.

The NPPF states that an FRA needs to consider the risk of flooding to a property or site and demonstrate that the site will be safe over its lifetime (including identification of appropriate mitigation measures). The FRA also needs to demonstrate that the proposals will not increase flood risk to others.

The purpose of this assessment is to demonstrate that the Development Proposal can be satisfactorily accommodated without worsening flood risk for the area and without placing the development itself at risk of flooding. This assessment has been written in accordance with national guidance provided within the NPPF, the Flood Risk and Coastal Change Planning Practice Guidance [3], DEFRA's National Standards for Sustainable Drainage [4], and Local Guidance and Policy Documents.

Based on the NPPF, a Flood Risk Assessment will be required for the Development Proposals, because the Application Site is wholly located within Flood Zone 3, as defined by the Environment Agency's Flood Map For Planning.

### 1.2 Site Overview

The Application Site is located at the eastern edge of Hayling Island, next to Chichester Harbour, at Ordnance Survey grid reference 474,856 mE, 98,606 mN. The redline boundary includes an area of 403 m<sup>2</sup> (0.043 Ha), as indicated on Figure 1.

<sup>1</sup> i. Development in Flood Zones 2 and 3. ii. In Flood Zone 1, an assessment should accompany all proposals involving: sites of 1 hectare or more; iii. Land which has been identified by the Environment Agency as having critical drainage problems; iv. Land identified in a strategic flood risk assessment as being at increased flood risk in future; or, v. Land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.

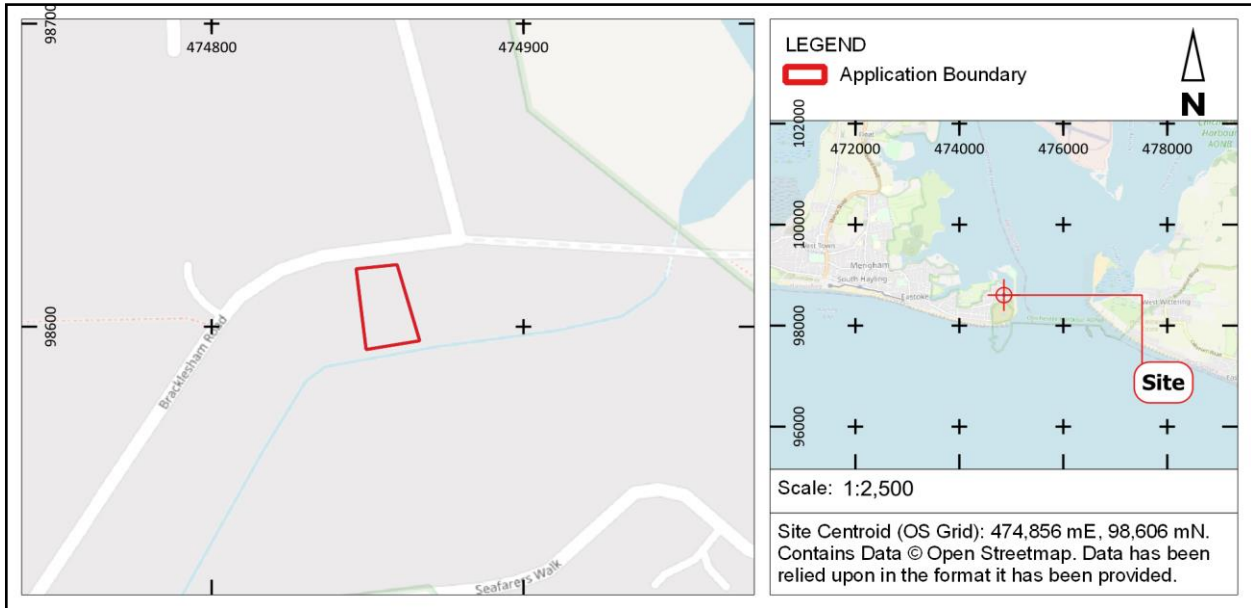


Figure 1: Site Location Plan

### 1.3 Current Site Usage

The Application Site is currently a residential property. An aerial image of the Application Site is shown in Figure 2.



Figure 2: Aerial Photograph

### 1.4 Development Proposals

The Development Proposals are for renovations and extensions to the existing residential dwelling. This is considered a Minor Development (householder development) and will hereafter be referred to as the Development Proposals.

## 1.5 Development Vulnerability Classification

The vulnerability classifications summarised in Annex 3 of the NPPF identify that the Development Proposals are '**More Vulnerable**'.

## 1.6 Specific Requirement for Extensions and Change of Use.

Paragraph 168 of the NPPF (2021) states:

*Applications for some minor development and changes of use (Footnote 56) should not be subject to the sequential or exception tests but should still meet the requirements for site-specific flood risk assessments set out in footnote 55.*

Footnote 56:

*This includes householder development, small non-residential extensions (with a footprint of less than 250m<sup>2</sup>) and changes of use; except for changes of use to a caravan, camping or chalet site, or to a mobile home or park home site, where the sequential and exception tests should be applied as appropriate*

Footnote 55:

*A site-specific flood risk assessment should be provided for all development in Flood Zones 2 and 3. In Flood Zone 1, an assessment should accompany all proposals involving: sites of 1 hectare or more; land which has been identified by the Environment Agency as having critical drainage problems; land identified in a strategic flood risk assessment as being at increased flood risk in future; or land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use*

The development proposals are for a Minor Extension. Subsequently, under Footnote 56, the Sequential Test and the Exception Test do not need to be applied.

However, as per Paragraph 051 of the Planning Practice Guidance (PPG) for Flood Risk and Coastal Changes, updated in August 2022:

*Applications for minor development involving extensions or additions should still meet the requirements to provide a site-specific flood risk assessment (as per footnote 55 of the National Planning Policy Framework). A pragmatic approach should be taken to the scope and level of detail of the assessment – a shorter, simpler assessment is likely to be sufficient in most such cases. As a minimum, the assessment needs to show that the development will be safe for its users for the intended lifetime of the development, without increasing flood risk elsewhere, and be sufficiently flood resistant and resilient to the level and nature of the flood risk.*

The Flood Risk Assessment for this minor development will demonstrate the above points.

## 1.7 Site Topography

Ground levels within the Application Site have been determined by reviewing Environment Agency 2m LiDAR data. On average, the ground levels are 2.47 m AOD. The highest topographic level on site is 2.81 m AOD and the lowest is 1.63 m AOD (see Figure 3).

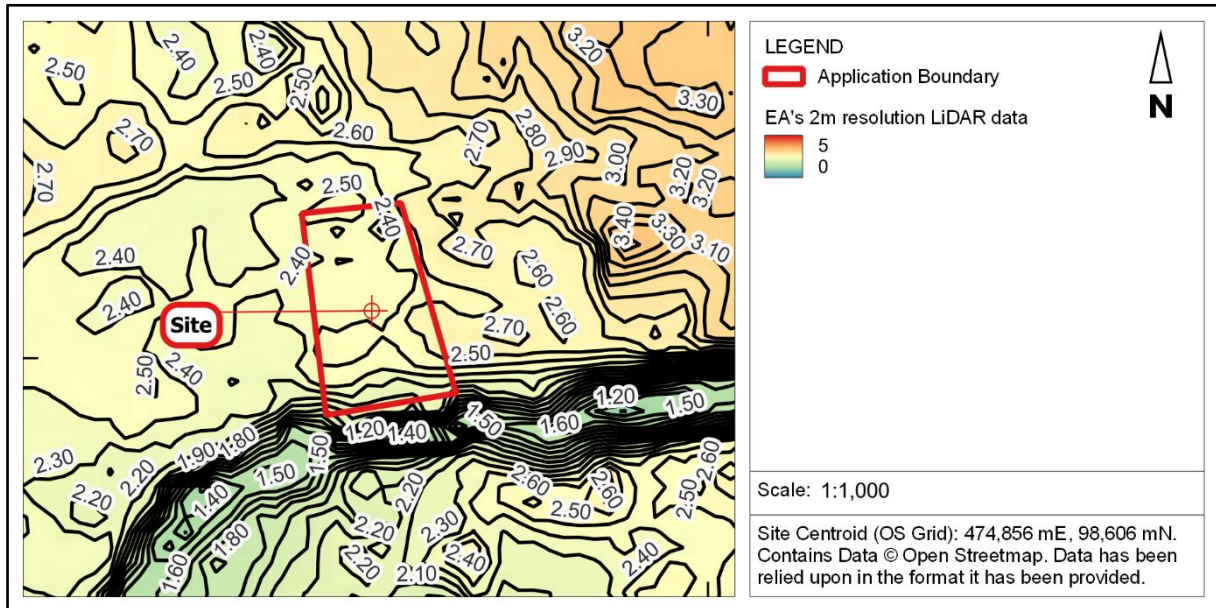


Figure 3: Site Topography

## 1.8 Main Rivers and Nearby Watercourses

The Application Site is located at the eastern-most edge of Hayling Island, with Chichester Harbour/Emsworth Channel 200m east of the site, at its closest proximity. This is shown as a main river on Figure 4 below. Another main river is located approximately 360m north-west of the site at its closest proximity, and is considered to be Mengham Rife (Figure 4).

Aerial satellite imagery also indicates that there is an existing harbour/waterbody 140m north-east of the site.

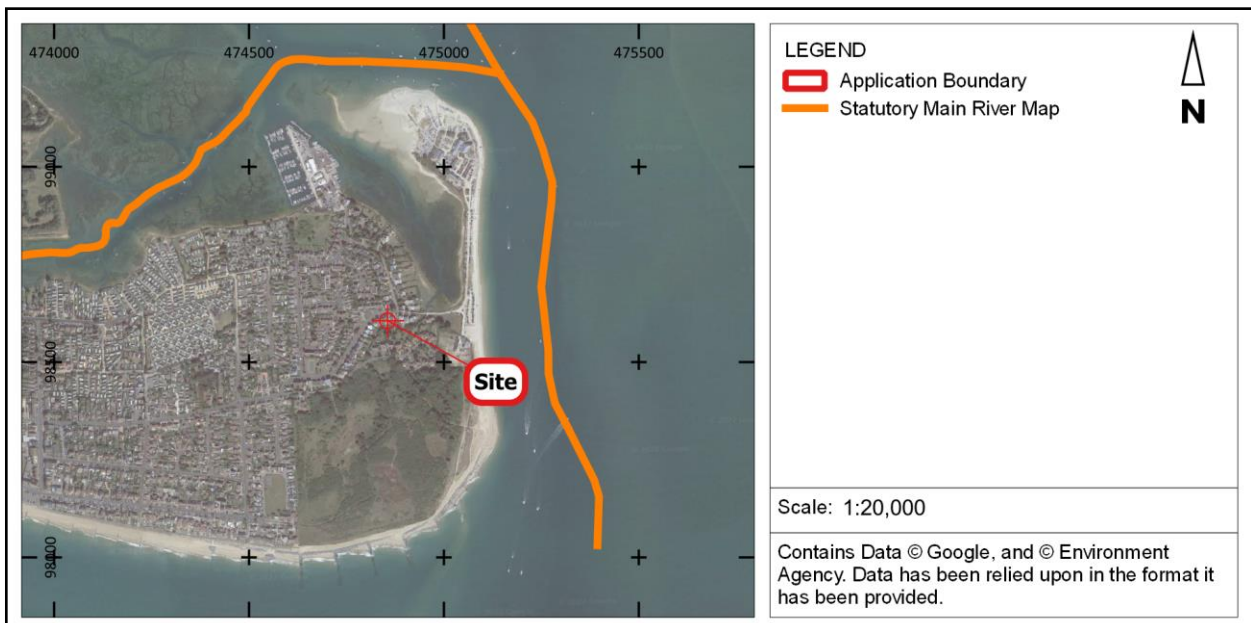


Figure 4: Statutory Main River Map

According to the CEH Rivers data, there is an Ordinary Watercourse along the southern boundary of the site (Figure 5).



Figure 5: Ordinary Watercourses

The Environment Agency's Detailed River Network dataset indicates that there are no further watercourses or drains near the Application Site. This is shown below in Figure 6.

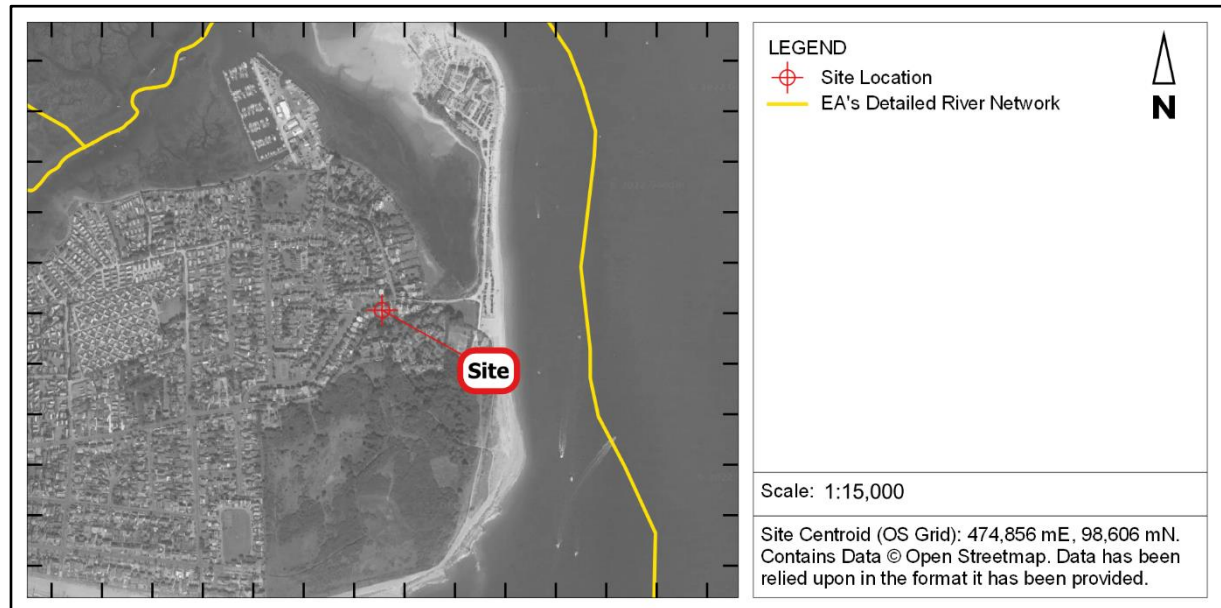


Figure 6: EA's Detailed River Network

## 2 Scope of Assessment

. The following sources of flooding need to be assessed:

- i. **Tidal flooding.** When high tide events overtop the shoreline to cause flooding to land behind.
- ii. **Fluvial (River) flooding.** When flows within watercourses exceed the capacity of the watercourse, causing out of bank flows and resulting in flooding of adjacent areas.
- iii. **Surface Water flooding.** When rainfall causes overland flow rates and volumes which exceed the capacity of the drainage network, causing flooding to land that is normally dry.
- iv. **Groundwater flooding.** Usually, the result of prolonged wet weather, causing groundwater levels to rise sufficiently to either emerge at surface or to cause flooding of below ground infrastructure, such as basements.

