Haymarket Tech Hub

Flood Risk Assessment & Drainage Strategy Report

Prepared by:	Steffan Rees MEng
Reviewed by:	Dimitris Linardatos BEng MSc CEng MICE FIHE
Job Number:	27983

Date	Version	Notes/Amendments/Issue Purpose
June, 2019	1	For Information
July, 2019	2	For Reserved Matters Application

Contents

Appendices:

Acronyms	
AOD	Above Ordnance Datum
BGS	British Geological Survey
CDA	Critical Drainage Area
CIRIA	Construction Industry Research and Information Association
EA	Environment Agency
FRA	Flood Risk Assessment
mAOD	Meters Above Ordnance Datum
mbgl	Meters Below Ground Level
NPPF	National Planning Policy Framework
OS	Ordnance Survey
PPG	Planning Practice Guidance
REEC	Richmond Education and Enterprise Campus
SFRA	Strategic Flood Risk Assessment
SWMP	Surface Water Management Plan
TW	Thames Water

1 Introduction

Price & Myers have been commissioned to undertake a Flood Risk Assessment for the proposed development at Richmond upon Thames College, Egerton Road, Twickenham, TW2 7SJ in the London Borough of Richmond upon Thames.

This FRA has been carried out in accordance with the National Planning Policy Framework and the accompanying Planning Practice Guidance "Flood Risk and Coastal Change". This FRA also incorporates advice and guidance from the Environment Agency, the Borough of Richmond upon Thames Strategic Flood Risk Assessment (March 2016) and Surface Water Management Plan (June 2011) and CIRIA documents.

The NPPF states that an appropriate FRA will be required for all development proposals of 1 ha or greater in Flood Zone 1 and for any development within Flood Zones 2 or 3.

The EA's indicative floodplain map shows that the site is in Flood Zone 1 and the site area is less than 1 ha, however the site is within a Critical Drainage Area (Group8_001). This assessment will therefore focus on the flood risk from surface water, as well as assessing the risk from all sources.

This report will also outline the proposed drainage strategy for the site including a detailed SUDS assessment.

2 Site Description and Location

The site is located in the London Borough of Richmond upon Thames and covers an area of 0.24 ha. The topographical survey information, given in Appendix A, shows that the topography is relatively flat with an average elevation between 9.030 mAOD and 9.260 mAOD. The site postcode is TW2 7SJ and the Ordnance Survey grid reference is 515226 E, 173853 N.

The wider site is approximately The site is located in the north-west corner of the campus, adjacent to the Chertsey Road/ A316 arterial road and is neighbouring Twickenham Stoop. Vehicular access to the site is from the A316, via the roundabout on Langhorn Drive. The Duke of Northumberland's River is located 70 m west of the site, which feeds the tidal Thames.

The site is currently occupied by a gym and sports hall. The existing buildings are to be demolished as part of the enabling works by the Contractor during the first phase of works.

Site Boundary

Figure 2.1: Existing site, showing site boundary

2.1 Existing Drainage

Public sewer records from Thames Water indicate that a 225 mm diameter surface water public sewer is located north of the site. This public sewer is located in Chertsey Road and flows west to east.

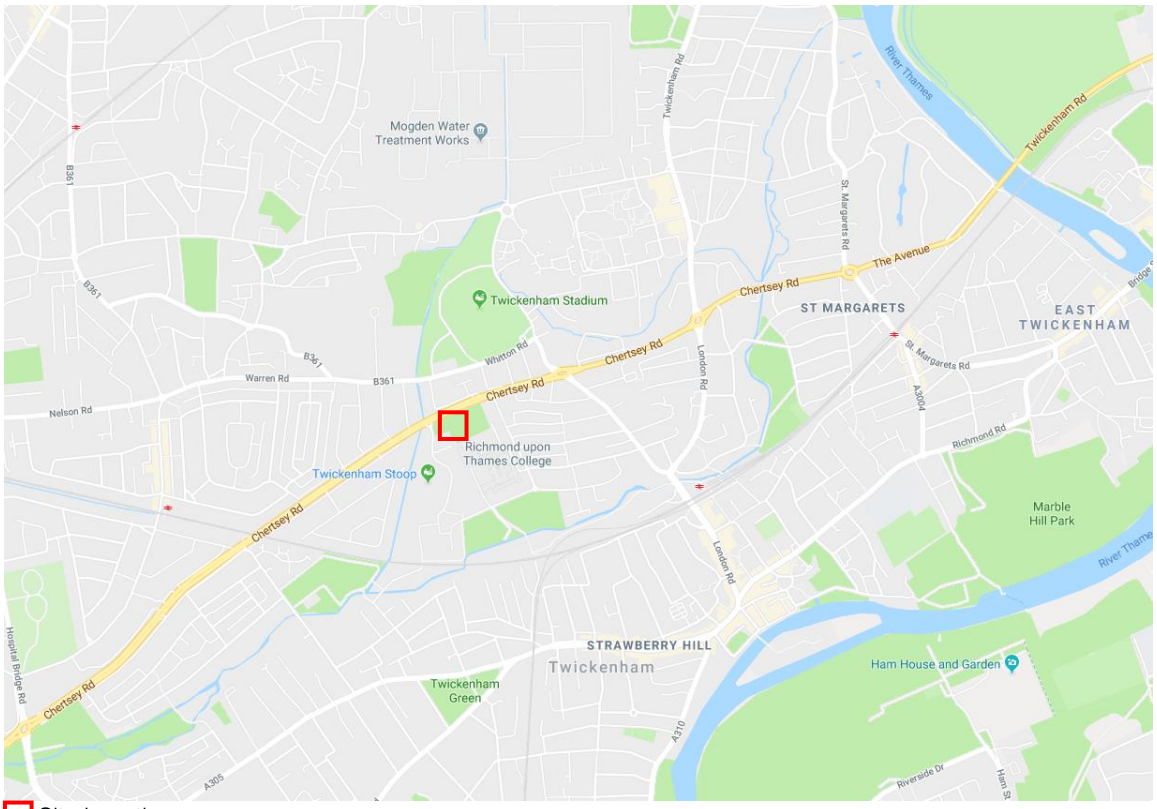
A 225 mm diameter foul water public sewer and a 225 mm diameter surface water public sewer are located approximately 260 m south of the Haymarket Tech Hub site in Craneford Way, which is circa 45 m south of the wider Richmond Education and Enterprise Campus site boundary.

240 m east of the Haymarket Tech Hub site, is a 225mm diameter foul water public sewer and a 225 mm surface water public sewer in Egerton Road, which is circa 5 m east of the wider REEC site boundary.

Refer to Appendix B for the Thames Water Asset Location Map.

The existing development utilises infiltration techniques to manage the surface water generated by rainfall events. Six soakaways were identified within the site boundary; these have been surveyed and the recorded sump levels vary between 7.23 mAOD and 7.51 mAOD (1.72 mbgl and 1.90 mbgl). Water was recorded in five of the six soakaways.

A CCTV drainage survey indicates that the private foul water drainage runs south of the site via a 150 mm diameter pipe and leads to a private pumping station approximately 60 m downstream. This pumps the foul waste south a further 200 m, and it is assumed this discharges into the 225mm diameter foul water public sewer located in Craneford Way.



Site Location

Figure 2.2: Site location, showing nearby watercourse etc.

3 Development Proposal

Outline planning permission (ref:15/3038/OUT) was granted in August 2016 for the development of the wider campus. The campus is divided into separate development zones and a separate Reserved Matters application for each development zone.

The Tech Hub is to be used by Haymarket Media Group, a global specialist media company involved in brand development and publications. The proposed three-storey office building (use class B1) includes a single lift, toilet blocks, one escape stair and riser / plant provision. On the ground floor there will be additional showers, cycle storage racks, a refuse area and plant areas.

Externally the brief will include 10 car parking spaces (one for disabled use), service areas to the rear and new landscaping.

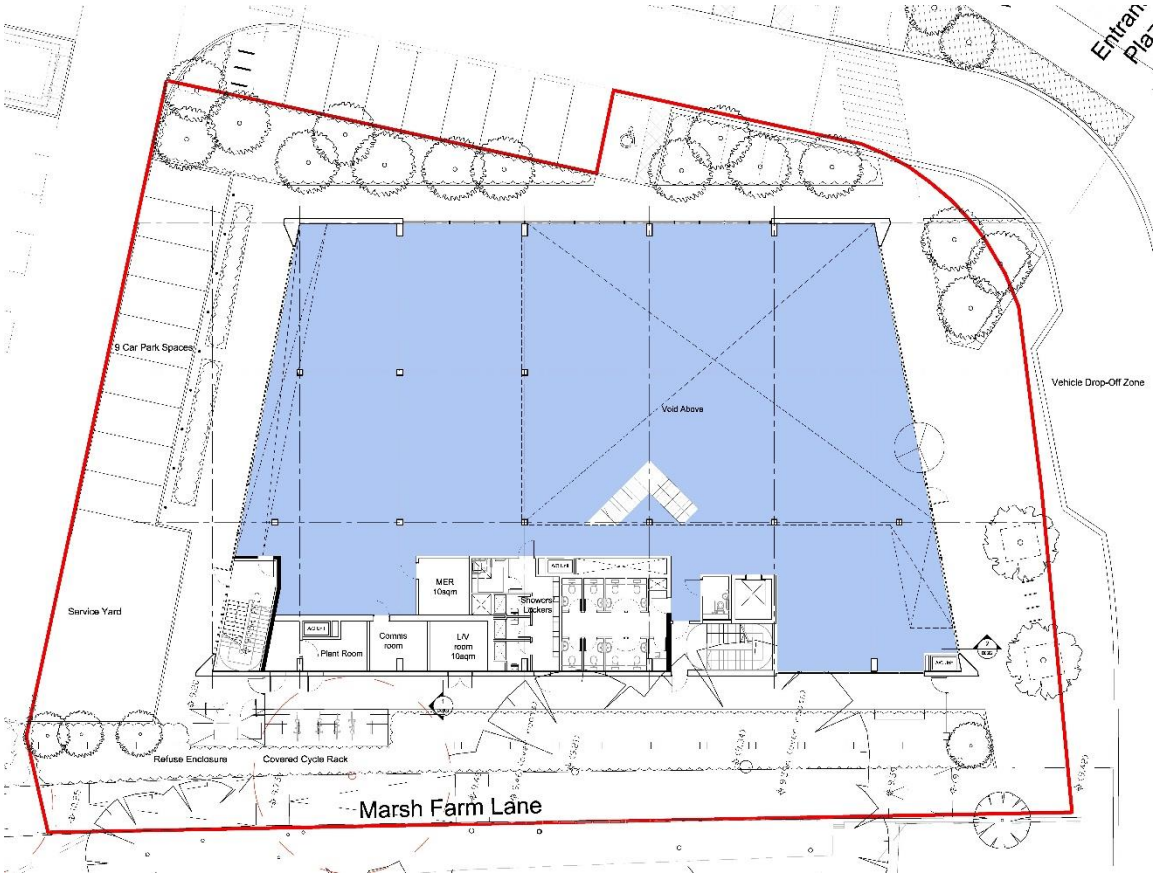


Figure 3.1: Proposed layout

4 Flood Risk Assessment

4.1 Flood Risk from Watercourses and Tidal Flooding

The EA's indicative floodplain map shows that the site is located in Flood Zone 1 and is not at risk of flooding. Developments in this flood zone do not have any restrictions, provided they do not increase the risk of flooding elsewhere.

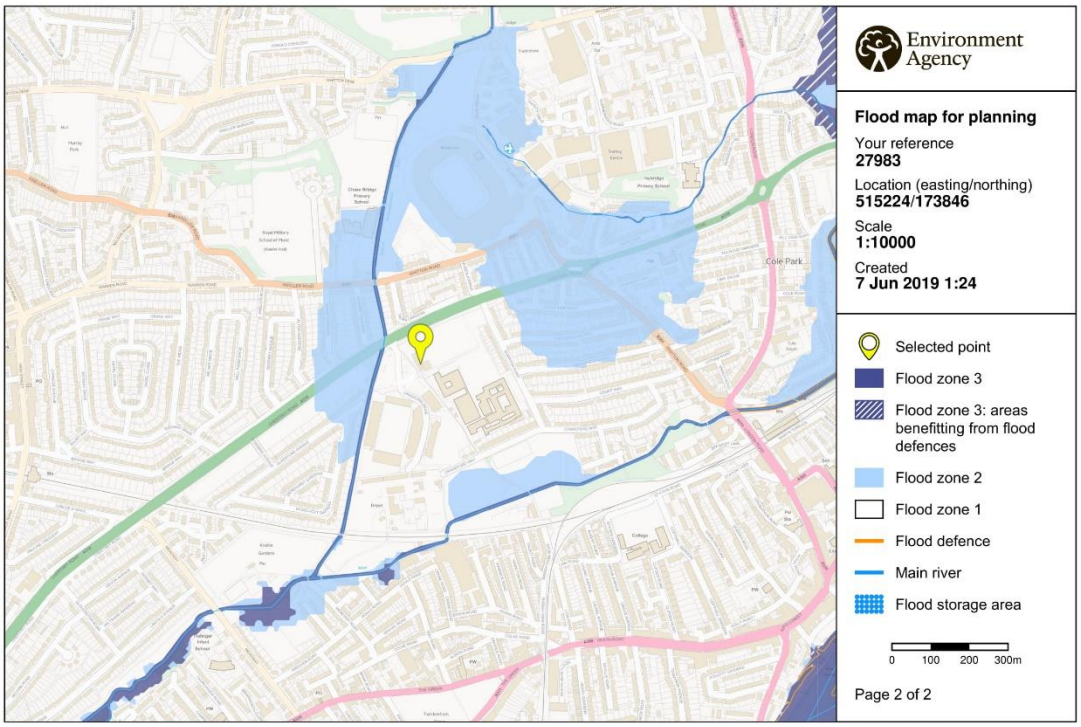


Figure 4.1: from EA Flood Map for Planning

4.2 Flood risk from Groundwater

The ground investigation encountered Made Ground overlying Kempton Park Gravel Member and London Clay Formation at depth, agreeing with the information published by the British Geological Survey.

A ground investigation report for the wider REEC campus was completed by Soiltechnics in May 2016 (reference report no: STM3361D-G01 revision 2) and in July 2008 (reference report no: STE1297R).

