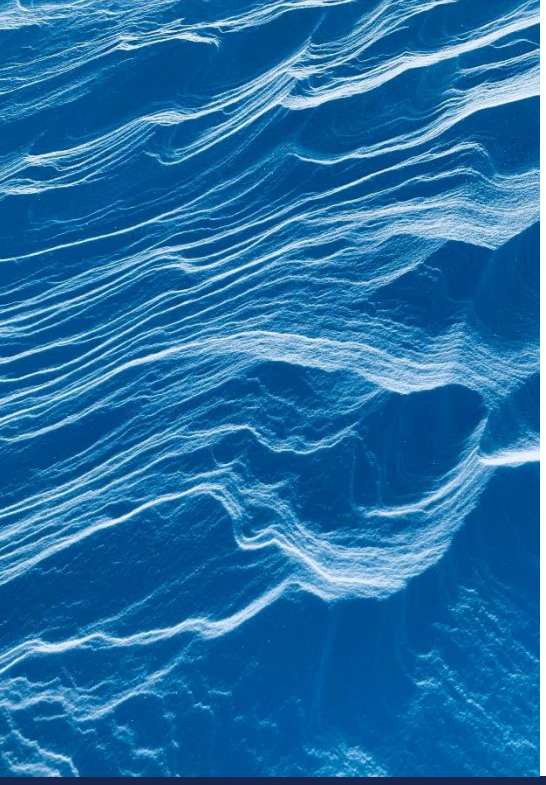

Flood Risk Assessment
AEG02241_UB10_Hillingdon_01

aegaea
Flood risk, water and environment

Site Address: 21 The Avenue
Ickenham
Hillingdon
London
UB10 8NR

UK Experts in Flood Modelling, Flood Risk Assessments, and Surface Water Drainage Strategies

aegaea
Flood risk, water and environment

Document Issue Record

Project: Flood Risk Assessment

Prepared for: Hardeep Jhutty

Reference: AEG02241_UB10_Hillingdon_01

Site Location: 21 The Avenue, Ickenham, Hillingdon, London, UB10 8NR

Consultant		Date	Signature
Author	Richard Gazzard	24/03/2023	
Document Check	Daniel Cook	28/03/2023	
Authorisation	Nick Darling-Drewett	31/03/2023	

Rev A - Alterations to the Proposed Plan

Consultant		Date	Signature
Author	Ahmed Alwaal	28/06/2023	
Authorisation	Nick Darling-Drewett	28/06/2023	

Please Note:

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Flood risk, water and environment

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Flood risk, water and environment

Summary

Development Description	Existing	Proposed
Development Type	A detached residential dwelling.	An extension to the existing dwelling.
EA Vulnerability Classification	More Vulnerable	More Vulnerable
Ground Floor Level	Approximately 37.15mAOD to 37.59mAOD based on LiDAR.	No change. FFLs of proposed extension should be set no lower than existing FFLs in line with EA Standing Advice for Minor Developments.
Level of Sleeping Accommodation	First Floor	First and second floors.
Surface Water Drainage	N/A[1]	Runoff from the extension could be discharged via the existing system, given that proposal is a Minor Development. Betterment could be provided through small-scale SuDS such as rainwater planters and water butts.
Site Size	Approximately 1327m^2	No change
Development Size	107m^2	<250m^2
Risk to Development	**Summary**	**Comment**
EA Flood Zone	Flood Zone 1 and 2	Review of the EA Flood Map For Planning shows that the majority of the footprint of the proposed extension lies in Flood Zone 2, however inspection of the West London SFRA Fluvial and Tidal Flood Risk mapping shows that neither the footprint of the proposed extension nor the site are affected by the modelled 1% or 1%+cc events.
Flood Source	N/A	The River Pinn approximately 180m west of the site.
SFRA Available	West London Online SFRA (2018)	
Management Measures	**Summary**	**Comment**

Ground floor level above extreme flood levels	Yes	Inspection of the West London SFRA Fluvial and Tidal Flood Risk mapping shows that neither the footprint of the proposed extension nor the site are affected by the modelled 1% or 1%+cc events. Finished Floor Levels (FFLs) of extension should be set no lower than the existing FFLs in line with EA Standing Advice for Minor Developments
Safe Access/Egress Route	Access/egress potentially affected during the modelled low risk pluvial event	Sign up to the EA Flood Warning and Alert Service - River Pinn at Ickenham Area. Access/ egress arrangements would not differ from existing as proposal is Minor Development.
Flood Resilient Design	Yes	Extension should be constructed in flood resilient manner in accordance with CLG *Report Improving the Flood Performance of New Buildings - Flood Resilient Construction*[1] *(2007).*
Site Drainage Plan	N/A[1]	Runoff from extension could be discharged via existing system given that proposal is Minor Development. Betterment could be provided through small-scale SuDS such as rainwater planters and water butts.
Flood Warning & Evacuation Plan	Yes	Sign up to the EA Flood Warning Service - River Pinn at Ickenham Area.
Offsite Impacts	**Summary**	**Comment**
Displacement of floodwater	Negligible	Proposal is Minor Development which may not result in significant impact of floodplain storage in isolation in

1 https://assets.publishing.service.gov.uk/media/602d673ee90e0709e8d085d8/Improving_the_Flood_Resilience_of_Buildings_Through_Improved_Materials__Methods_and_Details_Technical_Report.pdf

		accordance with paragraph 051 of the Flood Risk and Coastal Change PPG.
Increase in surface run-off generation	N/A	Runoff from extension could be discharged via existing system given that proposal is Minor Development. Betterment could be provided through small-scale SuDS such as rainwater planters and water butts.
Impact on hydraulic performance of channels	Negligible	The development should not affect watercourse.

[1] not required for this assessment. [2] data not available.

1. Introduction

1.1. Aegaea were commissioned by Hardeep Jhutty to undertake a Flood Risk Assessment (FRA) to facilitate a planning application for the proposed development. This FRA has been prepared in accordance with the requirements set out in the National Planning Policy Framework (NPPF) and the associated Planning Practice Guidance.

1.2. This FRA is intended to support a full planning application and as such the level of detail included is commensurate and subject to the nature of the proposals.

Site Overview

1.3. The site of the proposed development is 21 The Avenue, Ickenham, Hillingdon, London, UB10 8NR (Figure 1).

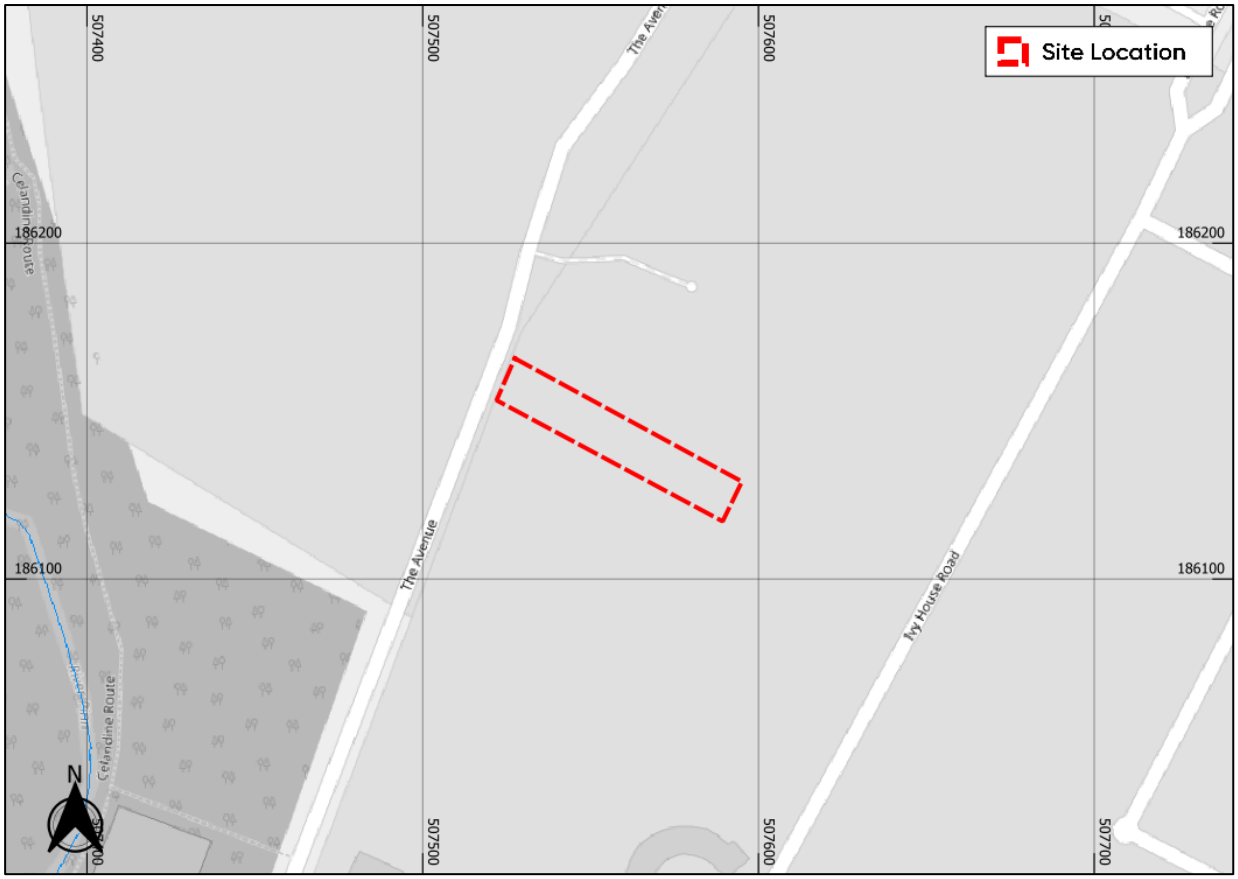

Figure 1: Site Location Mapping (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © https://www.openstreetmap.org and contributors).

1.4. The proposed development is for the construction of an extension to the existing dwelling on site to provide greater habitable space and as such, is classed as a minor development. Note that alterations have been made to the proposed design which include the followings:

- Reduced ridge height to match existing.
- Part double storey part first floor front extension. The second floor will be unhabitable space to be used for storage only.

1.5. The alterations are illustrated in Figure 2. A full set of development proposals can be found in Appendix A of this report.

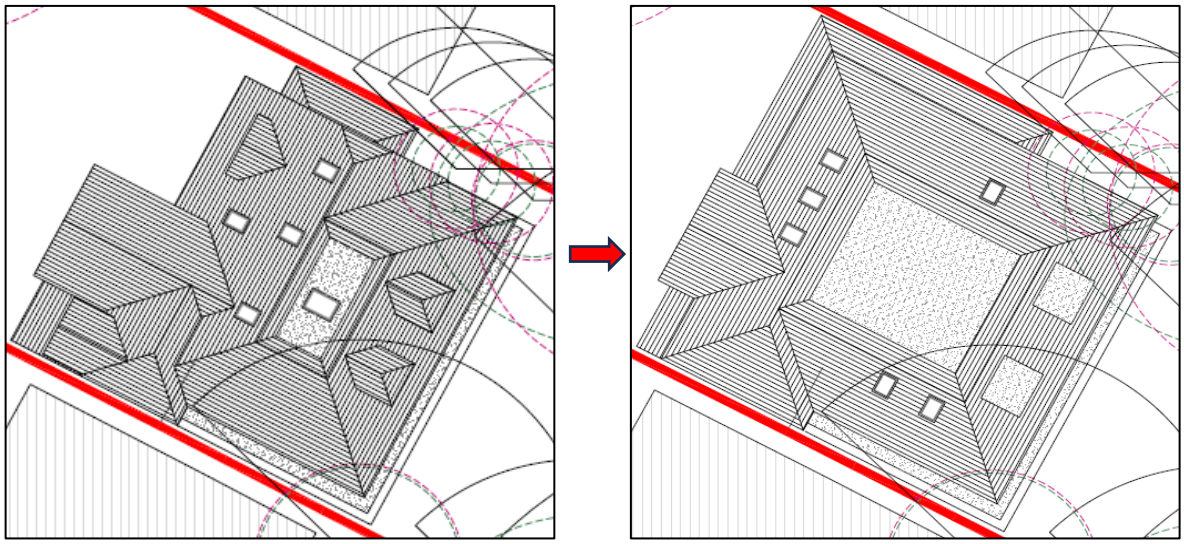

Figure 2: Current Proposed Design vs New Proposed Design

1.6. In the absence of a topographical survey, Environment Agency Light Detection and Ranging (LiDAR) data Digital Terrain Model (1m resolution) has been used to review the topography of the site. The LiDAR data shows the ground elevation of the site varies between approximately 37.15mAOD (metres Above Ordnance Datum) and 37.59mAOD. Analysis of topographic levels indicates that the site generally slopes with a fall to the south-east (Figure 3).

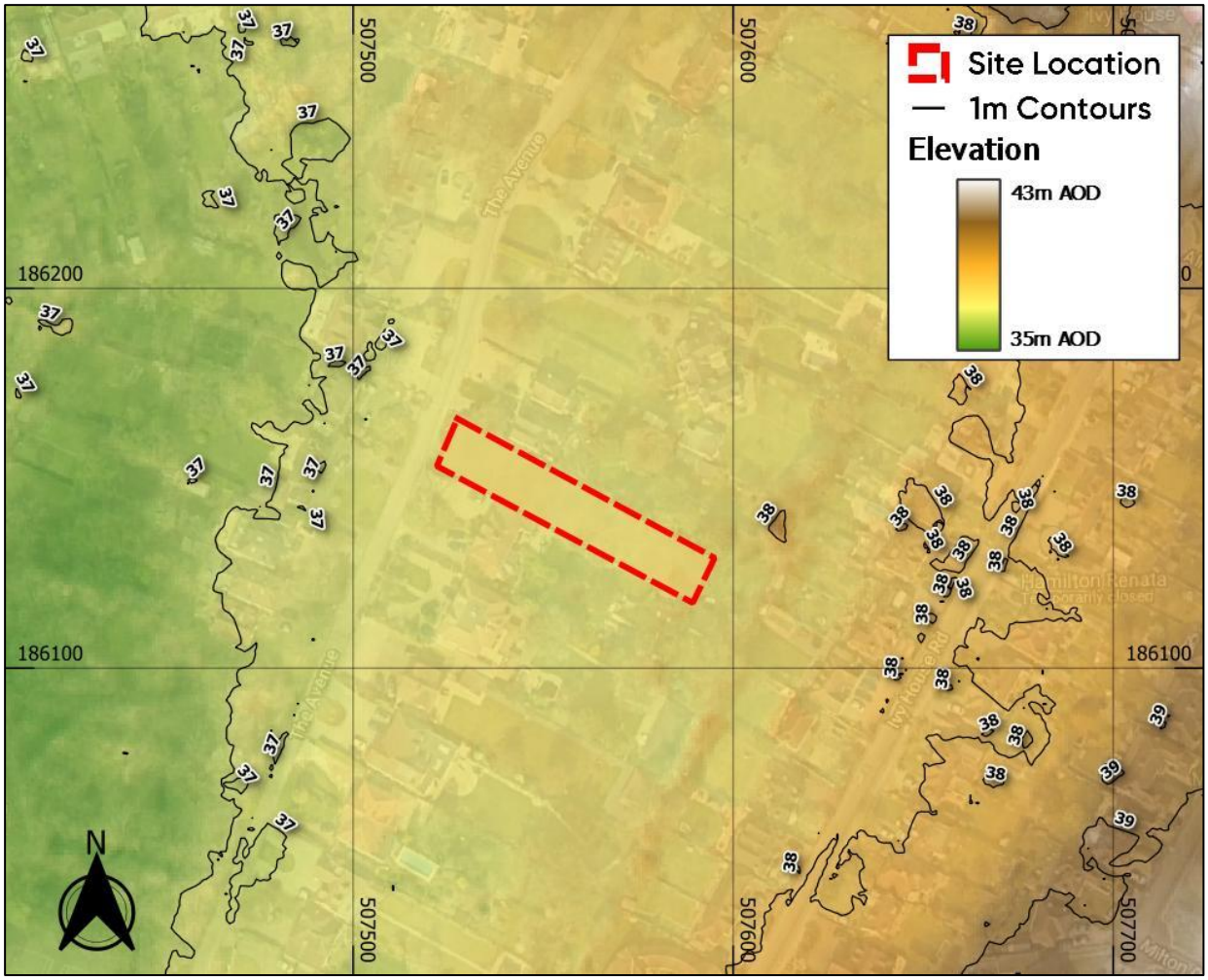

Figure 3: Site Topography Mapping (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © https://www.openstreetmap.org and contributors. Contains public sector information licensed under the Open Government Licence v3.0.

1.7. Hillingdon Council is the Local Planning Authority (LPA) for the site, and also the designated Lead Local Flood Authority (LLFA). The site sits within the Environment Agency's Hertfordshire and North London region.

Planning Policy and Guidance

1.8. UK government planning guidance states[2] that an FRA is required for developments which are:

- *in flood zone 2 or 3 including minor development and change of use*
- *more than 1 hectare (ha) in flood zone 1*
- *less than 1 ha in flood zone 1, including a change of use in development type to a more vulnerable class (for example from commercial to residential), where they could be affected by sources of flooding other than rivers and the sea (for example surface water drains, reservoirs)*
- *in an area within flood zone 1 which has critical drainage problems as notified by the Environment Agency*

1.9. The site is partially in Flood Zone 2 therefore the NPPF states that an FRA is required.

1.10. The objective of this FRA is to demonstrate that the proposals are acceptable in terms of flood risk. This report summarises the findings of the study and specifically addresses the following issues in the context of the current legislative regime:

- Fluvial flood risk
- Surface water flood risk
- Risk of flooding from other sources

[2] https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications#when-you-need-an-assessment

2. Planning Policy

2.1. Inappropriate development in a flood risk area could pose significant risk in terms of personal safety and damage to property for the occupiers of the development or for people elsewhere. The approach taken in the assessment of flood risk at the planning stage is set out in national, regional, and local planning policy and associated guidance. This section summarises the key policies and guidance relevant to the proposed development.

National Planning Policy Framework (NPPF)

2.2. The National Planning Policy Framework[3] (NPPF) (DLUHC, 2021) which includes UK Government policy on development and flood risk states:

> *"159. Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere.*
>
> *167. When determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk assessment. Development should only be allowed in areas at risk of flooding where, in the light of this assessment (and the sequential and exception tests, as applicable) it can be demonstrated that:*
>
> *a) within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;*
>
> *b) the development is appropriately flood resistant and resilient such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment;*
>
> *c) it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;*

[3] https://www.gov.uk/guidance/national-planning-policy-framework, **last updated July 2021**

d) any residual risk can be safely managed; and

e) safe access and escape routes are included where appropriate, as part of an agreed emergency plan.

