

REPORT

8 - 10 Southampton Row, Holborn: Flood Risk Assessment

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1 Introduction

In March 2019, Royal HaskoningDHV was commissioned to prepare a Flood Risk Assessment (FRA) to support a planning application for the proposed re-development of 8 – 10 Southampton Row, Holborn, London to provide a renovated 85 room hotel and residential development of 9 flats. The purpose of this FRA is;

- to provide the information required to support a planning application in terms of flooding;
- supported by the application of the sequential and, where appropriate, the exception test;
- to inform potential mitigation options; and
- recommendations required to reduce flood risk, if applicable.

This FRA has been prepared in accordance with the National Planning Policy Framework (NPPF)¹, the supporting Planning Practice Guidance² (PPG) for Flood Risk and Coastal Change² and the Environment Agency's Climate Change Allowance³ guidance. The Climate Change Allowance guidance sets out the Environment Agency's recommended climate change allowances for development, when considering flood risk and coastal change for planning purposes.

The principal aim of these policies and guidance documents is to avoid inappropriate development in areas at risk of flooding and, wherever possible, to direct development away from areas at highest risk.

¹ National Planning Policy Framework, Ministry of Housing, Communities & Local Government (Last updated 19/02/2019) <https://www.gov.uk/guidance/national-planning-policy-framework> (Accessed: 28/03/19)

² National Planning Policy Framework, Flood Risk and Coastal Change. Department of Energy and Climate Change (Last updated 15/04/15) <http://planningguidance.communities.gov.uk/blog/guidance/flood-risk-and-coastal-change/> (Accessed: 28/03/19)

³ Flood risk assessments: climate change allowances, Environment Agency (Last updated 15/02/2019) – <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>, (Accessed: 28/03/2019)

2 Development Description and Location

2.1 Site location

The site is located at 8 – 10 Southampton Row, Holborn, London. It comprises an existing building which is bounded to the north by Fisher Street and by Catton Street to the south.

The front of the existing building faces onto Southampton Row and an access shaft serving the construction of the new Crossrail project is located to the rear (east) of the existing building. The eastern boundary of the site is formed by a UK Power Networks building as shown in Figure 2-1. The site is located within a highly urbanised area of London.

