

30-36 CLARENDON ROAD

N8 0DJ



FLOOD RISK ASSESSMENT & SUDS REPORT

VERSION 2 – OCTOBER 2022

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References

National Planning Policy Framework 2021 (NPPF)
 National Planning Policy Guidance (NPPG)
 Haringey Borough Council Strategic Flood Risk Assessment (SFRA) 2015
 Haringey Borough Council Surface Water Management Plan (SWMP) 2011
 Haringey Borough Council Local SuDS Standards
 Haringey Borough Council SuDS Design Requirements for LLFA Technical Assessment
 Building Regulations Part H – Drainage and Waste Disposal 2015
 London Plan 2021
 CIRIA C753 The SuDS Manual 2015

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1. INTRODUCTION

Graphic Structures Limited have been appointed to produce a Flood Risk Assessment (FRA) on behalf of Paul Simon Magic Homes for their development at the Jessica Buttons Factory site in Hornsey, London.

The report will assess the risk of flooding at the proposed site and will review any impacts the development will have with regards to flood risk to surrounding properties. This report will also outline the approach taken with regards to the below ground drainage proposals, it evaluates the selection of SuDS devices utilised and demonstrates how the surface water disposal hierarchy has been followed.

This report has been produced in compliance with the NPPF, NPPG, Haringey Borough Council Strategic Flood Risk Assessment (SFRA) and Surface Water Management Plan (SWMP) as well as additional local guidance.

2. DEVELOPMENT DESCRIPTION

2.1 Site Location

The site is located approximately 300m to the North of Hornsey Train Station in North London. The National Grid reference for the site is 530936E 189532N (OS grid reference TQ309895). The development site is bounded by Clarendon Road to the North and West, Hornsey Park Road to the East, and Turnpike Lane (A504). A day centre and 'The African Caribbean Culture Centre' bound the site to the South. Figure 1 shows the site location.

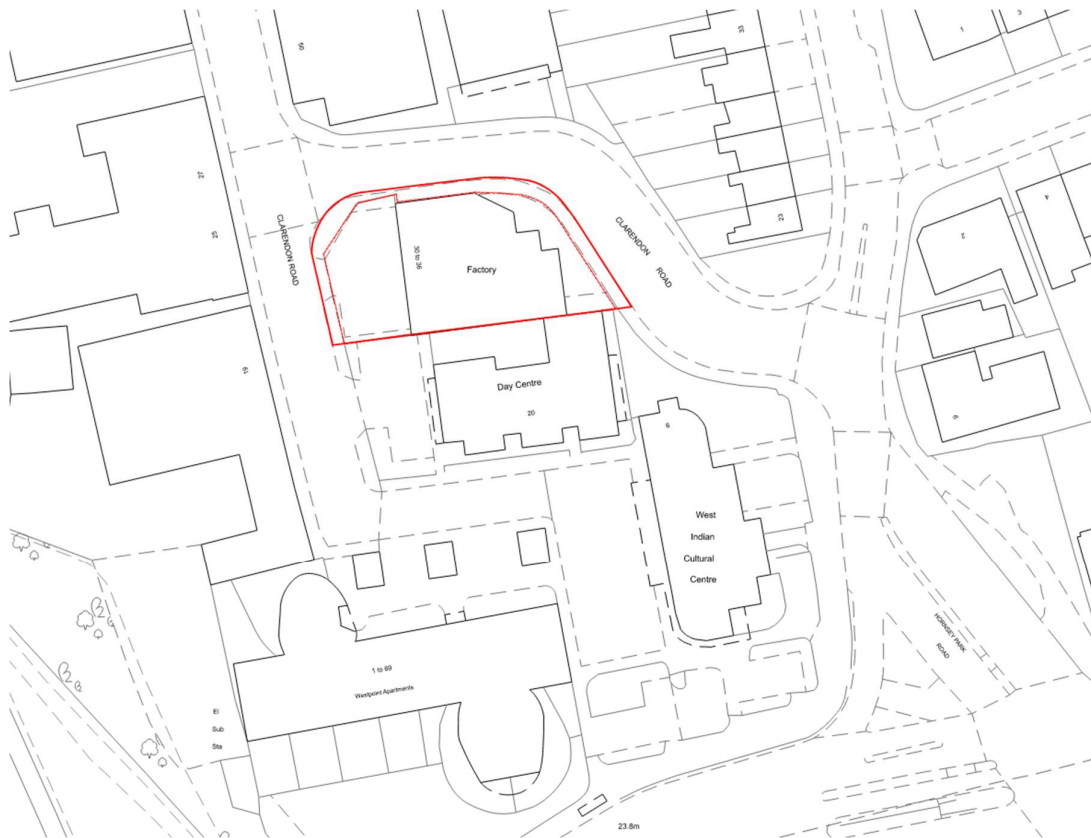


Figure 1 – Development Site Location

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Other locations of note in the vicinity of the site as follows; seven-storey Westpoint apartment block to the West; Railway operated by Network Rail 100m to the West of the site; 'New River' Canal 150m to the West; 'Clarendon Road Gas Works' around 350m to the North (where a large future residential development is proposed); 'Thames Water Hornsey Treatment Works' 500m to the Northwest.

Haringey Borough Council are the Lead Local Flood Authority (LLFA) responsible for all flood risk matters that do not relate directly to designated Main Rivers. The Statutory Sewerage Undertaker for the area is Thames Water. The Local Planning Authority (LPA) is the Haringey Borough Council.

2.2 Existing Site

The existing site consists of the Jessica Buttons Factory and associated parking, the site address is 30-36 Clarendon Road. There is a 500mm or so change in level across the site, with a general North to South fall. The topographical survey, found in Appendix 3, shows that levels vary from around 25.24 to 24.70 AOD.

There are some small existing trees along the North and Eastern boundary. A tree survey has been carried out as part of the planning application which gives further information on root protection area extents and tree heights and species.

A utility search has been carried out which shows there are many existing services which run shortly to the West of the site. Notably these involve a large Cadent low-pressure gas main and a Thames Water foul sewer. These are to be maintained and protected as part of the development with appropriate easements applied.

The NPPF includes guidance on flood vulnerability classification dependent on the use of the site. Consulting this, the existing site can be classified as 'less vulnerable' due to the commercial nature of the existing building.

The total area of the development site is approximately 785m². The existing impermeable area of the site has been measured as 765m² with only some small pockets of permeable soft landscaping. The existing site's drainage is discussed in Section 6.

