

TFL_PSF_9131 SITE INVESTIGATIONS: SMALL SITES INITIATIVE SITE OPPOSITE COLLIERS WOOD STATION, MERTON, SW19 2BN

Site Ref. 2546

Flood Risk Review

NOVEMBER 2017

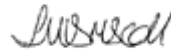
Site opposite Colliers Wood Station, Merton, SW19 2BN

Flood Risk Review

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1 INTRODUCTION

1.1 Background

Arcadis Consulting (UK) Limited ('Arcadis') has been commissioned by Transport for London (TfL) 'the Client' to a number of technical surveys for a site on opposite Colliers Wood Station, Merton ('the Site').

TfL is aiming to divest a number of small sites to enable positive regeneration. The objective of the Small Sites Initiative is to provide robust and pragmatic advice that sensibly de-risks each of the sites such that unreasonable 'abnormal' development costs are not included by developers.

The aim of this flood risk review is to assess the flood risk status of the Site and confirm the suitability of the Site for various forms of development based on the findings of a desk study.

1.2 Scope of Works

Specific objectives of the flood risk review are to:

- Collect and review Environment Agency (EA) and Lead Local Flood Authority (Merton London Borough Council (MLBC)) flood maps and published datasets (Strategic Flood Risk Assessments, Preliminary Flood Risk Assessment and Local Flood Risk Management Strategy);
- Assess flood risk from all relevant sources (rivers, groundwater, surface water, sewers and artificial sources) and assign a risk value for each form of flooding (high, medium or low);
- Confirm the EA Flood Zone and confirm the acceptability of accommodating residential or other forms of development in accordance with the National Planning Policy Framework (NPPF) requirements;
- Confirm the need for application of the NPPF Sequential and Exception Tests; and
- Provide recommendations for further study or necessary flood risk mitigation measures to facilitate development.

1.3 Limitations

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2 SITE OVERVIEW

The Site covers 0.02ha and is located opposite Colliers Wood Station, Merton, SW19 2BN, centred at national grid reference 526759 170363.

The Site is located at the end of a terrace plot and consists of vacant, paved land, currently used as a car park. The Site is located within a generally suburban setting and is surrounded by residential, commercial and public buildings as well as some green open spaces. The Site is bounded by High Street Collier's Wood (A24) to the east, Baltic Close to the south, Oslo Court (apartment block) to the west and residential properties to the north, as shown in Figure 1.