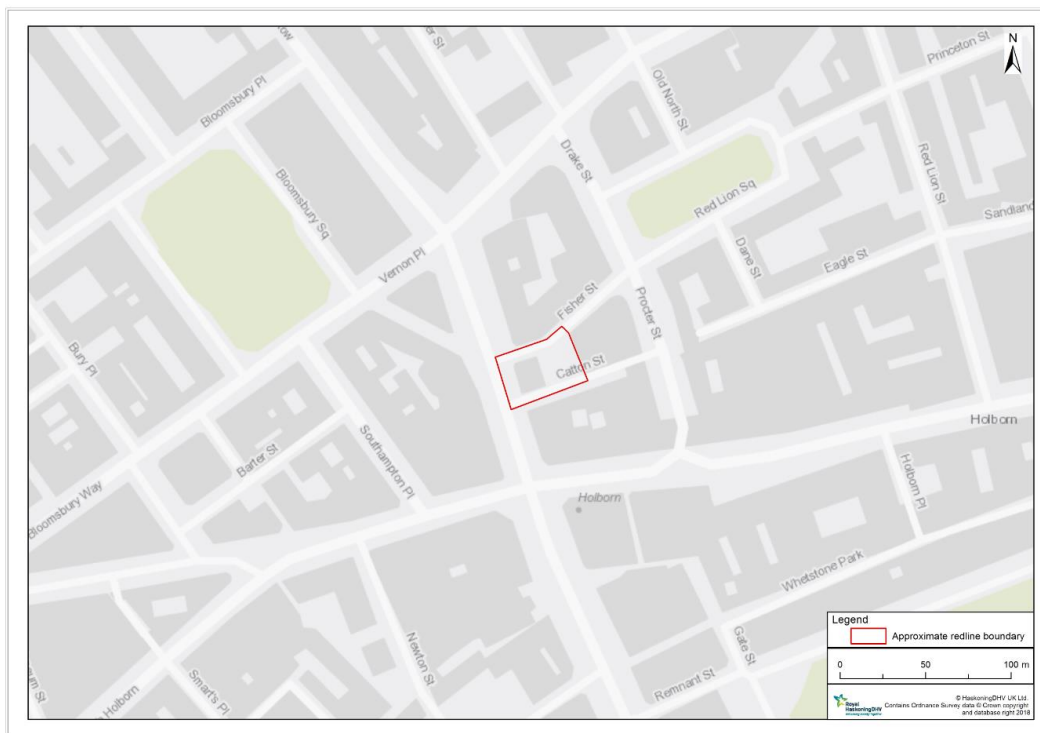


Figure 2-1: Red line boundary for the proposed re-development site

The site is located within the London Borough of Camden’s area of authority. The location of the site, within London, is shown in Figure 2-2.

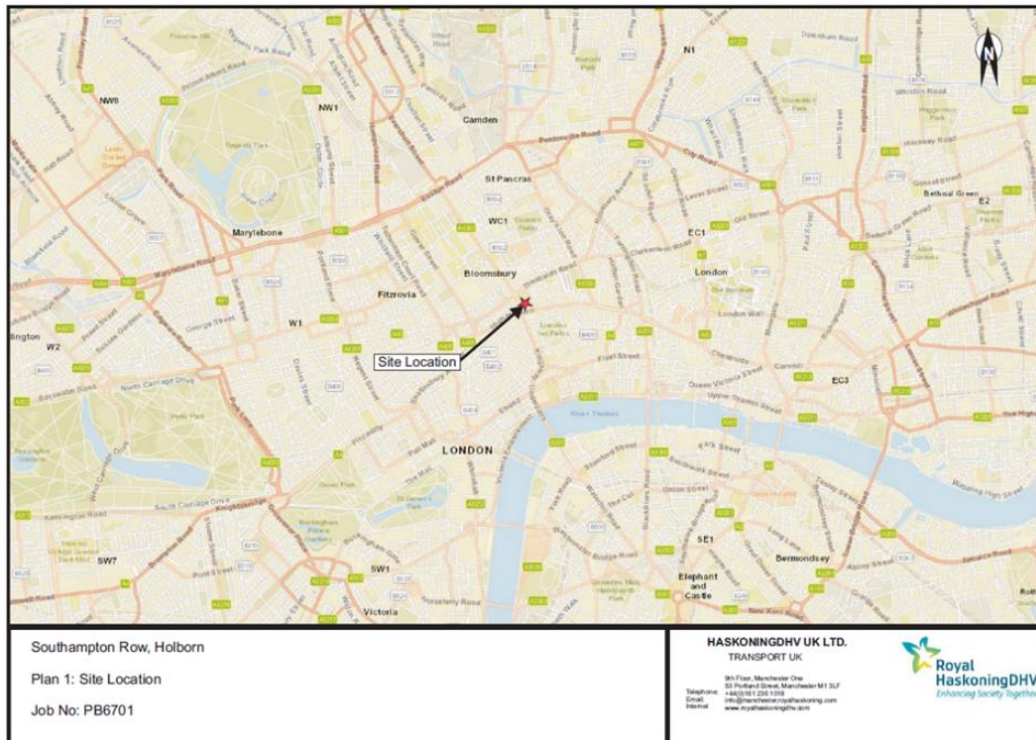


Figure 2-2: Wider site location

2.2 Existing Site

The site comprises an existing Grade II listed building which along the western boundary fronts onto Southampton Row with a large excavation, comprising a Crossrail access shaft, located at the rear.

The existing building has six main above ground storeys, with two additional domer storeys and two levels of basement with the lower basement being situated beneath the main basement at the rear of the building. It was originally constructed as a hotel (Tollard Royal Hotel) and Friendly Society Offices in 1905-1906.

The site currently comprises part of the Crossrail development, providing access to the subterranean development and the interior of the existing building is being used as part of the Crossrail site offices.

2.3 Proposed re-development Site

The proposed re-development of the site incorporates the re-development and extension of the existing structure, to form an 85 room hotel and a residential development comprising 9 apartments with communal roof terrace and supporting building services.

The existing single level basement will be retained beneath the footprint of the existing structure with the double basement levels to be retained beneath the rear section of the existing building. The double level basement at the rear of the existing building will house attenuation tanks, various plant rooms, Back of House facilities, Front of House toilets and lift pits.

