



20 Rotherfield Avenue, Wokingham, Berkshire, RG41
2EX

Flood Risk Assessment

For Alexander Smith
KRS.0807.001.R.001.B
July 2024

www.krsenviro.com

CONTACT DETAILS

Registered Office:
KRS Environmental Ltd
3 Princes Square
Princes Street
Montgomery
Powys
SY15 6PZ

Tel: 01686 668957
Mob: 07711 257466

Email: keelan@krsenviro.com
Web: www.krsenviro.com
LinkedIn: uk.linkedin.com/in/keelanserjeant/

Office also at:
KRS Environmental Ltd
The Media Centre
7 Northumberland Street
Huddersfield
West Yorkshire
HD1 1RL

Tel: 01484 437420
Mob: 07711 257466

20 Rotherfield Avenue, Wokingham, Berkshire, RG41 2EX

Project	Flood Risk Assessment
Client	Alexander Smith
Status	Final
Prepared by	Ruth Evans
Reviewed by	Keelan Serjeant BSc (Hons), MSc, MCIWEM
Date	July 2024

Disclaimer

This report has been produced by KRS Environmental Limited within the terms of the contract with the client and taking account of the resources devoted to it by agreement with the client.

We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.

This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at their own risk.

CONTENTS

CONTENTS	ii
TABLES & FIGURES	iv
EXECUTIVE SUMMARY	1
1.0 INTRODUCTION	2
1.1 Background	2
1.2 National Planning Policy Framework (NPPF)	2
1.3 Report Structure	3
2.0 LOCATION & DEVELOPMENT DESCRIPTION	4
2.1 Site Location	4
2.2 Existing Development	4
2.3 Proposed Development	4
2.4 Ground Levels	5
2.5 Catchment Hydrology	5
2.6 Ground Conditions	5
3.0 FLOOD RISK	6
3.1 Sources of Flooding	6
3.2 Environment Agency	6
3.3 Climate Change	6
3.4 Environment Agency Flood Zones	6
3.5 Flood Vulnerability	8
3.6 Historic Flooding	9
3.7 Existing and Planned Flood Defence Measures	9
3.8 Fluvial (River) Flooding	9
3.9 Tidal (Coastal) Flooding	11
3.10 Groundwater Flooding	11
3.11 Surface Water (Pluvial) Flooding	11
3.12 Sewer Flooding	12
3.13 Flooding from Artificial Drainage Systems/Infrastructure Failure	12
3.14 The Effect of the Development on Flood Risk	13
3.15 Summary of Site Specific Flood Risk	14
4.0 SURFACE WATER DRAINAGE	16
4.1 Surface Water Management Overview	16
4.2 Surface Water Runoff Rates / Volumes	16
5.0 RISK MANAGEMENT	17
5.1 Introduction	17
5.2 Finished Floor Levels	17
5.3 First Floor Accommodation	17
5.4 Flood Resistance	17
5.5 Flood Resilience	18
5.6 Flood Warning and Evacuation	18
5.7 Flood Plan	18
5.8 Safe Access and Egress Route	19
5.9 Flooding Consequences	20
6.0 SEQUENTIAL APPROACH	21
6.1 Sequential / Exception Tests	21
7.0 SUMMARY AND CONCLUSIONS	22
7.1 Introduction	22
7.2 Flood Risk	22
7.3 Surface Water Drainage	23
7.4 Risk Management	23



7.5 Conclusion 24

APPENDICES 25

APPENDIX 1 – Existing and Proposed Site Layout..... 26

APPENDIX 2 – Environment Agency Data..... 27

TABLES & FIGURES

Figure 1 - Site Location	4
Table 1 - Peak River Flow Allowances by River Catchment	6
Figure 2 - Environment Agency Flood Zones	7
Table 2 - Environment Agency Flood Zones and Appropriate Land Use	8
Table 3 - Flood Risk Vulnerability and Flood Zone 'Compatibility'	9
Table 4 - Environment Agency Defended Modelled Water Levels (mAOD)	10
Figure 3 - Environment Agency Model Nodes Locations and Modelled Flood Outlines	10
Figure 4 - Environment Agency Surface Water Flood Map	12
Figure 5 - Environment Agency Reservoir Flood Map	13
Table 5 - Risk Posed by Flooding Sources	14
Figure 6 - Safe Access and Egress Route	20

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 Alexander Smith to support a planning application for a 2 storey side extension and rear single storey extension following the demolition of the existing side porch (“the Proposed Development”) at 20 Rotherfield Avenue, Wokingham, Berkshire, RG41 2EX (“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 (2023) National Planning Policy Framework: https://assets.publishing.service.gov.uk/media/65a11af7e8f5ec000f1f8c46/NPPF_December_2023.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 20 Rotherfield Avenue, Wokingham, Berkshire, RG41 2EX (see Figure 1). The National Grid Reference (NGR) of the Site is 479930, 169356.



Figure 1 - Site Location

2.2 Existing Development

The existing Site consists of a detached 4 bedroom house (see Appendix 1).

2.3 Proposed Development

The Proposed Development is for a 2 storey side extension and rear single storey extension following the demolition of the existing side porch (see Appendix 1). 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 minimum ground level is approximately 45.40 metres Above Ordnance Datum (mAOD) on the western boundary of the Site rising to a maximum ground level of approximately 46.51mAOD on the eastern boundary of the Site.

2.5 Catchment Hydrology

The Emm Brook is located approximately 23m to the west of the Site.

2.6 Ground Conditions

The British Geological Survey (BGS) map³ shows that the bedrock deposits at the Site consist of the London Clay Formation – clay, silt and sand. Sedimentary bedrock formed between 56 and 47.80 million years ago during the Palaeogene period. There are no superficial deposits underlying the Site.

Information from the National Soil Resources Institute⁴ details the Site area as being situated on freely draining slightly acid loamy soils

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 (see Appendix 2).

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 for 'more vulnerable' uses 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 (+14%) event.

Table 1 - Peak River Flow Allowances by River Catchment

River Catchment	Allowance Category	2020s	2050s	2080s
Loddon and tributaries Management Catchment	Upper	+23%	+25%	+46%
	Higher	+11%	+10%	+23%
	Central	+7%	+4%	+14%

3.4 Environment Agency Flood Zones

A review of the Environment Agency's Flood Zones indicates that the majority of the Site is located within Flood Zone 1, with a 'low probability' of fluvial flooding, with less than a 1 in 1000 annual probability of river flooding in any year (<0.1%), as shown in Figure 2. However, a small proportion of the Site, approximately 5%, on the western boundary of the Site is located within Flood Zone 3, with a 1 in 100 or greater annual probability of river flooding (>1%) in any year. It should be noted that the Proposed Development will be located within Flood Zone 1.

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 and 3a.

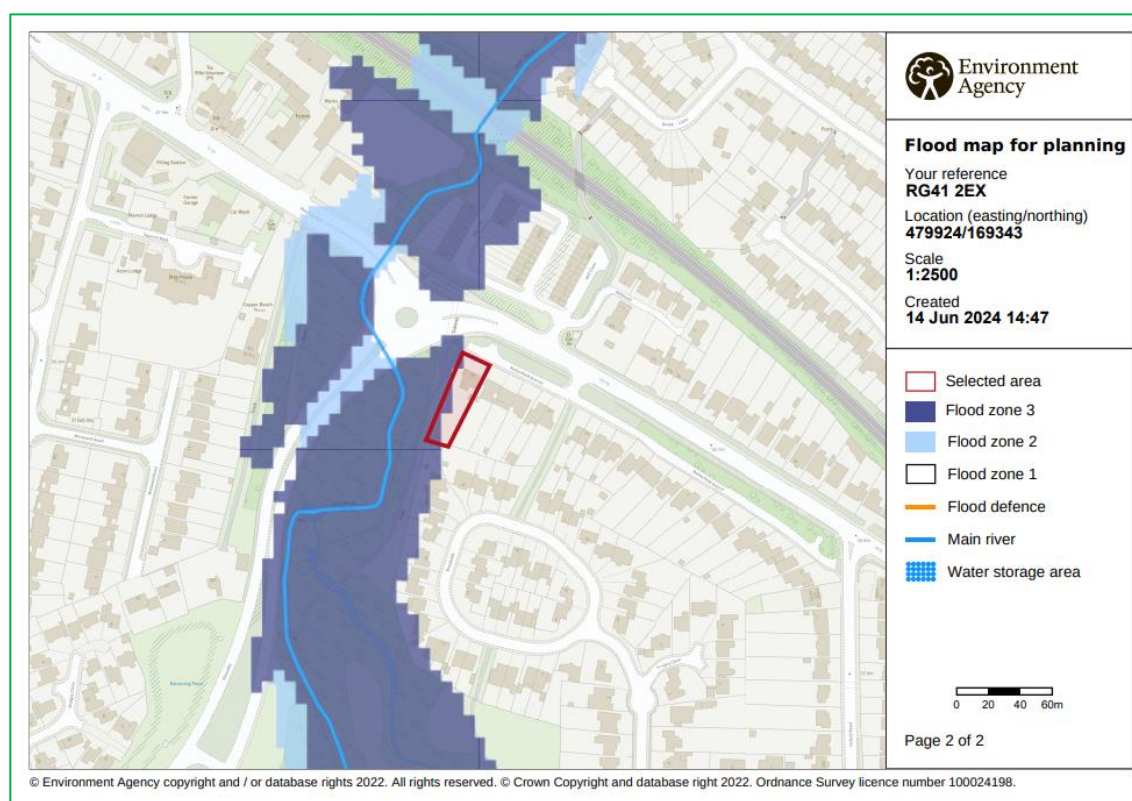


Figure 2 - Environment Agency Flood Zones

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 increase the vulnerability of the Site to flooding 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 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

Environment Agency data indicates that the Site has not historically flooded. 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. Therefore, it has been assumed that the Site has not historically flooded in the recent past.

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 primary, but unlikely, flood risk posed to the Site is from fluvial flooding from the Emm Brook which is located approximately 23m to the west 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.

