

Flood Risk Assessment

5 Nelmes Close, Hornchurch, Romford

Date	Prepared For	Reference
November 2023	PLG Consultants	73155



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Contract

GeoSon Limited were instructed by Justine Matthews of PLG Consultants by an email dated 1st November 2023 to undertake a Site Specific Flood Risk Assessment to support a proposed planning application for development at 5 Nelves Close, Hornchurch, Romford.

Project	Flood Risk Assessment for Planning
Prepared For	PLG Consultants
Location	5 Nelves Close, Hornchurch, Romford RM11 2QA
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Our Reference	73155
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Issued To	Justine Matthews (PLG Consultants)
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Purpose

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Introduction

Context

GeoSon Limited have been instructed by PLG Consultants to undertake a Site Specific Flood Risk Assessment (FRA) to support a proposed planning application for development at 5 Nelves Close, Hornchurch, Romford.

This FRA has been undertaken in accordance with the revised National Planning Policy Framework (NPPF) July 2021 and the associated Planning Practice Guidance (PPG).

The level of flood risk to and from the site has been determined using third party information including Environment Agency flood data, national government mapping, LiDAR topography data and Local Authority documentation.

National FRA Requirements

In accordance with the National Planning Policy Framework (NPPF), a Flood Risk Assessment is required to accompany a planning application when a development site is:

- located within flood zones 2 or 3 (including minor development and change of use)
- more than 1 hectare (ha) in size
- less than 1 ha in flood zone 1 however includes a change of use in development type to a more vulnerable class (for example from commercial to residential) which could be affected by sources of flooding other than rivers and the sea
- located within an area which has been identified to have critical drainage problems by the Environment Agency

The site is located within Flood Zone 2 and 3 on the Environment Agency's Flood Map for Planning. As such, in accordance with NPPF guidance, London Borough of Havering Council have requested that the applicant submit a Flood Risk Assessment in order to validate the proposed application.

The Flood Risk Assessment is required to consider the proposed use of the site and assess the potential flood risk posed to the intended development from multiple sources of flooding including rivers, sea, surface water, groundwater, reservoir failure, sewer surcharge and any other artificial sources.

The Flood Risk Assessment will assess the risk posed from all potential sources of flooding so that site users and third party land will be safe now and for the expected lifetime of the development, taking climate change into account.

Objectives

The objectives of this document are to determine:

- Whether the site is at significant risk of flooding from any source currently or in the future, taking climate change into account
- Whether the development will increase flood risk elsewhere

If the site is identified to be at risk of flooding from any source this FRA will:

- Outline appropriate mitigation measures, compliant with NPPF and PPG, which would be suitable to incorporate within the proposed development to alleviate flood risk on and off site
- Determine whether safe ingress and egress can be achieved and maintained for the lifetime of the development

Site Details

Site Description

The proposed application site is located at 5 Nelmes Close, Hornchurch, Romford RM11 2QA. The site is approximately 800m² in size and is currently occupied by a detached residential dwelling with a driveway in the south east and a soft landscaped garden to the north.

The site is located at the end of a cul-de-sac and is accessed via Nelmes Close which terminates at the south eastern corner of the application boundary.

Having reviewed aerial imagery the wider area is primarily characterised by detached residential dwellings, similar to that of the site.

Site Address	5 Nelmes Close, Hornchurch, Romford RM11 2QA
Current Use	Residential Use
Proposed Use	Residential Use
OS NGR	TQ 54655 88928
County	Greater London
Local Planning Authority	London Borough of Havering
Lead Local Flood Authority	London Borough of Havering

Table 1: Site Details



Figure 1: View of the Site from Nelmes Close (Source: Google)

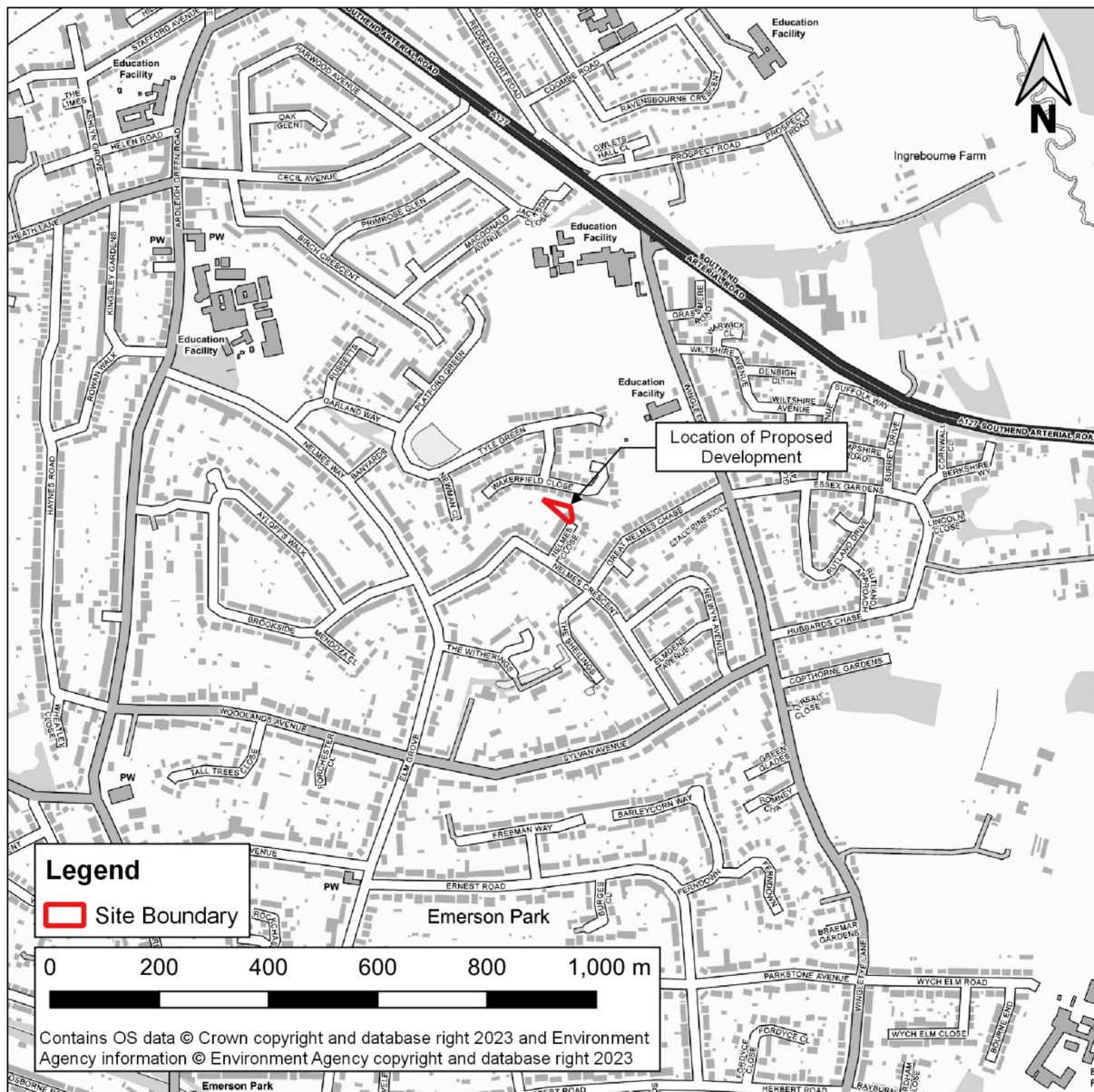


Figure 2: Site Location

Topography

Topographic LiDAR data has been obtained from the Environment Agency to assess the ground elevation profile across the site and within the wider area.

Light Detection and Ranging (LiDAR) is an airborne remote sensing technique, which accurately measures the height of the terrain and surface objects on the ground through the use of a laser, scanner and GPS receiver. The mapping technique measures the distance between the aircraft and the ground to generate precise, three-dimensional information of the terrain and surface objects. Hundreds of thousands of measurements per second are made of the ground, allowing highly detailed surface and terrain models to be generated at different spatial resolutions ranging between 25cm and 2.0 metres.

The LiDAR dataset can be supplied in two forms by the EA:

1. As a Digital Surface Model (DSM), which includes surface objects, such as vehicles, buildings and vegetation, as well as the terrain surface. Or;
2. As a Digital Terrain Model (DTM) produced by removing surface objects such as buildings from the Digital Surface Model through application of bespoke algorithms and manual filtering techniques.

For the purposes of this study the 1.0m resolution Digital Terrain Model has been used.

Environment Agency 1.0m LiDAR data indicates that ground levels within the application boundary have a 0.35m elevation range between 28.20mAOD and 28.55mAOD.

Nelmes Close, adjacent south east, appears to be elevated at approximately 28.55mAOD.

According to plans provided by the client, the proposed extension will be developed upon land with an approximate elevation of 28.40mAOD.

Having reviewed EA LiDAR data for the wider area, the site is located at the top of a localised 'valley' with the immediate surrounding land sloping in a westerly direction away from the development. Figure 3 shows the elevation profile of the site and surrounding area.

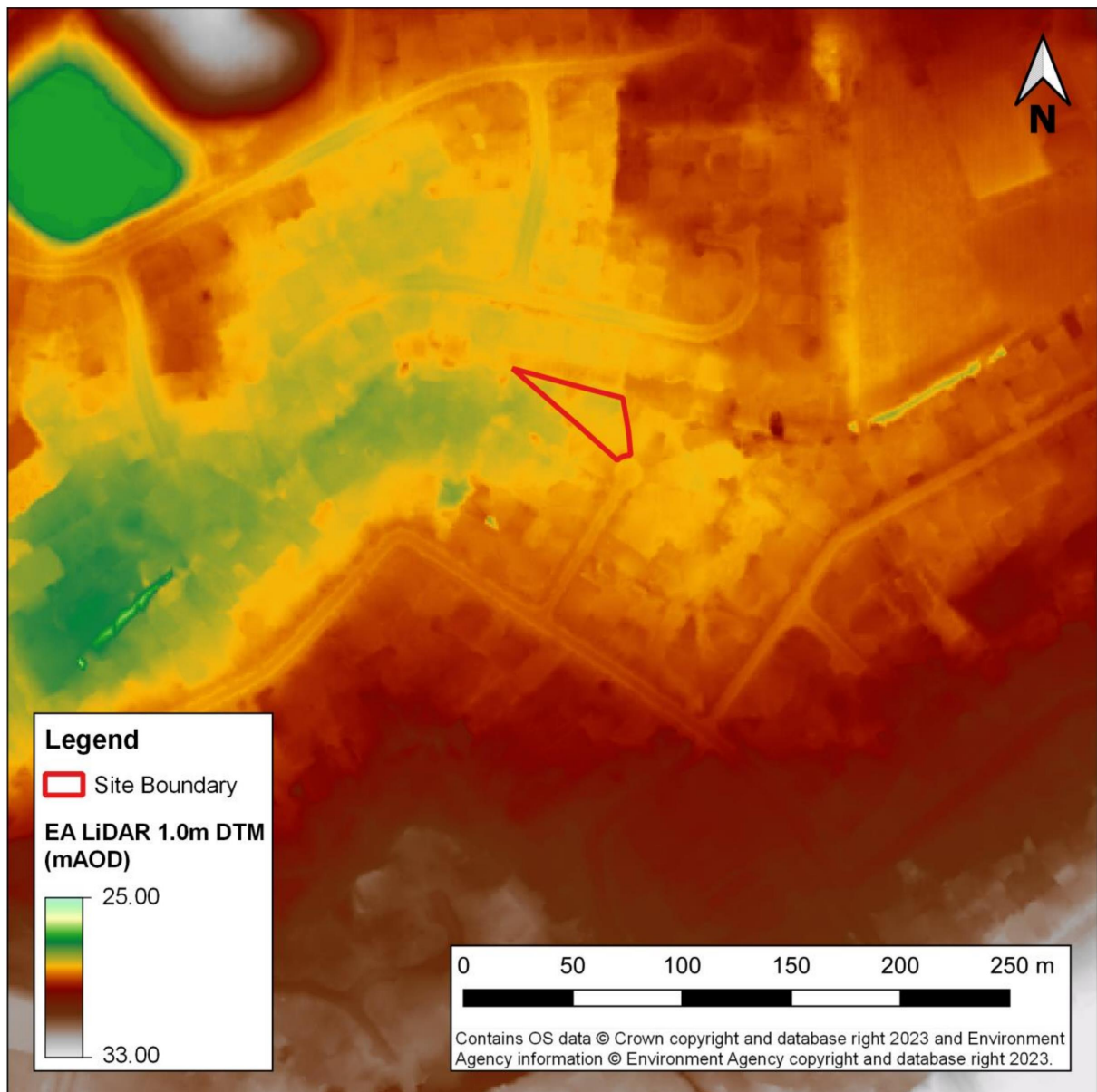


Figure 3: Topography of the Site and Surrounding Area

Geology and Hydrogeology

Review of online British Geological Survey (BGS) records indicates that the site is located upon London Clay Formation (Clay and Silt) bedrock. This geological strata was formed during the Ypresian Age some 47.8 to 56.0 million years ago.

Records state that London Clay Formation is typically characterised by bioturbated or poorly laminated, blue-grey or grey-brown, slightly calcareous, silty to very silty clay, clayey silt and sometimes silt, with some layers of sandy clay.

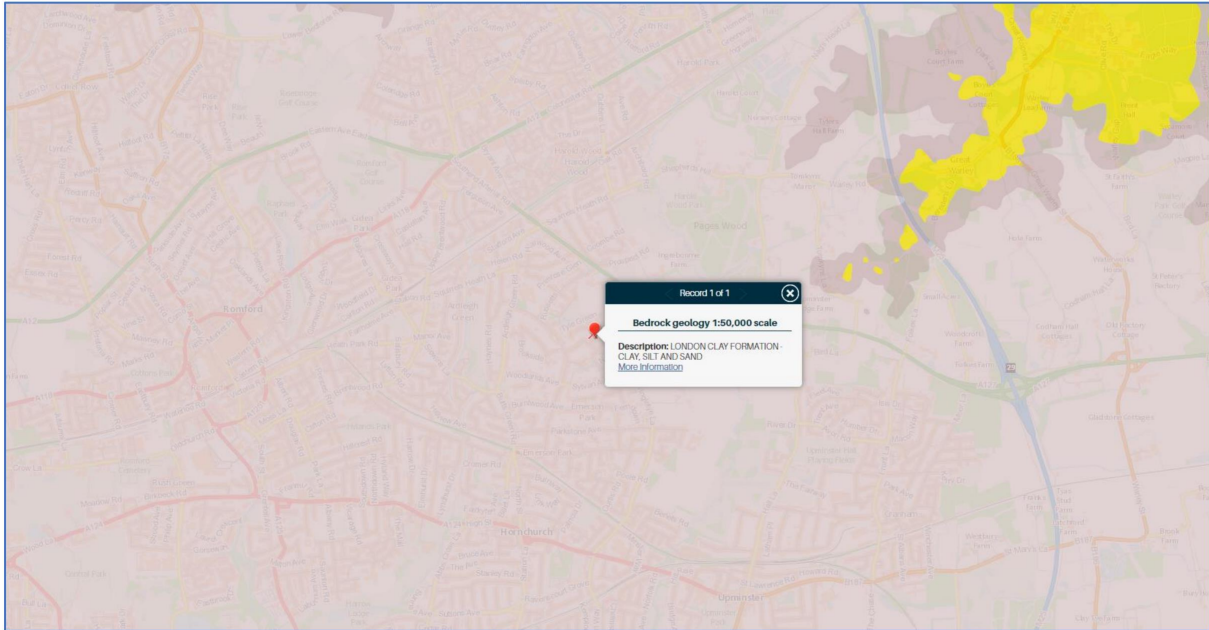


Figure 4: Bedrock Geology Map (Source: British Geological Survey)

According to BGS data the site is also underlain by superficial deposits comprising Alluvium (Clay, Silt, Sand and Gravel).

