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Flood Risk Assessment
AEG5004_TW9_Richmond_01

Site Address: 5 Park Lane
Richmond
TW9 2RA

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

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Document Issue Record

Project: Flood Risk Assessment

Prepared for: Mr. Zak Godfrey

Reference: AEG5004_TW9_Richmond_01

Site Location: 5 Park Lane, Richmond, TW9 2RA

Issue	Date	Author	Check	Auth.	Comments
1	17/05/2024	Oliver Manston	CH	OH	First issue
1.01	17/07/2024	Oliver Manston	-	-	Appendix A added
1.02	30/09/2024	Oliver Manston	-	-	Update to Appendix A to reflect latest set of development proposal drawings

Please Note:

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Summary

Development Description	Existing	Proposed
Development Type	Residential dwelling	Construction of a part single, part two-storey rear extension to the existing dwelling
EA Vulnerability Classification	More Vulnerable	More Vulnerable
Ground Floor Level	EA 1m LiDAR data shows the ground elevation of the site varies between approximately 5.26m AOD and 7.82m AOD.	No change. Finished Floor Levels (FFLs) of the new extension will be set no lower than existing floor levels in accordance with EA Standing Advice for Minor Developments.
Level of Sleeping Accommodation	First Floor	No change
Surface Water Drainage	N/A[1]	Proposed to manage runoff via existing surface water drains on site. Small scale SuDS such as rainwater planters are recommended in external areas.
Site Size	Approximately 85m^2	No change
Risk to Development	**Summary**	**Comment**
EA Flood Zone	Flood Zone 1	
Flood Source	Groundwater	Site located in an area susceptible to groundwater flooding
SFRA Available	Level 1 Strategic Flood Risk Assessment (Richmond Council, 2021)	
Management Measures	**Summary**	**Comment**
Ground floor level above extreme flood levels	Yes	Proposed development location lies wholly within Flood Zone 1 and outside the modelled surface water flood events
Safe Access/Egress Route	As existing	The proposed development consists of an extension to the existing dwelling,

		existing access/egress arrangements should remain in place.
Flood Resilient Design	Recommended	Details of flood resilience and resistance techniques to be included in accordance with *'Improving the flood performance of new buildings'* (DCLG, 2007)
Site Drainage Plan	N/A[1]	Proposed to manage runoff via existing surface water drains on site. Small scale SuDS such as rainwater planters are recommended in external areas.
Flood Warning and Evacuation Plan	Recommended	Recommended that occupier monitor Met Office Weather Warnings for extreme weather events.
Offsite Impacts	**Summary**	**Comment**
Displacement of floodwater	Negligible	Development is classified as minor development in terms of flood risk and therefore in isolation should not result in increase in flood risk elsewhere.
Increase in surface run-off generation	N/A[1]	Proposed to manage runoff via existing surface water drains on site. Small scale SuDS such as rainwater planters are recommended in external areas.
Impact on hydraulic performance of channels	Negligible	Does not impact channel.

[1] not required for this assessment

[2] data not available.

1. Introduction

1.1. Aegaea were commissioned by Mr. Zak Godfrey 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 5 Park Lane, Richmond, TW9 2RA (Figure 1). It is understood that the proposed development is for the construction of a part single, part two-storey rear extension to the existing dwelling. A copy of the proposed development plans can be found in Appendix A.

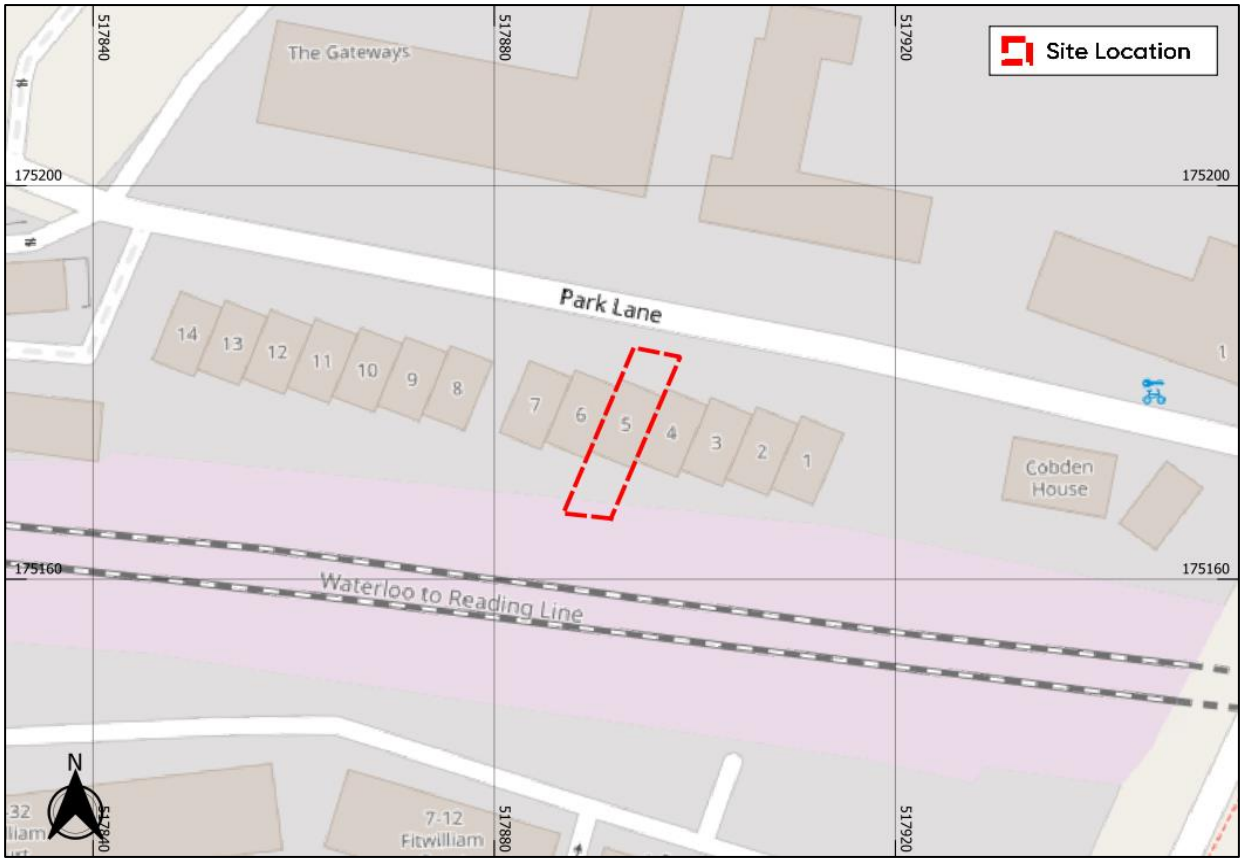


Figure 1: Site Location (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © https://www.openstreetmap.org and contributors)

1.4. In the absence of a topographical survey, Environment Agency Light Detection and Ranging (LiDAR) data Digital Terrain Model (1m resolution) has been utilised to review the topography of the site. The LiDAR data shows the ground elevation of the site varies between approximately 5.26 metres Above Ordnance Datum (m AOD) and 7.82m AOD. The site is shown to slope from north to south toward the Waterloo to Reading trainline adjacent to the south of the site.

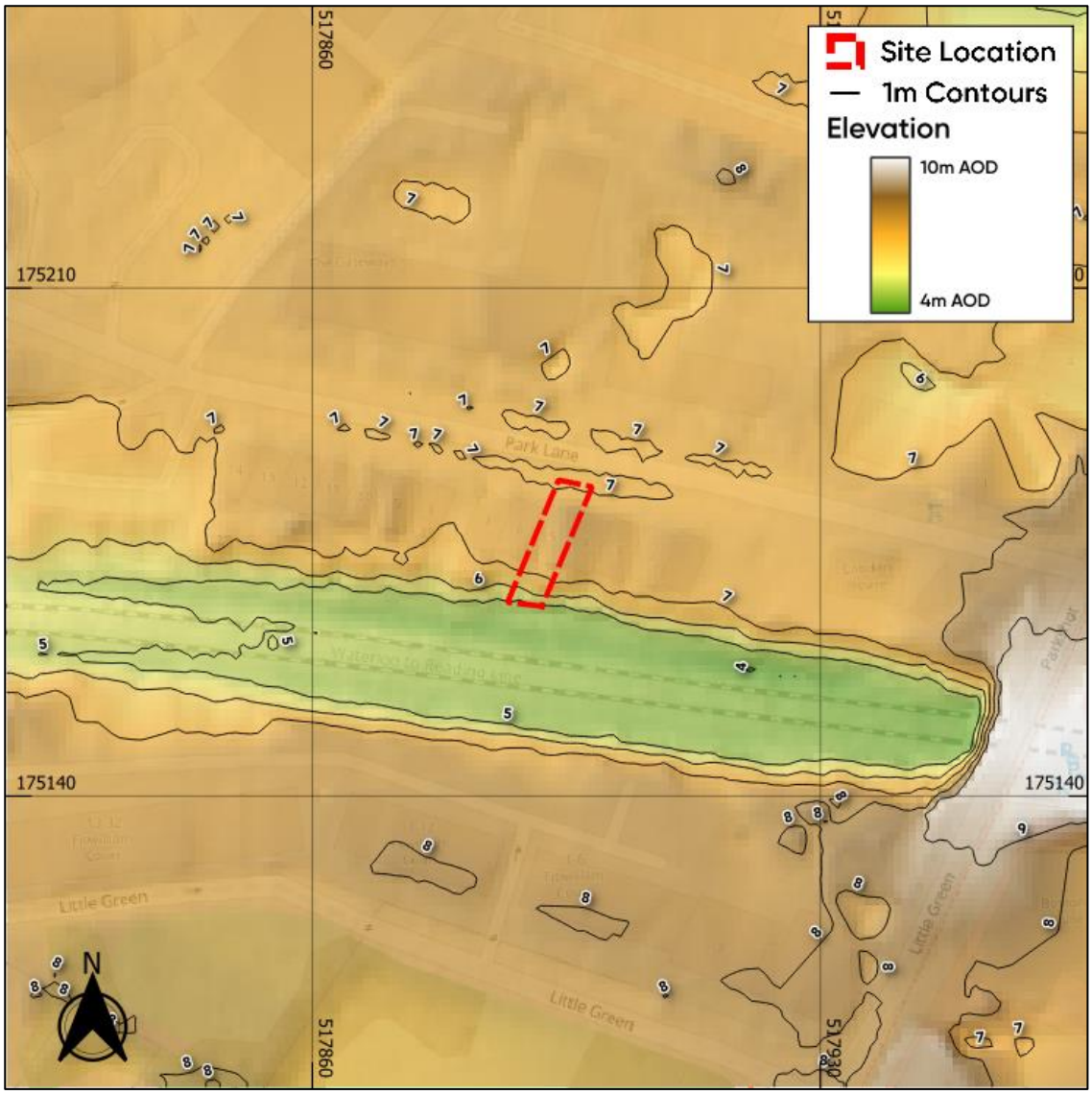


Figure 2: Site Topography (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © https://www.openstreetmap.org and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

1.5. Richmond 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 Kent South London and East Sussex region.

Planning Policy and Guidance

1.6. UK government planning guidance states[1] 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*

1.7. The site is understood to be within a 'Throughflow Catchment Area' (Richmond SFRA), a 'Critical Drainage Area' (Richmond) as well as an area susceptible to groundwater and surface water flooding. It is also within an area with increased potential elevated groundwater. As such, a site specific Flood Risk Assessment is required.

