



18 Church Road, Caversham, Reading, Berkshire, RG4
7AD

Flood Risk Assessment

For Guy Williams

KRS.0894.001.R.001.C

September 2025

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18 Church Road, Caversham, Reading, Berkshire, RG4 7AD

Project	Flood Risk Assessment
Client	Guy Williams
Status	Final
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EXECUTIVE SUMMARY

The Site would be expected to remain dry in all but the most extreme conditions. The consequences of flooding are acceptable, and the development would be in accordance with the requirements of the National Planning Policy Framework (NPPF). The Proposed Development would be operated with minimal risk from flooding, would not increase flood risk elsewhere and is compliant with the requirements of the NPPF.

The Proposed Development should not therefore be precluded on the grounds of flood risk or drainage.

1.0 INTRODUCTION

1.1 Background

This Flood Risk Assessment (FRA) has been prepared by KRS Enviro at the request of Guy Williams to support a planning application for the construction of a 1.50 storey side extension, a double storey rear extension and the regrading of the existing garden steps (“the Proposed Development”) at 18 Church Road, Caversham, Reading, Berkshire, RG4 7AD (“the Site”).

This FRA has been carried out in accordance with guidance contained in the National Planning Policy Framework (NPPF)¹, associated Planning Practice Guidance on flood risk and coastal change² (PPG) and the PPG ‘Site-specific flood risk assessment checklist’. This FRA identifies and assesses the risks of all forms of flooding to and from the development and demonstrates how these flood risks will be managed so that the development remains safe throughout the lifetime, taking climate change into account.

It is recognised that developments which are designed without regard to flood risk may endanger lives, damage property, cause disruption to the wider community, damage the environment, be difficult to insure and require additional expense on remedial works. The development design should be such that future users will not have difficulty obtaining insurance or mortgage finance, or in selling all or part of the development, as a result of flood risk issues.

1.2 National Planning Policy Framework (NPPF)

One of the key aims of the NPPF is to ensure that flood risk is taken into account at all stages of the planning process; to avoid inappropriate development in areas at risk of flooding and to direct development away from areas of highest risk.

It advises that where new development is exceptionally necessary in areas of higher risk, this should be safe, without increasing flood risk elsewhere, and where possible, reduce flood risk overall. A risk-based approach is adopted at stages of the planning process, applying a source pathway receptor model to planning and flood risk. To demonstrate this, an FRA is required and should include:

- whether a Proposed Development is likely to be affected by current or future flooding from all sources;
- whether it will increase flood risk elsewhere;
- whether the measures proposed to deal with these effects and risks are appropriate;
- if necessary, provide the evidence to the Local Planning Authority (LPA) that the Sequential Test can be applied; and
- whether the development will be safe and pass part c) of the Exception Test if this is appropriate.

The report findings are based upon professional judgement and are summarised below with detailed recommendations provided at the end of the report. The report includes rainfall data from

¹ Ministry for Housing, Communities and Local Government (2025) National Planning Policy Framework: <https://assets.publishing.service.gov.uk/media/675abd214cbda57cacd3476e/NPPF-December-2024.pdf>

² Communities and Local Government (2022) Planning Practice Guidance - Flood Risk and Coastal Change: <https://www.gov.uk/guidance/flood-risk-and-coastal-change>

the Flood Estimation Handbook (FEH) and hydrogeological information from the British Geological Survey (BGS). The assessment will summarise and refer to these datasets in the text.

1.3 Report Structure

This FRA has the following report structure:

- Section 2 describes the location and the existing and Proposed Development;
- Section 3 outlines the flood risk to the existing and Proposed Development;
- Section 4 details the proposed surface water drainage for the Site and assesses the potential impacts of the Proposed Development on surface water drainage;
- Section 5 outlines the mitigation measures used to manage the overall level of flood risk;
- Section 6 details the Sequential and Exception Tests; and
- Section 7 presents a summary and conclusions

2.0 LOCATION & DEVELOPMENT DESCRIPTION

2.1 Site Location

The Site is located at 18 Church Road, Caversham, Reading, Berkshire, RG4 7AD (see Figure 1). The National Grid Reference (NGR) of the Site is 471025, 174777.



Figure 1 - Site Location

2.2 Existing Development

The existing Site consists of a two-storey detached house with large southern rear garden (see Appendix 1). A boat house sits below the southern extension which has its own external entrance (with no internal access to the main house), is used for storage only and is not a habitable room. The existing finished floor levels are raised by 220mm above the external ground levels, with the existing finished floor levels being over 2m above the rear garden to the south of the Site.

2.3 Proposed Development

The Proposed Development is for the construction of a 1.50 storey side extension, a double storey rear extension and the regrading of the existing garden steps (see Appendix 1). It is proposed that the finished floor levels of the proposed extensions will be set no lower than the existing finished floor levels which are raised 220mm above the external ground levels. Further details with regard to the Proposed Development can be found in the accompanying information submitted with the planning application.

2.4 Ground Levels

The Site slopes from north to south with an approximate maximum ground level of 39.40 metres Above Ordnance Datum (mAOD) to the north and an approximate minimum ground level of 36.93mAOD to the south, as shown on the Ordnance Survey Datum Digital Terrain Model (DTM). A topographical survey has recently been undertaken however, this is to an arbitrary datum, based on the finished floor level, and not mAOD (see Appendix 2). The topographical survey shows that the Site falls by 2.11m from north to south of the Site, with the existing finished floor levels being over 2m above the rear garden to the south of the Site.

2.5 Catchment Hydrology

The River Thames is located adjacent to the southern boundary of the Site.

2.6 Ground Conditions

The British Geological Survey (BGS) map³ shows that the bedrock deposits at the Site consist of the Seaford Chalk Formation and Newhaven Chalk Formation - chalk. The superficial deposits consist of the Langley Silt Member - Clay and silt.

Information from the National Soil Resources Institute⁴ details the Site area as being situated on loamy and clayey floodplain soils with naturally high groundwater.

³ https://mapapps2.bgs.ac.uk/geoindex/home.html?_ga=2.14476159.932338379.1655890995-1831306757.1655472887

⁴ <http://www.landis.org.uk/soilscapes/>

3.0 FLOOD RISK

3.1 Sources of Flooding

All sources of flooding have been considered, these are; fluvial (river) flooding, tidal (coastal) flooding, groundwater flooding, surface water (pluvial) flooding, sewer flooding and flooding from artificial drainage systems/infrastructure failure.

3.2 Environment Agency

Information regarding the current flood risk at the application Site and local flood defences has been obtained from the Environment Agency.

3.3 Climate Change

Projections of future climate change, in the UK, indicate more frequent, short-duration, high intensity rainfall and more frequent periods of long duration rainfall. Guidance included within the NPPF recommends that the effects of climate change are incorporated into FRA's. Recommended precautionary sensitivity ranges for peak rainfall intensities and peak river flows are outlined in the flood risk assessments: climate change allowances guidance⁵. Table 1 shows the peak river flow allowances by river management catchment.

The flood risk assessments: climate change allowances guidance recommends that the central allowances are used to assess climate change throughout the lifetime of the development which is 100 years. Therefore, the fluvial design event for the Site is the 1 in 100 year (+31%) event.

Table 1 - Peak River Flow Allowances by River Catchment

River Catchment	Allowance Category	2020s	2050s	2080s
Thames and South Chilterns Management Catchment	Upper	+30%	+42%	+76%
	Higher	+17%	+22%	+43%
	Central	+12%	+14%	+31%

3.4 Environment Agency Flood Zones

A review of the Environment Agency's Flood Zones indicates that the Site is located within Flood Zones 1, 2 and 3, with a 'low to high probability' of fluvial flooding, with less than 1 in 1000 annual probability of river flooding in any year (<0.1%) to a 1 in 100 or greater annual probability of river flooding (>1%) in any year, as shown in Figure 2. Figure 3 shows how the combined extent of Flood Zones 2 and 3 could increase with climate change over the next 100 years, ignoring the benefits of any existing flood defences.

The Site should not be designated as Flood Zone 3b 'Functional Floodplain'. The definition of Flood Zone 3b 'Functional Floodplain' as per the PPG is: "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:

- land having a 3.3% or greater annual probability of flooding, with any existing flood risk management infrastructure operating effectively; or

⁵ <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#high-allowances>

- 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).

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.”

The Site does not comprise land where water has to flow or be stored in times of flood. The Site does not perform a water conveyance flood route or a flood storage area. The Site does not provide a function of flood conveyance (i.e. free flow) or flood storage, either through natural processes, or by design (e.g. washlands and flood storage areas). The Site is already developed therefore, the Site is located within Flood Zone 3a.

The Flood Zones are the current best information on the extent of the extremes of flooding from rivers or the sea that would occur without the presence of flood defences, because these can be breached, overtopped and may not be in existence for the lifetime of the development. They show the worst case scenario. The Environment Agency Flood Zones and acceptable development types are explained in Table 2. Table 2 shows that some development types are generally acceptable in Flood Zones 1, 2 and 3a.

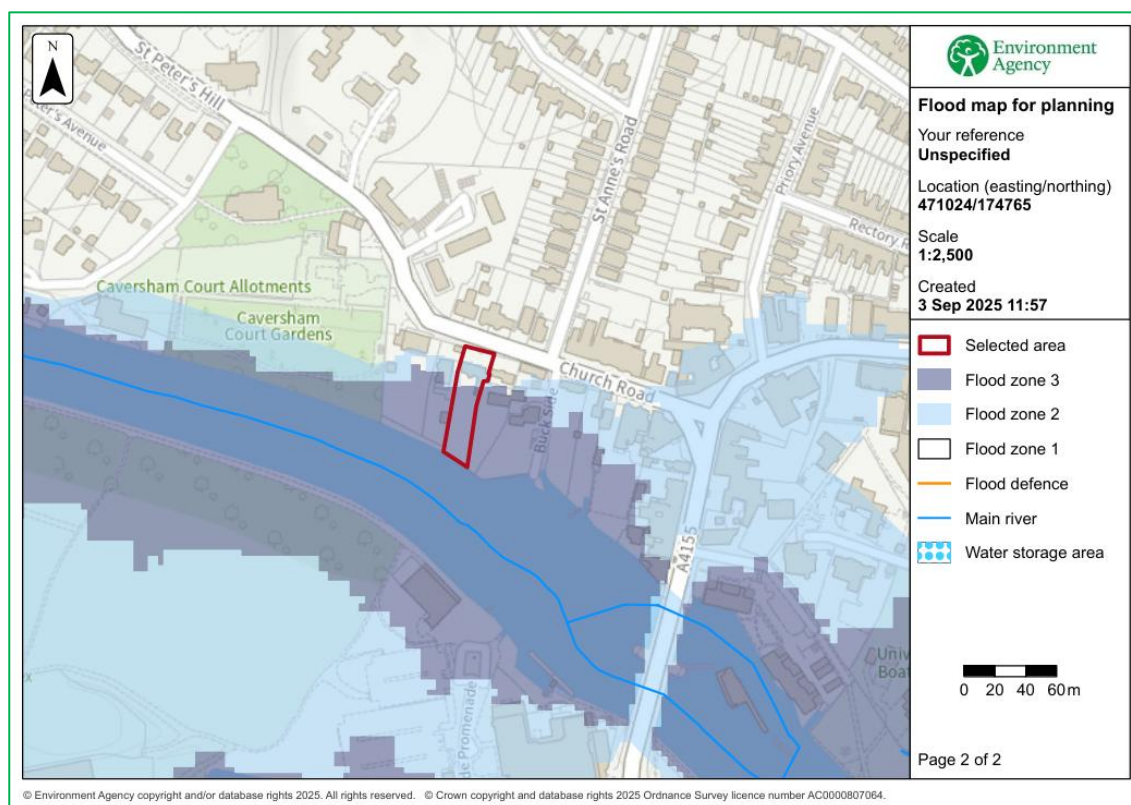


Figure 2 - Environment Agency Flood Zones: Present Day

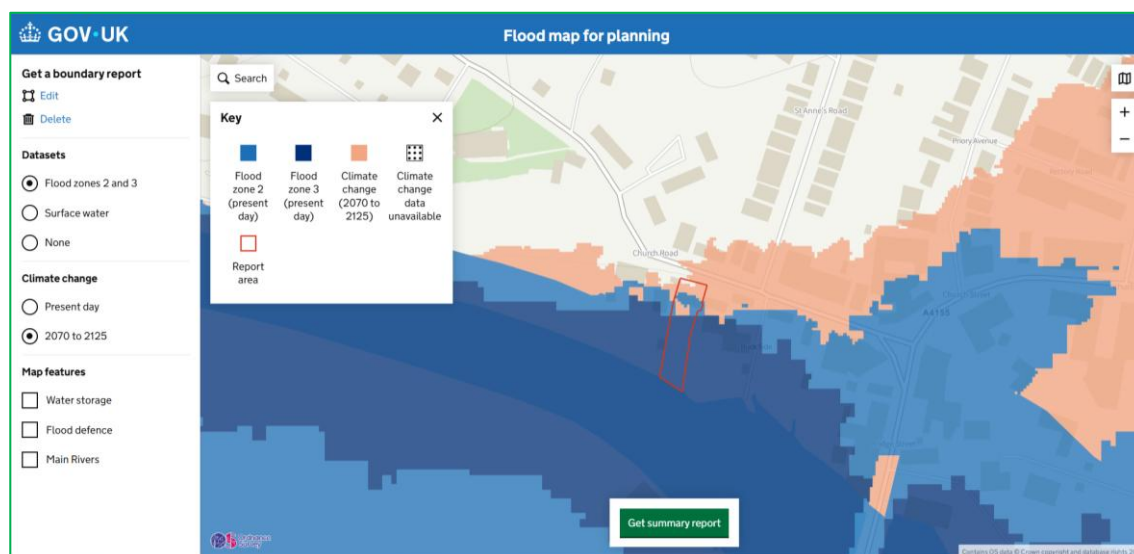


Figure 3 - Environment Agency Flood Zones: Climate Change 2070 to 2125

Table 2 - Environment Agency Flood Zones and Appropriate Land Use

Flood Zone	Probability	Explanation	Appropriate Land Use
Zone 1	Low	Less than a 1 in 1000 annual probability of river or sea flooding in any year (<0.1%)	All development types generally acceptable
Zone 2	Medium	Between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% - 0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% - 0.1%) in any year	Most development type are generally acceptable
Zone 3a	High	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	Some development types not acceptable
Zone 3b	'Functional Floodplain'	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: - land having a 3.3% or greater annual probability of flooding, with any existing flood risk management infrastructure operating effectively; or - 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). 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)	Some development types not acceptable

3.5 Flood Vulnerability

In the PPG, appropriate uses have been identified for the Flood Zones. Applying the Flood Risk Vulnerability Classification in the PPG, the existing and proposed use is classified as 'more vulnerable'.

The Proposed Development will not change the nature or times of occupation or introduce a new 'more vulnerable' use into the floodplain. Table 3 of this report and the PPG state that 'more vulnerable' uses are appropriate within Flood Zones 1, 2 and 3a after the completion of a satisfactory FRA.

Table 3 - Flood Risk Vulnerability and Flood Zone 'Compatibility'

Flood Risk Vulnerability Classification	Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	✓	Exception test required	✓	✓
Zone 3a	Exception test required	✓	✗	Exception test required	✓
Zone 3b 'Functional Floodplain'	Exception test required	✓	✗	✗	✗

Key: ✓: Development is appropriate, ✗: Development should not be permitted.

3.6 Historic Flooding

The Environment Agency records show that the garden area has historically flooded (see Figure 4). The client has further confirmed that the garden has flooded but the house and boat house have not flooded. These records do not give a return date or an indication of the depth of flooding on the Site. There are no other records of anecdotal information of flooding at the Site. The British Hydrological Society "Chronology of British Hydrological Events" has no information on flooding within the vicinity of the Site. No other historical records of flooding for the Site have been recorded.



Figure 4 - Environment Agency Historic Flood Map

3.7 Existing and Planned Flood Defence Measures

The Environment Agency data shows that there are currently no flood defence measures within the vicinity of the Site. Further property level protection measures will be used to protect the Site from flooding these are discussed in Section 5.0.

