C Proposed Site Layout

N
W
E
S

0 10m 20m

Colour Site Layout
Kenley Campus

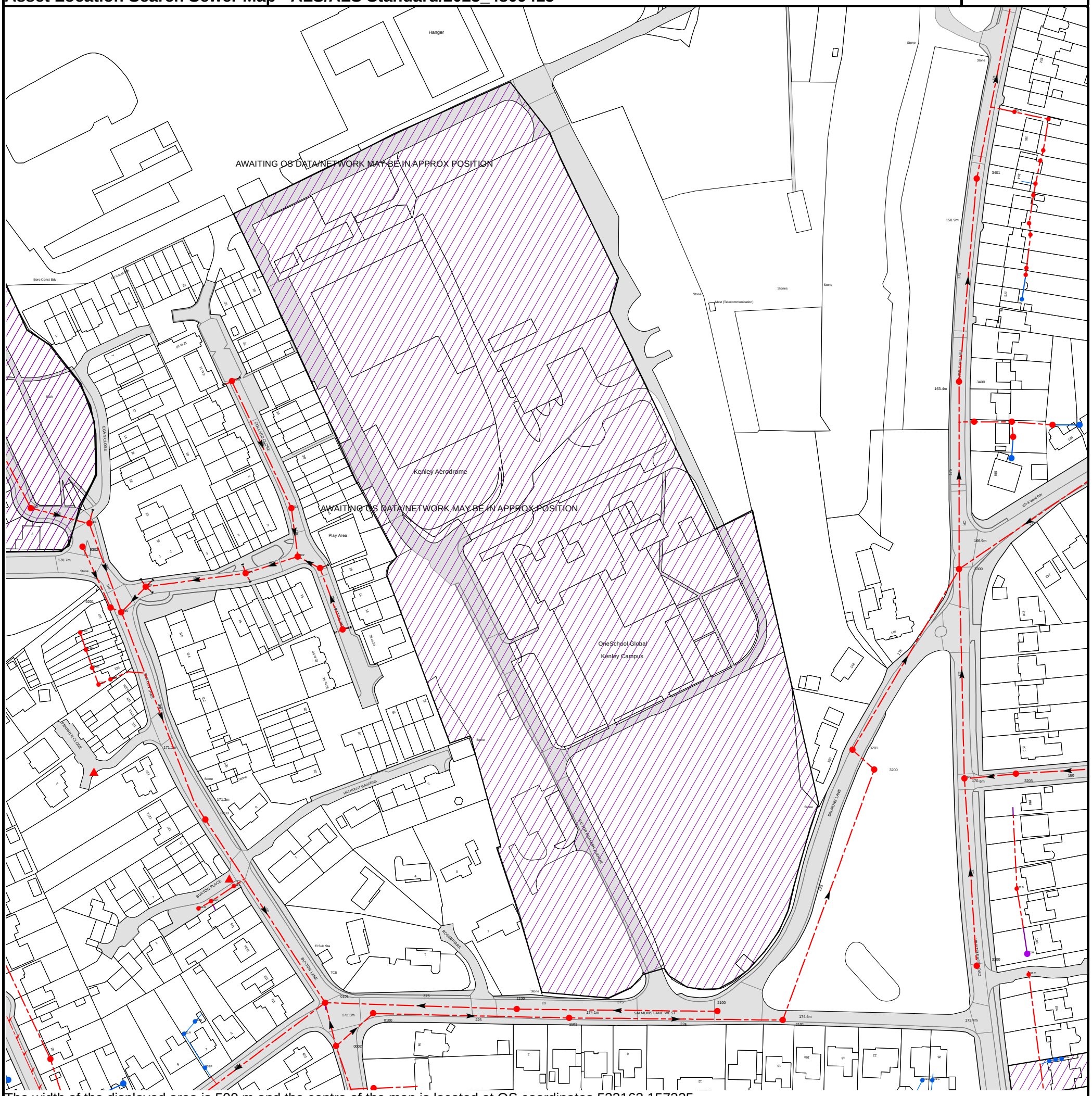
21125 / C104

Scale 1:500 @ A1 June 2023

OSP Architecture, Broadmede House, Farnham Business Park, Weydon Lane, Farnham, Surrey, GU9 8QT Tel: 01252 267878
www.osparchitecture.com

D Thames Water Asset Records

Asset Location Search Sewer Map - ALS/ALS Standard/2023_4809415



The width of the displayed area is 500 m and the centre of the map is located at OS coordinates 533163,157325

