PROPOSED PART CHANGE OF USE FROM OFFICES TO RESIDENTIAL TOGETHER WITH BASEMENT LEVEL AND SECOND FLOOR AT 27 ELIZABETH MEWS, CAMDEN, LONDON

FLOOD RISK ASSESSMENT

MAY 2023

REPORT REF: 3202/RE/05-23/01

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CONTRACT

Evans Rivers and Coastal Ltd has been commissioned by Geotechnical & Environmental Associates to carry out a Flood Risk Assessment for a proposed part change of use from offices to residential together with a basement level and second floor at number 27 Elizabeth Mews, Camden, London.

QUALITY ASSURANCE, ENVIRONMENT AND HEALTH AND SAFETY

Evans Rivers and Coastal Ltd operates a Quality Assurance, Environmental, and Health and Safety Policy.

This project comprises various stages including data collection; depth analysis; and reporting. Quality will be maintained throughout the project by producing specific methodologies for each work stage. Quality will also be maintained by providing specifications to third parties such as surveyors; initiating internal quality procedures including the validation of third party deliverables; creation of an audit trail to record any changes made; and document control using a database and correspondence log file system.

To adhere to the Environmental Policy, data will be obtained and issued in electronic format and alternatively by post. Paper use will also be minimised by communicating via email or telephone where possible. Documents and drawings will be transferred in electronic format where possible and all waste paper will be recycled. Meetings away from the office of Evans Rivers and Coastal Ltd will be minimised to prevent unnecessary travel, however for those meetings deemed essential, public transport will be used in preference to car journeys.

The project will follow the commitment and objectives outlined in the Health and Safety Policy operated by Evans Rivers and Coastal Ltd. All employees will be equipped with suitable personal protective equipment prior to any site visits and a risk assessment will be completed and checked before any site visit. Other factors which have been taken into consideration are the wider safety of the public whilst operating on site, and the importance of safety when working close to a water source and highway. Any designs resulting from this project and directly created by Evans Rivers and Coastal Ltd will also take into account safety measures within a "designers risk assessment".

Report carried out by:

Rupert Evans, BSc (Hons), MSc, CEnv, C.WEM, MCIWEM, PIEMA

DISCLAIMER

This report has been written and produced for Geotechnical & Environmental Associates. No responsibility is accepted to other parties for all or any part of this report. Any other parties relying upon this report without the written authorisation of Evans Rivers and Coastal Ltd do so at their own risk.

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1. INTRODUCTION

1.1 Project Scope

1.1.1 Evans Rivers and Coastal Ltd has been commissioned by Geotechnical & Environmental Associates to carry out a Flood Risk Assessment for a proposed part change of use from offices to residential together with a basement level and second floor at number 27 Elizabeth Mews, Camden, London.

1.1.2 It is understood that this Flood Risk Assessment will be submitted to the Planning Authority as part of a planning application. Specifically, this assessment intends to:

a) Review any literature and guidance specific to this area;

b) Assess the risks to people and property and propose mitigation measures accordingly;

c) Review existing evacuation and warning procedures for the area;

d) Carry out an appraisal of flood risk from all sources as required by NPPF;

e) Report findings and recommendations.

1.1.3 This assessment is carried out in accordance with the requirements of the National Planning Policy Framework (NPPF) dated 2021. Other documents which have been consulted include:

- DEFRA/EA document entitled *Framework and guidance for assessing and managing flood risk for new development Phase 2 (FD2320/TR2)*, 2005;
- DEFRA/Jacobs 2006. *Groundwater flooding records collation, monitoring and risk assessment (ref HA5)*.
- National Planning Practice Guidance – Flood Risk and Coastal Change.
- Woods-Ballard., et al. 2015. *The SUDS Manual, Report C753*. London: CIRIA.
- National SUDS Working Group. 2004. *Interim Code of Practice for Sustainable Drainage Systems*.
- London Borough of Camden Preliminary Flood Risk Assessment (PFRA) Version 0.2 dated 2011.
- London Borough of Camden Strategic Flood Risk Assessment (SFRA) dated 2014.
- London Borough of Camden Surface Water Management Plan (SWMP) Version 1 dated 2011.
- London Borough of Camden flood risk management strategy (FRMS) dated 2013.
- *Camden Planning Guidance – Water and Flooding* dated 2018.
- *Camden Planning Guidance – Basements* dated 2021.

2. DATA COLLECTION

2.1 To assist with this report, the data collected included:

- 1:250,000 *Soil Map of South East England* (Sheet 6) published by Cranfield University and Soil Survey of England and Wales 1983.
- Ordnance Survey 1:10,000 street view map obtained via Promap (Evans Rivers and Coastal Ltd OS licence number 100049458).
- 1:625,000 *Hydrogeological Map of England and Wales*, published in 1977 by the Institute of Geological Sciences (now the British Geological Survey).
- Filtered LIDAR data at 1m resolution.
- British Geological Survey, *Online Geology of Britain Viewer*.
- British Geological Survey, *Groundwater Susceptibility Map*.