2.2 Ground Conditions

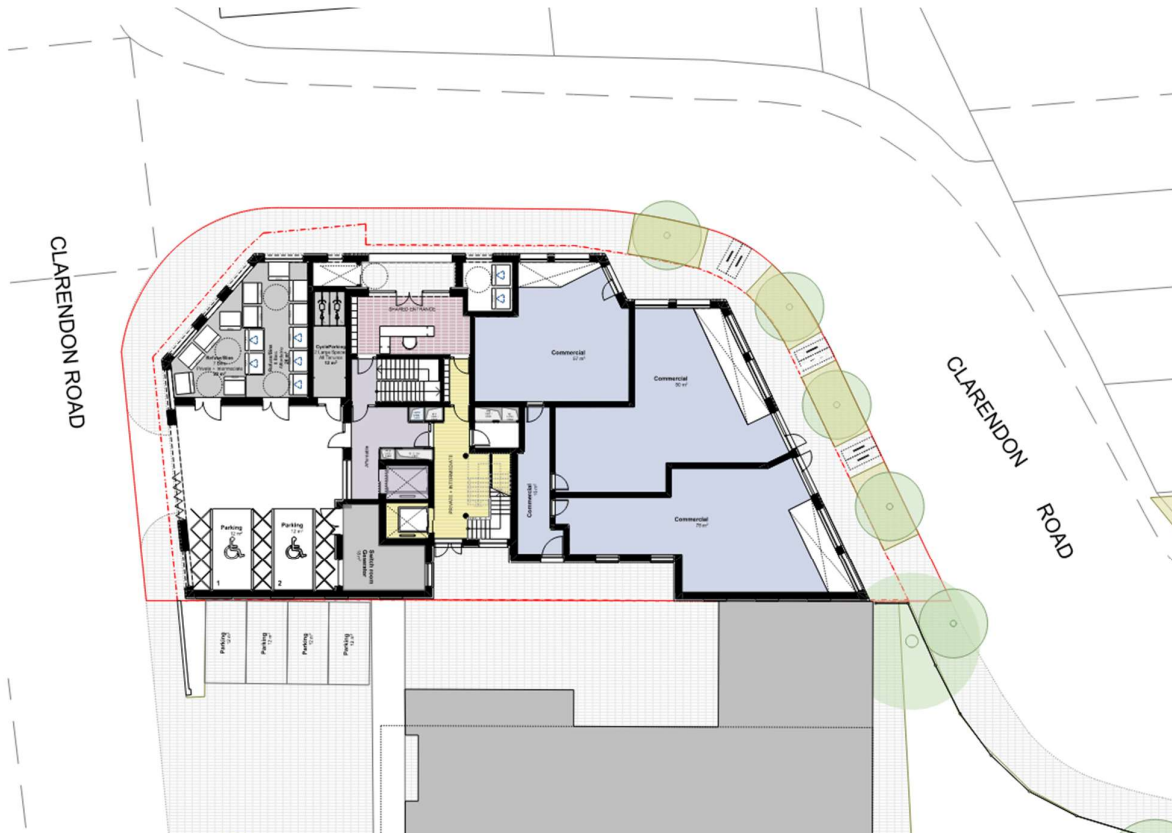
Reviewing the expected existing ground conditions mapped by the British Geological Survey, it can be seen that the site is likely to be underlain by the London Clay Formation without any notable superficial deposits. As the site was developed prior to the construction of the existing building, it is likely that Made Ground will form the surface layers.

A full intrusive ground investigation is to be carried out in order to determine the ground conditions and groundwater levels beneath the site. This will enable engineering properties of the soil to be determined and will also provide an opportunity to recover samples for contamination testing.

The site is not located within a Groundwater Source Protection Zone (SPZ).

2.3 Proposed Development

The proposed scheme involves the demolition of the existing building and construction of a part two, six, eight and eleven storey building, with basement, to provide 51 residential units and 560 sqm of commercial floorspace, with access, landscaping and car and cycle parking. The proposed site plan is shown below in Figure 2. Full architectural floor plans can be found in Appendix 4.



The NPPF flood vulnerability classification of the development is classified as 'more vulnerable' due to the part residential nature of the proposed building. This means the new development achieves the same flood vulnerability classification as the existing site.

The proposed impermeable area of the site has been measured as 785m² as the proposed site is entirely impermeable. However, it should be noted that green roofs are included within this area although will store and slow water.

2.4 Future Masterplan & Previous Scheme

The proposed development is intended to form the first part of a larger masterplan which includes areas under different ownerships to the South. A drawing illustrating the envisaged overall masterplan can be found within Appendix 4.

In 2020 a separate planning application was prepared for a similar scheme to the overall masterplan which covers the same site area. The LLFA and Thames Water were consulted during the pre-planning process during this application. The precedents set previously are followed within this report due to time constraints restricting opportunity for any liaison.

3. SEQUENTIAL AND EXCEPTION TEST

3.1 Sequential Test

It is a requirement for the development to receive confirmation from the LLFA of passing the sequential test (and exception test if required) before planning consent is granted.

Paragraph 162 of the NPPF states; *"The aim of the Sequential Test is to steer new development to areas with the lowest probability of flooding. Development should not be allocated or permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower probability of flooding. The Strategic Flood Risk Assessment will provide the basis for applying this test. A sequential approach should be used in areas known to be at risk from any form of flooding."*

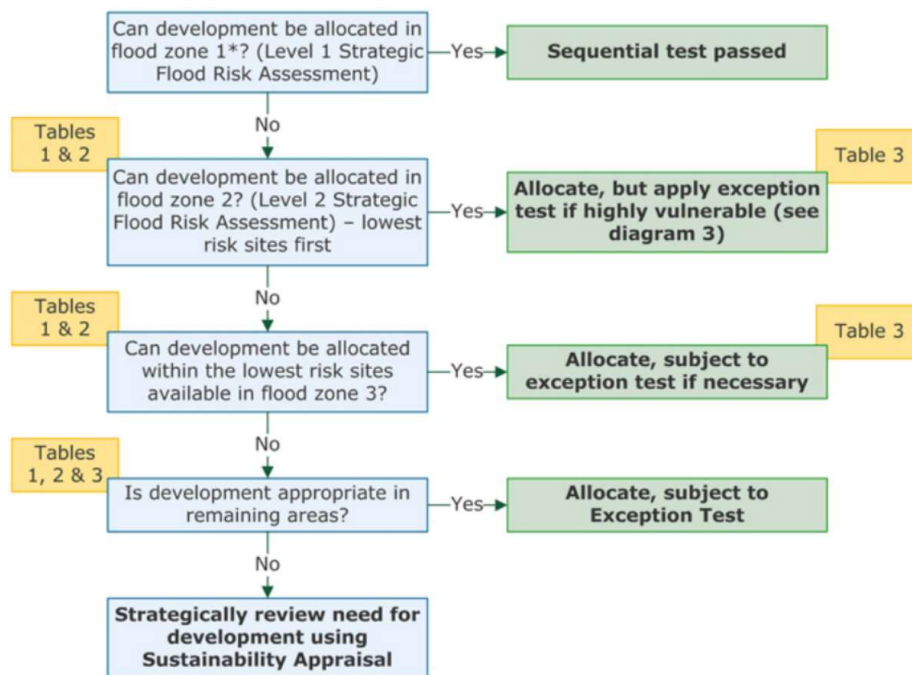


Figure 3 – GOV.uk: Application of Sequential Test

Figure 3 illustrates the application of the sequential test. As discussed in Section 4.1 the site is located within Flood Zone 1. Therefore, the sequential test is passed.