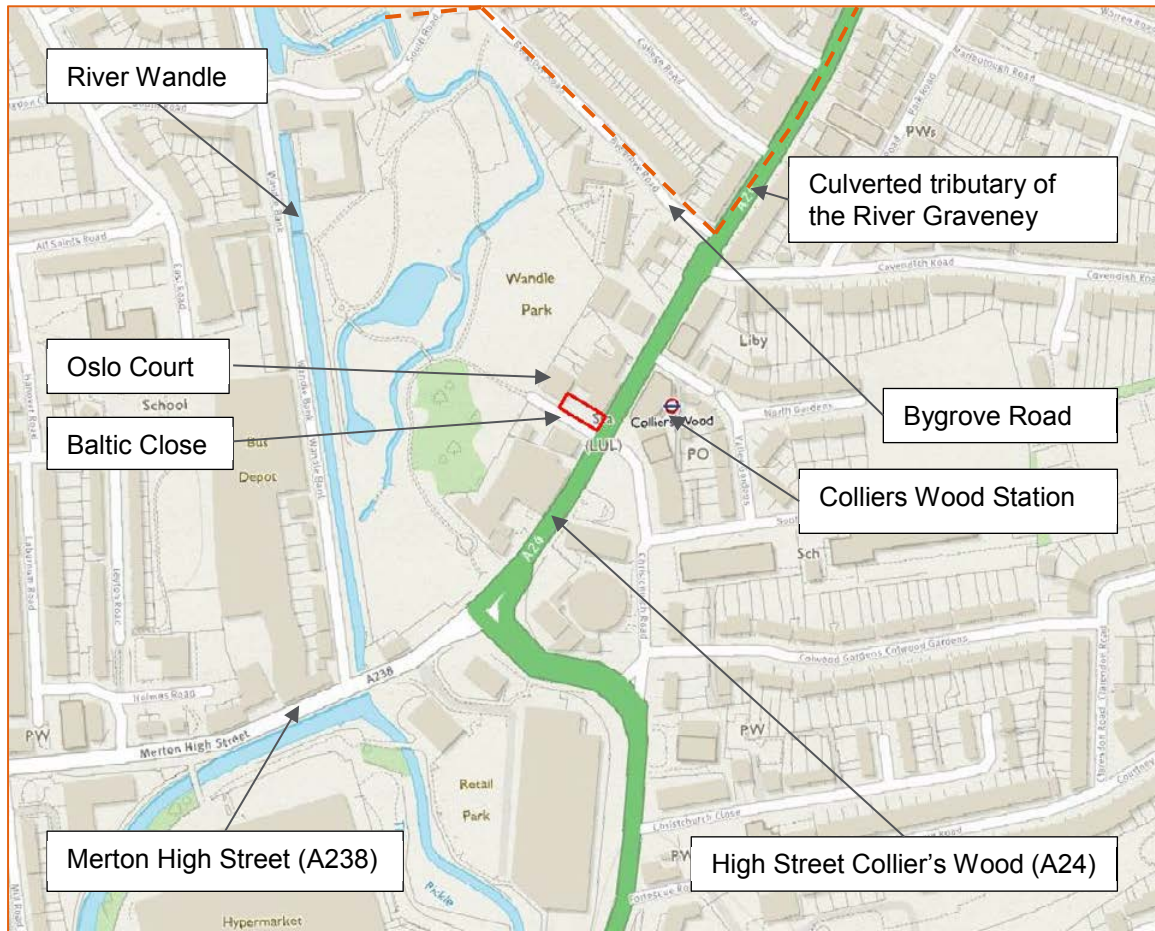


Figure 1: Site Location. Site Boundary Outlined in Red.
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Topographical information for the Site has been identified from data collected from a survey commissioned by TfL and completed by 40Seven in May 2017, verified against EA Opensource Government License 2m LiDAR digital terrain mapping (DTM) datasets (Ref. 1). The Site is flat, with levels between 12.10m above ordnance datum (mAOD) and 12.20 mAOD. The landform in the wider area generally slopes down towards the River Wandle in the west (Figure 2).

