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Flood Risk Assessment AEG4478_N18_Edmonton_01

Site Address: 20 Cavendish Road
Edmonton
London
N18 2LS

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

Document Issue Record

Project: Flood Risk Assessment

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Prepared for: Daniyel Munir

Reference: AEG4478_N18_Edmonton_01

Site Location: 20 Cavendish Road, Edmonton, London, N18 2LS

Issue	Date	Author	Check	Auth.	Comments
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Summary

Development Description	Existing	Proposed
Development Type	Residential dwelling	A rear extension to the existing dwelling
EA Vulnerability Classification	More Vulnerable	More Vulnerable
Ground Floor Level	The LiDAR data shows the ground elevation of the site varies between approximately 11.43mAOD and 11.24mAOD.	The proposed development is a minor development (in terms of flood risk), as such, following the EA's Standing Advice for minor extensions, Finished Floor Levels (FFLs) are set no lower than the existing.
Level of Sleeping Accommodation	Ground floor	No change
Impermeable Surface Area	Approximately 61m ²	Approximately 5m ² (the majority of the extension is on an area of existing hardstanding).
Surface Water Drainage	N/A ¹	As a precautionary measure it is recommended that the proposed development utilises minor SuDS and to provide a betterment to the existing drainage infrastructure.
Site Size	Approximately 220m ²	No change
Risk to Development	Summary	Comment
EA Flood Zone	Flood Zone 3	According to the Enfield model (2016) the site could experience flood depths of 0.77m during the 1:100 year (+CC) event.
Flood Source	Fluvial	At risk to depths up to 0.77m.
	Pluvial	The proposed extension is at risk of flooding to depths of 0.6m during the 'Low risk' surface water event. As such, the risk of surface water flooding is moderate
SFRA Available	Level 1 Strategic Flood Risk Assessment (Enfield Council, 2021)	
Management Measures	Summary	Comment
Ground floor level above extreme flood levels	No	The proposed development is a minor development (in terms of flood risk), as such, following the EA's Standing Advice for minor extensions, Finished Floor Levels (FFLs) are set no lower than the existing.

Safe Access/Egress Route	No	It is important to note that as the proposed development is a minor development in terms of flood risk, access/ egress will remain as existing. However, prior evacuation of the site should be sought following the EA flood warning.
Flood Resilient Design	Yes	The proposed development should be constructed in a flood resilient manner, in accordance with DCLG Report <i>Improving the Flood Performance of New Buildings Flood Resilient Construction (2007)</i> (standards for the installation and retrofit of resistance measures are available in British Standard 851188 1:2019+A1:2021)
	No	As a precautionary measure it is recommended that the proposed development utilises minor SuDS and to provide a betterment to the existing drainage infrastructure.
Site Drainage Plan	Yes	Recommended to sign up to the Pymmes Brook at Upper Edmonton and Tottenham Environment Agency (EA) flood warning service.
Offsite Impacts	Summary	Comment
Displacement of floodwater	Negligible	The proposed development is a minor development (in terms of flood risk). This is in line with Paragraph 051 of the Flood Risk and Coastal Change Planning Practice Guidance.
	Yes	The proposed increase is negligible, however, as a precautionary measure it is recommended that the proposed development utilises minor SuDS and to provide a betterment to the existing drainage infrastructure.
Increase in surface run-off generation	No	There are no watercourses within the sites boundaries.
Impact on hydraulic performance of channels		

¹ not required for this assessment ²

data not available.

1. Introduction

- 1.1. Aegaea were commissioned by Daniyel Munir 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 20 Cavendish Road, Edmonton, London, N18 2LS (Figure 1).

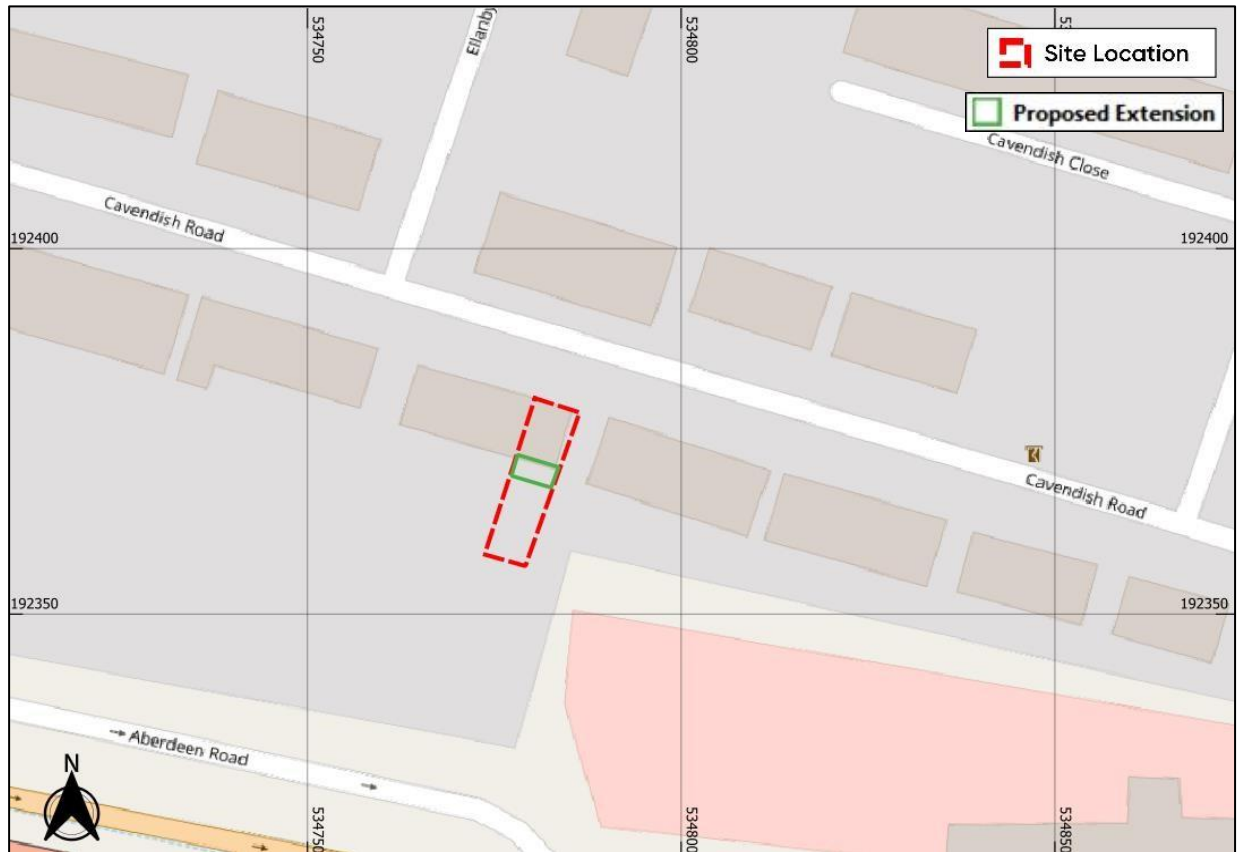


Figure 1: Site Location (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors)

- 1.4. The proposed development is for the construction of an extension to the existing dwelling on site. The property is a semi-detached house, that has been converted into 5 residential flats (4

studio flats and 1 one-bedroom flat), with a small 3 m deep extension at the GF rear and loft conversion.

- 1.5. In the absence of a topographical survey, Environment Agency Light Detection and Ranging (LiDAR) data Digital Terrain Model has been used to review the topography of the site (Figure 2). The LiDAR data shows the ground elevation of the site varies between approximately 10.96m AOD (metres Above Ordnance Datum) and 11.26m AOD.