1.8. 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/tidal flood risk
- Surface water flood risk
- Risk of flooding from other sources

[1] **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[2] (NPPF) (DLUHC, 2023) which includes UK Government policy on development and flood risk states:

> *165. 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.*
>
> *173. 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;*

[2] https://www.gov.uk/guidance/national-planning-policy-framework, **last updated Dec 2023**

> *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.*

> *174. 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 59.*

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 59 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.

2.8. An assessment of hydrological impacts should be undertaken, including to surface water runoff and impacts to drainage networks in order to demonstrate how flood risk to others will be managed following development and taking climate change into account.

The London Plan

2.9. The London Plan (2021)[3] provides an overall strategic plan for London, it sets out an integrated economic, environmental, transport and social framework for the development of London over the next 20-25 years. The proposed development lies within the jurisdiction of the London Plan and therefore should consider the policies contained within the document. Policy SI 12 and SI 13, quoted below, contains guidance on flood risk management and sustainable drainage;

> *Policy SI 12 Flood risk management*
>
> *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.*

[3] **https://www.london.gov.uk/sites/default/files/the_london_plan_2021.pdf**

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.

Policy SI 13 Sustainable drainage

A Lead Local Flood Authorities should identify – through their Local Flood Risk Management Strategies and Surface Water Management Plans – areas where there are particular surface water management issues and aim to reduce these risks. Increases in surface water run-off outside these areas also need to be identified and addressed.

B Development proposals should aim to achieve greenfield run-off rates and ensure that surface water run-off is managed as close to its source as possible. There should also be a preference for green over grey features, in line with the following drainage hierarchy:

1) rainwater use as a resource (for example rainwater harvesting, blue roofs for irrigation)

2) rainwater infiltration to ground at or close to source

3) rainwater attenuation in green infrastructure features for gradual release (for example green roofs, rain gardens)

4) rainwater discharge direct to a watercourse (unless not appropriate)

5) controlled rainwater discharge to a surface water sewer or drain

6) controlled rainwater discharge to a combined sewer.

C Development proposals for impermeable surfacing should normally be resisted unless they can be shown to be unavoidable, including on small surfaces such as front gardens and driveways.

D Drainage should be designed and implemented in ways that promote multiple benefits including increased water use efficiency, improved water quality, and enhanced biodiversity, urban greening, amenity and recreation.

Local Plan

2.10. The Local Plan prepared by the Local Planning Authority, Richmond Council, sets out the policies for development in the local area. The proposed site lies under the jurisdiction of this LPA and therefore will be required to adhere to the local plan policies. The Local Plan (2018)[4] document provides the following policy on flood risk management and sustainable drainage;

Policy LP 21

Flood Risk and Sustainable Drainage

A. All developments should avoid, or minimise, contributing to all sources of flooding, including fluvial, tidal, surface water, groundwater and flooding from sewers, taking account of climate change and without increasing flood risk elsewhere. Development will be guided to areas of lower risk by applying the 'Sequential Test' as set out in national policy guidance, and where necessary, the 'Exception Test' will be applied. Unacceptable developments and land uses will be refused in line with national policy and guidance, the Council's Strategic Flood Risk Assessment (SFRA) and as outlined in the table below.

In Flood Zones 2 and 3, all proposals on sites of 10 dwellings or more or 1000sqm of non-residential development or more, or on any other proposal where safe access/egress cannot be achieved, a Flood Emergency Plan must be submitted.

Where a Flood Risk Assessment is required, on-site attenuation to alleviate fluvial and/or surface water flooding over and above the Environment Agency's floodplain compensation is required where feasible.

Sustainable drainage

4 https://www.richmond.gov.uk/media/15935/adopted_local_plan_interim.pdf

C. The Council will require the use of Sustainable Drainage Systems (SuDS) in all development proposals. Applicants will have to demonstrate that their proposal complies with the following:

1. A reduction in surface water discharge to greenfield run-off rates wherever feasible.

2. Where greenfield run-off rates are not feasible, this will need to be demonstrated by the applicant, and in such instances, the minimum requirement is to achieve at least a 50% attenuation of the site's surface water runoff at peak times based on the levels existing prior to the development.

Flood defences

D. Applicants will have to demonstrate that their proposal complies with the following:

1. Retain the effectiveness, stability and integrity of flood defences, river banks and other formal and informal flood defence infrastructure.

2. Ensure the proposal does not prevent essential maintenance and upgrading to be carried out in the future.

3. Set back developments from river banks and existing flood defence infrastructure where possible (16 metres for the tidal Thames and 8 metres for other rivers).

4. Take into account the requirements of the Thames Estuary 2100 Plan and the River Thames Scheme, and demonstrate how the current and future requirements for flood defences have been incorporated into the development.

5. The removal of formal or informal flood defences is not acceptable unless this is part of an agreed flood risk management strategy by the Environment Agency.

Sequential and Exception Tests

2.11. 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.

2.12. The proposed development is viewed as minor development in accordance with the EA standing advice. In accordance with NPPF paragraph 174, minor developments 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 59.

2.13. In addition, the proposed development lies within Flood Zone 1 and lies outside the extent of the modelled 1.0% AEP pluvial event, so is sequentially preferably located with regards to fluvial and tidal risk and therefore the Sequential Test and Exception Test are not required to be applied.

Summary

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

3. Consultation and Review

Documents and Online Mapping

3.1. 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.

3.2. 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, 2023)
- Planning Practice Guidance - Flood Risk and Coastal Change (Department for Levelling Up, Housing and Communities, 2022)
- Geoindex Onshore (British Geological Survey, 2023)
- The London Plan (Greater London Authority, 2021) and Local Plan (Richmond Council, 2018)
- Preliminary Flood Risk Assessment[5] (Richmond Council, 2011)
- Level 1 Strategic Flood Risk Assessment[6] (Richmond Council, 2021)
- Richmond Council Local Flood Risk Management Strategy[7] (Richmond Council, 2015)

[5] **https://www.richmond.gov.uk/media/4287/pfra_richmond_incl_all_appendices.pdf**
[6] **https://www.richmond.gov.uk/media/20529/sfra_level_1_report.pdf**
[7] **https://www.richmond.gov.uk/media/13402/lfrms_strategic_environment_assessment.pdf**

- Richmond Council Surface Water Management Plan[8] (Richmond Council, 2021)

Preliminary Flood Risk Assessment (PFRA)

3.3. The PFRA, published in 2011, is a high-level appraisal of flood risk across Lead Local Flood Authority Richmond 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 (described below) is produced.

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

Strategic Flood Risk Assessment (SFRA)

3.5. The SFRA, published in 2021, provides the evidence base for the Local Planning Authority Richmond Council Local Plan and guidance for consideration when determining planning applications.

3.6. 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 Richmond 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 LFRMS (2015) 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 what the policies, objectives and actions of the Lead Local Flood Authority are.

3.9. The Richmond LFRMS assesses the risk of flooding in the county and will be used within this report to identify whether the proposed site is at risk.

[8] **https://www.richmond.gov.uk/media/23830/surface_water_management_plan.pdf**

Surface Water Management Plan (SWMP)

3.10. The SWMP (2021) outlines the preferred surface water management strategy in a given location. In this context surface water flooding describes flooding from sewers, drains, groundwater, and runoff from land, ordinary watercourses and ditches that occurs as a result of heavy rainfall.

3.11. The SWMP has been used to inform the surface water flood risk to the proposed site throughout this report.

4. Sources of Flood Risk

Fluvial/Tidal Watercourses

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.

4.2. 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 river bank or river defences when tide levels are high.

Main Rivers and Ordinary Watercourses

4.3. The nearest EA main river to the site is the River Thames, which lies approximately 570m south. The Thames flows from west to east past the location of the proposed development. The River Thames is tidally-influenced at this location (tidal and fluvial).

4.4. There are no other ordinary watercourses within the vicinity of the site.

Historical Flooding

4.5. The EA Recorded and Historical Flood Outlines show that the site lies at a distance greater than 1km from any recorded flood events.

EA Flood Map for Planning

The site is located wholly within Flood Zone 1 based on the EA Flood Map for Planning (Figure 3). Flood Zone 1 denotes land having less than 1 in 1,000 annual probability of river or

sea flooding.