3. SITE CHARACTERISTICS

3.1 Existing Site Characteristics and Location

3.1.1 The site is located at number 27 Elizabeth Mews, Camden, London. The approximate Ordnance Survey (OS) grid reference for the site is 527532 184631 and the location of the site is shown on Figure 1.

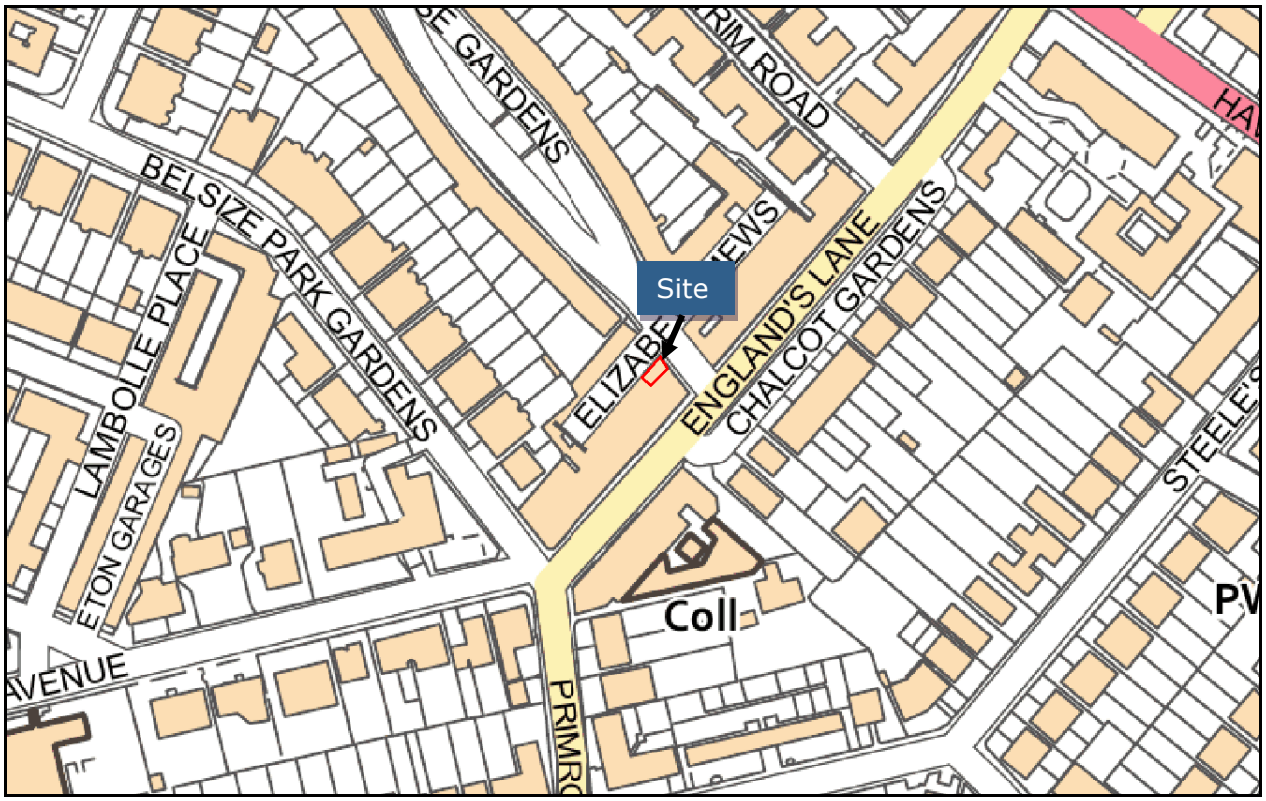

Figure 1: Site location plan (Source: Ordnance Survey)

3.1.2 The site comprises an existing two-storey building currently used as offices. The site is accessed from Elizabeth Mews adjacent to the north western frontage of the site. The existing site layout can be seen on Drawing Number PR-101.

3.1.3 Filtered LIDAR data at 1m resolution has been obtained to determine and illustrate the topography of the site and surrounding area (Figure 2).

3.1.4 By reviewing the site layout and LIDAR data it can be seen that the ground floor level is set at approximately 54.65m AOD.