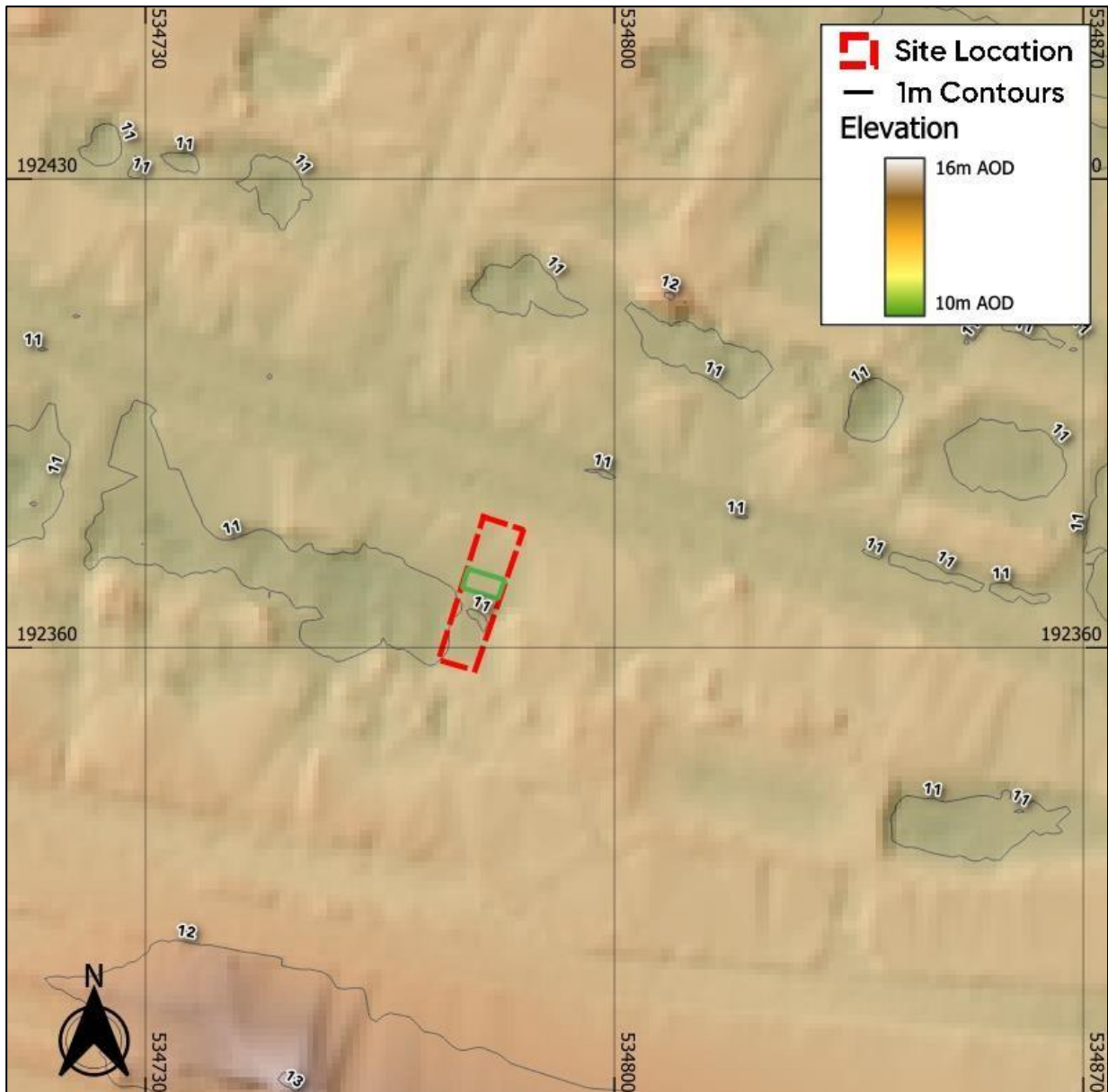


Figure 2: Site Topography (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

- 1.6. Enfield 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

- 1.7. UK government planning guidance states¹ 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*

- 1.8. The site is located within Flood Zone 3. According to NPPF Footnote 59 an FRA is required.

- 1.9. 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

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 Framework² (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. 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.

2.4. 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:
Flood Zone	Definition
	<p>land having a 3.3% or greater annual probability of flooding, with any existing flood risk management infrastructure operating effectively; or</p> <p>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).</p> <p>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)</p>

- 2.5. 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.
- 2.6. 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

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

2.9. Policy SI 13 Sustainable drainage outlines the requirements for new development within the region. It states:

- 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

- [REDACTED]
- 2.10. The Local Plan prepared by the Local Planning Authority, Enfield Council, sets out the policies for development in the local area.
- 2.11. Policy CP 28 Managing Flood Risk Through Development outlines the requirements for new development within the area. It states:

The Council will take a risk-based approach to development and flood risk, directing development to areas of lowest risk in accordance with Planning Policy Statement 25: Development and Flood Risk. However:

- Development of sites in the Central Leaside and North East Enfield Area Action Plan areas that lie within flood zones 2 and 3a, (as defined in table D.1 of Planning Policy Statement 25) but that contribute to the strategic objectives for change in the Upper Lee Valley, will be supported in principle. These schemes will be expected to

comprehensively address flood risk, mitigating the impacts of the development and reducing flood risk overall; and

- Redevelopment and intensification of existing industrial sites within the strategic industrial locations will be encouraged, provided that this reduces flood risk overall. The Sequential Approach, Exception Test, and all other requirements of PPS25 will still need to be applied to individual developments. Given that there is likely to be redevelopment within the floodplain, there will be increased emphasis on innovative, flood resistant and resilient design, including a requirement to normally set back development from the watercourse.

Sustainable Drainage Systems (SUDS) will be required in all developments, irrespective of the flood risk at individual development sites.

Developments proposed in areas identified as being at risk from surface or groundwater flooding (in level 1 and/or 2 Strategic Flood Risk Assessments and in any subsequent surface water management plans) will be required to demonstrate that further investigation of the extent of risk, and the feasibility of options for prevention or mitigation, have been considered.

SUDs are discussed in detail in Chapter 5 of the PPS25: Development and Flood Risk: Practice Guide (2008) and are defined there as "a sequence of management practices and control structures designed to drain surface water in a more sustainable fashion than some conventional techniques". They include, for example, permeable paving, swales and detention ponds.

Sequential and Exception Tests

- [REDACTED]
- 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.

Summary

2.16. 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)³
 - The Enfield Local Plan 2019-2041 (Enfield Council, 2023)⁴
 - Preliminary Flood Risk Assessment (Enfield Council, 2011)⁵
 - Level 1 Strategic Flood Risk Assessment (Enfield Council, 2021)⁶

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

⁴ https://www.enfield.gov.uk/__data/assets/pdf_file/0024/49263/1.-ELP-draft-for-pre-publication-Dec-23-for-web-pages-58-to-144-Planning.pdf

⁵ https://www.enfield.gov.uk/__data/assets/pdf_file/0018/5463/flooding-information-preliminary-flood-risk-assessment.pdf

⁶ https://www.enfield.gov.uk/__data/assets/pdf_file/0022/11983/Level-1-strategic-flood-risk-assessment-report-2021-Planning.pdf

- Local Flood Risk Management Strategy (Enfield Council, 2016)⁷

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 Enfield 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.
- 3.4. The PFRA summarises historical flood incidents in Enfield 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 Enfield 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 Enfield 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.
- 3.9. The Enfield Council LFRMS is used within this report to identify any flood management infrastructure and historical incidences of flooding.

⁷ https://www.enfield.gov.uk/__data/assets/pdf_file/0021/5547/flooding-information-local-flood-risk-management-strategy-2016.pdf

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

- 4.2. The nearest EA main river is the Pymmes Brook located approximately 80m south of the site. This flows east approximately 900m southeast and discharges into the Salmons Brook, another EA main river.

Ordinary Watercourses

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

EA Flood Map for Planning

- 4.4. The site is located within Flood Zone 3 (Figure 3). Flood Zone 3 denotes a risk of flooding from fluvial sources greater than 1 in 100 (1%).