The conversion and restoration of the existing building will include a bar on the ground floor and a restaurant with kitchens on the first floor and an 8-storey extension to the rear comprising the remainder of

the hotel accommodation. The sleeping accommodation for the hotel is located from the second floor to sixth floor. The eighth floor and the roof level above the eighth floor houses plant rooms and enclosures.

The residential development will be accessed through a dedicated entrance at the rear of the development from Catton Street. All residential apartments are on the second to the eighth floors. Seven of the apartments are on the southern side of the site and two are positioned in the northeast corner. Communal roof terrace for the residential development is included in the development on the roof level (above the eighth floor).

The existing Crossrail access shaft shall be maintained at sub-ground level with accompanying Transport for London office facilities to be provided from ground floor to first floor level. The Transport for London facilities will be positioned above the Crossrail access shaft.

The ground floor layout for the proposed re-development is presented in in Figure 2-3.



Figure 2-3: Ground Floor Level Proposed Re-Development Plan (Source: Mathew Lloyd Architects)

2.4 Existing Drainage System

The site is currently developed and located within a densely urban area. Sewer records provided by Thames Water in February 2017 show that combined sewers are located along Fisher Street, Catton Street and Southampton Row. These are designed to convey both the surface and foul water within the area.

2.5 Geology

Below any made ground located on the site, the British Geological Survey (BGS) maps identify the site to be located over superficial geology of the Lynch Hill Gravel Member, formed of sand and gravel which was formed during the Quaternary Period (up to two million years ago) in an environment dominated by rivers.

The bedrock within the area has been identified as the London Clay Formation, formed of clay. This sedimentary bedrock formed during the Paleogene Period (between 34 to 56 million years ago) in an environment dominated by deep seas.

2.6 Hydrology

The River Thames is located approximately 0.9km to the south of the site and is primarily tidally influenced within this area. At this location the River Thames is classified as Main River by the Environment Agency. A review of Ordnance Survey mapping indicates that there are no other watercourses within the vicinity of the site.

The SFRA has produced a surface waterbodies map which includes approximate locations of culverted watercourses (or 'lost' rivers). This map shows the site to be located above the potential location of one of the culverted watercourses within the Borough.

3 Development and Flood Risk

3.1 National Planning Policy Framework (NPPF)

The NPPF PPG for Flood Risk and Coastal Change² and Environment Agency Climate Change Allowance Guidance³ provides direction on how flood risk should be considered at all stages of the planning and development process.

The planning system should ensure that new development is safe and not exposed unnecessarily to the risks associated with flooding. This FRA sets out the planning and wider context within which the proposed re-development needs to be considered along with the flood risk to the site.

3.2 The London Plan

The London Plan is the principal spatial planning policy document, it has been consolidated with alterations since 2011 and the latest version was adopted in March 2016.

The London Plan 2016 provides an overarching planning policy document that sets out the vision and objectives for the city up to 2036. The plan identifies broad locations for development. The London Plan recognises that large parts of the city are at risk of tidal and fluvial flooding. London Plan's objectives that are relevant to the proposed redevelopment at the site are:

- Policy 5.3: Sustainable design and construction (extract reproduced as Figure 3-1);
- Policy 5.12: Flood risk management (extract reproduced as Figure 3-2); and
- Policy 5.13: Sustainable drainage (extract reproduced as Figure 3-3).

Policy 5.3 Sustainable design and construction

Policy
Strategic

A The highest standards of sustainable design and construction should be achieved in London to improve the environmental performance of new developments and to adapt to the effects of climate change over their lifetime.

Planning decisions

B Development proposals should demonstrate that sustainable design standards are integral to the proposal, including its construction and operation, and ensure that they are considered at the beginning of the design process.

C Major development proposals should meet the minimum standards outlined in the Mayor's supplementary planning guidance and this should be clearly demonstrated within a design and access statement. The standards include measures to achieve other policies in this Plan and the following sustainable design principles:

- a minimising carbon dioxide emissions across the site, including the building and services (such as heating and cooling systems)
- b avoiding internal overheating and contributing to the urban heat island effect
- c efficient use of natural resources (including water), including making the most of natural systems both within and around buildings
- d minimising pollution (including noise, air and urban runoff)
- e minimising the generation of waste and maximising reuse or recycling
- f avoiding impacts from natural hazards (including flooding)
- g ensuring developments are comfortable and secure for users, including avoiding the creation of adverse local climatic conditions
- h securing sustainable procurement of materials, using local supplies where feasible, and
- i promoting and protecting biodiversity and green infrastructure.