As well as considering the risk of flooding from these primary sources, a FRA needs to consider residual risks. The likelihood of these types of flooding occurring is much lower than the primary sources of flooding discussed above. The residual flood risks to be considered are:

- i. **Sewer flooding.** The public sewer network within the UK is formed of a combination of lost rivers, old sewers, former private sewer systems, and more recent sewers installed to support developments. This results in a network that has areas that are prone to being overwhelmed or blocked. Areas with a history of sewer flooding are more likely (without intervention) to experience flood events in the future.
- ii. **Flood defence failure.** The consequence of a failure of part of a flood defence could result in the rapid release of water in an area that would otherwise not be at risk of flooding. If such an event were to occur, there could be very little warning time and therefore it is unlikely that prior evacuation from an area at risk could be achieved.
- iii. **Reservoir failure.** Although the likelihood of reservoir failure resulting in widespread flooding is extremely low<sup>2</sup> [5], the consequences of such an event need to be considered to inform appropriate emergency planning.
- iv. **Canal failure.** Canal Failure could result in flooding if a section of raised canal, either on an embankment or on a viaduct, was to fail.

<sup>2</sup> Environment Minister Richard Benyon said: "While the risk of a reservoir failure is extremely low the safety of the public must remain our top priority and where there is even a small risk we need to make sure that we are prepared."

### 3 Relevant Policy and Guidance

This Flood Risk Assessment has been developed in accordance with the guidance and legislation set out in the below documents:

#### 3.1 National Policy

- Flood and Water Management Act (2010) [10]
- National Planning Policy Framework (NPPF, 2021) [1]
- Town and Country Planning, Development Management Procedure, (England) Order (2015) [11]
- The Building Regulations, Part H (2015) [12]
- British Standards, Drain and sewer systems outside buildings (BS EN 752:2017) [13]

#### 3.2 National Guidance

- Planning Practice Guidance for Flood Risk and Coastal Change (PPG, 2022) [14]
- Non-statutory Sustainable Drainage Technical Standards (2015) [15]
- CiRIA SuDS Manual (C753, 2015) [17]
- Sector Guidance in relation to the adoption of sewerage assets by sewerage companies in England (October 2019) [18]
- Preparing a Flood Risk Assessment: Standing Advice, Environment Agency, and DEFRA (2022) [2]
- Flood Risk Assessments: Climate Change Allowances, Environment Agency (2021) [19]

#### 3.3 Local Policy and Guidance

- Hampshire County Council Local Flood and Water Management Strategy (date unknown) [15]
- Hampshire County Council Preliminary Flood Risk Assessment (2011) [16]
- Partnership for Urban South Hampshire (PUSH) Strategic Flood Risk Assessment (2016) [17]

#### 3.4 Flood Zone Classification

The EA Flood Map for Planning (Figure 7) demonstrates that the Development Proposals are located within an area defined as Flood Zone 3.

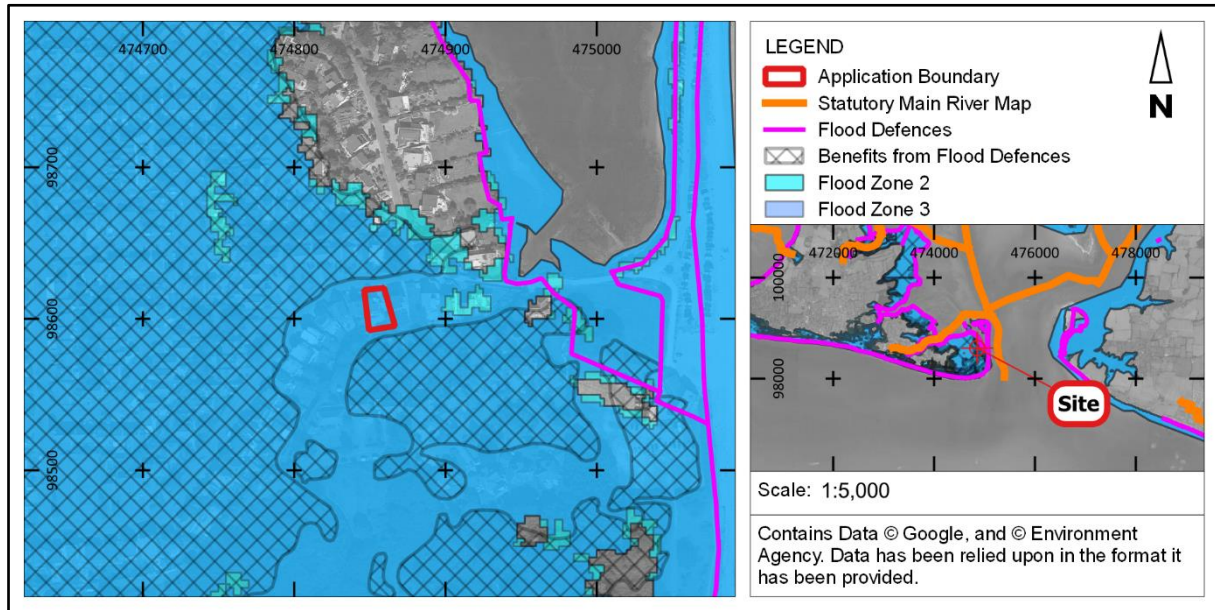


Figure 7: EA Flood Map for Planning

Table 1: Flood Zones of the Flood Risk and Coastal Change Guidance [3], reproduced in Table 2, presents the flood zone definitions.

Table 2: Flood Risk and Coastal Change, Table 1

| Flood Zone | Probability                | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------------|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1          | Low Probability.           | This zone comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any year (<0.1%).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 2          | Medium Probability.        | This zone comprises land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% to 0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% to 0.1%) in any year.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 3a         | High Probability.          | This zone comprises 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.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 3b         | The Functional Floodplain. | <p>This zone comprises land where water 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 of:</p> <ul style="list-style-type: none"> <li>land having a 1 in 30 or greater annual probability of flooding (&gt;3.3%), with any existing flood risk management infrastructure operating effectively; or</li> <li>land that is designed to flood (such as a flood attenuation scheme), even if it would only flood in more extreme events (such as 1 in 1000 (0.1%) annual probability of flooding).</li> </ul> <p>Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Flood Zone 3b is not distinguished from Zone 3a on the Flood Map).</p> |

### 3.5 Climate Change Allowances

The Environment Agency published guidance on climate change allowances for Flood Risk Assessments in February 2016, with the latest update in May 2022 [14].

The current Environment Agency climate change allowances are classified on how likely that scenario is predicted to occur, based on percentile of the scenario.

## 4 Flood Risk: Historic Records

### 4.1 Recorded Flooding

The Environment Agency publishes records of historic flooding<sup>3</sup> and this data has been reviewed. There are recorded instances of flooding 330m south of the Application Site, which are due to flooding in November 2005 (Figure 8).

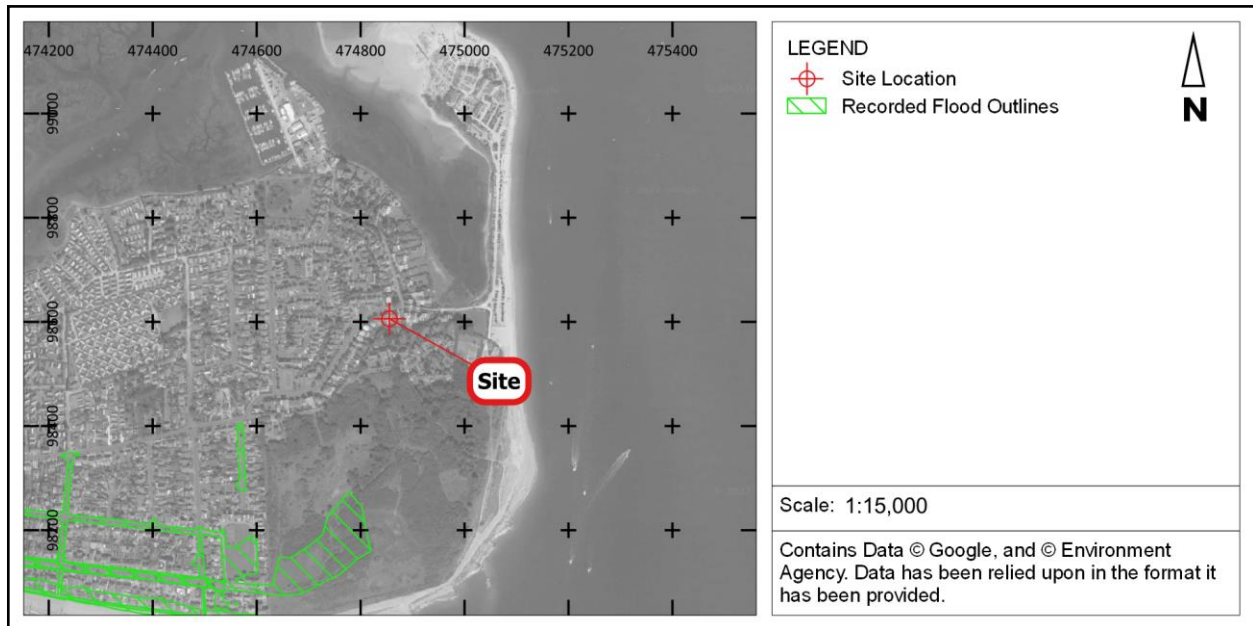


Figure 8: EA Historic and Recorded Flood Outlines

### 4.2 Site Owner Recorded Flooding

The site owner has provided no details of flooding having affected the Application Site.

<sup>3</sup> [Historic Flood Map - data.gov.uk](https://data.gov.uk)

## 5 Flood Risk: Tidal Flooding

### 5.1 Assessment Methodology

To determine the flood risk from tidal sources, the EA Flood Map for Planning has been reviewed. The EA flood extents indicate areas at risk of fluvial and/or tidal flooding.

If the modelled flood data indicates the main source of flood risk to be fluvial only (based on the type of model used), the tidal flood risk is considered to be insignificant.

If, however, the tidal flood risk is dominant, the ground levels at the Application Site will be compared to the Environment Agency's Coastal Design Sea Levels<sup>4</sup>. It should be noted that the baseline year for the data set is 2018.

### 5.2 Tidal Flood Risk Analysis

The dominant source of flood risk to the Application Site is tidal. The EA Flood Map for Planning indicates that the Application Site does not benefit from flood defences. However, it should be noted that the areas surrounding the site benefit from flood defences, located along the coastline of Hayling Island. The location of the existing flood defences are shown below, in Figure 9.

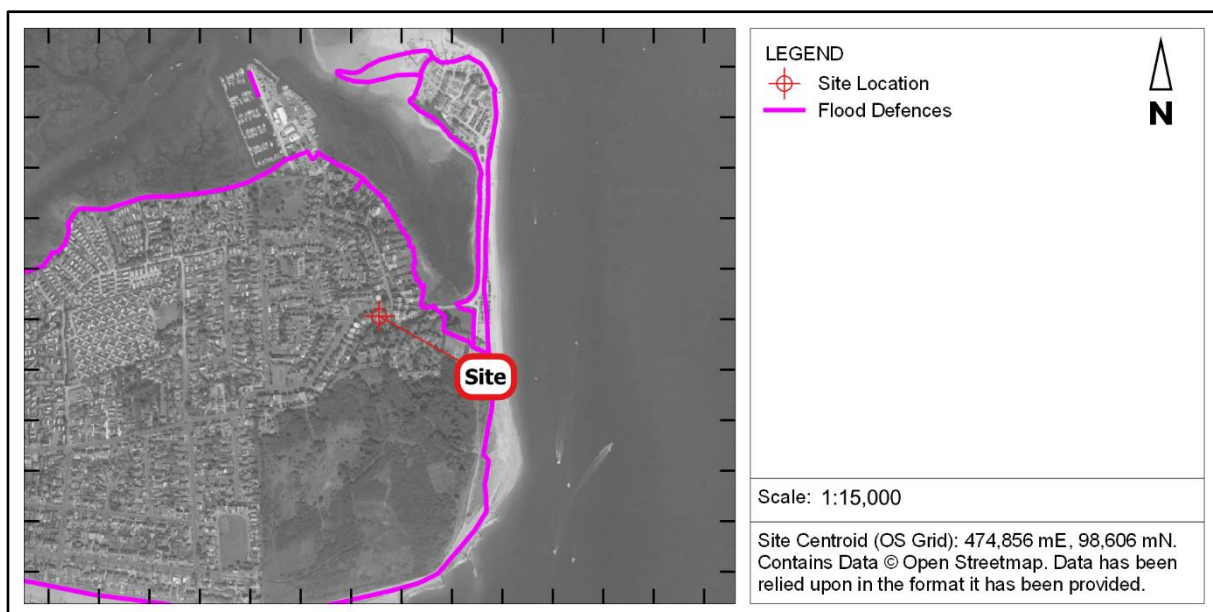


Figure 9: Environment Agency Flood Defences

Given that the Development Proposals are for the construction of a minor extension to the existing residential dwelling, the Environment Agency's Standing Advice for Minor Developments applies. Therefore, Finished Floor Levels of the proposed extension should be set no lower than those of the existing house.

<sup>4</sup> <https://data.gov.uk/dataset/73834283-7dc4-488a-9583-a920072d9a9d/coastal-design-sea-levels-coastal-flood-boundary-extreme-sea-levels-2018>

## **6 Flood Risk: Fluvial Flooding**

### **6.1 Assessment Methodology**

To determine the flood risk from fluvial sources, the EA Flood Map for Planning has been reviewed. The EA flood extents indicate areas at risk of fluvial and/or tidal flooding.