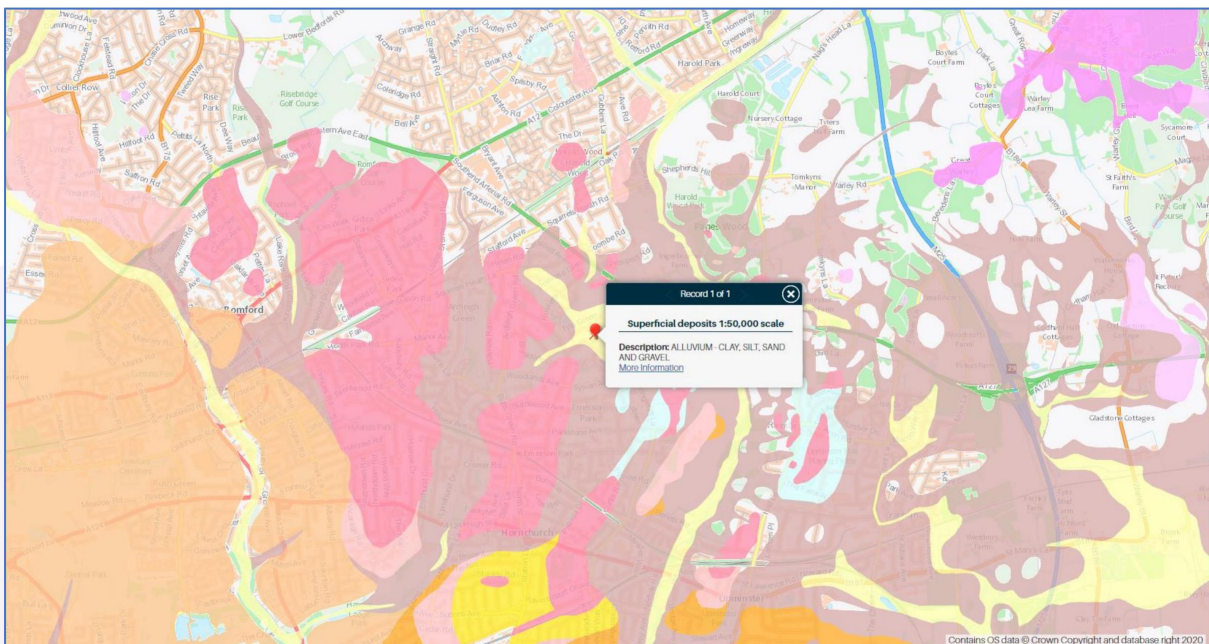


Figure 5: Superficial Deposit Geology Map (Source: British Geological Survey)

Review of Landis Soilscales online viewer suggests that the site is located in area where the soils are classified as 'Slowly permeable, seasonally wet, slightly acid but base-rich loamy and clayey soils' with impeded drainage.

DEFRA 'Magic Maps' indicate that there are no groundwater Source Protection Zones beneath the site. According to DEFRA 'Magic Maps' the closest Source Protection Zone to the development is located approximately 2.40km east and is classified as a Zone 3 – Total Catchment Zone.

Nearby Watercourses

Review of the Environment Agency's Statutory Main Rivers dataset and OS Open Rivers layer indicates that a culverted section of The Ravensbourne flows within close proximity to the development.

In addition to the culverted section of The Ravensbourne, several open water features have been identified within a 1.50km radius of 5 Nelmes Close, including:

- Platford Swan Pond some 210m north west;
- Open sections of The Ravensbourne approximately 110m east (within the rear garden of properties along Great Nelmes Chase) and 1.10km west (within Haynes Park), and;
- The River Ingrebourne some 1.30km east of the site.

The Ravensbourne and the River Ingrebourne are classified as main rivers and are therefore managed by the Environment Agency. Any proposed connection or works adjacent to a main river or main river asset will require consent from the Environment Agency prior to being undertaken.

The watercourses within a 1.50km radius of the site are shown in Figure 6 (below).

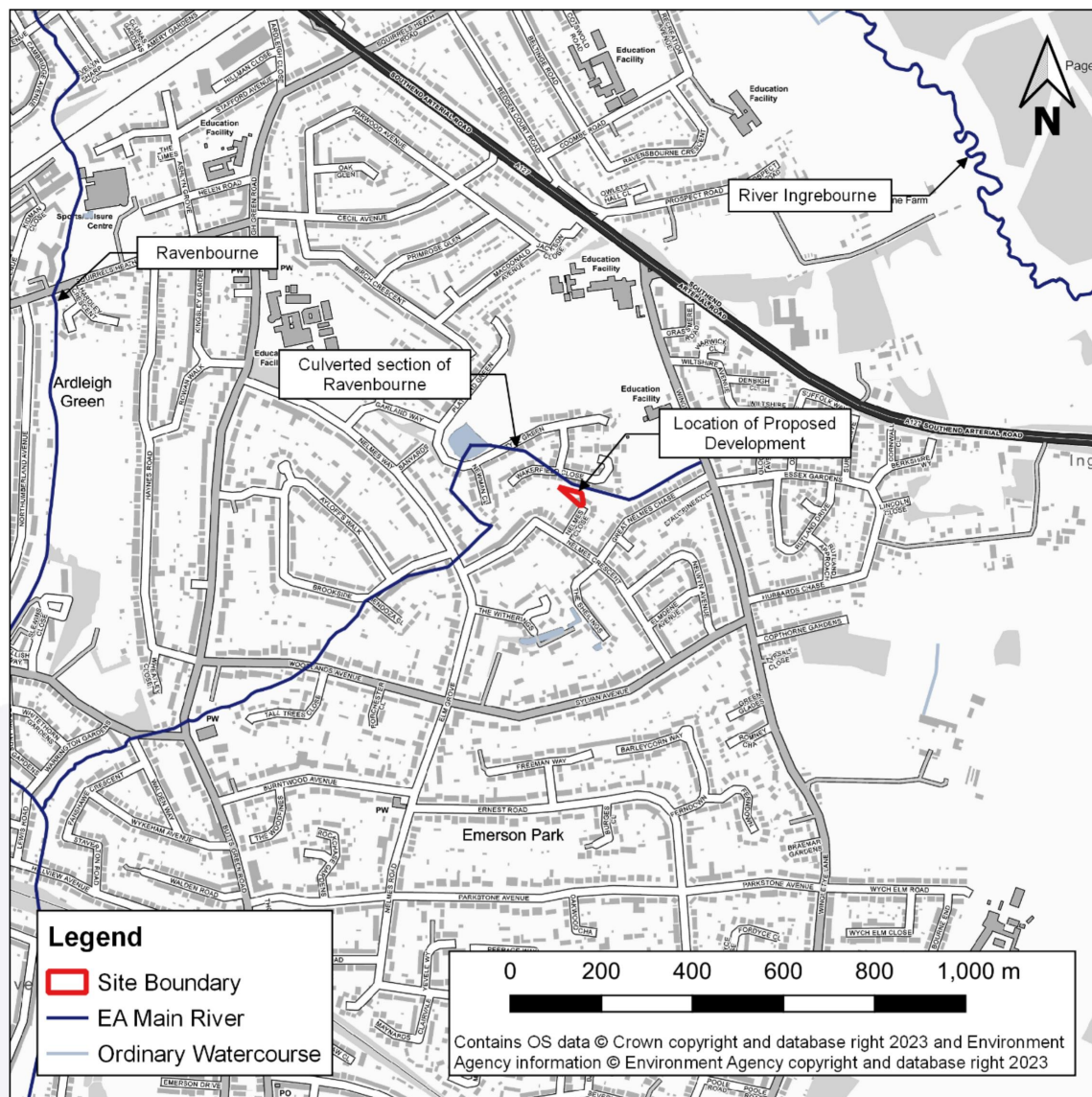


Figure 6: Watercourses Near the Site

Existing Finished Floor Levels

Review of Google Streetview indicates that the existing Finished Floor Level of the residential dwelling is raised approximately 150mm above adjacent, external ground levels at the front of the property.

A conservative approach has been adopted to estimate the existing Finished Floor Level utilising the observed threshold measurement and the lowest LiDAR elevation which corresponds to the front of the existing dwelling.

Comparison of the in-situ threshold measurement at 5 Nelmes Close with corresponding EA LiDAR data indicates that the dwelling has an existing Finished Floor Level of approximately 28.55mAOD (workings below).

Average External LiDAR Elevation (mAOD)	+	Reported Threshold (m)	=	Approximate Finished Floor Level (mAOD)
28.40	+	0.15	=	28.55

Table 2: Approximate Existing Finished Floor Level

Proposed Development

Development Proposals

The proposed planning application is for construction of a single storey rear extension followed by internal reconfiguration to provide disability adaptations to the existing residential dwelling. According to plans provided by the client the proposed extension will increase the total built footprint by 33m².

The proposed extension will provide additional living accommodation for residents of 5 Nelmes Close and will allow for reconfiguration of the ground floor to make the dwelling wheelchair accessible. The extension will provide additional built footprint to create a wheelchair accessible sensory room, wet room and bedroom along with a separate bedroom and ensuite for a carer.

It has been confirmed that the Finished Floor Level of the proposed extension will match that of the existing ground floor level to allow a seamless connection between the extension and the main house.

The proposed site layout plan is shown in Figure 7 and Appendix B.



Figure 7: Proposed Ground Floor Layout Plan

Development Vulnerability Classification

The National Planning Policy Framework classifies land use type in terms of vulnerability to flooding. Annex 3 of the NPPF details the flood risk vulnerability classification for each land use type (refer below).

Essential infrastructure

- Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk.
- Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including infrastructure for electricity supply including generation, storage and distribution systems; including electricity generating power stations, grid and primary substations storage; and water treatment works that need to remain operational in times of flood.
- Wind turbines.
- Solar farms.

Highly vulnerable

- Police and ambulance stations; fire stations and command centres; telecommunications installations required to be operational during flooding.
- Emergency dispersal points.
- Basement dwellings.
- Caravans, mobile homes and park homes intended for permanent residential use.
- Installations requiring hazardous substances consent. (Where there is a demonstrable need to locate such installations for bulk storage of materials with port or other similar facilities, or such installations with energy infrastructure or carbon capture and storage installations, that require coastal or water-side locations, or need to be located in other high flood risk areas, in these instances the facilities should be classified as 'Essential Infrastructure'.)

More vulnerable

- Hospitals
- Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels.
- **Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels.**
- Non-residential uses for health services, nurseries and educational establishments.
- Landfill* and sites used for waste management facilities for hazardous waste.
- Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan.

Less vulnerable

- Police, ambulance and fire stations which are not required to be operational during flooding.
- Buildings used for shops; financial, professional and other services; restaurants, cafes and hot food takeaways; offices; general industry, storage and distribution; non-residential institutions not included in the 'more vulnerable' class; and assembly and leisure.
- Land and buildings used for agriculture and forestry.
- Waste treatment (except landfill* and hazardous waste facilities).

- Minerals working and processing (except for sand and gravel working).
- Water treatment works which do not need to remain operational during times of flood.
- Sewage treatment works, if adequate measures to control pollution and manage sewage during flooding events are in place.
- Car parks.

Water-compatible development

- Flood control infrastructure.
- Water transmission infrastructure and pumping stations.
- Sewage transmission infrastructure and pumping stations.
- Sand and gravel working.
- Docks, marinas and wharves.
- Navigation facilities.
- Ministry of Defence installations.
- Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location.
- Water-based recreation (excluding sleeping accommodation).
- Lifeguard and coastguard stations.
- Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms.
- Essential ancillary sleeping or residential accommodation for staff required by uses in this category, subject to a specific warning and evacuation plan.

Table 3: Flood Risk Vulnerability Classification (Source: NPPF)

The site is currently occupied by a single residential property. Therefore, in terms of flood risk vulnerability it is considered "More Vulnerable".

The proposals comprise construction of a single storey rear extension followed by internal reconfiguration to provide disability adaptations to the existing residential dwelling. As such, according to NPPF guidance the site as whole will remain "More Vulnerable" post development.

In light of this, it is considered that the vulnerability of the site will not increase as a result of the development.

Sequential and Exception Test Guidance

In accordance with the National Planning Policy Framework, and associated Planning Practice Guidance, the Sequential and Exception Tests should be undertaken to determine the most appropriate location for a development and used to inform the proposed design layout.

The Sequential Test is designed to steer new development to areas with the lowest risk of flooding, taking all sources of flood risk and climate change into account.

The Exception Test is undertaken when development in a flood risk area cannot be avoided. The Exception Test comprises of two elements which need to be satisfied before a development can be permitted. It needs to be demonstrated that:

1. A development will provide wider sustainability benefits to the community that outweigh flood risk; and
2. A development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

Flood Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test Required	✓	✓	✓
Zone 3a	Exception Test Required	X	Exception Test Required	✓	✓
Zone 3b	Exception Test Required	X	X	X	✓

Table 4: Flood risk vulnerability and flood zone 'incompatibility' (Source: PPG)

Given the nature of the proposals the development is considered 'More Vulnerable'.

According to Table 4 (above) 'More Vulnerable' development is considered suitable within Flood Zone 1, 2 and 3a (subject to the Exception Test).

However, it should be noted that Sequential and Exception Tests do not apply to Change of Use and Minor Extension applications.

EA Standing Advice

Environment Agency Standing Advice guidance applies to household or non-domestic extensions where the additional footprint created by the development is no more than 250 square metres.

The proposed extension will increase the total built footprint at the site by 33m². Therefore, it is considered that EA standing advice applies.