168. Applications for some minor development and changes of use should not be subject to the sequential or exception tests but should still meet the requirements for site-specific flood risk assessments set out in footnote 55. "

2.3. Paragraph 051 of the Flood Risk and Coastal Change Planning Practice Guidance (PPG) states:

Minor development means:

- *minor non-residential extensions (industrial/commercial/leisure etc): extensions with a floorspace not in excess of 250 square metres.*
- *alterations: development that does not increase the size of buildings, e.g. alterations to external appearance.*
- *householder development: for example, sheds, garages, games rooms etc within the curtilage of the existing dwelling,* ***in addition to physical extensions to the existing dwelling itself.*** *This definition excludes any proposed development that would create a separate dwelling within the curtilage of the existing dwelling (eg subdivision of houses into flats) or any other development with a purpose not incidental to the enjoyment of the dwelling.*

2.4. As such, the proposal would be considered a Minor Development under the PPG.

2.5. Footnote 55 of the NPPF states:

"A site-specific flood risk assessment should be provided for all development in Flood Zones 2 and 3. In Flood Zone 1, an assessment should accompany all proposals involving: sites of 1 hectare or more; land which has been identified by the Environment Agency as having critical drainage problems; land identified in a strategic flood risk assessment as being at increased flood risk in future; or land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use."

2.6. Flood Zones in England are defined as follows:

Table 1: Flood Zone Definitions

Flood Zone	Definition
Zone 1 Low Probability	Land having less than 1 in 1,000 annual probability of river or sea flooding (all land outside Zones 2 and 3).
Zone 2 Medium Probability	Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding.
Zone 3a High Probability	Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding.
Zone 3b The 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)

2.7. An FRA should be appropriate to the scale, nature, and location of the development. It should identify and assess the risk from all sources of flooding to and from the development and demonstrate how any flood risks will be managed over the lifetime of the development.

The London Plan

2.8. The London Plan prepared by the Greater London Authority in 2021 sets out the policies for development in the region.

2.9. Policy SI 12 Flood risk management outlines the requirements for new development within the region. It states:

> *- A. Current and expected flood risk from all sources (as defined in paragraph 9.2.12) across London should be managed in a sustainable and cost-effective way in collaboration with the Environment Agency, the Lead Local Flood Authorities, developers and infrastructure providers.*
>
> *- B. Development Plans should use the Mayor's Regional Flood Risk Appraisal and their Strategic Flood Risk Assessment as well as Local Flood Risk Management Strategies, where necessary, to identify areas where particular and cumulative flood risk issues exist and develop actions and policy approaches aimed at reducing these risks. Boroughs should cooperate and jointly address cross-boundary flood risk issues including with authorities outside London.*
>
> *- C. Development proposals should ensure that flood risk is minimised and mitigated, and that residual risk is addressed. This should include, where possible, making space for water and aiming for development to be set back from the banks of watercourses.*
>
> *- D. Developments Plans and development proposals should contribute to the delivery of the measures set out in Thames Estuary 2100 Plan. The Mayor will work with the Environment Agency and relevant local planning authorities, including authorities outside London, to safeguard an appropriate location for a new Thames Barrier.*
>
> *- E. Development proposals for utility services should be designed to remain operational under flood conditions and buildings should be designed for quick recovery following a flood. - F. Development proposals adjacent to flood defences will be required to protect the integrity of flood defences and allow access for future maintenance and upgrading. Unless exceptional circumstances are demonstrated for not doing so, development proposals should be set back from flood defences to*

allow for any foreseeable future maintenance and upgrades in a sustainable and cost-effective way.

- G. Natural flood management methods should be employed in development proposals due to their multiple benefits including increasing flood storage and creating recreational areas and habitat.

Hillingdon Local Plan: Part 1 Strategic Policies

2.10. The Local Plan prepared by the Local Planning Authority, Hillingdon Council, sets out the policies for development in the local area.

2.11. Policy EM6 Flood Risk Management outlines the requirements for new development within the area. It states:

The Council will require new development to be directed away from Flood Zones 2 and 3 in accordance with the principles of the National Planning Policy Framework (NPPF).

The subsequent Hillingdon Local Plan: Part 2 -Site Specific Allocations LDD will be subjected to the Sequential Test in accordance with the NPPF. Sites will only be allocated within Flood Zones 2 or 3 where there are overriding issues that outweigh flood risk. In these instances, policy criteria will be set requiring future applicants of these sites to demonstrate that flood risk can be suitably mitigated.

The Council will require all development across the borough to use sustainable urban drainage systems (SUDS) unless demonstrated that it is not viable. The Council will encourage SUDS to be linked to water efficiency methods. The Council may require developer contributions to guarantee the long term maintenance and performance of SUDS is to an appropriate standard.

Sequential and Exception Tests

2.12. The Sequential and Exception Tests are applied in specific cases defined by UK Government policy. Their purpose is to drive development to areas of low flood risk and to support developments which improve flood risk for developments in areas at risk of flooding.

2.13. Under the NPPF all new planning applications should undergo a Sequential Test accordance with paragraph 168 and footnotes 55 and 56. This test should be implemented by local planning

authorities with a view to location particularly vulnerable new developments outside of the floodplain.

2.14. Paragraph 168 of the NPPF states:

> *168. Applications for some minor development and changes of use should not be subject to the sequential or exception tests but should still meet the requirements for site-specific flood risk assessments set out in footnote 55.*

2.15. As such, a site-specific Sequential Test and Exception Test for the proposed developments is not considered necessary in line with the NPPF given that the proposal is for a Minor Development (in terms of flood risk).

Summary

2.16. This flood risk assessment has been prepared with due consideration to the above local and national policy.

3. Document Review

Documents and Online Mapping

3.1. The site is within the remit of Hillingdon Council as Lead Local Flood Authority (LLFA).

3.2. Local Governments and Lead Local Flood Authorities provide documents which contain data and policies on flood risk and new development in their areas. These documents are introduced and briefly summarised below. For the purposes of this FRA, these documents have been reviewed for relevant information and any relevant data is discussed within the appropriate sub heading of this report.

3.3. The following sources of information have been reviewed for this assessment:

- Flood Map for Planning on the Environment Agency website *https://flood-map-for-planning.service.gov.uk/*
- Long Term Flood Risk Information on the Environment Agency website *https://www.gov.uk/check-long-term-flood-risk*
- National Planning Policy Framework (NPPF) (Department for Levelling Up, Housing and Communities, 2021)
- Planning Practice Guidance - Flood Risk and Coastal Change (Department for Levelling Up, Housing and Communities, 2022)
- The London Plan (Greater London Authority, 2021)
- Geoindex Onshore (British Geological Survey, 2022)
- Local Plan: Part 1 - Strategic Policies (Hillingdon Council, 2012)[4]
- Preliminary Flood Risk Assessment (Hillingdon Council, 2011)[5]
- West London Strategic Flood Risk Assessment (Hillingdon Council, 2018)[6]

[4]https://www.hillingdon.gov.uk/media/3080/Local-Plan-Part-1---Strategic-Policies/pdf/Local_Plan_Part_1_Strategic_Policies_15_feb_2013_a_1_1.pdf?m=1598370401647

[5] https://modgov.hillingdon.gov.uk/documents/s8734/Appendix%20-%20Flood%20Appraisal.pdf

[6] https://westlondonsfra.london/

- Local Flood Risk Management Strategy 2015 (Hillingdon Council, 2016)[7]

Preliminary Flood Risk Assessment (PFRA)

3.4. The PFRA, published in 2011, is a high-level appraisal of flood risk across Lead Local Flood Authority Hillingdon Council. The flood risk from all sources, including fluvial, surface water, groundwater and surcharged sewers is evaluated. It is the basis upon which the Local Flood Risk Management Strategy is produced.

3.5. The PFRA summarises historical flood incidents in Hillingdon Council. The site is not recorded as having been affected by any flood event.

Strategic Flood Risk Assessment (SFRA)

3.6. The SFRA, published in 2018, provides the evidence base for the Local Planning Authority Hillingdon Council Local Plan and guidance for consideration when determining planning applications. The SFRA seeks to place new development into areas of lower flood risk taking into account current flood risk, future flood risk, and the effect a proposed development would have on the risk of flooding.

3.7. The SFRA mapping provided by Hillingdon Council has been used throughout production of this report as a source of information, particularly pertaining to historical flood incidents.

Local Flood Risk Management Strategy (LFRMS)

3.8. The Local Flood Risk Management Strategy sets out roles and responsibilities for flood risk management, assesses the risk of flooding in the area, where funding can be found to manage flood risk, and the policies, objectives and actions of the Lead Local Flood Authority. The Hillingdon Council LFRMS is used within this report to identify any flood management infrastructure and historical incidences of flooding.

[7]https://www.hillingdon.gov.uk/media/4499/Local-Flooding-Risk-Management-Strategy/pdf/Appendix_A_-_Local_Flood_Risk_Management_Strategy_2016_1.pdf?m=1610451478887

4. Sources of Flood Risk

Fluvial

4.1. Flooding from watercourses arises when flows exceed the capacity of the channel, or where a restrictive structure is encountered, resulting in water overtopping the banks into the floodplain.

Main Rivers and Ordinary Watercourses

4.2. The River Pinn flows north to south approximately 180m to the west of the site and the Ickenham Stream flows north to south approximately 650m to the east of the site.

4.3. There are no other watercourses in the vicinity of the site.

Historical Fluvial Flooding

4.4. The site is almost entirely outside the extent of EA historical flood mapping (Figure 4). Additionally, mapping within the Hillingdon Council PFRA (2011) shows no record of historical fluvial flood incidents within the vicinity of the site.

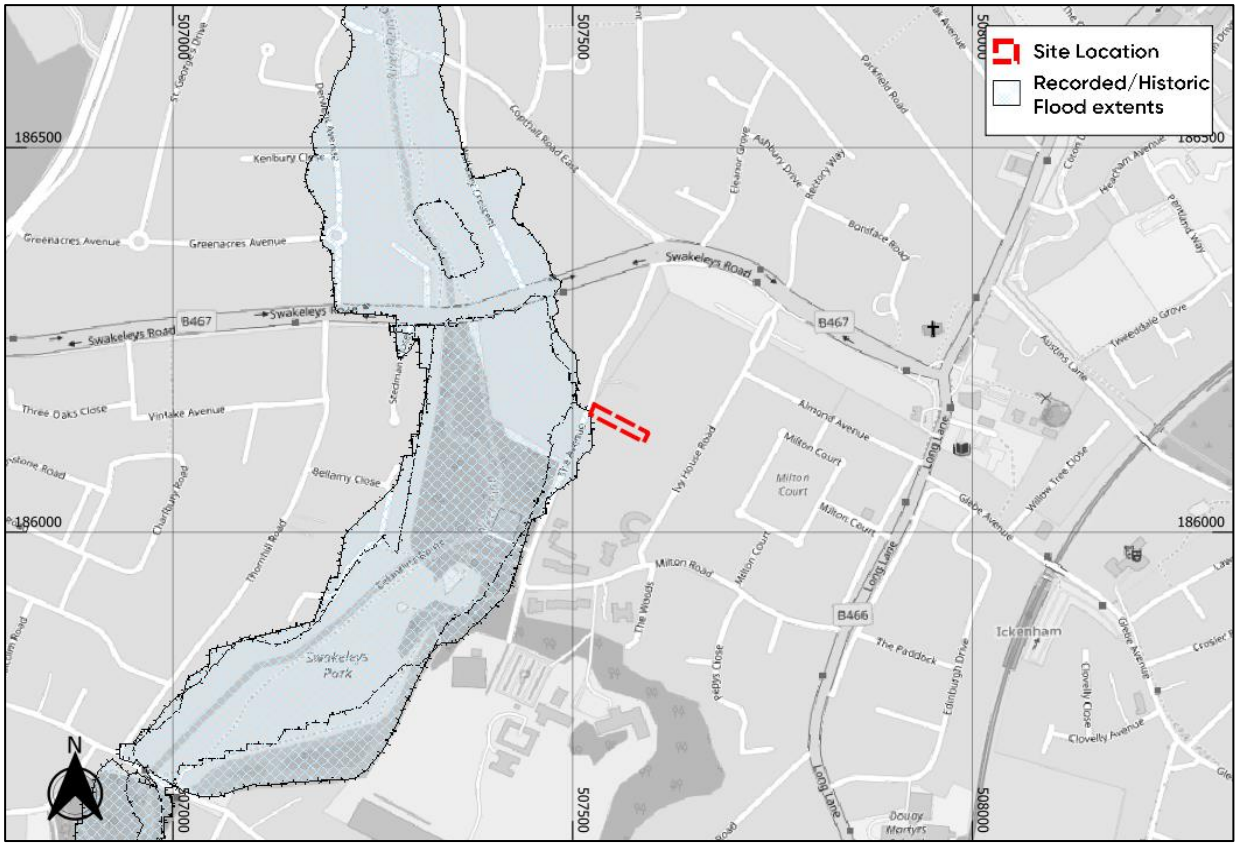

Figure 4: EA Historic Flood Mapping (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © https://www.openstreetmap.org and contributors. Contains public sector information licensed under the Open Government Licence v3.0).

EA Flood Map for Planning

4.5. The site is located within Flood Zone 1 and 2 according to the EA Flood Map for Planning (Figure 5). Flood Zone 2 denotes a risk of flooding from fluvial sources between a 1 in 100 (1%) and 1 in 1,000 (0.1%). Flood Zone 1 is denoted as land having less than 1 in 1,000 (0.1%) annual probability of river or sea flooding.

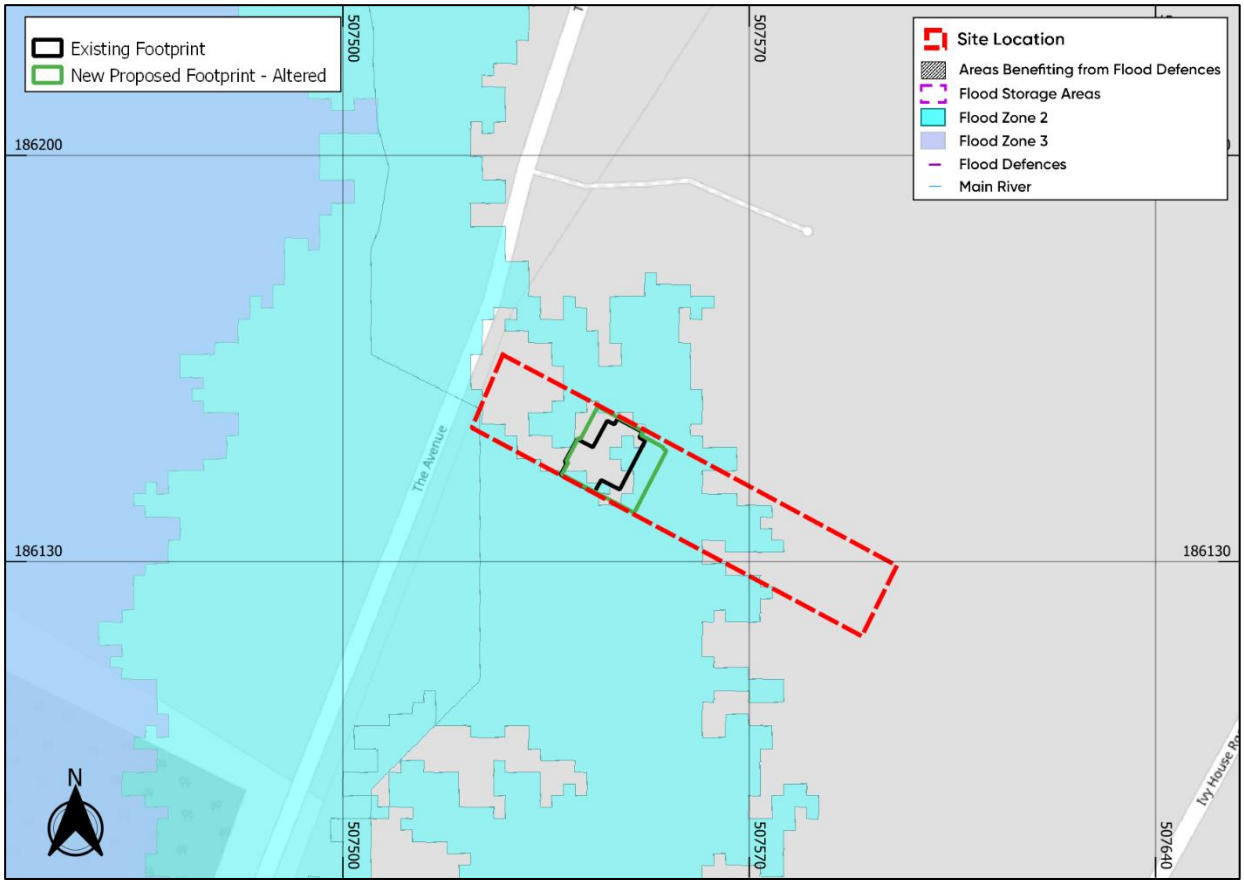

Figure 5: EA Flood Zone (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © https://www.openstreetmap.org and contributors. Contains public sector information licensed under the Open Government Licence v3.0).

Climate Change

4.6. The site lies in the EA Colne Management Catchment for which the climate change central allowance for peak river flow, applicable for 'more vulnerable' developments, is stated as 21%.

4.7. The West London SFRA Fluvial and Tidal Flood Risk Map (online) shows the site to be entirely outside the flood extent of the River Pinn 1:100 year flood extent (Figure 6). It also shows the site to be outside the flood extent of the River Pin 1:100+25%cc climate change allowance which has been used as a conservative estimate for the 1:100+21%cc (Figure 7).

