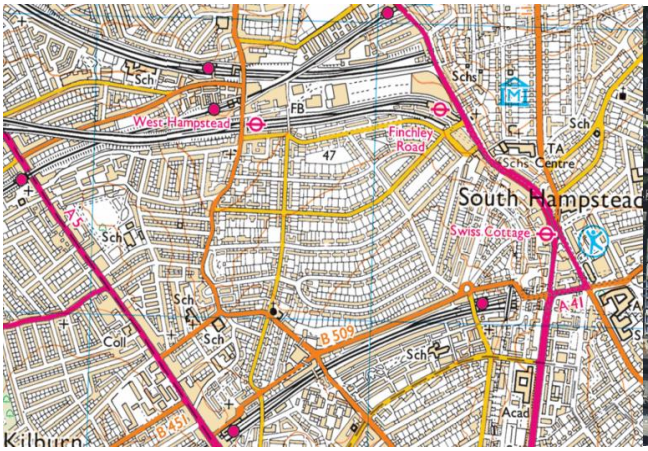
WtFR Ltd

Flood Risk Assessment

Development at

111 Canfield Gardens, London, NW6 3DY



On behalf of
Mr Guy Ziser

Date: 11th October 2022

Reference: WTFR-FRA-2022/05/Q05 Rev C

Issue sheet

Revision	Prepared by	Date	Checked by	Date
Draft	James Scott	18/06/22	Jim Hitching	20/06/22
Draft A	Jim Hitching	22/06/22		
Rev B	Jim Hitching	04/10/22	John Dixon C.Eng MICE	07/10/22
Rev C	Jim Hitching	11/10/22	John Dixon C.Eng MICE	11/10/22

Revision A – Changes following feedback from client.

Revision B – Discussion of permeable paving and surface water disposal

Revision C – Revision of permeable paving assessment taking into account the impermeable nature of the car lift roof.

Disclaimer

WtFR Ltd expressly disclaims responsibility for any error in, or omission from, this assessment arising from or in connection with any of the assumptions being incorrect.

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1. Introduction

WtFR Ltd has been commissioned by Mr Guy Ziser to undertake a Flood Risk Assessment (FRA) in connection with the planning application for the proposed development at 111 Canfield Gardens, London, NW6 3DY.

This FRA has been produced to demonstrate how risks from all sources of flooding to the site and flood risk to others from the development will be managed, in order to satisfy the requirements, set out in the National Planning Policy Framework (NPPF).

A full assessment of the flood risk to the site and consideration of the surface water management as a result of the development has been considered as part of this analysis.

Data has been gathered from a number of other sources including: the Environment Agency (EA), the British Geological Society (BGS), National Soil Research Institute (NSRI), aerial photographs, Ordnance Survey (OS), commercially available historical mapping and relevant strategic documents developed by Camden Council, in their capacity as the Local Planning Authority and Lead Local Flood Authority.

2. Site Description

Area Size: 600m^2 (total) 400m^2 (impermeable)

Grid reference: TQ 25797 84328

The proposal is for the relocation of 2No. of the existing 3No. forecourt car parking spaces into basement parking via a car lift while retaining 1No. car parking space on the forecourt at 111 Canfield Gardens, London, NW6 3DY.

Figures 1 and 2 below show location details of the development site. Figure 3 shows an aerial photograph of the development site.

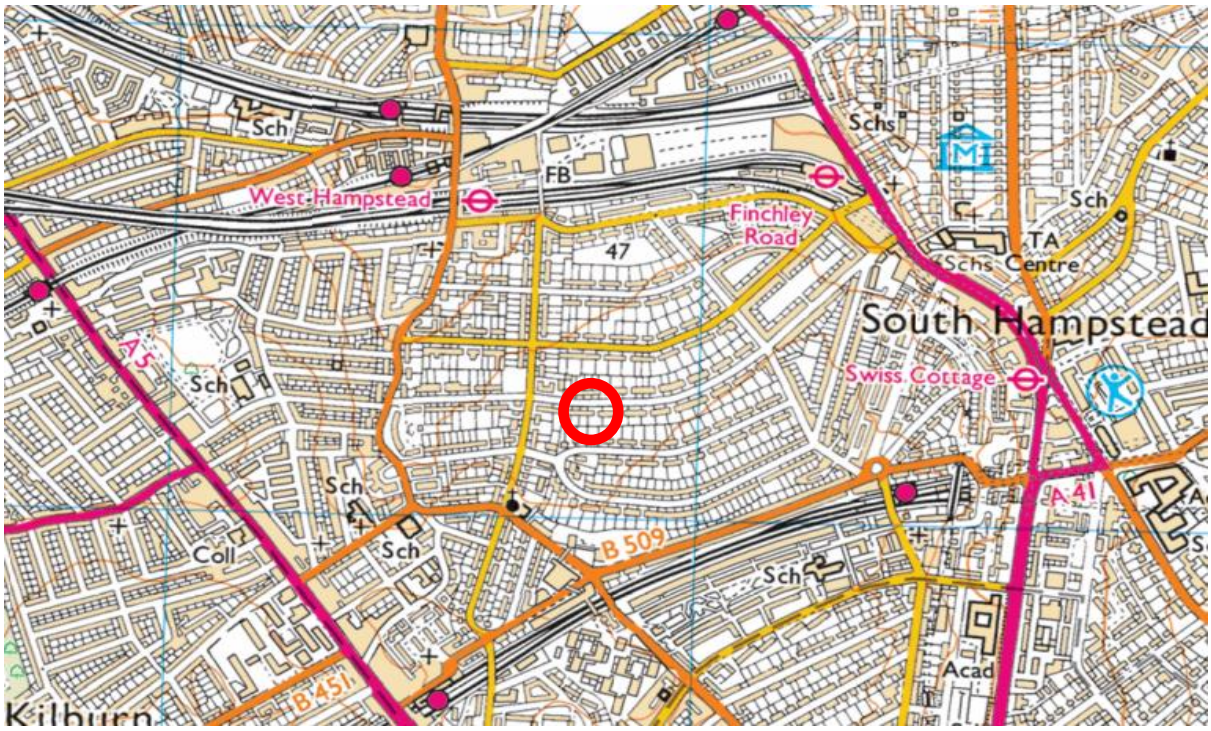

Figure 1 – Location of the site, highlighted.

