102 Camley Street, Kings Cross
London, NW1 0NF

Strategic Drainage Report

Ref: 140674/AW/TG
Date: 11 April 2016
Rev No: 6.0

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1.0 EXECUTIVE SUMMARY

1.1 Following the approval of the non-material amendment application, Ref: 2015/6282/P, drainage strategy has been revised. Due to the reduction in basement size this provides the opportunity to increase the size of the attenuation tank and therefore achieve Greenfield run-off rates of 5l/s from the site. Blue roof is no longer required as attenuation can now be accommodated within the permeable pavement and tank. Rainwater harvesting tanks will be also provided.

1.2 The proposed redevelopment will consist of the demolition of the existing warehouse, and the introduction of a 162 new residential flats and a mixed development of A1 and B1 employment use; spread over approximately 19,267sq ft.

1.3 The access road will be formed from Camley Street.

1.4 The Finished Floor Levels were set by the Architect.

1.5 The site is categorised on the Environment Agency database as Flood Zone 1 and therefore at a low risk of flooding.

1.6 In accordance with best practice guidelines stipulated in NPPF and Planning Policy Guidance it is proposed to provide attenuation up to and including the 1 in 100 year plus 30% for the Climate Change storm event for this site.

1.7 London Borough of Camden requires reasonable endeavours to achieve Greenfield run-off rates. Greenfield Run off rate for the 100YR storm event is 2.9 l/s. Therefore, the applicable runoff rate is to be limited to 5l/s which ensure hydraulic efficiency.

The attenuation will consist of underground modular storage units together with tanked porous pavement. These will attenuate surface water runoff from the new development prior to discharge into the Thames Water sewer running along Camley Street. Discharge rates are to be restricted to 5 l/s by Hydrobrake. The Preliminary Drainage Layout drawings can be found in Appendix C.

1.8 This strategic drainage report sets out the proposed sustainable urban drainage systems (suds) strategy, and provides an assessment of the proposed scheme against the suds hierarchy.

1.9 A flood risk assessment for the proposed development has been prepared by Conisbee in March 2016.

1.10 Surface water attenuation will be required; a volume of 124.6m³ has been calculated. This is based upon a discharge rate of 5l/s into existing Thames Water sewer, for the 1 in 100 year + 30% Climate Change storm event.

2.0 LIMITATIONS

2.1 This report is confidential and may not be disclosed by the client or relied upon by any other party without the express written agreement of Conisbee.

2.2 The conclusions and recommendations contained within this report are based upon information provided by others and upon the assumption that all relevant information received is accurate and correct

3.0 EXISTING SITE CONDITIONS & DRAINAGE

3.1 Existing Site Conditions

3.1.1 The site is located at NGR 529798,183740 in Kings Cross in the London Borough of Camden, approximately 400m north of St. Pancras Railway Station. The site is bounded to the west by Camley Street and to the north by the adjacent existing commercial/ industrial property on Camley Street. The southern boundary is formed by a brick retaining wall, approximately 2-3m high, adjacent to Regent's Canal. The eastern site boundary is adjacent to the mainline railway line and associated infrastructure.

3.1.2 The site's previous land use was classified as Brownfield.

3.1.3 The total area of the proposed development site is 2.543m² of which about 89% appears from the topographical survey to be currently impermeable.

3.1.4 A site investigation has been undertaken by REC Ltd in May 2014.

3.1.5 The Envirocheck geological data maps indicate that the site is underlain by Made Ground, underlain by London Clay forming the bedrock geology. The site investigation confirms this geological sequence.

3.1.6 Intrusive ground investigation report for the site found perched groundwater at depths of 2.0m below existing ground levels. The SFRA map shows the depth of the groundwater approx 60m - 80m below the existing ground levels.

3.1.7 The Environment Agency website informs the site as classified within a Flood Zone 1 and therefore, at a very low risk of fluvial flooding.

3.1.8 The Environment Agency website informs that the site sits outside of any source protection zones.

3.1.9 The Environment Agency has recently amended their aquifer designations so that they are consistent with the Water Framework Directive. Both the Superficial (Drift) and Bedrock geology indicate that this site is not underlain by an Aquifer.

3.2 Existing Drainage

3.2.1 A Drainage CCTV survey of the site has been undertaken by SDS in January 2015; a review of the topographical and CCTV surveys has identified existing foul and surface water sewers and manhole covers within the existing site area, associated with the current building use. The CCTV survey has confirmed existing foul and surface water outfalls located in Camley Street.

3.2.2 The Thames Water drainage records have confirmed an existing 225mm foul water sewer in Camley Street. There is an existing foul water manhole ref. 7702, which is 2.25m deep.

3.2.3 The Thames Water drainage records have confirmed an existing 457mm surface water sewer in Camley Street. There is an existing surface water manhole ref. 7703, which is 2.01m deep

3.2.4 Depth of the existing Surface Water Sewer is approximately 2m; therefore connection by gravity is possible. Existing Foul Water Manhole 7702 is approx. 2.25m deep. A pumping station will be required for the lower ground/basement floor.

3.2.5 To date we have not received confirmation from Thames Water regarding available capacity on the public drainage networks, however pre-development enquiries are ongoing.

4.0 PROPOSED SURFACE WATER STRATEGY

4.1 The Surface Water Drainage strategy for the site has been developed based upon the following design standards aimed at providing a Sustainable Drainage System:

- Sewers for Adoption 7th Edition
- Building Regulations – Part H
- BS EN 752, BS EN 12056
- National Planning Policy Framework (NPPF, March 2012)
- The SuDS Manual – CIRIA 697
- BREEAM New Construction
- London Plan Policy 5.13

4.2 In line with the current best practice for SUDS hierarchy, the development targets various methods of source control in order to limit surface water peak flows at the source and therefore reduce the overall peak demand on the existing sewer network, and in order to alleviate direct discharge of surface water to the sewers and watercourses.

4.3 Due to the presence clay geology, the use of traditional ‘shallow’ soakaways is precluded.

The SUDS system chosen for this site will primarily be required to dispose of surface water runoff from access road, hard surfaced areas and roofs. The roof water and water from car free hard surfaced areas will not require pre-treatment before it is discharged and so any of the techniques considered suitable for source control will be acceptable. Surface water runoff from access road will be treated by passing through a matrix of porous pavement aggregate and catchpits. The SUDS options for this site are in line with the London Plan Policy 5.13 drainage hierarchy, as follows:

- Storage rainwater for later use; for details refer to section 4.4 and Appendix E.
- Permeable Pavement
- Subsurface storage, provided by modular storage units

4.4 Rainwater harvesting systems

2No Rainwater harvesting systems will be incorporated, one for the 9th floor terrace and one for the ground floor external landscape areas.

Ground Level

The ground level external landscape area will be fitted with a rain water harvesting tank located within the basement of the building. A rain water down pipe will be diverted to fill the water tank, when the tank is full the rainwater shall continue to discharge through the down pipe.

The rainwater harvesting tank shall be fitted with a second water feed. The second feed shall be off the boosted could water supply and shall be controlled via a level switch mounted in the tank. The boosted supply shall only activate when the tank is down to 200mm above the outlet connection and shall turn off when 500mm above the outlet connection. The intention is to use as much rainwater as possible.

The tank shall have a capacity of 280 litres between the lower level switch location and the water line in the tank.

A Booster pump set will be provided to pump the harvested water up to the ground floor landscape area. A tap shall be provided within a cabinet in the wall of the landscape area. The cabinet shall be lockable. The pump shall have a minimum duty of 0.3 l/s at 2 bar.

All exposed pipework shall be suitably insulated. An isolating valve and drain cock shall be fitted inside the building prior to the connection to the outside tap. The tap shall be fitted with a removable insulated cover.

Level 9

The 9th floor terrace system will comprise a rain water harvesting tank/water butt adjacent to the main building. The rain water down pipe inside the main building shall be diverted to fill the water butt, when the butt is full the rainwater shall continue to discharge down the down pipe. The tank/Water Butt shall be fitted with a tap to allow manual watering on the 9th floor terrace. The tank/Water Butt shall have a capacity of 265 litres

For details Refer to M&E Specification located in Appendix E.

4.5 The total area of the proposed development site is 2,543m². The former use of the site has a impermeable area of 2,276m². A calculated Greenfield run off rate of 2.9 l/s for 100 years return period has been calculated.

4.6 In accordance with best practice guidelines stipulated in PPS25, it is proposed to provide attenuation up to and including the 1 in 100 year plus 30% for the Climate Change storm event for this site. In line with the London Plan and London Borough of Camden requirements, the proposed discharge rate will be restricted to 5l/s, which ensure hydraulic efficiency.

4.7 The hydraulic restriction will be Hydro-brake manhole chamber, which will reduce off site flows into the Thames Water sewer system to 5l/s.

4.8 Infiltration tests have been carried out and showed that the infiltration rates are very poor which suggest that infiltration techniques are not suitable for the site.

4.9 On site attenuation will have to be incorporated into the scheme. A volume of 124.6 m³ has been calculated.

4.10 The incorporation of SUDs should be used for the surface water strategy for the development, for cost purposes, we have allowed an attenuation volume of 124.62m³, this will be provided in the form of buried cellular storage tanks and permeable pavements.

