SURVEY STATIONS			
Name	Easting	Northing	Height
STN1	465021.074	155570.993	71.879
STN2	465029.217	155524.557	71.987
STN3	464943.054	155561.627	72.505
STN4	464959.211	155616.109	72.094
STN5	465012.306	155630.374	71.847
STN6	465047.129	155606.677	71.692
STN7	465065.118	155619.389	71.756
STN8	465082.302	155601.885	72.282
STN9	464949.586	155603.077	72.209
STN10	464989.644	155568.109	72.089
STN11	464946.302	155529.452	72.682
STNX1	465010.457	155635.293	71.970
STNX2	465076.778	155572.088	72.176
STNX3	465076.778	155572.088	71.883
STNX4	465061.825	155605.245	71.883
STNX5	465057.017	155639.962	71.758
STNX6	465029.020	155584.404	71.907
STNX7	465022.582	155634.829	71.734
STNX8	465022.582	155634.829	71.734
STNX9	464949.586	155603.077	72.209

Crockford Lane

Legend

ars	air raid shelter	mw	monitoring well
bdm	boundary marker	nb	notice board
bh	borehole	oh	overhead
bk w	brick wall	pbx	post box
bol	bollard	po	post
bm	benchmark	pl	pavement light
bs	bus stop	re	rodding eye
btc	telephone inspection cover	rg	road gulley
catv	cable tv cover	rnp	road name plate
cbd	cupboard	ret w	retaining wall
conc	concrete	rwp	rainwater pipe
ch	channel	rp	reflector post
chy	chimney	rs	road sign
cl t s	carriage	sc	stop cock
col	column	sf	silo
cul	culvert	sta	survey station
cw	concrete wall	sps	slippery surface
d	diameter	sp	sign post
dk	dropped kerb	svp	soil & vent pipe
dp	downpipe	sw	stone wall
dr	drain	tbx	telephone box
elx	electricity box	tl	traffic light
ep	electricity pylon	tp	telegraph pole
em	electricity marker	tw	timber wall
er	earthing rod	tsc	traffic signal cover
fb	flowerbed	u/s	underside
ft	footbridge	ult	unable to lift
FFL	finished floor level	vp	vent pipe
fh	fire hydrant	w	well
fp	flagpole	wm	water meter
g	gulley	wsc	water stop cock
gm	gas marker	wsv	water stop valve
gp	gate post		
gsc	gas stop cock	**Fence details**	
gsv	gas stop valve	bwf	barbed wire fence
h	high	clf	close boarded fence
hd	head	crf	corrugated iron fence
hyd	hydrant	clf	chain-link fence
ir	inspection cover	rpf	rheinhold pale fence
l	lower level	gh	gate hurdle
jbx	junction box	irf	iron rail fence
kb	kerb	ref	interwoven fence
ko	kerb outlet	rwf	metal rail fence
le	leading tile edge	mpf	metal panel fence
lp	lamp post	msf	metal security fence
lc	lamp column	prf	post & rail fence
te	leading tile edge	pwf	post & wire fence
mk	multi-bole	wh	woven hurdle
mh	manhole	wmf	wire mesh fence
mp	marker post		
ms	milestone		

Grid Origin OSGB

TITLE/PROJECT

Lindenwood

Chineham Business Park

Crockford Lane

Basingstoke

RG24 8QY

Survey Drawing

SOLENT SURVEYS

BUILDING AND LAND SURVEY CONSULTANTS

FOREST COTTAGE 16 WOOD ROAD

ASHURST SOUTHAMPTON SO40 7BD

T: 02380 411 661

E: mail@solentsurveys.co.uk

W: www.solentsurveys.co.uk

SCALE 1:200 (0 1 2 3 4 5)	DRAWN BY J.R.Chalk ACInstCES
DATE Jan 2023	LEVELS BASED ON GPS/OSBM Datum
DRAWING NUMBER 14614 | S1	REVISIONS

Appendix F

Utility Survey Map

Sheet Layout

Sheet 1

SHEET NO 1

ABBREVIATIONS

AR	Assumed Route	Mtr	Meter
BO	Bollard	OH	Overhead Service
BH	Borehole	OSA	Off Survey Area
BTB	British Telecom Box	PR	Pipe Riser
BTC	British Telecom Cover	RE	Rodding Eye
CP	Cable Pit	RWP	Rain Water Pipe
CTV	Cable TV	RS	Rod stop
CP	Catch Pit	RE	Rodding Eye
Co	Concrete	S/A	Soakaway
CL	Cover Level	ST	Stop Tap
DP	Down Pipe	SV	Stop Valve
ER	Earth Rod	SVP	Soil Vent Pipe
EIC	Electricity IC	SVS	Soil Vapour Sample
EP	Electricity Pole	TFR	Taken From Records
EOT	End of Trace	TP	Telegraph Pole
FH	Fire Hydrant	UTL	Unable to Lift
GV	Gas Valve	UTR	Unable to Radar
G	Gully	UTS	Unable to Survey
IC	Inspection Cover	UTT	Unable to Trace
IL	Invert Level	VE	Vapour Recovery
LP	Lamp Post	VP	Vent Pipe
MH	Manhole Cover	WM	Water Meter

Inspection Covers
IC:BT British Telecom
IC:CATV Cable Television
IC:COM Data Communications
IC:ELEC Electricity

Man Holes
MH:FW Foul Water
MH:SW Storm Water
MH:WTD Walk Through Ducts

LEGEND

Co, He, Fe, Fibe, Ch, Ch, Kb, Dk, Wall, Con, Ve, Asp

SURVEY BOUNDARY

Tree, Manhole, Building, Manhole triangle, Pillar, Manhole circle, Valves, Gully, LP, PO, BO, TP/EP

GEOTECHNICAL KEY

Bore hole, Trial pit

STATION INFORMATION

Survey Stations, Permanent ground marker, Bench mark

UTILITY KEY

LOW VOLTAGE ELV ELV
HIGH VOLTAGE EHV EHV
MULTI DUCT ELEC DUCT DUCT
TRAFFIC MANAGEMENT TM TM
POWER PWR PWR
ELECTRICAL LINE OVERHEAD ELO ELO
CLOSE CIRCUIT TV CCTV CCTV
CABLE TV CATV CATV
DATA COMMUNICATIONS COM COM
HEATING PIPE HP HP
GAS GAS GAS
LOW VOLTAGE LV LV
BRITISH TELECOM BT BT
FOUL WATER FW FW
SURFACE WATER SW SW
COMBINED DRAIN CD CD
PUMPING MAIN PM PM
GAS GAS GAS
WATER WTR WTR
RADIO LOCATE GPR GPR
RADIO LOCATE STL STL
UNKNOWN CULVITS UNK UNK

Detected Using Electromagnetic Location Methods
Example: Any metals plant/cable. Accuracy +/- 5% of depth reading.

Detected Using Electromagnetic Location Methods
Example: Using a sonde to locate drainage pipework. Accuracy +/- 5% of depth reading.

Detected Using Ground Penetrating Radar.
Example: An object or plastic pipe not located by other means.
Accuracy dependent on ground conditions.