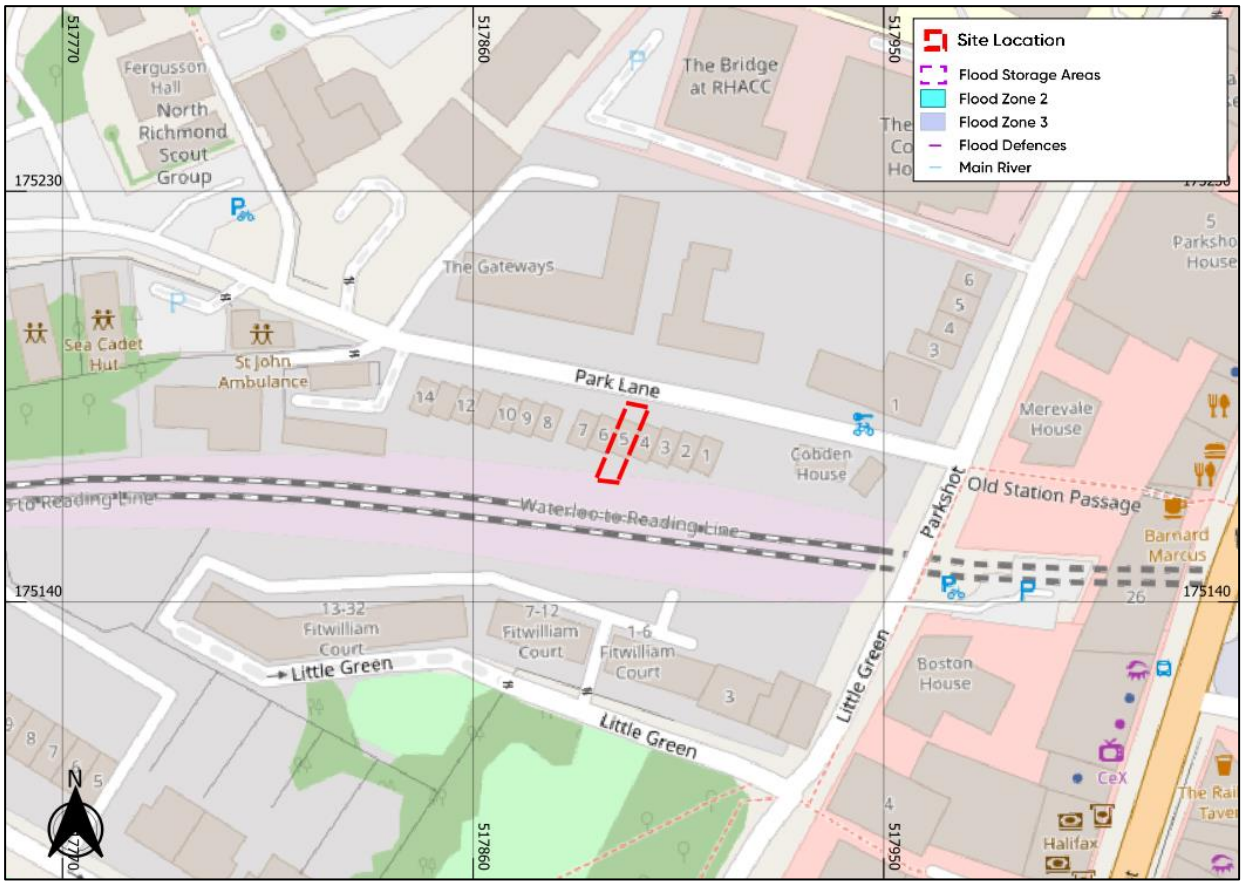


Figure 3: EA Flood Map for Planning (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © https://www.openstreetmap.org and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

Fluvial/Tidal Flood Risk Summary

4.6. Based on the information above, the site is considered to be at a low risk of fluvial and tidal flooding.

Canals

4.7. 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.

4.8. 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.

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

4.10. The nearest canal lies at a distance greater than 1km from the site, as such the risk of canal flooding is considered to be low.

Pluvial

4.11. 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.

Critical Drainage Areas

4.12. The SWMP has identified that the site lies within a Critical Drainage Area (CDA) (Figure 4), the CDA is named 'Richmond Town Centre and Mortlake'.

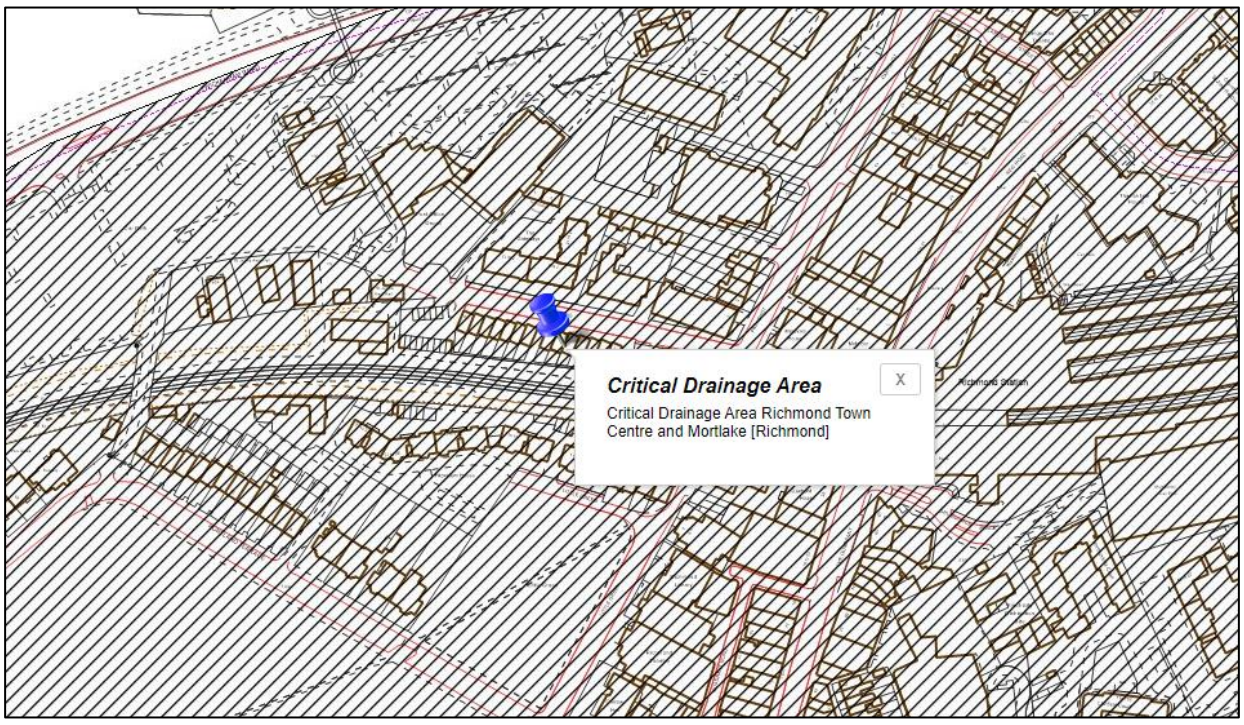


Figure 4: Richmond SWMP – Critical Drainage Areas (Site Located at Pin)

4.13. The CDAs identified within the SWMP have been done so stating that; '*CDAs are geographical areas (usually hydrological catchments) where multiple and cumulative sources of flood risk have the potential of causing flooding in one or more Local Flood Risk Zones. The impact of this potential flooding could affect people, property, and local infrastructure.*'

4.14. Given the sites location within a CDA, the surface water flood risk has been analysed in further detail below.

RoFSW Data Analysis

4.15. 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).

4.16. Examination of the EA's Flood Risk from Surface Water mapping for High Risk, Medium Risk, and Low Risk AEP flood events shows the majority of the site is shown to remain unaffected in each of the modelled surface water flood events (Figure 5).

4.17. The northern most extent of the site is shown to be affected in both the 1.0%AEP and 0.1%AEP surface water flood events, though neither the existing dwelling footprint, nor the proposed extension location are shown to be affected.

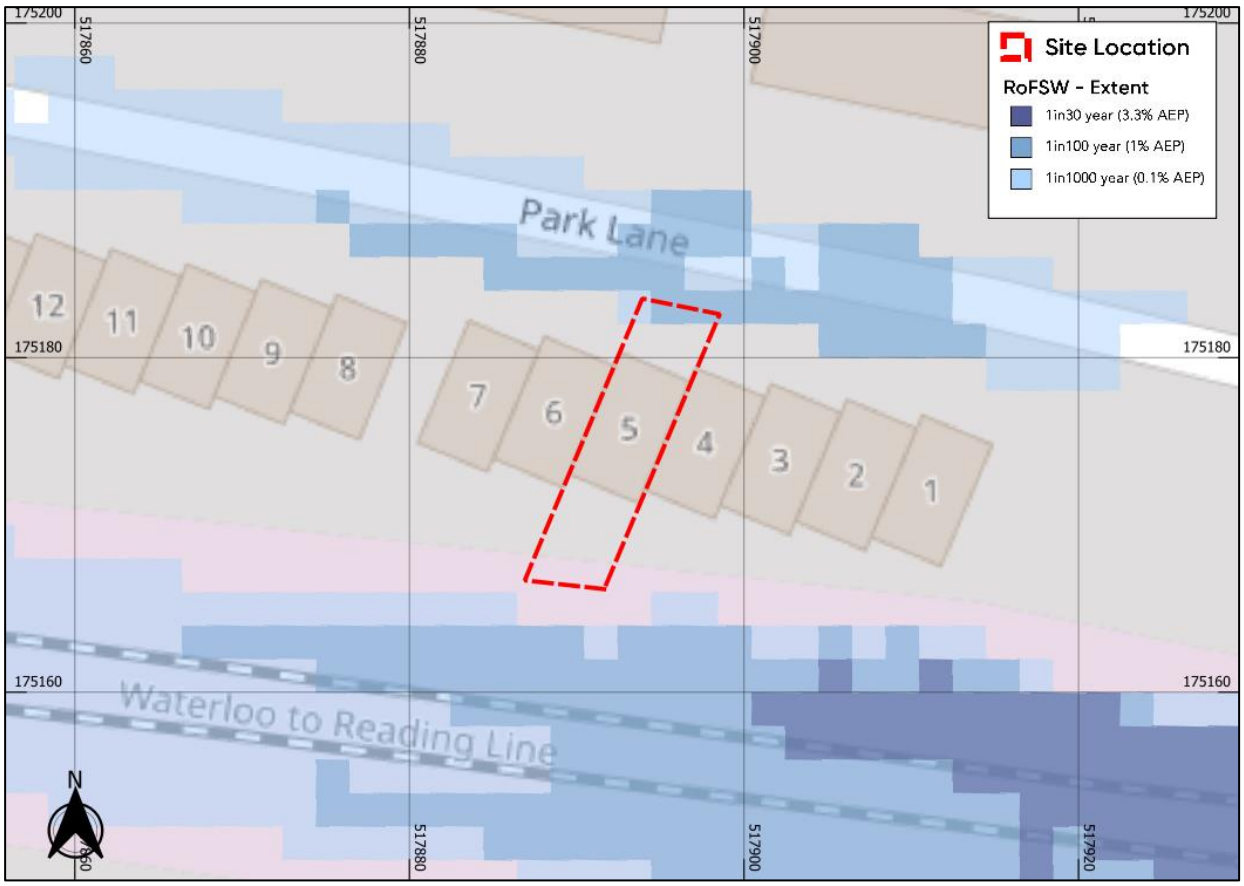


Figure 5: EA Surface Water Flood Risk Mapping (Base map and data from OpenStreetMap and OpenStreetMap Foundation Contains public sector information licensed under the Open Government Licence v3.0)

Surface Water Flood Risk Summary

4.18. Based on the information above, the proposed development is considered to be at a low risk of flooding. It should be noted that due to the fact that the proposed development consists of an extension to the existing dwelling, existing access/egress arrangements should remain in place.