Figure 3-1: Extract of Policy 5.3 from the London Plan taken from the London Plan Website⁴

⁴ The London Plan (2016), The Greater London Authority - Policy 5.3 <https://www.london.gov.uk/what-we-do/planning/london-plan/current-london-plan/london-plan-chapter-five-londons-response/policy-53-sustainable> (Checked 28/03/2019)

Policy 5.12 Flood risk management

Policy
Strategic

A The Mayor will work with all relevant agencies including the Environment Agency to address current and future flood issues and minimise risks in a sustainable and cost effective way.

Planning decisions

B Development proposals must comply with the flood risk assessment and management requirements set out in the NPPF and the associated technical Guidance on flood risk⁵ over the lifetime of the development and have regard to measures proposed in Thames Estuary 2100 (TE2100 – see paragraph 5.55) and Catchment Flood Management Plans.

C Developments which are required to pass the Exceptions Test set out in the NPPF and the Technical Guidance will need to address flood resilient design and emergency planning by demonstrating that:

- a the development will remain safe and operational under flood conditions
- b a strategy of either safe evacuation and/or safely remaining in the building is followed under flood conditions
- c key services including electricity, water etc will continue to be provided under flood conditions
- d buildings are designed for quick recovery following a flood.

D Development adjacent to flood defences will be required to protect the integrity of existing flood defences and wherever possible should aim to be set back from the banks of watercourses and those defences to allow their management, maintenance and upgrading to be undertaken in a sustainable and cost effective way.

Figure 3-2: Extract of Policy 5.12 from the London Plan taken from the London Plan Website⁵

Policy 5.13 Sustainable drainage

Policy
Planning decisions

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
- 2 use infiltration techniques, such as porous surfaces in non-clay areas
- 3 attenuate rainwater in ponds or open water features for gradual release
- 4 attenuate rainwater by storing in tanks or sealed water features for gradual release
- 5 discharge rainwater direct to a watercourse
- 6 discharge rainwater to a surface water sewer/drain
- 7 discharge rainwater to the combined sewer.

Drainage should be designed and implemented in ways that deliver other policy objectives of this Plan, including water use efficiency and quality, biodiversity, amenity and recreation.

Figure 3-3: Extract of Policy 5.13 from the London Plan taken from the London Plan Website⁶

An updated new London Plan is currently in the Examination in Public stage and is yet to be adopted; however, it is a material consideration in planning decisions. Within the new London Plan the existing policies related to flood risk and drainage have been updated.

⁵ The London Plan (2016), The Greater London Authority - Policy 5.12 <https://www.london.gov.uk/what-we-do/planning/london-plan/current-london-plan/london-plan-chapter-five-londons-response/policy-512-flood-risk> (Checked 28/03/2019)

⁶ The London Plan (2016), The Greater London Authority - Policy 5.13 <https://www.london.gov.uk/what-we-do/planning/london-plan/current-london-plan/london-plan-chapter-five-londons-response/policy-513-sustainable> (Checked 28/03/2019)

The revised policies related to flood risk and drainage will be:

- Policy SI12 Flood Risk Management
- Policy SI13 Sustainable Drainage

A review of the proposed policy wording indicates that whilst the policies are more comprehensive there should be no material impact on the design or proposals for the proposed re-development.

3.3 Local Development Documents

3.3.1 London Borough of Camden Strategic Flood Risk Assessment

The London Borough of Camden produced an updated Strategic Flood Risk Assessment (SFRA) in July 2014. The SFRA reviews flood risk to the London Borough of Camden's authority area from all sources of flooding. The report highlights Critical Drainage Areas, initially identified within the Surface Water Management Plan and states that development within the London Borough of Camden should aim to locate development sequentially within areas of low surface water flood risk first.

3.3.2 Surface Water Management Plan

The London Borough of Camden produced a Surface Water Management Plan in July 2011. The report has a number of objectives, including developing a robust understanding of the surface water flood risk of the borough and identifying Critical Drainage Areas (CDA).