If the main source of flood risk is considered to be tidal in this area, the fluvial flood risk is considered to be insignificant.

If, however, the fluvial flood risk is dominant, Environment Agency flood level information will be requested for this area. The modelled flood levels will then be compared with the ground levels at the Application Site.

### **6.2 Fluvial Flood Risk Analysis**

The main source of flood risk to this area is tidal. Subsequently, the risk of fluvial flooding to the area is considered to be low. Therefore, no mitigation measures are considered necessary for the development.

## 7 Flood Risk: Surface Water Flooding

### 7.1 Assessment Methodology

To determine the flood risk from surface water, the EA Flood Risk from Surface Water Map has been reviewed. If the Application Site has been shown to be an area where no surface water flooding occurs for the Low Risk Scenario (1 in 1000 Year Event), the surface water flood risk is considered to be insignificant.

### 7.2 Surface Water Flood Risk Analysis

Comparison of the Environment Agency's Risk of Flooding from Surface Water mapping with the Application Site boundary has been shown in Figure 10, Figure 11, and Figure 12 below.

It is demonstrated below that the Application Site could remain unaffected by surface water flooding in all assessed flood events (1 in 30-year, 1 in 100-year and 1 in 1,000-year). Subsequently, the risk of surface water flooding to the Development Proposals is deemed low and no mitigation measures are required.

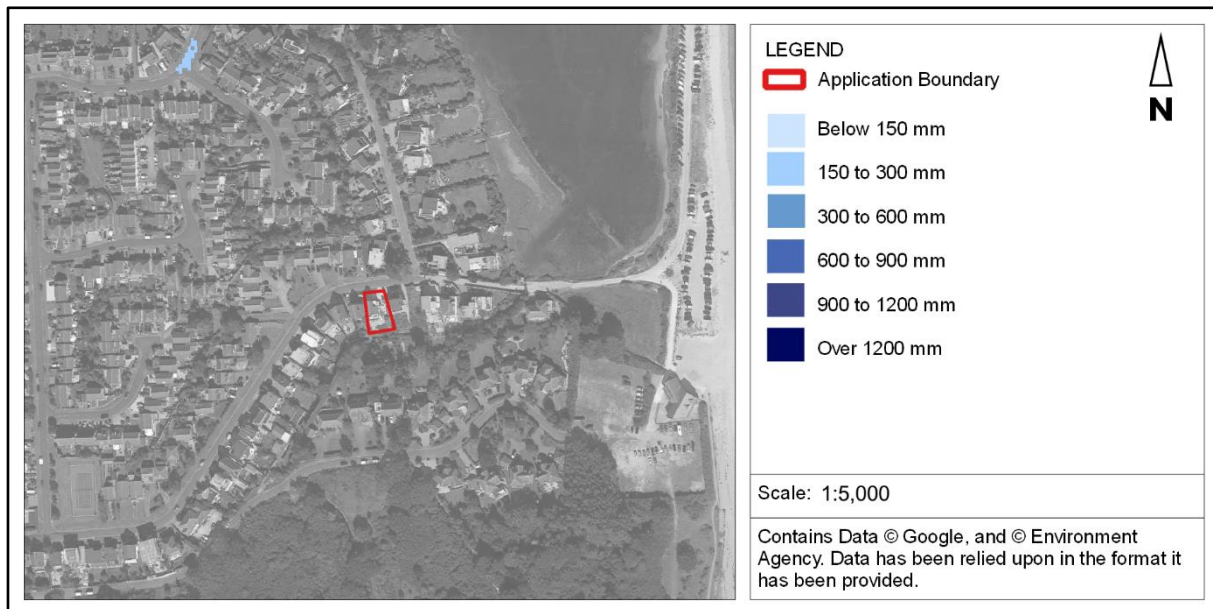


Figure 10: EA Risk of Flooding from Surface Water Map, 1 in 30 Year Event

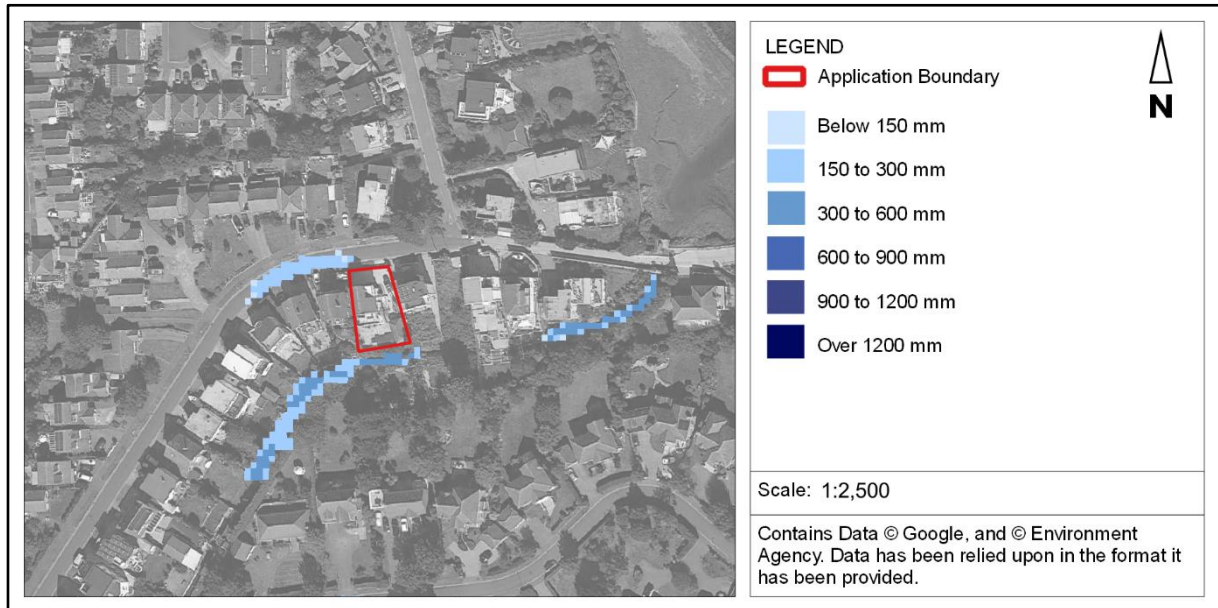


Figure 11: EA Risk of Flooding from Surface Water Map, 1 in 100 Year Event

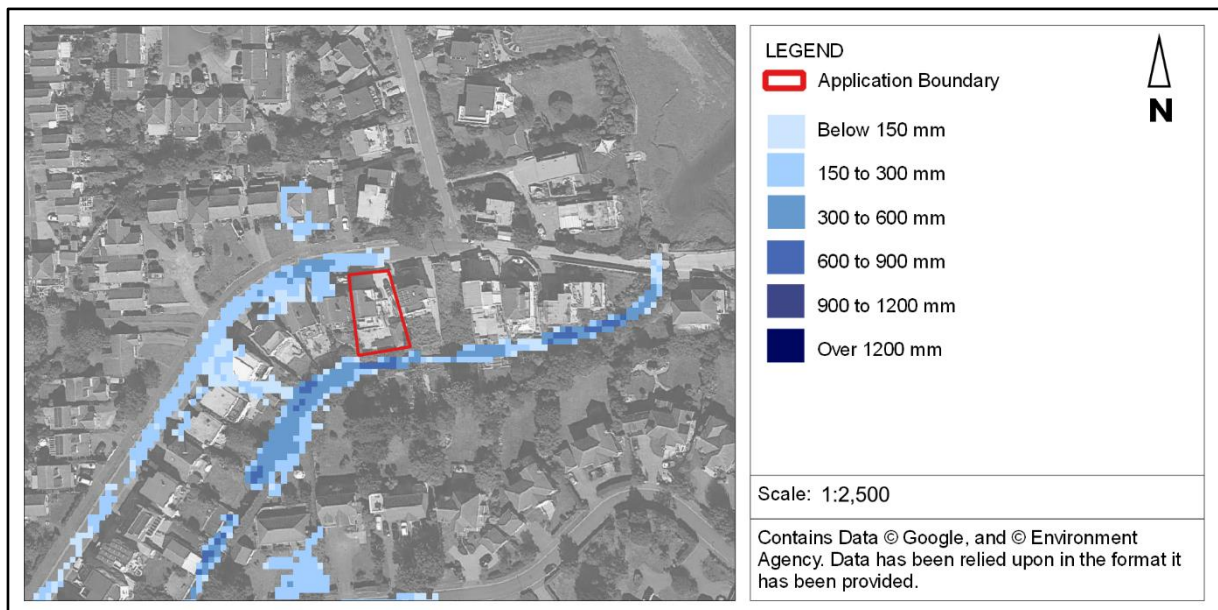


Figure 12: EA Risk of Flooding from Surface Water Map, 1 in 1000 Year Event

## 8 Flood Risk: Groundwater Flooding

### 8.1 Assessment Methodology

To determine the flood risk from groundwater sources, the British Geological Survey “Area’s Susceptible to Groundwater Flooding” dataset has been reviewed. If this dataset shows the Application Site to be located in an area which is “Not Affected”, the groundwater flood risk is considered to be insignificant.

### 8.2 Groundwater Flood Risk Analysis

The British Geological Survey’s (BGS) Areas Susceptible to Groundwater Flooding (ASStGW) dataset has been used to determine the groundwater flood risk to the Development Proposals. This mapping has four categories:

- Unaffected (Very Low Risk);
- Limited potential for groundwater flooding to occur (Low Risk);
- Potential for groundwater flooding of property situated below ground level (Medium Risk);
- Potential for groundwater flooding to occur at surface (High Risk).

By reviewing the British Geological Survey ASStGW, the groundwater flood risk to the Development Proposals is classified as having potential for groundwater flooding of property situated below ground level (Medium Risk).

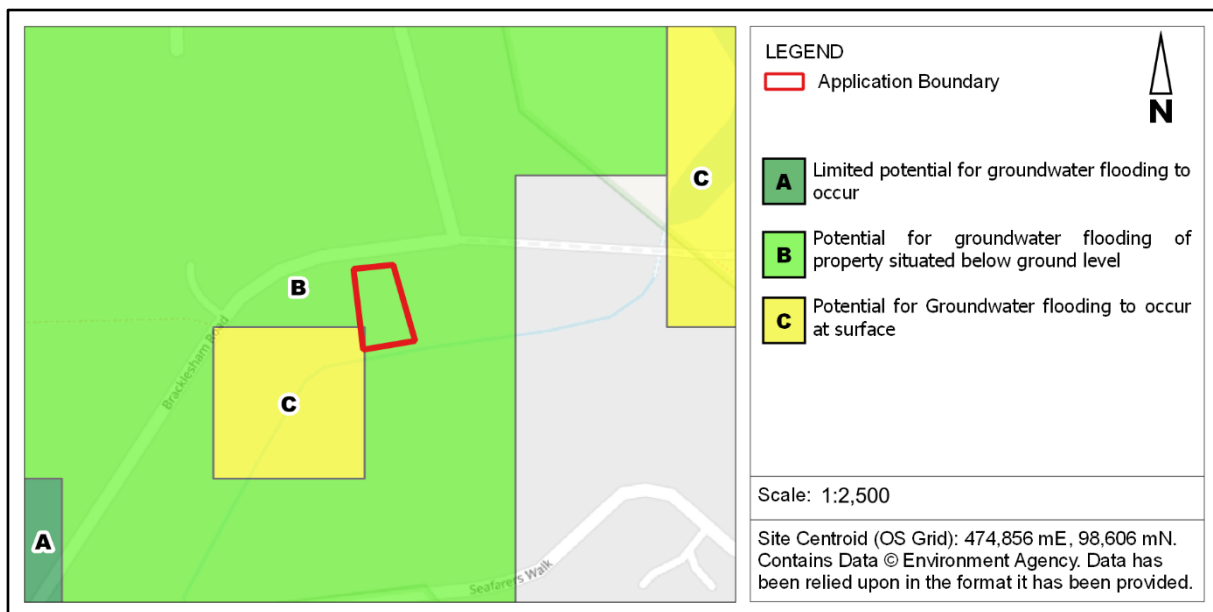


Figure 13: BGS Groundwater Flood Risk

According to the UK Groundwater Forum<sup>5</sup>, the effects of the predicted impacts of climate change may include:

- a long term decline in groundwater storage;

<sup>5</sup> Groundwater Resources and Climate Change, [http://www.groundwateruk.org/Groundwater\\_resources\\_climate\\_change.aspx#:~:text=The%20effects%20of%20climate%20change,the%20UK%20therefore%20may%20include%3A&text=increased%20frequency%20and%20severity%20of,to%20seasonally%20high%20water%20tables](http://www.groundwateruk.org/Groundwater_resources_climate_change.aspx#:~:text=The%20effects%20of%20climate%20change,the%20UK%20therefore%20may%20include%3A&text=increased%20frequency%20and%20severity%20of,to%20seasonally%20high%20water%20tables)

- increased frequency and severity of groundwater droughts;
- increased frequency and severity of groundwater-related floods;
- mobilisation of pollutants due to seasonally high water tables;
- saline intrusion in coastal aquifers, due to sea level rise and resource reduction.

These impacts cannot be locally managed and would need a catchment wide resource management plan to mitigate the risks.

As the Application Site is identified as being at risk of groundwater flooding, it is also recommended that the extension is constructed using flood resilient construction techniques. These are discussed in detail in Section 11 of the report.

Perched groundwater may be present below areas of the Application Site and could be encountered during the below ground civil engineering works. The perched groundwater, if encountered, would need to be mitigated for by appropriate construction techniques and in accordance with an appropriate method statement, to ensure Health and Safety and Environmental permitting requirements are satisfied.

Considering the impacts of climate change and the other factors discussed above, the assessed groundwater flood risk over the development lifespan is Very Low.

## 9 Residual Flood Risk

Residual risks are those remaining after applying the sequential approach to the location of development and taking mitigating actions.

### 9.1 Sewer Flooding

Consent from the public sewer authority will be required prior to occupation of the Development Proposals. This will require formal written consent and the public sewer authority would be required to undertake appropriate reinforcing work where necessary.

Current climate change predictions are for changes in rainfall profile and water availability, which are likely to alter the demands on the public sewer network. As far as practicable within the Development Proposals, opportunities for water reuse and to restrict surface water discharges have been considered.