Reservoirs

4.19. Large waterbodies or reservoirs that have walls built above the surrounding ground level pose a risk of flooding. Walls could fail due to old age, accident, or because excess flood water has been added to the reservoir. Although a breach is unlikely, the consequences would be significant, leading to rapid inundation of the downstream floodplain.

4.20. According to the EA's Flood Risk from Reservoirs mapping the site is at risk of flooding in the event of a breach at multiple reservoirs. The worst reservoir failure model is a 'wet day' scenario

(Figure 6). This scenario predicts how much worse the flooding might be if a river is already experiencing an extreme natural flood.

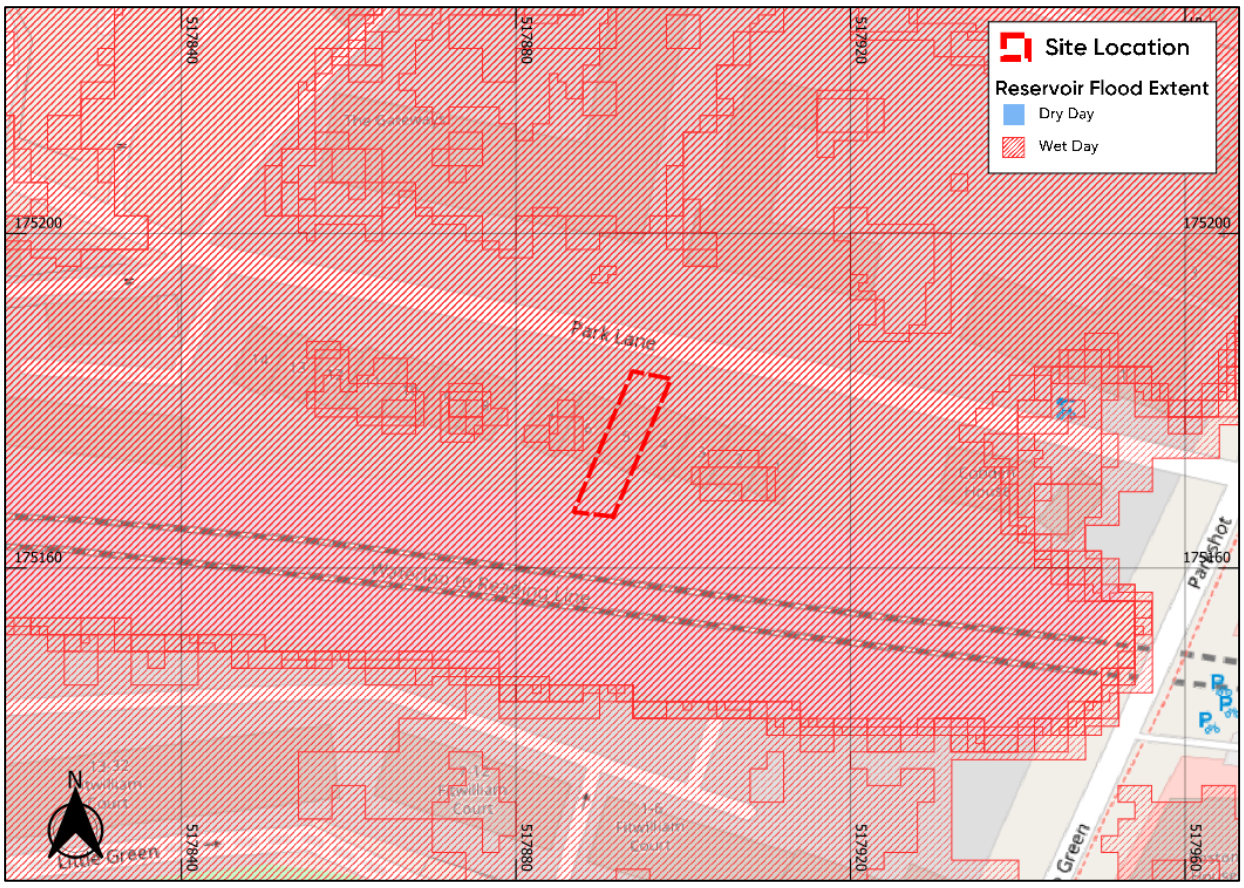


Figure 6: EA Reservoir Flood Risk Mapping (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). ©https://www.openstreetmap.org and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

4.21. 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 regularly inspected, 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.

4.22. 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.

Groundwater

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

4.24. The British Geological Survey's (BGS) mapping shows superficial deposits of permeable Kempton Park Gravel Member comprising of sand and gravel underlying the site. The bedrock underlying the site is impermeable London Clay Formation comprising of clay and silt. Whilst the underlying bedrock is typically impermeable, the overlying gravels may be permeable resulting in localised perched water tables.

4.25. Two historic BGS boreholes (ref: TQ17NE373 and TQ17NE372) located approximately 5m northwest and 10m northwest of the site respectively, did not note that groundwater was struck whilst drilling took place. In fact, in both instances water was noted to have to be added in order to assist with shelling. Both boreholes were drilled to a 7.90m depth and stated that the strata consisted of clay bedrock overlain with gravel.

4.26. The SFRA presents the EA's Areas Susceptible to Groundwater Flooding mapping, which assesses the future risk of groundwater flooding. The site is within a 1km square grid of which ">=75%" is susceptible to groundwater flooding (Figure 7).

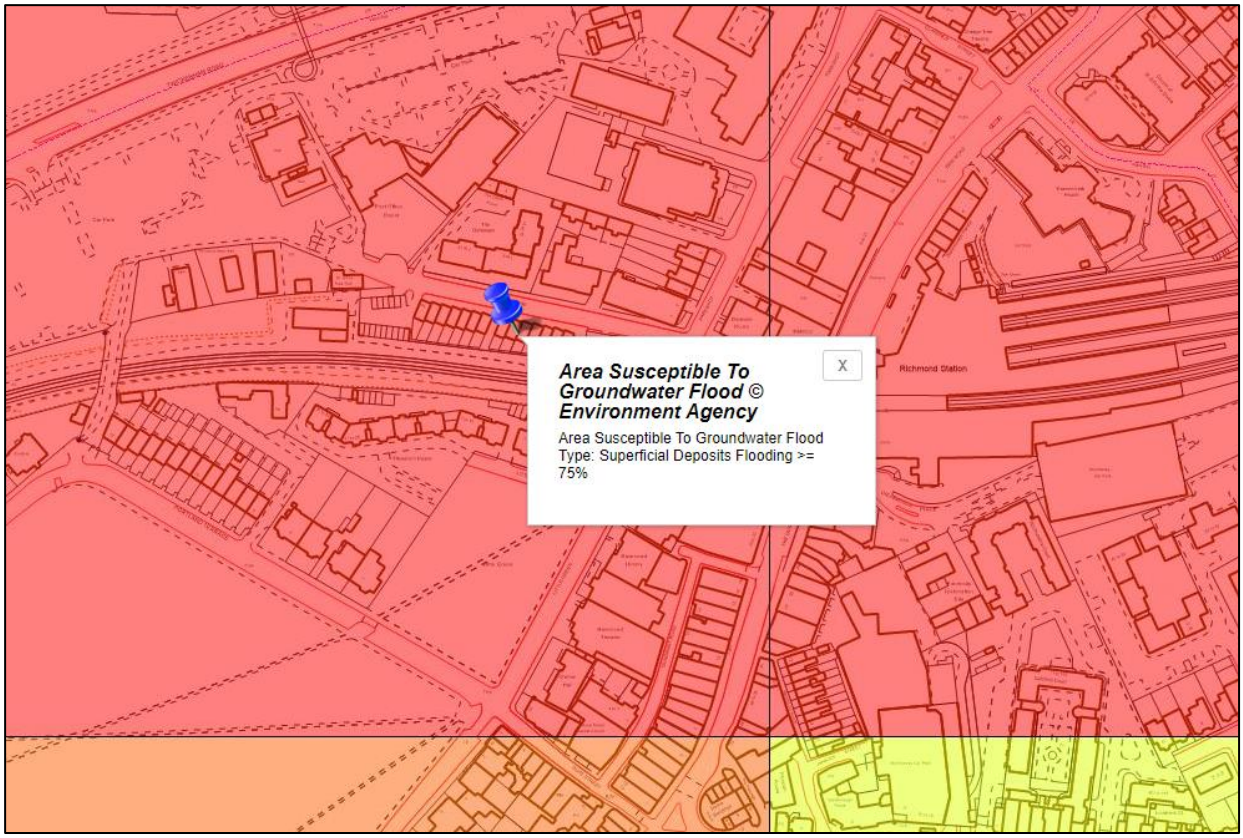


Figure 7: Areas Susceptible to Groundwater Flooding, (Richmond SFRA) (Site Location at Pin)

4.27. Additionally, the SFRA contains information from the GLA Drain London study (Figure 8). The site is located within an area shown to have permeable superficial deposits.