Within the SWMP a number of Local Flood Risk Zones (LFRZ) were identified. These are classified as a discrete area of flooding that does not exceed the national criteria for a Flood Risk Area but affects houses, businesses and/or local infrastructure. The boundary is defined as the actual spatial extent of predicted flooding in a single location.

Furthermore, the SWMP identified a number of Critical Drainage Areas (CDA) which are discrete geographic area where multiple and interlinked sources of flood risk cause flooding in one of more LFRZs during severe weather affecting people, property and/or local infrastructure. The report identified the large majority of the borough is located within the boundaries of a number of CDA. The site is shown to be located on the boundary between CDA Group3_003 and CDA Group3_005⁷ which also covers an area that is largely located outside of the London Borough of Camden's authority area. However, the site is not identified as being located within a LFRZ.

⁷ Surface Water Management Plan for the London Borough of Camden, London Borough of Camden (2011)
https://www.camden.gov.uk/documents/20142/1458280/SWMP_Halcrow_Report_for_Camden.pdf/2a8bf03-cbd7-e808-3bb4-e75b62756b0a (Accessed 28/03/2019)

4 Definition of Flood Hazard

A Flood Risk Assessment must consider the issues associated with all sources of flooding in accordance with the NPPF and the supporting PPG for Flood Risk and Coastal Change. These have been considered in this FRA with respect to the proposed re-development of 8 – 10 Southampton Row, Holborn. The following sections have reviewed publicly available flooding information and relevant planning documents.

4.1 Probability of Flood Risk – Flood Zones

Table 4-1 outlines the definitions of each Flood Zone and associated probability, which has been taken from Table 1 of the NPPF PPG. The NPPF through the application of the Sequential Test aims to steer new developments to areas with the lowest probability of flooding (Flood Zone 1) and away from the medium and high flood risk areas (Flood Zone 2 and 3).

Table 4-1: Summary of Flood Zone Definition

Flood Zone	Probability of Flooding	Return Periods
1	Low	Land having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%).
2	Medium	Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% - 0.1%); or Land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5% - 0.1%).
3a	High	Land having a 1 in 100 or greater annual probability of river flooding (>1%); or Land having a 1 in 200 or greater annual probability of sea flooding (>0.5%).
3b	High – 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.

4.2 Historic Flooding Information

Correspondence with the Environment Agency and London Borough of Camden, in their role as the Lead Local Flood Authority, has not identified any reported incidents of flooding affecting the site from any of the potential sources.

Although there are no reported flooding incidents affecting the site it is important to note that the records held by either party are based on reported incidents / events only. Therefore, it does not mean that there has been no historic flooding to the site.

4.3 Flooding from Rivers (Fluvial) and / or the Sea (Tidal & Coastal)

The site is located within Flood Zone 1 and outside the natural floodplain of any fluvial watercourse, as confirmed by communication with the Environment Agency in December 2016. The only watercourse in the vicinity of the site is the tidal River Thames and therefore it is concluded that there is a negligible fluvial or tidal flood risk to the site.

4.4 Flooding from Groundwater

Groundwater flooding can occur when water stored beneath the ground reaches the surface and is generally associated with porous rocks e.g. sands and gravels. The superficial geologies of the surrounding area have been identified as the Lynch Hill Gravel Member, formed of sand and gravel, with bedrock geology identified as the London Clay Formation.

The British Geological Survey Aquifer Maps show the superficial deposits within the area to be classified as a 'Secondary A' aquifer, defined as permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of baseflow to rivers.

The British Geological Survey Aquifer Maps have also classified the bedrock of the area to be a 'non aquifer'.

The SFRA has produced an Increased Susceptibility to Elevated Groundwater Map showing the site to be located outside of areas shown to be at risk.

4.5 Flooding from Surface Water

The SFRA has produced maps of the CDA and LFRZ, based on work undertaken within the Surface Water Management Plan. This shows the site to be located within CDA Group3_005, which also covers an area that is largely located outside of the London Borough of Camden's authority area. However, the site is not located within a LFRZ.

The Environment Agency's Flood Risk from Surface Water map⁸ shows the site to be at very low flood risk from surface water, with a small area of low flood risk beyond the site boundary on Southampton Row.