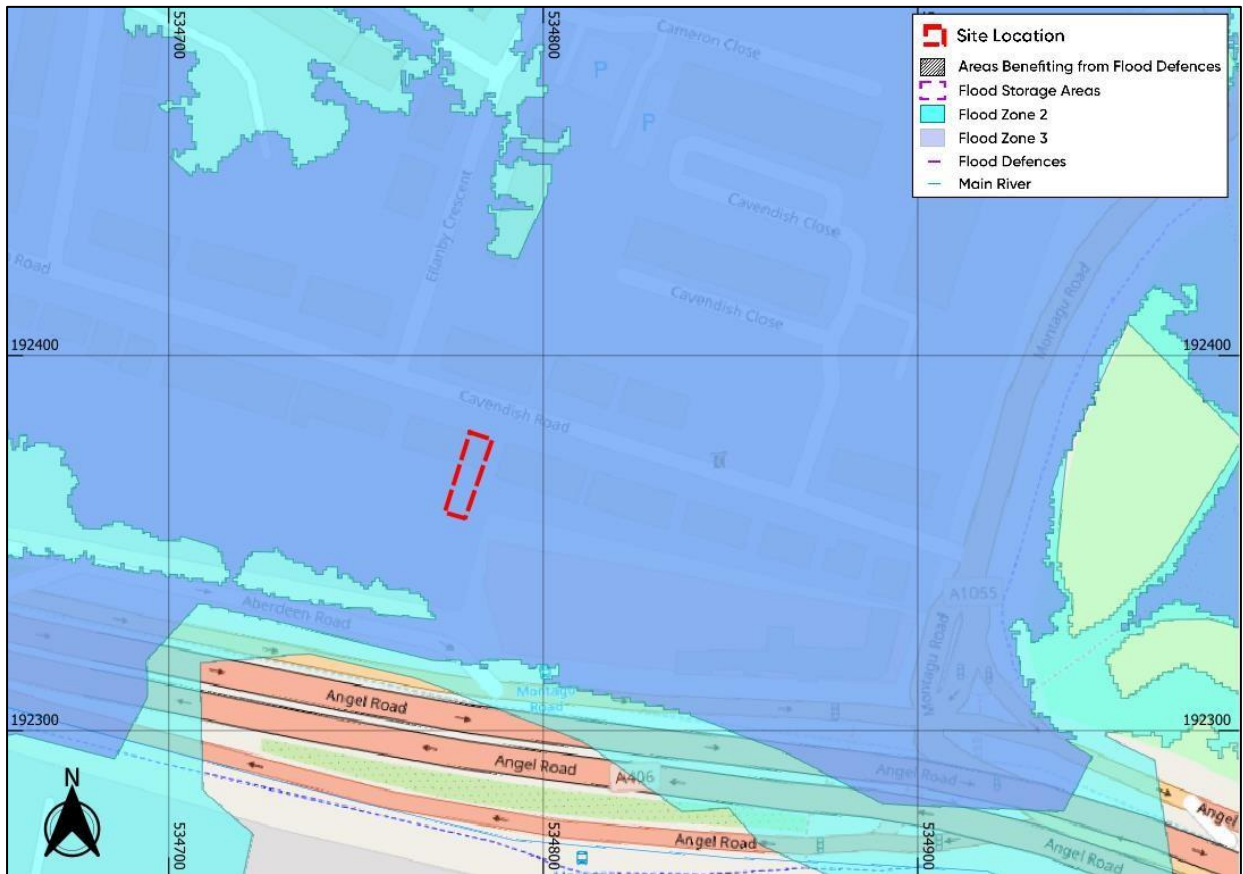


Figure 3: EA Flood Map for Planning (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

Historical Fluvial Flooding

- 4.5. According to the EA Historical Flood Extents there is no records of historical fluvial flooding on the site (Figure 4).

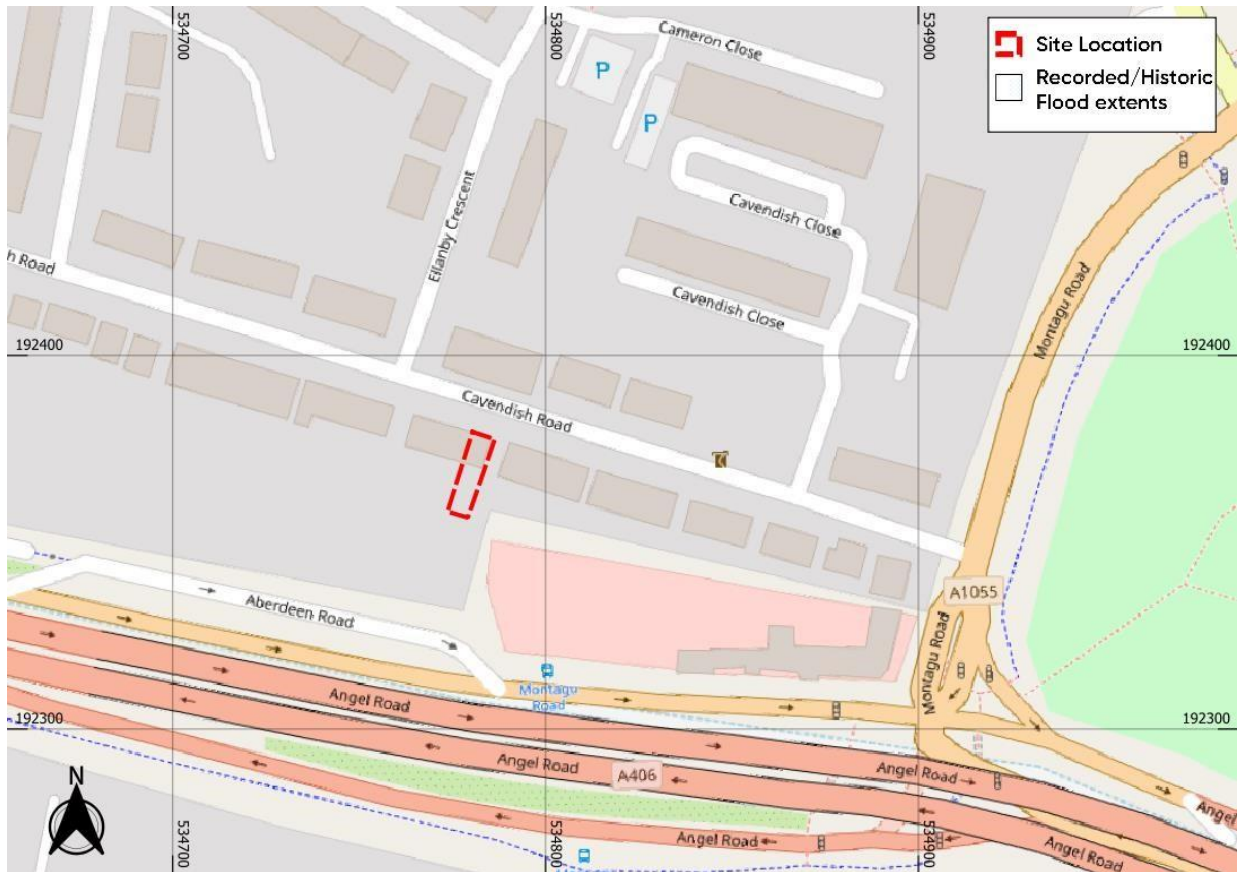


Figure 4: EA Historic Flood Mapping (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

Climate Change

- 4.6. The site is located within the Thames Catchment Flood Management Plan, which has updated central peak flow river allowances to: 10% for the 2020s, 7% for the 2050s, and 17% for the 2080s. As the development is for the construction of a residential extension, it is understood that the design life would be at least 100years. As such the 17% peak flow allowance for the 2080s would be required for fluvial flood flows.

Salmons Brook (2016) Fluvial Model

- 4.7. The Salmons Brook (2016) fluvial model contains the flood extent and depths for the 1.0%AEP plus climate change return period. Figure 5 shows that the site is affected during the 1.0%AEP (+CC) plus climate change event (considered the design event) to depths of 0.64m. According to LiDAR data, ground elevations at the proposed extension area are approximately

11.0611.39m AOD, therefore, the flood level could be circa 11.7m AOD. Flood levels have been approximated as flood level grids have not been provided.