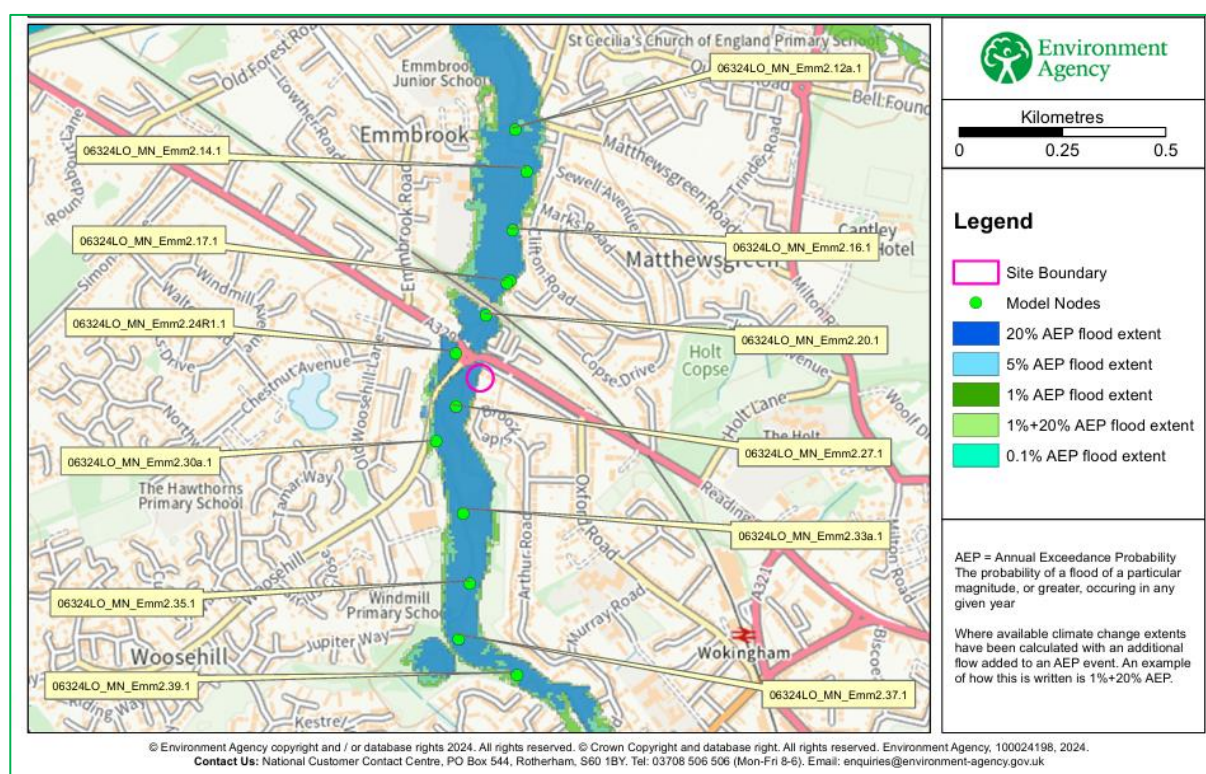
Node 06324LO_MN_Emm2.27.1 has been used as this is the closest to the Site. Figure 3 shows the model node locations and modelled flood outlines. The 1 in 100 year (+14%) event is not available for the Site (i.e. the design event) therefore, the 1 in 100 year (+20%) event has been used as the design event in this case.

Water levels have been modelled at 45.45mAOD during the 1 in 100 year event and 45.58mAOD during the 1 in 100 (+20%) event. The Site minimum ground level is approximately 45.40mAOD on the western boundary of the Site rising to a maximum ground level of approximately 46.51mAOD on the eastern boundary of the Site.

Therefore, the Site may be inundated with floodwater to a maximum depth of 0.05m during the 1 in 100 year event and to a maximum depth of 0.08m during the 1 in 100 year (+20%) event. However, this minor flooding would only occur on the western boundary of the Site. The majority of the Site ground levels are located above the modelled water levels. The existing buildings and Proposed Development will not be inundated with floodwater for all events up to and including the 1 in 100 year (+20%) event.

Table 4 - Environment Agency Defended Modelled Water Levels (mAOD)

Node Label	Easting	Northing	Return Period (years)			
			5	20	100	100 (+20%)
06324LO_MN_Emm2.39.1	480013	168625	46.23	46.23	46.40	46.44
06324LO_MN_Emm2.37.1	479872	168712	45.70	45.80	45.92	46.00
06324LO_MN_Emm2.35.1	479898	168847	45.59	45.68	45.81	45.90
06324LO_MN_Emm2.33a.1	479882	169014	45.31	45.49	45.70	45.81
06324LO_MN_Emm2.30a.1	479817	169191	45.20	45.33	45.52	45.66
06324LO_MN_Emm2.27.1	479865	169276	45.15	45.27	45.45	45.58
06324LO_MN_Emm2.24R1.1	479864	169403	45.12	45.21	45.34	45.43
06324LO_MN_Emm2.20.1	479938	169495	44.04	44.19	44.35	44.43
06324LO_MN_Emm2.17.1	479996	169579	43.84	43.96	44.09	44.16
06324LO_MN_Emm2.16.1	480002	169702	43.63	43.87	44.02	44.10
06324LO_MN_Emm2.14.1	480036	169843	43.56	43.81	43.94	44.00
06324LO_MN_Emm2.12a.1	480008	169944	43.16	43.32	43.52	43.67

**Figure 3 - Environment Agency Model Nodes Locations and Modelled Flood Outlines**

The mechanism for flooding at this location is generally prolonged episodes of high 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.

The Site is one of the last places in the area to flood and remains flood free when other areas are flooded. The Site is at such a ground level that it would only flood in the most extreme flood events; the Site will remain flood free for the vast majority of flood events during the lifetime of the Proposed Development. Fluvial flood risk to the Site can be considered to be limited. Any overbank flow would follow the contours of the surrounding area and would flow away from the Site rather than flowing towards the Site.

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 low flood risk to the Site. Therefore, the risk of fluvial flooding is considered to be of **low significance**. The risk from this source 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 or areas with the geology and/or topography which may result in surface water flooding. The Site surroundings are relatively flat and there are no large catchments that would tend to generate surface water runoff towards the Site. Surface water flow flooding tends to occur sporadically in both location and time such surface water flows 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 to low risk of surface water flooding with an annual probability of flooding of less than 1 in 1000 (0.1%) years to between a 1 in 1000 (0.1%) to a 1 in 100 (1%) chance of flooding (see Figure 4). Therefore, the risk of flooding from surface water flooding is considered to be of **low significance**. The risk from this source will be further mitigated by using a number of property level protection measures to manage and reduce the overall risk at the Site (see Section 5.0).

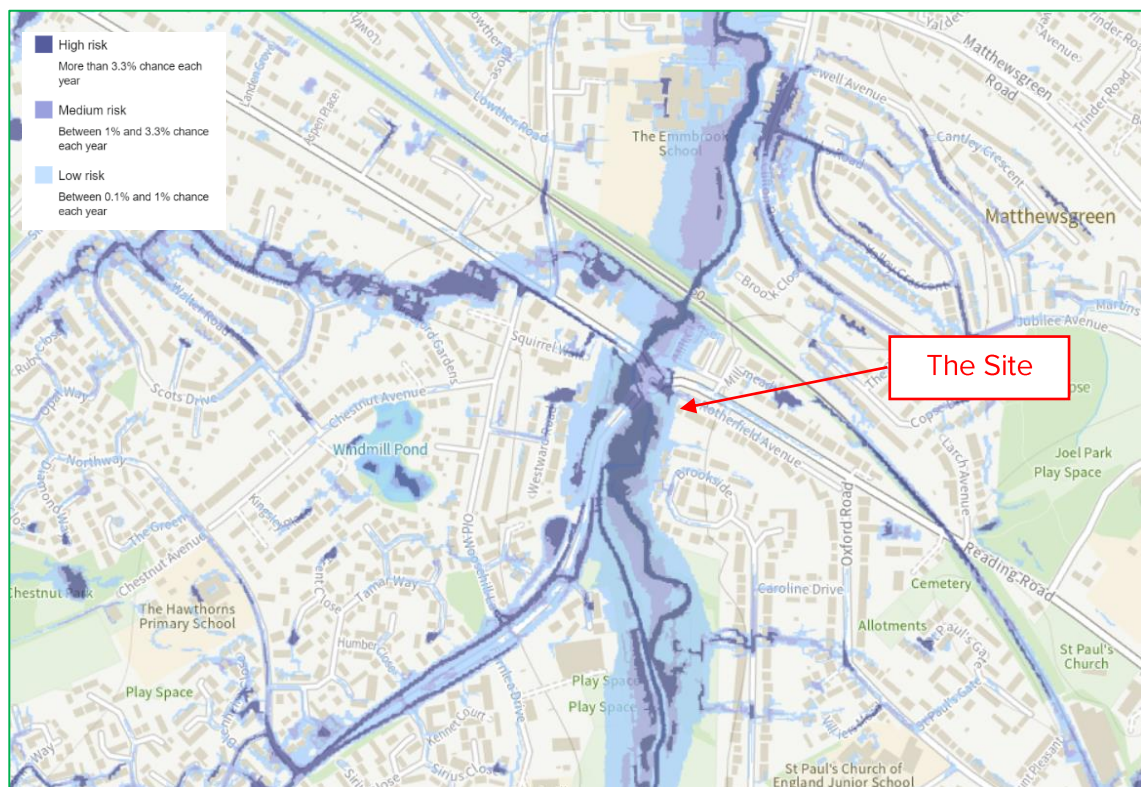


Figure 4 - Environment Agency Surface Water Flood Map

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

Reservoirs are located within the vicinity of the Site. The Environment Agency Reservoir flood map shows that the Site, along the western boundary is at risk of reservoir flooding when there is also flooding from rivers (see Figure 5). 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 is 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 allow the Proposed Development. The risk of flooding from artificial drainage systems/infrastructure failure is considered to be **not significant**.



Figure 5 - Environment Agency Reservoir Flood Map

3.14 The Effect of the Development on Flood Risk

The Proposed Development is located outside of the 1 in 100 year (+20%) flood outline, 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.

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.

Table 5 - Risk Posed by Flooding Sources

Sources of Flooding	Potential Flood Risk	Potential Source	Probability/Significance
Fluvial Flooding	Yes	Emm Brook	Low
Tidal Flooding	No	None Reported	None
Groundwater Flooding	No	None Reported	None
Surface Water Flooding	Yes	Low Spots/Poor Permeability	Low
Sewer Flooding	No	None Reported	None
Flooding from Artificial Drainage Systems/Infrastructure Failure	Yes	Reservoir	None

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 Emm Brook which is located approximately 23m to the west of the Site.

The majority of the Site is located within Flood Zone 1, with a 'low probability' of fluvial flooding, with less than a 1 in 1000 annual probability of river flooding in any year (<0.1%). However, a small proportion of the Site, approximately 5%, on the western boundary of the Site is located within Flood Zone 3, with a 1 in 100 or greater annual probability of river flooding (>1%) in any year. It should be noted that the Proposed Development will be located within Flood Zone 1.

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 and 3a after the completion of a satisfactory FRA.

Water levels have been modelled at 45.45mAOD during the 1 in 100 year event and 45.58mAOD during the 1 in 100 (+20%) event. The Site minimum ground level is approximately 45.40mAOD on the western boundary of the Site rising to a maximum ground level of approximately 46.51mAOD on the eastern boundary of the Site.

Therefore, the Site may be inundated with floodwater to a maximum depth of 0.05m during the 1 in 100 year event and to a maximum depth of 0.08m during the 1 in 100 year (+20%) event. However, this minor flooding would only occur on the western boundary of the Site. The majority of the Site ground levels are located above the modelled water levels. The existing buildings and Proposed Development will not be inundated with floodwater for all events up to and including the 1 in 100 year (+20%) event.

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 low flood risk to the Site. Therefore, the risk of fluvial flooding is considered to be of **low significance**. A secondary flooding source has been identified which may pose a **low significant** risk to the Site. This is:

- Surface Water Flooding

The risk from all sources 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 Proposed Development is located outside of the 1 in 100 year (+20%) flood outline, 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.

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 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 extensions will be set no lower than the existing finished floor levels. 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 extension 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. A proprietary damp-proof membrane system will be used that is bonded to the slab rather than below the insulation and installed in accordance with the manufacturer's requirements will be used.