LEVELS

LOCAL DATUM: ☐
GPS OS DATUM: ☒
PREVIOUS SURVEY: ☐

GRID

LOCAL & ARBITARY: ☐
GPS OS GRID: ☒
PREVIOUS SURVEY: ☐

NORTH INDICATIVE ONLY

APPROX.

ADP

THE SURVEY ASSOCIATION
AFFILIATE MEMBER

- Utility Mapping Surveys
- Topographical Surveys

NOTES

UNABLE TO LOCATE GAS ON SITE - TFR.

UNABLE TO LOCATE WATER ON SITE AND IN FOOTPATH - ASSUMED PLASTIC.

CLIENT:
FRASERS PROPERTY

TITLE:
LINDENWOOD UTILITY SURVEY
CHINEHAM BUSINESS PARK

REVISION HISTORY

REVISION	DATE	DRAWING CHANGE
--	--	
--	--	--
--	--	--
--	--	--
--	--	--

Original Scale:	Dimension In:	Drawn:	Checked:
1:-- @ A0	m mm Levels Depths	JB	--
		Date: 15/12/22	Date: ------

Drawing Number: ADP-LINDENWOOD UTILITY SURVEY

Iss. --

Electro-magnetic and/or GPR (ground penetrating radar) techniques have been used in the location of underground services and other features. The results are not 100% accurate and accuracy is reliant on electronic equipment. Although all reasonable effort has been made in searching available record drawings, the completeness of the underground services information cannot be guaranteed. Where quoted, depth estimations are to the centre of service or feature, -/+5%. Depths to gravity sewers and drains are generally to invert levels unless otherwise stated. Pipe sizes which cannot be obtained by visual survey are taken from record drawings or marker plates where available. adp always recommend, in accordance with HS(G)47, that safe digging techniques, i.e., vacuum excavation, are employed for the intrusive excavation around suspected buried services, adp are not responsible for any inaccuracies.

Appendix G

Thames Water Asset Location Map

Asset location search

Property Searches

motion

GUILDFORD
GU1 4AU

Search address supplied

Lindenwood
Crockford Lane
Lindenwood
Chineham
Basingstoke
RG24 8QY

Your reference frchi4/2210020

Our reference ALS/ALS Standard/2023_4918921

Search date 30 November 2023

Notification of Price Changes

From 1st April 2023 Thames water Property Searches will be increasing the prices of its CON29DW, CommercialDW Drainage & Water Enquiries and Asset Location Searches. Historically costs would rise in line with RPI but as this currently sits at 14.2%, we are capping it at 10%.

Customers will be emailed with the new prices by January 1st 2023.

Any orders received with a higher payment prior to the 1st April 2023 will be non-refundable. For further details on the price increase please visit our website at www.thameswater-propertysearches.co.uk

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

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

0800 009 4540

Asset location search

Thames Water Property Searches

Search address supplied: Lindenwood, Crockford Lane, Lindenwood, Chineham, Basingstoke, RG24 8QY

Dear Sir / Madam

An Asset Location Search is recommended when undertaking a site development. It is essential to obtain information on the size and location of clean water and sewerage assets to safeguard against expensive damage and allow cost-effective service design.

The following records were searched in compiling this report: - the map of public sewers & the map of waterworks. Thames Water Utilities Ltd (TWUL) holds all of these.

This searchprovides maps showing the position, size of Thames Water assets close to the proposed development and also manhole cover and invert levels, where available.

Please note that none of the charges made for this report relate to the provision of Ordnance Survey mapping information. The replies contained in this letter are given following inspection of the public service records available to this company. No responsibility can be accepted for any error or omission in the replies.

You should be aware that the information contained on these plans is current only on the day that the plans are issued. The plans should only be used for the duration of the work that is being carried out at the present time. Under no circumstances should this data be copied or transmitted to parties other than those for whom the current work is being carried out.

Thames Water do update these service plans on a regular basis and failure to observe the above conditions could lead to damage arising to new or diverted services at a later date.

Contact Us

If you have any further queries regarding this enquiry please feel free to contact a member of the team on 0800 009 4540, or use the address below:

Thames Water Utilities Ltd
Property Searches
PO Box 3189
Slough
SL1 4WW

Email: searches@thameswater.co.uk
Web: www.thameswater-propertysearches.co.uk

Waste Water Services

Please provide a copy extract from the public sewer map.

Enclosed is a map showing the approximate lines of our sewers. Our plans do not show sewer connections from individual properties or any sewers not owned by Thames Water unless specifically annotated otherwise. Records such as "private" pipework are in some cases available from the Building Control Department of the relevant Local Authority.

Where the Local Authority does not hold such plans it might be advisable to consult the property deeds for the site or contact neighbouring landowners.

This report relates only to sewerage apparatus of Thames Water Utilities Ltd, it does not disclose details of cables and or communications equipment that may be running through or around such apparatus.

The sewer level information contained in this response represents all of the level data available in our existing records. Should you require any further Information, please refer to the relevant section within the 'Further Contacts' page found later in this document.

For your guidance:

- The Company is not generally responsible for rivers, watercourses, ponds, culverts or highway drains. If any of these are shown on the copy extract they are shown for information only.
- Any private sewers or lateral drains which are indicated on the extract of the public sewer map as being subject to an agreement under Section 104 of the Water Industry Act 1991 are not an ‘as constructed’ record. It is recommended these details be checked with the developer.

Clean Water Services

Please provide a copy extract from the public water main map.

With regard to the fresh water supply, this site falls within the boundary of another water company. For more information, please redirect your enquiry to the following address:

South East Water
Rocfort Road
Snodland

Asset location search

Property Searches

Kent
ME6 5AH

Tel: 0845 301 0845

www.southeastwater.co.uk.

For your guidance:

- Assets other than vested water mains may be shown on the plan, for information only.
- If an extract of the public water main record is enclosed, this will show known public water mains in the vicinity of the property. It should be possible to estimate the likely length and route of any private water supply pipe connecting the property to the public water network.

Payment for this Search

A charge will be added to your suppliers account.

Further contacts:

Waste Water queries

Should you require verification of the invert levels of public sewers, by site measurement, you will need to approach the relevant Thames Water Area Network Office for permission to lift the appropriate covers. This permission will usually involve you completing a TWOSA form. For further information please contact our Customer Centre on Tel: 0845 920 0800. Alternatively, a survey can be arranged, for a fee, through our Customer Centre on the above number.

