

**FLOOD RISK ASSESSMENT  
&  
Throughflow Screening  
&  
SUDS Strategy**

**Richmond SFRA 2020/21 & LP21 compliant  
London Plan SI.12 and SI.13 compliant**

**Demolition of the existing garages and first floor flat  
Remove impermeable areas  
Erect a block of 4no. flats  
Increase in porous / permeable parking & landscaping  
**Change for 2024 scheme: No Basement structures****

**FZ1, No – Very Low Surface Water hazard  
Not within a Throughflow area**

**This is a site where the NPPF promotes that new dwellings should  
be located, in flood risk terms**

**AT**

**Hunters Lodge, Friars Lane, Richmond, TW9 1NX**

**March 2024**

**Ark Environmental Consultancy Ltd**



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*If this report has been released electronically, the appendices referred to herein can be found in the annexed zip folder/s as .pdf or .dwg files. If this report has been released in hard copy the appendices will be bound into the back of this report. Plans may be annexed separately as A1 or A0 copies where a bound-in A3 copy is not appropriate.*

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## 1.0 Scope

This report contains the details of a flood risk assessment statement for planning carried out by Ark Environmental Consulting Limited (“ARK Ltd”) for Hunters Lodge, Friars Lane, Richmond, TW9 1NX, henceforth referred to as “the site” in this report.

This report has been prepared for 50 Degrees North Architects and must not be relied upon by any other party without the explicit written permission of ARK Ltd.

All parties to this report do not intend any of the terms of the Contracts (Right of Third Parties Act 1999) to apply to this report.

Please note this report does not purport to provide definitive legal advice nor can it be used to demonstrate that the site will never flood in the future or provide exact specifications / warranties for the products used.

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## 2.0 Introduction

The information source used to undertake this FRA & SUDS / Drainage Strategy has been collected from the following sources:

- British Geological Survey Website;
- EA Website;
- NPPF and PPG 2024
- Richmond Strategic Flood Risk Assessment 2020 / 2021
- DRAIN LONDON Preliminary (Surface Water) Flood Risk Assessment for London Borough of Richmond. (GLA & Environment Agency, June 2011)
- Internet mapping and searches

## 3.0 Existing Site Status and Environmental Setting

### 3.1 Site Location and Topography

This site is an existing garage block with upper flat, carparking and landscaping (hard and soft).

The site is wholly in Flood Zone 1 and not within any new climate change flood extents.

#### Topography Requirement

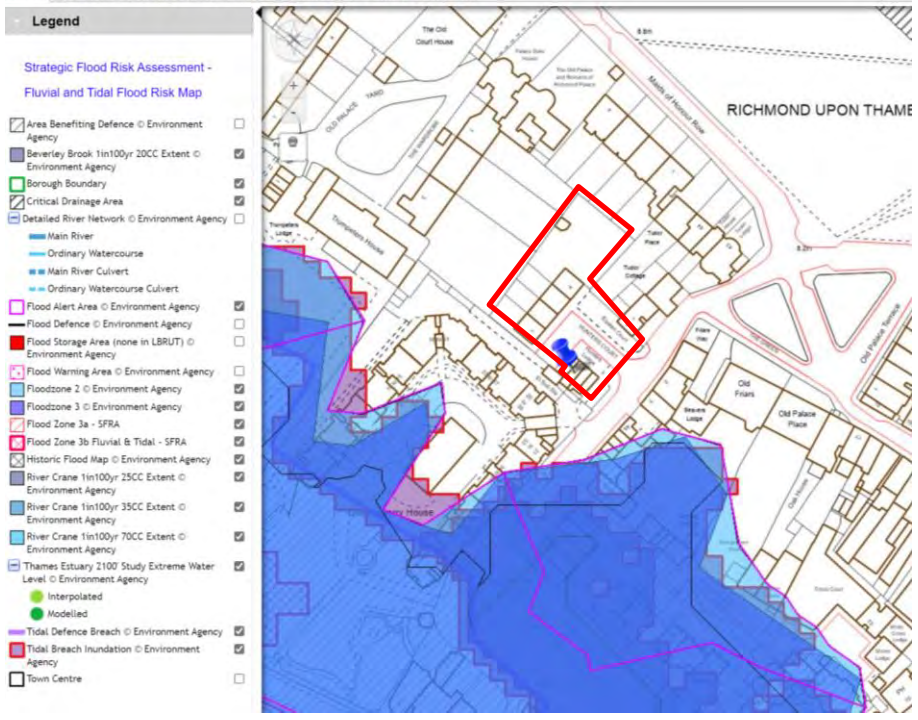
The scheme is new dwellings in FZ1. A full topographic survey is not required because a raised floor level is not an option that is required i.e. given no comparison of flood heights vs a structure relative to ordnance datum is required for a FZ1 setting.

### 3.2 Flood Status including new climate change allowances

The site is wholly in FZ1.

The site is not within any tidal or fluvial new climate change flood extents.

This is all corroborated by the Richmond SFRA 2020 / 2021.



### 3.3 Geology / Hydrogeology and Throughflow Zones

Based on BGS mapping, surrounding borehole records and the council SFRA, the site is underlain by:

Bedrock: London Clay

Superficial deposits: Kempton Park Gravels

#### Strata and Flood Risk (Groundwater):

The site is within the policy area of likely elevated groundwater hazards.

There are no basement proposed. There are no basement mitigation measures required.

No complex or novel engineering approaches are required.

However, the new Richmond SFRA 2020/21 includes new Throughflow Zone to consider the soil throughflow of perched water within the upper levels of clay.

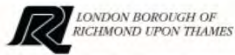
But the site is not within a Richmond Throughflow zone: see specific section on Throughflow Screening.

#### Strata and Drainage / SUDS

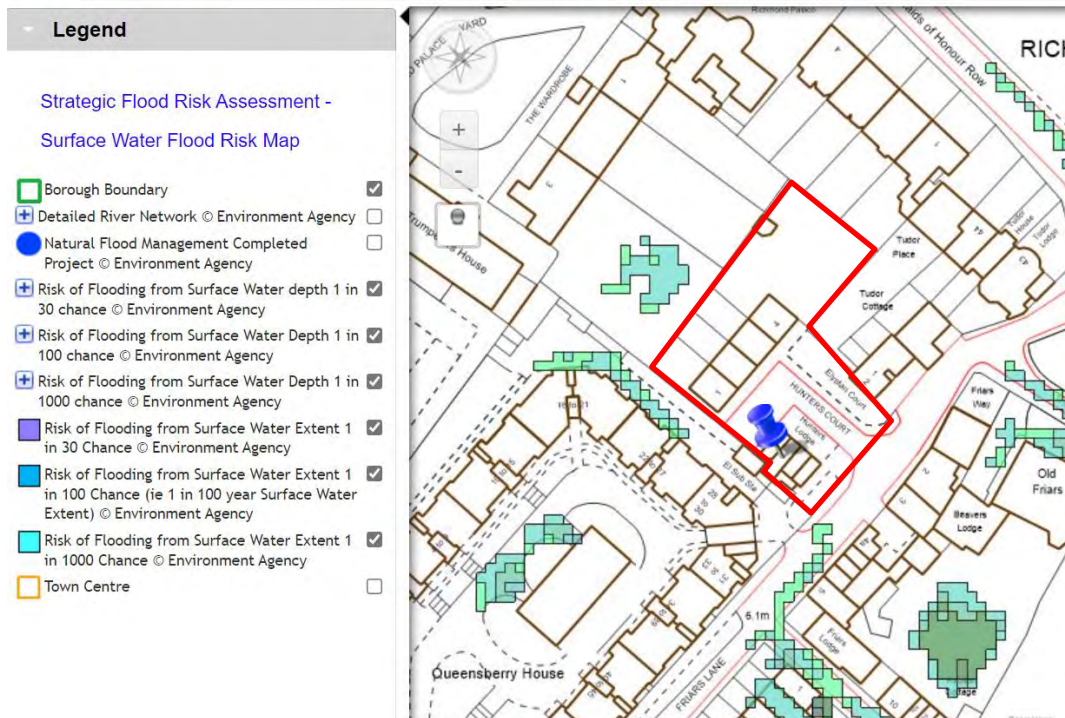
Given the main Bedrock is London Clay and the site is constrained: no soakaways are technically / engineering wise feasible but Source Control SUDS are included.

### 3.4 Richmond and EA 2024 Surface Water Flood Hazard

- The site is in Very Low - No surface water hazard



Location: HUNTERS LODGE FRIARS LANE RICHMOND RICHMOND TW9 1NX



### 3.5 Summary of other Flood Risks Posed to and From Site and Scheme

Flood Sources	Site Status	Comment on flood risk posed to / from the development
Groundwater	Site is within an area of potential for elevated groundwater flooding Engineering to address	Scheme will not increase the risk posed to or from groundwater: no basement structures proposed and foundations will be designed appropriately Suitable waterproofing Not in the Throughflow Zone
Artificial Sources	Site is within EA general Reservoir Flood Warning area No other artificial sources with likely flood flowpaths that could reach the site	Low Risk
Climate Change	Included in the flood modelling extents 40% used in the SUDS storage calculations	Development will manage the peak flow and volume of discharge from the site Low risk posed to and from the development

### **3.6 Existing Drainage**

The site is an existing operating residential, garage and landscaping site. It has connections to the adjacent sewers in Friars Lane.

