

**FLOOD RISK ASSESSMENT  
FOR RESIDENTIAL DEVELOPMENT AT  
SQUIRES DROVE, THREE HOLES**

**FINAL REPORT**

**ECL0740a/SWANN EDWARDS ARCHITECTURE**

**DATE FEBRUARY 2023**

**ELLINGHAM CONSULTING LTD**

Email: [tim@ellinghamconsulting.co.uk](mailto:tim@ellinghamconsulting.co.uk)

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#### DISCLAIMER

*This document has been prepared solely as a Flood Risk Assessment in support of a planning application for a proposed residential development at Squires Drove, Three Holes. “Ellingham Consulting Ltd” accepts no responsibility or liability whatsoever for any use made of this document other than by the client “Mrs I Forth” for the purposes it was originally commissioned and prepared. All comments and opinions made are based upon information available to “Ellingham Consulting Ltd” during the necessary investigative process, and the conclusions and recommendations, could therefore, differ in the event of material subsequently being found erroneous, incomplete, or misleading. “Ellingham Consulting Ltd” therefore, accepts no liability should this prove to be the case.*

## **1.0 INTRODUCTION**

This Flood Risk Assessment has been prepared in accordance with National Planning Policy Framework (NPPF) and supporting planning practice guidance (PPG) on Flood Risk and Coastal Change.

In areas at risk of flooding or for sites of 1 hectare or more, developers are required to undertake a site-specific Flood Risk Assessment to accompany an application for planning permission. This Flood Risk Assessment has been produced on behalf of Mrs I Forth in respect of a development that consists of the conversion of a barn to form one residential dwelling at Squires Drove, Three Holes.

Planning application (22/00659/PACU3) to convert an agricultural building into a dwelling was approved in September 2022. The proposed development will supersede the approval granted. A planning application for the proposed development is to be submitted by Swann Edwards Architecture.

The mitigation measures proposed within this Flood Risk Assessment are consistent with those recommended within the Flood Risk Assessment prepared to support the previous applications.

## 2.0 SITE LOCATION AND DESCRIPTION

### 2.1 Site Location

The site is situated at Burnsill, Squires Drove, Three Holes, Wisbech, PE14 9JY. The National Grid Reference of the site is 55123/30007.

The location of the site is shown in Figure 1.



Figure 1 – Location Plan (© OpenStreetMap contributors)

### 2.2 Existing Site

The site is on the southern side of Squires Drove. The site comprises an access track that is to the west of Burnsill and an agricultural building that is to the south of Burnsill. The site is surrounded by agricultural land. The area of development is approximately 0.14 hectares.

A site survey has been undertaken relative to a site datum. The spot levels, which are shown in Attachment 1, indicate that the site is flat and at a level approximately 0.2m below the carriageway level of Squires Drove. Environment Agency LiDAR shows that the ground level at the barn is between +2.3m OD and +2.4m OD. The agricultural land surrounding site is typically between +1.5m OD and +2.2m OD.

The site is in the Upwell Internal Drainage Board's (IDB) area. Surface water at the site drains naturally through soakaway and hence to the IDB drain system. There is an IDB drain on the western boundary of the site.

The online British Geological Survey maps indicate that the site is likely to be underlain by the Amphill Clay Formation mudstone. The bedrock is shown to be overlain with superficial deposits of clay and silt.

## 2.3 Proposed Development

The proposed development consists of the construction of one dwelling. The dwelling will have two storeys. Details of the proposed development are shown in Attachment 2.

## 2.4 Local Development Documents

The King's Lynn and West Norfolk Borough Council Local Development Framework - Core Strategy is the adopted Local Plan for the district. Policy CS08 for Sustainable Development states the requirements for flood risk reduction.

The King's Lynn and West Norfolk Borough Council Level 1 Strategic Flood Risk Assessment (SFRA) was prepared in November 2018. The Level 2 SFRA was prepared in March 2019.

The Norfolk Lead Local Flood Authority (LLFA) Statutory Consultee Guidance Document has been drafted to support the development of Norfolk County Council's LLFA role as a statutory consultee to planning and to inform stakeholders in this process such as Local Planning Authorities (LPA's) and developers.

## 2.5 Flood Zones

An extract from the Environment Agency Flood Map for Planning is shown in Figure 2. The site is located within defended Flood Zone 3, an area with a high probability of flooding benefitting from defences.

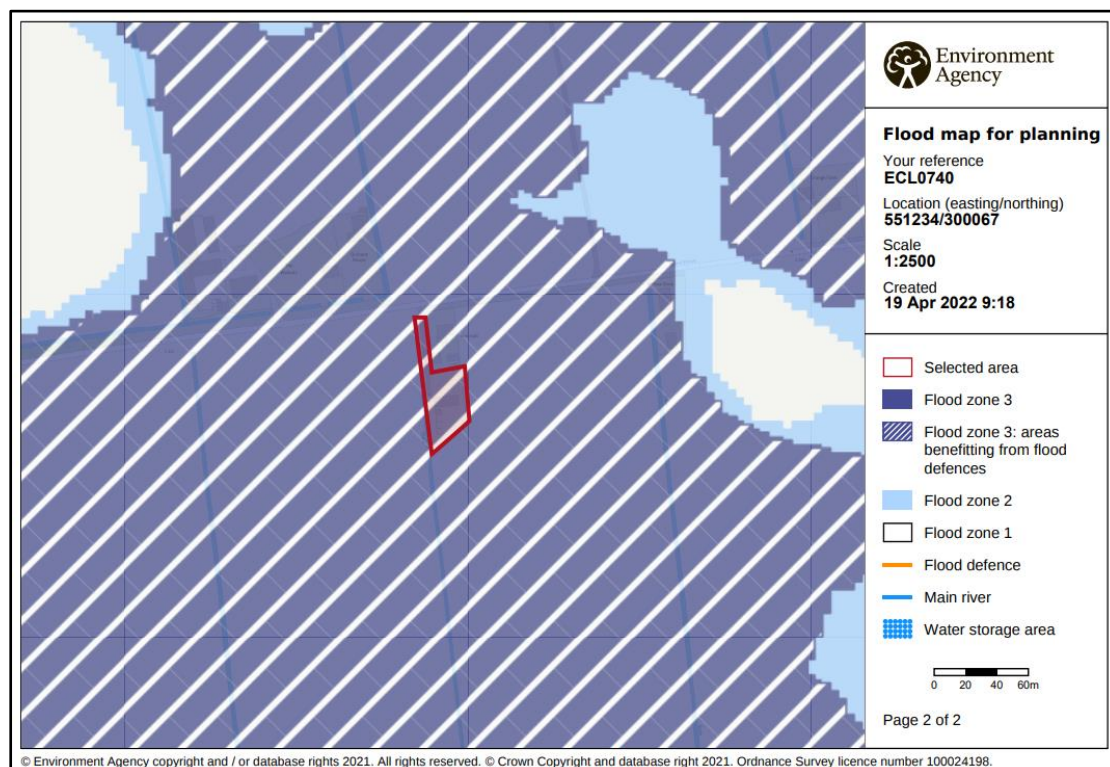


Figure 2 – Environment Agency Flood Map for Planning

The Environment Agency Long Term Flood Risk maps show that:

- the site has a medium risk of flooding from rivers or the sea (annual probability between 1% and 3.3%);
- the site has a very low risk of surface water flooding (annual probability less than 0.1%); and
- the site is within an area at risk of reservoir flooding when river levels are normal.