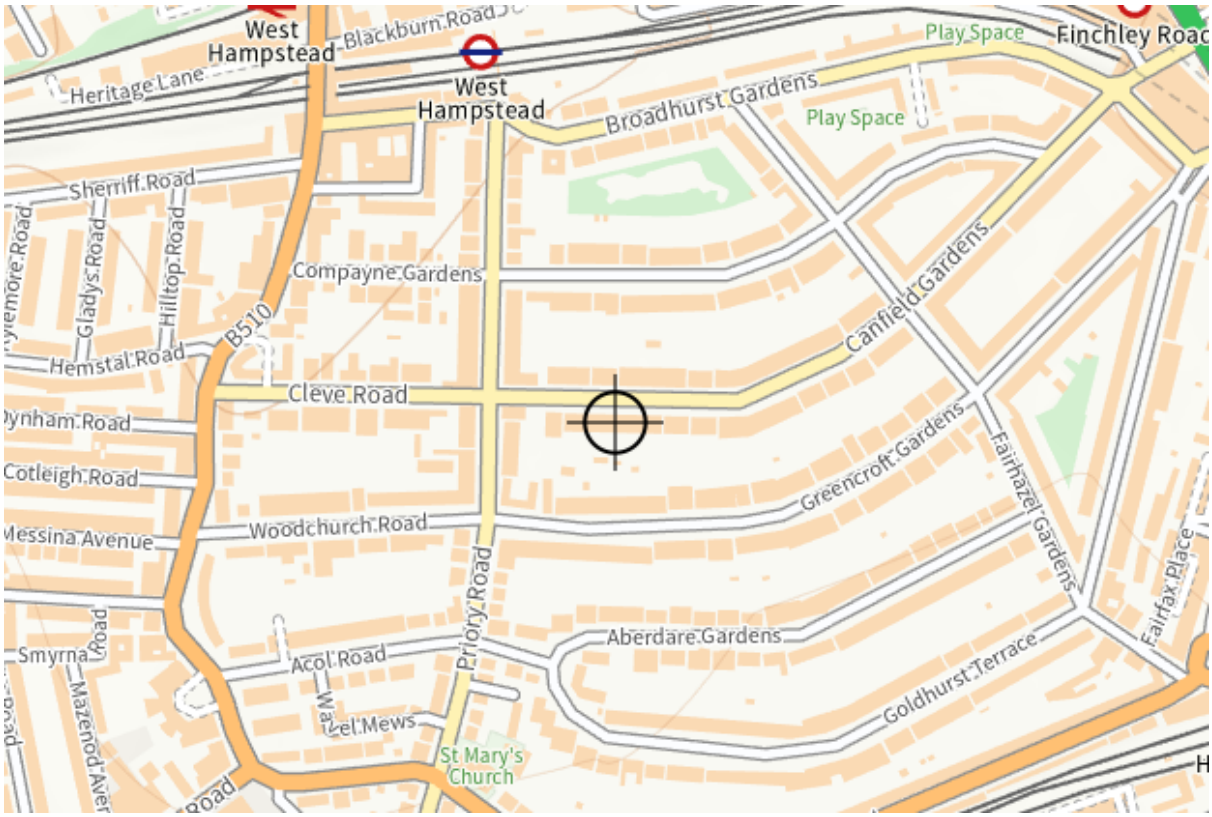

Figure 2 –detailed location of the development site, highlighted.

Figure 3 – aerial photograph of the development site.

3. Flood Risk Assessment

3.1 National Planning Policy

Paragraph 167 of the NPPF states "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[50]. Development should only be allowed in areas at risk of flooding where, in the light of this assessment (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;

c) it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;

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".

Footnote 55 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".

Furthermore paragraph 30 of the Planning Practice Guide on Flood Risk and Climate Change states "A site-specific flood risk assessment is carried out by (or on behalf of) a developer to assess the flood risk to and from a development site. Where necessary, the assessment should accompany a planning application submitted to the local planning authority. The assessment should demonstrate to the decision-maker how flood risk will be managed now and over the development's lifetime, taking climate change into account, and with regard to the vulnerability of its users.

The objectives of a site-specific flood risk assessment are to establish:

- whether a proposed development is likely to be affected by current or future flooding from any source;
- whether it will increase flood risk elsewhere;
- whether the measures proposed to deal with these effects and risks are appropriate;
- evidence for the local planning authority to apply (necessary) the Sequential Test, and;
- whether the development will be safe and pass the Exception Test, if applicable".

Continuing paragraph 31 of the Planning Practice Guidance quotes "The information provided in the flood risk assessment should be credible and fit for purpose. Site-specific flood risk assessments should always be proportionate to the degree of flood risk and make optimum use of information already available, including information in a Strategic Flood Risk Assessment for the area, and the interactive flood risk maps available on the Environment Agency's web site.

A flood risk assessment should also be appropriate to the scale, nature and location of the development. For example, where the development is an extension to an existing house (for

which planning permission is required) which would not significantly increase the number of people present in an area at risk of flooding, the local planning authority would generally need a less detailed assessment to be able to reach an informed decision on the planning application. For a new development comprising a greater number of houses in a similar location, or one where the flood risk is greater, the local planning authority would need a more detailed assessment".

3.2 Local Planning Policy

Local Authorities consider flood risk through relevant environmental and climate change policies which enforce the requirements of the NPPF. Relevant local policy, as outlined by Camden Council, is contained within the;

i) Strategic Flood Risk Assessment
ii) Local Flood Risk Management Strategy

The Strategic Flood Risk Assessment (SFRA) and the Local Flood Risk Management Strategy (LFRMS) are key sources of flood risk specific information for the area. The SFRA provides a more detailed review of flood risks and recommendations for ensuring developments can be constructed and operated safely in accordance with the NPPF.

3.3 Flood Risk Zones, Vulnerability and Classification

These Flood Zones refer to the probability of river and sea flooding, ignoring the presence of defences. They are shown on the Environment Agency's Flood Map for Planning available on the Environment Agency's web site, as indicated in the table below.

Table 1 – Flood Zones

Flood Zone	**Definition**
Zone 1 *Low Probability*	Land having a less than 1 in 1,000 annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map – 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. (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 sea flooding. (Land shown in dark blue on the Flood Map)
Zone 3b *The Functional Floodplain*	This zone comprises land where water has to flow or be stored in times of flood. 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)

Table 2 – Flood Risk Vulnerability Classification

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 electricity generating power stations and grid and primary substations; and water treatment works that need to remain operational in times of flood. • Wind turbines.
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.
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.

* Landfill as defined in Schedule 10 to the Environmental Permitting (England and Wales) Regulations 2010.

Table 3 - Flood risk vulnerability and flood zone 'compatibility'

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†	✗	Exception Test required	✓	✓
Zone 3b*	Exception Test required*	✗	✗	✗	✓*

Key:

✓ Development is appropriate

✗ Development should not be permitted.

Notes to table 3:

- This table does not show the application of the Sequential Test which should be applied first to guide development to Flood Zone 1, then Zone 2, and then Zone 3; nor does it reflect the need to avoid flood risk from sources other than rivers and the sea;
- The Sequential and Exception Tests do not need to be applied to minor developments and changes of use, except for a change of use to a caravan, camping or chalet site, or to a mobile home or park home site;
- Some developments may contain different elements of vulnerability and the highest vulnerability category should be used, unless the development is considered in its component parts.

† In Flood Zone 3a essential infrastructure should be designed and constructed to remain operational and safe in times of flood.

* In Flood Zone 3b (functional floodplain) essential infrastructure that has to be there and has passed the Exception Test, and water-compatible uses, should be designed and constructed to:

- remain operational and safe for users in times of flood;
- result in no net loss of floodplain storage;
- not impede water flows and not increase flood risk elsewhere.