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
931D	171.02	169.77
921C	n/a	n/a
9302	170.79	169.6
931B	170.79	169.64
9201	n/a	n/a
9200	171.14	169.33
9301	171.47	169.72
041A	172.86	170.77
031A	172.34	170.02
031B	172.81	170.42
0302	172.73	170.23
021A	172.85	170.33
0200	171.06	168.75
921F	n/a	n/a
921G	n/a	n/a
921E	n/a	n/a
921D	n/a	n/a
90AI	n/a	n/a
90BA	n/a	n/a
90BI	n/a	n/a
911A	n/a	n/a
011B	n/a	n/a
011D	n/a	n/a
001F	n/a	n/a
011A	n/a	n/a
011C	n/a	n/a
0101	172.16	167.86
3400	n/a	n/a
3401	n/a	n/a
351A	n/a	n/a
34BF	n/a	n/a
34BE	n/a	n/a
34BD	n/a	n/a
34BB	n/a	n/a
34BC	n/a	n/a
34BA	n/a	n/a
34BI	n/a	n/a
35AF	n/a	n/a
35AE	n/a	n/a
35AD	n/a	n/a
0002	172.17	170.38
0201	172.94	170.48
0100	172.47	170.36
1100	173.72	170.47
1101	173.89	169.87
2100	174.24	172.79
2101	174.22	169.69
3201	171.17	169.19
3200	171.57	169.25
3300	n/a	n/a
3202	n/a	n/a
33AH	n/a	n/a
3100	n/a	n/a
33AJ	n/a	n/a
33AG	n/a	n/a
33AE	n/a	n/a
3203	n/a	n/a
311B	n/a	n/a
311A	n/a	n/a
311C	n/a	n/a
301F	n/a	n/a
33BA	n/a	n/a
301H	n/a	n/a
301G	n/a	n/a
43BD	n/a	n/a
0003	n/a	n/a
301D	n/a	n/a
301C	n/a	n/a

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Asset Location Search - Sewer Key

Public Sewer Types (Operated and maintained by Thames Water)

Foul Sewer: A sewer designed to convey waste water from domestic and industrial sources to a treatment works.

Surface Water Sewer: A sewer designed to convey surface water (e.g. rain water from roofs, yards and car parks) to rivers or watercourses.

Combined Sewer: A sewer designed to convey both waste water and surface water from domestic and industrial sources to a treatment works.

- Storm Sewer
- Sludge Sewer
- Foul Trunk Sewer
- Surface Trunk Sewer
- Combined Trunk Sewer
- Foul Rising Main
- Surface Water Rising Main
- Combined Rising Main
- Vacuum
- Thames Water Proposed
- Vent Pipe
- Gallery

Other Sewer Types (Not operated and maintained by Thames Water)

- Sewer
- Culverted Watercourse
- Proposed
- Decommissioned Sewer
- Content of this drainage network is currently unknown
- Ownership of this drainage network is currently unknown

Sewer Fittings

A feature in a sewer that does not affect the flow in the pipe. Example: a vent is a fitting as the function of a vent is to release excess gas.

- Air Valve
- Meter
- Dam Chase
- Vent
- Fitting

Operational Controls

A feature in a sewer that changes or diverts the flow in the sewer. Example: A hydrobrake limits the flow passing downstream.

- Ancillary
- Drop Pipe
- Control Valve
- Weir

End Items

End symbols appear at the start or end of a sewer pipe. Examples: an Undefined End at the start of a sewer indicates that Thames Water has no knowledge of the position of the sewer upstream of that symbol. Outfall on a surface water sewer indicates that the pipe discharges into a stream or river.

- Inlet
- Outfall
- Undefined End

Other Symbols

Symbols used on maps which do not fall under other general categories.

- Change of Characteristic Indicator
- Public / Private Pumping Station
- Invert Level
- Summit

Areas

Lines denoting areas of underground surveys, etc.

- Agreement
- Chamber
- Operational Site

Ducts or Crossings

- Casement

Ducts may contain high voltage cables. Please check with Thames Water.

- Conduit Bridge
- Subway
- Tunnel

Notes:

1) All levels associated with the plans are to Ordnance Datum Newlyn.
2) All measurements on the plan are metric.
3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate the direction of flow.
4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.
5) 'na' or '0' on a manhole indicates that data is unavailable.
6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in millimeters. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement.

If you are unsure about any text or symbology, please contact Property Searches on 0800 009 4540.

E HR Wallingford and Greenfield Calculations

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Anthony Horswell
Site name:	Kenley Campus
Site location:	Caterham

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:	51.29885° N
Longitude:	0.09052° W
Reference:	1614767310
Date:	May 16 2023 16:32

Runoff estimation approach

IH124

Site characteristics

Total site area (ha):	4.4

Methodology

Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics

	Default	Edited
SOIL type:	1	1
HOST class:	N/A	N/A
SPR/SPRHOST:	0.1	0.1

Hydrological characteristics

	Default	Edited
SAAR (mm):	780	780
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):	0.84	0.84
1 in 1 year (l/s):	0.71	0.71
1 in 30 years (l/s):	1.93	1.93
1 in 100 year (l/s):	2.68	2.68
1 in 200 years (l/s):	3.14	3.14

F Thames Water Pre-Planning Response

Paul Chance

Elliott Wood Partnership Ltd
241 The Broadway
Wimbledon
London
SW19 1SD

Wastewater pre-planning
Our ref DS6104068

16 June 2023

Pre-planning enquiry: Confirmation of sufficient capacity (Foul Only)

Site: KENLEY CAMPUS, VICTOR BEAMISH AVENUE, CATERHAM, CR3 5FX

Dear Paul,

Thank you for providing information on your development.

