Drainage Strategy Report

18-23 Hand Court
High Holborn Estate
SRG Holborn Ltd.

26th September 2018


HAND COURT

Contents

Appendices

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1. Introduction

Heyne Tillett Steel Ltd have been instructed by SRG Holborn Limited to undertake a Drainage Strategy Report for the proposed development at 18-21 Hand Court, High Holborn Estate in the London Borough of Camden.

2. Site Description

2.1 Existing Development

The existing site is approximately 0.045 ha (450 m^2) in size and is at National Grid Reference TQ308816 as shown in Figure 1.

The existing building comprises of a basement (125 m^2 office use), ground floor (305 m^2 office use), first floor (222 m^2 office use), second floor (123 m^2 office use) and roof.

2.2 Proposed Development

The proposed development is rectangular on plan and consists of a new five storey reinforced concrete structure over a single storey basement. At fourth floor level, the building envelope steps in to create an external terrace. Basement is retail and plant/ancillary space, ground floor is predominately retail space with a UKPN substation and the office entrance, first floor and above is office accommodation.

A copy of the proposed site plans is included as Appendix A of this report.

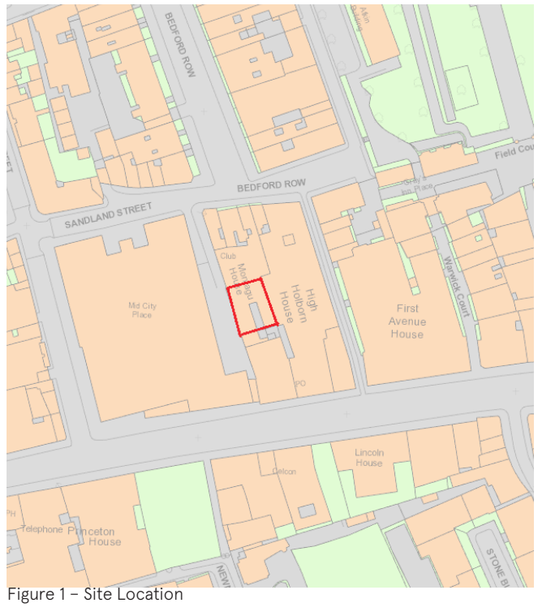

Figure 1 – Site Location

3. Policy and Statutory Requirements

The report aims to incorporate and demonstrate compliance with the following national, regional and local planning policy guidance and statutory requirement as far as reasonably possible.

- National Planning Policy Framework (NPPF) – March 2012
- National Planning Practice Guidance (NPPG) – March 2014
- The London Plan - March 2016
- Camden Local Plan – Policy CC3

Policy CC3 – Water and flooding

The Council will seek to ensure that development does not increase flood risk and reduces the risk of flooding where possible.

We will require development to:

a. incorporate water efficiency measures;
b. avoid harm to the water environment and improve water quality;
c. consider the impact of development in areas at risk of flooding (including drainage);
d. incorporate flood resilient measures in areas prone to flooding;
e. utilise Sustainable Drainage Systems (SuDS) in line with the drainage hierarchy to achieve a greenfield run-off rate where feasible; and
f. not locate vulnerable development in flood-prone areas.

Where an assessment of flood risk is required, developments should consider surface water flooding in detail and groundwater flooding where applicable.

4. Existing Drainage

4.1 Public Drainage

The Thames Water asset map indicates that the closest sewer to the site is a 225 mm combined sewer underneath Hand Court to the west of the site. The levels of the sewer were interpolated as approximately 20.245m, at the location of the new proposed connection (described in further sections).

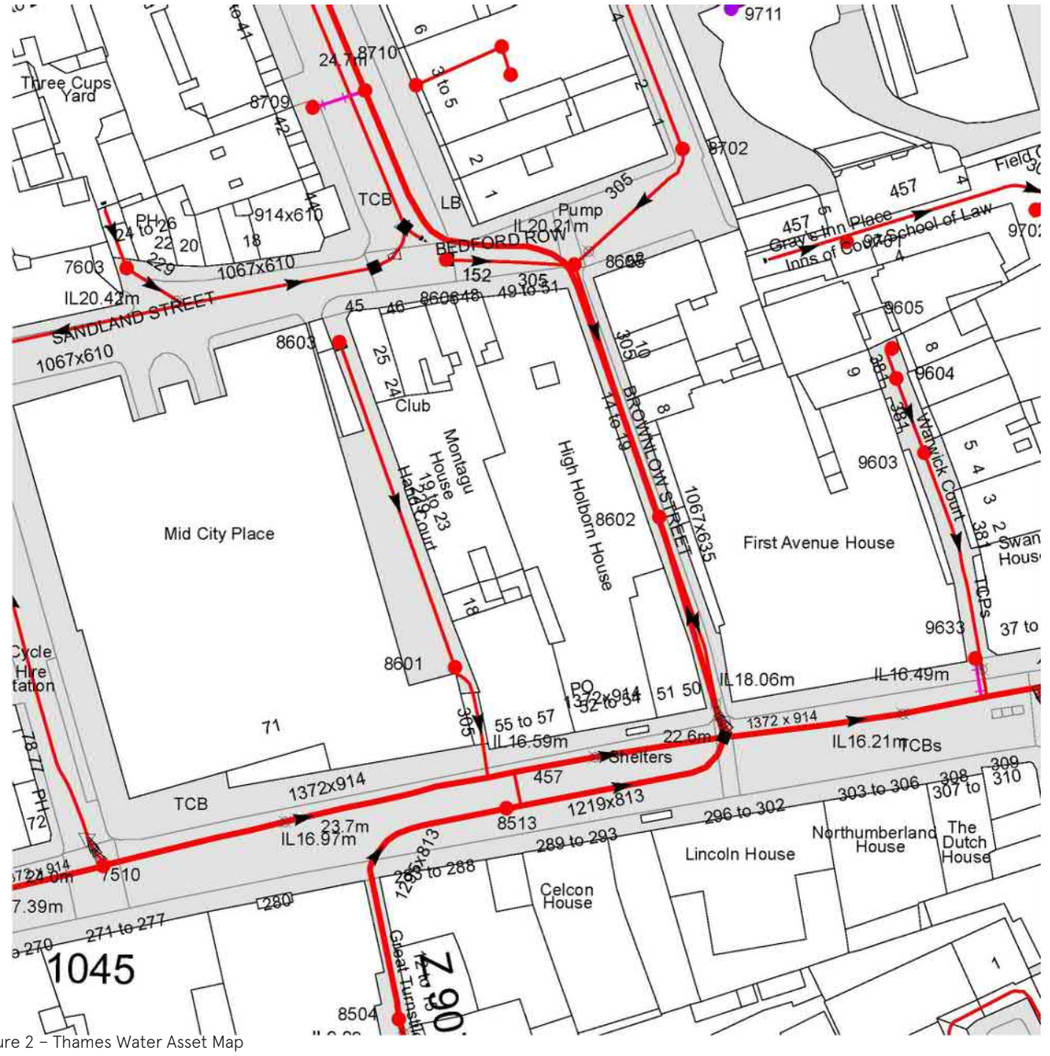

Figure 2 – Thames Water Asset Map

4.2 Private Drainage

A CCTV survey was undertaken by Spaflow Ltd in March 2017. It confirms that the existing drainage layout is a combined system as it receives connections from foul and surface water drainage. The existing building drainage pipe work is of cast iron with the outfall having a 150 mm diameter and made of vitrified clay. The outfall pipe is approximately 2.83 m in length from MH22 to public sewer.

Due to lowering of the level of existing basement, the existing drainage network is considered unusable and will be removed. The proposals are to construct a new sewer connection at high-level basement, to allow for connection of a new suitable drainage system.

A copy of the existing drainage layout and CCTV drainage survey are included as Appendix B of this report.

5. Flood Risk

5.1 Planning Policy Context

The latest Gov.uk Flood Zone maps show that the siteis in Flood Zone 1 - an area with a low probability of flooding.

As confirmed by the SWMP the site is located in a Critical Drainage Area (CDA), Group3_003.

The risk of flooding to the site will be assessed in accordance with the technical guidance document to the National Planning Policy Framework (NPPF) and the National Planning Policy Guidance (NPPG) for flood risk and coastal change.

Table 2 of the technical guidance document to the NPPF states that the flood risk vulnerability classification of the existing and proposed development is "Less Vulnerable"

Less vulnerable

· Police, ambulance and fire stations which are not required to be operational during flooding.

· Buildings used for shops, financial, professional and other services, restaurants and cafes, hot food takeaways, offices, general industry, storage and distribution, non-residential institutions not included in "more vulnerable", and assembly and leisure.

· Land and buildings used for agriculture and forestry.

· Waste treatment (except landfill and hazardous waste facilities).

· Minerals working and processing (except for sand and gravel working).

· Water treatment works which do not need to remain operational during times of flood.

· Sewage treatment works (if adequate measures to control pollution and manage sewage during flooding events are in place).

NPPF Table 2 – Flood risk vulnerability classification

Flood risk vulnerability classification	Essential infra-structure	Water com-patible	Highly vulner-able	More vulner-able	Less vulnerable
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	✓	Exception Test required	✓	✓
Zone 3a	Exception Test required	✓	x	Exception Test required	✓
Zone 3b func-tional flood-plain	Exception Test required	✓	x	x	x

NPPF Table 3 – Flood risk vulnerability and flood zone 'compatibility'

Key: ✓ Development is appropriate.
x Development should not be permitted.

Table 3 above confirms that the development is appropriate and the Sequential and Exceptions Test are therefore passed.

6. Sources of flooding

6.1 Flooding from Rivers and Sea

The latest Gov.uk flood zone maps (Appendix C) show that the site is located in Flood Zone 1 – an area with a low probability of flooding.

The technical guidance document to the National Planning Policy Framework (NPPF) states that this zone comprises land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%). Therefore the risk of flooding from rivers and sea is considered low.

6.2 Flooding from Surface Water

Surface water flooding can occur as a result of either overland flow or ponding. Overland flow occur following heavy or prolonged rainfall, or snow melt, where water can no longer be absorbed on the surface and results in surface run-off. Unless it is channelled elsewhere, the run-off travels overland, following the natural gradient of the land. Ponding occurs as the overland flow reaches natural depressions or blockages in the local topography.

The Gov.uk flood risk from surface water map (Figure 3), shows that most of the site is not at risk of surface water flooding with only patches of low risk area shown within proximity of the site. It appears to be located on top of the proposed roof of the building.

The development will drain the entire site – with water from roofs attenuated and discharged into the neighbouring public sewer. There will be no undrained areas, therefore the risk of surface water flooding is low.

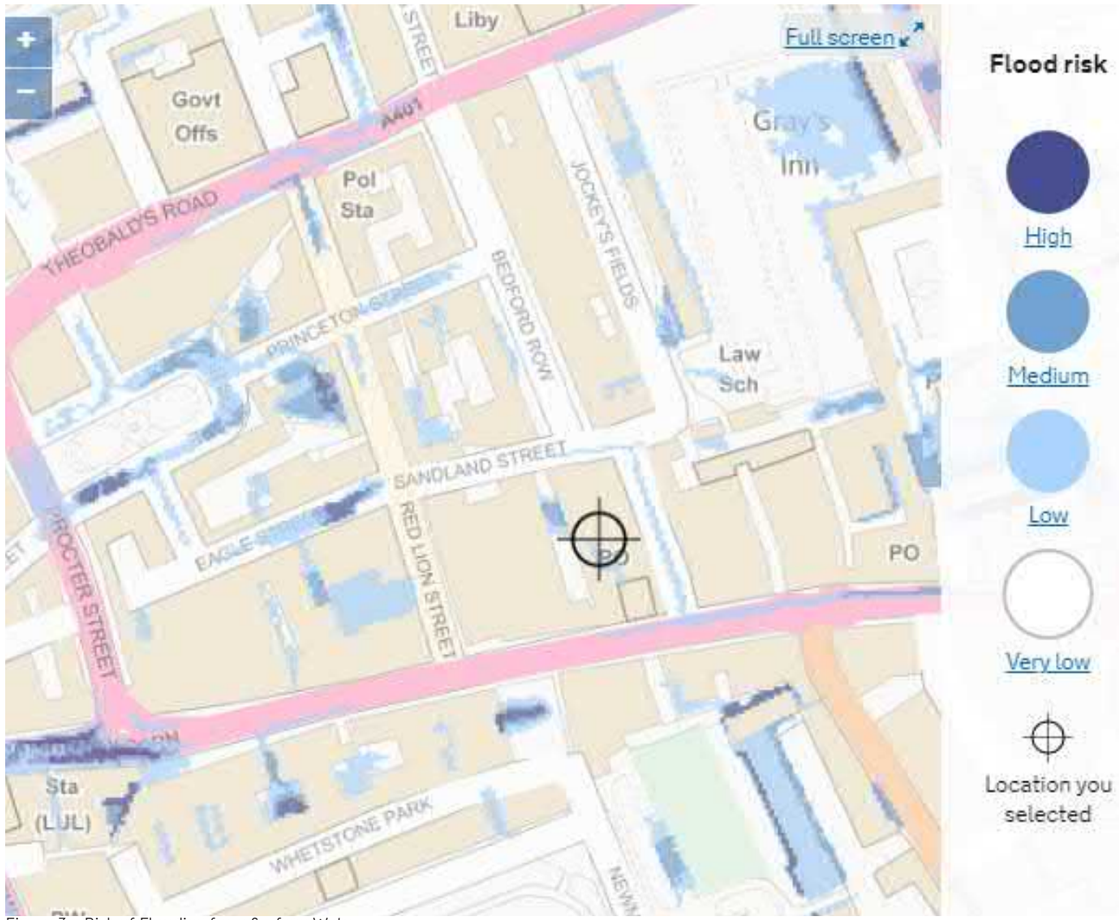

Figure 3 - Risk of Flooding from Surface Water

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6.3 Flooding from Groundwater

Groundwater flooding can occur on sites which are located on permeable ground. After a prolonged period of rainfall, a considerable rise in the water table can result in inundation for extended periods of time.

Mapped information included in the LBC's SFRA shows that the site is not located in an area where there is increased susceptibility for elevated groundwater. A copy of this map is located in Appendix C.

Therefore, the flood risk from groundwater is low.

6.4 Flooding from sewers

Sewer and highway drainage flooding occurs when the capacity of systems is exceeded, or the function of the system is impeded (e.g. tide locking), which results in the surcharging and/or failure of the system and water being forced to the surface via gullies, manholes, dedicated overflows or connected infrastructure (e.g. toilets).

The Thames Water asset map indicated that the closest sewer to the site is a 225 mm combined sewer underneath Hand Court to the west of the site. The sewer originates in Hand Court, it is therefore very unlikely to ever be surcharged (as it is the head of the run). No sewer flooding is recorded nearby the proposed development, as demonstrated in LBC's SFRA (Appendix C).

The site is located Critical Drainage Area 'Group3_003' but there are no designated Local Flood Risk zones located nearby. The relevant maps can be found in Appendix C.

The risk of flooding from sewers is therefore low.

6.5 Flooding from Reservoirs and Artificial Sources

There are no artificial water sources near the site which pose a risk of flooding. Figure 4 below shows that the site is not at residual risk of flooding from reservoirs. Therefore, the risk of flooding from reservoirs and artificial sources is low.

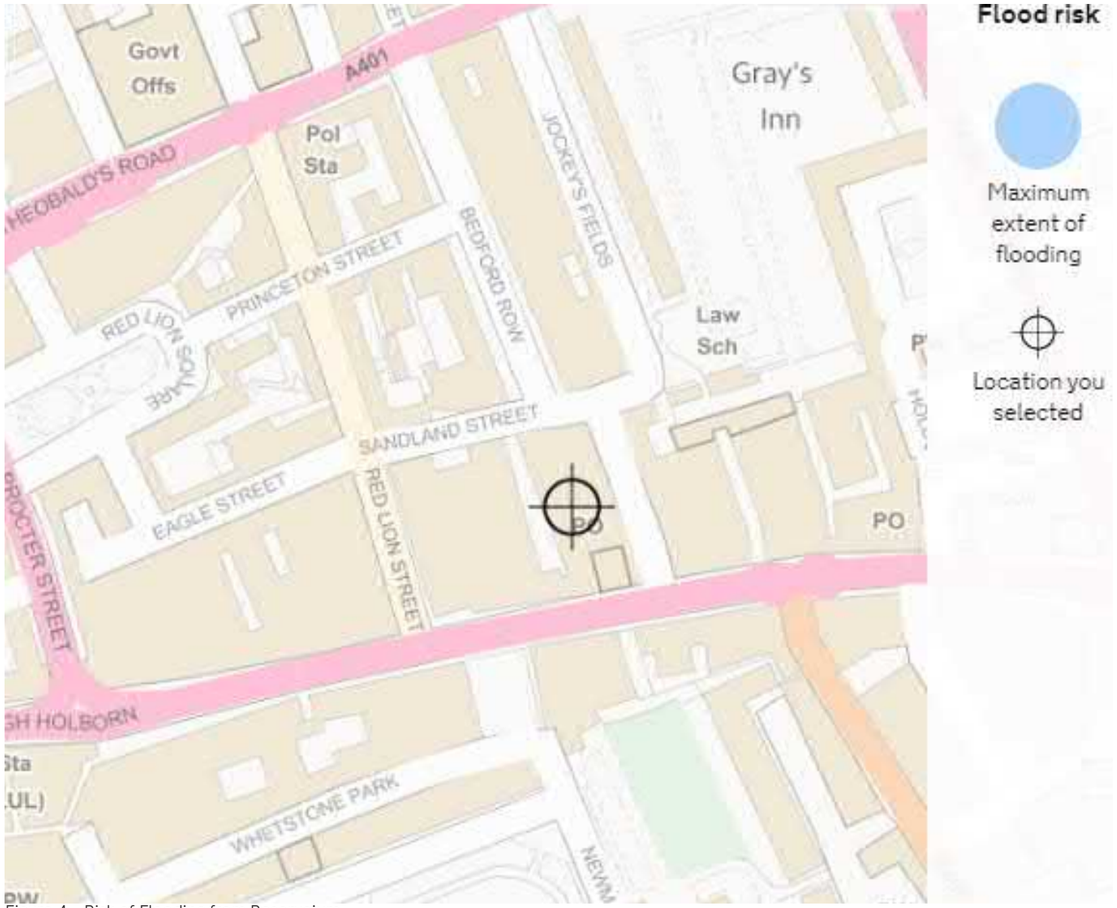

Figure 4 - Risk of Flooding from Reservoiurs

7. Surface Water Hierarchy

The design will be in accordance with BS EN 752 – Drain and Sewer Systems Outside Buildings and Approved Document H to the Building Regulations.

The site area is 450 m^2 which consists entirely of the building footprint. The drainage strategy report will focus on managing the surface water runoff from the site.

In line with the Building Regulations and the forthcoming National Standards for Sustainable Drainage Systems, the following hierarchy of surface water disposal should be adhered to, in decreasing order of preference:

- Store rainwater for later use
- Use infiltration techniques, such as porous surfaces in non-clay areas
- Attenuate rainwater in ponds or open water features for gradual release
- Attenuate rainwater by storing in tanks or sealed water features for gradual release
- Discharge rainwater direct to a watercourse
- Discharge rainwater to a surface water sewer/ drain
- Discharge rainwater to the combined sewer

Store rainwater for later use

Due to the nature and scale of the proposed development it is deemed not appropriate to store rainwater for later use, due to space constraints. Therefore, this method of surface water disposal is not suitable.

Infiltration techniques

Ground conditions are not suitable for the use of infiltration, in addition, the building footprint takes up the entire site area, therefore this method of surface water disposal is not suitable

Attenuate rainwater in ponds or open water features for gradual release

This part of London is highly urbanised with no ponds or open water features near the site. Therefore, this method of surface water disposal is not suitable.

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

Proposals are to store water in a blue and green roof systems and release slowly to the public sewer therefore this method of surface water disposal is a viable option.

Discharge rainwater direct to a watercourse
There are no water courses in close proximity to the site therefore this method of surface water disposal is not suitable.

Discharge rainwater to a surface water sewer/drain

There is no surface water sewer located near the site. This is not a viable method for disposal of surface water from the site.

Discharge rainwater to the combined sewer

There is a combined sewer located in Hand Court where the existing site discharges to via a 150 mm out-fall. Discharging rainwater to the combined public sew-er is therefore a viable option for this development.

8. Proposed Surface Water Drainage

The proposed surface water drainage strategy for the site has been developed based on the following design standards aimed at providing a sustainable drainage system:

- Building Regulations 2010 – Part H (Drainage and Waste Disposal)
- Sewers for Adoption 7th Edition
- BS EN 75, BS EN 12056
- CIRIA (C753) – The SuDS Manual
- Camden Planning Guidance 1

The new proposed connection will have to be a high-level connection - proposed level of the basement (20.870m) is too close to the invert level of the existing Thames Water sewer (20.245m) to allow for below ground connection.

The proposals are to route the surface water at high level towards the new outlet and discharge all surface water from site via gravity.

8.1 Greenfield Runoff Rates

Greenfield runoff rate (Q_{bar}) was calculated using MicroDrainage software as 0.2 l/s. Extract from MicroDrainage can be seen in appendix D.

8.2 Pre-development Runoff Rates

The total site area is approximately 450 m^2 and is currently 100% hard standing. In accordance with the Modified Rational Method, the peak existing run-off from the site is calculated from the formula:

$Q = 3.61 \times C_V \times i \times A$

where C_V is the volumetric runoff coefficient, A is the catchment area in hectares and i is the peak rainfall intensity in mm/hr.

For the peak 1 in 1-year return period storm event this gives an existing discharge rate from the site of:

$Q_1 = 3.61 \times 1.00 \times 33.2 \times 0.045 = 5.4$ l/sec

and for the peak 1 in 30-year return period storm event this gives an existing discharge rate from the site of:

$Q_{30} = 3.61 \times 1.00 \times 81.5 \times 0.045 = 13.2$ l/sec

and for the peak 1 in 100-year return period storm event this gives an existing discharge rate from the site of:

$Q_{100} = 3.61 \times 1.00 \times 105.7 \times 0.045 = 17.2$ l/sec

8.3 Post-development Runoff Rates (Unmitigated)

The proposed development also contains 100% impermeable area therefore, again using the Modified Rational Method, the proposed peak run-off for the peak 1 in 1-year return period storm event this gives an existing discharge rate from the site of:

$Q_1 = 3.61 \times 1.00 \times 33.2 \times 0.045 = 5.4$ l/sec

and for the peak 1 in 30-year return period storm event this gives an existing discharge rate from the site of:

$Q_{30} = 3.61 \times 1.00 \times 81.5 \times 0.045 = 13.2$ l/sec

and for the peak 1 in 100-year return period storm event plus 40% climate change this gives an existing discharge rate from the site of:

$Q_{100\ +40\%\ CC} = 3.61 \times 1.00 \times 105.7 \times 0.045 \times 1.4 = 24$ l/sec

8.4 Post-development Runoff Rates (Mitigated)

Proposals are to restrict the surface water runoff from the proposed development to 4.0 l/sec which will require approximately 15.3 m^3 of storm water attenuation to accommodate the 1 in 100-year plus 40% climate change event.

A copy of the SuDS Proforma is included as Appendix E.

8.5 Volume of Runoff from site

Volume of runoff was calculated using MicroDrainage software for 6-hour storms for up to 1 in 100-years plus 40% climate change events, results can be seen in the table below:

Storm Event	Existing Vol.	Proposed Vol.
1 in 1-year	8.1	8.1
1 in 30-year	18.0	18.0
1 in 100-year	23.3	23.3
1 in 100-year + 40% CC	N/A	32.7

As the site catchment area does not change and infiltration & other methods of reducing volume of runoff are not suitable for this site, the existing and proposed volumes of runoff are the same for all storm events.

All surface water calculations can be found in Appendix D.

9. Proposed Foul Water Drainage

9.1 Design Standards

The design of the foul water drainage will be in accordance with:

- BS EN 752 (Drain and sewer systems outside buildings. Pumping Installations)
- BS EN 12056 (Gravity drainage systems inside buildings)
- Building Regulations 2010 – Approved Part H
- Sewer for Adoption 7th Edition

As described in the previous section, new outfall from site will be located at high level basement.

The proposals are that all foul water drainage from above the basement level will be routed at high level towards the new outfall via gravity. Below ground drainage located at basement level will be pumped to high level, from where it will discharge by gravity towards the new outfall.

Proposed drainage layout can be seen in appendix F.

9.2 Existing Flows

The existing site comprises of a building with office use only. Using the existing drawings, the peak foul flow has been calculated for the site and is estimated as 2.59 l/sec using a frequency factor of 0.5 for offices.

9.3 Proposed Flows

The proposed peak foul flow has been assessed as 5.45 l/sec however this is based on preliminary design information and may vary slightly as the design process moves forward. The proposed foul flow based on BS 12056-2:2000 using a frequency of factor of 0.5 for office/retail.

The flow from drainage appliances at basement level – routed towards the pump – was calculated as 1.93 l/s, using the method above. The flow from appliances above the basement level was calculated as 3.52 l/s.

Although there is an increase in FW discharge, the neighbouring combined sewer is expected to have required capacity as the development offers an overall reduction in discharge rates for both foul and surface water. This was confirmed by a TW predevelopment application confirming capactiy within the neighbouring sewer.

All foul water calculations can be found in appendix G.

10. Conclusion

The flood risk assessment has been prepared in accordance with NPPF, Guidance for Flood Risk and Coastal Change and regional and local planning policy guidance. The best available information has been used to assess each risk. All sources of flooding have been assessed as low risk.

The site will require a new combined connection to the 225 mm Ø public sewer located in Hand Court, as the existing connection is not suitable for re-use.

Proposals are to restrict the surface water runoff from the proposed development to 4.0 l/sec which will require approximately 15.3 m^3 of storm water attenuation to accommodate the 1 in 100-year plus 40% climate change event. Restricting the proposed runoff rates to 4.0 l/sec is a significant betterment of 77% over the existing system.

The proposed foul flow rate of 5.45 l/sec provides an increase of 2.86 l/sec from the existing case, however the sewer has sufficient capacity, confirmed by TW predevlopment appliction.

Appendix A

Proposed Site Plans

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