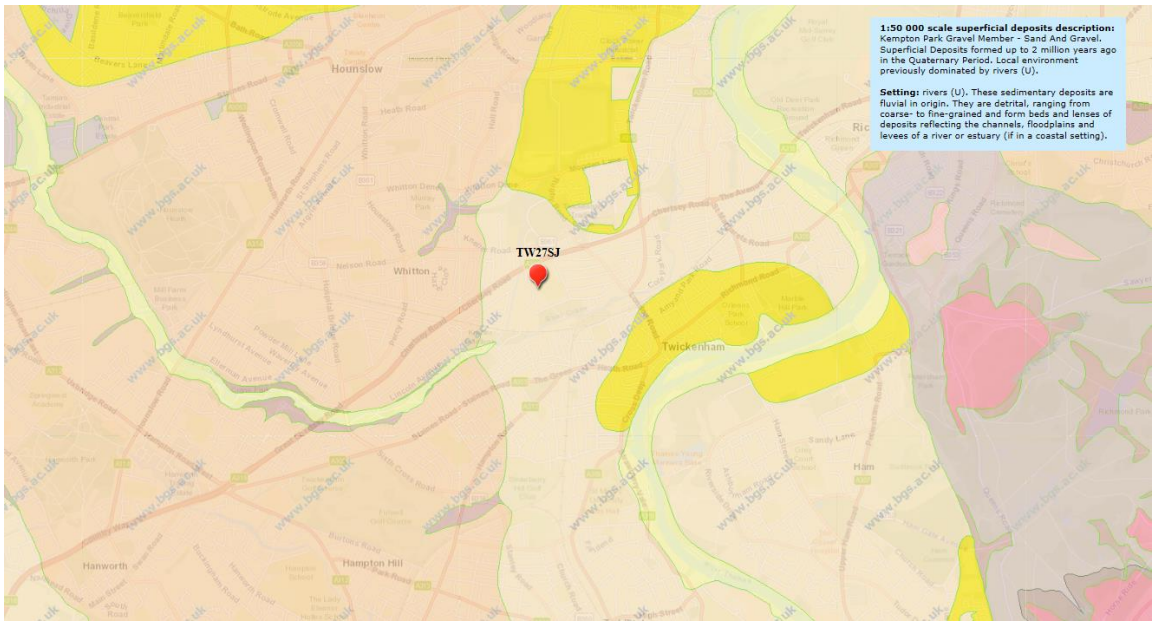


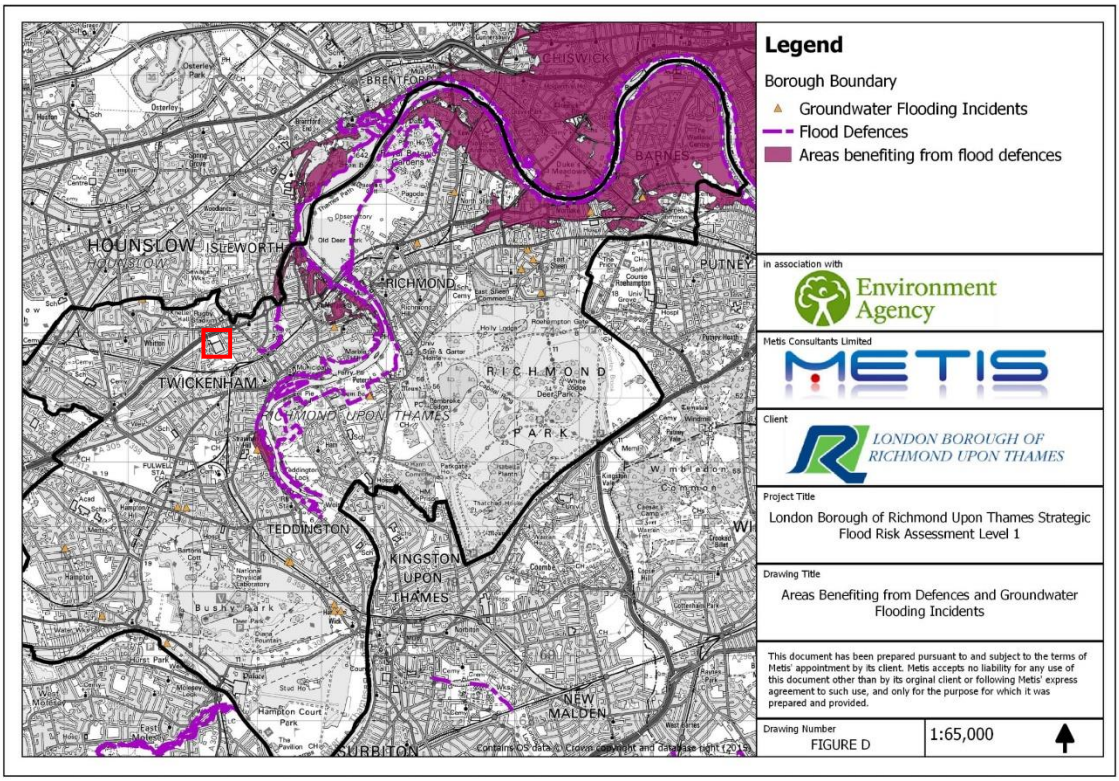
Figure 4.2: British Geological Survey Map

Groundwater flooding occurs when water originating from sub-surface permeable strata emerges from the ground, typically after prolonged rainfall.

The SFRA shows that there have been no groundwater flooding incidents within the site boundary, however this report does identify the area as having potential for groundwater flooding to occur. This does not indicate the relative risk or likelihood that it will occur.

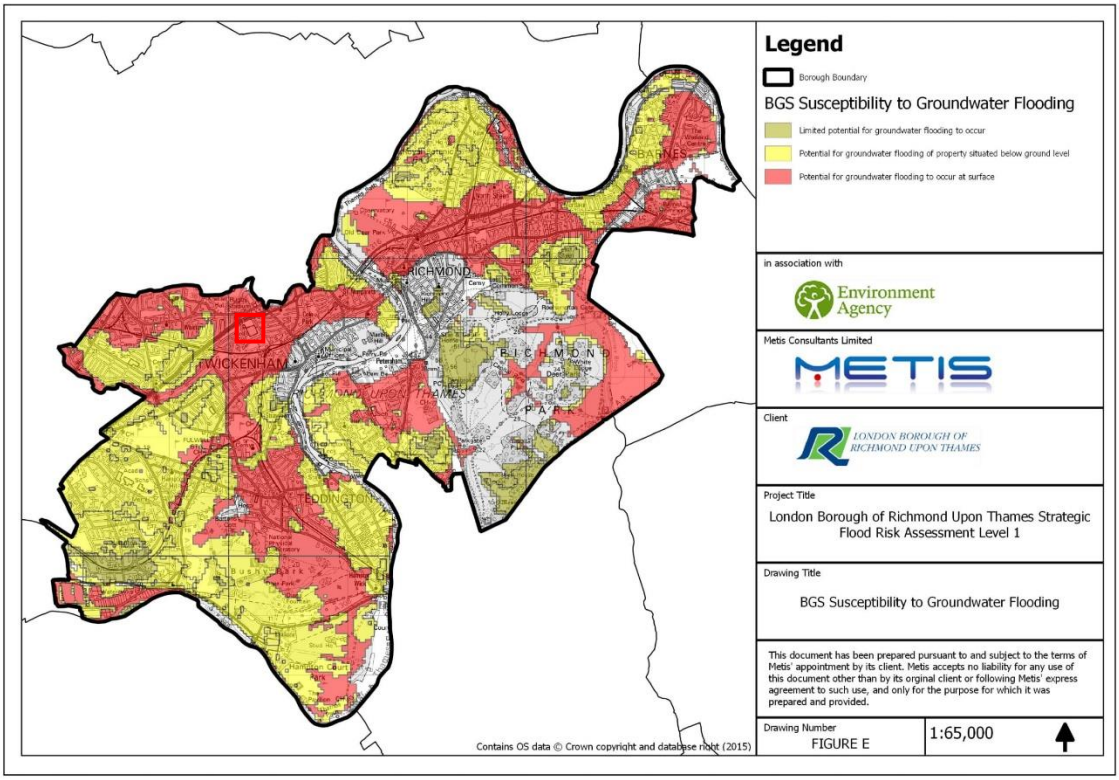
The site investigation reports confirm that groundwater inflows were apparent within the Haymarket Tech Hub site boundary. The highest groundwater level recorded was 8.05 mAOD (1.05 mbgl). However, the major variations in the recorded groundwater levels suggest that this is perched water.

Across the wider REEC site, the geology is relatively consistent, however the depth to groundwater level varies from 1.00 mbgl to 2.50 mbgl, and groundwater was not encountered in all exploratory excavations. The long-term monitoring of the groundwater levels was not investigated within the Haymarket Tech Hub site boundary, however, the topographical survey completed in February 2008 recorded the water levels in the existing soakaways. This recorded that the water levels vary between 7.63 mAOD and 7.76 mAOD. This record is consistent and provides a better indication of the seasonal groundwater levels on site. Therefore, the flood risk from groundwater is low.



Site Location

Figure 4.3: from SFRA Groundwater Flooding Incidents



Site Location

Figure 4.4: from SFRA Susceptibility to Groundwater Flooding

4.2.1 Mitigation Measures for Groundwater Flooding

The functionality of SUDS techniques are heavily influenced by the high groundwater level. Therefore, shallow infiltration solutions in the form of permeable pavements are proposed for the hardstanding external areas, allowing storage in the pavement before infiltrating into the underlying Kempton Park Gravel strata.

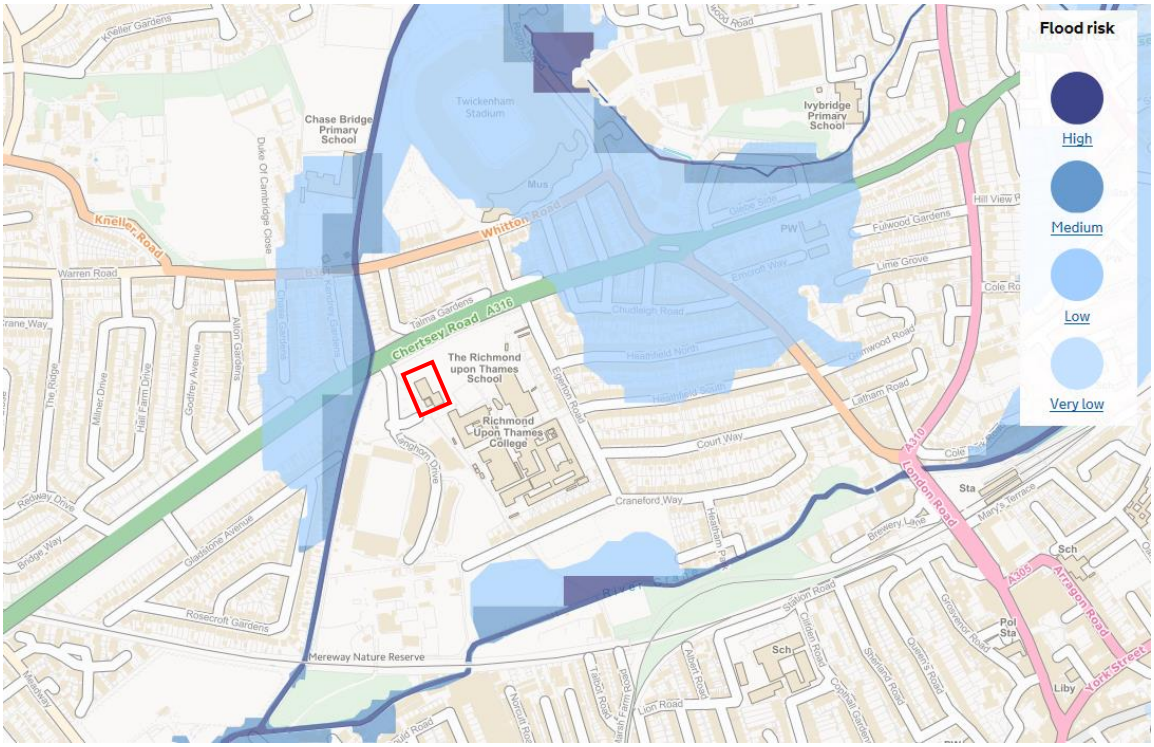
It is proposed to have a minimum clearance of 700mm between the formation level of the infiltration structure and the groundwater level. This depth is in agreement with the drainage strategy produced by Atkins (2016) for the College site, which is part of the REEC development. Outline planning permission (ref:15/3038/OUT) was granted in August. Refer to Appendix C for the correspondence between Atkins and the London Borough of Richmond upon Thames for information. This is a betterment of the existing drainage system, as the existing soakaways are permanently submerged in the ground water table.

The proposals do not include any lower ground floors, which are more vulnerable to this type of flooding, lowering the risk of groundwater flooding.

4.3 Flood Risk from Surface Water and Overland Flows

Surface water flooding occurs when intense rainfall is unable to soak into the ground or enter a drainage system due to blockages or the capacity of the system being exceeded. Overland flows can also be generated by burst water mains, failed dams and any failure in a system storing or transferring water.

The EA's indicative Surface Water Flooding Map shows that the site is at very low risk of surface water flooding.



Site Location

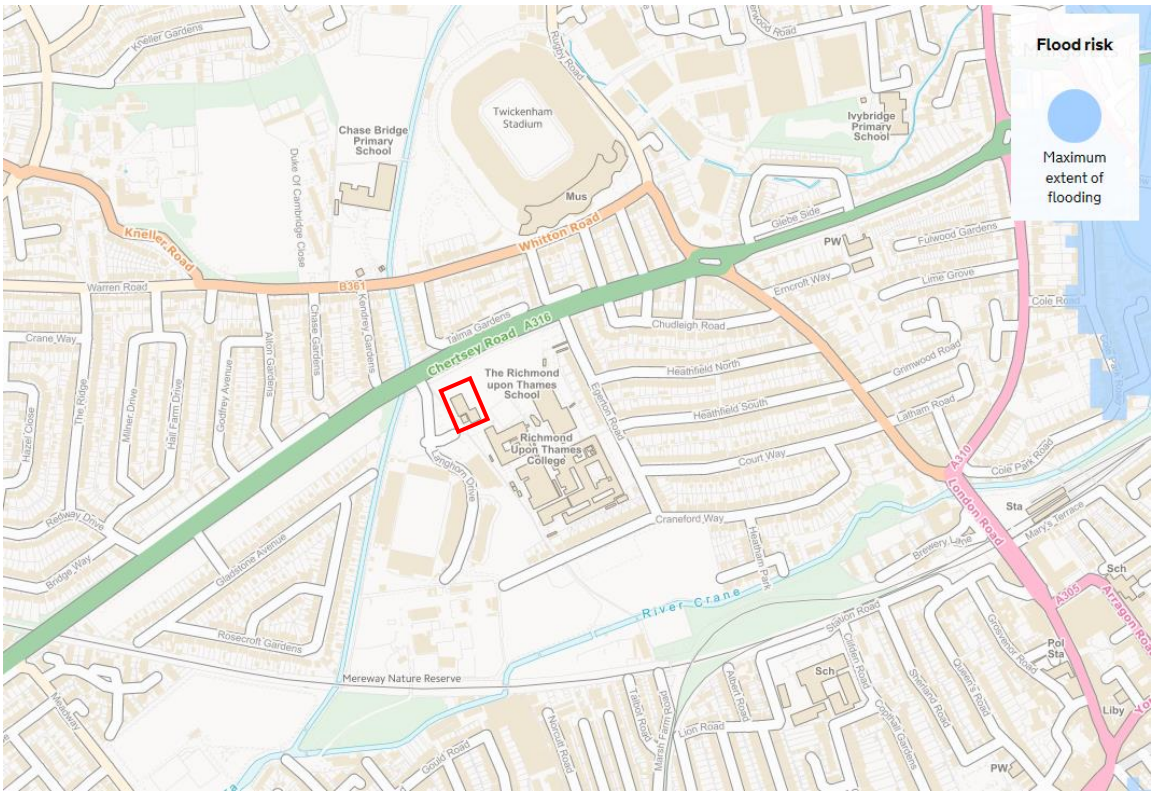
Figure 4.5 Environment Agency Surface Water Flood Risk Map

4.3.1 Mitigation Measures for Surface Water and Overland Flows

Site levels will be set so overland flows are directed away from the building footprint to prevent runoff from entering.

4.4 Flood Risk from Reservoirs

The EA provides information on flood risk from reservoirs. The figure below shows that the site is not at risk of reservoir flooding.



Site Location

Figure 4.6 Environment Agency Risk of Reservoir Flooding Map

4.5 Summary of Flood Mitigation Measures

Flood Risk from:	Mitigation Measure
Watercourses and Tidal Flooding	Flood zone 1. Very low risk, therefore no additional mitigation measures proposed.
Groundwater Flooding	Proposals do not include any lower ground floors. Shallow infiltration solutions (i.e. permeable paving) are proposed for the external areas to maintain the required unsaturated zone between SUDS and groundwater.
Surface Water and Overland Flows	Very low risk. However, site levels will also be set so overland runoff is directed away from the building footprint.
Reservoir Flooding	Not at risk, therefore no additional mitigation measures proposed.

Table 4.1 Summary of Flood Mitigation Measures

5 Surface Water Run-off Assessment

5.1 Existing Run-off

The total site area is approximately 2365.76 m^2 (or 0.24 ha), of this approximately 861.9 m^2 (or 0.086 ha) is impermeable.

The existing run-off rate for the design storm events was calculated using the modified rational method as shown below:

$Q_x = 2.78 \times i \times A$

Where 'x' is the return period in years, 'A' is the catchment area in ha and 'i' is the rainfall intensity in mm/hr as estimated from Micro Drainage software, using the Flood Studies Report method.

$Q1_{ex}$ = 2.78 x 33.47 x 0.082 = 8.00 l/s
$Q30_{ex}$ = 2.78 x 42.42 x 0.082 = 10.14 l/s
$Q100_{ex}$ = 2.78 x 161.17 x 0.082 = 38.53 l/s

The existing Greenfield run-off rates for storm events of several different return periods were calculated using the Greenfield Runoff Estimator tool from uksuds.com as shown in the table below. Supporting documentation is contained in Appendix D.

The existing run-off from the impermeable and greenfield areas are then added together to give the total existing run-off, as in the table below.