4. Sources of flooding

4.1 Fluvial/Tidal

The Environment Agency's Flood Map for Planning (Rivers and Sea) identifies fluvial and tidal flood zones, and provides an indication of whether or not these zones are protected, due to the presence of flood defences (also highlighted). Figure 4, below, presents the Flood Map for the surrounding area.

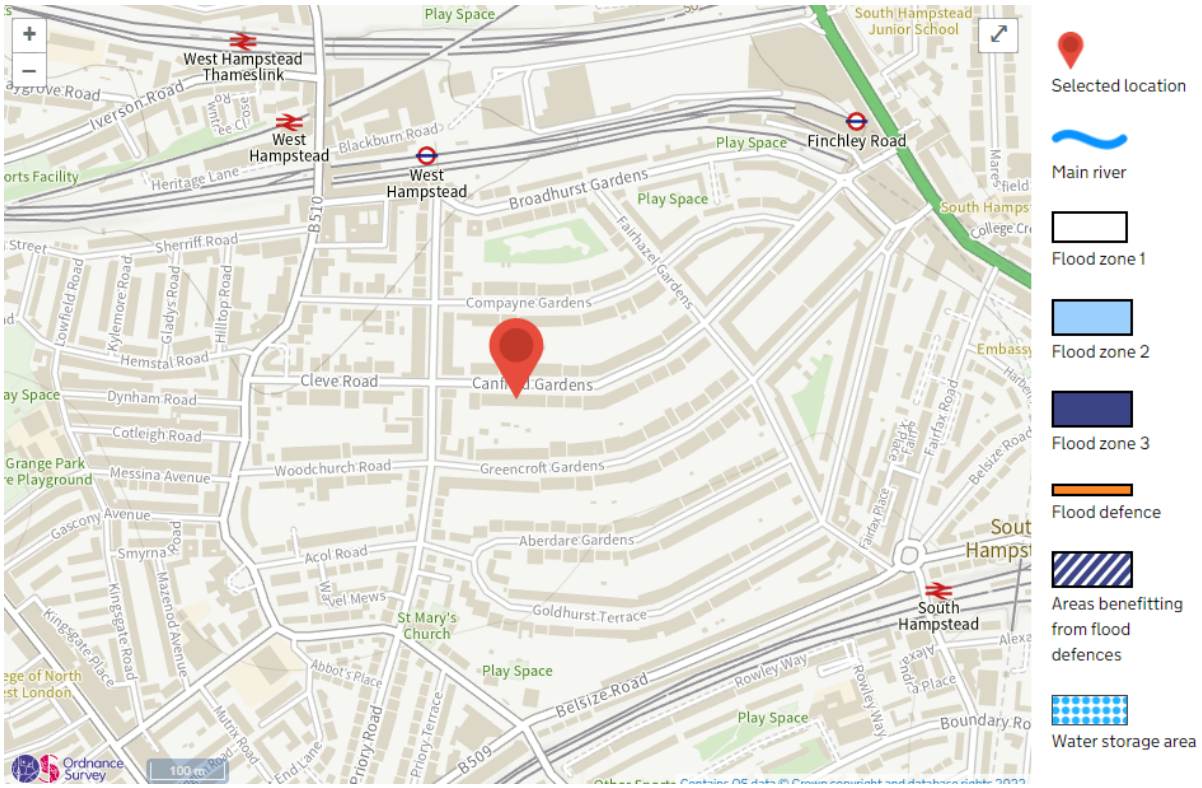

Figure 4 – Fluvial flood risk – EA Flood Map.

The EA Flood Map identifies the development site to lie within Flood Zone 1, where the chance of flooding in any given year is less than 1 in 1000 (0.1%).

With reference to Camden Geological, Hydrogeological and Hydrological Study (1999), Talling (2011) and Barton (1992) a tributary of the 'lost rivers' River Westbourne was located approximately within close proximity to the site. Figure 4a illustrates the location of the site and a 'lost watercourse.

The River Westbourne flowed in a southerly direction from West Hampstead. From the tributaries it flowed southwards towards Kilburn, across Bayswater Road and into Hyde Park, where it entered the Serpentine. From the Serpentine it flowed southwards under Knightsbridge before entering the River Thames within the grounds of Chelsea Hospital. The watercourses have since been largely lost through a culverting system as the urban extent of the borough has grown over time.

Further investigation into the 'lost river' using Ordnance survey maps indicate a small drainage ditch running between two field boundaries (from 1871 maps) which is the only indication of a water source for the River Westbourne approximately 200m east of the site and a small pond 110m west. By 1896 this watercourse and pond have either been culverted and running beneath the roads, or has been removed as it is no longer needed.

Due to the small size of the ditch, any possible flooding that may have occurred is unlikely to have caused anything but very thin layers of Alluvium, but is unlikely to extend as far as Number 111 as such there is negligible influence on-site.

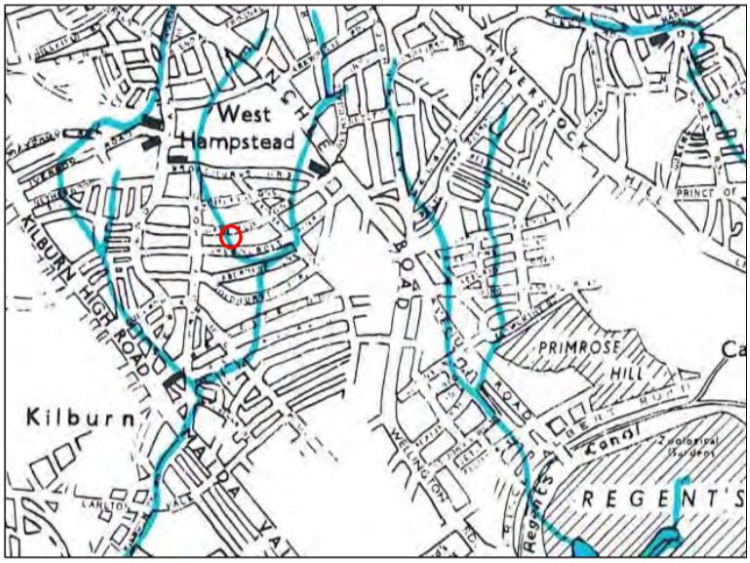

Figure 4a – Lost rivers of London and location of the development.

4.2 Historic Flooding

The EA does not have records of historic flood events from rivers affecting the area local to this property. Further analysis of strategic flood risk documents developed by Camden Council show that Canfield Gardens flooded in 2002, but not in 1975.