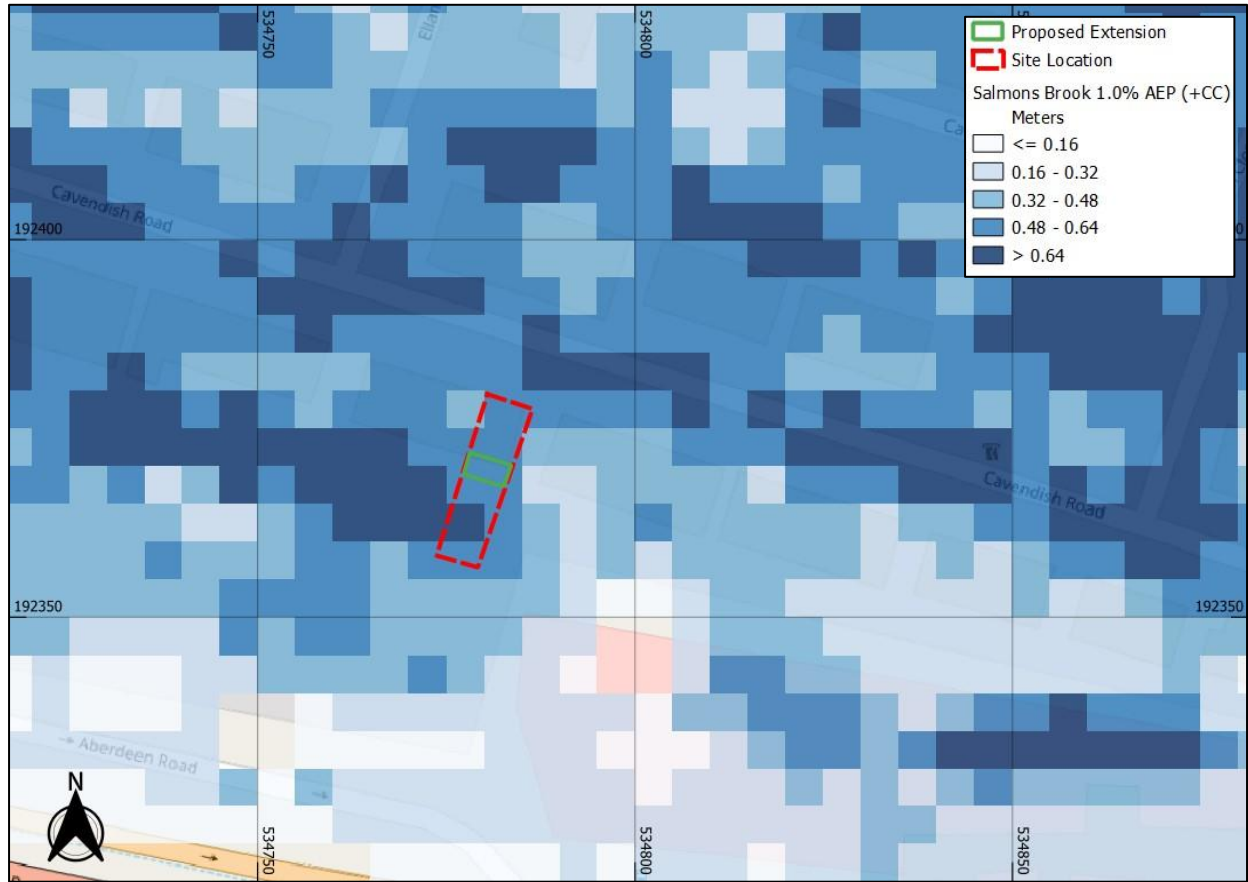


Figure 5: 1.0%AEP +CC Salmon Brooks (2016) Fluvial Model. Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors.

Enfield Model

- 4.8. Aegaea hold a copy of the Enfield fluvial model which includes the results for the design 1.0%AEP event with a 17% allowance for climate change (Figure 5), as such this has been reviewed to analyse the fluvial flood risk with the climate change allowance.
- 4.9. In the modelled 1.0%AEP fluvial event plus a 17% allowance for climate change (Figure 5), the site is shown to be affected by flooding. The modelled flood extent is shown to affect the majority of the site, with flood depths ranging up to 0.77m.
- 4.10. According to LiDAR data, ground elevations at the proposed extension area are approximately 11.06m AOD, therefore, the flood level could be circa 11.83m AOD. Flood levels have been approximated as flood level grids have not been provided.

4.11. Flood depths for this event adjacent to the site at the access / egress point on Cavendish Road could reach up to 0.7m. Therefore, safe refuge should be sought on site on the first floor and above if prior evacuation has not been sought when flooding occurs. However, it is important to note that the development is for a minor development, therefore, the existing access/ egress arrangements are to remain in place.

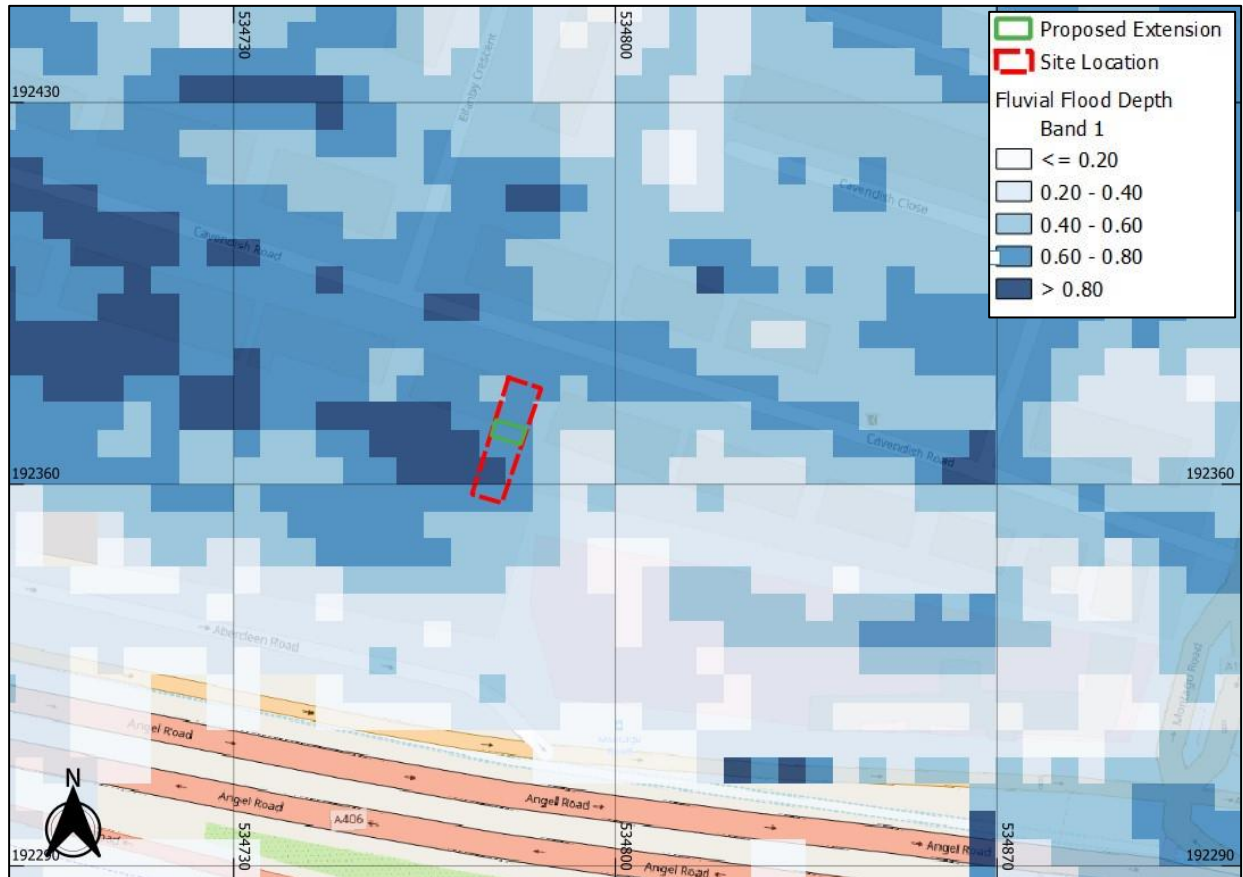


Figure 5. 1.0%AEP Event plus a 17% allowance for climate change (Enfield Model). Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors.