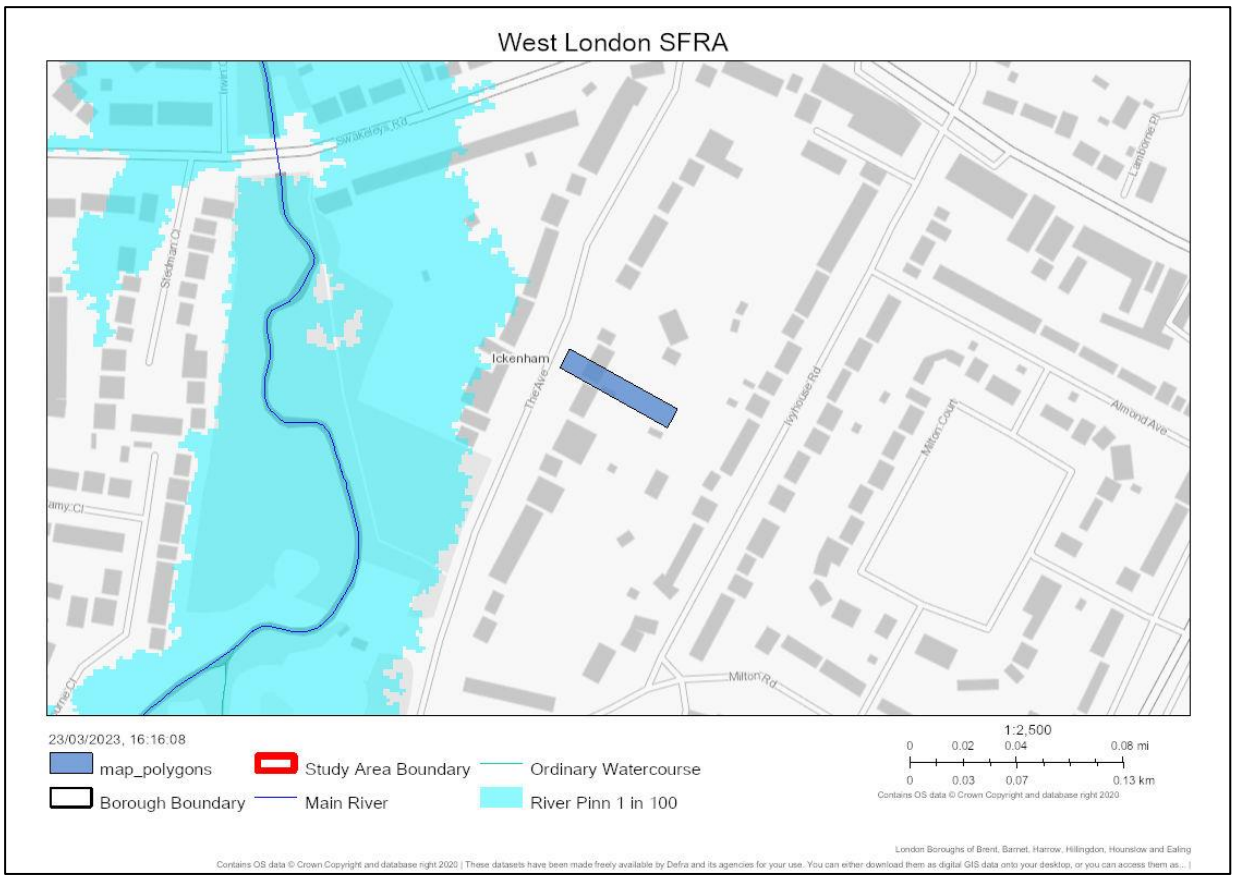

Figure 6: 1:100 year Fluvial flood extent (source: West London SFRA; available from: https://westlondonsfra.london/).

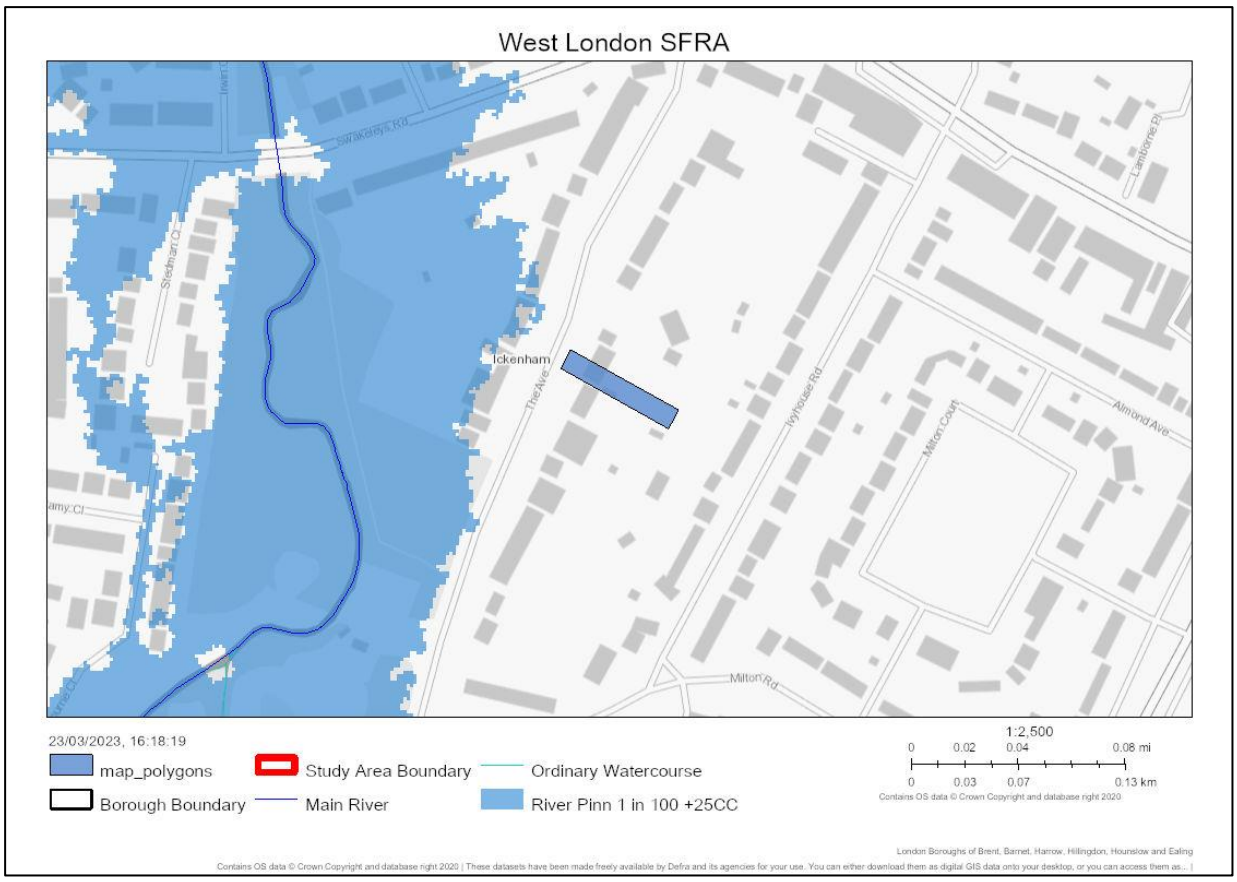

Figure 7: 1:100+25%cc year Fluvial flood extent (source: West London SFRA; available from: https://westlondonsfra.london/).

4.8. The West London SFRA does not include a 1:1000 year extent on the River Pinn. However, as the site is in Flood Zone 2, which is derived in part using the recorded flood outlines and part using detailed modelling, the site is partially affected in the modelled 1:1000 year event although depths cannot be quantified at the time of writing.

4.9. As such, based on the EA Flood Map for Planning and data reviewed as part of the West London SFRA, the risk of flooding from fluvial sources is considered moderate.

4.10. The development proposals constitute a 'Minor Development' and so, in line with the EA Standing Advice for Minor Developments, the Finished Floor Levels (FFLs) of the proposed extensions should be set no lower than the existing dwelling FFLs. This is discussed further along with other mitigation strategies in section 5 of this SFRA.

Tidal

4.11. Tidal flooding occurs when a high tide and high winds combine to elevate sea levels. An area behind coastal flood defences can still flood if waves overtop the defences or break through them. Tidal flooding can also occur a long way from the coast by raising river levels. Water may overtop the riverbank or river defences when tide levels are high.

4.12. The site is a significant distance from any tidal source and above the anticipated extreme tidal levels, even when considering the impacts of climate change. Therefore, the risk of flooding from tidal sources is considered low.

4.13. There is no record of historical tidal or sea flooding.

Canals

4.14. The Canal and River Trust (CRT) generally maintains canal levels using reservoirs, feeders, and boreholes and manages water levels by transferring it within the canal system.

4.15. Water in a canal is typically maintained at predetermined levels by control weirs. When rainfall or other water enters the canal, the water level rises and flows out over the weir. If the level continues rising it will reach the level of the storm weirs. The control weirs and storm weirs are normally designed to take the water that legally enters the canal under normal conditions. However, it is possible for unexpected water to enter the canal or for the weirs to become obstructed. In such instances the increased water levels could result in water overtopping the towpath and flowing onto the surrounding land.

4.16. Flooding can also occur where a canal is impounded above surrounding ground levels and the retaining structure fails.

There are no canals identified within 1000m of the site. The risk of flooding to this site from canals is considered to be low.

Pluvial

4.17. Pluvial flooding can occur during prolonged or intense storm events when the infiltration potential of soils, or the capacity of drainage infrastructure is overwhelmed leading to the accumulation of surface water and the generation of overland flow routes.

4.18. Annual surface water flood risk is labelled by the EA as:

- 'High Risk'; >3.3% AEP (annual probability greater than 1 in 30).
- 'Medium Risk'; 1.1% to 3.3% AEP (annual probability between 1 in 100 and 1 in 30).
- 'Low Risk'; 0.1% to 1% AEP (annual probability between 1 in 1000 and 1 in 100).
- 'Very Low Risk'; <0.1% AEP (annual probability less than 1 in 1000).

4.19. Review of the EA's Flood Risk from Surface Water mapping for High Risk, Medium Risk and Low Risk AEP flood events indicates that the site would remain unaffected in the modelled 1:30 year (high risk) and 1:100 year (medium risk) events (Figure 8).

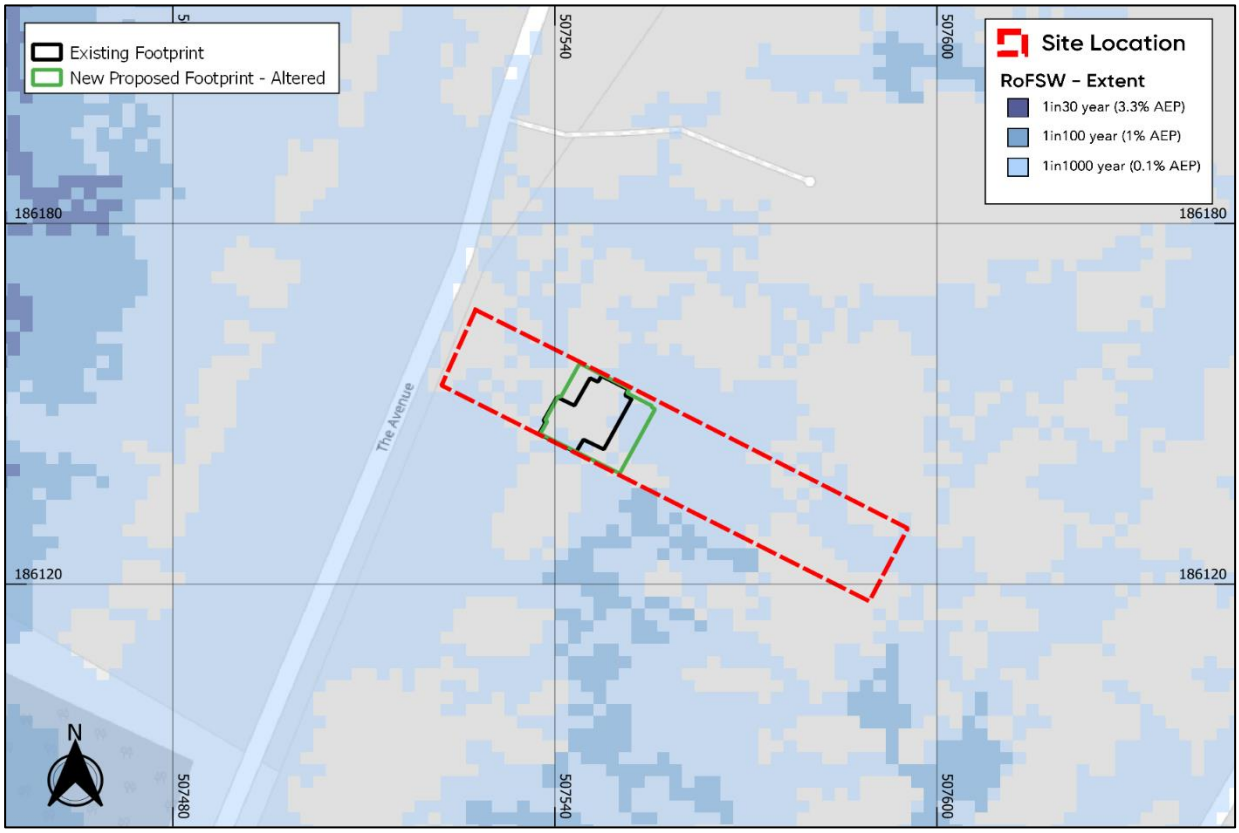

Figure 8: EA Surface Water Flood Risk Mapping Scenario (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © https://www.openstreetmap.org and contributors. Contains public sector information licensed under the Open Government Licence v3.0).

4.20. However, model results show that the site would experience flood depths of up to 600mm during the modelled 1:1000 year (low risk) event (Figure 9) with depths of up 300mm affecting the footprint of the proposed development.

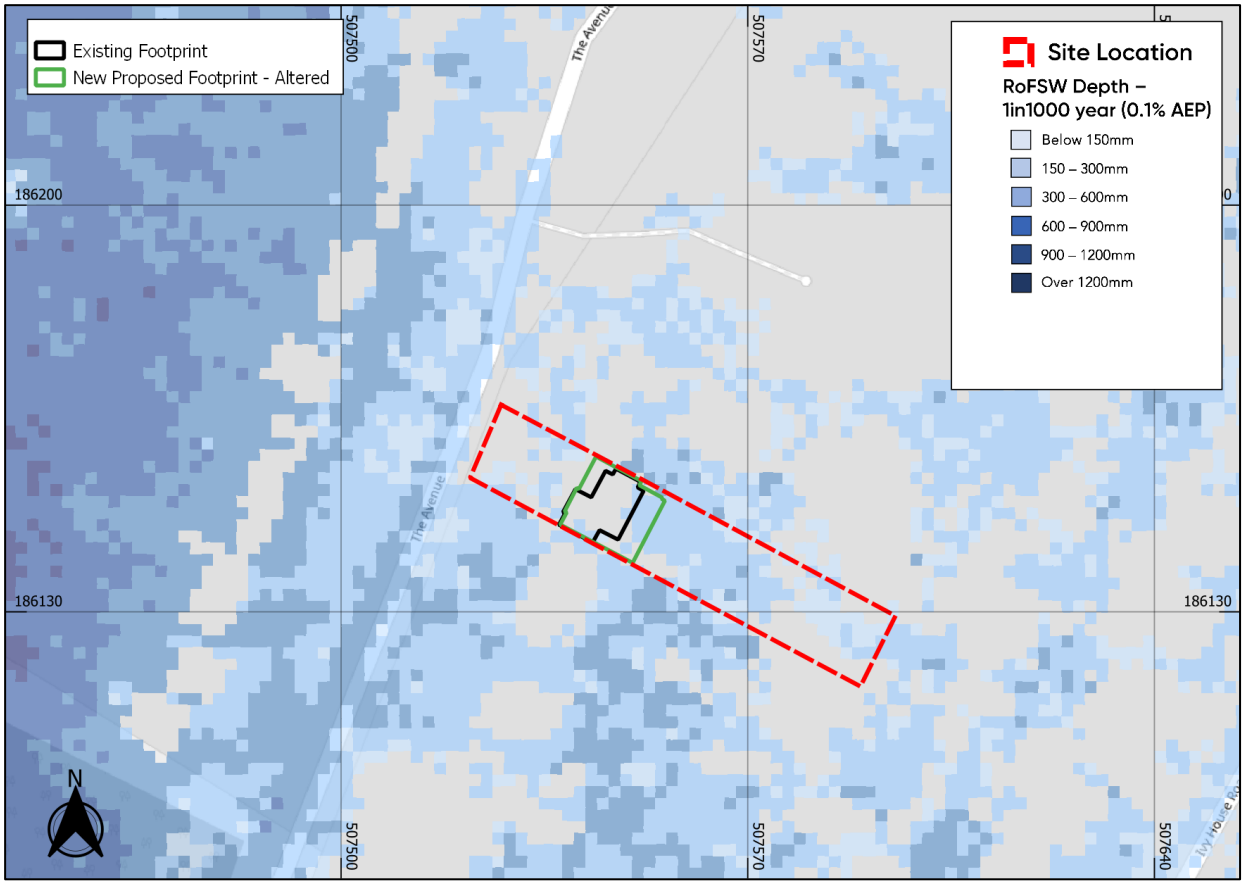

Figure 9: EA Surface Water Flood Risk Mapping-Flood Depths for 0.1% AEP event Scenario (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © https://www.openstreetmap.org and contributors. Contains public sector information licensed under the Open Government Licence v3.0).

4.21. The Avenue, which serves as the only access road to the site, is shown to be affected during the modelled low risk pluvial event with depths up to 300mm and EA Hazard rating indicating conditions of 'Danger to Some' immediately in front of the site (Figure 10). Therefore, in such conditions, access and egress are affected. If it evacuation is prior to the onset of flooding when conditions are safe, it is recommended that residents head north along The Avenue where model results indicate depths are lower; otherwise residents should seek safe refuge within the property until flooding recedes and conditions return to a safe level.

4.22. It is also important to note that access/ egress arrangements would not differ from the existing as the proposal is a Minor Development.