Fixings will be galvanized/stainless steel/copper (no mild steel to be used - cause rust/staining or walls). Hardcore and binding will have good compaction to reduce the risk of settlement and consequential cracking.

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 for the Emm Brook at Wokingham. 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 north west 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 east 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 6.

The Safe Access and Egress Route shown in Figure 6 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.

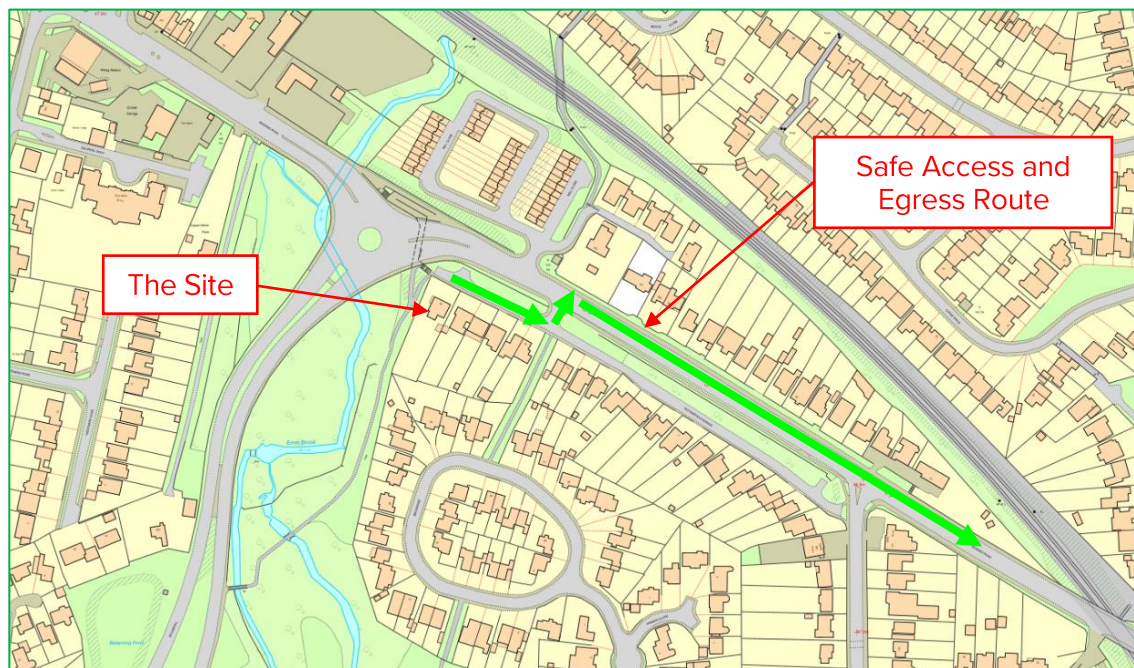


Figure 6 - Safe Access and Egress Route

5.9 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 174 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 a FRA in accordance with the NPPF for the Proposed Development at 20 Rotherfield Avenue, Wokingham, Berkshire, RG41 2EX.

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 Emm Brook which is located approximately 23m to the west of the Site.

The majority of the Site is located within Flood Zone 1, with a 'low probability' of fluvial flooding, with less than a 1 in 1000 annual probability of river flooding in any year (<0.1%). However, a small proportion of the Site, approximately 5%, on the western boundary of the Site is located within Flood Zone 3, with a 1 in 100 or greater annual probability of river flooding (>1%) in any year. It should be noted that the Proposed Development will be located within Flood Zone 1.

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 and 3a after the completion of a satisfactory FRA.

Water levels have been modelled at 45.45mAOD during the 1 in 100 year event and 45.58mAOD during the 1 in 100 (+20%) event. The Site minimum ground level is approximately 45.40mAOD on the western boundary of the Site rising to a maximum ground level of approximately 46.51mAOD on the eastern boundary of the Site.

Therefore, the Site may be inundated with floodwater to a maximum depth of 0.05m during the 1 in 100 year event and to a maximum depth of 0.08m during the 1 in 100 year (+20%) event. However, this minor flooding would only occur on the western boundary of the Site. The majority of the Site ground levels are located above the modelled water levels. The existing buildings and Proposed Development will not be inundated with floodwater for all events up to and including the 1 in 100 year (+20%) event.

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 low flood risk to the Site. Therefore, the risk of fluvial flooding is considered to be of **low significance**. A secondary flooding source has been identified which may pose a **low significant** risk to the Site. This is:

- Surface Water Flooding

The risk from all sources will be further mitigated by using a number of property level protection measures to manage and reduce the overall flood risk at the Site.

The Proposed Development is located outside of the 1 in 100 year (+20%) flood outline, 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.

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 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 extensions will be set no lower than the existing finished floor levels. 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 extension 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: All electrics wiring, switches, sockets, socket outlets etc. to be located a minimum of 450mm above the finished floor levels. A proprietary damp-proof membrane system will be used that is bonded to the slab rather than below the insulation and installed in accordance with the manufacturer's requirements will be used.

Fixings will be galvanized/stainless steel/copper (no mild steel to be used - cause rust/staining or walls). Hardcore and binding will have good compaction to reduce the risk of settlement and consequential cracking.

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 for the Emm Brook at Wokingham. 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 High Street to the south of the Site rises rapidly and is located above the floodwater levels. 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 east 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.

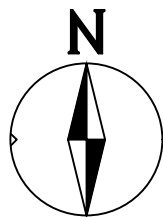
7.5 Conclusion

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

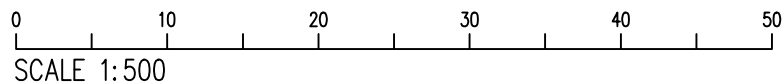
APPENDICES

APPENDIX 1 – Existing and Proposed Site Layout



NOTES:

1. CONTRACTOR MUST CHECK DIMENSIONS ON-SITE PRIOR TO COMMENCEMENT OF WORKS.
2. ANY DISCREPANCIES OR UNCERTAINTIES MUST BE NOTIFIED TO THE PRINCIPAL DESIGNER.
3. BOUNDARIES HAVE BEEN ASSUMED ON SITE. CLARIFICATION AND CONFIRMATION OF BOUNDARY MUST BE TAKEN UP WITH A LEGAL PARTY.
4. ALL DRAWINGS ARE TO BE PLAN-CHECKED BY THE LOCAL AUTHORITY, OR AN ALLOCATED INDEPENDENT BUILDING CONTROL SURVEYOR AND APPROVED.
5. ANY UNSPECIFIED USAGE OR REPRODUCTION OF 'HAC DESIGNS LTD' DRAWING ARE SUBJECT TO INTELLECTUAL PROPERTY AND COPYRIGHT LAWS AND MUST BE APPROVED BY PRIOR WRITTEN CONSENT.
6. STRUCTURAL ELEMENTS AND SUPPORTS MUST BE DESIGNED BY A CERTIFIED STRUCTURAL ENGINEER; THAT HAS PROVIDED SUPPORTIVE CALCULATIONS TO BE APPROVED BY THE LOCAL AUTHORITY BEFORE INSTALLATION.
7. NON-SPECIFIED MATERIALS MUST BE CONSULTED AND APPROVED BY ALL RELEVANT PARTIES PRIOR TO INSTALLATION.



©Crown Copyright and database rights 2019 OS Licence no. 100019980

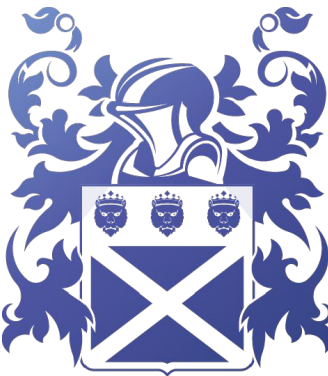
MR & MRS SMITH

DESIGN PROPOSAL @
20 ROTHERFIELD AVENUE
WOKINGHAM
RG41 2EX

BLOCK
PLAN

1:500 @ A3
APRIL 2024
23007.S.PP-07
ER

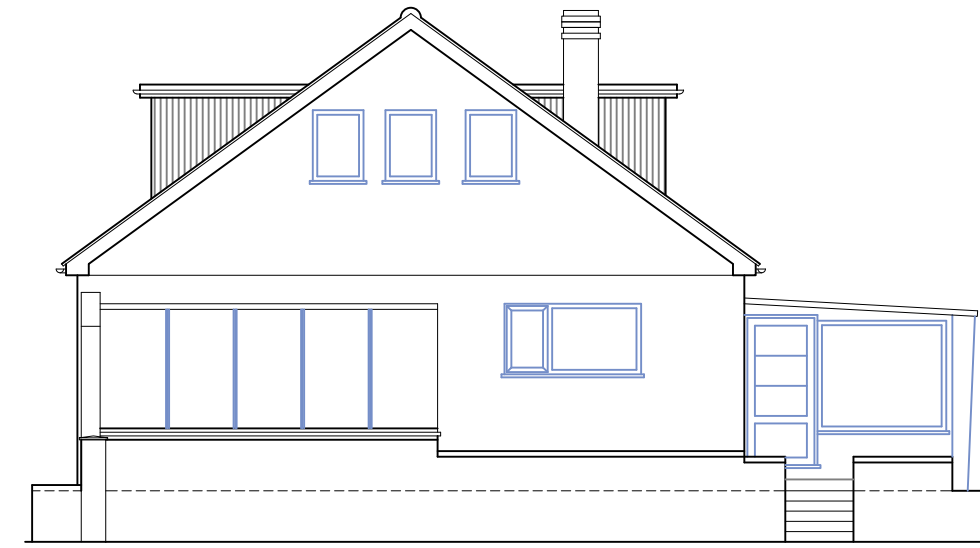
HAC DESIGNS LTD
WYVOLS COURT
BASINGSTOKE ROAD
SWALLOWFIELD RG7 1WY
info@hac-designs.co.uk
www.hac-designs.co.uk



HAC
DESIGNS



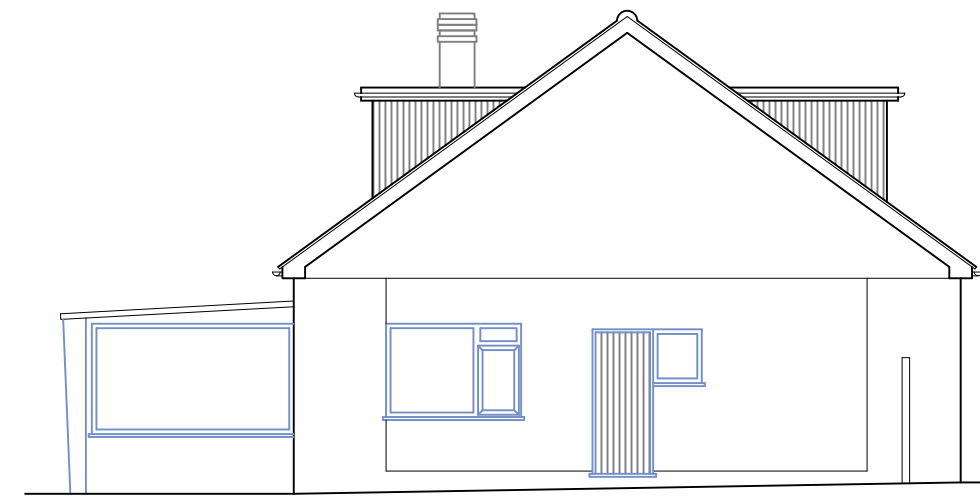
EXISTING FRONT ELEVATION



EXISTING SIDE ELEVATION



EXISTING REAR ELEVATION



EXISTING SIDE ELEVATION

MR & MRS SMITH
DESIGN PROPOSAL @
20 ROTHERFIELD AVENUE
WOKINGHAM
RG41 2EX

EXISTING ELEVATIONS

1:100 @ A2
MARCH 2023
23007.S.PP-03
DM

HAC DESIGNS LTD
100 BERKSHIRE PLACE
WHARFEDALE ROAD,
WINNERSH
WOKINGHAM RG41 5RD
info@hac-designs.co.uk
www.hac-designs.co.uk