In accordance with the EA's Standing Advice for Minor Extensions, the following information is required within the Flood Risk Assessment:

- Plans showing the Finished Floor Levels (FFL) and estimated flood levels
- Assurance that the floor levels will be set either no lower than existing floor levels or 300 millimetres above estimated flood levels
- Details of appropriate flood resistance and resilience measures. Resilience measures should be recommended in accordance with Construction Industry Research and Information Association (CIRIA) Property Flood Resilience Code of Practice guidance.
- Confirmation that the development will not be flooded by surface water runoff or groundwater. This could be by diverting water away from the property (but managing the diverted water safely within the wider site) or by raising finished floor levels above the estimated flood depths.

If the minor extension is considered to be at increased flood risk as a result of multiple minor extensions in the area, the FRA will also need to include an assessment of off-site flood risk.

Assessment of Flood Risk

Flood risk is a combination of:

- the probability (likelihood or chance) of a flood event happening; and
- the potential consequences (impact) if an event were to occur.

In accordance with guidance set out in the Flood Risk and Coastal Change section of the PPG, areas at risk of flooding should be considered as those at risk of flooding from any source, now or in the future.

This study uses publicly available data (including EA flood maps and Local Authority documentation) to assess the potential flood risk posed to the intended development from multiple sources of flooding and the risk of flooding elsewhere, as a result of the proposals. Where flood risks are identified this study outlines appropriate mitigation measures, compliant with NPPF and PPG, which would be suitable to incorporate within the proposed development to manage said flood risk(s).

Historical Flooding

Review of London Borough of Havering Council's Strategic Flood Risk Assessment (2016) indicates that the site and immediate surrounding area have not been subject to historical flooding. Refer to Figure 8, below.

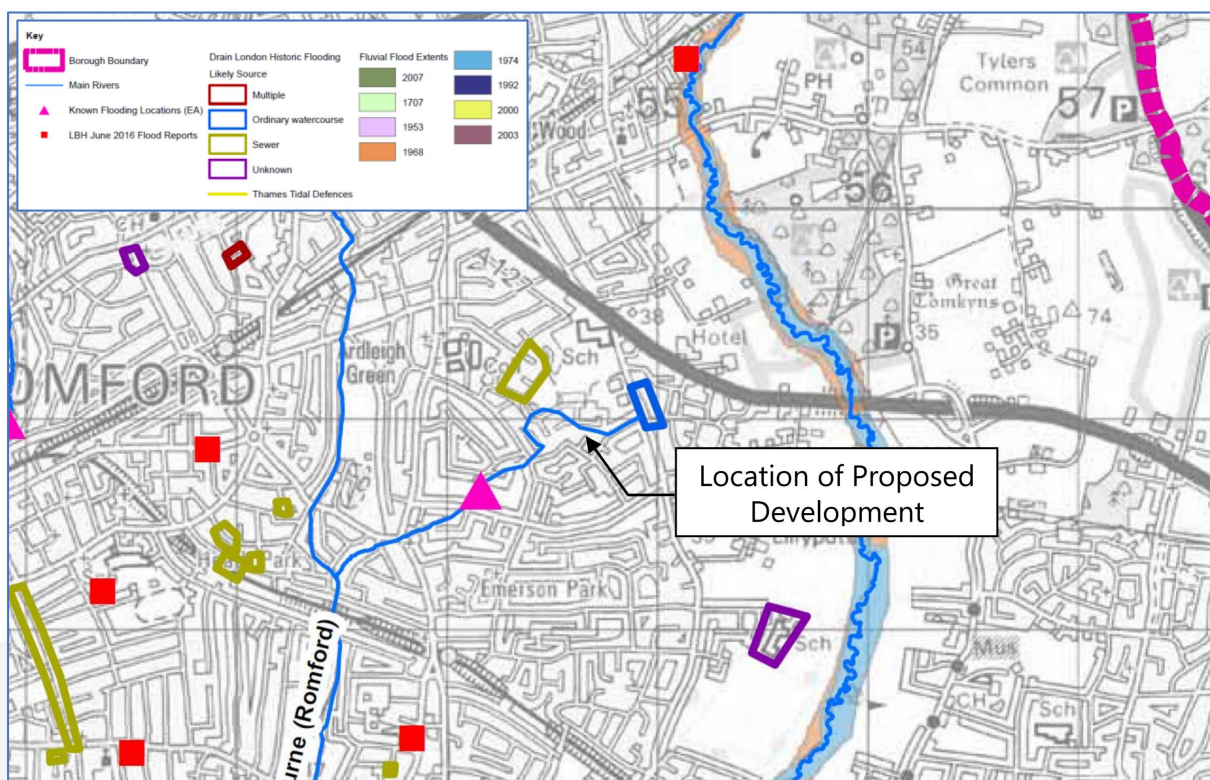


Figure 8: Extract of Historical Flood Extent Map (Source: Havering SFRA)

Additionally, according to the Environment Agency's Recorded Flood Outline dataset, the closest recorded fluvial flood incidents to the site are located approximately 1.30km east of the development. Denoted by the areas shaded light blue and orange in Figure 8.

Information held by the EA indicates that land adjacent to the River Ingrebourne flooded in September 1968 and November 1974 as a result of the watercourse exceeding its channel capacity in the absence of raised defences.

Flood Zones

The Environment Agency has created a set of Flood Zones which shows the risk of flooding from rivers and sea in England, for several return period events, ignoring the presence of defences. The Flood Zones are shown on the EA's Flood Map for Planning which forms the basis for assessing flood risk and development suitability under the National Planning Policy Framework.

Flood Zone	Definition
Zone 1 Low Probability	Land having a less than a 1 in 1000 annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map for Planning – all land outside Zones 2, 3a and 3b)
Zone 2 Medium Probability	Land having between a 1 in 100 and 1 in 1000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1000 annual probability of tidal flooding. (Land shown in light blue on the Flood Map)
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 tidal flooding. (Land shown in dark blue on the Flood Map)
Zone 3b Functional Floodplain	This zone comprises land where water from rivers or the sea has to flow or be stored in times of flood. The identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. The functional floodplain will normally comprise: • land having a 1 in 30 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 1 in 1000 annual probability of flooding). Areas of functional floodplain should be identified by local planning authorities within Strategic Flood Risk Assessments, in agreement with the Environment Agency. (Note, Zone 3b is not separately distinguished from Zone 3a on the Flood Map).

Table 5: Flood Zone Definitions (Source: Planning Practice Guidance)

Note: The Flood Zones shown on the Environment Agency's Flood Map for Planning (Rivers and Sea) do not take into account the possible impacts of climate change and consequent changes in the future probability of flooding.

According to the Environment Agency's Flood Map for Planning (refer to Figure 9) the site is located within Flood Zones 2 and 3. Flood Zone 2 and 3 are defined as follows:

- Flood Zone 2 - land with between a 1 in 100 and 1 in 1000 annual probability of river flooding;
- Flood Zone 3 - land with a 1 in 100 or greater annual probability of river flooding.

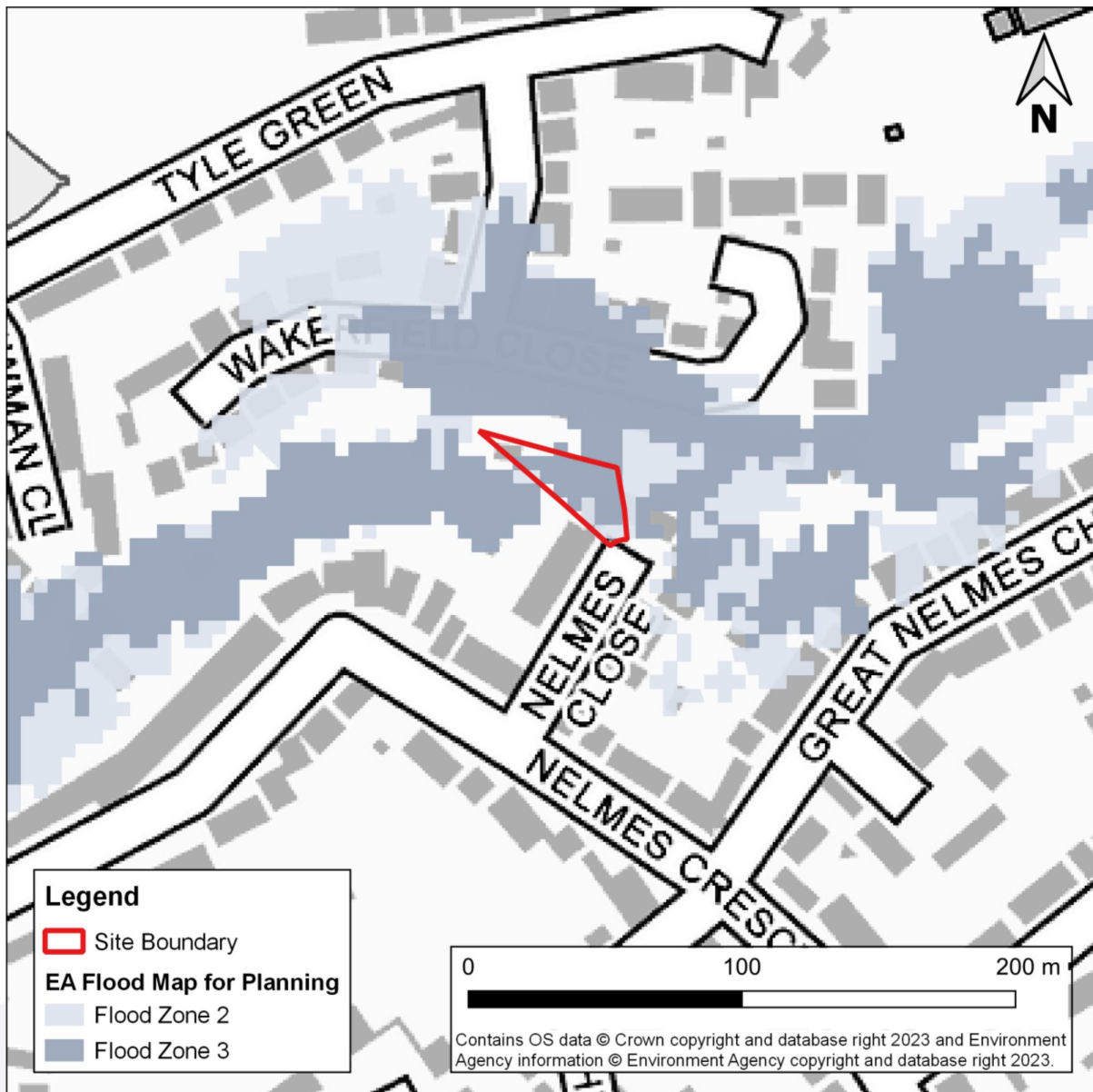


Figure 9: Environment Agency Flood Map for Planning (Source: EA)

Fluvial (Rivers)

Environment Agency Product 4

Considering that the site has been modelled within Flood Zones 2 and 3 on the EA's Flood Map for Planning, a Product 4 enquiry has been raised with the Environment Agency to obtain detailed flood model information in the relation to the site.

At the time of writing this report, enquiries with the Environment Agency remain pending.

Defences

Review of the EA's AIMS Spatial Flood Defences dataset indicates that the site is not afforded protection by formal flood defences.

Pluvial (Surface Water)

Pluvial (surface water) flooding occurs as a result of excess overland flow and stormwater ponding. Surface water flooding can happen when water does not have time to soak into the underlying ground or cannot infiltrate at all, for instance because the ground is already fully saturated.

This mechanism of flooding can also arise when the volume of precipitation exceeds the capacity of the drainage system meaning that water is unable to drain away through the sewer network and instead flows overland.

Overland flow will follow the local topography and can therefore pose a risk to both the development and surrounding third party land.

The risk posed to the site from surface water flooding has been assessed using the Environment Agency's Risk of Flooding from Surface Water (RoFSW) dataset, refer to Figure 10.

The Risk of Flooding from Surface Water maps were produced in 2013 by the Environment Agency, working with Lead Local Flood Authorities. They are considered to represent a significant improvement on the previous surface water flood maps, both in terms of method and representation of the risk of flooding. Considerable improvements were made to the modelling techniques and data used, including the incorporation of locally produced mapping, where available, to represent features best modelled at a local scale.

The RoFSW information assesses flooding scenarios as a result of rainfall with the following chance of occurring in any given year:

- 1 in 30 (3.3%)
- 1 in 100 (1%)
- 1 in 1000 (0.1%)

The modelled return period outputs are then classified into four categories based on the level of surface water flood risk posed to an area. These categories are detailed below:

High	An area which has a 1 in 30 (3.3%) or greater annual probability of flooding
Medium	An area which has between a 1 in 100 (1%) and 1 in 30 (3.3%) annual probability of flooding
Low	An area which has between a 1 in 1000 (0.1%) and 1 in 100 (1%) annual probability of flooding
Very Low	An area which has less than a 1 in 1000 (0.1%) annual probability of flooding

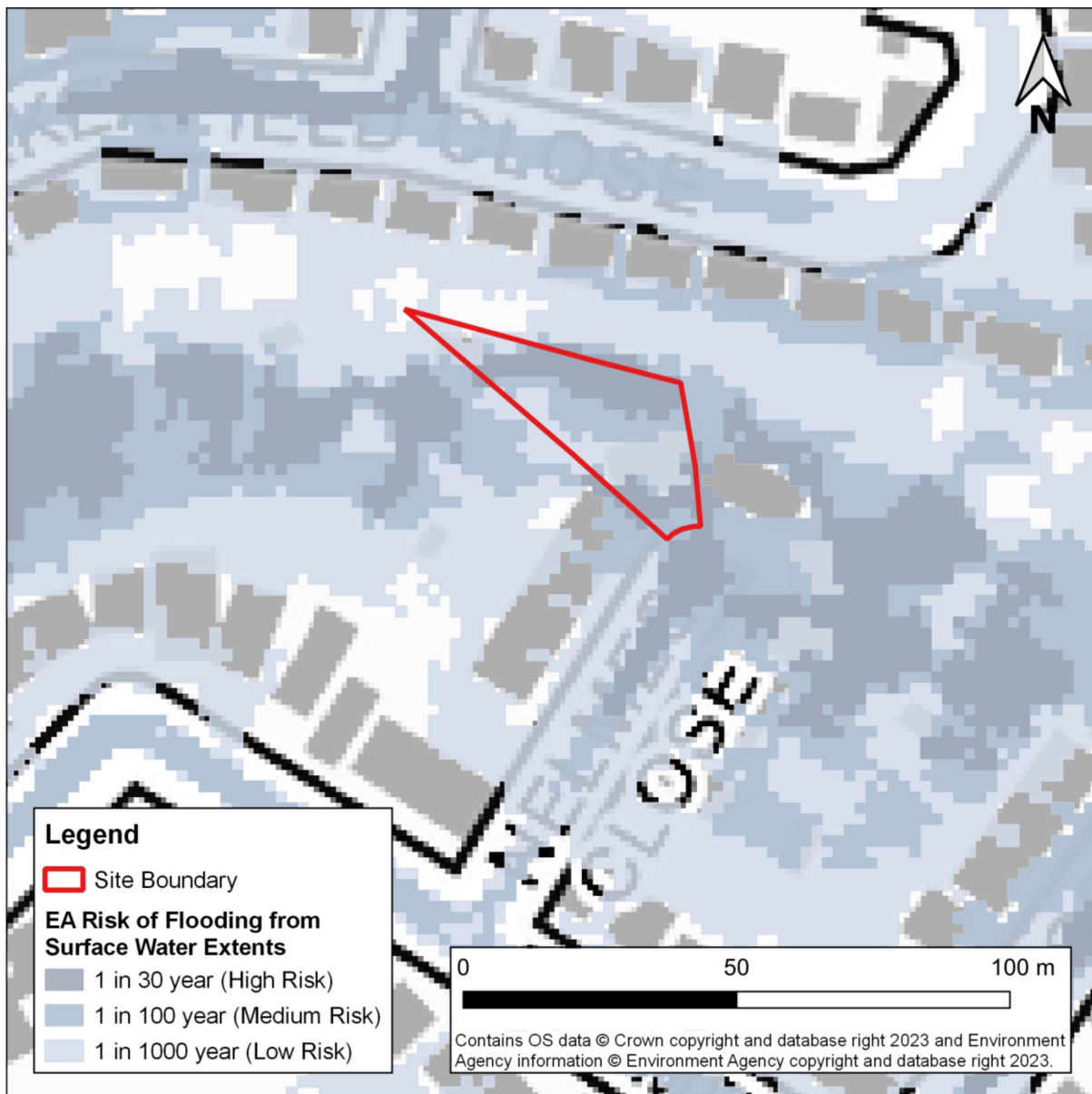


Figure 10: Risk of Flooding from Surface Water Map (Source: Environment Agency)

The EA's Risk of Flooding from Surface Water data (Figure 10) shows that the site and surrounding area are located within an area at "Low" to "High" risk of flooding from surface water.