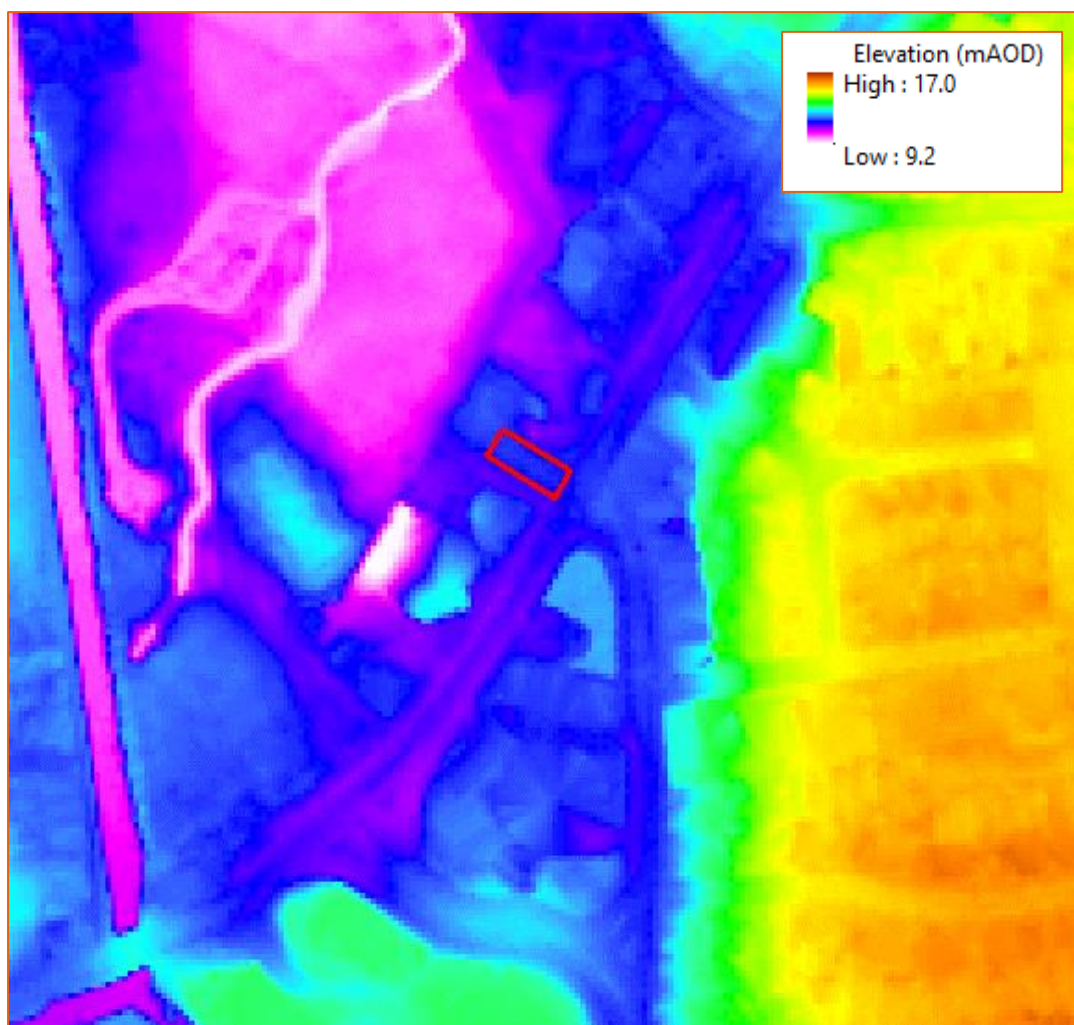


Figure 2: Site Topography. Site boundary Outlined in Red
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2.1 Catchment Description

The Site is located within the catchment of the River Wandle, an EA designated Main River and tributary of the River Thames. The River Wandle flows in a northerly direction approximately 160m west of the Site and to this point drains a catchment of approximately 154km². The River Wandle catchment receives an average annual rainfall of 725mm (Ref. 2).

A side channel of the River Wandle splits off the right bank of the watercourse and flows through Wandle Park approximately 100m to the west of the Site. The side channel connects to a small pond, and then re-joins the main channel (see Figure 1).

The River Graveney, an EA designated Main River, flows westwards approximately 500m north of the Site and confluent with the River Wandle approximately 900m northwest of the Site. The River Graveney is a heavily modified watercourse and a culverted tributary of the river flows southwards along High Street Collier's Wood and then turns westwards along Bygrove Road towards the River Wandle. At its closest, this culverted watercourse is located less than 100m north of the Site (see Figure 1).

2.2 Ground Conditions and Aquifers

Soils underlying the Site are described as naturally wet, loamy and clayey floodplain soils with naturally high groundwater (Ref. 3). The superficial geology consists of Alluvium – clay, silt, sand and gravel (Ref. 4), supporting a Secondary A aquifer (Ref. 5). Such aquifers are defined by rock layers or drift deposits with a wide range of permeability and storage that are capable of supporting water supplies at a local scale and the Site is located within an inner (Zone 1) groundwater source protection zone attributed to a potable water supply abstraction from the superficial aquifer. The bedrock geology underlying the Site consists of the London Clay Formation – clay and silt, which has no aquifer designation.

3 DATA SOURCES

Information has been drawn from web-based and published sources, outlined below, as well as having been collected through consultation with the EA who provided a Flood Product 4 data pack.

Web-bases sources:

- Flood Estimation Handbook (FEH) Web-Service;
- EA What's in Your Backyard? Interactive Maps;
- EA Long Term Flood Risk Interactive Maps (Ref. 6);
- EA Flood Map for Planning (Ref. 7);
- Cranfield University Soilscales Soil Interactive Map;
- British Geological Survey Geology Viewer.

Published documents:

- MLBC Level 1 Strategic Flood Risk Assessment (SFRA) (Ref. 8);
- MLBC Level 2 SFRA (Ref. 9);
- MLBC Local Flood Risk Management Strategy (LFRMS) (Ref. 10);
- MLBC Preliminary Flood Risk Assessment (PFRA) (Ref. 11);
- Surface Water Management Plan for the LMBC (SWMP) (Ref. 12).