4.11 The depth of the existing surface sewer system in Camley Street is sufficient to provide a gravity connection from the site, and therefore hydraulic pumping will not be required.

4.12 The FFLs shown on the drainage drawings have been set based upon the existing ground levels to the site.

4.13 The new surface water connection in Camley Street will require consent under Sections 106 of The Water Industry Act 1991.

5.0 PROPOSED FOUL WATER STRATEGY

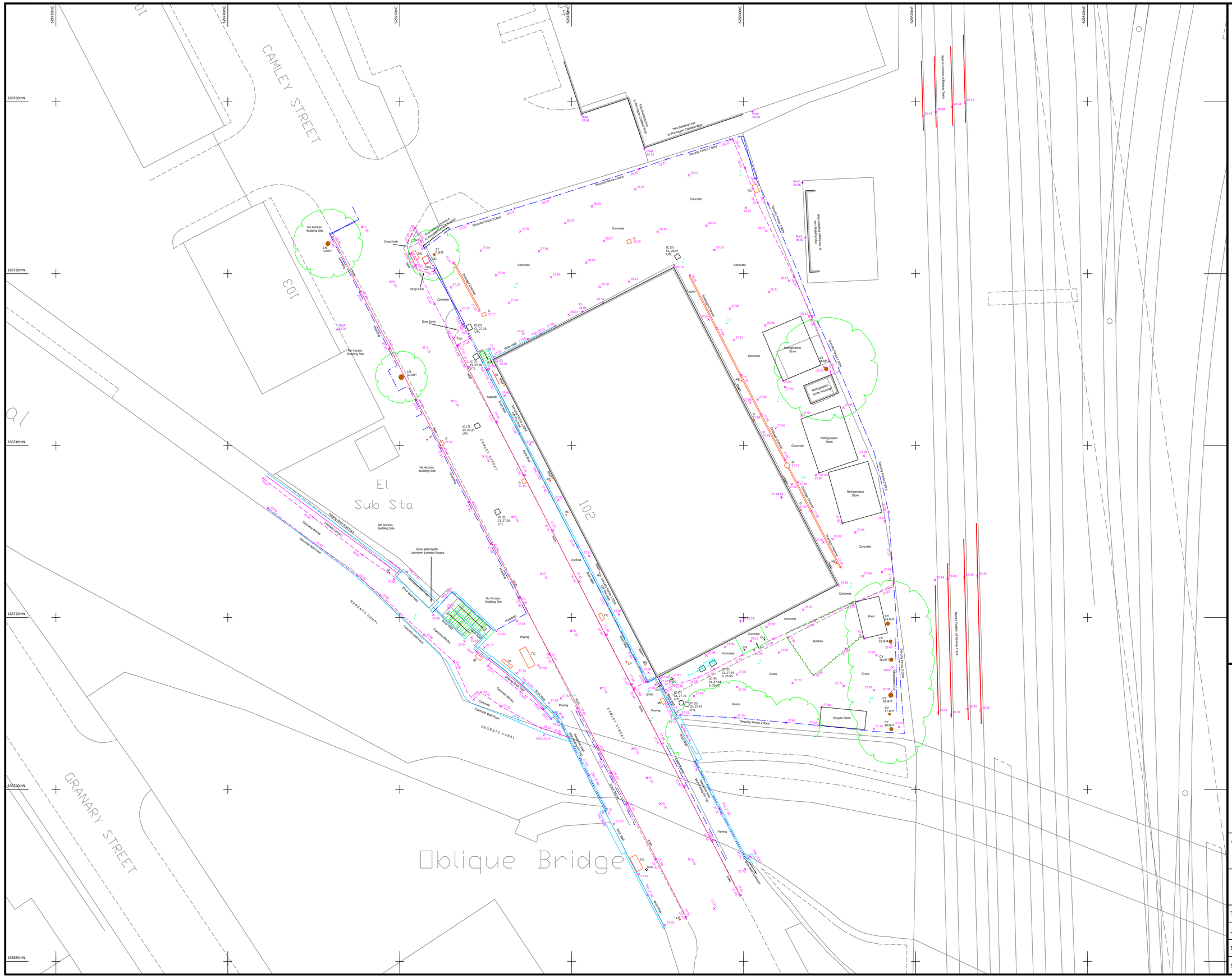
5.1 In terms of the foul drainage strategy, it is proposed to discharge at rate of 20 l/s into the Thames Water public sewer network.

5.2 The Thames Water drainage records have confirmed an existing 225mm foul water sewer in Camley Street. There is an existing foul water manhole ref. 7702, which is 2.25m deep.

5.3 The foul water flow from ground floor and above is to be drained by gravity, with a suspended drainage network at basement ceiling level and connected in to proposed system and discharged in to existing Thames Water manhole located in Camley Street. It is proposed to drain the basement via an internal drainage network which will be pumped to new sewers outside the building.

5.4 The new foul water connection in Camley Street will require consent Under Section 106 of The Water Industry Act 1991.

Appendix A – Topographical Survey



LEGEND

BEB	Belisha Beacon	MF	Miscellaneous Fence
BH	Borehole	MK	Service Marker
BL	Base Level	MRF	Metal Railing Fence
BO	Bollard	NP	Name Plate
BP	Brick Pillar	OBF	Open Board Fence
BPav	Brick Paving	PB	Post Box
BRW	Brick Wall	PCF	Post & Chain Fence
BS	Bus Stop	PM	Parking Meter
BW	Block Wall	PNF	Panel Fence
CBF	Close Board Fence	PRF	Post & Rail Fence
CL	Cover Level	PRL	Parapet Wall Level
CLF	Chain Link Fence	PWF	Post & Wire Fence
Conc	Concrete	RE	Rodding Eye
CPF	Chestnut Paling Fence	RL	Ridge Level
CPO	Concrete Post	RS	Road Sign
CPS	Concrete Paving Slabs	RTW	Retaining Wall
CRW	Concrete Retaining Wall	RWP	Rain Water Pipe
CW	Concrete Wall	SEG	Side Entry Gully
DC	Drainage Channel	SI	Sign
DIL	Dilapidated	SSL	Structural Slab Level
DP	Down Pipe	STN	Survey Station
DPC	Damp Proof Course	STW	Stone Wall
EIC	Electric Inspection Cover	SU	Step Up
EL	Eaves Level	SV	Stop Valve (W) Water (G) Gas
EP	Electric Pole	SVP	Soil Vent Pipe
ER	Earth Rod	TAC	Tactile Paving
FB	Flower Bed	Tap	Attached to Wall etc
FFL	Finished Floor Level	TCB	Telephone Call Box
FH	Fire Hydrant	THL	Threshold Level
FL	Flood Light	TIC	Telecom Inspection Cover
FP	Flag Pole	Tmac	Tarmac
FRL	Flat Roof Level	TL	Traffic Light
G	Gully	TLCB	Traffic Light Control Box
GB	Grit Box	TP	Telegraph Pole
GIC	Gas Inspection Cover	TWL	Top Of Wall Level
GM	Gas Meter	UTL	Unable To Lift
GP	Gas Pipe	WIC	Water Inspection Cover
GV	Gas Valve	WM	Water Meter
IC	Inspection Cover	WMF	Wire Mesh Fence
IC(C)	(C)Combined (F)Foul (S)Storm	WO	Water Wash Out
IL	Invert Level	WSV	Water Stop Valve
JB	Junction Box	WTL	Water Level
LP	Lamp Post	VP	Vent Pipe

AC	Acer	HC	Horse Chestnut	RO	Rowan
AL	Alder	HY	Holly	SA	Sallow
AS	Ash	HZ	Hazel	SB	Silver Birch
BE	Beech	LA	Larch	SC	Sweet Chestnut
CE	Cedar	LB	Laburnum	SP	Spruce
CH	Cherry	LI	Lime	ST	Stump
CY	Cypress	LN	London Plane	SY	Sycamore
DE	Dead	LO	Locust	U	Unidentified
EL	Elder	MA	Maple	WA	Walnut
FR	Fruit	OA	Oak	WB	Whitebeam
HA	Hawthorn	PI	Pine	WE	Wellingtonia
HB	Hornbeam	PO	Poplar	WI	Willow

STEPS / RAMPS
TOP / BOTTOM OF BANKING
BUSHES/OVERGROWTH
CHANGE OF SURFACE
DETAIL
OVERHEAD STRUCTURE
TELECOM OVERHEAD
POWER OVERHEAD
SURVEY STATION
FENCE
BUILDING FACE
DROP KERB
KERB
WALL / STRUCTURE
SINGLE GATE
DOUBLE GATE
BANKING
OSBM

ALL LEVELS AND CO-ORDINATES ARE RELATED TO THE ORDNANCE SURVEY NATIONAL GRID BY MEANS OF GPS USING LEICA SMARTNET RTK NETWORK.

ALL DIMENSIONS ARE IN METERS.

DO NOT SCALE FROM THIS DRAWING.

TREE GIRTHS AND SPREADS ARE QUOTED AS A MEAN SIZE AND SHOWN TO SCALE.

EAVE LEVELS ARE TAKEN AT THE BOTTOM OF THE LOWEST ROOF TILE.