Considering the impacts of climate change and the other factors discussed above, the assessed sewer flood risk over the development lifespan is Very Low.

### 9.2 Flood Defence Breach Analysis

According to the Environment Agency Flood Map for Planning, the Application Site does not benefit from flood defences. However, the area surrounding the Application Site does benefit from flood defences. Consequently, there could be a residual risk of flooding in the unlikely event of a flood defence breach. The likelihood of a breach in flood defences occurring is considered to be very low. As such, the residual risk of flooding at the site is deemed low.

### 9.3 Reservoir Failure

The Environment Agency risk of reservoir flooding indicates that the site is not at risk as a result of a modelled reservoir failure (Figure 14).

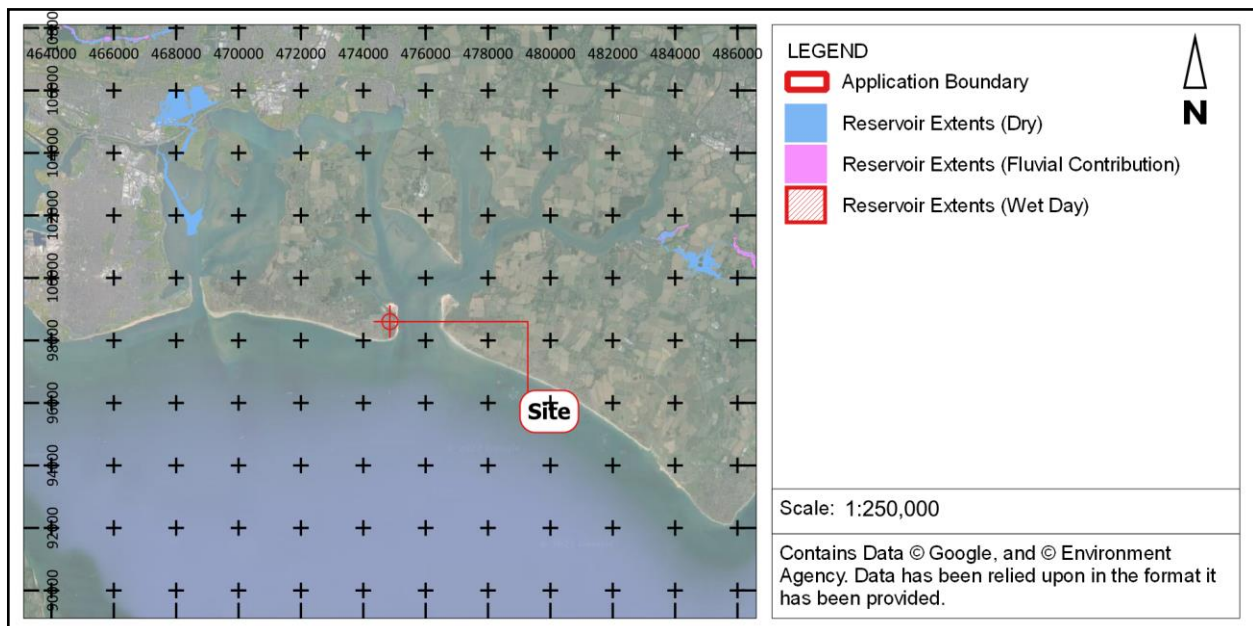


Figure 14: Environment Agency, Risk of Reservoir Flooding

## 9.4 Canal Failure

Canal Failure could result in flooding if a section of raised canal, either on an embankment or on a viaduct, was to fail.

As the Application Site is not within 1km of a raised canal, it is considered that the residual risk of canal flooding is low.

## 10 Surface Water Management

The purpose of a surface water management plan is to, wherever possible, limit the peak rate of surface water run-off generated by impervious areas of the site, to a rate similar to that of a greenfield.

As the development proposals are for the extension of the existing use, it is proposed to re-use the existing surface water drainage discharge, and to retrofit in appropriate Sustainable Drainage Systems (SuDS).

The proposed house and garage will have a roof area of approximately 150m<sup>2</sup> (0.015 Ha) post-development. To determine the amount of storage required for the proposed development, the HR Wallingford SuDS Tool has been applied. Based on the Site Characteristics, it is predicted that 3m<sup>3</sup> of surface water attenuation will need to be provided. Calculations are provided in Appendix B.

It is proposed that the downpipes from the new roof should connect to a large capacity water butt, for example the Garantia Garden Tank has a capacity of 1,000 litres, or 1m<sup>3</sup>. On receipt of a Met Office Yellow Weather Warning for Rain, the Water Butt should be emptied, to make capacity available for the following storm.

To achieve the surface water attenuation requirement, it will be necessary to provide three water butts of 1,000 litre capacity.

## 11 Mitigation Measures

### 11.1 Embedded Mitigation Measures

There are several embedded flood mitigation measures associated with the existing Site, which are as follows:

#### 11.1.1 Construction

- In accordance with the Environment Agency's Standing Advice for Minor Extensions, the Finished Floor Levels will be no lower than the existing floor levels;
- Structures exposed to flood depths of greater than 600mm depth of floodwater are at risk of structural failure. Therefore, should be designed by a Structural Engineer to accommodate loadings associated with the predicted depth of floodwater;
- Using flood resilient materials (for example lime plaster) to at least 600mm above the estimated flood level;
- Ground floor to be solid (i.e. concrete floors), where possible, with waterproof membrane;
- Damp proof membranes should be included within the design of the Development Proposals, to minimise the passage of water through ground floors. Impermeable polythene membranes should be at least 1200 gauge to minimise ripping. Effective methods of joining membrane sections are overlaps of 300mm, and also taping (mastic tape with an overlap of 50mm minimum). Care should be taken not to stretch the membrane in order to retain a waterproof layer;
- All floors to be finished with waterproof screed (where possible);
- Wall cavities to be filled with closed-cell foam throughout;
- Exterior ventilation outlets, utility points and air bricks to be fitted with removable waterproof covers;
- External walls to be resistant to flooding to at least 900mm above external ground level;
- Utilise waterproof seals on the doors/windows of the new building, to minimise flood water ingress during a flood event;
- Making sure any doors, windows or other openings are flood resistant to at least 600mm above the estimated flood level
- Incorporation of surface water drainage strategy measures.

#### 11.1.2 Interior fittings

- Kitchen units to be of solid, water resistant material;
- Units to be raised on legs above plinth; and,
- Use of MDF carpentry (i.e. skirting, architrave, built-in storage) to be avoided at the ground floor level.

#### 11.1.3 Electrical connection

- Raising all sensitive electrical equipment, wiring and sockets to at least 600mm above the finished floor level
- Ground floor electrical main ring to be run at least 900mm above external ground level;

- Electrical incomer and meter to be situated at least 900mm above external ground level; and,
- Bringing down electrical services from ceilings on the ground floor (where possible).

#### **11.1.4 Gas / water supply**

- Boilers, control and water storage / immersion to be installed at least 900mm above external ground level and, where possible, to be installed at first floor level or above;
- Gas meter to be installed at least 900mm above external ground level; and,
- All plumbing insulation to be of closed-cell design.

#### **11.1.5 Drainage**

- To minimise the potential for sewer flooding, foul and surface water sewer systems should be kept separate and non-return valves or similar protection measures should be installed, to prevent the public sewers from surcharging into the lateral drains serving properties.
- Anti-syphon fitted to all toilets; and,
- Non-return valves on sewers to be installed separately on the foul and surface water systems, to prevent back-flow and “self-flooding”.

## 12 Flood Warning & Emergency Plan

The below process outlines the key steps to take in response to the alert or warning level issued by the Environment Agency or Met Office Rain Warnings.

### Preparation;



#### PRACTICE FWEP

Check the National Flood Forum or speak to a Floodline adviser to find out how to stay safe during a flood. Telephone: 0345 988 1188.

Prepare a personal flood plan, community or group flood plan, or business flood plan.

If you own property next to a watercourse, for example a river, culvert, brook or mill stream, you must:

- maintain river beds and banks (for advice speak to the Environment Agency or Lead Local Flood Authority for guidance) not obstruct the water flow

### EA Flood Alert or Met Office Yellow Rain Warning



#### PREPARE FOR POSSIBLE FLOODING

check your flood risk - <https://flood-warning-information.service.gov.uk/long-term-flood-risk>

sign up for flood warnings - <https://www.gov.uk/sign-up-for-flood-warnings>

keep up to date with the latest situation - call Floodline on 0345 988 1188

or follow @EnvAgency and #floodaware on Twitter for the latest flood updates

have a bag ready with vital items like insurance documents and medications in case you need to leave your home

check you know how to turn off your gas, electricity and water mains supplies plan how you'll move family and pets to safety

empty water butts to provide surface water attenuation

### EA Flood Warning or Met Office Amber Rain Warning



#### IMMEDIATE ACTION REQUIRED

move vehicles to higher ground

move family and pets to safety

move important items upstairs or to a safe place in your property, starting with cherished items and valuables, then furniture and furnishings

turn off gas, electricity and water supplies if it's safe to do so; never touch an electrical switch if you're standing in water

if you have property protection products such as flood barriers, or air brick covers, use them now

keep track of the latest situation - <https://flood-warning-information.service.gov.uk/warnings>

### EA Severe Flood Warning or Met Office Red Rain Warning



#### DANGER TO LIFE, ACT NOW.

call 999 if you're in immediate danger

follow advice from the emergency services and evacuate

make sure you have an emergency kit including a torch, spare batteries, mobile phone and charger, warm clothes, important numbers like your home insurance, water, food, first aid kit and any medicines and baby care items you may need

alert neighbours and offer help if it's safe to do so

avoid driving or walking through flood water: just 30cm (1 foot) of fast flowing water could move your car and even shallow moving water can knock you off your feet

keep your family and pets away from floodwater – it may contain heavy debris, sharp objects, open manhole covers, sewage and chemicals

wash your hands if you've been in contact with flood water which may contain toxic substances

It is important to leave the site/property upon receipt of a severe flood warning. This is to ensure that additional strain is not put on the emergency services.

## **12.1 Met Office weather warnings**

In addition to the Environment Agency flood warning service, it is recommended that the site occupants / staff subscribe to weather warnings from the Met Office. These provide an indication of when weather warnings (e.g. extreme rainfall) are forecast and enable appropriate action to be taken.

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. It is also possible to stay up to date with weather warnings through the Met Office app (available on both android and apple), social media (twitter, Facebook) or email alerts. More information can be found at <https://www.metoffice.gov.uk/weather/guides/warnings>.

During periods of bad weather, site users should monitor local weather reports and sign up for the Met Office UK weather warnings. Warnings can be monitored through an Apple/Android app, Twitter or directly via emails. Further information can be found at <https://www.metoffice.gov.uk/>.

## 13 Conclusions

Ambiental Environmental Assessment (AEA), a company of Royal HaskoningDHV UK Ltd, has been appointed by Jo Hewitson to undertake a National Planning Policy Framework (NPPF) [1] compliant Flood Risk Assessment (FRA) for the Development Proposals located at 54 Bracklesham Road, Hayling Island, PO11 9SJ.

The Development Proposals are for renovations and extensions to the existing residential dwelling. This is considered a Minor Development (householder development).

According to the Flood Risk and Coastal Change Planning Policy Guidance, the Development Proposal would be classified as a Minor Extension (Standing Advice).

On the basis that the development proposals are for a minor extension in Flood Zone 2 or 3, the Environment Agency's Standing Advice will apply [2].

According to Annex 3 of the NPPF, the Development Proposal's Vulnerability Classification is "More Vulnerable", which consists of the following uses:

*"Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels."*

The key findings of the Flood Risk Assessment are as follows:

- The Application Site is in Flood Zone 3, as defined by the Environment Agency's Flood Map for Planning. The risk of tidal flooding at the site is **high**.
- The risk of groundwater flooding is **medium**.
- The risk of fluvial flooding to the site is **low**.
- There is **no risk** of surface water flooding to the site.
- There could be a residual risk of flooding at the site from sewer flooding.
- As the development proposals are for the extension of the existing use, it is proposed to re-use the existing surface water drainage discharge, and to retrofit in appropriate Sustainable Drainage Systems (SuDS).
- Due to the high tidal flood risk to the Application Site, the proposed extension should be constructed using flood resilient construction methods, where possible.

A summary of the flood risk for the Application Site for each source requiring consideration under the NPPF is presented as Table 1, overleaf.

The Surface Water Drainage Strategy outlined as part of this Flood Risk Assessment will reduce the peak rate of surface water discharge to a state that should not adversely impact third party properties.