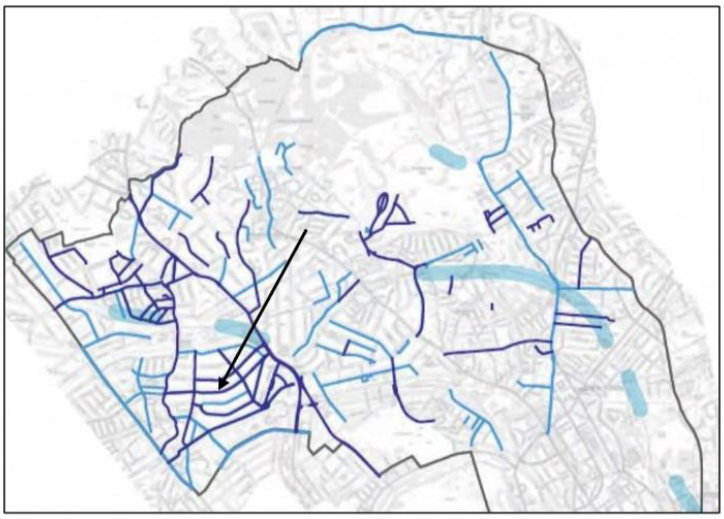

Figure 5 - Extract from Figure 15 of the Camden CPG4 showing roads which flooded in 1975 (light blue), in 2002 (dark blue) and 'areas with potential to be at risk from surface water flooding' (wide light blue bands)

4.3 Surface Water Flooding

The Environment Agency's updated Flood Map for Surface Water (uFMfSW) identifies pluvial flood risk. Figure 6 below presents the uFMfSW for the development site and the surrounding area.

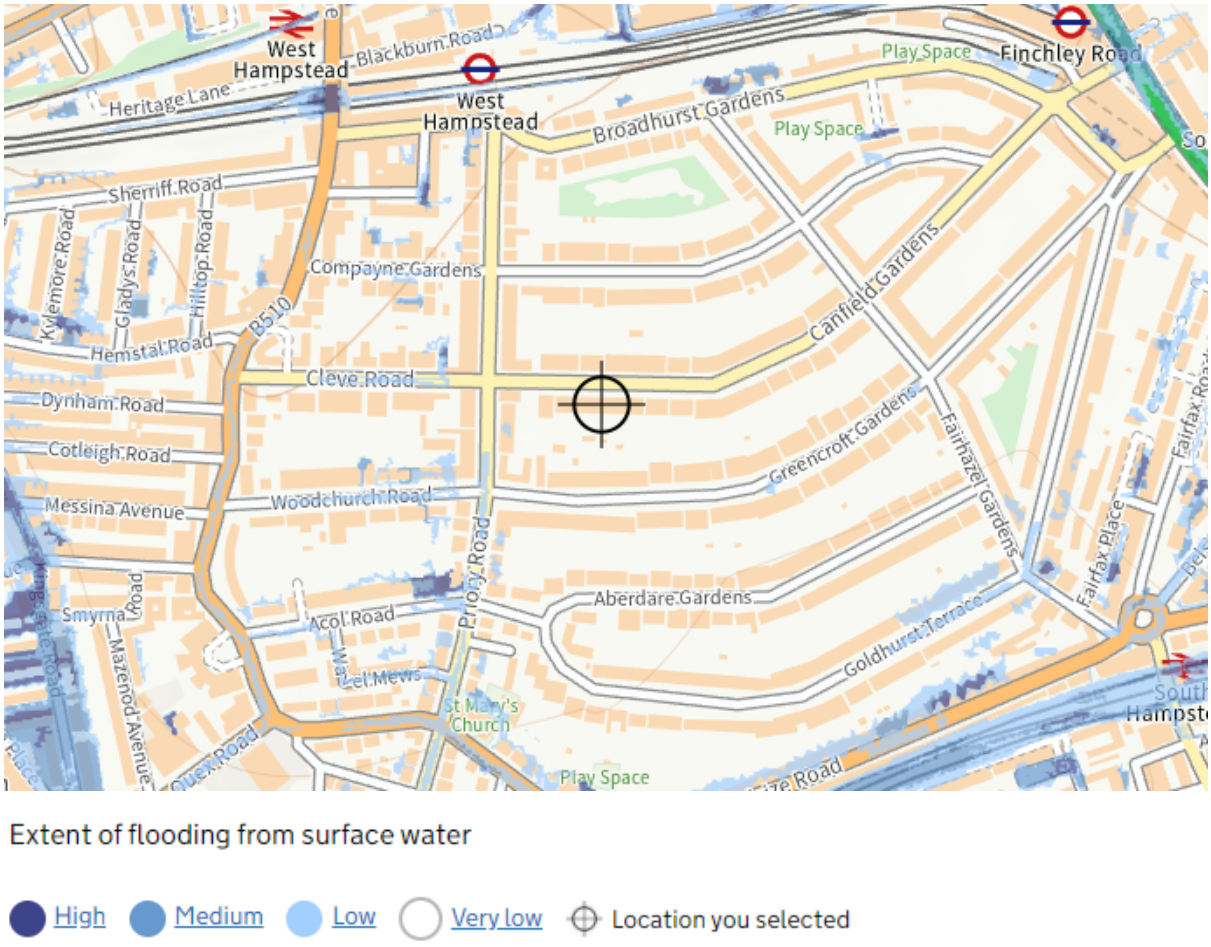

Figure 6 – Flooding from surface water sources, uFMfSW, site highlighted.

The uFMfSW shows that area in the vicinity of the development site is at very low risk of surface water flooding. Very low risk means that the probability of flooding in any given year is less than 1 in 1000 (0.1%).

4.4 Reservoir

The Environment Agency's Risk of Reservoir Flooding Map identifies the maximum extent of flooding that may be expected in the unlikely event that a reservoir dam failed. The development is not at risk of flooding.

4.5 Groundwater

The Environment Agency's Groundwater Vulnerability Map indicates that the development site is situated over an unproductive groundwater vulnerability area, as shown in Figure 7. Further analysis shows that the development site is not situated over a Groundwater Source Protection Zone, as shown in Figure 8.

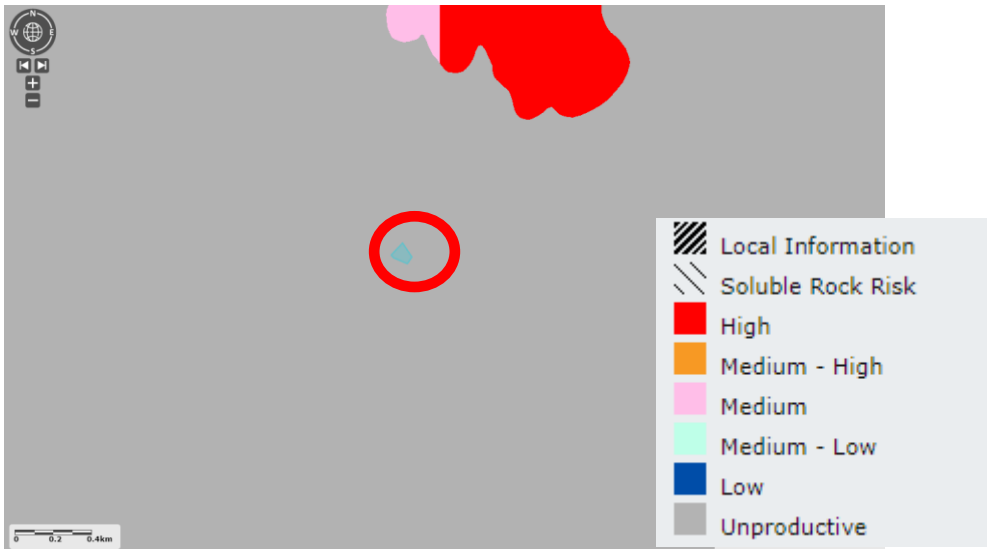

Figure 7 – Groundwater vulnerability map, site highlighted.