If you have any questions regarding sewer connections, budget estimates, diversions, building over issues or any other questions regarding operational issues please direct them to our service desk. Which can be contacted by writing to:

Developer Services (Waste Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk

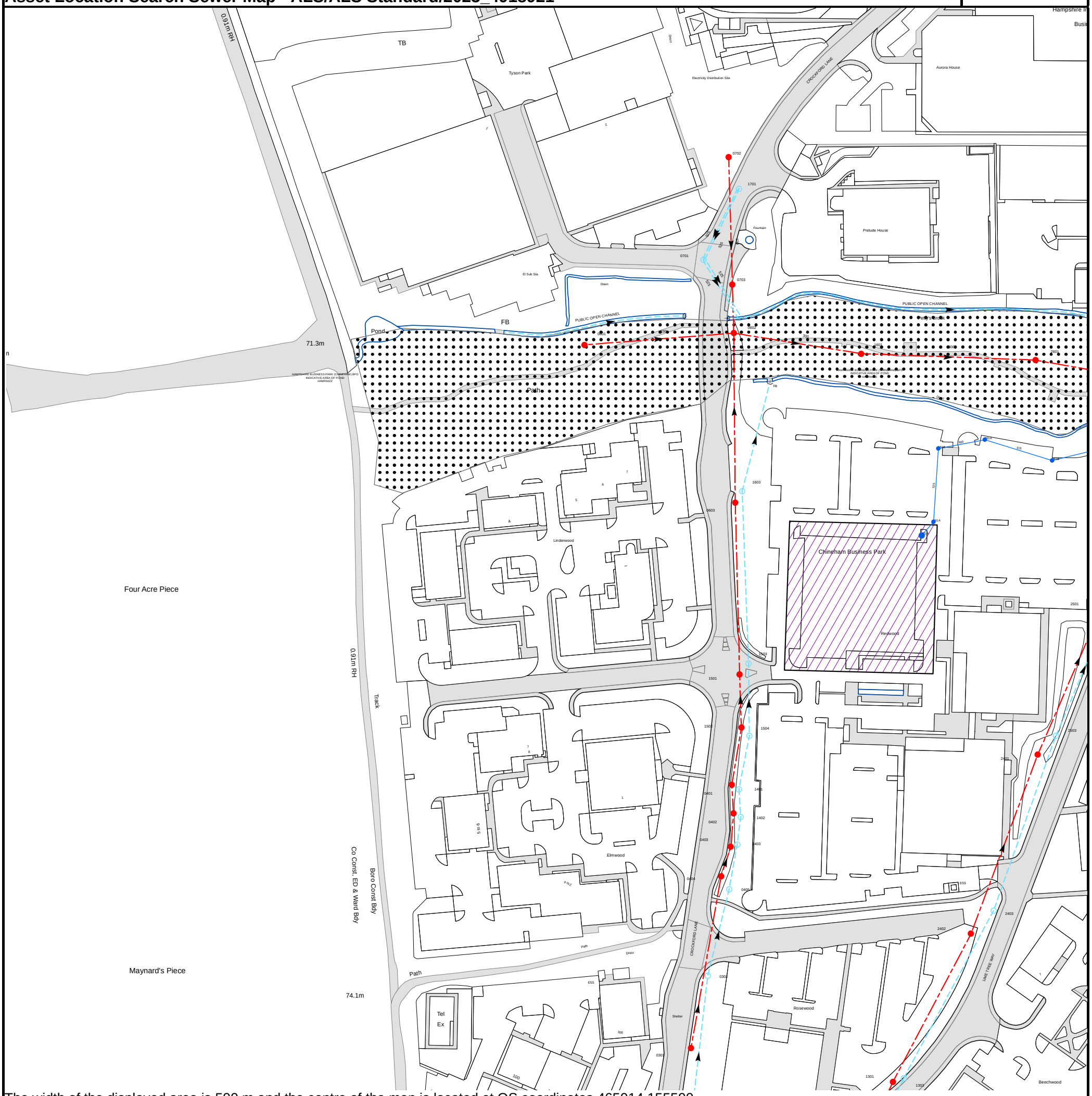
Clean Water queries

Should you require any advice concerning clean water operational issues or clean water connections, please contact:

Developer Services (Clean Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk

Asset Location Search Sewer Map - ALS/ALS Standard/2023_4918921



The width of the displayed area is 500 m and the centre of the map is located at OS coordinates 465014,155590

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
261B	n/a	n/a
2503	n/a	n/a
0301	n/a	n/a
0302	n/a	n/a
2402	n/a	n/a
2403	n/a	n/a
0405	n/a	n/a
0404	n/a	n/a
0403	n/a	n/a
1403	n/a	n/a
1402	n/a	n/a
0402	n/a	n/a
1401	n/a	n/a
0401	n/a	n/a
2401	n/a	n/a
1504	n/a	n/a
1502	n/a	n/a
1301	n/a	n/a
1303	n/a	n/a
1501	n/a	n/a
1503	n/a	n/a
151A	71.33	70.04
161A	71.17	69.87
0603	n/a	n/a
1603	n/a	n/a
161B	n/a	n/a
261A	n/a	n/a
2601	70.68	68.41
1601	70.79	68.63
0601	71.34	69.49
0602	71.21	68.87
0703	71.16	68.88
0701	71.31	69.78
1701	71.38	69.65
0702	71.59	69.31

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
- Conduit Bridge
- Subway
- Tunnel

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

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.

Payment Terms and Conditions

All sales are made in accordance with Thames Water Utilities Limited (TWUL) standard terms and conditions unless previously agreed in writing.

1. All goods remain in the property of Thames Water Utilities Ltd until full payment is received.
2. Provision of service will be in accordance with all legal requirements and published TWUL policies.
3. All invoices are strictly due for payment within 14 days of the date of the invoice. Any other terms must be accepted/agreed in writing prior to provision of goods or service or will be held to be invalid.
4. Penalty interest may be invoked by TWUL in the event of unjustifiable payment delay. Interest charges will be in line with UK Statute Law 'The Late Payment of Commercial Debts (Interest) Act 1998'.
5. Interest will be charged in line with current Court Interest Charges, if legal action is taken.
6. A charge may be made at the discretion of the company for increased administration costs.

A copy of Thames Water's standard terms and conditions are available from the Commercial Billing Team (cashoperations@thameswater.co.uk).

We publish several Codes of Practice including a guaranteed standards scheme. You can obtain copies of these leaflets by calling us on 0800 316 9800.

If you are unhappy with our service, you can speak to your original goods or customer service provider. If you are still not satisfied with the outcome provided, we will refer the matter to a Senior Manager for resolution who will provide you with a response.

If you are still dissatisfied with our final response, and in certain circumstances such as you are buying a residential property or commercial property within certain parameters, The Property Ombudsman will investigate your case and give an independent view. The Ombudsman can award compensation of up to £25,000 to you if he finds that you have suffered actual financial loss and/or aggravation, distress, or inconvenience because of your search not keeping to the Code. Further information can be obtained by visiting www.tpos.co.uk or by sending an email to admin@tpos.co.uk.

If the Goods or Services covered by this invoice falls under the regulation of the 1991 Water Industry Act, and you remain dissatisfied you can refer your complaint to Consumer Council for Water on 0300 034 2222 or write to them at Consumer Council for Water, 1st Floor, Victoria Square House, Victoria Square, Birmingham, B2 4AJ.

