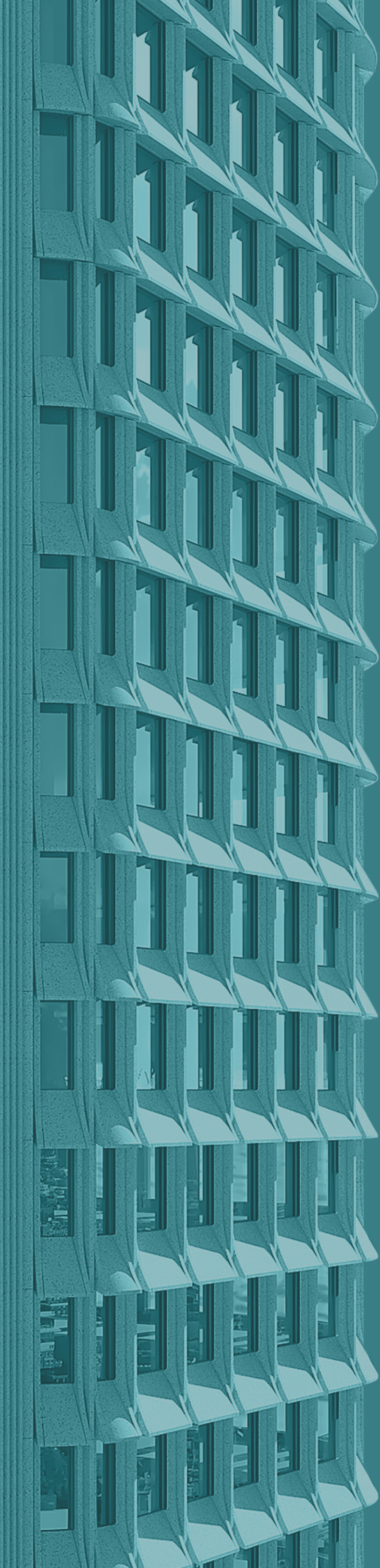


EUSTON TOWER

Drainage & SuDS Report Addendum

December 2024

British Land

ARUP

British Land Property Management Limited

Euston Tower

Drainage & SuDS Strategy Addendum

Reference: 281835-ARP-XX-XX-TN-CD-0002

04 | 10 December 2024

Job number 281835-00

Arup Limited
8 Fitzroy Street
London
W1T 4BJ
United Kingdom
arup.com

Document Verification

Project title	Proposed Development at Euston Tower
Document title	Drainage & SuDS Strategy Addendum
Job number	281835-00
Document ref	281835-ARP-XX-XX-TN-CD-0002
File reference	281835-ARP-XX-XX-TN-CD-0002.docx

Revision	**Date**	**Filename**	281835-ARP-XX-XX-TN-CD-0002.docx		
Issue 01	25/10/24	Description	First draft		
			Prepared by	**Checked by**	**Approved by**
		Name	Rob Belcher	Hamish Tozer	Kate Fletcher
		Signature			
Issue 02	26/11/24	**Filename**	281835-ARP-XX-XX-TN-CD-0002.docx		
		Description	First Issue		
			Prepared by	**Checked by**	**Approved by**
		Name	Rob Belcher	Hamish Tozer	Kate Fletcher
		Signature			
Issue 03	09/12/24	**Filename**	281835-ARP-XX-XX-TN-CD-0002.docx		
		Description	Updated following comment		
			Prepared by	**Checked by**	**Approved by**
		Name	Rob Belcher	Hamish Tozer	Kate Fletcher
		Signature			
Issue 04	10/12/24	**Filename**	281835-ARP-XX-XX-TN-CD-0002.docx		
		Description	Introduction updated		
			Prepared by	**Checked by**	**Approved by**
		Name	Rob Belcher	Hamish Tozer	Kate Fletcher
		Signature			

Issue Document Verification with Document ✓

Contents

Tables

Appendices

1. Introduction

This Drainage & SuDS Strategy Addendum summarises the revisions made to the pending strategic application for Full Planning Permission (ref. 2023/5240/P), submitted in December 2023 for the Proposed Development at Euston Tower (286 Euston Road, London).

The Applicant has undertaken extensive consultation during both the pre-application and determination stages of the Proposed Development and has sought to respond positively to the responses received. The scheme has been revised in response to feedback from Officers, local stakeholders and residents, the Regents Park Conservation Area Advisory Committee and statutory consultees, including Historic England and The Greater London Authority.

This Addendum has been prepared detailing the revisions to the pending scheme (the "Proposed Development"). For the avoidance of doubt, the Drainage & SuDS Strategy report which accompanied the December 2023 Submission is considered as read and this Addendum deals only with the 2024 Revisions and any updates to assessments as a result of these revisions. This Addendum also clarifies and provides further details responding to consultation responses received since the original submission in December 2023 and March 2024. Save where varied or supplemented in this Addendum, the content of the Drainage & SuDS Strategy remains valid and up to date.

The Description of Development for the Proposed Development, in light of the 2024 Revisions, has been updated to the following (additions in bold):

"Redevelopment of Euston Tower comprising retention of parts of the existing building (including central core, basement and foundations) and erection of a new building incorporating these retained elements, to provide a 32-storey mixed-use building providing offices and research and development floorspace (Class E(g)) and office, retail, café and restaurant space (Class E) and Enterprise space (Class E/ F) at ground and first, and associated external terraces; public realm enhancements, including new landscaping and provision of new publicly accessible steps and ramp; short and long stay cycle storage; servicing; refuse storage; plant and other ancillary and associated work."

2. Revised Surface Water Drainage Proposals

The revised drainage strategy included within this Addendum caters for surface water captured from within the building footprint and public realm (totalling approximately 0.79ha). The information below provides details of the estimated existing brownfield runoff rates, attenuation and discharge proposals and a review of appropriate SuDS that are considered viable based on the development proposals.

Public realm design, including provision of wetland and rain gardens, has been undertaken by DSDHA (Ref: Euston Tower – Landscape Statement). Proposals within this Drainage & SuDS Addendum have been prepared in line with public realm proposals by DSDHA however act independently and do not require any attenuation volume to be provided within public realm proposals.

2.1 Existing

2.1.1 Discharge Rates

Greenfield run off rates for this development have been calculated using FEH data and are detailed in the below table (calculations included within Appendix A). The greenfield runoff rates remain unchanged from the initial application and are provided for completeness only.

Table 1: Greenfield runoff rates

Rainfall Event	Greenfield Site Discharge Rate (l/s) (A=0.79ha)
1 in 1 Year	1.0
1 in 30 Year	2.8
1 in 100 Year	3.9
Qbar	1.2

Given this is a brownfield development, the modified rational method provides an estimate of existing surface water run-off rates from rainfall intensity.

Rainfall data has been obtained from Flood Estimation Handbook (FEH) online mapping to determine approximate existing discharge rates at the Site. The 60-minite storm durations were used within these calculations as typical duration storm events and the Rational Method applied:

Q = 2.78 CIA, where;

Q = flow (l/s);

C = runoff coefficient (1);

I = rainfall (mm/hr); and

A = catchment area (ha).

Table 2: Pre-development discharge rates

Rainfall Event	Intensity (mm/hr)	Total Existing Site Discharge Rate (l/s) (A=0.79ha)
1 in 1 Year	12.0	26.3
1 in 30 Year	37.3	81.9
1 in 100 Year	56.0	123.0

2.1.2 Point of Connection

A drainage survey has been undertaken by Plowman Craven in 2019 (Appendix B) which indicates a total of three connections into the existing TWUL combined sewers reaching the boundary of this application. Two are located along the east and are assumed to connect into Hampstead Road and one along the south which is assumed to connect within Euston Road.

2.2 Proposed

2.2.1 Surface Water Attenuation

A 380m^3 attenuation tank is proposed to be provided within the basement which is a reduced amount compared to the previous application however due to proximity constraints within the basement this is the maximum volume of attenuation feasible here. The attenuation feature will cater for rainfall captured in the public realm and on the roof of the building. Other forms of attenuation have been considered however are not deemed suitable, as explained in Table 5.

2.2.2 Discharge rates

It is proposed that runoff from the building and public realm is drained towards the attenuation tank and discharged at restricted rates into the existing Thames Water network, offering significant betterment upon the existing scenario, as it is not possible to restrict fully to greenfield runoff rates (refer to Table 5).

Discharge rates have been calculated to maximise the available storage at each return period event (calculations provided in Appendix C). The below table shows discharge rates at each storm event.

Table 3: Proposed discharge rates

Rainfall Event	Existing Site Discharge Rate (l/s)	Proposed Site Discharge Rate (l/s)	Betterment upon existing
1 in 1 Year	26.3	2.0	92%
1 in 30 Year	81.9	14.1	83%
1 in 100 Year +40% CC	123.0	39.0	68%

Flows are proposed to be restricted by the use of a pump, or series of pumps, which provides a restricted discharge rate and optimises overall storage requirements during different storm events through the use of multiple or variable-rate pumps.

Discussions with Thames Water regarding the proposed discharge rates are ongoing, however it is envisaged that these rates will pose no issue as they are significantly lower than existing. The proposals exceed Camden Council guidance which states where it is not possible to restrict to greenfield run off rate, a minimum of 50% betterment must be provided.

2.2.3 Discharge volumes

As the development is keeping the existing basement below the proposed public realm, it is not possible to decrease the impermeable area, and therefore it is not possible to reduce overall volume. However, it should be noted that there will be marginal reduction in discharge volume due to increases in green areas and tree planting.

2.2.4 Climate Change

Current NPPF Guidance stipulates that to allow for the predicted impacts of climate change on surface water runoff, increases to peak rainfall intensity should be used.

Table 4 is an extract from the updated government guidance in relation to climate change allowances for the London Management Catchment for the 1% annual exceedance event. For development with a lifetime beyond 2100 the upper end allowances should be assessed at both the 1% and 3.3% annual exceedance probability events for the 2070s epoch.

The development should be designed for the upper end allowance in the 1% annual exceedance probability event.

Table 4: Peak rainfall intensity allowance in small and urban catchments (use 1961 to 1990 baseline) (Source: Environment Agency Climate Change Guidance)

Annual Exceedance Probability Event	Allowance	Total potential change anticipated for the '2050s' (Development lifetime up to 2060)	Total potential change anticipated for the '2070s' (Development lifetime 2061 to 2125)
3.3%	Upper end	20%	35%
3.3%	Central	20%	40%
1%	Upper end	20%	40%
1%	Central	25%	40%

In line with Environment Agency guidance, an allowance of 40% for the effects of climate change to the year 2125 should be used to achieve the policy requirements for the proposed development.