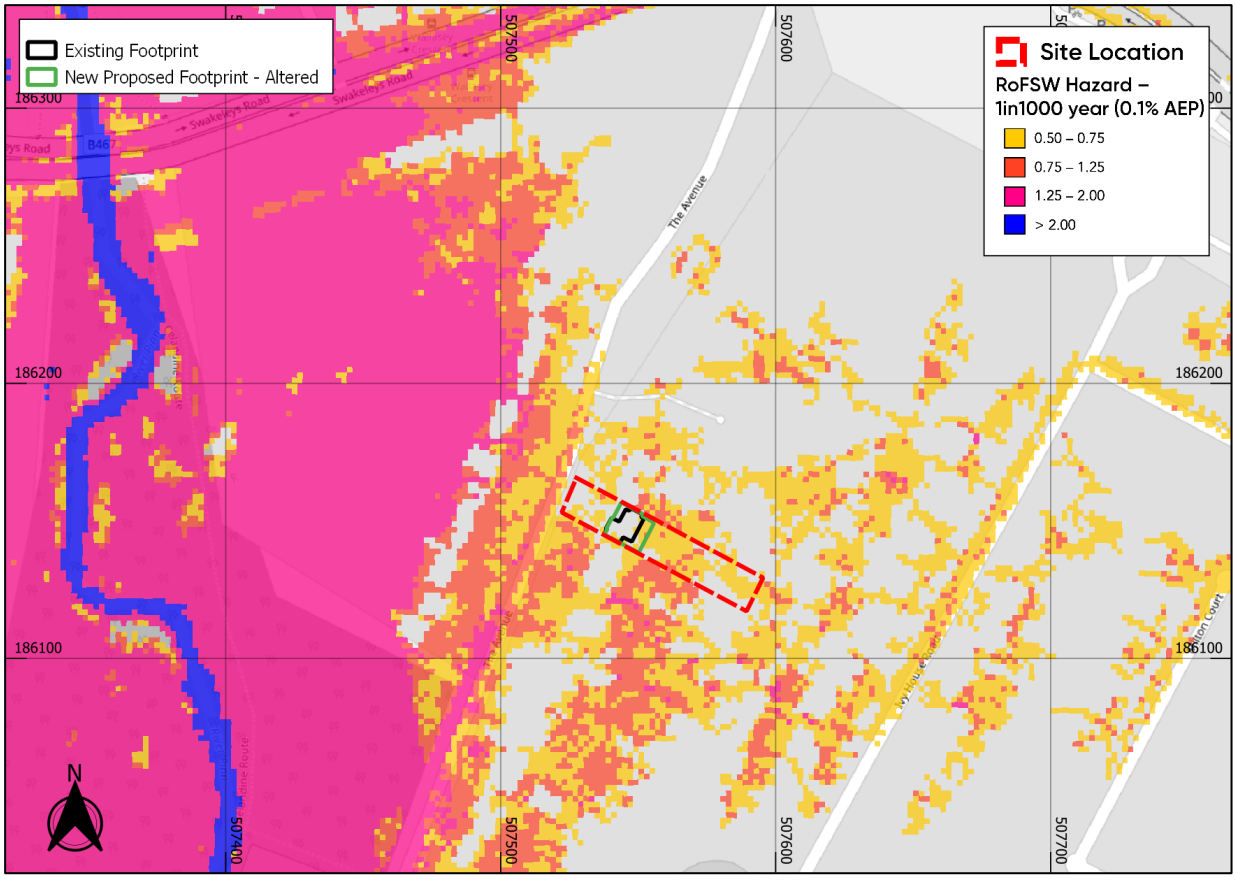

Figure 10: EA Surface Water Flood Risk Mapping – Hazard map for the 0.1% AEP event Scenario (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © https://www.openstreetmap.org and contributors. Contains public sector information licensed under the Open Government Licence v3.0).

4.23. The site is only affected during the modelled low risk pluvial event and therefore, the risk of flooding from pluvial sources is considered low.

Reservoirs

4.24. Flooding can occur from large waterbodies or reservoirs if they are impounded above the surrounding ground levels or are used to retain floodwater. Although unlikely, reservoirs and large waterbodies could overtop or breach leading to rapid inundation of the downstream floodplain.

4.25. According to the EA's Flood Risk from Reservoirs mapping the site is at risk of flooding in the event of a breach at the George V FSA and Ruislip Lido reservoirs (Figure 11). The worst reservoir failure model is a 'wet day' scenario meaning that it would have to happen at the same time as other flooding for there to be enough water to reach the site.

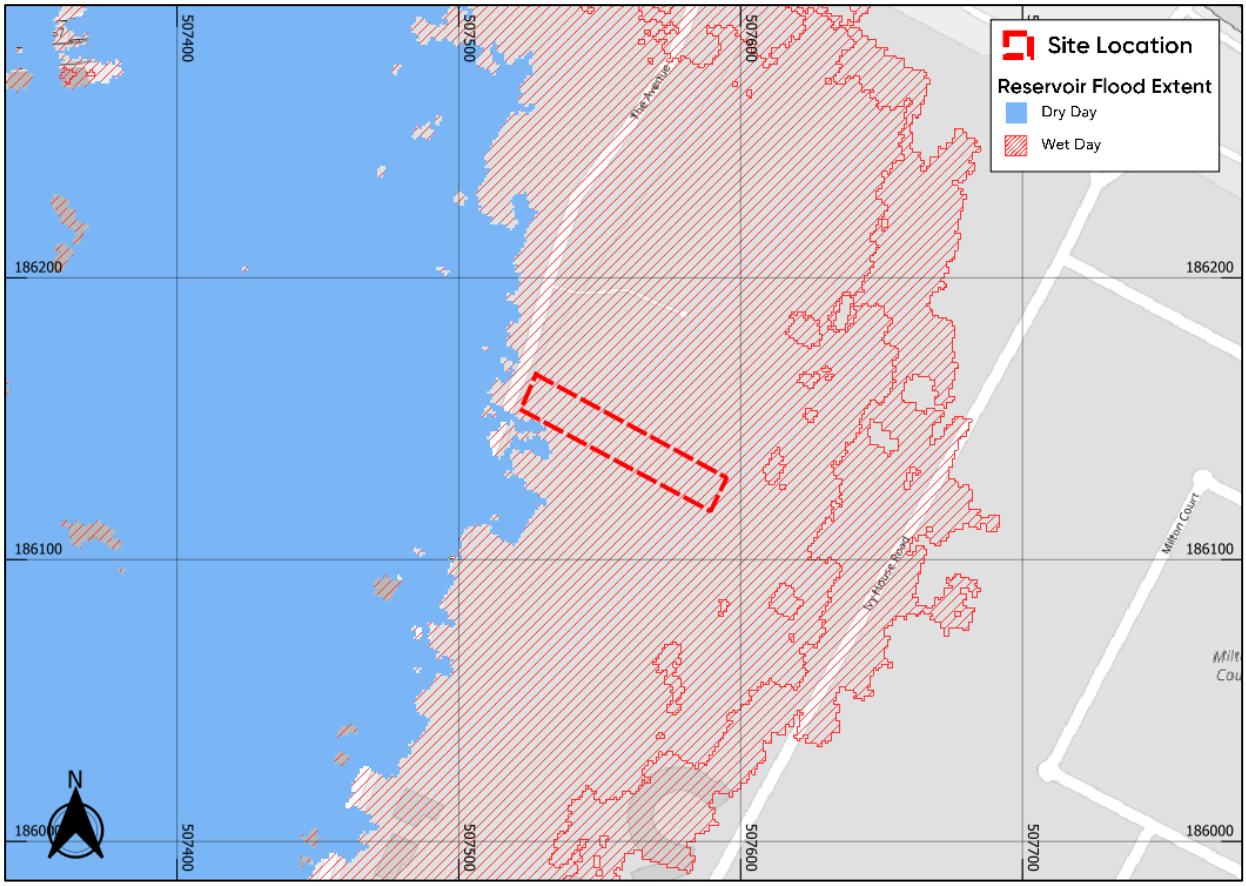

Figure 11: EA Reservoir Flood Risk Mapping (Source: Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA) © https://www.openstreetmap.org and contributors. Contains public sector information licensed under the Open Government License v3.0).

4.26. All large reservoirs must be inspected and supervised by reservoir panel engineers as detailed by the Reservoirs Act 1975 in England and Wales. The EA are responsible to ensure that reservoirs are inspected regularly, and essential safety work carried out. As reservoirs are highly managed the maximum flood extent provided in the EA Risk of Flooding from Reservoirs mapping is considered a worst-case scenario. As reservoir flooding is unlikely and the modelled flood depths are based on the worst-case scenario, flooding from this source may be considered as a relatively low risk. Although to be precautionary flood resilient design and building practices could be implemented to further reduce risk.

Groundwater

4.27. Groundwater flooding occurs in areas where underlying geology is permeable, and water can rise within the strata sufficiently to breach the surface.

4.28. British Geological Survey's (BGS) mapping cannot identify the superficial deposits underlying the site but records the bedrock composition has been found to be Lambeth Group Clay comprised of clay silt and sand. This formation is designated a 'Secondary A Aquifer' which comprise permeable layers capable of supporting water supplies at a local rather than strategic scale and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers. This suggests water would not be able to reach the surface, but the gravel/sand strata may possess perched water.

4.29. The closest historical BGS boreholes to the site (ref: TQ08NE164 - approximately 320 southwest of the site) recorded boring through chalk but did not record the groundwater level.

4.30. The PFRA contains mapping of areas with potential for elevated groundwater levels (Figure 12). The site is shown to be neither on permeable superficial deposits nor on a consolidated aquifer. Additionally, the map shows that there are no recorded groundwater flooding incidents in the vicinity of the site in any records.

4.31. Furthermore, the West London SFRA (2018) indicates that the site is within a 1km grid square of which <25% is considered to be susceptible to groundwater flooding.

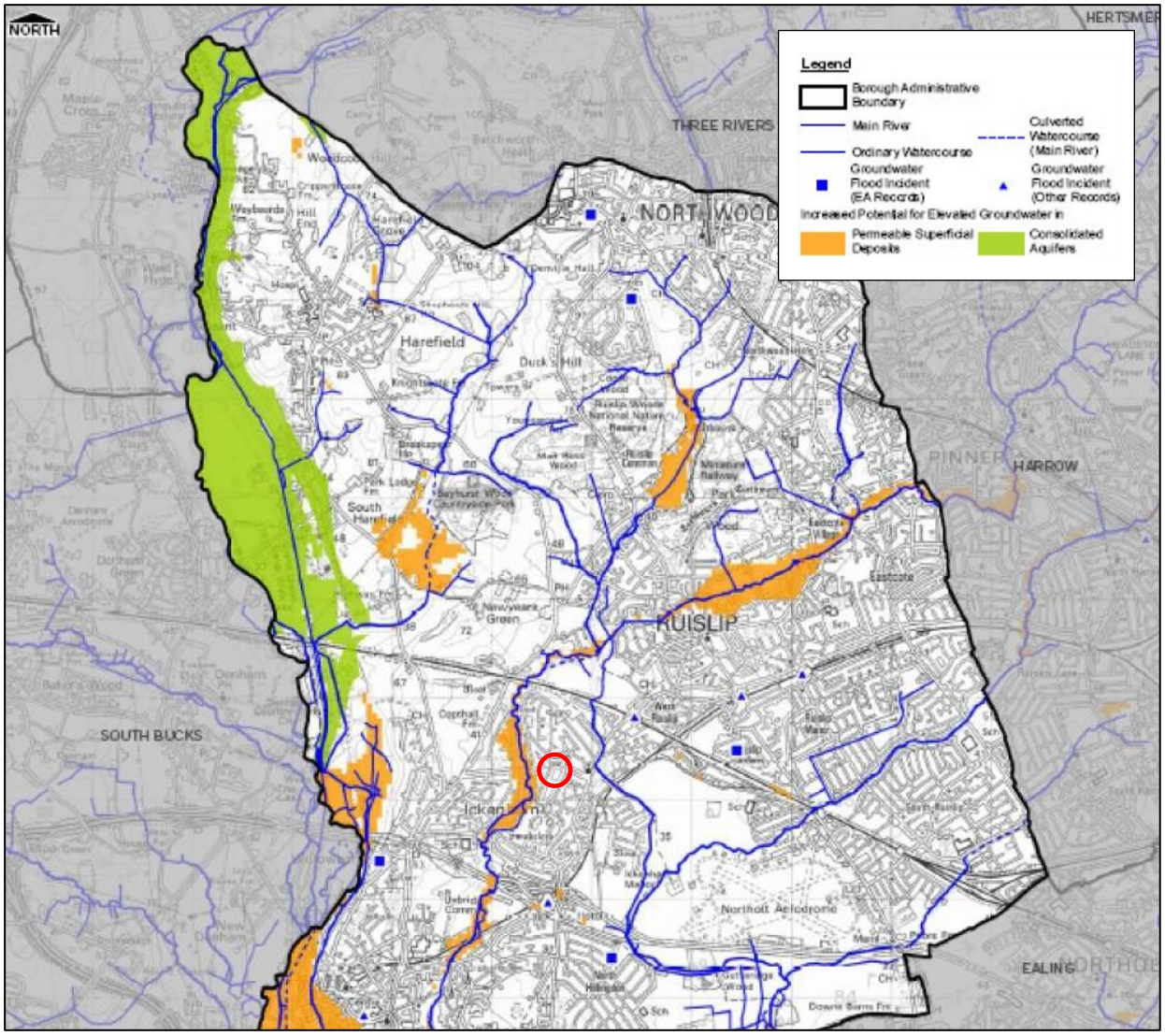

Figure 12: Potential for Elevated Groundwater (source: London Borough of Hillingdon PFRA 2011); the approximate location of the site is marked by the red circle.

4.32. The risk from groundwater to the development is therefore considered to be low.

Sewers

4.33. Foul or surface water sewers can be a cause of flooding if the drainage network becomes overwhelmed, either by blockage or due to local development beyond the designed capabilities of the drainage system.

4.34. The SFRA provides mapping of historical sewer flood incident records kept by the local authority (Thames Water) and is shown in Figure 13. The site is shown to be in the area 'UB10 8' where 11-15 sewer incidents (internal and external) were recorded between December 2011 and June

2017 (addendum by London Borough of Hillingdon 2017) OR 11-20 as of 2010 (Hillingdon PFRA 2011).

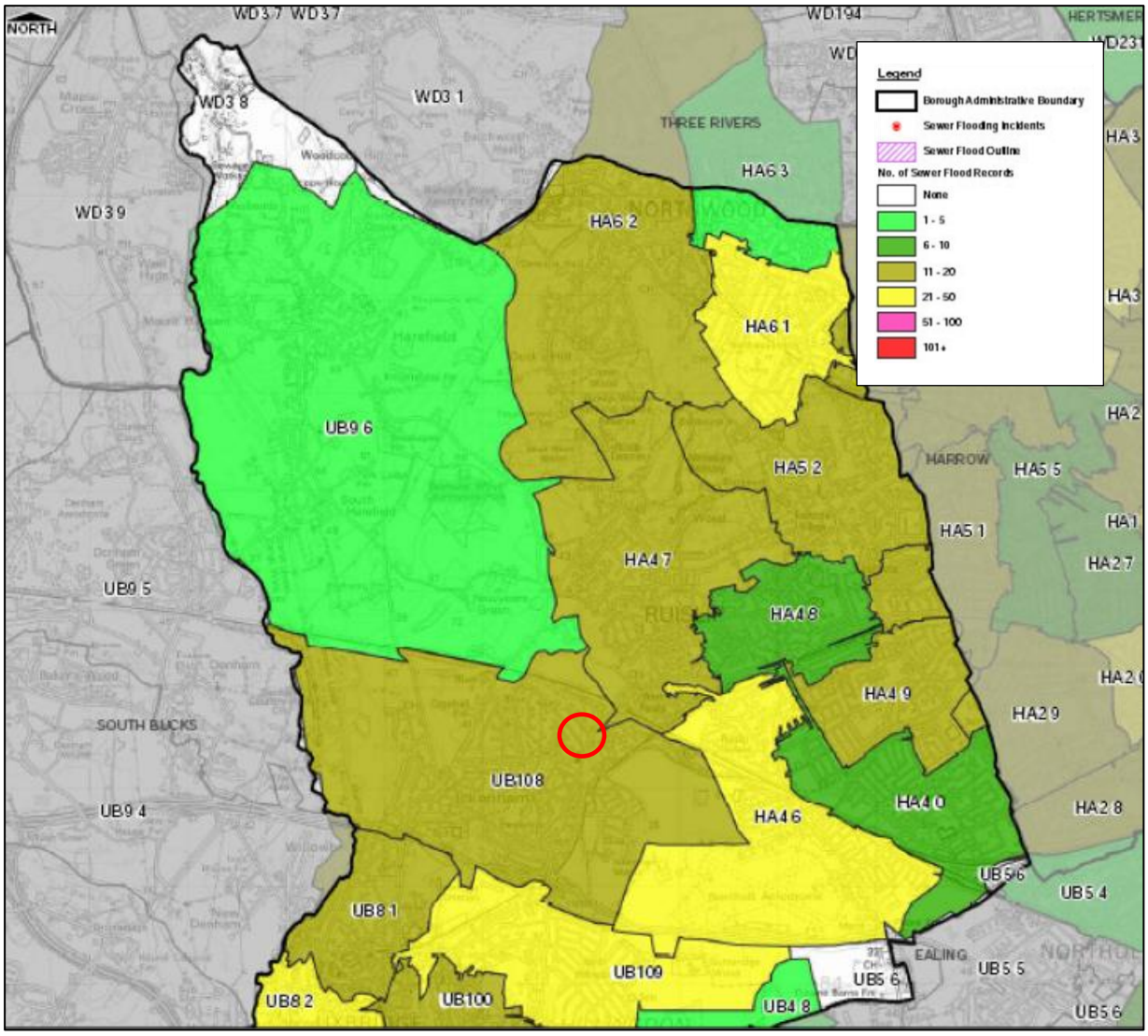

Figure 13: Historic Sewer Flooding Incidents (source: London Borough of Hillingdon PFRA 2011); the approximate location of the site is marked by the red circle.

4.35. The West London SFRA does not identify the site as being in a Critical Drainage Area.

4.36. The development is therefore considered to be at low risk of flooding from sewers.

5. Flood Risk Mitigation

Fluvial

5.1. Based on the EA Flood Map for Planning, the risk of flooding from fluvial sources is considered moderate.

5.2. This FRA has shown that the proposed development is not affected during the modelled 1:100 year and 1:100 year +cc events.

5.3. In line with best practice outlined in the EA Standing Advice for Minor Developments, Finished Floor Levels (FFLs) of the proposed extension will be set no lower than those of the existing dwelling. Furthermore, the extension should be constructed in a flood resilient manner in accordance with the CLG Report, *Improving the Flood Performance of New Buildings - Flood Resilient Construction (2007)* including, where feasible, the measures listed below:

- Solid (i.e. concrete floors) with waterproof screed.
- Raised wiring and power outlets at ground level.
- Units to be raised on legs above plinth.
- Waterproof plasterboard used at ground floor.
- Air brick covers to be installed.
- Damp Proof Membranes (d.p.m.) should be included in any design to minimise the passage of water through ground floors.
- Patio doors may be susceptible to ingress of flood water. Any PVC window/door sills should be adequately sealed. Double glazing should be used to provide resistance against external flood water pressure. Of concern would be excessive water pressure on the glazing of patio doors.
- Residents to sign up to the EA Flood Warning Service (River Loddon at Winnersh and Woodley) if not done so already.

Pluvial

5.4. It has been shown that the site could be affected by flooding during the low risk (0.1% AEP) pluvial event and therefore the risk from pluvial flooding to the proposed development is considered low. Access/egress are unaffected during the high (3.3% AEP) and medium (1% AEP) pluvial events but may be affected during the low risk (0.1%) event. In such a scenario, residents

are advised to stay indoors (and outside the extent of the flood) until conditions become safe to leave the site. If it evacuation is sought at the early onset of flooding and when conditions are safe, it is recommended that residents head north along The Avenue where model results indicate depths are lower.