Given that surface water flood extents have been identified within close proximity to the development, further analysis of modelled surface water flood depths have been undertaken. The detailed flood mapping below (refer to Figure 11, Figure 12 and Figure 13) shows the modelled flood depths, taken from the Risk of Flooding from Surface Water dataset, across the site during the 1 in 30, 1 in 100, and 1 in 1000 year pluvial flood events, respectively.

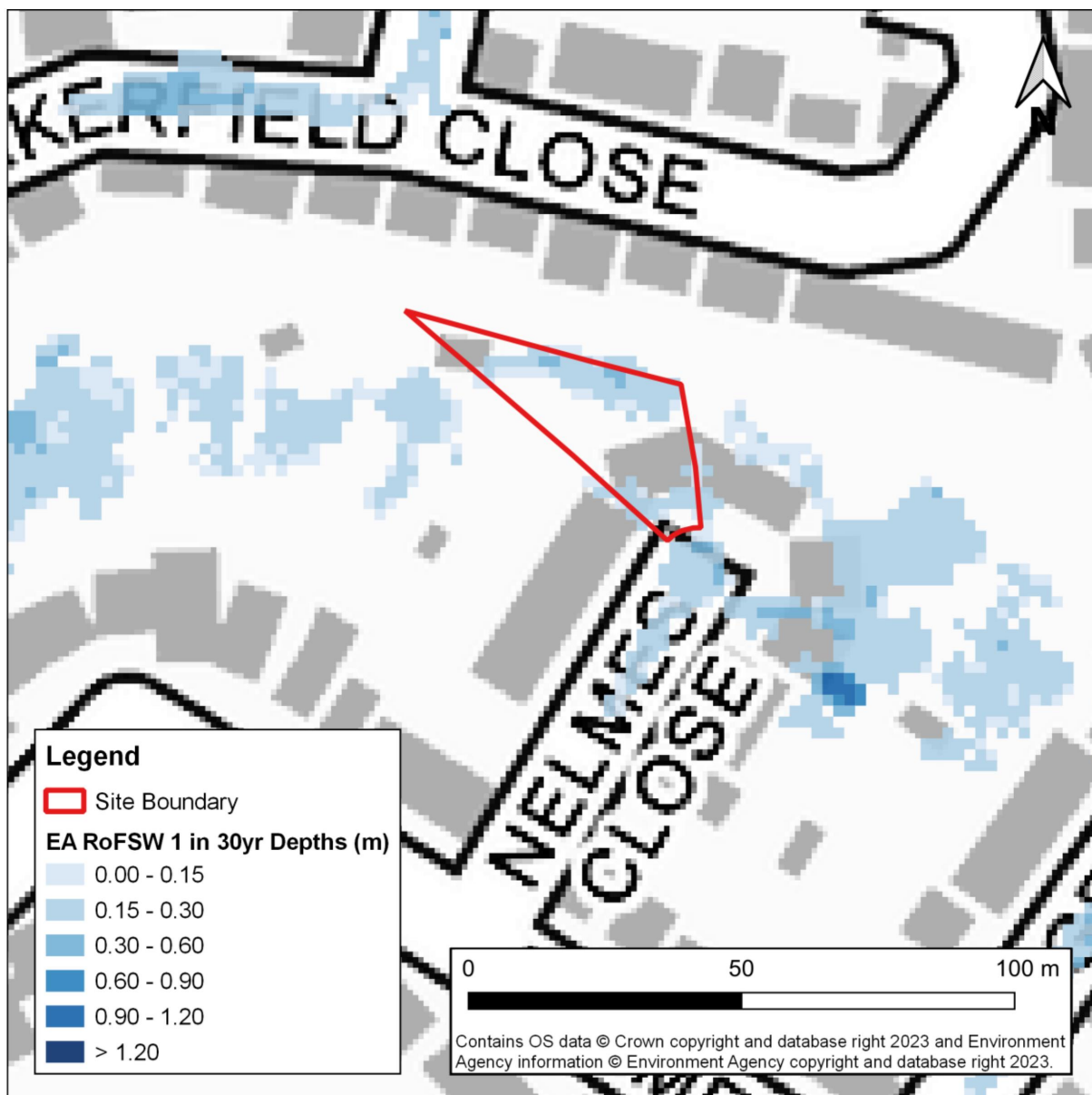


Figure 11: Risk of Flooding from Surface Water 1 in 30 year Depth Map

Figure 11 indicates that the majority of the site, including the proposed extension footprint, is anticipated to remain flood free during the modelled 1 in 30 year storm event.

However, water accumulation has been modelled along the northern boundary of the site and within the south eastern corner, associated with the front driveway. According to Environment Agency data, the driveway and land along the northern boundary could experience flood depths of up to 300mm during the 1 in 30 year storm event.

Low levels of flooding are also expected along the section of Nelmec Close adjacent south east of the site.

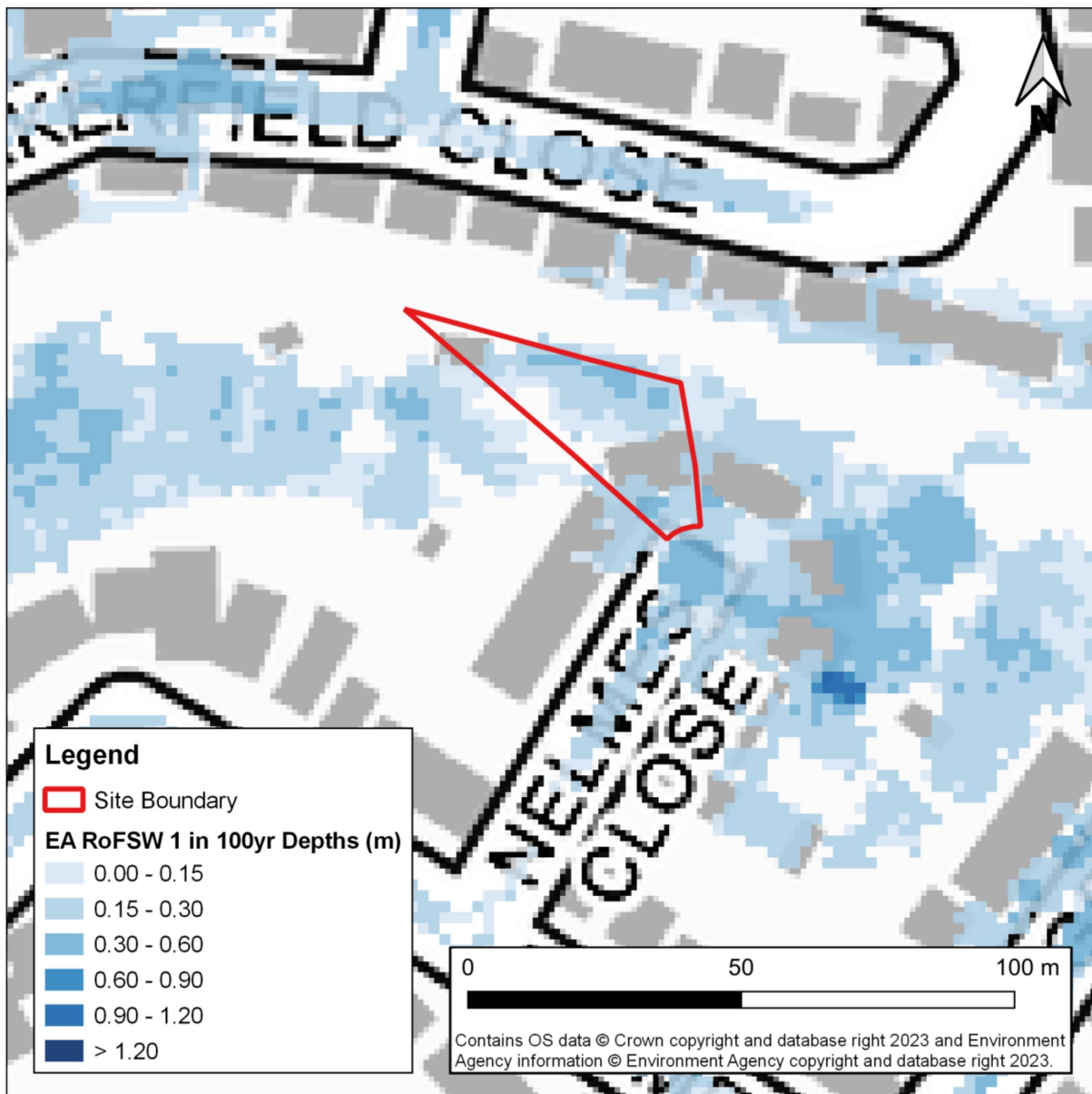


Figure 12: Risk of Flooding from Surface Water 1 in 100 year Depth Map

Figure 12 indicates that whilst the western part of the site is expected to remain flood free a larger area of the application boundary, including the proposed extension footprint, could be at risk of flooding during the 1 in 100 year storm event.

RoFSW data shows that surface water flood depths of up to 150mm could collect along the rear of the house and in the area proposed to be developed.

Flood depths of up to 600mm are anticipated to collect along the northern boundary with lower levels of flooding, ranging between 300mm and 600mm, expected in the driveway.

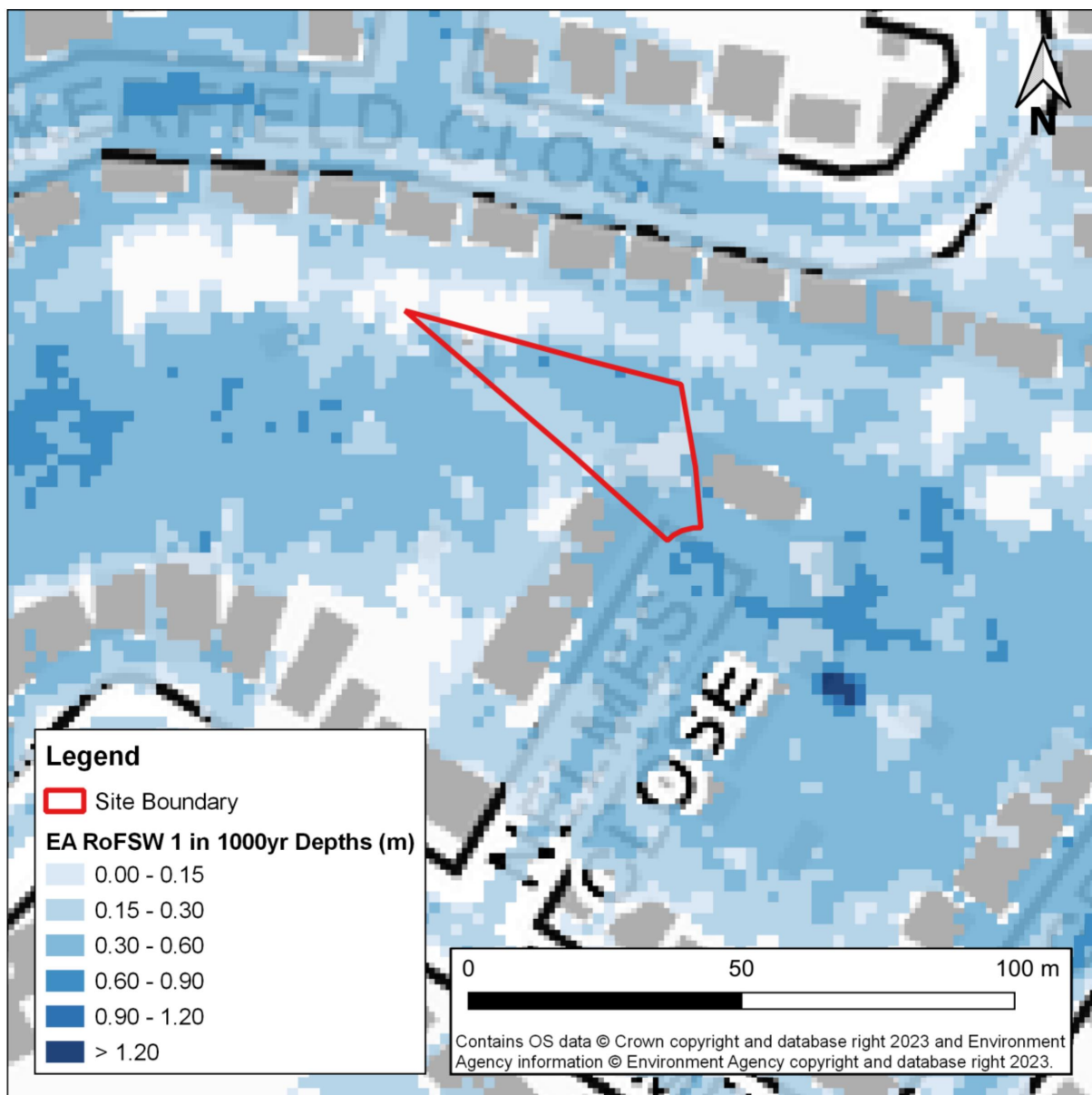


Figure 13: Risk of Flooding from Surface Water 1 in 1000 year Depth Map

Figure 13 indicates that the entire site and wider area could be at risk of flooding during the 1 in 1000 year storm event.