Proposal is for 88 new dwellings
Proposed foul water discharge via gravity into the existing 225mm foul water sewer between existing manholes TQ3357 1101 and 2101
Surface water discharge via SuDS

We have completed the assessment of the foul water flows and surface water run-off based on the information submitted in your application with the purpose of assessing sewerage capacity within the existing Thames Water sewer network.

Foul Water

If your proposals progress in line with the details you've provided, we're pleased to confirm that there will be sufficient sewerage capacity in the adjacent foul water sewer network to serve your development.

This confirmation is valid for 12 months or for the life of any planning approval that this information is used to support, to a maximum of three years.

You'll need to keep us informed of any changes to your design – for example, an increase in the number or density of homes. Such changes could mean there is no longer sufficient capacity.

Surface Water

In accordance with the Building Act 2000 Clause H3.3, positive connection of surface water to a public sewer will only be consented when it can be demonstrated that the hierarchy of disposal methods have been examined and proven to be impracticable. Before we can consider your surface water needs, you'll need written approval from the lead local flood authority that you have followed the sequential approach to the disposal of surface water and considered all practical means.

When developing a site, policy SI 13 of the London Plan states "Development proposals should aim to achieve greenfield run-off rates and 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:"

The disposal hierarchy being:

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

Where connection to the public sewerage network is still required to manage surface water flows, we will accept these flows at a discharge rate in line with CIRIA's best practice guide on SuDS or that stated within the sites planning approval.

Please see the attached 'Planning your wastewater' leaflet for additional information.

Source Protection Zone

The development site boundary falls within a Source Protection Zone for groundwater abstraction. These zones may be at particular risk from polluting activities on or below the land surface. To prevent pollution, the Environment Agency and Thames Water (or other local water undertaker) will use a tiered, risk-based approach to regulate activities that may impact groundwater resources, this may potentially affect your drainage or surface water strategies where deep or infiltration systems are proposed. The applicant is encouraged to read the Environment Agency's approach to groundwater protection (available at *https://www.gov.uk/government/publications/groundwater-protection-position-statements* and may wish to discuss the full implications for their development with a suitably qualified environmental consultant.

What happens next?

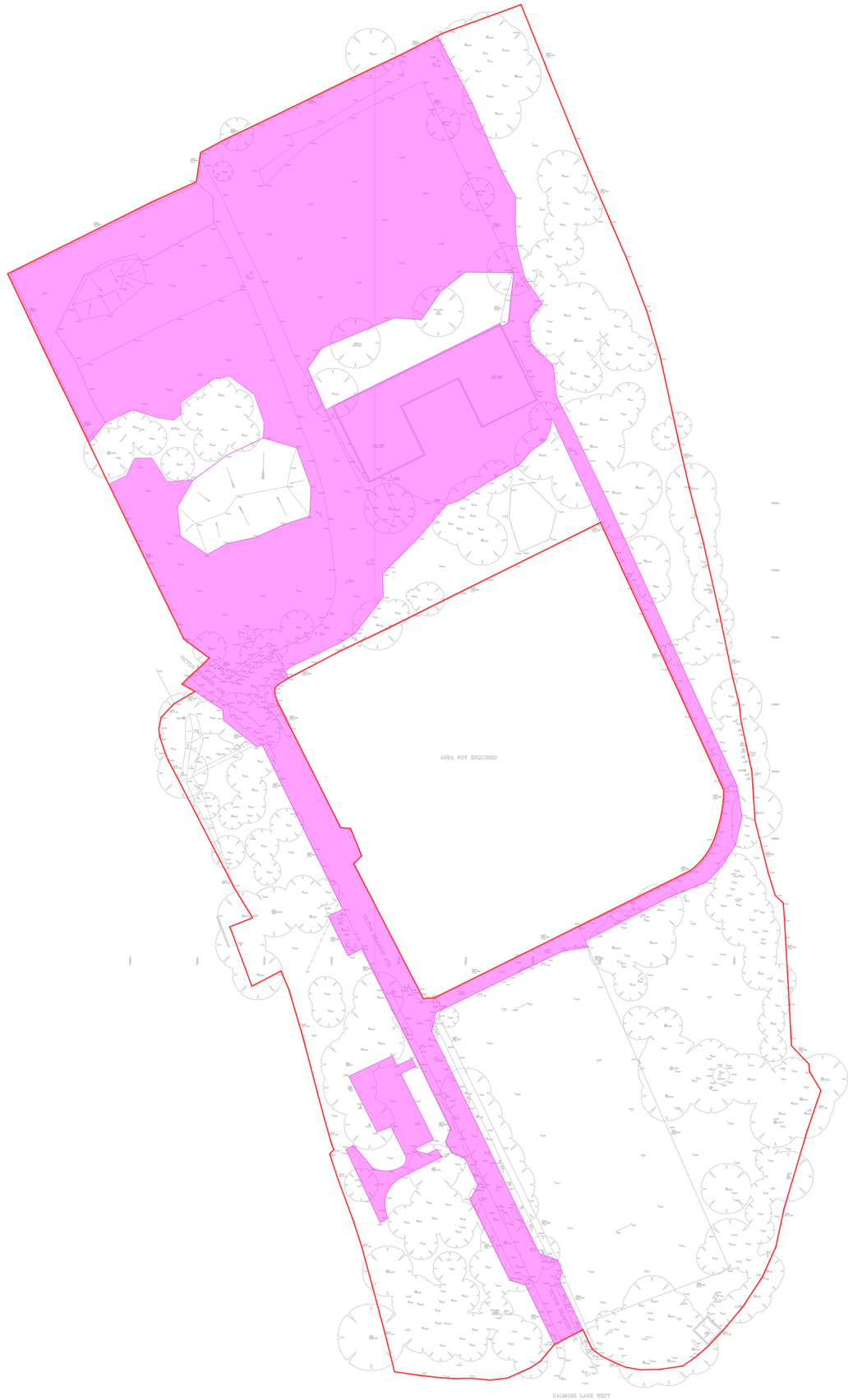
Please make sure you submit your connection application, giving us at least 21 days' notice of the date you wish to make your new connection/s.