4.12. In summary, the site is at risk of fluvial flooding in the 1.0%AEP fluvial event plus a 17% allowance for climate change with depths of up to 0.77m, therefore, the site is considered to be at a high risk of flooding from fluvial sources.

Tidal

- 4.13. 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.
- 4.14. 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.
- 4.15. There is no record of historical tidal or sea flooding.
- 4.16. The risk of flooding from tidal sources is considered low.

Canals

- 4.17. 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.
- 4.18. 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. 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.
- 4.19. Flooding can occur where a canal is impounded above surrounding ground levels and the retaining structure fails.
- 4.20. The site is approximately 1km from the Lee Navigation canal. Analysis of LiDAR data shows that the canal is at an elevation of approximately 10.13m AOD and the site at a minimum of 10.96m AOD. Moreover, ground elevations of the land between the site and the canal are raised to 14.70m AOD, therefore, it could be considered unlikely that water would reach the site if the canal structure was to fail.
- 4.21. The risk of flooding from canals is considered to be low due to the distance from the site.

Pluvial

- 4.22. 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.
- 4.23. 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).
- 4.24. Examination of the EA's Flood Risk from Surface Water mapping (Figure 6) for High Risk, Medium Risk, and Low Risk AEP flood events shows the site and its immediate vicinity is at risk of flooding in the modelled 'Low Risk' surface water flood event.

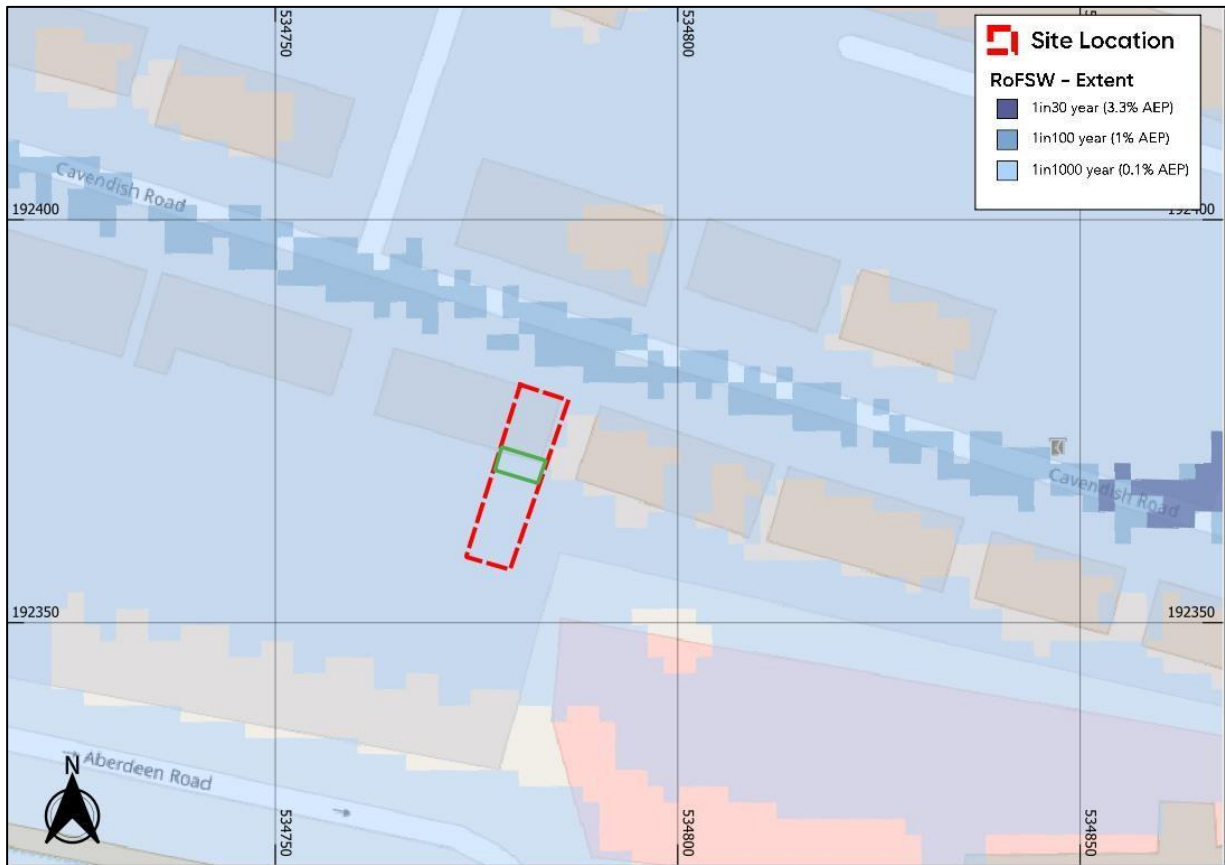


Figure 6: EA Surface Water Flood Risk Mapping (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

- 4.25. Figure 7 shows during the 1:100 year event the depth of flooding on Cavindash Road would be a maximum of 0.3m and the hazard rating would be 0.5-0.75 (low). However, due to the fluvial risk safe access/ egress would not be possible and safe refuge should be sought on site on the first floor and above if prior evacuation has not been sought when flooding occurs.



Figure 7: EA Surface Water Flood Risk and Hazard Mapping – 1.0% AEP (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)

4.26. Figure 8 shows that the depth of surface water flooding during the 1:1000 year event (Low risk) would be a maximum of 0.6m. The depth of flooding on Cavindash Road would be between 0.6m and 0.9m, therefore, safe refuge should be sought on site on the first floor and above if prior evacuation has not been sought when flooding occurs.