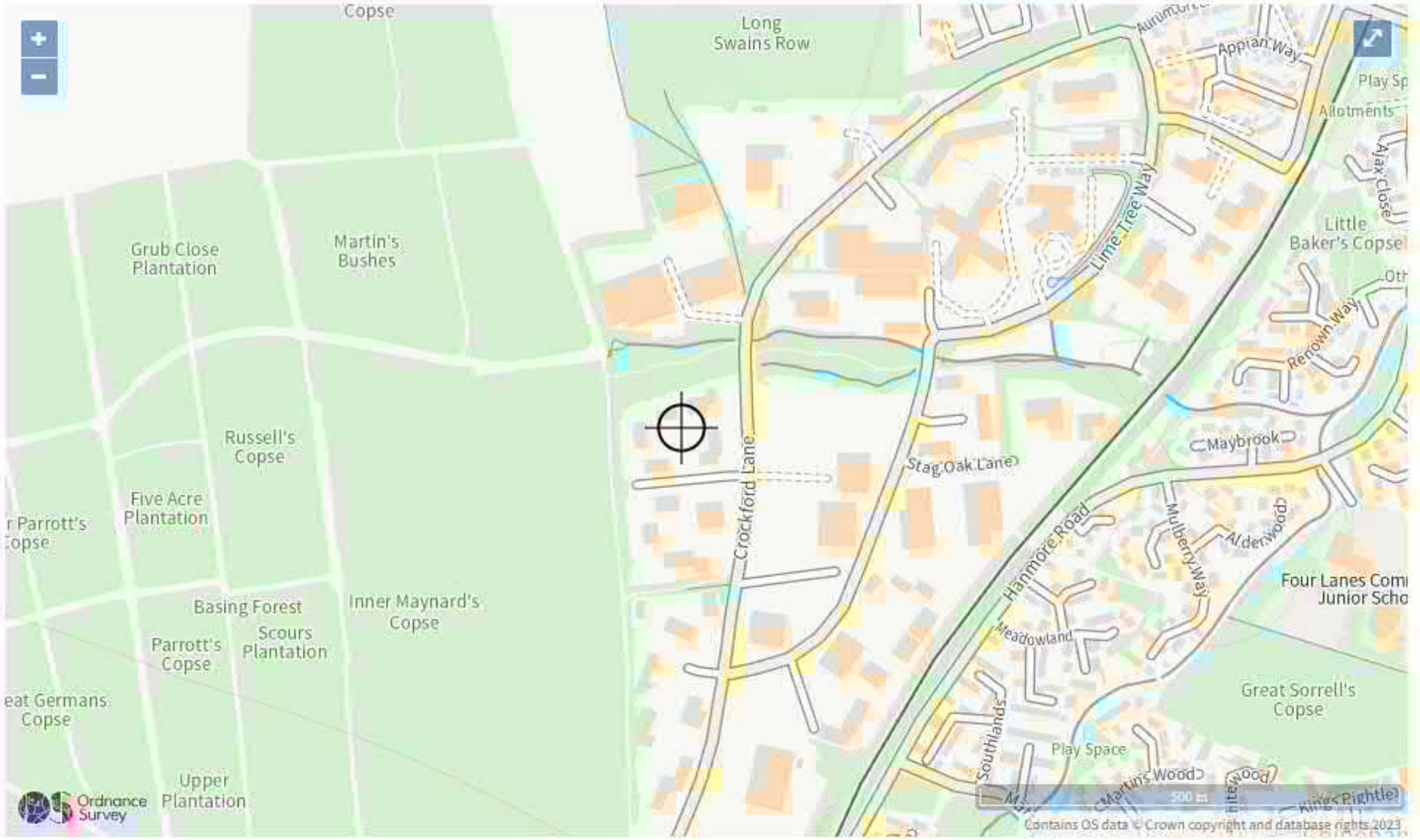
Ways to pay your bill

Credit Card	**BACS Payment**	**Telephone Banking**
Please Call **0800 009 4540** quoting your invoice number starting CBA or ADS	Account number **90478703** Sort code **60-00-01** A remittance advice must be sent to: **Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW.** or email **ps.billing@thameswater.co.uk**	By calling your bank and quoting: Account number **90478703** Sort code **60-00-01** and your invoice number

Appendix H

Reservoir Flood Risk Map

Reservoir Flood Risk Map



Maximum extent of flooding from reservoirs:

when river levels are normal | when there is also flooding from rivers | Location you selected

Appendix I

UDS Greenfield Runoff Calculation

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Laura Jagiela
Site name:	Lindenwood
Site location:	Chineham Business Park

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:	51.29558° N
Longitude:	1.06903° W
Reference:	3165912479
Date:	Dec 01 2023 16:38

Runoff estimation approach

IH124

Site characteristics

Total site area (ha): 1.6

Methodology

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

Soil characteristics

	Default	Edited
SOIL type:	4	4
HOST class:	N/A	N/A
SPR/SPRHOST:	0.47	0.47

Hydrological characteristics

	Default	Edited
SAAR (mm):	714	714
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):	7.91	7.91
1 in 1 year (l/s):	6.72	6.72
1 in 30 years (l/s):	18.18	18.18
1 in 100 year (l/s):	25.22	25.22
1 in 200 years (l/s):	29.57	29.57