3.2 Exception Test

The exception test is a method to demonstrate and help ensure that flood risk to people and property will be managed satisfactorily, while allowing necessary development to go ahead in situations where suitable sites at lower risk of flooding are not available. Figure 5 shows the requirements for an exception test to be carried out with regards to flood vulnerability and flood zone.

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Flood risk vulnerability classification (see table 2)		Essential infrastructure	Water compatible	Highly vulnerable	More vulnerable	Less vulnerable
Flood zone (see table 1)	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test required	✓	✓
	Zone 3a	Exception Test required	✓	✗	Exception Test required	✓
	Zone 3b functional floodplain	Exception Test required	✓	✗	✗	✗
Key:		✓ Development is appropriate. ✗ Development should not be permitted.				

Figure 4– GOV.uk: Exception Test Requirements

For the exception test to be passed, the following criteria needs to be met as set in NPPF paragraph 164;

“The application of the exception test should be informed by a strategic or site-specific flood risk assessment, depending on whether it is being applied during plan production or at the application stage. For the exception test to be passed it should be demonstrated that:

(a) the development would provide wider sustainability benefits to the community that outweigh the flood risk; and

(b) the 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.”

As the site is located within Flood Zone 1 the exception test is passed.

4. FLOOD RISK

The risk of flooding for the future masterplan site has been assessed for the below sources. Within this section 'the site' refers to the envisaged future masterplan site.

- Rivers & Seas
- Surface Water (Overland Flow)
- Sewers
- Groundwater
- Artificial Water Bodies

The following sections of this report evaluate each source of flood risk in relation to the development proposals, using data provided by the GOV.uk website, Haringey Strategic Flood Risk Assessment (SFRA) and the Haringey Surface Water Management Plan (SFRA).

The SFRA and SFRA confirm the site is **not** located within a Critical Drainage Area. This is defined as 'a discrete geographic area (usually a hydrological catchment) where multiple and interlinked sources of flood risk (surface water, groundwater, sewer, min river and/or tidal) cause flooding in one or more Local Flood Risk Zones during sever weather thereby affecting people, property or local infrastructure.'

4.1 Flood Risk For Planning (Rivers & Sea)

Flood Zone information published by Environment Agency shows that the development site is located within defended Flood Zone 1. It should be noted that there are areas within Flood Zones 2 and 3 approximately 4km to the East of the site around Tottenham Hale.

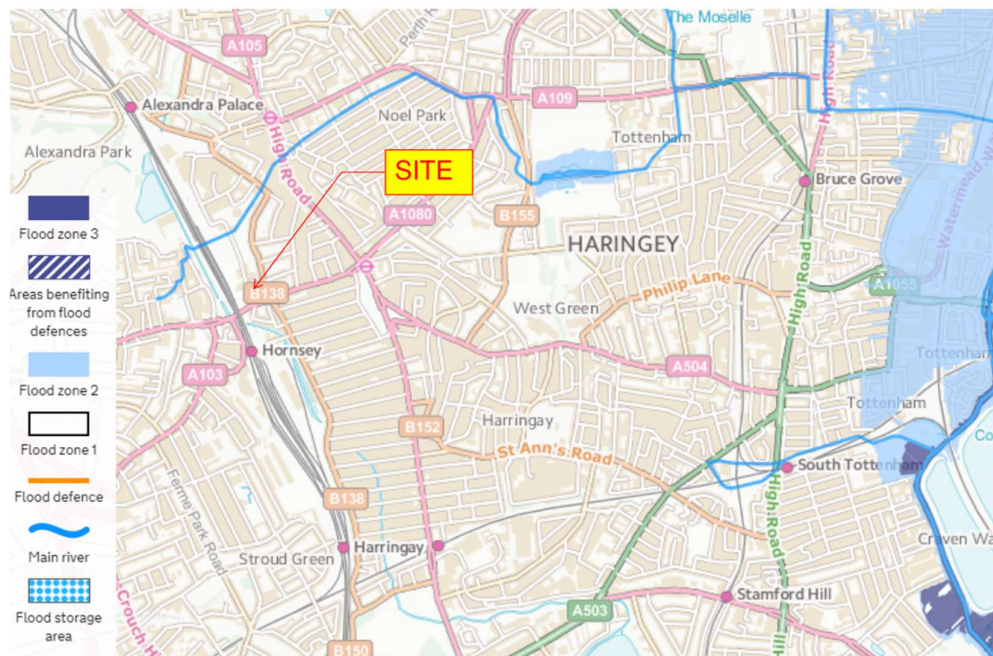


Figure 5 – EA Flood Map for Planning: Rivers & Seas

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The nearest watercourse to the site location is the 'New River' Canal around 150m to the West of the site. The River Lea which is located approximately 4km to the East of the site. The River Thames is located 8km to the South of the site.

After review of the relevant information, this development is at a **low risk** of flooding from rivers and seas.

4.2 Flood Risk from Surface Water (Overland Flows)

Surface water flooding occurs when rainwater cannot drain away through the existing drainage infrastructure or soak into the ground. The flood water flows over the ground instead, with its direction, depth and speed influenced by the local topography. Figure 6 has been taken from the GOV.uk flood risk maps.

