ARUP

Colt Data Centre Services

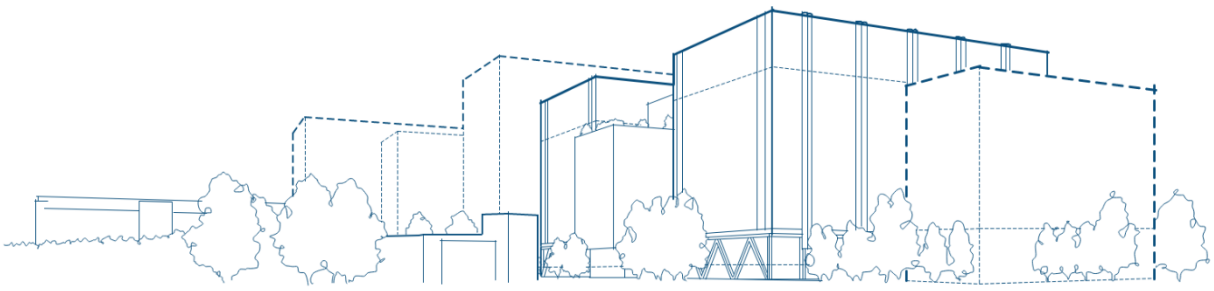
HDP Masterplan

Drainage Strategy

Reference: LONUX-ARUP-SW-LP-RP-C-52001

P01 | 14 March 2025

Status: S3



Job number 304472

Ove Arup & Partners Limited
Central Square
Forth Street
Newcastle upon Tyne
NE1 3PL
United Kingdom
arup.com

ARUP

Document Verification

Project title	HDP Masterplan
Document title	Drainage Strategy
Job number	304472
Document ref	LONUX-ARUP-SW-LP-RP-C-52001
File reference	04-05-03

Revision	**Date**	**Filename**	LONUX-ARUP-SW-LP-RP-C-52001		
P01.01	28/02/2025	**Description**	Preliminary Issue		
			Prepared by	**Checked by**	**Approved by**
		Name	Chris Heath	Jamie Temple	Gordon Mungall
		Signature			
P01	14/03/2025	**Filename**	LONUX-ARUP-SW-LP-RP-C-52001		
		Description	For Planning		
			Prepared by	**Checked by**	**Approved by**
		Name	Chris Heath	Jamie Temple	Gordon Mungall
		Signature			
		Filename			
		Description			
			Prepared by	**Checked by**	**Approved by**
		Name			
		Signature			

Issue Document Verification with Document ☑

Contents

Tables

Figures

Appendices

1. Introduction

Ove Arup & Partners Limited (Arup) has been commissioned by Colt Data Centre Services to provide Civil and Structural Engineering design services for the proposed Hayes Digital Park (HDP) Masterplan.

This drainage strategy sets out the drainage proposals for the project. Flood risk is addressed in a separate report.

A copy of The London Sustainable Drainage Proforma has been completed to accompany this application, and is included in Appendix A.

2. Project and site details

2.1 Location

The site is situated in the Hayes Bridge Retail Park and Heathrow Interchange, Hayes, UB4 0RH in the London Borough of Hillingdon (LBH).

2.2 Site description and overview

Colt secured planning permission from LBH in 2022 for the redevelopment of the former Trinity Data Centre, Veetec Building, and Tudor Works sites at Beaconsfield Road in Hayes to deliver two data centre buildings (alongside substation and tank rooms) which together provide more than 37,000sqm of floorspace (ref. 38421/APP/2021/4045).

Since the granting of planning permissions for Buildings 1 and 2 (ref. 38421/APP/2021/4045), Colt has acquired Heathrow Interchange and Hayes Bridge Retail Park. The southern boundary of Heathrow Interchange immediately abuts the northern boundary of the site that Colt is presently redeveloping.

The proposed site sits as part of a wider commercial area which is broadly bound to the north by Uxbridge Road, the west by Springfield Road (and Minet Country Park), to the east by the Yeading Brook, and to the south by Beaconsfield Road. The broader area comprises of a mix of commercial operations with retail uses located predominantly in the northern part and industrial, storage, and manufacturing operations across much of the central and southern areas.

The site consists of two distinct parts which together have a site area of approximately 4.4ha but are separated from each other by Bullsbrook Road, an adopted highways which serves other premises within the wider commercial area.

On the northern side of Bullsbrook Road is Hayes Bridge Retail Park. The Hayes Bridge Retail Park consists of a terrace of seven retail units and a standalone commercial bank (Metro Bank) set around a central surface car park which is accessed from the Uxbridge Road. The majority of these units are vacant. It is anticipated that demolition of units within the retail park (save for Metro Bank) will take place whilst this application is being considered in accordance with an application for prior notification of demolition.

To the south of Bullsbrook Road and Hayes Bridge Retail Park is Heathrow Interchange. Heathrow Interchange consists of a series of industrial units arranged into two parallel terraces which are orientated north-south and separated from each other by an open yard with parking and vehicle turning which is served by Bullsbrook Road. Each terrace is split into two units so that there are four units within Heathrow Interchange. Prior notification of demolition of Unit 1 (ref. 71554/APP/2024/2490) and it is envisaged that the unit will be demolished whilst this application is being considered. There is a live application for planning permission for a substation in this location (ref. 71554/APP/2025/47). Unit 2, the southern unit on the eastern terrace, is outside of Colt's ownership and is excluded from this application.

2.3 Overview of development

Colt is progressing an application for hybrid planning permission. This consists of full planning permission for a data centre building (to be known as LON6) and outline planning permission for two further data centre buildings (to be known as LON7 and LON8) and the Innovation Hub.

LON6, LON7, and the Innovation Hub are to be located on the site of Hayes Bridge Retail Park with LON8 (and the substation for which there is a separate application for full planning permission for) to be located on the site of Heathrow Interchange.

The Metro Bank building and use in the northeast corner of the site will be retained.

Figure 1 below shows the site location, with the proposed site in red.

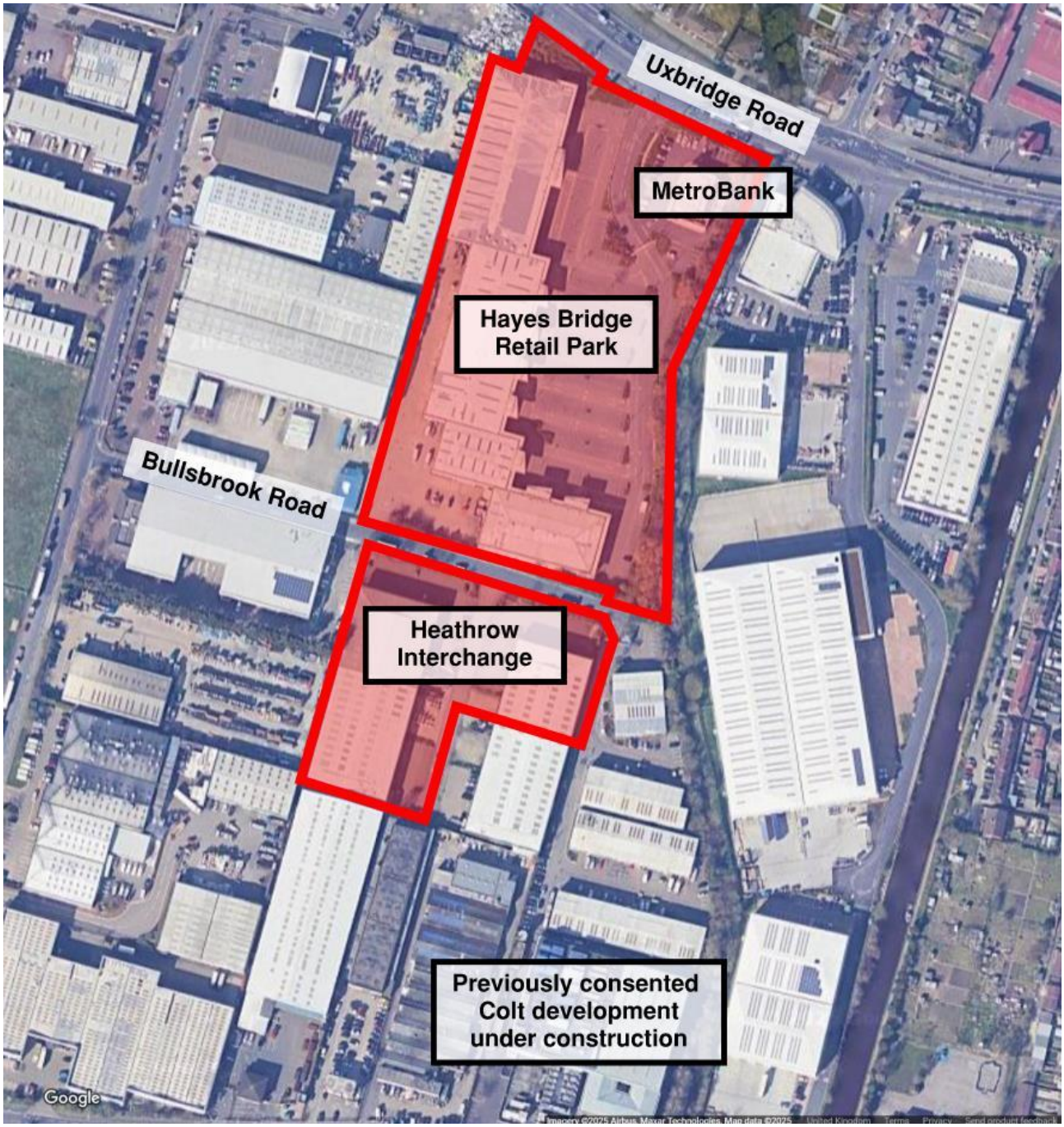


Figure 1 - Site Location

Total site area excluding Bullsbrook Road Substation is approximately 4.4ha. This comprises 1.8ha subject to a full planning application, and 2.6ha subject to an outline planning application.

Figure 2 below shows the proposed site layout.

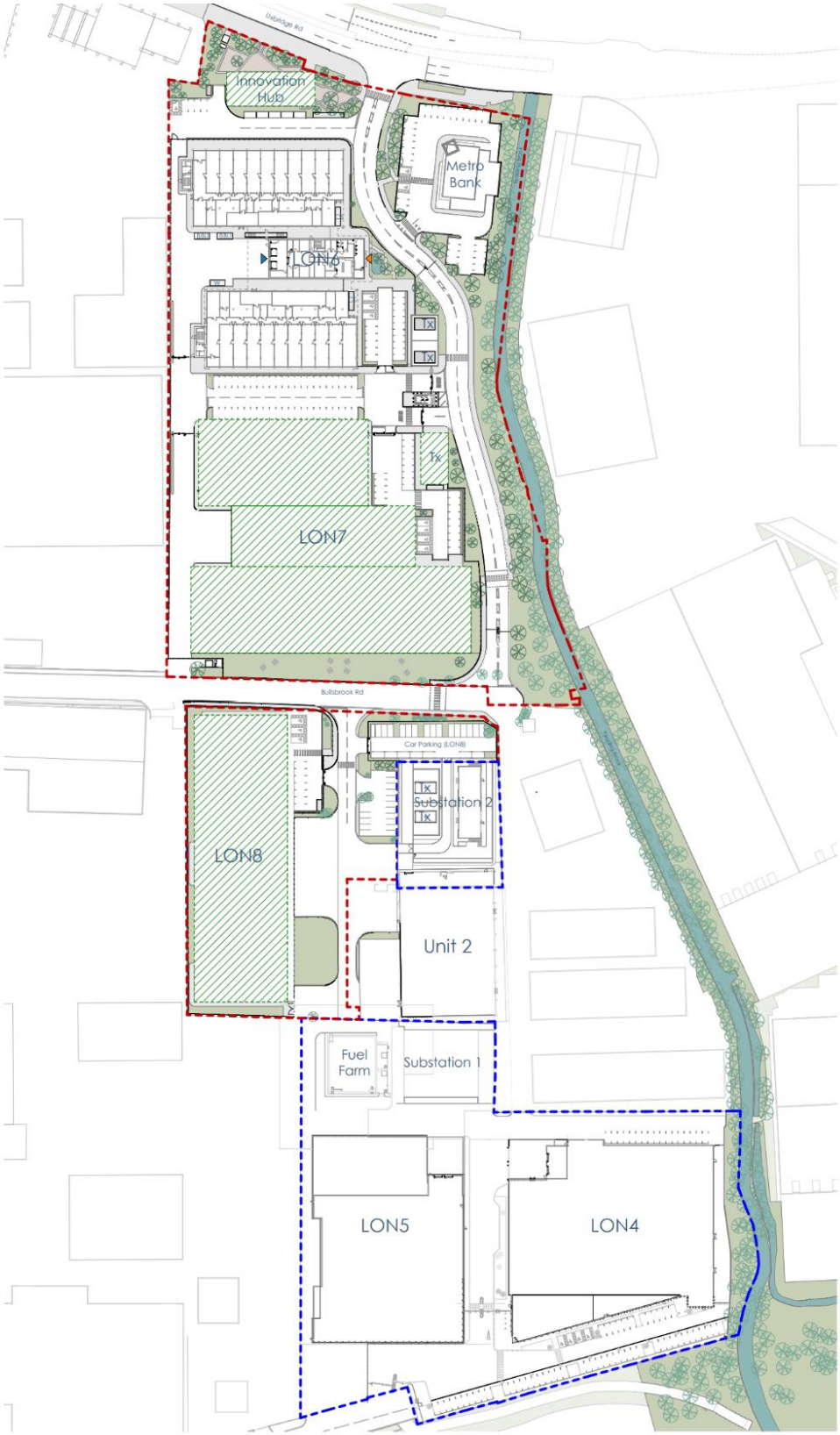


Figure 2 - Site Layout

A proposed site plan is also included in 0.

2.4 Existing topography

Topographical and ground penetrating radar (GPR) surveys were undertaken in 2021 by Greenhatch Group and 2022 by Catsurveys.

For Hayes Bridge Retail Park, levels are relatively flat, ranging from 29m in the centre of the site to 30m at the Uxbridge Road entrance and southwestern corner.

For Heathrow Interchange site levels are also generally flat, varying form approximately 28.8m to approximately 29.5m. The lowest levels are to the southeast corner.

A copy of the topographical/ground penetrating radar surveys are included in Appendix B.

2.5 Existing Drainage

2.5.1 Public sewerage

Thames water records indicate public foul and surface water sewers located in Bullsbrook Road and Uxbridge Road. Thames water records are included in Appendix C and are summarised below.

2.5.1.1 Foul water

In Bullsbrook Road, the foul water sewer is indicated as flowing in an east to west direction, and is 225mm in diameter.

In Uxbridge Road, the foul water sewer is indicated as flowing in an east to west direction, and is 225mm in diameter.

2.5.1.2 Surface water

In Bullsbrook Road, the surface water sewer is indicated as flowing in a west to east direction, and is 825mm in diameter reducing to 600mm in diameter before outfalling to Yeading Brook.

In Uxbridge Road, surface water sewers are 375mm in diameter and flow in a west to east direction, outfalling to Yeading Brook to the north of the site.

2.5.2 Private drainage

Private foul and surface water drainage across the development site is extensive, and summarised below.

2.5.2.1 Foul water

The site is served by a largely separate drainage system. For Hayes Bridge Retail Park, foul water discharges to the existing Thames Water foul water public sewers in Uxbridge Road and Bullsbrook Road.

For Heathrow Interchange, foul water discharges to the existing Thames Water foul water public sewer in Bullsbrook Road. Foul water private drainage is 150mm in diameter.

2.5.2.2 Surface water

For Hayes Bridge Retail Park, surface water discharges to Yeading Brook to the east. Surface water private drainage ranges from 150mm to 525mm in diameter. Records indicate that a light liquid separator is provided to the storm water system prior to the outfall to Yeading Brook.

For Heathrow Interchange, surface water discharges to Yeading Brook to the east. Surface water private drainage ranges from 150mm to 450mm in diameter. Records indicate that a light liquid separator is provided to the storm water system prior to the outfall to Yeading Brook.

2.5.2.3 Outfalls

Existing outfalls will be retained. For Hayes Bridge Retail Park, drainage from the MetroBank will also be retained. For Heathrow Interchange, drainage serving retained industrial units will also be retained. The existing outfall is also used for the Bullsbrook Road substation development.

3. Proposed storm water drainage

The storm water drainage has been developed in line with national and local policy, recognising site constraints.

The design approach for the storm water drainage system was discussed in a meeting held with Metis, on behalf of the LLFA, on 24th October 2024. Correspondence and minutes of the meeting are included in Appendix D.

3.1 Drainage hierarchy

In accordance with the CIRIA SuDS Manual (C753) and National Planning Practice Guidance storm water disposal should follow the hierarchy of discharge:

1st. Discharge to the ground

2nd. Discharge to a watercourse

3rd. Discharge to a surface water sewer/drain

4th. Discharge to a combined sewer

Geotechnical investigations (GI) were carried out during late 2021 for the adjacent LON4 data centre development site.

GI demonstrated that the site sits above London Clay which is present at varying depths of circa 2-12m below ground level. The site investigation suggests variable geology on site, with the presence of a possible drift filled hollow identified due to an increased presence of superficial deposits identified in the northwest corner of the site. In addition to this, water seepage has also been identified throughout the London Clay. This poses the risk of hydraulic continuity between the upper and lower aquifer which is to be confirmed by the outstanding groundwater monitoring.

It is considered that due to variable water levels, infiltration rates and potential contamination from spilled fuels and chemicals, it is not appropriate to discharge storm water via infiltration.

The existing storm water outfall to Yeading Brook passing through the north of the development site will therefore be used for the disposal of storm water.

3.2 Discharge restrictions

3.2.1 Planning policy

LBH Local Plan Part 2 Policy DMEI 10 states that:

"All major new build developments, as well as minor developments in Critical Drainage Areas or an area identified at risk from surface water flooding must be designed to reduce surface water run-off rates to no higher than the pre-development greenfield run-off rate in a 1:100-year storm scenario, plus an appropriate allowance for climate change for the worst storm duration. The assessment is required regardless of the changes in impermeable areas and the fact that a site has an existing high run-off rate will not constitute justification"

In accordance with LBH criteria, a major development has a site boundary of 1ha or greater. The development area is 4.4ha. The development is therefore considered a major development, and the above policy applies.

The development is not located in a Critical Drainage Area.

LBH flood maps do not identify the development to be in an area at risk of surface water flooding.

3.2.2 Pre-development flow rates

3.2.2.1 Hayes Bridge Retail Park

For Hayes Bridge Retail Park, the development is predominantly impermeable and drained. The exceptions are small planting beds, and area to the east of the access road that borders Yeading Brook. Drainage from the Metro Bank also connects to the same network and outfalls to Yeading Brook through the Hayes Bridge Retail Park outfall. Drainage routes from the Metro Bank will be maintained, and the exiting Metro Bank drainage regime will be unaffected by the proposals. As such, this area has been discounted from existing runoff rate calculations.

Of the 4.4ha of total site area, 3.418ha lies within Hayes Bridge Retail Park. Area within the Hayes Bridge Retail Park development boundary can be split as follows:

- 0.585ha of permeable soft landscaping adjacent to Yeading Brook and area occupied by the Metro Bank, unaffected by the development proposals and discounted from greenfield runoff rate calculations.
- 2.833ha of impermeable drained building roof and external hardstanding, to be redeveloped and provided with a new drainage system.

Greenfield runoff rates for the impermeable area that will be redeveloped have been calculated using the Greenfield runoff rate estimation tool available on HR Wallingford's uksuds.com website. The tool uses the method set out in the Institute of Hydrology Report 124.

Using this method, greenfield runoff rates for various storm return periods are as follows:

Site	Area (ha)	Return Period (Years)	Greenfield Runoff Rate (l/s)
Hayes Bridge Retail Park	2.833	Q_{bar}	11.8
		1	10.03
		30	27.14
		100	37.64

Table 1 – Greenfield runoff rates – Hayes Bridge Retail Park

3.2.2.2 Heathrow Interchange

For Heathrow Interchange with the exception of planting beds, the existing development is impermeable and drained.

Of the 4.4ha of total site area, 1.188ha lies within Heathrow Interchange. Area within the Heathrow Interchange development boundary can be split as follows:

- 0.205ha of area occupied by the Bullsbrook Road sub-station development, unaffected by the development proposals.
- 0.103ha of hard surfacing, mainly the existing access road, where the existing drainage regime will remain unchanged by the development proposals.
- 0.880ha of new building roof and external area, to be redeveloped and provided with a new drainage system.

Greenfield runoff rates for the 0.880ha of redeveloped area have been calculated using the Greenfield runoff rate estimation tool available on HR Wallingford's uksuds.com website. The tool uses the method set out in the Institute of Hydrology Report 124.

Using this method, greenfield runoff rates for various storm return periods are as follows:

Site	Area (ha)	Return Period (Years)	Greenfield Runoff Rate (l/s)
Heathrow Interchange	0.880	Q_{bar}	3.67
		1	3.12
		30	8.43
		100	11.69

Table 2 – Greenfield runoff rates – Heathrow Interchange

3.3 Proposed drainage

The surface water drainage system has been designed in accordance with the recommendations set out in:

- BS EN 752:2017 - *Drain and sewer systems outside buildings - Sewer system management*, and
- The Building Regulations 2010, Approved Document H – *Drainage and waste disposal*.

Proposed drainage layouts for the development are included in Appendix G.

A new drainage system has been designed to ensure that flow rates do not exceed rates outlined in Table 2 and Table 2, Section 3.2.2, and where practical to do so reduce flow rates.

3.3.1 Drainage network modelling

The proposed drainage network has been modelled using InfoDrainage software.

The following constraints and assumptions have been applied:

- FEH point rainfall data for the site location has been obtained from the UK Centre for Ecology and Hydrology, Flood Estimation Handbook Web Service.
- Paved external surfaces and the building roofs have been modelled as 100% impermeable.
- The summer and winter volumetric runoff coefficients have been set at 1.
- Rainfall intensity has been increased by 40%, in line with climate change allowances set out current Environment Agency guidance.
- The drainage has been modelled and designed to the following storm events:
    - 1 in 30-year storm. – Designed for no flooding.
    - 1 in 100-year storm – Designed for no flooding to property.

With no restrictions applied to the model, predicted peak flow rates exceed the rates outlined in Table 1 and Table 2, Section 3.2.2.

3.3.1.1 Hayes Bridge Retail Park

Pre and post development flow rates are summarised in Table 3 below:

Return Period (Years)	Greenfield runoff rate (l/s)	Peak proposed flow rate, excl. climate change (l/s)	Peak proposed flow rate, incl. 40% climate change (l/s)
2*	11.8*	10.6	10.6
30	27.14	10.6	10.6
100	37.64	10.6	11.7

Table 3 – Pre and post development flow rates – Hayes Bridge Retail Park

* 1 in 2 year storm simulated as FEH rainfall used for modelling. Q_{bar} used for greenfield runoff rates.

The model predicts no flooding during the critical 1 in 30 year storm and negligible (<1m^3) flooding during the critical 1 in 100 year storm with climate change applied.

Runoff volumes have been calculated using InfoDrainage for the 1 in 100 year 360 minute storm. Catchment descriptors have been obtained from the UK Centre for Ecology & Hydrology FEH Web Service and used within the InfoDrainage Audit process. Greenfield runoff volume is calculated at 1141m^3. Post development runoff is calculated at 2677m^3. As infiltration is infeasible, and long term storage cannot be provided due to site constraints, all events up to and including the 1 in 100 year storm has been restricted to Q_{bar}.

Model results are included in Appendix F.

3.3.1.2 Heathrow Interchange

Pre and post development flow rates are summarised in Table 4 below:

Return Period (Years)	Greenfield runoff rate (l/s)	Peak proposed flow rate, excl. climate change (l/s)	Peak proposed flow rate, incl. 40% climate change (l/s)
2*	3.67*	3.0	3.0
30	8.43	3.0	3.0
100	11.69	3.0	3.6

Table 4 – Pre and post development flow rates – Heathrow Interchange

* 1 in 2 year storm simulated as FEH rainfall used for modelling. Q_{bar} used for greenfield runoff rates.

The model predicts no flooding during the critical 1 in 30 year and 1 in 100 year storms.

Runoff volumes have been calculated using InfoDrainage for the 1 in 100 year 360 minute storm. Catchment descriptors have been obtained from the UK Centre for Ecology & Hydrology FEH Web Service and used within the InfoDrainage Audit process. Greenfield runoff volume is calculated at 354m^3. Post development runoff is calculated at 815m^3. As infiltration is infeasible, and long term storage cannot be provided due to site constraints, all events up to and including the 1 in 100 year storm has been restricted to Q_{bar}.

Model results are included in Appendix F.

3.3.2 Sustainable drainage and water quality mitigation features

Consideration has been given as to how sustainable drainage features could be incorporated into the development.

Rainwater recovery and re-use has been incorporated into the development for toilet flushing and landscape irrigation requirements.

Green roofs have been incorporated where roof top plant allows.

Due to the operational demands of the development, planting and green space is limited. In addition, below ground utility routes are extensive, limiting the potential to provide deep SuDS features requiring under drains. A combined utility plan is included in Appendix H.

There is insufficient width and space to provide large open water features such as detention basins and swales.

A small pond has been incorporated into the development adjacent to LON6. Tree pits and small rain gardens receiving runoff from adjacent surfaces will be incorporated into the landscaping proposals where below ground utility constraints and operational demands permit.

Permeable surfaces have been provided to car parking areas. The surfaces will be concrete/grass or block paved, with a permeable sub-base. Permeable surfaces were considered for other trafficked areas but discounted due to anticipated heavy vehicle loading.

Below ground storage has been provided in the form of geocellular storage tanks.

The existing drainage systems for both Hayes Bridge Retail Park and Heathrow Interchange benefit from light liquid separators prior to the outfalls to Yeading Brook. Details of the separators are unknown, and as such additional full retention separators sized for the contributing catchments have been provided for new drained areas. The separators will be installed and alarmed in accordance with current regulations. Alarms will be connected to the Building Management Systems.

Fuel storage will be located in a watertight basement, with drainage managed via a pumped system. Water quality monitors will be in place to prevent the escape of hydrocarbons. All levels have been designed to contain runoff during fuelling, ensuring that any spillage is directed through a forecourt separator, sized to contain the maximum spill from a road tanker compartment (7,600 litres).

For fire-fighting purposes, a manual shut-off valve will be installed prior to the outfall into Yeading Brook. This will be closed in the event of a pollution incident or fire to ensure any fuel or firefighting water is contained within the site-wide attenuation system, where it will be tested before being either released or pumped out to a tanker. Approximately 2,500m^3 of storage volume is available within the geocellular storage tanks split across Hayes Bridge Retail Park and Heathrow Interchange.

4. Proposed foul water drainage

A new foul water drainage system has been provided to convey foul flows from proposed buildings to the exiting Thams Water public sewers in Uxbridge Road and Bullsbrook Road. Existing private connections to the public sewers will be retained and reused.