There is no evidence of any existing SUDS.

The site currently discharges 100% unattenuated by (standard site) a combination of:

- Low Order Storms: natural on site interception from vegetation, soil infiltration and roof with RWP's direct to sewer
- Higher Order Storms: majority to sewer

The scheme does not need to alter the connections.

## **4.0 Throughflow Screening / Groundwater Hazards**

### **4.1 Throughflow Screening**

Of relevance to the Throughflow screening, site and scheme specifically:

- The site is an existing property
- The site is not within the Throughflow zone

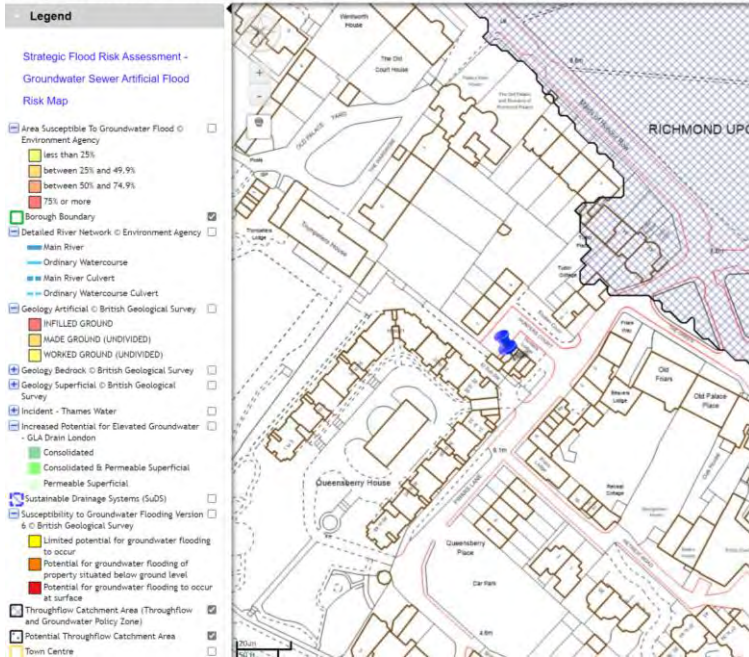
No additional ground investigation is required at this stage to verify this assessment.

The scheme will not increase the risk posed from this source to surrounding areas as this is controlled by policy and engineering requirements.

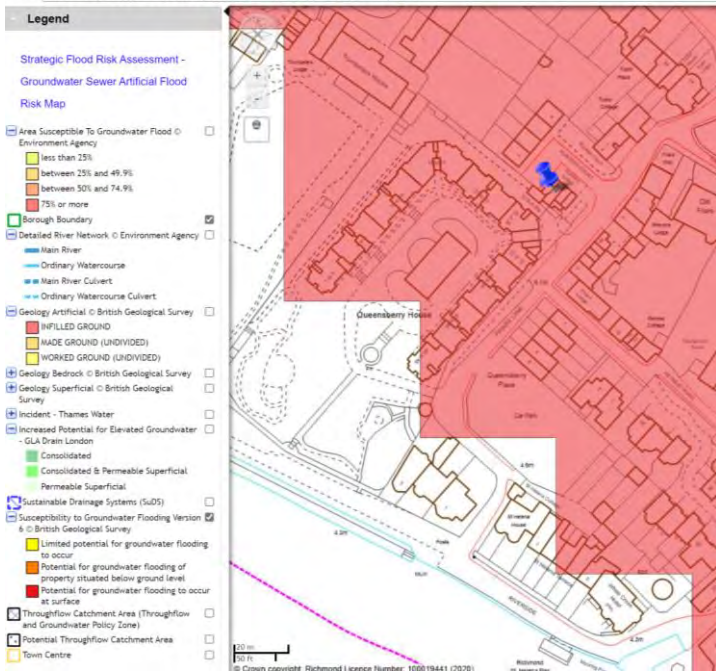
#### Risk posed to the scheme itself

Given the site specific groundwater setting, the scheme will be able to address the appropriate waterproofing with standard construction materials and methods; it is a low hazard to the scheme at this site. No novel or complex solutions are required.

No further Throughflow assessment is required based on site and scheme specifics.



The site is not within the Richmond Throughflow Zone



Ground floor / foundations engineering to address hydrogeology setting  
No basements.

No novel or complex engineering approaches are



## 5.0 SUDS Strategy

### 5.1 Existing site

The existing landscaping comprises existing impermeable roof, hardstanding and some porous planted garden areas.

### 5.2 SUDS Assessment and Specifications

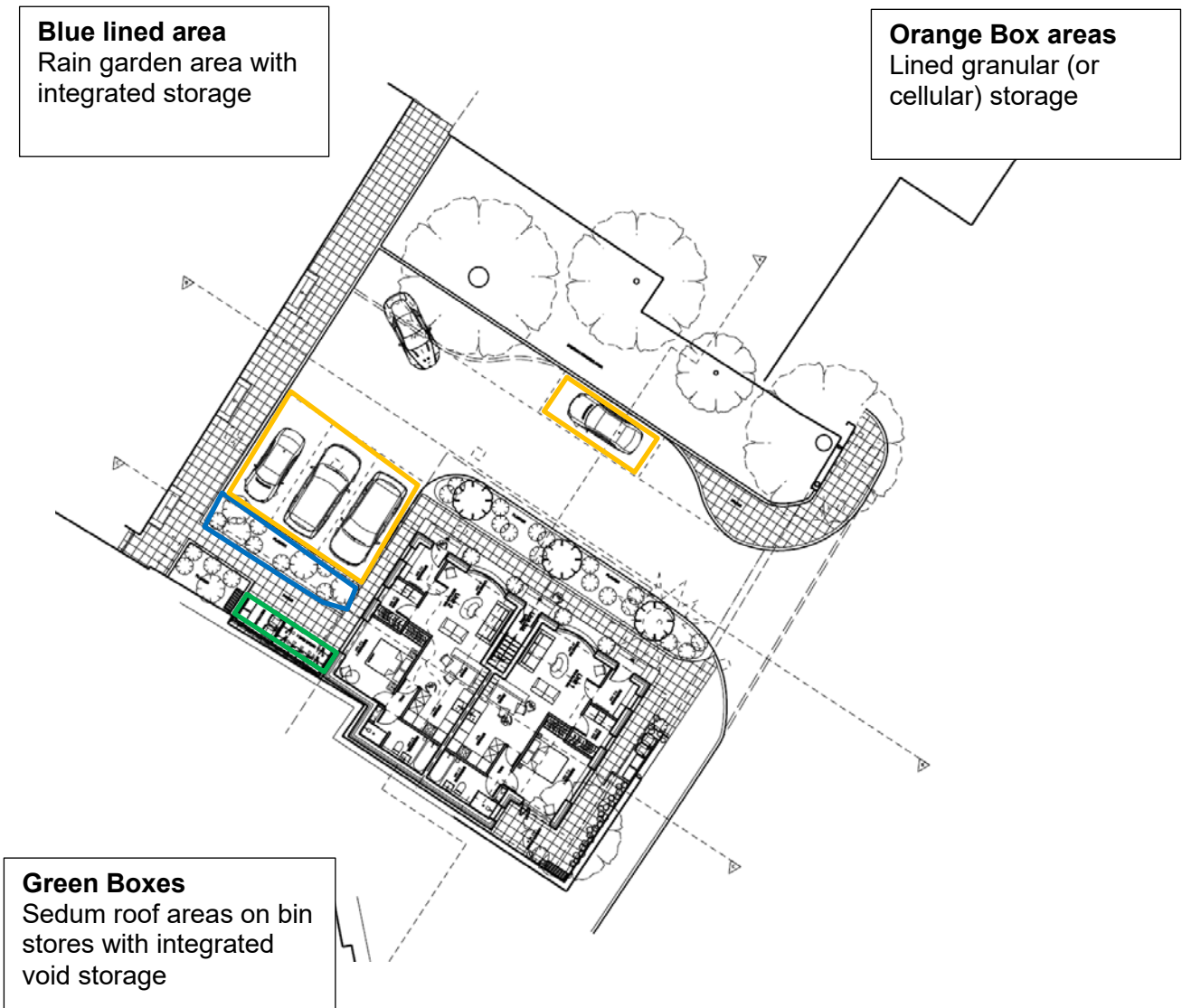
Formal infiltration is not feasible due to the geology / hydrogeology and site constraints (RPZ's and adjacent properties also).

The site can discharge majority via gravity given the invert of the lowest element of drainage on site is still higher than the invert of final manhole invert on site.

The most sustainable approach is a re-use of the existing system with betterment i.e. the maximisation of porous and permeable areas can be complemented with additional Source Control SUDS storage.

Type of SUDS	Source Control	Dimensions	Total Storage
Rain Garden Planted Beds Take discharge direct from RWP Splayed end / diverters to the RWP	YES	Assume worse case only 14.0m <sup>2</sup> of the available planted area that could store in a void area, being possible to have a RWP connection Use minimum 0.2m height retention / depth = 2.8m <sup>3</sup>	2.8m <sup>3</sup>
Increase in Porous and Permeable Areas Maximised including green roofs	YES	Scheme results in a maximisation of porous and permeable areas	n/a
Lined Granular Angular Storage under parking areas  Not in areas of RPZ's  (or Cellular Storage if combined connection)	YES	c. 49.0m minimum (4 car park spaces with new permeable paving) Use 0.25m depth of additional granular angular storage = 12.25m <sup>3</sup> Assume 30% void space = 3.68m <sup>3</sup>  (If cellular assume 0.2m depth with 95% void ratio = 9.31m <sup>3</sup> ((49.0 x 0.2) x 0.95)	3.68m <sup>3</sup>   (9.31m <sup>3</sup> if cellular)
Green / Sedum Roof Areas with additional cellular tray storage system	YES	c. 14.40m <sup>2</sup> of sedum / green roof in total Use a 0.04m Bedecker specification depth cellular tray system in addition to the subbase (depth not necessary to be confirmed at this stage) = 0.576m <sup>3</sup> Assume the 80% void for a tray system = 0.46m <sup>3</sup>	0.46m <sup>3</sup>
		<b>Total Potential SUDS storage</b>	<b>6.94m<sup>3</sup></b>  <b>(or 12.57m<sup>3</sup> if cellular rather than granular used)</b>

### 5.3 Indicative SUDS Layout



- Any new permeable surfacing can be constructed following the guidance <http://www.communities.gov.uk/publications/planningandbuilding/pavingfrontgardens>

## 5.4 Flood resilience / resistance

Given the scheme is a refurbishment of an existing property but with extensions, the following flood resilient measures will be incorporated where feasible / where works are required

- Electrics to be installed top-down where feasible
- Non-return valves as standard for ground floor
- Any new waterproofing to be installed to above ground level as appropriate
- Plasterboards will be installed in horizontal sheets on ground floor rather than conventional vertical installation methods to minimise the amount of plasterboard that could be damaged in a flood event
- Wall sockets will be raised to as high as is feasible and practicable in order to minimise damage if flood waters inundate the property
- Any wood fixings on the ground floor will be robust and/or protected by suitable coatings in order to minimise damage during a flood event
- The Damp Proof Membrane will be installed above the main floor slab and tied in to the walls where appropriate, to reduce the turnaround time for returning the property to full operation after a flood event.
- Insulation to the external walls will be specified as rigid board which has impermeable foil facings that are resistant to the passage of water vapour and double the thermal resistance of the cavity

## 6.0 Summary

The scheme will be flood future-proofed for the lifetime of the scheme.

The scheme:

- Reduces impermeable areas overall
- Incorporates formal SUDS storage of the highest form feasible at the constrained site
  - Includes sedum / green roof areas: Source Control and storage
  - Includes rain garden planters: Source Control and storage
  - Includes a rainwater butt (reducing potable water usage)
  - Includes permeable paving with integrated storage: Source Control and storage

Throughflow Screening:

Site is not within the Throughflow Zone. No further calculations are required

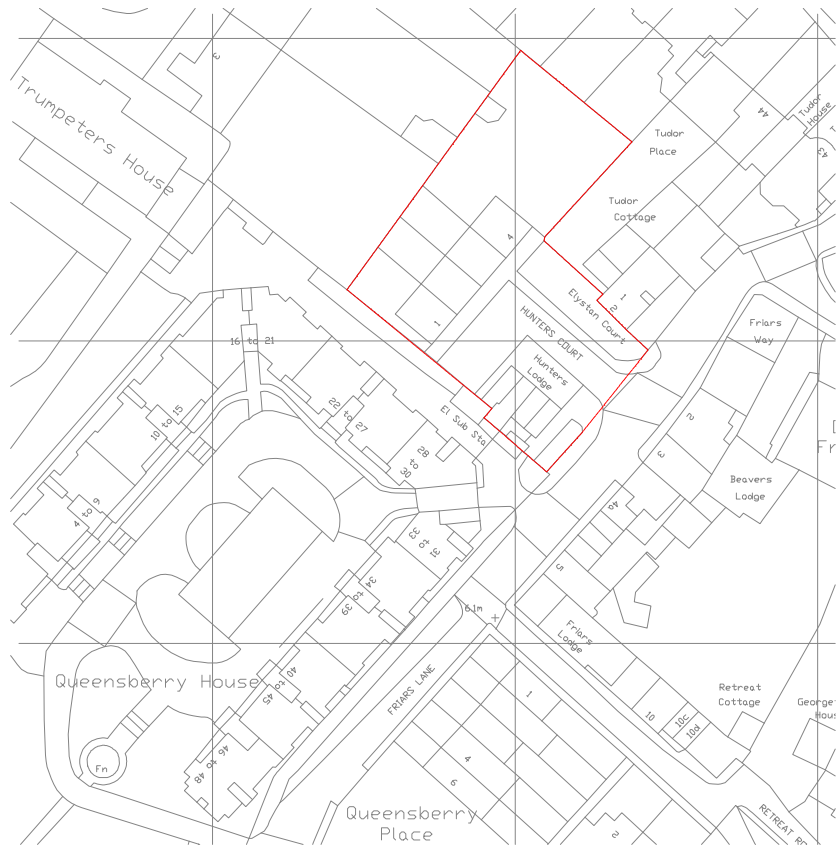
- The scheme includes full flood resilience
- No novel or complex engineering requirements

**The scheme will result in lifetime flood future-proofed dwellings.**

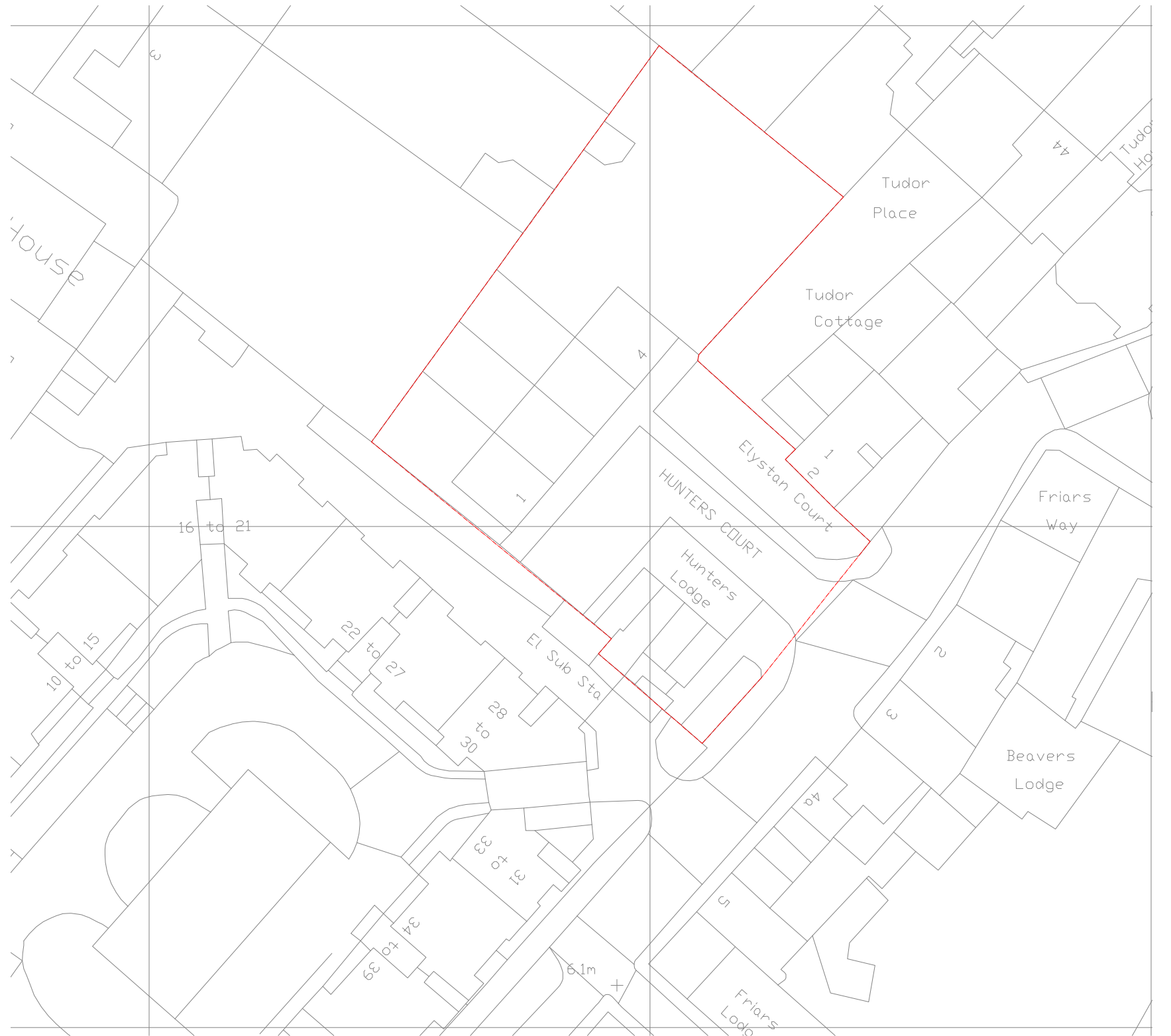
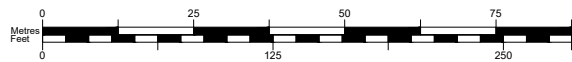
Based on the likely flooding risk, it is considered that the proposed development can be constructed and operated safely in flood risk terms, without increasing flood risk elsewhere and is therefore appropriate development in accordance with the NPPF/PPG.

## APPENDICES

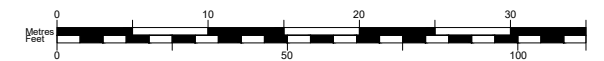
**APPENDIX A**



Block Plan  
Scale 1:1250



Site Location Plan  
Scale 1:500



NOTES:  
- Do not scale off this drawing.

Revisions:  
15-03-22 - Issued to client and team

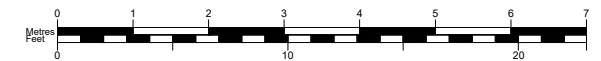



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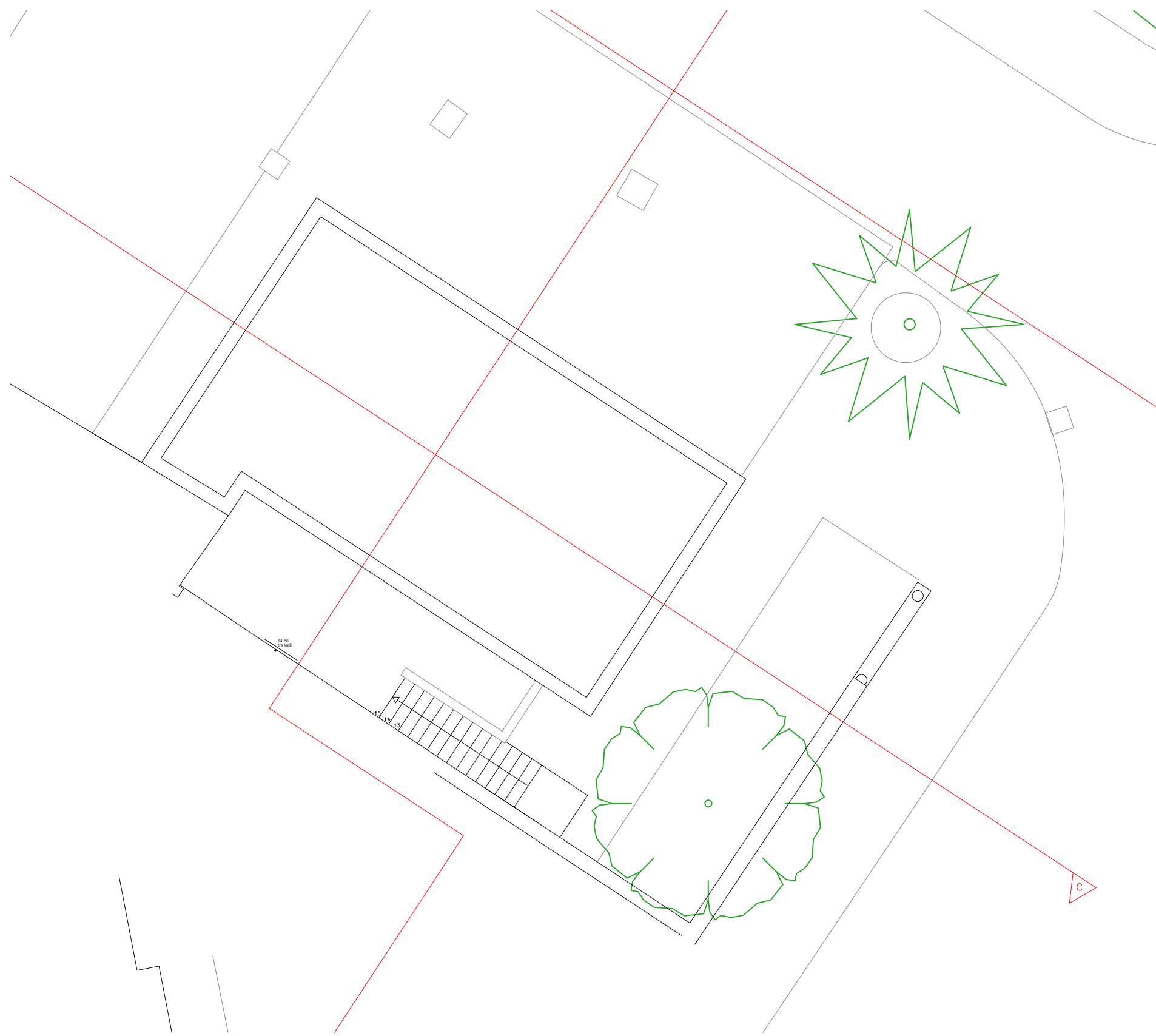


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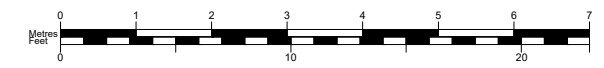
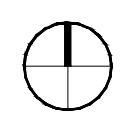


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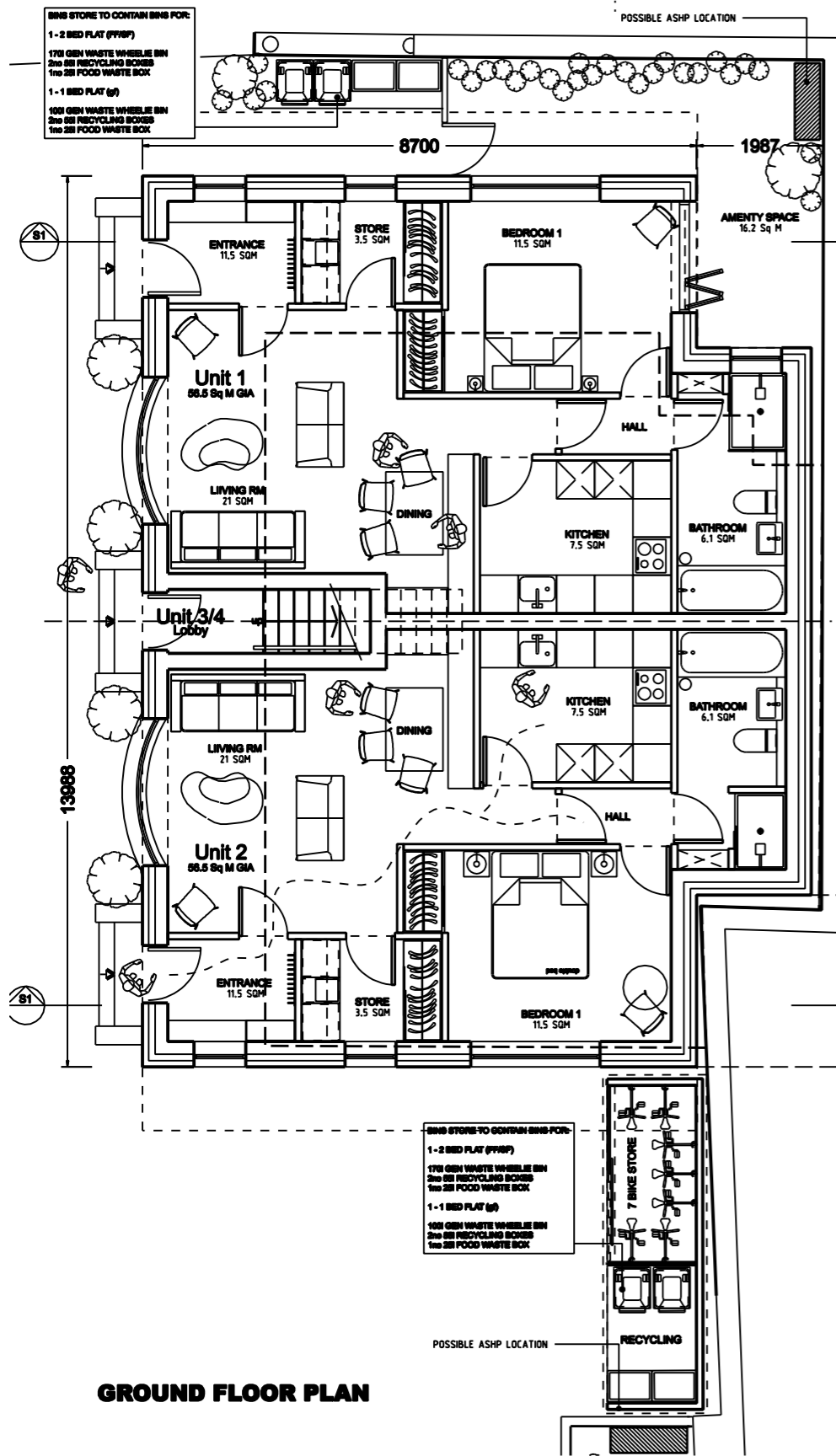
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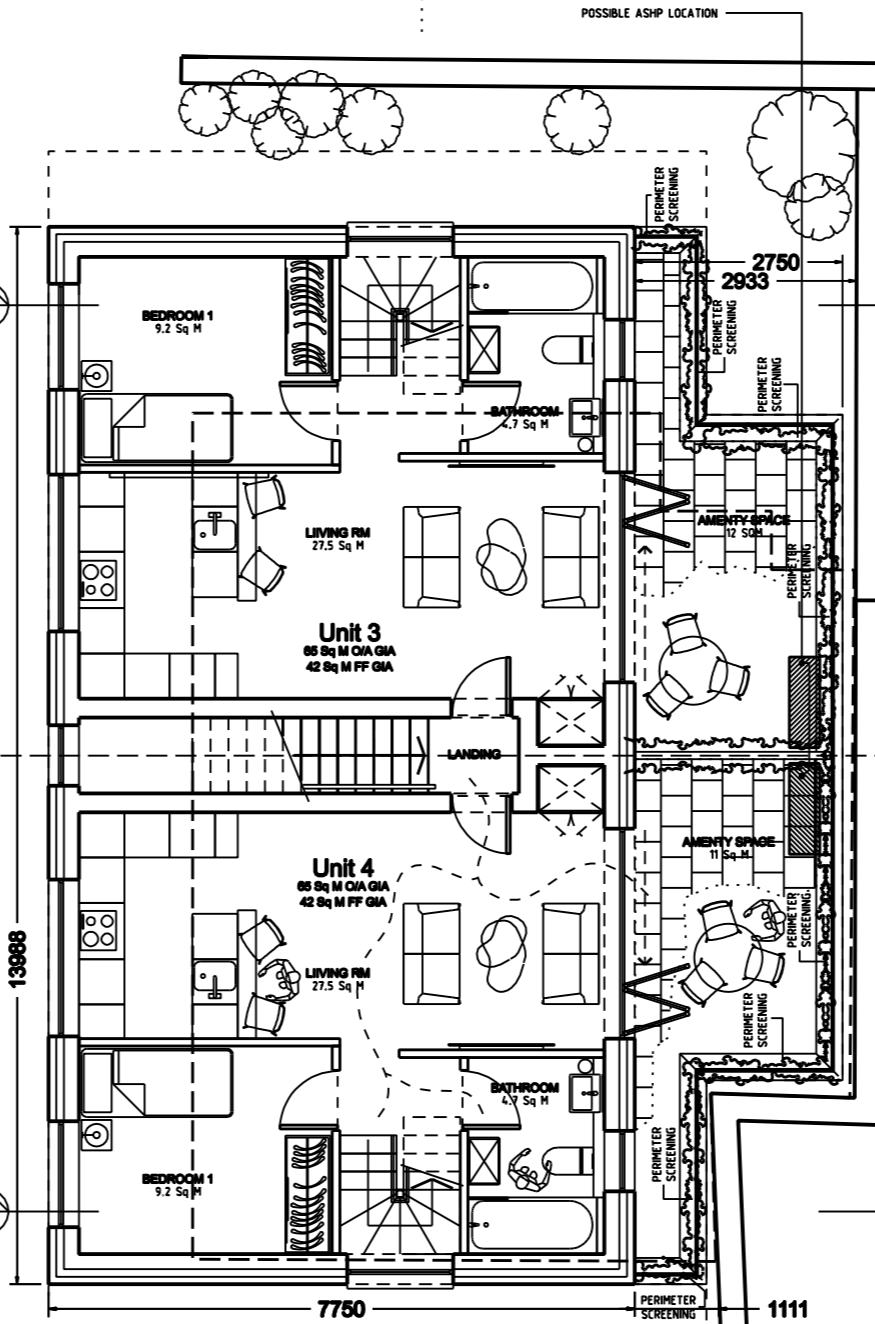
**APPENDIX B**

# HUNTERS LODGE / FRIARS LANE / RICHMOND

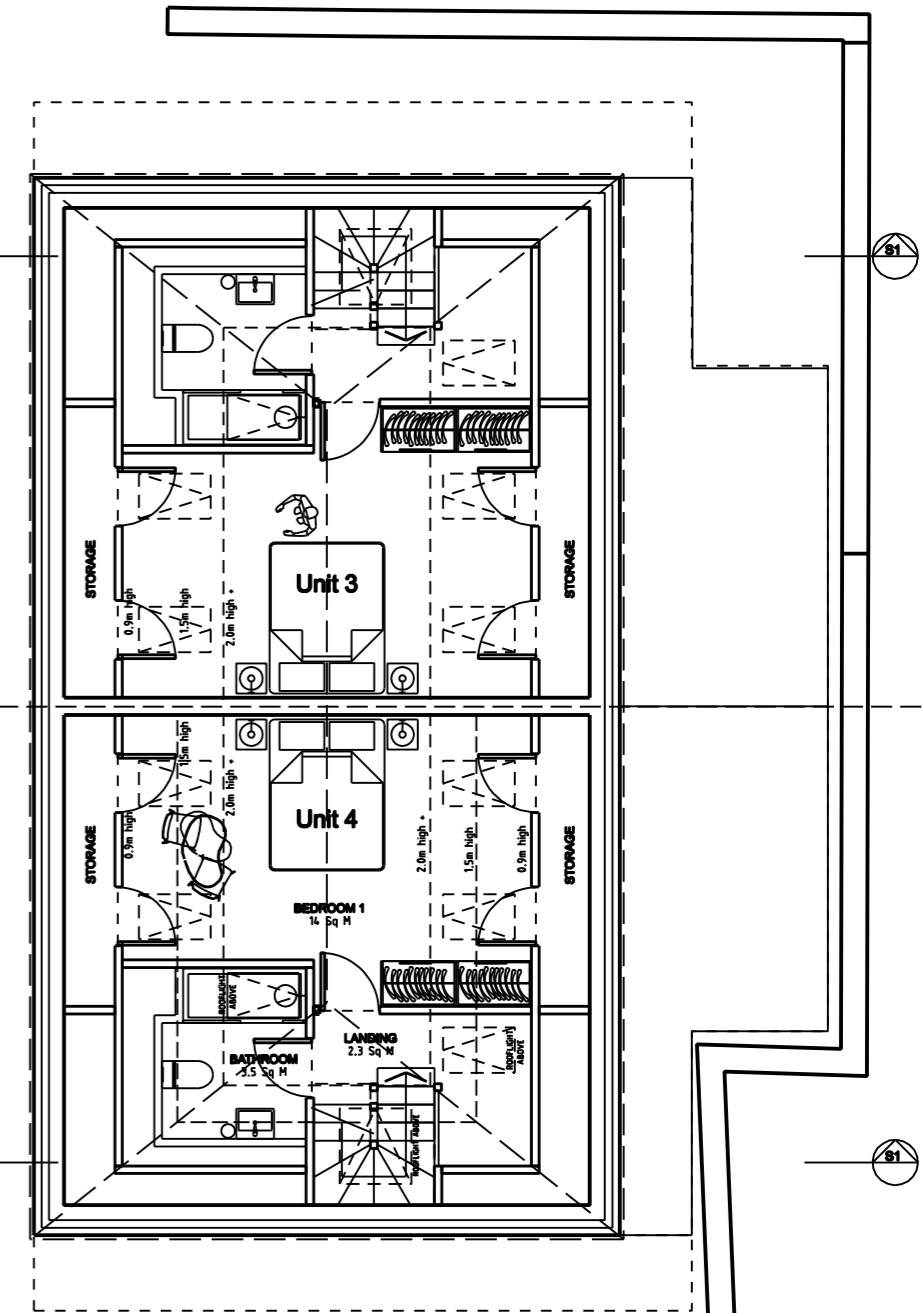
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**GROUND FLOOR PLAN**



**FIRST FLOOR PLAN**

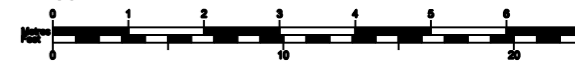


**SECOND FLOOR PLAN**

1:50



1:100



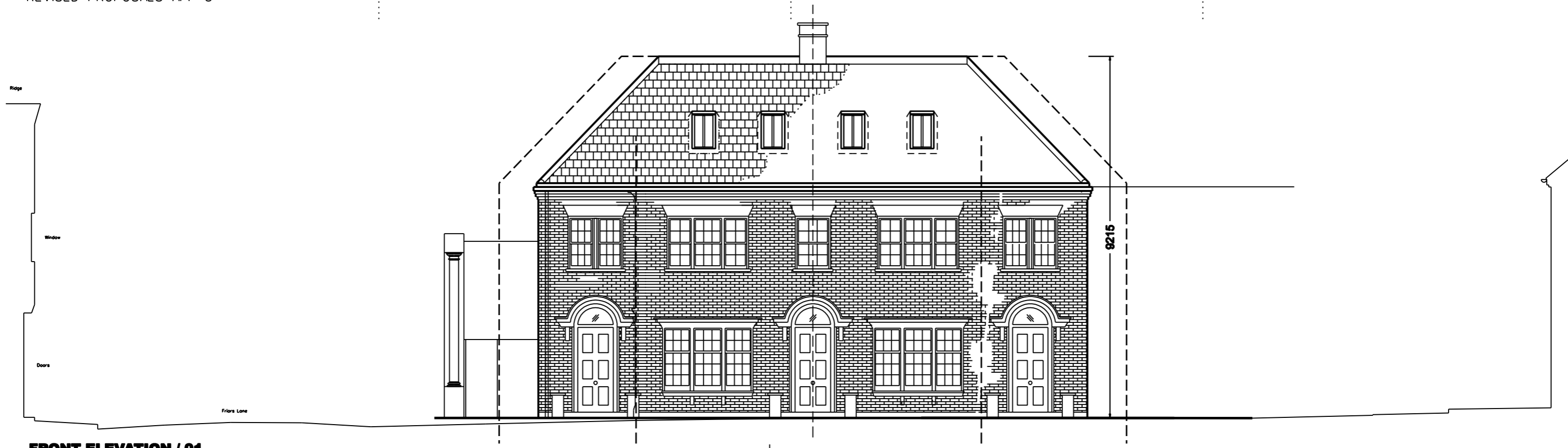
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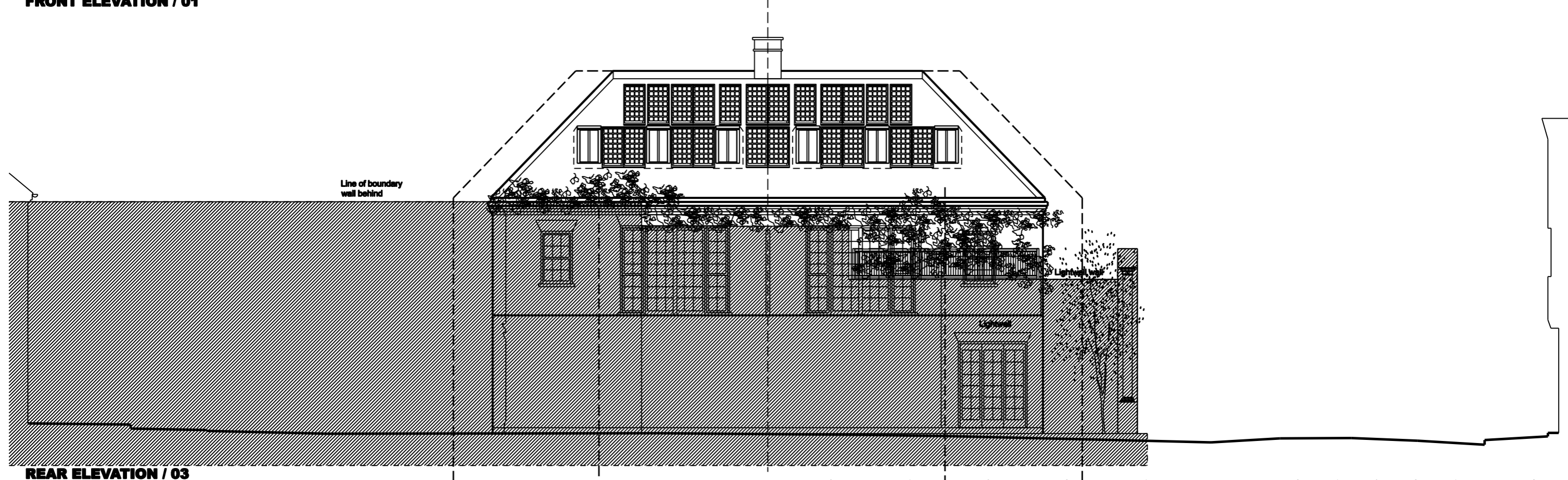
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- 231213 - Issued to client via email
- 240109 - Issued to client via email
- A - 240125 - Issued to LBRUT via email
- B - 240213 - Issued to LBRUT via email
- C - 240216 - Issued to client/FJ via email
- D - 240301 - Issued to client/FJ/LBRUT via email
- E - 240305 - Issued to client/FJ via email

LOCATION <b>Hunters Lodge                  Friars Lane                  Richmond</b>	CLIENT <b>Mr C Deehan</b>	DRAWING TITLE <b>Ground/First/Second Floor Plans                  Large scale detail</b>	JOB No <b>2561</b>	SIZE <b>A3</b>
JOB DESCRIPTION <b>4 New Build Apartments</b>	SCALE <b>1:100 @ A3</b>	STATUS <b>Planning</b>	DRAWING No <b>002</b>	REV <b>E</b>



**FRONT ELEVATION / 01**



**REAR ELEVATION / 03**

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- B - 240213 - Issued to LBRUT via email
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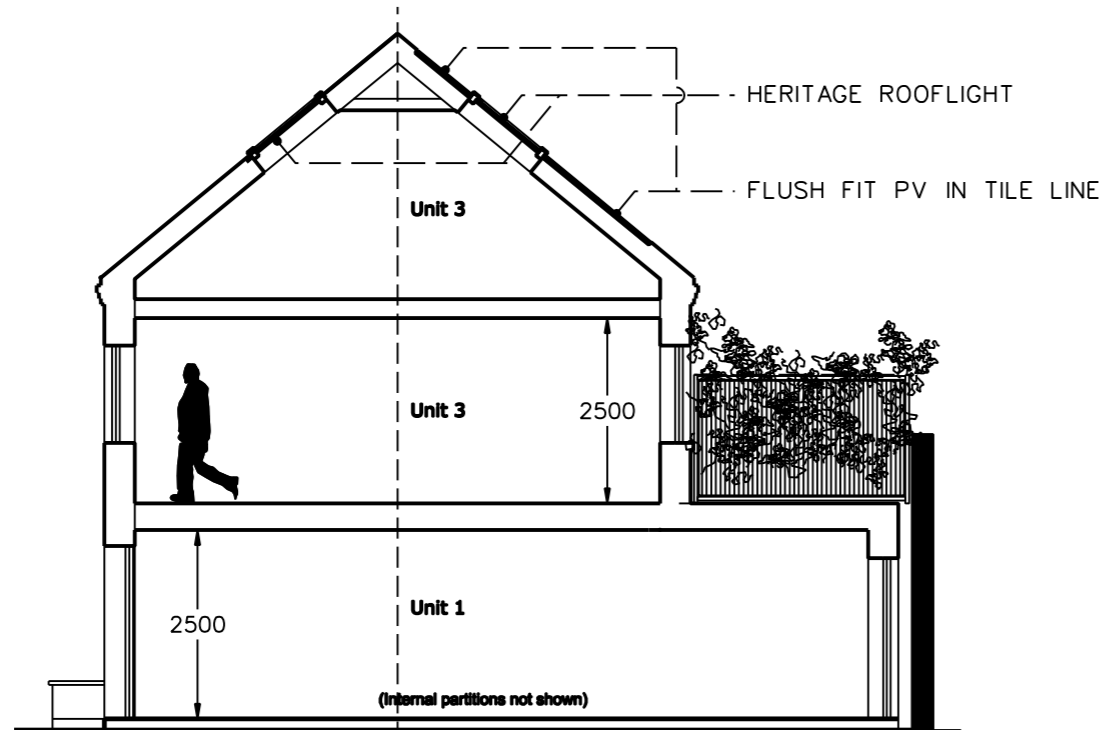
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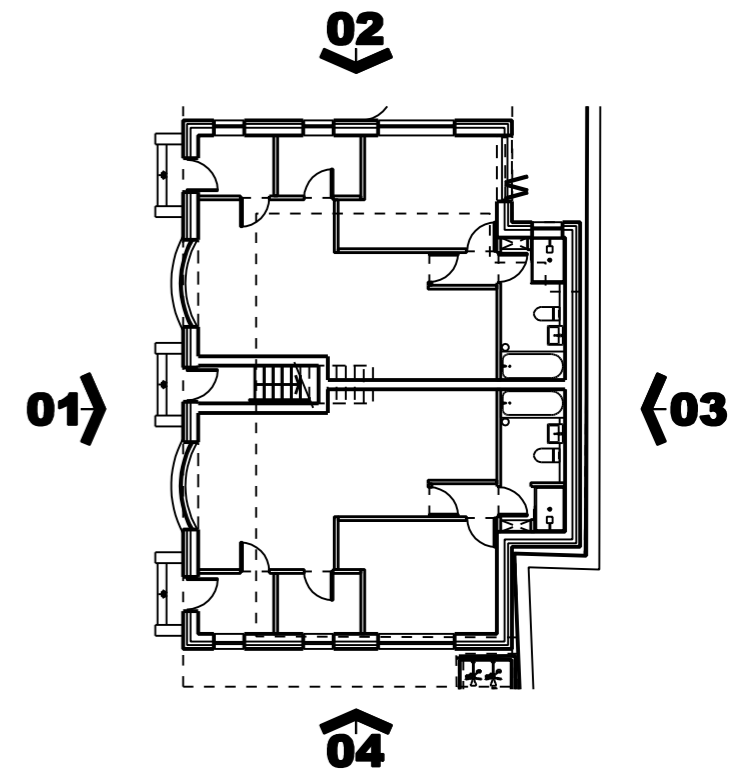
RIGHT HAND SIDE ELEVATION / 04



LEFT HAND SIDE ELEVATION / 02



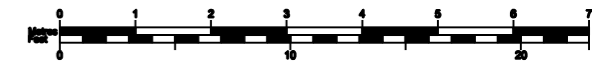
SECTION 1-1



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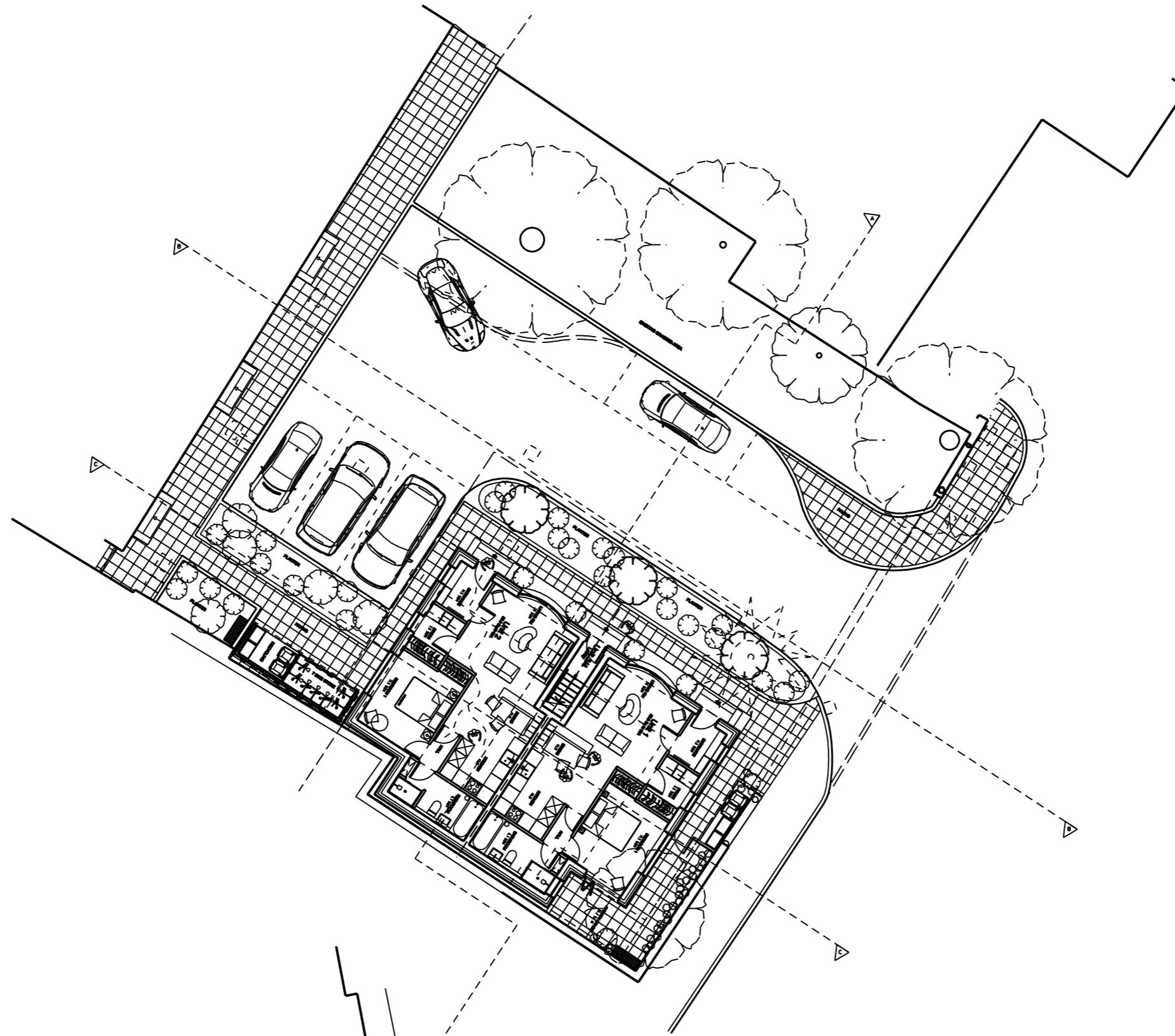
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- D - 240301 - Issued to client/FJ/LBRUT via email



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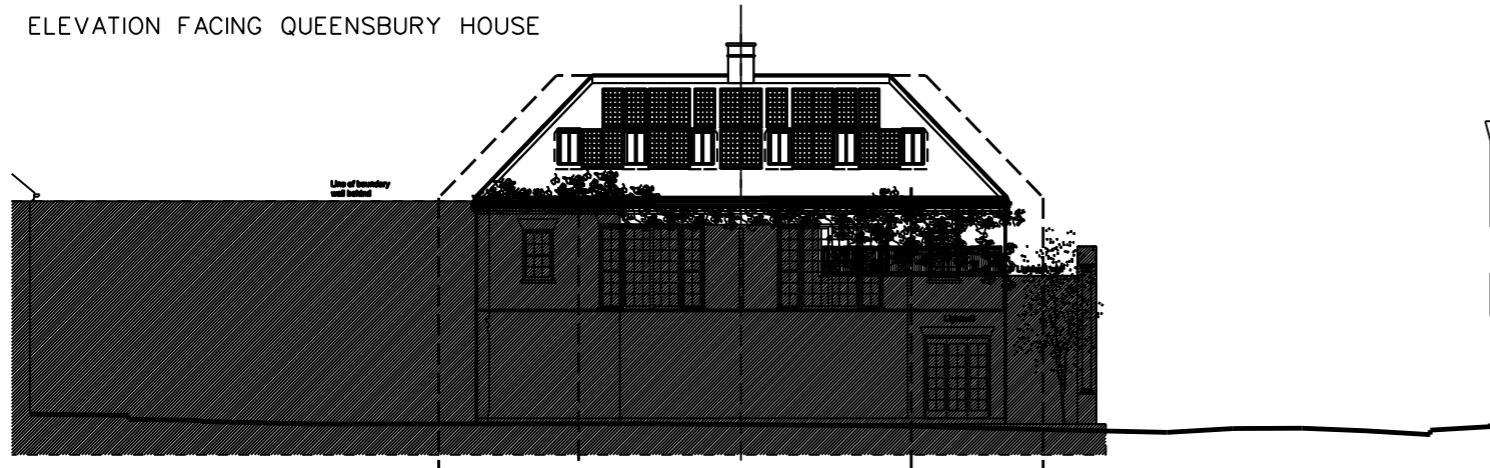
**HUNTERS LODGE / FRIARS LANE / RICHMOND**

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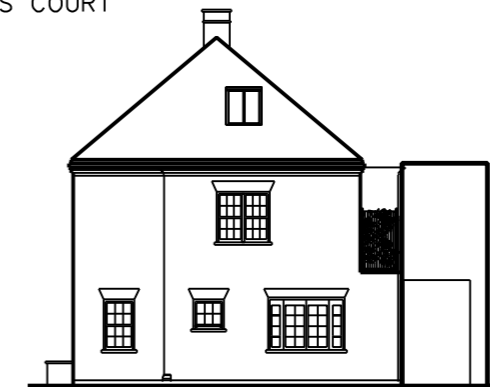
ELEVATION FACING FRIARS LANE



ELEVATION FACING QUEENSBURY HOUSE



ELEVATION FACING HUNTERS COURT



ELEVATION FACING HUNTERS COURT



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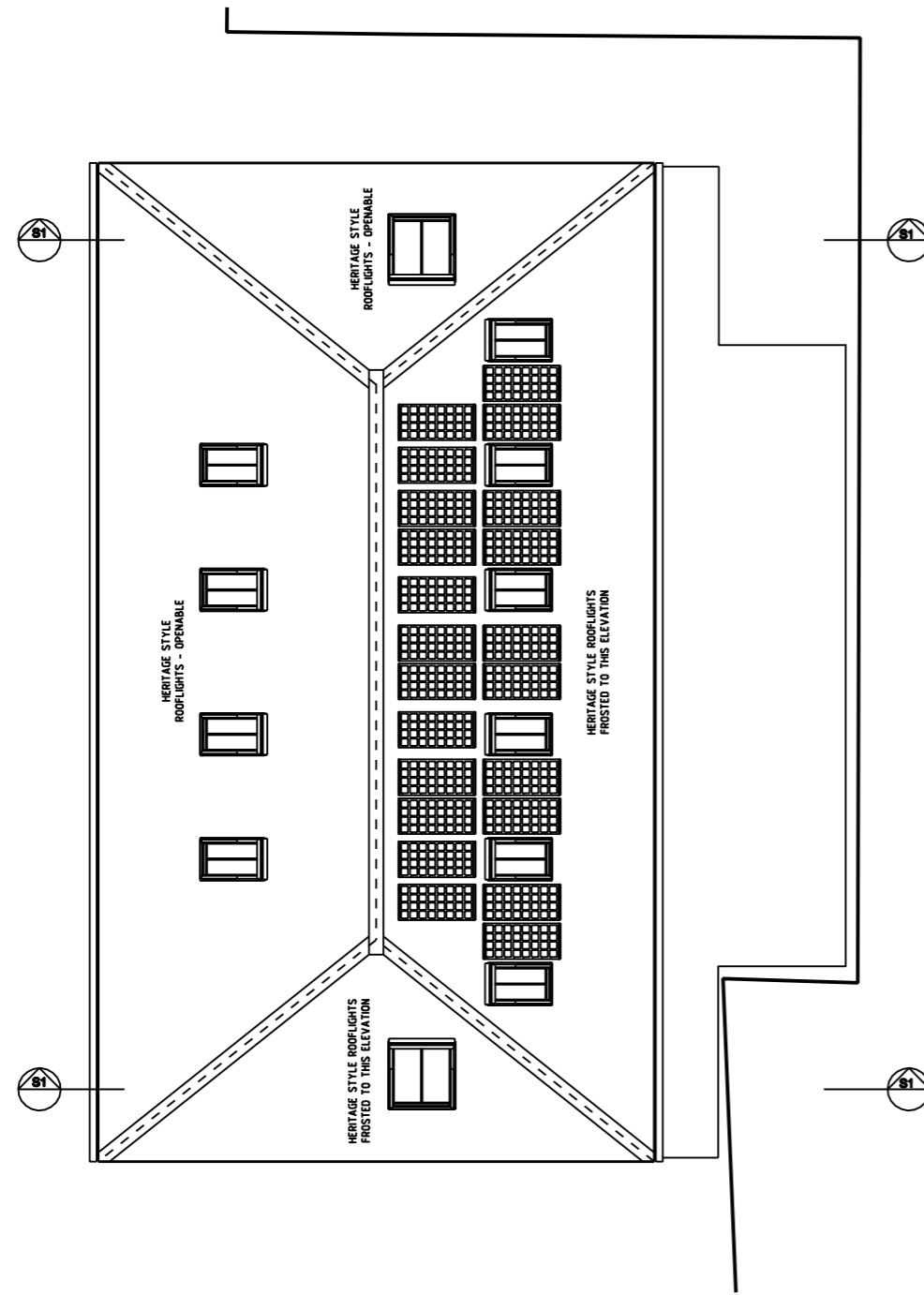
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- D - 240301 - Issued to client/FJ/LBRUT via email

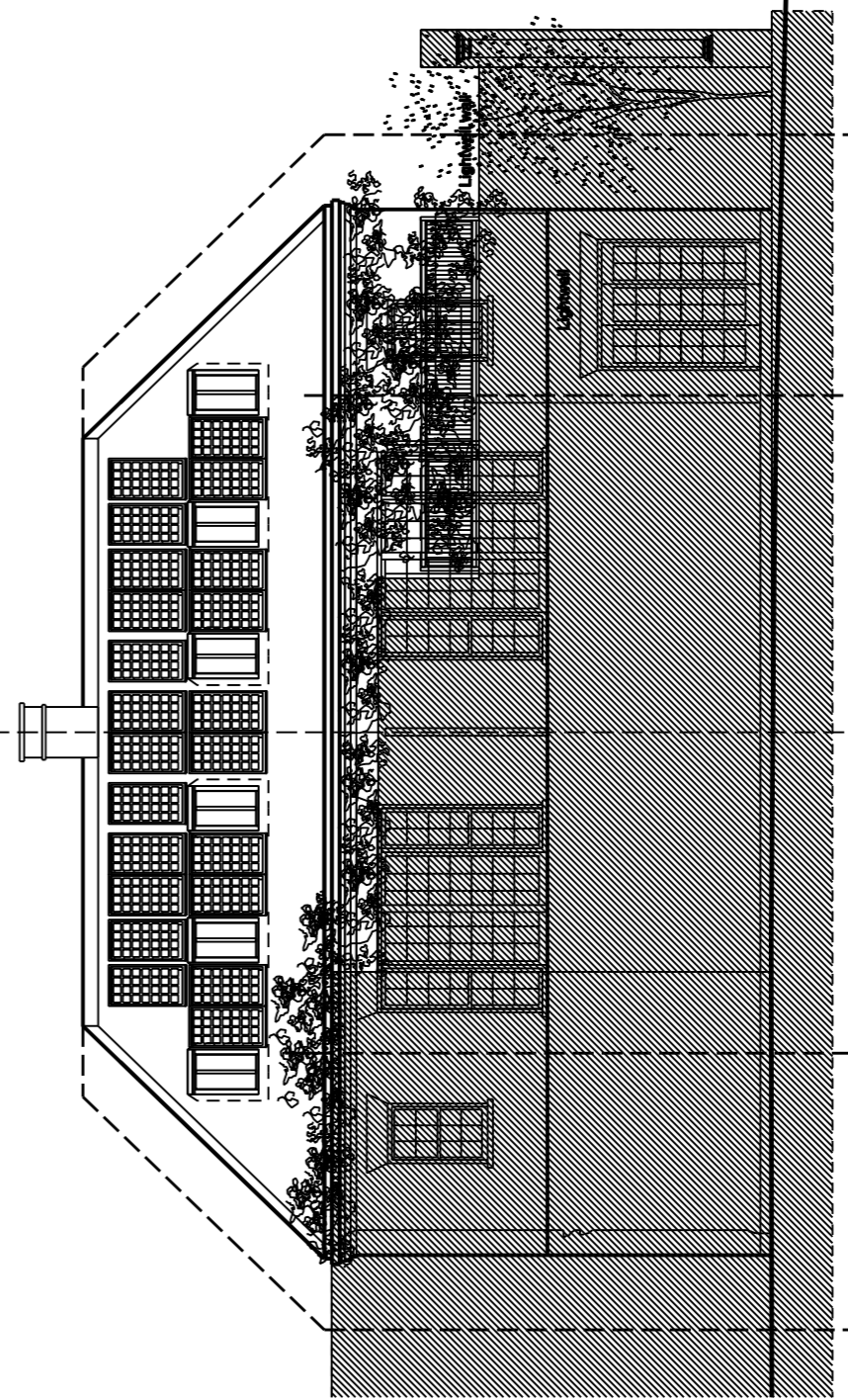


LOCATION <b>Hunters Lodge                  Friars Lane                  Richmond</b>	CLIENT <b>Mr C Deehan</b>	DRAWING TITLE <b>Proposed Street Elevations                  Large scale detail</b>	JOB No <b>2561</b>	SIZE <b>A3</b>
JOB DESCRIPTION <b>4 New Build Apartments</b>	SCALE <b>1:200 @ A3</b>	STATUS <b>Planning</b>	DRAWING No <b>006</b>	REV <b>D</b>

PROPOSED ROOF PLAN



PROPOSED REAR ELEVATION

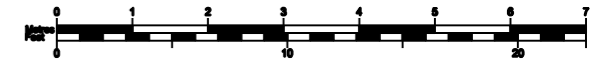


Notes: The General contractor is responsible for the verification of all dimensions on site & shall inform the contract administrator of any discrepancies. Do not scale from this drawing. Use figured dimension only. Existing foundations, lintels and wall to be exposed if req'd by Building Control for assessment & upgrading if found inadequate. Unless stated otherwise these drawings represent design intent only & approved assembly drawings will be required from the Trade Contractor prior to any work and/or procurement being undertaken. If in doubt, ask.

Any images shown are for illustrative purposes only.

Revisions

- / - 240215 - Issued to client via email
- A - 240216 - Issued to client/FJ via email
- B - 240223 - Issued to LBRUT via email
- C - 240301 - Issued to client/FJ/LBRUT via email



LOCATION <b>Hunters Lodge                  Friars Lane                  Richmond</b>	CLIENT <b>Mr C Deehan</b>	DRAWING TITLE <b>Proposed Elevations / Plan                  Roof plan showing PV and                  rooflight design</b>	JOB No <b>2561</b>	SIZE <b>A3</b>
JOB DESCRIPTION <b>4 New Build Apartments</b>	SCALE <b>1:100 @ A3</b>	STATUS <b>Planning</b>	DRAWING No <b>007</b>	REV <b>C</b>