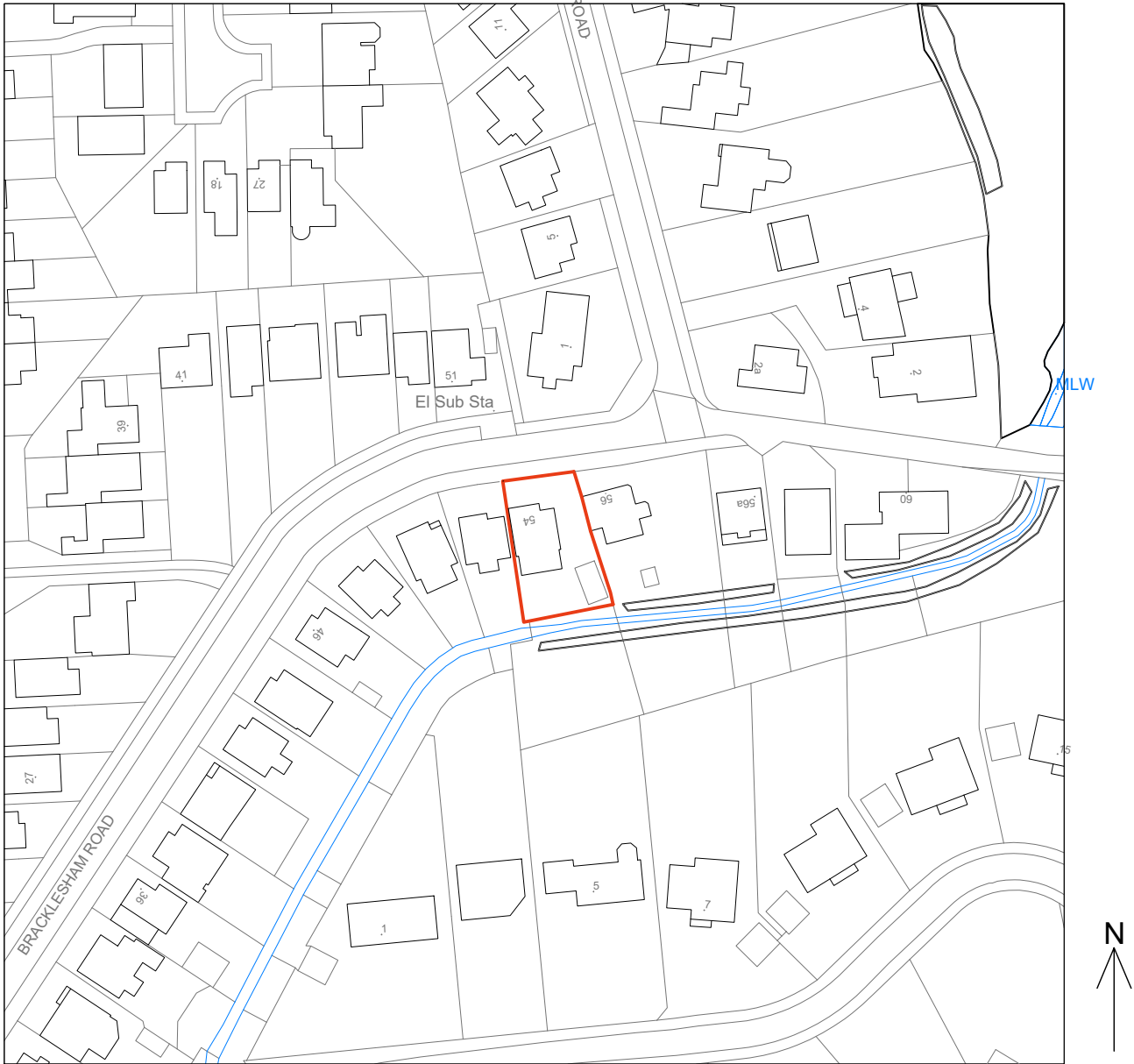
The Flood Risk Assessment has been undertaken in accordance with the requirements of the NPPF and it can be demonstrated that the Development Proposals are compatible with the predicted flood risk profile, including climate change allowance over the development lifetime.

It should be noted that the Development Proposals are not predicted to increase the risk of flooding to others over the development lifetime. Consequently, it is concluded that, with regards to the Flood Risk requirements of the NPPF, the Development Proposals are acceptable.

## **Appendix**

### **A. Development Proposals**

# Ordnance Survey®

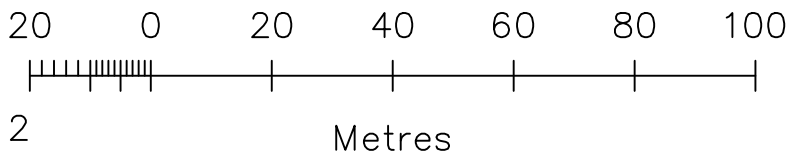


Scale 1:1250

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RS ARCHITECTURE

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**54 Bracklesham Road**  
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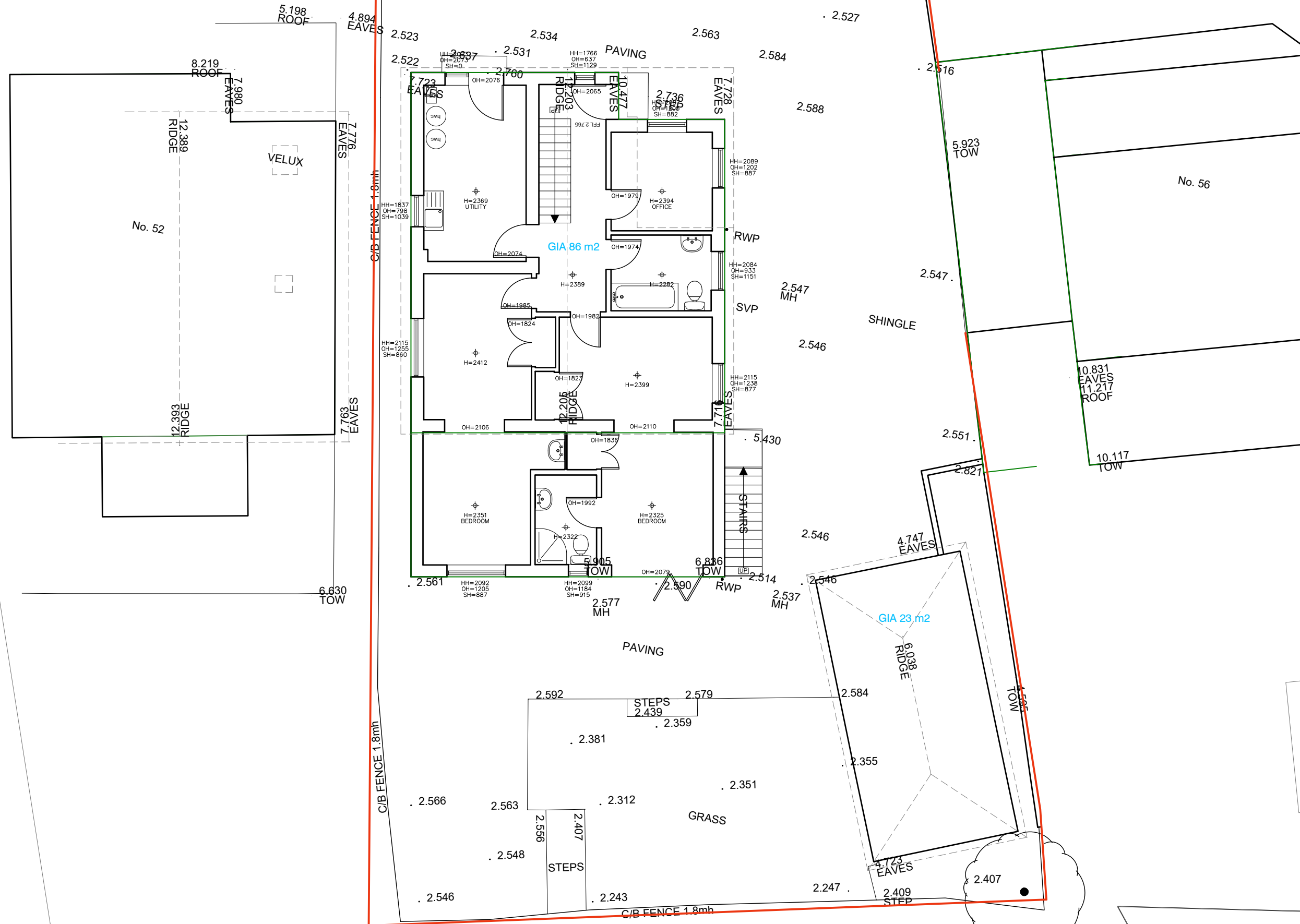
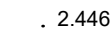
DATE: 20 October 2022  
DRAWN BY: AS APPROVED BY: RS

194 Southwood Road, Hayling Island,  
Hampshire, PO11 9QL  
**07887933281**  
**rob@rs-architecture.co.uk**  
**www.rs-architecture.co.uk**

## Existing Ground Floor & Site Plan



## PLANNING



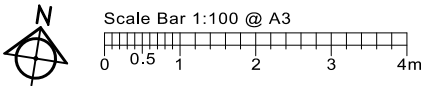
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ROOF  
10.1  
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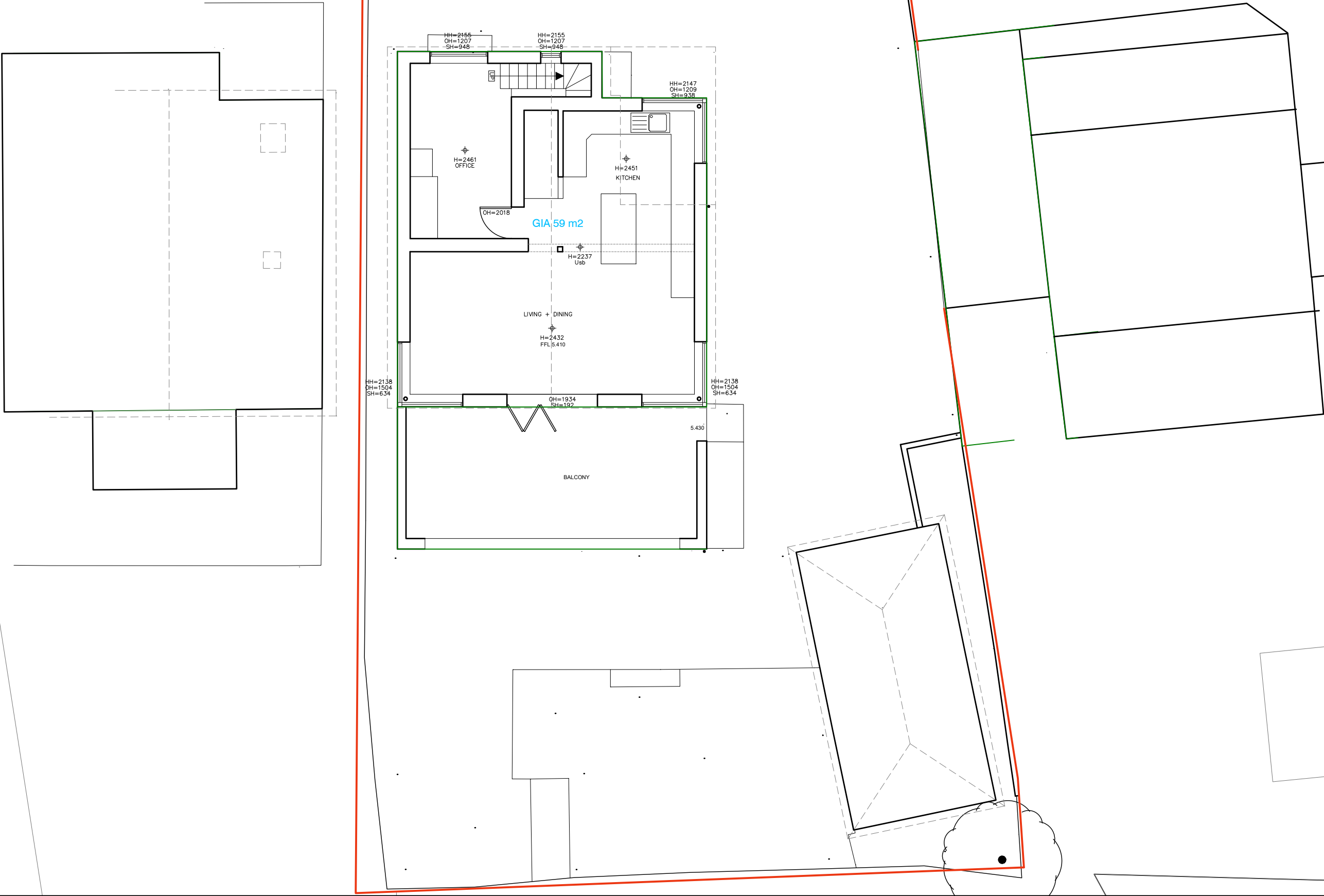


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| TITLE: Existing Ground and Site<br>Plan                                                                                                                  |
| DRAWING NUMBER : 001 EGF                                                                                                                                 |
| Scale : 1:100 @ A3                                                                                                                                       |
| DATE: 20 October 2022                                                                                                                                    |
| DRAWN BY: AS APPROVED BY: RS                                                                                                                             |
| 194 Southwood Road, Hayling Island,<br>Hampshire, PO11 9QL<br><b>07887933281</b><br><b>rob@rs-architecture.co.uk</b><br><b>www.rs-architecture.co.uk</b> |

Existing First Floor Plan

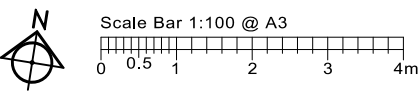


PLANNING

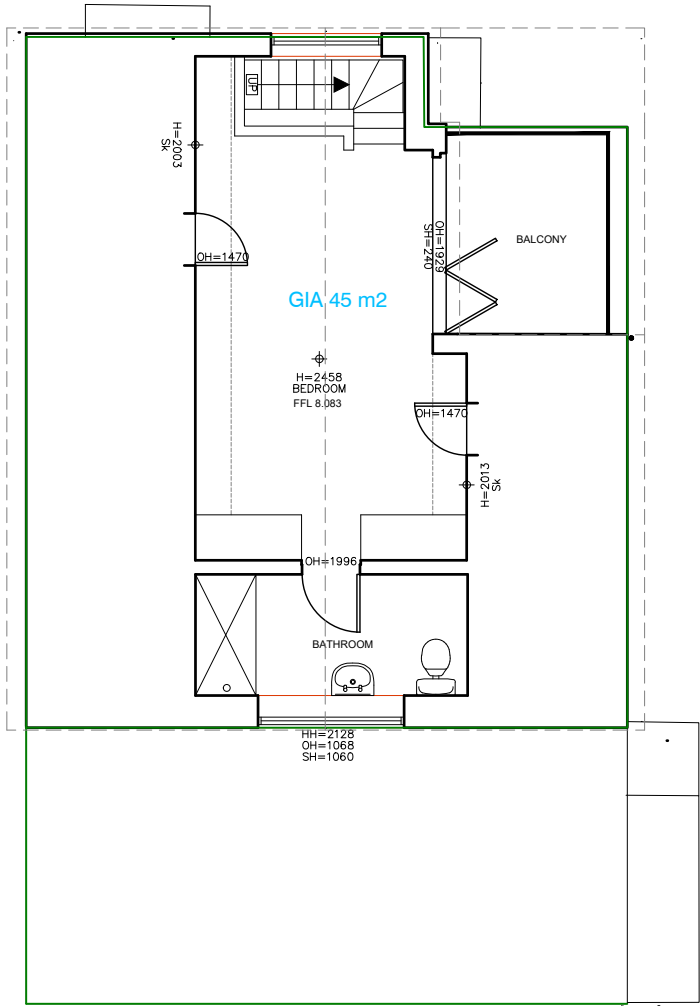
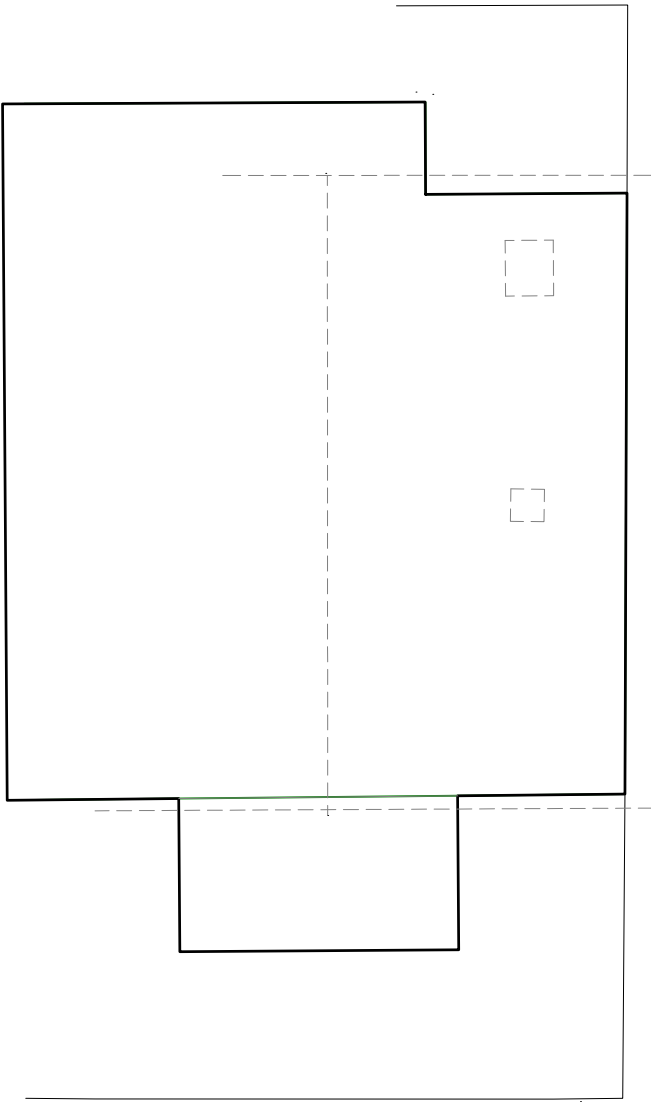