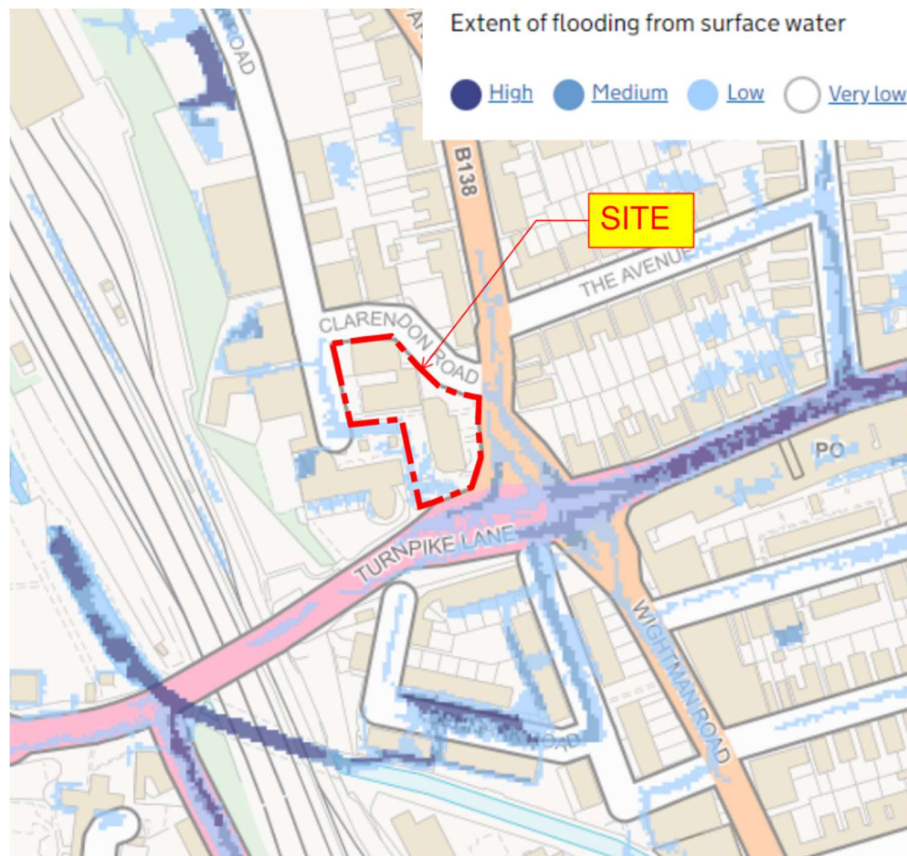


Figure 6 – GOV.uk Flood Risk: Surface Water

Predominately the site is at very low risk of surface water flooding. However, there are small areas at low risk towards the South of the site. Therefore, the low-risk scenario depths and velocities shall be considered. Figures 7 and 8 show the depths and velocities respectively.

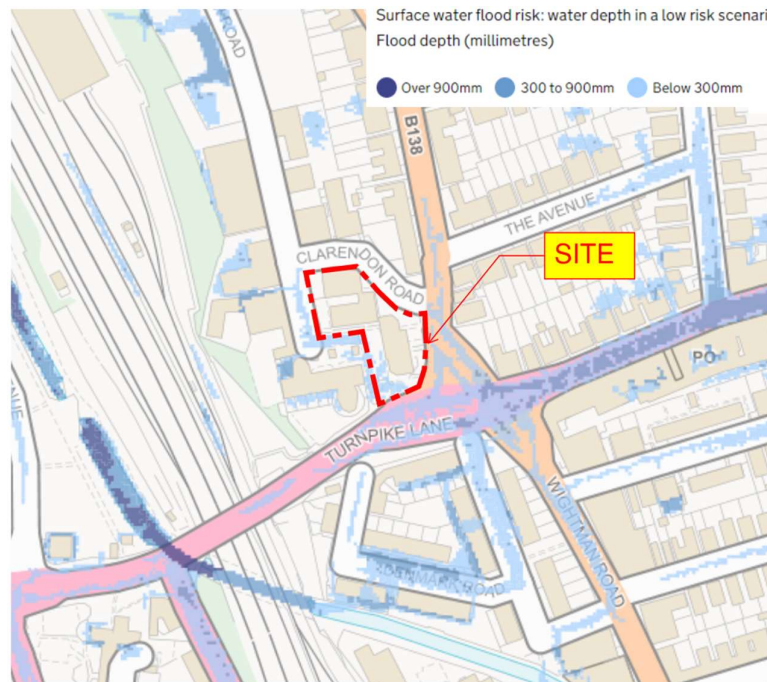
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Figure 7 – GOV.uk: Low Surface Water Flood Risk Depth

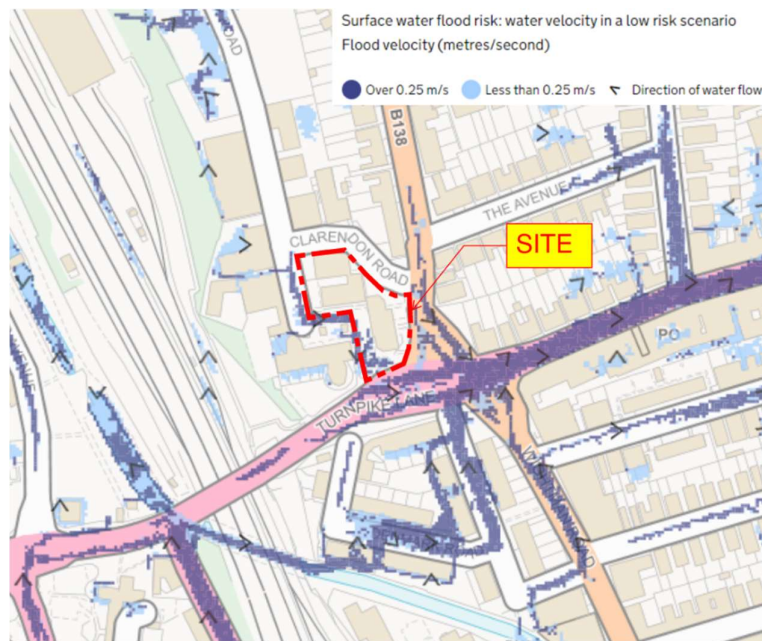


Figure 8 – GOV.uk: Low Surface Water Flood Risk Velocity

It can be seen that areas of the site are subject to flood depths under 300mm with a maximum velocity over 0.25 m/s. The flows occur at the West of the site are directed south by the topography before being conveyed eastwards along Turnpike Lane. The proposed development does not involve building placement within any of the site area at risk of surface water flooding which means that the existing overland flow route will be maintained, therefore, not placing any areas outside of the site at an increased risk of flooding.

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To minimise any risk from this source of flooding, the site levels will be designed to route any surface water away from building entrances for the event of surface water flooding or a local drainage system failure. This will increase the buildings resilience to flooding from overland flows. It is important that appropriate Finished Floor Levels (FFL's) are chosen for the building to enable this. This is discussed further in Section 5.