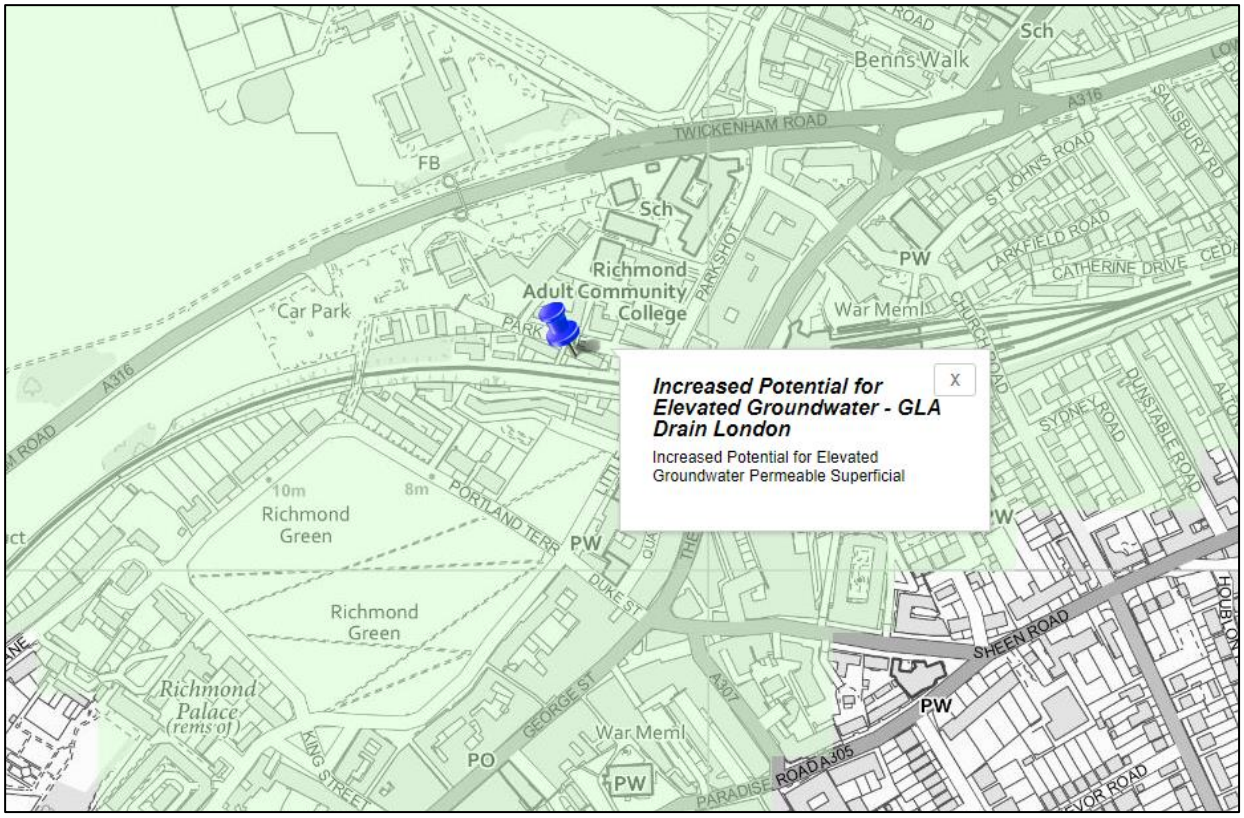


Figure 8: Increased Potential for Elevated Groundwater (Source: Richmond SFRA) (Site Location at Pin)

4.28. Based on the information above, the site is considered to be at a moderate risk of groundwater flooding. This is considering the fact that no subterranean elements are proposed, and that historical records show that groundwater was not struck at the borehole records within the vicinity of the site, though superficial deposits overlaying London Clay can increase the risk the groundwater flooding or perched groundwater.

Sewer Flooding

4.29. Surface water sewers can be a cause of flooding where the drainage network has become overwhelmed, either by blockage or due to local development beyond the designed capabilities of the drainage system.

4.30. Thames Water Utilities Ltd (Thames Water), are the Public Sewer Authority covering Richmond. Thames Water provide surface water, foul, and combined sewer systems. Modern sewer systems are designed to be separate surface water and foul water systems, typically accommodating up to 1 in 30 year rainfall events. However, sewer system segments across London vary in capacity

due to age. Older segments have a smaller capacity and may not be designed to accommodate rainfall events as significant as 1 in 30 year events.

4.31. The SFRA provides mapping of historical sewer flood incident records (Figure 9). This data has been provided by Thames Water and is broken down into 4-digit postcode areas. The site is shown to lie within an area which has experienced 5 indoor sewer flooding incidents and 0 outdoor sewer flooding incidents.

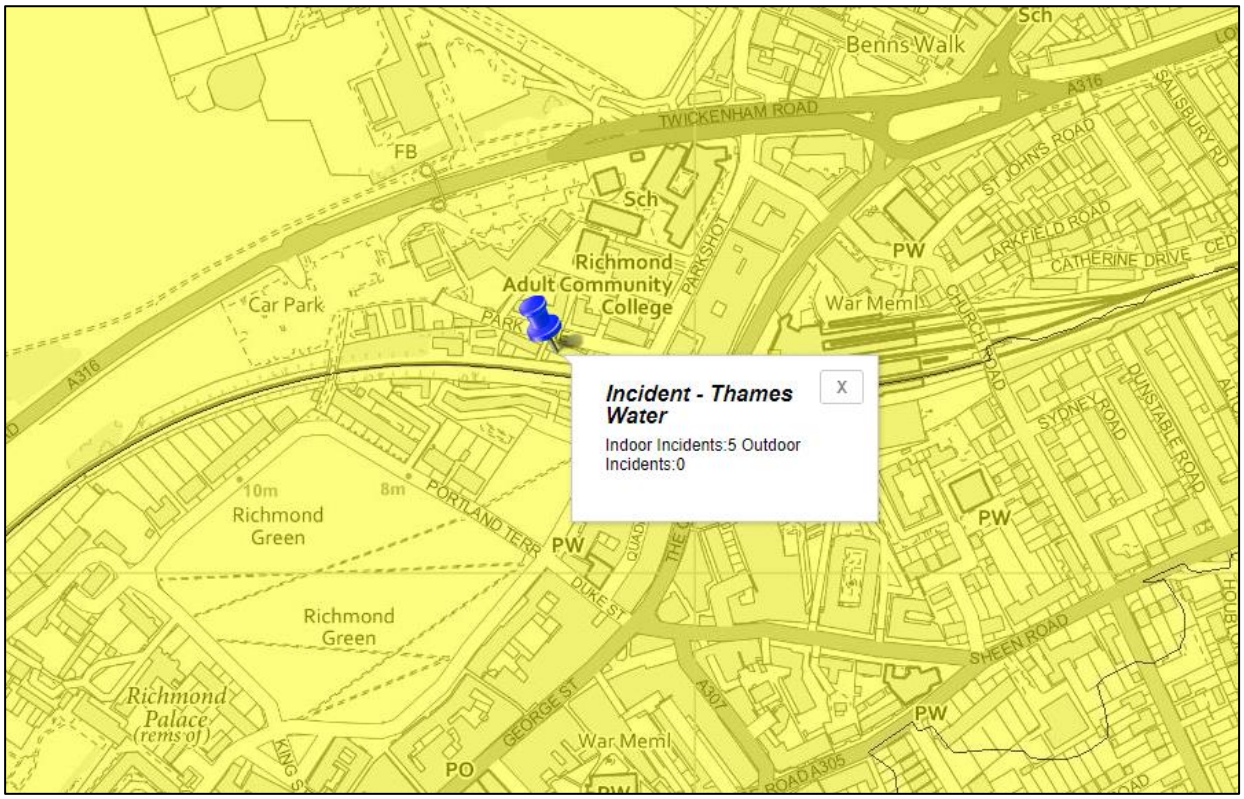


Figure 9: Thames Water Sewer Flooding Incident Record (Site Located at Pin)

4.32. Based on the information above, the site is considered to be at a low risk of sewer flooding.

5. Flood Risk Mitigation

Groundwater

5.1. Based on this assessment, the site is considered to be at a moderate risk of groundwater flooding. This is considering the fact that no subterranean elements are proposed, and that historical records show that groundwater was not struck at the borehole records within the vicinity of the site, though superficial deposits overlaying London Clay can increase the risk the groundwater flooding or perched groundwater.

5.2. Finished floor levels should be set no lower than those of the existing dwelling in line within EA standing advice for minor extensions.

5.3. Given the moderate risk of groundwater flooding to the site, it is advised that appropriate flood resilience measures could be incorporated within the proposed development (where applicable), in accordance with the CLG Report, Improving the Flood Performance of New Buildings - Flood Resilient Construction (2007) including measures such as the below:

- *Flooring to be constructed using solid concrete to prevent water ingress.*
- *Raised wiring and power outlets at basement and ground floor level.*
- *Non-return valves should be installed on all new drainage.*
- *All new plumbing insulation to be of closed cell design.*
- *Finish shall be water resistant render with lime-based plaster finish, hydraulic lime coating or ceramic tiles. Plasterboard placed horizontally as a sacrificial material, not vertically.*
- *Insulation to be low adsorption board or semi rigid self-draining wool bats.*

Other Sources

5.4. Flood risk to the proposed development from fluvial, canal, reservoir, tidal, pluvial and sewer sources is considered to be low and as such, no further specific mitigation is recommended.

5.5. It is recommended that any new sewer outfalls associated with the scheme be fitted with non-return valves and that any new plumbing should be constructed in a closed cell design.

Increase to Flood Risk Elsewhere

5.6. It is understood that the proposed development is for the construction of a part single, part two-storey rear extension to the existing dwelling. As such, the proposal constitutes a Minor Development under the NPPF.

5.7. 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.*

5.8. Additionally, the proposed development lies within Flood Zone 1 and lies outside the extent of each of the modelled surface water flood events. As such, the proposed development in isolation should have a negligible impact on flood risk elsewhere.

Flood Warnings

5.9. The site is not in an area where the EA provide specific flood alerts and warnings. The occupant of the dwelling should monitor Met Office Weather Warnings to be prepared for extreme weather events.

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.

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 5 Park Lane, Richmond, TW9 2RA. It has been written to support a planning application and 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
Groundwater	Based on this assessment, the site is considered to be at a moderate risk of groundwater flooding. This is considering the fact that no subterranean elements are proposed, and that historical records show that groundwater was not struck at the borehole records within the vicinity of the site, though superficial deposits overlaying London Clay which can increase the risk the groundwater flooding or perched groundwater. Given the moderate risk of groundwater flooding to the site, it is advised that appropriate flood resilience measures could be incorporated within the proposed development (where applicable), in accordance with the CLG Report, Improving the Flood Performance of New Buildings - Flood Resilient Construction (2007)
Pluvial Fluvial Tidal Reservoirs Groundwater Sewers Canals	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. It should be noted that due to the fact that the proposed development consists of an extension to the existing dwelling, existing access/egress arrangements should remain in place.

6.5. The proposed development lies within Flood Zone 1 and lies outside the extent of each of the modelled surface water flood events. As such, the proposed development in isolation should have a negligible impact on flood risk elsewhere.

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

Appendix A - Development Proposals

PARK LANE

7

5

1:100mm. 0 1 2 3 4 5 6

Contract:
5 PARK LANE. TW9 2RA.