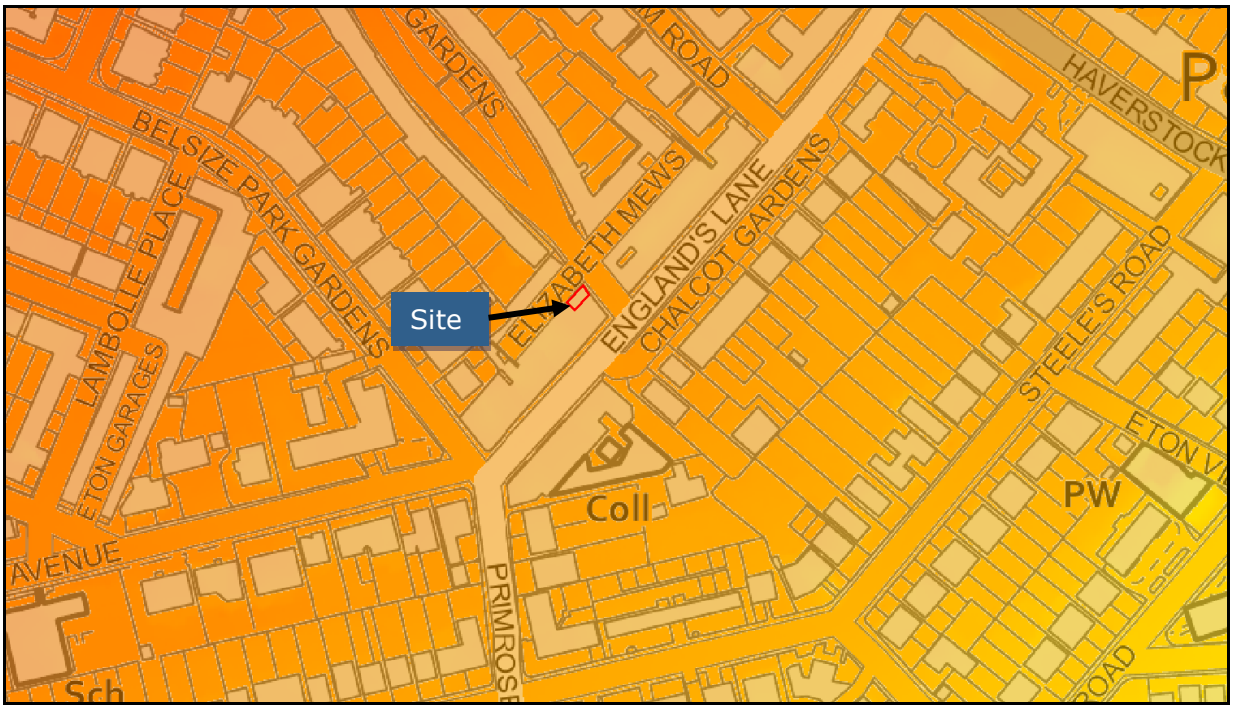

Figure 2: LIDAR survey data where higher ground is denoted as red, orange and yellow colours and lower areas denoted by blue and green colours

3.2 Site Proposals

3.2.1 It is the Client's intention to retain offices across the ground floor and across a new basement level whilst providing a residential use across the first floor and a new second floor level. Access into the residential area will be provided from a private access and stairwell at ground floor level.

3.2.2 The basement will be at least 2.70m lower than existing ground floor level.

3.2.3 The site proposals can be seen on Drawing Number PR-105.

4. SOURCES OF FLOODING

4.1 Fluvial

4.1.1 The Environment Agency Flood Map (Figure 3) shows that the site is located within the NPPF Flood Zone 1, 'Low Probability' which comprises land as having less than a 1 in 1000 year annual probability of fluvial or tidal flooding (i.e. an event more severe than the extreme 1 in 1000 year event). NPPF states that all uses of land are appropriate in this zone.

4.1.2 The SFRA also states that there has been no historical flooding within the Borough from fluvial or tidal sources.

4.1.3 The SFRA and SWMP states that all main rivers historically located within the Borough are now culverted and incorporated into the sewer network. The SWMP discusses the River Fleet which is one of London's "lost rivers" and which historically originates from springs on Hampstead Heath and drains to the Thames through the Borough. The Fleet is entirely incorporated within the sewer network.

4.1.4 The SFRA continues to discuss the Borough's historic rivers and in addition to the Fleet, the Tyburn, Kilburn and Brent were also located in the area of Hampstead Heath. All of these "lost rivers" are also now incorporated into the local sewer system maintained by Thames Water. It is for these reasons that the Borough is located entirely within Flood Zone 1.

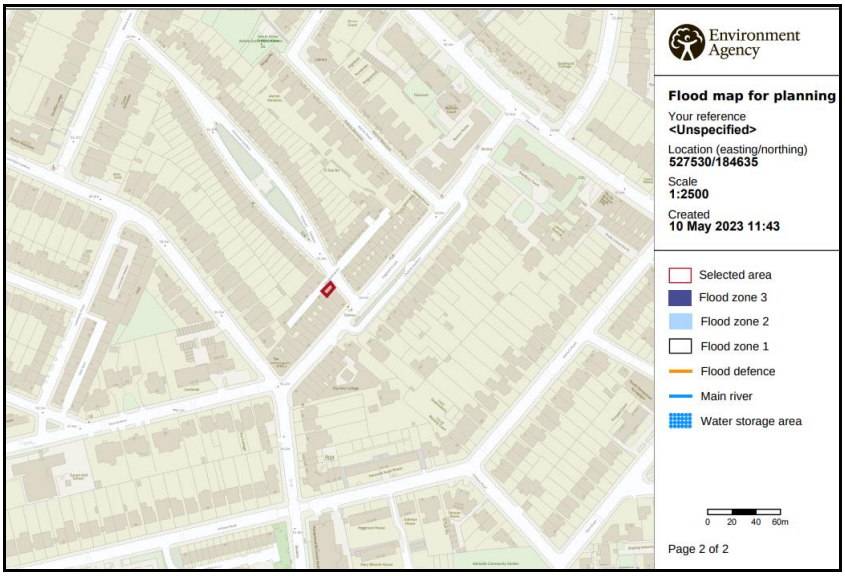

Figure 3: Environment Agency Flood Map (Source: Environment Agency)

4.2 Critical Drainage Areas (CDA)

4.2.1 It is understood from Figure 6/Rev 2 of the SFRA and Figure 3.1 of the SWMP, that the site is located within the Group3-003 Critical Drainage Area (CDA).