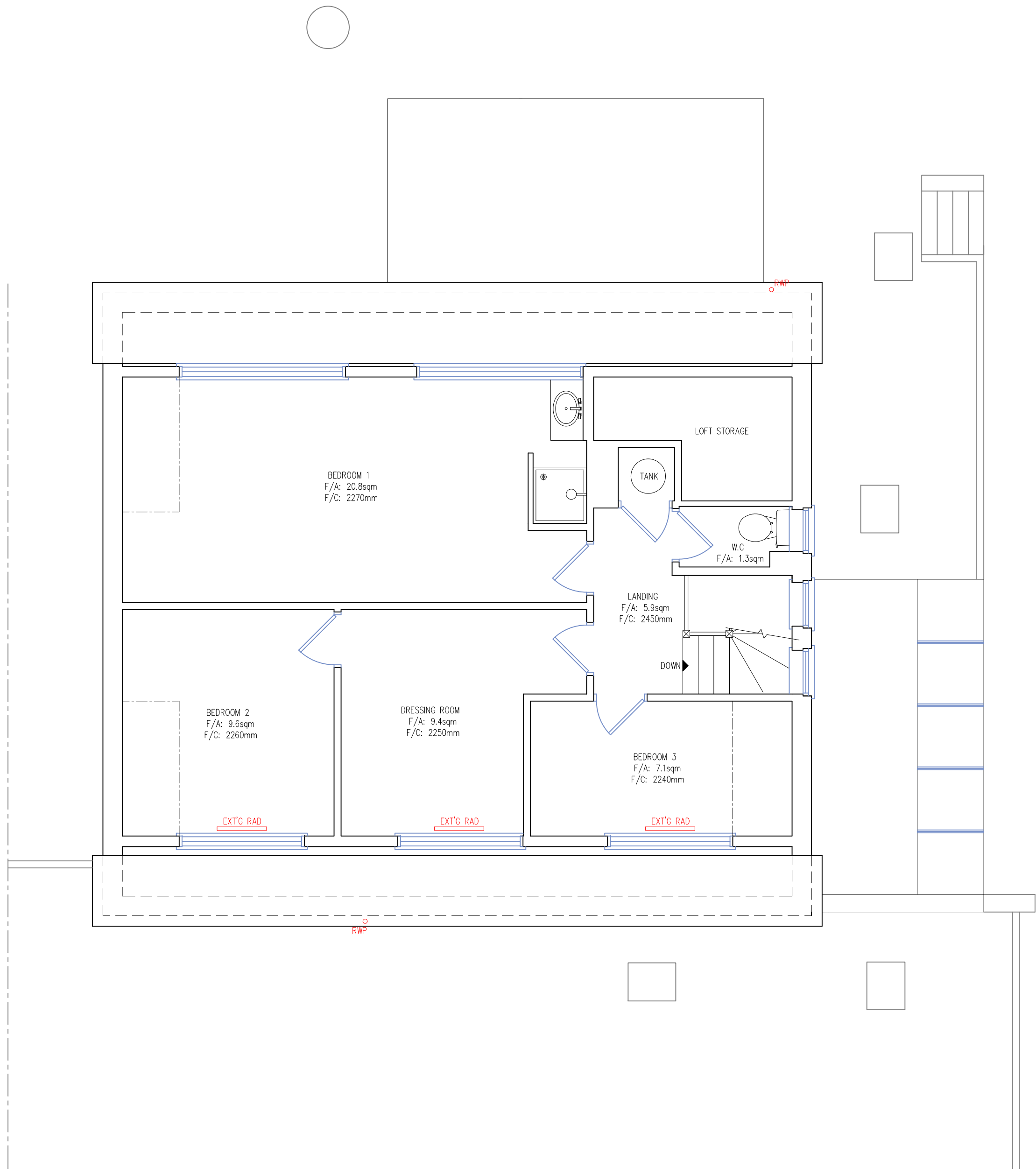
0 1 2 3 4 5 6 7 8 9 10
SCALE 1:100

NOTES:

1. CONTRACTOR MUST CHECK DIMENSIONS ON-SITE PRIOR TO COMMENCEMENT OF WORKS.
2. ANY DISCREPANCIES OR UNCERTAINTIES MUST BE NOTIFIED TO THE PRINCIPAL DESIGNER.
3. BOUNDARIES HAVE BEEN ASSUMED ON SITE. CLARIFICATION AND CONFIRMATION OF BOUNDARY MUST BE TAKEN UP WITH A LEGAL PARTY.
4. ALL DRAWINGS ARE TO BE PLAN-CHECKED BY THE LOCAL AUTHORITY, OR AN ALLOCATED INDEPENDENT BUILDING CONTROL SURVEYOR AND APPROVED.
5. ANY UNSPECIFIED USAGE OR REPRODUCTION OF 'HAC DESIGNS LTD' DRAWING ARE SUBJECT TO INTELLECTUAL PROPERTY AND COPYRIGHT LAWS AND MUST BE APPROVED BY PRIOR WRITTEN CONSENT.
6. STRUCTURAL ELEMENTS AND SUPPORTS MUST BE DESIGNED BY A CERTIFIED STRUCTURAL ENGINEER, THAT HAS PROVIDED SUPPORTIVE CALCULATIONS TO BE APPROVED BY THE LOCAL AUTHORITY BEFORE INSTALLATION.
7. NON-SPECIFIED MATERIALS MUST BE CONSULTED AND APPROVED BY ALL RELEVANT PARTIES PRIOR TO INSTALLATION.



HAC
DESIGNS

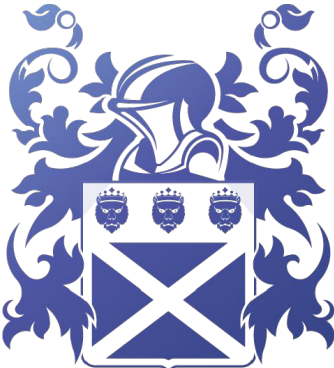


MR & MRS SMITH
DESIGN PROPOSAL @
20 ROTHERFIELD AVENUE
WOKINGHAM
RG41 2EX

EXISTING FIRST FLOOR PLAN

1:50 @ A2
MARCH 2023
23007.S.PP-02
DM

HAC DESIGNS LTD
100 BERKSHIRE PLACE
WHARFEDALE ROAD,
WINNERSH
WOKINGHAM RG41 5RD
info@hac-designs.co.uk
www.hac-designs.co.uk



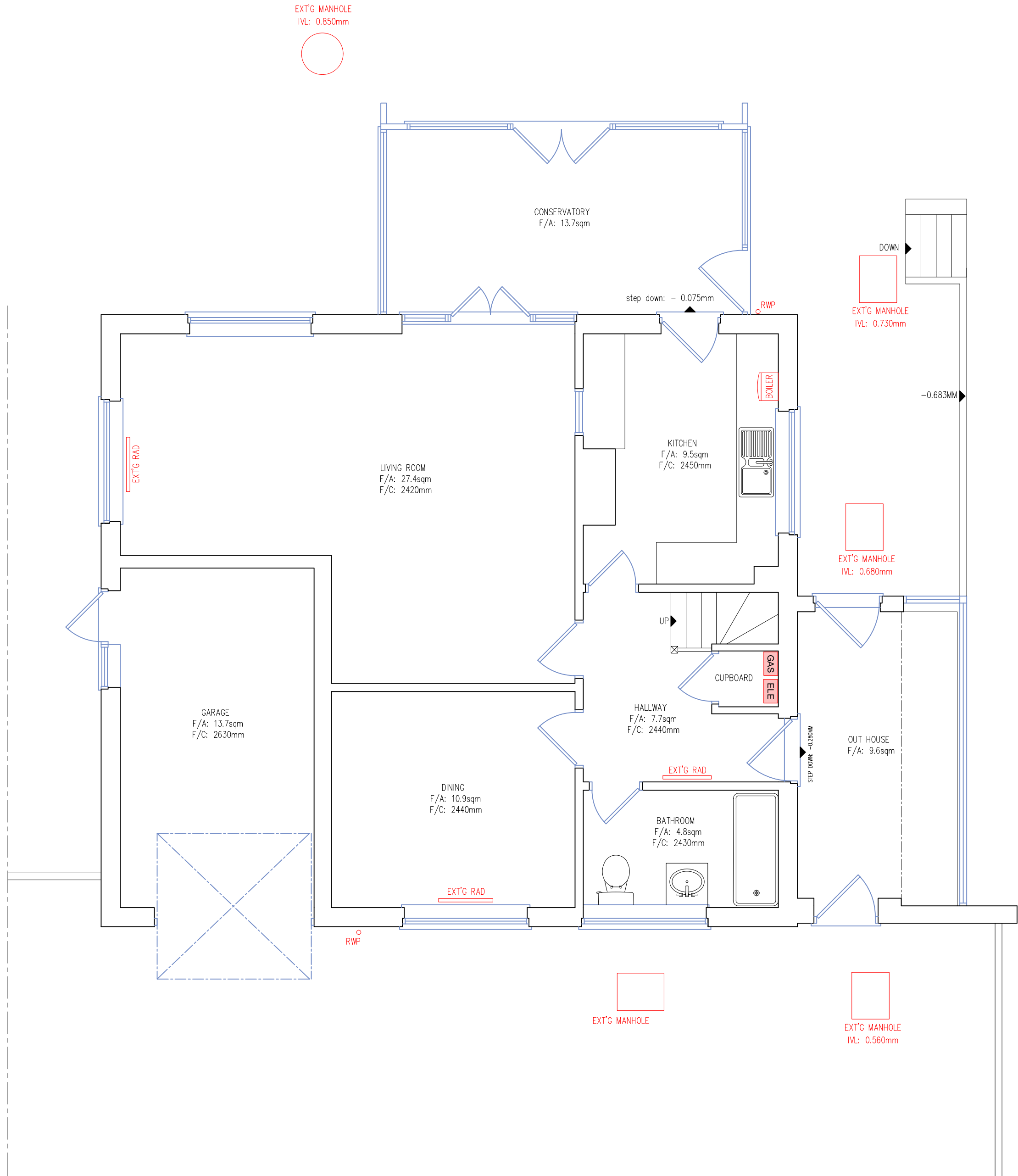
HAC
DESIGNS

NOTES:

1. CONTRACTOR MUST CHECK DIMENSIONS ON-SITE PRIOR TO COMMENCEMENT OF WORKS.
2. ANY DISCREPANCIES OR UNCERTAINTIES MUST BE NOTIFIED TO THE PRINCIPAL DESIGNER.
3. BOUNDARIES HAVE BEEN ASSUMED ON SITE. CLARIFICATION AND CONFIRMATION OF BOUNDARY MUST BE TAKEN UP WITH A LEGAL PARTY.
4. ALL DRAWINGS ARE TO BE PLAN-CHECKED BY THE LOCAL AUTHORITY, OR AN ALLOCATED INDEPENDENT BUILDING CONTROL SURVEYOR AND APPROVED.
5. ANY UNSPECIFIED USAGE OR REPRODUCTION OF 'HAC DESIGNS LTD' DRAWING ARE SUBJECT TO INTELLECTUAL PROPERTY AND COPYRIGHT LAWS AND MUST BE APPROVED BY PRIOR WRITTEN CONSENT.
6. STRUCTURAL ELEMENTS AND SUPPORTS MUST BE DESIGNED BY A CERTIFIED STRUCTURAL ENGINEER; THAT HAS PROVIDED SUPPORTIVE CALCULATIONS TO BE APPROVED BY THE LOCAL AUTHORITY BEFORE INSTALLATION.
7. NON-SPECIFIED MATERIALS MUST BE CONSULTED AND APPROVED BY ALL RELEVANT PARTIES PRIOR TO INSTALLATION.