Title:
BLOCK PLAN as EXISTING.

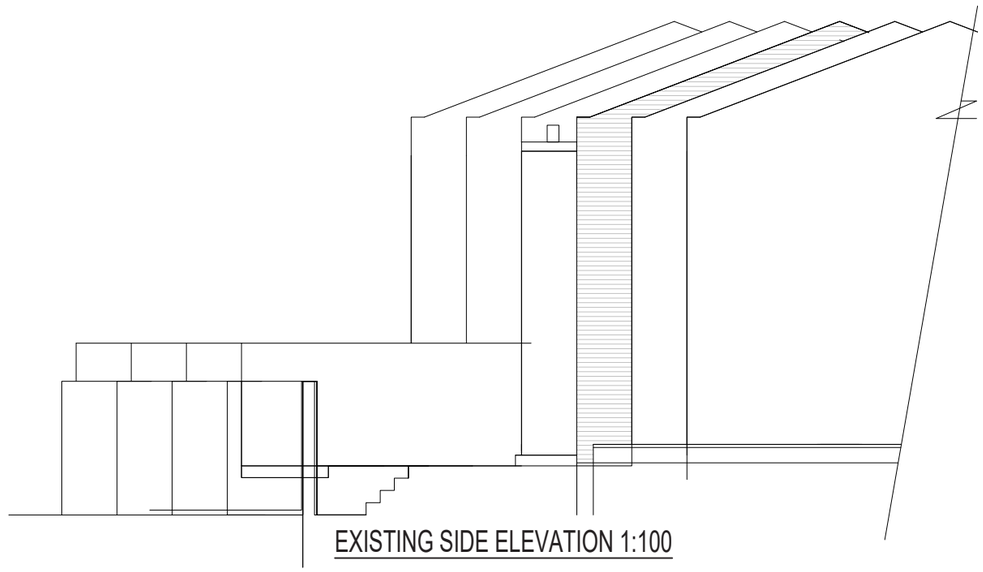
MOBBSPLANS.
7 Willcott Road
London W3 9QX
TELEPHONE: 07747 080 449
E-MAIL: ivan@mobbsplans.co.uk

Scale: 1:100mm@A3.

Date: JUNE 2024.

Drawing No:
319/ 2.