4.2.2 The SWMP defines the CDA as:

"A discrete geographic area (usually a hydrological catchment) where multiple and interlinked sources of flood risk (surface water, groundwater, sewer, main river and/or

tidal) cause flooding in one or more Local Flood Risk Zones during severe weather thereby affecting people, property or local infrastructure."

4.3 Groundwater Flooding

4.3.1 In addition to the information provided in the SFRA and SWMP, in order to assess the potential for groundwater flooding, the Jacobs/DEFRA report entitled *Strategy for Flood and Coastal Erosion Risk Management: Groundwater Flooding Scoping Study*, published in May 2004, was consulted, together with the guidance offered within the document entitled *Groundwater flooding records collation, monitoring and risk assessment (ref HA5)*, commissioned by DEFRA and carried out by Jacobs in 2006.

4.3.2 The various soil and geological data outlined in Chapter 2, together with Figure 4b/Rev 1 of the SFRA indicates that the soils beneath the site comprise London Clay.

4.3.3 Figure 4e/Rev 1 of the SFRA shows that the site has not been affected in the past from groundwater flooding incidents, and that the site is not located within an area of increased susceptibility to elevated groundwater.

4.3.4 The basement will need to be designed to achieve a Grade 3 level of waterproofing protection as outlined in BS8102:2009. A new reinforced concrete lining wall and ground-bearing concrete slab should be constructed using water resistant concrete to form the primary barrier. Appropriate groundwater control such as sump pumping may be required especially during the construction phase.

4.4 Surface Water Flooding and Sewer Flooding

4.4.1 Surface water and sewer flooding across urban areas is often a result of high intensity storm events which exceed the capacity of the sewer thus causing it to surcharge and flood. Poorly maintained sewer networks and blockages can also exacerbate the potential for sewer flooding.

Surface Water Flooding

4.4.2 It has been established that the site lies within the Group3-003 Critical Drainage Area. The SFRA notes that the surface water mapping indicates that the surface water flood extent broadly follows the natural topography of the borough and man-made features such as roads and rail lines. During extreme modelling scenarios, the SFRA states that there is increased ponding in areas of properties.

4.4.3 The SFRA discusses the two large surface water flooding events in the Borough, which occurred in 1975 and 2002 and caused widespread damage. It is understood that during these events the sewers reached maximum capacity and Figure 3ii/Rev 1 of the SFRA shows that Elizabeth Mews was not affected. Figure 3ii/Rev 1 of the SFRA shows that in this area there have been no known properties affected by surface water flooding in the past.

4.4.4 Figure 3ii/Rev 1 of the SFRA and the Agency's Surface Water Flooding Map (Figure 4 and 5) indicates that there is a very low surface water flood risk across the site (i.e. chance less than 1 in 1000 years).

4.4.5 It is generally accepted that the low risk flood event (i.e. between 1 in 1000 years and 1 in 100 years) on the Agency's map is used as a substitute for the climate change 1 in 100 year event to provide a worst-case scenario.