3.8 Fluvial (River) Flooding

The Site is unlikely to flood except in extreme conditions. The primary, but unlikely, flood risk posed to the Site is from fluvial flooding from the River Thames which is located adjacent to the southern boundary of the Site.

The Environment Agency has provided modelled water levels for the Site which have been compared to the ground level of the Site and areas within the vicinity of the Site to assess the flood risk at the Site in detail. Table 4 shows the Environment Agency floodplain water levels for the Site. Figures 5 to 10 show the Environment Agency modelled flood outlines.

The Environment Agency modelled data shows that lower areas of the Site, adjacent to the River Thames, may be inundated with floodwater to a maximum depth of 1.25m during the 1 in 100 year event, to a maximum depth of 1.71m during the 1 in 100 year (+35%) event and to a maximum depth of 1.79m during the 1 in 1000 year event. However, it should be noted that areas of the Site, to the north, including the access route, will not be inundated with floodwater for all events up to and including the 1 in 1000 year (+25%) event, these areas will be flood free during the 1 in 1000 year (+25%) event. The existing finished floor levels are raised by 220mm above the external ground levels, with the existing finished floor levels being over 2m above the rear garden to the south of the Site.

For all events up to and including the 1 in 1000 year (+25%) event, the majority of the existing house is shown to not be inundated with floodwater, only the very southern portion of the existing house, where the boat house which sits below the southern extension is situated, is shown to be inundated with floodwater. The majority of the existing house will be flood free during the 1 in 1000 year (+25%) event.

Table 4 - Environment Agency Modelled Water Levels (mAOD)

75	100	100 (+25%)	100 (+35%)	100 (+70%)	1000	1000 (+25%)
38.10	38.18	38.53	38.64	38.97	38.72	39.04

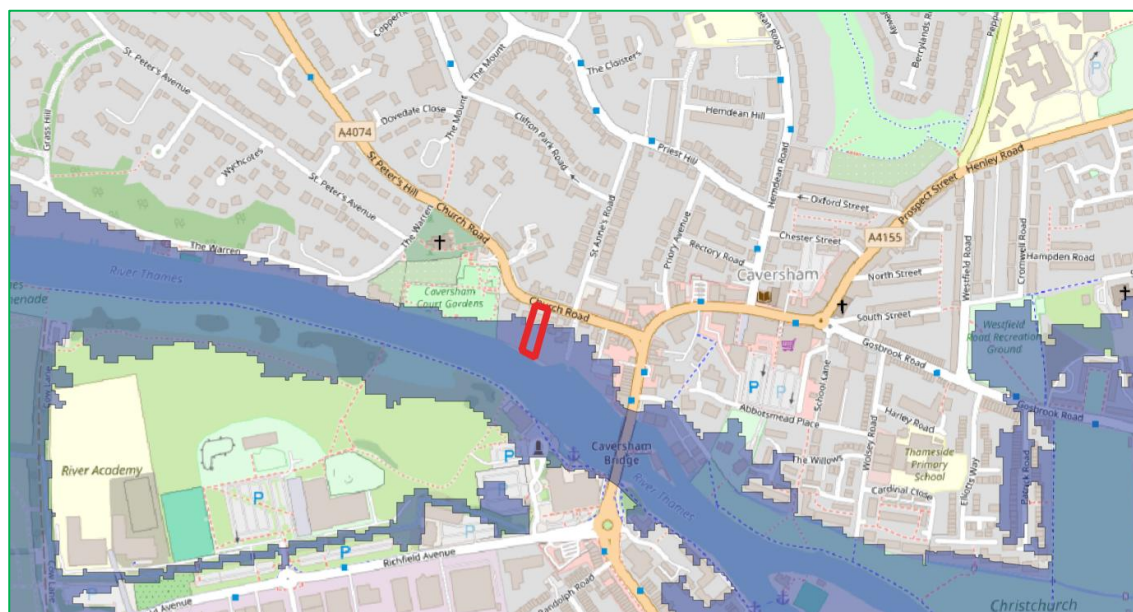


Figure 5 - Environment Agency Modelled 1 in 100 Year Flood Outline

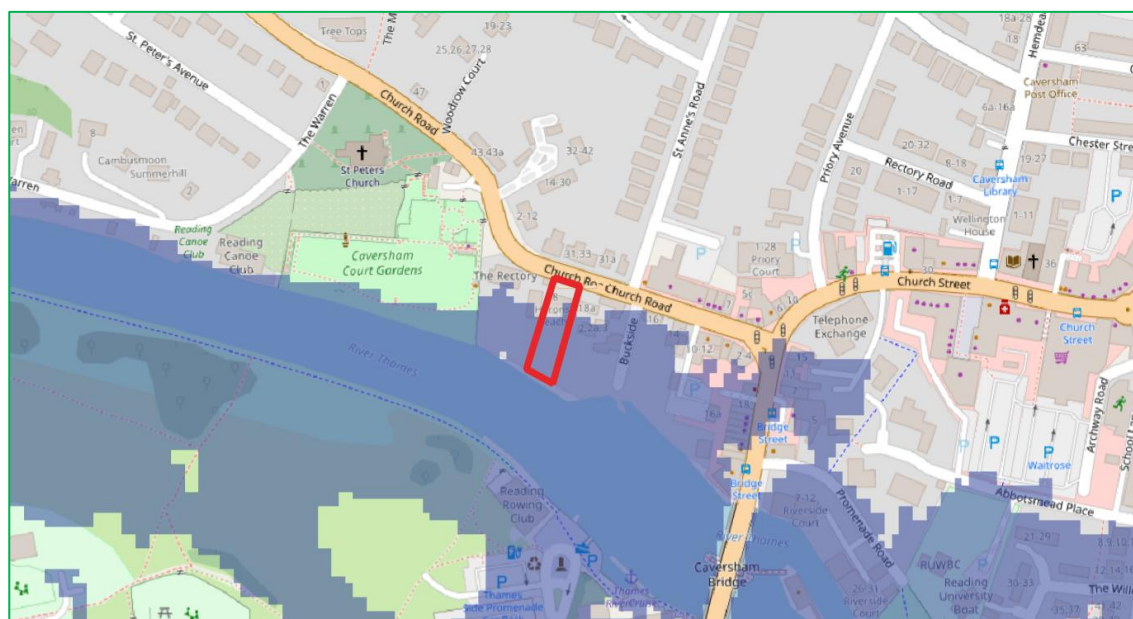


Figure 6 - Environment Agency Modelled 1 in 100 Year (+25%) Flood Outline

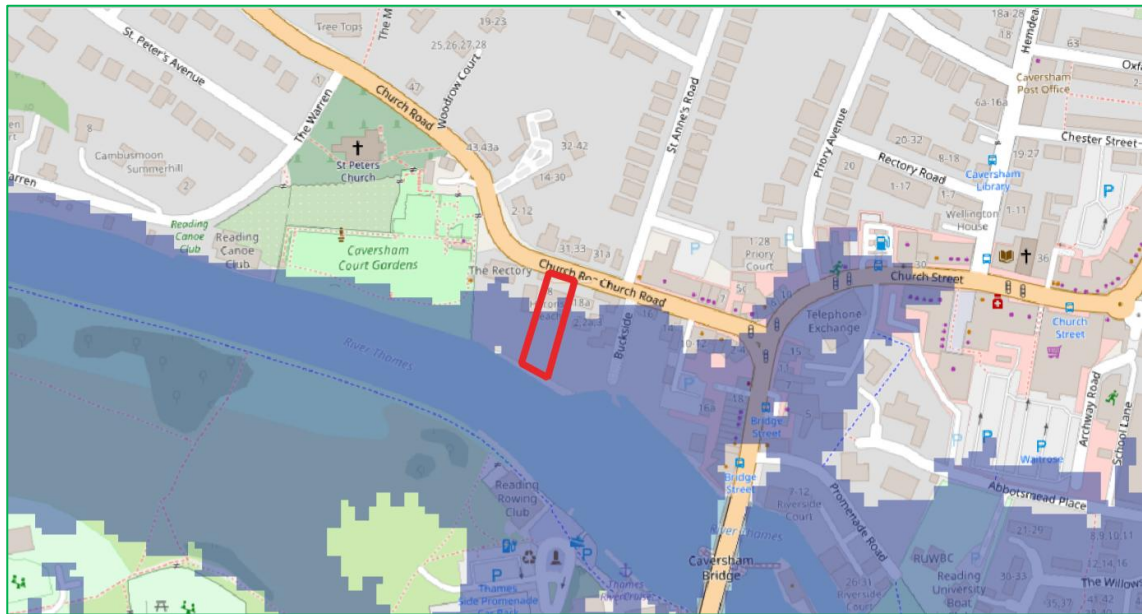


Figure 7 - Environment Agency Modelled 1 in 100 Year (+35%) Flood Outline

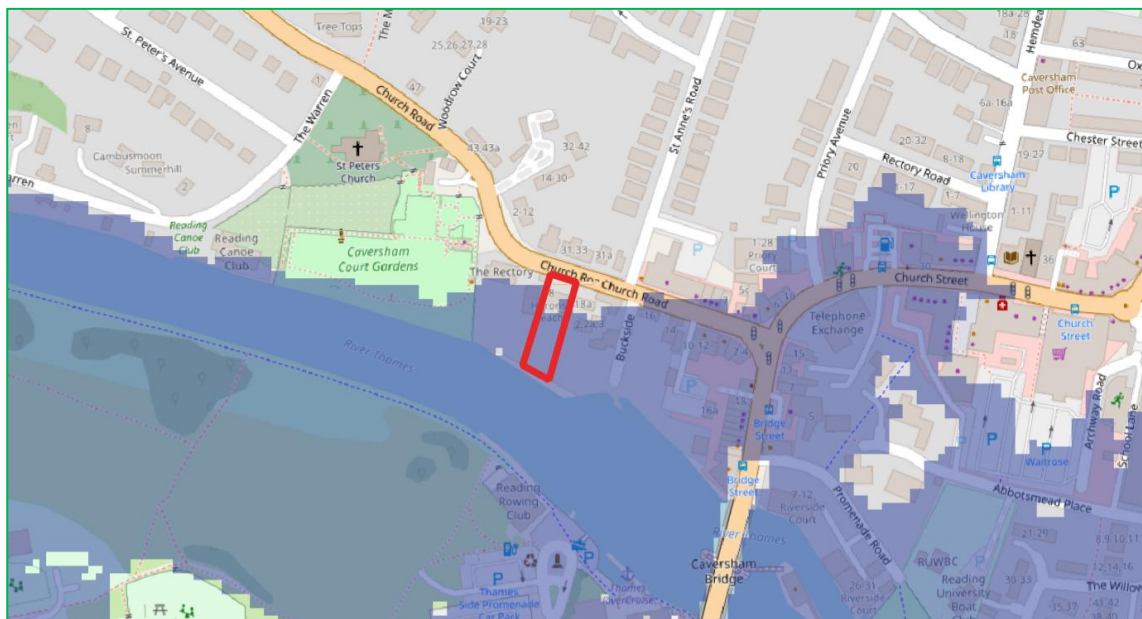


Figure 8 - Environment Agency Modelled 1 in 100 Year (+70%) Flood Outline

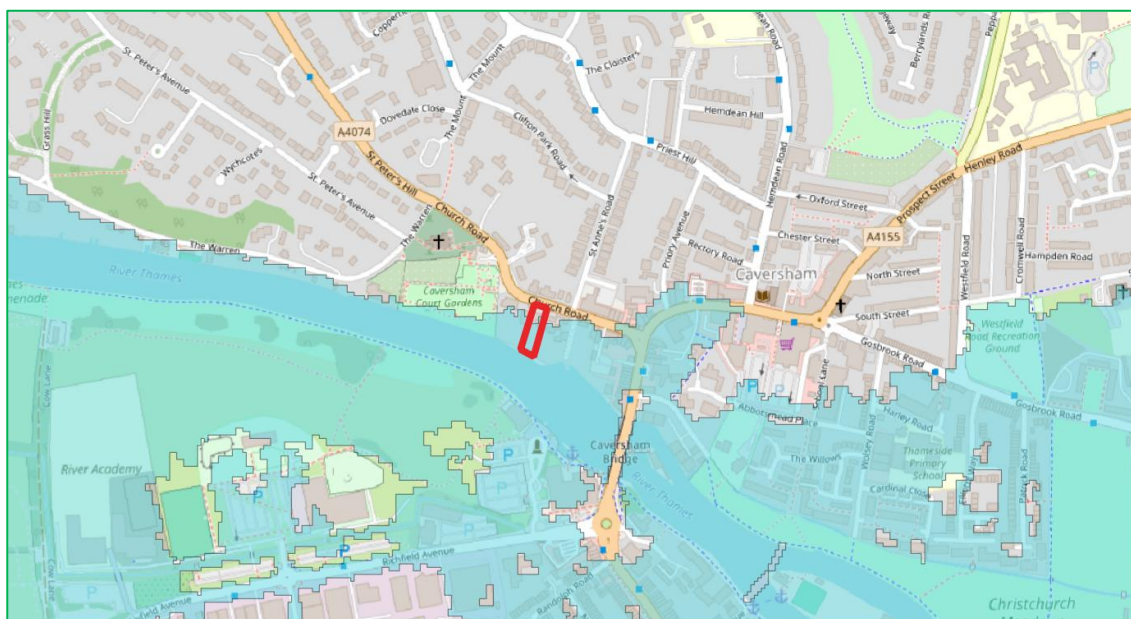


Figure 9 - Environment Agency Modelled 1 in 1000 Year Flood Outline

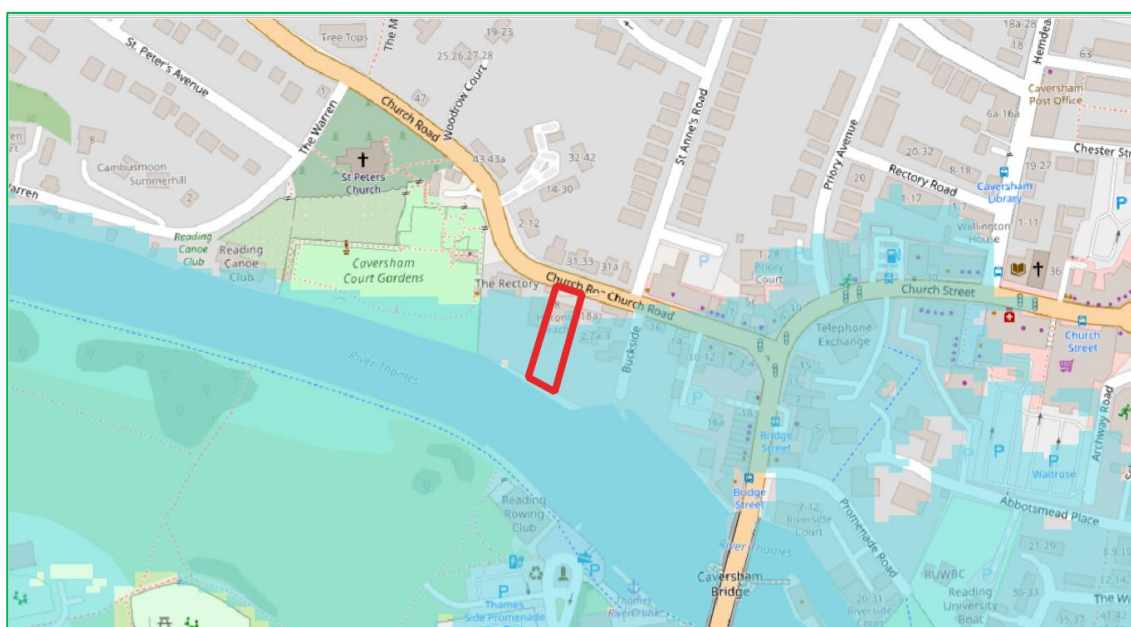


Figure 10 - Environment Agency Modelled 1 in 1000 Year (+25%) Flood Outline

The mechanism for flooding is generally prolonged episodes of rainfall, which affords good time for flood warnings to be issued. The likelihood of a rapid water level rise and possible rapid inundation of urban areas posing a risk to life is considered to be minimal with a forewarning of two (2) days of a pending flood event. The site is located within a low risk area where the onset of flooding is very gradual (many hours) as per Flood Risk Assessment Guidance for New Development Phase 2, R&D Technical Report FD2320/TR2.