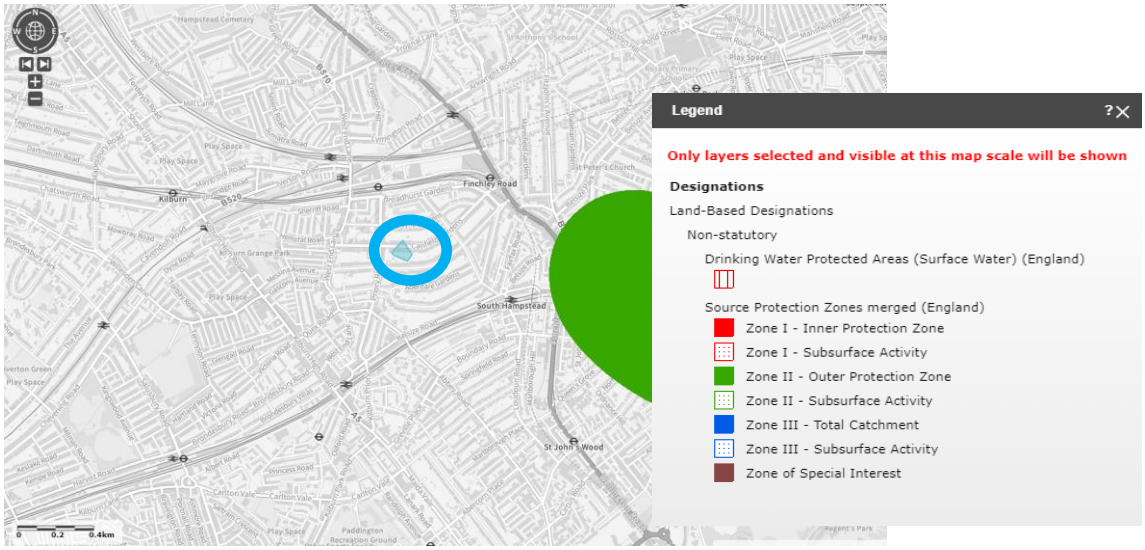

Figure 8 – Groundwater source protection zones, site highlighted.

The impact of this development on groundwater is considered to be negligible. However, it is recommended that a groundwater mitigation plan is developed that may be implemented if groundwater is encountered during construction.

4.6 Geology

Figures 9 and 10 present information from the British Geological Survey.

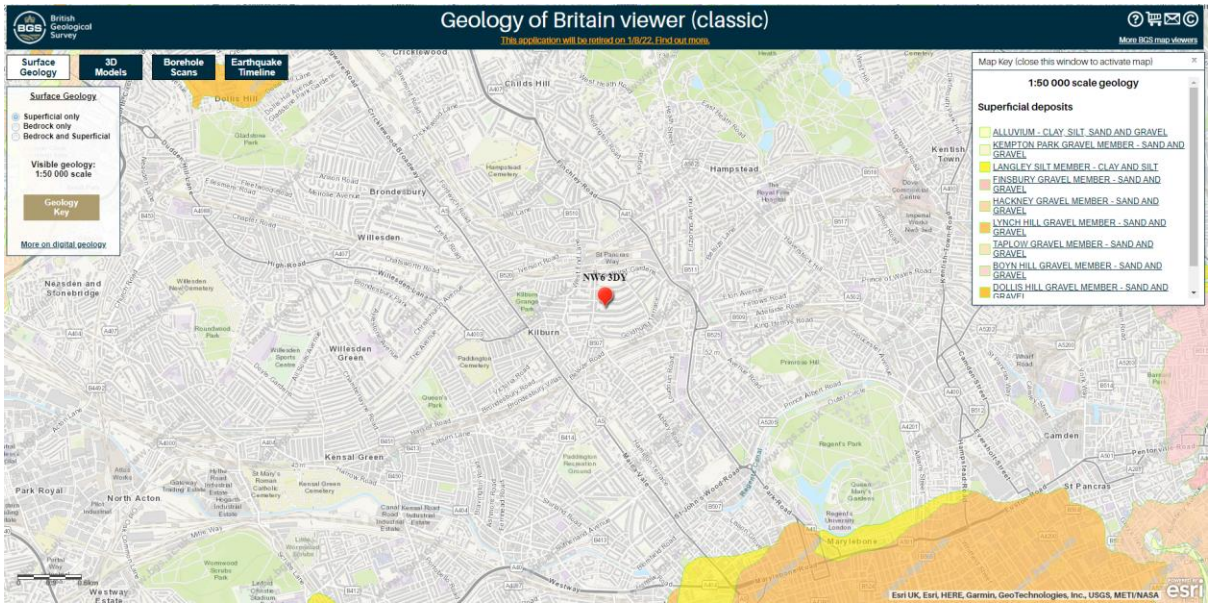

Figure 9 – Superficial Geology of the development.

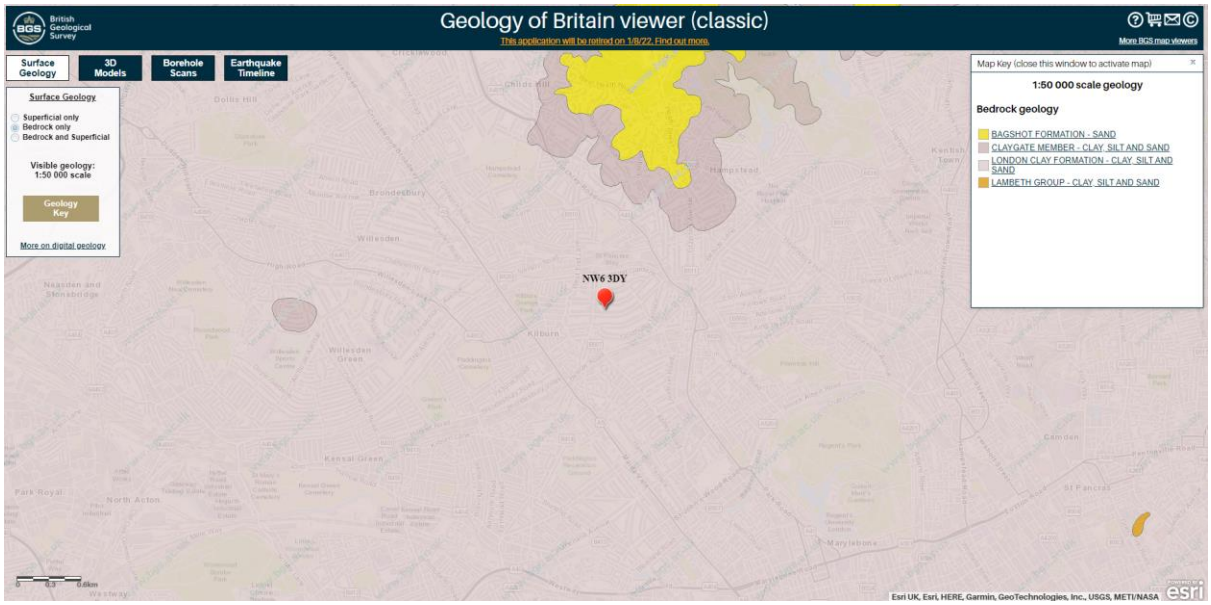

Figure 10 – Bedrock geology of the development.