EXISTING FRONT ELEVATION 1:100



EXISTING SIDE ELEVATION 1:100

EXISTING REAR ELEVATION 1:100

1:100

2m 0 2m 4m 6m

mza planning
planning permission without the headaches

14 Devonshire Mews
Chiswick
London, W4 2HA

T. 0844 500 5050
office@mzaplanning.com

Title: **EXISTING ELEVATIONS**

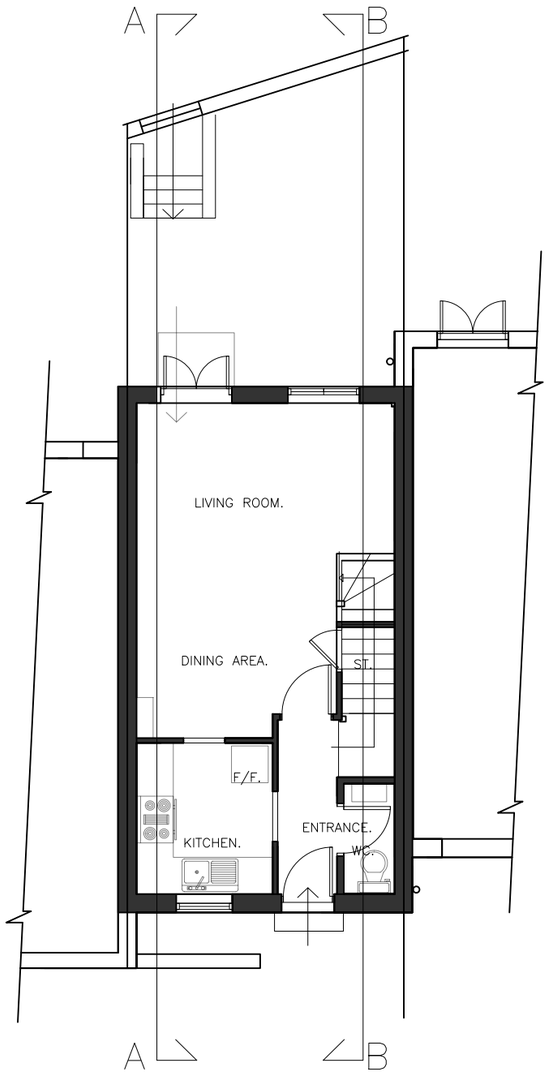
Dwg.No: 610-EXT-02

REV : ORIGINAL

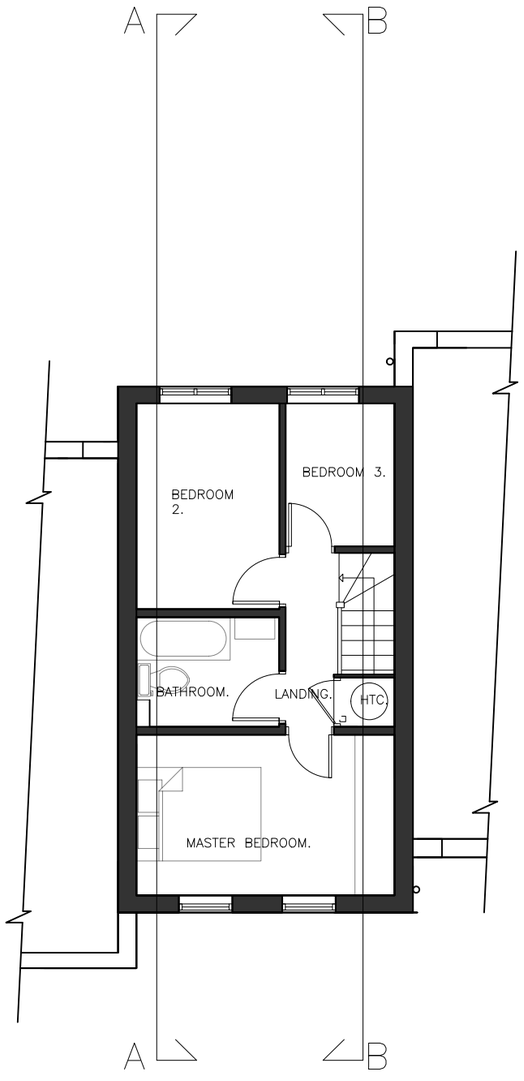
Project: 5 Park Lane
Richmond
TW9 2RA

Date: 17-09-24

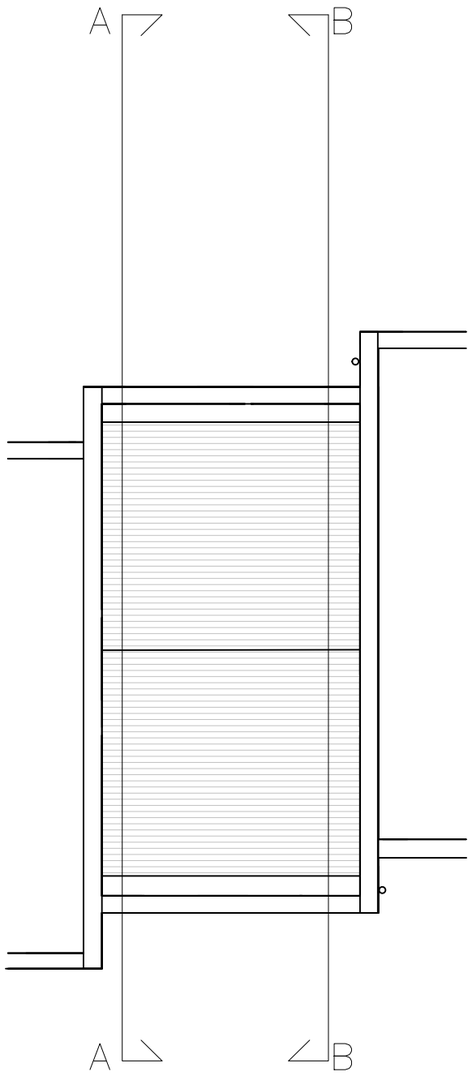
Scale: as noted @ A3



EXISTING GROUND FLOOR PLAN 1:100



EXISTING FIRST FLOOR PLAN 1:100



EXISTING ROOF PLAN 1:100

1:100

2m 0 2m 4m 6m

mza planning
planning permission without the headaches

14 Devonshire Mews
Chiswick
London, W4 2HA

T. 0844 500 5050
office@mzaplanning.com

Title: **EXISTING FLOOR PLANS**

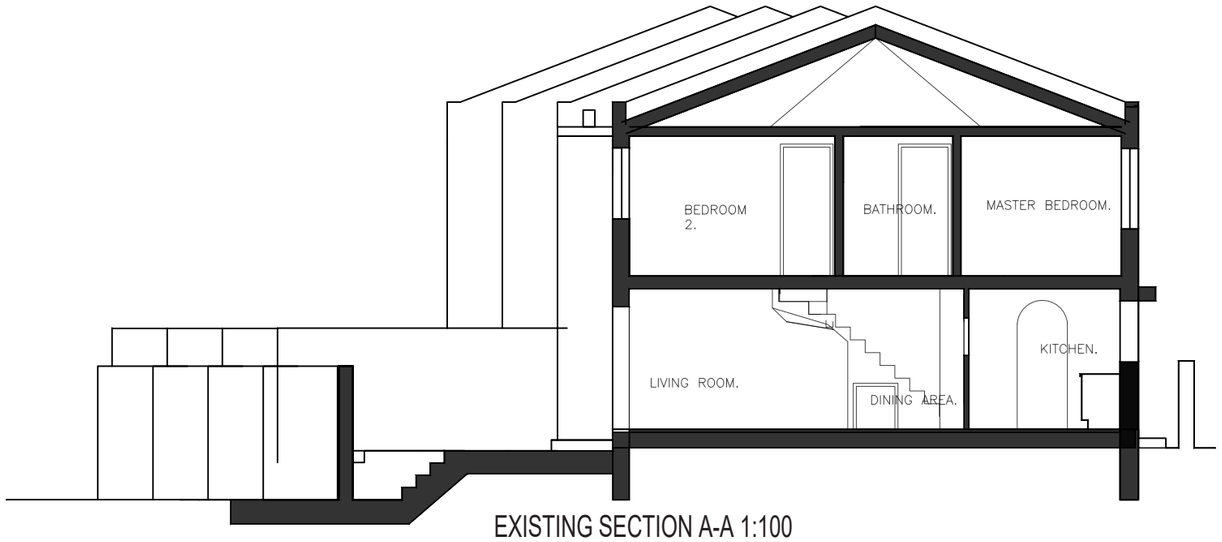
Dwg.No: 610-EXT-01

REV : ORIGINAL

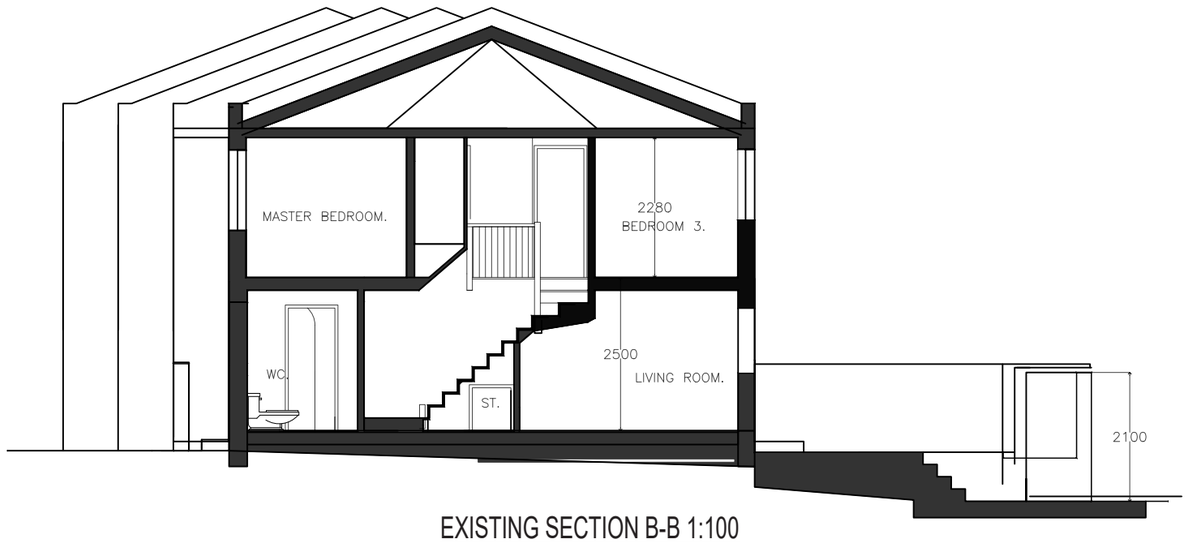
Project: 5 Park Lane
Richmond
TW9 2RA

Date: 17-09-24

Scale: as noted @ A3



EXISTING SECTION A-A 1:100



EXISTING SECTION B-B 1:100

1:100

2m 0 2m 4m 6m

mza planning
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14 Devonshire Mews
Chiswick
London, W4 2HA

T. 0844 500 5050
office@mzaplanning.com

Title: **EXISTING SECTIONS**

Dwg.No: 610-EXT-03

REV : ORIGINAL

Project: 5 Park Lane
Richmond
TW9 2RA

Date: 17-09-24

Scale: as noted @ A3

PARK LANE

7

B

A

GROUND FLOOR as PROPOSED.

WC

LOBBY.

UTILITY ROOM.

5

KITCHEN.

DINING AREA.

NEIGHBOURING PROPERTY.

LIVING AREA.

NEIGHBOURING GARDEN.

GARDEN AREA.

NEIGHBOURING GARDEN.

B

A

1:100mm. 0 1 2 3 4 5 6

Contract:
5 PARK LANE. TW9 2RA.

Title:
BLOCK PLAN as PROPOSED.

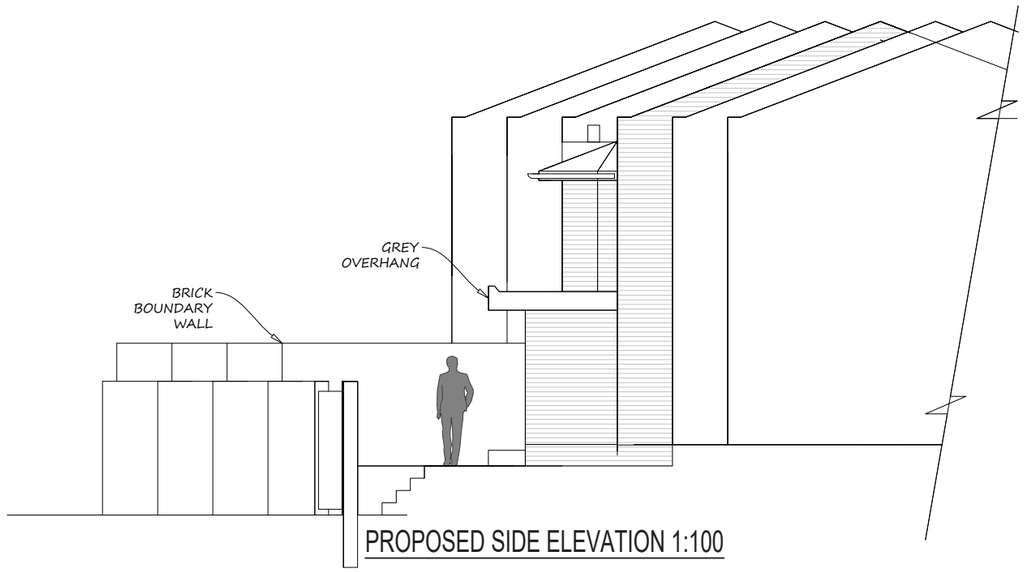
MOBBSPLANS.
7 Willcott Road
London W3 9QX
TELEPHONE: 07747 080 449
E-MAIL: ivan@mobbsplans.co.uk

Scale: 1:100mm@A3.

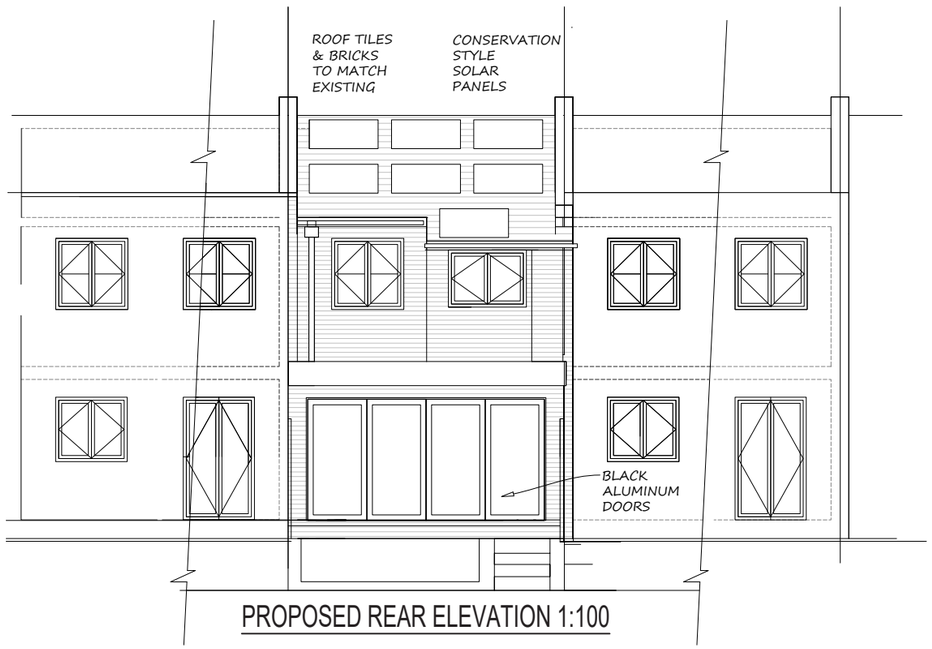
Date: JUNE 2024.