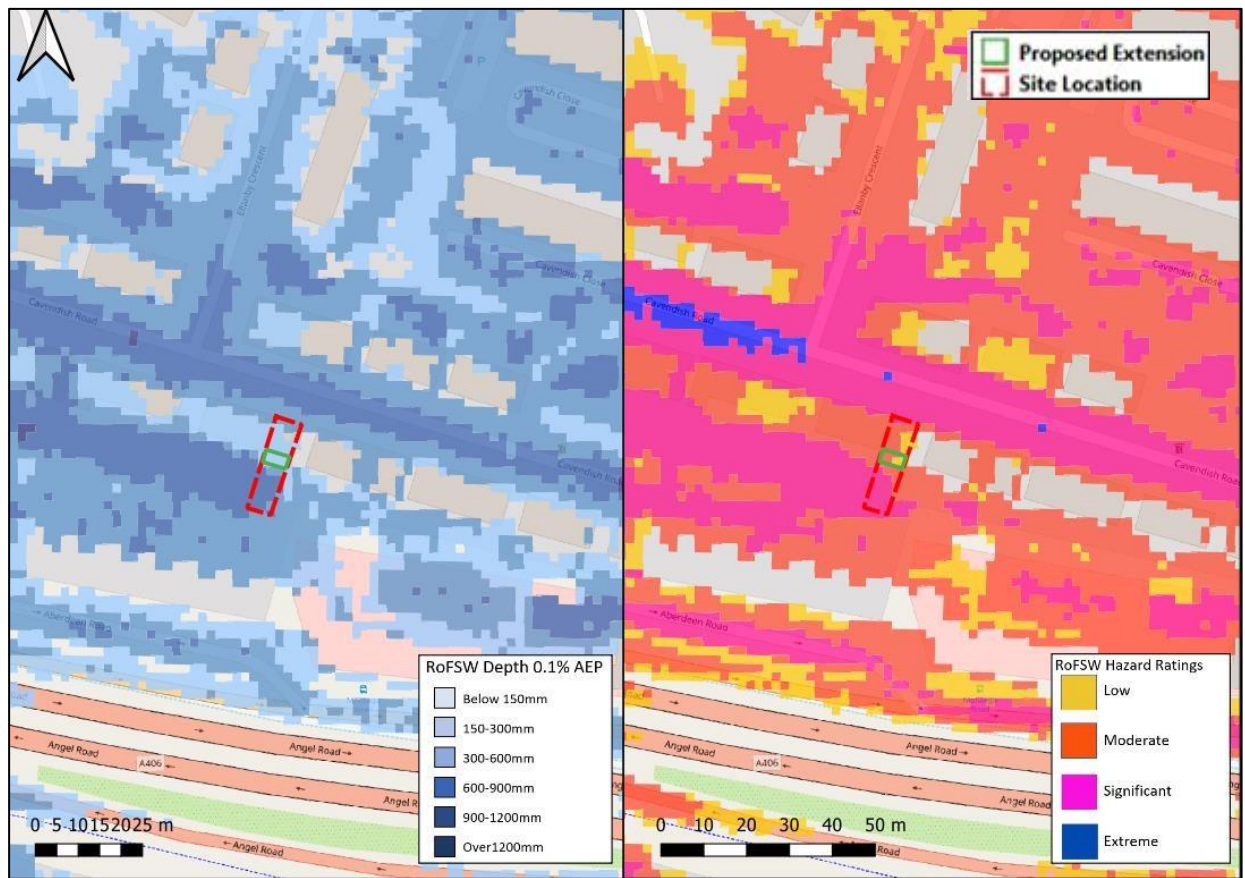


Figure 8: EA Surface Water Flood Risk and Hazard Mapping – 0.1% AEP (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

4.27. Based on the available information the site is considered to be at a moderate risk of surface water flooding.

Reservoirs

4.28. 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.

4.29. According to the EA's Flood Risk from Reservoirs mapping (Figure 8) the site is at risk of flooding in the event of a breach at the King George V and William Girling reservoirs. The worst reservoir failure model is a 'dry day' scenario meaning that it could be caused by reservoir walls failing due to old age, accident, or because excess flood water has been added to the reservoir.

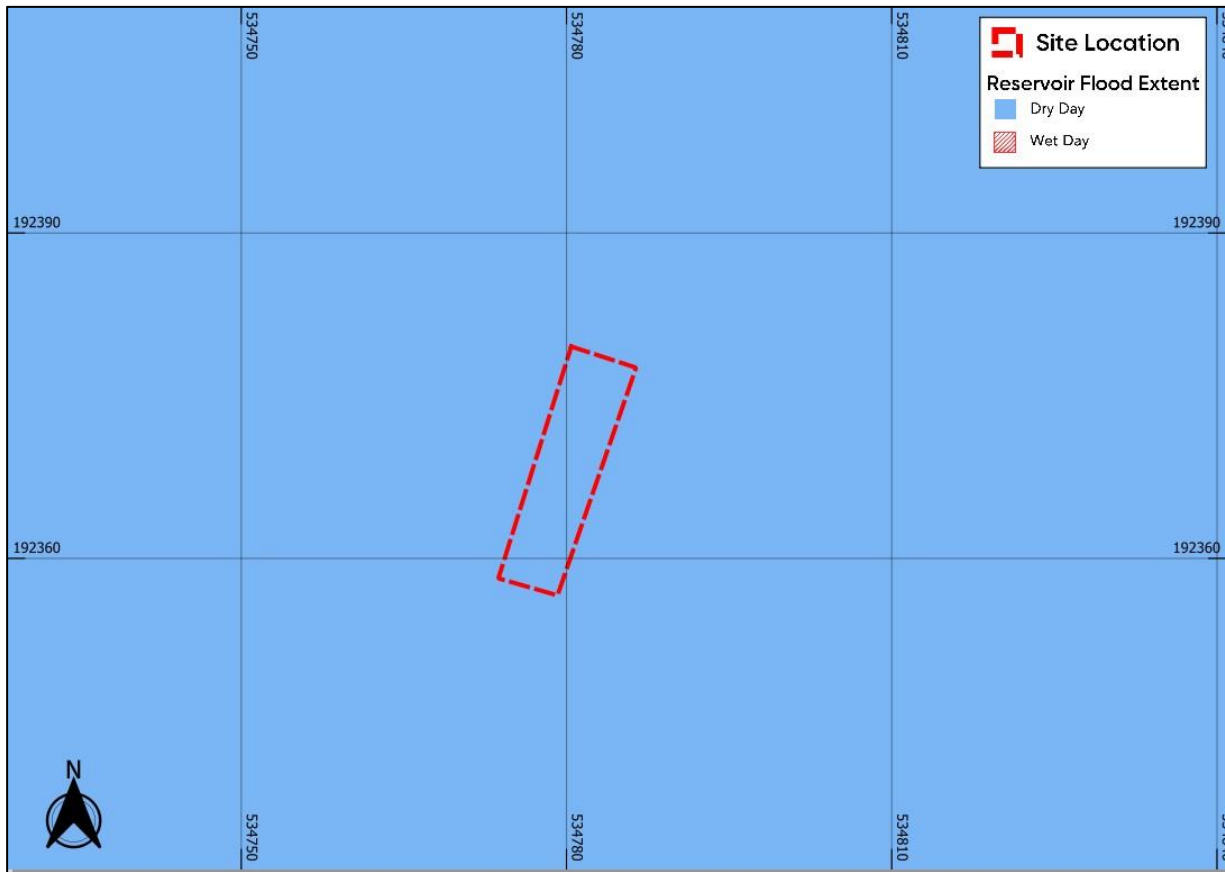


Figure 9: EA Reservoir Flood Risk Mapping (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). ©<https://www.openstreetmap.org> and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

- 4.30. 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.
- 4.31. 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

- 4.32. Groundwater flooding occurs in areas where underlying geology is permeable, and water can rise within the strata sufficiently to breach the surface.
- 4.33. The British Geological Survey's (BGS) mapping shows superficial deposits of Enfield Silt Member comprising clay underlying the site. The bedrock underlying the site is London Clay comprising Clay, silt and sand.
- 4.34. A historical BGS borehole record located approximately 70m southwest (BGS reference: TQ39SW155) shows that groundwater was struck at 3.8m below the surface. Another borehole located approximately 80m southeast struck water at 3.5m below the surface.
- 4.35. 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 cell which is < 25% at risk of groundwater flooding in the future (Figure 10).