If you have any further questions, please contact me on 0774 764 6498.

Kind Regards,

Long Tran
Developer Services – Adoptions Engineer, Sewer Adoptions Team
Tel: 0800 009 3921
Get advice on making your sewer connection correctly at connectright.org.uk
Clearwater Court, Vastern Road, Reading, RG1 8DB
Find us online at developers.thameswater.co.uk

G Existing and Proposed Impermeable Areas



This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.

Do not scale from this drawing.

LEGEND

EXISTING HARDSTANDING (19820m²)

SITE BOUNDARY

NOT FOR CONSTRUCTION

rev	sc	date	by	chk	description
P1	S2	23.05.23	AHo	PCh	Issued for information

elliottwood engineering a better society

Elliott Wood Partnership Ltd
Central London • Wimbledon • Nottingham
Consulting Structural and Civil Engineers
(020) 7499 5888 • elliottwood.co.uk

Project

Kenley Campus

Victor Beamish Way

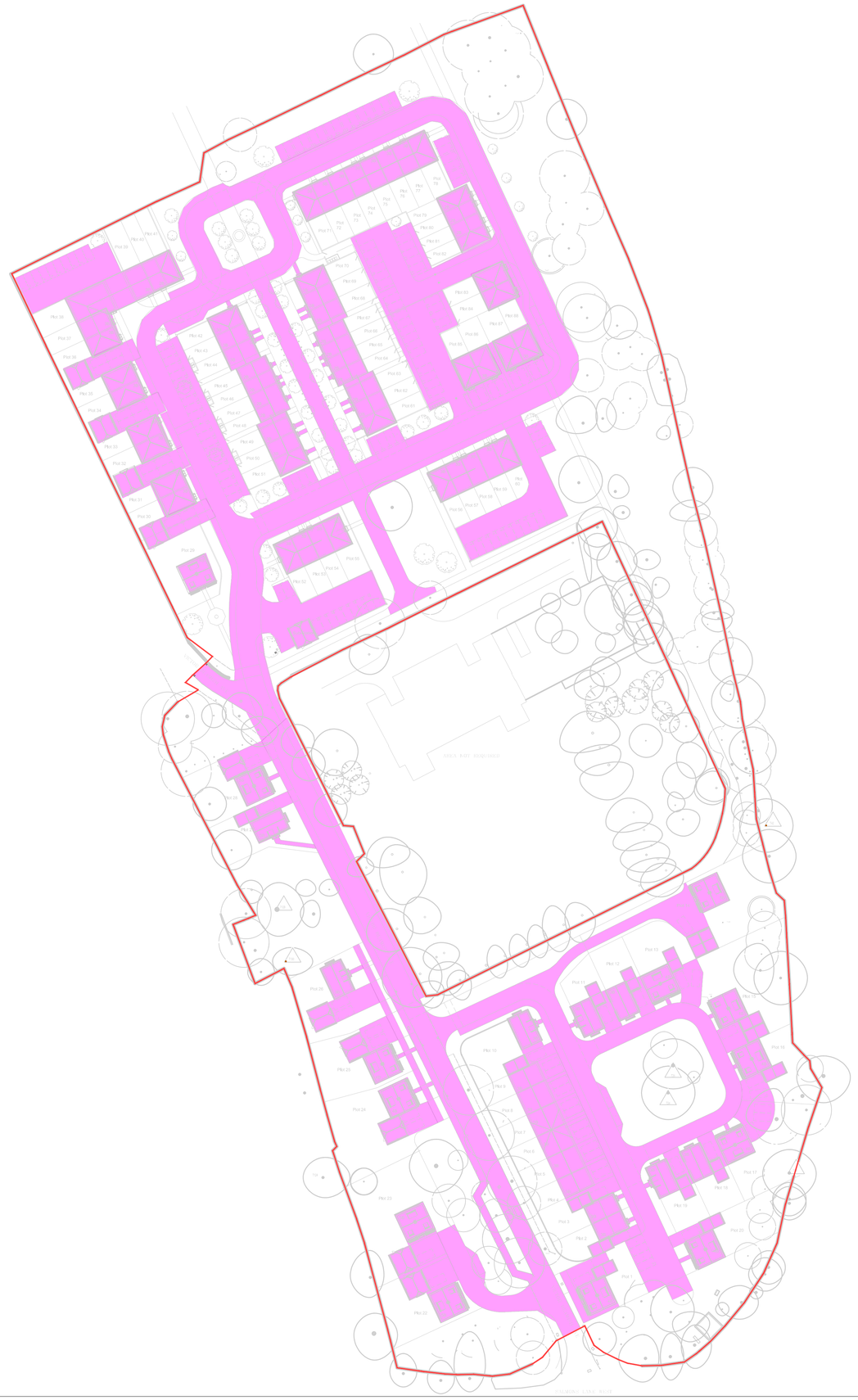
Drawing title

Existing Hardstanding

Scale (s)	Date	Drawn
1:750@ A1	May 2023	AHo

Drawing status	Status	Revision
Preliminary	S2	P1

Project no.	Originator	Zone	Level	Type	Role	drg no.
2230131	- EWP -	ZZ -	XX -	DR -	C -	20001



This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.

Do not scale from this drawing.

LEGEND

PROPOSED HARDSTANDING (20200m²)

SITE BOUNDARY

NOT FOR CONSTRUCTION

rev	sc	date	by	chk	description
P1	S2	23.05.23	AHo	PCh	Issued for information

elliottwood | engineering a better society

Elliott Wood Partnership Ltd
Central London • Wimbledon • Nottingham
Consulting Structural and Civil Engineers
(020) 7499 5888 • elliottwood.co.uk

Project

Kenley Campus

Victor Beamish Way

Drawing title

Proposed Hardstanding

Scale (s)	Date	Drawn
1:750@ A1	May 2023	AHo

Drawing status: Preliminary

Status: S2

Revision: P1

Project no.	Originator	Zone	Level	Type	Role	drg no.
2230131	EWP	ZZ	XX	DR	C	20000

H MicroDrainage Calculations

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	2
FEH Rainfall Version	1999
Site Location	GB 533127 157364 TQ 33127 57364
C (1km)	0.000
D1 (1km)	0.000
D2 (1km)	0.000
D3 (1km)	0.000
E (1km)	0.000
F (1km)	0.000
Maximum Rainfall (mm/hr)	75
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	1.000
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	1.500
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	1.641	4-8	0.581

Total Area Contributing (ha) = 2.222