RoFSW data shows that surface water flood depths of between 300mm and 600mm could collect at the front and rear of the dwelling with similar depths anticipated within Nelm Close.

Despite the modelled extents shown in the RoFSW dataset, no information has been provided to suggest that the site has historically flooded as a result of surface water flows.

Groundwater

Groundwater flooding occurs when the water table rises up from the underlying rocks and emerges at the ground surface or within subsurface infrastructure (such as basements). Low lying areas that are underlain by permeable bedrock, superficial geology and aquifers are particularly susceptible to this form of flooding, especially during the winter months and after periods of heavy, sustained precipitation.

Unlike other mechanisms of flooding, groundwater flooding takes longer to dissipate as the water table needs to lower before any emerged flood water can soak back into the ground. As a result of this, whilst groundwater flooding does not pose a significant risk to life, flood waters can last for many months and can cause considerable damage to property.

The London Borough of Havering's SFRA (2016) uses the Environment Agency's Areas Susceptible to Groundwater Flooding (ASTGWF) dataset to assess of the risk of groundwater flooding in the catchment area. The ASTGWF dataset gives an indication of the susceptibility of groundwater flooding across the borough, based upon 1km grid squares where geological and hydro-geological conditions show that groundwater may emerge.

According to the map (refer to Figure 14) the site is located within a grid reference where $\geq 75\%$ of the area is susceptible to groundwater flooding.

In addition, the SFRA map includes details of the locations of reported groundwater flood incidents. London Borough of Havering hold details of a nearby groundwater flood event which occurred in October 2002. This record appears to relate to an incident which occurred along Great Nelves Chase.

Despite this, no information has been provided to suggest that the site itself has been subject to groundwater flooding.

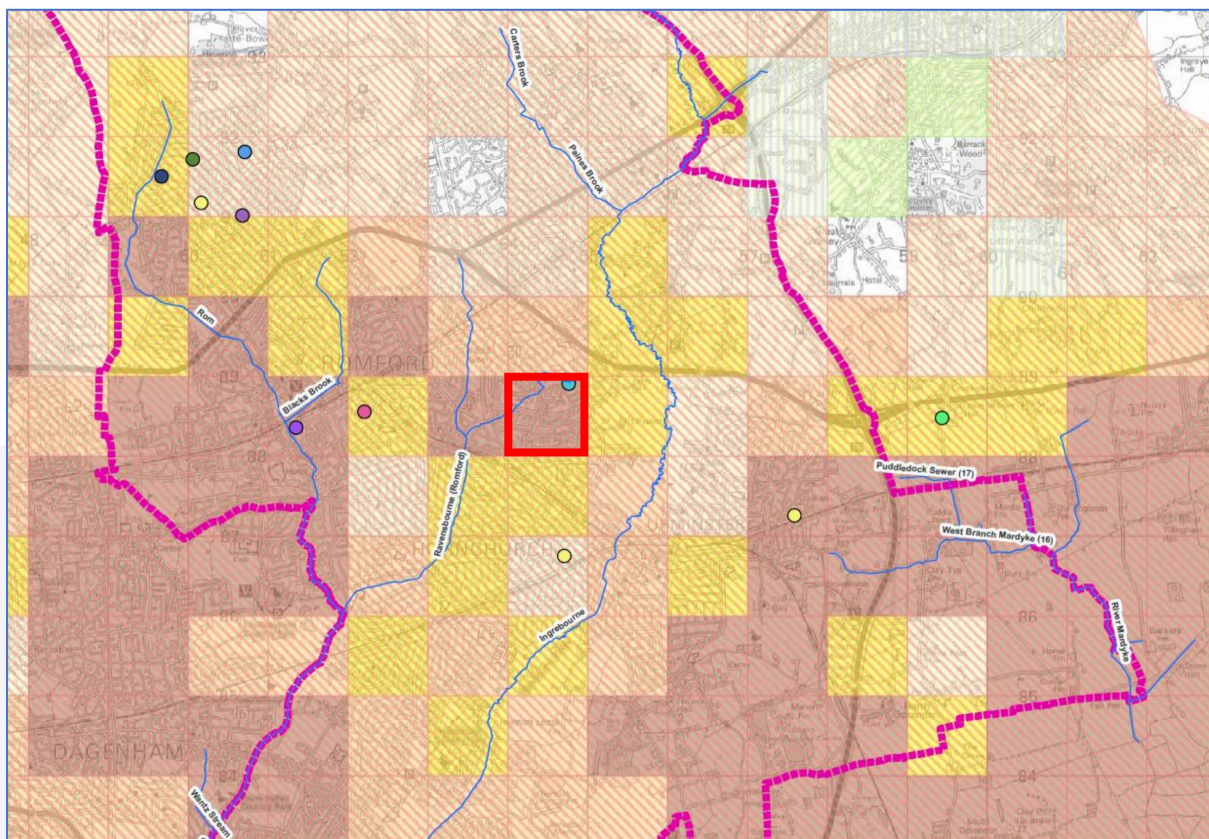


Figure 14: JBA Areas at Risk of Groundwater Emergence (Source: SODC SFRA)

Sewer Surcharge

Sewer flooding occurs when the volume of water entering a drainage system is greater than the capacity of the sewer network. It is often experienced during periods of heavy rainfall, when a large amount of precipitation falls within a short period of time, and overloads the sewer system capacity causing a surcharge and localised short-term flooding.

Sewer flooding can also occur when the sewerage system is unable to discharge as intended. This is frequently caused by problems such as high water levels within the receiving watercourse, blockages, siltation and structural defects.

London Borough of Havering Council's Level 1 SFRA (2016) includes a map which details areas known to have suffered from historical sewer flooding in the catchment.

The map details known incidents collated from records held by both the London Borough of Havering and Thames Water. The data displayed on the map includes incidents of flooding relating to public foul, combined and surface water sewers and displays properties that suffered internal and external flooding.

According to the SFRA Properties Flooded from Sewers Map, no internal or external sewer flood incidents have been recorded in the area which the development is located.

No further information has been provided to suggest that the site itself is susceptible to sewer surcharge flooding.

Reservoir

Reservoirs are artificially created lakes, typically formed by building a dam across an existing watercourse to hold water back. Whilst unlikely, flooding from reservoirs can occur as a result of water exceeding the reservoir capacity or structural failure of the dam or bank.

All large reservoirs are regulated under the Reservoirs Act 1975 and undergo regular maintenance to minimise the possibility of reservoir failure. This legislation is enforced by the Environment Agency and requires reservoirs to be routinely inspected and maintained to an appropriate standard. As an enforcement authority the Environment Agency is responsible for some 2,000 reservoirs in England and Wales.

The Environment Agency have produced a flood map which shows where water may go in the unlikely event of a dam or reservoir failure. Two flooding scenarios are shown on the reservoir flood maps:

- A 'dry-day' scenario which shows the predicted flood extents if a dam or reservoir failed when rivers are at normal levels
- A 'wet-day' scenario which shows how much greater the flood extent might be if a downstream river is already experiencing an extreme flood event

Review of the Environment Agency's Risk of Flooding from Reservoirs map indicates that the site is not located within the 'maximum extent of flooding from reservoirs'.

As such, the development is not considered to be susceptible to reservoir failure.

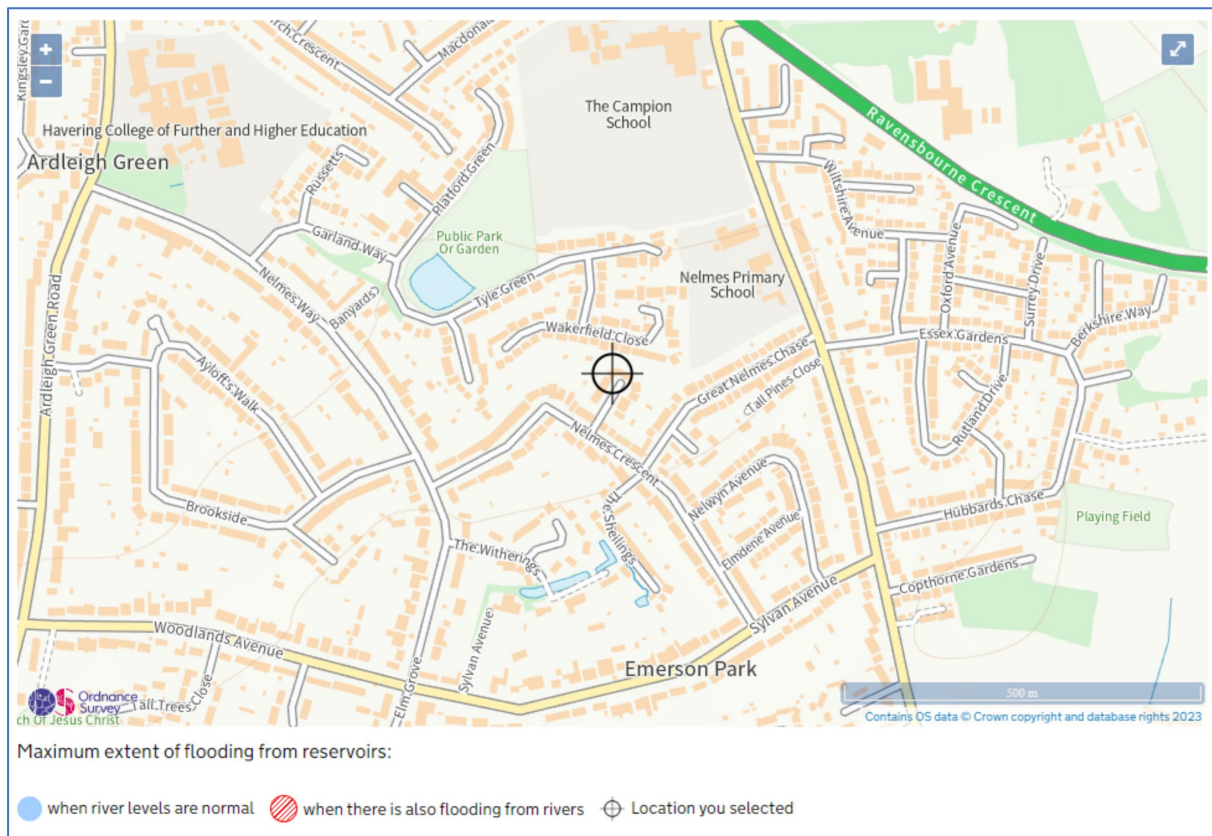


Figure 15: Risk of Flooding from Reservoirs Map (Source: Environment Agency)

Other Sources

No canals or other artificial infrastructure have been identified within the surrounding area which could pose a risk of flooding to the development.

Flood Risk Management

Finished Floor Levels

In accordance with EA Standing Advice for Minor Extensions, the Finished Floor Level (FFL) of the proposed extension should be set either:

- no lower than existing floor levels or
- 300 millimetres (mm) above the estimated flood level

Given that the nature of the proposed development is to increase the accessibility of the dwelling for a wheelchair user, the applicant has confirmed that raising the Finished Floor Level of the extension above that of the existing house is impractical.

Therefore, the proposed extension will match the existing FFL of main house to allow for continuity across the ground floor.

Based on the observed threshold measurements and EA LiDAR data, it is considered that the Finished Floor Level of the extension will be set at approximately 28.55mAOD, 150mm greater than surrounding external ground levels.

In light of this, the advice for minor extensions has been met.

Mitigation Measures

The site is shown to be located within Flood Zones 2 and 3 on the EA's Flood Map for Planning. As such, a Product 4 enquiry has been raised with the Environment Agency to obtain detailed flood model information in the relation to the site. At the time of writing this report, enquiries with the Environment Agency remain pending.

In the absence of a Product 4 response, flood risk mitigation measures have been suggested for the development based on the Environment Agency's Risk of Flood from Surface Water (RoFSW) dataset.

Review of the EA's RoFSW dataset shows that the extension is located entirely outside of the modelled 1 in 30 year surface water flood extent. However, RoFSW mapping indicates that flood depths of up to 150mm could accumulate upon land associated with the proposed extension footprint during the 1 in 100 year flood event. Refer to Figure 12.

Based on information provided by the applicant, the FFL of the proposed extension will be set at approximately 28.55mAOD. Setting the FFL at 28.55mAOD will result in the extension being elevated approximately 150mm higher than the surrounding external ground levels. Thus level with the corresponding 1 in 100 year surface water flood level.

The applicant has confirmed that the intention is to grade external ground levels to create a sloped access to the property for greater accessibility. Whilst the FFL will be raised 150mm above the external ground levels, considering that the land leading to the property doorways will be graded, it is recommended that channel drains are installed at all entry thresholds to mitigate the risk of stormwater ponding at entry points and stormwater ingress.

In order to offer further protection during an extreme flood event it is recommended that the following mitigation measures are considered in consultation with the Local Authority:

- Non-return valves fitted on drains and pipes
- Any chambers fitted with double seal screw down cover and frame
- All electrics and sockets within the extension are raised at least 600mm above the modelled 1 in 100 year surface water flood level (installed at 29.15mAOD or above)

- Boilers, gas meters and electrical incomer/meters are raised 300mm above Finished Floor Level (if located within the extension)
- The extension slab is constructed of solid concrete, with waterproof membrane
- Waterproof screed used on the floor of the extension with waterproof internal render
- External walls rendered resistant to flooding to first floor level
- Any cracks and holes in the external walls, including service and drainage entry points are sealed with mortar/sealant and made watertight
- Covers for airbricks, pet flaps and appliance vents
- Water resistant materials such as stainless steel, plastic or solid wood used for the ground floor level fitout.

The applicant may also wish to consider installation of demountable flood defence barriers to protect ground floor entry thresholds against flood water ingress up to a maximum depth of 0.6m.

Additionally, important personal items and documents (including insurance policies and photographs) belonging to the future residents should be stored on the upper floor.

Post Development Surface Water Management

Having reviewed the existing and proposed site layout plans, the area proposed to be developed is already predominantly underlain by hardstanding. Therefore, post development, there will be a negligible change in the total impermeable surfaced area at the site.

As a result, it is considered that the development in its current form will not significantly increase surface water runoff rates and volumes when compared to the pre-developed situation, and a surface water drainage strategy is not required.

It is envisaged that post development runoff from the proposed extension will be discharged into the surface water drainage system which currently serves 5 Nelmes Close.

Despite this, in order to reduce existing surface water runoff rates and further protect the property from existing overland flows the applicant may wish to consider the following surface water measures:

- Incorporating rainwater butts (to provide a source of non-potable water) and raingardens into the scheme
- Designing external landscaping to slope away from the dwelling
- Installing linear drains in front of all building entry points.