4 RELEVANT PLANNING POLICES & DESIGNATIONS

4.1 NPPF and Flood Risk

The National Planning Policy Framework (NPPF) (Ref. 13) and accompanying flood risk and coastal change planning practice guidance (PPG) (Ref. 14) set out the Government's planning policy for England and advises on '*how to take account of and address the risks associated with flooding and coastal change in the planning process*'. The principal aim of the NPPF is to achieve sustainable development by accounting for flooding at all stages of the planning process, avoiding inappropriate development in areas at risk of flooding and directing development away from areas where risks are highest. Where development is necessary in areas at risk of flooding, the NPPF aims to ensure it is safe, without increasing flood risk to third parties.

Early adoption of, and adherence to, the principles set out in the NPPF and its PPG, with respect to flood risk, ensures that detailed designs and plans for development take due account of flood risk and the need for appropriate mitigation, if required.

4.2 The Sequential and Exception Tests

The NPPF identifies four Flood Zone classifications, detailed in Table 1 below.

Table 1: Flood Zones (Source: PPG, Table 1)

Flood Zone	Definition
Zone 1 – Low Probability	Land having a less than 1 in 1,000 annual probability of river or sea flooding.
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 1 in 200 and 1 in 1,000 annual probability of sea flooding.
Zone 3a – High Probability	Land having a greater than 1 in 100 annual probability of river flooding; or land having a greater than 1 in 200 annual probability of sea flooding.
Zone 3b – The Functional Floodplain	Land where water flows or is stored in times of flood.

The NPPF specifies that the suitability of all new development in relation to flood risk should be assessed by applying the Sequential Test to demonstrate that there are no reasonably available sites in areas with a lower probability of flooding that would be appropriate to the type of development proposed. The NPPF provides guidance on the compatibility of each land use classification in relation to each of the Flood Zones, as summarised in Table 2.

Table 2: Flood Risk Vulnerability and Flood Zone Compatibility (Source: PPG Table 3)

Flood Zone	Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	✓	Exception Test required	✓	✓

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Flood Zone	Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Zone 3a	Exception Test required	✓	X	Exception Test required	✓
Zone 3b	Exception Test required	✓	X	X	X
Key: ✓ Development is appropriate X Development should not be permitted					

When the Exception Test is triggered, this requires the development proposals to demonstrate wider sustainability benefits to the community that outweigh flood risk, and that the development will be safe for its lifetime, without increasing flood risk elsewhere and where possible reduce flood risk overall.

The Site has been assessed against the NPPF planning tests in Section 6 of this report.

5 FLOOD RISK SOURCES AND FLOODING HISTORY

5.1 Overview

In line with best practice, flood risk from the range of possible sources listed in Table 3 has been considered.

Table 3: Potential Sources of Flooding

Source of Flooding	Description
1. Flooding from rivers (Fluvial)	Floodwater originating from a nearby watercourse when the amount of water exceeds the channel capacity of that watercourse
2. Flooding from land (Surface Water)	Flooding caused by intense rainfall exceeding the available infiltration and/or drainage capacity of the ground
3. Flooding from groundwater	Flooding caused when groundwater levels rise above ground level following prolonged rainfall
4. Flooding from reservoirs, canals and other artificial sources	Failure of infrastructure that retains or transmits water or controls its flow

5.2 Historical Flooding

Consultation with the EA identified no records of historic flooding affecting the Site.

The MLBC PFRA *Surface Water Flooding Incidents and Fluvial Flooding Incidents* map identifies one surface water flooding incident at the Site and two flood outlines within the local area (located on High Street Collier's Wood, approximately 130m north of the Site, and on South Gardens and Colwood Gardens, approximately 150m south of the Site). The MLBC Level 1 SFRA dates these events to 20th July 2007, where intense periods of rainfall (with 50.8mm of rainfall record in 24 hours) caused flash flooding and the capacity of drainage systems was exceeded across the Borough.

Consultation with the MLBC and review of published documentation identified no historical incidences of fluvial or sewer flooding affecting the Site.

The Site does not benefit from any installed flood defences.

5.3 Flooding from Rivers

The EA *Flood Map for Planning* (Figure 3), confirmed via consultation with the EA, identifies the Site within Flood Zone 2, medium flood risk (land having between a 1 in 100 (1%) and 1 in 1,000 (0.1%) annual probability of flooding) from rivers. This risk is associated with the River Wandle and the culverted tributary of the River Graveney.