WHILST EVERY EFFORT IS MADE TO IDENTIFY TREE SPECIES AND SIZES, NO RESPONSIBILITY CAN BE TAKEN FOR THE ACCURACY OF THIS INFORMATION.

IT IS RECOMMENDED THAT ALL INVERT LEVELS AND PIPE SIZES BE CHECKED PRIOR TO CONSTRUCTION.

DRAWING CORRECT AT TIME OF SURVEY AND TO SCALE.

OMEGA GEOMATICS TAKES NO RESPONSIBILITY FOR THE PASSING OF THIS DRAWING TO THIRD PARTIES OR FOR ANY UNAUTHORISED OR UNINTENDED USE.

SURVEY STATIONS

Name	Easting	Northing	Height
1ASTN	529773.407	183758.416	27.536
1STN	529763.248	183759.646	27.251
2STN	529799.581	183771.482	28.194
3ASTN	529806.772	183735.967	27.858
3STN	529803.952	183745.147	27.887
4STN	529812.430	183723.535	27.912
5ASTN	529814.681	183710.163	27.710
5STN	529801.753	183714.678	27.871
6ASTN	529779.986	183710.560	27.608
6STN	529789.200	183708.035	27.644
7ASTN	529798.052	183754.224	27.948
7STN	529792.880	183761.353	28.057
8STN	529770.053	183717.986	27.558
9STN	529761.738	183719.649	23.680

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Web: www.omegageo.co.uk
inquiries: survey@omegageo.co.uk

CLIENT
SHAW CORPORATION

PROJECT
102 CAMELY STREET,
LONDON, N1C 4PF

TITLE TOPOGRAPHICAL SURVEY

JOB Ref.	13-0187	DATE	JULY 2013
SCALE	1:200 @ A1	DWG. No.	1 OF 1
SHEET SIZE	A1	DRAWING FILE	TOPO_03.DWG

Appendix B – Thames Water Records

Asset Location Search

Conisbee
LONDON
N1 1DH

Search address supplied 102
Camley Street
London
N1C 4PW

Your reference 140674 - Camley Street Kings Cross

Our reference ALS/ALS Standard/2014_2866291

Search date 17 September 2014

You are now able to order your Asset Location Search requests online by visiting
www.thameswater-propertysearches.co.uk

Asset Location Search

Search address supplied: 102, Camley Street, London, N1C 4PW

Dear Sir / Madam

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

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

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

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

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

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

Contact Us

If you have any further queries regarding this enquiry please feel free to contact a member of the team on 0845 070 9148, or use the address below:

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

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

Asset Location Search

Waste Water Services

Please provide a copy extract from the public sewer map.

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

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

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

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

For your guidance:

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

Clean Water Services

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

Enclosed is a map showing the approximate positions of our water mains and associated apparatus. Please note that records are not kept of the positions of individual domestic supplies.

For your information, there will be a pressure of at least 10m head at the outside stop valve. If you would like to know the static pressure, please contact our Customer Centre on 0800 316 9800. The Customer Centre can also arrange for a full flow and

pressure test to be carried out for a fee.

For your guidance:

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

Payment for this Search

A charge will be added to your suppliers account.

Asset Location Search

Further contacts:

Waste Water queries

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

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

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

Tel: 0845 850 2777
Email: developer.services@thameswater.co.uk

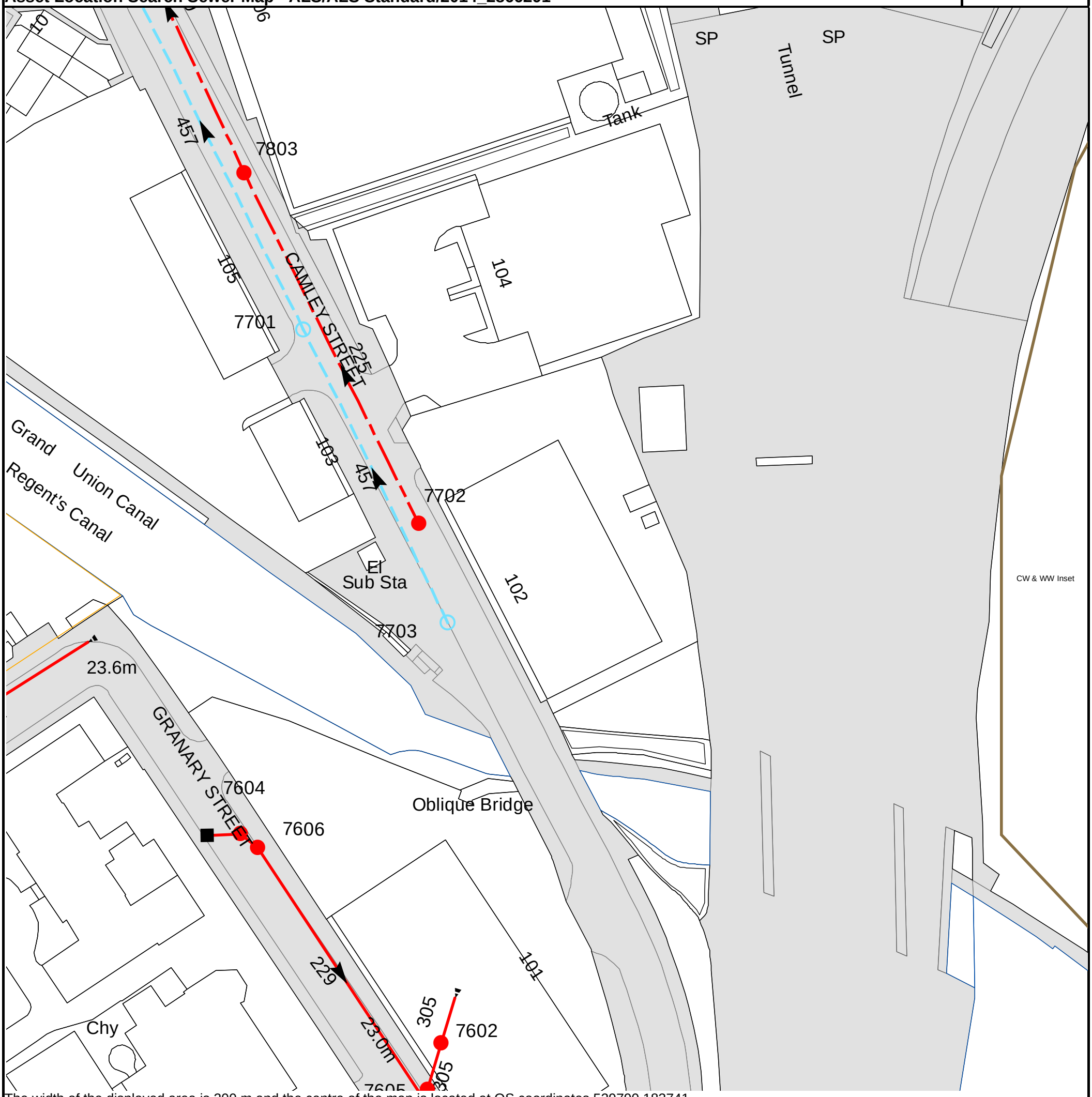
Clean Water queries

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

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

Tel: 0845 850 2777
Email: developer.services@thameswater.co.uk

Asset Location Search Sewer Map - ALS/ALS Standard/2014_2866291



The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 529790,183741

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

Manhole Reference	Manhole Cover Level	Manhole Invert Level
7604	23.2	22.52
7803	26.85	23.93
7606	n/a	n/a
7701	27.5	24.8
7702	27.5	25
7605	n/a	n/a
7602	n/a	n/a
7703	27.5	25.4

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

ALS Sewer Map Key

Public Sewer Types (Operated & Maintained by Thames Water)

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

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

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

Trunk Surface Water

Trunk Foul

Storm Relief

Trunk Combined

Vent Pipe

Bio-solids (Sludge)

Proposed Thames Surface Water Sewer

Proposed Thames Water Foul Sewer

Gallery

Foul Rising Main

Surface Water Rising Main

Combined Rising Main

Sludge Rising Main

Proposed Thames Water Rising Main

Vacuum

Sewer Fittings

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

Air Valve

Dam Chase

Fitting

Meter

Vent Column

Operational Controls

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

Control Valve

Drop Pipe

Ancillary

Weir

End Items

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

Outfall

Undefined End

Inlet

Other Symbols

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

Public/Private Pumping Station

Change of characteristic indicator (C.O.C.I.)

Invert Level

Summit

Areas

Lines denoting areas of underground surveys, etc.

Agreement

Operational Site

Chamber

Tunnel

Conduit Bridge

Other Sewer Types (Not Operated or Maintained by Thames Water)

Foul Sewer

Surface Water Sewer

Combined Sewer

Gulley

Culverted Watercourse

Proposed

Abandoned Sewer

Notes:

1) All levels associated with the plans are to Ordnance Datum Newlyn.

2) All measurements on the plans are metric.