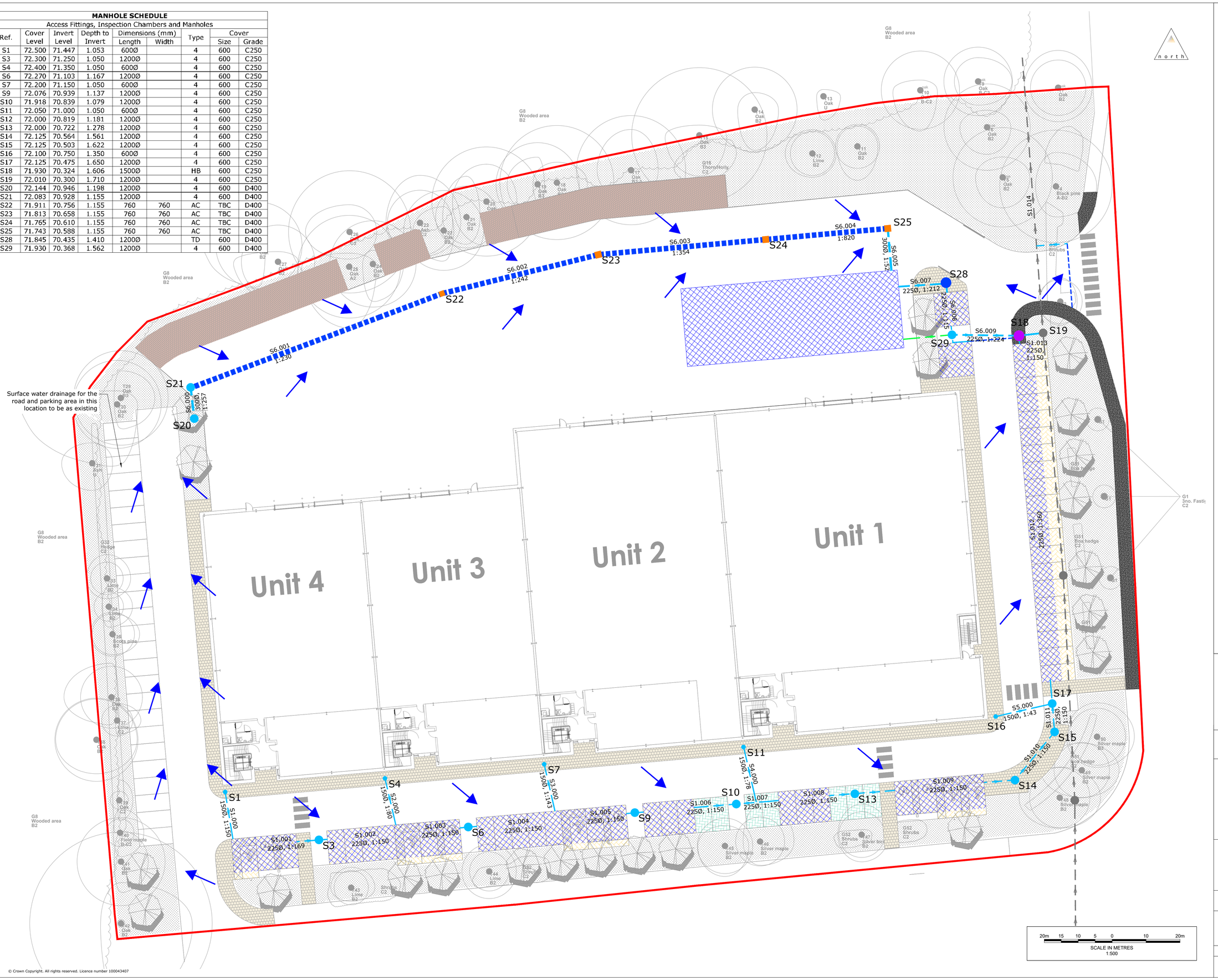
Appendix J

Proposed Surface Water Drainage Strategy Layout

MANHOLE SCHEDULE

Access Fittings, Inspection Chambers and Manholes

Ref.	Cover Level	Invert Level	Depth to Invert	Dimensions (mm) Length	Dimensions (mm) Width	Type	Cover Size	Cover Grade
S1	72.500	71.447	1.053	600Ø		4	600	C250
S3	72.300	71.250	1.050	1200Ø		4	600	C250
S4	72.400	71.350	1.050	600Ø		4	600	C250
S6	72.270	71.103	1.167	1200Ø		4	600	C250
S7	72.200	71.150	1.050	600Ø		4	600	C250
S9	72.076	70.939	1.137	1200Ø		4	600	C250
S10	71.918	70.839	1.079	1200Ø		4	600	C250
S11	72.050	71.000	1.050	600Ø		4	600	C250
S12	72.000	70.819	1.181	1200Ø		4	600	C250
S13	72.000	70.722	1.278	1200Ø		4	600	C250
S14	72.125	70.564	1.561	1200Ø		4	600	C250
S15	72.125	70.503	1.622	1200Ø		4	600	C250
S16	72.100	70.750	1.350	600Ø		4	600	C250
S17	72.125	70.475	1.650	1200Ø		4	600	C250
S18	71.930	70.324	1.606	1500Ø		HB	600	C250
S19	72.010	70.300	1.710	1200Ø		4	600	C250
S20	72.144	70.946	1.198	1200Ø		4	600	D400
S21	72.083	70.928	1.155	1200Ø		4	600	D400
S22	71.911	70.756	1.155	760	760	AC	TBC	D400
S23	71.813	70.658	1.155	760	760	AC	TBC	D400
S24	71.765	70.610	1.155	760	760	AC	TBC	D400
S25	71.743	70.588	1.155	760	760	AC	TBC	D400
S28	71.845	70.435	1.410	1200Ø		TD	600	D400
S29	71.930	70.368	1.562	1200Ø		4	600	D400



Notes

1. All levels and dimensions are to be checked on site before any work commences. All dimensions are in metres unless stated otherwise.
2. This drawing has been based upon survey information supplied by Solent Surveys and Motion cannot guarantee the accuracy of the data provided.
3. Any discrepancies should be reported to the architect and/or engineer immediately, so that clarification can be sought prior to the commencement of works.
4. This drawing should be read in conjunction with all other relevant architect and engineering details, drawings and specification.
5. The exact location of all private rainwater pipes are to be confirmed with the architect details prior to commencement of works.
6. The contractor is to keep a record of any variations made onsite, including the relocation of sewers or drains, for their 'As-Built' drawings to be prepared upon project completion.
7. All works to the private drainage system to be in accordance with the Building Regulations Approved Document 'H', 2015 edition.
8. 350mm minimum cover is to be provided for private pipes laid in soft/paved areas, with 900mm minimum cover to be provided for private pipes laid beneath roads / driveways unless not practicable. Where unachievable, shallow pipe drains may require protection using concrete surround or paving slabs bridging the trench, subject to the NHBC Inspector's requirements.
9. Manholes situated within areas accessible to motor vehicles are to be fitted with suitable strength covers and frames.
10. Adjacent areas of hardstanding will comply with building regulations and divert water away from the proposed dwellings.
11. The top surface of the pervious pavement should finish at least 150mm below any adjoining DPC level. Advice should always be sought from the manufacturer.
12. Manhole cover levels and inclination shall be set on site to suit the finished ground profile.
13. The Surface Water Drainage Strategy is based on preliminary levels and is subject to detailed design.

Legend

- Development Site Boundary
- Indicative Existing Surface Water Gravity Pipe
- Indicative Surface Water Manhole Locations
- New surface water gravity drain - refer to drawing for pipe sizes and gradients
- New Surface Water Catchpit Manhole - Refer to drawing for chamber diameter specification
- New SW Catchpit Inspection Chamber [Ø600mm]
- ACO Qmax Access Chamber
- Proposed Proprietary Treatment Device - Up-Flo Filter or similar
- New Surface Water Hydro-Brake Flow Control Chamber - 19.4 l/s 100 year + 45% climate change critical flow rate
- New Surface Water Linear Drainage - ACO Qmax 900 channel or similar with sump unit
- Type C No Infiltration Pervious Pavement - total depth 430mm including 150mm Permavoid geocellular storage
- Type B Partial Infiltration Pervious Pavement including within Tree root protection zone - total depth 230mm
- Type C No Infiltration Pervious Pavement - total depth minimum 1050mm including 400-800mm geocellular storage suitable for minimum 650mm cover
- SX.000; XXXØ @ 1:X — Pipe reference - refer to MicroDrainage calculations for full specification
- Proposed Slope Arrow / Exceedance
- New Surface Water Linear Drainage - ACO M150 PPD 0.0J or similar with sump unit
- Geocellular Attenuation Storage - 11.5x32.0x0.4m suitable for minimum 900mm cover
- High level overflow pipe

Revision	Notes	Drn	Chk	App	Date
B	Second Issue	ST	CG	JM	19/12/2023
A	First Issue	ST	CG	JM	08/12/2023

Drawing Status:

FINAL
FOR PLANNING NOT FOR CONSTRUCTION

motion
Guildford - Reading - London
www.motion.co.uk

Client:
Aviemore Trustee Limited

Project:
Chineham Business Park, Lindenwood

Title:
Surface Water Drainage Strategy

Scale: 1:500	Size: A1	Project No: 2210020

Drawing:	Revision:
2210020-0500	B

C:\Users\hhavat\Motion\Staff\Site - Fr\H4 2210020\Drawings\2210020-0500 B (Surface Water Drainage Strategy).dwg

Appendix K

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)	100
FEH Rainfall Version	2013
Site Location	GB 465150 155700 SU 65150 55700
Data Type	Catchment
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	40
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

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Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.372	4-8	0.452	8-12	0.160	12-16	0.160	16-20	0.085

Total Area Contributing (ha) = 1.229

Total Pipe Volume (m³) = 58.542

Network Design Table for Storm

« - Indicates pipe capacity < flow

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
S1.000	7.006	0.047	149.1	0.048	15.00	0.0	0.600	o	150	Pipe/Conduit	
S1.001	12.673	0.075	169.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.002	11.669	0.078	149.6	0.017	0.00	0.0	0.600	o	225	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)
S1.000	50.00	15.14	71.447	0.048	0.0	0.0	2.6	0.82	14.5	9.1
S1.001	50.00	15.35	71.325	0.048	0.0	0.0	2.6	1.00	39.9	9.1
S1.002	50.00	15.54	71.250	0.065	0.0	0.0	3.5	1.07	42.4	12.4

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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
S2.000	8.278	0.103	80.4	0.097	15.00	0.0	0.600	o	150	Pipe/Conduit	
S1.003	10.406	0.069	150.8	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.004	13.113	0.087	150.7	0.030	0.00	0.0	0.600	o	225	Pipe/Conduit	
S3.000	8.419	0.059	142.7	0.117	15.00	0.0	0.600	o	150	Pipe/Conduit	
S1.005	11.515	0.077	149.5	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.006	14.990	0.100	149.9	0.033	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.007	2.960	0.020	150.0	0.019	0.00	0.0	0.600	o	225	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)
S2.000	50.00	15.12	71.350	0.097	0.0	0.0	5.2	1.12	19.8	18.3
S1.003	50.00	15.70	71.172	0.162	0.0	0.0	8.8	1.06	42.2	30.7
S1.004	50.00	15.90	71.103	0.192	0.0	0.0	10.4	1.06	42.3	36.4
S3.000	50.00	15.17	71.150	0.117	0.0	0.0	6.4	0.84	14.8«	22.3
S1.005	50.00	16.08	71.016	0.309	0.0	0.0	16.8	1.07	42.4«	58.6
S1.006	50.00	16.32	70.939	0.342	0.0	0.0	18.5	1.07	42.4«	64.9
S1.007	50.00	16.36	70.839	0.361	0.0	0.0	19.6	1.07	42.4«	68.5

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
S4.000	8.300	0.106	78.3	0.159	15.00	0.0	0.600	o	150	Pipe/Conduit	
S1.008	14.569	0.097	150.2	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.009	23.674	0.158	149.8	0.023	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.010	9.191	0.061	150.7	0.027	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.011	4.179	0.028	149.2	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S5.000	8.541	0.200	42.7	0.087	15.00	0.0	0.600	o	150	Pipe/Conduit	
S1.012	54.385	0.151	360.2	0.010	0.00	0.0	0.600	o	225	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)
S4.000	50.00	15.12	71.000	0.159	0.0	0.0	8.6	1.14	20.1«	30.2
S1.008	50.00	16.59	70.819	0.521	0.0	0.0	28.2	1.06	42.3«	98.7
S1.009	50.00	16.96	70.722	0.543	0.0	0.0	29.4	1.07	42.4«	103.0
S1.010	50.00	17.11	70.564	0.570	0.0	0.0	30.9	1.06	42.3«	108.1
S1.011	50.00	17.17	70.503	0.570	0.0	0.0	30.9	1.07	42.5«	108.1
S5.000	50.00	15.09	70.750	0.087	0.0	0.0	4.7	1.54	27.3	16.5
S1.012	50.00	18.50	70.475	0.667	0.0	0.0	36.2	0.68	27.2«	126.5

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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
S6.000	4.629	0.018	257.2	0.093	15.00	0.0	0.600	o	300	Pipe/Conduit	
S6.001	39.509	0.172	229.7	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
S6.002	23.722	0.098	242.1	0.126	0.00	0.0	0.600	o	750	Pipe/Conduit	
S6.003	24.767	0.070	353.8	0.082	0.00	0.0	0.600	o	750	Pipe/Conduit	
S6.004	18.041	0.022	820.0	0.083	0.00	0.0	0.600	o	750	Pipe/Conduit	
S6.005	6.220	0.120	51.8	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S6.006	2.603	0.050	52.1	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S6.007	7.007	0.033	212.3	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S6.008	7.735	0.067	115.4	0.105	0.00	0.0	0.600	o	225	Pipe/Conduit	
S6.009	9.870	0.044	224.3	0.000	0.00	0.0	0.600	o	225	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)
S6.000	50.00	15.08	70.946	0.093	0.0	0.0	5.0	0.98	69.0	17.6
S6.001	50.00	15.44	70.928	0.093	0.0	0.0	5.0	1.84	813.9	17.6
S6.002	50.00	15.66	70.756	0.218	0.0	0.0	11.8	1.79	792.7	41.4
S6.003	50.00	15.94	70.658	0.300	0.0	0.0	16.3	1.48	654.7	57.0
S6.004	50.00	16.25	70.610	0.383	0.0	0.0	20.8	0.97	428.2	72.7
S6.005	50.00	16.29	70.588	0.383	0.0	0.0	20.8	2.19	154.7	72.7
S6.006	50.00	16.31	70.518	0.383	0.0	0.0	20.8	2.18	154.4	72.7
S6.007	50.00	16.44	70.468	0.383	0.0	0.0	20.8	0.89	35.5«	72.7
S6.008	50.00	16.55	70.435	0.489	0.0	0.0	26.5	1.22	48.3«	92.6
S6.009	50.00	16.74	70.368	0.489	0.0	0.0	26.5	0.87	34.5«	92.6

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
S1.013	3.570	0.024	150.0	0.073	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.014	40.707	0.239	170.3	0.000	0.00	0.0	0.600	o	225	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)
S1.013	50.00	18.56	70.324	1.229	0.0	0.0	66.6	1.07	42.4«	233.1
S1.014	50.00	19.23	70.300	1.229	0.0	0.0	66.6	1.00	39.7«	233.1