0 1 2 3 4 5
SCALE 1:50



NOTES:

1. CONTRACTOR MUST CHECK DIMENSIONS ON-SITE PRIOR TO COMMENCEMENT OF WORKS.
2. ANY DISCREPANCIES OR UNCERTAINTIES MUST BE NOTIFIED TO THE PRINCIPAL DESIGNER.
3. BOUNDARIES HAVE BEEN ASSUMED ON SITE. CLARIFICATION AND CONFIRMATION OF BOUNDARY MUST BE TAKEN UP WITH A LEGAL PARTY.
4. ALL DRAWINGS ARE TO BE PLAN-CHECKED BY THE LOCAL AUTHORITY, OR AN ALLOCATED INDEPENDENT BUILDING CONTROL SURVEYOR AND APPROVED.
5. ANY UNSPECIFIED USAGE OR REPRODUCTION OF 'HAC DESIGNS LTD' DRAWING ARE SUBJECT TO INTELLECTUAL PROPERTY AND COPYRIGHT LAWS AND MUST BE APPROVED BY PRIOR WRITTEN CONSENT.
6. STRUCTURAL ELEMENTS AND SUPPORTS MUST BE DESIGNED BY A CERTIFIED STRUCTURAL ENGINEER; THAT HAS PROVIDED SUPPORTIVE CALCULATIONS TO BE APPROVED BY THE LOCAL AUTHORITY BEFORE INSTALLATION.
7. NON-SPECIFIED MATERIALS MUST BE CONSULTED AND APPROVED BY ALL RELEVANT PARTIES PRIOR TO INSTALLATION.



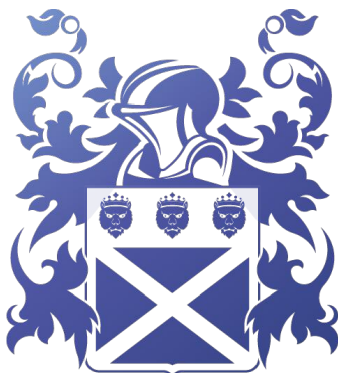
0 1 2 3 4 5
SCALE 1:50

MR & MRS SMITH
DESIGN PROPOSAL @
20 ROTHERFIELD AVENUE
WOKINGHAM
RG41 2EX

EXISTING GROUND FLOOR PLAN

1:50 @ A2
MARCH 2023
23007.S.PP-01
DM

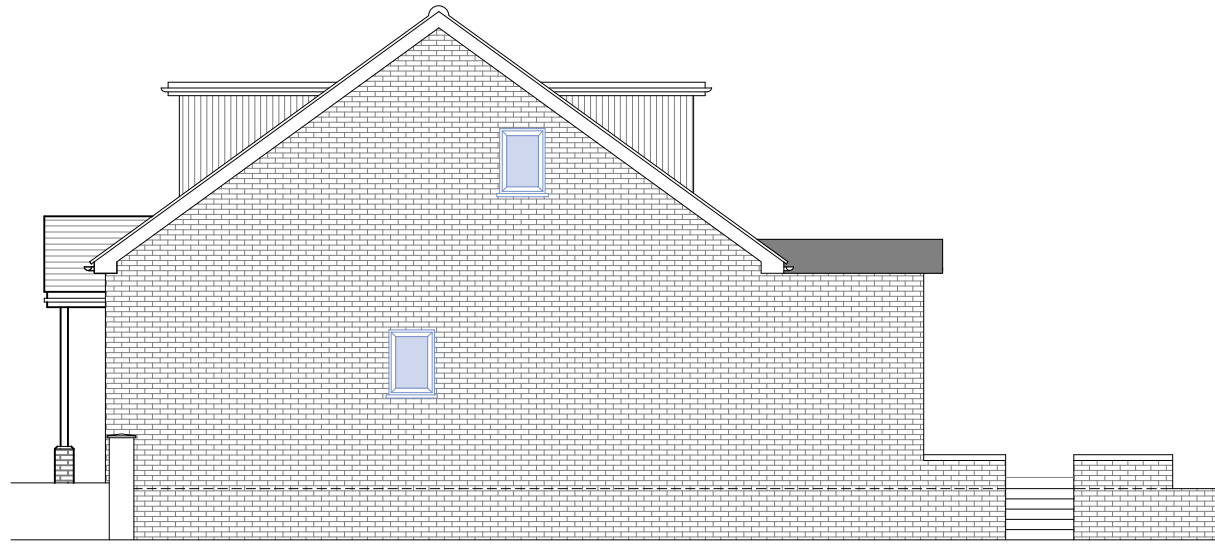
HAC DESIGNS LTD
100 BERKSHIRE PLACE
WHARFEDALE ROAD,
WINNERSH
WOKINGHAM RG41 5RD
info@hac-designs.co.uk
www.hac-designs.co.uk