Total Pipe Volume (m³) = 2.089

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	10.734	0.100	107.3	2.222	5.00	0.0	0.600	o	300	Pipe/Conduit	
1.001	4.814	0.125	38.5	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.002	14.008	0.125	112.1	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	

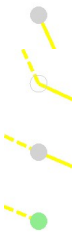
Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	11.72	5.12	171.100	2.222	0.0	0.0	0.0	1.52	107.2	94.1
1.001	11.65	5.15	171.000	2.222	0.0	0.0	0.0	2.54	179.6	94.1
1.002	11.31	5.31	170.875	2.222	0.0	0.0	0.0	1.48	104.9	94.1

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
DUMMY	173.100	2.000	Open Manhole	1200	1.000	171.100	300				
STORAGE	173.100	2.100	Junction		1.001	171.000	300	1.000	171.000	300	
DB SOAKWAY 1	173.100	2.225	Open Manhole	1500	1.002	170.875	300	1.001	170.875	300	
DUMMY OUTFALL	173.100	2.350	Open Manhole	1200		OUTFALL		1.002	170.750	300	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
DUMMY	533207.689	157222.354	533207.689	157222.354	Required	
STORAGE	533212.259	157212.642			No Entry	
DB SOAKWAY 1	533216.616	157210.594	533216.616	157210.594	Required	
DUMMY OUTFALL	533229.536	157205.181			No Entry	



PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	300	DUMMY	173.100	171.100	1.700	Open Manhole	1200
1.001	o	300	STORAGE	173.100	171.000	1.800	Junction	
1.002	o	300	DB SOAKWAY 1	173.100	170.875	1.925	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	10.734	107.3	STORAGE	173.100	171.000	1.800	Junction	
1.001	4.814	38.5	DB SOAKWAY 1	173.100	170.875	1.925	Open Manhole	1500
1.002	14.008	112.1	DUMMY OUTFALL	173.100	170.750	2.050	Open Manhole	1200

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	2.222	2.222	2.222
1.001	-	-	100	0.000	0.000	0.000
1.002	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				2.222	2.222	2.222

Simulation Criteria for Storm

Volumetric Runoff Coeff	1.000	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Offline Controls	0	Number of Time/Area Diagrams	0
Number of Online Controls	1	Number of Storage Structures	2	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH	E (1km)	0.000
Return Period (years)	2	F (1km)	0.000
FEH Rainfall Version	1999	Summer Storms	Yes
Site Location	GB 533127 157364 TQ 33127 57364	Winter Storms	Yes
C (1km)	0.000	Cv (Summer)	1.000
D1 (1km)	0.000	Cv (Winter)	0.840
D2 (1km)	0.000	Storm Duration (mins)	30
D3 (1km)	0.000		