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)
S1	72.500	1.053	Open Manhole	600	S1.000	71.447	150				
S2	72.450	1.125	Junction		S1.001	71.325	225	S1.000	71.400	150	
S3	72.300	1.050	Open Manhole	1200	S1.002	71.250	225	S1.001	71.250	225	
S4	72.400	1.050	Open Manhole	600	S2.000	71.350	150				
S5	72.345	1.173	Junction		S1.003	71.172	225	S1.002	71.172	225	
								S2.000	71.247	150	
S6	72.270	1.167	Open Manhole	1200	S1.004	71.103	225	S1.003	71.103	225	
S7	72.200	1.050	Open Manhole	600	S3.000	71.150	150				
S8	72.150	1.134	Junction		S1.005	71.016	225	S1.004	71.016	225	
								S3.000	71.091	150	
S9	72.076	1.137	Open Manhole	1200	S1.006	70.939	225	S1.005	70.939	225	
S10	71.918	1.079	Open Manhole	1200	S1.007	70.839	225	S1.006	70.839	225	
S11	72.050	1.050	Open Manhole	600	S4.000	71.000	150				
S12	72.000	1.181	Open Manhole	1200	S1.008	70.819	225	S1.007	70.819	225	
								S4.000	70.894	150	
S13	72.000	1.278	Open Manhole	1200	S1.009	70.722	225	S1.008	70.722	225	
S14	72.125	1.561	Open Manhole	1200	S1.010	70.564	225	S1.009	70.564	225	
S15	72.125	1.622	Open Manhole	1200	S1.011	70.503	225	S1.010	70.503	225	
S16	72.100	1.350	Open Manhole	600	S5.000	70.750	150				
S17	72.125	1.650	Open Manhole	1200	S1.012	70.475	225	S1.011	70.475	225	

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)
								S5.000	70.550	150	
S20	72.144	1.198	Open Manhole	1200	S6.000	70.946	300				
S21	72.083	1.155	Open Manhole	1200	S6.001	70.928	750	S6.000	70.928	300	
S22	71.911	1.155	Open Manhole	760 x 760	S6.002	70.756	750	S6.001	70.756	750	
S23	71.813	1.155	Open Manhole	760 x 760	S6.003	70.658	750	S6.002	70.658	750	
S24	71.765	1.177	Open Manhole	760 x 760	S6.004	70.610	750	S6.003	70.588	750	
S25	71.743	1.155	Open Manhole	760 x 760	S6.005	70.588	300	S6.004	70.588	750	
S26	71.807	1.339	Junction		S6.006	70.518	300	S6.005	70.468	300	
S27	71.845	1.377	Junction		S6.007	70.468	225	S6.006	70.468	300	
S28	71.845	1.410	Open Manhole	1500	S6.008	70.435	225	S6.007	70.435	225	
S29	71.930	1.562	Open Manhole	1200	S6.009	70.368	225	S6.008	70.368	225	
S18	71.930	1.606	Open Manhole	1500	S1.013	70.324	225	S1.012	70.324	225	
								S6.009	70.324	225	
S19	72.010	1.710	Open Manhole	1200	S1.014	70.300	225	S1.013	70.300	225	
S	71.643	1.582	Open Manhole	0		OUTFALL		S1.014	70.061	225	

Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S1	464955.816	155546.112	464955.816	155546.112	Required	
S2	464956.954	155539.199			No Entry	
S3	464969.626	155539.059	464969.626	155539.059	Required	
S4	464979.358	155548.116	464979.358	155548.116	Required	
S5	464981.253	155540.057			No Entry	
S6	464991.620	155540.956	464991.620	155540.956	Required	
S7	465002.804	155550.196	465002.804	155550.196	Required	
S8	465004.692	155541.991			No Entry	

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Manhole Schedules for Storm

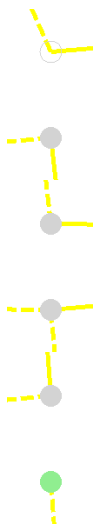
MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S9	465016.157	155543.070	465016.157	155543.070	Required	
S10	465031.094	155544.326	465031.094	155544.326	Required	
S11	465032.166	155552.725	465032.166	155552.725	Required	
S12	465034.037	155544.639	465034.037	155544.639	Required	
S13	465048.556	155545.842	465048.556	155545.842	Required	
S14	465072.144	155547.860	465072.144	155547.860	Required	
S15	465077.983	155554.957	465077.983	155554.957	Required	
S16	465069.306	155557.218	465069.306	155557.218	Required	

Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S17	465077.632	155559.121	465077.632	155559.121	Required	
S20	464951.264	155601.078	464951.264	155601.078	Required	
S21	464950.733	155605.676	464950.733	155605.676	Required	
S22	464987.751	155619.482	464987.751	155619.482	Required	
S23	465010.771	155625.211	465010.771	155625.211	Required	
S24	465035.437	155627.448	465035.437	155627.448	Required	
S25	465053.405	155629.074	465053.405	155629.074	Required	
S26	465053.945	155622.877			No Entry	

Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S27	465055.011	155620.502			No Entry	
S28	465061.992	155621.100	465061.992	155621.100	Required	
S29	465062.869	155613.414	465062.869	155613.414	Required	
S18	465072.738	155613.286	465072.738	155613.286	Required	
S19	465076.293	155613.610	465076.293	155613.610	Required	
S	465073.234	155654.202			No Entry	



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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)
S1.000	o	150	S1	72.500	71.447	0.903	Open Manhole	600
S1.001	o	225	S2	72.450	71.325	0.900	Junction	
S1.002	o	225	S3	72.300	71.250	0.825	Open Manhole	1200
S2.000	o	150	S4	72.400	71.350	0.900	Open Manhole	600
S1.003	o	225	S5	72.345	71.172	0.948	Junction	
S1.004	o	225	S6	72.270	71.103	0.942	Open Manhole	1200
S3.000	o	150	S7	72.200	71.150	0.900	Open Manhole	600

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)
S1.000	7.006	149.1	S2	72.450	71.400	0.900	Junction	
S1.001	12.673	169.0	S3	72.300	71.250	0.825	Open Manhole	1200
S1.002	11.669	149.6	S5	72.345	71.172	0.948	Junction	
S2.000	8.278	80.4	S5	72.345	71.247	0.948	Junction	
S1.003	10.406	150.8	S6	72.270	71.103	0.942	Open Manhole	1200
S1.004	13.113	150.7	S8	72.150	71.016	0.909	Junction	
S3.000	8.419	142.7	S8	72.150	71.091	0.909	Junction	

84 North Street
Guildford
Surrey GU1 4AU

Date 19/12/2023 11:42
File 100Y 40CC 2210020 19122023 FINAL.MDX

Designed by Chris Gray
Checked by Jason Morgans

Causeway | Network 2020.1.3

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)
S1.005	o	225	S8	72.150	71.016	0.909	Junction	
S1.006	o	225	S9	72.076	70.939	0.912	Open Manhole	1200
S1.007	o	225	S10	71.918	70.839	0.854	Open Manhole	1200
S4.000	o	150	S11	72.050	71.000	0.900	Open Manhole	600
S1.008	o	225	S12	72.000	70.819	0.956	Open Manhole	1200
S1.009	o	225	S13	72.000	70.722	1.053	Open Manhole	1200
S1.010	o	225	S14	72.125	70.564	1.336	Open Manhole	1200