Given the scale and nature of the Proposed Development and the size and location of the fluvial flooding sources it has been concluded that fluvial flooding poses a minimal actual and residual flood risk to the site. Therefore, the risk of fluvial flooding is considered to be of **medium significance**.

The flood risk at the Site will be further mitigated by using a number of property level protection measures to manage and reduce the overall flood risk at the Site (see Section 5.0).

3.9 Tidal (Coastal) Flooding

The Site is not located within the vicinity of tidal flooding sources and the risk of tidal flooding is considered to be **not significant**.

3.10 Groundwater Flooding

Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded.

Groundwater flooding tends to occur sporadically in both location and time. When groundwater flooding does occur, it tends to mostly affect low-lying areas, below surface infrastructure and buildings (for example, tunnels, basements and car parks) underlain by permeable rocks (aquifers). Site ground conditions suggest a low potential for groundwater flooding. Environment Agency data confirms that flooding from groundwater is unlikely in this area. The risk of flooding from groundwater flooding is considered to be **not significant**.

3.11 Surface Water (Pluvial) Flooding

The Site is not situated near to large areas of poor permeability and the soil conditions at the Site and within the vicinity of the Site indicate that the Site would not be at risk of surface water flooding. Surface water flooding tends to occur sporadically in both location and time such surface water would tend to be confined to the streets around the development.

The Environment Agency Surface Water flood map shows that the Site has a very low risk of surface water flooding with a chance of flooding of less than a 1 in 1000 (0.1%) annual probability of flooding in any year, as shown in Figures 11 to 13.

Given the scale and nature of the Proposed Development and the size and location of the surface water flooding sources it has been concluded that surface water flooding poses a very low flood risk to the Site. Therefore, the risk of flooding from surface water flooding is considered to be **not significant**.

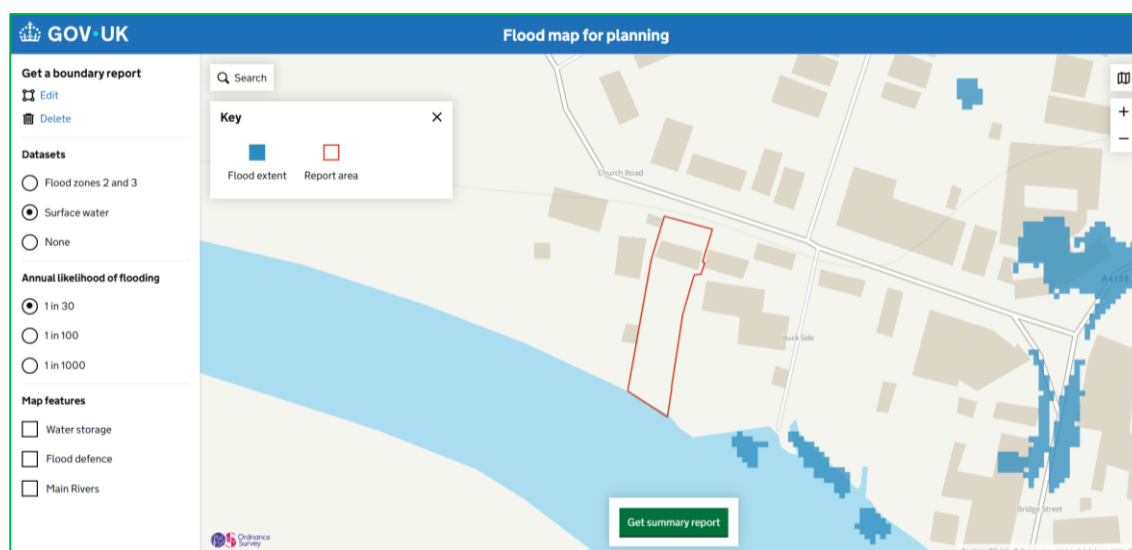


Figure 11 - Environment Agency Surface Water Flood Map: High Risk 1 in 30 Year Event

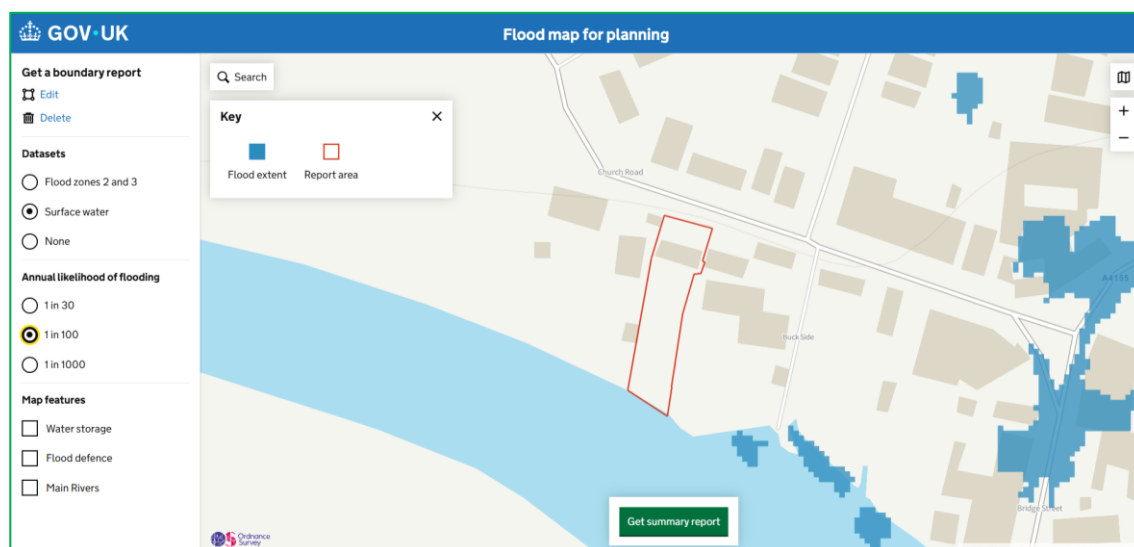


Figure 12 - Environment Agency Surface Water Flood Map: High Risk 1 in 100 Year Event

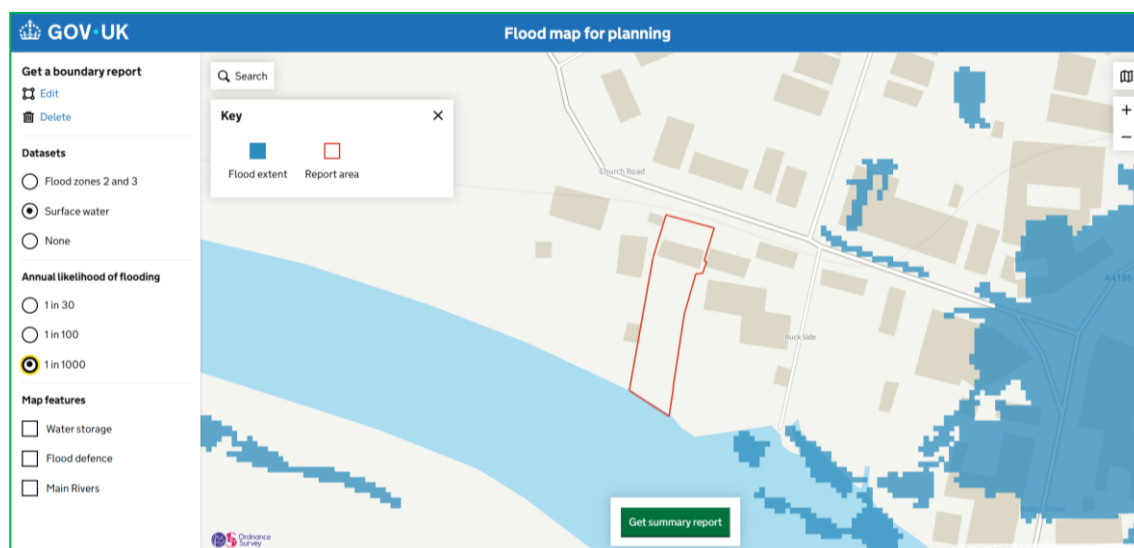


Figure 13 - Environment Agency Surface Water Flood Map: High Risk 1 in 1000 Year Event

3.12 Sewer Flooding

Sewer flooding occurs when urban drainage networks become overwhelmed and maximum capacity is reached. This can occur if there is a blockage in the network causing water to back up behind it or if the sheer volume of water draining into the system is too great to be handled. Sewer flooding tends to occur sporadically in both location and time such flood flows would tend to be confined to the streets around the development.

There are existing sewers located within the vicinity of the Site and these will inevitably have a limited capacity so in extreme conditions there would be surcharges, which may in turn cause flooding. Flood flows could also be generated by burst water mains, but these would tend to be of a restricted and much lower volume than weather generated events and so can be discounted for the purposes of this assessment.

Given the design parameters normally used for drainage design in recent times and allowing for some deterioration in the performance of the installed systems, which are likely to have been in

place for many years, an appropriate flood risk probability from this source could be assumed to have a return period in the order of 1 in 10 to 1 in 20 years. The provision of adequate level difference between the ground floors and adjacent ground level would reduce the annual probability of damage to property from this source to 1 in 100 years or less. Therefore, the risk of flooding from sewer flooding is considered to be **not significant**.

3.13 Flooding from Artificial Drainage Systems/Infrastructure Failure

The Site is located within the vicinity of reservoirs. The Environment Agency Reservoir Flood Map shows that the Site is at risk of flooding from reservoir failure where there is also flooding from rivers (see Figure 14). This map shows the largest area that might be flooded if a reservoir were to fail and release the water it holds. The Environment Agency Reservoir flood map has been prepared for emergency planning purposes and for this reason they reflect a worst case scenario.

Since this is a prediction of a worst case scenario, it's unlikely that any actual flood would be this large. Reservoir flooding is extremely unlikely; reservoirs in the UK have a very good safety record. There has been no loss of life in the UK from reservoir flooding since 1925. Since then reservoir safety legislation has been introduced to make sure reservoirs are well maintained.

The hazard is well managed through effective legislation and it is unlikely that the impact zone downstream of these reservoirs should not preclude the proposed development. The risk of flooding from reservoir flooding is considered to be **not significant**.



Figure 14 - Environment Agency Reservoir Flood Map

3.14 The Effect of the Development on Flood Risk

No land raising will occur within the Site therefore, the Proposed Development will have no impact on flood risk and the overall direction of the movement of water will be maintained within the developed Site and surrounding area. There will no net loss in flood storage capacity. The conveyance routes (flow paths) will not be blocked or obstructed.

There will be no detriment to the flood storage capacity of the Site. There will be no increase in the flood water levels due to the Proposed Development. There will be no loss in flood storage capacity and no change in the on-site and off-site flood risk.

3.15 Summary of Site Specific Flood Risk

A summary of the sources of flooding and a review of the risk posed by each source at the Site is shown in Table 5.

The Site is unlikely to flood except in extreme conditions. The primary, but unlikely, flood risk posed to the Site is from fluvial flooding from the River Thames which is located adjacent to the southern boundary of the Site. The Site is located within Flood Zones 1, 2 and 3a, with a 'low to high probability' of fluvial flooding, with less than 1 in 1000 annual probability of river flooding in any year (<0.1%) to a 1 in 100 or greater annual probability of river flooding (>1%) in any year.

The existing and proposed use is classified as 'more vulnerable'. The Proposed Development will not increase the vulnerability of the Site to flooding or introduce a new 'more vulnerable' use into the floodplain. 'More vulnerable' uses are appropriate within Flood Zones 1, 2 and 3a after the completion of a satisfactory FRA.

The Environment Agency modelled data shows that lower areas of the Site, adjacent to the River Thames, may be inundated with floodwater to a maximum depth of 1.25m during the 1 in 100 year event, to a maximum depth of 1.71m during the 1 in 100 year (+35%) event and to a maximum depth of 1.79m during the 1 in 1000 year event. However, it should be noted that areas of the Site, to the north, including the access route, will not be inundated with floodwater for all events up to and including the 1 in 1000 year (+25%) event, these areas will be flood free during the 1 in 1000 year (+25%) event. The existing finished floor levels are raised by 220mm above the external ground levels, with the existing finished floor levels being over 2m above the rear garden to the south of the Site.

For all events up to and including the 1 in 1000 year (+25%) event, the majority of the existing house is shown to not be inundated with floodwater, only the very southern portion of the existing house, where the boat house which sits below the southern extension is situated, is shown to be inundated with floodwater. The majority of the existing house will be flood free during the 1 in 1000 year (+25%) event.

The mechanism for flooding is generally prolonged episodes of rainfall, which affords good time for flood warnings to be issued. The likelihood of a rapid water level rise and possible rapid inundation of urban areas posing a risk to life is considered to be minimal with a forewarning of two (2) days of a pending flood event. The site is located within a low risk area where the onset of flooding is very gradual (many hours) as per Flood Risk Assessment Guidance for New Development Phase 2, R&D Technical Report FD2320/TR2.

Given the scale and nature of the Proposed Development and the size and location of the fluvial flooding sources it has been concluded that fluvial flooding poses a minimal actual and residual flood risk to the site. Therefore, the risk of fluvial flooding is considered to be of **medium significance**. The flood risk at the Site will be further mitigated by using a number of property level protection measures to manage and reduce the overall flood risk at the Site (see Section 5.0).

The building is existing and no land raising will occur within the Site, therefore the Proposed Development will have no impact on flood risk and the overall direction of the movement of water will be maintained within the developed Site and surrounding area. There will be no net loss in flood storage capacity. The conveyance routes (flow paths) will not be blocked or obstructed.

There will be no detriment to the flood storage capacity of the Site. There will be no increase in the flood water levels due to the Proposed Development. There will be no loss in flood storage capacity and no change in the on-site and off-site flood risk.

Table 5 - Risk Posed by Flooding Sources

Sources of Flooding	Potential Flood Risk	Potential Source	Probability/Significance
Fluvial Flooding	Yes	River Thames	Medium
Tidal Flooding	No	None Reported	None
Groundwater Flooding	No	None Reported	None
Surface Water Flooding	No	None Reported	None
Sewer Flooding	No	None Reported	None
Flooding from Artificial Drainage Systems/Infrastructure Failure	Yes	Reservoirs	None

4.0 SURFACE WATER DRAINAGE

4.1 Surface Water Management Overview

It is recognised that consideration of flood issues should not be confined to the floodplain. The alteration of natural surface water flow patterns through developments can lead to problems elsewhere in the catchment, particularly flooding downstream. For example, replacing vegetated areas with roofs, roads and other paved areas can increase both the total and the peak flow of surface water runoff from the Site. Changes of land use on previously developed land can also have significant downstream impacts where the existing drainage system may not have sufficient capacity for the additional drainage.

An assessment of the surface water runoff rates has been undertaken, in order to determine the surface water options and attenuation requirements for the Site. The assessment considers the impact of the proposals compared to current conditions. Therefore, the surface water attenuation requirement for the developed Site can be determined and reviewed against existing arrangements.

The surface water drainage arrangements for any development site should be such that the volumes and peak flow rates of surface water leaving a developed site are no greater than the rates prior to the Proposed Development unless specific off-site arrangements are made and result in the same net effect.

4.2 Surface Water Runoff Rates/Volumes

The Proposed Development will not alter the impermeable areas of the Site. It is understood that the existing drainage infrastructure at the Site efficiently and effectively manages surface water runoff generated at the Site. As there is no recent history of surface water flooding at the Site it is likely that the current drainage system is sufficient for the current and proposed Site use. There will be no increase in surface water runoff or exacerbation of off-site risk as a result of the development.

5.0 RISK MANAGEMENT

5.1 Introduction

The flood risk at this location is considered suitable for the Proposed Development within the NPPF. In this flood zone, developers and local authorities should seek opportunities to reduce the overall level of flood risk in the area through the layout and form of the development and the use of flood mitigation measures.

The flooding sources will be mitigated on the Site by using a number of techniques, and mitigation strategies to manage and reduce the overall flood risk at the Site. This will ensure the development will be safe and there is:

- Minimal risk to life;
- Minimal disruption to people living and working in the area;
- Minimal potential damage to property;
- Minimal impact of the Proposed Development on flood risk generally; and;
- Minimal disruption to natural heritage.