The SFRA has produced hazard maps based on the 1 in 1,000 year surface water flood event. This hazard mapping indicated that the site is deemed to have a low flood hazard during this surface water flood event.

4.6 Flooding from Reservoirs, Canals and Other Artificial Sources

The SFRA has produced a surface waterbodies map which includes approximate locations of culverted watercourses (or lost rivers). This map shows the site to be located above the potential location of one of the culverted watercourses within the Borough.

4.7 Flooding from Sewers

The SFRA has provided maps showing the DG5 internal sewer flooding records and the DG5 external sewer flooding records based on postcode areas. Neither of these maps indicate that the site is located in an area affected by sewer flooding.

⁸ Long term flood risk information; Flood risk from surface water. Environment Agency Accessed 12/04/2017

4.8 Summary of Flooding Sources

The Environment Agency has indicated that they hold no records of flooding for the site or the surrounding area due to fluvial or tidal sources and that it is located in Flood Zone 1.

The SFRA contained no records of the site or the surrounding area flooding from internal or external sewer sources, groundwater events or due to surface water flooding.

The key potential source of flooding to the site would be as a result of surface water flooding, however based on the information available this risk is considered to be very low.

5 Climate Change

In line with NPPF, considerations of the potential future impacts of flooding as a result of climate change have been included within this FRA.

Given the potential sources of flooding outlined within Section 4, there is one aspect related to climate change that is likely to impact the site. This would comprise an increase in the duration and intensity of rainfall events and the associated impact this might have on surface water flooding.

The site is located within a Critical Drainage Area and therefore a review of both the Central and Upper End allowances would be appropriate for consideration when considering the surface water risk. The current Environment Agency guidance on the increase in peak rainfall intensity taking into account climate change is outlined in Table 5-1.

In line with current best practice, a 60 year development lifetime is applicable to commercial development. As the site is located within a Critical Drainage Area, it would therefore be appropriate to consider both the 40% and 20% climate change allowance for the increase in rainfall intensity at the site. However, guidance is such that the drainage should be designed utilising the Central value of 20%.

Table 5-1: Peak rainfall intensity allowance in small and urban catchments (Source: Environment Agency)

Applies across all of England	Total potential change anticipated for the '2020s' (2015 to 2039)	Total potential change anticipated for the '2050s' (2040 to 2069)	Total potential change anticipated for the '2080s' (2070 to 2115)
Upper end	10%	20%	40%
Central	5%	10%	20%

6 Flood Risk Vulnerability

6.1 Background to Sequential & Exception Test

The aim of the NPPF PPG Sequential Test is to ensure that a sequential approach is adopted to steer new development to areas with the lowest probability of flooding i.e. Flood Zone 1. Where there are no reasonably available sites in Flood Zone 1 the Local Planning Authority (LPA) can consider reasonably available sites in Flood Zone 2. Only where there are no reasonably available sites for development in Flood Zone 1 and 2, should the suitability of sites in Flood Zone 3 be considered.

Following application of the Sequential Test, if it is not possible, consistent with wider sustainability objectives, for the development to be located in zones with a lower probability of flooding, the Exception Test can be applied if appropriate. For the Exception Test to be passed:

- it must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk, informed by a Strategic Flood Risk Assessment where one has been prepared; and
- a site-specific flood risk assessment must demonstrate that 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.

Both elements of the test will have to be passed for development to be allocated or permitted.

Within each flood zone, surface water and other sources of flooding also need to be taken into account in applying the sequential approach to the location of development.

6.2 Vulnerability Classification

Under the NPPF PPG Flood Risk and Coastal Change, the proposed hotel re-development and associated residential development are considered 'More Vulnerable' developments, as defined in Table 2 of the NPPF, and shown in Figure 6-1. The proposed hotel re-development is located within Flood Zone 1, based on the Environment Agency's online Flood Map for Planning, and confirmed by the Environment Agency in December 2016.

More vulnerable
<ul style="list-style-type: none"> • 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.

Figure 6-1: Flood Risk Vulnerability Classification, NPPF PPG Table 2.