Refer to Appendix 5 for a preliminary plan showing flow routes offsite for these exceedance flows based on proposed and existing site levels.

After review of the relevant information, this development is considered to be at a **low risk** of flooding from surface water providing site levels are carefully designed to route any overland flows away from building entrances.

4.3 Flood Risk from Sewers

Public sewer records have been obtained from Thames Water; refer to Appendix 2 for details. Thames Water are responsible for operating and maintaining their sewer infrastructure, therefore the likelihood of surcharge due to blockages is generally expected to be low.

The SFRA and SFRA reports show that there have been no historic incidents of sewer flooding within the immediate vicinity of the site. In the unlikely event of sewer flooding affecting the site, the flooding will be conveyed in a similar way to that of surface water described in the previous section due to the topography.

A pre-planning enquiry has been submitted to Thames Water who have confirmed that the offsite foul and surface water sewer network have capacity to receive discharge from the development. This can be found in Appendix 2.

After review of the relevant information, this development is at a **low risk** of flooding from sewers.

4.4 Flood Risk from Groundwater

Groundwater flooding occurs when the water level in ground rises above the surface elevation. As the underground flow of groundwater is slow, this can take longer to dissipate than flooding from other sources. Areas within topographical depressions are more at risk of this source of flooding, as well as areas at interfaces between permeable and impermeable subsoils and areas above principal aquifers.

The SFRA and SFRA reports that site is not within an area at risk of groundwater flooding and that there have been no historic incidents of groundwater flooding within the immediate vicinity of the site.

After review of the relevant information, this development at a **low risk** of flooding from groundwater.

FLOOD RISK ASSESSMENT & SUDS REPORT**4.5 Flood Risk from Artificial Water Bodies**

Figure 9 has been taken from the GOV.uk flood risk maps. This shows that the site is located within an area not at risk of flooding from a residual risk of a reservoir breach. It should be noted that there is an area shown at risk around 150m to the West of the site.



Figure 9 – GOV.uk Flood Risk: Reservoirs – Extent of Flooding

All large reservoirs are regularly inspected by the Environment Agency and essential maintenance works carried out. Reservoir flooding is very unlikely to occur, and it is recorded that no loss of life has been caused from this flood source since 1925.

After careful consideration of the relevant information, this development is at a **low risk** of flooding from artificial water bodies.

4.6 Climate Change

The EA guidance on climate change allowances requires applicants to include a climate change factor to peak rainfall intensities. The factor used is dependent on the flood zone, use and development design life.

Consulting the guidance, a climate change factor to the peak rainfall intensity in the range of 20-40% should be applied to the development is intended for residential use which is regarded as 'more vulnerable' and has a design life lasting past the year 2070. For a conservative approach we recommend that a climate change factor of **40%** is applied to rainfall across the site for the 100-year storm.

5. FLOOD RISK MANAGEMENT

5.1 Floor Levels

A Ground Floor Finished Floor Level (FFL) of 25.225 AOD has been set for the building in mind of the existing boundary levels. The basement FFL has been assumed as 20.000 AOD. These FFL's are subject to further review post planning.

It is important that flood flow routes are considered to direct water away from entrances and ultimately offsite. This caters for both the surface water flood risk as well as the event of a local failure of the private drainage (eg poor maintenance). This should be achievable across the site due to the FFL being above surrounding boundary levels. It is envisaged excess surface water will be able to flow offsite without entering the building in the event of a local drainage system failure. At the detail design stage levels should be designed to achieve this.

Refer to Appendix 5 for a preliminary plan showing flow routes offsite for these exceedance flows based on proposed and existing site levels.

5.2 Flood Resilience

Provided flood flow routes can be achieved directing overland flows away from building entrances, as the current scheme achieves, no additional flood resilience measures will be required.

6. EXISTING DRAINAGE NETWORK

6.1 Overview

Public sewer records have been obtained from Thames Water; refer to Appendix 2 for details. An extract of the asset plan has been shown in Figure 9 below.