The flood risk at the Site will be reduced by mitigation measures; these are discussed in more detail below.

5.2 Finished Floor Levels

It is proposed that the finished floor levels of the proposed extensions will be set no lower than the existing finished floor levels which are raised 220mm above the external ground levels and being over 2m above the rear garden to the south of the Site.

It is recognised however that owing to limited headroom constraints, massing, planning policy and Building Regulations it is considered impractical to raise the finished floor levels further, than those stated above. Therefore, in order to mitigate against this, it is recommended that the occupants implement a Flood Plan to a safe area away from the building during times of flood and sign up to the Environment Agency flood warning telephone service.

It is also proposed that flood protection measures are employed within the building design to reduce the overall risk to the occupants. This is discussed below.

5.3 First Floor Accommodation

Accommodation will be located on the first floor as well as the ground floor of the house. This will allow occupants to retreat to higher floor levels if needed. The levels of the first floor are located well above any floodwater levels. This provides a 'safe haven' above any floodwater levels. This will enable rapid escape should flooding occur which is unlikely.

The upper floors are accessed via internal stairs and are sufficient in size to safely house all occupants of the building. The 'safe haven' will only be required in very extreme events or if a flood warning has not been received.

5.4 Flood Resistance

The flood risk can be mitigated through the design of the extensions. Flood resistance measures are measures that help resist floodwaters entering a property (airbrick covers are an example of a flood resistance measure). Flood resistant measures will be used, including:

- The walls of the extensions will be thick.
- Sealant will be used around all external doors and windows.
- All windows will be located above ground levels.
- All external doors and windows are constructed from hard wearing materials.

These factors will prevent water entering the property and make the property more resistant to seepage.

5.5 Flood Resilience

Flood resilience measures are designed in such a way as to reduce the cost and time required to reinstate the property should it be flooded (tiled floors are an example of a flood resilience measure).

The property will be constructed in such a way that although floodwater may enter the building, elements that are damaged by flood water can be easily repaired or replaced. This is a form of flood resilience. They are suitable as no other measure is practicable. Robust materials and finishes will be used.

All electrics wiring, switches, sockets, socket outlets etc. to be located a minimum of 450mm above the finished floor levels.

5.6 Flood Warning and Evacuation

The Site is located within the vicinity of a flood risk area; the Site will participate in the Environment Agency flood warning telephone service. The Site will register contact details with the Environment Agency's Flood Warnings Service (Floodline 0845 988 1188) in order to receive Flood Warnings. The Environment Agency operate a free flood warning service providing alerts by phone, text or email when flooding is anticipated providing an opportunity for home owners to take necessary precautions, giving enough time for the building to be safely evacuated and mitigation measures to be put in place.

All occupants/visitors of the Site will be made aware of the Environment Agency Floodline telephone number (Call Floodline on 0345 988 1188 or 0845 988 1188 to get more information) and the three Flood Warning Codes and their meaning. The owner of the Site will carry out the role of Flood Warden for the Site and ensure they have an understanding of the flood mechanisms of the Site and will ensure that the safety of the occupants and visitors will not be compromised.

The Environment Agency uses three Flood Warnings Codes. They can be issued in any order, usually ending with an 'all clear'. They are issued by the Environment Agency through their website and Floodline Warning Service. The flood warning will be passed onto the occupier/visitors of the Site verbally, by telephone and/or in person. It will be ensured that everyone receives the flood warnings when required.

5.7 Flood Plan

A Flood Plan outlining the precautions and actions you should take when a flood event is anticipated to help reduce the impact and damage flooding may cause will be developed. Sensible

precautions would include raising electrical items, moving valuable items off the ground or where possible moving them to a higher floor, rolling up carpets and rugs and turning off utilities. In addition, consider what actions you would take should the property need to be evacuated including access and egress routes and preparing a flood kit in advance containing warm clothing, medication, a torch, food and wellingtons.

The Flood Plan is a 'living' document and therefore should be periodically reviewed and updated to provide advice and guidance to occupants in the event of an extreme flood. The Flood Plan will therefore reduce the vulnerability of the occupants to flooding and makes them aware of the mechanisms of flooding at the Site.

Residual Risk

If flooding starts to affect the Site without any pre-warning i.e. in real time (e.g. through a failure of the flood warning delivery) the following actions will be taken:

- Occupants and visitors should consider evacuating the Site.
- If flood levels continue to rise, occupants and visitors are advised to evacuate before safe access is lost. Occupants and visitors should monitor the flood progression and evacuate.

The Flood Warden will monitor flood levels and keep occupants and visitors informed and will decide whether to initiate the Flood Plan. If required a 'safe haven' can also be maintained and may be required in very extreme events if a flood warning has not been received.

5.8 Safe Access and Egress Route

The NPPF requires that, where required, safe access and escape is available to/from new developments in flood risk areas. Access routes should be such that occupants can safely access and exit their houses in design flood conditions. These routes must also provide the emergency services with access to the development during a flood event and enable flood defence authorities to carry out any necessary duties during the period of flood.

The Site is at such a ground level that it would only flood in the most extreme flood event. The Site is located where the onset of flooding is very gradual (many hours) as per Flood Risk Assessment Guidance for New Development Phase 2, R&D Technical Report FD2320/TR2. The ground levels rise to the east of the Site with the water depths decreasing rapidly therefore, a safe access and egress route, including emergency access can be maintained for vehicles and/or by foot.

Facilities such as community centres, shops etc. are located to the north of the Site. There may also be large areas than those shown in Figure 2 that are flood free located nearer and within the vicinity of the Site. In the event of a flood warning, vital belongings, including waterproof clothing, necessary medication and essentials for infants and children will be collected. It should be ensured that all occupiers and visitors to the Site are accounted for, and then exit the Site using the routes shown in Figure 15.

The Safe Access and Egress Route shown in Figure 15 indicates the exit routes that all people (i.e. occupants and visitors) on Site should follow once a flood warning has been received. People should make their way to areas outside of the flood zone. Therefore, safe access and egress can be maintained in accordance with the NPPF and Environment Agency guidance.

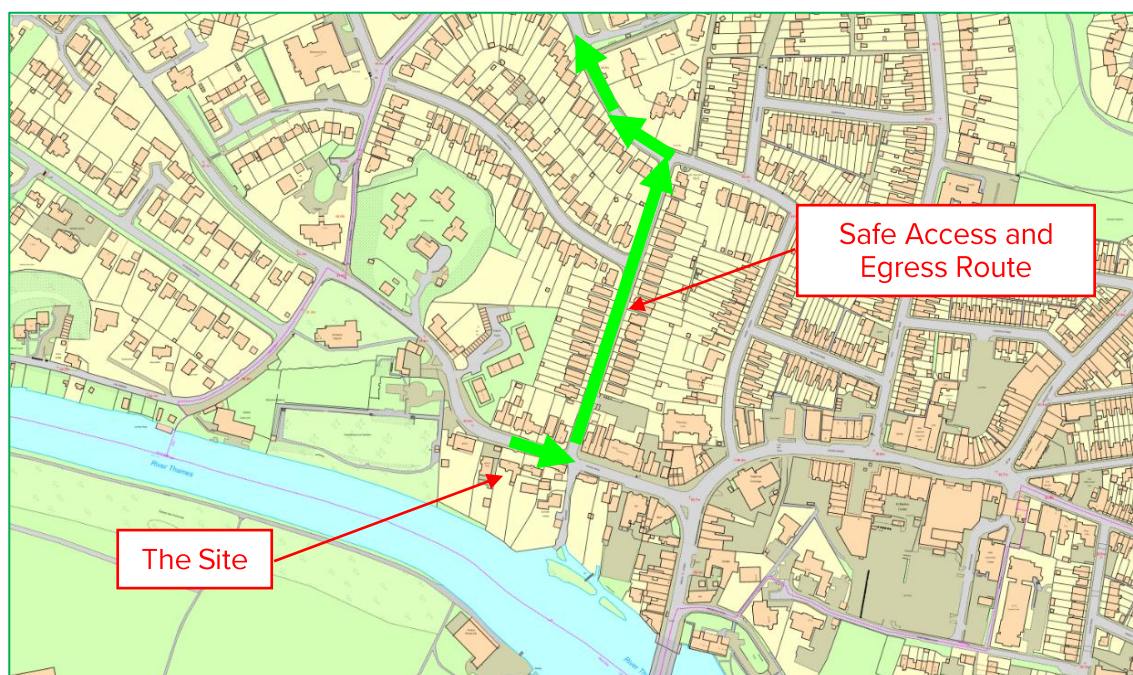


Figure 15 - Safe Access and Egress Route

5.9 Flood Warning Codes/Flood Evacuation Procedures

In order for the following evacuation procedures to be effective:

- The Site will participate in the Environment Agency flood warning telephone service. The Site will register contact details with the Environment Agency's Flood Warnings Service (Floodline 0345 988 1188) in order to receive Flood Warnings/Alerts.
- The flood warning will be passed onto the visitors of the Site verbally, by telephone and/or in person. It will be ensured that everyone receives the flood warnings when required.

Flood Alert



'Flooding of low-lying land and roads is expected. Be aware, be prepared, watch out!'

The Environment Agency will issue a Flood Alert status when flooding is possible, based upon weather and river/sea conditions. Be prepared to act on your Flood Plan. At this stage occupants and visitors should make themselves aware of the Flood Plan and evacuation routes. Prepare a flood kit of essential items. Monitor local water levels and the flood forecast.

Flood Warning



'Flooding of homes and businesses is expected. Act now!'

The Flood Warning alert will be issued when water levels are rising, and further rain is expected. The Site will be evacuated. Move family, pets and valuables to a safe place.

Safe access and egress, including emergency access can be maintained for vehicles and/or by foot. Water, electricity and gas supplies should be located and switched off before evacuating. The Environment Agency Floodline on 0345 988 1188 to get more information should be contacted to get more information, periodically and listen to and watch for weather and flood warnings on local radio and television stations.

Severe Flood Warning



'Severe Flooding is expected. There is extreme danger life and property. Act now!'

If the Site has not already been evacuated, it will be evacuated immediately. Co-operate with the emergency services and call 999 if immediately in danger. Safe access and egress, including emergency access can be maintained for vehicles and/or by foot.

Warning No Longer in Force

'Flood Watches or Flood Warnings are no longer in force for this area'.

Occupants and visitors should contact the Council to check that it is safe to return to the Site. Please be careful water may be around for several days. If there is any doubt that appliances may be water damaged, they must be checked before switching the power or gas back on. Contact your insurance company as soon as possible to get their approval before arranging any clean-up or repairs.

5.10 Flooding Consequences

The mitigation measures detailed above show that the flood risk can be effectively managed and therefore the consequences of flooding are acceptable. The Site is unlikely to flood except in extreme conditions. This takes into account the property level protection measures.

6.0 SEQUENTIAL APPROACH

6.1 Sequential/Exception Tests

The risk-based Sequential Test in accordance with the NPPF aims to steer new development to areas at the lowest probability of flooding (i.e. Flood Zone 1). However, paragraph 176 of the NPPF confirms that: *'Applications for some minor development and changes of use⁶ should not be subject to the Sequential or Exception Tests but should still meet the requirements for site-specific flood risk assessments'*.

The development proposals should therefore be considered by the LPA to satisfy the Sequential and Exception Tests as set out in the NPPF.

⁶ This includes householder development, small non-residential extensions (with a footprint of less than 250m²) 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.

7.0 SUMMARY AND CONCLUSIONS

7.1 Introduction

This report presents an FRA in accordance with the NPPF for the Proposed Development at 18 Church Road, Caversham, Reading, Berkshire, RG4 7AD.

This FRA identifies and assesses the risks of all forms of flooding to and from the development and demonstrates how these flood risks will be managed so that the development remains safe throughout the lifetime, taking climate change into account.

7.2 Flood Risk

The Site is unlikely to flood except in extreme conditions. The primary, but unlikely, flood risk posed to the Site is from fluvial flooding from the River Thames which is located adjacent to the southern boundary of the Site. The Site is located within Flood Zones 1, 2 and 3a, with a 'low to high probability' of fluvial flooding, with less than 1 in 1000 annual probability of river flooding in any year (<0.1%) to a 1 in 100 or greater annual probability of river flooding (>1%) in any year.

The existing and proposed use is classified as 'more vulnerable'. The Proposed Development will not increase the vulnerability of the Site to flooding or introduce a new 'more vulnerable' use into the floodplain. 'More vulnerable' uses are appropriate within Flood Zones 1, 2 and 3a after the completion of a satisfactory FRA.

The Environment Agency modelled data shows that lower areas of the Site, adjacent to the River Thames, may be inundated with floodwater to a maximum depth of 1.25m during the 1 in 100 year event, to a maximum depth of 1.71m during the 1 in 100 year (+35%) event and to a maximum depth of 1.79m during the 1 in 1000 year event. However, it should be noted that areas of the Site, to the north, including the access route, will not be inundated with floodwater for all events up to and including the 1 in 1000 year (+25%) event, these areas will be flood free during the 1 in 1000 year (+25%) event. The existing finished floor levels are raised by 220mm above the external ground levels, with the existing finished floor levels being over 2m above the rear garden to the south of the Site.

For all events up to and including the 1 in 1000 year (+25%) event, the majority of the existing house is shown to not be inundated with floodwater, only the very southern portion of the existing house, where the boat house which sits below the southern extension is situated, is shown to be inundated with floodwater. The majority of the existing house will be flood free during the 1 in 1000 year (+25%) event.

The mechanism for flooding is generally prolonged episodes of rainfall, which affords good time for flood warnings to be issued. The likelihood of a rapid water level rise and possible rapid inundation of urban areas posing a risk to life is considered to be minimal with a forewarning of two (2) days of a pending flood event. The site is located within a low risk area where the onset of flooding is very gradual (many hours) as per Flood Risk Assessment Guidance for New Development Phase 2, R&D Technical Report FD2320/TR2.

Given the scale and nature of the Proposed Development and the size and location of the fluvial flooding sources it has been concluded that fluvial flooding poses a minimal actual and residual flood risk to the site. Therefore, the risk of fluvial flooding is considered to be of **medium significance**. The flood risk at the Site will be further mitigated by using a number of property level protection measures to manage and reduce the overall flood risk at the Site (see Section 5.0).

The building is existing and no land raising will occur within the Site, therefore the Proposed Development will have no impact on flood risk and the overall direction of the movement of water

will be maintained within the developed Site and surrounding area. There will be no net loss in flood storage capacity. The conveyance routes (flow paths) will not be blocked or obstructed.

There will be no detriment to the flood storage capacity of the Site. There will be no increase in the flood water levels due to the Proposed Development. There will be no loss in flood storage capacity and no change in the on-site and off-site flood risk.

7.3 Surface Water Drainage

The Proposed Development will not alter the impermeable areas of the Site. It is understood that the existing drainage infrastructure at the Site efficiently and effectively manages surface water runoff generated at the Site. As there is no recent history of surface water flooding at the Site it is likely that the current drainage system is sufficient for the current and proposed Site use. There will be no increase in surface water runoff or exacerbation of off-site risk as a result of the development.

7.4 Risk Management

The flood risk at the Site will be reduced by mitigation measures, discussed below.

Finished Floor Levels: It is proposed that the finished floor levels of the proposed extensions will be set no lower than the existing finished floor levels which are raised 220mm above the external ground levels and being over 2m above the rear garden to the south of the Site.

It is recognised however that owing to limited headroom constraints, massing, planning policy and Building Regulations it is considered impractical to raise the finished floor levels further, than those stated above. Therefore, in order to mitigate against this, it is recommended that the occupants implement a Flood Plan to a safe area away from the building during times of flood and sign up to the Environment Agency flood warning telephone service.

It is also proposed that flood protection measures are employed within the building design to reduce the overall risk to the occupants. This is discussed below.

First Floor Accommodation: Accommodation will be located on the first floor as well as the ground floor of the house. This will allow occupants to retreat to higher floor levels if needed. The levels of the first floor are located well above any floodwater levels. This provides a 'safe haven' above any floodwater levels. This will enable rapid escape should flooding occur which is unlikely.

The upper floors are accessed via internal stairs and are sufficient in size to safely house all occupants of the building. The 'safe haven' will only be required in very extreme events or if a flood warning has not been received.