Groundwater Flood Risk Mitigation

Considering that the site has been shown to be located in an area where there is the potential for groundwater flooding to occur, it is recommended that the floor of the new extension is made of either solid construction materials or the ground beneath the suspended floor is sealed.

This mitigation measure will protect against the unlikely occurrence of groundwater ingress should water table levels fluctuate in the future.

Other Mitigation Measures

The site is located within an EA Flood Alert area. Therefore it is recommended that future owners/occupants of the development sign up to the Environment Agency's free Targeted Flood Alert Service at <https://www.gov.uk/sign-up-for-flood-warnings>.

Future owners/occupants should also be advised to monitor weather forecasts by signing up to the Met Office weather warnings.

Considering the vulnerability of future site users, it is recommended that the applicant develops a Flood Warning and Evacuation Plan in accordance with the Environment Agency's Flood Plan template and London Borough of Havering's Flood Resilience Guide (refer to Appendix C). The Flood Warning and Evacuation Plan will outline the site-specific actions which will be followed in the event of a flood warning being issued.

Safe Access and Egress

The NPPF requires all new residential developments in areas at risk of flooding to demonstrate a route of safe escape for residents and site users which can be maintained for the lifetime of the development.

Given that the proposals relate to extension of an existing two storey dwelling, it is considered that safe refuge above the design flood level can be provided on the first floor.

Safe access and egress to and from the development can be provided via Nelmes Close, adjacent south east. It is recommended that residents travel south along Nelmes Close before heading south east along Nelmes Crescent. This route is located outside of the 1 in 100 year and 1 in 1000 year fluvial flood extents, and the 1 in 100 year surface water extent from 130m south east of the site (along Nelmes Crescent) onwards.

Conclusions and Recommendations

Conclusions

GeoSon Limited have been instructed by PLG Consultants to undertake a Site Specific Flood Risk Assessment (FRA) to support a proposed planning application for development at 5 Nelmes Close, Hornchurch, Romford.

This FRA has been undertaken in accordance with the revised National Planning Policy Framework (NPPF) July 2021 and the associated Planning Practice Guidance (PPG).

The proposed application site is located at 5 Nelmes Close, Hornchurch, Romford RM11 2QA. The site is approximately 800m² in size and is currently occupied by a detached residential dwelling with a driveway in the south east and a soft landscaped garden to the north.

The proposed planning application is for construction of a single storey rear extension followed by internal reconfiguration to provide disability adaptations to the existing residential dwelling.

The proposed extension will provide additional living accommodation for residents of 5 Nelmes Close and will allow for reconfiguration of the ground floor to make the dwelling wheelchair accessible. The extension will provide additional built footprint to create a wheelchair accessible sensory room, wet room and bedroom along with a separate bedroom and ensuite for a carer.

According to plans provided by the client the proposed extension will increase the total built footprint by 33m². Therefore, it is considered that EA standing advice applies.

Several flood events have been recorded in the surrounding area. However, there is no information to suggest that the site itself has ever flooded.

According to the Environment Agency's Flood Map for Planning the site is located within Flood Zones 2 and 3.

Considering that the site has been modelled within Flood Zones 2 and 3 on the EA's Flood Map for Planning, a Product 4 enquiry has been raised with the Environment Agency to obtain detailed flood model information in the relation to the site. At the time of writing this report, enquiries with the Environment Agency remain pending.

The EA's Risk of Flooding from Surface Water data shows that the site and surrounding area are located within an area at "Low" to "High" risk of flooding from surface water. Given that surface water flood extents have been identified within close proximity to the development, further analysis of modelled surface water flood depths have been undertaken (refer to Pages 24-26).

The London Borough of Havering's SFRA (2016) uses the Environment Agency's Areas Susceptible to Groundwater Flooding (ASStGWF) dataset to assess the risk of groundwater flooding in the catchment area. According to the SFRA map the site is located within a grid reference where >=75% of the area is susceptible to groundwater flooding.

Despite this, no information has been provided to suggest that the site itself has been subject to groundwater flooding.

The site is not considered to be susceptible to sewer surcharge or reservoir failure. No canals or other artificial infrastructure have been identified within the surrounding area which could pose a risk of flooding to the development.

Recommendations

- It is recommended that the Finished Floor Level of the proposed extension is set at the same level as the existing dwelling (approximately 28.55mAOD). A Finished Floor Level of 28.55mAOD would elevate the extension approximately 150mm higher than surrounding external ground levels.
- Based on the assumption that the proposed extension is set at the same level as the existing dwelling the advice for minor extensions has been met.
- In the absence of a Product 4 response, flood risk mitigation measures have been suggested for the development based on the Environment Agency's Risk of Flood from Surface Water (RoFSW) dataset (refer to Pages 30 and 31).
- The applicant has confirmed that the intention is to grade external ground levels to create a sloped access to the property for greater accessibility. Whilst the FFL will be raised 150mm above the external ground levels, considering that the land leading to the property doorways will be graded, it is recommended that linear drains are installed at all entry thresholds to mitigate the risk of stormwater ponding at entry points and stormwater ingress.
- Any external landscaping should be designed to slope away from the proposed extension, where possible.
- It is recommended that the floor of the new extension is made of either solid construction materials or the ground beneath the suspended floor is sealed. This mitigation measure will protect against the unlikely occurrence of groundwater ingress should water table levels fluctuate in the future.
- The site is located within an EA Flood Alert area. Therefore it is recommended that future owners/occupants of the development sign up to the Environment Agency's free Targeted Flood Alert Service at <https://www.gov.uk/sign-up-for-flood-warnings>.
- Future owners/occupants should also be advised to monitor weather forecasts by signing up to the Met Office weather warnings.
- Considering the vulnerability of future site users, it is recommended that the applicant develops a Flood Warning and Evacuation Plan in accordance with the Environment Agency's Flood Plan template and London Borough of Havering's Flood Resilience Guide.
- Safe access and egress to and from the development can be provided via Nelmes Close, adjacent south east. It is recommended that residents travel south along Nelmes Close before heading south east along Nelmes Crescent. This route is located outside of the 1 in 100 year and 1 in 1000 year fluvial flood extents, and the 1 in 100 year surface water extent from 130m south east of the site (along Nelmes Crescent) onwards.

Appendix

- A. Existing Plans
- B. Proposed Plans
- C. Environment Agency's Flood Plan template and London Borough of Havering's Flood Resilience Guide

Appendix A



EXISTING NORTH WEST ELEVATION SCALE 1:100



EXISTING SOUTH EAST ELEVATION SCALE 1:100



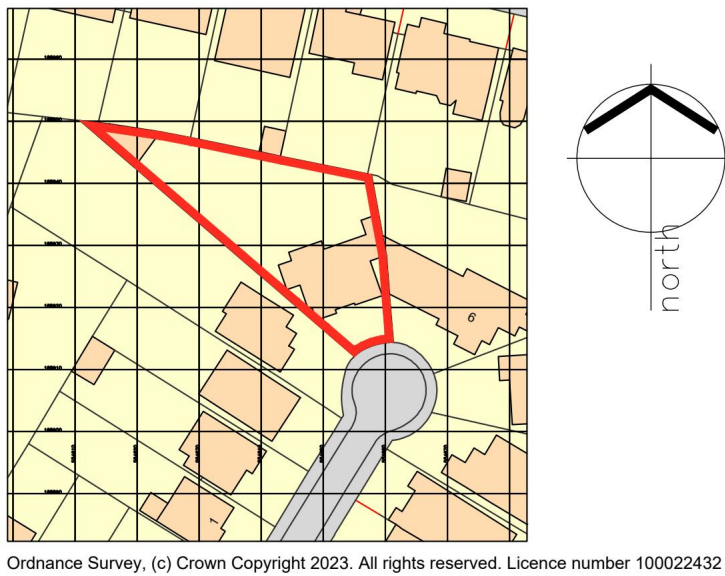
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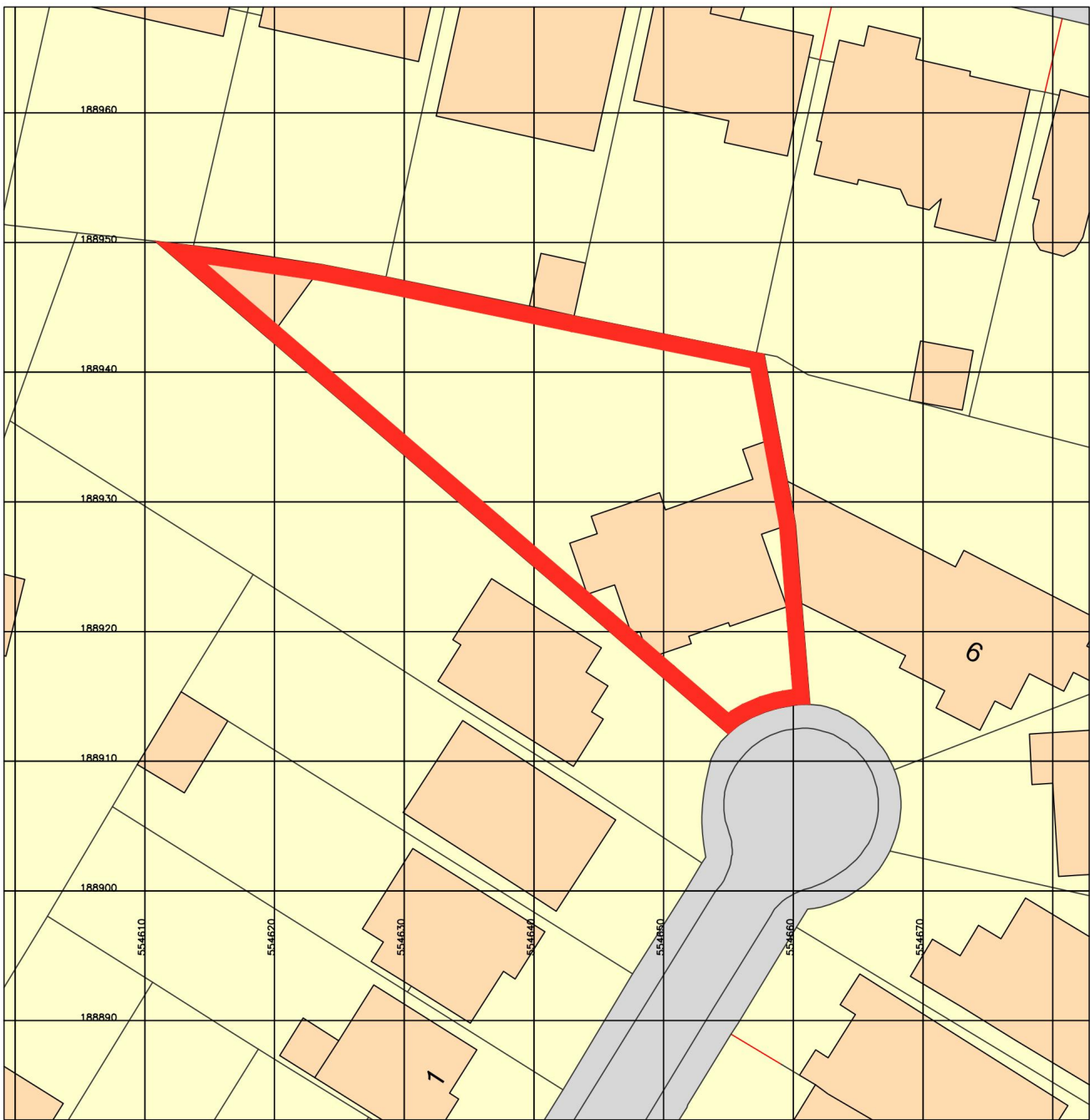
EXISTING EAST ELEVATION SCALE 1:100

MATERIALS KEY

- 01 - EXISTING ROOF TILES RETAINED
- 02 - EXISTING RENDER RETAINED
- 03 - BRICKWORK
- 04 - RENDER
- 05 - WHITE UPVC WINDOWS/DOORS
- 06 - Brown UPVC DOOR



