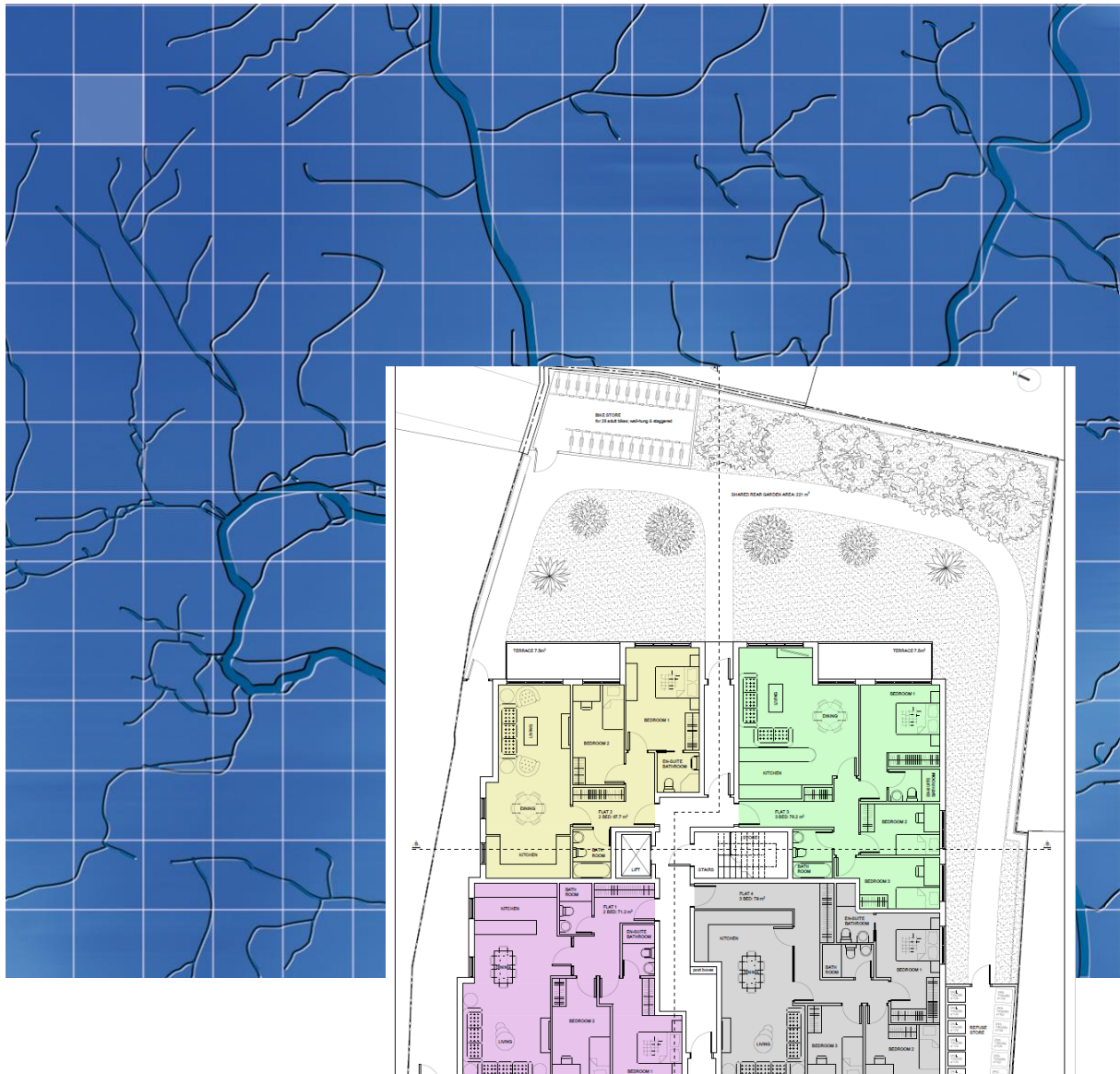


Perfect Property Developments Ltd

September 2021

75-81 Southampton Street SuDS Report



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Document issue details

WHS1886

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1	22/12/2020	Draft	Alexandros Petrakis (Consultant)	Paul Blackman (Director)
2	1/09/2021	Draft	Daniel Murtagh (Consultant)	Paul Blackman (Director)

For and on behalf of Wallingford HydroSolutions Ltd.