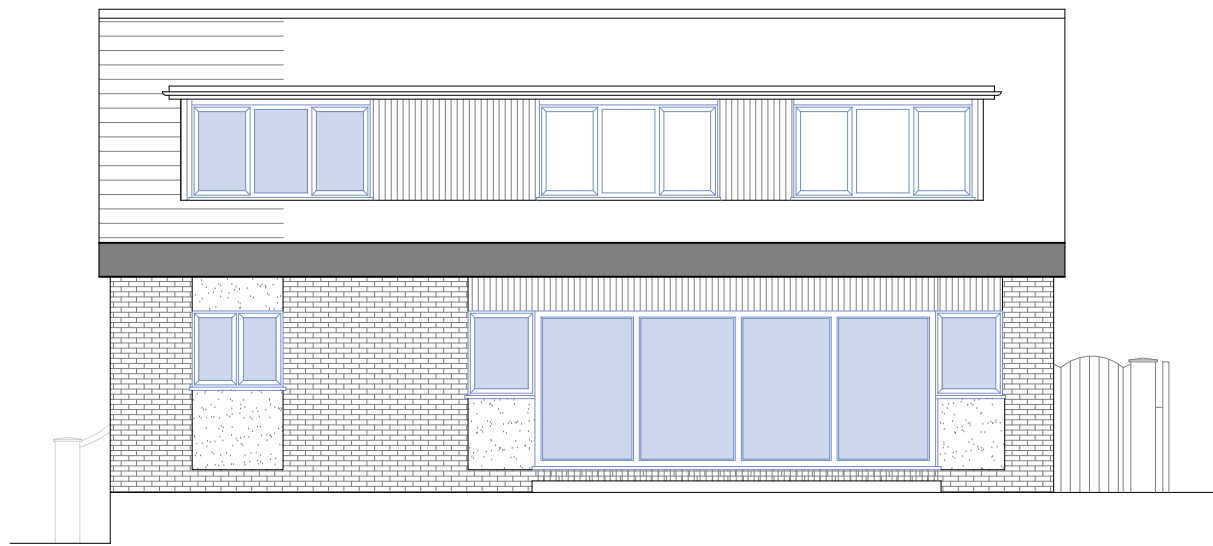
HAC
DESIGNS



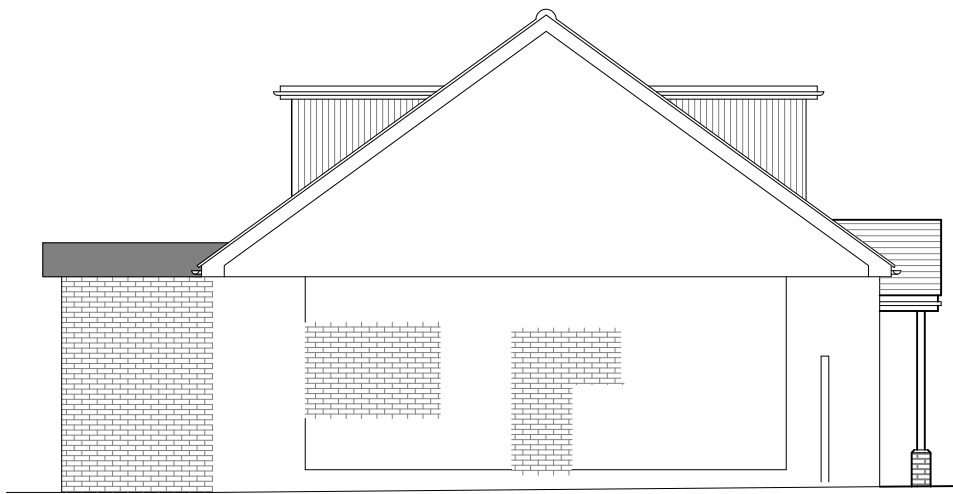
PROPOSED FRONT ELEVATION



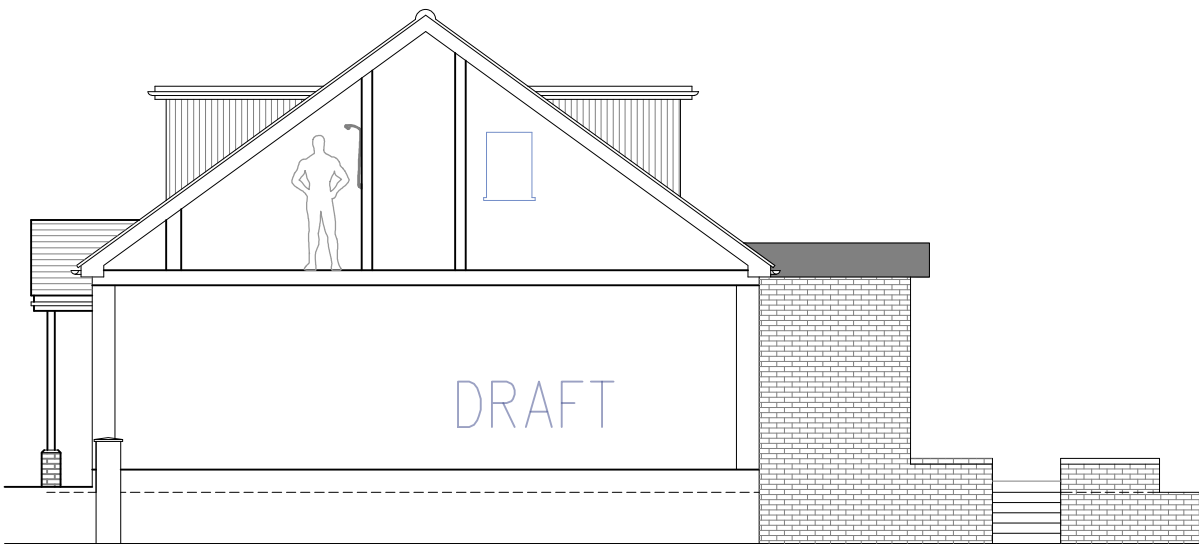
PROPOSED SIDE ELEVATION



PROPOSED REAR ELEVATION



PROPOSED SIDE ELEVATION



PROPOSED SECTION DRAFT

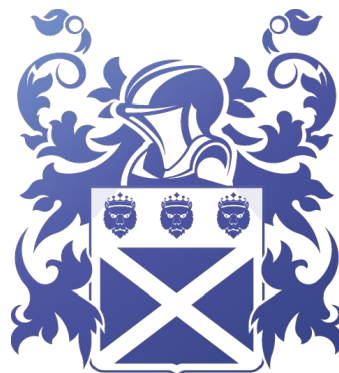
MR & MRS SMITH

DESIGN PROPOSAL @
20 ROTHERFIELD AVENUE
WOKINGHAM
RG41 2EX

PROPOSED ELEVATIONS

1:100 @ A2
MARCH 2024
23007.S.PP-06H
ER

HAC DESIGNS LTD
100 BERKSHIRE PLACE
WHARFEDALE ROAD,
WINNERSH
WOKINGHAM RG41 5RD
info@hac-designs.co.uk
www.hac-designs.co.uk



HAC
DESIGNS



0 1 2 3 4 5 6 7 8 9 10
SCALE 1:100

NOTES:

1. CONTRACTOR MUST CHECK DIMENSIONS ON-SITE PRIOR TO COMMENCEMENT OF WORKS.
2. ANY DISCREPANCIES OR UNCERTAINTIES MUST BE NOTIFIED TO THE PRINCIPAL DESIGNER.
3. BOUNDARIES HAVE BEEN ASSUMED ON SITE. CLARIFICATION AND CONFIRMATION OF BOUNDARY MUST BE TAKEN UP WITH A LEGAL PARTY.
4. ALL DRAWINGS ARE TO BE PLAN-CHECKED BY THE LOCAL AUTHORITY, OR AN ALLOCATED INDEPENDENT BUILDING CONTROL SURVEYOR AND APPROVED.
5. ANY UNDESIGNED USAGE OR REPRODUCTION OF 'HAC DESIGNS LTD' DRAWING ARE SUBJECT TO INTELLECTUAL PROPERTY AND COPYRIGHT LAWS AND MUST BE APPROVED BY PRIOR WRITTEN CONSENT.
6. STRUCTURAL ELEMENTS AND SUPPORTS MUST BE DESIGNED BY A CERTIFIED STRUCTURAL ENGINEER; THAT HAS PROVIDED SUPPORTIVE CALCULATIONS TO BE APPROVED BY THE LOCAL AUTHORITY BEFORE INSTALLATION.
7. NON-SPECIFIED MATERIALS MUST BE CONSULTED AND APPROVED BY ALL RELEVANT PARTIES PRIOR TO INSTALLATION.



MR & MRS SMITH

DESIGN PROPOSAL @
20 ROTHERFIELD AVENUE
WOKINGHAM
RG41 2EX

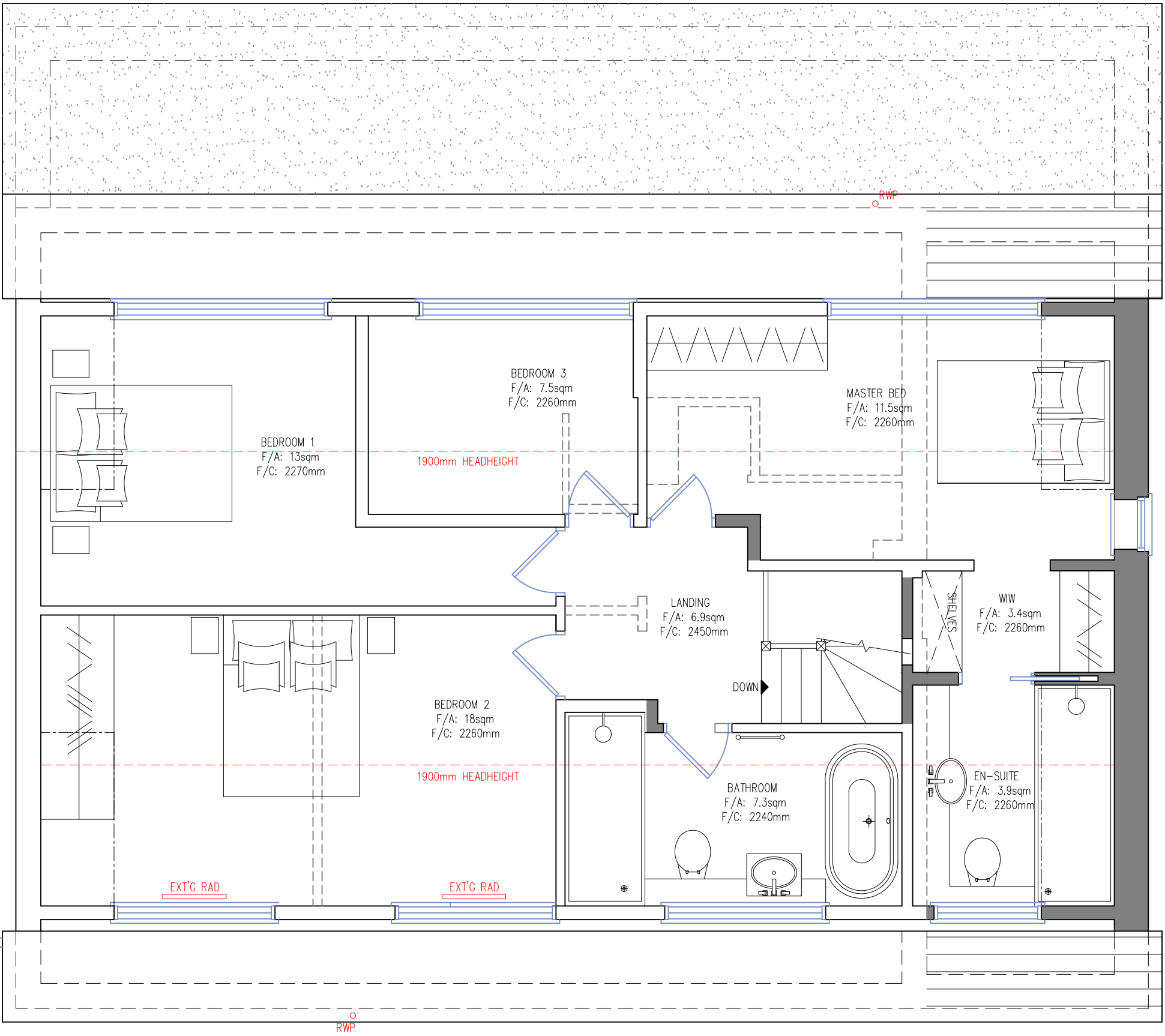
PROPOSED FIRST
FLOOR PLAN

1:50 @ A2
MARCH 2024
23007.S.PP-05H
ER

HAC DESIGNS LTD
100 BERKSHIRE PLACE
WHARFEDALE ROAD,
WINNERSH
WOKINGHAM RG41 5RD
info@hac-designs.co.uk
www.hac-designs.co.uk



HAC
DESIGNS

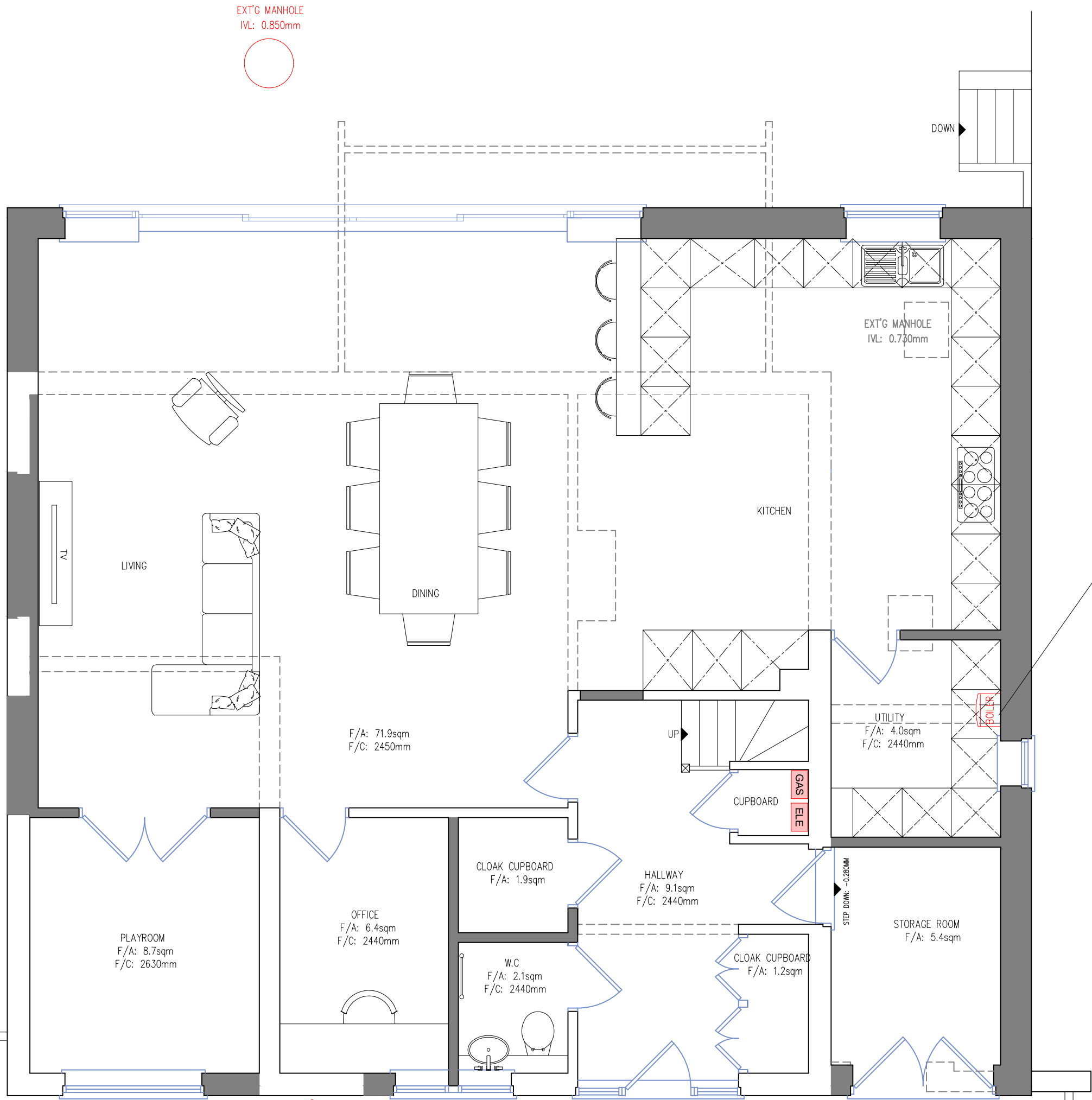


NOTES:

1. CONTRACTOR MUST CHECK DIMENSIONS ON-SITE PRIOR TO COMMENCEMENT OF WORKS.
2. ANY DISCREPANCIES OR UNCERTAINTIES MUST BE NOTIFIED TO THE PRINCIPAL DESIGNER.
3. BOUNDARIES HAVE BEEN ASSUMED ON SITE, CLARIFICATION AND CONFIRMATION OF BOUNDARY MUST BE TAKEN UP WITH A LEGAL PARTY.
4. ALL DRAWINGS ARE TO BE PLAN-CHECKED BY THE LOCAL AUTHORITY, OR AN ALLOCATED INDEPENDENT BUILDING CONTROL SURVEYOR AND APPROVED.
5. ANY UNSPECIFIED USAGE OR REPRODUCTION OF 'HAC DESIGNS LTD' DRAWING ARE SUBJECT TO INTELLECTUAL PROPERTY AND COPYRIGHT LAWS AND MUST BE APPROVED BY PRIOR WRITTEN CONSENT.
6. STRUCTURAL ELEMENTS AND SUPPORTS MUST BE DESIGNED BY A CERTIFIED STRUCTURAL ENGINEER, THAT HAS PROVIDED SUPPORTIVE CALCULATIONS TO BE APPROVED BY THE LOCAL AUTHORITY BEFORE INSTALLATION.
7. NON-SPECIFIED MATERIALS MUST BE CONSULTED AND APPROVED BY ALL RELEVANT PARTIES PRIOR TO INSTALLATION.



0 1 2 3 4 5
SCALE 1:50



MR & MRS SMITH
DESIGN PROPOSAL @
20 ROTHERFIELD AVENUE
WOKINGHAM
RG41 2EX

PROPOSED GROUND FLOOR PLAN

1:50 @ A2
MARCH 2024
23007.S.PP-04H
ER

HAC DESIGNS LTD
100 BERKSHIRE PLACE
WHARFEDALE ROAD,
WINNERSH
WOKINGHAM RG41 5RD
info@hac-designs.co.uk
www.hac-designs.co.uk



HAC
DESIGNS

NOTES:

1. CONTRACTOR MUST CHECK DIMENSIONS ON-SITE PRIOR TO COMMENCEMENT OF WORKS.
2. ANY DISCREPANCIES OR UNCERTAINTIES MUST BE NOTIFIED TO THE PRINCIPAL DESIGNER.
3. BOUNDARIES HAVE BEEN ASSUMED ON SITE. CLARIFICATION AND CONFIRMATION OF BOUNDARY MUST BE TAKEN UP WITH A LEGAL PARTY.
4. ALL DRAWINGS ARE TO BE PLAN-CHECKED BY THE LOCAL AUTHORITY, OR AN ALLOCATED INDEPENDENT BUILDING CONTROL SURVEYOR AND APPROVED.
5. ANY UNSPECIFIED USAGE OR REPRODUCTION OF 'HAC DESIGNS LTD' DRAWING ARE SUBJECT TO INTELLECTUAL PROPERTY AND COPYRIGHT LAWS AND MUST BE APPROVED BY PRIOR WRITTEN CONSENT.
6. STRUCTURAL ELEMENTS AND SUPPORTS MUST BE DESIGNED BY A CERTIFIED STRUCTURAL ENGINEER, THAT HAS PROVIDED SUPPORTIVE CALCULATIONS TO BE APPROVED BY THE LOCAL AUTHORITY BEFORE INSTALLATION.
7. NON-SPECIFIED MATERIALS MUST BE CONSULTED AND APPROVED BY ALL RELEVANT PARTIES PRIOR TO INSTALLATION.



0 1 2 3 4 5
SCALE 1:50

APPENDIX 2 – Environment Agency Data

Product 4 (Detailed Flood Risk) for 20 Rotherfield Avenue, Wokingham, Berkshire, RG41 2EX

Our Ref: THM359750

Product 4 is designed for developers where Flood Risk Standing Advice FRA (Flood Risk Assessment) Guidance Note 3 Applies. This is:

- i) "all applications in Flood Zone 3, other than non-domestic extensions less than 250 sq metres; and all domestic extensions", and
- ii) "all applications with a site area greater than 1 ha" in Flood Zone 2.

Product 4 includes the following information:

Ordnance Survey 1:25k colour raster base mapping;
Flood Zone 2 and Flood Zone 3;
Relevant model node locations and unique identifiers (for cross referencing to the water levels, depths and flows table);
Model extents showing *defended* scenarios;
FRA site boundary (where a suitable GIS layer is supplied);
Flood defence locations (where available/relevant) and unique identifiers; (supplied separately)
Flood Map flood storage areas (where available/relevant);
Historic flood events outlines (where available/relevant, not the Historic Flood Map) and unique identifiers;

Statutory (Sealed) Main River (where available within map extents);

A table showing:

- i) Model node X/Y coordinate locations, unique identifiers, and levels and flows for *defended* scenarios.
- ii) Flood defence locations unique identifiers and attributes; (supplied separately)
- iii) Historic flood events outlines unique identifiers and attributes; and
- iv) Local flood history data (where available/relevant).

Please note:

If you will be carrying out computer modelling as part of your Flood Risk Assessment, please request our guidance which sets out the requirements and best practice for computer river modelling.

This information is based on that currently available as of the date of this letter. You may feel it is appropriate to contact our office at regular intervals, to check whether any amendments/ improvements have been made. Should you re-contact us after a period of time, please quote the above reference in order to help us deal with your query.

This information is provided subject to the enclosed notice which you should read.

This letter is not a Flood Risk Assessment. The information supplied can be used to form part of your Flood Risk Assessment. Further advice and guidance regarding Flood Risk Assessments can be found on our website at:

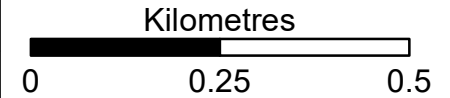
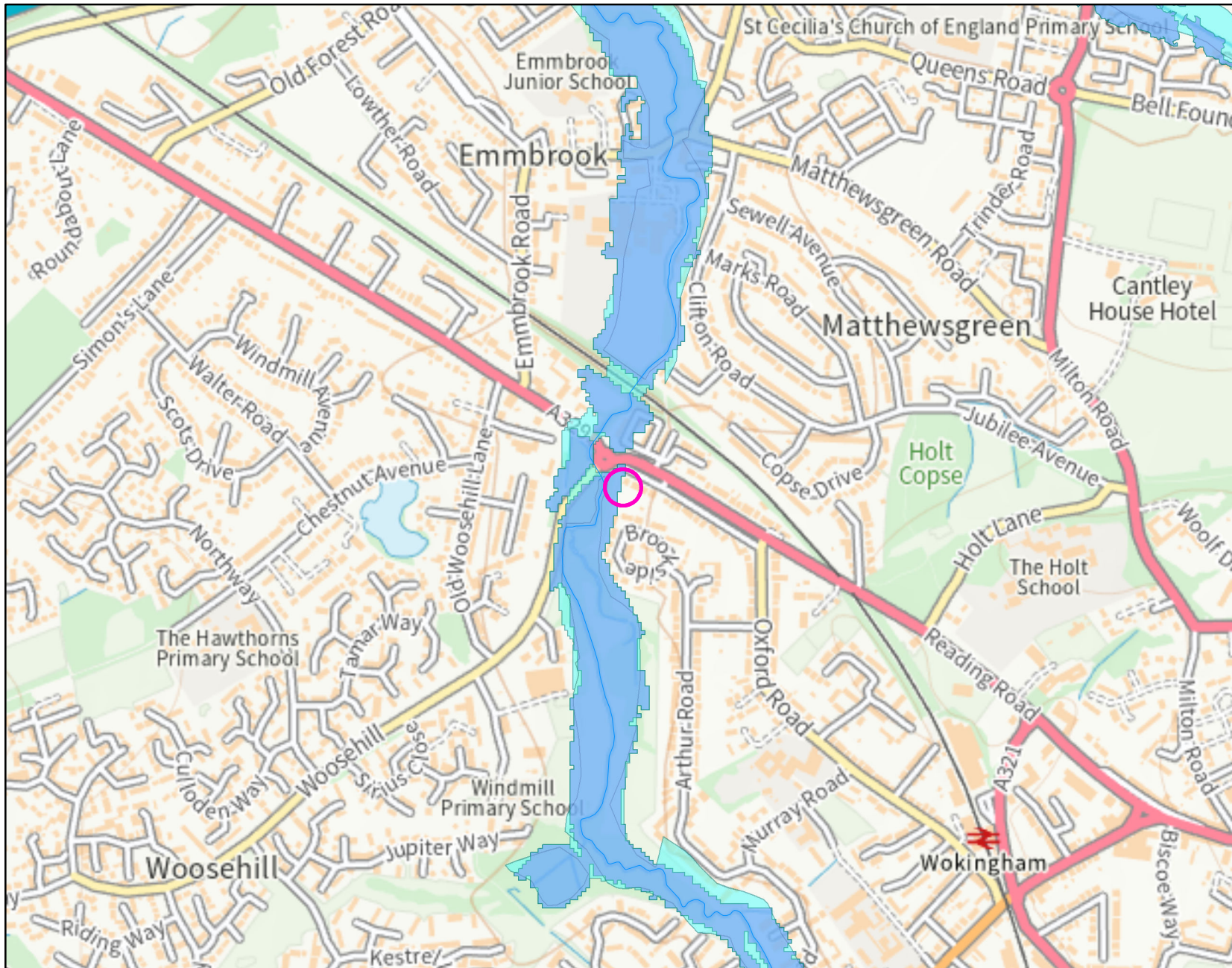
<https://www.gov.uk/guidance/flood-risk-assessment-local-planning-authorities>

If you would like advice from us regarding your development proposals you can complete our pre application enquiry form which can be found at:

<https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion>

Flood Map for Planning centred on 20 Rotherfield Avenue, Wokingham, Berkshire, RG41 2EX

Created on 21/05/24 REF: THM359750



Legend

- Site Boundary
- Statutory Main Rivers
- Flood Map - Flood defences
- Flood Map - Flood Storage Areas
- Flooding from rivers or sea (FZ3)
- Extent of extreme flood (FZ2)

Flooding from rivers or sea without defences (Flood Zone 3) shows the area that could be affected by flooding:

- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year.