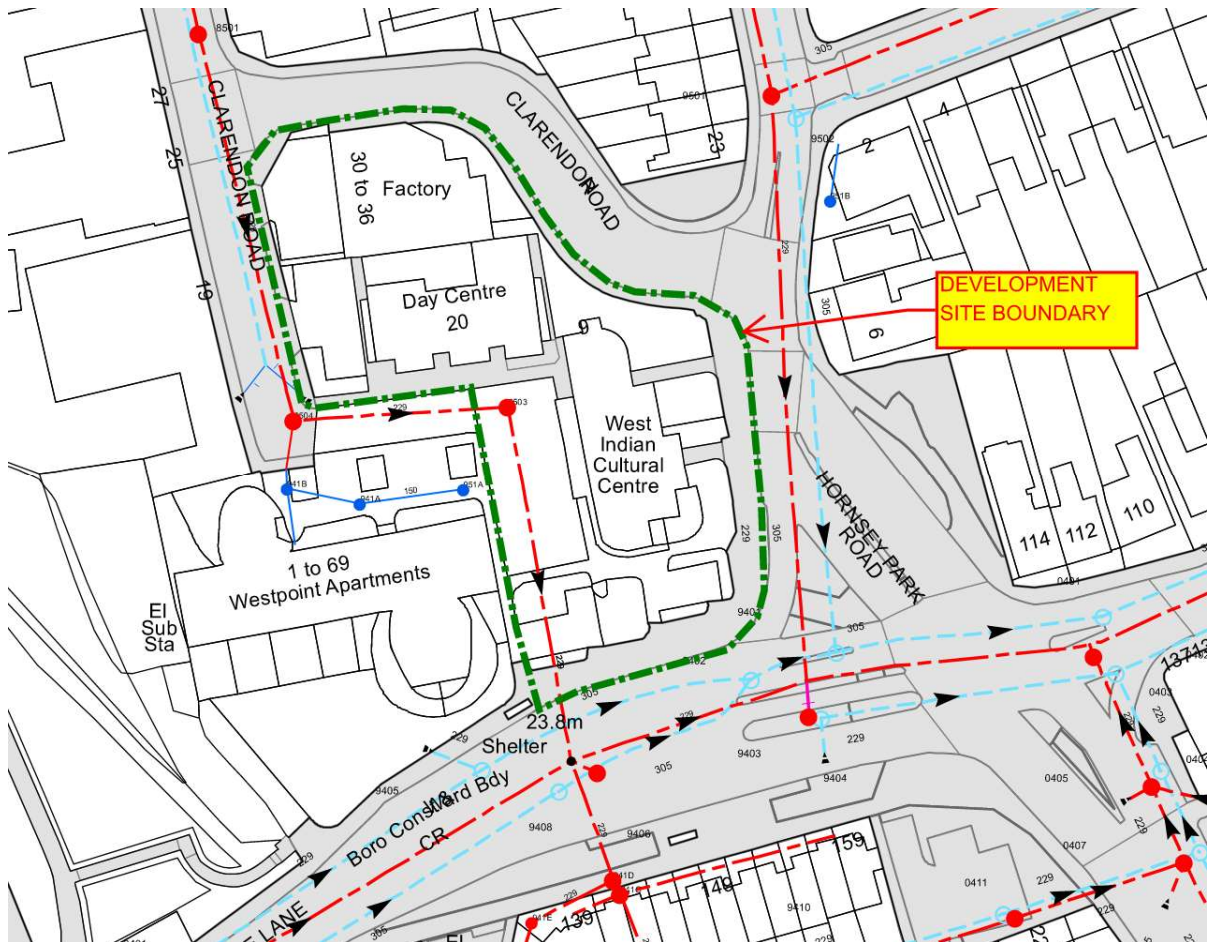


Figure 10 – Thames Water Sewer Records

As seen above, there are many Thames Water foul and surface water sewers in the vicinity of the site. These flow in a southerly direction along Clarendon and Hornsey Park Road before being conveyed Eastwards along Turnpike Lane.

To date a CCTV survey of the existing site drainage has not been carried out. The topographic survey provides some information of the existing site drainage. It appears foul and surface water are kept separate within the site with a possible existing foul connection to a Thames Water manhole within the site. The survey suggests that part of the sites surface water is conveyed towards the East of the site. However, access was not possible to this enclosed external location during the survey. Reusing an existing outfall connection from this vicinity would be beneficial as this would avoid excavations within the public highway to connect to the Thames Water surface water sewer. It is recommended that a CCTV survey is undertaken to verify the existing drainage outfalls and verify their suitability for reuse.

FLOOD RISK ASSESSMENT & SUDS REPORT**6.2 Existing Run-off Rates**

The existing surface water run-off rates for a range of rainfall events to the public sewer from the site have been calculated using Causeway Flow. The model is based on an existing impermeable area of 765m². The existing site involves small pockets of permeable soft landscaping with an area of approximately 20m². Figure 11 below summarises the existing run-off rates, Refer to Appendix 6 for calculations.

Annual Return Event	Peak Existing Discharge Rate
1 in 1 Year	12.9 l/s
1 in 30 Year	31.8 l/s
1 in 100 Year	41.3 l/s

Figure 11 – Existing Surface Water Run-off Rates

6.3 Greenfield Run-off Rates

NPPF and local guidance states that for previously developed (brownfield) sites, the peak run-off rate from any new development should be as close as reasonably practical to greenfield run-off rates.

Greenfield run-off rate is defined as the rate of surface water run-off that would occur from a site in its undeveloped and therefore undisturbed state.

Using the UK SuDS online tool, existing greenfield run-off rates have been obtained which apply to the site based on the total site area of 785m². Figure 12 below summarises the greenfield run-off rates for the site. A more detailed greenfield run off rate print out can be found in Appendix 6.

Annual Return Event	Greenfield Run-off Rate
QBAR	0.35 l/s
1 in 1 Year	0.30 l/s
1 in 30 Year	0.80 l/s
1 in 100 Year	1.11 l/s

Figure 12 – Greenfield Run-off Rates

7. PROPOSED DRAINAGE

7.1 Surface Water Hierarchy

The 2021 London Plan gives an overview of the surface water drainage hierarchy. Whilst not being directly applicable to this project it clearly outlines good practice on the preferred method of the ultimate destination of the runoff from a site. Sustainable Drainage Policy 5.13 is outlined below in italics with comments added regarding the suitability for the site.

'A Development should utilise sustainable urban drainage systems (SUDS) unless there are practical reasons for not doing so, and should aim to achieve greenfield run-off rates and ensure that surface water run-off is managed as close to its source as possible in line with the following drainage hierarchy:

1 store rainwater for later use

Rainwater harvesting for reuse within the building is not considered practical due to the associated additional plant space and service requirements. The external planting will only require watering during establishment therefore a rainwater harvesting system for irrigation is also not considered practical.

2 use infiltration techniques, such as porous surfaces in non-clay areas

This is not deemed feasible due to a combination of the large building footprint and anticipated clay geology.

3 attenuate rainwater in ponds or open water features for gradual release

The large footprint of the proposed building reduces the available area for open water features such as ponds or detention basins.

4 attenuate rainwater by storing in tanks or sealed water features for gradual release

The proposals involve an attenuation tank which will attenuate rainwater before being released to the existing surface water network at a restricted rate.

5 discharge rainwater direct to a watercourse

There are no watercourses in the immediate vicinity of the site so this method of connection is not feasible

6 discharge rainwater to a surface water sewer/drain

This is the chosen method of discharge, to a surface water sewer owned by Thames Water

7 discharge rainwater to the combined sewer.

This is not proposed

FLOOD RISK ASSESSMENT & SUDS REPORT**7.2 SuDS Appraisal**

The use of various sustainable drainage techniques has been investigated with respect to their potential use within the development to control storm water as close to the source as possible and reduce the potential increased flood risk from the development. They are reviewed in order of most to least sustainable based upon the SuDS Hierarchy table from the Environment Agency, shown below in Figure 13. Attenuation storage will be required to ensure no offsite flooding for the 1 in 100 year storm (+40% climate change).

	SUDS technique	Flood Reduction	Pollution Reduction	Landscape & Wildlife Benefit
Most Sustainable ↑	Living roofs	✓	✓	✓
	Basins and ponds	✓	✓	✓
	- Constructed wetlands			
	- Balancing ponds			
	- Detention basins			
	- Retention ponds			
	Filter strips and swales	✓	✓	✓
	Infiltration devices	✓	✓	✓
	- soakaways			
	- infiltration trenches and basins			
	Permeable surfaces and filter drains	✓	✓	
	- gravelled areas			
	- solid paving blocks			
	- porous paviers			
Least Sustainable ↓	Tanked systems	✓		
	- over-sized pipes/tanks			
	- storm cells			

Figure 13 – SuDS Hierarchy

7.2.1 Green/Blue Roofs

Living roofs provide source control storage within the growing medium, as well as evapotranspiration, water quality, biodiversity and amenity benefits. These are best suited to flat, non-pitched roofs. As the proposed building involves flat roofs, green and blue roofs have been identified as a suitable form of SuDS for the development.