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TITLE: Existing First Floor Plan  
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Scale : 1:100 @ A3  
DATE: 20 October 2022  
DRAWN BY: AS APPROVED BY: RS  
194 Southwood Road, Hayling Island,  
Hampshire, PO11 9QL  
**07887933281**  
rob@rs-architecture.co.uk  
www.rs-architecture.co.uk

Existing Second Floor Plan



PLANNING



GIA 45 m2

H=2458  
BEDROOM  
FFL 8.083

BATHROOM

HH=2128  
OH=1068  
SH=1060

BALCONY

H=2003  
SK

OH=1470

OH=1470

H=2013  
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RS ARCHITECTURE

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PROJECT:  
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TITLE: Existing Second Floor Plan

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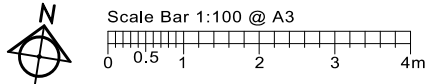
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DATE: 20 October 2022  
DRAWN BY: AS APPROVED BY: RS

194 Southwood Road, Hayling Island,  
Hampshire, PO11 9QL  
**07887933281**  
rob@rs-architecture.co.uk  
www.rs-architecture.co.uk

Existing Roof Plan

6

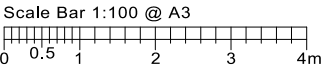


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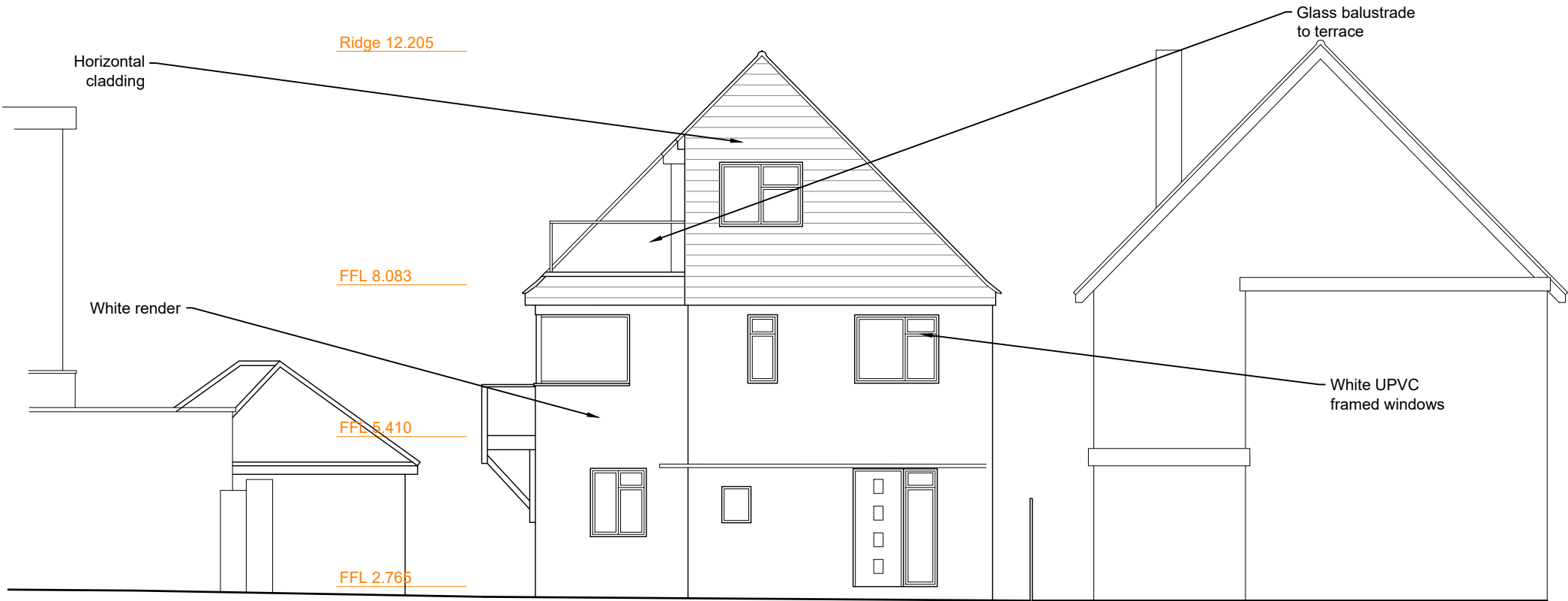


CLIENT:  
PROJECT:  
**54 Bracklesham Road**  
TITLE: Existing Roof Plan  
DRAWING NUMBER : 004 ERP  
Scale : 1:100 @ A3  
DATE: 20 October 2022  
DRAWN BY: AS APPROVED BY: RS  
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Existing North and South Elevations



Existing South Elevation



Existing North Street Elevation

PLANNING



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CLIENT:

PROJECT:  
**54 Bracklesham Road**

TITLE: Existing North and South  
Elevations

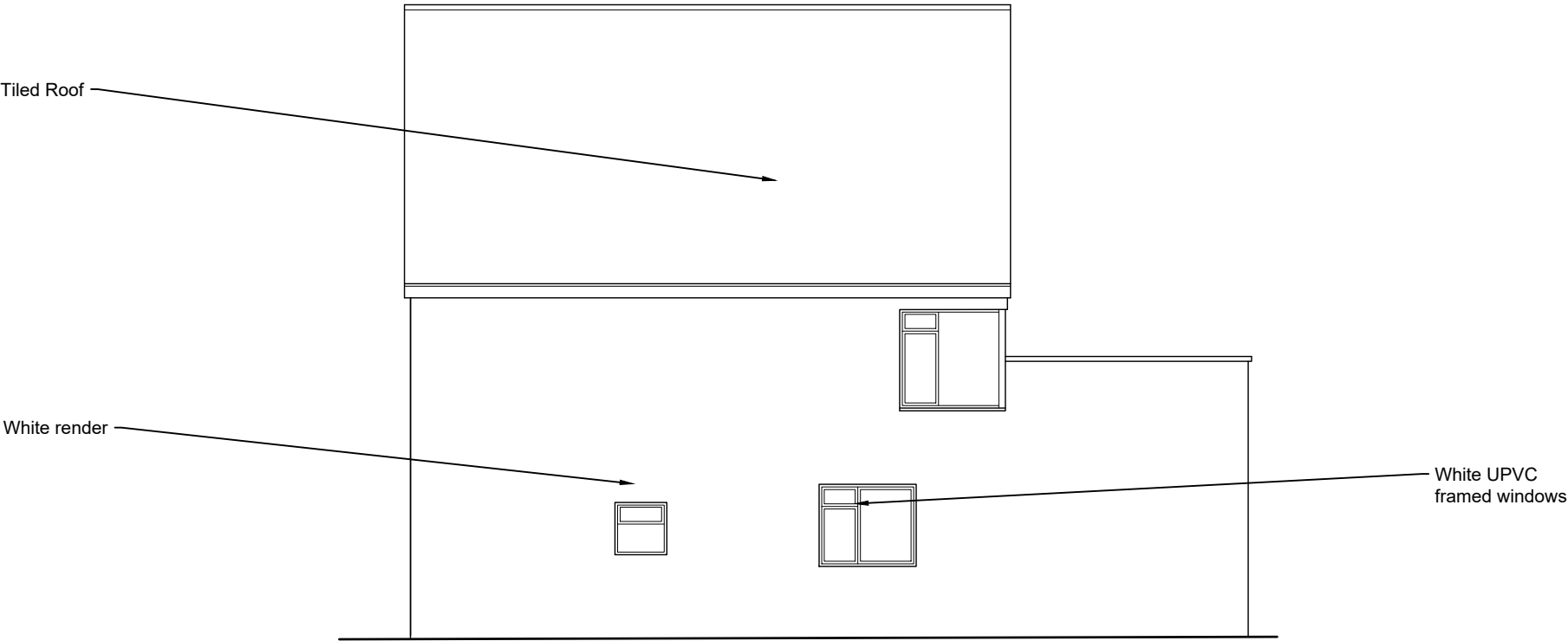
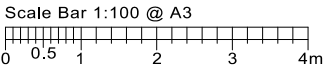
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Scale : 1:100 @ A3

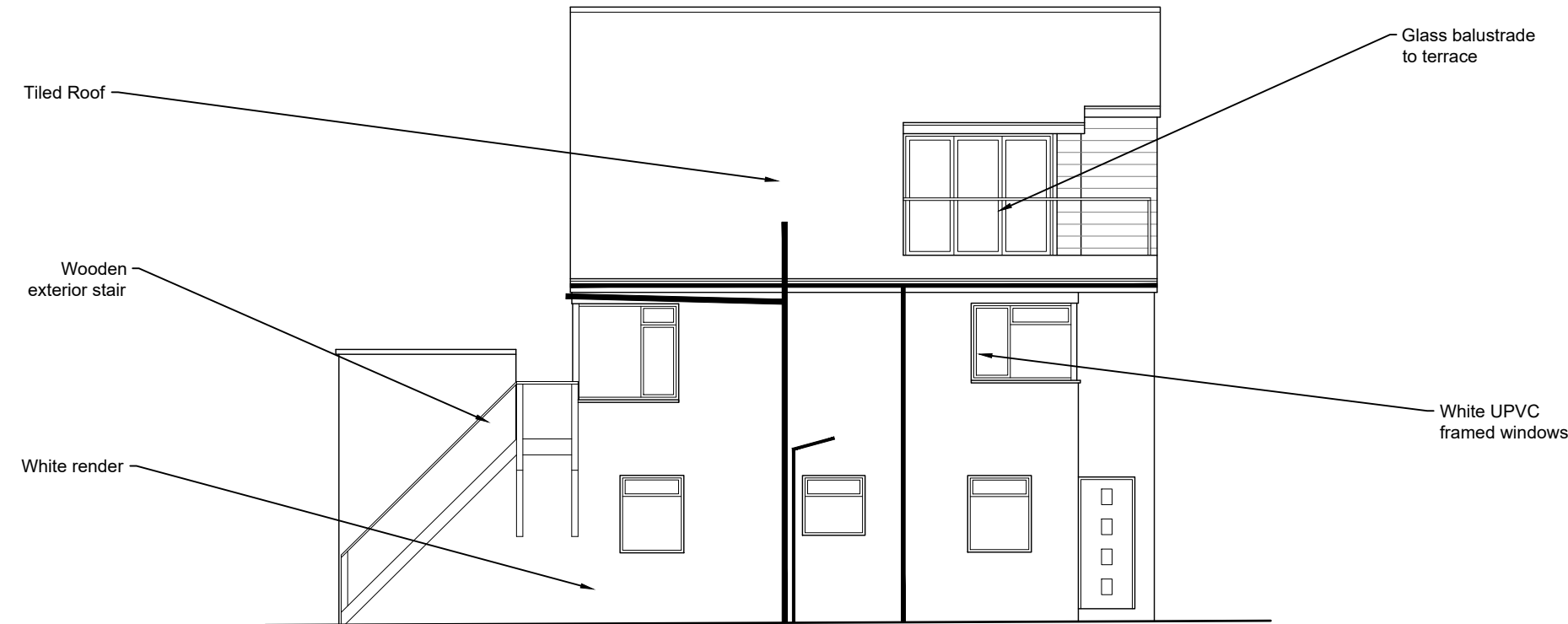
DATE: 20 October 2022  
DRAWN BY: AS APPROVED BY: RS

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Existing East and West Elevations



Existing West Elevation



Existing East Elevation

PLANNING



CLIENT:  
PROJECT:  
**54 Bracklesham Road**  
TITLE: Existing East and West Elevations  
DRAWING NUMBER : 011 EEWE  
Scale : 1:100 @ A3  
DATE: 20 October 2022  
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Proposed Ground Floor & Site Plan