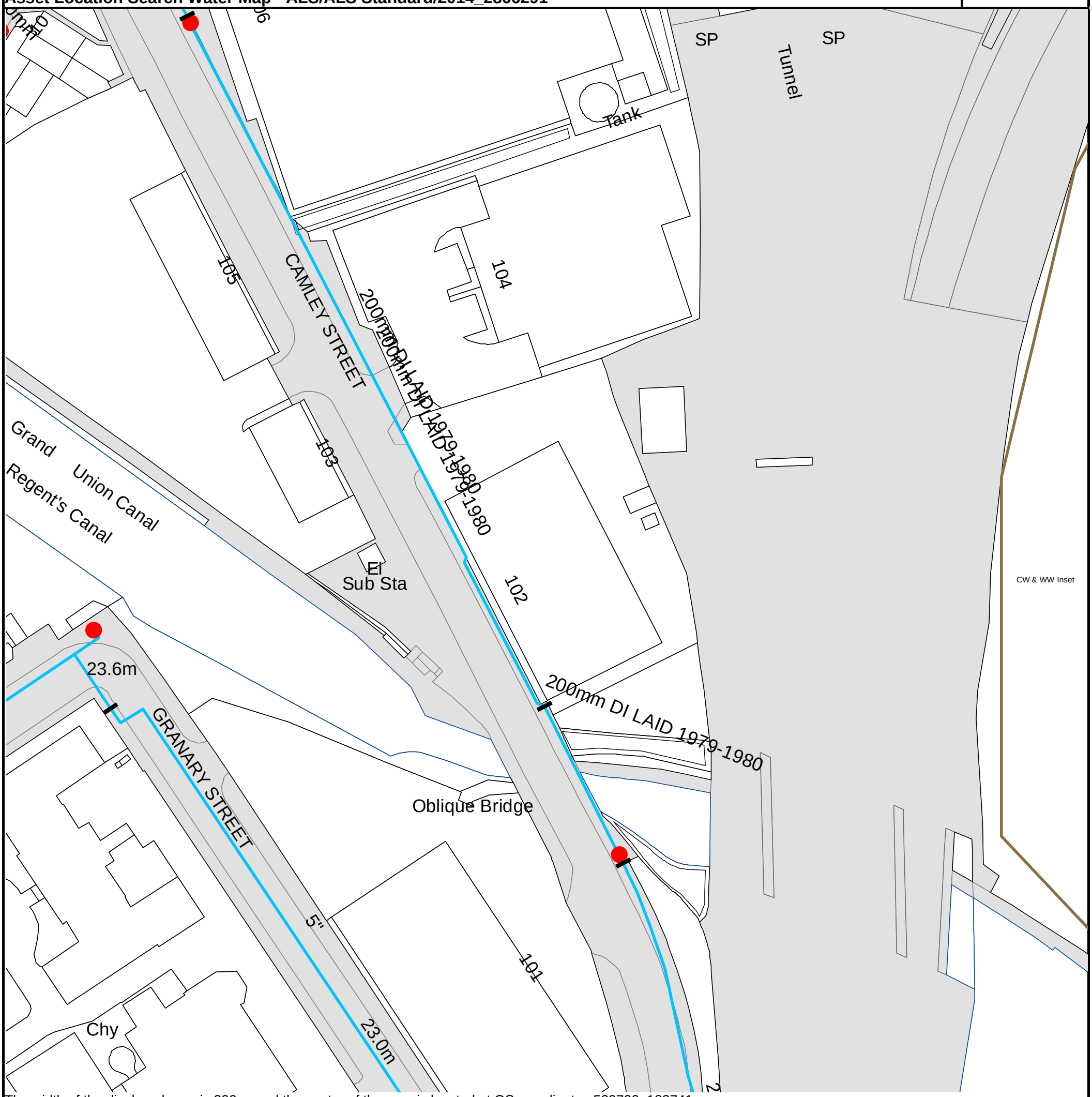
3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate direction of flow.

4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.

5) 'na' or '0' on a manhole level indicates that data is unavailable.

6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in milimetres. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement. If you are unsure about any text or symbology present on the plan, please contact a member of Property Insight on 0845 070 9148.

Asset Location Search Water Map - ALS/ALS Standard/2014_2866291



The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 529790, 183741.

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

ALS Water Map Key

Water Pipes (Operated & Maintained by Thames Water)

4"

Distribution Main: The most common pipe shown on water maps. With few exceptions, domestic connections are only made to distribution mains.

16"

Trunk Main: A main carrying water from a source of supply to a treatment plant or reservoir, or from one treatment plant or reservoir to another. Also a main transferring water in bulk to smaller water mains used for supplying individual customers.

3" SUPPLY

Supply Main: A supply main indicates that the water main is used as a supply for a single property or group of properties.

3" FIRE

Fire Main: Where a pipe is used as a fire supply, the word FIRE will be displayed along the pipe.

3" METERED

Metered Pipe: A metered main indicates that the pipe in question supplies water for a single property or group of properties and that quantity of water passing through the pipe is metered even though there may be no meter symbol shown.

Transmission Tunnel: A very large diameter water pipe. Most tunnels are buried very deep underground. These pipes are not expected to affect the structural integrity of buildings shown on the map provided.

Proposed Main: A main that is still in the planning stages or in the process of being laid. More details of the proposed main and its reference number are generally included near the main.

Valves

- General Purpose Valve
- Air Valve
- Pressure Control Valve
- Customer Valve

Hydrants

- Single Hydrant

Meters

- Meter

End Items

Symbol indicating what happens at the end of a water main.

- Blank Flange
- Capped End
- Emptying Pit
- Undefined End
- Manifold
- Customer Supply
- Fire Supply

Operational Sites

- Booster Station
- Other
- Other (Proposed)
- Pumping Station
- Service Reservoir
- Shaft Inspection
- Treatment Works
- Unknown
- Water Tower

Other Symbols

- Data Logger

PIPE DIAMETER	DEPTH BELOW GROUND
Up to 300mm (12")	900mm (3')
300mm - 600mm (12" - 24")	1100mm (3' 8")
600mm and bigger (24" plus)	1200mm (4')

Other Water Pipes (Not Operated or Maintained by Thames Water)

Other Water Company Main: Occasionally other water company water pipes may overlap the border of our clean water coverage area. These mains are denoted in purple and in most cases have the owner of the pipe displayed along them.

Private Main: Indiates that the water main in question is not owned by Thames Water. These mains normally have text associated with them indicating the diameter and owner of the pipe.

Terms and Conditions

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

1. All goods remain in the property of Thames Water Utilities Ltd until full payment is received.
2. Provision of service will be in accordance with all legal requirements and published TWUL policies.
3. All invoices are strictly due for payment 14 days from due date of the invoice. Any other terms must be accepted/agreed in writing prior to provision of goods or service, or will be held to be invalid.
4. Thames Water does not accept post-dated cheques-any cheques received will be processed for payment on date of receipt.
5. In case of dispute TWUL`s terms and conditions shall apply.
6. Penalty interest may be invoked by TWUL in the event of unjustifiable payment delay. Interest charges will be in line with UK Statute Law 'The Late Payment of Commercial Debts (Interest) Act 1998'.
7. Interest will be charged in line with current Court Interest Charges, if legal action is taken.
8. A charge may be made at the discretion of the company for increased administration costs.

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

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

If you are unhappy with our service you can speak to your original goods or customer service provider. If you are not satisfied with the response, your complaint will be reviewed by the Customer Services Director. You can write to him at: Thames Water Utilities Ltd. PO Box 492, Swindon, SN38 8TU.

If the Goods or Services covered by this invoice falls under the regulation of the 1991 Water Industry Act, and you remain dissatisfied you can refer your complaint to Consumer Council for Water on 0121 345 1000 or write to them at Consumer Council for Water, 1st Floor, Victoria Square House, Victoria Square, Birmingham, B2 4AJ.

Ways to pay your bill

Credit Card	**BACS Payment**	**Telephone Banking**	**Cheque**
Call **0845 070 9148** quoting your invoice number starting CBA or ADS.	Account number **90478703** Sort code **60-00-01** A remittance advice must be sent to: **Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW.** or email **ps.billing@thameswater.co.uk**	By calling your bank and quoting: Account number **90478703** Sort code **60-00-01** and your invoice number	Made payable to '**Thames Water Utilities Ltd**' Write your Thames Water account number on the back. Send to: **Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW** or by DX to **151280 Slough 13**

Thames Water Utilities Ltd Registered in England & Wales No. 2366661 Registered Office Clearwater Court, Vastern Rd, Reading, Berks, RG1 8DB.

Search Code

IMPORTANT CONSUMER PROTECTION INFORMATION

This search has been produced by Thames Water Property Searches, Clearwater Court, Vastern Road, Reading RG1 8DB, which is registered with the Property Codes Compliance Board (PCCB) as a subscriber to the Search Code. The PCCB independently monitors how registered search firms maintain compliance with the Code.

The Search Code:

- provides protection for homebuyers, sellers, estate agents, conveyancers and mortgage lenders who rely on the information included in property search reports undertaken by subscribers on residential and commercial property within the United Kingdom
- sets out minimum standards which firms compiling and selling search reports have to meet
- promotes the best practise and quality standards within the industry for the benefit of consumers and property professionals
- enables consumers and property professionals to have confidence in firms which subscribe to the code, their products and services.

By giving you this information, the search firm is confirming that they keep to the principles of the Code. This provides important protection for you.