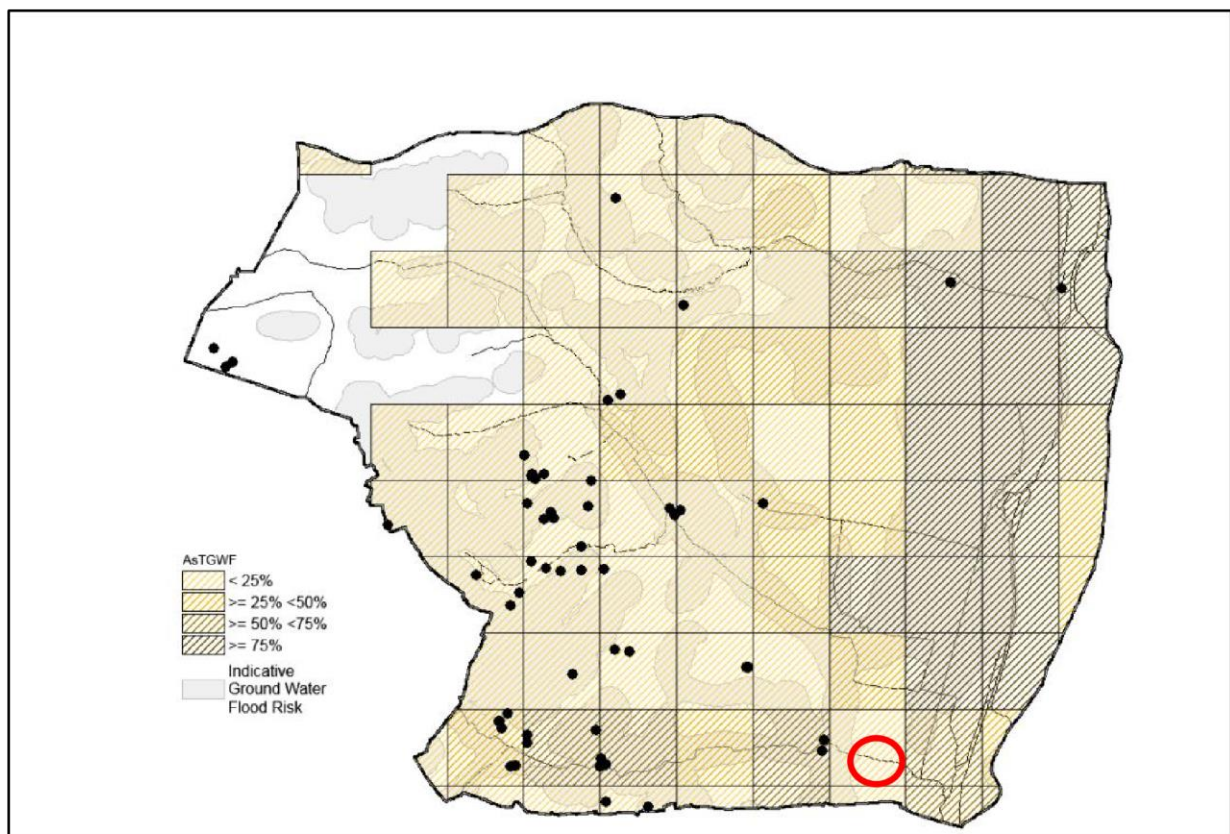


Figure 10: Enfield SFRA - Areas Susceptible to Groundwater Flooding overlaid with indicative groundwater flood risk areas and locations of groundwater flooding incidents shown as black dots. Site location circled in red.

- 4.36. The site is not within the vicinity of any recorded groundwater flooding events.

4.37. As the development proposals do not include any proposed basements, the risk from groundwater to the development is considered to be low.

Sewers

4.38. 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.

4.39. The Enfield Level 1 SFRA holds record of the number of properties affected by sewer flooding in the last 20 years by the postcode area. This information is reproduced as Table 2.

Table 2: Enfield SFRA – Sewer Flooding Incident in the last 20 years

Postcode Area	Total	Surface Water	Foul	Combined
N18 2	3	0	3	0

4.40. Local policy documentation does not identify the site as being in a Critical Drainage Area.

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

5. Flood Risk Mitigation

Fluvial and Pluvial

- 5.1. During the 1:100 year (+CC) event (considered the design event) the proposed extension is at risk of flooding to depths of 0.77m according to the Enfield fluvial model and depths of 0.64m according to the Salmons Brooks (2016) fluvial model. As such, the development is at a high risk of fluvial flooding.
- 5.2. The proposed extension is at risk of flooding to depths of 0.6m during the 'Low risk' surface water event. As such, the risk of surface water flooding is moderate.

Mitigation

- 5.3. The proposed development is a minor development (in terms of flood risk), as such, following the EA's Standing Advice for minor extensions, Finished Floor Levels (FFLs) are set no lower than the existing.
- 5.4. The proposed development should be constructed in a flood resilient manner, in accordance with DCLG Report *Improving the Flood Performance of New Buildings Flood Resilient Construction (2007)* (standards for the installation and retrofit of resistance measures are available in British Standard 851188-1:2019+A1:2021). The following mitigation measures are recommended:
 - Damp proof membranes should be included within the design of the dwelling to minimise the passage of water through ground floors. Impermeable polythene membranes should be at least 1200 gauge to minimise ripping.
 - Cavity insulation should preferably incorporate rigid closed cell materials as these retain integrity and have low moisture take-up.
 - Non-return valve fitted to the existing sewer connection.
 - Air bricks to be fitted with waterproof removable covers.
 - Air bricks to be fitted with periscopic vents.

Reservoirs, Tidal, Canals, Groundwater and Sewers Increase to Flood Risk Elsewhere

- 5.5. Flood risk from other sources is deemed to be low, therefore mitigation is not required.

5.6. It is understood that the proposed development is for construction of a single storey rear extension to provide greater habitable space 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. As such, the proposed development in isolation should have a negligible impact on flood risk elsewhere. As a precautionary measure it is recommended that the proposed development utilises minor SuDS and to provide a betterment to the existing drainage infrastructure.

Flood Warnings

5.9. The site is in the Environment Agency (EA) 'Pymmes Brook at Upper Edmonton and Tottenham' flood warning service area. This service allows site owners to register an address along with contact details so that, in the event of a flood being forecast, they are sent an alert. As a further precaution and risk reduction, the owner of the site should sign up.

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.

Access and Egress

5.11. It is important to note that as the proposed development is a minor development in terms of flood risk, access/ egress will remain as existing. However, prior evacuation of the site should be sought following the EA flood warning.

6. Conclusions

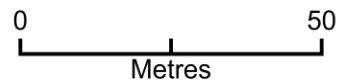
- 6.1. This FRA has been undertaken with reference to the requirements of NPPF and Planning Practice Guidance with respect to the development at 20 Cavendish Road, Edmonton, London, N18 2LS. It has been written to support a planning application and prepared with due consideration to the nature of the 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:

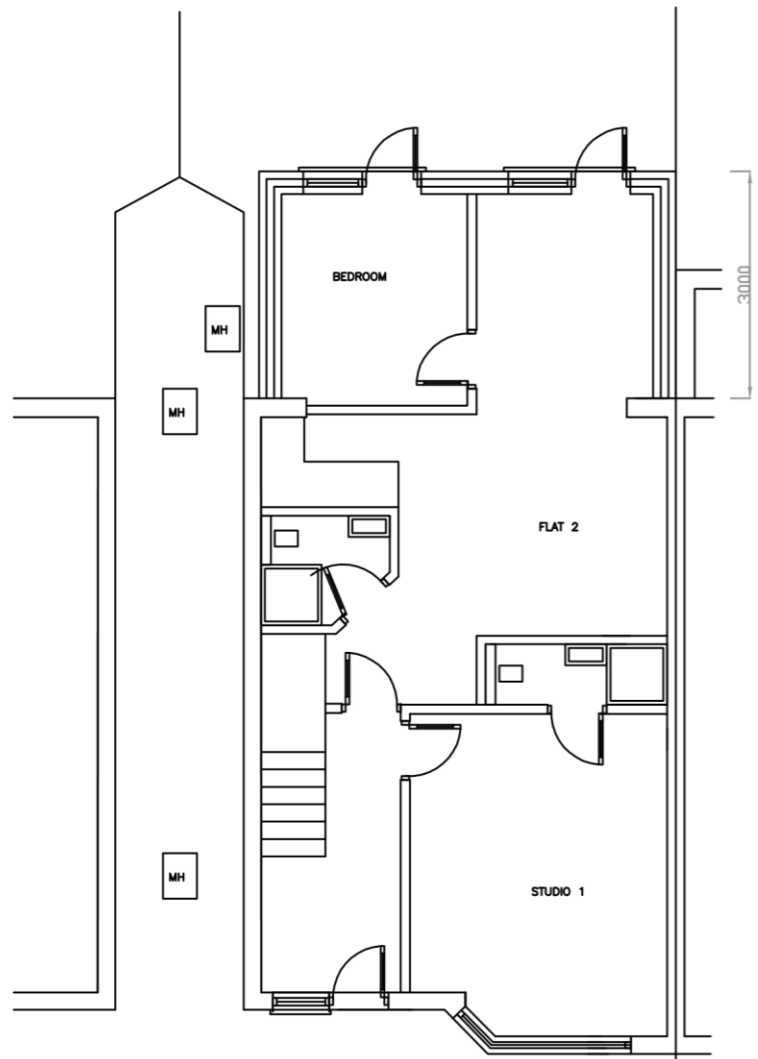
Source of Flooding	Flood Risk Summary
Fluvial	During the 1:100 year (+CC) event (considered the design event) The proposed extension is at risk of flooding to depths of 0.77m according to the Enfield fluvial model and depths of 0.64m according to the Salmons Brooks (2016) fluvial model. As such, the development is at a high risk of fluvial flooding.
Pluvial	The proposed extension is at risk of flooding to depths of 0.6m during the 'Low risk' surface water event. As such, the risk of surface water flooding is moderate.
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. This Flood Risk Assessment should be submitted as part of the planning application to satisfy the requirements under NPPF.