Design Storm	Impermeable Run-off Q_{ex}	Greenfield Run-off $Q_{ex\ Gr}$	Total Existing Run-off $Q_{Tx} = Q_{ex} + Q_{ex\ Gr}$
Mean Annual		Qbar = 0.21 l/s	Qbar = 0.21 l/s
1 in 1 year	$Q1_{ex}$ = 8.00 l/s	$Q1_{ex\ Gr}$ = 0.18 l/s	$Q1_{Tx}$ = 8.18 l/s
1 in 30 year	$Q30_{ex}$ = 10.14 l/s	$Q30_{ex\ Gr}$ = 0.49 l/s	$Q30_{Tx}$ = 10.63 l/s
1 in 100 year	$Q100_{ex}$ = 38.53 l/s	$Q100_{ex\ Gr}$ = 0.67 l/s	$Q100_{Tx}$ = 39.20 l/s

Table 5.1 Run-off Rates

5.2 Climate Change

The current EA guidance states that for the years 2070 to 2115 there is a 50% chance the peak rainfall intensity will increase by 20% or more and that there is a 10% change it will increase by 40% or more. For this building/development, which is classed as less vulnerable, a design life of 100-years and an allowance of an additional 40% is considered appropriate. This gives a design storm event runoff rate of:

5.3 Proposed Run-off

The proposed development will increase the impermeable areas from approximately 861.98 m^2 (or 0.086 ha) pre-development, to approximately 1313.19 m^2 (or 0.13 ha), and therefore there will be an increase in the surface water run-off rate.

Q_{100+40} = 2.78 x 225.64 x 0.082 = 81.54 l/sec.

The run-off rate for the proposed development shall be restricted to 5l/s. This was agreed in the site wide surface water drainage strategy supplied by Atkins (2016), which was previously granted outline planning permission (ref:15/3038/OUT). The attenuation tank was designed for the 1 in 100-year storm event plus 30% allowance for climate change, allowing for the future connection of the building roof area of the Haymarket Tech Hub, as well as the Sports Hall and

STEM building roof areas. The flow control device was designed to discharge to the Thames Water surface water public sewer located in Chertsey Road – design and route by others.

This run-off rate will be the limit for all storm events, including the design storm with the climate change allowance. External surfaces will be managed via infiltration solutions.

6 SUDS Assessment

In accordance with the London Plan, EA guidelines, the SFRA, and CIRIA documents, surface water run-off should be managed as close to its source as possible. The London Plan states that all new developments should aim to reduce run-off to greenfield rates "utilising SUDS unless there are practical reasons for not doing so".

The possibility of implementing SUDS at the site was assessed using a hierarchy of preferred surface water management methods. The following paragraphs discuss the various methods in order of that hierarchy and evaluate the site's suitability for each method.

6.1 Store Rainwater for Later Use

Rainwater harvesting promotes the storage and re-use of rain water collected from roofs and hard surfaced areas. This type of system contributes to the reduction of runoff rates and volumes within a development.

The capacity of rainwater harvesting systems to attenuate rainwater depends on the water use within the building. If there is no activity in the building and the harvester is full, no attenuation will be provided during a subsequent storm event. In the worst-case scenario, the rainwater harvester will provide no attenuation, and in this instance, it is not proposed to store rainwater for later use.

6.2 Permeable Paving

According to the EA guidelines, Building Regulations and Water Authorities advice, an infiltration drainage system is the preferred method of surface water drainage for any new development as it mimics natural conditions and encourages the recharge of groundwater. Thus, reducing the impact of urbanisation on watercourses/sewer flows, also ensuring the protection and enhancement of water quality.

Boreholes investigations within the site boundary indicate that the Kempton Park Gravel strata was encountered between 0.30 mbgl and 5.30 mbgl. Infiltration testing was completed at 0.55 mbgl, to confirm the infiltration rate below a permeable paving build-up. The infiltration rate at subgrade level ranges from $1.20x10^{-5}$ mbgl and 3.74x10-5 mbgl. On this basis, it is proposed for external hardstanding areas to be managed by infiltration solutions.

Refer to Appendix E for information regarding the the extent of the proposed permeable pavement construction.

6.3 Attenuation

The Haymarket Tech Hub roof area is proposed to discharge to the public sewer via a below ground modular attenuation tank which is located underneath the College car park. This was sized and designed as per the site wide drainage strategy (Atkins 2016) so that there is no flooding in a 1:100-year storm event (+30% climate change).

The SUDS manual states that "the hydraulic performance of green roofs during extreme events tends to be fairly similar to standard roofs". This means that green roofs will reduce the run-off rates in small storm event such as the annual and the 1 in 2-year events. However, these systems provide no attenuation benefits in high storm events such as the 1 in 30-year and 1 in 100-year storms which are considered in the design of surface water drainage systems. The benefits of these systems therefore cannot be considered in the design of any attenuation systems. It is proposed 600 m^2 of the roof area will be used as a green roof.

6.4 Discharge to Surface Water Sewer / Foul Water Sewer

Runoff from Haymarket Tech Hub, Sports Hall and STEM building roof areas is proposed to be attenuated and discharged into the 225mm surface water public sewer located in Chertsey Road, north of the site. Due to the shallow invert level of the Thames Water surface water public sewer, a surface water pumping station will be installed at the northern extent of the wider REEC site boundary (design by others).

It is assumed the attenuation tank was sized based on the maximum extent of the permitted Haymarket Tech Hub building (1395 m^2), the required attenuation storage volume is 64.5 m^3. This is based on the design criteria and information stated by Atkins (2016):

- Attenuation tank depth equalling 1.50 m;
- Attenuation tank designed not to flood during the 1 in 100-year storm event plus 30% allowance for climate change;
- FEH catchment rainfall data modelled;
- Hydrobrake restricted to greenfield run-off rates (5 l/s);
- Hydrobrake design head equalling 1.375 m.

The proposed roof area is now smaller than this, equalling 1104 m^2, therefore the required attenuation storage for the 1 in 100-year storm event plus 30% allowance for climate change equals 48m^3. Note, the volume of attenuation storage assumed by Atkins (2016), allows the revised area of the roof sufficient storage to facilitate the 1 in 100-year storm event plus 40% climate change.

The foul water drainage is proposed to connect to manhole FW25. The downstream foul water network is as per the Aktins (2016) site wide below ground drainage layout. Refer to Appendix G for information. This foul water network continues south before entering a private pumping station (design by others) and discharges into the 225mm diameter foul water public sewer located in Craneford Way.

7 Surface Water Maintenance Strategy

The successful implementation and operation of a SUDS system depends on a robust and clear maintenance strategy being implemented. The following measures should form part of the site's proposed management plan.

It is envisaged that the majority of the wider site drainage will be offered for adoption to Thames Water subject to further discussions. However, the majority of the SUDS will be maintained by Haymarket Media Group and will form part of the overall maintenance regime for the site.

SUDS Element	Maintenance		
	Maintenance Schedule	Required Action	Typical Frequency
Trees	Monitoring / Inspections	Inspect silt accumulation rates and establish appropriate removal frequencies	Half yearly
	Regular Maintenance	Remove litter and debris	Monthly, or as required)
		Manage other vegetation and remove nuisance plants	Monthly at start, then as required
		Inspect inlets and outlets	Monthly
	Occasional Maintenance	Check tree health and manage tree appropriately	Annually
		Remove silt build-up from inlets and surface and replace mulch as necessary	Annually, or as required
		Water	As required - in periods of drought
Permeable Paving	Monitoring / Inspections	Initial inspection	Monthly for three months after installation
		Inspect for evidence of poor operation and/or weed growth – if required, take remedial action	Three-monthly, 48 hours after large storms in first six months
		Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
		Monitor inspection chambers	Annually
	Regular Maintenance	Brushing and vacuuming -standard cosmetic sweep over whole surface	Once a year after autumn leaf fall
		Rubbish and litter removal	As required
	Remedial Actions	Remediate any landscaping which through vegetation maintenance or soil slip, has been raised to within 50mm of the level of the paving.	As required
		Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material	
		Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required

SUDS Element	Maintenance		
	Maintenance Schedule	Required Action	Typical Frequency
Attenuation Tank	Monitoring / Inspections	Inspect all inlets, outlets, vents, overflows and control structures to ensure they are working as they should	Annually or after severe storms
	Regular Maintenance	Inspect and identify any elements that are not operating correctly.	Monthly for three months, then Half yearly or as required.
		Remove sediments / debris from catch pits / gullies and control structures	Annually, after severe storms or as required
	Remedial Actions	Repair inlets, outlets, vents, overflows and control structures.	As required

Table 7.1 SUDS Maintenance Strategy as taken from the CIRIA SUDS Manual

Effective SUDS design must assess all foreseeable risks during construction and maintenance. These must be mitigated during the detailed design stages where effective design will aim to avoid, reduce and mitigate risks.

This process will also require input from the principal contractor who will ensure the construction of SUDS components are carried out in a safe and sustainable manner.

8 Foul Water Assessment

As outlined in Section 6.42.1, the Haymarket Tech Hub foul water drainage connects to the foul water network as proposed by Atkins. This eventually outfalls to the 225mm diameter foul water public sewer in Craneford Way.

The preliminary peak foul water flow rates are anticipated to be 4.11 l/s.

Qww = K√∑DU
where Qww = Waste Water flowrate (lit/sec)
K = Frequency factor (dependant on the usage)
∑DU = Sum of discharge units

System 1

Appliance	Amount	DU	Σ DU
WC with 9L cistern	18	2.5	45
wash basin, bidet	18	0.5	9
shower without plug	4	0.8	3.2
kitchen sink	4	0.8	3.2
dishwasher	4	0.8	3.2
Floor Gully DN90	2	2	4
-	0	-	
-	0	-	
-		-	
		Total	67.6

Calculation of Stack Size		
Total DU	67.6	DU
Usage	office	
Qww	4.11	l/s
Type of Entry	Square Entries	
Calculation of Drain Size		
chosen dia	100	mm
Qcap	5.88	l/s

A 'Pre-development Enquiry' was submitted to Thames Water to confirm capacity exists within the receiving public sewers. Their response, contained in Appendix H, shows that the existing foul water public sewer can accommodate the foul water discharge from the proposed development.

A Section 106 application will be made to the Water Authority for consent to connect to the public sewer.

9 Conclusions

- The site falls within Flood Zone 1 “areas with little or no potential risk of flooding” from watercourses.

- The site is located within a CDA; however, the site is at low risk of flooding from all sources, i.e. groundwater, surface water/overland flows, reservoirs.

- Therefore, the proposed redevelopment has an acceptable flood risk within the terms and requirements of the NPPF.

- Shallow infiltration solutions in the form of permeable pavements are proposed for the hardstanding external area.

- Surface water drainage from the roof area of the Haymarket Tech is proposed to be attenuated and discharge to the Thames Water surface water public sewer at a maximum flow rate of 5 l/s, as per the Atkins (2016) site wide drainage strategy, which has been granted outline planning approval (ref:15/3038/OUT).

- Calculations using FEH rainfall data indicate an attenuation tank storage volume of 48m^3 is required including a 30% allowance for climate change.

- Foul water drainage will connect to the foul water public sewers as per the site wide below ground drainage strategy designed by Atkins (2016), which has been granted outline planning approval (ref:15/3038/OUT).

- A SUDS Maintenance plan is to be put in place to ensure efficient operation and prevent failure of the system.

Appendix A

Topographical Survey

Rev	Date	By	Amendment
A	02/08	SAB	SURVEY AREA EXTENDED
B	04/08	EDL	UNDERGROUND SERVICES INFORMATION ADDED (PRELIMINARY)
C	04/08	SAB	SURVEY AREA EXTENDED
D	04/08	SAB	SURVEY AREA EXTENDED & UNDERGROUND SERVICES INFORMATION COMPLETED

LEGEND

ABBREVIATIONS

B	BOLLARD	MH	MANHOLE
BOE	BRICK ON EDGE	O/H	OVER HEAD
BOX.	BOXING	P	POST
BT	BRITISH TELECOM	P/L	PAVEMENT LIGHT
B/W	BRICK WALL	RAD	RADIATOR
CATV	CABLE TELEVISION	RE	RODDING EYE
CF	CEILING FALL	RS	ROAD SIGN
CL	COVER LEVEL	RSJ	ROLLED STEEL JOIST
CONC	CONCRETE FINISH	RSS	ROLLED STEEL STANCHION
COU	COVER ORIGIN UNKNOWN	RWP	RAIN WATER PIPE
CPD	CUPBOARD	SC	STOP COCK
DK	DROP KERB	SP	SIGN POST
DL	DERIVED LEVEL	SVP	SOIL VENT PIPE
ELEC.	ELECTRICAL	TL	TRAFFIC LIGHT
ER	EARTHING ROD	TN	TREE NUMBER
F/B	FLOWER BED	TP	TELEPHONE POLE
FAR	FLAT ASPHALT ROOF	UTL	UNABLE TO LIFT
G	GULLY	VP	VENT PIPE
GV	GAS VALVE	VTF	VINYL TILED FLOOR
HLW	HIGH LEVEL WINDOW	WC	WATER CLOSET
IC	INSPECTION COVER	WHB	WASH HAND BASIN
LC	LIGHTING COLUMN	WV	WATER VALVE
LP	LAMP POST	ø	DIAMETER

OVERHEAD DETAIL
BARRIER OR FENCE
CHANGE IN SURFACE
GATE
SURVEY STATION

HEIGHTS

C	HEIGHT FROM FLOOR TO CILL
H	HEIGHT FROM CILL TO HEAD
SP	HEIGHT FROM FLOOR TO SPRING OF ARCH
AH	HEIGHT FROM FLOOR TO HEAD OF ARCH
(2890)	HEIGHT TO CEILING, BEAM OR DOOR
S/C	STRUCTURAL CEILING HEIGHT
F/C	FALSE CEILING HEIGHT

TREES

ø DIAMETER(mm)
S SPREAD(mm) diameter
H HEIGHT(mm)

ALL TREE HEIGHTS SHOWN IN (mm)

SURVEY CONTROL STATION SCHEDULE

STN	EASTING	NORTHING	LEVEL
1	515381.027	173605.085	9.349
2	515542.508	173684.553	9.033
3	515469.901	173831.857	8.772
4	515381.259	173998.402	8.896
5	515293.631	173967.544	9.289
6	515161.352	173895.479	10.878
7	515202.268	173816..528	10.335
8	515251.928	173813.811	9.268
9	515287.725	173753.782	9.197
10	515315.126	173730.911	9.229
11	515347.168	173654.899	9.220
34	515174.909	173771.690	10.546
35	515212.216	173750.799	10.795
36	515245.781	173783.210	10.165
43	515291.214	173572.813	10.259
64	515511.568	173616.818	8.920

SERVICE ABBREVIATIONS

(AC)	Assumed Connection
(AR)	Assumed Route but proved connection
BdL	Backdrop Level
BT	British Telecom
CL	Cover Level
cog	cable on ground
CR	Cable Riser
d	depth of service (approx)
Dd	Depth to top of Duct
DP	Down Pipe
DT	Disconnecting Trap
(e)	empty duct
ECR	Electric CR
(ET)	Electronically Traced
G	Gully
GPR	Gas pipe riser
GV	Gas Valve
HV	High Voltage
IC	Inspection Chamber
IL	Invert Level
Ltg	Lighting
LV	Low Voltage
MH	Manhole
MP	Medium Pressure
(NFI)	No Further Information
(NPV)	No Pipes Visible
Pd	Depth to top of pipe
Pe	Polyethylene
PM	Pumped Main
(R)	From Records
RE	Rodding Eye
RWP	Rain Water Pipe
Sd	Sump depth
SI	Spun Iron
SL	Sump Level
(UTL)	Unable to Lift without damage
(UTT)	Unable to Trace
VP	Vent Pipe
WD	Way Duct
WL	Water Level
WPR	Water Pipe Riser

SERVICE LEGEND

FOUL DRAINAGE
SURFACE WATER DRAINAGE
WATER
GAS
ELECTRICITY
TELEPHONE
CABLE TV
FIBRENET
CLOSED CIRCUIT TV
UNKNOWN SERVICE
UNDERGROUND CHAMBER

CAUTIONARY NOTES

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, POSITIONS AND PARTICULARLY DEPTHS. ALTHOUGH ALL REASONABLE EFFORT HAS BEEN MADE IN SEARCHING AVAILABLE RECORD DRAWINGS, THE COMPLETENESS OF THE UNDERGROUND SERVICE INFORMATION CANNOT BE GUARANTEED.

Note: Pipe sizes in mm
All drainage 100 unless otherwise stated

THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE ACCOMPANYING WRITTEN REPORT

LEVELS ARE RELATED TO ORDNANCE SURVEY BENCH MARK

LOCATED ON THE MAIN CAMPUS BUILDING

VALUE : 9.78m

3sixty measurement

LONDON
SOUTH BANK HOUSE, BLACK PRINCE ROAD
LONDON SE1 7SJ
Tel: 020 7637 2930
Fax: 020 7637 2931
E-mail: info@3sixtymeasurement.co.uk
Website:www.3sixtymeasurement.co.uk

Client: RICHMOND UPON THAMES COLLEGE

Project: RICHMOND UPON THAMES COLLEGE

Drawing: SITE PLAN

Date	Scale	Drawn by	Checked by
FEB 2008	A0@1:500	SAB	CAM

Project No	Drawing No	Revision
07404	-01	D

Appendix B

Thames Water Asset Location Map

Asset Information Sheet

Issued By : GNYAMEKY

Issued Date / Time : 06/01/2015 11:37:08

Centred on Easting : 515417

Northing : 173745

Centre Mapsheet : TQ1573NW

Short Ref No	Cover Level(M)	Invert Level(M)	Maintainer	Purpose	Type	Alt No	Comments
56ZY			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
67TT			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
68SZ			Private	Surface	Manhole		From Building Control Records Null
58UW			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
66ZS			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
67XX			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
67XY			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
68ST			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
58QT			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
58PR			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
58PS			Thames Water Utilities	Foul	Manhole		From Building Control Records Null

Asset Information Sheet

58VS			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
57YV			Private	Surface	Manhole		From Building Control Records Null
67TR			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
56ZT			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
67YY			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
66ZY			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
58SX			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
58AC			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
58SW			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
58RY			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
57ZS			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
58TS			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
57WZ			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
57WY			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
66ZQ			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
68TZ			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
68QW			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
68TY			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
68SW			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of

Asset Information Sheet

							S24 Null
66ZV			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
602B			Thames Water Utilities	Surface	Manhole	6602	
67YX			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
67VR			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
68RZ			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
68QX			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
68SV			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
57TQ			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
57SZ			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
5802			Thames Water Utilities	Foul	Manhole	5804	
57VP			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
57TV			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
58QS			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
57SW			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
58AA			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
58SP			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
58AB			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
66TR			Thames Water Utilities	Foul	Manhole		From Building Control Records Null

Asset Information Sheet

68QV			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
66SX			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
67ZQ			Private	Surface	Manhole		From Building Control Records Null
57VQ			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
57SP			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
56ZX			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
56ZV			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
57XY			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
57WW			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
57WX			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
58RZ			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
601A			Thames Water Utilities	Foul	Manhole	6601	
57SS			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
57ZV			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
57ZW			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
57ZY			Private	Surface	Manhole		From Building Control Records Null
58AS			Private	Surface	Manhole		From Building Control Records (Null
58VR			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
58TT			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
3601	9.43	8.24	Thames Water Utilities	Foul	Manhole	3601	

46YX			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
48ZT			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
48YW			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
46YW			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
46ZQ			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
703B			Thames Water Utilities	Surface	Manhole	5703	
701B			Thames Water Utilities	Foul	Manhole	5701	
46WT			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
48SQ			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
46WV			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
4602	8.9	7.94	Thames Water Utilities	Surface	Manhole	4603	
48ZQ			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
48YX			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
46XT			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
48ZV			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
57YX			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
57YY			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
57ZX			Thames Water Utilities	Foul	Manhole		From Building Control Records Null

Asset Information Sheet

5801			Thames Water Utilities	Foul	Manhole	5803	
48YT			Private	Surface	Manhole		From Building Control Records (Null
48TV			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
57VX			Private	Surface	Manhole		From Building Control Records Null
57XQ			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
58TV			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
5603			Thames Water Utilities	Surface	Manhole	5603	
5602			Thames Water Utilities	Foul	Manhole	5602	
57TT			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
56XX			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
58WR			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
58WP			Private	Surface	Manhole		From Building Control Records Null
57RX			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
56YX			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
57ZR			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
58RW			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
58RQ			Private	Surface	Manhole		From Building Control Records Null
58PX			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
56ZR			Thames Water Utilities	Foul	Manhole		From Building Control Records Null

Asset Information Sheet

56YZ			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
48YY			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
56ZQ			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
58RX			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
57RW			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
57RT			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
58VP			Private	Surface	Manhole		From Building Control Records Null
56YR			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
58PT			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
58TW			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
56XZ			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
58WQ			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
57VT			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
57VS			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
57WP			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
56YQ			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
46XS			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
46WY			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
48SV			Thames Water Utilities	Foul	Manhole		From Building Control Records Null

Asset Information Sheet

48TR			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
48SZ			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
46XX			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
46YR			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
58PW			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
58QQ			Private	Surface	Manhole		From Building Control Records Null
58WV			Private	Surface	Manhole		From Building Control Records Null
46XR			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
46WX			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
48SX			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
48TT			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
5803			Thames Water Utilities	Surface	Manhole	5801	
48YZ			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
56YP			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
4803			Thames Water Utilities	Surface	Manhole	4803	
4802			Thames Water Utilities	Foul	Manhole	4802	
704A			Thames Water Utilities	Surface	Manhole	5704	
46XY			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
46ZT			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
46ZX			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
48RY			Thames Water Utilities	Surface	Manhole		From Building Control Records Null

48SW			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
46ZP			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
5804			Thames Water Utilities	Surface	Manhole	5802	
46YV			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
57VZ			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
57XT			Private	Surface	Manhole		From Building Control Records Null
57XP			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
48RS			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
48XV			Private	Surface	Manhole		From Building Control Records Null
4601	9.19	7.58	Thames Water Utilities	Foul	Manhole	4601	
58PV			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
46ZV			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
46YQ			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
46XW			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
46WZ			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
46ZS			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
66ZX			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
48ZP			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
601B			Thames Water Utilities	Foul	Manhole	5601	
56YY			Thames Water Utilities	Surface	Manhole		From Building Control Records Null

Asset Information Sheet

68RY			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
57WQ			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
68SS			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
702B			Thames Water Utilities	Foul	Manhole	5702	
68QT			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
57TZ			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
48RZ			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
58BP			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
58OX			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
68RP			Private	Surface	Manhole		From Building Control Records Null
66ZW			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
57SQ			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
58AF			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
58ST			Private	Surface	Manhole		From Building Control Records Null
57TW			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
57XX			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
48RT			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
57SR			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
481A			Thames Water Utilities	Foul	Inspection Chamber		REDLINEID002139XQZMLGPSZALI17051 3020435 Null

67TQ			Thames Water Utilities	Foul	Inspection Chamber		From Building Control Records Extent of S24 Null
67TV			Thames Water Utilities	Foul	Inspection Chamber		From Building Control Records Null
4603	8.95	8.14	Thames Water Utilities	Surface	Manhole	4602	DEPTH=2M? REDLINEID002140BNCXLGCRBULA2603 14060734 Null
58AD			Thames Water Utilities	Foul	Inspection Chamber		From Building Control Records REDLINEID002140CXMJLGPMWILS07041 4012636 Null
671A			Thames Water Utilities	Foul	Inspection Chamber		

Asset Information Sheet

Issued By : GNYAMEKY

Issued Date / Time : 06/01/2015 11:39:36

Centred on Easting : 515411

Northing : 173947

Centre Mapsheet : TQ1573NW

Short Ref No	Cover Level(M)	Invert Level(M)	Maintainer	Purpose	Type	Alt No	Comments
59WS			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
68SZ			Private	Surface	Manhole		From Building Control Records Null
60WT			Private	Foul	Manhole		From Building Control Records (Null
69VW			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
60WR			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
58YV			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
59ZS			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
58XT			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
58UW			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
59XP			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
59XQ			Thames Water Utilities	Surface	Manhole		From Building Control Records Null

Asset Information Sheet

58QT			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
58PR			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
59VT			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
59VV			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
58PS			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
59TS			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
59TT			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
5010	8.45	7.54	Thames Water Utilities	Surface	Manhole	5004	
58VS			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
58SX			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
58XS			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
59XX			Private	Surface	Manhole		From Building Control Records Null
5905			Thames Water Utilities	Surface	Manhole	5901	
58AC			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
58SW			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
58RY			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
58XY			Private	Surface	Manhole		From Building Control Records Null
50WZ			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
50WV			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
59XZ			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
59YS			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null

Asset Information Sheet

58TS			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
68TZ			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
69WP			Private	Surface	Manhole		From Building Control Records Null
68QW			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
68TY			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
68SW			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
69XR			Private	Surface	Manhole		From Building Control Records (Null
68VS			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
59WX			Private	Surface	Manhole		From Building Control Records Null
5001	8.55	6.71	Thames Water Utilities	Foul	Manhole	5007	
69VX			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
58XV			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
59WT			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
68RZ			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
68QX			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
68SV			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
68VT			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
58XW			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null

Asset Information Sheet

68WP			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
69VQ			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
5802			Thames Water Utilities	Foul	Manhole	5804	
58QS			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
58AA			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
58SP			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
59WR			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
58AB			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
59YX			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
59WP			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
59WQ			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
68QV			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
59RZ			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
58RZ			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
68VR			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
69VV			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
59ZQ			Private	Surface	Manhole		From Building Control Records Null
50VY			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
58AS			Private	Surface	Manhole		From Building Control Records (Null
58VR			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
58TT			Thames Water Utilities	Foul	Manhole		From Building Control Records Null

Asset Information Sheet

48ZT			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
48YW			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
4007			Thames Water Utilities	Surface	Manhole	4005	
39ZP			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
39ZT			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
30WZ			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
48TZ			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
30ZV			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
30ZQ			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
48SQ			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
59SZ			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
59TP			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
59TY			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
48WX			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
49YP			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
49XP			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
48WT			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
49WV			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
59ZY			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
5006	8.64	7.17	Thames Water Utilities	Foul	Manhole	5003	

Asset Information Sheet

48ZQ			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
48WW			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
48YX			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
4003	8.59	7.51	Thames Water Utilities	Surface	Manhole	4003	
48ZV			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
49YW			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
4912			Thames Water Utilities	Foul	Manhole	4904	
40ZX			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
5012	8.52	7.01	Thames Water Utilities	Surface	Manhole	5006	
5801			Thames Water Utilities	Foul	Manhole	5803	
48YT			Private	Surface	Manhole		From Building Control Records (Null
49ZT			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
40YY			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
48TV			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
58TV			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
58WR			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
58WP			Private	Surface	Manhole		From Building Control Records Null
58RW			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
58RQ			Private	Surface	Manhole		From Building Control Records Null
3904			Thames Water Utilities	Surface	Manhole	3901	

Asset Information Sheet

30ZP			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
58XQ			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
5008	8.6	7.33	Thames Water Utilities	Surface	Manhole	5001	
58ZQ			Private	Surface	Manhole		From Building Control Records Null
50ZW			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
49XT			Private	Surface	Manhole		From Building Control Records Null
5903			Thames Water Utilities	Foul	Manhole	5904	
2901			Thames Water Utilities	Surface	Manhole	2903	
48YY			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
49YT			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
49TQ			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
40XS			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
5902			Thames Water Utilities	Foul	Manhole	5902	
5011	8.46	7.42	Thames Water Utilities	Surface	Manhole	5005	
58RX			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
5901			Thames Water Utilities	Foul	Manhole	5902	
5009	8.61	7.4	Thames Water Utilities	Surface	Manhole	5002	
58VP			Private	Surface	Manhole		From Building Control Records Null
59TV			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
48VP			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
49VT			Private	Surface	Manhole		From Building Control Records Null

58WY			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
59YV			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
30ZW			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
2903			Thames Water Utilities	Surface	Manhole	2901	
2001	9.55	6.86	Thames Water Utilities	Surface	Manhole	2001	
58PT			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
58TW			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
58WQ			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
50ZX			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
4002			Thames Water Utilities	Surface	Manhole	4007	
4910			Thames Water Utilities	Foul	Manhole	4901	
4001	9.04	7.77	Thames Water Utilities	Surface	Manhole	4006	
4907			Thames Water Utilities	Surface	Manhole	4906	
49WY			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
48WY			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
4005			Thames Water Utilities	Surface	Manhole	4001	
2902			Thames Water Utilities	Surface	Manhole	2902	
48SV			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
49VP			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null

Asset Information Sheet

48TR			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
48SZ			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
48VZ			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
4801			Thames Water Utilities	Foul	Manhole	4907	
58PW			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
58QQ			Private	Surface	Manhole		From Building Control Records Null
58WV			Private	Surface	Manhole		From Building Control Records Null
002A	9.08	7.86	Thames Water Utilities	Surface	Manhole	3002	
4911			Thames Water Utilities	Foul	Manhole	4902	
49TX			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
48SX			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
49TW			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
49WQ			Private	Surface	Manhole		From Building Control Records Null
48TT			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
3006	9.46	7.91	Thames Water Utilities	Surface	Manhole	3006	
3005	9.07	7.72	Thames Water Utilities	Surface	Manhole	3005	
58WZ			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
5803			Thames Water Utilities	Surface	Manhole	5801	
48YZ			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
58XR			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
58ZX			Thames Water Utilities	Surface	Manhole		From Building Control Records Null

4803			Thames Water Utilities	Surface	Manhole	4803	
4802			Thames Water Utilities	Foul	Manhole	4802	
4901			Thames Water Utilities	Foul	Manhole	4908	
3007	9.27	8	Thames Water Utilities	Surface	Manhole	3307	
3003	9.43	7.67	Thames Water Utilities	Surface	Manhole	3003	
48XX			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
3004			Thames Water Utilities	Surface	Manhole	3004	
58XP			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
49VW			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
48SW			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
40ZY			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
5804			Thames Water Utilities	Surface	Manhole	5802	
49TZ			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
48TY			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
48WP			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
59VQ			Private	Surface	Manhole		From Building Control Records Null
50XQ			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
001A	9.12	7.95	Thames Water Utilities	Foul	Manhole	3001	
48WZ			Private	Surface	Manhole		From Building Control Records Null
48RS			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
49VX			Thames Water Utilities	Surface	Manhole		From Building Control Records Null

Asset Information Sheet

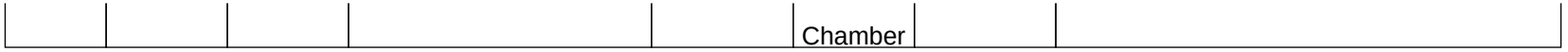
49TY			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
4006			Thames Water Utilities	Surface	Manhole	4002	
40YX			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
39ZQ			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
48XV			Private	Surface	Manhole		From Building Control Records Null
49TR			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
58ZR			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
59ZW			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
48VY			Private	Surface	Manhole		From Building Control Records Null
49ZV			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
30YZ			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
49SY			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
59TX			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
3008	9.23	7.71	Thames Water Utilities	Foul	Manhole	3308	
40XV			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
58PV			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
59TW			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
40XT			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
48TX			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
48VR			Private	Surface	Manhole		From Building Control Records Null
39ZV			Thames Water Utilities	Surface	Manhole		From Building Control Records Null

49SS			Thames Water Utilities	Foul	Manhole		FROM Blockage Return Extent of S24 Null
30ZR			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
49YQ			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
4909			Thames Water Utilities	Surface	Manhole	4905	
48XY			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
40XW			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
48ZP			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
4908			Thames Water Utilities	Surface	Manhole	4903	
30YS			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
68RY			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
50WP			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
4902			Thames Water Utilities	Surface	Manhole	4909	
49YX			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
5906			Thames Water Utilities	Surface	Manhole	5903	
48RZ			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
58BP			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
58OX			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
30XT			Thames Water Utilities	Surface	Manhole		From Building Control Records Null

68RP			Private	Surface	Manhole		From Building Control Records Null
60VX			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
58AF			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
69XV			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
58ST			Private	Surface	Manhole		From Building Control Records Null
60WQ			Private	Foul	Manhole		From Building Control Records Null
40YV			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
49XQ			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
50ZY			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
5904			Thames Water Utilities	Surface	Manhole	5901	
4004	8.65	7.51	Thames Water Utilities	Surface	Manhole	4004	
3901			Thames Water Utilities	Surface	Manhole	3902	
49YV			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
39ZR			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
481A			Thames Water Utilities	Foul	Inspection Chamber		REDLINEID002139XQZMLGPSZALI17051 3020435 Null
201A			Thames Water Utilities	Foul	Inspection Chamber		REDLINEID002140DPBQLGPMWILS24051 4025639 Null
201B			Thames Water Utilities	Foul	Inspectio		REDLINEID002140DPBQLGPMWILS24051

					n Chamber		4025639 Null
201C			Thames Water Utilities	Foul	Inspectio n Chamber		REDLINEID002140DPBQLGPMWILS24051 4025639 Null
50YZ			Thames Water Utilities	Foul	Inspectio n Chamber		From Building Control Records Extent of S24 REDLINEID002140CPSTLGPMWILS16031 4112922 Null
50YY			Thames Water Utilities	Foul	Inspectio n Chamber		From Building Control Records Null
50YX			Thames Water Utilities	Foul	Inspectio n Chamber		From Building Control Records Null
50YV			Thames Water Utilities	Foul	Inspectio n Chamber		From Building Control Records Null
50YW			Thames Water Utilities	Foul	Inspectio n Chamber		From Building Control Records Null
58AD			Thames Water Utilities	Foul	Inspectio n Chamber		From Building Control Records REDLINEID002140CXMJLGPMWILS07041 4012636 Null
501A			Unknown	Foul	Inspectio n		REDLINEID002140FLBJLGPMWILS04081 4032050 Null

Asset Information Sheet



Asset Information Sheet

Issued By : GNYAMEKY

Issued Date / Time : 06/01/2015 11:58:00

Centred on Easting : 515146

Northing : 173850

Centre Mapsheet : TQ1573NW

Short Ref No	Cover Level(M)	Invert Level(M)	Maintainer	Purpose	Type	Alt No	Comments
99VS			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
99WT			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
99TT			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
98ZP			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
07ZV			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
09VS			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
07YY			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
09YZ			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
902B			Thames Water Utilities	Surface	Manhole	0901	
09TZ			Thames Water Utilities	Surface	Manhole		From Building Control Records Null

Asset Information Sheet

0701	9.65	7.03	Thames Water Utilities	Foul	Manhole	0701	
0802	10.21	8.63	Thames Water Utilities	Surface	Manhole	0801	
09WS			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
0809	11.06	5.7	Thames Water Utilities	Foul	Manhole	082T	
09VT			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
9804	10.22	8.44	Thames Water Utilities	Surface	Manhole	9802	
07YT			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
09SR			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
07ZW			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
07WZ			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
09YV			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
0806	10.08	8.18	Thames Water Utilities	Surface	Manhole	0803	
9701	9.91	8.61	Thames Water Utilities	Surface	Manhole	9703	
0702	9.6	7.39	Thames Water Utilities	Foul	Manhole	0702	
09YT			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
09GS			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
98YZ			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
903B			Thames Water Utilities	Foul	Manhole	9903	
2901			Thames Water Utilities	Surface	Manhole	2903	
09WW			Thames Water Utilities	Surface	Manhole		From Building Control Records Null

Asset Information Sheet

99WZ			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
99XS			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
07YS			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
09XQ			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
09FX			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
98YX			Thames Water Utilities	Surface	Manhole		From Building Control Records Extent of S24 Null
99TW			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
2903			Thames Water Utilities	Surface	Manhole	2901	
09YP			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
99YS			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
99VX			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
99VR			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
2902			Thames Water Utilities	Surface	Manhole	2902	
07ZT			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
07YZ			Thames Water Utilities	Combined	Manhole		From Building Control Records Extent of S24 Null
09XS			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
09WT			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null

Asset Information Sheet

07XS			Private	Combined	Manhole		From Building Control Records Null
09ZW			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
09ZS			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
901B			Thames Water Utilities	Foul	Manhole	0902	
07YW			Private	Combined	Manhole		From Building Control Records Null
0803	10.5	8.52	Thames Water Utilities	Surface	Manhole	0806	
09VZ			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
0801	10.25	8.98	Thames Water Utilities	Foul	Manhole	0802	
1701	10.42	-7.66	Thames Water Utilities	Foul	Manhole	171T	
902A			Thames Water Utilities	Surface	Manhole	9904	
901A			Thames Water Utilities	Surface	Manhole	9905	
9805	10.24	9.04	Thames Water Utilities	Foul	Manhole	9801	
09PT			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
09VV			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
07ZQ			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
07ZR			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
0807	10.6	-8.12	Thames Water Utilities	Foul	Manhole	081T	
99YT			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
07ZY			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
09SX			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null

Asset Information Sheet

07YP			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
09TS			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
09XP			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
0808	10.2	-8	Thames Water Utilities	Unknown	Manhole	085T	NEW MH SEE DRG.NO.SDS/M/19 Null
99ZQ			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
9703	10.05	8.6	Thames Water Utilities	Surface	Manhole	9702	
803A	10.25	8	Thames Water Utilities	Surface	Manhole	9803	
07YQ			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
07XY			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
07XZ			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
08ZY			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
07ZS			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
09ZT			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
0805	9.75	8.07	Thames Water Utilities	Surface	Manhole	0804	
99YR			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
99WQ			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
99VW			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
99XV			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
09SY			Thames Water Utilities	Surface	Manhole		From Building Control Records Null
0804	9.33	8.08	Thames Water Utilities	Surface	Manhole	0807	

Asset Information Sheet

99WX			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
1903			Thames Water Utilities	Surface	Manhole	1901	
1901	10.99	9.35	Thames Water Utilities	Surface	Manhole	1903	
99TY			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
1801			Thames Water Utilities	Foul	Manhole	1805	
1904			Thames Water Utilities	Foul	Manhole	1902	
99ZR			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
99TS			Thames Water Utilities	Foul	Manhole		From Building Control Records Null
981C			Thames Water Utilities	Foul	Manhole		
081E			Thames Water Utilities	Foul	Manhole		
081F			Thames Water Utilities	Foul	Manhole		
981B			Thames Water Utilities	Foul	Manhole		
081A			Thames Water Utilities	Foul	Inspection Chamber		
081B			Thames Water Utilities	Foul	Inspection Chamber		
081D			Thames Water Utilities	Foul	Inspection Chamber		
981A			Private	Foul	Inspectio		

					n Chamber		
99YP			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
09SS			Thames Water Utilities	Foul	Manhole		From Building Control Records Extent of S24 Null
1902	11.38	8.53	Thames Water Utilities	Surface	Manhole	1903	
3901			Thames Water Utilities	Surface	Manhole	3902	
09ZY			Thames Water Utilities	Foul	Inspectio n Chamber		From Building Control Records REDLINEID002140DDXJLGPMWILS25041 4025247 Null
09XN			Thames Water Utilities	Foul	Inspectio n Chamber		From Building Control Records Null
09XY			Thames Water Utilities	Foul	Inspectio n Chamber		From Building Control Records Null
09IR			Thames Water Utilities	Foul	Inspectio n Chamber		From Building Control Records Extent of S24 Null

Asset Information Sheet

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Centred on Easting : 515152

Northing : 173621

Centre Mapsheet : TQ1573NW

Short Ref No	Cover Level(M)	Invert Level(M)	Maintainer	Purpose	Type	Alt No	Comments
06ZS			Private	Combined	Manhole		From Building Control Records Null
96VX			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
06ZV			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
95YS			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
95WW			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
95WX			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
96VW			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
97ZW			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
05ZY			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
05ZW			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
05ZV			Thames Water Utilities	Combined	Manhole		From Building Control Records Null

Asset Information Sheet

06ZX			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
05YQ			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
06WP			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
0701	9.65	7.03	Thames Water Utilities	Foul	Manhole	0701	
96WT			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
95XX			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
9601	10.03	8.28	Thames Water Utilities	Foul	Manhole	9601	
05XW			Private	Combined	Manhole		From Building Control Records Null
07YT			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
06YV			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
05XT			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
07ZW			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
06YZ			Private	Combined	Manhole		From Building Control Records Null
94VY			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
95XP			Private	Combined	Manhole		From Building Control Records Null
07WZ			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
9502			Thames Water Utilities	Foul	Manhole		
0702	9.6	7.39	Thames Water Utilities	Foul	Manhole	0702	
95YV			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
07XQ			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
94VW			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
96TV			Private	Combined	Manhole		From Building Control Records Null

Asset Information Sheet

06XR			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
07YS			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
06XP			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
96WV			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
95TT			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
96WX			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
96TR			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
06WZ			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
95XY			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
96VT			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
1601	11.24	-7.24	Thames Water Utilities	Foul	Manhole	161T	
95WY			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
97ZY			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
97ZV			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
07ZT			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
95XS			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
07XS			Private	Combined	Manhole		From Building Control Records Null
06WY			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
0601	9.85	8.02	Thames Water Utilities	Foul	Manhole	0601	
05YW			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
07YW			Private	Combined	Manhole		From Building Control Records Null
96YS			Thames Water Utilities	Combined	Manhole		From Building Control Records Null

Asset Information Sheet

95TS			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
06XY			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
1701	10.42	-7.66	Thames Water Utilities	Foul	Manhole	171T	
95XT			Thames Water Utilities	Combined	Manhole		From Building Control Records Extent of S24 Null
96VQ			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
96YQ			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
06YQ			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
96TS			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
06YS			Private	Combined	Manhole		From Building Control Records Null
97ZT			Private	Combined	Manhole		From Building Control Records Null
05YV			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
05YS			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
07ZQ			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
07ZR			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
05YR			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
96TW			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
95TR			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
07ZY			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
06WR			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
06YX			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
96VZ			Private	Combined	Manhole		From Building Control Records Null

Asset Information Sheet

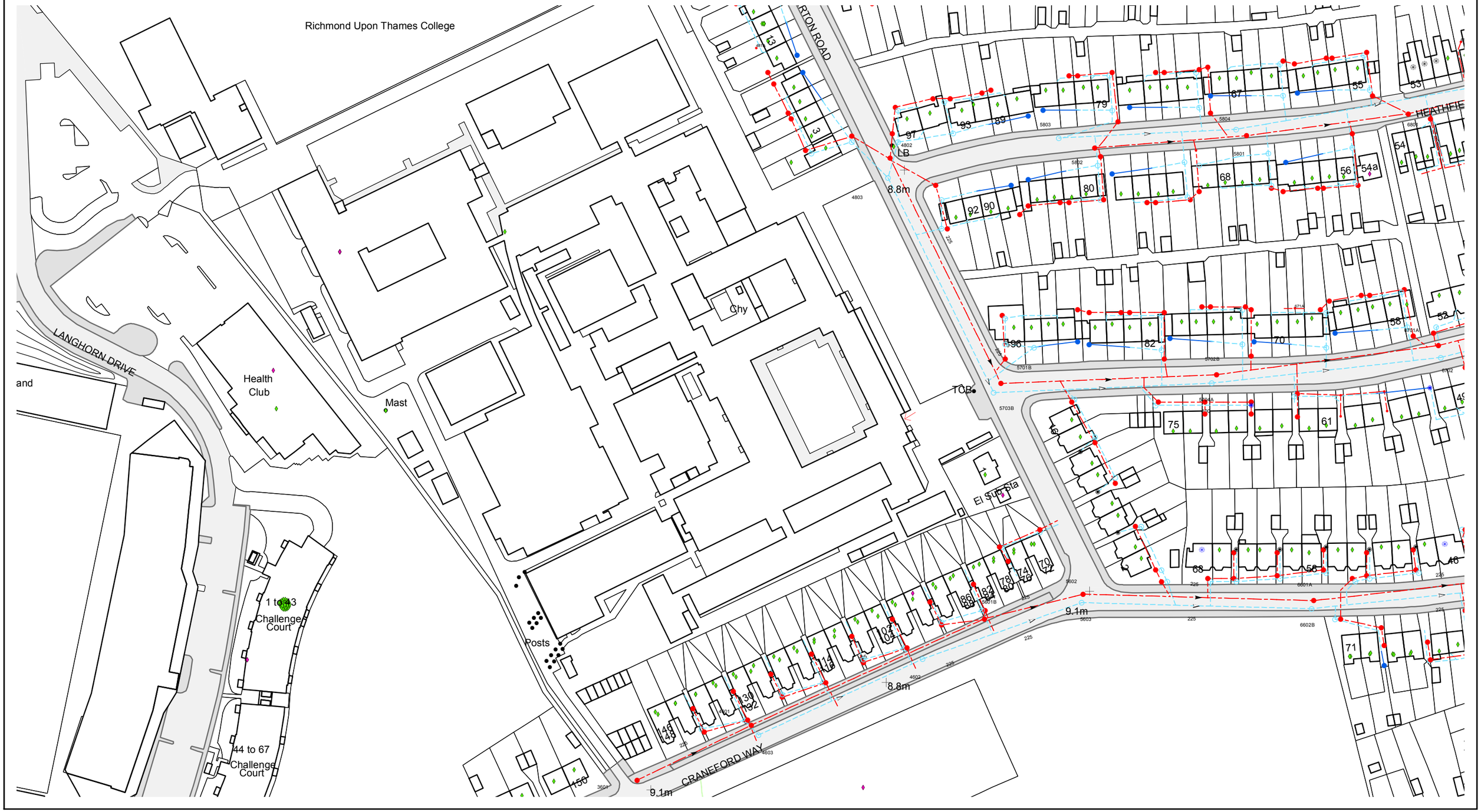
0501	10.3	8.42	Thames Water Utilities	Foul	Manhole	0501	
95VW			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
95VR			Private	Combined	Manhole		From Building Control Records Null
96WZ			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
06YP			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
96YT			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
05XS			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
96VR			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
07XY			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
07XZ			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
07WV			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
94VX			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
95YX			Private	Combined	Manhole		From Building Control Records Null
07ZS			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
05ZT			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
06ZQ			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
04ZR			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
06ZW			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
95YP			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
06XS			Thames Water Utilities	Combined	Inspection Chamber		From Building Control Records Null

Asset Information Sheet

96WW			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
95YR			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
05ZQ			Private	Combined	Manhole		From Building Control Records Null
05ZR			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
05YY			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
96VP			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
96YR			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
95XZ			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
96VS			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
05YZ			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
06WQ			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
07WX			Thames Water Utilities	Combined	Manhole		From Building Control Records Null
06WT			Thames Water Utilities	Combined	Inspection Chamber		From Building Control Records REDLINEID002140CVGLLGPMWILS31031 4114140 Null
95TQ			Thames Water Utilities	Combined	Inspection Chamber		From Building Control Records REDLINEID002140FBSCLGPMWILS05071 4015453 Null

Based on the Ordnance Survey Map with the Sanction of the Controller of H.M Stationery Office License Number 100019345

Thames Water



0 20 40 80 120 160 Metres

The position of any boundary or apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. No liability of any kind whatsoever is accepted by Thames Water for any error or omission.

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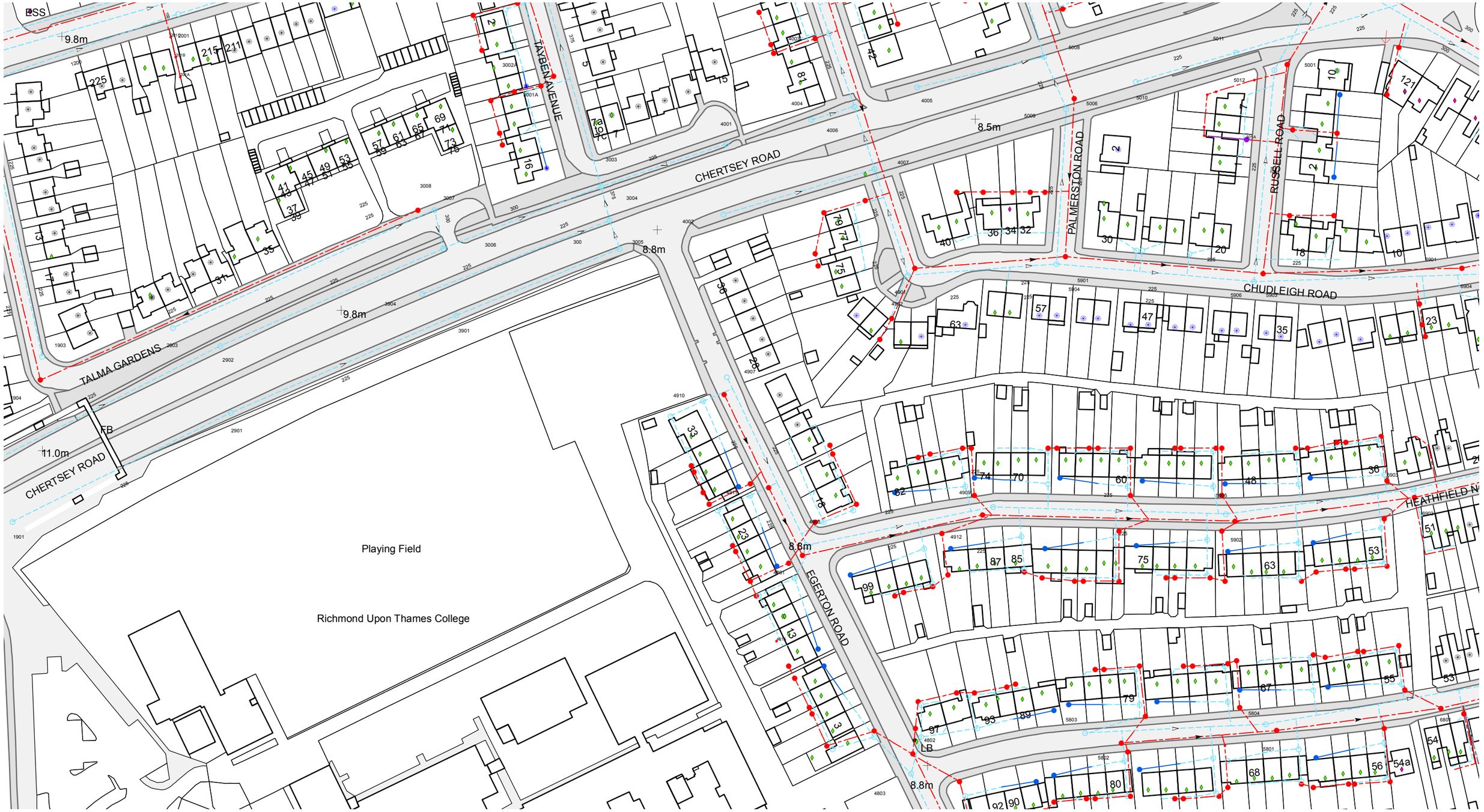
Printed By :GNYAMEKY
Print Date :06/01/2015
Map Centered On :515418,173746
Grid Reference :TQ1573

Thames Water



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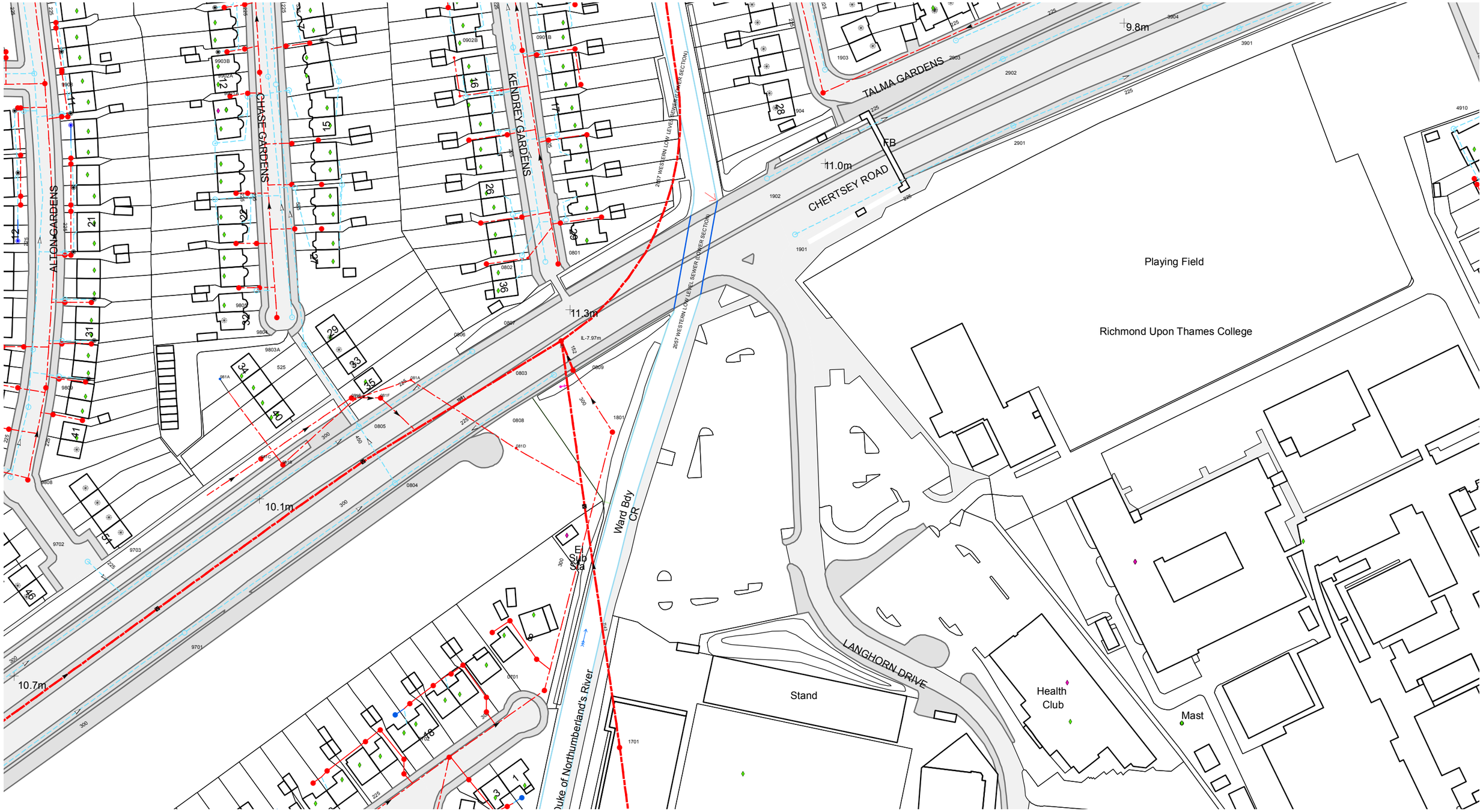
Print Date :06/01/2015
Map Centered On :515411,173948
Grid Reference :TQ1573

Thames Water

N



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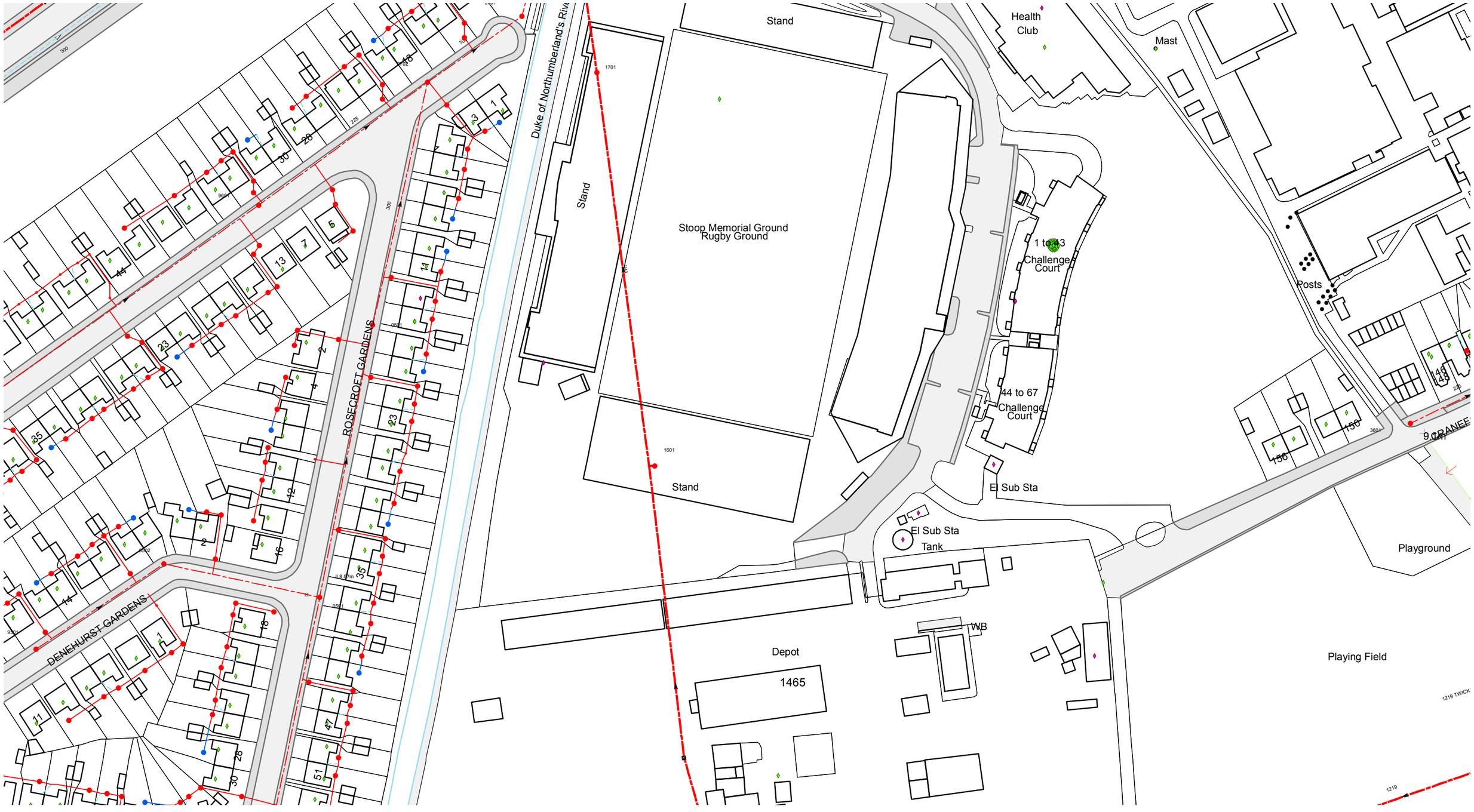
Printed At (A3) :1:1250
Printed By :GNYAMEKY
Print Date :06/01/2015
Map Centered On :515146,173850
Grid Reference :TQ1573

Thames Water

Based on the Ordnance Survey Map with the Sanction of the Controller of H.M Stationery Office License Number 100019345

Thames Water

N



0 20 40 80 120 160 Metres

The position of any boundary or apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. No liability of any kind whatsoever is accepted by Thames Water for any error or omission.

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Printed By :GNYAMEKY
Print Date :06/01/2015
Map Centered On :515152,173621
Grid Reference :TQ1573

Appendix C

Atkins & LBo Richmond upon Thames Correspondence

From: Brian Humphris
To: Taylor, Jessica
Subject: RE: Richmond-upon-Thames College - Drainage strategy queries
Date: 23 May 2016 16:05:59

Hi Jessica, sorry for the delay in replying. I confirm that your proposals are acceptable in principal.

Regards Brian

Brian Humphris
Highway Asset Co-ordinator

020 8891 7738

From: Taylor, Jessica [mailto:Jessica.Taylor@atkinsglobal.com]
Sent: 09 May 2016 18:29
To: Brian Humphris
Subject: Richmond-upon-Thames College - Drainage strategy queries

Hi Brian,

Thanks for speaking with me earlier today regarding the Richmond-upon-Thames College redevelopment.

As discussed on the phone, we wanted to get in touch with you to confirm our discharge assumptions and parameters prior to submitting the Sustainable Drainage Assessment in the RMA.

Brief site description

The existing Richmond-upon-Thames College site is to be redeveloped into the Richmond Education and Enterprise Campus (new college building, a new borough school/SEN, Haymarket building, Sports hall, STEM building and come residential). This query is just in relation to RMA application for the development of the new College building – proposed on top of the existing playing field. I have attached existing and DRAFT proposed site master plans for reference.

The existing RuT College surface water is discharged to ground via soakaway.

Discharge proposal

To manage surface water runoff we are proposing a combined SuDs network consisting of permeable paving (discharging via infiltration into the groundwater) and below ground attenuation with restricted discharge (peak greenfield runoff rate) into a Thames Water surface water sewer. In both instances run-off from the 100 yr + CC event will be stored within the structure resulting in no surface water flooding.

1) Infiltration

The College plaza area and surrounding carpark is proposed to be all porous paving. The surface water captured from this area will be stored in the pavement for infiltration into the underlying strata. The strata is Kempton Park Gravel exhibits infiltration rates constituting a Type A (SuDs Manual) total infiltration solution. As discussed on the phone we can send these results through as a part of the Sustainable drainage strategy.

The volume of water that can be infiltrated onsite is constrained due to the high groundwater table (seasonal high recorded as 1.2-1.5 m below existing ground level). In accordance with the London Plan Hierarchy we have endeavoured to direct as much surface water runoff to ground as possible. At this point we are looking at facilitating a **freeboard of about 700 to 800 mm** between the seasonal ground water high and the subgrade of the pavement. **Would this be acceptable to RuT borough in principal?**

For information, the current design of the permeable pavement contains a block layer, 50mm of crushed aggregate, a geotextile sheet, a DTM, a geogrid for stability, 450mm of sub-base stone, an additional geogrid, and a final geotextile layer. Geomembrane "check dams" will be installed every 10 or so m to facilitate pavement storage and to avoid runoff concentrating for discharge in one location. From our discussions with the EA they agree that this pavement composition would adequately treat the carpark runoff but would confirm this following our submission in the RMA.

2) Restricted Discharge to Sewer (TW)

Runoff from all roofs will be collected through a piped network and attenuated below ground for controlled discharge into the local Thames Water surface water network. Discharge will be restricted to the greenfield runoff rate which has been calculated as follows based on the IH124 Method (SPR = 0.3 based on HOST class maps from IH126 report).

As mentioned previously the attenuation has been design to store the peak duration 1:100 year + CC event with discharge at the 1 in 100 year greenfield rate. Discharge will be controlled using a hydrobrake optimised to discharge at the greenfield run off rates. We also note that TW have reviewed the discharges as a part of the predevelopment enquiry process and have confirmed that no impact study is required.

These assumptions are based on recommended practice but **would you please be able to comment if this concept is acceptable in principal?**

My apologies for the information download! Happy to talk the strategy and assumptions through further with you on the phone. Please feel free to contact me using my details below.

Thanks very much for your assistance with this.

Jess

Jess Taylor
Assistant Civil Engineer, Design & Engineering

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Euston Tower, 286 Euston Road, London NW1 3AT **|** Tel: +44 (0)20 7121 2305 **|** Mob: +44 (0) 7482 623583
Email: jessica.taylor@atkinsglobal.com Web: www.atkinsglobal.com Careers: www.atkinsglobal.com/careers

Appendix D

Greenfield Runoff (Existing Permeable Areas)

HR Wallingford
Working with water

Greenfield runoff estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	
Site name:	27983 Existing Permeable Areas
Site location:	Haymarket Tech Hub

This is an estimation of the greenfield runoff rate limits that are needed to meet normal best practice criteria in line with Environment Agency guidance "Preliminary rainfall runoff management for developments", W5-074/A/TR1/1 rev. E (2012) and the SuDS Manual, C753 (Ciria, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site coordinates

Latitude:	51.45198° N
Longitude:	0.34317° W

Reference:	
Date:	2019-06-10 16:26

Methodology	FEH Statistical

Site characteristics

Total site area (ha)	0.141

Methodology

Qmed estimation method	Calculate from BFI and SAAR
BFI and SPR estimation method	Specify BFI manually
HOST class	N/A
BFI / BFIHOST	0.603
Qmed (l/s)	NaN
Qbar / Qmed Conversion Factor	1.14

Hydrological characteristics

	Default	Edited
SAAR (mm)	599	599
Hydrological region	6	6
Growth curve factor: 1 year	0.85	0.85
Growth curve factor: 30 year	2.3	2.3
Growth curve factor: 100 year	3.19	3.19

Notes:

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

Normally limiting discharge rates which are less than 2.0 l/s/ha 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 consents are usually set at 5.0l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set in which case blockage work must be addressed by using appropriate drainage elements

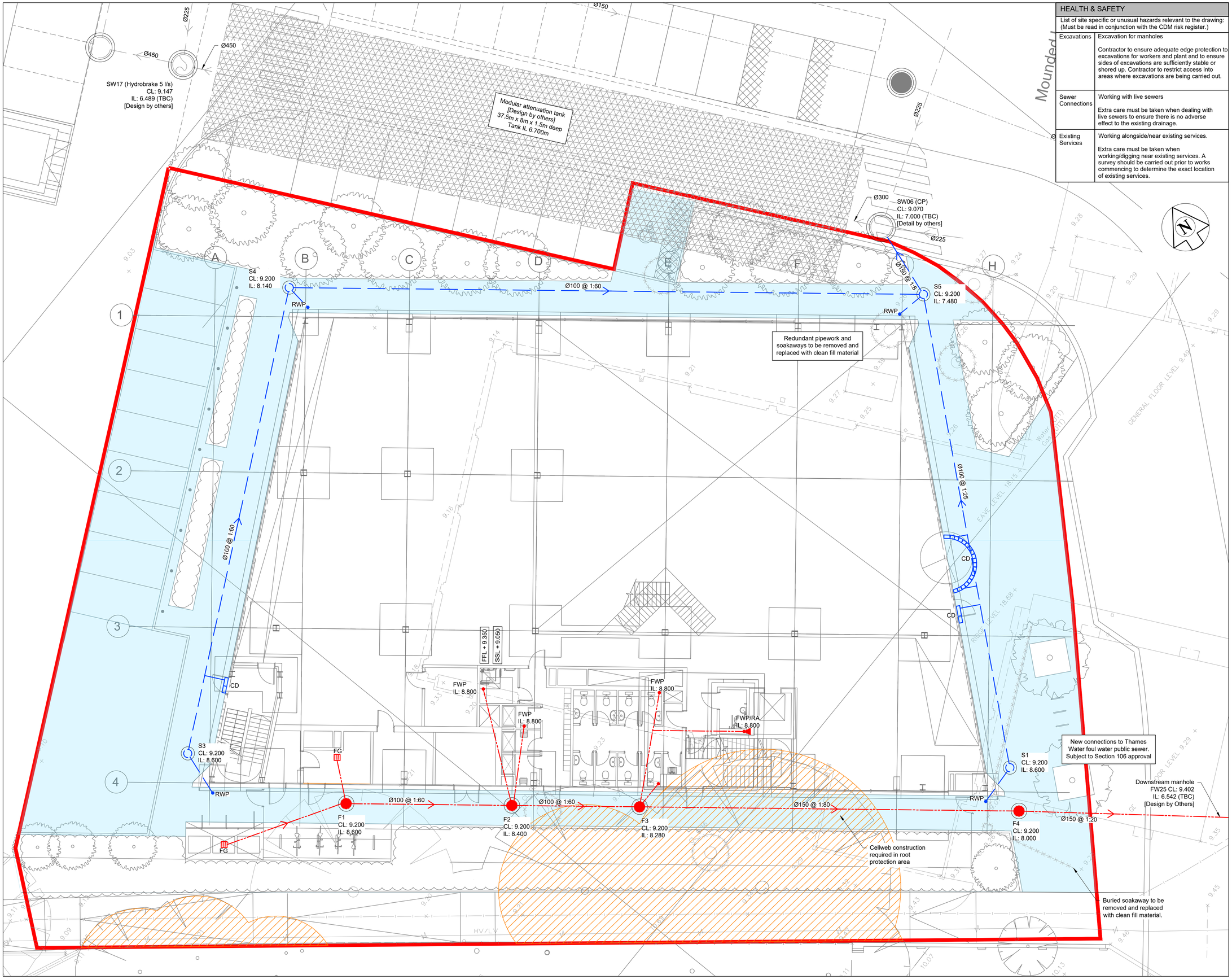
(3) Is SPR/SPRHOST ≤ 0.3?

Greenfield runoff rates

	Default	Edited
Qbar (l/s)	NaN	0.21
1 in 1 year (l/s)	NaN	0.18
1 in 30 years (l/s)	NaN	0.49
1 in 100 years (l/s)	NaN	0.67

Appendix E

Preliminary Below Ground Drainage Layout



HEALTH & SAFETY

List of site specific or unusual hazards relevant to the drawing: (Must be read in conjunction with the CDM risk register.)

Excavations	Excavation for manholes Contractor to ensure adequate edge protection to excavations for workers and plant and to ensure sides of excavations are sufficiently stable or shored up. Contractor to restrict access into areas where excavations are being carried out.
Sewer Connections	Working with live sewers Extra care must be taken when dealing with live sewers to ensure there is no adverse effect to the existing drainage.
Existing Services	Working alongside/near existing services. Extra care must be taken when working/digging near existing services. A survey should be carried out prior to works commencing to determine the exact location of existing services.

Notes :

1. This drawing is to be read in conjunction with all relevant Architect's, Engineer's and specialists' drawings and specifications.
2. Do not scale from this drawing in either paper or digital form. Use written dimensions only. To check that this drawing has been printed to the intended scale this bar should be 50mm long @ A1 or 25mm long @ A3.
3. Health & Safety :
   All specific drawing notes are to be read in conjunction with the project "Information Pack" and "Site Rules".

DRAINAGE LEGEND

- New FW Drain
- New SW Drain
- Existing SW Drain
- Existing FW Drain
- Demolished/Abandoned

DRAINAGE KEY

RWP	Rainwater Down Pipe
FWP	Foul Waste Pipe
RA	Rodding Access
FG	Floor Gully
CD	Channel Drain / Brick Slot
S1	Surface Water Manhole Chamber
F1	Foul Water Manhole Chamber
ExS1	Surface Water Manhole Chamber by Others
ExS1	Flow Control Chamber by Others
ExF1	Foul Water Manhole Chamber by Others
	Root Protection Zone
	Attenuation Cells by Others
	Permeable Paving

ABBREVIATIONS

IL	- Invert Level
CL	- Cover Level
RA	- Above Ground Rodding Access

Ver	Date	Drawn	Eng	Amendment
2	17.07.19	AF	SR	Issued for Reserved Matters Application
1	17.06.19	AF	SR	Issued for Information

HAYMARKET TECH HUB

BELOW GROUND DRAINAGE LAYOUT

Status
FOR INFORMATION
NOT FOR CONSTRUCTION

Drawn	AF	Eng	SR
Scales	1:100 at A1		1:200 at A3
Drawing No	27983-6000	Ver	2

PRICE&MYERS
Consulting Engineers
37 Alfred Place London WC1E 7DP
T 020 7631 5128 F 020 7462 1390
E mail@pricemyers.com www.pricemyers.com

Appendix F

Preliminary MicroDrainage Calculations

Summary of Results for 100 year Return Period (+30%)

Half Drain Time : 120 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	7.919	1.219	0.0	5.1	5.1	49.8	O K
30 min Summer	7.998	1.298	0.0	5.2	5.2	53.0	O K
60 min Summer	8.000	1.300	0.0	5.2	5.2	53.1	O K
120 min Summer	7.872	1.172	0.0	5.0	5.0	47.9	O K
180 min Summer	7.783	1.083	0.0	5.0	5.0	44.2	O K
240 min Summer	7.709	1.009	0.0	5.0	5.0	41.2	O K
360 min Summer	7.574	0.874	0.0	5.0	5.0	35.7	O K
480 min Summer	7.447	0.747	0.0	5.0	5.0	30.5	O K
600 min Summer	7.309	0.609	0.0	5.0	5.0	24.9	O K
720 min Summer	7.171	0.471	0.0	5.0	5.0	19.2	O K
960 min Summer	6.983	0.283	0.0	5.0	5.0	11.6	O K
1440 min Summer	6.776	0.076	0.0	4.9	4.9	3.1	O K
2160 min Summer	6.700	0.000	0.0	4.3	4.3	0.0	O K
2880 min Summer	6.700	0.000	0.0	3.4	3.4	0.0	O K
4320 min Summer	6.700	0.000	0.0	2.4	2.4	0.0	O K
5760 min Summer	6.700	0.000	0.0	1.8	1.8	0.0	O K
7200 min Summer	6.700	0.000	0.0	1.5	1.5	0.0	O K
8640 min Summer	6.700	0.000	0.0	1.3	1.3	0.0	O K
10080 min Summer	6.700	0.000	0.0	1.1	1.1	0.0	O K
15 min Winter	8.080	1.380	0.0	5.4	5.4	56.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	209.523	0.0	55.0	18
30 min Summer	119.012	0.0	62.5	32
60 min Summer	67.600	0.0	71.2	60
120 min Summer	38.398	0.0	80.7	98
180 min Summer	27.581	0.0	86.9	132
240 min Summer	21.810	0.0	91.8	166
360 min Summer	15.667	0.0	98.9	234
480 min Summer	12.389	0.0	104.1	304
600 min Summer	10.326	0.0	108.6	370
720 min Summer	8.899	0.0	112.1	426
960 min Summer	7.082	0.0	118.9	540
1440 min Summer	5.132	0.0	129.4	762
2160 min Summer	3.720	0.0	140.6	0
2880 min Summer	2.960	0.0	149.2	0
4320 min Summer	2.069	0.0	156.4	0
5760 min Summer	1.605	0.0	161.8	0
7200 min Summer	1.318	0.0	166.1	0
8640 min Summer	1.122	0.0	169.6	0
10080 min Summer	0.979	0.0	172.7	0
15 min Winter	209.523	0.0	61.7	18

Summary of Results for 100 year Return Period (+30%)

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
30 min Winter	8.183	1.483	0.0	5.5	5.5	60.6	O K
60 min Winter	8.559	1.859	0.0	6.0	6.0	61.6	O K
120 min Winter	8.088	1.388	0.0	5.4	5.4	56.7	O K
180 min Winter	7.966	1.266	0.0	5.2	5.2	51.7	O K
240 min Winter	7.864	1.164	0.0	5.0	5.0	47.6	O K
360 min Winter	7.668	0.968	0.0	5.0	5.0	39.5	O K
480 min Winter	7.477	0.777	0.0	5.0	5.0	31.7	O K
600 min Winter	7.251	0.551	0.0	5.0	5.0	22.5	O K
720 min Winter	7.060	0.360	0.0	5.0	5.0	14.7	O K
960 min Winter	6.829	0.129	0.0	4.9	4.9	5.2	O K
1440 min Winter	6.700	0.000	0.0	4.2	4.2	0.0	O K
2160 min Winter	6.700	0.000	0.0	3.1	3.1	0.0	O K
2880 min Winter	6.700	0.000	0.0	2.4	2.4	0.0	O K
4320 min Winter	6.700	0.000	0.0	1.7	1.7	0.0	O K
5760 min Winter	6.700	0.000	0.0	1.3	1.3	0.0	O K
7200 min Winter	6.700	0.000	0.0	1.1	1.1	0.0	O K
8640 min Winter	6.700	0.000	0.0	0.9	0.9	0.0	O K
10080 min Winter	6.700	0.000	0.0	0.8	0.8	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	119.012	0.0	70.0	32
60 min Winter	67.600	0.0	79.4	60
120 min Winter	38.398	0.0	90.2	112
180 min Winter	27.581	0.0	97.5	140
240 min Winter	21.810	0.0	102.6	178
360 min Winter	15.667	0.0	110.4	254
480 min Winter	12.389	0.0	116.5	330
600 min Winter	10.326	0.0	121.3	394
720 min Winter	8.899	0.0	125.6	446
960 min Winter	7.082	0.0	133.3	548
1440 min Winter	5.132	0.0	144.9	0
2160 min Winter	3.720	0.0	157.5	0
2880 min Winter	2.960	0.0	167.1	0
4320 min Winter	2.069	0.0	175.2	0
5760 min Winter	1.605	0.0	181.2	0
7200 min Winter	1.318	0.0	186.0	0
8640 min Winter	1.122	0.0	190.0	0
10080 min Winter	0.979	0.0	193.5	0

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	GB 515250 173900 TQ 15250 73900
C (1km)	-0.025
D1 (1km)	0.299
D2 (1km)	0.321
D3 (1km)	0.232
E (1km)	0.307
F (1km)	2.539
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.140

Time (mins) From:	To:	Area (ha)
0	4	0.140

Model Details

Storage is Online Cover Level (m) 9.200

Cellular Storage Structure

Invert Level (m) 6.700 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)
0.000	43.0	0.0	1.501	0.0	0.0
1.500	43.0	0.0			

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0100-5000-1375-5000
Design Head (m)	1.375
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	100
Invert Level (m)	6.489
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.375	5.0
Flush-Flo™	0.408	5.0
Kick-Flo®	0.840	4.0
Mean Flow over Head Range	-	4.4

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)
0.100	3.3	1.200	4.7	3.000	7.2	7.000	10.8
0.200	4.6	1.400	5.0	3.500	7.7	7.500	11.1
0.300	4.9	1.600	5.4	4.000	8.2	8.000	11.5
0.400	5.0	1.800	5.7	4.500	8.7	8.500	11.8
0.500	4.9	2.000	6.0	5.000	9.2	9.000	12.1
0.600	4.8	2.200	6.2	5.500	9.6	9.500	12.4
0.800	4.2	2.400	6.5	6.000	10.0		
1.000	4.3	2.600	6.7	6.500	10.4		

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

Half Drain Time : 96 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	9.154	0.254	3.9	28.2	Flood Risk
30 min Summer	9.166	0.266	4.1	30.8	Flood Risk
60 min Summer	9.170	0.270	4.2	31.8	Flood Risk
120 min Summer	9.168	0.268	4.2	31.2	Flood Risk
180 min Summer	9.163	0.263	4.1	30.2	Flood Risk
240 min Summer	9.158	0.258	4.0	28.9	Flood Risk
360 min Summer	9.145	0.245	3.8	26.2	Flood Risk
480 min Summer	9.133	0.233	3.6	23.6	Flood Risk
600 min Summer	9.122	0.222	3.4	21.4	Flood Risk
720 min Summer	9.111	0.211	3.3	19.4	Flood Risk
960 min Summer	9.094	0.194	3.0	16.4	Flood Risk
1440 min Summer	9.067	0.167	2.6	12.1	Flood Risk
2160 min Summer	9.038	0.138	2.1	8.3	Flood Risk
2880 min Summer	9.018	0.118	1.8	6.1	Flood Risk
4320 min Summer	8.989	0.089	1.4	3.4	Flood Risk
5760 min Summer	8.971	0.071	1.1	2.2	Flood Risk
7200 min Summer	8.959	0.059	0.9	1.5	Flood Risk
8640 min Summer	8.950	0.050	0.8	1.1	Flood Risk
10080 min Summer	8.947	0.047	0.7	0.9	Flood Risk
15 min Winter	9.172	0.272	4.2	32.2	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Summer	225.640	0.0	18
30 min Summer	128.166	0.0	32
60 min Summer	72.800	0.0	60
120 min Summer	41.351	0.0	88
180 min Summer	29.703	0.0	122
240 min Summer	23.488	0.0	156
360 min Summer	16.872	0.0	224
480 min Summer	13.342	0.0	290
600 min Summer	11.121	0.0	356
720 min Summer	9.583	0.0	418
960 min Summer	7.626	0.0	540
1440 min Summer	5.527	0.0	782
2160 min Summer	4.006	0.0	1144
2880 min Summer	3.188	0.0	1500
4320 min Summer	2.228	0.0	2208
5760 min Summer	1.728	0.0	2936
7200 min Summer	1.419	0.0	3672
8640 min Summer	1.208	0.0	4400
10080 min Summer	1.055	0.0	5064
15 min Winter	225.640	0.0	18