The Code's core principles

Firms which subscribe to the Search Code will:

- display the Search Code logo prominently on their search reports
- act with integrity and carry out work with due skill, care and diligence
- at all times maintain adequate and appropriate insurance to protect consumers
- conduct business in an honest, fair and professional manner
- handle complaints speedily and fairly
- ensure that products and services comply with industry registration rules and standards and relevant laws
- monitor their compliance with the Code

Complaints

If you have a query or complaint about your search, you should raise it directly with the search firm, and if appropriate ask for any complaint to be considered under their formal internal complaints procedure. If you remain dissatisfied with the firm's final response, after your complaint has been formally considered, or if the firm has exceeded the response timescales, you may refer your complaint for consideration under The Property Ombudsman scheme (TPOs). The Ombudsman can award compensation of up to £5,000 to you if he finds that you have suffered actual loss as a result of your search provider failing to keep to the Code.

Please note that all queries or complaints regarding your search should be directed to your search provider in the first instance, not to TPOs or to the PCCB.

TPOs Contact Details

The Property Ombudsman scheme
Milford House
43-55 Milford Street
Salisbury
Wiltshire SP1 2BP
Tel: 01722 333306
Fax: 01722 332296
Email: admin@tpos.co.uk

You can get more information about the PCCB from www.propertycodes.org.uk

PLEASE ASK YOUR SEARCH PROVIDER IF YOU WOULD LIKE A COPY OF THE SEARCH CODE

Sewer Flooding
History Enquiry

Conisbee

Search address supplied	102 Camley Street Camley Street 102 Camley Street London N1C 4PW
Your reference	140674 - Camley Street Kings Cross
Our reference	SFH/SFH Standard/2014_2896944
Received date	**27 October 2014**
Search date	**27 October 2014**

Thames Water Utilities Ltd

Property Searches
PO Box 3189
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DX 151280 Slough 13

T 0118 925 1504
E searches@thameswater.co.uk
I www.thameswater-propertysearches.co.uk

Registered in England and Wales
No. 2366661, Registered office
Clearwater Court, Vastern Road
Reading RG1 8DB

Sewer Flooding

History Enquiry

Search address supplied: 102 Camley Street,Camley Street,102,Camley Street,London,N1C 4PW

This search is recommended to check for any sewer flooding in a specific address or area

TWUL, trading as Property Searches, are responsible in respect of the following:-

(i) any negligent or incorrect entry in the records searched;

(ii) any negligent or incorrect interpretation of the records searched;

(iii) and any negligent or incorrect recording of that interpretation in the search report

(iv) compensation payments

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Reading RG1 8DB

Sewer Flooding

History Enquiry

History of Sewer Flooding

Is the requested address or area at risk of flooding due to overloaded public sewers?

The flooding records held by Thames Water indicate that there have been no incidents of flooding in the requested area as a result of surcharging public sewers.

For your guidance:

- A sewer is “overloaded” when the flow from a storm is unable to pass through it due to a permanent problem (e.g. flat gradient, small diameter). Flooding as a result of temporary problems such as blockages, siltation, collapses and equipment or operational failures are excluded.
- “Internal flooding” from public sewers is defined as flooding, which enters a building or passes below a suspended floor. For reporting purposes, buildings are restricted to those normally occupied and used for residential, public, commercial, business or industrial purposes.
- “At Risk” properties are those that the water company is required to include in the Regulatory Register that is presented annually to the Director General of Water Services. These are defined as properties that have suffered, or are likely to suffer, internal flooding from public foul, combined or surface water sewers due to overloading of the sewerage system more frequently than the relevant reference period (either once or twice in ten years) as determined by the Company’s reporting procedure.
- Flooding as a result of storm events proven to be exceptional and beyond the reference period of one in ten years are not included on the At Risk Register.
- Properties may be at risk of flooding but not included on the Register where flooding incidents have not been reported to the Company.
- Public Sewers are defined as those for which the Company holds statutory responsibility under the Water Industry Act 1991.
- It should be noted that flooding can occur from private sewers and drains which are not the responsibility of the Company. This report excludes flooding from private sewers and drains and the Company makes no comment upon this matter.
- For further information please contact Thames Water on Tel: 0800 316 9800 or website www.thameswater.co.uk

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Appendix C – Strategic Drainage Layout

Linetype Legend:

- FW — FW — Existing Foul Sewer
- SW — SW — Existing Storm Sewer
- Proposed Foul Sewer
- RM — RM — Proposed Foul Rising Main
- Site Boundary

Blocks Legend:

- Proposed Foul Water Manhole
- Internal Brick Manholes Size 1200mm x 750mm Size 900mm x 750mm
- Foul water 250Ø PPIC
- SVP SS — Soil Vent Pipe/stub Stack
- G — Proposed Trapped floor gully
- FFL=23.01 — finished floor level
- Pumping station
- Proposed Lift Sumps (600mm x 600mm x 600mm)

NOTES

1. Invert levels and positions of existing drains / chambers / sewers where new connections are to be made must be checked and confirmed to the engineer prior to the commencement of any works.
2. All drainage works shall be carried out in accordance with the requirements of the Local Authority, the Environment Agency and in conjunction with all relevant British Standards, Codes of Practice and 'Sewers for Adoption' 7th Edition and any addendums as appropriate.
3. All drainage shall comply with the typical details and the requirements of BS EN 752 and Part H of the Building Regulations.
4. Any part of the existing drainage system to be retained as part of the new scheme shall be cleaned and inspected. Any structural defects shall be repaired using appropriate and approved means.
5. For setting-out dimensions of SVP's, RWP's etc, refer to Architect's or Mechanical Engineer's drawings. Positions shown are indicative and subject to final design.
6. All foul and RWP connections shall be 100mm diameter unless otherwise specified.
7. All precast concrete units used in the drainage works shall be manufactured using sulphate resisting cement.
8. Manhole covers and frames shall be to BS EN 124 and shall be Kitemarked. Covers and frames shall be heavy duty D400 in carriageways and vehicular areas and medium duty B125 in footways and soft landscaping. In blocked/concrete paved areas covers shall be recessed fabricated steel. All recessed covers shall in accordance with the FACTA association gradings.
9. All internal inspection chambers to be recessed, double sealed with screw down covers.
10. Cover levels are to be adjusted locally to suit finished ground levels.
11. At least one soil pipe at the head of each foul run shall vent to the atmosphere.
12. Existing drainage to be removed is to be broken out to bed level and void backfilled with granular material, compacted in layers not exceeding 250mm.
13. All drain runs from SVP's, stub stacks or FW gullies to be laid at 1:40 gradient unless otherwise stated. All RWP's to be laid 1:80 min unless otherwise stated.
14. All manholes / inspection chambers in block paved areas, to have recessed covers. MH covers in paved areas to have cover & frame orientated 'square' with paving to minimise cut slabs or blocks.
15. All private drainage to be laid to levels shown using flexibly jointed pipes, either uPVC to BS 4660 and BS 5481 or vitrified clayware to BS EN 295. Pipes below structural building slabs or basements shall be Cast Iron to BS 437.
16. Rodding eyes, etc are to be laid to manufacturers minimum cover and depth to allow adequate fall from adjoining unit.
17. All proposed trees to have appropriate tree barrier details linking pits to ensure roots are directed away from drainage.
18. Where new sewers are constructed within 5m of a new or existing tree the sewer shall be concrete encased against root intrusion. Refer to drainage details.
19. All new drainage to be jetted and CCTV surveyed on completion. Contractor to make sure that the drainage is fully operational. Refer to Drainage maintenance manual for maintenance details.
20. All runs connecting into the public drainage network to be vitrified clay, extra length to BS EN 295 or BS65 with plain sleeved or socketed flexible joints.
21. CDM note: All pipework, silt traps, catchpits, trapped gullies and attenuation tanks to be regularly inspected every three months and cleared out on a regular frequency for the first nine months. After this period the frequency can be reduced to every six months. Porous surface to be regularly swept three times a year to remove the silt.
22. This drawing is to be read in conjunction with all relevant Conisbee drawings.
23. HEALTH AND SAFETY: The works shall be carried out by specialist competent and experienced contractors who are members of a recognised national organisation.Operatives shall have received full and appropriate training for the operations they are to undertake. All work shall be carried out in accordance with all pertinent Health and Safety Regulations.