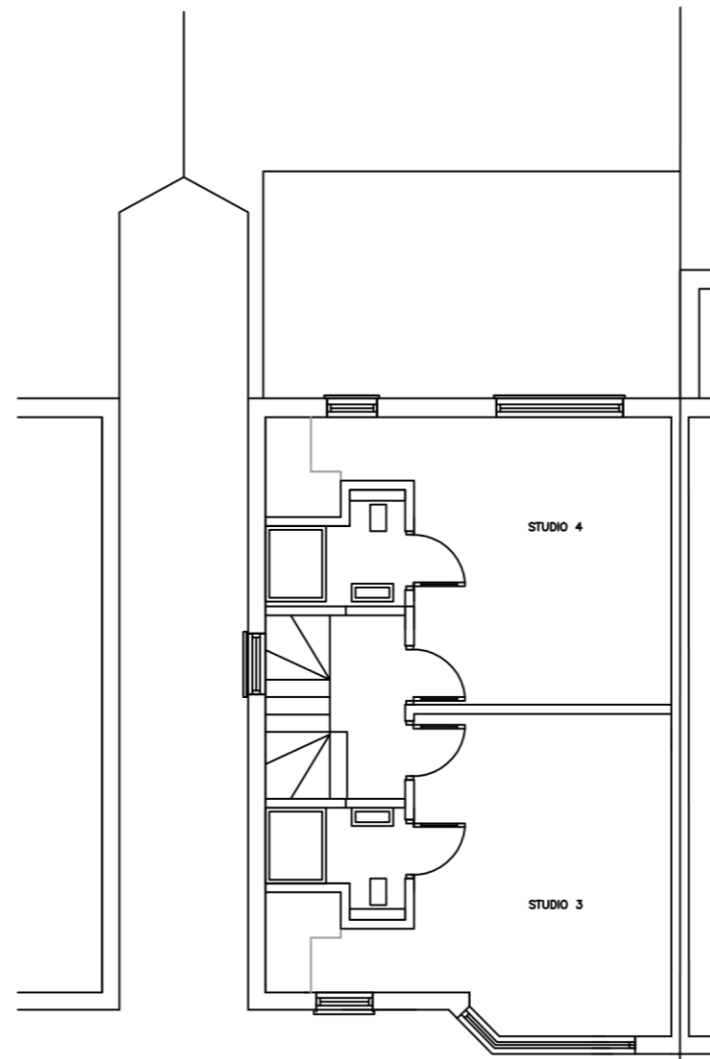
Appendix A - Development Proposals

Site Location Plan- 20 Cavendish Road, London N18 2LS

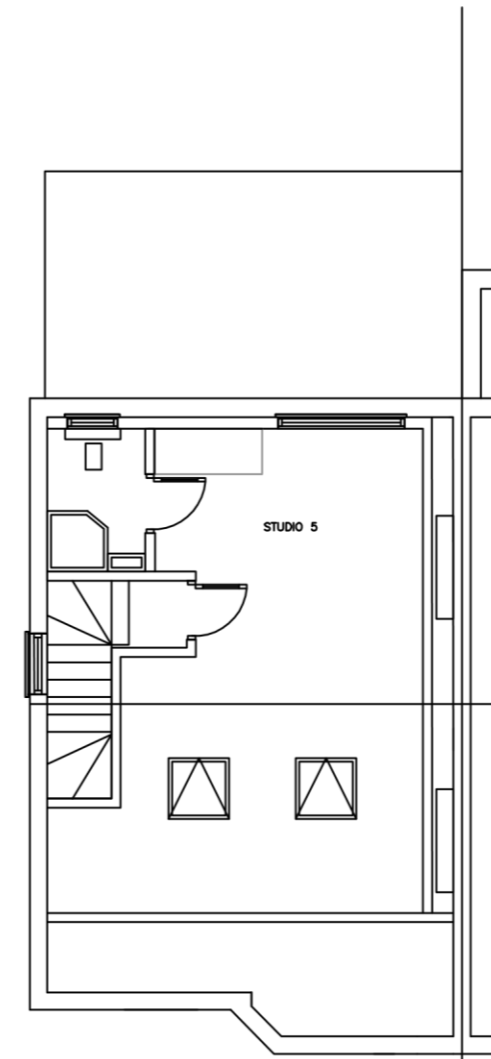




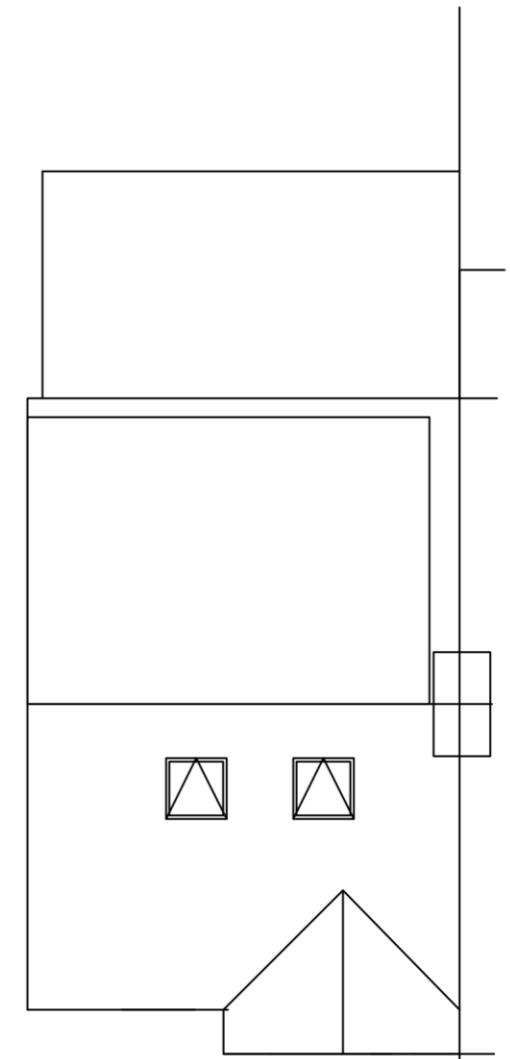
EXISTING/PROPOSED GROUND FLOOR



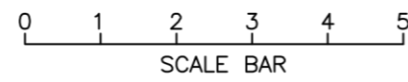
EXISTING/PROPOSED FIRST FLOOR



EXISTING/PROPOSED SECOND FLOOR



PROPOSED ROOF



GENERAL NOTES

1. All dimensions in millimetres (mm).
2. Mains operated smoke alarms to all landings. In series and battery back up.
3. Dimension are to be obtained on site and not scaled off this plan applied for contractor only.
4. Finished room dimensions may vary to those stated on this plan.
5. Work although specified may not be part of the agreed schedule of works/contract.
6. Any changes to this drawing must be advised/consulted by the Architect or Building Control Officer/Planning as applicable.
7. Party Wall Agreements are deemed to be the responsibility of the client unless the Architect is specifically appointed under a separate agreement to undertake such matters.
8. It is the responsibility of the client to wait for full planning permission and full building regulations to be granted before any work start.
9. All structural members are calculated without the length of the bearing. It is the responsibility of the contractor to measure the required length of any structural member on site.



LONDON
CONSULTANTS LTD

FLOOR PLAN

DATE: 29.01.2024

SCALE: 1:100

DRAWING NUMBER: gla-011

SITE ADDRESS: 20
CAVENDISH RD

DRAWN: *J. V*

CHECK: *R. K*

REV: