



**PROPOSED EXTENSION,  
LOFT CONVERSION AT  
SYDERSTONE, 147 EAST  
LANE, WEST HORSLEY,  
SURREY**

**FLOOD RISK ASSESSMENT**

**MAY 2023**

**REPORT REF: 3175/RE/03-23/03**

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## **CONTRACT**

Evans Rivers and Coastal Ltd has been commissioned by Mr I Compton to carry out a flood risk assessment for a proposed extension and loft conversion at Syderstone, 147 East Lane, West Horsley, Surrey.

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This project comprises various stages including data collection; depth analysis; and reporting. Quality will be maintained throughout the project by producing specific methodologies for each work stage. Quality will also be maintained by providing specifications to third parties such as surveyors; initiating internal quality procedures including the validation of third party deliverables; creation of an audit trail to record any changes made; and document control using a database and correspondence log file system.

To adhere to the Environmental Policy, data will be obtained and issued in electronic format and alternatively by post. Paper use will also be minimised by communicating via email or telephone where possible. Documents and drawings will be transferred in electronic format where possible and all waste paper will be recycled. Meetings away from the office of Evans Rivers and Coastal Ltd will be minimised to prevent unnecessary travel, however for those meetings deemed essential, public transport will be used in preference to car journeys.

The project will follow the commitment and objectives outlined in the Health and Safety Policy operated by Evans Rivers and Coastal Ltd. All employees will be equipped with suitable personal protective equipment prior to any site visits and a risk assessment will be completed and checked before any site visit. Other factors which have been taken into consideration are the wider safety of the public whilst operating on site, and the importance of safety when working close to a water source and highway. Any designs resulting from this project and directly created by Evans Rivers and Coastal Ltd will also take into account safety measures within a "designers risk assessment".

Report carried out by:

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## **1. INTRODUCTION**

### **1.1 Project Scope**

1.1.1 Evans Rivers and Coastal Ltd has been commissioned by Mr I Compton to carry out a flood risk assessment for a proposed extension and loft conversion at Syderstone, 147 East Lane, West Horsley, Surrey.

1.1.2 It is understood that this Flood Risk Assessment will be submitted to the Planning Authority as part of a planning application. Specifically, this assessment intends to:

- a) Consider the impacts of the 1in 20 year, 1 in 100 year and 1 in 1000 year flood events (inclusive of climate change), in accordance with NPPF;
- b) Review any literature and guidance specific to this area;
- c) Determine the extents of the aforementioned NPPF Flood Zones across the site, together with depths of floodwater and hazard;
- d) Assess the risks to people and property and propose mitigation measures accordingly;
- e) Review existing evacuation and warning procedures for the area;
- f) Carry out an appraisal of flood risk from any other sources such as groundwater as required by NPPF;
- g) Report findings and recommendations.

1.1.3 This assessment is carried out in accordance with the requirements of the National Planning Policy Framework (NPPF) dated 2021. Other documents which have been consulted include:

- DEFRA/EA document entitled *Framework and guidance for assessing and managing flood risk for new development Phase 2 (FD2320/TR2)*, 2005;
- Communities and Local Government 2007. *Improving the Flood Performance of New Buildings*. HMSO.
- DEFRA/EA document entitled *The flood risks to people methodology (FD2321/TR1)*, 2006;
- EA *Supplementary Note on Flood Hazard Ratings and Thresholds for Development Planning and Control Purpose*, 2008;
- National Planning Practice Guidance – Flood Risk and Coastal Change.
- UK Government’s climate change allowances guidance.
- Environment Agency guidance entitled *Flood risk assessments: Climate change allowances – Thames Area*.
- Surrey County Council Local Flood Risk Management Strategy (LFRMS) 2017-2032.
- Surrey County Council Preliminary Flood Risk Assessment (PFRA) dated 2011.

- Guildford Borough Strategic Flood Risk Assessment (SFRA) dated 2016.
- Surrey County Council Section 19 Flood Investigation Report for 11<sup>th</sup> May 2016 event and Addendum report.

## **2. DATA COLLECTION**

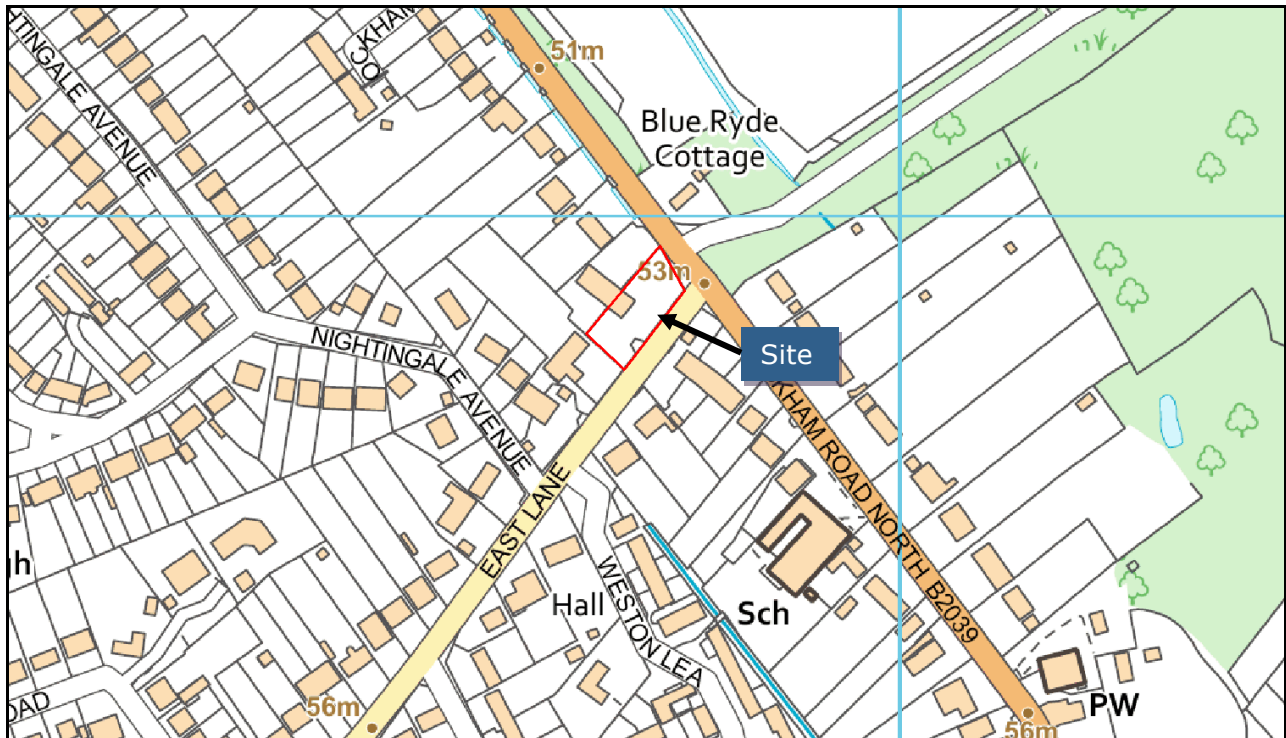
2.1 To assist with this report, the data collected included:

- Ordnance Survey 1:10,000 street view map obtained via Promap (Evans Rivers and Coastal Ltd OS licence number 100049458).
- British Geological Survey, *Online Geology of Britain Viewer*.
- 1:250,000 *Soil Map of South East England* (Sheet 6) published by Cranfield University and Soil Survey of England and Wales 1983.
- 1:625,000 *Hydrogeological Map of England and Wales*, published in 1977 by the Institute of Geological Sciences (now the British Geological Survey).
- Filtered LIDAR data at 1m resolution.
- Flood risk assessment and flood modelling for the Stratford Brook undertaken by Peter Brett Associates Ltd in March 2019 for planning application 19/P/O1541.

### 3. SITE CHARACTERISTICS

#### 3.1 Existing Site Characteristics and Location

3.1.1 The site is located at Syderstone, 147 East Lane, West Horsley, Surrey. The approximate Ordnance Survey (OS) grid reference for the site is 508866 154951 and the location of the site is shown on Figure 1.