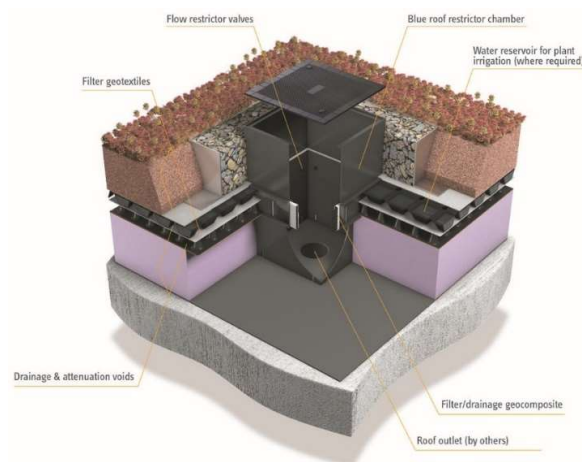


Figure 14 – Typical Blue Roof

Blue roofs work by their outlets restricting the flow rate off the roof, with an attenuation crate layer providing storage for when water backs up during heavy rainfall. Blue roofs can be aesthetically the same as a standard green or biodiverse brown roof. However, due to the storage crate layer they have a slightly thicker, heavier build up.

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As such the drainage strategy in Appendix 5 includes blue roofs which provide attenuation at roof level. This is discussed further in Section 7.3. A sketch outlining the blue roof areas considered as part of the drainage strategy can be found in Appendix 5.

7.2.2 Basins and Ponds

As there is limited open space and due to the sloping nature of the site, open water features such as basins and ponds have been discounted for this development. These require gently sloping side slopes which lead to a large area requirement depending on the desired drainage invert level and storage volume.

7.2.3 Filter Strips and Swales

Filter strips are typically used adjacent roads and hardstanding to provide water quality benefits by removing contamination from surface water run-off. These are typically a 2m strip of grass laid to a fall towards a swale or filter drain (also known as a French drain).

As there is limited open space and due to the sloping nature of the site, filter strips and swales have been discounted. These require gently sloping side slopes which lead to a sizable conduit width to achieve desired drainage invert level.

7.2.4 Infiltration Devices

Due to the anticipated underlying impermeable geology of the site, total disposal of the sites surface water via infiltration SuDS such as soakaways is not assumed to be achievable. Additionally, Building Regulations Part H requires soakaways to be located more than 5m from foundations which would not be possible due to the large proposed building footprint.

Furthermore, it is possible that during the intrusive site investigation works soluble contamination will be encountered. If so, disposal of surface water by infiltration could help spread these pollutants with a risk of these making their way into aquifers. Therefore, disposal of surface water via onsite infiltration SuDS have been ruled out for the development.

As part of the overall landscape proposals rain gardens are indicated adjacent the development within Highway land. These will collect flows from the carriageway and footway and provide water quality benefits by removing contaminants from road run off. It is assumed that these would involve overflows back into the sewers rather than into the private drainage system as these are from areas under Highway ownership.

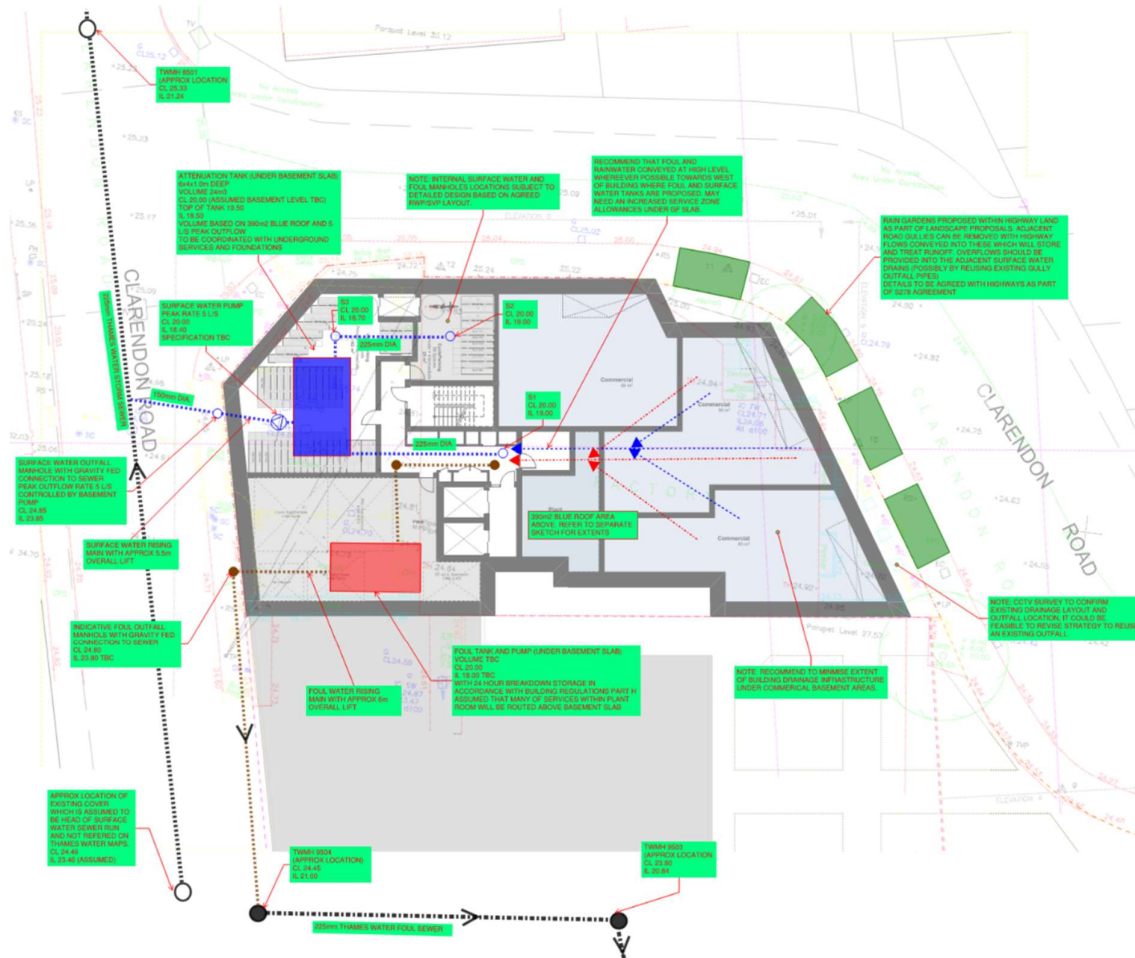
7.2.5 Permeable Paving

The available external space for permeable paving is greatly reduced due to the large building footprint. Due to these constraints the use of ground level permeable paving for the development has been deemed infeasible due to coordination issues. However, permeable paved areas are proposed within terraces higher up the building. These will work in conjunction to green/blue roof build ups to slow and store rainwater.