Online Controls for Storm

Pump Manhole: DB SOAKWAY 1, DS/PN: 1.002, Volume (m³): 0.3

Invert Level (m) 170.875

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)
0.200	0.0000	1.400	0.0000	2.600	0.0000	3.800	0.0000	5.000	0.0000
0.400	0.0000	1.600	0.0000	2.800	0.0000	4.000	0.0000	5.200	0.0000
0.600	0.0000	1.800	0.0000	3.000	0.0000	4.200	0.0000	5.400	0.0000
0.800	0.0000	2.000	0.0000	3.200	0.0000	4.400	0.0000	5.600	0.0000
1.000	0.0000	2.200	0.0000	3.400	0.0000	4.600	0.0000	5.800	0.0000
1.200	0.0000	2.400	0.0000	3.600	0.0000	4.800	0.0000	6.000	0.0000

Storage Structures for Storm

Cellular Storage Manhole: STORAGE, DS/PN: 1.001

Invert Level (m) 171.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	20.0	100.0	0.800	20.0	132.0	0.801	0.0	132.0

Deep Bore Soakaway Manhole: DB SOAKWAY 1, DS/PN: 1.002

Chamber Invert Level (m) 145.875 Infiltration Coefficient Base (m/hr) 3.40560
Chamber Diameter/Length (m) 1.500 Safety Factor 2.0
Borehole Diameter (m) 0.150
Borehole Depth (m) 25.000

Depth (m)	Side Infil. Coef. (m/hr)	Depth (m)	Side Infil. Coef. (m/hr)	Depth (m)	Side Infil. Coef. (m/hr)
0.000	0.00000	10.600	3.40560	25.000	3.40560

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 2 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FEH	D3 (1km)	0.000
FEH Rainfall Version	1999	E (1km)	0.000
Site Location	GB 533127 157364 TQ 33127 57364	F (1km)	0.000
C (1km)	0.000	Cv (Summer)	1.000
D1 (1km)	0.000	Cv (Winter)	1.000
D2 (1km)	0.000		

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	OFF
Inertia Status	OFF

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
1.000	DUMMY	15 Winter	1	+0%	1/15 Summer				171.426	0.026
1.001	STORAGE	15 Summer	1	+0%	1/15 Summer				171.424	0.124
1.002	DB SOAKWAY 1	15 Summer	1	+0%	1/15 Summer				171.426	0.251

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	DUMMY	0.000	0.49			39.1	SURCHARGED	
1.001	STORAGE	0.000	0.10		58	8.9	SURCHARGED*	
1.002	DB SOAKWAY 1	0.000	0.00		95	0.0	SURCHARGED	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 2 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FEH	D3 (1km)	0.000
FEH Rainfall Version	1999	E (1km)	0.000
Site Location	GB 533127 157364 TQ 33127 57364	F (1km)	0.000
C (1km)	0.000	Cv (Summer)	1.000
D1 (1km)	0.000	Cv (Winter)	1.000
D2 (1km)	0.000		

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	OFF
Inertia Status	OFF

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
1.000	DUMMY	15 Winter	30	+0%	1/15 Summer				171.426	0.026
1.001	STORAGE	15 Summer	30	+0%	1/15 Summer				171.424	0.124
1.002	DB SOAKWAY 1	15 Summer	30	+0%	1/15 Summer				171.426	0.251

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	DUMMY	0.000	0.49			39.1	SURCHARGED	
1.001	STORAGE	0.000	0.10		58	8.9	SURCHARGED*	
1.002	DB SOAKWAY 1	0.000	0.00		95	0.0	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 2 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FEH	D3 (1km)	0.000
FEH Rainfall Version	1999	E (1km)	0.000
Site Location	GB 533127 157364 TQ 33127 57364	F (1km)	0.000
C (1km)	0.000	Cv (Summer)	1.000
D1 (1km)	0.000	Cv (Winter)	1.000
D2 (1km)	0.000		

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	OFF
Inertia Status	OFF

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
1.000	DUMMY	15 Winter	100	+40%	1/15 Summer				171.598	0.198
1.001	STORAGE	15 Winter	100	+40%	1/15 Summer				171.595	0.295
1.002	DB SOAKWAY 1	15 Summer	100	+40%	1/15 Summer				171.596	0.421

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	DUMMY	0.000	0.60			47.6	SURCHARGED	
1.001	STORAGE	0.000	0.10		81	8.9	SURCHARGED*	
1.002	DB SOAKWAY 1	0.000	0.00		126	0.0	SURCHARGED	

Drainage Drawing

This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.

Do not scale from this drawing.