Project related

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	✓*

Figure 6-2: Flood Risk Vulnerability and Flood Zone 'compatibility', NPPF PPG Table 3

The Sequential and Exception Test required in accordance with the NPPF PPG, and reproduced as Figure 6-2, shows that 'More Vulnerable' development located within Flood Zone 1 is deemed acceptable.

The site is located within Flood Zone 1 and as such can be deemed to have passed the principles of the Sequential Test.

The London Borough of Camden requires development to also take into consideration surface water flood risk and locate development where possible in lower surface water flood risk areas. The site has been shown to be located within a very low risk of surface water flooding area and as such appears to comply with this additional requirement. It is, however for the Local Planning Authority to determine the site's compliance in passing the Sequential Test.

As demonstrated in the preceding paragraphs and Figure 6-2, the application of the Exception Test is not required for "More Vulnerable" land uses located in Flood Zone 1.

7 Outline Surface Water Drainage Strategy

7.1 Existing Drainage System

The site is served by the Thames Water combined sewer which is located along Southampton Row, Catton Street and Fisher Street. Although the exact connection point from the site has not been identified it appears from the Thames Water Asset Location data that there is a connection at the southern corner of the site into the combined sewer which is running in a southerly direction along Southampton Row.

7.2 Proposed Outline Surface Water Drainage Strategy

A separate Outline Drainage Strategy has been prepared by WSP (March 2019)⁹ which considers surface water runoff from the site in accordance with the drainage hierarchy defined within the London Plan (Policy 5.13) and based upon Building Regulations 2015 Part H.

The Outline Drainage Strategy confirms that infiltration and discharge to a watercourse is not possible on this site. Therefore, it is proposed that the site will discharge to the Thames Water sewer in Catton Street via the existing connection (if feasible). An alternative outfall location could be provided on Fisher Street subject to Thames Water approval.

High level drainage calculations have been carried out to ascertain the runoff rates that are likely to be associated with the site, based on an area of 800m² and utilising the existing 100% impermeable built footprint. The existing surface water flow rates have been calculated using the Wallingford Procedure's Modified Rational Method, as follows:

$$Q_{100} = 2.78 \times \text{Rainfall Intensity (mm/hr)} \times \text{Site Area (ha)} = 2.78 \times 126.28 \times 0.08 = 28.08 \text{ l/s}$$

The greenfield runoff rate was calculated to be 0.31 l/s for the 1 in 100 year event (QBAR equivalent of 0.98 l/s). It is proposed for the site to discharge to the adjacent sewer at 2 l/s as it is not feasible to reduce the discharge rate to the greenfield rate. The proposed discharge rate is a significant reduction of 26.08 l/s from the existing rate of 28.08 l/s (1 in 100 year) and therefore an improvement on the pre-development situation. Therefore, the proposed drainage network has been designed for the 1 in 100 year plus 40% climate change event, in accordance with the latest Environment Agency guidance on climate change.

Best practice related to attenuation and management of surface water within the site will be applied where feasible. The surface water runoff will be attenuated via the use of a combination of green roofs and in attenuation tanks within the development.

The Outline Drainage Strategy indicates that approximately 85m² of green roof area will be provided on top of the proposed building, which assumes 60% of the area allocated for plant equipment, and the exact extent will be subject to detailed design. Attenuation tanks are proposed within the basement level of the site. A series of rainwater pipes and external gullies and channels will convey water to the tank. All attenuation will be designed to accommodate a 1 in 100 year plus 40% climate change event.

Due to the difference in levels a pump is required to discharge surface water from the site into the Thames Water sewer. The pump will be restricted to a discharge rate of 2 l/s.

The Outline Drainage Strategy should also include details of appropriate maintenance to ensure drainage features function optimally.

⁹ 8-10 Southampton Row Outline Drainage Strategy Report, WSP, March 2019

8 Flood Risk Management Measures

The proposed development is located within Flood Zone 1, based on the Environment Agency's online Flood Map for Planning, and as such is deemed to be at low risk of flooding from fluvial or tidal sources. As such the main risk of flooding to the site has been deemed to be from surface water sources. However, this is also considered to be very low for the site.

8.1 Design Mitigation

The proposed re-development uses the existing 100% impemeable site and therefore there is considered to be no increase in runoff from the site. As a result, the requirement to incorporate any design mitigation measures is minimal. The existing access into the property will be retained. Therefore, both the existing kerb line for the adjacent highway and the partially stepped access into the property are likely to protect it from the potential low risk of ground level surface water flooding that has been indicated may affect the adjacent highway of Southampton Row.