There are no superficial deposit records at the development site.

With regards to the bedrock, the site is underlain by the London Clay Formation - Clay, Silt and Sand. The sedimentary bedrock formed approximately 48 to 56 million years ago in the Palaeogene Period. The local environment was previously dominated by deep seas.

5. Proposed development

This FRA is prepared to support a planning application for the relocation of 2No. of the existing 3No. forecourt car parking spaces into basement parking via a car lift while retaining 1No. car parking space on the forecourt at 111 Canfield Gardens, London, NW6 3DY.

The development is classified as being **More Vulnerable** development within Table 2 of the Planning Practice Guidance. More Vulnerable developments within Flood Zone 1 are acceptable.

Figure 11 – Proposed section through basement car lift and lightwell

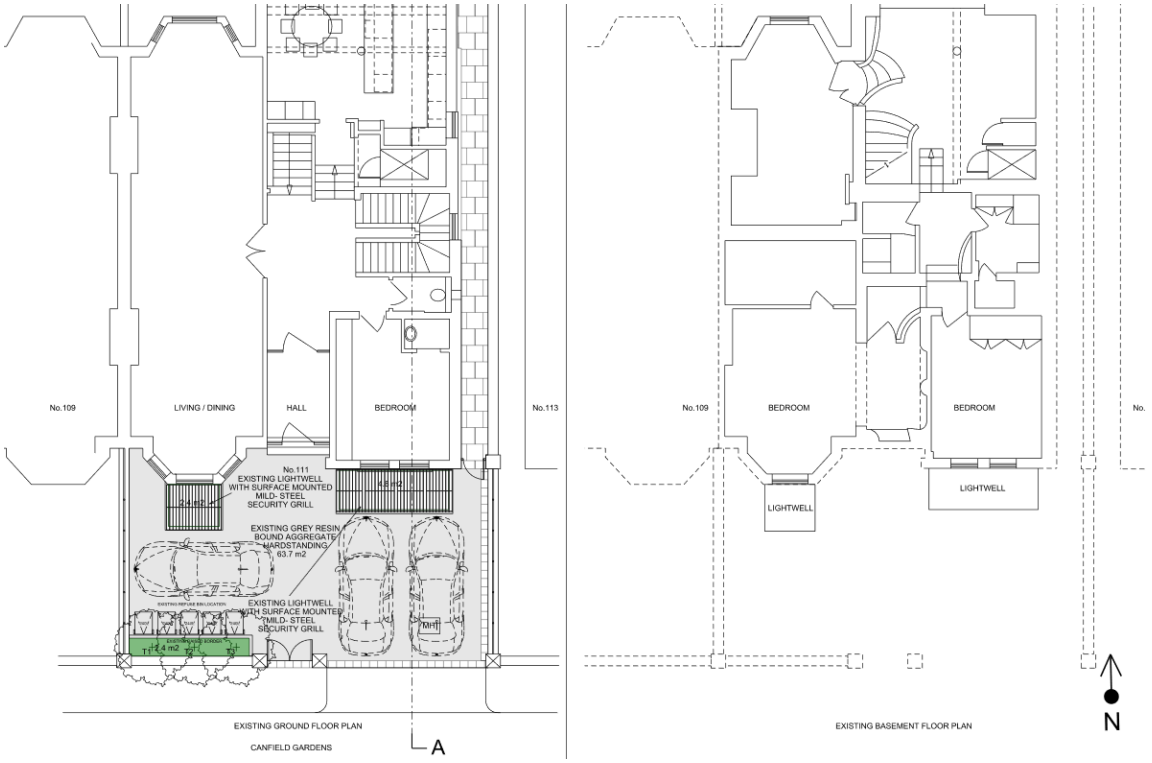

Figure 12 – Existing ground floor and basement plans

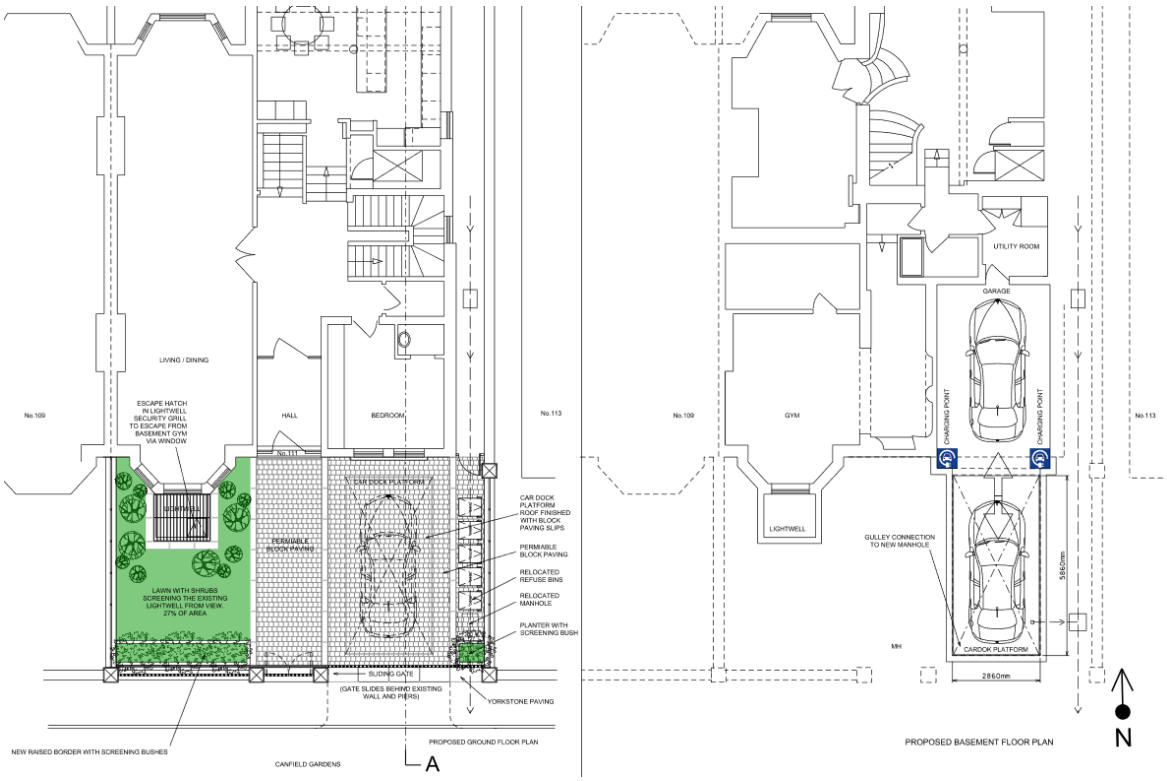

Figure 13 – Proposed ground floor and basement plans

6. Surface Water Drainage

The existing runoff rate from the site can be calculated using the Modified Rational Rainfall Method. Where Q = 2.78 * Cv * Cr * Ri * A