The site is not within one of the settlements considered within the King's Lynn and West Norfolk Borough Council Level 2 SFRA. As such the Level 1 SFRA maps have been reviewed and they show that:

- the site is in Flood Zone 3;
- the site is not at risk during a 1% annual probability (1 in 100 chance each year) fluvial event including allowance for climate change;
- the site is not at risk during a 0.5% annual probability (1 in 200 chance each year) tidal event including allowance for climate change;
- the site is not at risk of surface water flooding during the 1% annual probability (1 in 100 chance each year) event including 40% allowance for climate change;
- the site is not in an area with susceptibility to groundwater flooding;
- the site is not within an area at risk from a tidal breach;
- the site is within an area at risk from reservoir flooding; and
- the site is not within a dry island.

### **3.0 FLOOD RISK VULNERABILITY**

#### **3.1 The Sequential and Exception Test**

The NPPF requires the application of a Sequential Test to ensure that new development is in areas with the lowest probability of flooding.

The Exception Test is a method to demonstrate and help ensure that flood risk to people and property will be managed, while allowing necessary development to go ahead in situations where suitable sites at lower risk of flooding are not available.

#### **3.2 Vulnerability Classification**

Table 2 of the PPG Flood Risk and Coastal Change categorises different types of uses and development according to their vulnerability to flood risk. The proposed development is covered by the description of buildings used for dwellings and is classified as 'More Vulnerable'.

Table 3 of the PPG Flood Risk and Coastal Change sets out Flood Risk Vulnerability and flood zone 'compatibility'. The site is in Flood Zone 3 and the development is 'More Vulnerable' therefore it is necessary to complete the Exception Test.

PPG Flood Risk and Coastal Change defines that the lifetime of the development in terms of flood risk and coastal change is 100 years.

#### **3.3 Application of the Sequential Test and Exception Test**

It is for the Local Planning Authority, using the evidence provided and taking advice from the Environment Agency as appropriate, to consider whether an application passes the Sequential Test.

The site has permission for the conversion of the agricultural building to form a dwelling. It is considered that the permissions for the change of use of the building has established the principle for a dwelling at the site. It is proposed that the dwelling that forms this application will replace the existing permissions.

As the proposed development can be considered to be the same as a replacement dwelling it is not necessary to apply the Sequential Test.

The Exception Test requires consideration of the wider sustainability benefits of a development and that the development would be safe and residual risks managed.

The Core Strategy defines the housing distribution for new dwellings across the Borough. Rural Villages, including Three Holes, have a target of at least 1,280 new dwellings over the period from 2011 to 2026. The proposed development will contribute to this target and the provision of rural housing is a benefit.

Section 5 of this Flood Risk Assessment describes the flood mitigation measures and the management of the residual risks, demonstrating that this development will be safe and not increase flood risk elsewhere. The development is considered to pass the Exception Test.



## **4.0 SITE SPECIFIC FLOOD RISK**

### **4.1 Local Flood Assets**

The site is 5.1km from the Ouse Washes, a washlands providing flood storage to manage flood risk. The site, and the Middle Level drainage area, is protected from the Ouse Washes by the Middle Level Barrier Bank. The barrier bank is inspected and maintained in accordance with the standards of the Reservoirs Act. This defence is the responsibility of the Environment Agency

There is a long-term strategy for the maintenance of the Environment Agency defences which is reviewed and updated periodically.

There is an extensive local drainage network managed by Upwell IDB. A Board drain is located on the western boundary of the site. The site and surrounding land drains by gravity to an outfall discharging to Popham's Eau.

During the operation and maintenance of its pumping stations, associated structures, and channel systems, the IDB seeks to maintain a general standard capable of providing flood protection to its district. A routine maintenance programme is in place to ensure that the Board's assets are commensurate with the standard of protection that is sought.

The site is 500m from Popham's Eau, an embanked channel which flows into the Middle Level Main Drain. The Middle Level Main Drain outfalls to the River Great Ouse via the St Germans Pumping Station. Popham's Eau, the Middle Level Main Drain and St Germans Pumping Station are the responsibility of the Middle Level Commissioners (MLC).

Current maintenance standards of the Upwell IDB's, the Middle Level Commissioners and the Environment Agency's defences are generally good.

### **4.2 Sources of Flooding**

The potential sources of flooding that have been identified during this assessment are:

- local blockages to the IDB main drain system;
- an event in the local drainage network that exceeds the standard of protection;
- failure of the outfall discharging to Popham's Eau;
- failure of St German's Pumping Station;
- overtopping and/or breaching of Popham's Eau; and
- overtopping and/or breaching of the Middle Level Barrier Bank.

### **4.3 Probability of Flooding**

The probability of flooding associated with blockages in the Upwell IDB drainage system is low due to the maintenance standards achieved and managed by the IDB.

The standard of drainage provided by Upwell IDB is assessed at 2% annual probability (1 in 50 chance each year). This is compatible with the Department of the Environment, Food and Rural Affairs (DEFRA) target level of service for rural drainage and flood defence works. The risk associated with flooding due to events greater than 2% annual probability (1 in 50 chance each year) is lowered due to the Board drains incorporating freeboard. This provides storage during events greater than 2% annual probability (1 in 50 chance each year).

Popham's Eau and St Germans Pumping Station offer protection against the 1% annual probability (1 in 100 chance each year) fluvial flood event with an allowance for climate change. The likelihood of overtopping and/or breach of Popham's Eau embankments is remote. The St German Pumping Station was replaced in 2011 so that a standard of protection against the 1% annual probability (1 in 100 chance each year) event could be maintained.

The Middle Level Barrier Bank is located 5.1km from the development. The Barrier Bank is inspected and maintained in accordance with the standards of the Reservoirs Act. The barrier bank provides protection during the 0.1% annual probability (1 in 1000 chance each year) event. The risk of floodwater reaching the site because of overtopping of the defence is very low.

#### 4.4 Historic Flooding

During the preparation of this assessment, no evidence was discovered of the site being flooded. The major flood event of Easter 1998 gave rise to the highest ever recorded floodwater levels in the Middle Level System, but no property flooding occurred because of overtopping of embankments.

#### 4.5 Climate Change

Climate change is likely to impact the site through increased rainfall intensity and duration affecting the local drainage network and increased flood levels in Popham's Eau and the Ouse Washes.

The protection provided by the Middle Level Commissioners watercourses during a flood with a 1% annual probability (1 in 100 chance each year) includes an allowance for climate change.

The SFRA shows that the site is not at risk during the 1% annual probability (1 in 100 chance each year) fluvial event with climate change.

In summary the existing systems and defences are appropriate for the design life of the development (i.e., 100 years).

## 4.6 Residual Risk

The residual risk to the site is low due to the elevation of the site relative to the surrounding land. The SFRA shows that the site is not at risk during a breach of the tidal or fluvial defences.

Water levels within the Middle Level Main Drain or Popham's Eau are such that the site is not at risk from a breach or from overtopping.

## 5.0 FLOOD RISK MITIGATION

### 5.1 Summary of Risks

The probability of this development flooding from localised drainage systems is low. Failure of the outfall to Popham's Eau would increase the level of risk at the site.

The probability of the site flooding from any Environment Agency system is less than 1% annual probability (1 in 100 chance each year) because of the standards of the existing flood defence systems. Over time there will be a gradual increase in risk to the site due to climate change. During the design life of the development the site is not at risk during the 1% annual probability (1 in 100 chance each year) event.