LEGEND

- GEOCELLULAR ATTENUATION TANK
- PERMEABLE PAVING
- SWALE
- FILTER STRIPS
- PROPOSED SURFACE WATER SEWER
- PROPOSED DEEP BORE SOAKAWAY
- SITE BOUNDARY

NOT FOR CONSTRUCTION

rev	sc	date	by	chk	description
P1	S2	23.05.23	AHo	PCh	Issued for information

elliottwood engineering a better society

Elliott Wood Partnership Ltd
Central London • Wimbledon • Nottingham
Consulting Structural and Civil Engineers
(020) 7499 5888 • elliottwood.co.uk

Project

Kenley Campus

Victor Beamish Way

Drawing title

Proposed Below Ground Drainage General Arrangement

Scale (s)	Date	Drawn
1:750@ A1	May 2023	AHo

Drawing status	Status	Revision
Preliminary	S2	P1

Project no.	Originator	Zone	Level	Type	Role	drg no.
2230131	EWP	ZZ	XX	DR	C	10000

J Surrey Surface Water Drainage Pro-forma

Surface Water Drainage Summary Pro-forma

Introduction

Surrey County Council (SCC) as Lead Local Flood Authority (LLFA) recommends this pro-forma is completed in full and should be submitted with any planning application which seeks permission for 'major' development. The information contained in this form will be used by SCC in its role as LLFA as a 'statutory consultee' on Sustainable Drainage Systems (SuDS) for all 'major' planning applications. The pro-forma should be completed in conjunction with the SCC SuDS Design Guidance. The pro-forma will accompany the site-specific Flood Risk Assessment and Drainage Strategy submitted as part of the planning application.

Please complete this pro-forma in full for full applications and the coloured sections for outline applications. This will help us identify what information has been included and will assist in our review process.

All bracketed numbers refer to the relevant note on page 5 of this document.

Site Details

1.0 Site Detail Questions

Question number	Question	Answer (to be completed or delete as applicable)	Required
1.1	Planning application reference (if known)	N/A	Outline & Full
1.2	Site name	Kenley Campus	Outline & Full
1.3	Total application site area (1) (in hectares)	4.4	Outline & Full
1.4	Predevelopment use (4)	Historically was used RAF land. The buildings have since been demolished but much of the land is still underlain by hardstanding. The south of the site is used as a sports field.	Outline & Full
1.5	Urban Creep applicable	Yes	Outline & Full

1.6	If Urban Creep required, factor applied (percentage)	10% (20 dwelling per hectare)	Outline & Full
1.7	Proposed design life / planning application life (in years)	????	Outline & Full
1.9	Have agreements in principle (where applicable) for discharge been provided	Yes/No	Outline & Full

2.0 Method(s) of Discharge (5)

Question number	Question	Answer (delete as applicable)	Required
2.1	Reuse	Yes (water butts)	Full
2.2	Infiltration	Yes (deep bore soakaway)	Full
2.3	Hybrid	No	Full
2.4	Watercourse	No	Full
2.5	Surface Water Sewer	No	Full
2.6	Combined sewer	No	Full

Calculation Inputs

3.0 Calculation input questions

Question number	Question	Answer (to be completed or delete as applicable)	Required
3.1	Area within proposed site which is drained by SuDS (2) (in hectares)	2.02	Outline & Full
3.2	Impermeable area drained predevelopment (3) (in hectares)	1.98	Outline & Full
3.3	Impermeable area drained post development (3) (in hectares)	2.02	Outline & Full
3.4	Additional impermeable area (Question 3.3 minus Question 3.2) (in hectares)	+10% urban creep (0.202 ha)	Outline & Full
3.5	Method for assessing greenfield runoff rate	IH124 Approach	Outline & Full
3.6	Method for assessing brownfield runoff rate (if applicable)	As there is no formal surface water drains on the existing site we have not calculated the existing	Outline & Full

		brownfield rate	
3.7	Coefficient of runoff (6) (Cv)	1	Outline & Full
3.8	Source of rainfall data (FEH Preferred)	FEH	Outline & Full
3.9	Climate change factor applied (percentage)	40%	Full

4.0 Attenuation (positive outlet) (13)

Question number	Question	Answer (to be completed or delete as applicable)	Required
4.1	Drainage outlet at risk of drowning (elevated water levels in watercourse/sewer)	OUTLINE	Full
4.2	Invert level at final outlet (in metres above ordnance datum)	OUTLINE	Full
4.3	Design level used for surcharged water level at outlet (13) (in metres above ordnance datum)	OUTLINE	Full

5.0 Infiltration (Discharge to Ground)

Question number	Question	Answer (to be completed or delete as applicable)	Required
5.1	Have infiltration tests been undertaken	Yes	Outline & Full
5.2	If yes, which method has been used	Falling Head	Outline & Full
5.3	Infiltration rate (where applicable) (in metres per second)	$9.46x10^{-4}$	Outline & Full
5.4	Depth to highest known ground water table (in metres above ordnance datum)	OUTLINE	Full
5.5	Depth of infiltration feature (in metres above ordnance datum)	OUTLINE	Full
5.6	Factor of safety used for sizing infiltration storage	OUTLINE	Full

Calculation Outputs

Section 6.0, 7.0 and 8.0 refer to sites where storage is provided by full attenuation or partial infiltration. For sites where all flows are infiltrated to ground go straight to Section 9.0.