5.5. It is also important to note that access/ egress arrangements would not differ from the existing as the proposal is a Minor Development.

5.6. During periods of bad weather, site users should monitor local weather reports and sign up for the Met Office UK weather warnings. The Met Office issues weather warnings up to 5 days in advance, through the National Severe Weather Warning Service, when severe weather has the potential to bring impacts to the UK. It is also possible to stay up to date with weather warnings through the Met Office app (available on both android and apple), social media (twitter, Facebook) or email alerts. Warnings can be monitored through an Apple/Android app, Twitter or directly via emails.

5.7. The flood resilience measures recommended to mitigate the risk of fluvial flooding should provide sufficient mitigation against pluvial flooding.

Other Sources

5.8. Flood risk from all other reviewed sources is considered to be low, therefore no mitigation other than that recommended above is required.

EA Flood Warning Service

5.9. As a further precaution and risk reduction, the owner of the site should sign up the River Pinn at Ickenham EA flood warning service and/or the River Pinn and Woodridings Stream Flood Alert. This service allows site owners to register an address, which is at risk of flooding, along with contact details so that in the event of a flood being forecast, the site owner will be sent an alert directly to their chosen method of contact.

5.10. Flood warnings/alerts can be enforced at any time of the day or night. Signing up for this service provides site owners some notice before a flood event. The amount of time afforded before a flood occurs depends on the site-specific location (e.g. proximity to the source of flooding, topography of the surrounding area) and the flood mechanism (e.g. bank over topping versus a breach event). Flood alerts and warnings provide site managers with time to take necessary action, e.g. communication of the risk of flooding to occupants/employees etc, evacuation of

occupants offsite or to a safe level, removal of valuable items out of reach of flooding and the mounting of site specific flood defences.

Increase to Flood Risk Elsewhere

5.11. Review of the West London Fluvial and Tidal Flood Risk Mapping indicates that the site is unaffected by both the 1:100 year and 1:100 year +cc modelled events.

5.12. The proposed development is for the construction of an extension and alteration to the existing dwelling on site to provide greater habitable space. As such, the proposal constitutes a Minor Development under the NPPF.

5.13. Paragraph 051 of the Flood Risk and Coastal Change Planning Practice Guidance (PPG) states:

> *Minor developments are unlikely to raise significant flood issues unless:*
>
> - *they would have an adverse effect on a watercourse, floodplain or its flood defences;*
> - *they would impede access to flood defence and management facilities, or;*
> - *where the cumulative impact of such developments would have a significant effect on local flood storage capacity or flood flows.*

5.14. As such, the proposed development in isolation should have a negligible impact on flood risk elsewhere.

6. Conclusions

6.1. This FRA has been undertaken with reference to the requirements of NPPF and Planning Practice Guidance with respect to the development at 21 The Avenue, Ickenham, Hillingdon, London, UB10 8NR. It has been written to support a planning application and has been prepared with due consideration to the nature of the proposed development to provide the appropriate level of detail.

6.2. An assessment of the risk of flooding from all sources has been undertaken and is summarised in the table below:

Source of Flooding	Flood Risk Summary
Fluvial	Based on the EA Flood Map for Planning, the risk of flooding from fluvial sources is considered moderate. However, the proposal is a Minor Development, and can adhere to the EA Standing Advice for Minor Developments. The site is located within Flood Zone 1 and 2, with the majority of the proposed extension in Flood Zone 2, according to the EA Flood Map For Planning. However, the West London SFRA Fluvial and Tidal Flood Risk Map (online) shows the site to be entirely outside the flood extent of the River Pinn 1:100 and 1:100+25% cc allowance which has been used as a conservative estimate for the 1:100+21%cc.
Pluvial	Low risk - the site is only affected during the low risk pluvial event. However, safe access and egress via The Avenue may be affected during the low risk (0.1% AEP) surface water scenario. It is also important to note that access/ egress arrangements would not differ from the existing as the proposal is a Minor Development.
All other reviewed sources	The site is considered to be at low risk from other sources.

6.3. The FRA supports the planning application and demonstrates that there is an acceptable level of flood risk to the site if the mitigation strategies recommended are implemented in the scheme. The development does not increase flood risk off site or to the wider area.

6.4. The following conclusions can be drawn from this FRA:

- This FRA has identified no prohibitive constraints in developing the proposed site for the proposed usage.
- The site and location of the proposed extension is in Flood Zone 1 and 2 and therefore deemed to be at medium risk of flooding from fluvial sources, however both have been shown to be entirely outside the flood extent of the River Pinn 1:100 and 1:100+25%cc allowance which has been used as a conservative estimate for the 1:100+21%cc.
- The site is affected during the modelled low risk pluvial event and therefore at low risk of pluvial flooding
- The site is considered to be at low risk from all other sources.
- The proposed development is not expected to cause any increase in flood risk either onsite or elsewhere over the lifetime of the development.

6.5. This Flood Risk Assessment should be submitted as part of the planning application to satisfy the requirements under NPPF.

Appendix A - Development Proposals

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Rev	Date	Description	Init.
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Client

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Project Title

PROPOSED EXTENSIONS AND ALTERATIONS

21 THE AVENUE, ICKENHAM, UB10 8NR

Drawing Title

LOCATION PLAN

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BR	SEP 2022	NJ
Project No.	Drawing No.	Revision
1942	P101	-

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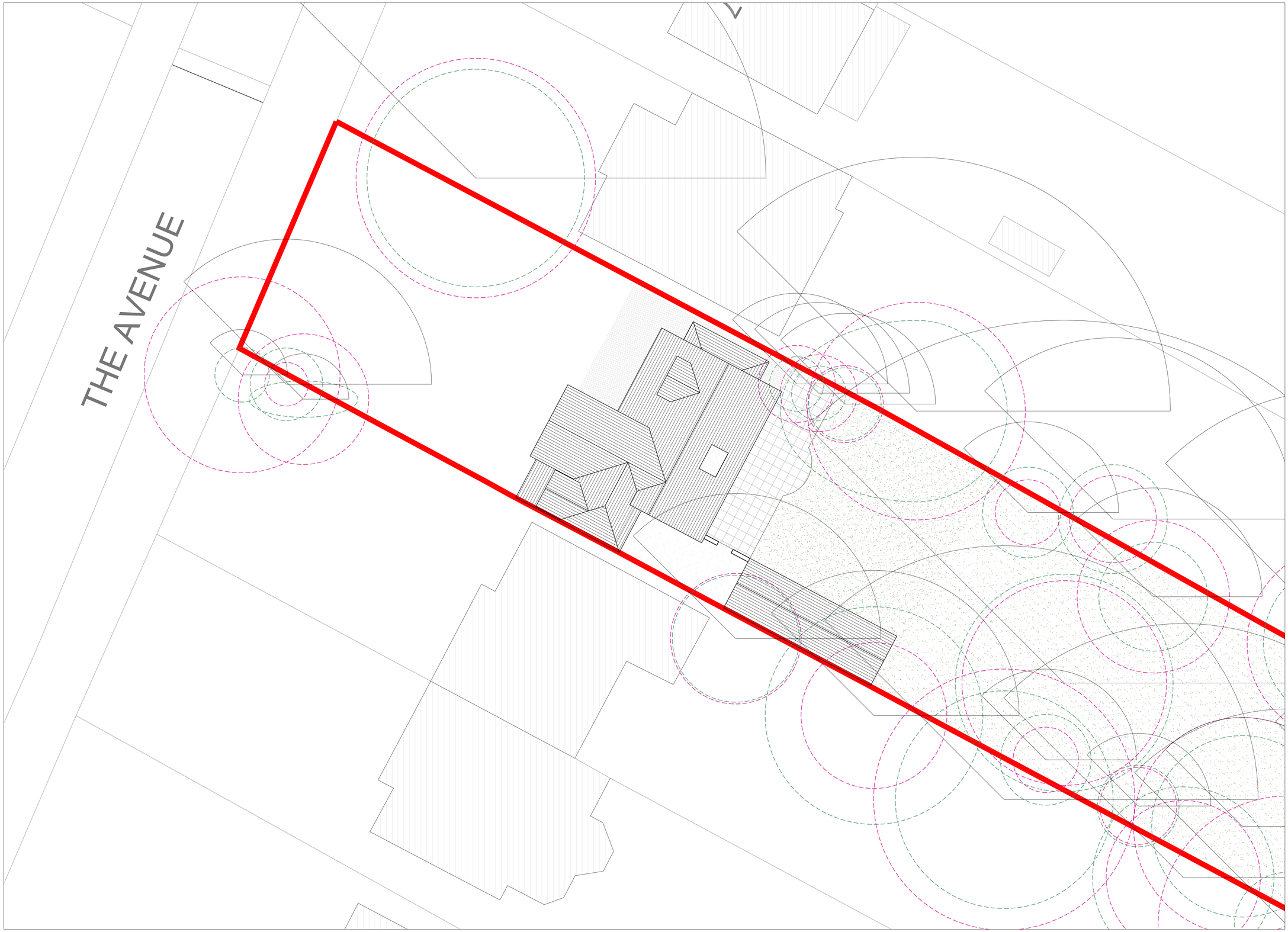

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PROPOSED EXTENSIONS AND ALTERATIONS

21 THE AVENUE, ICKENHAM, UB10 8NR

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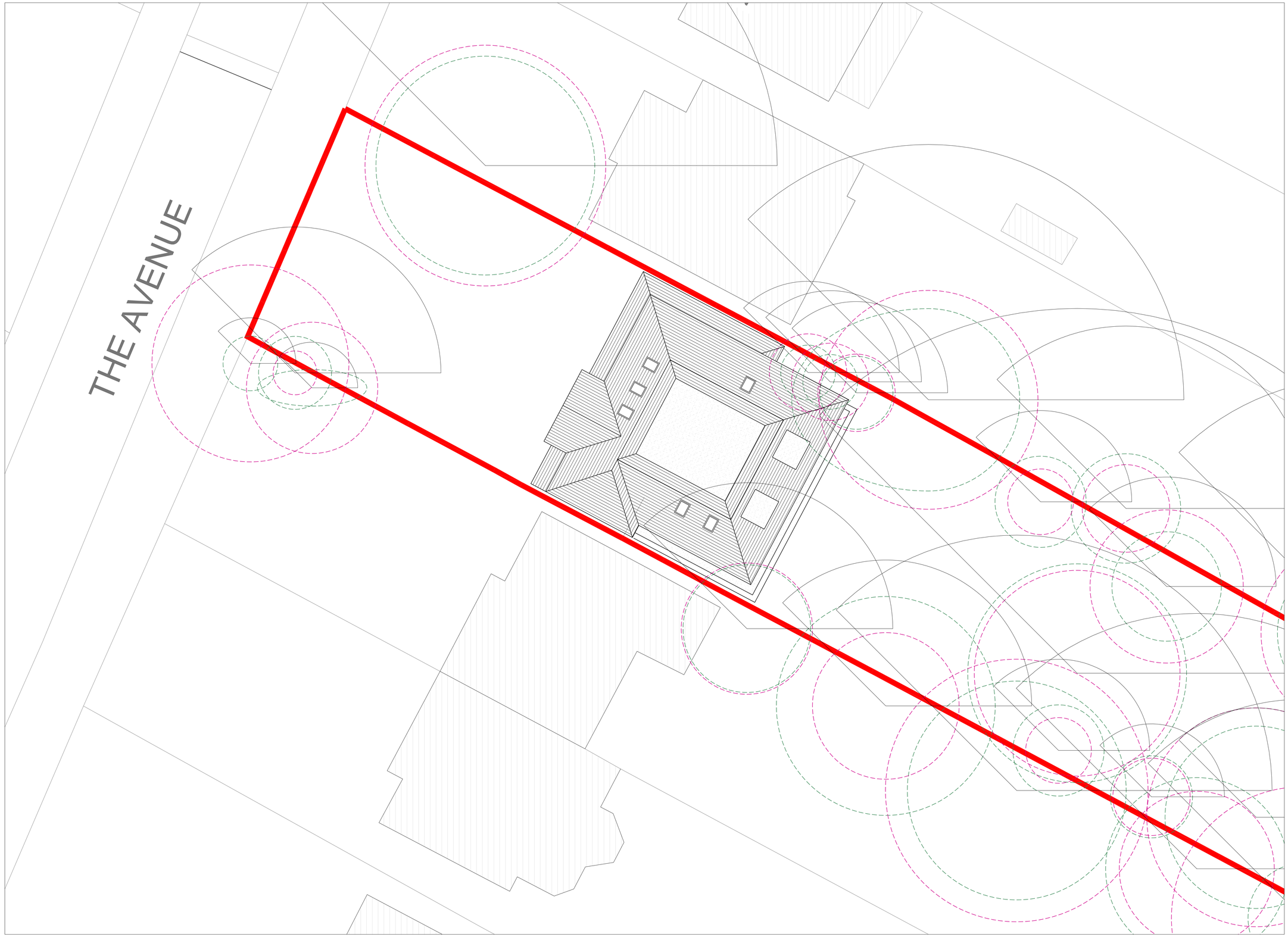

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C	17.02.23	AMENDED TO SUIT PLANNING COMMENTS	KP
B	01.02.23	AMENDED TO SUIT PLANNING COMMENTS	KP
A	21.10.22	AMENDED TO SUIT CLIENTS COMMENTS	KP

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PROPOSED EXTENSIONS AND ALTERATIONS

21 THE AVENUE, ICKENHAM, UB10 8NR

Drawing Title

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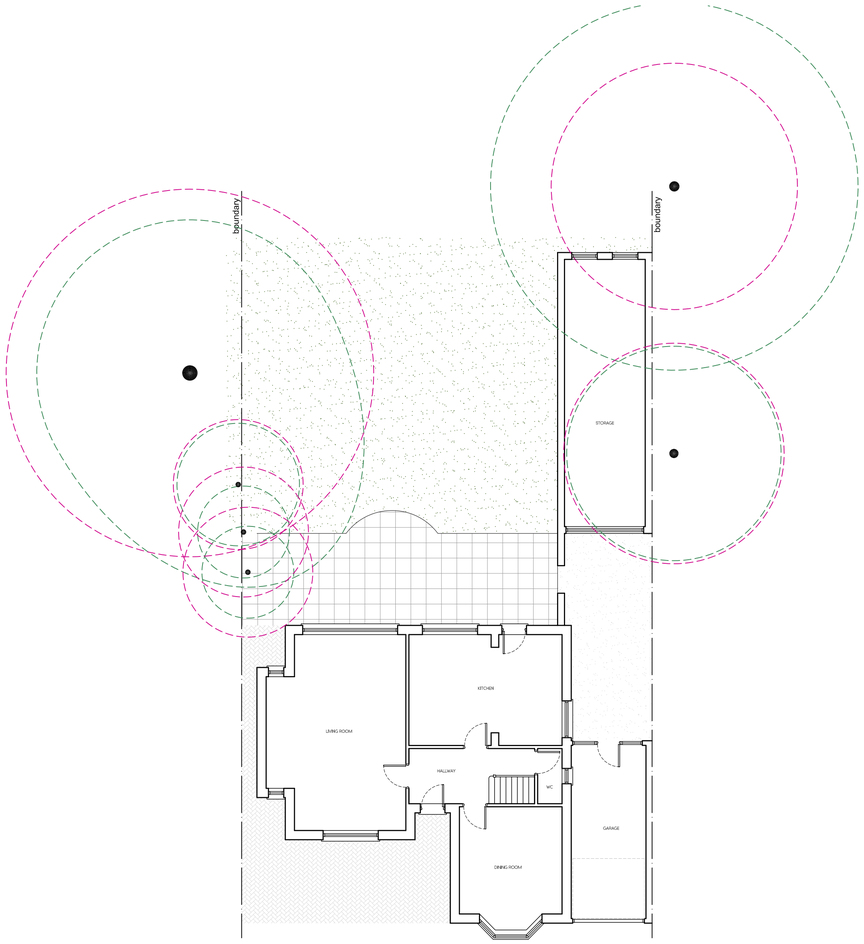

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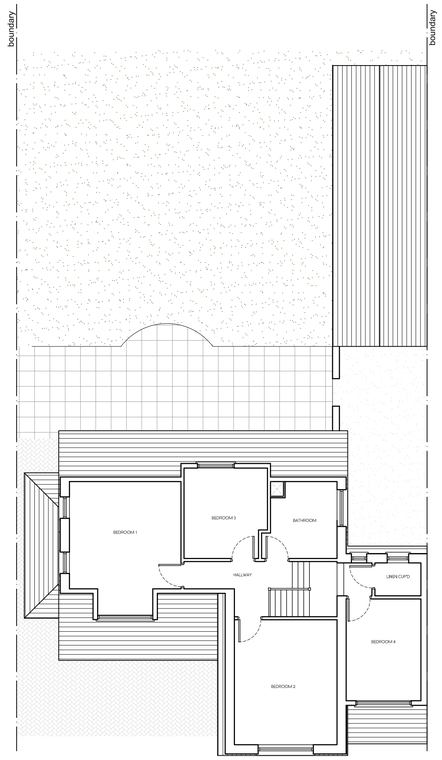

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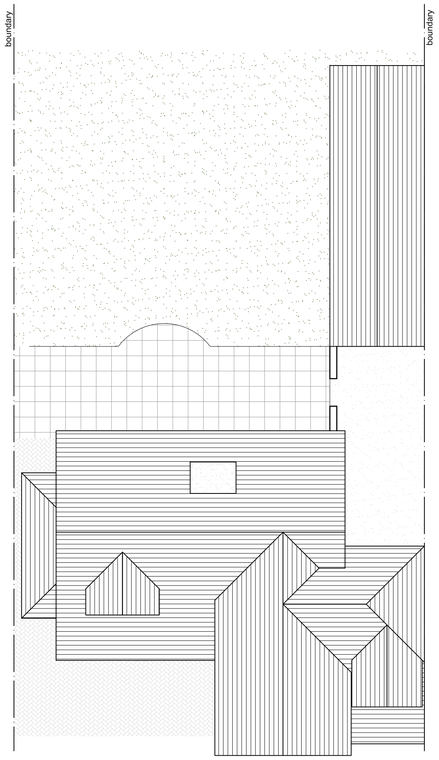

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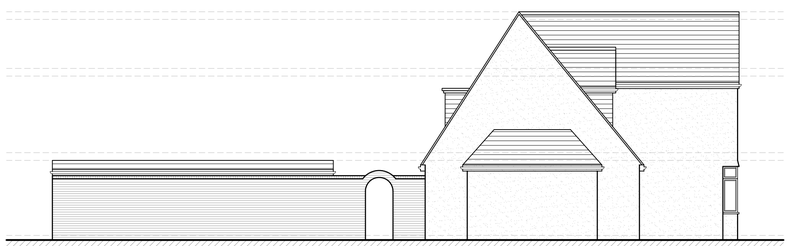