EA modelled flood water data predicts fluvial flood levels around the Site of up to 12.26 mAOD during the 1 in 100 (1%) storm, 12.57 mAOD for a 1 in 100 plus climate change (1%+CC) storm and 12.76 mAOD for a 1 in 1,000 (0.1%) storm. Comparison of modelled flood levels and topography indicates that the Site would be subject to inundation during all three of these events, with flood levels of up to 0.66m in the extreme (0.1%) event.

The EA *Flood Map for Planning*, does not illustrate flood risk from non-Main River sources (ordinary watercourses). However, there are no ordinary watercourses in proximity to the Site, therefore flood risk from this source is considered Negligible.

Overall, it is considered the Site is at medium risk of fluvial flooding.

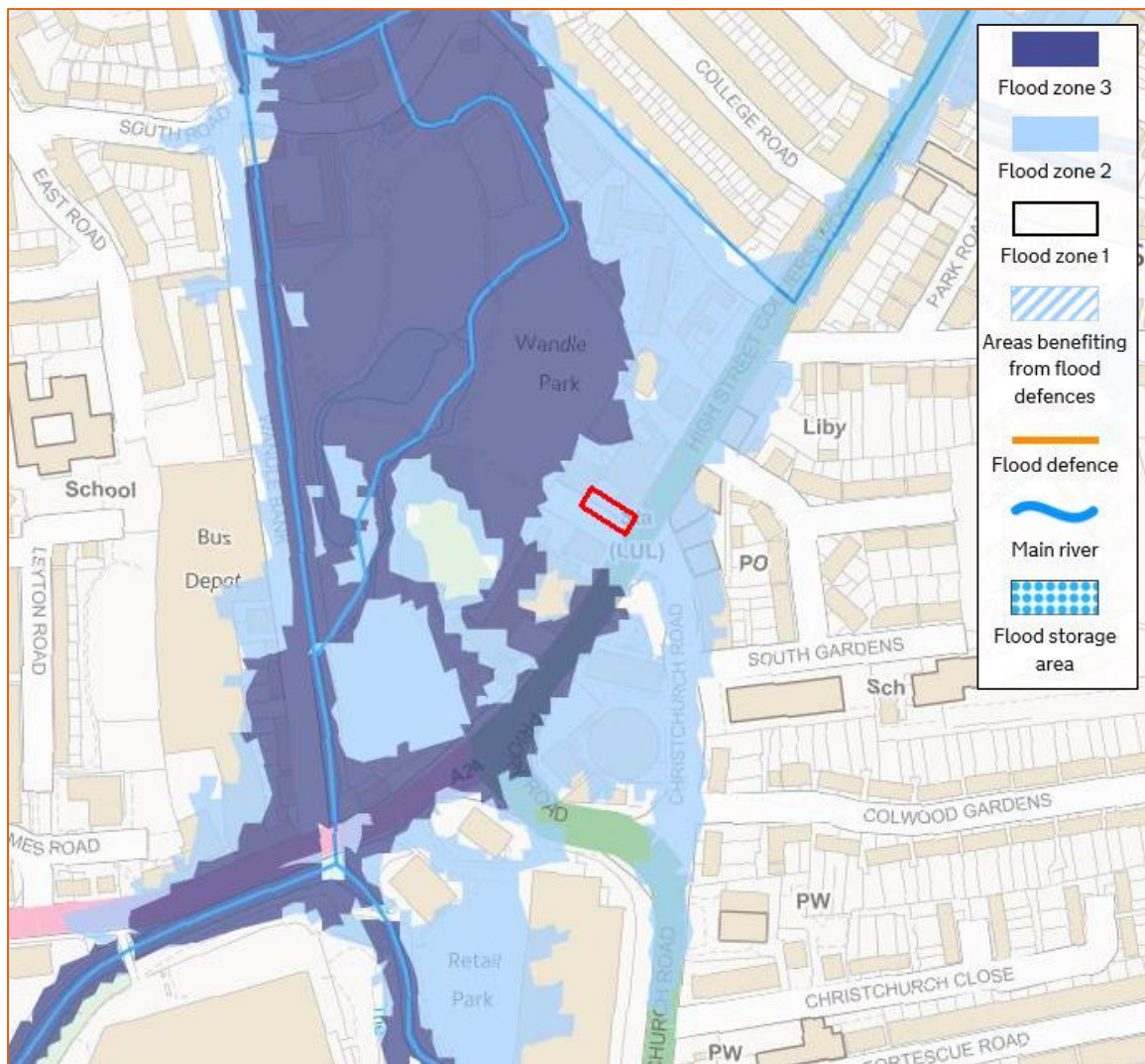


Figure 3: EA Flood Map for Planning, Site Boundary Outlined in Red
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5.4 Flooding from Surface Water