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)
S1.005	11.515	149.5	S9	72.076	70.939	0.912	Open Manhole	1200
S1.006	14.990	149.9	S10	71.918	70.839	0.854	Open Manhole	1200
S1.007	2.960	150.0	S12	72.000	70.819	0.956	Open Manhole	1200
S4.000	8.300	78.3	S12	72.000	70.894	0.956	Open Manhole	1200
S1.008	14.569	150.2	S13	72.000	70.722	1.053	Open Manhole	1200
S1.009	23.674	149.8	S14	72.125	70.564	1.336	Open Manhole	1200
S1.010	9.191	150.7	S15	72.125	70.503	1.397	Open Manhole	1200

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)
S1.011	o	225	S15	72.125	70.503	1.397	Open Manhole	1200
S5.000	o	150	S16	72.100	70.750	1.200	Open Manhole	600
S1.012	o	225	S17	72.125	70.475	1.425	Open Manhole	1200
S6.000	o	300	S20	72.144	70.946	0.898	Open Manhole	1200
S6.001	o	750	S21	72.083	70.928	0.405	Open Manhole	1200
S6.002	o	750	S22	71.911	70.756	0.405	Open Manhole	760 x 760
S6.003	o	750	S23	71.813	70.658	0.405	Open Manhole	760 x 760

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)
S1.011	4.179	149.2	S17	72.125	70.475	1.425	Open Manhole	1200
S5.000	8.541	42.7	S17	72.125	70.550	1.425	Open Manhole	1200
S1.012	54.385	360.2	S18	71.930	70.324	1.381	Open Manhole	1500
S6.000	4.629	257.2	S21	72.083	70.928	0.855	Open Manhole	1200
S6.001	39.509	229.7	S22	71.911	70.756	0.405	Open Manhole	760 x 760
S6.002	23.722	242.1	S23	71.813	70.658	0.405	Open Manhole	760 x 760
S6.003	24.767	353.8	S24	71.765	70.588	0.427	Open Manhole	760 x 760

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)
S6.004	o	750	S24	71.765	70.610	0.405	Open Manhole	760 x 760
S6.005	o	300	S25	71.743	70.588	0.855	Open Manhole	760 x 760
S6.006	o	300	S26	71.807	70.518	0.989	Junction	
S6.007	o	225	S27	71.845	70.468	1.152	Junction	
S6.008	o	225	S28	71.845	70.435	1.185	Open Manhole	1500
S6.009	o	225	S29	71.930	70.368	1.337	Open Manhole	1200
S1.013	o	225	S18	71.930	70.324	1.381	Open Manhole	1500
S1.014	o	225	S19	72.010	70.300	1.485	Open Manhole	1200

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)
S6.004	18.041	820.0	S25	71.743	70.588	0.405	Open Manhole	760 x 760
S6.005	6.220	51.8	S26	71.807	70.468	1.039	Junction	
S6.006	2.603	52.1	S27	71.845	70.468	1.077	Junction	
S6.007	7.007	212.3	S28	71.845	70.435	1.185	Open Manhole	1500
S6.008	7.735	115.4	S29	71.930	70.368	1.337	Open Manhole	1200
S6.009	9.870	224.3	S18	71.930	70.324	1.381	Open Manhole	1500
S1.013	3.570	150.0	S19	72.010	70.300	1.485	Open Manhole	1200
S1.014	40.707	170.3	S	71.643	70.061	1.357	Open Manhole	0

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.048	0.048	0.048
1.001	-	-	100	0.000	0.000	0.000
1.002	User	-	100	0.017	0.017	0.017
2.000	User	-	100	0.048	0.048	0.048
	User	-	100	0.048	0.048	0.097
1.003	-	-	100	0.000	0.000	0.000
1.004	User	-	100	0.030	0.030	0.030
3.000	User	-	100	0.047	0.047	0.047
	User	-	100	0.071	0.071	0.117
1.005	-	-	100	0.000	0.000	0.000
1.006	User	-	100	0.033	0.033	0.033
1.007	User	-	100	0.019	0.019	0.019
4.000	User	-	100	0.072	0.072	0.072
	User	-	100	0.087	0.087	0.159
1.008	-	-	100	0.000	0.000	0.000
1.009	User	-	100	0.023	0.023	0.023
1.010	User	-	100	0.027	0.027	0.027
1.011	-	-	100	0.000	0.000	0.000
5.000	User	-	100	0.087	0.087	0.087
1.012	User	-	100	0.010	0.010	0.010
6.000	User	-	100	0.093	0.093	0.093
6.001	-	-	100	0.000	0.000	0.000
6.002	User	-	100	0.126	0.126	0.126
6.003	User	-	100	0.082	0.082	0.082
6.004	User	-	100	0.083	0.083	0.083
6.005	-	-	100	0.000	0.000	0.000
6.006	-	-	100	0.000	0.000	0.000
6.007	-	-	100	0.000	0.000	0.000

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
6.008	User	-	100	0.105	0.105	0.105
6.009	-	-	100	0.000	0.000	0.000
1.013	User	-	100	0.073	0.073	0.073
1.014	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				1.229	1.229	1.229

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.014	S	71.643	70.061	0.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Manhole Headloss Coeff (Global)	0.500	Inlet Coeffiecient	0.800
Areal Reduction Factor	1.000	Foul Sewage per hectare (l/s)	0.000	Flow per Person per Day (l/per/day)	0.000
Hot Start (mins)	0	Additional Flow - % of Total Flow	0.000	Run Time (mins)	60
Hot Start Level (mm)	0	MADD Factor * 10m³/ha Storage	2.000	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 9 Number of Real Time Controls 0

Synthetic Rainfall Details

Synthetic Rainfall Details

Rainfall Model	FEH	Summer Storms	Yes
Return Period (years)	100	Winter Storms	No
FEH Rainfall Version	2013	Cv (Summer)	0.750
Site Location	GB 465150 155700 SU 65150 55700	Cv (Winter)	0.840
Data Type	Catchment	Storm Duration (mins)	30

Online Controls for Storm

Hydro-Brake® Optimum Manhole: S18, DS/PN: S1.013, Volume (m³): 5.3

Unit Reference	MD-SHE-0190-1940-1450-1940	Sump Available	Yes
Design Head (m)	1.450	Diameter (mm)	190
Design Flow (l/s)	19.4	Invert Level (m)	70.324
Flush-Flo™	Calculated	Minimum Outlet Pipe Diameter (mm)	225
Objective	Minimise upstream storage	Suggested Manhole Diameter (mm)	1500
Application	Surface		

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.450	19.4	Kick-Flo®	0.950	15.9
Flush-Flo™	0.432	19.4	Mean Flow over Head Range	-	16.7

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

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)	Depth (m)	Flow (l/s)
0.100	6.6	0.600	19.1	1.600	20.3	2.600	25.6	5.000	35.1	7.500	42.7
0.200	17.4	0.800	18.0	1.800	21.5	3.000	27.5	5.500	36.8	8.000	44.1
0.300	18.9	1.000	16.3	2.000	22.6	3.500	29.6	6.000	38.3	8.500	45.4
0.400	19.4	1.200	17.7	2.200	23.7	4.000	31.5	6.500	39.8	9.000	46.6
0.500	19.3	1.400	19.1	2.400	24.7	4.500	33.4	7.000	41.3	9.500	47.9