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EXISTING SIDE ELEVATION

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PROPOSED EXTENSIONS AND ALTERATIONS

21 THE AVENUE, ICKENHAM, UB10 8NR

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EXISTING PLANS AND ELEVATIONS

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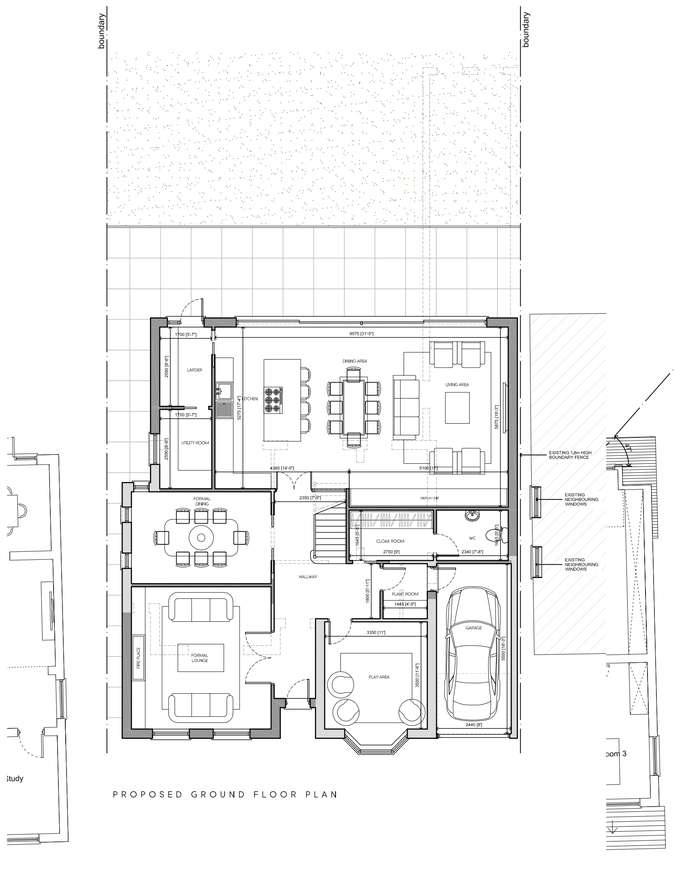

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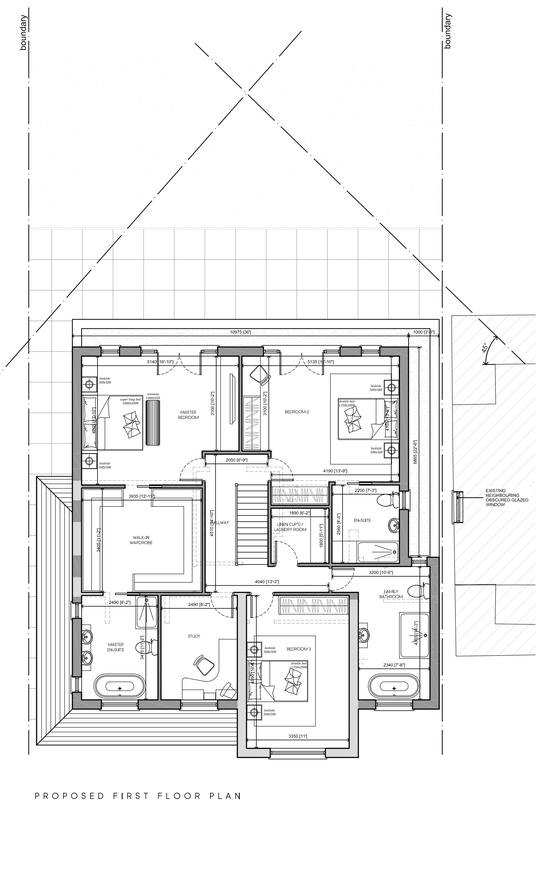

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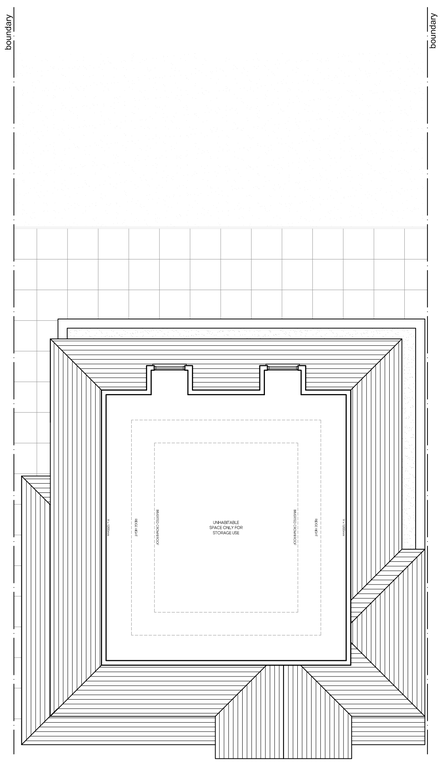

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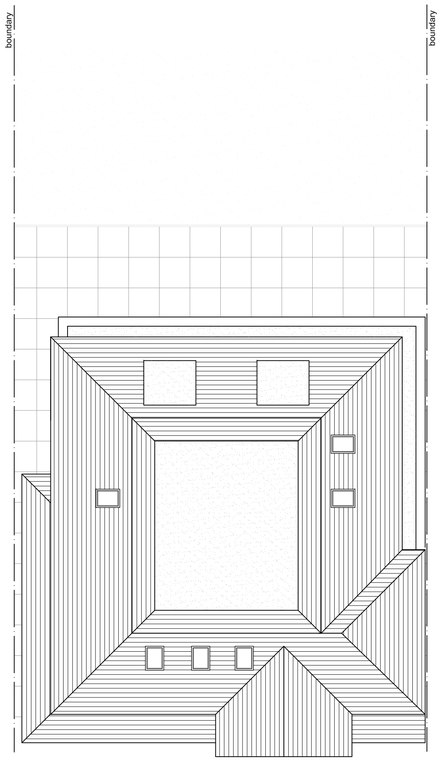

PROPOSED ROOF PLAN

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PROPOSED FRONT ELEVATION

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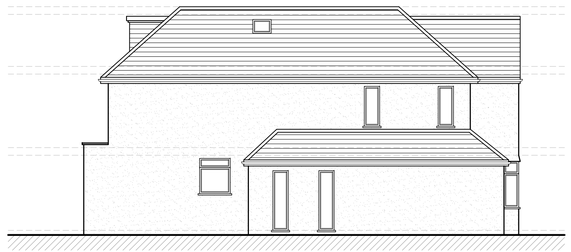

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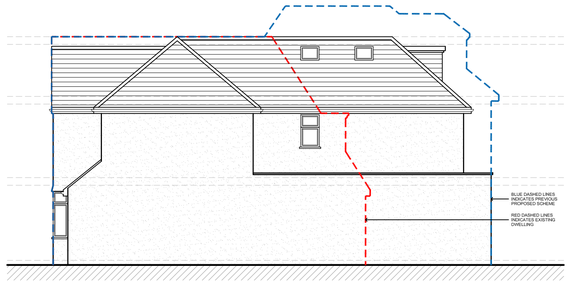

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D	19.04.23	AMENDED TO SUIT PLANNING COMMENTS	KP
C	17.02.23	AMENDED TO SUIT PLANNING COMMENTS	KP
B	01.02.23	AMENDED TO SUIT PLANNING COMMENTS	KP
A	21.10.22	AMENDED TO SUIT CLIENTS COMMENTS	KP

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PROPOSED EXTENSIONS AND ALTERATIONS

21 THE AVENUE, ICKENHAM, UB10 8NR

Drawing Title

PROPOSED PLANS AND ELEVATIONS

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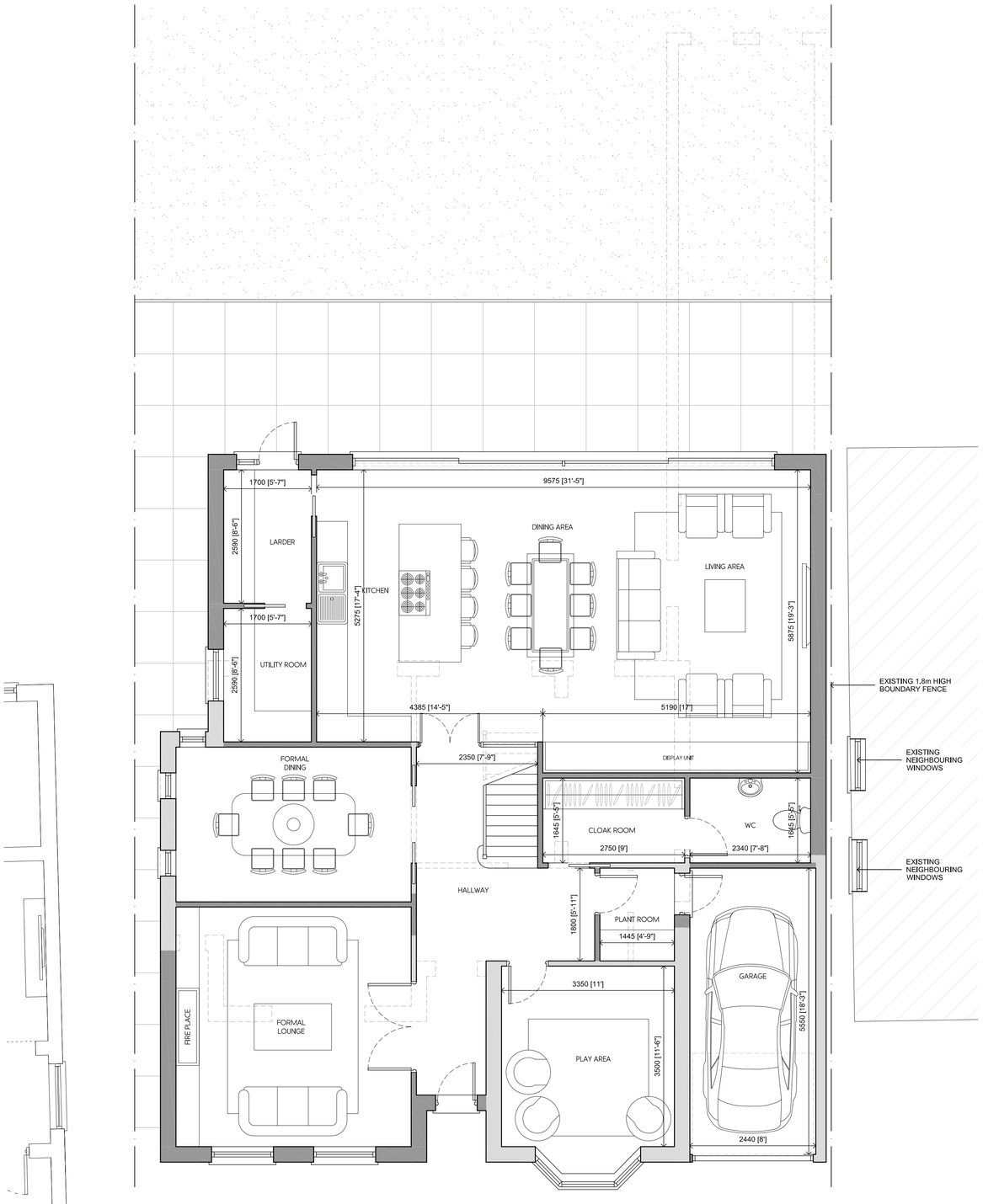

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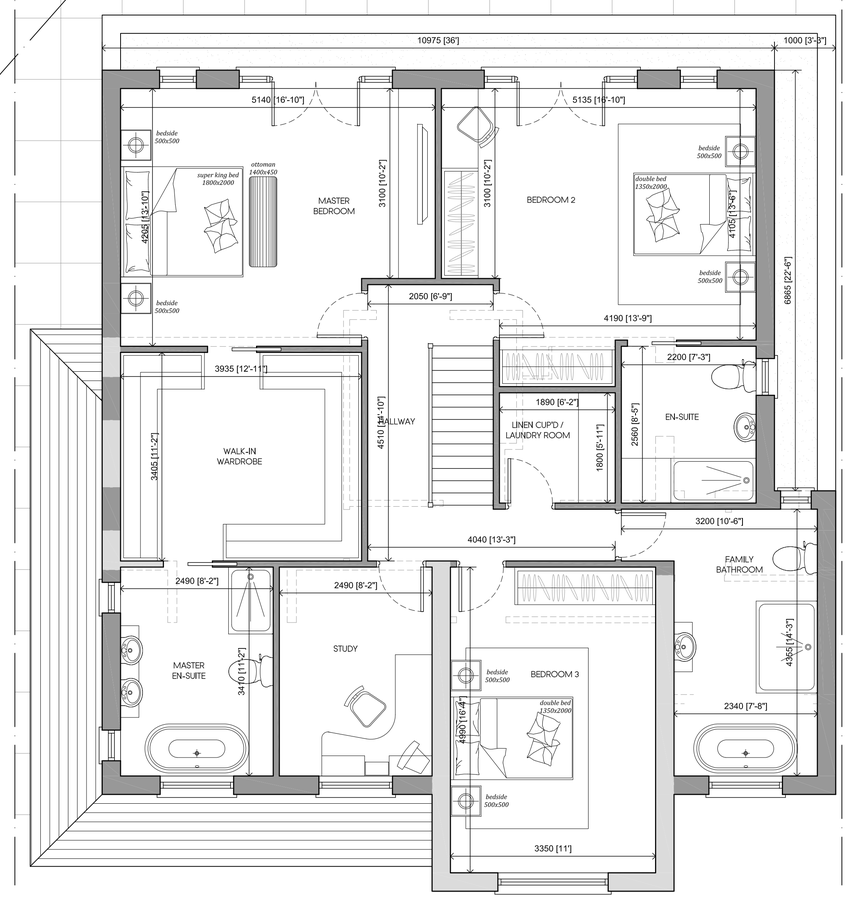

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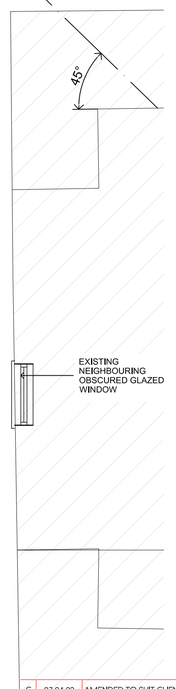

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PROPOSED EXTENSIONS AND ALTERATIONS

21 THE AVENUE, ICKENHAM, UB10 8NR

Drawing Title

PROPOSED GROUND AND FIRST FLOOR PLANS

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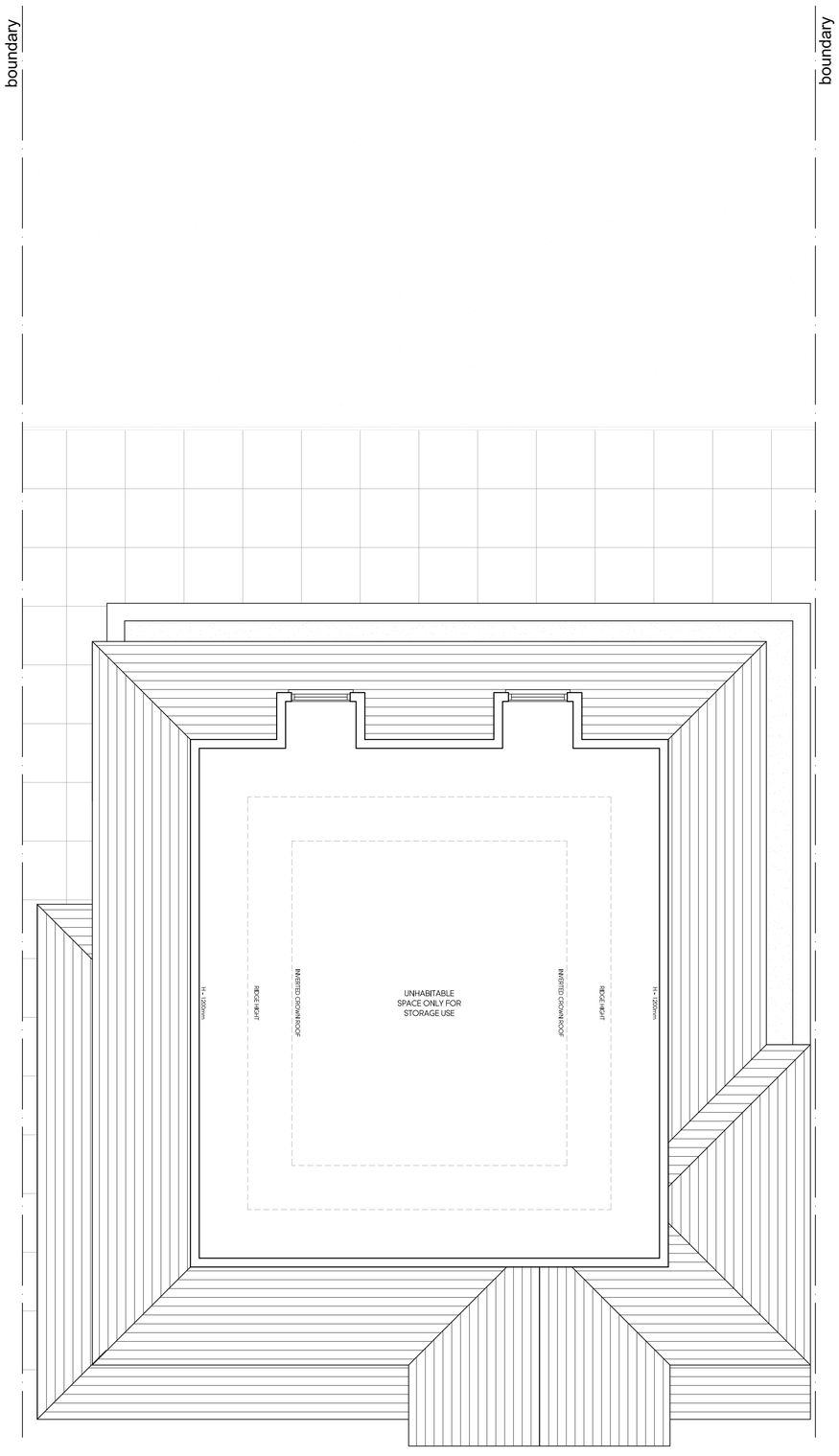