Cv = **0.75** – Fully impermeable areas i.e. existing roads and hardstanding

Cr = **1.3** – Routing Coefficient (CIRIA C697 recommends a value of 1.3)

Ri = **120**mm Rainfall intensity

A = **0.04**ha current impermeable area

Q = 2.78 * 0.75 * 1.3 * 120 * 0.004

Q = 1.3l/s

It is assumed that the existing arrangement for the discharge of surface water from the development is into the surface water or combined sewerage system. The impermeable area of the site will decrease. This is due to the proposed forecourt will make use of permeable block paving (except for the paving on the platform), therefore the method of surface water disposal will be as existing and not increasing the rate of runoff.

The current impermeable area of the front garden is 63.7m2 - this consists of the current parking forecourts, with a permeable area of 2.4m2.

Post development the impermeable area of the development will be 66.1m2. 48.25m2 of this area will consist of permeable paving, with a grassed area consisting of the other 17.85m2.

On this basis, the proposed discharge of surface water from the development will not see any surface water flooding on site in the 1 in 30 year and 1 in 100 year plus climate change events. Therefore, it will not increase the risk of surface water / sewer flooding elsewhere.

7. Hierarchy of disposing surface water

The Planning Practice Guidance and part H of the Building Regulations state that "generally, the aim should be to discharge surface run off as high up the following hierarchy of drainage options as reasonably practicable:

- into the ground (infiltration);
- to a surface water body;
- to a surface water sewer, highway drain, or another drainage system;
- to a combined sewer".

7.1 Infiltration

The proposed forecourt will make use of permeable block paving (except for the paving on the platform) and the lawn and shrubs adjacent. This will allow an element of infiltration for most of the application area.

7.2 Surface Water Body

There are no watercourses within immediate vicinity of the development site.

7.3 Surface Water or Combined Sewer

It is assumed that a public surface water or combined sewer serves the existing property. As such, it is recommended that surface water is discharged to the public sewerage system for those areas that do not discharge via infiltration.

8. Use of SuDS

The NPPF, Planning Practice Guide and the Ministerial Statement all look at the use of SuDS as a priority to aid the disposal of surface water from new developments.

Due to the nature of the development proposal there is limited capacity to include SuDS measures although permeable paving will be used within the forecourt area.

9. Management of flood risk

9.1 Fluvial

The EA Flood Map identifies the development site to lie within Flood Zone 1, where the chance of flooding in any given year is less than 1 in 1000 (0.1%).

There is the possibility that a 'lost river of London' flows within the immediate vicinity of the development. Whilst, unlikely, it is recommended that if any culvert or water is struck during construction, a mitigation plan shall be set up and incorporated. A suitable planning condition can word this appropriately. Such a condition could be worded thus "During construction if any pipe, culvert, drainage feature is struck or groundwater is found, development shall cease and a mitigation plan submitted to the Local Planning Authority for approval. The findings and mitigation within this report shall therefore be implemented forthwith. Reason: To adequately protect the development from flooding".

Residential dwellings are classified as being a More Vulnerable development within Table 2 of the Planning Practice Guidance. More vulnerable developments are acceptable in Flood Zone 1.

9.2 Surface Water

The development site is described as being at very low risk of flooding, which means that the probability of flooding in any given year is less than 1 in 1000 (0.1%).

It is assumed that a public surface water or combined sewer serves the existing property. As such, it is recommended that surface water is discharged to the public sewerage system.

Appropriate SuDS features and measures (permeable paving and soft landscaping) will be incorporated within the development to minimise surface water discharges.

The current impermeable area of the front garden is 63.7m2 - this consists of the current parking forecourts, with a permeable area of 2.4m2.

Post development the impermeable area of the development will be 66.1m2. 48.25m2 of this area will consist of permeable paving, with a grassed area consisting of the other 17.85m2.

At present if rainfall falls within the development (parking forecourt) area – 63.7m2 of this area will see its surface water collect and be conveyed to the positive drainage system that eventually outfalls to the adjacent sewerage network. If this network is exceeded – i.e. water from the forecourt cannot enter the network it will flow out of the site and into the adjacent highway network.

The proposed development sees the impermeable area being reduced to 0m2. 17.85m2 will see surface water fall onto grass, where natural drainage processes will occur i.e. infiltration into the underlying geology. The other 48.25m2 will consist of permeable paving. The nature of permeable paving is to mimic natural drainage as closely as possible. It looks to mimic the characteristics of rainfall on grass. The car lift roof area (15m2) will not be permeable, but water which falls onto this surface will runoff onto adjacent impermeable areas.

To assist with this mimicking, it is proposed to have the subbase of the paving at a 450mm depth. With an area of 33m2 (48m2 minus the 15m2 car lift roof area), a 450mm depth and a typical void ratio of 30% (0.3) this will see a subbase storage volume of 4.45m3. A volume of this size will be sufficient to cope with all rainfall events up to and including the 1 in 100 year plus (40%) climate change event. If this network is exceeded, water from the forecourt will flow out of the site and into the adjacent highway network – just as existing.

As such, the proposed development will not increase the risk of flooding elsewhere from surface water sources.

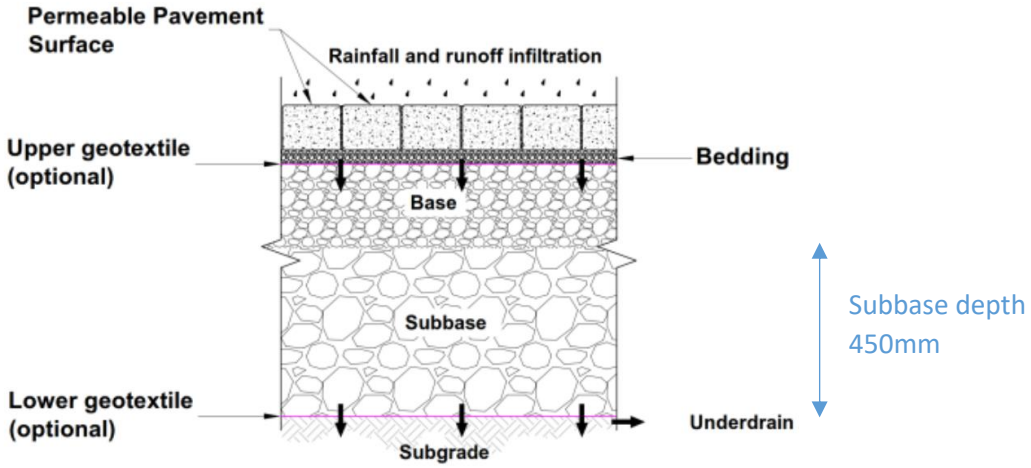

Figure 10 – Typical permeable paving cross-section with stated subbase depth

9.3 Flood Mitigation Strategy

The development proposed is for the relocation of 2No. of the existing 3No. forecourt car parking spaces into basement parking via a car lift while retaining 1No. car parking space on the forecourt.