Any increase in impermeable area associated with the development will be minimal so there is no potential that flood risk will be increased elsewhere.

### 5.2 Mitigation Measures

Based upon the information available during the preparation of this flood risk assessment, to mitigate against the remote risk of flooding it is recommended that the dwelling has a finished floor level 0.3m above the surrounding ground level. It is recommended that there is 0.3m of flood resilient construction above finished floor level.

The risk of flooding is lowered as the proposed dwelling has 2 storeys with all sleeping accommodation on the first floor.

The developer should ensure that the occupier of the dwelling is sufficiently aware of the risk of flooding and the standard of the existing defences. The Environment Agency provides a Flood Warning Service which includes Flood Warning Codes and uses direct warning methods where the risks and impacts of flooding are high.

In addition to direct and indirect flood warnings, the Environment Agency operates a 24 hour a day Floodline Service providing advice and information on flooding. The occupier of the dwelling should register with the Floodline Direct Warnings Service to receive any future flood warnings.

If egress from the site was required during a flood, the safest route to evacuate the site is to the west along Squires Drove to Upwell which is in Flood Zone 1.

It is recommended that surface water run-off is managed so that stormwater from the development will not affect any adjoining properties or increase the flood risk elsewhere.

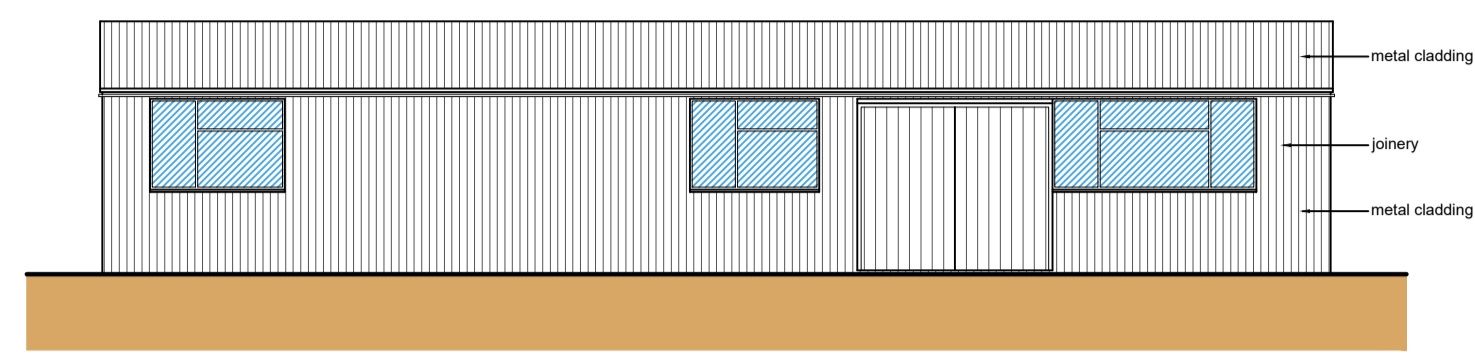
## 6.0 CONCLUSIONS

As a result of this assessment, the following conclusions have been reached.

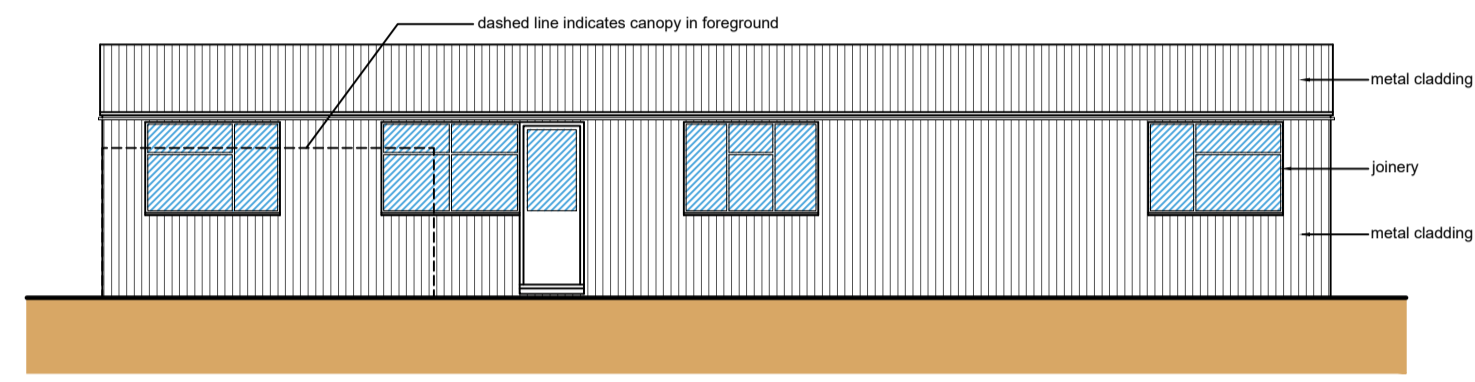
- The proposed development consists of one 2 storey dwelling on Squires Drove, Three Holes.
- The proposed development is in Flood Zone 3. The site benefits from defences on the Ouse Washes that provide protection during the 1% annual probability (1 in 100 chance each year) fluvial event with climate change.
- The site is located within an IDB catchment with a minimum standard of drainage of 2% annual probability (1 in 50 chance each year) which exceed with DEFRA guidelines for rural development. The risk of flooding is lowered further due to the Board drains incorporating a significant freeboard. This provides storage during events greater than 2% annual probability (1 in 50 chance each year).
- It is recommended that the finished floor levels are 0.3m above the surrounding ground levels and there is 0.3m of flood resilient construction above finished floor level.
- The development passes the Sequential Test and Exception Test and is therefore suitable for the proposed location.

**ATTACHMENT 1**

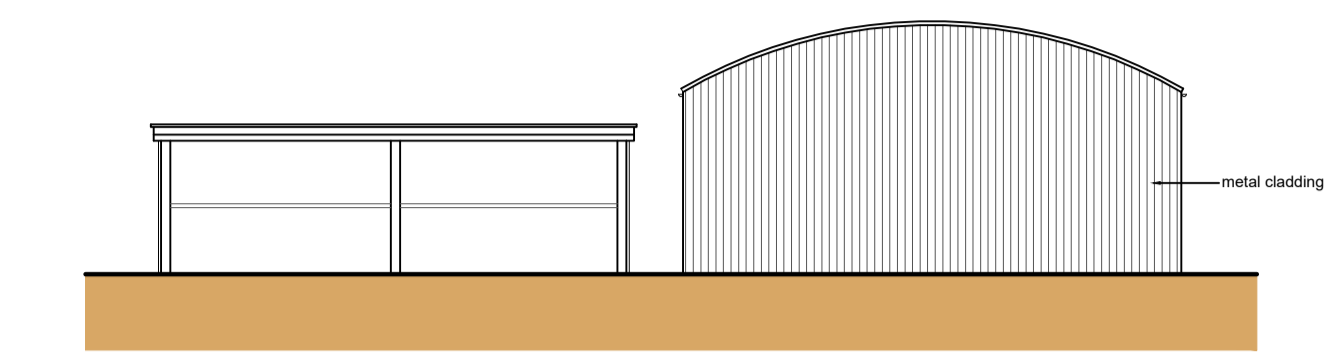
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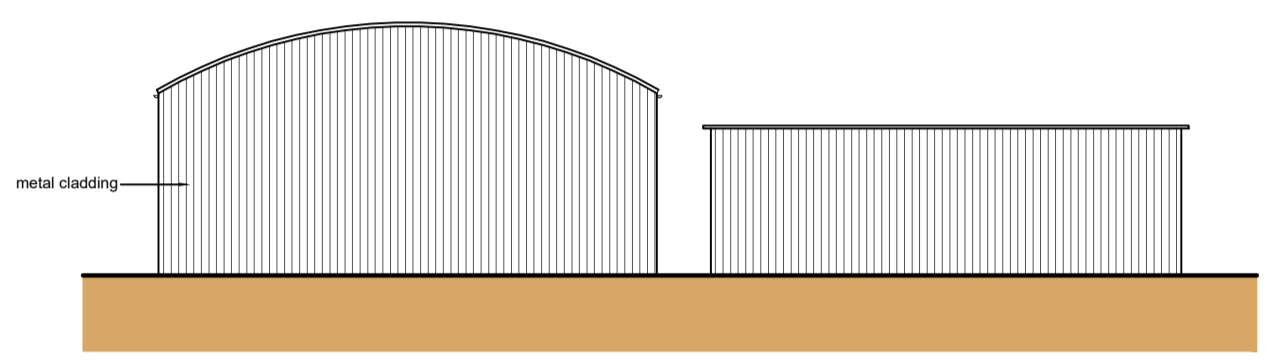
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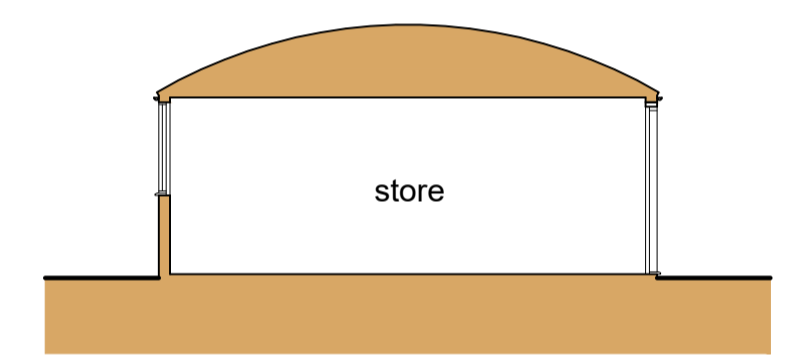
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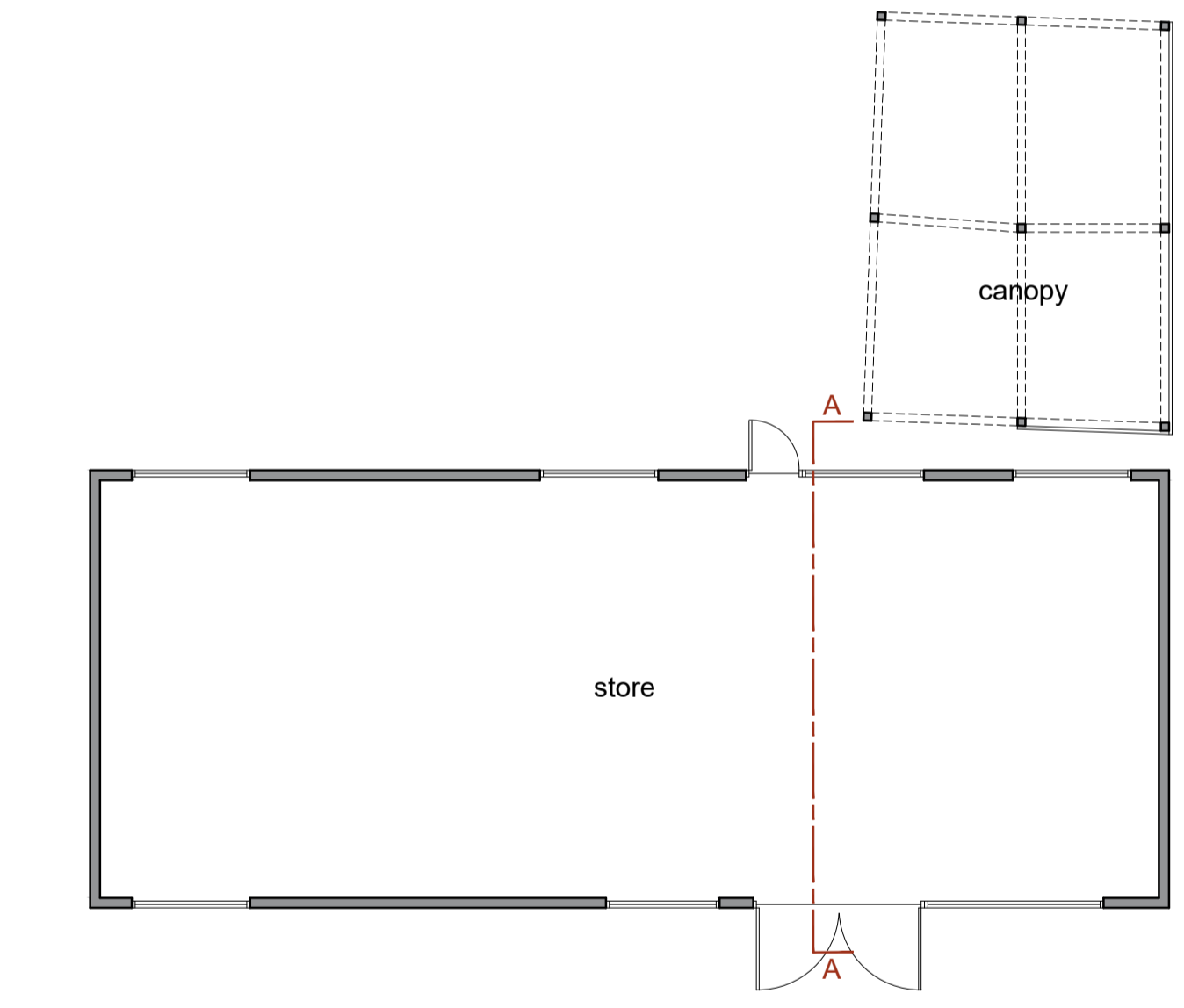
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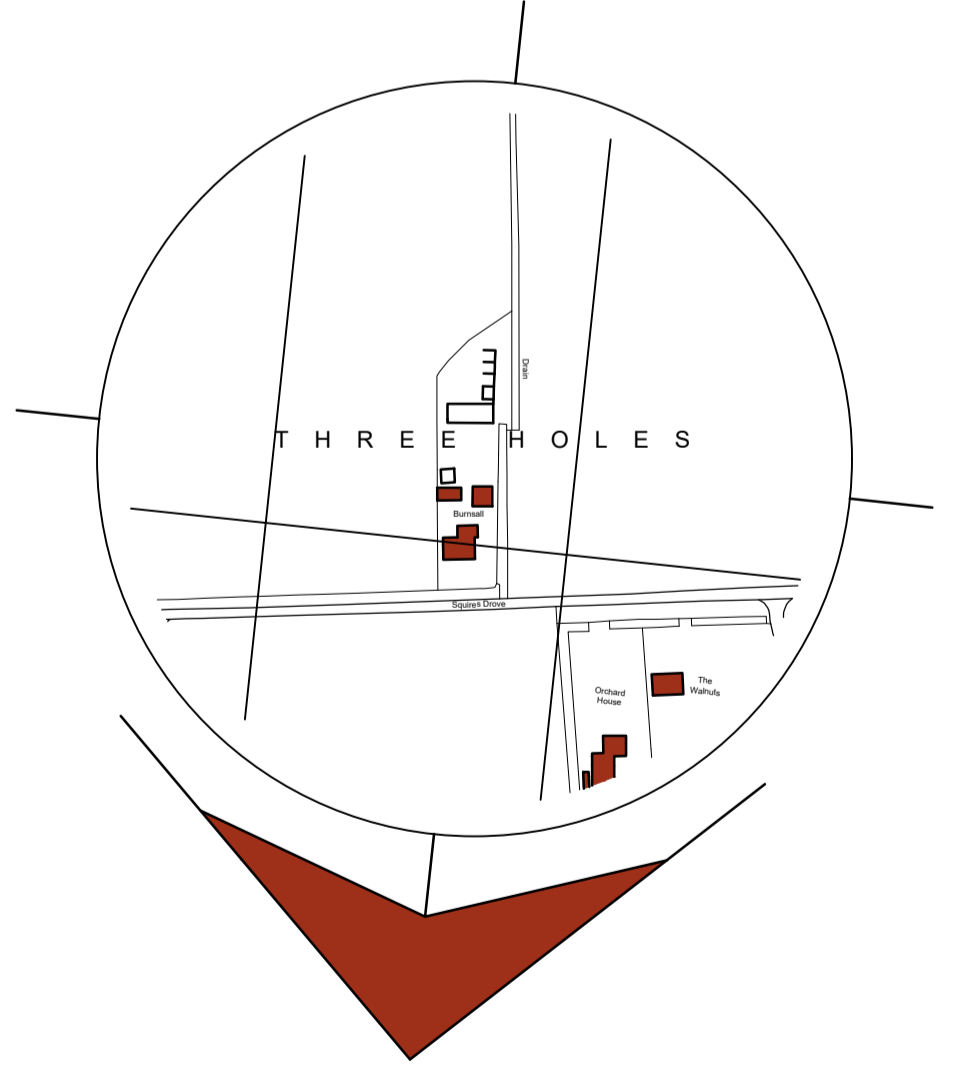
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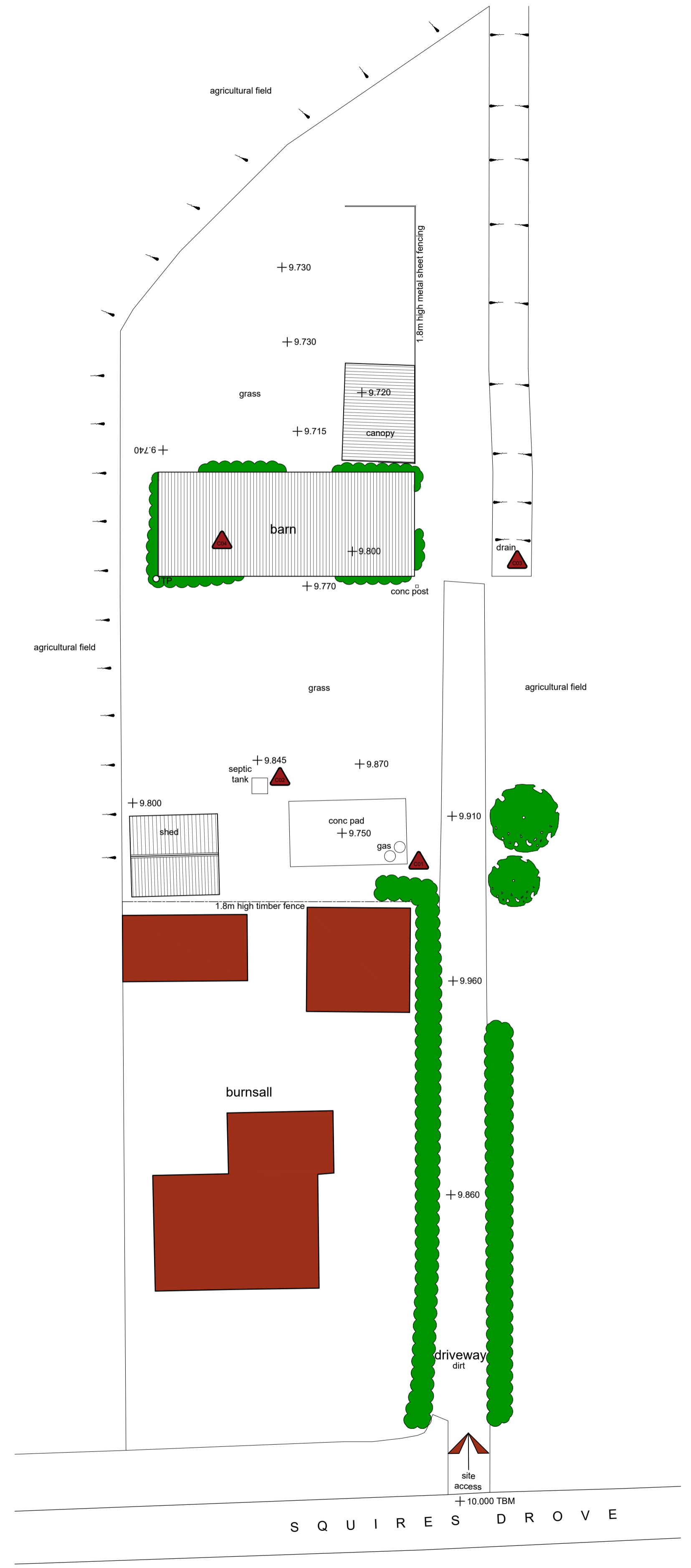
Section A-A  
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Store Floor Plan  
Scale: 1:100



Location Plan  
Scale: 1:2500



Site Plan  
Scale: 1:200

General Notes  
1. All dimensions are shown in 'mm' unless otherwise stated.  
2. The contractor, sub-contractors and suppliers must verify all dimensions on site prior to the commencement of any work.  
3. This drawing is to be read in conjunction with all relevant engineers and specialist sub-contractors drawings and specifications.  
4. Any discrepancies are to be brought to the designers attention.

**CONSTRUCTION DESIGN & MANAGEMENT REGULATIONS 2015**  
The following information must be read in conjunction with the project Risk register. This drawing highlights significant design related Health & Safety Risks present during Construction phase, and Residual Risks which remain post completion. Other Health & Safety Risks associated with Construction Activities may be present, and must be identified by the Principal Contractor prior to works commencing. Design Risks relating to specialist design items must be identified by the relevant specialist designers/ consultants and issued to the Principal Designer.

**SITE PLAN KEY**

- Indicates surveyed buildings
- Indicates un-surveyed buildings taken from OS map
- Indicates site access
- Indicates site levels taken from temporary datum
- Indicates approximate position of un-surveyed trees and hedges

C01	Gas Cylinders	
C02	Septic Tank	
C03	Drain	
C04	Potential Asbestos	

Status  
**AS EXISTING**

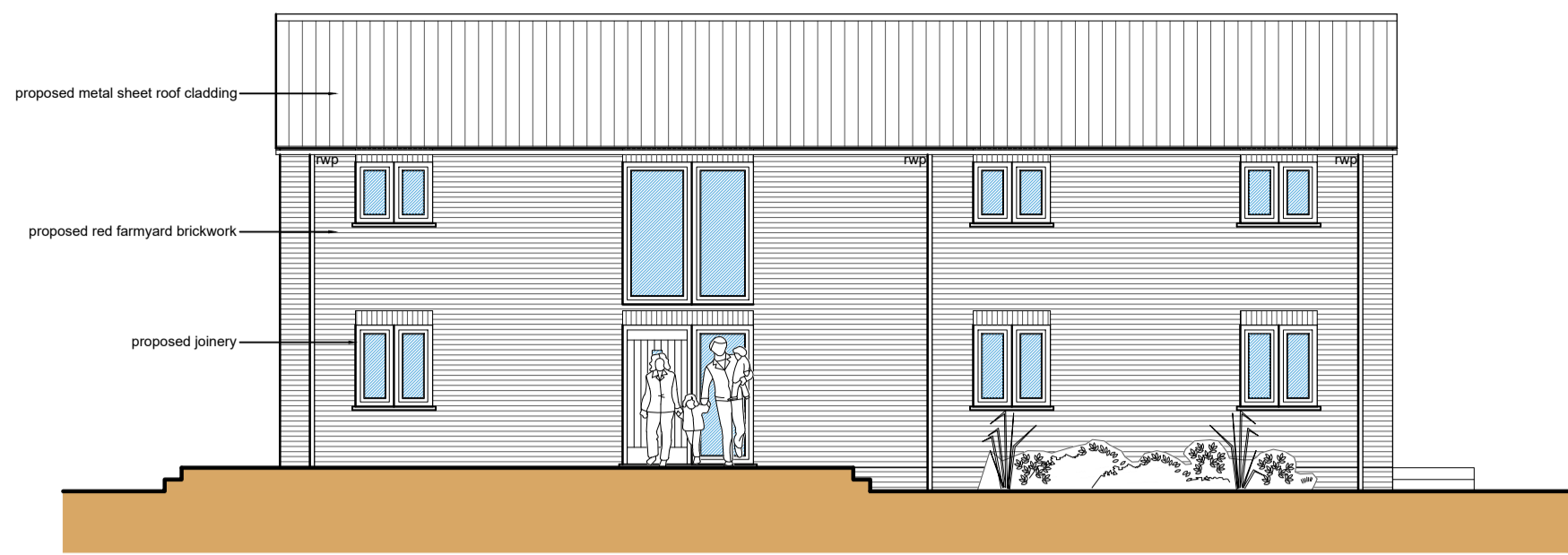
**SWANN EDWARDS ARCHITECTURE**  
Swann Edwards Architecture Limited, Swann Edwards Architecture, Black Barn, Fen Road, Guyhim, Wisbech, Cambs. PE13 4AA  
t 01945 450504 e info@swannedwards.co.uk w www.swannedwards.co.uk

Job Title	Date	Drawn by
Proposed Barn Conversion	February 2022	GT
Burnsill, Squires Drive, Three Holes		Checked by
For: Mrs. A. Lunn		GE
Drawing Title	Job No.	Sheet Size
Survey Drawing	SE-1770	A1
Site Plan, Location Plan, Floor Plans, Elevations & Section	Dwg. No.	Revision
	100	