SITE PLAN SCALE 1:1250



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SITE PLAN SCALE 1:500



PHOTO-Existing street scene



PHOTO-Existing front elevation



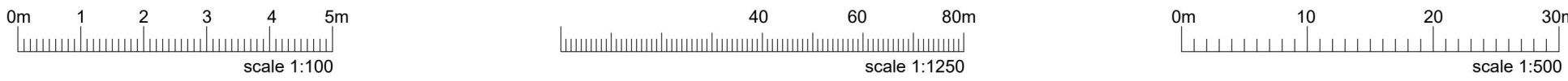
PHOTO-Existing rear elevation

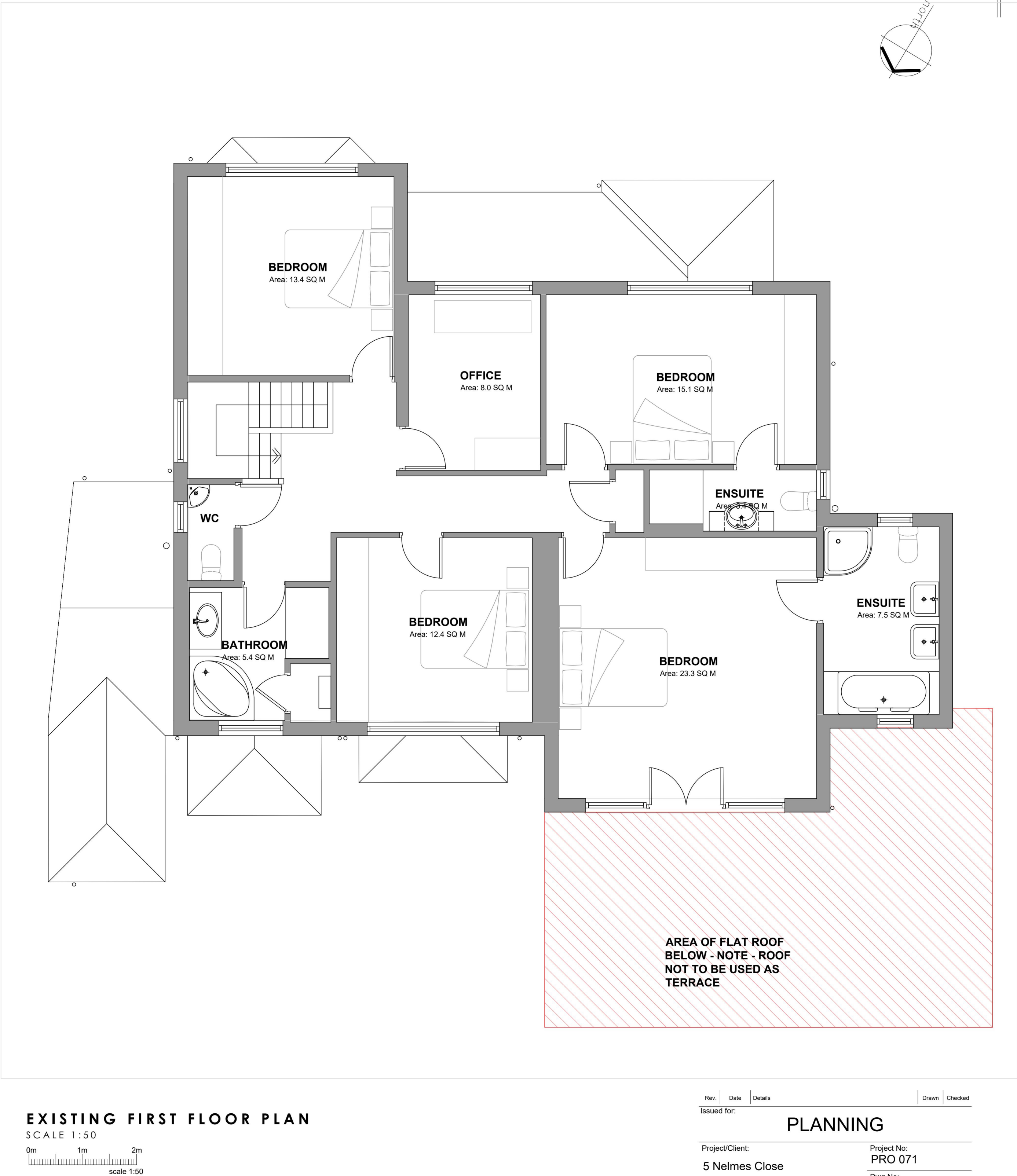
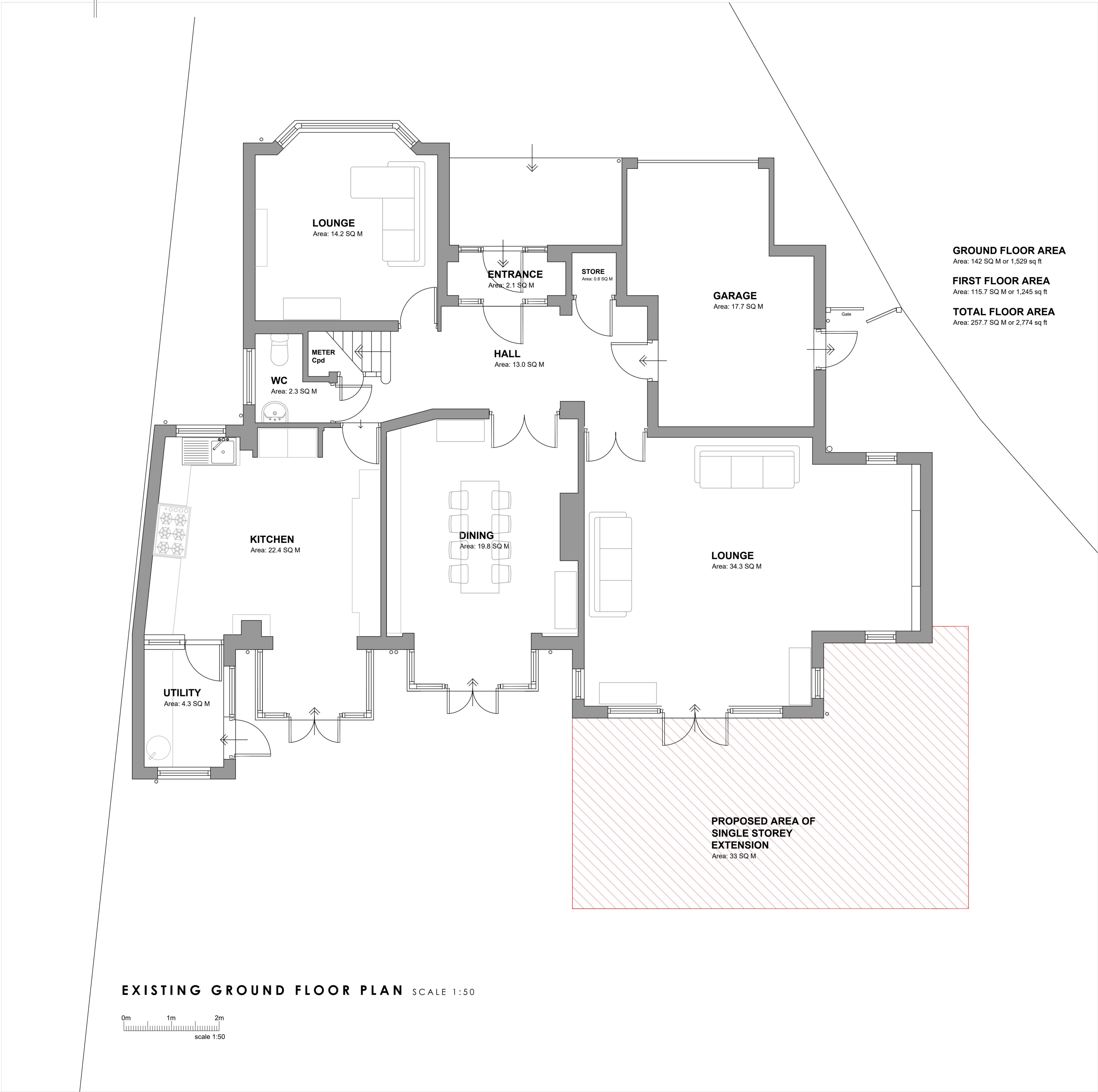
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Issued for:				
PLANNING				
Project/Client:			Project No:	
5 Nelves Close			PRO 071	
Emerson Park			Dwg No:	
Romford, RM11 2QA			(PL)-E-002	
			Rev:	
			/	
Drawing:			Scale:	
EXISTING			1:50 @A1	
ELEVATIONS			Drawn By: Date:	
			JM 17-03-2023	
			Checked By: Date:	



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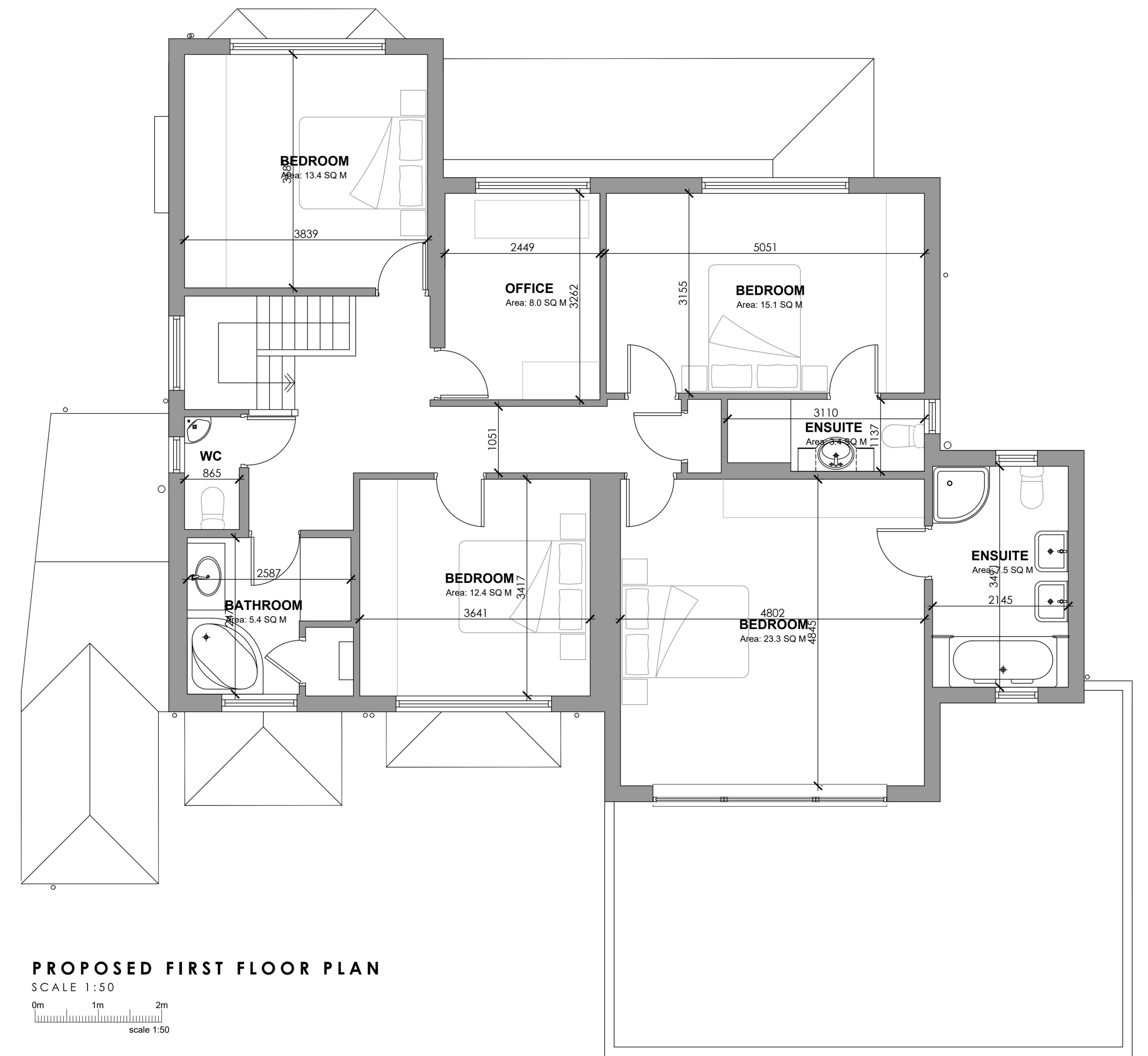
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• Only figured dimensions to be taken from this drawing. Do not scale off this drawing.
• Drawing based on Ordnance Survey and/or existing record drawings - design and drawing content subject to Site Survey, Structural Survey, Site Investigations, Planning and Statutory Requirements and Approvals.





Rev	Date	Details	Drawn	Checked
Issued for:				
PLANNING				
Project/Client:			Project No:	
5 Nelmes Close			PRO 071	
Emerson Park			Dwg No:	
Romford, RM11 2QA			(PL)-E-001	
Rev:			Rev:	
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Drawing:			Scale:	
EXISTING			1:50 @A1	
PLANS			Drawn By:	
			JM	
			Date:	
			14-08-2023	
			Checked By:	

Appendix B



Rev.	Date	Details	Drawn	Checked
Issued for:				
PLANNING				
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5 Nelves Close		PRO 071		
Emerson Park		Dwg No:		
Romford, RM11 2QA		(PL)-P-001		
Rev:		Scale:		
1:50		@A1		
Drawing:		Drawn By:		
PROPOSED		JM		
PLANS		Date:		
14-08-2023		Checked By:		
		Date:		



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Structural Engineer to confirm

To be read in conjunction with the latest engineers designs and details drawings ref:

KEY:
Existing Building Structure
Structural beam TRC
To be demolished
Hull



PROPOSED NORTH WEST ELEVATION SCALE 1:100



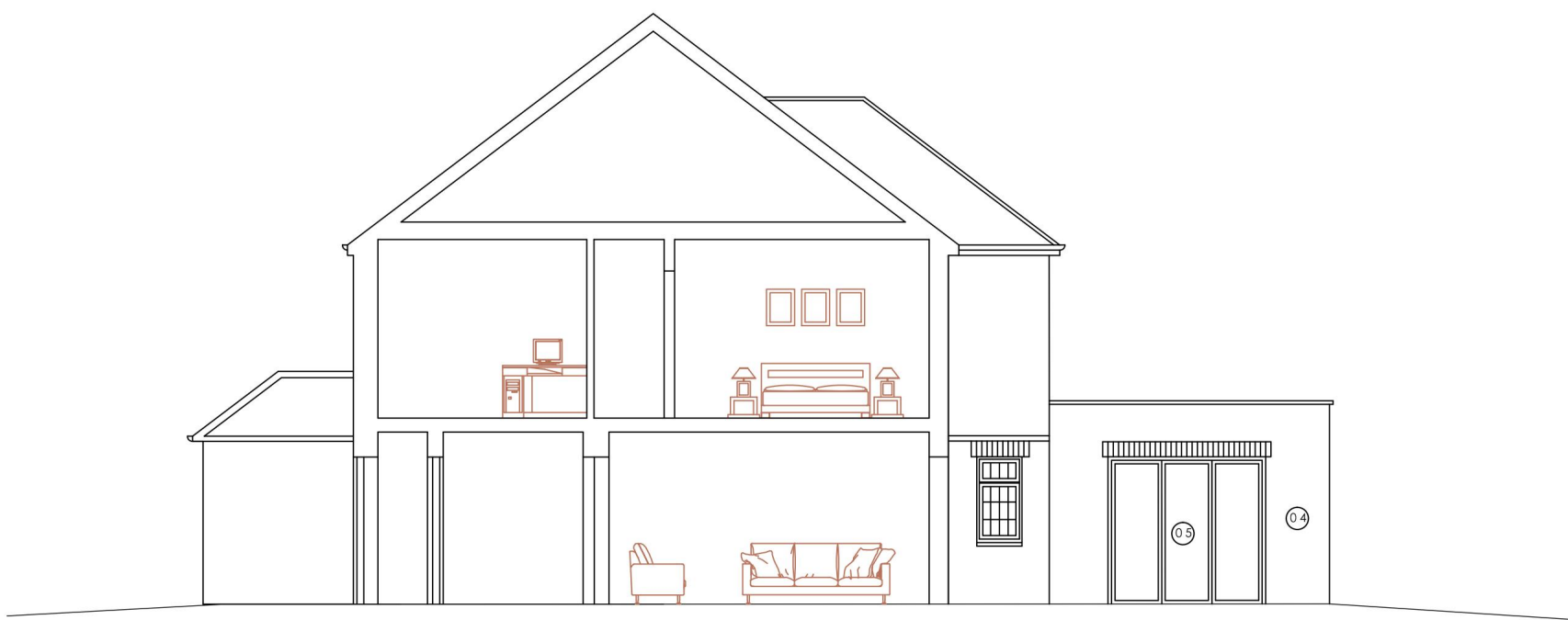
PROPOSED SOUTH EAST ELEVATION SCALE 1:100



PROPOSED WEST ELEVATION SCALE 1:100



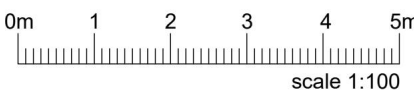
PROPOSED EAST ELEVATION SCALE 1:100



PROPOSED EAST ELEVATIONAL SECTION SCALE 1:100

MATERIALS KEY

- 01 - ROOF TILES TO MATCH
- 02 - EXISTING RENDER RETAINED/PAINTED
- 03 - BRICKWORK TO MATCH EXISTING
- 04 - NEW PAINTED RENDER
- 05 - WHITE UPVC/ALUMINIUM WINDOWS/DOORS
- 06 - Brown UPVC DOOR
- 07 - FLAT ROOF MEMBRANE
- 08 - Parapet Capping



scale 1:100

Structural Engineer to confirm

To be read in conjunction with the latest engineers designs and details drawings ref:

Rev.	Date	Details	Drawn	Checked
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Issued for:

PLANNING

Project/Client:	Project No:
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Emerson Park	Dwg No:
Romford, RM11 2QA	(PL)-P-002
	Rev:
	/
Drawing:	Scale:
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ELEVATIONS	Drawn By: Date:
	JM 14-08-2023
	Checked By: Date:



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• Drawing based on Ordnance Survey and/or existing record drawings - design and drawing content subject to Site Survey, Structural Survey, Site Investigations, Planning and Statutory Requirements and Approvals.