Referencing information from Total Lifting Solutions the company installing the car lift system it looks at the technical measures to ensure water tightness of their car lift systems. "The roof of the car lift is supported by telescopic columns that pick up the roof in the upward travel and land the roof underside surface onto the guttering upstand in downward travel sealing the shaft from water ingress. The roof tray is waterproofed (we recommend GRP) to prevent water getting through the roof metal surface. The guttering is designed to take away the surface water from the lift roof finish with outlets that can be vertical or horizontal depending on the clients' requirements. Also, additional water outlets can be added or positioned to the client's driveway drainage design.

We ask that these measures are incorporated into the development to help prevent the ingress of any water.

In addition to the above, further general information on groundwater flooding from the Environment Agency has been referenced below. Whilst not pertinent to this development, some of the information may be useful and information to the client/user of the development.:

The most effective way to keep groundwater out of the property is to use a drainage or pump system to divert water away from the property. However, in some cases there may be too much water and even pumping may not be effective.

Pumps work best when the inlet is installed in a sump (a low point into which water can drain). Pumping is likely to be required over many days, weeks or months. Pumps can be electric or petrol/diesel driven. Electric pumps may be the most convenient but there is a chance of power cuts during a flood. A back up generator may be required. Care must be taken if a mains powered electric pump is used during a flood and advice should be sought from a qualified electrician.

Petrol or diesel pumps are possible alternatives but can be noisier and will require refuelling. This can be a problem as flooding from groundwater can often last for many weeks or even months. Position the generator outside in the open air as generators produce carbon monoxide fumes which can kill. Consider that pumping from one place to another may cause flooding elsewhere. Pump water must not be discharged into the public foul sewer.

Only pump out water when flood levels outside the property start to be lower than inside. This reduces the risk of structural damage. A structural engineer should be consulted before pumping very deep water from basements".

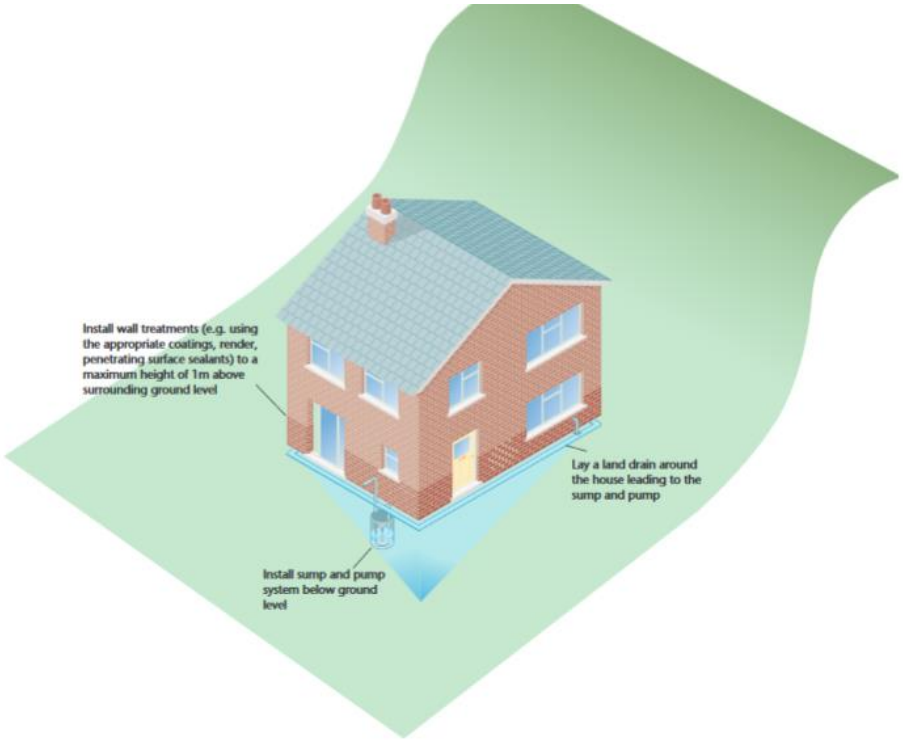

Figure 11 – Groundwater prevention measures (source EA Groundwater Flooding).

10. Conclusions

The EA Flood Map identifies the development site to lie within Flood Zone 1, where the chance of flooding in any given year is less than 1 in 1000 (0.1%).

Residential dwellings are classified as being a More Vulnerable development within Table 2 of the Planning Practice Guidance. More vulnerable developments are acceptable in Flood Zone 1.

There is the possibility that a 'lost river of London' flows within the immediate vicinity of the development. Whilst, unlikely, it is recommended that if any culvert or water is struck during construction, a mitigation plan shall be set up and incorporated. A suitable planning condition can word this appropriately.

The development site is at very low risk of flooding, which means that the probability of flooding in any given year is less than 1 in 1000 (0.1%).

The current impermeable area of the front garden is 63.7m2 - this consists of the current parking forecourts, with a permeable area of 2.4m2.

Post development the impermeable area of the development will be 66.1m2. 48.25m2 of this area will consist of permeable paving, with a grassed area consisting of the other 17.85m2.

At present if rainfall falls within the development (parking forecourt) area – 63.7m2 of this area will see its surface water collect and be conveyed to the positive drainage system that eventually outfalls to the adjacent sewerage network. If this network is exceeded – i.e. water from the forecourt cannot enter the network it will flow out of the site and into the adjacent highway network.

The proposed development sees the impermeable area being reduced to 0m2. 17.85m2 will see surface water fall onto grass, where natural drainage processes will occur i.e. infiltration into the underlying geology. The other 48.25m2 will consist of permeable paving. The nature of permeable paving is to mimic natural drainage as closely as possible. It looks to mimic the characteristics of rainfall on grass. The car lift roof area (15m2) will not be permeable, but water which falls onto this surface will runoff onto adjacent impermeable areas.

To assist with this mimicking, it is proposed to have the subbase of the paving at a 450mm depth. With an area of 33m2 (48m2 minus the 15m2 car lift roof area), a 450mm depth and a typical void ratio of 30% (0.3) this will see a subbase storage volume of 4.45m3. A volume of this size will be sufficient to cope with all rainfall events up to and including the 1 in 100 year plus (40%) climate change event. If this network is exceeded, water from the forecourt will flow out of the site and into the adjacent highway network – just as existing.

As such, the proposed development will not increase the risk of flooding elsewhere from surface water sources.

There is no evidence of historic flooding of the development site.

The development is not at risk from reservoir flooding.

Based on the likely flooding risk, it is considered that the proposed development can be operated safely in flood risk terms, without increasing flood risk elsewhere and is therefore appropriate development in accordance with the NPPF.