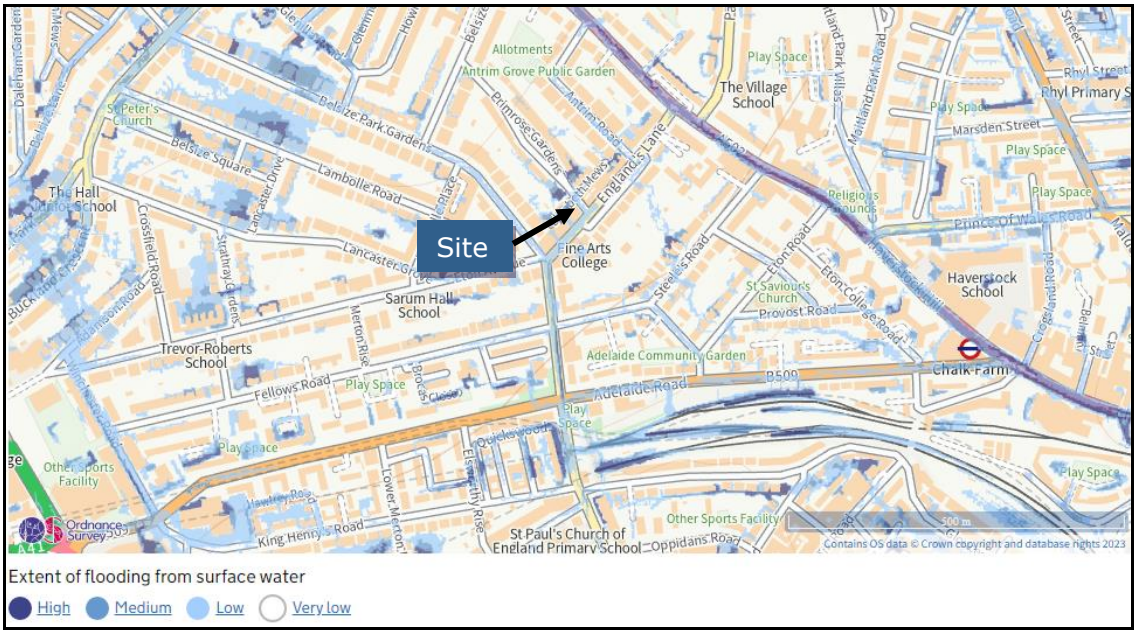

Figure 4: Environment Agency Surface Water Flooding Map (Source: Environment Agency, 2023)

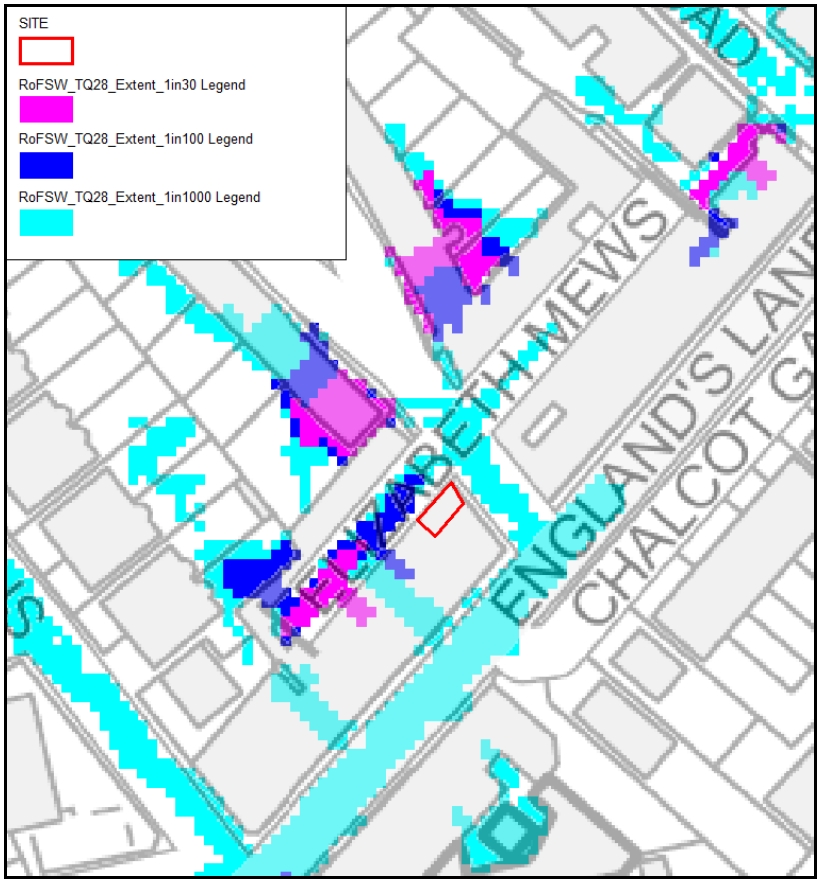

Figure 5: Environment Agency Surface Water Flooding Map (Source: Environment Agency, 2023)

Safe Access/Egress

4.4.6 The mapping shows that Elizabeth Mews adjacent to the site would be affected during low and medium risk events.

4.4.7 To determine the hazard, further more detailed data has been obtained via the Data.gov.uk site (https://environment.data.gov.uk/DefraDataDownload/?Mode=rofsw) (for tile TQ_28).

4.4.8 The flood hazard is calculated based on different combinations of floodwater depth and velocity, and subsequently by using the hazard equation as cited in the DEFRA/EA R&D Document *Framework and guidance for assessing and managing flood risk for new development Phase 2 (FD2320/TR2).* The numerical hazard rating is then categorised into four degrees of flood hazard in accordance with *FD2320/TR2*, shown on Table 1 below.

4.4.9 By reviewing the flood hazard GIS *shape file* downloaded from Data.gov.uk, the hazard to people leaving the building during the peak of the low risk event would be *Dangerous for Most* for 5m, *Dangerous for Some* for 1m then *Very low.*

Table 1: Hazard to people categories (based on *FD2320/TR2)*

Hazard Rating	Degree of Flood Hazard	Description
< 0.75	Very low hazard	Caution "Flood zone with shallow flowing water or deep standing water"
0.75 – 1.25	Danger for Some	Dangerous for some (i.e. children) "Danger: Flood zone with deep or fast flowing water"
1.25 – 2.0	Danger for Most	Dangerous for most people (i.e. general public) "Danger: Flood zone with deep fast flowing water"
> 2.0	Danger for All	Dangerous for all "Extreme danger: flood zone with deep fast flowing water"