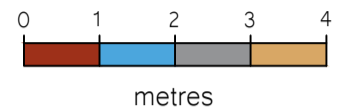
**ATTACHMENT 2**

**PLANNING DRAWING  
(DWG SE-1770 PP1000)**

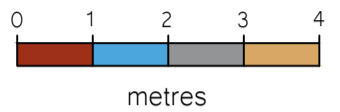




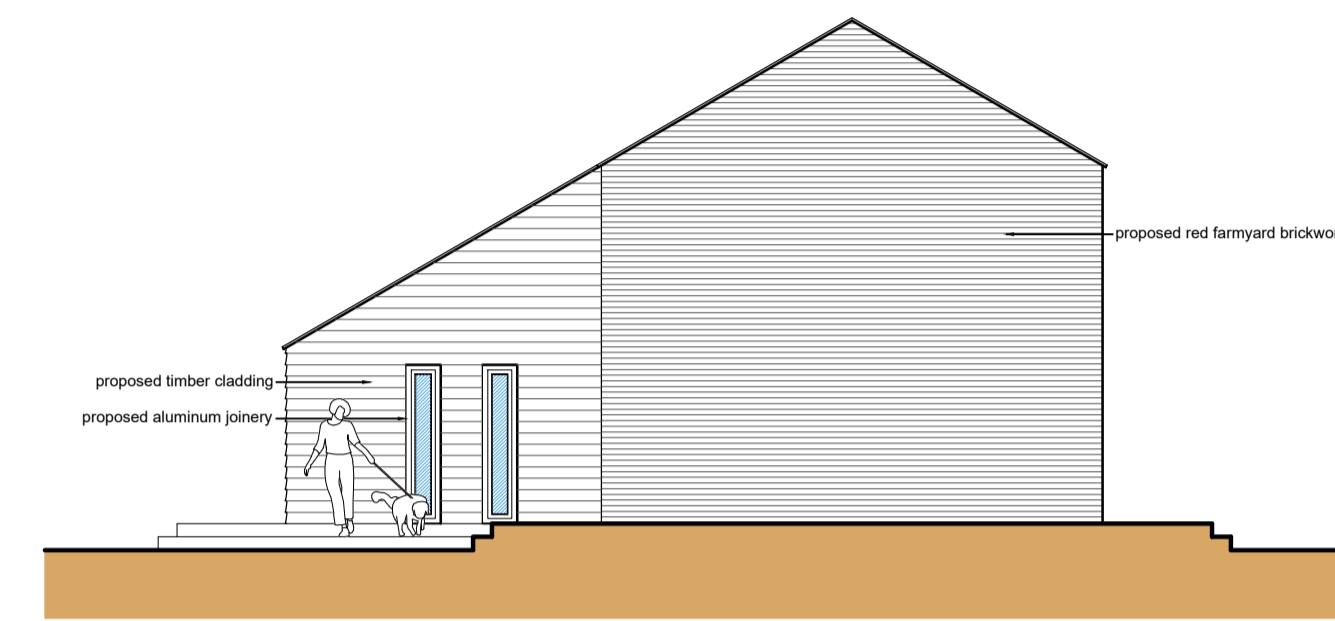
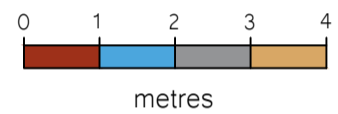
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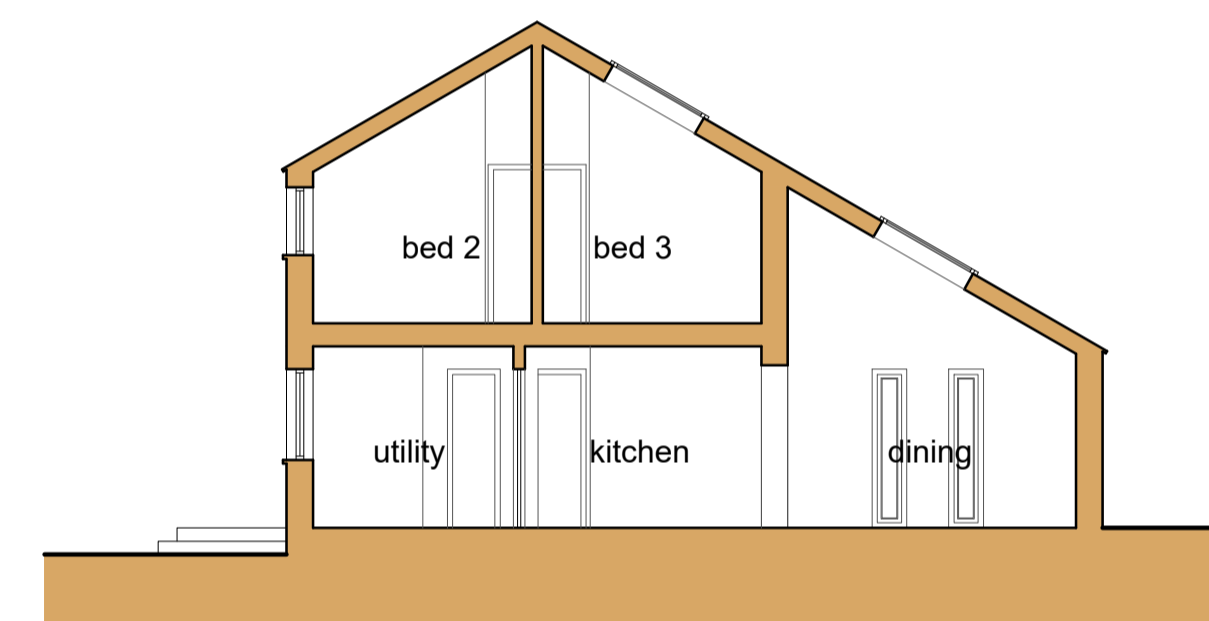
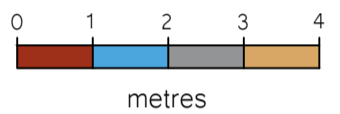
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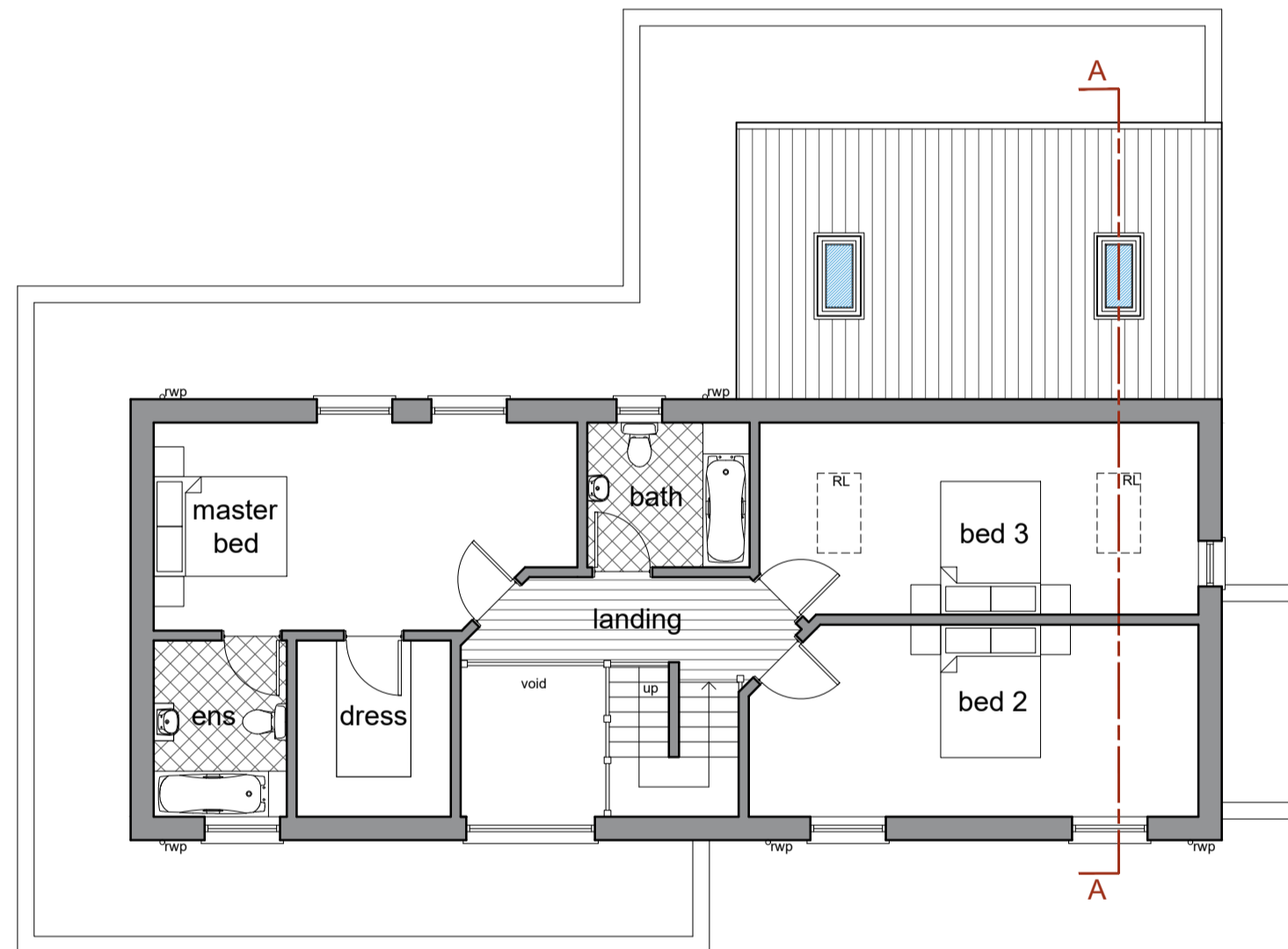
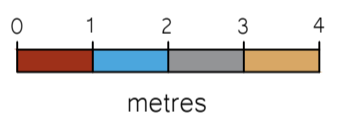
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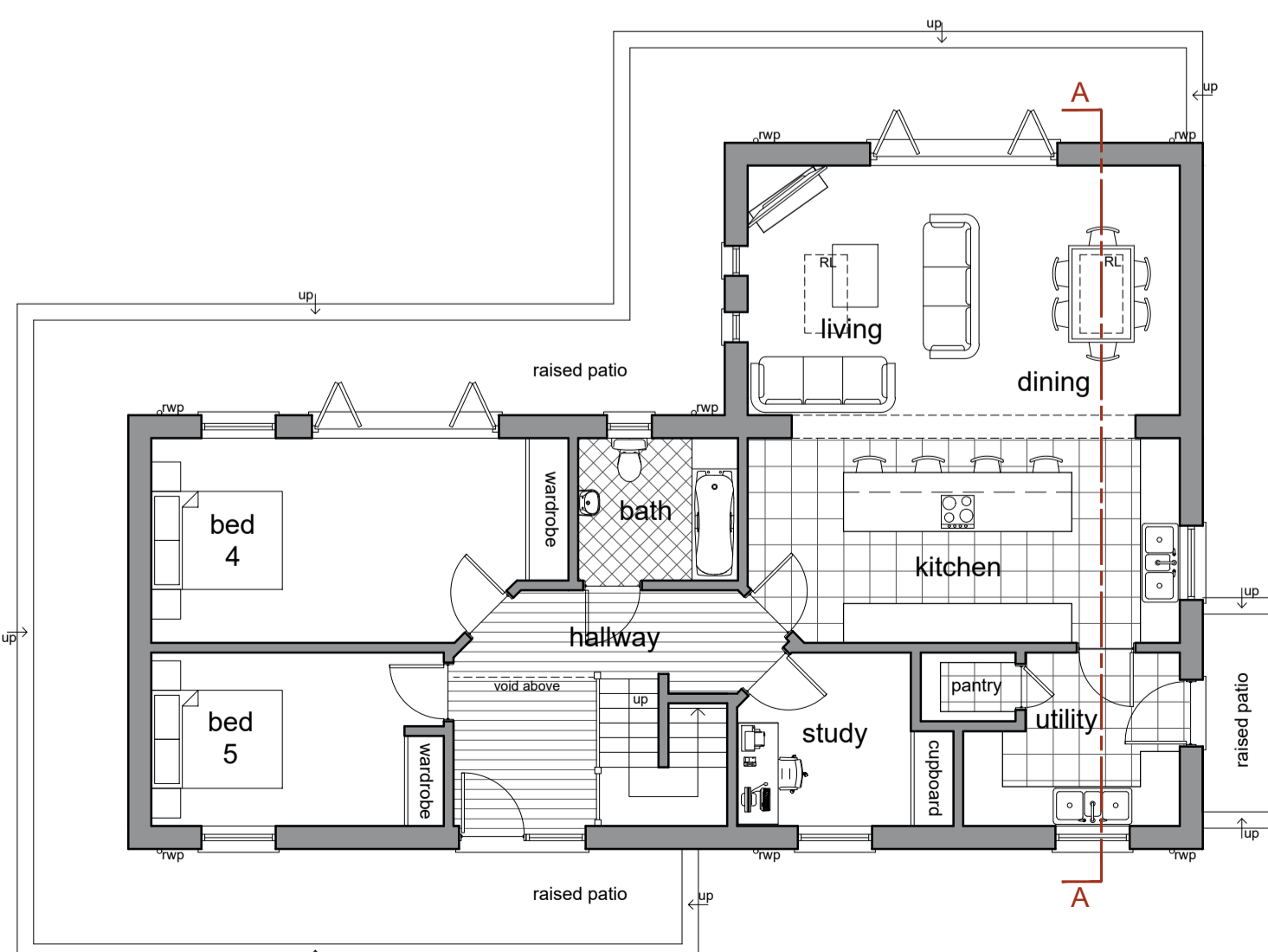
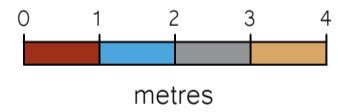
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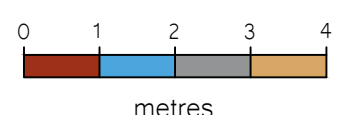
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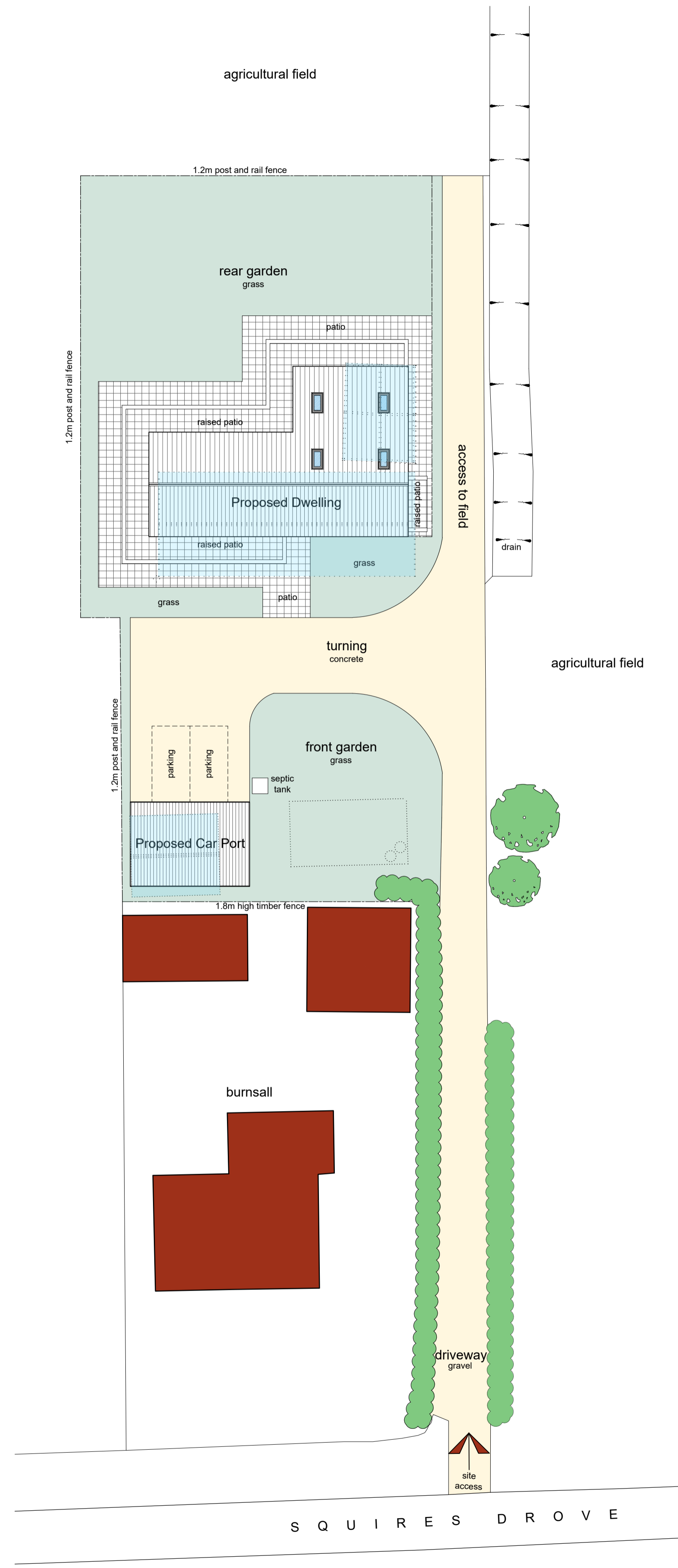
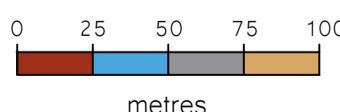
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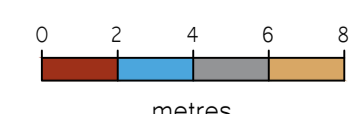
Ground Floor Plan  
Scale: 1:100



Location Plan  
Scale: 1:2500



Site Plan  
Scale: 1:200



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**SITE PLAN KEY**

	Indicates proposed replacement dwelling
	Indicates footprint of existing buildings (to be demolished)
	Indicates un-surveyed buildings taken from OS map
	Indicates proposed grass
	Indicates proposed gravel
	Indicates proposed patio
	Indicates existing site access to be retained
	Indicates features to be demolished
	Indicates approximate position of un-surveyed trees and hedges to be retained

Status  
**FOR APPROVAL**

**SWANN EDWARDS ARCHITECTURE**

Swann Edwards Architecture Limited, Swann Edwards Architecture, Black Barn, Fen Road, Guyhim, Wisbech, Cambs. PE13 4AA  
 t 01945 450504 e info@swannedwards.co.uk w www.swannedwards.co.uk

Proposed Dwelling & Car Port at Land Rear Of Burnsall, Squires Drive, Three Holes For: Mrs. I. Forth	Job Title Date January 2023	Drawn by GT Checked by GE
Planning Drawing Location Plan, Site Plan, Floor Plans, Elevations & Section	Job No. SE-1770 Dwg No. PP1000	Sheet Size A1 Revision