Appendix C

Personal flood plan

Name



Are you signed up to receive flood warnings?

If not call Floodline on 0345 988 1188 to see if your area receives free flood warnings.

☐

Let us know when you've completed your flood plan by calling Floodline on **0345 988 1188**. This will help us learn more about how people are preparing for flooding.

General contact list	Company name	Contact name	Telephone
Floodline	Environment Agency		0345 988 1188
Electricity provider			
Gas provider			
Water company			
Telephone provider			
Insurance company and policy number			
Local council			
Local radio station			
Travel/weather info			

Key locations

Service cut-off	Description of location
Electricity	
Gas	
Water	

Who can help/who can you help?

Relationship	Name	Contact details	How can they/you help?
Relative			
Friend or neighbour			

Be prepared for flooding. Act now

Personal flood plan

What can I do NOW?



Put important documents out of flood risk and protect in polythene

☐

Look at the best way of stopping floodwater entering your property

☐

Find out where you can get sandbags

☐

Identify what you would need to take with you if you had to leave your home

☐

Check your insurance covers you for flooding

☐

Make a flood plan and prepare a flood kit

☐

Identify who can help you/ who you can help

☐

Understand the flood warning codes

☐

What can you do if a flood is expected in your area?

Actions	Location
Home	
• Move furniture and electrical items to safety	
• Put flood boards, polythene and sandbags in place	
• Make a list now of what you can move away from the risk	
• Turn off electricity, water and gas supplies	
• Roll up carpets and rugs	
• Unless you have time to remove them hang curtains over rods	
• Move sentimental items to safety	
• Put important documents in polythene bags and move to safety	
Garden and outside	
• Move your car out of the flood risk area	
• Move any large or loose items or weigh them down	
Business	
• Move important documents, computers and stock	
• Alert staff and request their help	
• Farmers move animals and livestock to safety	
Evacuation - Prepare a flood kit in advance	
• Inform your family or friends that you may need to leave your home	
• Get your flood kit together and include a torch, warm and waterproof clothing, water, food, medication, toys for children and pets, rubber gloves and wellingtons	

There are a range of flood protection products on the market to help you protect your property from flood damage. A directory of these is available from the **National Flood Forum** at www.bluepages.org.uk

Be prepared for flooding. Act now

Flood Resilience

Find out if you're at risk

To plan for a flood, check your risk from:

Check-long-term-flood-risk

You can obtain the flooding history of the land around a property. This is a free service unless it's for a business or takes more than 18 hours to complete.

Email: enquiries@environment-agency.gov.uk

You must include:

- the property's address
- a map showing the property's location
- your address and phone number

Order a Land Registry flood risk report for a property in England or Wales.

Sign up for flood warnings - GOV.UK (www.gov.uk)

Make a flood plan

A flood plan will ensure you and your family know what to do if there's a flood. See the Environment Agency website for advice on how to **make a flood plan**.

The flood plan includes a checklist to help you decide what you need to do before a flood, such as listing which belongings, electrical items and/or furniture you would want to move to safety and what you would want to take with you if you had to evacuate your home.

Make sure everyone who lives in your house knows about the plan and understands it.

Make a flood kit

Consider putting together a flood kit containing essential items such as:

- waterproof clothing
- battery operated radio to monitor local news and weather broadcasts
- battery operated torch
- spare batteries for your torch and radio
- first aid kit
- bottled water
- important documents including passport and insurance certificates
- emergency phone numbers - including your insurance number
- a fully charged mobile phone with credit and, if possible, a portable charger
- any medication that you, your family or your pets may need
- tinned and non-perishable food and a tin opener
- blankets.

Keep the flood kit in an easily accessible place.

Further information and guidance can be found on the [National Flood Forum website](#).

Prepare inside your home

- Know and label all mains supplies (gas, water and electricity). Include instructions on how to turn them off (which way to turn) beside the 'tap'. Remember, it maybe dark when you need to do so.
- Protect sentimental things as they cannot be replaced. Think about moving them upstairs permanently so that they are not forgotten in the flood.
- Keep all important documents in a waterproof sealed container.

Preparing outside

- Consider moving your car to outside the flood risk area.
- Decide what type of barriers and protection you need to reduce flood water coming into your home, including airbricks, doors and windows.
- Make sure you buy or construct the barriers you need as soon as possible and do not postpone the project indefinitely. Flood waters can rise quickly, so prepared barriers will be much quicker to fit when flooding is imminent.
- The [Flood Protection Advisor on the National Flood Forum](#) provides advice on protecting residential and/or business properties from flooding.
- The [Property Protection Advisor](#), funded by DEFRA, can give you online estimates on roughly how much it is likely to cost to protect your property.
- You can buy flood protection products and find service providers on [The National Flood Forum Blue Pages Directory](#) website. You may also find it useful to read Gov.uk's advice on how to [Prepare your property for flooding](#).
- Sandbags can be used for flood protection and are available from most local builders merchants and DIY stores. There is no statutory requirement for us to provide sandbags or prevent a property from flooding. Residents and business owners are responsible for protecting their properties and should make plans in advance of a flood. [Haverling's Sandbag Policy \(Appendix C\)](#)
- You can also read our general advice about [what to do in an emergency](#) for advice.

Getting insurance cover

People who live in flood risk areas or who have experienced flooding in the past can find it difficult to obtain affordable flood insurance for their property. Without insurance you will be vulnerable to the impacts of a flood.

If you are having difficulty going through your existing provider you may need to shop around and go through a specialist insurance broker.

Flood Re provides affordable insurance for those most at risk. More information on how this works can be found on the [Flood Re website- external site](#).

More information on how to get flood insurance is provided on the [National Flood Forum website- external site](#).

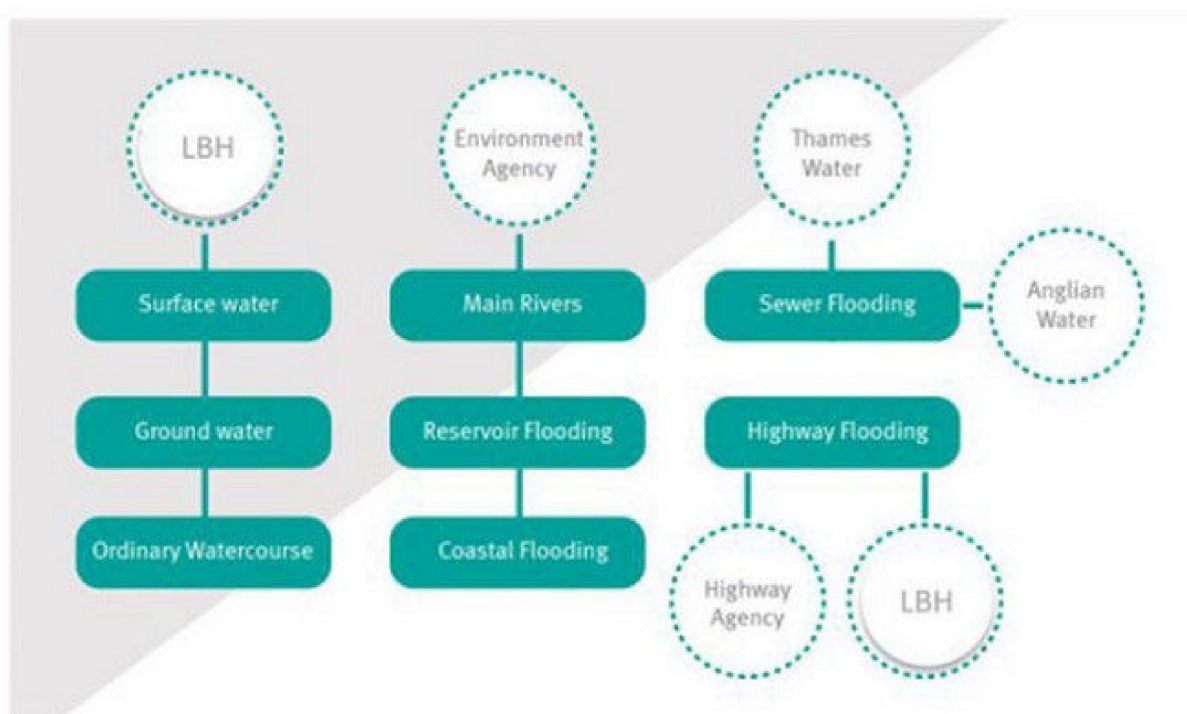
Understanding watercourses

Who is responsible for what?

The responsibility for flooding is held jointly among a number of different bodies. The Flood and Water Management Act defines who is responsible for different types of flooding.

Understanding this is important when establishing who to contact first in the event of a flood event. A useful diagram showing responsibility of each watercourse can be found [here](#).

Who we work with



Water courses within Havering

Details of all watercourses located within Havering can be found by accessing the links below

Main Rivers

NAME
BLACKS BROOK
CARTER BROOK
COLDHARBOUR LANE
EMERSON PARK STREAM
MONKS FARM SEWER
PAINES BROOK
RAINHAM CREEK
RAINHAM MAIN SEWER
RIVER BEAM
RIVER INGREBOURNE
RIVER MARDYKE
RIVER RAVENSBORNE
RIVER ROM
WEALD BROOK

Ordinary Watercourses

AVELEY ROAD	CULVERT
BERWICK POND ROAD (A)	CULVERT
COLDHARBOUR LANE CULVERT	CULVERT
CROWN COTTAGES CULVERT	CULVERT
FERRY LANE 2	CULVERT
FERRY LANE CULVERT 1	CULVERT
FREDERICK ROAD	CULVERT
GARRY CLOSE	CULVERT
HALL LANE CULVERT	CULVERT
LOWER BEDFORDS ROAD CULVERT	CULVERT
MARSH DRAIN WEST	CULVERT
MARSH WAY (E)	CULVERT
MARSH WAY (W)	CULVERT
NELMES WAY CULVERT	CULVERT
NOAK HILL ROAD WEST	CULVERT
NORTH STREET CULVERT	CULVERT
PARK FARM ROAD CULVERT	CULVERT
PARKWAY CULVERT	CULVERT
PIKE LANE CULVERT	CULVERT
ST MARYS LANE CULVERT	CULVERT
TOMKYNs LANE CULVERT	CULVERT
VIKING WAY CULVERT 1	CULVERT
WARLEY ROAD	CULVERT
WARLEY STREET CULVERT	CULVERT
WINGLETYE LANE	CULVERT
WOODLANDS AVENUE CULVERT 1	CULVERT

Householder and other minor extensions in Flood Zones 2 and 3

This guidance is for domestic extensions; and non-domestic extensions where the additional footprint created by the development does not exceed 250 square metres. It should NOT be applied if an additional dwelling is being created.

We recommend that:

Planning Authorities

- 1) Refer the applicant to the standing advice pages on the Environment Agency website or provide them with a copy of this page for them to include as part of the planning application submission.
- 2) Check the planning application to ensure that one or other of the mitigation measures from the table below has been incorporated.

Applicants complete the table below and include it with the planning application submission. The table, together with the supporting evidence, will form the Flood Risk Assessment (FRA) and will act as an assurance to the Local Planning Authority that flood risk issues have been adequately addressed. Print the completed form to a PDF writer if submitting this form electronically.

Applicant to choose one or other of the flood mitigation measures below	Applicant to provide the LPA with the supporting information detailed below as part of their FRA	Applicant to indicate their choice in the box below. Enter 'yes' or 'no'
Either ; Floor levels within the proposed development will be set no lower than existing levels AND, flood proofing of the proposed development has been incorporated where appropriate.	Details of any flood proofing / resilience and resistance techniques, to be included in accordance with ' <i>Improving the flood performance of new dwellings</i> ' CLG (2007)	yes
Or; Floor levels within the extension will be set 300mm above the known or modelled 1 in 100 annual probability river flood (1%) or 1 in 200 annual probability sea flood (0.5%) in any year. This flood level is the extent of the Flood Zones	This must be demonstrated by a plan that shows finished floor levels relative to the known or modelled flood level. All levels should be stated in relation to Ordnance Datum ¹	

Subterranean/basement extensions

Due to the risk of rapid inundation by floodwater; basements should be avoided in areas at risk of flooding.

The LPA may hold additional guidance for basement extensions.

Self-contained basement dwellings are 'Highly Vulnerable' development and should not be permitted in flood zone 3. We are fundamentally opposed to these developments.

Continued...

¹ Ordnance Datum or the abbreviation 'OD' is the mean level of the sea at Newlyn in Cornwall from which heights above sea level are taken. The contour

Cumulative impact of minor extensions and the removal of Permitted Development rights.

PPS25 paragraph D16 highlights the potential for the cumulative impact of minor extensions to have a significant effect on flood risk. Where local knowledge (Strategic Flood Risk Assessment held by the LPA/information provided by the parish council) suggests this is the case the guidance contained in FRA guidance note 2 should be applied². FRA guidance note 2 can also be applied where permitted development rights have been removed for flood risk reasons. The Environment Agency does not usually comment on minor development in this category.

Permeable paving and changes to permitted development rights for householders

On the 1st October 2008 the General Permitted Development Order (GPDO) in England was amended by the Government (Statutory Instrument 2008 No. 2362).

One of the changes introduced by the GPDO amendment is the removal of permitted development rights for householders wishing to install hard surfacing in front gardens which exceeds 5 square metres (i.e. 1m x 5 m) without making provision to ensure permeability. This means that use of traditional materials, such as impermeable concrete, where there is no facility in place to ensure permeability, requires an application for planning permission.

In order to help and advise householders of the options for achieving permeability and meeting the condition for permitted development status the Department for Communities and Local Government (CLG) has produced guidance on permeable paving which can be found on the following link <http://www.communities.gov.uk/publications/planningandbuilding/pavingfrontgardens>.

The Environment Agency support this change to the GPDO as it is in line with the recommendations of the Pitt Report regarding the need to better tackle the impact of surface water flooding. However, Local Planning Authorities should determine these applications in accordance with the CLG guidance **without** consulting the Environment Agency.

End of comment