The EA *Risk of Flooding from Surface Water* map (Figure 4) identifies most of the Site as having a very low risk (less than 1 in 1,000 (0.1%) annual probability) of surface water flooding. A small proportion of the eastern extent of the Site, neighbouring High Street Collier's Wood, has a low risk (between a 1 in 100 (1%) and 1 in 1,000 (0.1%) annual probability) of flooding from this source.

It is considered that the overall risk of flooding from surface water is low.

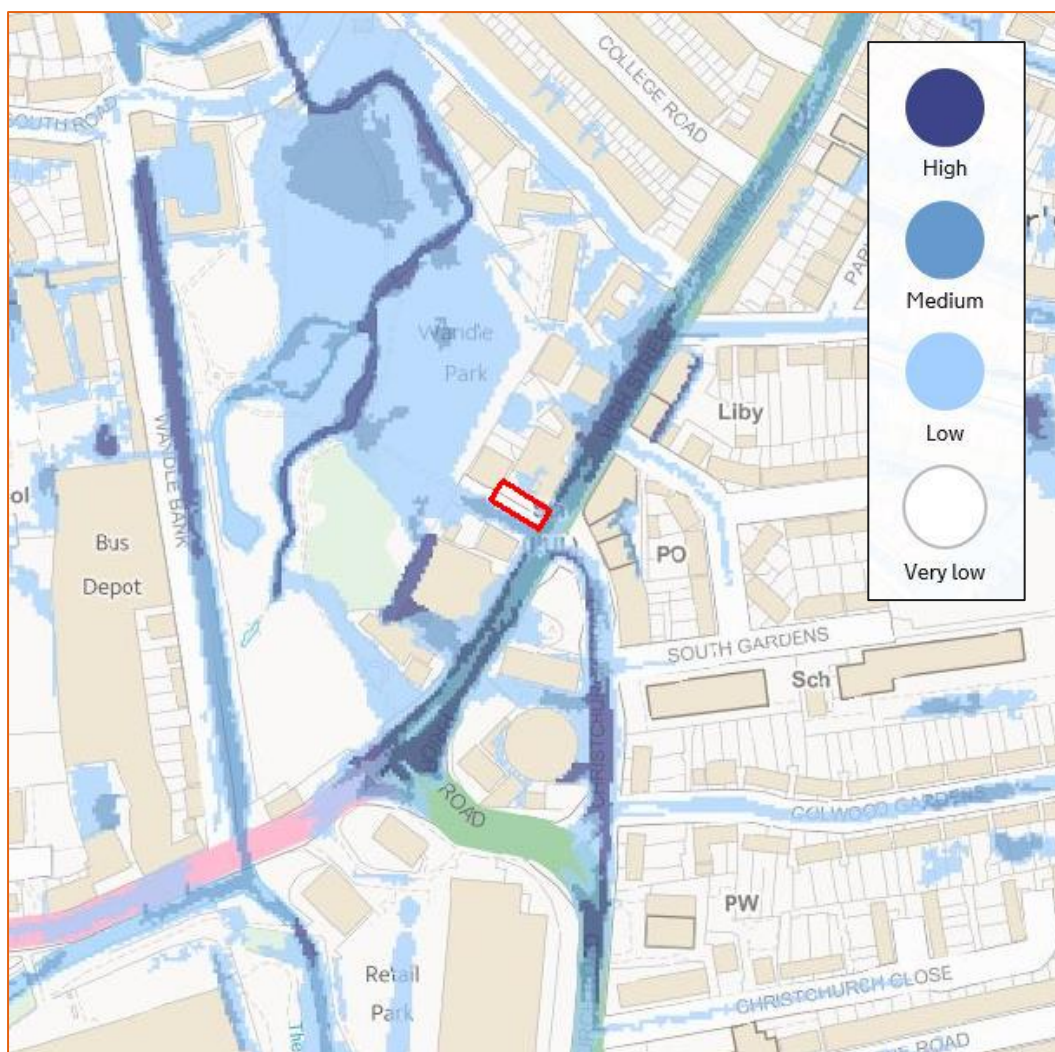


Figure 4: EA Risk of Flooding from Surface Water, site boundary outlined in red. Contains EA data © Crown copyright and database right 2017. All rights reserved.

5.5 Flooding from Groundwater

The MLBC LFRMS *Flood Risk from Groundwater* map identifies the Site within an area having 'potential for groundwater flooding to occur at surface', linked to the underlying Secondary A superficial aquifer and soils with naturally high groundwater levels. Water levels in the aquifer may have hydraulic connectivity with the River Wandle, which could cause localised flooding if river levels were high for prolonged periods. The MLBC *Level 1 Strategic Flood Risk Assessment* identifies 34 records of groundwater flooding within the Borough, however the *Groundwater Flooding Records* map identifies that none of these incidences were near the Site.

The overall risk of flooding from groundwater sources is low.

5.6 Flooding from Artificial Sources and Sewers

There are no significant bodies of water (lakes, reservoirs or canals), retained above natural ground level upstream of the Site. The EA *Risk of Flooding from Reservoirs* map indicates that the Site is not at risk from reservoir flooding.

The overall risk of flooding from artificial sources is low.

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The LMBC Level 1 SFRA states that the Collier's Wood area is known to experience sewer flooding during heavy rainfall, however the LMBC PFRA *Sewer Flooding Incidences* map records no incidences of sewer flooding affecting the Site.

Overall, it is considered that the risk of flooding from sewers is low.

6 RISK RATING & RECOMMENDATIONS FOR FURTHER INVESTIGATIONS

Following the assessment of flooding to the Site from all likely sources, it is considered that there is a **Medium** risk of flooding to the Site from main rivers and a **Low** risk of flooding from surface water, groundwater and artificial sources, including sewers, as summarised in Table 4.

Table 4: Flood Risk Sources

Source of Flooding	Flood Risk
1. Flooding from rivers (Fluvial)	Medium
2. Flooding from land (Surface Water)	Low
3. Flooding from groundwater	Low
4. Flooding from reservoirs, canals, sewers and other artificial sources	Low

The EA *Flood Map for Planning* identifies the Site as within Flood Zone 2. Following the NPPF guidance, the Site would be suitable for all development types, but triggering the requirement for application of the Exception Test for ‘*Highly Vulnerable*’ developments (which includes emergency services stations and command centres; basement dwellings; caravans, mobile homes and park homes intended for permanent use; and installations requiring hazardous substance consent). Use for ‘*More Vulnerable*’ development, including residential land use, is appropriate in this Flood Zone in accordance with the NPPF, subject to satisfaction of the Sequential Test, which steers new development to Flood Zone 1. A Flood Risk Assessment (FRA) would need to be prepared in support of a planning application for any development on the Site.

The FRA would be a more detailed assessment than is presented in this Flood Risk Review and would need to be specific to the type and layout/configuration of development that is proposed. The FRA should demonstrate that the proposed development would not be subject to an unreasonable risk of flooding and that developing the Site would not subsequently increase flood risk to third parties. EA modelled flood data indicates maximum flood depths on Site of up to 0.66m during the extreme flood event. Further investigation, via the FRA, would therefore be required to demonstrate how the Site can be developed safely, identifying necessary design measures to provide adequate protection in these flood scenarios, without increasing flood risk to third parties.

It is considered that there is a low risk of surface water flooding, however there is a known history of surface water flooding in areas local to the Site. Surface water drainage and runoff from the Site should be further investigated and it should be ensured that drainage is managed to a high standard. Current rainfall-runoff rates and volumes, as well as greenfield runoff rates for the Site should be calculated. A Drainage Strategy should then be developed, in consultation with the Lead Local Flood Authority and Thames Water, which should detail methods, including the use of Sustainable Drainage Systems (SuDS) to manage site runoff, which would ideally be controlled to match greenfield rates.

Subject to production of an FRA and Drainage Strategy and the implementation of the flood resilience recommendations from these studies, it is considered that flood risk would not limit any form of development on the Site.

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