Flood Resistance Measures: Flood resistant measures will be used, including:

- The walls of the extensions will be thick.
- Sealant will be used around all external doors and windows.
- All windows will be located above ground levels.
- All external doors and windows are constructed from hard wearing materials.

These factors will prevent water entering the property and make the property more resistant to seepage.

Flood Resilience Measures: Robust materials and finishes will be used:

- All electrics wiring, switches, sockets, socket outlets etc. to be located a minimum of 450mm above the finished floor levels.

Flood Warning and Evacuation: The Site is located within the vicinity of a flood risk area therefore; the Site will participate in the Environment Agency flood warning telephone service. The Site will register contact details with the Environment Agency' Flood Warnings Service (Floodline 0845 988 1188) in order to receive Flood Warnings.

Flood Plan: A Flood Plan outlining the precautions and actions you should take when a flood event is anticipated to help reduce the impact and damage flooding may cause will be developed.

Safe Access and Egress Route: The Site is at such a ground level that it would only flood in the most extreme flood event. The Site is located where the onset of flooding is very gradual (many hours) as per Flood Risk Assessment Guidance for New Development Phase 2, R&D Technical Report FD2320/TR2. The ground levels rise to the north of the Site with the water depths decreasing rapidly therefore, a safe access and egress route, including emergency access can be maintained for vehicles and/or by foot.

Facilities such as community centres, shops etc. are located to the north of the Site. In the event of a flood warning, vital belongings, including waterproof clothing, necessary medication and essentials for infants and children will be collected. It should be ensured that all occupiers and visitors to the Site are accounted for, and then exit the Site.

The Safe Access and Egress Route indicates the exit routes that all people (i.e. occupants and visitors) on Site should follow once a flood warning has been received. People should make their way to areas outside of the flood zone. Therefore, safe access and egress can be maintained in accordance with the NPPF and Environment Agency guidance.

Flood Warning Codes/Flood Evacuation Procedures: The flood evacuation procedures have been developed so that the Site can be safely evacuated. The property will participate in the Environment Agency flood warning telephone service. The Site will register contact details with the Environment Agency' Flood Warnings Service (Floodline 0345 988 1188) in order to receive Flood Warnings. Flood warning will be passed onto the visitors of the Site verbally, by telephone and/or in person. It will be ensured that everyone receives the flood warnings when required.

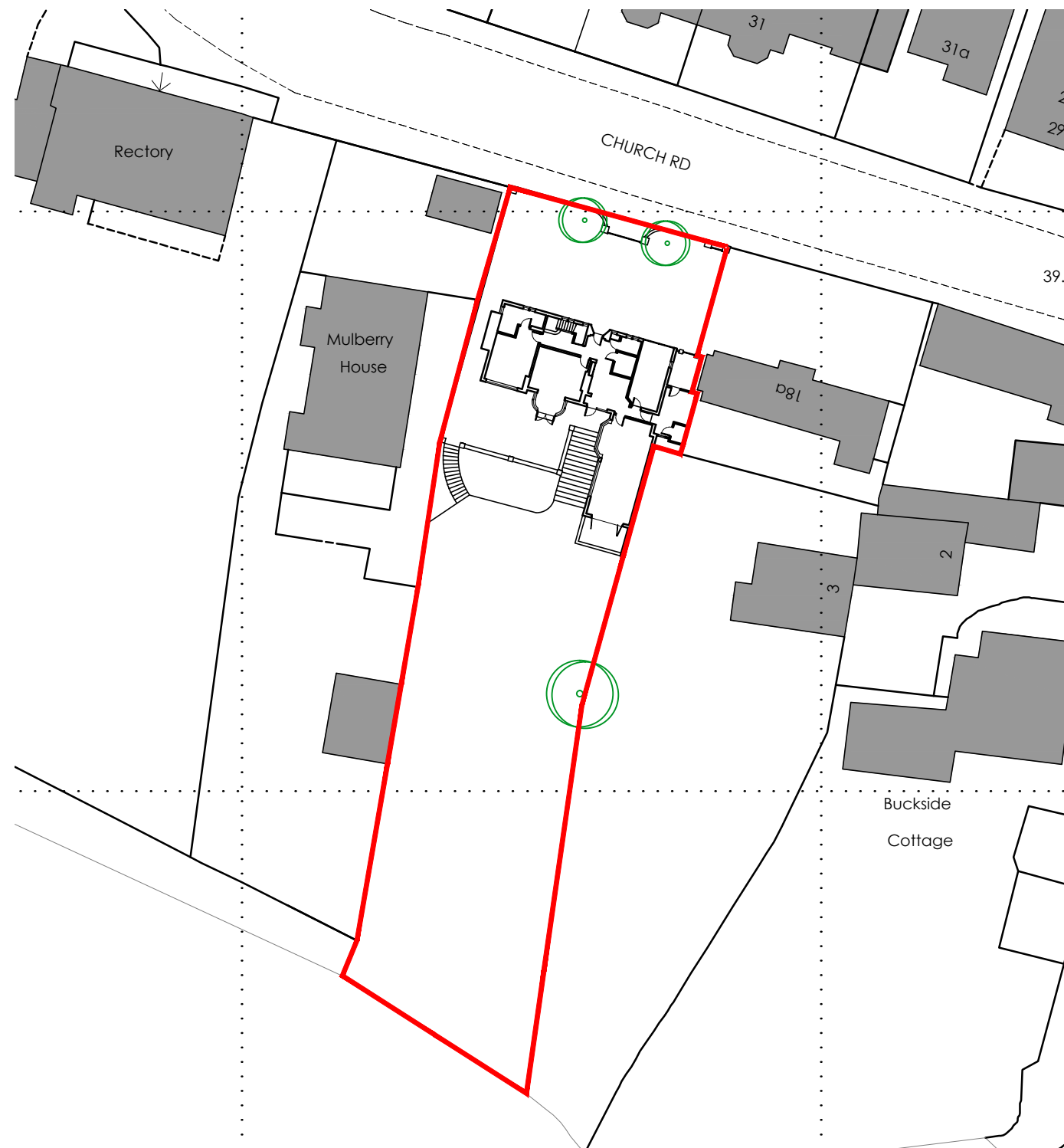
7.5 Conclusion

In conclusion, the Proposed Development, would be expected to remain dry in all but the most extreme conditions. Providing the recommendations made in this FRA are instigated, flood risk from all sources would be minimised, the consequences of flooding are acceptable and the development would be in accordance with the requirements of the NPPF.

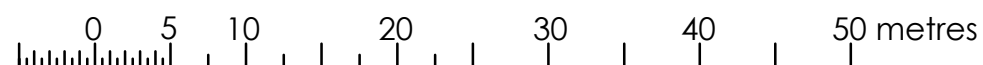
This FRA demonstrates that the Proposed Development would be operated with minimal risk from flooding, would not increase flood risk elsewhere and is compliant with the requirements of the NPPF. The development should not therefore be precluded on the grounds of flood risk

APPENDICES

APPENDIX 1 – Existing and Proposed Site Layout

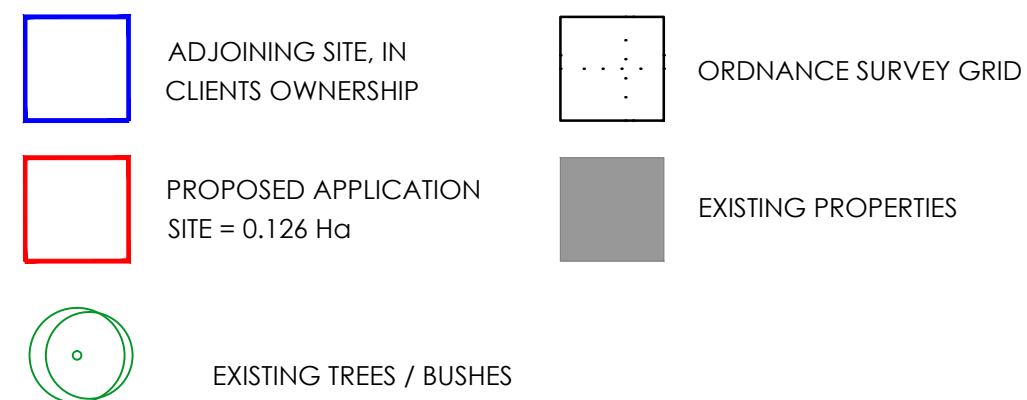


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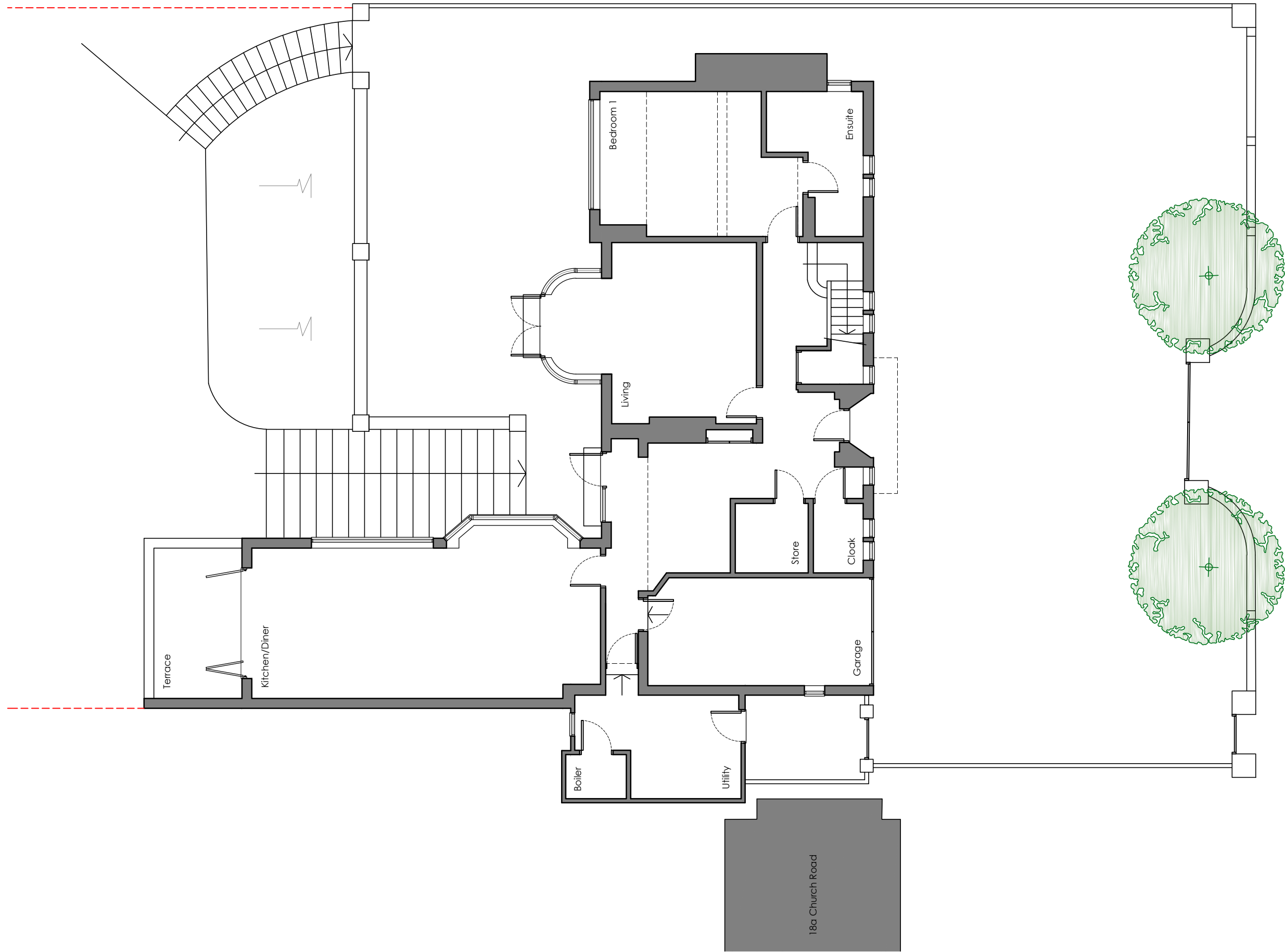
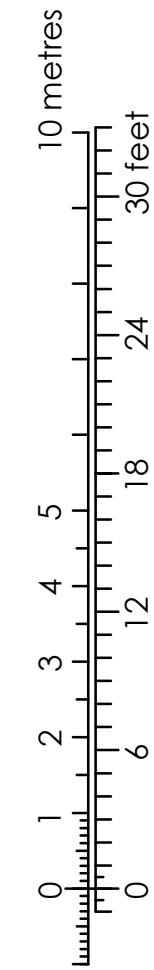
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Title
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Noted @ A3	Oct '24	283-001	/



GROUND FLOOR PLAN

EXISTING

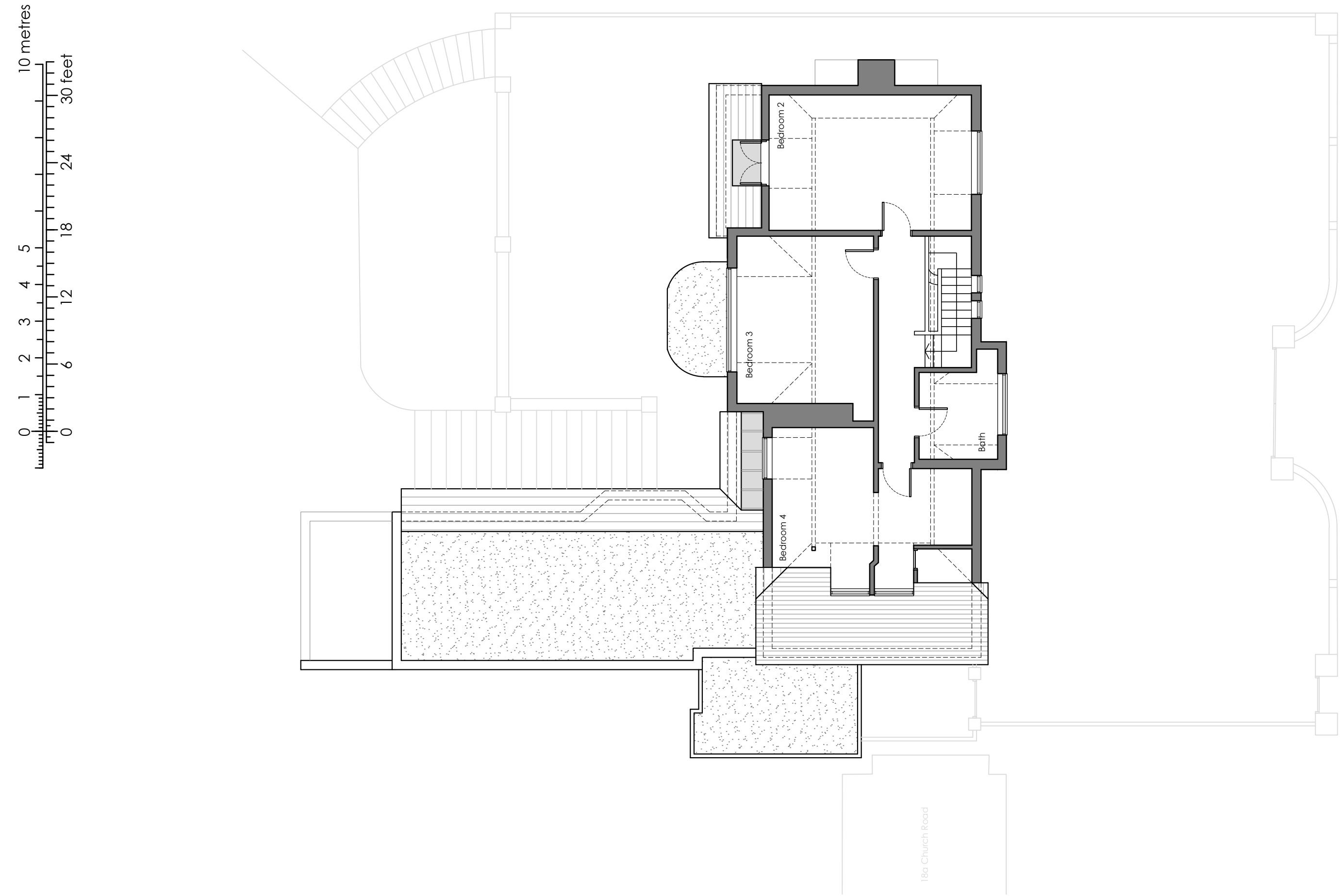
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FIRST FLOOR PLAN