The Outline Drainage Strategy indicates that hard landscaped areas should fall away from thresholds to low spots within the site where feasible and this will be further developed during the detailed design stage.

8.2 Off-site Impact

As the site is located in Flood Zone 1 and comprises an existing building / structure there is considered to be no displacement of flood water during an extreme event and therefore no detrimental impact as a result of the proposed re-development.

In addition, as the existing site is classed as being 100% impemeable and the proposed re-development will utilise the fabric of the existing building it is considered that there will be no increase in runoff as a result of the re-development and therefore no resultant off-site impact.

Additionally, the Outline Drainage Strategy indicates that the proposed re-development will not have a negative impact on surface water flooding offsite as the existing discharge rates will be significantly reduced in comparison to the anticipated existing arrangement which would help alleviate existing capacity issues in the area and support the strategic reduction of flood risk.

The green roofs proposed will help provide other wider sustainable benefits including urban cooling, creation of green areas to support a growth in bio-diversity and surface water source control designed to mimic the natural environment.

8.3 Flood Warning

The site is located within Flood Zone 1, at low risk of flooding from fluvial or tidal sources and as such is not located within an Environment Agency flood warning or flood alert area.

9 Conclusions

This Flood Risk Assessment has been carried out in accordance with the National Planning Policy Framework (NPPF), accompanying Planning Practice Guidance (PPG) for Flood Risk and Coastal Change and the Environment Agency's Climate Change Allowance guidance.

In summary the key conclusions are as follows:

- The River Thames (tidal) is located approximately 0.9km to the south of the site, however the site is located within Flood Zone 1 and therefore at low risk of flooding from this source;
- The Site has been identified to be outside any area of increased risk of groundwater flooding;
- The Site is located within a Critical Drainage Area. However, it is not located within a Local Flood Risk Zone, as defined by London Borough of Camden;
- Surface water flood risk to the Site has been identified as being very low by the Environment Agency, with area of low flood risk located on Southampton Row adjacent to the site;
- No records of flooding affecting the Site have been identified;
- The proposed development incorporates the re-development of the existing building for use as hotel. The existing Crossrail access shaft shall be maintained at sub-ground level;
- The re-development has been deemed to pass the principles of the Sequential Test and is not required to pass the Exception Test;
- Surface water runoff generated from the proposed re-development would be no more than the existing situation due to the Site's existing 100% developed and impermeable nature;
- Discharge to the sewer at 2 l/s is a significant reduction of 26.08 l/s from the existing rate of 28.08 l/s (1 in 100 year);
- Surface water runoff from the Site is understood to currently drain to Thames Water combined sewers and it is proposed that surface water shall continue to utilise the same approach at a reduced discharge rate;
- The proposed re-development utilises the existing 100% impermeable site. Therefore, there is considered to be no increase in runoff from the Site. As a result, the requirement to incorporate any design mitigation measures is minimal;
- The proposed drainage network has been designed for the 1 in 100 year plus 40% climate change event;
- The surface water runoff will be attenuated using a combination of green roofs and attenuation tanks within the site;
- Approximately 85m² of green roof area will be provided on top of the proposed building, although the exact extent will be subject to detailed design;
- Attenuation tanks are proposed within the basement level of the site;
- Due to the difference in the levels a pump is required to discharge surface water from the site into the Thames Water sewer. The pump will be restricted to a discharge rate of 2 l/s;
- The existing access into the property will be retained and therefore both the existing kerb line for the adjacent highway and the partially stepped access into the property are likely to protect it from the

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potential low risk of surface water flooding that has been indicated may affect the adjacent highway of Southampton Row;

- As the Site is located within Flood Zone 1 there will be no displacement of flood water during an extreme flood event and as such shall have no detrimental impact off site; and
- The proposed re-development will not have a negative impact on surface water flooding offsite as the existing discharge rates will be significantly reduced in comparison to the anticipated existing arrangement which would help alleviate existing capacity issues in the area and support the strategic reduction of flood risk.

On the basis of the flood risk to the site it is considered that the proposed re-development is appropriate in line with the National Planning Policy Framework.