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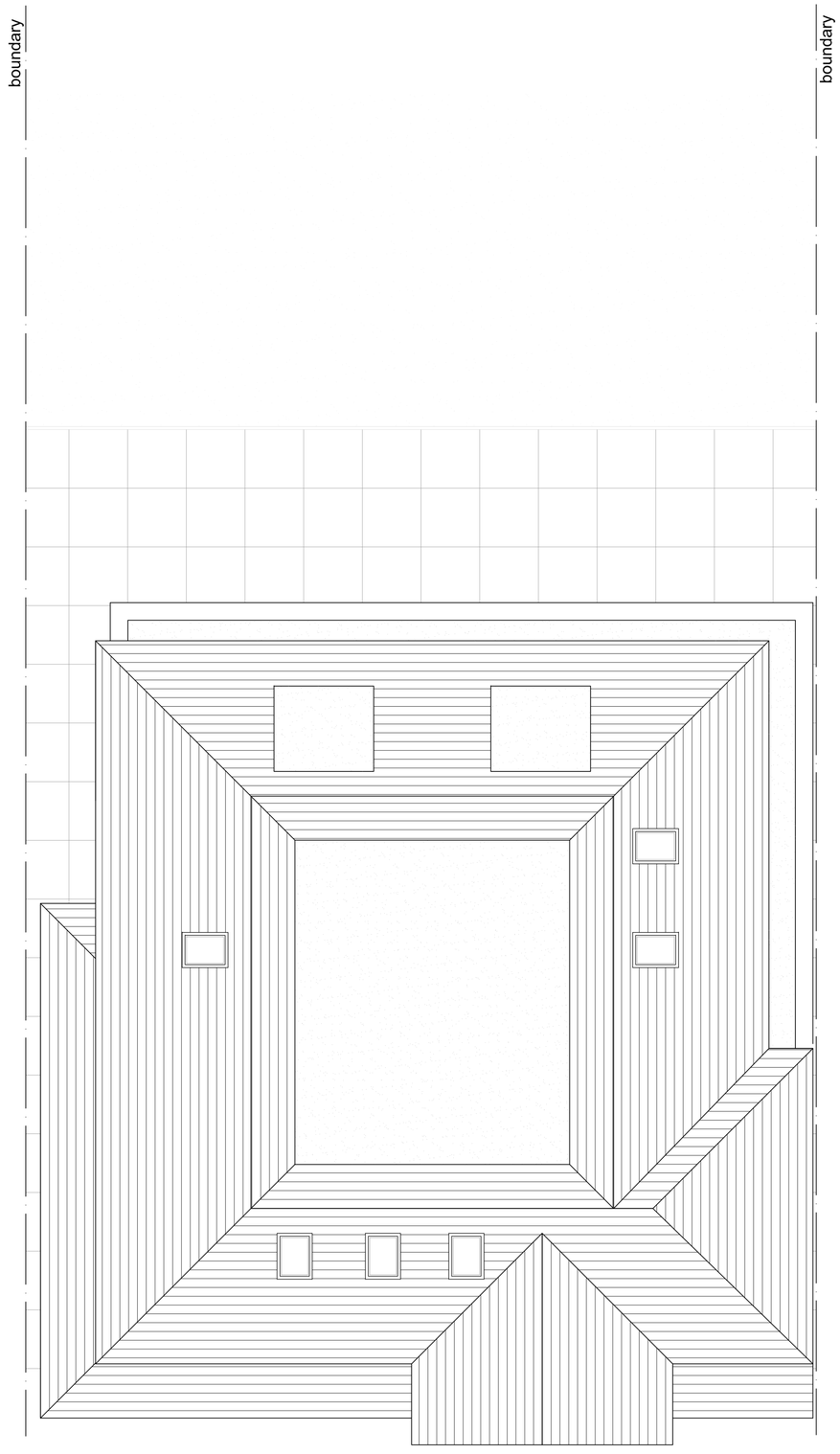

PROPOSED ROOF PLAN

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Project Title

PROPOSED EXTENSIONS AND ALTERATIONS

21 THE AVENUE, ICKENHAM, UB10 8NR

Drawing Title

PROPOSED SECOND FLOOR AND ROOF PLANS

Cad File	Sheet Size	Scale
P001	A1	1:50
Drawn by	Drawing Date	Approved by
KP	OCT 2022	NJ
Project No.	Drawing No.	Revision
1942	P302	E

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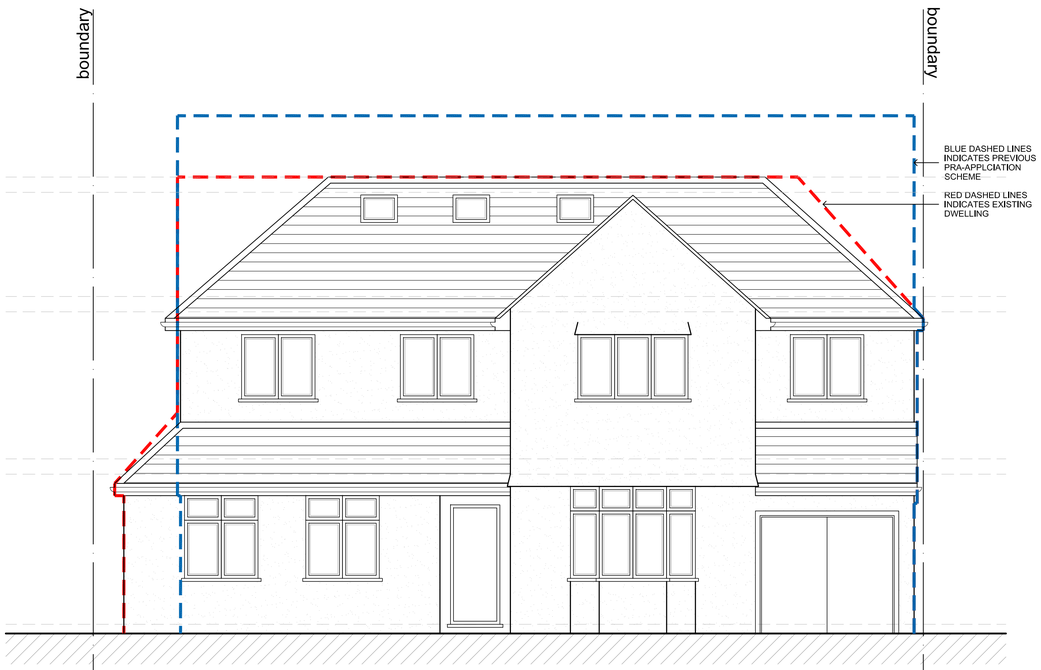
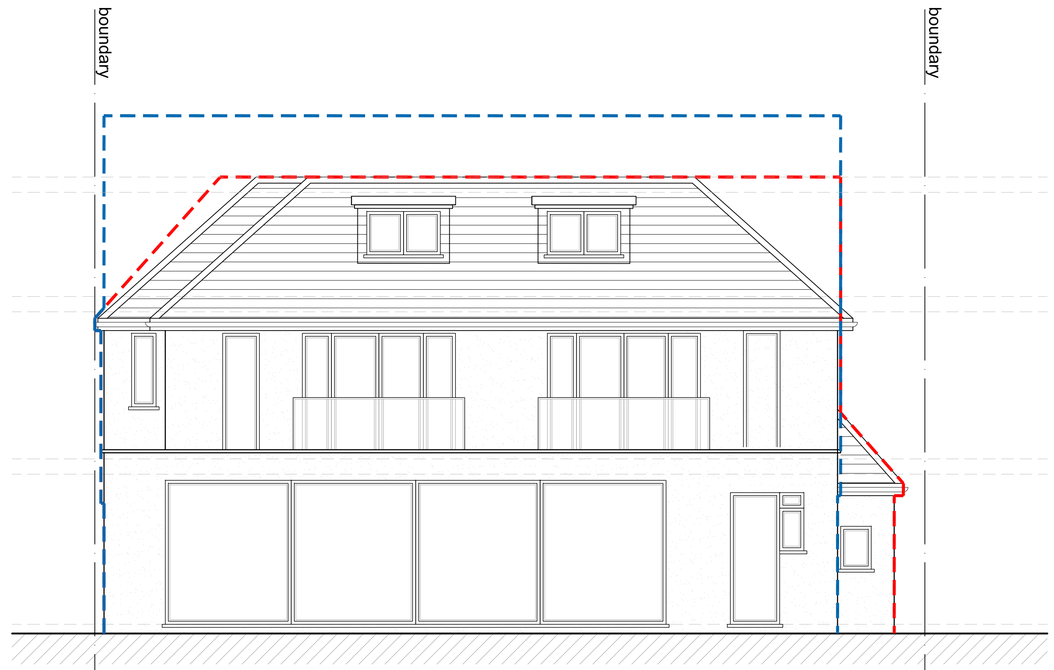
PLANNING ISSUE

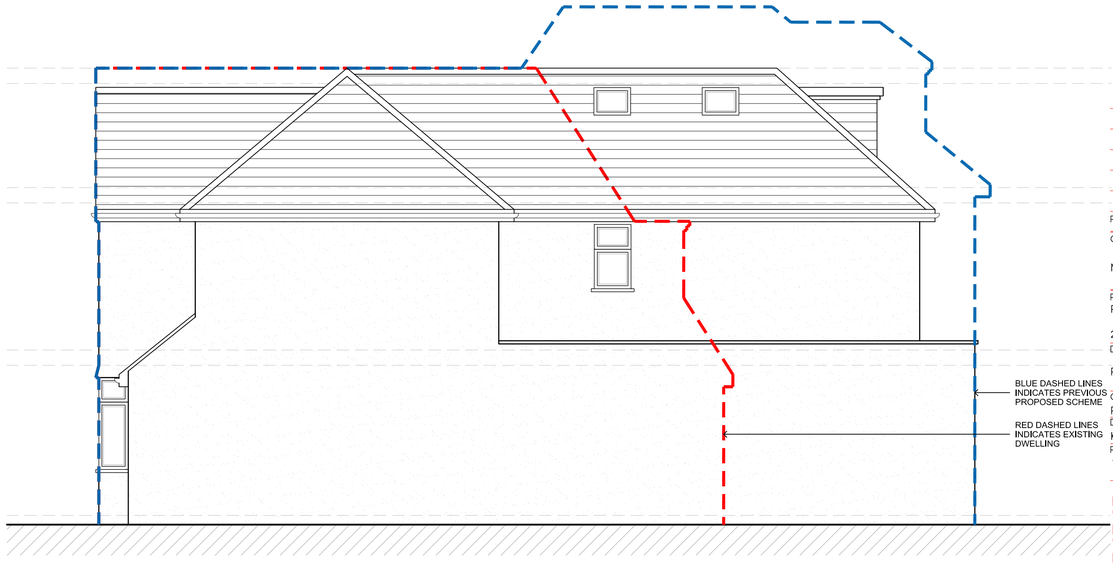


PROPOSED FRONT ELEVATION



PROPOSED REAR ELEVATION

PROPOSED SIDE ELEVATION



PROPOSED SIDE ELEVATION

SCALE BAR 1:50

LOCATION PLAN
SCALE 1:1250

Rev	Date	Description	Init.
E	17.05.23	AMENDED TO SUIT PLANNING COMMENTS	KP
D	27.04.23	AMENDED TO SUIT CLIENT COMMENTS	KP
C	19.04.23	AMENDED TO SUIT PLANNING COMMENTS	KP
B	01.02.23	AMENDED TO SUIT PLANNING COMMENTS	KP
A	21.10.22	AMENDED TO SUIT CLIENTS COMMENTS	KP

Client

MR & MRS JHUTTY

Project Title

PROPOSED EXTENSIONS AND ALTERATIONS

21 THE AVENUE, ICKENHAM, UB10 8NR

Drawing Title

PROPOSED ELEVATIONS

Cad File	Sheet Size	Scale
P001	A1	1:100
Drawn by	Drawing Date	Approved by
KP	OCT 2022	NJ
Project No.	Drawing No.	Revision
1942	P401	E

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PLANNING ISSUE

EXISTING FRONT ELEVATION

PROPOSED FRONT ELEVATION

LOCATION PLAN
SCALE 1:1250

Rev	Date	Description	Init.
C	17.05.23	AMENDED TO SUIT PLANNING COMMENTS	KP
B	27.04.23	AMENDED TO SUIT CLIENT COMMENTS	KP
A	19.04.23	AMENDED TO SUIT PLANNING COMMENTS	KP

Client

MR & MRS JHUTTY

Project Title

PROPOSED EXTENSIONS AND ALTERATIONS

21 THE AVENUE, ICKENHAM, UB10 8NR

Drawing Title

EXISTING AND PROPOSED STREET SCENE

Cad File	Sheet Size	Scale
P001	A1	1:100
Drawn by	Drawing Date	Approved by
KP	OCT 2022	NJ
Project No.	Drawing No.	Revision
1942	P402	C

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PLANNING ISSUE

Trevor Heaps

Arboricultural Consultancy Ltd.

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Email: trevor@trevorheaps.co.uk • www. trevorheaps.co.uk

Tree Constraints Report

For

21 The Avenue, Ickenham, UB10 8NR

Prepared for Jagdeep Jhutty

Prepared by Trevor Heaps BSc, MICFor, M. Arbor. A.

Date: 26th September 2022

Ref: TH 3619

Contents

1.0 Introduction

1.1 I am Trevor Heaps, Director of Trevor Heaps Arboricultural Consultancy Ltd. I hold a First-Class Honours Degree in Arboriculture; I am a Chartered Arboriculturist and a professional member of the Institute of Chartered Foresters; and I am also a Registered Consultant with the Arboricultural Association. Further information about my qualifications and experience is provided in Appendix 1.

1.2 Contact details:

Who	Contact	Organisation	Details
Arboricultural consultant	Trevor Heaps	Trevor Heaps Arboricultural Consultancy Ltd., 12 Plover Drive, Milford-on-Sea, Hampshire, SO41 0XF	Tel: 07957 763 533 trevor@trevorheaps.co.uk
Client	Jagdeep Jhutty		
London Borough of Hillingdon - LPA	Tree Officer	Civic Centre, High Street, Uxbridge, UB8 1UW	Tel: 01895 556000 E-mail: trees@hillingdon.gov.uk

2.0 Instruction

2.1 In accordance with British Standard 5837:2012 '*Trees in relation to design, demolition and construction – Recommendations*' (hereafter referred to as BS5837), we are instructed to survey all significant trees within and adjacent to the subject property / site.

2.2 Based on the data collected in the tree survey, we are to produce a tree survey report and tree constraints plan.

2.4 The purpose of this information is to assist the design process towards the preparation of an arboriculturally defensible scheme and to demonstrate that due consideration has been given to the trees on and adjacent to the site.

3.0 Drawings provided

3.1 OS Plan

4.0 The tree survey

4.1 The site was surveyed by Trevor Heaps on the 26th September 2022.

4.2 The trees were surveyed from within the site at ground level. No climbed inspections were carried out and no root/soil samples were taken for analysis.

4.3 The trees were inspected based on the Visual Tree Assessment (VTA) developed by Mattheck & Breloer (The Body Language of Trees, 1994).

4.4 Tree heights, crown spreads and stem diameters were measured with a clinometer, a Disto laser measure and a diameter measuring tape respectively.

4.5 Most large shrubs or small trees (with stem diameters less than 150mm) were not surveyed because BS 5837 states that these can be transplanted or replaced.

4.6 The report is based on the information provided (i.e. site plans, proposed drawings, scales, measurements etc.) and observations during the site visit.

4.7 We were not instructed to investigate the statutory protection status of trees on or adjacent to the site; but will check the LPAs website for any relevant information.

4.8 This report comprises stage 1 of a 5-stage arboricultural process relating to planning. The other stages are as follows:

- Stage 2 is the arboricultural input and advice given during the layout design, taking account of any arboricultural features and constraints.

- Stage 3 is the preparation of supporting documentation (Arboricultural Impact Assessment) when the layout designed has been finalised.

- Stage 4 is the preparation of an Arboricultural Method Statement and Tree Protection Plan specifying how trees will be physically protected during the development process.

- Stage 5 is the implementation, supervision and on-going monitoring of the works during development.

5.0 Statutory tree protection

5.1 According to the Council's website (checked 26/09/2022), none of the trees within or adjacent to this site are covered by a Tree Preservation Order (TPO),; however, the property is within the Ickenham Village Conservation Area. This means that if any works are required to trees with a stem diameter of 75mm or above, then a Section 211 Notice must be served on the Council.

6.0 Ecological constraints

6.1 The Wildlife and Countryside Act 1981 (as amended by the Countryside and Rights of Way Act 2000) provides statutory protection to birds, bats and other species that inhabit trees.

6.2 In addition to any tree matters considered in this report, these animals could impose significant constraints on the use and timing of access to the site.

7.0 The site

7.1 This site is situated within a leafy, residential part of Ickenham.

8.0 The soil and topography

8.1 The soils at this site were determined using information provided by the British Geological Survey and my observations during the site visit.

8.2 The site is level with no adverse features, and the soil texture is clayey loam to silty loam. The soil parent material is prequaternary marine / estuarine sand and silt.

8.3 The soil is deep, and so a thick soil profile is likely. Soil (and any underlying parent Material) should be easily dug to a depth of more than one metre.

8.4 Given the information above, the soil has the potential of becoming compacted (which is harmful to tree roots).

9.0 The tree survey data and constraints

9.1 The trees (and other relevant vegetation) have been allocated a number prefixed by a letter: T for trees, S for stumps or shrubs, G for groups, H for hedges and W for woodlands.

9.1.1 Their locations are shown on the tree constraints plan in Appendix 4.

9.2 Data relating to each tree / shrub is included within the tree data schedule (see Appendix 2).

9.3 The following data was collected:

- Dimensions (height, crown spread, stem diameter, and clearance beneath crown)
- Life stage and physiological condition
- Structural defects of significance, and general condition
- An assessment of the likely remaining useful contribution in years.

9.4 Based on the above information, each tree has been allocated a category (A, B, C or U) indicating its quality and value (in accordance with BS5837). This information must be properly considered when proposing development.

9.5 Four different colours are used to distinguish between the following four categories:

- Category U trees (red) should be removed for reasons of sound arboricultural management.

- Category C trees (grey) are of low quality; they should not impose significant constraints to design layout and, if necessary, can defensibly be removed to facilitate good design. If, however, they can be retained within the proposed layout, then consideration should be given for this.

- Category B trees (blue) are of moderate quality, which covers a large range. It is likely that most of these trees should be retained and regarded as a constraint to development. Some Category B trees, particularly smaller individuals, are of insufficient value to impose significant design constraints and the removal of such trees can sometimes be justified to promote good design (usually on the basis that mitigation is provided elsewhere on the site in the form of high-quality new planting).