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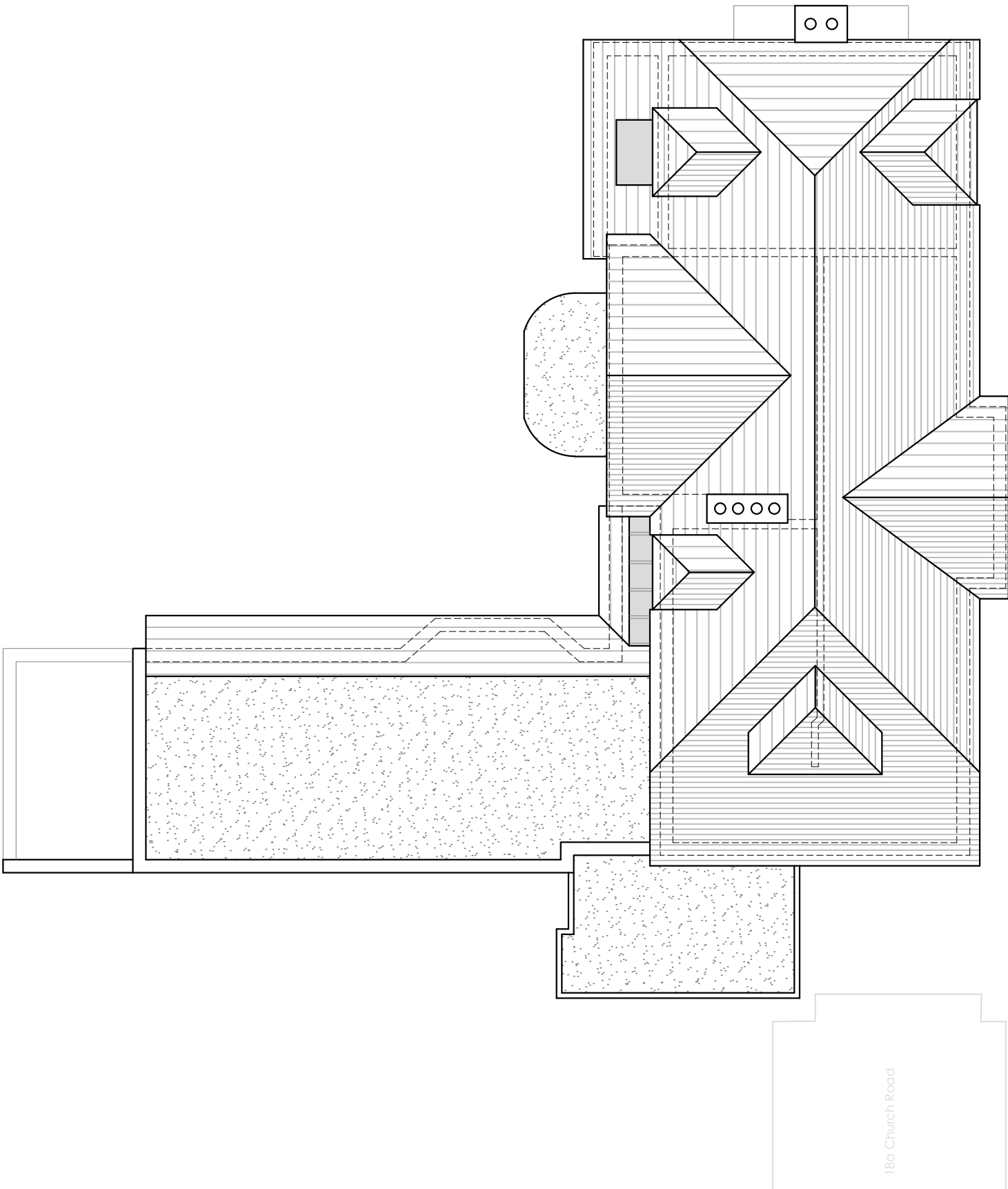
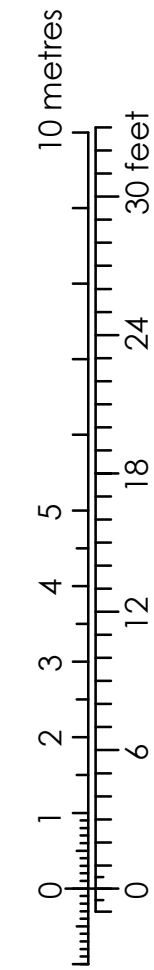
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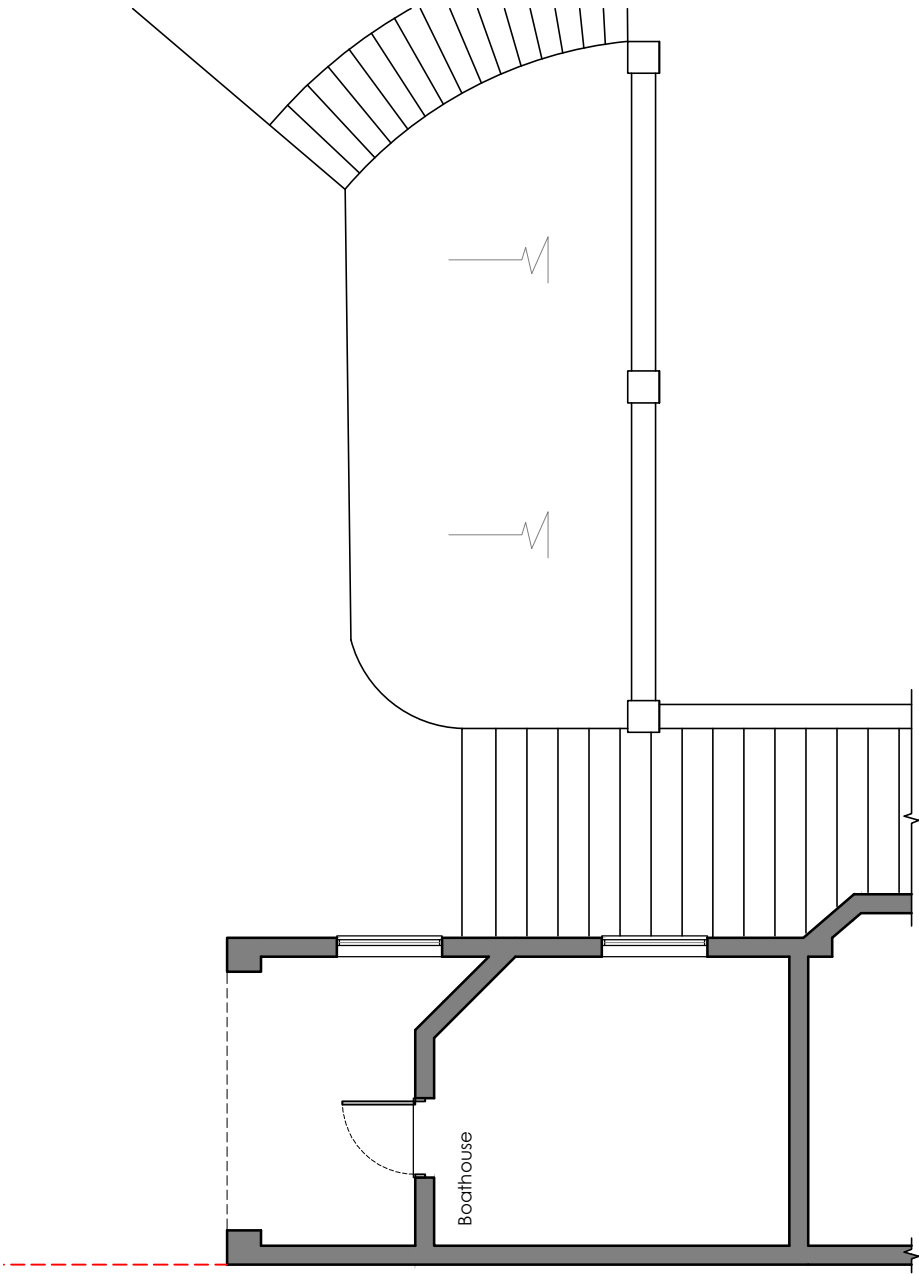
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EXISTING FIRST FLOOR PLAN

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ROOF PLAN



LOWER GROUND FLOOR

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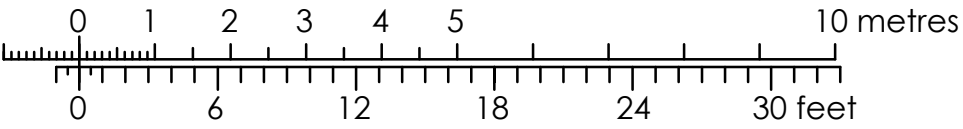
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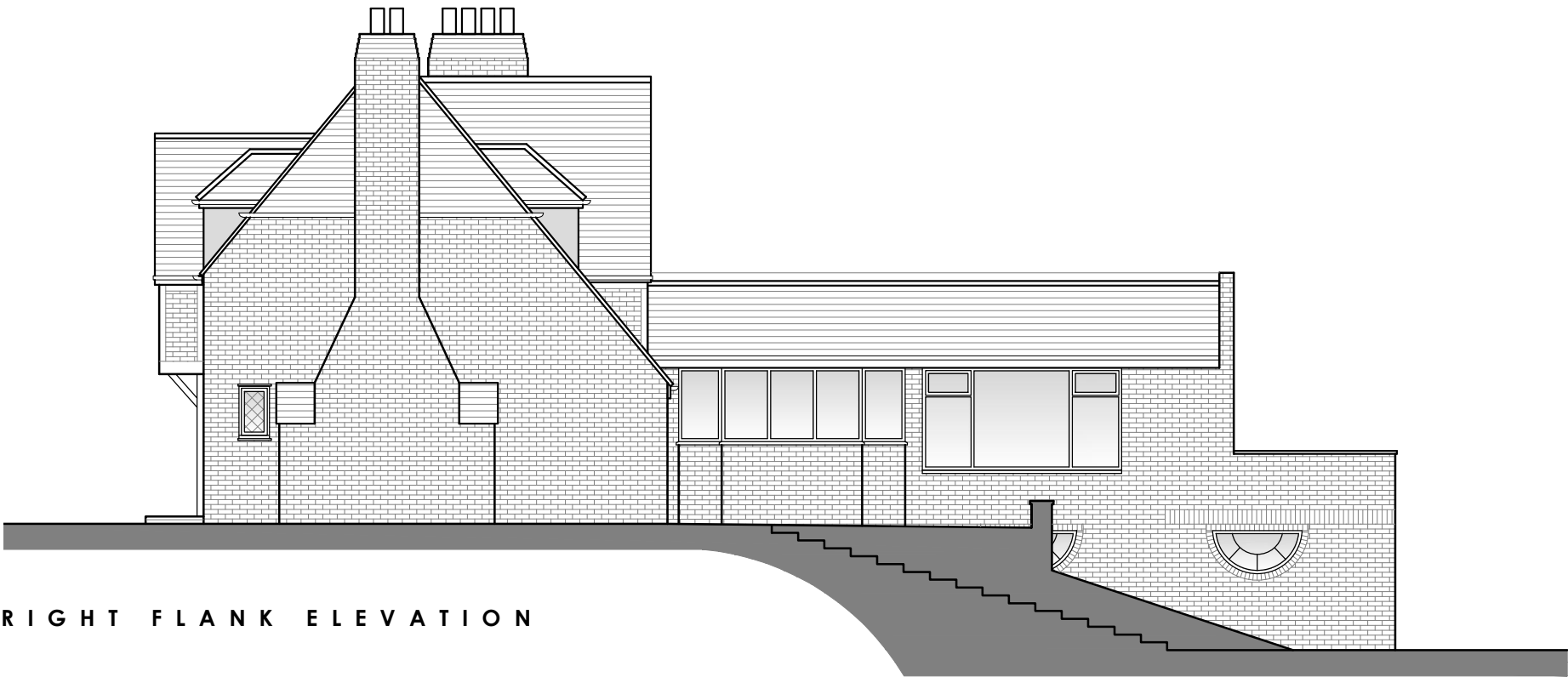
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Title
EXISTING LOWER GROUND FLOOR & ROOF PLANS

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FRONT ELEVATION



RIGHT FLANK ELEVATION

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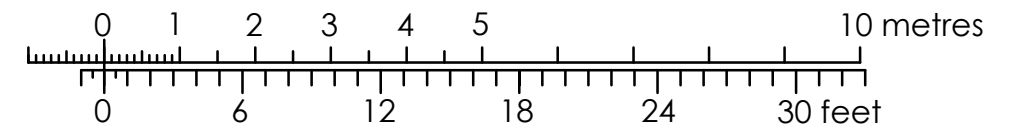
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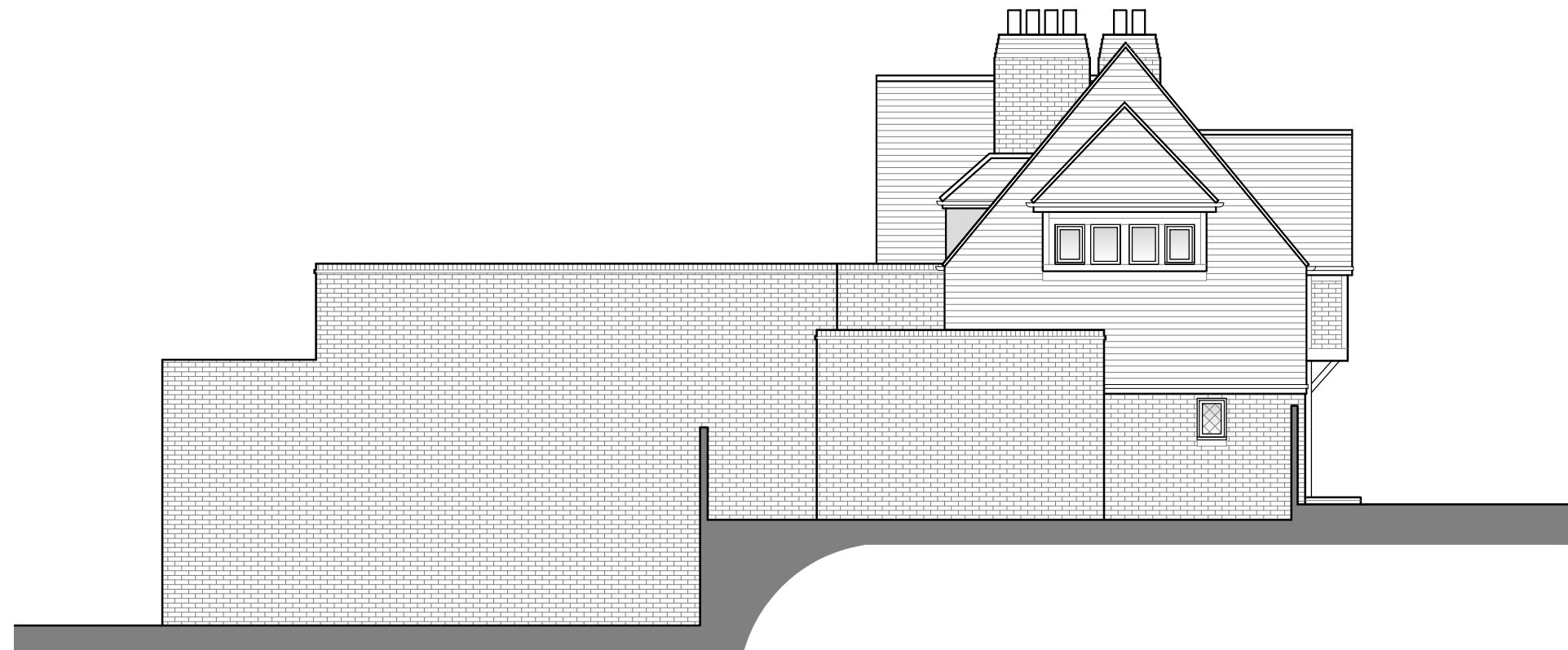
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Title
EXISTING ELEVATIONS 1 OF 2