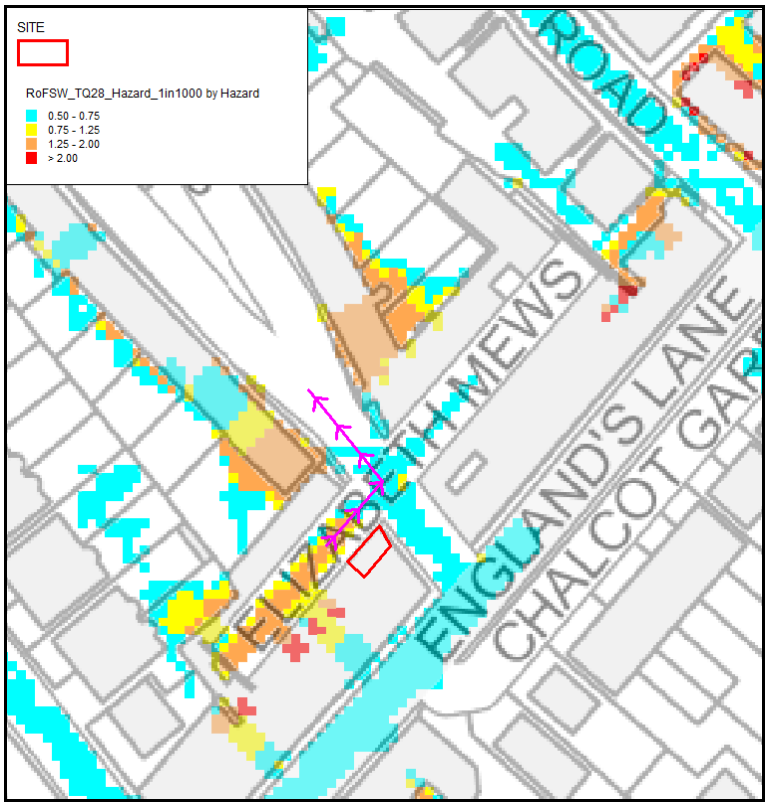

Figure 6: Preferred evacuation route and hazard during low risk event (see Table 1 above for hazard classifications)

Sewer Flooding

4.4.10 The SFRA states that the majority of the Borough is served by a combined surface and foul water system which is designed to accommodate rainfall events of up to 1 in 30 years return period.

4.4.11 The combined sewer network outfalls into the River Thames during intense rainfall events when the sewer network reaches capacity. The evidence suggests that as the sewer capacity becomes exceeded this results in surcharging of the network prior to sufficient discharge into the Thames.

4.4.12 Figure 5a/Rev 1 of the SFRA indicates that the site is located across an area which has had 1 recorded internal sewer flooding incidents. Figure 5b/Rev 1 of the SFRA that the site is located across an area which has had no external sewer flooding incidents.

4.4.13 It is considered that the site should be fitted with a positive pumped device so that it will be protected further from sewer flooding.

4.4.14 In addition to the pumped device there should be a non-return valve (e.g. http://www.forgevalves.co.uk/) installed so that if the sewers become completely full during a heavy storm, foul water does not backflow into the property.

4.4.15 This approach is recommended in section 6.13 of the *Camden Planning Guidance – Basements* dated 2021.

4.5 Reservoirs, Canals And Other Artificial Sources

4.5.1 The failure of man-made infrastructure such as flood defences and other structures can result in unexpected flooding. Flooding from artificial sources such as reservoirs, canals and lakes can occur suddenly and without warning, leading to high depths and velocities of flood water which pose a safety risk to people and property.

4.5.2 The Environment Agency's "Risk of flooding from reservoirs" map suggests that the site is not at risk from reservoirs.

5. SURFACE WATER DRAINAGE AND SUDS

5.1 Section 3.2 of the CPG Basements 2021 states that it will be expected that a minimum of 1 metre of soil be provided above basement development that extends beyond the footprint of the building, to enable garden planting and to mitigate the effect on infiltration capacity.

5.2 The basement is beneath the footprint of the building and the 1m distance between the roof of the basement and ground surface as recommended by section 3.2 of the CPG Basements 2021 does not apply.

6. CONCLUSIONS

- The site is located within Flood Zone 1.
- This assessment has investigated the possibility of groundwater flooding and flooding from other sources at the site. It is considered that there will be a low risk of groundwater flooding which will be further mitigated by tanking of the basement.
- There is a very low surface water flood risk across the site.
- There is a low sewer flooding risk, however, it is considered that the site should be fitted with a positive pumped device so that it will be protected further from sewer flooding. In addition to the pumped device there should be a non-return valve (e.g. http://www.forgevalves.co.uk/) installed so that if the sewers become completely full during a heavy storm, foul water does not backflow into the property.