NOT FOR CONSTRUCTION

KEY PLAN (NTS)

FOR CONTINUATION REFER TO DRAWING NO 140674/C111, FOR DRAINAGE AT GROUND FLOOR LEVEL REFER TO DRAWINGS No. 140674/C112 & 140674/C113

Rev	Date	Description	Drawn	Check
C1	30.03.16	CONSTRUCTION ISSUE	AW	TG

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Fax 020 7700 6686
design@conisbee.co.uk
www.conisbee.co.uk

Drawing Status: CONSTRUCTION

Project: CAMLEY STREET KINGS CROSS

Title: DRAINAGE LAYOUT AT BASEMENT LEVEL SHEET 1 OF 2

Date: NOV 2014
Scale: 1:100
Drawn: AW
Engineer: TG
Project No: **140674**
Drawing No: **C-1-110**
Revision: **C1**

Linetype Legend:

- FW — Existing Foul Sewer
- SW — Existing Storm Sewer
- Proposed Foul Sewer
- RM — Proposed Foul Rising Main
- Site Boundary

Blocks Legend:

- Proposed Foul Water Manhole
- Internal Brick Manholes Size 1200mm x 750mm Size 900mm x 750mm
- Foul water 250Ø PPIC
- SVP SS — Soil Vent Pipe/stub Stack
- G — Proposed Trapped floor gully
- FFL=23.01 — finished floor level
- Pumping station
- Proposed Lift Sumps (600mm x 600mm x 600mm)

KEY PLAN (NTS)

FOR CONTINUATION REFER TO DRAWING NO 140674/C110, FOR DRAINAGE AT GROUND FLOOR LEVEL REFER TO DRAWINGS No. 140674/C112 & 140674/C113

NOTES

1. Invert levels and positions of existing drains / chambers / sewers where new connections are to be made must be checked and confirmed to the engineer prior to the commencement of any works.
2. All drainage works shall be carried out in accordance with the requirements of the Local Authority, the Environment Agency and in conjunction with all relevant British Standards, Codes of Practice and 'Sewers for Adoption' 7th Edition and any addendums as appropriate.
3. All drainage shall comply with the typical details and the requirements of BS EN 752 and Part H of the Building Regulations.
4. Any part of the existing drainage system to be retained as part of the new scheme shall be cleaned and inspected. Any structural defects shall be repaired using appropriate and approved means.
5. For setting-out dimensions of SVP's, RWP's etc, refer to Architect's or Mechanical Engineer's drawings. Positions shown are indicative and subject to final design.
6. All foul and RWP connections shall be 100mm diameter unless otherwise specified.
7. All precast concrete units used in the drainage works shall be manufactured using sulphate resisting cement.
8. Manhole covers and frames shall be to BS EN 124 and shall be Kitemarked. Covers and frames shall be heavy duty D400 in carriageways and vehicular areas and medium duty B125 in footways and soft landscaping. In blocked/concrete paved areas covers shall be recessed fabricated steel. All recessed covers shall in accordance with the FACTA association gradings.
9. All internal inspection chambers to be recessed, double sealed with screw down covers.
10. Cover levels are to be adjusted locally to suit finished ground levels.
11. At least one soil pipe at the head of each foul run shall vent to the atmosphere.
12. Existing drainage to be removed is to be broken out to bed level and void backfilled with granular material, compacted in layers not exceeding 250mm.
13. All drain runs from SVP's, stub stacks or FW gullies to be laid at 1:40 gradient unless otherwise stated. All RWP's to be laid 1:80 min unless otherwise stated.
14. All manholes / inspection chambers in block paved areas, to have recessed covers. MH covers in paved areas to have cover & frame orientated 'square' with paving to minimise cut slabs or blocks.
15. All private drainage to be laid to levels shown using flexibly jointed pipes, either uPVC to BS 4660 and BS 5481 or vitrified clayware to BS EN 295. Pipes below structural building slabs or basements shall be Cast Iron to BS 437.
16. Rodding eyes, etc are to be laid to manufacturers minimum cover and depth to allow adequate fall from adjoining unit.
17. All proposed trees to have appropriate tree barrier details linking pits to ensure roots are directed away from drainage.
18. Where new sewers are constructed within 5m of a new or existing tree the sewer shall be concrete encased against root intrusion. Refer to drainage details.
19. All new drainage to be jetted and CCTV surveyed on completion. Contractor to make sure that the drainage is fully operational. Refer to Drainage maintenance manual for maintenance details.
20. All runs connecting into the public drainage network to be vitrified clay, extra length to BS EN 295 or BS65 with plain sleeved or socketed flexible joints.
21. CDM note: All pipework, silt traps, catchpits, trapped gullies and attenuation tanks to be regularly inspected every three months and cleared out on a regular frequency for the first nine months. After this period the frequency can be reduced to every six months. Porous surface to be regularly swept three times a year to remove the silt.
22. This drawing is to be read in conjunction with all relevant Conisbee drawings.
23. HEALTH AND SAFETY: The works shall be carried out by specialist competent and experienced contractors who are members of a recognised national organisation.Operatives shall have received full and appropriate training for the operations they are to undertake. All work shall be carried out in accordance with all pertinent Health and Safety Regulations.

Rev	Date	Description	Drawn	Check
C1	03.03.16	CONSTRUCTION ISSUE	AW	TG

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www.conisbee.co.uk

Drawing Status: CONSTRUCTION

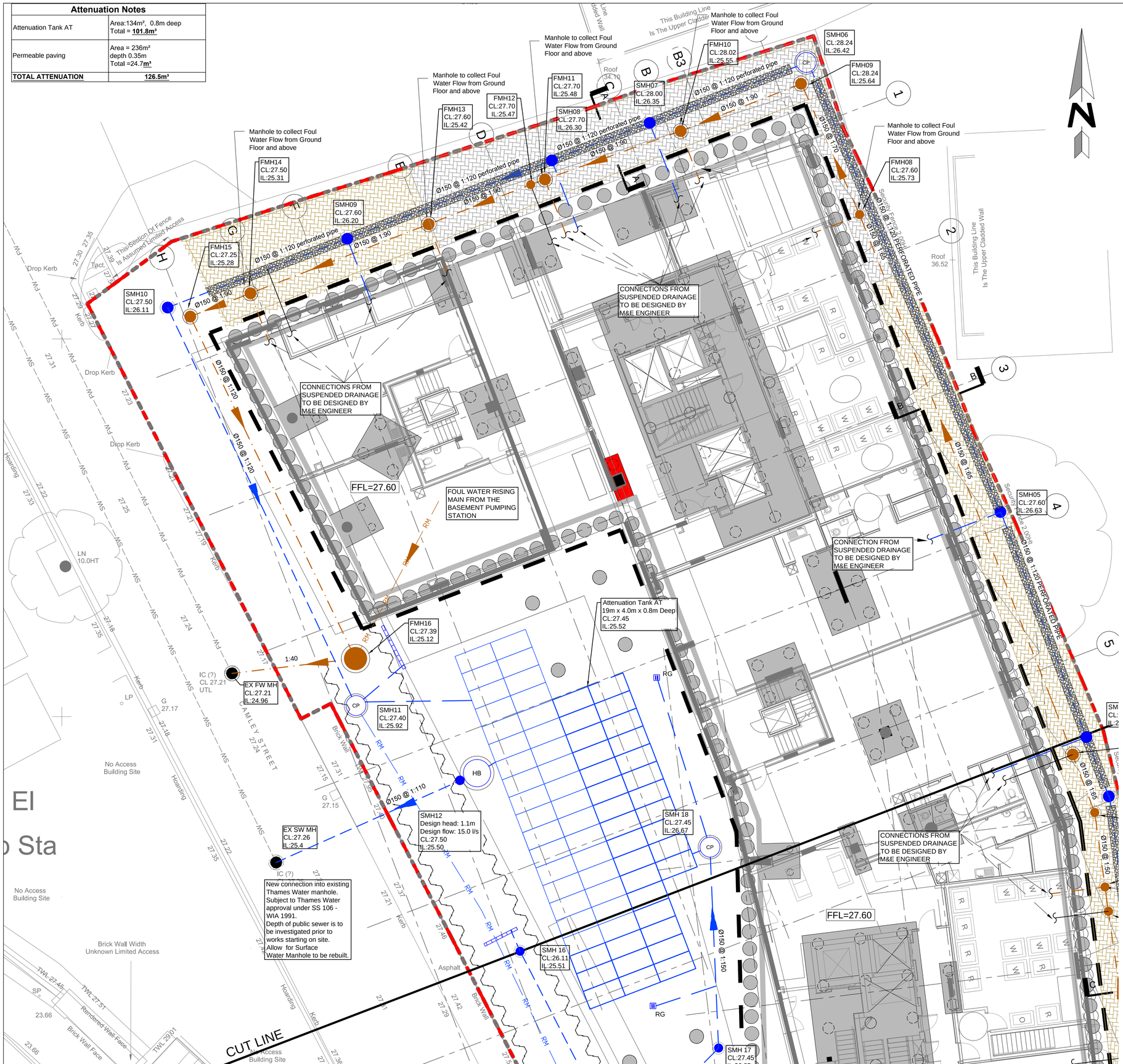
Project: CAMLEY STREET KINGS CROSS

Title: DRAINAGE LAYOUT AT BASEMENT LEVEL SHEET 2 OF 2

Date: NOV 2014
Scale: 1:100
Drawn: AW
Engineer: TG
Project No: **140674**
Drawing No: **C-1-111**
Revision: **C1**

Attenuation Notes

Attenuation Tank AT	Area:134m², 0.8m deep Total = **101.8m³**
Permeable paving	Area = 236m² depth 0.35m Total =24.7**m³**
TOTAL ATTENUATION	**126.5m³**



Linetype Legend:

- FW — Existing Foul Sewer
- SW — Existing Storm Sewer
- Proposed Foul Sewer
- Proposed Storm Sewer
- RM — Proposed Foul Rising Main
- RM — Proposed Surface Rising Main
- Suspended SW Drainage
- Basement
- Site Boundary
- Perforated pipe

Blocks Legend:

- Proposed Surface Water Manhole
- Proposed Foul Water Manhole
- Surface or Foul water 250Ø PPIC
- SVP SS — Soil Vent Pipe/stub Stack
- RWP — Proposed Rainwater Pipe
- G — Proposed floor gully
- RG — Proposed Road gully
- x 15.250 — Proposed levels
- CD01 — Channel Drain
- FFL=27.60 — finished floor level
- Pumping station
- HB — Manhole with hydro-brake
- Permeable paving with 350mm sub-base
- AquaCell Units Attenuation tank
- A — Refer to drawing C401 for typical sections though paving and french drain.

NOTES

1. Invert levels and positions of existing drains / chambers / sewers where new connections are to be made must be checked and confirmed to the engineer prior to the commencement of any works.
2. All drainage works shall be carried out in accordance with the requirements of the Local Authority, the Environment Agency and in conjunction with all relevant British Standards, Codes of Practice and 'Sewers for Adoption' 7th Edition and any addendums as appropriate.
3. All drainage shall comply with the typical details and the requirements of BS EN 752 and Part H of the Building Regulations.
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5. For setting-out dimensions of SVP's, RWP's etc, refer to Architect's or Mechanical Engineer's drawings. Positions shown are indicative and subject to final design.
6. All foul and RWP connections shall be 100mm diameter unless otherwise specified.
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9. All internal inspection chambers to be recessed, double sealed with screw down covers.
10. Cover levels are to be adjusted locally to suit finished ground levels.
11. At least one soil pipe at the head of each foul run shall vent to the atmosphere.
12. Existing drainage to be removed is to be broken out to bed level and void backfilled with granular material, compacted in layers not exceeding 250mm.
13. All drain runs from SVP's, stub stacks or FW gullies to be laid at 1:40 gradient unless otherwise stated. All RWP's to be laid 1:80 min unless otherwise stated.
14. All manholes / inspection chambers in block paved areas, to have recessed covers. MH covers in paved areas to have cover & frame orientated 'square' with paving to minimise cut slabs or blocks.
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20. All runs connecting into the public drainage network to be vitrified clay, extra length to BS EN 295 or BS65 with plain sleeved or socketed flexible joints.
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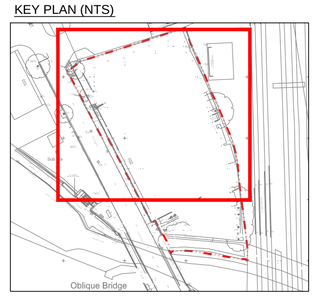
22. This drawing is to be read in conjunction with all relevant Conisbee drawings.
23. HEALTH AND SAFETY: The works shall be carried out by specialist competent and experienced contractors who are members of a recognised national organisation.Operatives shall have received full and appropriate training for the operations they are to undertake. All work shall be carried out in accordance with all pertinent Health and Safety Regulations.

Design Notes :

Existing Site Area:	2,543 m²
Proposed Site Area:	2,543 m²
Total Existing Impermeable Area:	2,276 m²
Total Proposed Impermeable Area:	2,287 m²
Existing Peak rate run off from Impermeable Areas (50mm/hr):	31.6l/s
Proposed restricted Surface Water discharge rate (50% reduction of 1 in 2 year storm):	5.0 l/s
Total Attenuation for 100YS + 30%CC:	**124.6 m³**
Foul Water Discharge:	**20 l/s**

KEY PLAN (NTS)



FOR CONTINUATION REFER TO DRAWING NO 140674/C113, FOR DRAINAGE AT BASEMENT LEVEL REFER TO DRAWINGS No. 140674/C110 & 140674/C111

NOT FOR CONSTRUCTION

Rev	Date	Description	Drawn	Check
T4	27.01.16	Blue roof omitted	AW	TG
T3	18.12.15	Drianage updated.	AW	TG
T2	02.12.15	Drianage updated.	AR	AW
T1	27.11.15	TENDER ISSUE	AW	TG

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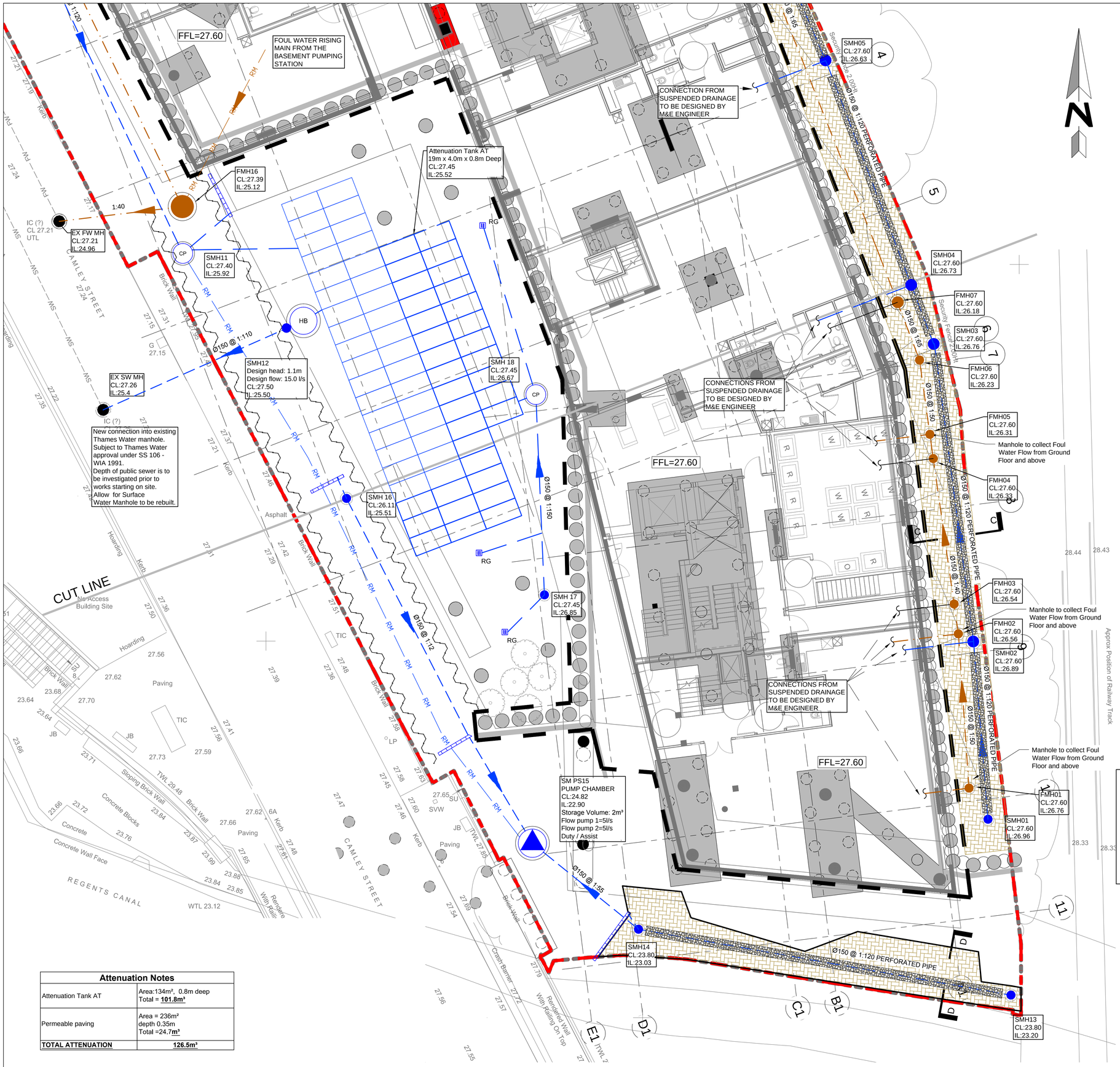
Drawing Status: TENDER

Project: CAMLEY STREET KINGS CROSS

Title: DRAINAGE LAYOUT AT GROUND LEVEL SHEET 1 OF 2

Date: NOV 2014
Scale: 1:100
Drawn: AW
Engineer: TG
Project No: **140674**
Drawing No: **C-1-112**
Revision: **T4**



Linetype Legend:

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- Proposed Foul Sewer
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- RM — RM — Proposed Surface Rising Main
- Suspended SW Drainage
- Basement
- Site Boundary
- Perforated pipe

Blocks Legend:

- Proposed Surface Water Manhole
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- G — Proposed floor gully
- RG — Proposed Road gully
- x 15.250 — Proposed levels
- CD01 — Channel Drain
- FFL=27.60 — finished floor level
- Pumping station
- HB — Manhole with hydro-brake
- Permeable paving with 350mm sub-base
- AquaCell Units Attenuation tank
- A — Refer to drawing C401 for typical sections though paving and french drain.