Scale	Date	Drawing Number	Revision
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REAR ELEVATION



LEFT FLANK ELEVATION

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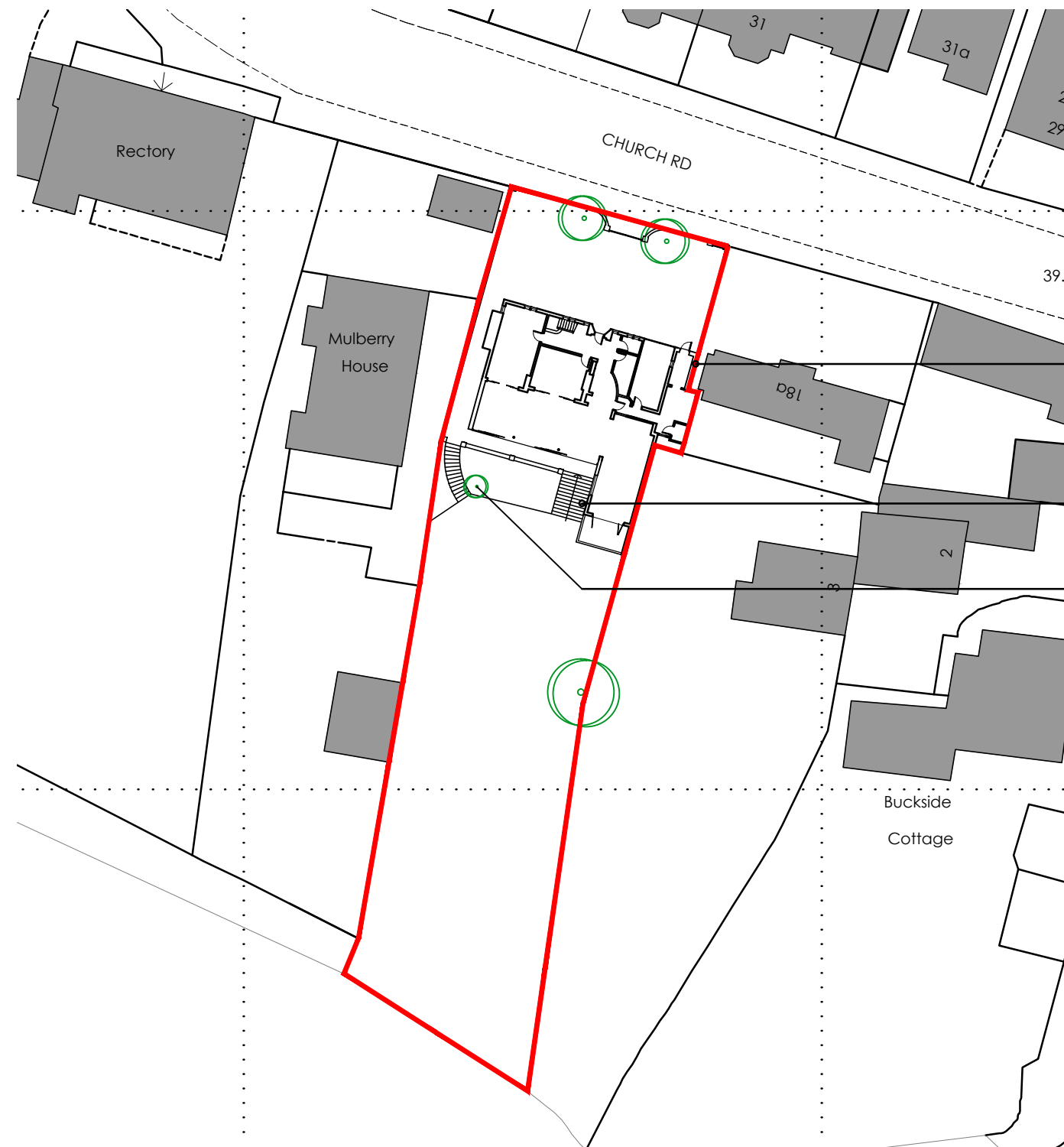
Revisions
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Project
18 CHURCH ROAD, CAVERSHAM,
READING, BERKSHIRE, RG4 7AD.

Title
EXISTING ELEVATIONS 2 OF 2

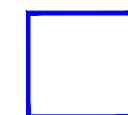
Scale	Date	Drawing Number	Revision
1:100 @ A3	Sep '24	283-006	/



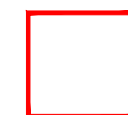
BOUNDARY MOVED BACK TO LINE OF NEW EXTENSION TO ALLOW NEIGHBOURING PROPERTY ADDITIONAL MAINTENANCE SPACE

STEPS ALTERED TO INCREASE PITCH

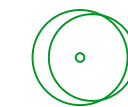
EXISTING OLIVE TREE/BUSH PRUNED, LIFTED AND REPLANTED IN NEW LOCATION. IF DAMAGED, OR DIES WITHIN 1 YEAR OF RELOCATING REPLACE WITH LIKE FOR LIKE SPECIMEN.



ADJOINING SITE, IN CLIENTS OWNERSHIP



PROPOSED APPLICATION SITE = 0.126 Ha



EXISTING TREES / BUSHES



ORDNANCE SURVEY GRID



EXISTING PROPERTIES

KEY:

B L O C K P L A N @ 1 : 5 0 0



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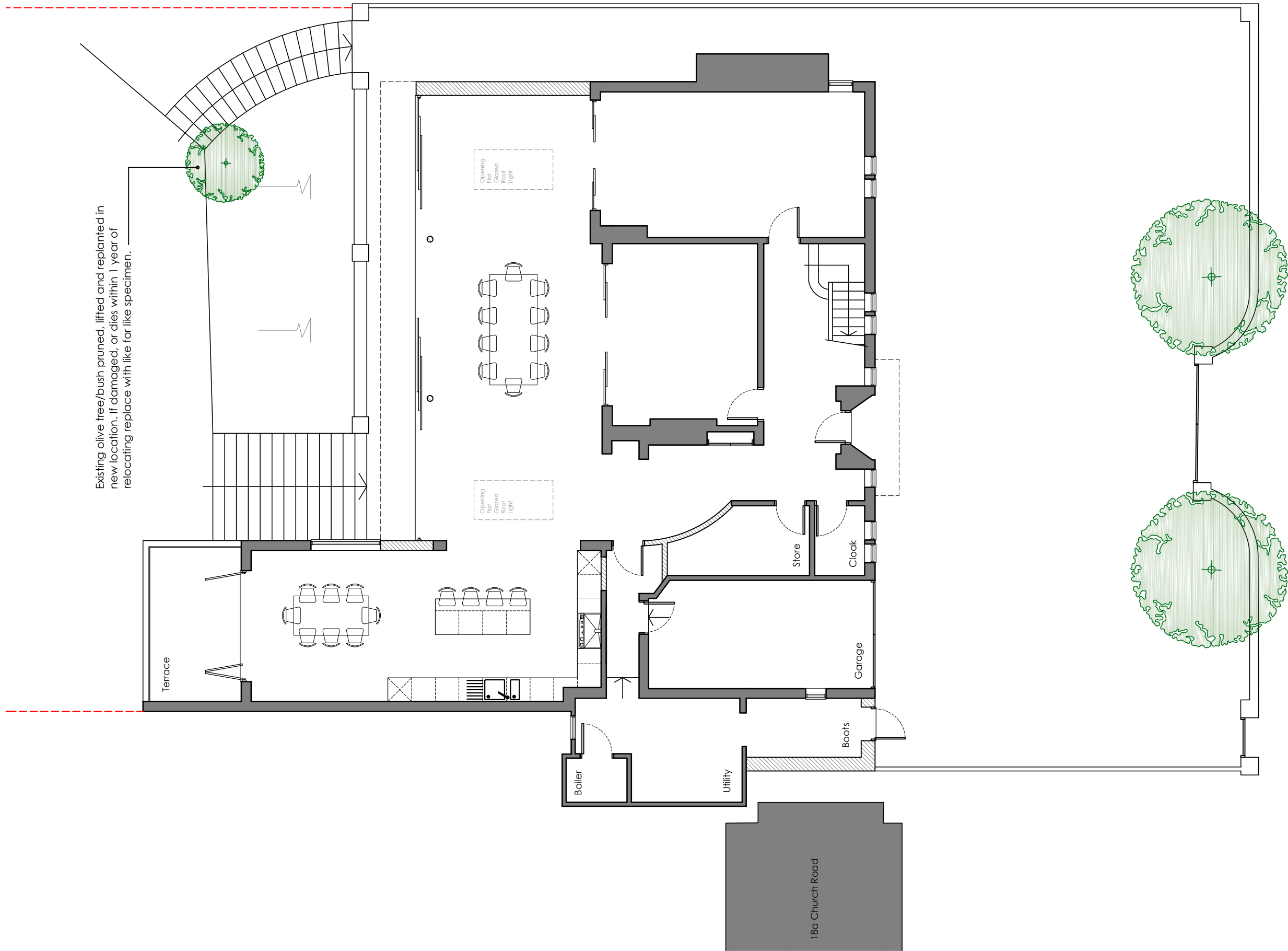
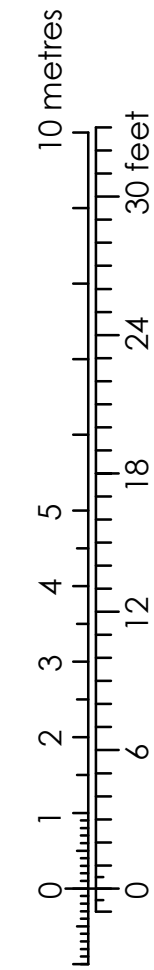
Revisions
A - Existing olive tree/bush relocation and step alterations noted - 16.09.25

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Project
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Title
P R O P O S E D B L O C K P L A N

Scale	Date	Drawing Number	Revision
Noted @ A3	Oct '24	283-02-019	A



GROUND FLOOR PLAN

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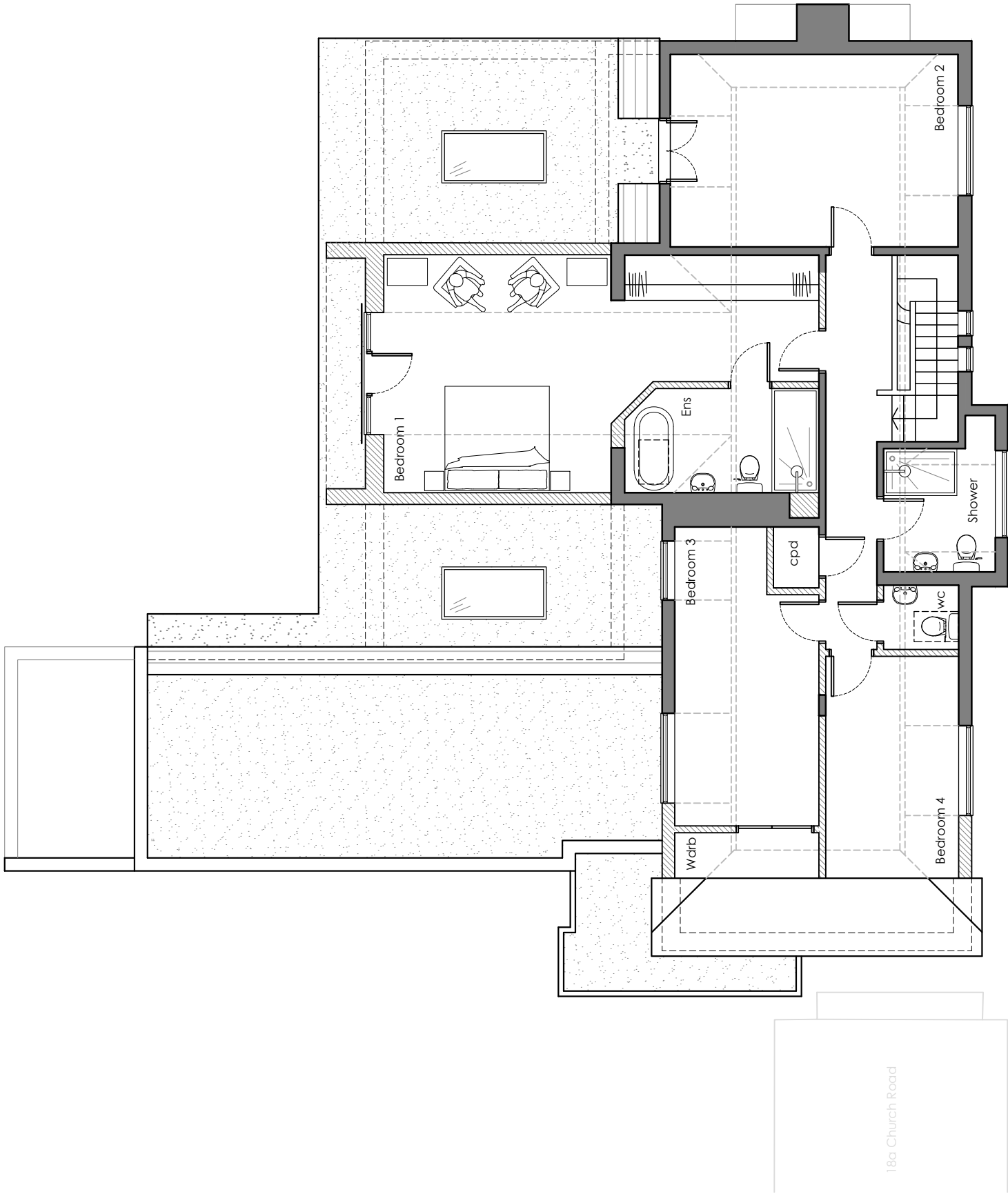
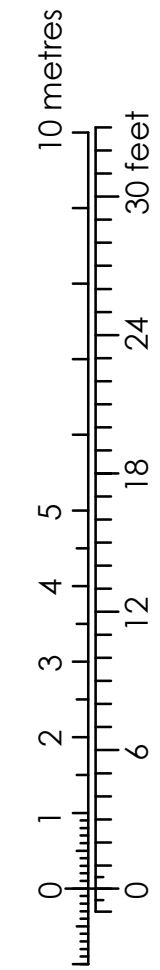
Revisions
A - Existing olive tree/bush relocation noted - 16.09.25

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Title
PROPOSED GROUND FLOOR PLAN