7. BIBLIOGRAPHY

i. *Camden Planning Guidance – Basements* dated 2021.

ii. *Camden Planning Guidance – Water and Flooding* dated 2018.

iii. Communities and Local Government 2018. *National Planning Policy Framework.*

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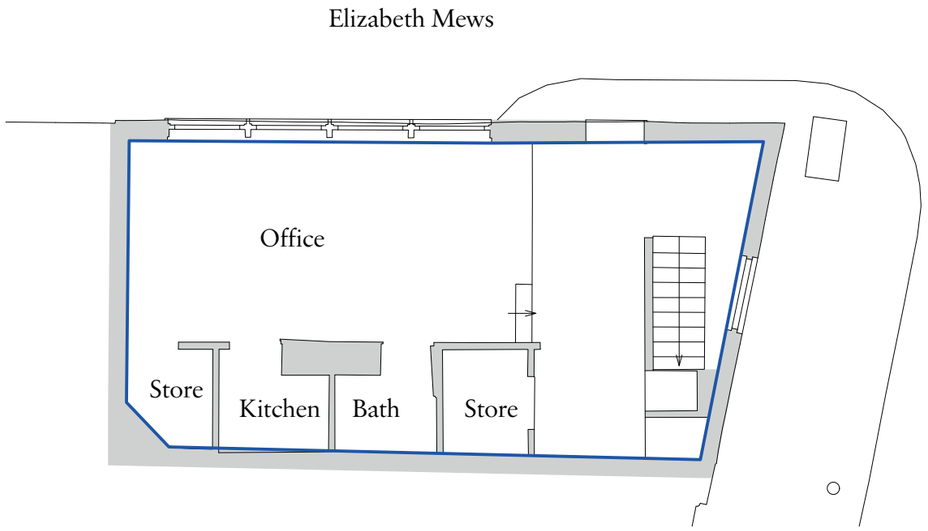
ix. London Borough of Camden Strategic Flood Risk Assessment (SFRA) dated 2014.

x. London Borough of Camden Surface Water Management Plan (SWMP) Version 1 dated 2011.

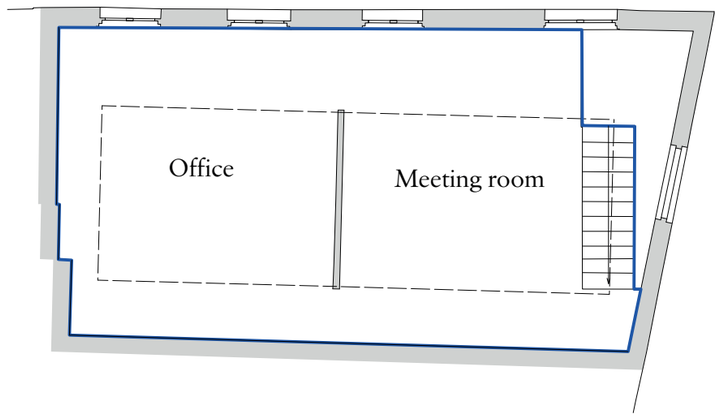
xi. London Borough of Camden flood risk management strategy (FRMS) dated 2013.

xii. Water UK 2012. *Sewers for Adoption 7th Edition, A design and construction guide for developers*. Water Research Council.

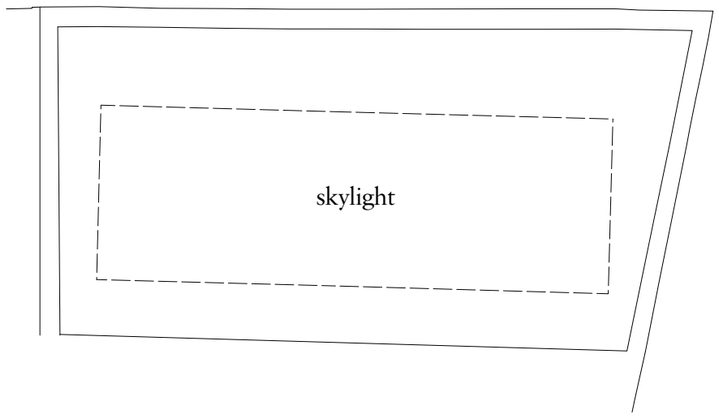
DRAWINGS



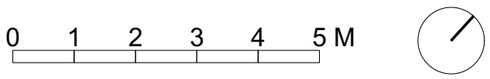
Existing Ground Floor Plan
49.7 sqm.



Existing First Floor Plan
46.6 sqm.



Existing Roof Plan



Total GIA 96.3 sqm.