This report has been prepared by WHS with all reasonable skill, care and diligence within the terms of the Contract with the client and taking account of both the resources allocated to it by agreement with the client and the data that was available to us. We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above. This report is confidential to the client and we accept no responsibility of any nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at their own risk.



The WHS Quality & Environmental Management system is certified as meeting the requirements of ISO 9001:2015 and ISO 14001:2015 providing environmental consultancy (including monitoring and surveying), the development of hydrological software and associated training.



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1 Introduction

1.1 Scope

Wallingford HydroSolutions Ltd (WHS) has been commissioned by Perfect Property Developments Ltd to undertake a review of the existing and proposed surface water drainage for a proposed apartment block, located at 75-81 Southampton Street, Reading (NGR: SU 71720 72803). The existing site comprises of a Cooperative Funeral Care Building and is fully paved.

Despite there being no net increase in impermeable surfaces as a result of the proposals, the Reading Borough Council (RBC) Strategic Flood Risk Assessment¹ (SFRA) requires a high-level investigation of drainage as the development is categorized as "major", consisting of more than 10 units (19 flats). This document is not a Flood Risk Assessment, which is not required given that the development is not located in Flood Zone 1, is smaller than 1ha and is not at risk of surface water flooding.

1.2 Approach

This study seeks to draw together available data relating to drainage at the site and provide recommendations on the proposed method of drainage. In summary, this report will:

- Review the existing drainage arrangements at the site
- Review site topography using LiDAR data
- Review the development proposals
- Review relevant guidance relating to surface water drainage
- Assess existing runoff rates
- Provide recommendations on the sustainable management of surface water on the site

1.3 Sources of Data

The following data sources have been utilized to compile this report.

- RBC SFRA Report¹
- Liaison with Reading Borough Council (RBC)²
- BGS Infiltration SuDS GeoReport³
- CCTV Survey by Pulse Mapping Ltd⁴
- Sit Plans provided by the client⁵
- Thames Water (TW) Asset Location Search (ALS)⁶
- LiDAR Data

¹ Reading Borough Council Strategic Flood Risk Assessment. Peter Brett Associates. June 2017.

² Email received from Darren Cook (Transport Development Control Manager). Tuesday 15th December 2020.

³ BGS Infiltration SuDS GeoReport. Report ID: BGS_313888/18412. Received 10.12.20.

⁴ P201021 Pulse Mapping Ltd. 05.11.20.

⁵ 75-81 Southampton Street Proposed Plan. PAD Architects. Received 10.12.20

⁶ ALS/ALS Standard/2020_4323949. 15.12.20.

2 Site Description

2.1 Location

The site is located within a dense urban area in the centre of Reading, at 75-81 Southampton Street (NGR: SU 71720 72803). The existing site is home to the Cooperative Funeral Care building. The red line boundary measures 0.078ha, or 780m². Please see Figure 2-1 for the site location plan. The River Kennet is located 350m to the west.

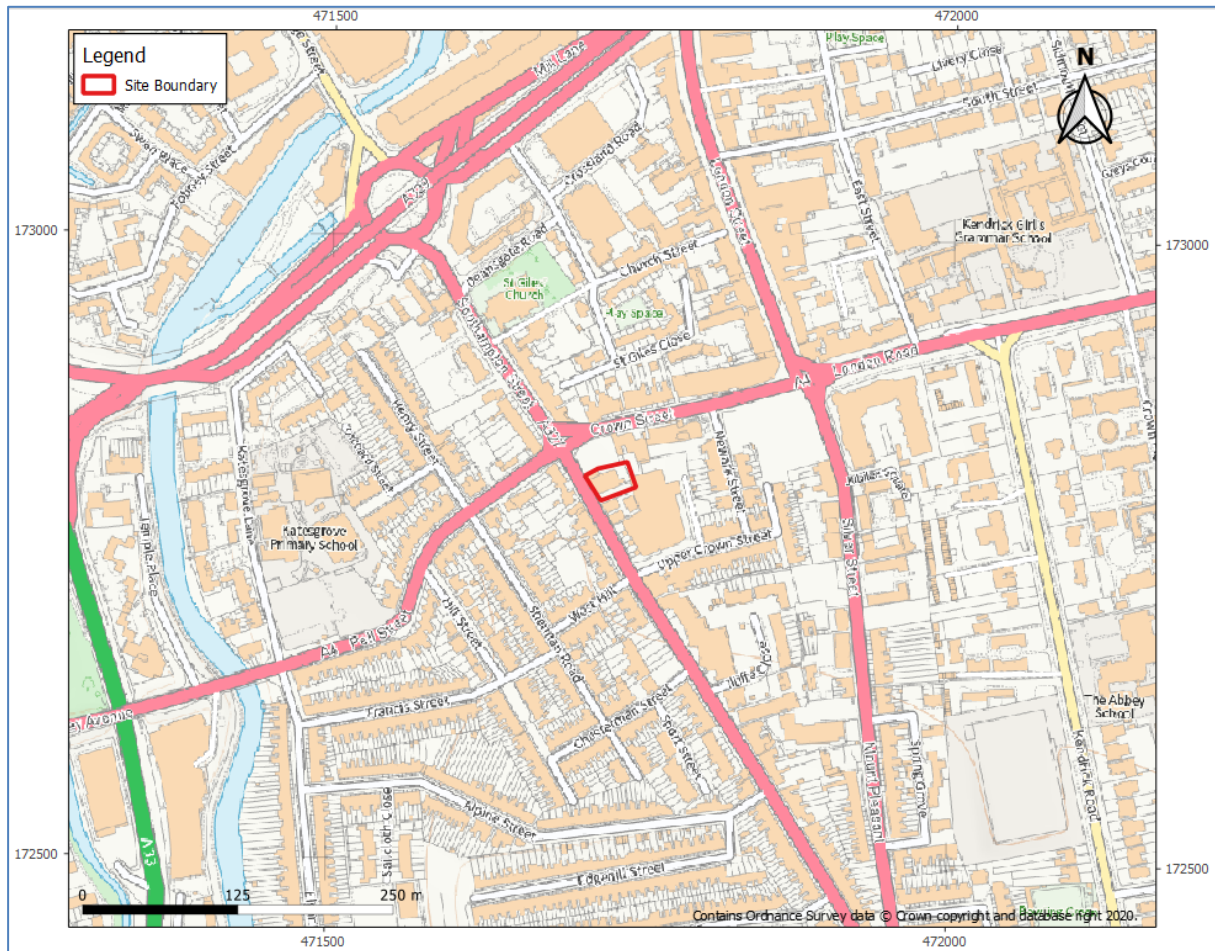


Figure 2-1 - Location plan

2.2 Topography

The topography at the site has been reviewed by viewing 2m resolution LiDAR data, which filters out buildings and trees to reveal raw ground levels. The site is relatively flat, owing to the urban nature of the local area and that there is existing hardstanding. Ground levels at the site range from 45.6mAOD to 45.8mAOD and the site does not sit lower than surrounding land. There is a slight gradient falling to the north and west. Please see Figure 2-2.

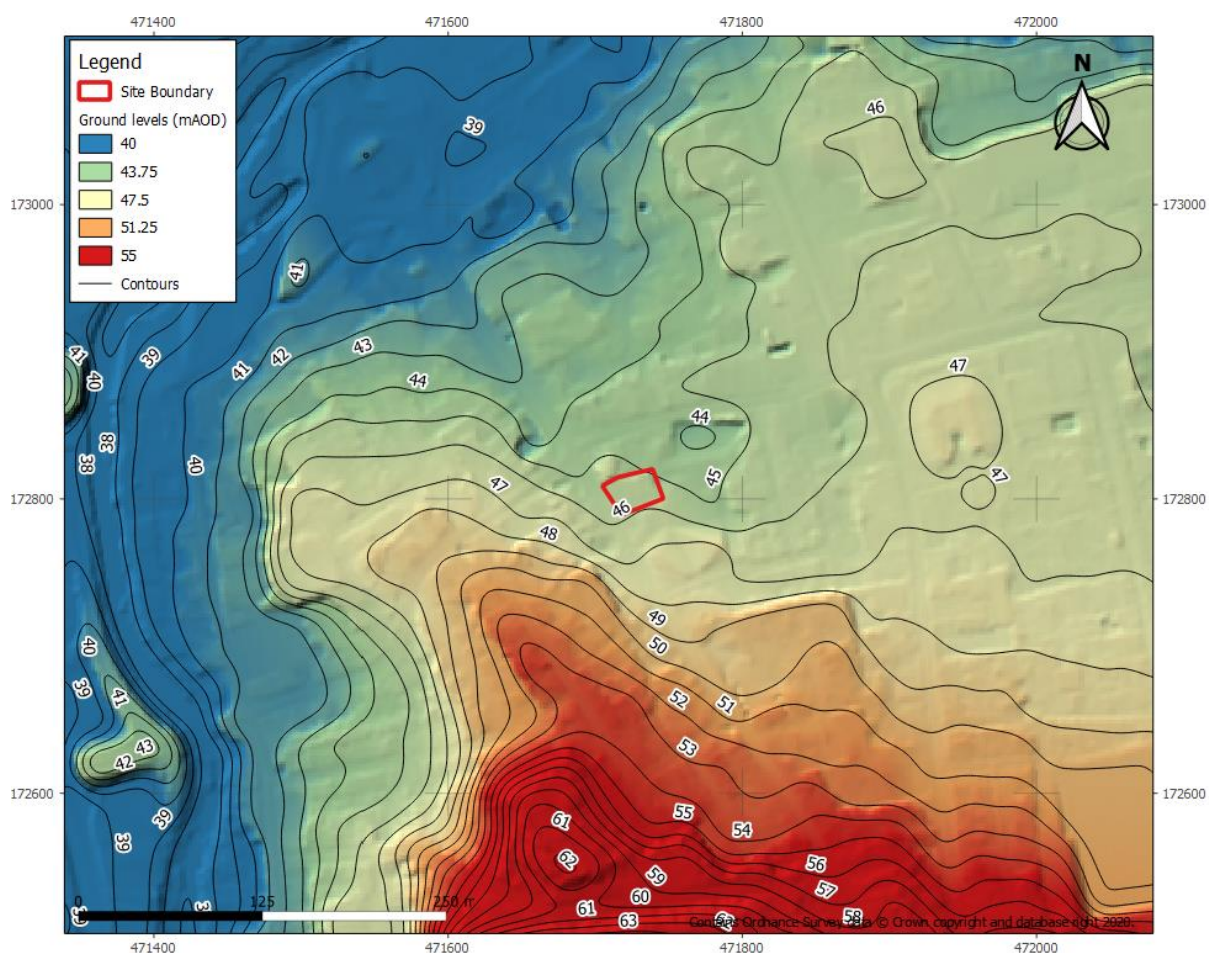


Figure 2-2 - Topography

2.3 Existing Drainage

The existing drainage at the site has been reviewed by provision of a CCTV survey and purchase of a Thames Water (TW) Asset Location Search (ALS) by the client. The CCTV survey shows the location of manholes and drainage pipes within the site boundary, on private land, whereas the TW ALS relates to public drainage in the main carriageway.

The CCTV survey shows that the existing building is served by rainwater gullies and a combined sewer. The combined sewer is related to the foul drainage, whereas the gullies serve to drain rainwater that falls onto the site. The driveway, just south of the existing building contains several gullies, however these were silted at the time of survey so further details are unavailable. These gullies, shown as "targets" on the CCTV survey are shown to drain into the public highway. Some of the targets that are suspected to be rainwater gullies are shown to be connected to the neighbouring site, however, could not be fully traced as access was not arranged during the survey.

The TW ALS confirms that buildings along Southampton Street are served by an existing surface water sewer that is adopted and is therefore a TW asset. It appears that the targets identified on the CCTV Survey that run along the driveway connect to this surface water sewer when comparing the two sources of information. The public sewer conveys flows north westwards, with the nearest manhole located 20m north west of the site, with a cover level of 44.45mAOD (manhole ref: 6850). The CCTV Survey is provided as Appendix 1 and the TW ALS as Appendix 2.

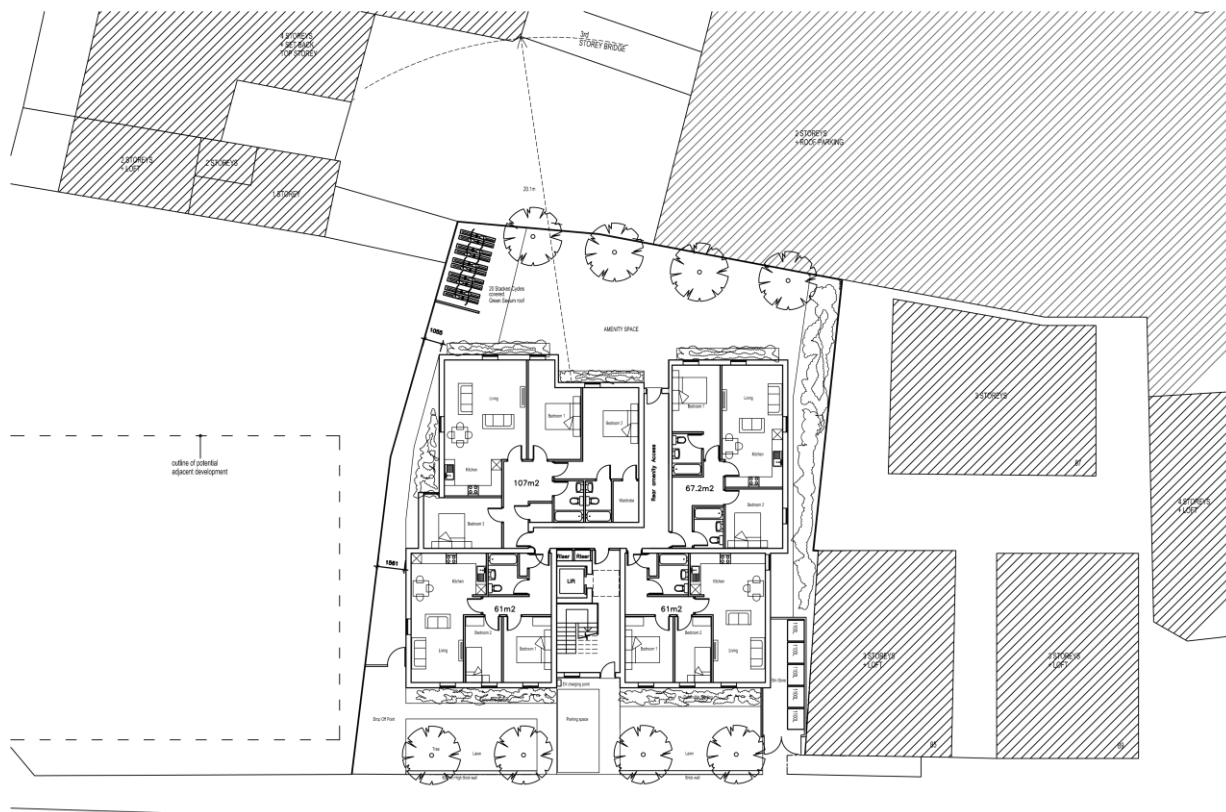
2.4 Geology

To provide a more detailed assessment of the site geology/hydrogeology, a BGS SuDS GeoReport was purchased. This contains information such as soil permeability, bedrock permeability and groundwater levels. A copy of this report is available as Appendix 3.

In summary, the ground conditions are probably compatible for infiltration. Groundwater levels are generally a minimum of 3m below ground level for part of the year and the groundwater is not especially vulnerable to contamination. Both the superficial deposits and bedrock contain spatially variable permeability but are likely to be moderately permeable. In regard to ground stability, it is stated that ground may be susceptible to shrink-swell ground movement, which could potentially be an issue if significant infiltration features were proposed.

2.5 Proposed Development

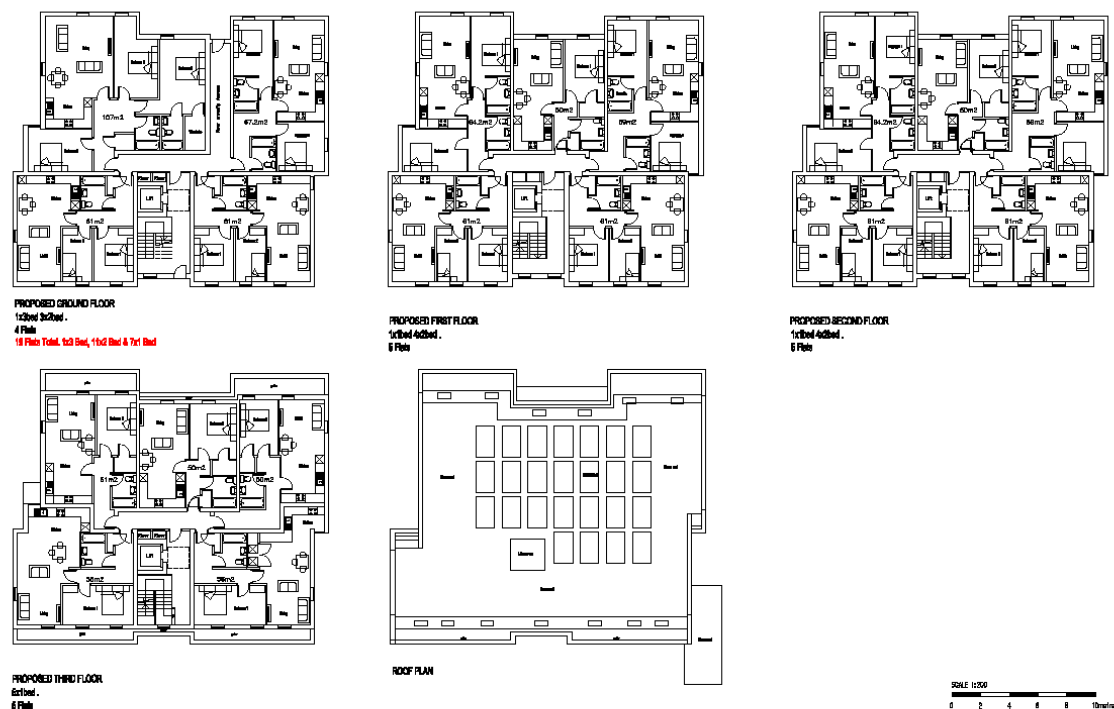
The proposed development will involve the demolition of the existing building and the erection of a 4-storey apartment block, containing 19 flats, ranging from 1-3 bedrooms. The footprint of the proposed building will be slightly larger than existing, however as this is placed on existing hardstanding there will be no increase in paved area. There will be a shared communal garden area to the rear. The proposals are shown below.



2-3

—

Development



Client	Job	Drawing	Date	Scale	Drawing No.	Revision
Sunny Grewal	75-81 Southamilton St. Reading, RG21 2JU	Proposed Plans	December 2020	1:200	P002	Rev F

3 SuDS Assessment

3.1 Liaison with Reading Borough Council

RBC has been contacted with regards to the scope of this drainage investigation and sewer flooding records. The Transport Development Control Officer has confirmed that there are no records of sewer flooding in the area.

RBC has also confirmed that there is no strict requirement for betterment in the area given the lack of sewer flooding issues. The site also does not lie in a critical drainage area. A copy of the correspondence is included as Appendix 4. The development will therefore be subject to the national guidance, more details of which are presented in the following section.

3.2 Non-Statutory Technical Standards for SuDS

Given that the site is currently developed, the most relevant national standard is as per the below, taken from the Non-Statutory Technical Standards for SuDS⁷.

- S3 For developments which were previously developed, the peak runoff rate from the development to any drain, sewer or surface water body for the 1 in 1-year rainfall event and the 1 in 100 year rainfall event must be as close as reasonably practicable to the greenfield runoff

⁷ Sustainable Drainage Systems. Non-statutory technical standards for sustainable drainage systems. Department for Environment, Food and Rural Affairs. March 2015.

rate from the development for the same rainfall event, but should never exceed the rate of discharge from the development prior to redevelopment for that event.

3.3 Existing Runoff Rates

The existing runoff rates have been calculated using the industry standard rainfall runoff method, within ReFH2.3 software. The rainfall was downloaded as point data from the FEH Web Service.

The estimates are first completed for a 50ha site, as per guidance in the CIRIA SuDS Manual C753. These are then scaled back down to the site area of 0.078ha, with certain parameters from the 50ha estimate carried over. As the site already contains full coverage of hardstanding, the urban area was set to match the site area and assumes that all rain that falls onto the site results in run off. Please see the results below in both l/s/ha and then l/s, scaled to the size of the site (0.078ha). Please note that these reflect a summer storm, which is the worst case in terms of run off rate but are shorter duration events. The existing right to discharge should remain.

Table 3-1 - Existing Runoff Rates

Return Period (yrs)	Runoff Rate (l/s/ha)	Runoff Rate (l/s – scaled to site)
1	13.41	1.05
2	15.52	1.21
10	26.52	2.07
30	33.71	2.63
100	42.32	3.30

3.4 Proposed Method of Drainage

Given that there is no increase in hardstanding (as the existing site is fully paved) and there is no strict requirement for betterment, it is recommended that the development maintains its existing drainage regime of draining to the existing surface water sewer. Given the scale of the development and the constrained nature of the site within an urban centre, it would seem impractical to incorporate significant SuDS features.

Despite the above, the development will have the potential to contribute to a reduction in surface water run off through the use of planting and rain gardens. These will help alleviate surface water flood risk by providing interception storage from vegetation. Downpipes from the proposed building can be routed to allow for rainwater to soak into the rain gardens before entering the drainage system, reducing the rate at which surface water enters the public sewer. Rain gardens can be flexible in terms of size and layout to suite a specific site, require little maintenance (limited to landscaping) and can be installed on paved areas. They will also bring amenity benefits by improving the visual appeal of open space within the communal gardens. An example is shown below.



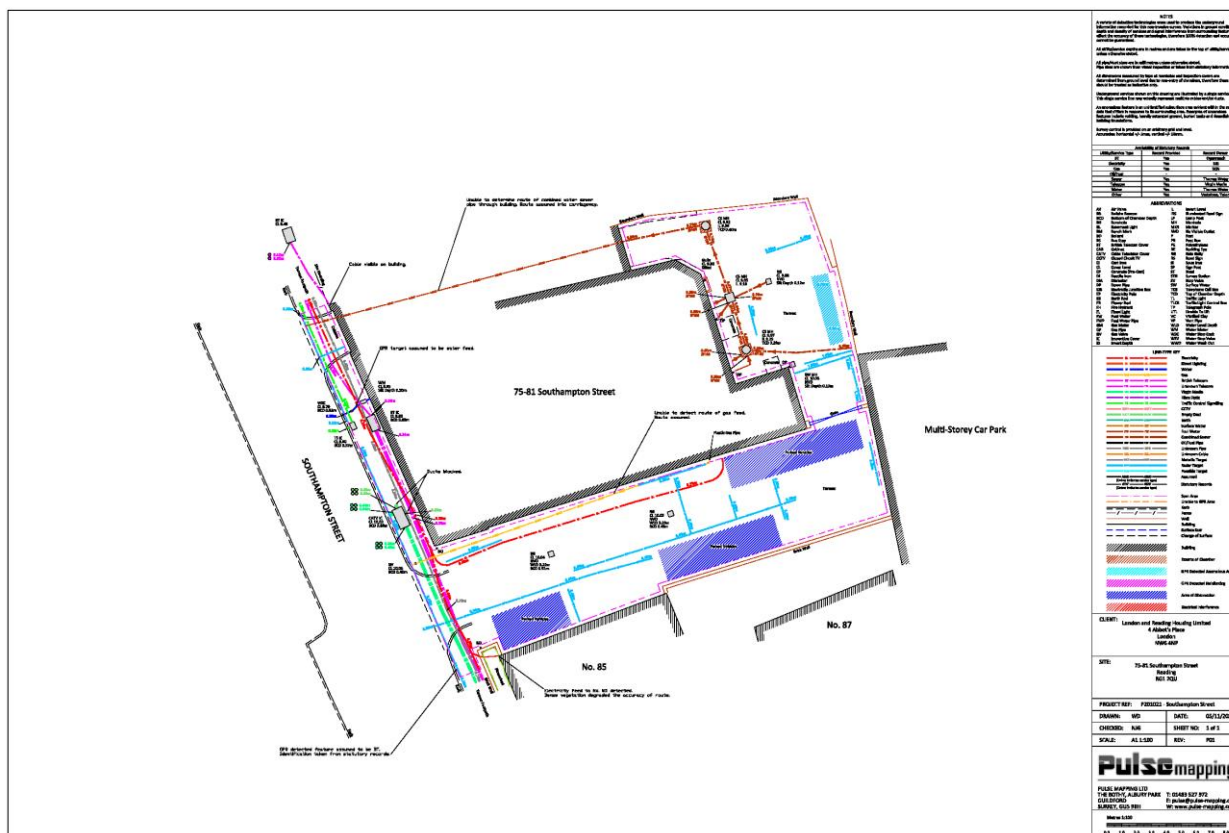
Figure 3-1 - Typical rain garden cross section (<https://naturesperspective.com/manage-stormwater-with-a-rain-garden/>)

4 Conclusion

An investigation into the existing and proposed drainage of a proposed apartment block located at 75-81 Southampton Street has been carried out. The existing building is shown to drain via rainwater gullies and an existing TW surface water sewer.

The proposed method of drainage is considered sustainable, as it will not increase surface water runoff rates and will seek opportunities to provide betterment where possible through the inclusion of planting and rain gardens. Therefore, the development is considered to satisfy standard S3 in the Non-Statutory Guidance for SuDS.

Appendix 1 – CCTV Survey



Appendix 2 – Thames Water Asset Location Search

Asset location search



Property Searches

Wallingford Hydrosolutions
MacLean Building
WALLINGFORD
OX10 8BB

Search address supplied

Co-Operative Funeral Care
75-81
Southampton Street
Reading
RG1 2QU

Your reference

WHS1824

Our reference

ALS/ALS Standard/2020_4323949

Search date

15 December 2020

Knowledge of features below the surface is essential for every development

The benefits of this knowledge not only include ensuring due diligence and avoiding risk, but also being able to ascertain the feasibility of any development.

Did you know that Thames Water Property Searches can also provide a variety of utility searches including a more comprehensive view of utility providers' assets (across up to 33-43 different providers), as well as more focused searches relating to specific major utility companies such as National Grid (gas and electric).

Contact us to find out more.



Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW
DX 151280 Slough 13



searches@thameswater.co.uk
www.thameswater.co.uk/propertysearches.co.uk



0843 070 9148

Appendix 3 – BGS Infiltration SuDS GeoReport

GeoReports



Alex Petrakis
Wallingford Hydrosolutions
C E H Wallingford
Maclean Building
Crowmarsh Gifford
Wallingford
OX10 8BB

Infiltration SuDS GeoReport:

This report provides information on the suitability of the subsurface for the installation of infiltration sustainable drainage systems (SuDS). It provides information on the properties of the subsurface with respect to significant constraints, drainage, ground stability and groundwater quality protection.

Report Id: *BGS_313888/18412*
Client reference: Southampton Street

Appendix 4 – Reading Borough Council Liaison

Hi Alex,

Thank you for your email.

The Council have no adopted standards specifying what betterment would be required as we work to the standards contained within the DEFRA Non-statutory technical standards for sustainable drainage systems. As such the proposed development should comply with the following:

S3 For developments which were previously developed, the peak runoff rate from the development to any drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event must be as close as reasonably practicable to the greenfield runoff rate from the development for the same rainfall event, but should never exceed the rate of discharge from the development prior to redevelopment for that event.

I am also not aware of any sewer flooding at the site.

I hope that the above is of use to you but if you have any questions please let me know.

Kind regards,

Darren Cook

Transport Development Control Manager

Transport | Directorate for Economic Growth and Neighbourhood Services (DEGNS)

Reading Borough Council

Civic Offices

Bridge Street

Reading

RG1 2LU

0118 937 2612 (72612)

07812 462820

[Website](#) | [Facebook](#) | [Twitter](#) | [YouTube](#)

Appendix 5 – Runoff Calculations

ReFH2 Greenfield Runoff Estimate
Calculation Sheet

Site Name	Southampton Street
Site Location	Reading
X (Eastings)	471720
Y (Northings)	172803
Engineer	AP
Checked by	DH
Reference	WHS1824
Revision	1
Date	15-Dec-20

Site Description

Total Area (ha)	0.078
Existing Developed area (ha)	0.078
SAAR (mm)	638
PROPWET(mm)	0.29
BFIHOST	0.77

Rainfall Parameters

Duration (hh:mm:ss)	03:30:00
Timestep (hh:mm:ss)	00:30:00
SCF (Seasonal correction factor)	0.99
ARF (Areal correction factor)	1 [1]
Seasonality	Summer

Loss Model Parameters

Cini (mm)	36.52
Cmax (mm)	860.65

Routing Parameters

Tp (hr)	0
Up	0.65
Uk	0.8

Baseflow Parameters

BFO (m³/s)	0
BL (hr)	55.35 [33.88]
BR	2.9

Growth Curves and
Discharge rates

Event	Q/Qmed	Q (l/s)	Q (l/s/ha)
Q1	-	1.05	13.41
Q2	1.00	1.21	15.52
Q30	2.17	2.63	33.71
Q100	2.73	3.30	42.32
Q200	3.10	3.76	48.17
Q1000	4.34	5.26	67.42