- Category A (green) are of high quality and there should be a general presumption against the removal of these trees.

9.6 At the design stage, detailed advice should be given by the arboriculturalist, specifically in relation to the above ground constraints, namely:

- Future growth predictions for the higher value trees where this is likely to be significantly different to their existing dimensions.

- The effects of dominance and shading posed by trees in a) their current context, and b) taking account their future likely growth.

9.7 The tree constraints plan also shows the position of the Root Protection Areas (RPAs) as a dotted magenta circle. BS5837 (Section 3.7) defines the RPA as a '*layout design tool indicating the minimum area around a tree deemed to contain sufficient roots and rooting volume to maintain the tree's viability, and where the protection of the roots and soil structure is treated as a priority'.* In other words, the RPA represents the minimum area around each tree in which the ground should remain largely undisturbed.

9.8 The RPA is an area based on a circle with a radial distance of 12 x the stem diameter at 1.5 metres in the case of single-stemmed trees, or 12 x the combined stem diameter (calculated in accordance with a formula set out in BS5837) for trees with more than one stem. In situations where the site conditions clearly prevent consistent rooting around the tree (for example the presence of roads or buildings within the notional RPA) the shape of the RPA should be modified to take this into account.

10.0 Design considerations

10.1 Foundations

10.1.1 Non-invasive foundations (such as pile and beam, floating concrete rafts, ground screws, cantilevered slabs etc) should be specified where proposed buildings conflict with the RPAs of retained trees (especially category A and B trees); however, LPAs will also usually require over-riding justification for building within the RPAs of such trees. It is normally unacceptable to build within the RPAs of veteran trees.

10.1.2 Where non-invasive foundations are specified, the supporting ground beams must sit at or above ground level - they cannot sit beneath ground level (i.e. there can be no excavations). This will have implications on floor levels within the proposed building and should be designed around.

10.1.3 Where non-invasive foundations are specified, please ensure that services, toilets etc are not located within the same area as this will exacerbate the situation (it will introduce avoidable excavations).

10.1.4 Where non-invasive foundations are specified, there is usually a requirement to leave a void (for gaseous exchange) between the base of the proposed structure and the existing ground level. Rainwater should also be directed into the void using guttering (subject to Building Control approval).

10.1.5 Foundations usually extend slightly beyond the footprint of a building. This should be taken into account at the design stage.

10.2 Basements and excavations

10.2.1 It is sometimes acceptable to excavate within RPAs of retained trees (e.g. for traditional strip foundations or basements); however, this should be limited to the RPA periphery and should not exceed about 5-10% of an RPA - if this can be offset within soft areas that are contiguous (linked) to it (the RPA).

10.2.1 Depending on the construction technique, the excavations needed to construct a basement usually extend beyond its footprint by a metre or two. This should be taken into account at the design stage.

10.3 New surfaces

10.3.1 'No-dig' construction techniques (such as 3D Cellweb or Gravel Grids) should be specified where vehicular access or parking is required within the RPAs of retained trees. However, it should be noted that these 'no-dig' surfaces will be about 100-150mm higher than the existing / surrounding ground levels.

10.4 Future pressure on trees

10.4.1 New buildings / extensions should be located away from areas that will be shaded by retained trees (the shading arcs are shown on the tree constraints plan in Appendix 4). If this is not practical, then dual-aspect and/or non-habitable rooms should be designed into the most shaded areas for the greatest chances of approval.

10.4.2 To guard against issues such as leaf or needle fall, mesh or bristle filters should be fitted to the guttering and the downpipes should be fitted with easily cleanable traps.

11.0 Conclusion

11.1 If proposals are designed around the arboricultural constraints shown on the tree constraints plan in Appendix 4 and / or appropriate and commensurate mitigation tree planting can be provided (if trees need to be removed), there are no practical (arboricultural) reasons why the house cannot be extended by up to about 4m to the rear (more if non-invasive foundations could be used and / or the neighbouring Silver Birch T5 was removed).

11.2 To demonstrate to the Council how the retained trees at this site are to be protected, an arboricultural impact assessment, arboricultural method statement and tree protection plan should now be provided. These matters can usually be dealt with by condition.

12.0 Signature

12.1 This report represents a true and factual account of the potential arboricultural constraints within and adjacent to the subject property / site.

Signed

.....

Trevor Heaps

Chartered Arboriculturist

BSc (Hons), MArborA, MICFor

Dated

26th September 2022

Appendix 1 - Professional résumé

I am Trevor Heaps, Director of Trevor Heaps Arboricultural Consultancy Ltd. I hold a First-Class Honours Degree in Arboriculture; I am a Chartered Arboriculturist and a professional member of the Institute of Chartered Foresters; and I am also a Registered Consultant with the Arboricultural Association.

Professional training

- Arboriculture and Bats: Scoping Surveys for Arborists (BCT & AA) – October 2017
- Tree Science (AA) – June 2016
- OPM (Oak Processionary Moth) Training (FC) – May 2016
- Visual Tree Assessment (Arboricultural Association) - October 2015
- Trees and the Law (Dr Charles Mynors) - June 2015
- Mortgage (Home Buyers) Report Writing (LANTRA / CAS) - February 2015
- Tree Preservation Orders - effective application (LANTRA / CAS) - November 2014
- Professional Tree Inspection 3-day course (LANTRA / AA) - July 2014
- Arboricultural Consultancy Course (AA) - May 2014
- Further down the subsidence trail 1-day course (AA) - April 2013
- Getting to grips with subsidence 1-day course (AA) - November 2012

AA – Arboricultural Asscociation

BCT – Bat Conservation Trust

CAS – Consulting Arborist Society

FC – Forestry Commission

Appendix 2 - Tree data schedule

Ref	Name	Age	DBH (mm)	Hgt. (m)	Can. hgt. (m)	Can N (m)	Can E (m)	Can S (m)	Can W (m)	Physio cond.	Struct cond.	Life Exp.	Ret. Cat.	Comments	Rec's
T1	Carpinus betulus (Hornbeam)	M	550	16	5	6	6	6	6	Normal	Fair	40+	A2	Growing on third-party land (dbh estimated). Crown reduced in past.	N/A
T2	Pittosporum (Pittosporum)	SM	125	5	1.5	1.5	1.5	1.5	1.5	Normal	Normal	20+	C2		N/A
T3	Pittosporum tenuifolium 'Variegatum' (Variegated Pittosporum)	SM	125	5	1.5	1.5	1.5	1.5	1.5	Normal	Normal	20+	C2		N/A
T4	Cordyline australis (Cabbage Palm)	SM	125	5	1.5	2	2	2	2	Normal	Normal	20+	C2		N/A
T5	Betula pendula (Silver Birch)	M	500	14	5	5	5	5	7.5	Fair	Fair	10+	C2	Growing on third-party land (dbh estimated). Crown reduced in past. Sparse. Die-back in crown.	May be worth contacting the owner. Tree may be defective as very old for the species
T6	Malus sylvestris (Crab Apple)	SM	150	5	2	2.5	2.5	2.5	2.5	Fair	Fair	20+	C2		N/A
T7	Liquidambar styraciflua (Sweet Gum)	EM	200	10	3	3	3	3	3	Normal	Normal	40+	A2	Growing on third-party land (dbh estimated).	N/A
T8	Crataegus monogyna (Hawthorn)	M	350	6	2	3	3	3	3	Normal	Normal	40+	B2		N/A
T9	Betula pendula (Silver Birch)	M	450	14	5	4.5	4.5	4.5	4.5	Normal	Normal	40+	B2	Growing on third-party land (dbh estimated).	N/A
G10	X Cupressocyparis leylandii 'Castlewellan' (Leyland Cypress 'Castlewellan')	M	450	16	5	5	5	5	5	Normal	Fair	40+	B2	Outgrown boundary hedge.	N/A
T11	Ilex aquifolium (Holly)	EM	200	5	2	2	2	2	2	Fair	Fair	20+	B2	Sparse.	N/A
T12	Fraxinus excelsior (Ash)	EM	600	12	8	3	3	3	3	Fair	Fair	20+	B2	Growing on third-party land (dbh estimated). Recently pollarded.	N/A
T13	Malus (Apple)	OM	500	6	2	5	5	5	5	Fair	Poor	20+	C2	Bark wounding on stem but sealing.	N/A

Ref	Name	Age	DBH (mm)	Hgt. (m)	Can. hgt. (m)	Can N (m)	Can E (m)	Can S (m)	Can W (m)	Physio cond.	Struct cond.	Life Exp.	Ret. Cat.	Comments	Rec's
T14	Prunus avium (Wild Cherry)	EM	250	14	6	5	5	5	5	Normal	Fair	40+	B2	Growing on third-party land (dbh estimated). Twin-stemmed. Tight forks noted.	N/A
T15	Prunus laurocerasus (Cherry Laurel)	SM	125	4	1.5	2.25	2.25	2.25	2.25	Normal	Normal	40+	C2		N/A
T16	Cedrus deodora (Deodar Cedar)	M	470	20	6	6	6	6	6	Normal	Normal	40+	A2		N/A
T17	Taxus baccata (Yew)	SM	150	5	1.5	2.5	2.5	2.5	2.5	Normal	Normal	40+	C2		N/A
T18	Quercus robur (Common Oak)	M	600	14	6	6	6	6	6	Normal	Fair	40+	A2	Growing on third-party land (dbh estimated). Crown reduced in past.	N/A
T19	Corylus avellana (Hazel)	M	150	8	3	6	6	6	6	Fair	Fair	20+	B2	Growing on third-party land (dbh estimated). Multi-stemmed.	N/A
T20	Betula pendula (Silver Birch)	EM	300	8	4	3.5	3.5	3.5	3.5	Normal	Fair	20+	B2	Growing on third-party land (dbh estimated). Crown reduced in past. Ivy (heavy covering).	N/A
H21	Carpinus betulus (Hornbeam)	SM	100	2.5	0.25	0.5	0.5	0.5	0.5	Normal	Normal	40+	C2	Clipped boundary hedge.	N/A
T22	Carpinus betulus (Hornbeam)	EM	300	2.5	0	1	3	1	3	Fair	Fair	20+	C2	Growing on third-party land (dbh estimated). Clipped tree.	N/A
T23	Fraxinus excelsior (Ash)	SM	100	8	6	2	2	2	2	Fair	Fair	20+	C2	Growing on third-party land (dbh estimated). Likely to be lost to Ash die-back in the near future.	N/A
T24	Taxus baccata (Yew)	EM	450	2.5	0.5	1.5	1.5	1.5	1.5	Fair	Fair	20+	C2	Growing on third-party land (dbh estimated). Clipped tree.	N/A

Appendix 3 - Tree survey schedule explanatory notes

This section explains the terms used in the **Tree data schedule** (Appendix 2).

Ref: Each item of vegetation has its own unique number prefixed by a letter such that:

T1=Tree **S2**=Shrub or stump **G3**=Group **H4**=Hedge **W5**=Woodland

Species: Latin (and common names in brackets) are given.

Age:

- **Y - Young** - Usually less than 10 years' old
- **SM - Semi-mature** - Significant future growth to be expected, both in height and crown spread (typically below 30% of life expectancy)
- **EM - Early-mature** - Full height almost attained. Significant growth may be expected in terms of crown spread (typically 30-60% of life expectancy)
- **M - Mature** - Full height attained. Crown spread will increase but growth increments will be slight (typically 60% or more of life expectancy)
- **V - Veteran** - A level of maturity whereby significant management may be required to keep the tree in a safe condition
- **OM – Over-mature** - As for veteran except management is not considered worthwhile

DBH (mm): Stem diameter, measured in mm, taken at 1.5m above ground level where possible.

Hgt. (m): Height: Measured from ground level to the top of the crown in metres.

Can Hgt. (m): Crown height: Measured from ground level to the lowest tips of the main crown begins in metres. Where the crown is unbalanced it is measured on the side deemed to be most relevant. This is usually the side facing the area of anticipated development.

Can N, S, E, W: - Canopy extents
Approximate radial crown spread measured to the four cardinal points (for individual trees only)

Physio cond.: Indicates the physiological condition of the tree as one of the following categories:

- **Normal** - Healthy tree with no symptoms of significant disease
- **Fair** - Tree with early signs of disease, small defects, decreased life expectancy, or evidence of less-than-average vigour for the species
- **Poor** - Significant disease present, limited life expectancy, or with very low vigour for the species and evidence of physiological stress
- **Very poor** - Tree is in advanced stages of physiological failure and is dying
- **Dead** - No leaves or signs of life

Struct cond.: Indicates the structural condition of the tree as one of the following categories:

- **Normal** - No significant structural defects noted
- **Fair** - Some structural defects noted but remedial action not required at present
- **Poor** - Significant defects noted resulting in a tree that requires regular monitoring or remedial action
- **Very poor** - Major defects noted that compromise the safety of the tree. Remedial works or tree removal is likely to be required.
- **Dead** - No leaves or signs of life

Life Exp.: The estimated number of years before the tree may require removal (<10), (10 – 20), (20 – 40), or (40+).

Ret. Cat.: - Retention category: BS5837:2012 Category where:

- **U = Trees unsuitable for retention**. Trees in such a condition that cannot realistically be retained as living trees in the context of the current land use for longer than 10 years. These trees are shown on the tree plans with red centres.

- **A = Trees of high quality**. Trees of high quality with an estimated remaining life expectancy of at least 40 years. These trees are shown on the tree plans with green centres.

- **B = Trees of moderate quality**. Trees of moderate quality with an estimated remaining life expectancy of at least 20 years. These trees are shown on the tree plans with blue centres.

- **C = Trees of low quality.** Trees of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150mm. These trees are shown on the tree plans with grey centres.

Trees of notable quality are graded as Cat A or Cat B. These trees are sometimes divided further into sub-categories:

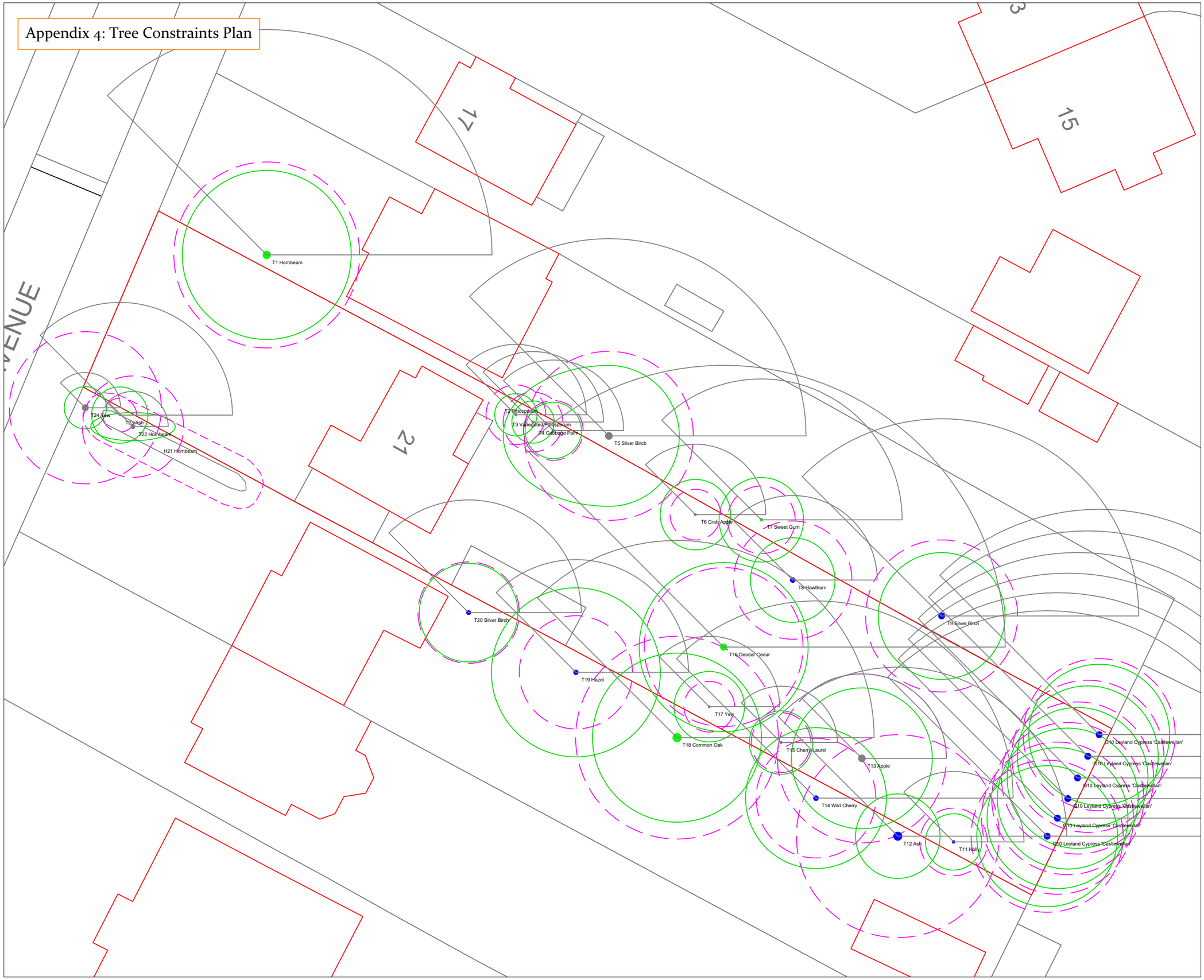
- Sub-category 1 is allocated where it has been assessed that the tree has mainly arboricultural qualities.
- Sub-category 2 is allocated where it is assessed that the tree has mainly landscape qualities.
- Subcategory 3 is allocated where it is assessed that the tree has mainly cultural qualities, including conservation.

Trees may be allocated more than one sub-category. All sub-categories carry equal weight, with for example an A3 tree being of the same importance and priority as an A1 tree.

Comments: Tree form and pruning history are also recorded along with an account of any significant defects.

Rec's - Recommendations: Usually based on any defects observed and intended to ensure that the tree is in an acceptable condition.

Appendix 4: Tree Constraints Plan



Plan Legend

- Tree/s to be retained
- Tree/s to be removed

Centre colours

- Category A Tree
- Category B Tree
- Category C Tree
- Category U Tree

Root Protection Area (RPA) If amended, the original is a dotted blue circle

am / pm — Approximate extent of tree shading on the spring and autumn equinoxes

Scale: 1:250 @ A3

0 5m 10m

Site Address: 21 The Avenue
Ickenham, UB10 8NR

Client: Jagdeep Jhutty
Drawing No: TH/A3/3619TPP

Job Ref: TH 3619 | Date: 26/09/2022

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End of Report