Rev	Date	Details	By

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Project
27 Elizabeth Mews

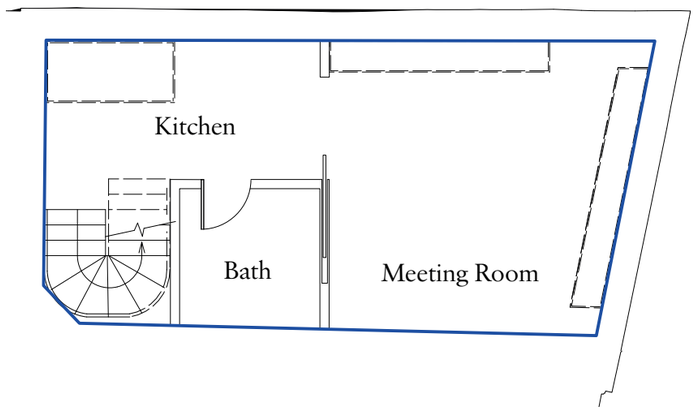
Drawing Title
Existing Floor Plans

Date	Drawn	Checked
22/06/2022	TG	NL

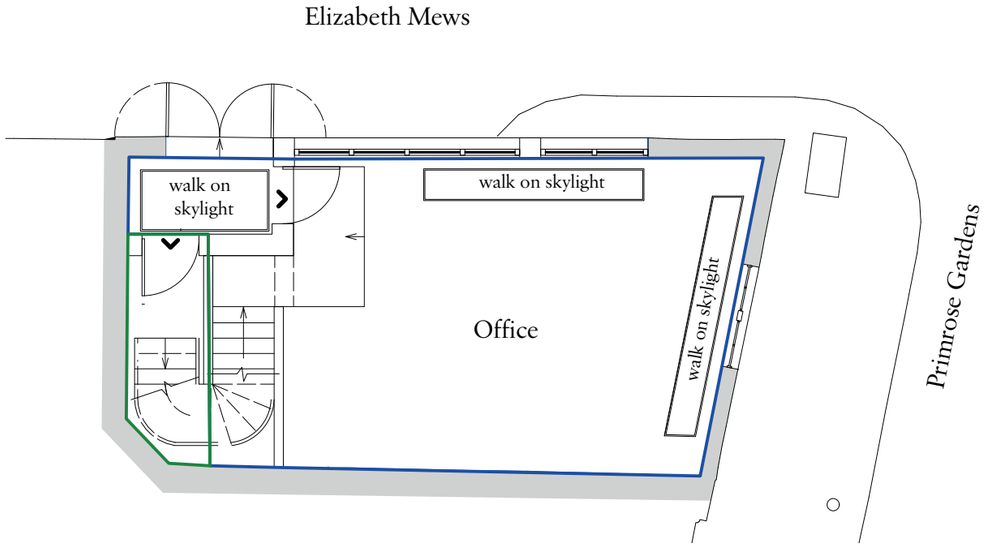
Scale
1:100 @ A3

Issue Status
Planning

Project Number	Drawing Number	Revision
21026	PR-101	

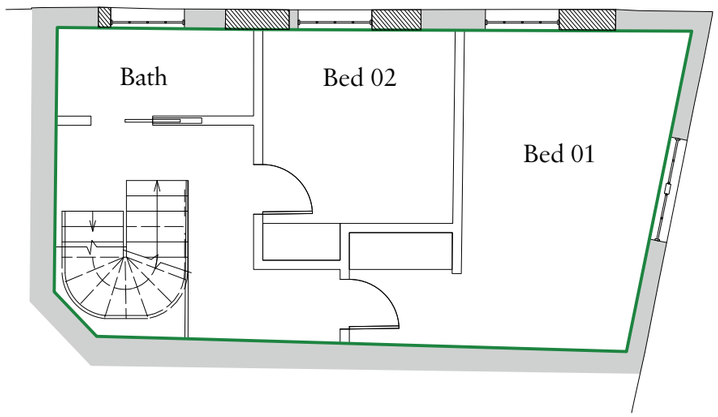


Proposed Office Basement Plan
44.4 sqm.

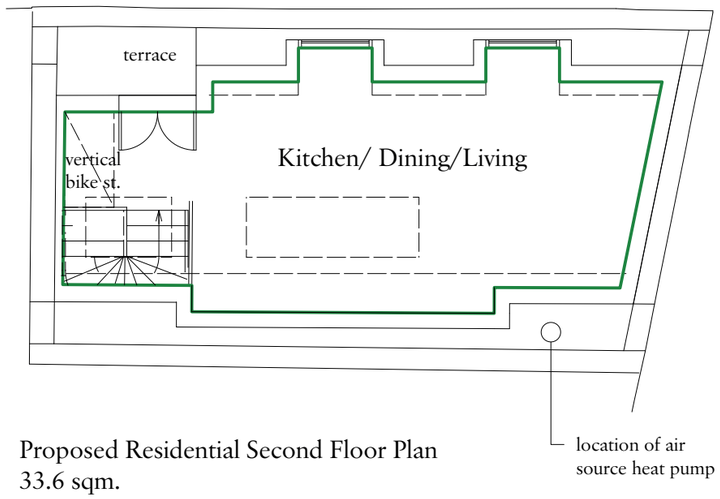


Proposed Office Ground Floor Plan
45.1 sqm.

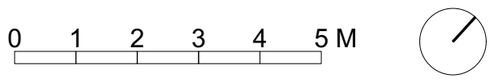
Proposed Residential Ground Floor Plan
4.8 sqm.



Proposed Residential First Floor Plan
50.1 sqm.



Proposed Residential Second Floor Plan
33.6 sqm.



Total Proposed Office GIA 89.5 sqm.

Total Proposed Residential GIA 88.5 sqm.

Rev	Date	Details	By

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