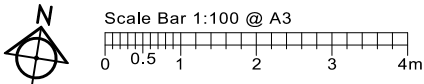


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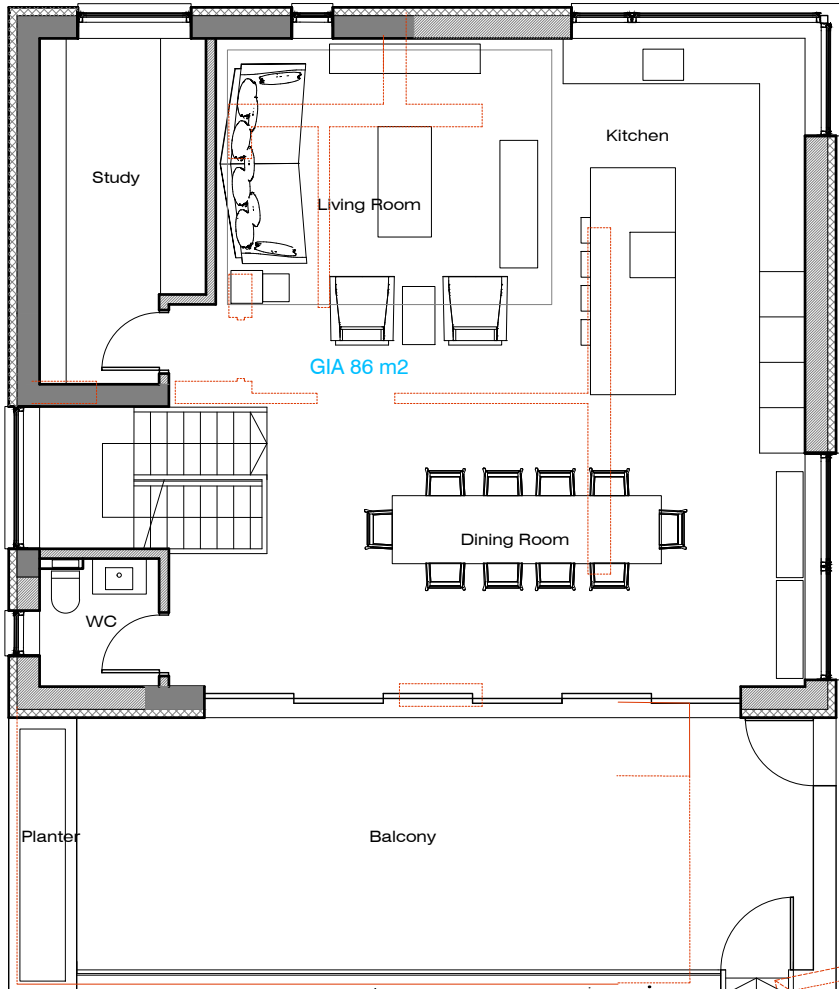
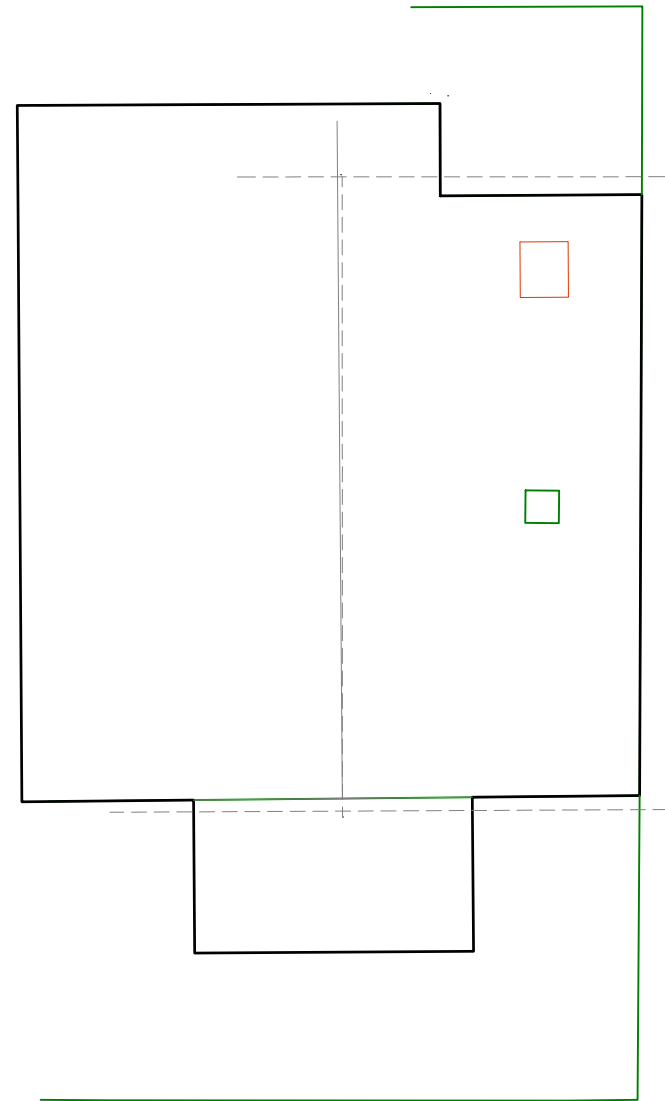


CLIENT:  
PROJECT:  
**54 Bracklesham Road**  
TITLE: Proposed Ground and Site Plan  
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Scale : 1:100 @ A3  
DATE: 20 October 2022  
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Proposed First Floor Plan



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2 NO.  
SOLAR PV  
PANELS  
1052x1769

220



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CLIENT:

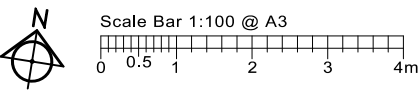
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**54 Bracklesham Road**  
TITLE: Proposed First Floor Plan

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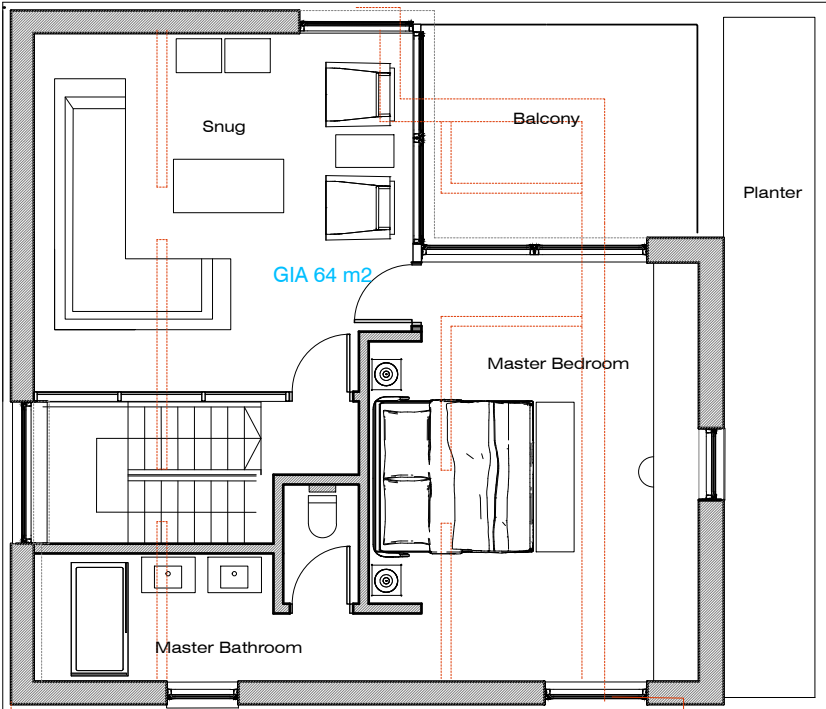
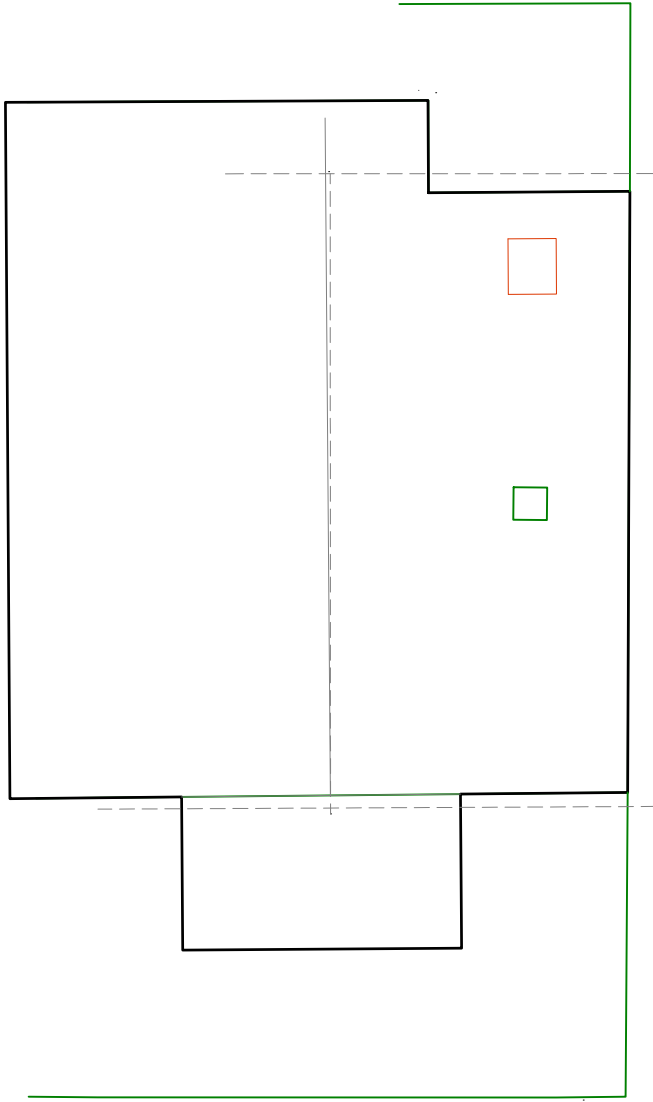
DATE: 20 October 2022  
DRAWN BY: AS APPROVED BY: RS

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Proposed Second Floor Plan



PLANNING



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CLIENT:  
PROJECT:  
**54 Bracklesham Road**  
TITLE: Proposed Second Floor Plan  
DRAWING NUMBER : 103 P2F  
Scale : 1:100 @ A3  
DATE: 20 October 2022  
DRAWN BY: AS APPROVED BY: RS  
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## 46

Scale Bar 1:100 @ A3



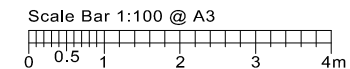
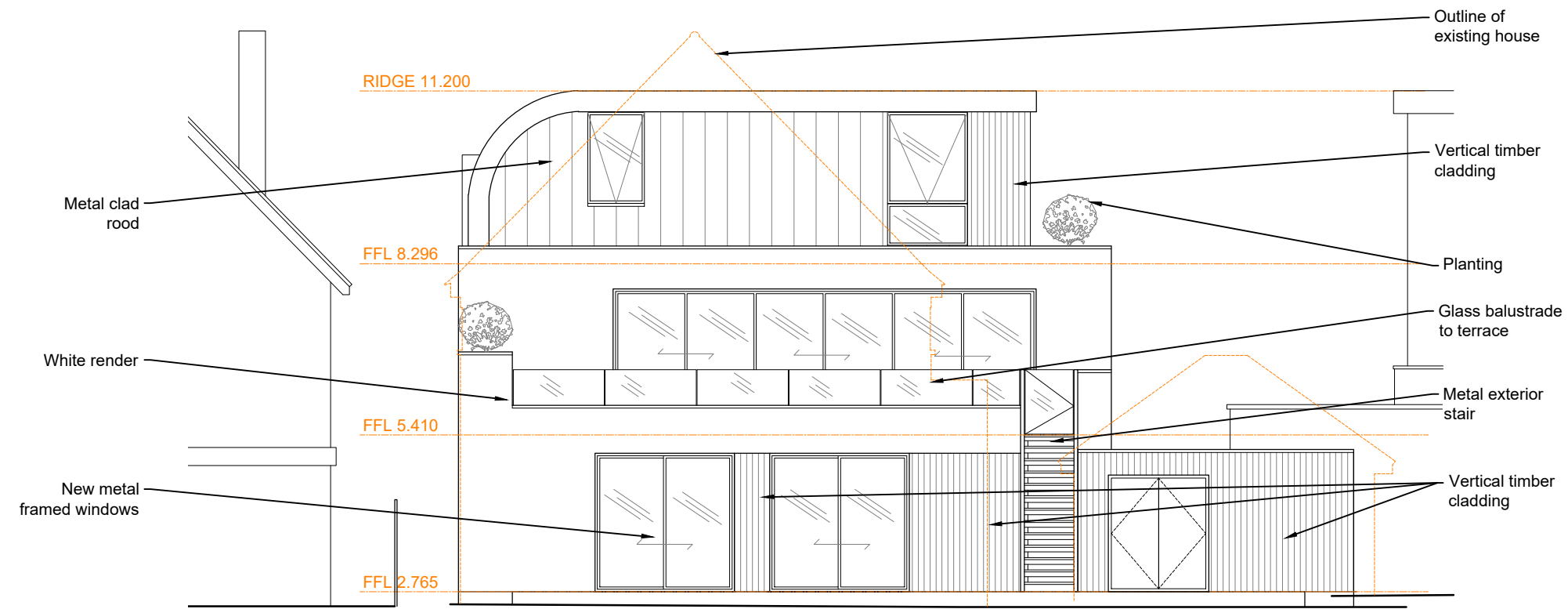
RS ARCHITECTURE

PROJECT:  
54 Bracklesham Road

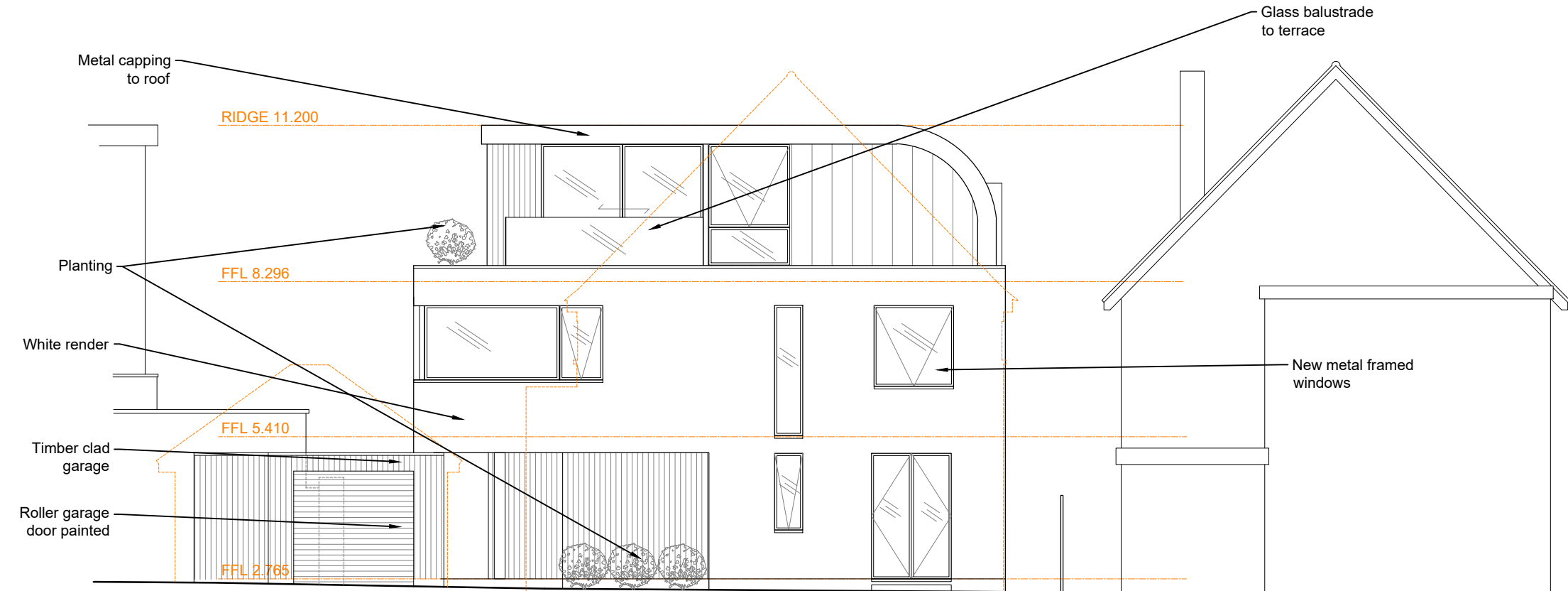
Scale : 1:100 @ A3

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Proposed North and South Elevations



Proposed South Elevation



Proposed North Street Elevation

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CLIENT:

PROJECT:  
**54 Bracklesham Road**

TITLE: Proposed North and South Elevations

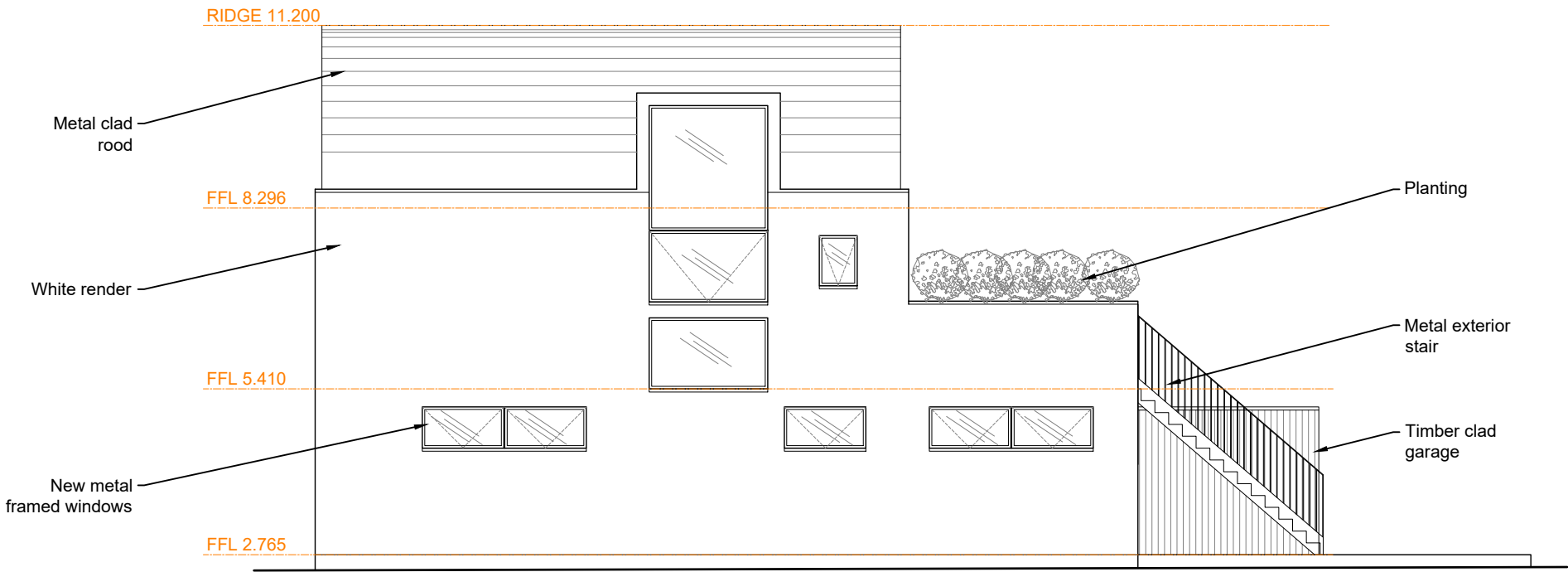
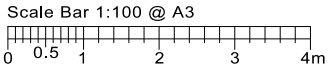
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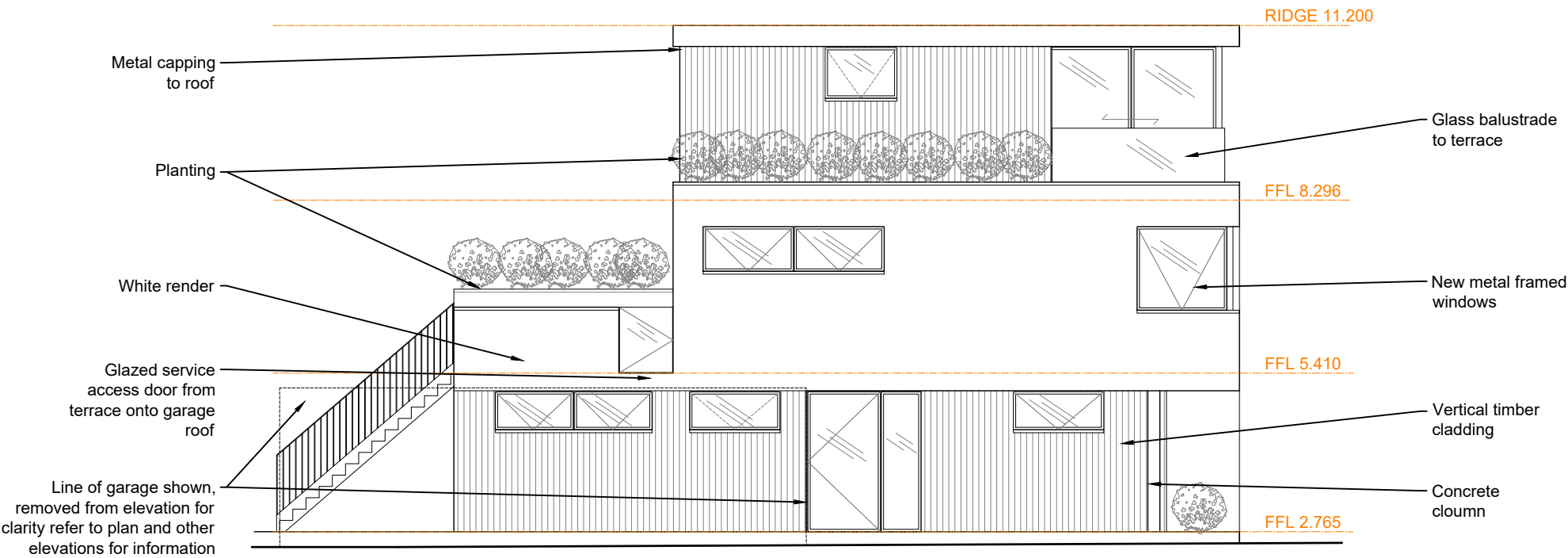
DATE: 20 October 2022  
DRAWN BY: AS APPROVED BY: RS

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Proposed East and West Elevations



Proposed West Elevation



Proposed East Elevation

PLANNING



CLIENT:

PROJECT:  
**54 Bracklesham Road**

TITLE: Proposed East and West Elevations

DRAWING NUMBER : 111 PEWE

Scale : 1:100 @ A3

DATE: 20 October 2022  
DRAWN BY: AS APPROVED BY: RS

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## **Appendix**

### **B. Calculations**

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# Surface water storage requirements for sites

www.uksuds.com | Storage estimation tool

|                |                                            |
|----------------|--------------------------------------------|
| Calculated by: | <input type="text" value="Sophie Isaacs"/> |
| Site name:     | <input type="text" value="6850"/>          |
| Site location: | <input type="text" value="Hayley Island"/> |

This is an estimation of the storage volume requirements that are needed to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). It is not to be used for detailed design of drainage systems. It is recommended that hydraulic modelling software is used to calculate volume requirements and design details before finalising the design of the drainage scheme.

## Site Details

|            |                                                |
|------------|------------------------------------------------|
| Latitude:  | <input type="text" value="50.78232° N"/>       |
| Longitude: | <input type="text" value="0.93984° W"/>        |
| Reference: | <input type="text" value="453469033"/>         |
| Date:      | <input type="text" value="Nov 03 2022 16:23"/> |

## Site characteristics

|                                                        |                                    |
|--------------------------------------------------------|------------------------------------|
| Total site area (ha):                                  | <input type="text" value="0.015"/> |
| Significant public open space (ha):                    | <input type="text" value="0"/>     |
| Area positively drained (ha):                          | <input type="text" value="0.015"/> |
| Impermeable area (ha):                                 | <input type="text" value="0.015"/> |
| Percentage of drained area that is impermeable (%):    | <input type="text" value="100"/>   |
| Impervious area drained via infiltration (ha):         | <input type="text" value="0"/>     |
| Return period for infiltration system design (year):   | <input type="text" value="10"/>    |
| Impervious area drained to rainwater harvesting (ha):  | <input type="text" value="0"/>     |
| Return period for rainwater harvesting system (year):  | <input type="text" value="10"/>    |
| Compliance factor for rainwater harvesting system (%): | <input type="text" value="66"/>    |
| Net site area for storage volume design (ha):          | <input type="text" value="0.02"/>  |
| Net impermeable area for storage volume design (ha):   | <input type="text" value="0.02"/>  |
| Pervious area contribution to runoff (%):              | <input type="text" value="30"/>    |

\* where rainwater harvesting or infiltration has been used for managing surface water runoff such that the effective impermeable area is less than 50% of the 'area positively drained', the 'net site area' and the estimates of  $Q_{BAR}$  and other flow rates will have been reduced accordingly.

## Design criteria

|                                   |                                                                 |
|-----------------------------------|-----------------------------------------------------------------|
| Climate change allowance factor:  | <input type="text" value="1.4"/>                                |
| Urban creep allowance factor:     | <input type="text" value="1.1"/>                                |
| Volume control approach           | <input type="text" value="Flow control to max of 2 l/s/ha or"/> |
| Interception rainfall depth (mm): | <input type="text" value="Qbar 5"/>                             |
| Minimum flow rate (l/s):          | <input type="text" value="1"/>                                  |

## Methodology

|                                      |                                                          |                                    |
|--------------------------------------|----------------------------------------------------------|------------------------------------|
| esti                                 | <input type="text" value="IH124"/>                       |                                    |
| $Q_{BAR}$ estimation method:         | <input type="text" value="Calculate from SPR and SAAR"/> |                                    |
| SPR estimation method:               | <input type="text" value="Calculate from SOIL type"/>    |                                    |
| Soil characteristics                 | Default                                                  | Edited                             |
| SOIL type:                           | <input type="text" value="3"/>                           | <input type="text" value="3"/>     |
| SPR:                                 | <input type="text" value="0.37"/>                        | <input type="text" value="0.37"/>  |
| Hydrological characteristics         | Default                                                  | Edited                             |
| Rainfall 100 yrs 6 hrs:              | <input type="text" value="--"/>                          | <input type="text" value="55"/>    |
| Rainfall 100 yrs 12 hrs:             | <input type="text" value="--"/>                          | <input type="text" value="80.01"/> |
| FEH / FSR conversion factor:         | <input type="text" value="1.27"/>                        | <input type="text" value="1.27"/>  |
| SAAR (mm):                           | <input type="text" value="679"/>                         | <input type="text" value="679"/>   |
| M5-60 Rainfall Depth (mm):           | <input type="text" value="17"/>                          | <input type="text" value="17"/>    |
| 'r' Ratio M5-60/M5-2 day:            | <input type="text" value="0.4"/>                         | <input type="text" value="0.4"/>   |
| Hydrological region:                 | <input type="text" value="7"/>                           | <input type="text" value="7"/>     |
| Growth curve factor 1 year:          | <input type="text" value="0.85"/>                        | <input type="text" value="0.85"/>  |
| Growth curve factor 10 year:         | <input type="text" value="1.62"/>                        | <input type="text" value="1.62"/>  |
| Growth curve factor 30 year:         | <input type="text" value="2.3"/>                         | <input type="text" value="2.3"/>   |
| Growth curve factor 100 years:       | <input type="text" value="3.19"/>                        | <input type="text" value="3.19"/>  |
| $Q_{BAR}$ for total site area (l/s): | <input type="text" value="0.04"/>                        | <input type="text" value="0.04"/>  |
| $Q_{BAR}$ for net site area (l/s):   | <input type="text" value="0.06"/>                        | <input type="text" value="0.06"/>  |

| Site discharge rates | Default                        | Edited                         | Estimated storage volumes             | Default                        | Edited                         |
|----------------------|--------------------------------|--------------------------------|---------------------------------------|--------------------------------|--------------------------------|
| 1 in 1 year (l/s):   | <input type="text" value="1"/> | <input type="text" value="1"/> | Attenuation storage 1/100 years (m³): | <input type="text" value="3"/> | <input type="text" value="3"/> |
| 1 in 30 years (l/s): | <input type="text" value="1"/> | <input type="text" value="1"/> | Long term storage 1/100 years (m³):   | <input type="text" value="0"/> | <input type="text" value="0"/> |
| 1 in 100 year (l/s): | <input type="text" value="1"/> | <input type="text" value="1"/> | Total storage 1/100 years (m³):       | <input type="text" value="3"/> | <input type="text" value="3"/> |

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