6.0 Greenfield runoff rates

Question number	Question	Answer (to be completed)	Required
6.1	1 in 1 year rainfall (in litres per second)	0.71	Outline & Full

6.2	1 in 30 year rainfall (in litres per second)	1.93	Outline & Full
6.3	1 in 100 year rainfall (in litres per second)	2.68	Outline & Full
6.4	Qbar (in litres per second)	0.84	Outline & Full

7.0 Brownfield runoff rates (if applicable)

Question number	Question	Answer (to be completed)	Required
7.1	1 in 1 year rainfall (in litres per second)	N/A	Outline & Full
7.2	1 in 30 year rainfall (in litres per second)	N/A	Outline & Full
7.3	1 in 100 year rainfall (in litres per second)	N/A	Outline & Full

8.0 Proposed maximum rate of runoff from site (incl. Urban Creep) (7)

Question number	Question	Answer (to be completed)	Required
8.1	1 in 1 year rainfall (in litres per second)	N/A	Outline & Full
8.2	1 in 30 year rainfall (in litres per second)	N/A	Outline & Full
8.3	1 in 100 year rainfall plus climate change allowance (in litres per second)	N/A	Outline & Full

9.0 Attenuation storage to manage flow rates from site (inclusive of Climate Change Allowance and Urban Creep)

Question number	Question	Answer (to be completed)	Required
9.1	Volume of Storage for the 1 in 100 year plus Climate Change Allowance (9) (in metres cubed)	OUTLINE	Full
9.2	50% storage drain down time for 1 in 30 year rainfall (in hours)	OUTLINE	Full

10.0 Volume control provision

Question number	Question	Answer (to be completed)	Required
10.1	Interception losses (11) (in metres cubed)	OUTLINE	Full
10.2	Rain harvesting (in metres cubed)	OUTLINE	Full
10.3	Infiltration (in metres cubed)	OUTLINE	Full
10.4	Attenuation (in metres cubed)	OUTLINE	Full
10.5	Separate volume designated as long-term storage (12) (in metres cubed)	OUTLINE	Full
10.6	Total volume control (sum of inputs for Questions 10.1 to 10.5) (in metres cubed)	OUTLINE	Full

11.0 Site storage volumes (for sites proposing full infiltration only)

Question number	Question	Answer (to be completed)	Required
11.1	Volume of Storage for the 1 in 30 year (8)	OUTLINE	Full
11.2	Volume of Storage for the 1 in 100 year plus Climate Change Allowance (10)	OUTLINE	Full

Notes

1. All area within the proposed application site boundary to be included.

2. The site area which is positively drained includes all green areas which drain to the SuDS system and area of surface SuDS features. It excludes large open green spaces which do not drain to the SuDS system.

3. Impermeable area should be measured pre and post development. Impermeable surfaces include roofs, pavements, driveways and paths; where runoff is conveyed to the drainage system.

4. Predevelopment use may impact on the allowable discharge rate. The LLFA will seek for reduction in flow rates to greenfield (SCC SuDS Design Guidance).

5. Runoff may be discharged via one or more methods.

6. Sewers for Adoption 7th Edition recommends a Cv of 100% when designing drainage for impermeable area (assumes no loss of runoff from impermeable surfaces) and 0% for permeable areas. Where lower Cv's are used the applicant should justify the selection of Cv.

7. It is Surrey County Council's preference that discharge rates for all events up to the 1 in 100 year rainfall event plus climate change match the greenfield rate for the same rainfall event.

8. Storage for the 1 in 30 year rainfall event must be fully contained within the SuDS components. Note that standing water within SuDS components such as ponds, basins and swales is not classified as flooding. Storage should be calculated for the critical duration rainfall event.

9. Runoff generated from rainfall events up to the 1 in 100 year rainfall event will not be allowed to leave the site in an uncontrolled way. Temporary flooding of designated areas to shallow depths and velocities may be acceptable.

10. Climate change is specified between 10% and 40% increase to rainfall intensity depending upon the design life of the development. Sensitivity testing should be carried out up to the 40% climate change allowance.

11. Where Source Control is provided Interception losses will occur. An allowance of 5mm rainfall depth can be subtracted from the net inflow to the storage calculation where interception losses are demonstrated. The Applicant should demonstrate use of sub-catchments and source control techniques. Further information is available in the SCC SuDS Design Guide.

12. Flows within long term storage areas should be infiltrated to the ground or discharged at low flow rate of maximum 2 l/s/ha.

13. Careful consideration should be used for calculations where flow control / storage is likely to be influenced by surcharged sewer or peak levels within a watercourse. Calculations should demonstrate that risk of drowned outlet has been taken into consideration. Vortex controls require conditions of free discharge to operate as per specification.

elliottwood | engineering a better **society**

London
55 Whitfield Street
Fitzrovia
W1T 4AH
+44 207 499 5888

Wimbledon
241 The Broadway
London
SW19 1SD
+44 208 544 0033

Nottingham
1 Sampsons Yard
Halifax Place
Nottingham
NG1 1QN
+44 870 460 0061

www.elliottwood.co.uk