Scale	Date	Drawing Number	Revision
1:100 @ A3	Sep '24	283-007	A



FIRST FLOOR PLAN

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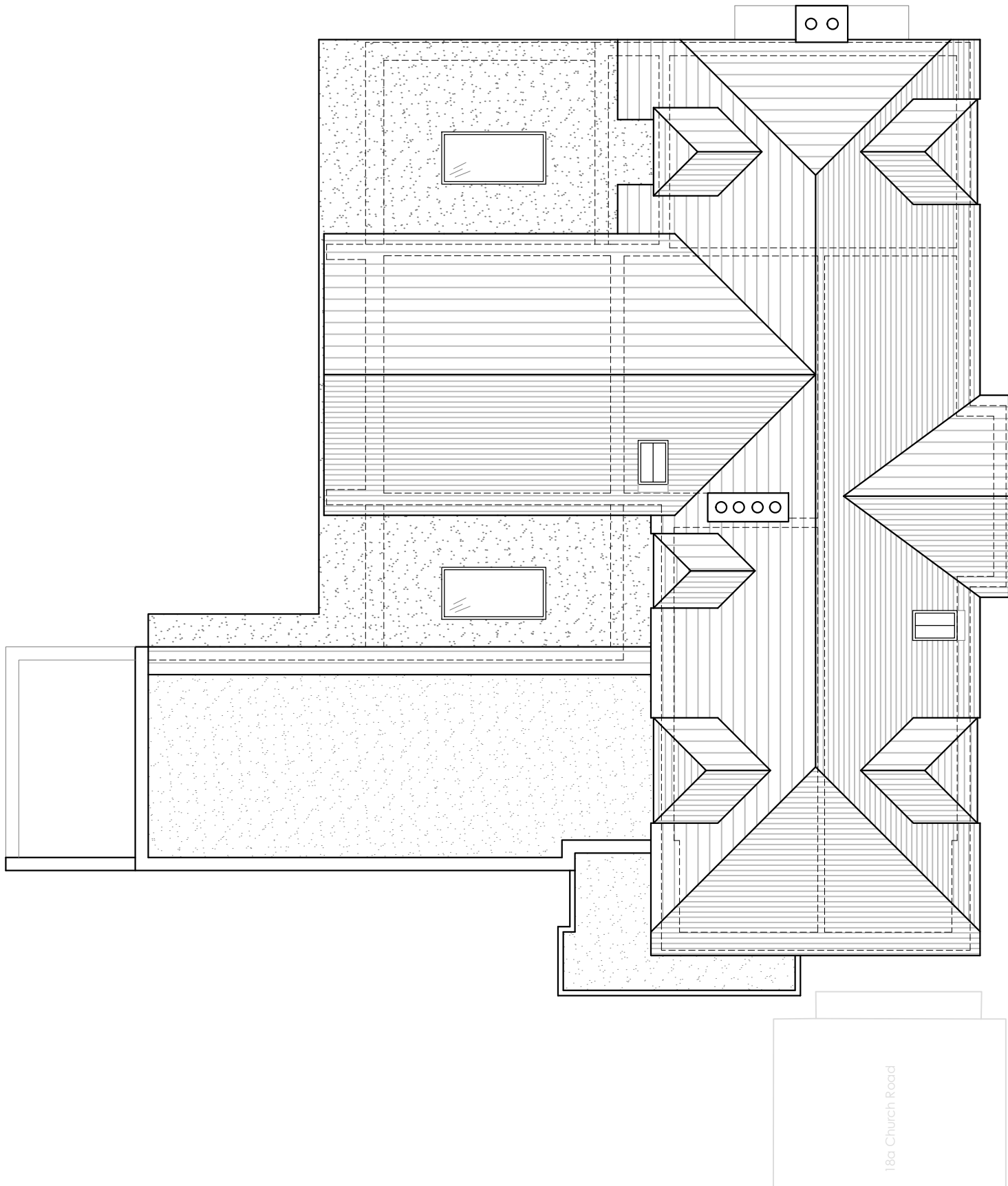
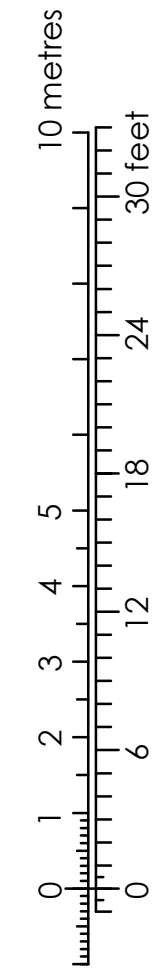
Revisions
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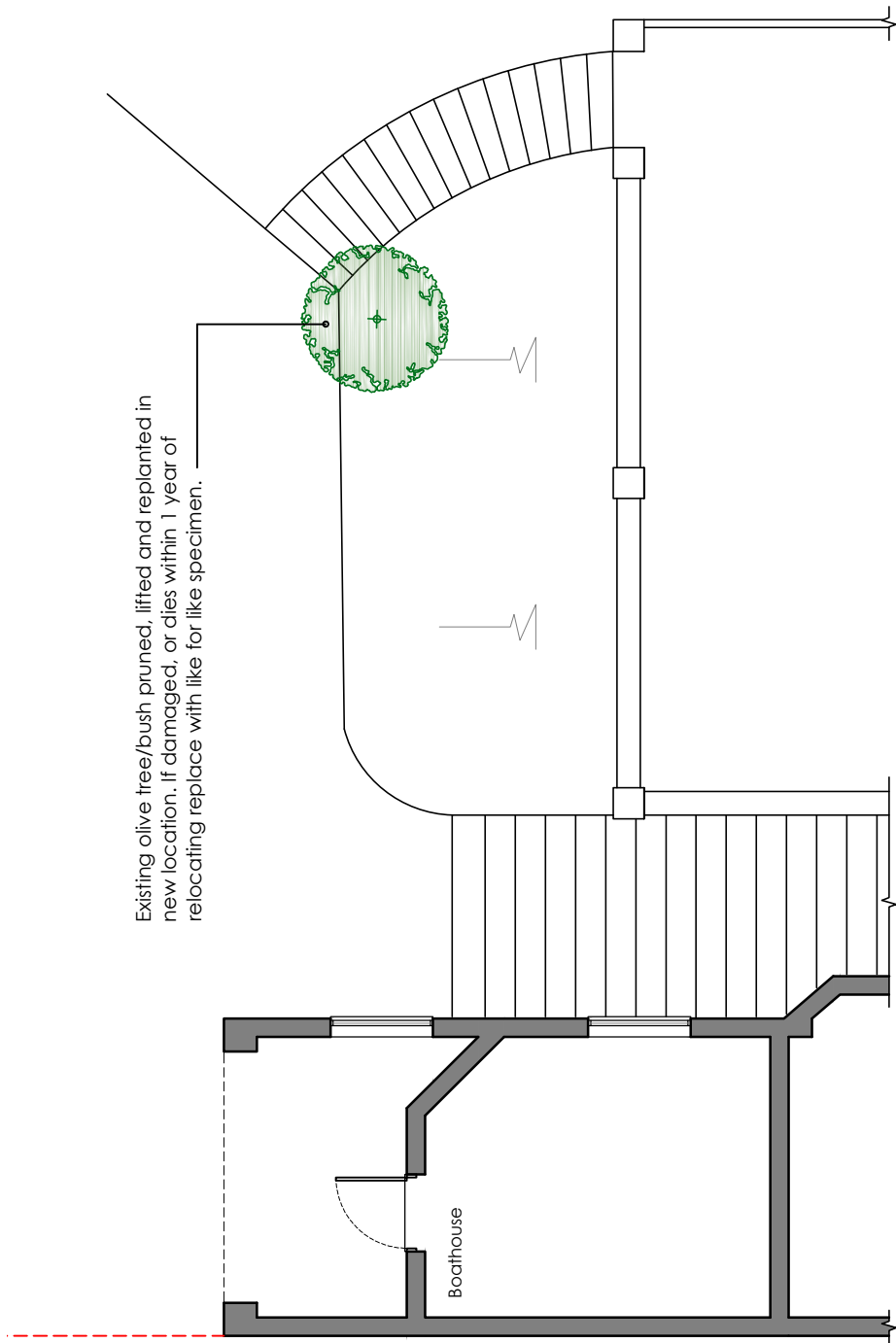
Project
18 CHURCH ROAD, CAVERSHAM,
READING, BERKSHIRE, RG4 7AD.

Title
PROPOSED FIRST FLOOR PLAN

Scale	Date	Drawing Number	Revision
1:100 @ A3	Sep '24	283-008	/



ROOF PLAN



LOWER GROUND FLOOR

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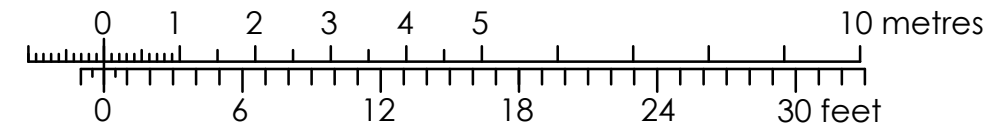
Revisions
A - Boathouse works removed, tree relocation indicated (lower ground floor level) - 16.09.25

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Project
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Title
PROPOSED LOWER GROUND
FLOOR & ROOF PLANS

Scale	Date	Drawing Number	Revision
1:100 @ A3	Sep '24	283-009	A



Flush fitting conservation style rooflight.

Overlooking dormer window removed, windows no longer look directly into first floor windows and rear garden of neighbour.

②

①

Relocated boundary wall providing 800mm accessible maintenance space for neighbouring property (previously 380mm).

Demolish boundary wall and relocate to line of new extension.



FRONT ELEVATION

MATERIALS KEY:

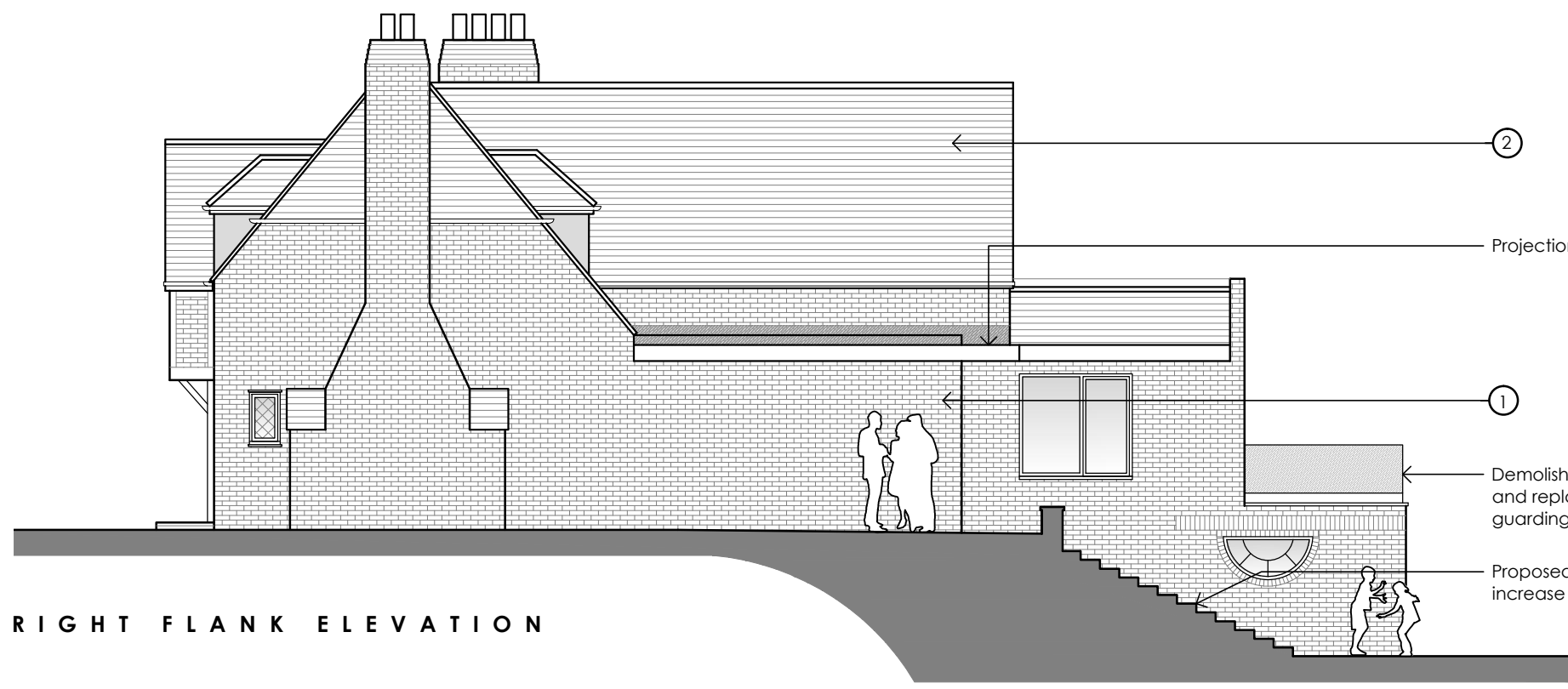
1. Blended red stock facing brickwork to match existing.
2. Plain clay tiles to match existing.

Black painted timber windows in black timber surrounds on front and rear first floor dormers.

Existing PVC windows on front and rear to be removed and upgraded to black painted timber.

Black aluminium feature windows and doors at rear.

Black PVC rainwater goods to match existing.



RIGHT FLANK ELEVATION

②

Projection clad in Cor-Ten steel.

①

Demolish existing masonry upstand and replace with frame-less glass guarding.

Proposed section of altered steps to increase pitch.

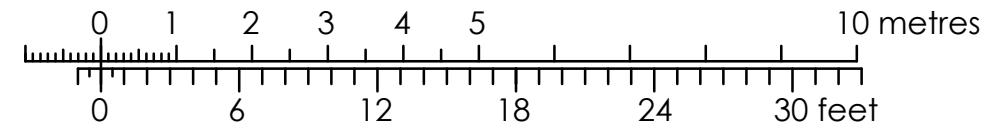
PROPOSED

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Revisions
A - Submission updates - 29.10.24
B - Note added indicating section to proposed altered steps - 16.09.25

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Project 18 CHURCH ROAD, CAVERSHAM, READING, BERKSHIRE, RG4 7AD.			
Title PROPOSED ELEVATIONS 1 OF 2			
Scale 1:100 @ A3	Date Sep '24	Drawing Number 283-010	Revision B



MATERIALS KEY:

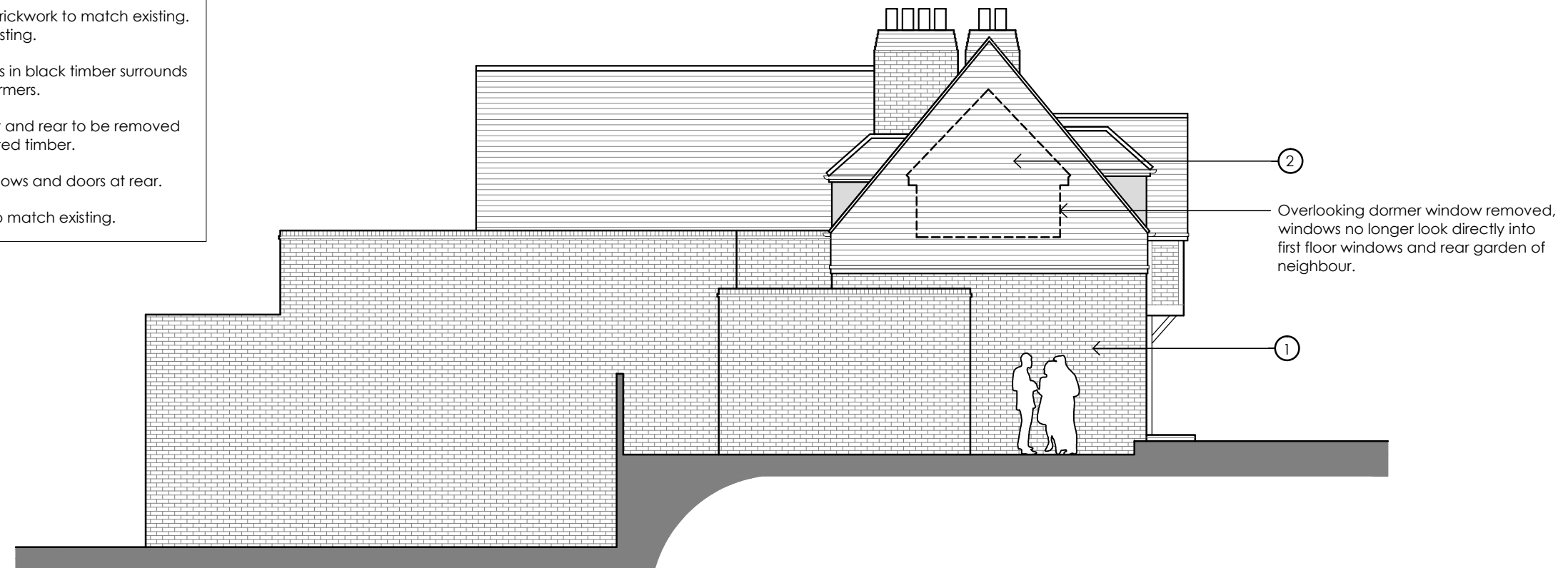
1. Blended red stock facing brickwork to match existing.
2. Plain clay tiles to match existing.

Black painted timber windows in black timber surrounds on front and rear first floor dormers.

Existing PVC windows on front and rear to be removed and upgraded to black painted timber.

Black aluminium feature windows and doors at rear.

Black PVC rainwater goods to match existing.



LEFT FLANK ELEVATION

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Revisions

A - Submission updates - 29.10.24

B - Boathouse works removed (lower ground floor level) - 16.09.25

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Project

18 CHURCH ROAD, CAVERSHAM,
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Title

PROPOSED ELEVATIONS 2 OF 2

Scale

1:100 @ A3

Date

Sep '24

Drawing Number

283-011

Revision

B

APPENDIX 2 – Topographical Survey