The Extent of an extreme flood (Flood Zone 2) shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occurring each year.

Defence information

Defence Location: No defences on Main River

Description: This location is not currently protected by any formal defences and we do not currently have any flood alleviation works planned for the area. However we continue to maintain certain watercourses and the schedule of these can be found on our internet pages.

Model information

THM359750

Model: **Loddon (Lower) 2009**

Description: The information provided is taken from the Lower Loddon Detailed Flood Risk Mapping study which was completed in January 2009. This model is a 1D-2D model using ESTRY-TUFLOW. The model was originally built in 2007 but the hydrology was updated and model rerun in 2009. The model was re-run for more return periods on the main Loddon than on some of the tributaries.

River Channel Model: ESTRY 1D model of Lower Loddon, Old Loddon, St. Patricks Stream, River Thames (from Sonning to Marsh Lock), Twyford Brook, Billingbear Brook and Emm Brook (from Toutley Bridge to Loddon), Barkham Brook, Ashridge Stream, Waterloo Road Stream and Upper Emm Brook (from Nine Mile Ride to Toutley Bridge)

Model design runs (Main River Loddon):

1 in 5 / 20% Annual Exceedance Probability (AEP); 1 in 20 / 5% AEP; 1 in 50 / 2% AEP; 1 in 100 / 1% AEP; 1 in 1000 / 0.1% AEP; and 1 in 100+20% / 1% AEP plus 20% increase in flows

Mapped outputs (main River Loddon):

1 in 5 / 20% AEP; 1 in 20 / 5% AEP; 1 in 50 / 2% AEP; 1 in 100 / 1% AEP, 1 in 100+20% / 1% AEP plus 20% increase in flows, and 1 in 1000 / 0.1% AEP

Model design runs (tributaries – Emm Brook (Wokingham), Emm Brook (Upstream), Ashridge Stream, Waterloo Road Stream, Barkham Brook):

1 in 5 / 20% Annual Exceedance Probability (AEP); 1 in 20 / 5% AEP; 1 in 100 / 1% AEP; and 1 in 100+20% / 1% AEP plus 20% increase in flows

Mapped outputs (tributaries):

1 in 5 / 20% AEP; 1 in 20 / 5% AEP, 1 in 100 / 1% AEP and 1 in 100+20% / 1% AEP plus 20% increase in flows

Model accuracy:

Levels $\pm$ 250mm

Modelled in-channel flood flows and levels

THM359750

The modelled flood levels and flows for the closest most appropriate model node points for your site that are within the river channel are provided below:

Node label	Model	Easting	Northing	Flood Levels (mAOD)			
				20% AEP	5% AEP	1% AEP	1% AEP (+20% increase in flows)
06324LO_MN_Emm2.39.1	Loddon (Lower) 2009	480013	168625	46.23	46.32	46.40	46.44
06324LO_MN_Emm2.37.1	Loddon (Lower) 2009	479872	168712	45.70	45.80	45.92	46.00
06324LO_MN_Emm2.35.1	Loddon (Lower) 2009	479898	168847	45.59	45.68	45.81	45.90
06324LO_MN_Emm2.33a.1	Loddon (Lower) 2009	479882	169014	45.31	45.49	45.70	45.81
06324LO_MN_Emm2.30a.1	Loddon (Lower) 2009	479817	169191	45.20	45.33	45.52	45.66
06324LO_MN_Emm2.27.1	Loddon (Lower) 2009	479865	169276	45.15	45.27	45.45	45.58
06324LO_MN_Emm2.24R1.1	Loddon (Lower) 2009	479864	169403	45.12	45.21	45.34	45.43
06324LO_MN_Emm2.20.1	Loddon (Lower) 2009	479938	169495	44.04	44.19	44.35	44.43
06324LO_MN_Emm2.17.1	Loddon (Lower) 2009	479996	169579	43.84	43.96	44.09	44.16
06324LO_MN_Emm2.16.1	Loddon (Lower) 2009	480002	169702	43.63	43.87	44.02	44.10
06324LO_MN_Emm2.14.1	Loddon (Lower) 2009	480036	169843	43.56	43.81	43.94	44.00
06324LO_MN_Emm2.12a.1	Loddon (Lower) 2009	480008	169944	43.16	43.32	43.52	43.67

Node label	Model	Easting	Northing	Flood Flows (m3/s)			
				20% AEP	5% AEP	1% AEP	1% AEP (+20% increase in flows)
06324LO_MN_Emm2.39.1	Loddon (Lower) 2009	480013	168625	0.00	0.00	0.00	0.00
06324LO_MN_Emm2.37.1	Loddon (Lower) 2009	479872	168712	0.00	0.00	0.00	0.00
06324LO_MN_Emm2.35.1	Loddon (Lower) 2009	479898	168847	0.00	0.00	0.00	0.00
06324LO_MN_Emm2.33a.1	Loddon (Lower) 2009	479882	169014	0.00	0.00	0.00	0.00
06324LO_MN_Emm2.30a.1	Loddon (Lower) 2009	479817	169191	0.00	0.00	0.00	0.00
06324LO_MN_Emm2.27.1	Loddon (Lower) 2009	479865	169276	0.00	0.00	0.00	0.00
06324LO_MN_Emm2.24R1.1	Loddon (Lower) 2009	479864	169403	0.00	0.00	0.00	0.00
06324LO_MN_Emm2.20.1	Loddon (Lower) 2009	479938	169495	0.00	0.00	0.00	0.00
06324LO_MN_Emm2.17.1	Loddon (Lower) 2009	479996	169579	0.00	0.00	0.00	0.00
06324LO_MN_Emm2.16.1	Loddon (Lower) 2009	480002	169702	0.00	0.00	0.00	0.00
06324LO_MN_Emm2.14.1	Loddon (Lower) 2009	480036	169843	0.00	0.00	0.00	0.00
06324LO_MN_Emm2.12a.1	Loddon (Lower) 2009	480008	169944	0.00	0.00	0.00	0.00

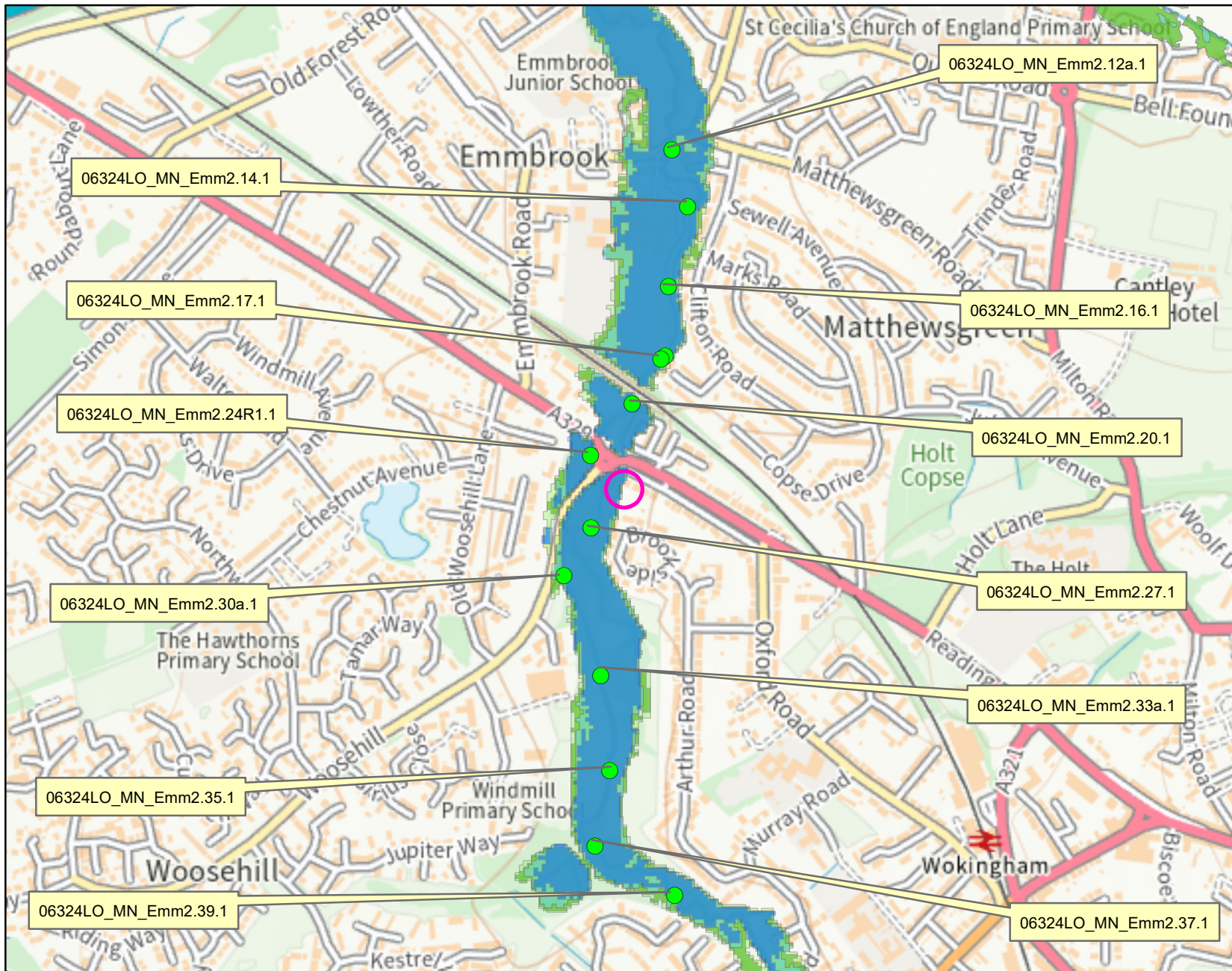
Note:

Due to changes in guidance on the allowances for climate change, the percentage increase in river flows above should no longer to be used for development design purposes. The data included in this Product can be used for interpolation of levels as part of an intermediate level assessment.

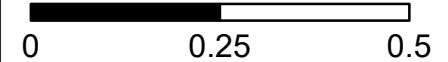
For further advice on the new allowances please visit

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

Detailed FRA Map centred on 20 Rotherfield Avenue, Wokingham, Berkshire, RG41 2EX
Created on 21/05/24 REF: THM359750



Kilometres



Legend



Site Boundary



Model Nodes

20% AEP flood extent

5% AEP flood extent

1% AEP flood extent

1%+20% AEP flood extent

0.1% AEP flood extent

AEP = Annual Exceedance Probability
The probability of a flood of a particular magnitude, or greater, occurring in any given year

Where available climate change extents have been calculated with an additional flow added to an AEP event. An example of how this is written is 1%+20% AEP.

Historic flood data

THM359750

Our records show that the area of your site has been affected by flooding.
Information on the floods that have affected your site is provided in the table below:

Flood Event Code	Flood Event Name	Start Date	End Date	Source of Flooding	Cause of Flooding
No historic flood data available					

Please note the Environment Agency maps flooding to land not individual properties. Floodplain extents are an indication of the geographical extent of a historic flood. They do not provide information regarding levels of individual properties, nor do they imply that a property has flooded internally.

Start and End Dates shown above may represent a wider range where the exact dates are not available.