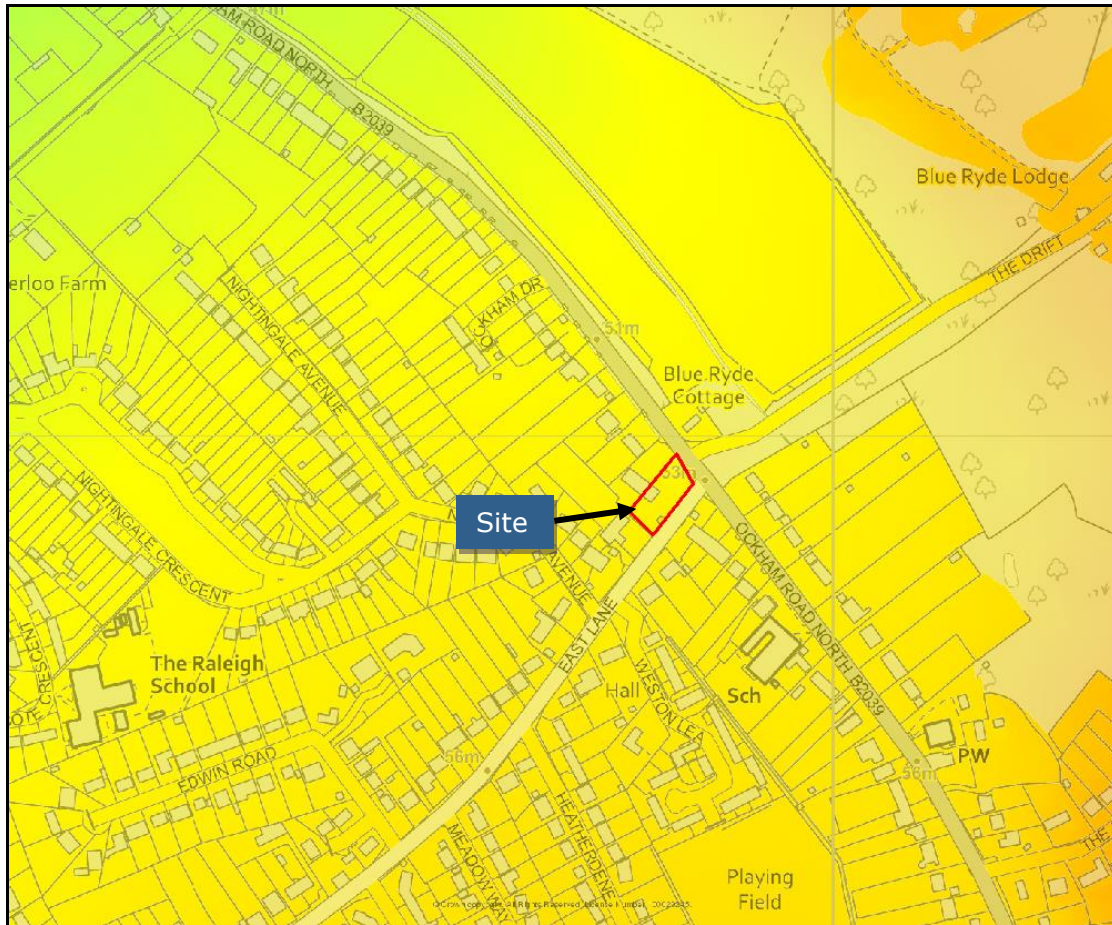
**Figure 1: Site location plan (Source: Ordnance Survey)**

3.1.2 The site comprises an existing dwelling with a garden area and a detached garage. Ockham Road North runs along the north east frontage of the site, however, the site is accessed from East Lane adjacent to the south eastern frontage of the site. The existing site layout can be seen on Drawing Number 1152/01.

3.1.3 Filtered LIDAR data at 1m resolution has been obtained to determine and illustrate the topography of the site and surrounding area (Figure 2).

3.1.4 The survey data and site measurements indicate that ground levels across the site range between 52.30m AOD and 53.53m AOD. The ground floor level of the dwelling is set at approximately 53.55m AOD.

3.1.5 Ground levels along Ockham Road North and East Lane adjacent to the site are set at 52.80m AOD and 53.40m AOD respectively.



**Figure 2: LIDAR survey data where higher ground is denoted as red, orange and yellow colours and lower areas denoted by blue and green colours**

### 3.2 Site Proposals

- 3.2.1 It is the Client's intention to provide a single-storey side extension along the dwelling's north eastern frontage as well as a small single-storey extension along its south western frontage.
- 3.2.2 The floor level of the north eastern extension will be set the same level as the dwelling and at 53.55m AOD. The floor level of the south western extension will be set lower and at 53.20m AOD.
- 3.2.3 The site proposals can be seen on Drawing Number 1152/03.
- 3.2.4 Annex 3 of the NPPF confirms that residential development is classified as a 'more-vulnerable' use.
- 3.2.5 Paragraph 27 of the NPPG and paragraph 168 of the NPPF states that the Sequential Test does not apply to minor householder development.

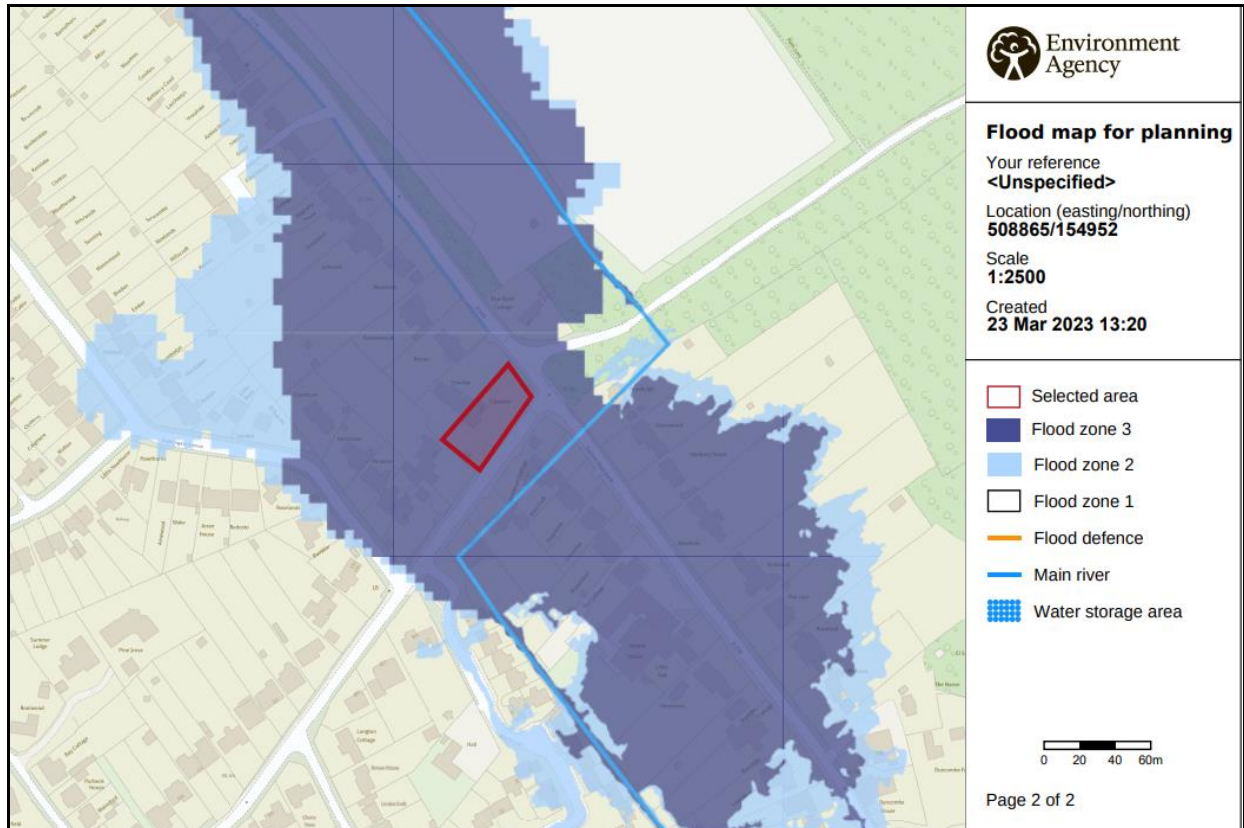


#### 4. BASELINE INFORMATION

##### 4.1 Environment Agency Flood Zone Map

4.1.1 The Environment Agency’s Flood Zone Map (Figure 3) and Figure 3-2 of the SFRA show that the site is located within the NPPF Flood Zone 3 associated with Stratford Brook located 75m north east of the site.

4.1.2 Figure 4A-2 of the SFRA shows no historical recorded incidents of fluvial flooding at the site.



**Figure 3: Environment Agency Flood Zone Map (Source: Environment Agency, 2023)**

##### 4.2 Flood Data

4.2.1 It is understood that there are no raised flood defences along this part of the watercourse.

4.2.2 A flood risk assessment and flood modelling assessment for the Stratford Brook has been undertaken by Peter Brett Associates Ltd in March 2019 for planning application 19/P/O1541. The modelling was approved by the Agency and the model extends up to the site as shown on Figure 4 overleaf (however, mapped flood extents do not extend this far).

4.2.3 Figure 4 overleaf and Drawing Number CS1182/03/A of the Peter Brett report shows that cross section CH\_04 is most relevant to the site’s location. The report includes modelling results from previous revisions which considered the climate change (20%) 1 in 100 year event, as well as further updates to the model to reflect climate change allowances of 35% and 70%.

4.2.4 The current UK Government’s climate change allowances guidance states that the “Central” climate change allowance should be used in FRA’s. For the Wey and tributaries management catchment the climate change allowance is 24% up to year 2080s.

4.2.5 Therefore, when considering this scenario, the fluvial modelling undertaken by Peter Brett Associates Ltd includes a 1 in 100 plus 20% climate change allowance and 35% climate change allowance, and can therefore be used further in this assessment.

**Table 1: Fluvial flood level data at cross section CH\_04 (from Peter Brett Associates Ltd flood risk assessment dated March 2019)**

1 in 20 year (mAOD)	1 in 100 year (mAOD)	1 in 100 year plus 20% climate change (mAOD)	1 in 100 year plus 35% climate change (mAOD)	1 in 100 year plus 70% climate change (mAOD)	1 in 1000 year (mAOD)
51.10	51.29	51.36	51.39	51.47	51.53



**Figure 4: Model schematic**

### 4.3 Flood Warning and Emergency Planning

- 4.3.1 The site is located within an Environment Agency Flood Alert Area 061WAF30LowerWey - Lower River Wey.
- 4.3.2 Sites at risk of fluvial flooding could have a minimum of 2 hours warning before any of the levels of flood warning is issued.
- 4.3.3 Flood Alerts, Flood Warnings and Severe Flood Warnings are issued to residents and businesses within flood risk areas by the Agency's *Floodline Warnings Direct* (FWD) service. This system is managed by the Environment Agency and dials out a message to the recipient when a particular category of flood warning is being advised. The message is conveyed by a constant ringing of the telephone or can alternatively be communicated to mobile phones and computers. The system functions at all times, issuing flood warnings and alerts in conjunction with announcements on radio and other media. Owners and occupiers of dwellings or businesses thought to be at risk can sign up to the scheme. **The owners are encouraged to confirm details with the Agency and to sign up for these warnings.** The various flood warning codes can be seen on Figure 5.

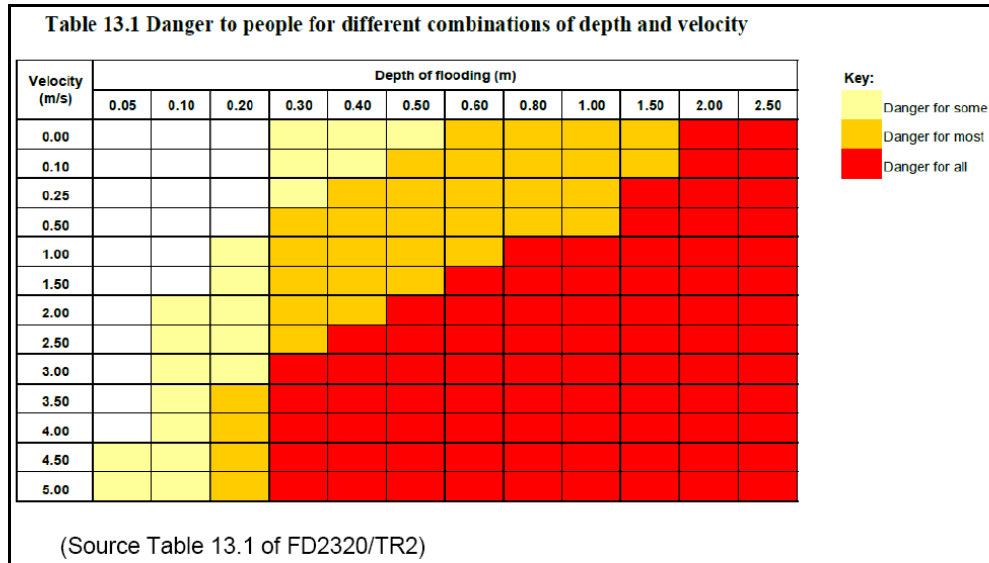


**Figure 5: Flood warning codes (Source: Environment Agency)**

- 4.3.4 It is understood that in the event of flooding, evacuation is managed by a multi-agency team in conjunction with the Police. The multi-agency team provides suitable premises for shelter, first aid, refreshments and possible transportation with consideration given to the elderly and vulnerable groups. It is essential that occupants produce robust Emergency Flood Plans to avoid putting themselves or emergency services at risk and that they do not rely solely on emergency services during the event.

**5. FLUVIAL FLOOD RISK**

- 5.1 The flood levels in Table 1 can be used to assess the flood risk at the site. Table 2 shows the flood depth and hazard across the site.
- 5.2 Although a hazard rating is not provided by the Agency, in order to determine the flood hazard at the site the hazard categories outlined in Table 13.1 of *FD2320/TR2* (Figure 6 below), which is defined by the depth and velocity of the floodwater and the ability of people to evacuate once flooding occurs, has been used (assuming 0.5 m/s velocity). It should be noted that the white cells shown on Figure 6 denote a *Very low* hazard.



**Figure 6: Hazard Classification**

**Table 2: Fluvial flood levels, depths and hazard at the site**

	1 in 20 year	1 in 100 year	1 in 100 year plus 20% climate change	1 in 100 year plus 35% climate change	1 in 100 year plus 70% climate change	1 in 1000 year
	51.10m AOD	51.29m AOD	51.36m AOD	51.39m AOD	51.47m AOD	51.53m AOD
Flood Depth (m) based on ground floor level of south western extension of 53.20m AOD.	0	0	0	0	0	0
Flood Depth (m) based on ground floor level of dwelling and north eastern extension of 53.55m AOD.	0	0	0	0	0	0
	<i>Very low hazard</i>					
	<i>Dangerous for Some</i>					
	<i>Dangerous for Most</i>					
	<i>Dangerous for All</i>					

- 5.3 Table 2 shows that flooding across the ground floor of the dwelling and extensions would not occur during all modelled events thus providing safe refuge and no internal flooding.
- 5.4 Furthermore, by reviewing the survey data it can be seen that the remainder of the site is set at least 0.77m higher than the worst-case 1 in 1000 year flood level. East Lane and Ockham Road North adjacent to the site would also not be affected during all modelled events.



## **6. FLUVIAL FLOOD RISK MITIGATION AND EVACUATION**

### **6.1 Reducing Exposure to the Hazard**

- 6.1.1 In order to assess and reduce the exposure to the hazard and the vulnerability to the hazard after the site has been developed, the guidance outlined in the DCLG/DEFRA/EA document entitled *Flood Risk Assessment Guidance for New Development Phase 2; Flood Risks to People, Phase 2; Improving the Flood Performance of New Buildings* has been consulted.
- 6.1.2 Paragraph 004 of the NPPF Planning Practice Guidance states that the first preference is to avoid flood risk by raising floor levels above the design flood level.
- 6.1.3 It has been established that the site is set outside of the design flood extent (up to 70% climate change allowance), as well as the extreme 1 in 1000 year extent, and therefore site proposals comply with the NPPG. No flood compensation is required.


### **6.2 Reducing Vulnerability to the Hazard**

- 6.2.1 The Agency aims to provide up to 2 hours notice before the issue of a *Flood Alert* for fluvial events.
- 6.2.2 It is recommended that the occupants liaise with the Agency in order to register with the Agency's Flood Warnings Direct service and ensure that they are aware of the flood risk so that they have the option to escape/evacuate upon receipt of a *Flood Alert* or upon the instruction of the emergency services.
- 6.2.3 The occupants should develop a *Family Flood Plan*. Further guidance is offered in the Environment Agency's guidance document entitled *What to do before, during and after a flood*. The *Family Flood Plan* should consider, for example, information about vital medication needed and a *Flood Kit*.
- 6.2.4 A *Flood Kit* is a useful precautionary measure especially if evacuation from the site is prolonged. The kit should be stored in an accessible location to ensure that it is not affected by floodwater. The contents should also be checked every 6 months and items replaced if necessary.
- 6.2.5 It may be sensible to compile two *Flood Kit's* to suit each eventuality. For example, a smaller kit could be compiled which would allow the occupants to carry it during evacuation. A larger kit could also be compiled which included additional food and beverage items in case of ongoing refuge within the property. Both kits should contain the necessary items as suggested below.

1. Important documents
2. Torch and batteries
3. Mobile phone (fully charged)
4. First-aid kit
5. Wind-up radio
6. Important telephone numbers
7. Bottled water
8. Non-perishable food provisions
9. Rubber Gloves and wellington boots
10. Medication or information relating to medication and its location
11. Blankets, warm clothes
12. Essential toiletries

- 13. Camera to record any damage
- 14. Emergency cash

**Table 3: Flood Event Action Plan**

Environment Agency Flood Warning Code	What to do!	Evacuate?
<p><b>Flood Alert</b> (Flooding Possible. Be aware/prepared! Watch Out).</p> 	<ul style="list-style-type: none"> <li>• Monitor flood risk through media and Floodline Warnings Direct.</li> <li>• Locate occupants and inform them of risk. If away from the site make assessment on risk if considering returning to site (i.e. how long it will take to return etc).</li> <li>• Begin to implement Flood Plan.</li> <li>• Gather Flood Kit and provisions in the event that evacuation is not possible.</li> <li>• Consider advice given from emergency services/Environment Agency.</li> </ul>	<p>Optional.</p> <p>Drive carefully if evacuating as roads may be flooded or closed.</p> <p>If evacuation is not possible people should reside across the building with their flood kit.</p>
<p><b>Warnings no longer in force</b> (No further flooding is expected in the area. Be careful).</p>	<ul style="list-style-type: none"> <li>• Return to site upon instruction from emergency services and assess any damage.</li> <li>• Contact insurance company depending on damage caused.</li> <li>• Beware of flood debris.</li> <li>• Do not touch sources of electricity.</li> </ul>	<p>Not applicable.</p>

### 6.3 Vulnerable Groups

- 6.3.1 The occupants at the site may include vulnerable groups such as elderly people, those with sensory or physical disabilities, minority ethnic groups, or the infirm. Priority will need to be given to these people during the flood event.
- 6.3.2 Vulnerable groups should be identified and priority should be given to these groups.

### 6.4 Safe Access/Egress

- 6.4.1 Safe access/egress is available during all flood events via Ockham Road North and East Lane as ground levels adjacent to the site are set above all modelled flood levels.

### 6.5 Insurance

- 6.5.1 The Association of British Insurers (ABI) published a guidance document in 2012 entitled *Guidance on Insurance and Planning in Flood Risk Areas for Local Planning Authorities in England*.
- 6.5.2 The ABI guidance sets out the requirements of the insurance industry when considering flood risk and insurability of the property. The guidance suggests that properties should

be protected for flood events up to the 1 in 100 year event in order to access insurance at a competitive price.

- 6.5.3 The guidance also states that insurers would of course prefer to cover properties which are not at risk of flooding, however, for those properties which are at risk of flooding insurers would prefer that the properties are raised above the flood level, over resistance measures which prevent floodwater from entering the building, or resilience measures which allows floodwater to enter the building.
- 6.5.4 The ground floor is set above the climate change 1 in 100 year event and 1 in 1000 year event. Therefore, the ABI's requirement of protection during a 1 in 100 year event will be met and there will be a good chance of the property being insured at a competitive rate.



## **7. OTHER SOURCES OF FLOODING**

### **7.1 Groundwater Flooding**

7.1.1 In order to assess the potential for groundwater flooding during higher return period rainfall events, the Jacobs/DEFRA report entitled *Strategy for Flood and Coastal Erosion Risk Management: Groundwater Flooding Scoping Study*, published in May 2004, was consulted, together with the guidance offered within the document entitled *Groundwater flooding records collation, monitoring and risk assessment (ref HA5)*, commissioned by DEFRA and carried out by Jacobs in 2006.

#### **Soil and Geology at the Site**

7.1.2 The British Geological Survey's *Online Geology of Britain Viewer* indicates that the soils beneath the site comprise silty, sandy clay.

#### **Groundwater Flooding Potential at the Site**

7.1.3 There have been no recorded groundwater flood events across the area between 2000 and 2003, as indicated by the Jacobs study. Figure 8 of the SFRA and the BGS Groundwater Flooding Susceptibility Map indicates that there is *Potential for groundwater flooding to occur at the surface*.

7.1.4 The SFRA states that the underlying geology presents a low groundwater flood risk across the northern parts of the Borough and that there are very few records of historical groundwater flooding across the Borough.

7.1.5 The building footprint will also reduce the risk of groundwater flooding to acceptable levels.

### **7.2 Surface Water Flooding and Sewer Flooding**

7.2.1 Surface water and sewer flooding across urban areas is often a result of high intensity storm events which exceed the capacity of the sewer thus causing it to surcharge and flood. Poorly maintained sewer networks and blockages can also exacerbate the potential for sewer flooding. Surface water flooding can also occur as a result of overland flow across poorly drained rural areas.

7.2.2 Figure 7 of the SFRA shows that according to the Thames Water DG5 register in this postcode area there have been 1 incident of sewer flooding. The data is on a broad scale and does not identify specific addresses. Therefore, the risk from sewers is considered to be low.

7.2.3 The Agency's Surface Water Flooding Map (Figure 7) and Figure 6A-2 of the SFRA indicates that there is a very low surface water flood risk across the area of the site intended for the extensions (i.e. chance less than 1 in 1000 years).

7.2.4 It is generally accepted that the low risk flood event (i.e. between 1 in 1000 years and 1 in 100 years) on the Agency's map is used as a substitute for the climate change 1 in 100 year event to provide a worst-case scenario.



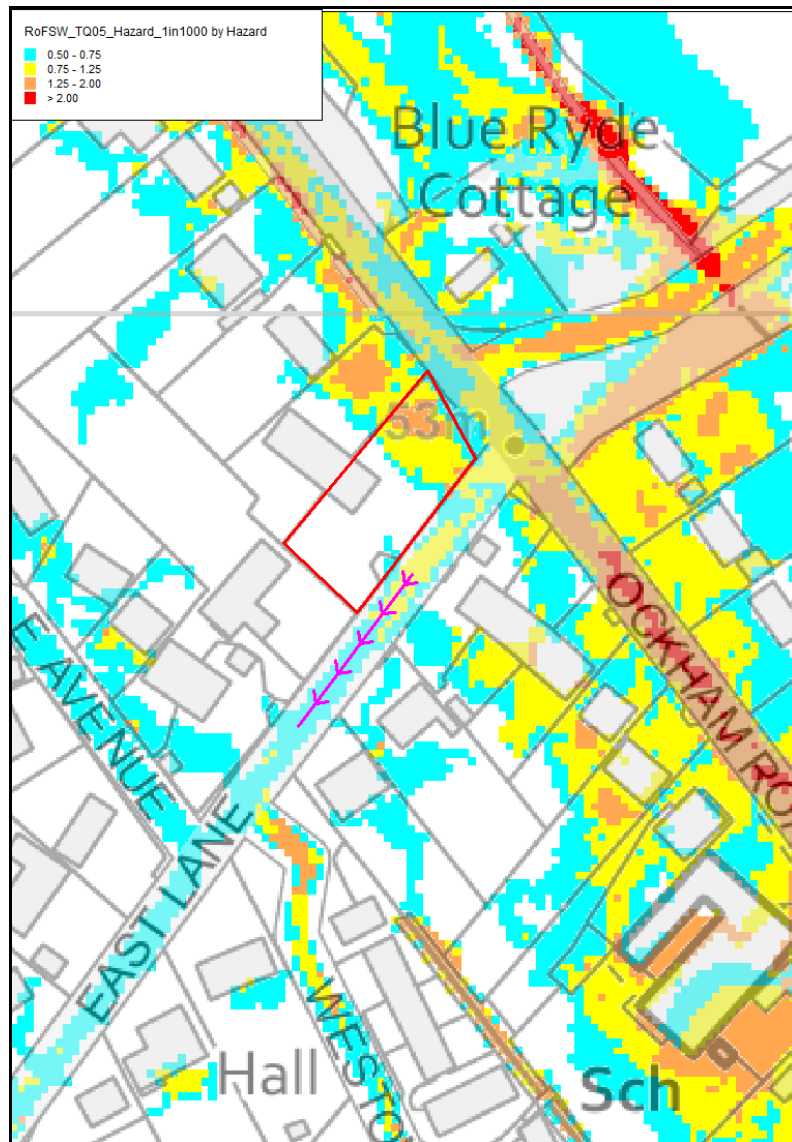
**Figure 7: Environment Agency Surface Water Flooding Map (Source: Environment Agency, 2023)**

**Safe Access/Egress**

- 7.2.5 The EA surface water flood map on Figure 7 shows that East Lane adjacent to the site entrance would be affected during low surface water flood events.
- 7.2.6 Further more detailed data has been obtained via the Data.gov.uk site (<https://environment.data.gov.uk/DefraDataDownload/?Mode=rofsw>). The flood extent, depth and hazard GIS *shape file* was downloaded from Data.gov.uk (for tile TQ\_05).
- 7.2.7 The flood hazard is calculated based on different combinations of floodwater depth and velocity, and subsequently by using the hazard equation as cited in the DEFRA/EA R&D Document *Framework and guidance for assessing and managing flood risk for new development Phase 2 (FD2320/TR2)*. The numerical hazard rating is then categorised into four degrees of flood hazard in accordance with *FD2320/TR2*, shown on Table 4 overleaf.
- 7.2.8 The hazard rating has been extracted from the surface water hazard data and according to Table 4 overleaf the hazard to people would be *Dangerous for Some* for 12m then *Very low* (Figure 8).

**Table 4: Hazard to people categories (based on FD2320/TR2)**

Hazard Rating	Degree of Flood Hazard	Description
< 0.75	Very low hazard	Caution "Flood zone with shallow flowing water or deep standing water"
0.75 – 1.25	Danger for Some	Dangerous for some (i.e. children) "Danger: Flood zone with deep or fast flowing water"
1.25 – 2.0	Danger for Most	Dangerous for most people (i.e. general public) "Danger: Flood zone with deep fast flowing water"
> 2.0	Danger for All	Dangerous for all "Extreme danger: flood zone with deep fast flowing water"



**Figure 8: Preferred evacuation route and hazard (see Table 4 above for hazard classification)**

### **7.3 Reservoirs, Canals And Other Artificial Sources**

- 7.3.1 The failure of man-made infrastructure such as flood defences and other structures can result in unexpected flooding. Flooding from artificial sources such as reservoirs, canals and lakes can occur suddenly and without warning, leading to high depths and velocities of flood water which pose a safety risk to people and property.
- 7.3.2 The Environment Agency’s “Risk of flooding from reservoirs” map indicates that the site is not at risk of flooding from reservoirs.

## **8. CONCLUSIONS**

- The site is located within Flood Zone 3. However, the flood risk assessment and flood modelling for the Stratford Brook undertaken by Peter Brett Associates Ltd in March 2019 for planning application 19/P/O1541, suggests that the site is located entirely within Flood Zone 1.
- The aforementioned modelling indicates that the climate change 1 in 100 year flood level (up to 70% climate change allowance) does not reach the site and the ground floor is set higher than the design flood level.
- The site is also set above the extreme 1 in 1000 year extent.
- The site is set at least 0.77m higher than the worst-case 1 in 1000 year flood level. East Lane and Ockham Road North adjacent to the site would also not be affected during all modelled events.
- A warning and evacuation strategy has been developed within this assessment. It is proposed that the occupants register with the Agency's *Flood Warnings Direct* and prepare a *Family Flood Plan*.
- Safe access/egress can be achieved during the peak of the design and extreme fluvial event.
- Safe refuge is available during the flood event at all times.
- It is considered that there is a low risk of groundwater flooding at the site from underlying deposits.
- The Environment Agency's Surface Water Flooding Map indicates that there is a very low surface water flood risk.

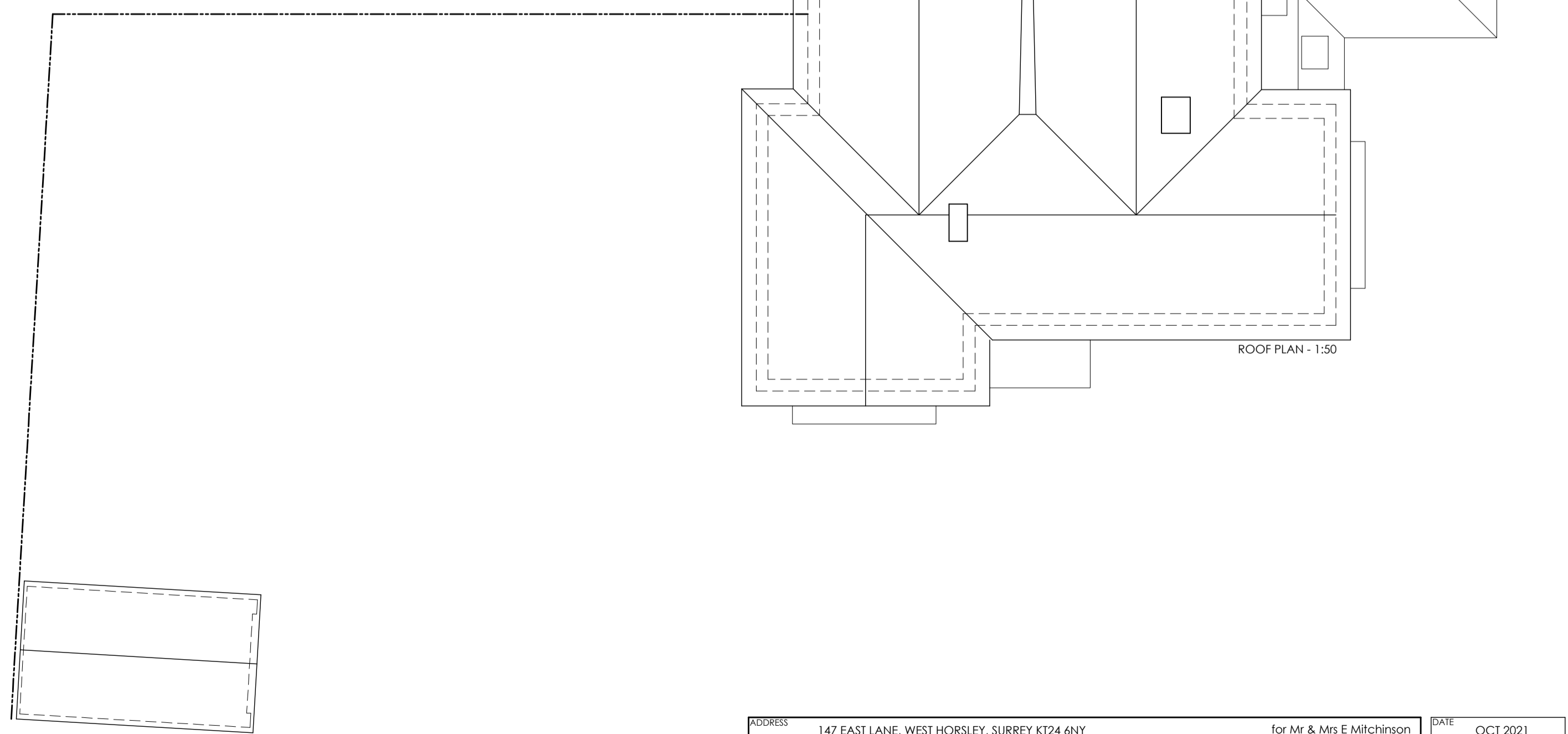
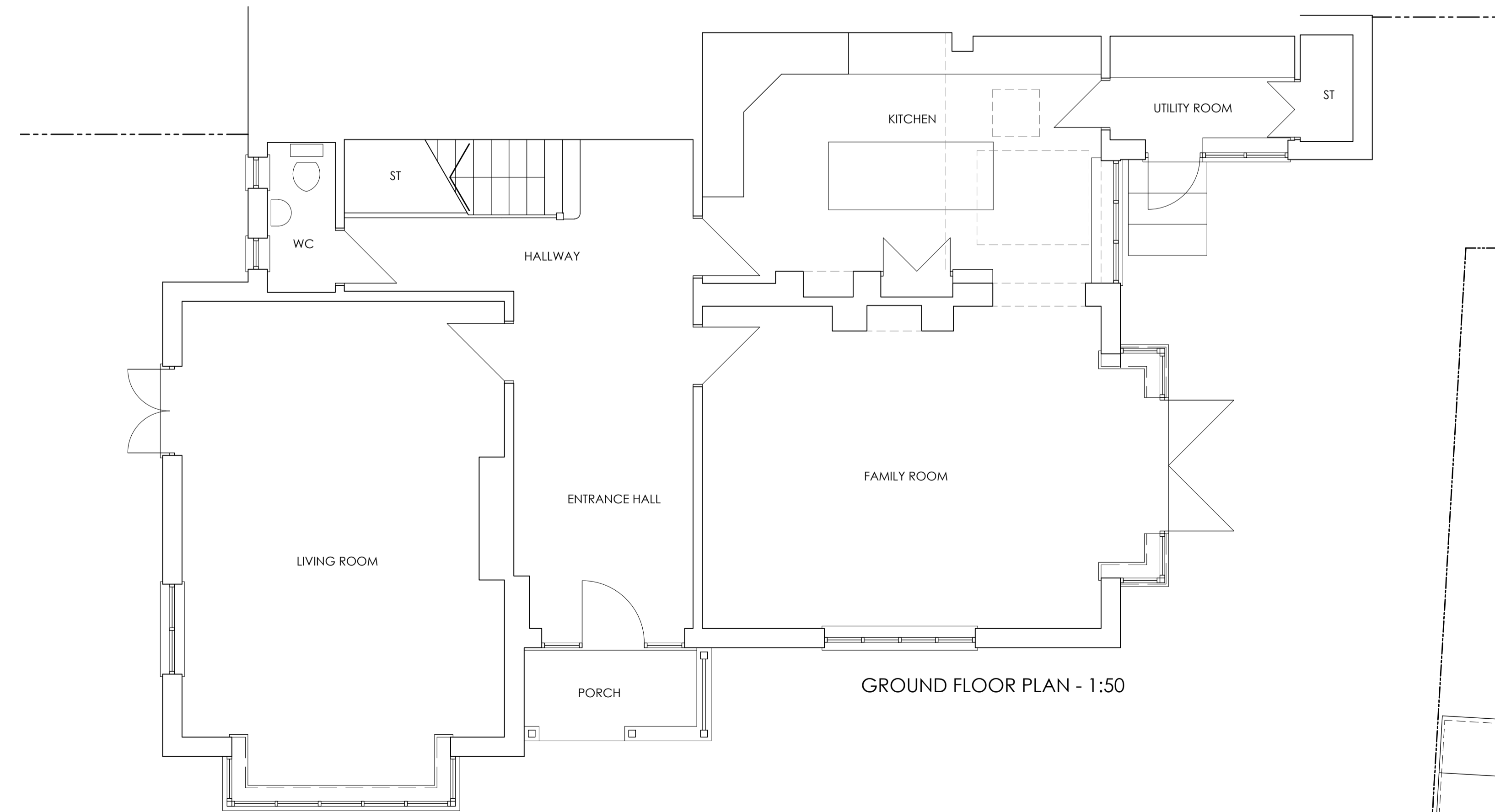
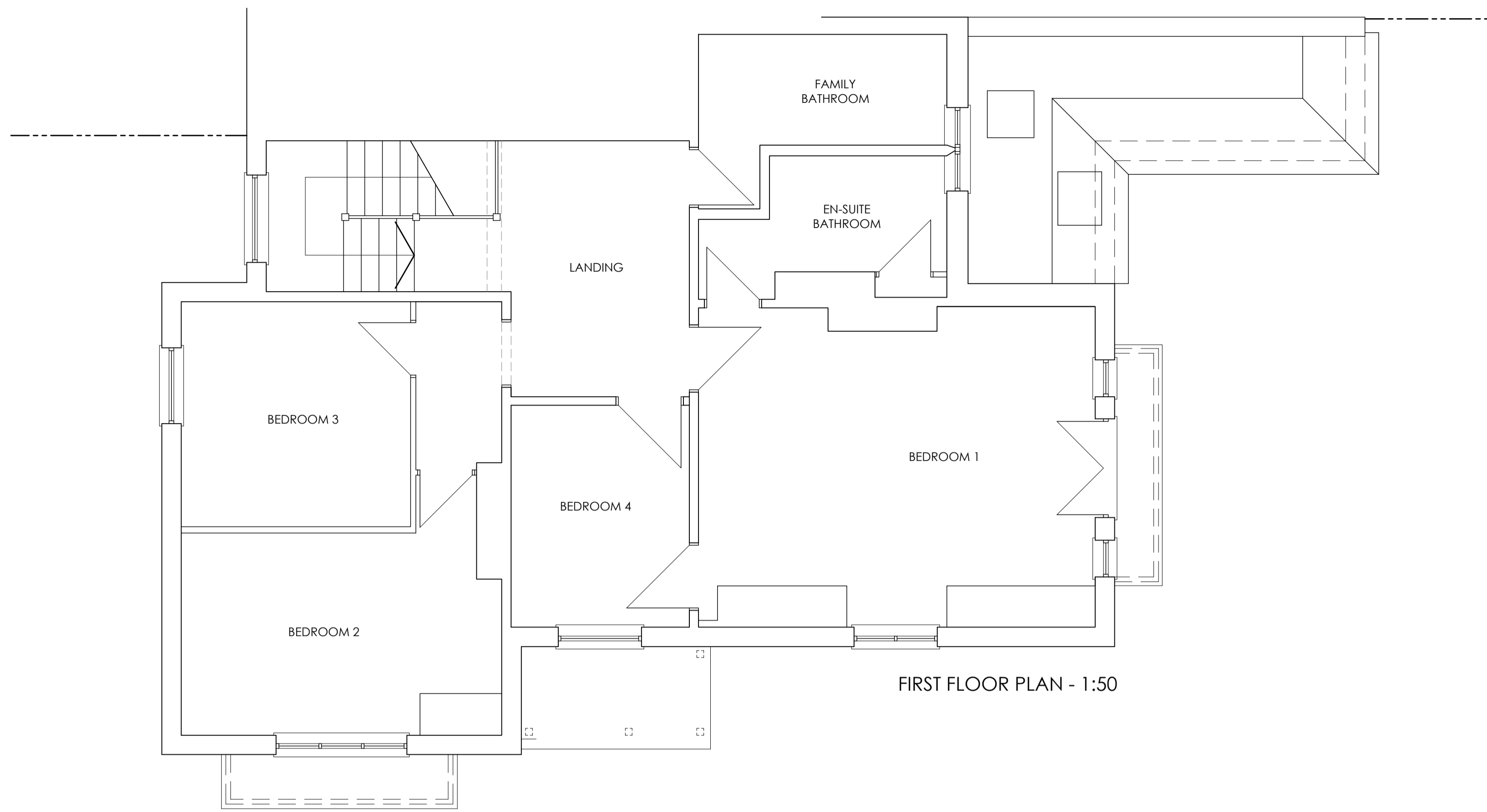
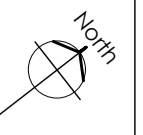
## 9. BIBLIOGRAPHY

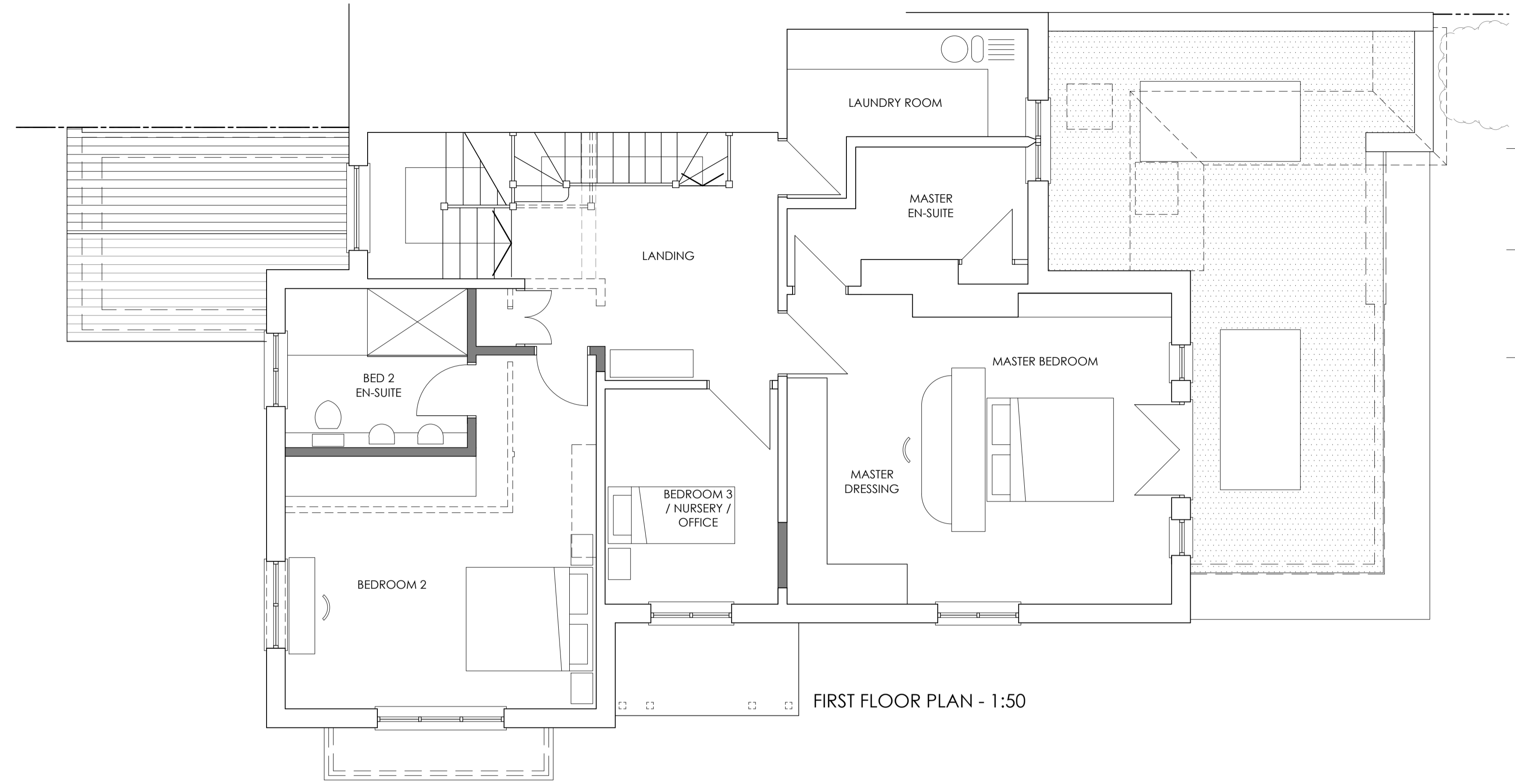
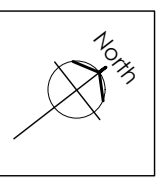
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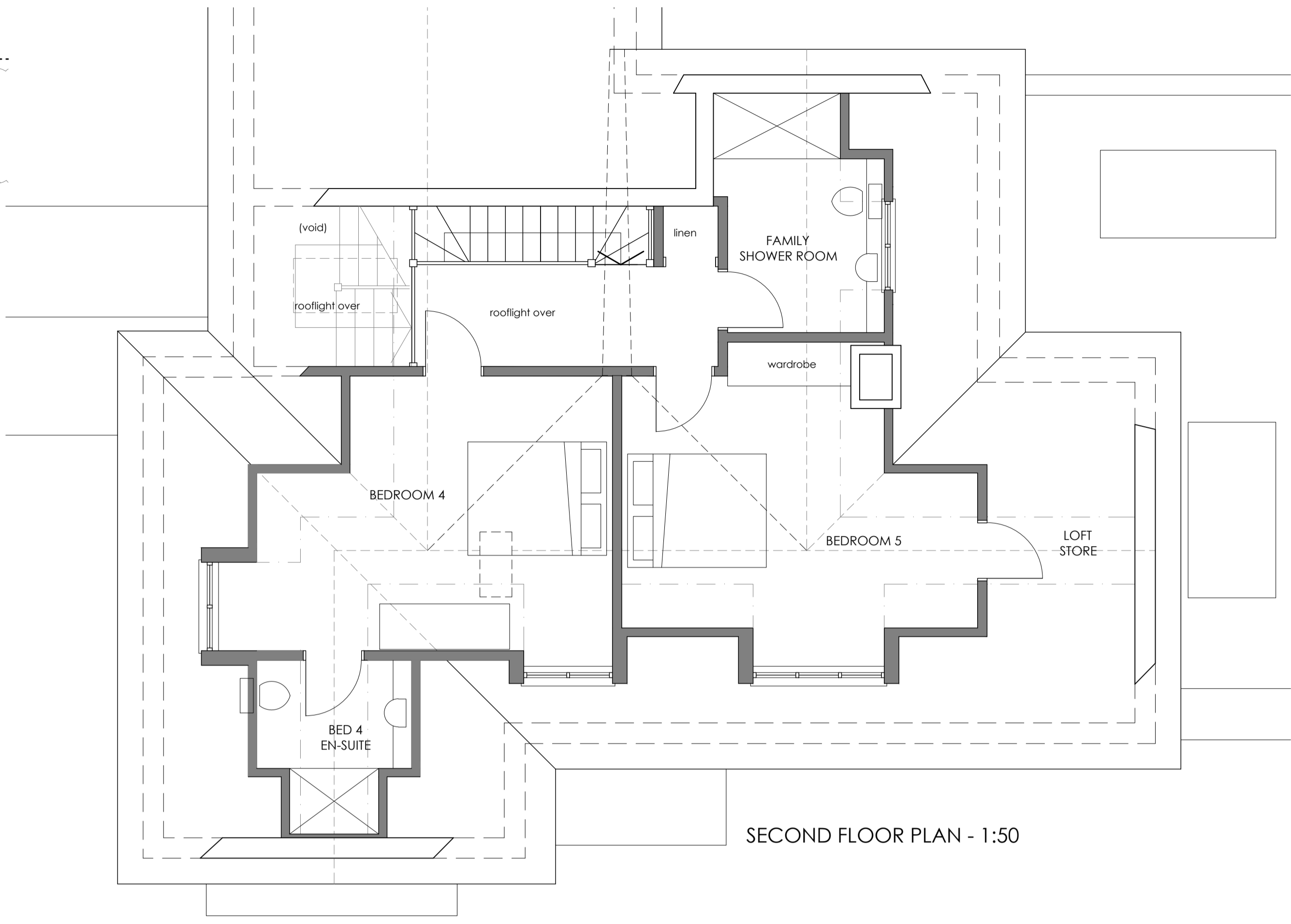
## **DRAWINGS**



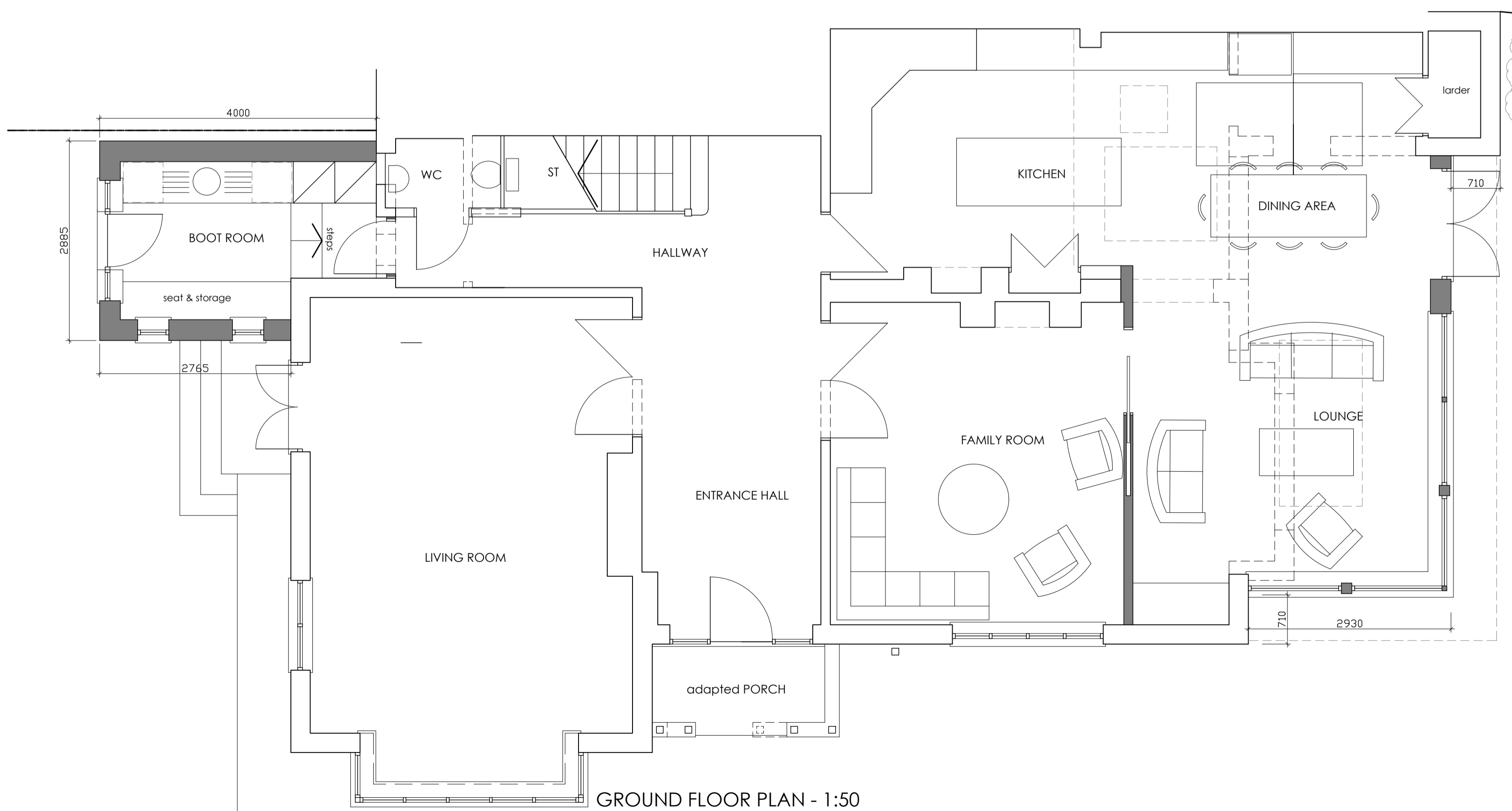




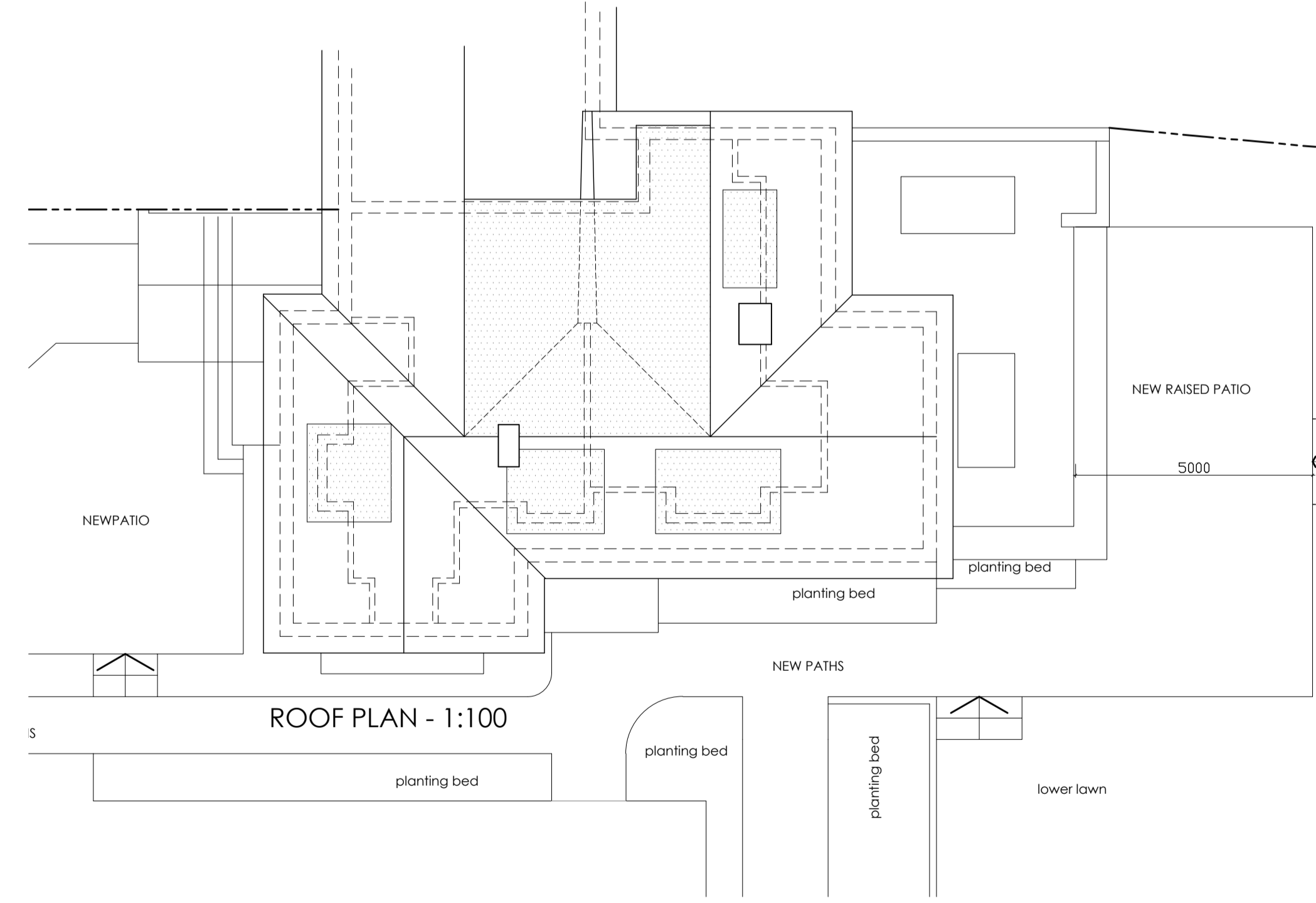
FIRST FLOOR PLAN - 1:50



SECOND FLOOR PLAN - 1:50



GROUND FLOOR PLAN - 1:50



ROOF PLAN - 1:100