As a result of including a 40% climate change allowance, the proposed surface water drainage strategy will serve to improve the resilience of the existing Site. This 40% increase in rainfall intensity has been applied to the calculations outlined in Table 3.

2.2.5 Opportunities for SuDS

Chapter 14 (paragraph 169) of the NPPF recommends that Sustainable Drainage Systems (SuDS) should be utilised, where possible, within all new drainage schemes. SuDS generally mimic the natural drainage patterns of an undeveloped site allowing infiltration into the ground (where feasible) and controlling outflow rates from the development. This reduces the impact and risk of flooding on downstream developments and can provide additional benefits such as pollution control, increased biodiversity and provision of water-based amenity space.

Table 5 below provides a detailed site-specific assessment of the suitability of a variety of SuDS considered within the proposed surface water drainage strategy.

Table 5: Detailed SuDS Suitability Appraisal for the building

<table>
<tr><th>SuDS Type</th><th colspan="3">Site Suitability</th></tr>
<tr><td rowspan="3">Blue Roof</td><td colspan="2">A roof specifically intended and designed to store water. This can be via open water surfaces, storage within or beneath porous medium or modular surfaces, within shallow geo-cellular crates or below a raised decking/impermeable surface.</td><td rowspan="4">✘</td></tr>
<tr><td>Advantages</td><td>Disadvantages</td></tr>
<tr><td>No additional land take making them effective within dense urban Sites and can contribute significantly to overall Site attenuation requirements.</td><td>Additional weight and cost to structure (compared to normal roof design). Damage to waterproof membrane can be critical. Does not always provide treatment dependent on system.</td></tr>
<tr><td>Site Suitability</td><td colspan="2">Blue roofs are not considered feasible at the Site due to waterproofing concerns and the amount of mechanical plant.</td></tr>
</table>

SuDS Type	Site Suitability		
Green Roof	Multi-layered system that covers the roof of a building with vegetation/landscaping over a drainage layer. Designed to intercept and retain rainfall, reducing the volume of runoff and attenuating peak flows. Typically, either defined as intensive or extensive systems depending on the nature of the selected flora.		✘
	Advantages	**Disadvantages**	
	Mimics greenfield state of building footprint for high density developments, good removal of pollutants, ecological benefits, insulates buildings, sound absorption.	Additional weight, not appropriate for steep roofs, maintenance of roof vegetation. Damage to waterproof membrane can be critical.	
Site Suitability	**Green roofs are not considered feasible at the Site due to plant requirements and structural design.**		
Rainwater Harvesting	The collection of rainwater (usually within underground storage tanks) for later re-use in either buildings (treated), wash down facilities (commercial) or irrigation.		✓
	Advantages	**Disadvantages**	
	Can provide source control of storm water runoff, reduces demand on mains water.	Use is dependent on demand requirements, contributing surface area, and seasonal rainfall characteristics	
Site Suitability	**Rainwater harvesting is to be included within the proposals. Water harvested from the roof will be used to flush WCs within the building.**		
Infiltration Systems/ Soakaways	Any system which stores and discharges water directly to the underlying soils. These are typically soakaways, infiltration trenches, infiltration basins or infiltration blankets.		✘
	Advantages	**Disadvantages**	
	Provides groundwater recharge, ease of construction and can have minimal land take subject to design. Manages surface water at source.	Increased risk of groundwater ingress and pollution. Not suitable for poor draining soils or where infiltrating water may pit structural foundations at risk. Uncertainty over long term performance. Requires comprehensive geotechnical knowledge of underlying soils.	
Site Suitability	**Given the underlying geology and existing basement being kept beneath the building and public realm area, this is not a viable option.**		
Swales	Swales are linear vegetated drainage features in which surface water can be stored or conveyed. They can be designed to allow infiltration, where appropriate.		✘
	Advantages	**Disadvantages**	
	Can be incorporated into landscaping proposals, offers good removal of pollutants and reduces runoff rates and volumes. Relatively low cost.	Not suitable for steep areas and requires significant land take (not suitable for high density urban Sites). Not suitable in areas with roadside parking.	
Site Suitability	**Given the urban setting of the development and the existing basement being kept beneath the building and public realm area, the inclusion of swales is not viable or appropriate.**		

SuDS Type	Site Suitability		
Filter Drains	Filter drains are shallow trenches filled with stone/gravel that accept runoff through sheet flow and provide temporary subsurface storage (typically provided adjacent to highways or as interception features). They can drain via infiltration or be lined and positively drained via a perforated collection pipe.		✘
	Advantages	**Disadvantages**	
	Hydraulic benefits achieved with filter trenches, trenches can be incorporated into Site landscaping and fit well beside roads and car parks.	High clogging potential without effective pre-treatment, limited to small catchments, high cost of replacing filter material.	
Site Suitability	**Given the urban setting of the development and the existing basement being kept beneath the building and public realm area, the inclusion of filter drains is not viable or appropriate.**		
Bio-retention Systems/Rain Gardens	Shallow planted features, which receive runoff directly from adjacent hardstanding. Typically under drained, surface water will infiltrate to the underlying piped drainage system and in doing so promote storage, plant up-take and filtration.		✓
	Advantages	**Disadvantages**	
	Easily incorporated into soft landscaping, flexible shape and planting mix and provide good degree of storage (reducing the below ground requirement). High degree of pollutant removal and high biodiversity potential. Reduces need for surface drainage (gullies, channels etc) and low cost.	Requires considered use of water tolerant plant species and landscaping & management. Susceptible to clogging if poorly managed and not suitable for steeply sloping Sites.	
Site Suitability	**Rain gardens features are proposed within the DSDHA public realm proposals. These features will provide surface water treatment before discharge into the basement tank. Due to the shallow depth between public realm and top of basement and the high density of existing and proposed utilities, the exact locations will need to be considered carefully.**		
Permeable Pavements	Pavements that allow rainwater to infiltrate through the surface and into the underlying layers. The water is temporarily stored before infiltrating the ground (unlined) or discharging to the sewerage system (lined).		✘
	Advantages	**Disadvantages**	
	Provides low-level treatment of highway-derived pollutants (as recognised by the EA) and reduces need for surface drainage (gullies, channels etc). Available in a range of surface types (not just block paving).	Often requires increased construction depth and not suitable for use with Type 1 sub-base. May not be applicable for heavy traffic loadings and irregular maintenance required in certain situations. Not suitable for utility routes.	
Site Suitability	**Permeable paving does not provide a viable solution due to no opportunity for infiltration based drainage, due to the existing basement being kept beneath the building and public realm area.**		
Detention Basins	Detention basins are surface storage basins that provide flow control through attenuation of storm water runoff. They facilitate settling of particulate pollutants. Typically dry, they can also offer multi-functional recreational use.		✘
	Advantages	**Disadvantages**	
	Can cater for a wide range of rainfall events, easy to maintain, potential for dual land use, can be incorporated in to landscaping proposals and low cost.	Not suitable for steep areas, significant land take and little reduction in runoff volume	
Site Suitability	**Given the urban setting of the development and the existing basement being kept beneath the building and public realm area, detention basins are not considered a suitable SuDS feature.**		

<table>
<tr><th>SuDS Type</th><th colspan="2">Site Suitability</th><th></th></tr>
<tr><td rowspan="3">Ponds</td><td colspan="2">Ponds can provide both storm water attenuation and treatment. They are designed to support emergent and submerged aquatic vegetation along their shoreline.</td><td rowspan="4">✗</td></tr>
<tr><td>Advantages</td><td>Disadvantages</td></tr>
<tr><td>Good removal capability of urban pollutants, high potential ecological, aesthetic and amenity benefits, can cater for all storm events and good community acceptability.</td><td>No reduction in runoff volume;
Anaerobic conditions can occur without regular inflow;
Significantly land take;
No suitable for steep Sites;</td></tr>
<tr><td>Site Suitability</td><td colspan="2">Given the urban setting of the development and the existing basement being kept beneath the building and public realm area, ponds are not considered a suitable SuDS feature.</td></tr>
<tr><td rowspan="3">Sub-Surface/Geo-cellular Storage</td><td colspan="2">Sub-surface storage provides an effective way of attenuating storm water prior to offsite discharge and can be in multiple forms, such as geo-cellular or concrete tanks.</td><td rowspan="4">✓</td></tr>
<tr><td>Advantages</td><td>Disadvantages</td></tr>
<tr><td>Modular and flexible, dual usage (infiltration/storage, high void ratios, can be installed beneath trafficked and soft landscaped areas.</td><td>No water quality treatment.</td></tr>
<tr><td>Site Suitability</td><td colspan="2">Attenuation tanks for surface water are proposed within the basement.
Shallow attenuation (Permavoid or similar) has been considered above basement, however due to the extensive landscaping proposals and lack of available depth between existing basement roof and the finished public realm levels, it is concluded that these extensive landscaping proposals provide significant public amenity and should take precedence above basement.</td></tr>
<tr><td rowspan="3">Rills/Canals</td><td colspan="2">Formal linear drainage features in which surface water can be stored or conveyed. They can be incorporated with water features such as ponds or waterfalls where appropriate.</td><td rowspan="4">✗</td></tr>
<tr><td>Advantages</td><td>Disadvantages</td></tr>
<tr><td>Negate the need for underground pipework. Can provide some attenuation.
Possible reduction in runoff volume via plant uptake and infiltration.</td><td>Potential trip/wheel hazard, disabled access issues.</td></tr>
<tr><td>Site Suitability</td><td colspan="2">Due to the shallow depth between public realm and top of basement and urban setting of the development, rills/canals do not provide a viable option.</td></tr>
</table>

2.3 SuDS Selection Summary

Further to the assessment above, Table 5 provides a summary of SuDS that are considered viable within the context of the proposals, where opportunities to implement SuDS should be explored at detailed design stage and SuDS which are not appropriate for the proposals due to spatial constraints and existing ground conditions:

Table 6: SuDS Selection Summary

SuDS Type	Site Suitability		
	Suitable for consideration on Site	Further consideration to be carried out during detailed design	Not suitable for consideration on Site
Blue Roof			
Green Roof			
Rainwater Harvesting			

SuDS Type	Site Suitability		
	Suitable for consideration on Site	Further consideration to be carried out during detailed design	Not suitable for consideration on Site
Infiltration Systems/Soakaways			
Swales			
Filter Drains			
Bio-retention Systems/Rain Gardens			
Permeable Pavements			
Detention Basins			
Ponds			
Sub-surface Storage			
Rills/Canals			

2.3.1 Compliance with London Plan

In accordance with the London Plan 2021 development proposals should ensure that surface water run-off is managed as close to its source as possible. There should also be a preference for green over grey features, in line with the following drainage hierarchy:

1. rainwater use as a resource (for example rainwater harvesting, blue roofs for irrigation)
2. rainwater infiltration to ground at or close to source
3. rainwater attenuation in green infrastructure features for gradual release (for example green roofs, rain gardens)
4. rainwater discharge direct to a watercourse (unless not appropriate)
5. controlled rainwater discharge to a surface water sewer or drain
6. controlled rainwater discharge to a combined sewer.

In line with the above, Table 7 below demonstrates compliance with the drainage hierarchy.

Table 7: London Plan Drainage Hierarchy

Hierarchy	Surface Water Management	Considered Within Design?	Design Comments
1	Rainwater use as a resource	Yes	Rainwater harvesting has been included within the design
2	Rainwater infiltration to ground at or close to source	No	Not possible within building or public realm footprint due to existing basements
3	Rainwater attenuation in green infrastructure features for gradual release (for example green roofs, rain gardens)	No	Blue roofs are not considered feasible at the Site due to waterproofing concerns and the amount of mechanical plant
4	Rainwater discharge direct to a watercourse (unless not appropriate)	No	No watercourses close to the Site
5	Controlled rainwater discharge to a surface water sewer or drain	No	No surface water sewers close to the Site
6	Controlled rainwater discharge to a combined sewer	Yes	The Site currently discharges to a combined public sewer and will continue to do so.

2.3.2 Exceedance Routes

In an exceedance level event where the drainage strategy is unable to accommodate rainfall effectively, it is anticipated that flows will follow the topography towards Hampstead Road and Euston Road. Existing levels across the development are very flat and therefore levels are to be designed in such a way to ensure flood waters are directed away from building thresholds.

2.3.3 SuDS Maintenance Schedules

It is the intention that the surface water drainage and SuDS features will be managed and maintained by the building management.

The following tables outline the minimum maintenance requirements for the different elements of the proposed strategy and are intended to form the basis of a final detailed operation and maintenance strategy document produced by the appointed private management company.

Maintenance requirements have been informed by the guidance outlined within CIRIA C753 and current best practice. The following information would also be supplemented by manufacturer's specifications and be dependent on the specific type of system/products used.

Table 8: Operation and Maintenance Requirements for Attenuation Tanks

Maintenance Schedule	Required Action	Frequency
Regular Maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance).	Monthly
	Remove sediment from pre-treatment structures and/or internal forebays.	Annually, or as required
Remedial Actions	Repair/rehabilitate inlets, outlet, overflows and vents.	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed.	Annually
	Survey inside of tank for sediment build up and remove if necessary.	Every 5 years or as required.
Health & Safety	In accordance with Table 36.2, management is considered Low Risk as minor injury or health effects are unlikely to occur, hence the design is accepted and no reasonable requirement to review proposals.	N/A

A. Greenfield Runoff Calculations

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Rob Belcher
Site name:	Euston Tower
Site location:	Euston

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013) , the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	51.52532° N
Longitude:	0.13919° W
Reference:	3774929550
Date:	Feb 05 2024 12:40

Runoff estimation approach

FEH Statistical

Site characteristics

Total site area (ha): 0.79

Methodology

Q_{MED} estimation method:	Calculate from BFI and SAAR
BFI and SPR method:	Specify BFI manually
HOST class:	N/A
BFI / BFIHOST:	0.629
Q_{MED} (l/s):	
Q_{BAR} / Q_{MED} factor:	1.14

Hydrological characteristics

	Default	Edited
SAAR (mm):	616	625
Hydrological region:	6	6
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 30 years:	2.3	2.3
Growth curve factor 100 years:	3.19	3.19
Growth curve factor 200 years:	3.74	3.74

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates

Default | Edited

Q_{BAR} (l/s):		1.22
1 in 1 year (l/s):		1.04
1 in 30 years (l/s):		2.81
1 in 100 year (l/s):		3.89
1 in 200 years (l/s):		4.56

B. Existing Drainage Survey

STANDARD ABBREVIATIONS

A/C	Air Conditioner	IRF	Iron Railing Fence
AH	Arch Height	IRS	Illuminated Road Sign
AL	Arch Level	JB	Junction Box
ASH	Arch Spring Height	L	Light
ASL	Arch Spring Level	LB	Litter Bin
B	Bollard	LP	Lamp Post
BGP	Break Glass Point	Max	Maximum
BH	Beam Height	MH	Manhole
Br	Brick	Min	Minimum
BRW	Brick Retaining Wall	O/H	Overhead
BSL	Beam Soffit Level	OSBM	Ordnance Survey Bench Mark
BT	British Telecom	P	Post
BW	Brick Wall	PB	Pillar Box
CBF	Close Boarded Fence	PLt	Pavement Light
CCTV	Closed Circuit Television	PS	Paving Stones
Chy	Chimney	Rad	Radiator
CL	Cover Level	RDM	Recessed Door Mat
CLF	Chain Link Fence	RE	Rodding Eye
Col	Column	RS	Road Sign
Conc	Concrete	RSJ	Rolled Steel Joist
CPS	Concrete Paving Slabs	RWP	Rain Water Pipe
CTV	Cable Television IC	s	spread
Cup	Cupboard	S	Window Sill Height/Level
DH	Door Head Height	SBM	Site Bench Mark
DP	Down Pipe	SC	Stop Cock
DrC	Drainage Channel	SH	Spring Height
EIC	Electrical Inspection Cover	SL	Sump Level
EJB	Electrical Junction Box	Slt	Skylight
EM	Electricity Meter	SO	Smoke Outlet
ER	Earthing Rod	SP	Sign Post
ESG	Electrical Switchgear	SS	Security Sensor
FA	Fire Alarm	SV	Stop Valve
FB	Flower Bed	T	Telephone
FE	Fire Extinguisher	Tac	Tactile Paving
FH	Fire Hydrant	TBM	Temporary Bench Mark
FHR	Fire Hose Reel	TCB	Telephone Call Box
FL	Floor Level	TIC	Telephone Inspection Cover
Flt	Floodlight	TJB	Telephone Junction Box
g	girth	TL	Traffic Light
G	Gully	TLCB	Traffic Light Control Box
GC	Gas Cock	TLIC	Traffic Light Inspection Cover
GM	Gas Meter	TP	Telephone Pole
GV	Gas Valve	Typ	Typical
H	Window Head Height/Level	V	Vent
h	height	VP	Vent Pipe
HB	Hand Basin	WH	Water Heater
HR	Handrail	WM	Water Meter
IC	Inspection Cover	WV	Water Valve
IL	Invert Level		

SERVICE ABBREVIATIONS

(AC)	Assumed Connection	IL	Invert Level
(AR)	Assumed Route	L	Level
BdL	Back Drop Level	(NPV)	No Pipes Visible
CR	Cable Riser	Pd	Depth to top of pipe
DP	Down Pipe	Sd	Sump Depth
G	Gully	(UTL)	Unable to Lift without damage
HB	Hatch Box	(UTT)	Unable to Trace
HbL	Hatch Box Level	VP	Vent Pipe

SERVICE LEGEND

SURFACE WATER DRAINAGE
WATER
GAS
ELECTRICITY
TELEPHONE
UNKNOWN SERVICE
UNDERGROUND CHAMBER

Electro-detection techniques have been used in the location of underground services. The results are not infallible and trial excavations must be carried out to confirm service identification, position and particularly depths.
Although all reasonable effort has been made in searching available record drawings the completeness of the underground services information cannot be guaranteed.

Unless otherwise stated, drainage pipes are 100mm diameter.

LEGEND

2.70 Floor to ceiling height
F2.70 Floor to false ceiling height
22.70 Ceiling level
F22.70 False ceiling level
Stair/step arrows point up
Sloping ceiling arrows point up
Roof arrows point down
Assumed detail

Due to the inherent instability of paper materials, drawings plotted on paper may be stretched and distorted - dimensions scaled from paper plots should therefore be treated with caution

This drawing has been produced for the purpose of the original commissioning agent. Plowman Craven Limited will accept no responsibility for details that are subsequently found to be the consequence of undisclosed facts or that were obscured from view at the time of survey or that have been altered since the survey.

See www.plowmancraven.co.uk for full terms and conditions of contract.

SHEET LAYOUT

42746-002-01-1	42746-002-01-2
42746-002-01-3	42746-002-01-4

ISSUES & REVISIONS

Issue	Details	By	Date
A	Original issue	PCL	11/12/2019

This drawing has been extracted from a revit model (drawing no. 42746-002-PCL-02-ZZ-M3-G-0001_R2019-S0-P01) constructed to an accuracy consistent with a presentation scale of 1:100, the plan is typically taken at 1600mm above finished floor level - due to the revit extraction process, this may result in duplicate linework and missing detail - for any level/height information please refer to the original revit model

Drawing units are metres

CLIENT
British Land Property Management Ltd
10 South Crescent
London
WC1E7BD

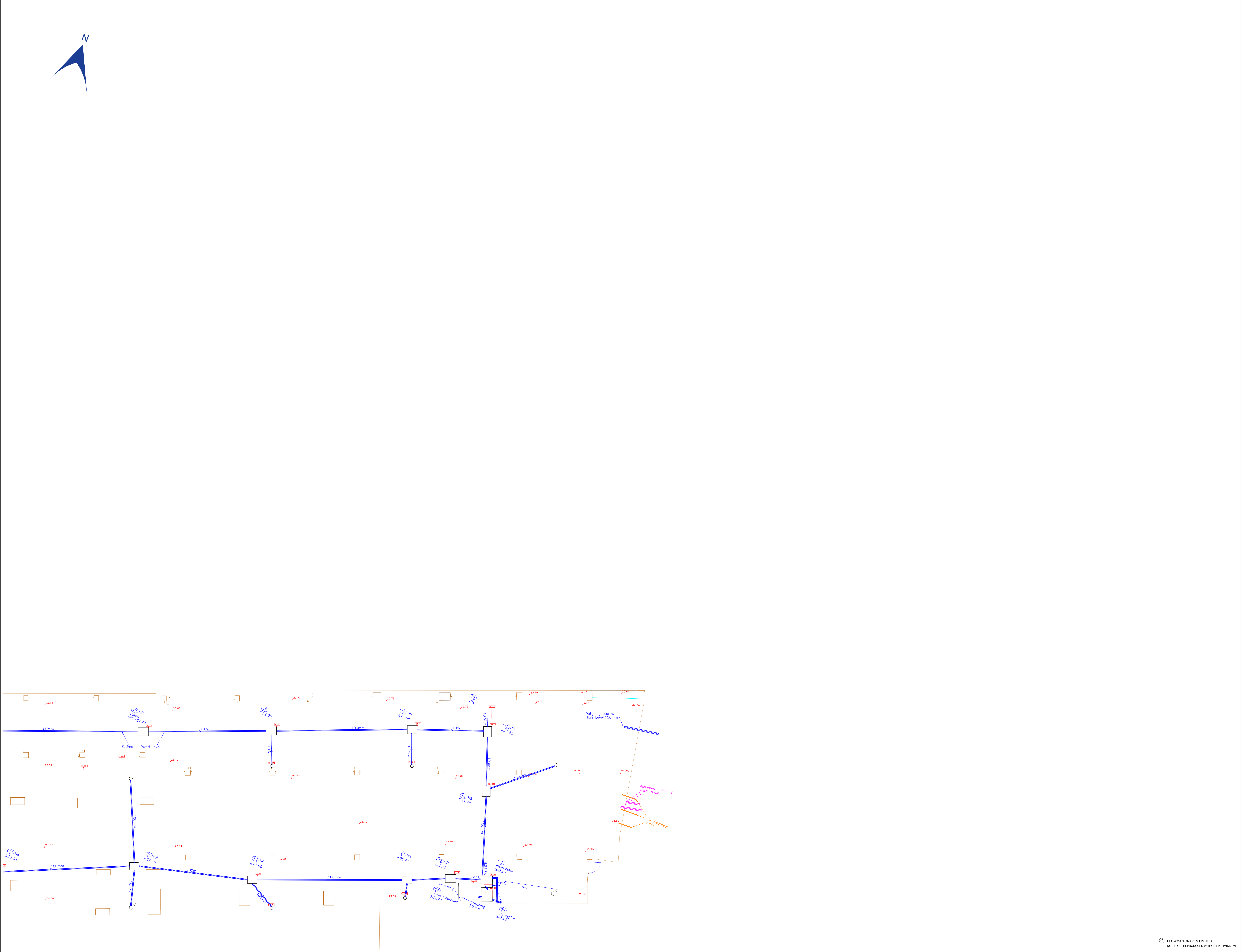
PROJECT TITLE
Euston Tower
N1

Basement Floor Plan

PRESENTATION SCALE 1:100 @ A0

DATE OF ORIGINAL SURVEY October 2019
PC PROJECT No. 42746-002 CHECKED MDW
DRAWING No. ISSUE A

Plowman Craven
Plowman Craven House
2 Lea Business Park
Lower Luton Road
Harpenden
Hertfordshire
AL5 5EQ
115 Southwark Bridge Road
London
SE1 0AX
Tel: +44 (0)1582 765566
Tel: +44 (0)207 490 7700
Email: post@plowmancraven.co.uk
Web: www.plowmancraven.co.uk



STANDARD ABBREVIATIONS

A/C	Air Conditioner	IRF	Iron Railing Fence
AH	Arch Height	IRS	Illuminated Road Sign
AL	Arch Level	JB	Junction Box
ASH	Arch Spring Height	L	Light
ASL	Arch Spring Level	LB	Litter Bin
B	Bollard	LP	Lamp Post
BGP	Break Glass Point	Max	Maximum
BH	Beam Height	MH	Manhole
Br	Brick	Min	Minimum
BRW	Brick Retaining Wall	O/H	Overhead
BSL	Beam Soffit Level	OSBM	Ordnance Survey Bench Mark
BT	British Telecom	P	Post
BW	Brick Wall	PB	Pillar Box
CBF	Close Boarded Fence	PLt	Pavement Light
CCTV	Closed Circuit Television	PS	Paving Stones
Chy	Chimney	Rad	Radiator
CL	Cover Level	RDM	Recessed Door Mat
CLF	Chain Link Fence	RE	Rodding Eye
Col	Column	RS	Road Sign
Conc	Concrete	RSJ	Rolled Steel Joist
CPS	Concrete Paving Slabs	RWP	Rain Water Pipe
CTV	Cable Television IC	s	spread
Cup	Cupboard	S	Window Sill Height/Level
DH	Door Head Height	SBM	Site Bench Mark
DP	Down Pipe	SC	Stop Cock
DrC	Drainage Channel	SH	Spring Height
EIC	Electrical Inspection Cover	SL	Sump Level
EJB	Electrical Junction Box	Slt	Skylight
EM	Electricity Meter	SO	Smoke Outlet
ER	Earthing Rod	SP	Sign Post
ESG	Electrical Switchgear	SS	Security Sensor
FA	Fire Alarm	SV	Stop Valve
FB	Flower Bed	T	Telephone
FE	Fire Extinguisher	Tac	Tactile Paving
FH	Fire Hydrant	TBM	Temporary Bench Mark
FHR	Fire Hose Reel	TCB	Telephone Call Box
FL	Floor Level	TIC	Telephone Inspection Cover
Flt	Floodlight	TJB	Telephone Junction Box
g	girth	TL	Traffic Light
G	Gully	TLCB	Traffic Light Control Box
GC	Gas Cock	TLIC	Traffic Light Inspection Cover
GM	Gas Meter	TP	Telephone Pole
GV	Gas Valve	Typ	Typical
H	Window Head Height/Level	V	Vent
h	height	VP	Vent Pipe
HB	Hand Basin	WH	Water Heater
HR	Handrail	WM	Water Meter
IC	Inspection Cover	WV	Water Valve
IL	Invert Level		

SERVICE ABBREVIATIONS

(AC)	Assumed Connection	IL	Invert Level
(AR)	Assumed Route	L	Level
BdL	Back Drop Level	(NPV)	No Pipes Visible
CR	Cable Riser	Pd	Depth to top of pipe
DP	Down Pipe	Sd	Sump Depth
G	Gully	(UTL)	Unable to Lift without damage
HB	Hatch Box	(UTT)	Unable to Trace
HbL	Hatch Box Level	VP	Vent Pipe

SERVICE LEGEND

SURFACE WATER DRAINAGE
WATER
GAS
ELECTRICITY
TELEPHONE
UNKNOWN SERVICE
UNDERGROUND CHAMBER

Electro-detection techniques have been used in the location of underground services. The results are not infallible and trial excavations must be carried out to confirm service identification, position and particularly depths.
Although all reasonable effort has been made in searching available record drawings the completeness of the underground services information cannot be guaranteed.

Unless otherwise stated, drainage pipes are 100mm diameter.

LEGEND

(2.70)	Floor to ceiling height
(F2.70)	Floor to false ceiling height
[22.70]	Ceiling level
[F22.70]	False ceiling level
→	Stair/step arrows point up
→	Sloping ceiling arrows point up
→	Roof arrows point down
——	Assumed detail

Due to the inherent instability of paper materials, drawings plotted on paper may be stretched and distorted - dimensions scaled from paper plots should therefore be treated with caution

SHEET LAYOUT

42746-002-01-1	42746-002-01-2
42746-002-01-3	42746-002-01-4

ISSUES & REVISIONS

Issue	Details	By	Date
A	Original Issue	PCL	11/12/2019

This drawing has been extracted from a revit model (drawing no. 42746-002-PCL-02-ZZ-M3-G-0001_R2019-S0-P01) constructed to an accuracy consistent with a presentation scale of 1:100, the plan is typically taken at 1600mm above finished floor level - due to the revit extraction process, this may result in duplicate linework and missing detail - for any level/height information please refer to the original revit model

Drawing units are metres

CLIENT

British Land Property Management Ltd

10 South Crescent
London
WC1E7BD

PROJECT TITLE

Euston Tower

N1

Basement Floor Plan

PRESENTATION SCALE 1:100 @ A0

DATE OF ORIGINAL SURVEY October 2019

PC PROJECT No. 42746-002 CHECKED MDW

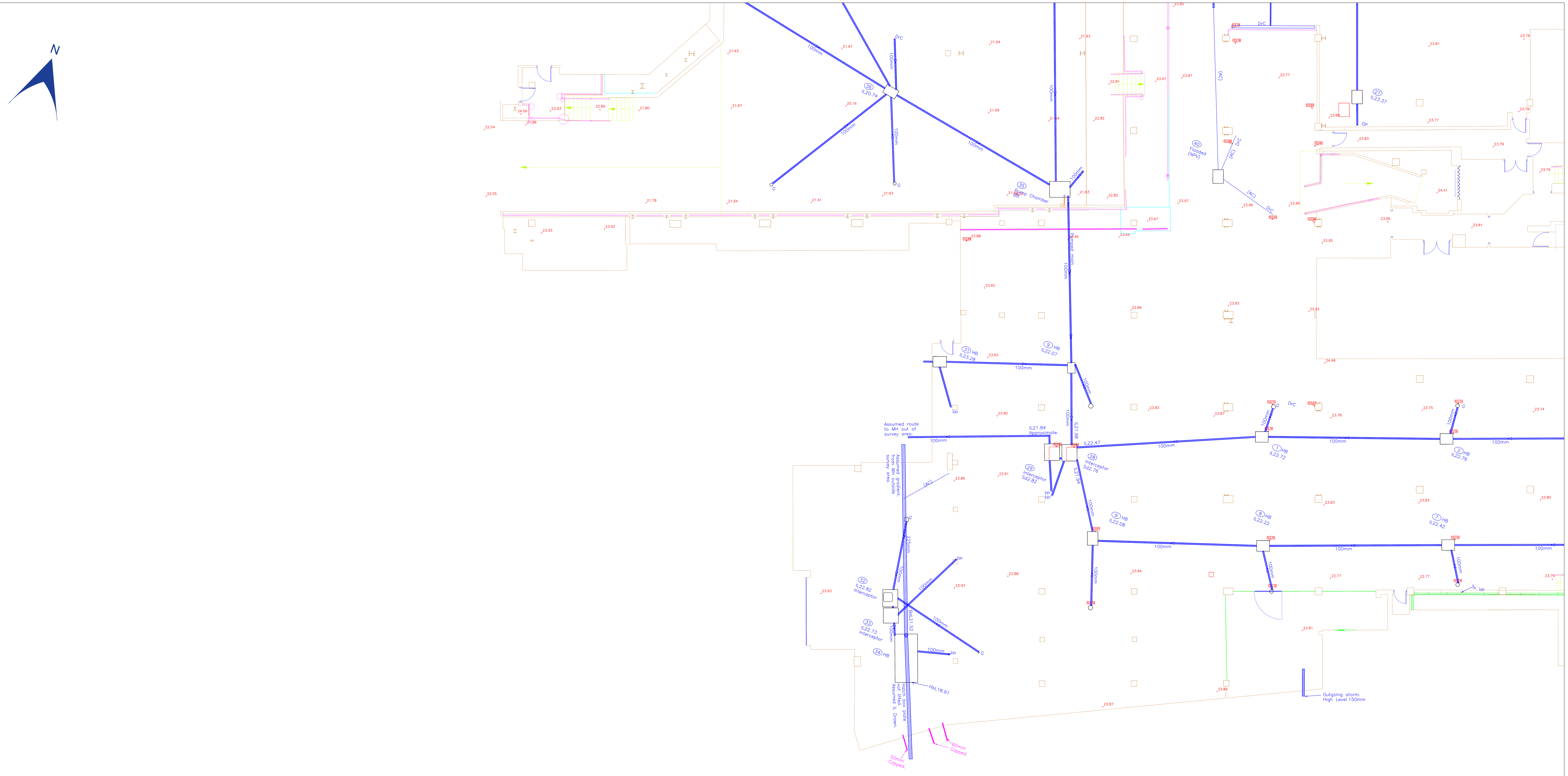
DRAWING No. ISSUE A

Plowman Craven

Plowman Craven House
2 Lea Business Park
Lower Luton Road
Harpenden
Hertfordshire
AL5 5EQ

115 Southwark Bridge Road
London
SE1 0AX

Tel: +44 (0)1582 765566
Tel: +44 (0)207 490 7700
Email: post@plowmancraven.co.uk
Web: www.plowmancraven.co.uk



STANDARD ABBREVIATIONS

A/C	Air Conditioner	IRF	Iron Railing Fence
AH	Arch Height	IRS	Illuminated Road Sign
AL	Arch Level	JB	Junction Box
ASH	Arch Spring Height	L	Light
ASL	Arch Spring Level	LB	Litter Bin
B	Bollard	LP	Lamp Post
BGP	Break Glass Point	Max	Maximum
BH	Beam Height	MH	Manhole
Br	Brick	Min	Minimum
BRW	Brick Retaining Wall	O/H	Overhead
BSL	Beam Soffit Level	OSBM	Ordnance Survey Bench Mark
BT	British Telecom	P	Post
BW	Brick Wall	PB	Pillar Box
CBF	Close Boarded Fence	PLt	Pavement Light
CCTV	Closed Circuit Television	PS	Paving Stones
Chy	Chimney	Rad	Radiator
CL	Cover Level	RDM	Recessed Door Mat
CLF	Chain Link Fence	RE	Rodding Eye
Col	Column	RS	Road Sign
Conc	Concrete	RSJ	Rolled Steel Joist
CPS	Concrete Paving Slabs	RWP	Rain Water Pipe
CTV	Cable Television IC	s	spread
Cup	Cupboard	S	Window Sill Height/Level
DH	Door Head Height	SBM	Site Bench Mark
DP	Down Pipe	SC	Stop Cock
DrC	Drainage Channel	SH	Spring Height
EIC	Electrical Inspection Cover	SL	Sump Level
EJB	Electrical Junction Box	Slt	Skylight
EM	Electricity Meter	SO	Smoke Outlet
ER	Earthing Rod	SP	Sign Post
ESG	Electrical Switchgear	SS	Security Sensor
FA	Fire Alarm	SV	Stop Valve
FB	Flower Bed	T	Telephone
FE	Fire Extinguisher	Tac	Tactile Paving
FH	Fire Hydrant	TBM	Temporary Bench Mark
FHR	Fire Hose Reel	TCB	Telephone Call Box
FL	Floor Level	TIC	Telephone Inspection Cover
Flt	Floodlight	TJB	Telephone Junction Box
g	girth	TL	Traffic Light
G	Gully	TLCB	Traffic Light Control Box
GC	Gas Cock	TLIC	Traffic Light Inspection Cover
GM	Gas Meter	TP	Telephone Pole
GV	Gas Valve	Typ	Typical
H	Window Head Height/Level	V	Vent
h	height	VP	Vent Pipe
HB	Hand Basin	WH	Water Heater
HR	Handrail	WM	Water Meter
IC	Inspection Cover	WV	Water Valve
IL	Invert Level		

SERVICE ABBREVIATIONS

(AC)	Assumed Connection	IL	Invert Level
(AR)	Assumed Route	L	Level
BdL	Back Drop Level	(NPV)	No Pipes Visible
CR	Cable Riser	Pd	Depth to top of pipe
DP	Down Pipe	Sd	Sump Depth
G	Gully	(UTL)	Unable to Lift without damage
HB	Hatch Box	(UTT)	Unable to Trace
HbL	Hatch Box Level	VP	Vent Pipe

SERVICE LEGEND

SURFACE WATER DRAINAGE
WATER
GAS
ELECTRICITY
TELEPHONE
UNKNOWN SERVICE
UNDERGROUND CHAMBER

Electro-detection techniques have been used in the location of underground services. The results are not infallible and trial excavations must be carried out to confirm service identification, position and particularly depths.
Although all reasonable effort has been made in searching available record drawings the completeness of the underground services information cannot be guaranteed.

Unless otherwise stated, drainage pipes are 100mm diameter.

LEGEND

2.70	Floor to ceiling height
F2.70	Floor to false ceiling height
22.70	Ceiling level
F22.70	False ceiling level
	Stair/step arrows point up
	Sloping ceiling arrows point up
	Roof arrows point down
	Assumed detail

Due to the inherent instability of paper materials, drawings plotted on paper may be stretched and distorted - dimensions scaled from paper plots should therefore be treated with caution

SHEET LAYOUT

42746-002-01-1	42746-002-01-2
42746-002-01-3	42746-002-01-4

ISSUES & REVISIONS

Issue	Details	By	Date
A	Original Issue	PCL	11/12/2019

This drawing has been extracted from a revit model (drawing no. 42746-002-PCL-02-ZZ-M3-G-0001_R2019-S0-P01) constructed to an accuracy consistent with a presentation scale of 1:100, the plan is typically taken at 1600mm above finished floor level - due to the revit extraction process, this may result in duplicate linework and missing detail - for any level/height information please refer to the original revit model

CLIENT
British Land Property Management Ltd
10 South Crescent
London
WC1E7BD

PROJECT TITLE

Euston Tower
N1

Basement Floor Plan

PRESENTATION SCALE 1:100 @ A0

DATE OF ORIGINAL SURVEY October 2019

PC PROJECT No. 42746-002 CHECKED MDW

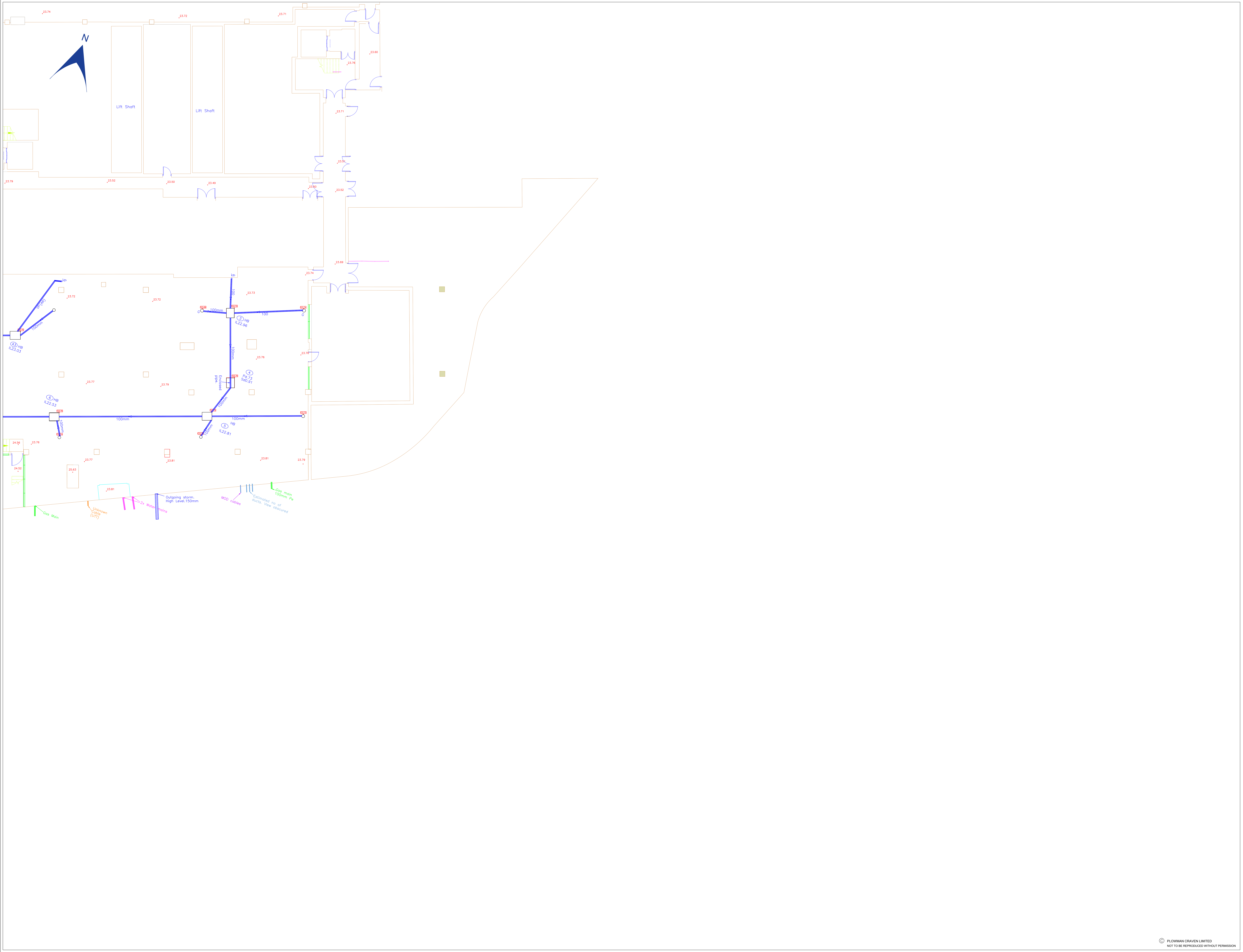
DRAWING No. ISSUE A

Plowman Craven

Plowman Craven House
2 Lea Business Park
Lower Luton Road
Harpenden
Hertfordshire
AL5 5EQ

115 Southwark Bridge Road
London
SE1 0AX

Tel: +44 (0)1582 765566
Tel: +44 (0)207 490 7700
Email: post@plowmancraven.co.uk
Web: www.plowmancraven.co.uk



STANDARD ABBREVIATIONS

A/C	Air Conditioner	IRF	Iron Railing Fence
AH	Arch Height	IRS	Illuminated Road Sign
AL	Arch Level	JB	Junction Box
ASH	Arch Spring Height	L	Light
ASL	Arch Spring Level	LB	Litter Bin
B	Bollard	LP	Lamp Post
BGP	Break Glass Point	Max	Maximum
BH	Beam Height	MH	Manhole
Br	Brick	Min	Minimum
BRW	Brick Retaining Wall	O/H	Overhead
BSL	Beam Soffit Level	OSBM	Ordnance Survey Bench Mark
BT	British Telecom	P	Post
BW	Brick Wall	PB	Pillar Box
CBF	Close Boarded Fence	PLt	Pavement Light
CCTV	Closed Circuit Television	PS	Paving Stones
Chy	Chimney	Rad	Radiator
CL	Cover Level	RDM	Recessed Door Mat
CLF	Chain Link Fence	RE	Rodding Eye
Col	Column	RS	Road Sign
Conc	Concrete	RSJ	Rolled Steel Joist
CPS	Concrete Paving Slabs	RWP	Rain Water Pipe
CTV	Cable Television IC	s	spread
Cup	Cupboard	S	Window Sill Height/Level
DH	Door Head Height	SBM	Site Bench Mark
DP	Down Pipe	SC	Stop Cock
DrC	Drainage Channel	SH	Spring Height
EIC	Electrical Inspection Cover	SL	Sump Level
EJB	Electrical Junction Box	Slt	Skylight
EM	Electricity Meter	SO	Smoke Outlet
ER	Earthing Rod	SP	Sign Post
ESG	Electrical Switchgear	SS	Security Sensor
FA	Fire Alarm	SV	Stop Valve
FB	Flower Bed	T	Telephone
FE	Fire Extinguisher	Tac	Tactile Paving
FH	Fire Hydrant	TBM	Temporary Bench Mark
FHR	Fire Hose Reel	TCB	Telephone Call Box
FL	Floor Level	TIC	Telephone Inspection Cover
Flt	Floodlight	TJB	Telephone Junction Box
g	girth	TL	Traffic Light
G	Gully	TLCB	Traffic Light Control Box
GC	Gas Cock	TLIC	Traffic Light Inspection Cover
GM	Gas Meter	TP	Telephone Pole
GV	Gas Valve	Typ	Typical
H	Window Head Height/Level	V	Vent
h	height	VP	Vent Pipe
HB	Hand Basin	WH	Water Heater
HR	Handrail	WM	Water Meter
IC	Inspection Cover	WV	Water Valve
IL	Invert Level		

SERVICE ABBREVIATIONS

(AC)	Assumed Connection	IL	Invert Level
(AR)	Assumed Route	L	Level
BdL	Back Drop Level	(NPV)	No Pipes Visible
CR	Cable Riser	Pd	Depth to top of pipe
DP	Down Pipe	Sd	Sump Depth
G	Gully	(UTL)	Unable to Lift without damage
HB	Hatch Box	(UTT)	Unable to Trace
HbL	Hatch Box Level	VP	Vent Pipe

SERVICE LEGEND

SURFACE WATER DRAINAGE
WATER
GAS
ELECTRICITY
TELEPHONE
UNKNOWN SERVICE
UNDERGROUND CHAMBER

Electro-detection techniques have been used in the location of underground services. The results are not infallible and trial excavations must be carried out to confirm service identification, position and particularly depths.
Although all reasonable effort has been made in searching available record drawings the completeness of the underground services information cannot be guaranteed.

Unless otherwise stated, drainage pipes are 100mm diameter.

LEGEND

2.70	Floor to ceiling height
F2.70	Floor to false ceiling height
22.70	Ceiling level
F22.70	False ceiling level
	Stair/step arrows point up
	Sloping ceiling arrows point up
	Roof arrows point down
	Assumed detail

Due to the inherent instability of paper materials, drawings plotted on paper may be stretched and distorted - dimensions scaled from paper plots should therefore be treated with caution

This drawing has been produced for the purpose of the original commissioning agent. Plowman Craven Limited will accept no responsibility for details that are subsequently found to be the consequence of undisclosed facts or that were obscured from view at the time of survey or that have been altered since the survey.

See www.plowmancraven.co.uk for full terms and conditions of contract.

SHEET LAYOUT

42746-002-01-1	42746-002-01-2
42746-002-01-3	42746-002-01-4

ISSUES & REVISIONS

Issue	Details	By	Date
A	Original Issue	PCL	11/12/2019

This drawing has been extracted from a revit model (drawing no. 42746-002-PCL-02-ZZ-M3-G-0001_R2019-S0-P01) constructed to an accuracy consistent with a presentation scale of 1:100, the plan is typically taken at 1600mm above finished floor level - due to the revit extraction process, this may result in duplicate linework and missing detail - for any level/height information please refer to the original revit model

CLIENT
British Land Property Management Ltd
10 South Crescent
London
WC1E7BD

PROJECT TITLE

Euston Tower
N1

Basement Floor Plan

PRESENTATION SCALE 1:100 @ A0

DATE OF ORIGINAL SURVEY October 2019

PC PROJECT No. 42746-002 CHECKED MDW

DRAWING No. ISSUE A

Plowman Craven
Plowman Craven House
2 Lea Business Park
Lower Luton Road
Harpenden
Hertfordshire
AL5 5EQ
Tel: +44 (0)1582 765566
Email: post@plowmancraven.co.uk
Web: www.plowmancraven.co.uk

115 Southwark Bridge Road
London
SE1 0AX
Tel: +44 (0)207 490 7700

C. Proposed Surface Water Calculations & Drawing

Summary of Results for 2 year Return Period (+40%)

Half Drain Time : 1072 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	99.200	0.200	0.0	2.0	2.0	76.0	O K
30 min Summer	99.250	0.250	0.0	2.0	2.0	94.9	O K
60 min Summer	99.297	0.297	0.0	2.0	2.0	112.9	O K
120 min Summer	99.421	0.421	0.0	2.0	2.0	159.9	O K
180 min Summer	99.485	0.485	0.0	2.0	2.0	184.5	O K
240 min Summer	99.524	0.524	0.0	2.0	2.0	199.3	O K
360 min Summer	99.564	0.564	0.0	2.0	2.0	214.3	O K
480 min Summer	99.579	0.579	0.0	2.0	2.0	220.1	O K
600 min Summer	99.583	0.583	0.0	2.0	2.0	221.6	O K
720 min Summer	99.580	0.580	0.0	2.0	2.0	220.5	O K
960 min Summer	99.565	0.565	0.0	2.0	2.0	214.9	O K
1440 min Summer	99.536	0.536	0.0	2.0	2.0	203.7	O K
2160 min Summer	99.498	0.498	0.0	2.0	2.0	189.4	O K
2880 min Summer	99.466	0.466	0.0	2.0	2.0	177.2	O K
4320 min Summer	99.415	0.415	0.0	2.0	2.0	157.9	O K
5760 min Summer	99.375	0.375	0.0	2.0	2.0	142.4	O K
7200 min Summer	99.341	0.341	0.0	2.0	2.0	129.5	O K
8640 min Summer	99.312	0.312	0.0	2.0	2.0	118.7	O K
10080 min Summer	99.288	0.288	0.0	2.0	2.0	109.5	O K
15 min Winter	99.225	0.225	0.0	2.0	2.0	85.4	O K
30 min Winter	99.280	0.280	0.0	2.0	2.0	106.6	O K
60 min Winter	99.334	0.334	0.0	2.0	2.0	127.0	O K
120 min Winter	99.474	0.474	0.0	2.0	2.0	180.3	O K
180 min Winter	99.549	0.549	0.0	2.0	2.0	208.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	52.681	0.0	76.8	26
30 min Summer	33.099	0.0	96.0	41
60 min Summer	20.007	0.0	118.4	70
120 min Summer	14.450	0.0	171.0	130
180 min Summer	11.342	0.0	201.2	188
240 min Summer	9.376	0.0	221.6	248
360 min Summer	7.002	0.0	247.5	366
480 min Summer	5.618	0.0	263.9	484
600 min Summer	4.712	0.0	275.6	602
720 min Summer	4.072	0.0	284.4	720
960 min Summer	3.223	0.0	296.3	858
1440 min Summer	2.314	0.0	304.6	1090
2160 min Summer	1.672	0.0	356.4	1480
2880 min Summer	1.337	0.0	380.0	1900
4320 min Summer	0.993	0.0	423.0	2720
5760 min Summer	0.815	0.0	463.3	3512
7200 min Summer	0.706	0.0	501.8	4264
8640 min Summer	0.632	0.0	539.4	5024
10080 min Summer	0.580	0.0	576.7	5760
15 min Winter	52.681	0.0	85.9	26
30 min Winter	33.099	0.0	107.0	40
60 min Winter	20.007	0.0	132.6	70
120 min Winter	14.450	0.0	191.5	128
180 min Winter	11.342	0.0	225.1	186

Summary of Results for 2 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Σ Max Outflow (l/s)	Max Volume (m³)	Status
240 min Winter	99.594	0.594	0.0	2.0	2.0	225.8	O K
360 min Winter	99.642	0.642	0.0	2.0	2.0	244.0	O K
480 min Winter	99.663	0.663	0.0	2.0	2.0	251.9	O K
600 min Winter	99.671	0.671	0.0	2.0	2.0	254.8	O K
720 min Winter	99.671	0.671	0.0	2.0	2.0	254.9	O K
960 min Winter	99.659	0.659	0.0	2.0	2.0	250.5	O K
1440 min Winter	99.619	0.619	0.0	2.0	2.0	235.3	O K
2160 min Winter	99.569	0.569	0.0	2.0	2.0	216.1	O K
2880 min Winter	99.521	0.521	0.0	2.0	2.0	197.9	O K
4320 min Winter	99.439	0.439	0.0	2.0	2.0	166.7	O K
5760 min Winter	99.369	0.369	0.0	2.0	2.0	140.4	O K
7200 min Winter	99.311	0.311	0.0	2.0	2.0	118.2	O K
8640 min Winter	99.262	0.262	0.0	2.0	2.0	99.6	O K
10080 min Winter	99.221	0.221	0.0	2.0	2.0	83.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
240 min Winter	9.376	0.0	247.6	244
360 min Winter	7.002	0.0	275.7	360
480 min Winter	5.618	0.0	292.8	474
600 min Winter	4.712	0.0	304.2	588
720 min Winter	4.072	0.0	312.0	702
960 min Winter	3.223	0.0	319.6	920
1440 min Winter	2.314	0.0	312.4	1170
2160 min Winter	1.672	0.0	399.2	1612
2880 min Winter	1.337	0.0	425.7	2072
4320 min Winter	0.993	0.0	473.2	2940
5760 min Winter	0.815	0.0	518.9	3752
7200 min Winter	0.706	0.0	562.0	4544
8640 min Winter	0.632	0.0	604.2	5280
10080 min Winter	0.580	0.0	645.9	6048

Rainfall Details

Rainfall Model	FEH	Winter Storms	Yes
Return Period (years)	2	Cv (Summer)	0.750
FEH Rainfall Version	2013	Cv (Winter)	0.840
Site Location	GB 529047 182363 TQ 29047 82363	Shortest Storm (mins)	15
Data Type	Point	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.790

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.250	4	8	0.250	8	12	0.290

Model Details

Storage is Online Cover Level (m) 100.000

Cellular Storage Structure

Invert Level (m) 99.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	**Area (m^2)**	**Inf. Area (m^2)**	**Depth (m)**	**Area (m^2)**	**Inf. Area (m^2)**
0.000	380.0	0.0	1.000	380.0	0.0

Pump Outflow Control

Invert Level (m) 99.000

Depth (m)	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**
0.100	2.0000	0.800	2.0000	2.000	2.0000	4.000	2.0000	7.000	2.0000
0.200	2.0000	1.000	2.0000	2.200	2.0000	4.500	2.0000	7.500	2.0000
0.300	2.0000	1.200	2.0000	2.400	2.0000	5.000	2.0000	8.000	2.0000
0.400	2.0000	1.400	2.0000	2.600	2.0000	5.500	2.0000	8.500	2.0000
0.500	2.0000	1.600	2.0000	3.000	2.0000	6.000	2.0000	9.000	2.0000
0.600	2.0000	1.800	2.0000	3.500	2.0000	6.500	2.0000	9.500	2.0000

Summary of Results for 30 year Return Period (+40%)

Half Drain Time : 226 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	99.485	0.485	0.0	14.0	14.0	184.3	O K
30 min Summer	99.606	0.606	0.0	14.0	14.0	230.2	O K
60 min Summer	99.699	0.699	0.0	14.0	14.0	265.5	O K
120 min Summer	99.817	0.817	0.0	14.0	14.0	310.3	Flood Risk
180 min Summer	99.838	0.838	0.0	14.0	14.0	318.5	Flood Risk
240 min Summer	99.828	0.828	0.0	14.0	14.0	314.5	Flood Risk
360 min Summer	99.781	0.781	0.0	14.0	14.0	296.8	Flood Risk
480 min Summer	99.726	0.726	0.0	14.0	14.0	276.0	Flood Risk
600 min Summer	99.672	0.672	0.0	14.0	14.0	255.3	O K
720 min Summer	99.619	0.619	0.0	14.0	14.0	235.4	O K
960 min Summer	99.522	0.522	0.0	14.0	14.0	198.3	O K
1440 min Summer	99.361	0.361	0.0	14.0	14.0	137.0	O K
2160 min Summer	99.198	0.198	0.0	14.0	14.0	75.1	O K
2880 min Summer	99.115	0.115	0.0	14.0	14.0	43.6	O K
4320 min Summer	99.079	0.079	0.0	11.1	11.1	30.2	O K
5760 min Summer	99.064	0.064	0.0	8.9	8.9	24.3	O K
7200 min Summer	99.054	0.054	0.0	7.6	7.6	20.6	O K
8640 min Summer	99.048	0.048	0.0	6.7	6.7	18.1	O K
10080 min Summer	99.043	0.043	0.0	6.0	6.0	16.3	O K
15 min Winter	99.547	0.547	0.0	14.0	14.0	208.0	O K
30 min Winter	99.686	0.686	0.0	14.0	14.0	260.6	O K
60 min Winter	99.796	0.796	0.0	14.0	14.0	302.5	Flood Risk
120 min Winter	99.942	0.942	0.0	14.0	14.0	358.0	Flood Risk
180 min Winter	99.979	0.979	0.0	14.0	14.0	372.0	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	134.997	0.0	199.8	25
30 min Summer	86.070	0.0	254.8	39
60 min Summer	52.328	0.0	309.9	66
120 min Summer	33.467	0.0	396.4	124
180 min Summer	25.086	0.0	445.7	180
240 min Summer	20.206	0.0	478.7	206
360 min Summer	14.643	0.0	520.4	268
480 min Summer	11.541	0.0	546.9	334
600 min Summer	9.558	0.0	566.1	400
720 min Summer	8.177	0.0	581.2	468
960 min Summer	6.373	0.0	604.0	598
1440 min Summer	4.477	0.0	636.4	846
2160 min Summer	3.150	0.0	671.7	1192
2880 min Summer	2.464	0.0	700.7	1504
4320 min Summer	1.763	0.0	752.0	2208
5760 min Summer	1.403	0.0	798.0	2936
7200 min Summer	1.184	0.0	841.9	3672
8640 min Summer	1.037	0.0	884.4	4408
10080 min Summer	0.931	0.0	926.3	5136
15 min Winter	134.997	0.0	223.8	25
30 min Winter	86.070	0.0	285.4	39
60 min Winter	52.328	0.0	347.1	66
120 min Winter	33.467	0.0	444.0	122
180 min Winter	25.086	0.0	499.2	178

Summary of Results for 30 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
240 min Winter	99.970	0.970	0.0	14.0	14.0	368.6	Flood Risk
360 min Winter	99.907	0.907	0.0	14.0	14.0	344.7	Flood Risk
480 min Winter	99.834	0.834	0.0	14.0	14.0	316.8	Flood Risk
600 min Winter	99.756	0.756	0.0	14.0	14.0	287.4	Flood Risk
720 min Winter	99.680	0.680	0.0	14.0	14.0	258.3	O K
960 min Winter	99.536	0.536	0.0	14.0	14.0	203.7	O K
1440 min Winter	99.302	0.302	0.0	14.0	14.0	114.7	O K
2160 min Winter	99.106	0.106	0.0	14.0	14.0	40.4	O K
2880 min Winter	99.081	0.081	0.0	11.4	11.4	30.8	O K
4320 min Winter	99.058	0.058	0.0	8.2	8.2	22.2	O K
5760 min Winter	99.047	0.047	0.0	6.5	6.5	17.7	O K
7200 min Winter	99.039	0.039	0.0	5.5	5.5	15.0	O K
8640 min Winter	99.035	0.035	0.0	4.9	4.9	13.1	O K
10080 min Winter	99.031	0.031	0.0	4.4	4.4	11.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
240 min Winter	20.206	0.0	536.2	232
360 min Winter	14.643	0.0	582.8	288
480 min Winter	11.541	0.0	612.5	362
600 min Winter	9.558	0.0	634.1	438
720 min Winter	8.177	0.0	651.0	508
960 min Winter	6.373	0.0	676.5	646
1440 min Winter	4.477	0.0	712.8	888
2160 min Winter	3.150	0.0	752.3	1152
2880 min Winter	2.464	0.0	784.8	1476
4320 min Winter	1.763	0.0	842.3	2212
5760 min Winter	1.403	0.0	893.8	2896
7200 min Winter	1.184	0.0	942.9	3680
8640 min Winter	1.037	0.0	990.6	4392
10080 min Winter	0.931	0.0	1037.5	5152

Rainfall Details

Rainfall Model	FEH	Winter Storms	Yes
Return Period (years)	30	Cv (Summer)	0.750
FEH Rainfall Version	2013	Cv (Winter)	0.840
Site Location	GB 529047 182363 TQ 29047 82363	Shortest Storm (mins)	15
Data Type	Point	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.790

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.250	4	8	0.250	8	12	0.290

Model Details

Storage is Online Cover Level (m) 100.000

Cellular Storage Structure

Invert Level (m) 99.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	380.0	0.0	1.000	380.0	0.0

Pump Outflow Control

Invert Level (m) 99.000

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	14.0000	0.800	14.0000	2.000	14.0000	4.000	14.0000	7.000	14.0000
0.200	14.0000	1.000	14.0000	2.200	14.0000	4.500	14.0000	7.500	14.0000
0.300	14.0000	1.200	14.0000	2.400	14.0000	5.000	14.0000	8.000	14.0000
0.400	14.0000	1.400	14.0000	2.600	14.0000	5.500	14.0000	8.500	14.0000
0.500	14.0000	1.600	14.0000	3.000	14.0000	6.000	14.0000	9.000	14.0000
0.600	14.0000	1.800	14.0000	3.500	14.0000	6.500	14.0000	9.500	14.0000

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 82 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	99.587	0.587	0.0	39.0	39.0	223.2	O K
30 min Summer	99.724	0.724	0.0	39.0	39.0	275.0	Flood Risk
60 min Summer	99.783	0.783	0.0	39.0	39.0	297.6	Flood Risk
120 min Summer	99.838	0.838	0.0	39.0	39.0	318.6	Flood Risk
180 min Summer	99.828	0.828	0.0	39.0	39.0	314.6	Flood Risk
240 min Summer	99.793	0.793	0.0	39.0	39.0	301.5	Flood Risk
360 min Summer	99.695	0.695	0.0	39.0	39.0	264.1	O K
480 min Summer	99.587	0.587	0.0	39.0	39.0	223.0	O K
600 min Summer	99.483	0.483	0.0	39.0	39.0	183.7	O K
720 min Summer	99.390	0.390	0.0	39.0	39.0	148.1	O K
960 min Summer	99.241	0.241	0.0	39.0	39.0	91.6	O K
1440 min Summer	99.101	0.101	0.0	39.0	39.0	38.3	O K
2160 min Summer	99.071	0.071	0.0	27.8	27.8	27.0	O K
2880 min Summer	99.055	0.055	0.0	21.5	21.5	21.0	O K
4320 min Summer	99.039	0.039	0.0	15.1	15.1	14.6	O K
5760 min Summer	99.030	0.030	0.0	11.8	11.8	11.4	O K
7200 min Summer	99.025	0.025	0.0	9.7	9.7	9.5	O K
8640 min Summer	99.022	0.022	0.0	8.5	8.5	8.2	O K
10080 min Summer	99.019	0.019	0.0	7.5	7.5	7.2	O K
15 min Winter	99.669	0.669	0.0	39.0	39.0	254.2	O K
30 min Winter	99.828	0.828	0.0	39.0	39.0	314.6	Flood Risk
60 min Winter	99.909	0.909	0.0	39.0	39.0	345.5	Flood Risk
120 min Winter	99.977	0.977	0.0	39.0	39.0	371.3	Flood Risk
180 min Winter	99.956	0.956	0.0	39.0	39.0	363.5	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	179.466	0.0	265.6	23
30 min Summer	115.404	0.0	341.7	36
60 min Summer	70.357	0.0	416.7	62
120 min Summer	45.255	0.0	536.1	98
180 min Summer	34.318	0.0	609.8	132
240 min Summer	27.902	0.0	661.1	166
360 min Summer	20.470	0.0	727.5	234
480 min Summer	16.234	0.0	769.3	298
600 min Summer	13.482	0.0	798.6	362
720 min Summer	11.546	0.0	820.7	420
960 min Summer	8.990	0.0	852.1	534
1440 min Summer	6.275	0.0	892.2	740
2160 min Summer	4.352	0.0	928.0	1104
2880 min Summer	3.356	0.0	954.2	1468
4320 min Summer	2.335	0.0	996.0	2200
5760 min Summer	1.814	0.0	1031.7	2936
7200 min Summer	1.501	0.0	1066.9	3672
8640 min Summer	1.291	0.0	1101.6	4344
10080 min Summer	1.142	0.0	1136.3	5064
15 min Winter	179.466	0.0	297.6	24
30 min Winter	115.404	0.0	382.7	36
60 min Winter	70.357	0.0	466.7	62
120 min Winter	45.255	0.0	600.4	106
180 min Winter	34.318	0.0	683.0	142

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
240 min Winter	99.900	0.900	0.0	39.0	39.0	342.1	Flood Risk
360 min Winter	99.746	0.746	0.0	39.0	39.0	283.4	Flood Risk
480 min Winter	99.581	0.581	0.0	39.0	39.0	220.7	O K
600 min Winter	99.427	0.427	0.0	39.0	39.0	162.4	O K
720 min Winter	99.295	0.295	0.0	39.0	39.0	112.2	O K
960 min Winter	99.119	0.119	0.0	39.0	39.0	45.2	O K
1440 min Winter	99.075	0.075	0.0	29.2	29.2	28.3	O K
2160 min Winter	99.052	0.052	0.0	20.2	20.2	19.8	O K
2880 min Winter	99.040	0.040	0.0	15.7	15.7	15.2	O K
4320 min Winter	99.028	0.028	0.0	11.0	11.0	10.6	O K
5760 min Winter	99.022	0.022	0.0	8.5	8.5	8.2	O K
7200 min Winter	99.018	0.018	0.0	7.1	7.1	6.9	O K
8640 min Winter	99.016	0.016	0.0	6.1	6.1	5.9	O K
10080 min Winter	99.014	0.014	0.0	5.4	5.4	5.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
240 min Winter	27.902	0.0	740.4	180
360 min Winter	20.470	0.0	814.8	252
480 min Winter	16.234	0.0	861.6	320
600 min Winter	13.482	0.0	894.5	382
720 min Winter	11.546	0.0	919.4	438
960 min Winter	8.990	0.0	954.4	524
1440 min Winter	6.275	0.0	999.2	738
2160 min Winter	4.352	0.0	1039.4	1108
2880 min Winter	3.356	0.0	1068.7	1452
4320 min Winter	2.335	0.0	1115.5	2176
5760 min Winter	1.814	0.0	1155.5	2928
7200 min Winter	1.501	0.0	1195.0	3680
8640 min Winter	1.291	0.0	1233.9	4312
10080 min Winter	1.142	0.0	1272.6	5024

Rainfall Details

Rainfall Model	FEH	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
FEH Rainfall Version	2013	Cv (Winter)	0.840
Site Location	GB 529047 182363 TQ 29047 82363	Shortest Storm (mins)	15
Data Type	Point	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.790

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.250	4	8	0.250	8	12	0.290

Model Details

Storage is Online Cover Level (m) 100.000

Cellular Storage Structure

Invert Level (m) 99.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	**Area (m²)**	**Inf. Area (m²)**	**Depth (m)**	**Area (m²)**	**Inf. Area (m²)**
0.000	380.0	0.0	1.000	380.0	0.0

Pump Outflow Control

Invert Level (m) 99.000

Depth (m)	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**
0.100	39.0000	0.800	39.0000	2.000	39.0000	4.000	39.0000	7.000	39.0000
0.200	39.0000	1.000	39.0000	2.200	39.0000	4.500	39.0000	7.500	39.0000
0.300	39.0000	1.200	39.0000	2.400	39.0000	5.000	39.0000	8.000	39.0000
0.400	39.0000	1.400	39.0000	2.600	39.0000	5.500	39.0000	8.500	39.0000
0.500	39.0000	1.600	39.0000	3.000	39.0000	6.000	39.0000	9.000	39.0000
0.600	39.0000	1.800	39.0000	3.500	39.0000	6.500	39.0000	9.500	39.0000

NOTES

1. Do not scale off this drawing.
2. This drawing is not for construction and is for information only to support planning.
3. This drawing has been based upon topographic survey drawing ref:42746T-01I-1 - 4 by Plowman Craven dated June 2018
4. This drawing has been based upon architectural layout drawing ref: ET-DR-A-20100 by 3XN dated Novemeber 2024.
5. This drawing has been based upon landscaper architect layout drawing ref: 364_20.001 by DSDHA
6. The proposed drainage strategy is subject to detailed design and formal approval of points of connection to public sewer by Thames Water at the rates noted.
7. This drawing is to be read in conjunction with Arup Flood Risk Assessment Ref: 281835-ARP-XX-XX-TN-CD-0001 and Arup Drainage Strategy Report Ref: 281835-ARP-XX-XX-TN-CD-0002

KEY

Existing

TWUL Combined sewer

Proposed

Site boundary

Indicative exceedance flow routing

Basement tank attenuation

Pumped flow control

Issue	Date	By	Chkd	Appd
02	26/11/24	RB	HT	SD
	Updated following design updates			
01	16/02/24	RB	NT	SD
	For Information			

ARUP

13 Fitzroy Street
London W1T 4BQ
Tel +44(0)20 7636 1531 Fax +44(0)20 7580 3924
www.arup.com

Client
British Land
Property Management Ltd

Job Title
Euston Tower New Build

Drawing Title
Drainage Strategy

Scale at A1: 1:500

Discipline: Drainage

Job No: 281835-00

Drawing Status: P1

Drawing No: 281835-ARP-XX-DR-CD-00001

Issue: 02

C:\Users\Robert.Belcher\Arup\281835-00 EUSTON TOWER NEW BUILD - Internal Data\01 Drawings\03 Civils\281835-ARP-XX-XX-DR-CD-0001.dwg 26 Nov 2024 18:10:33

Do not scale

D. Camden SuDS Pro-forma

Camden GREATER LONDON AUTHORITY LoDEG

1. Project & Site Details		
Project / Site Name (including sub-catchment / stage / phase where appropriate)	Euston Tower	
Address & post code	286 Euston Road, London, NW1 3DP	
OS Grid ref. (Easting, Northing)	E 529192	
	N 182362	
LPA reference (if applicable)		
Brief description of proposed work	Major retrofit of Euston Tower including the partial retention (retention of existing core, foundations and basement), disassembly and re-use	
Total site Area	7900	m^2
Total existing impervious area	7900	m^2
Total proposed impervious area	7900	m^2
Is the site in a surface water flood risk catchment (ref. local Surface Water Management Plan)?	No	
Existing drainage connection type and location	Connection into eixsting Thames Water combined sewer	
Designer Name	Robert Belcher	
Designer Position	Engineer	

2. Proposed Discharge Arrangements

2a. Infiltration Feasibility

Superficial geology classification	Lynch Hill Gravel	
Bedrock geology classification	London Clay	
Site infiltration rate	0	m/s
Depth to groundwater level	Unknown	m below ground level
Is infiltration feasible?	No	

2b. Drainage Hierarchy

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

2c. Proposed Discharge Details

Proposed discharge location	Euston Road (continue to use existing)
Has the owner/regulator of the discharge location been	Yes

	Designer Company	Arup

	consulted?	

3. Drainage Strategy

3a. Discharge Rates & Required Storage

	Greenfield (GF) runoff rate (l/s)	*Existing discharge rate (l/s)*	*Required storage for GF rate (m^3)*	*Proposed discharge rate (l/s)*
Qbar	1.2			
1 in 1	1	26.3		2
1 in 30	2.8	81.9		14.1
1 in 100	3.9	123		39
1 in 100 + CC				
Climate change allowance used		40%		

3b. Principal Method of Flow Control	Pump

3c. Proposed SuDS Measures

	Catchment area (m^2)	*Plan area (m^2)*	*Storage vol. (m^3)*
Rainwater harvesting	0		0
Infiltration systems	0		0
Green roofs	0	0	0
Blue roofs	0	0	0
Filter strips	0	0	0
Filter drains	0	0	0
Bioretention / tree pits	0	0	0
Pervious pavements	0	0	0
Swales	0	0	0
Basins/ponds	0	0	0
Attenuation tanks	7900		380
Total	7900	0	380

4. Supporting Information

4a. Discharge & Drainage Strategy	*Page/section of drainage report*
Infiltration feasibility (2a) – geotechnical factual and interpretive reports, including infiltration results	Not feasible due to underlying strata and existing basement which is to be retained (page 14, table 3) 281835-of ARP-XX-XX-RP-CD-0002-05
Drainage hierarchy (2b)	Page 8, table 7 (Addendum)
Proposed discharge details (2c) – utility plans, correspondence / approval from owner/regulator of discharge location	Page 3 (Addendum)
Discharge rates & storage (3a) – detailed hydrologic and hydraulic calculations	Page 3 (Addendum)
Proposed SuDS measures & specifications (3b)	Page 5 (Addendum)

4b. Other Supporting Details	*Page/section of drainage report*
Detailed Development Layout	Appendix
Detailed drainage design drawings, including exceedance flow routes	Appendix
Detailed landscaping plans	NA (see landscape document)
Maintenance strategy	Table 8 & 9
Demonstration of how the proposed SuDS measures improve:	
a) water quality of the runoff?	Table 5
b) biodiversity?	Table 5
c) amenity?	Table 5