Drawing No: 319/18A

PROPOSED FRONT ELEVATION 1:100



PROPOSED SIDE ELEVATION 1:100



PROPOSED REAR ELEVATION 1:100

1:100

2m 0 2m 4m 6m

mza planning
planning permission without the headaches

14 Devonshire Mews
Chiswick
London, W4 2HA

T. 0844 500 5050
office@mzaplanning.com

Title: **PROPOSED ELEVATIONS**

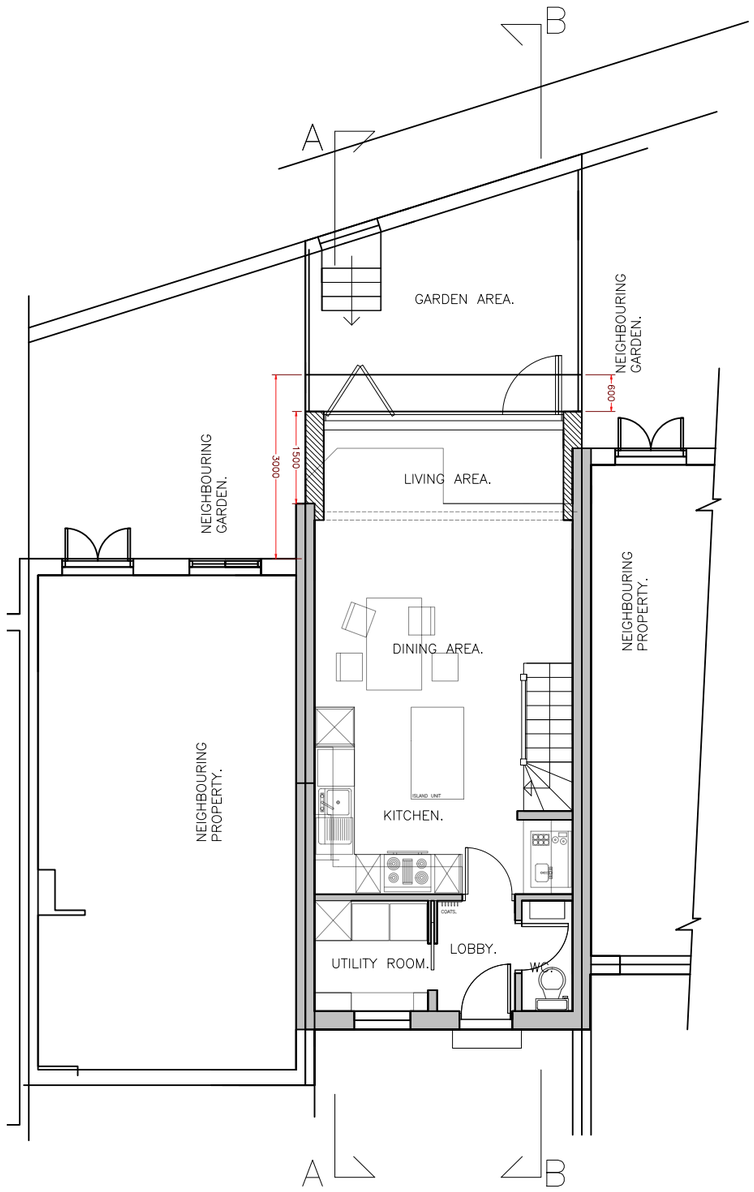
Dwg.No: 610-PROP-05

REV : ORIGINAL

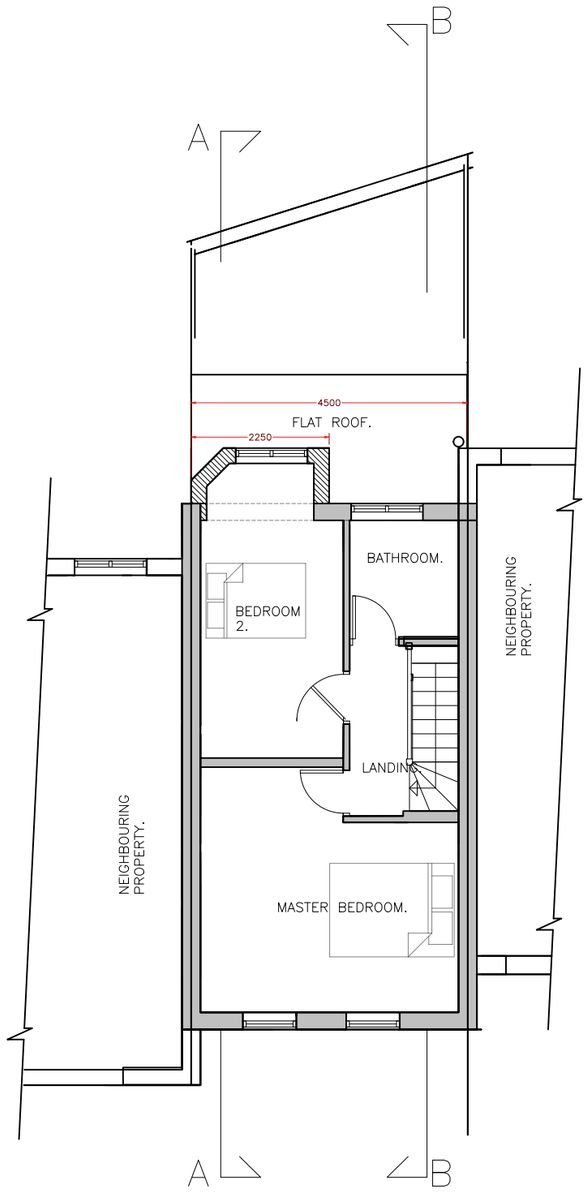
Project: 5 Park Lane
Richmond
TW9 2RA

Date: 17-09-24

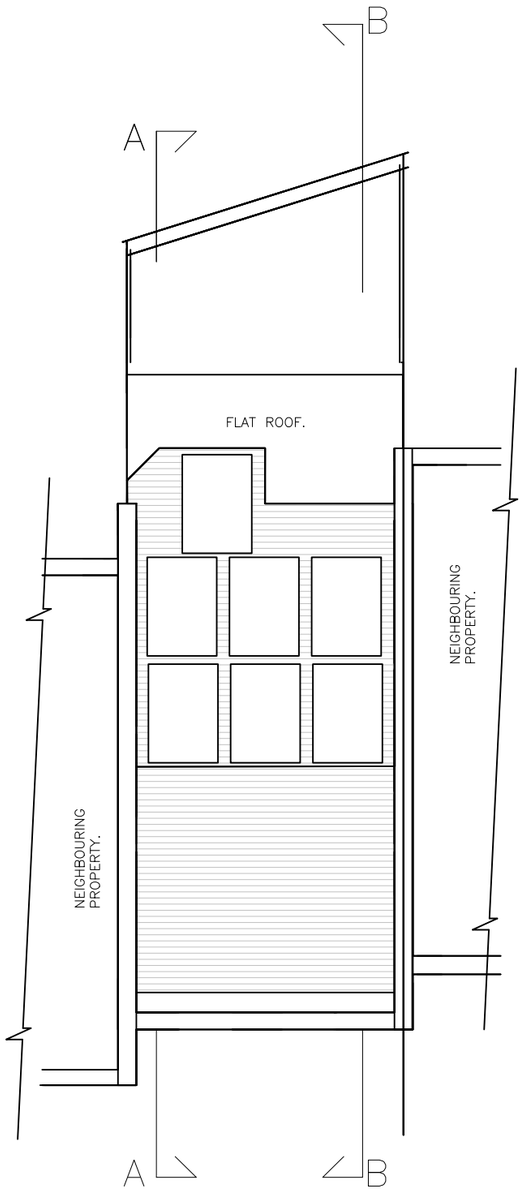
Scale: as noted @ A3



PROPOSED GROUND FLOOR PLAN 1:100



PROPOSED FIRST FLOOR PLAN 1:100



PROPOSED ROOF PLAN 1:100

1:100

2m 0 2m 4m 6m

mza planning
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14 Devonshire Mews
Chiswick
London, W4 2HA

T. 0844 500 5050
office@mzaplanning.com

Title: **PROPOSED FLOOR PLANS**

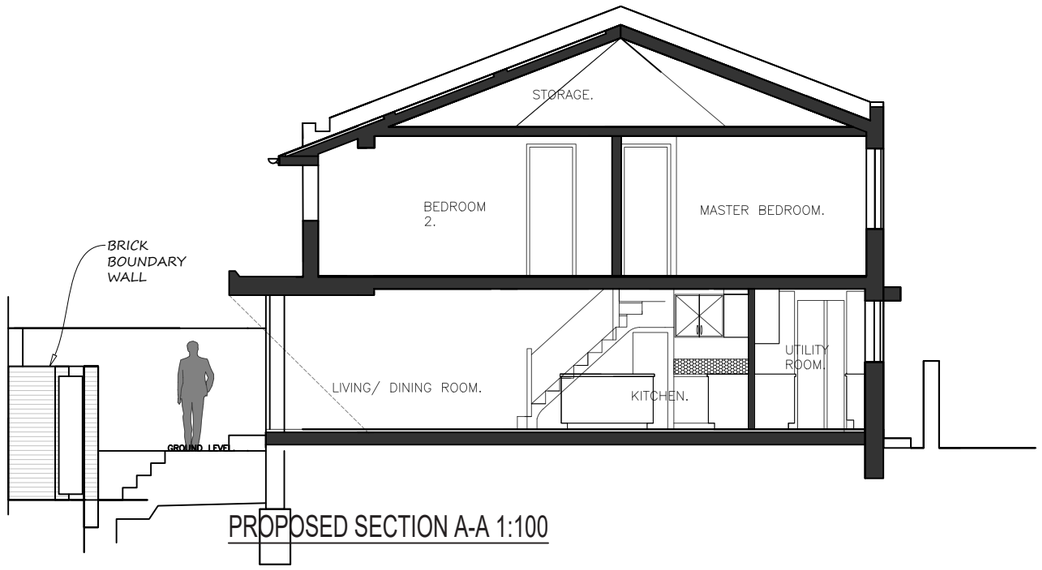
Dwg.No: 610-PROP-04

REV : ORIGINAL

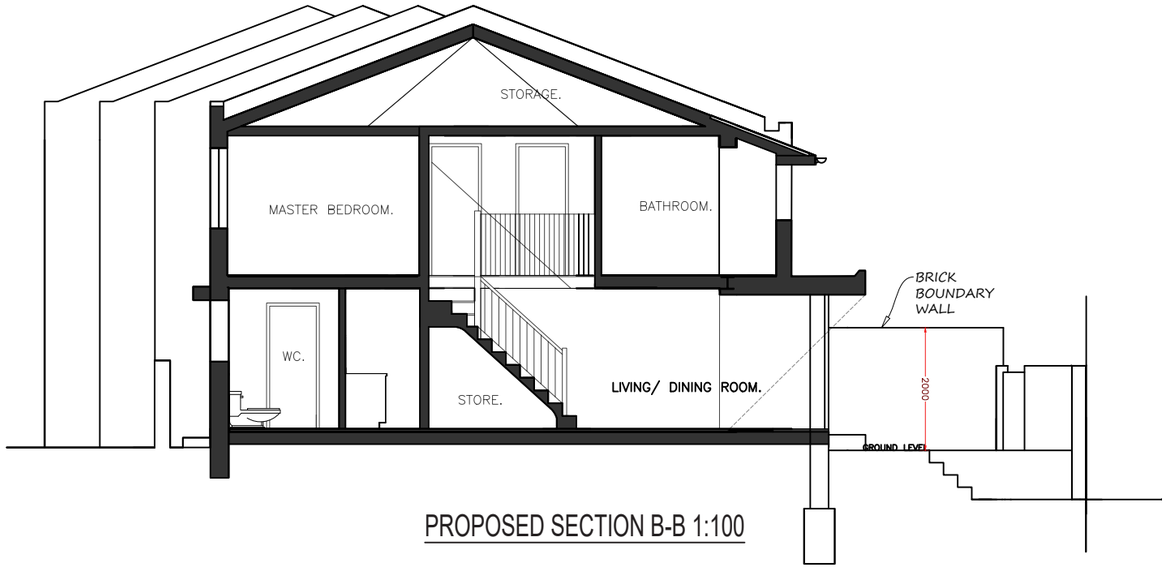
Project: 5 Park Lane
Richmond
TW9 2RA

Date: 17-09-24

Scale: as noted @ A3



PROPOSED SECTION A-A 1:100



PROPOSED SECTION B-B 1:100

1:100

2m 0 2m 4m 6m

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planning permission without the headaches

14 Devonshire Mews
Chiswick
London, W4 2HA

T. 0844 500 5050
office@mzaplanning.com

Title: **PROPOSED SECTIONS**

Dwg.No: 610-PROP-06

REV : ORIGINAL

Project: 5 Park Lane
Richmond
TW9 2RA

Date: 17-09-24

Scale: as noted @ A3