7.2.6 Tanked Systems

This is the most common form of SuDS technique within built up areas. Underground attenuation tanks can be used with flow controls to restrict the flow rate of surface water to any nearby sewerage systems or watercourses reducing the downstream impact compared to an unrestricted system. As such the drainage strategy in Appendix 5 shows underground attenuation which has been sized based on the proposed surface water outflow rate from the site. This is discussed further in Section 7.3.

The drainage scheme involves the use of blue roofs and an underground attenuation tank located under the basement slab. A pump is proposed adjacent the attenuation tank which also restricts the rate of flow to the Thames Water surface water sewer. Figure 15 below shows an extract from the Surface Water Drainage Scheme, this can be found included within Appendix 5.



The existing private onsite drainage network (gullies etc.) will be almost completely abandoned and removed as part of the proposed works, with a new network being provided. This is subject to the results of a CCTV survey on the existing drainage to verify any outfalls and connections from offsite.

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The tank is located under the basement slab, the groundwater level and extent of pilecaps within the basement would need to be considered. It could also be possible to incorporate an above slab attenuation tank which would involve an area of the basement being dedicated for this, although due to space requirements this is considered not viable with the current scheme. It is recommended that wherever feasible any rainwater pipes are offset at high level to enable them to drop into the Western portion of the basement. This will reduce the extent of underground drainage infrastructure within the commercial premises at the East of the basement.

It is proposed that the peak surface water rate from the site is restricted to 5 l/s. The LLFA were consulted as part of the pre-planning process for the 2020 scheme preplanning. Minutes from a meeting on the 11th November 2020 can be found within Appendix 1. It was agreed that the peak rate would be set to 25 l/s, in mind of the constrained site and lack of available space for additional underground storage to reduce the rate. The LLFA advised that the area of blue roof should be maximised in order to provide a greater storage volume at roof level. Hence the 5 l/s proposed as part of this application represents a prorated rate based on the overall area.

As part of the 2020 application a pre-planning enquiry was submitted to Thames Water who confirmed that the offsite surface water sewer network had capacity to receive discharge from the development. This can be found in Appendix 2. It is assumed that this is still the case. S106 connection consent is required from Thames Water before any proposed surface drainage connections are made.

At the detail design stage, it is recommended that particular attention is paid to coordination of underground drainage with foundations and service trenches.

All below ground drainage and SuDS devices will be maintained by an appropriate maintenance company for the lifetime of the development, in accordance with the CIRIA SuDS Manual and good practise. A SuDS Maintenance Plan for the development can be found in Appendix 7.

7.4 Foul Water Overview

As shown indicatively on the surface water drainage layout, is envisaged that it will not be possible to drain the entirety of the foul drainage building to the sewer via gravity due the need to pick up basement drainage connections. Any pumped portion of the foul drainage will require 24-hour storage in accordance with Building Regulations Part H. This would likely require a tank and pump beneath the basement slab which is shown indicatively on the drainage layout.

As part of the 2020 application a pre-planning enquiry was submitted to Thames Water who confirmed that the offsite foul water sewer network had capacity to receive discharge from the development. This can be found in Appendix 2. It is assumed that this is still the case. S106 connection consent is required from Thames Water before any proposed foul drainage connections are made.

7.5 Proposed Run-off Rates

NPPF and local guidance states '*Run-off rates from new development on greenfield sites should be restricted to greenfield run-off rates, as required by the London Plan. Development on Brownfield sites should also aim to achieve greenfield run-off rates wherever possible.*'

A peak surface water discharge rate of **5.0 l/s** is proposed. This is deemed to be the lowest practical rate due to the site constraints. This rate is above the existing site 100-year greenfield rate of 1.11 l/s. S106 connection consent will also be required from Thames Water before the connection is made.

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Figure 16 below details the percentage reductions on surface water flow from the site. The development achieves an 87.9% reduction on existing peak flows for the 100-year storm. This will ease the burden on local public sewerage networks by storing rainwater within the site during periods of intense and/or prolonged rainfall.

Annual Return Event	Peak Existing Rate	Peak Proposed Rate	Percentage reduction
1 in 1 Year	12.9 l/s	5.0 l/s (2 year)	61.2%
1 in 30 Year	31.8 l/s	5.0 l/s	84.3%
1 in 100 Year	41.3 l/s	5.0 l/s (+40% climate change)	87.9%

Figure 16 – Surface Water Run-off Rate Reductions

8. CONCLUSION

The risk of flooding has been assessed in relation to the development proposals and the site is deemed to be at a **low risk** of flooding from all sources. The overarching flood risk mitigation requirement for this development is for the proposed levels design to provide flood flow routes which ensure that the risk of flood water entering the building is minimised.

There are no surface water bodies in the immediate vicinity of the site. It is therefore proposed to drain surface water from the development to a surface water sewer which is owned and maintained by Thames Water.

Due to the anticipated underlying impermeable geology of the site and site constraints, total disposal of the sites surface water via infiltration SuDS such as soakaways is not assumed to be achievable.

Blue roofs and underground attenuation tanks have been identified as the most suitable form of attenuation storage for the development.

The proposed development is intended to form the first part of a larger masterplan which includes areas under different ownerships to the South. In 2020 a separate planning application was prepared for a similar scheme to the overall masterplan which covers the same site area. The LLFA and Thames Water were consulted during the pre-planning process during this application. The precedents set previously are followed within this report

It is proposed that the peak surface water rate from the site is restricted to 5 l/s. The LLFA were consulted as part of the pre-planning process for the 2020 scheme preplanning. Minutes from a meeting on the 11th of November 2020 can be found within Appendix 1. It was agreed that the peak rate would be set to 25 l/s. Hence the 5 l/s proposed as part of this application represents a prorated rate based on the overall area.

As part of the 2020 application a pre-planning enquiry was submitted to Thames Water who confirmed that the offsite foul and surface water sewer network had capacity to receive the proposed discharge rates from the development. It is assumed this is still the case.

It is deemed possible to design proposed site levels to direct surface water offsite in the event of a flood occurring from overland flows or a local drainage system failure without causing any unsafe flood depths inside the proposed building.

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Appendix 1 – Haringey SuDS Proforma & LLFA Meeting Minutes