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

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
30 min Winter	9.185	0.285	4.4	35.2	Flood Risk
60 min Winter	9.190	0.290	4.5	36.6	Flood Risk
120 min Winter	9.186	0.286	4.4	35.5	Flood Risk
180 min Winter	9.179	0.279	4.3	33.8	Flood Risk
240 min Winter	9.170	0.270	4.2	31.8	Flood Risk
360 min Winter	9.153	0.253	3.9	27.8	Flood Risk
480 min Winter	9.136	0.236	3.7	24.2	Flood Risk
600 min Winter	9.120	0.220	3.4	21.1	Flood Risk
720 min Winter	9.106	0.206	3.2	18.5	Flood Risk
960 min Winter	9.083	0.183	2.8	14.6	Flood Risk
1440 min Winter	9.049	0.149	2.3	9.7	Flood Risk
2160 min Winter	9.016	0.116	1.8	5.8	Flood Risk
2880 min Winter	8.995	0.095	1.5	3.9	Flood Risk
4320 min Winter	8.967	0.067	1.0	2.0	Flood Risk
5760 min Winter	8.952	0.052	0.8	1.2	Flood Risk
7200 min Winter	8.946	0.046	0.7	0.9	Flood Risk
8640 min Winter	8.942	0.042	0.6	0.8	Flood Risk
10080 min Winter	8.940	0.040	0.5	0.7	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
30 min Winter	128.166	0.0	31
60 min Winter	72.800	0.0	58
120 min Winter	41.351	0.0	94
180 min Winter	29.703	0.0	132
240 min Winter	23.488	0.0	170
360 min Winter	16.872	0.0	240
480 min Winter	13.342	0.0	308
600 min Winter	11.121	0.0	374
720 min Winter	9.583	0.0	440
960 min Winter	7.626	0.0	566
1440 min Winter	5.527	0.0	808
2160 min Winter	4.006	0.0	1164
2880 min Winter	3.188	0.0	1500
4320 min Winter	2.228	0.0	2204
5760 min Winter	1.728	0.0	2936
7200 min Winter	1.419	0.0	3640
8640 min Winter	1.208	0.0	4408
10080 min Winter	1.055	0.0	5112

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	GB 515250 173900 TQ 15250 73900
C (1km)	-0.025
D1 (1km)	0.299
D2 (1km)	0.321
D3 (1km)	0.232
E (1km)	0.307
F (1km)	2.539
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.082

Time (mins) From:	To:	Area (ha)
0	4	0.082

Model Details

Storage is Online Cover Level (m) 9.200

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.03852	Width (m)	29.0
Membrane Percolation (mm/hr)	1000	Length (m)	29.0
Max Percolation (l/s)	233.6	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	8.900	Membrane Depth (m)	0

Summary of Results for 100 year Return Period (+30%)

Half Drain Time : 92 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	7.952	1.252	0.0	5.1	5.1	38.1	O K
30 min Summer	8.008	1.308	0.0	5.2	5.2	39.8	O K
60 min Summer	7.957	1.257	0.0	5.2	5.2	38.2	O K
120 min Summer	7.808	1.108	0.0	5.0	5.0	33.7	O K
180 min Summer	7.706	1.006	0.0	5.0	5.0	30.6	O K
240 min Summer	7.614	0.914	0.0	5.0	5.0	27.8	O K
360 min Summer	7.443	0.743	0.0	5.0	5.0	22.6	O K
480 min Summer	7.252	0.552	0.0	5.0	5.0	16.8	O K
600 min Summer	7.091	0.391	0.0	5.0	5.0	11.9	O K
720 min Summer	6.970	0.270	0.0	5.0	5.0	8.2	O K
960 min Summer	6.818	0.118	0.0	4.9	4.9	3.6	O K
1440 min Summer	6.700	0.000	0.0	4.6	4.6	0.0	O K
2160 min Summer	6.700	0.000	0.0	3.3	3.3	0.0	O K
2880 min Summer	6.700	0.000	0.0	2.7	2.7	0.0	O K
4320 min Summer	6.700	0.000	0.0	1.9	1.9	0.0	O K
5760 min Summer	6.700	0.000	0.0	1.4	1.4	0.0	O K
7200 min Summer	6.700	0.000	0.0	1.2	1.2	0.0	O K
8640 min Summer	6.700	0.000	0.0	1.0	1.0	0.0	O K
10080 min Summer	6.700	0.000	0.0	0.9	0.9	0.0	O K
15 min Winter	8.122	1.422	0.0	5.4	5.4	43.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	209.523	0.0	43.1	18
30 min Summer	119.012	0.0	49.0	32
60 min Summer	67.600	0.0	55.8	60
120 min Summer	38.398	0.0	63.2	90
180 min Summer	27.581	0.0	68.3	124
240 min Summer	21.810	0.0	71.8	160
360 min Summer	15.667	0.0	77.3	228
480 min Summer	12.389	0.0	81.6	292
600 min Summer	10.326	0.0	85.0	348
720 min Summer	8.899	0.0	88.2	404
960 min Summer	7.082	0.0	93.5	512
1440 min Summer	5.132	0.0	101.6	0
2160 min Summer	3.720	0.0	110.5	0
2880 min Summer	2.960	0.0	117.2	0
4320 min Summer	2.069	0.0	122.9	0
5760 min Summer	1.605	0.0	127.1	0
7200 min Summer	1.318	0.0	130.5	0
8640 min Summer	1.122	0.0	133.3	0
10080 min Summer	0.979	0.0	135.7	0
15 min Winter	209.523	0.0	48.3	18

Summary of Results for 100 year Return Period (+30%)

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
30 min Winter	8.301	1.601	0.0	5.7	5.7	45.7	O K
60 min Winter	8.180	1.480	0.0	5.5	5.5	45.0	O K
120 min Winter	7.998	1.298	0.0	5.2	5.2	39.5	O K
180 min Winter	7.861	1.161	0.0	5.0	5.0	35.3	O K
240 min Winter	7.728	1.028	0.0	5.0	5.0	31.2	O K
360 min Winter	7.471	0.771	0.0	5.0	5.0	23.4	O K
480 min Winter	7.170	0.470	0.0	5.0	5.0	14.3	O K
600 min Winter	6.956	0.256	0.0	5.0	5.0	7.8	O K
720 min Winter	6.817	0.117	0.0	4.9	4.9	3.6	O K
960 min Winter	6.700	0.000	0.0	4.6	4.6	0.0	O K
1440 min Winter	6.700	0.000	0.0	3.3	3.3	0.0	O K
2160 min Winter	6.700	0.000	0.0	2.4	2.4	0.0	O K
2880 min Winter	6.700	0.000	0.0	1.9	1.9	0.0	O K
4320 min Winter	6.700	0.000	0.0	1.3	1.3	0.0	O K
5760 min Winter	6.700	0.000	0.0	1.0	1.0	0.0	O K
7200 min Winter	6.700	0.000	0.0	0.9	0.9	0.0	O K
8640 min Winter	6.700	0.000	0.0	0.7	0.7	0.0	O K
10080 min Winter	6.700	0.000	0.0	0.6	0.6	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	119.012	0.0	54.9	31
60 min Winter	67.600	0.0	62.4	58
120 min Winter	38.398	0.0	70.7	96
180 min Winter	27.581	0.0	76.5	134
240 min Winter	21.810	0.0	80.8	172
360 min Winter	15.667	0.0	86.9	248
480 min Winter	12.389	0.0	91.5	308
600 min Winter	10.326	0.0	95.3	360
720 min Winter	8.899	0.0	98.6	408
960 min Winter	7.082	0.0	104.7	0
1440 min Winter	5.132	0.0	113.8	0
2160 min Winter	3.720	0.0	123.7	0
2880 min Winter	2.960	0.0	131.3	0
4320 min Winter	2.069	0.0	137.7	0
5760 min Winter	1.605	0.0	142.4	0
7200 min Winter	1.318	0.0	146.1	0
8640 min Winter	1.122	0.0	149.3	0
10080 min Winter	0.979	0.0	152.0	0

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	GB 515250 173900 TQ 15250 73900
C (1km)	-0.025
D1 (1km)	0.299
D2 (1km)	0.321
D3 (1km)	0.232
E (1km)	0.307
F (1km)	2.539
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.110

Time (mins) From:	To:	Area (ha)
0	4	0.110

Model Details

Storage is Online Cover Level (m) 9.200

Cellular Storage Structure

Invert Level (m) 6.700 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)
0.000	32.0	0.0	1.501	0.0	0.0
1.500	32.0	0.0			

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0100-5000-1375-5000
Design Head (m)	1.375
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	100
Invert Level (m)	6.489
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.375	5.0
Flush-Flo™	0.408	5.0
Kick-Flo®	0.840	4.0
Mean Flow over Head Range	-	4.4

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)
0.100	3.3	1.200	4.7	3.000	7.2	7.000	10.8
0.200	4.6	1.400	5.0	3.500	7.7	7.500	11.1
0.300	4.9	1.600	5.4	4.000	8.2	8.000	11.5
0.400	5.0	1.800	5.7	4.500	8.7	8.500	11.8
0.500	4.9	2.000	6.0	5.000	9.2	9.000	12.1
0.600	4.8	2.200	6.2	5.500	9.6	9.500	12.4
0.800	4.2	2.400	6.5	6.000	10.0		
1.000	4.3	2.600	6.7	6.500	10.4		

Appendix G

Atkins Site Wide Below Ground Drainage Layout

DO NOT SCALE

NEW SW CONNECTION TO DISCHARGE INTO THAMES WATER NETWORK. DEVELOPMENT DISCHARGE INTO EXISTING SYSTEM 5 l/s. CONNECTION LOCATION TO BE AGREED WITH THAMES WATER.

FOR UTILITY CORRIDOR CROSS SECTION, REFER TO DRAWING 5137894-ATK-00-XX-DR-C-0150.

SURFACE WATER PUMPING CHAMBER. REFER TO TYPICAL DETAIL 5137894-ATK-00-XX-DR-C-0171 CL = 9.400mAOD. INLET PIPE IL = 6.298mAOD

ACO STEP DRAIN OUTFALL VIA PERFORATED PIPE TO EXTEND 5m BEYOND BUILDING INTO PERMEABLE PAVEMENT SUBBASE

COLLEGE FOR PUBLIC HEALTH SERVICES LAYOUT REFER TO 5137894-ATK-MB-00-DR-P DRAWING SERIES

FLUSH ACO MULTIDRAIN MD (150mm CHANNEL D400) OUTFALL VIA PERFORATED PIPE INTO PERMEABLE PAVEMENT SUBBASE

PAVEMENT LEVELS & LAYOUT PLAN REFER TO LANDSCAPE ARCHITECT DRAWINGS. PAVEMENT DETAILS REFER TO DRAWING 5137894-ATK-00-XX-DR-C-0151

HYDRO-BRAKE OPTIMUM OR APPROVED EQUIVALENT. DESIGN FLOW = 5.0 l/s DESIGN HEAD = 1.375m IL = 6.489m

FOUL AND SURFACE WATER CONNECTIONS TO SUPPLY HAYMARKET TO BE CAPPED FOR FUTURE CONNECTION TIE IN. AS PER TYPICAL DUCT PROTECTION DETAIL ON DRAWING 5137894-ATK-00-XX-DR-C-0150

STORMCELL OR EQUIVALENT APPROVED ATTENUATION STRUCTURE. REFER TO 5137894-ATK-00-XX-DR-C-0174 FOR DETAILS. VOLUME = 450m³ AREA = 300m² DEPTH = 1.5m TANK IL = 6.700m

DRAINAGE DIVERSIONS TO PROPOSED FOUL WATER NETWORK (TBC PENDING CONSTRUCTION PHASING)

LEGEND:

- EXISTING FOUL WATER
- EXISTING SURFACE WATER (THAMES WATER)
- PROPOSED FOUL WATER
- PROPOSED SURFACE WATER
- PROPOSED FOUL WATER DIVERSIONS
- FOUL WATER RISING MAIN
- SURFACE WATER RISING MAIN
- GULLY
- PROPOSED SURFACE WATER MANHOLE
- PROPOSED FOUL WATER MANHOLE
- PROPOSED SURFACE WATER CHAMBER
- PROPOSED FOUL WATER CHAMBER

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following:

CONSTRUCTION

BURIED SERVICES INCLUDING POSSIBILITY OF UNCHARTED SERVICES - REFER TO SERVICES PLANS AND USE CABLE AVOIDANCE TOOLS BEFORE DIGGING.
POTENTIAL FOR POCKETS OF BURIED CONTAMINATION INCLUDING ASBESTOS CONTAINING MATERIALS.
POSSIBILITY OF UNEXPLODED ORDNANCE - KEEP WATCH DURING GROUND WORKS.
IF IN DOUBT, STOP WORK AND ASK.

MAINTENANCE/CLEANING

MULTIPLE BURIED SERVICES - CONSULT SERVICES PLANS, USE CABLE AVOIDANCE TOOLS AND FOLLOW RAMS WHEN EXCAVATING.
IF IN DOUBT, STOP WORK AND ASK.

DECOMMISSIONING/DEMOLITION

MULTIPLE BURIED SERVICES - CONSULT SERVICES PLANS, HOST UTILITY COMPANIES AND USE CABLE AVOIDANCE TOOLS BEFORE EXCAVATING.
IF IN DOUBT, STOP WORK AND ASK.

It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved method statement

GENERAL NOTES:

1. FOR ALL GENERAL & SERVICES NOTES REFER TO DRAWING No. 5137894-ATK-00-XX-DR-C-0010
2. FOR FOUL AND SURFACE WATER SCHEDULES REFER TO DRAWING 5137894-ATK-00-XX-DR-C-184 AND 188

KEY PLAN:

Rev.	Date	Description	By	Chk'd	App'd
P3	21/10/16	FOR TENDER	MJS	JT	RW
P2	08/07/16	FOR TENDER	MJS	JT	RW
P1	24/12/15	FOR TENDER	MJS	JT	RW

Drawing Status: FOR TENDER
Suitability: D2

ATKINS
Euston Tower
286 Euston Road
London
NW1 3AT
Tel: +44 (0)20 7121 2000
Fax: +44 (0)20 7121 2111
www.atkinsglobal.com

Client: Richmond upon Thames College

Project Title: RICHMOND UPON THAMES COLLEGE REDEVELOPMENT

Drawing Title: SITE WIDE DRAINAGE PLAN SHEET 1 OF 3

Scale	Designed	Drawn	Checked	Authorised
1:500	JT	MS	JT	RW
Original Size	Date	Date	Date	Date
A1	18/12/2015	18/12/2015	18/12/2015	18/12/2015

Drawing Number: 5137894-ATK-00-XX-DR-C-0111
Revision: P3.0

Appendix H

Pre-Development Enquiry

Jessica Taylor
Atkins
Euston Tower
286 Euston Road
London
NW1 3AT

Your account number
DS4007616
thameswater.co.uk

0800 009 3921
Mon – Fri 9am-5pm,
05th May 2016

Pre Development Enquiry

Site Address: Richmond College, Twickenham, Middlesex, TW2 7SQ

Development Details: New Campus with occupancy of 3300 (including staff), Residential Development comprising 179 properties and Haymarket group technical hub with occupancy of 100

Dear Miss Taylor

I write in relation to the above site regarding the proposed development here.

Please note: your initial fee of £398+ VAT covers the expense of our asset planners reviewing your proposed discharges in relation to the capacity in our existing network. They also carry out flood risk assessments. At this stage if your proposal is accepted, we issue an approval letter for you to progress with your development.

Foul Water

In this instance we have notified our Catchment Planners for the area and they have made comment regarding the capacity of the public sewers. The proposed discharge rates are acceptable providing that the flow rate from the Nuffield St Health Centre as shown in submitted calculations. If the flows proves to be higher than the rate allowed in the calculations provided following flow testing, Thames Water should be consulted.

Surface Water

Please note that discharging surface water to the public sewer network should only be considered after all other methods of disposal have been investigated and proven to be not viable. In accordance with the Building Act 2000 Clause H3.3, positive connection 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. The disposal hierarchy being: 1st Store rain water for Later Use; 2nd Use infiltration techniques, such as porous surfaces in non-clay area; 3rd Attenuate rainwater in ponds or open water features for gradual release to a watercourse; 4th Attenuate rainwater by storing in tanks or sealed water features for gradual release to a watercourse; 5th Discharge rainwater direct to a watercourse; 6th Discharge rainwater to a surface water drain; 7th Discharge rainwater to the combined sewer.

You should be aware that in the public sewer system will be unable to accommodate any storm greater than a 1 in 20 year event. You should assume this level of storm when calculating the current discharge rate. Please ensure that storm flows are attenuated or regulated into the receiving public network through on or off site storage.

Only when it can be proven that soakage into the ground or a connection into the adjacent watercourse is not possible would we consider a restricted discharge into the public surface water sewer network. A reduction of at least 50% on existing flows from the same site area would be sought for a range of storm conditions.

Please Note

All connection requests are subject to a full Section 106 (Water Industry Act 1991) application before the Company can confirm approval to the connection itself. Please also note that capacity in the public sewerage system cannot be reserved.

The views expressed by Thames Water in this letter are in response to this pre development enquiry at this time and do not represent our final views on any future planning applications made in relation to this site.

Yours sincerely

Natalya Collins
Development Engineer