FOR CONTINUATION REFER TO DRAWING NO 140674/C112, FOR DRAINAGE AT BASEMENT LEVEL REFER TO DRAWINGS No. 140674/C110 & 140674/C111

Design Notes :

Existing Site Area:	2,543 m²
Proposed Site Area:	2,543 m²
Total Existing Impermeable Area:	2,276 m²
Total Proposed Impermeable Area:	2,287 m²
Existing Peak rate run off from Impermeable Areas (50mm/hr):	31.6l/s
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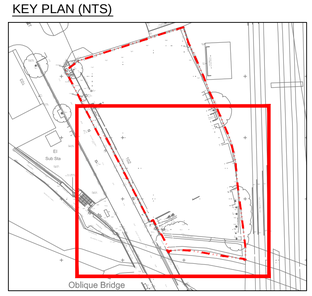
Total Attenuation for 100YS + 30%CC:	**124.6 m³**
Foul Water Discharge:	**20 l/s**

KEY PLAN (NTS)



Attenuation Notes

Attenuation Tank AT	Area:134m², 0.8m deep Total = **101.8m³**
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TOTAL ATTENUATION	**126.5m³**

NOTES

1. Invert levels and positions of existing drains / chambers / sewers where new connections are to be made must be checked and confirmed to the engineer prior to the commencement of any works.
2. All drainage works shall be carried out in accordance with the requirements of the Local Authority, the Environment Agency and in conjunction with all relevant British Standards, Codes of Practice and 'Sewers for Adoption' 7th Edition and any addendums as appropriate.
3. All drainage shall comply with the typical details and the requirements of BS EN 752 and Part H of the Building Regulations.
4. Any part of the existing drainage system to be retained as part of the new scheme shall be cleaned and inspected. Any structural defects shall be repaired using appropriate and approved means.
5. For setting-out dimensions of SVP's, RWP's etc, refer to Architect's or Mechanical Engineer's drawings. Positions shown are indicative and subject to final design.
6. All foul and RWP connections shall be 100mm diameter unless otherwise specified.
7. All precast concrete units used in the drainage works shall be manufactured using sulphate resisting cement.
8. Manhole covers and frames shall be to BS EN 124 and shall be Kitemarked. Covers and frames shall be heavy duty D400 in carriageways and vehicular areas and medium duty B125 in footways and soft landscaping. In blocked/concrete paved areas covers shall be recessed fabricated steel. All recessed covers shall in accordance with the FACTA association gradings.
9. All internal inspection chambers to be recessed, double sealed with screw down covers.
10. Cover levels are to be adjusted locally to suit finished ground levels.
11. At least one soil pipe at the head of each foul run shall vent to the atmosphere.
12. Existing drainage to be removed is to be broken out to bed level and void backfilled with granular material, compacted in layers not exceeding 250mm.
13. All drain runs from SVP's, stub stacks or FW gullies to be laid at 1:40 gradient unless otherwise stated. All RWP's to be laid 1:80 min unless otherwise stated.
14. All manholes / inspection chambers in block paved areas, to have recessed covers. MH covers in paved areas to have cover & frame orientated 'square' with paving to minimise cut slabs or blocks.
15. All private drainage to be laid to levels shown using flexibly jointed pipes, either uPVC to BS 4660 and BS 5481 or vitrified clayware to BS EN 295. Pipes below structural building slabs or basements shall be Cast Iron to BS 437.
16. Rodding eyes, etc are to be laid to manufacturers minimum cover and depth to allow adequate fall from adjoining unit.
17. All proposed trees to have appropriate tree barrier details linking pits to ensure roots are directed away from drainage.
18. Where new sewers are constructed within 5m of a new or existing tree the sewer shall be concrete encased against root intrusion. Refer to drainage details.
19. All new drainage to be jetted and CCTV surveyed on completion. Contractor to make sure that the drainage is fully operational. Refer to Drainage maintenance manual for maintenance details.
20. All runs connecting into the public drainage network to be vitrified clay, extra length to BS EN 295 or BS65 with plain sleeved or socketed flexible joints.
21. CDM note: All pipework, silt traps, catchpits, trapped gullies and attenuation tanks to be regularly inspected every three months and cleared out on a regular frequency for the first nine months. After this period the frequency can be reduced to every six months. Porous surface to be regularly swept three times a year to remove the silt.
22. This drawing is to be read in conjunction with all relevant Conisbee drawings.
23. HEALTH AND SAFETY: The works shall be carried out by specialist competent and experienced contractors who are members of a recognised national organisation.Operatives shall have received full and appropriate training for the operations they are to undertake. All work shall be carried out in accordance with all pertinent Health and Safety Regulations.

NOT FOR CONSTRUCTION

Rev	Date	Description	Drawn	Check
T4	26.01.16	Blue roof omitted	AW	TG
T3	18.12.15	Drianage updated.	AW	TG
T2	02.12.15	Drianage updated.	AR	AW
T1	27.11.15	TENDER ISSUE	AW	TG

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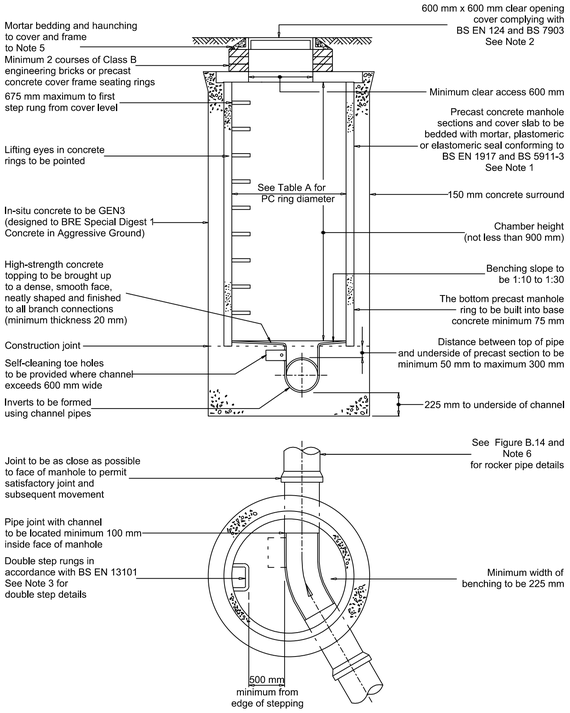
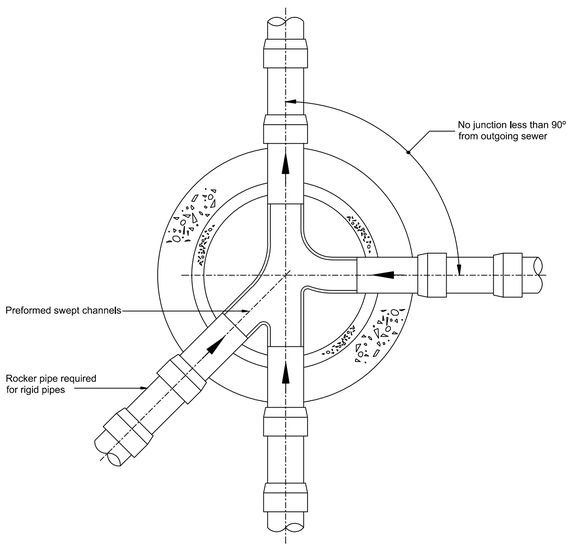
Drawing Status	TENDER
Project	CAMLEY STREET KINGS CROSS
Title	DRAINAGE LAYOUT AT GROUND LEVEL SHEET 2 OF 2
Date	NOV 2014
Scale	1:100
Drawn	AW
Engineer	TG
Project No	**140674**
Drawing No	**C-1-113**
Revision	**T4**

FIGURE B.12
TYPICAL MANHOLE DETAIL - TYPE 2
Maximum depth from cover level to soffit of pipe 3.0 m



Not to scale

FIGURE B.14
TYPICAL ARRANGEMENT OF PIPE JUNCTIONS WITHIN MANHOLES



Sectional Plan

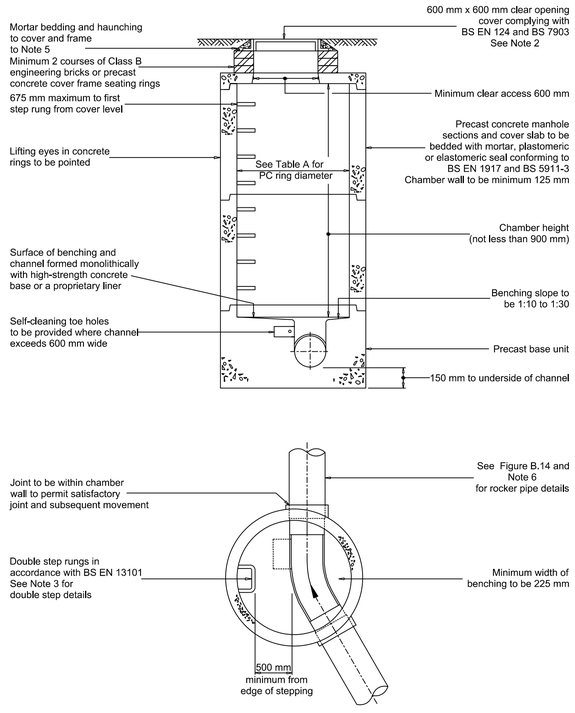
Rigid pipes built into manhole should have a flexible joint as close as feasible to the external face of the structure and the length of the next rocker pipe should be as shown.

Table C

Nominal diameter (mm)	Maximum effective length (m)
150 - 600	0.6
601 - 750	1.00
over 750	1.25

All pipes entering the bottom of the manhole to have soffits level.

FIGURE B.13
TYPICAL MANHOLE DETAIL - TYPE 2 (Alternative construction detail)
Maximum depth from cover level to soffit of pipe 3.0 m



Not to scale

Table A

Diameter of largest pipe (mm)	Internal diameter of manhole (mm)
Less than 375	1200
375-700	1500
750-900	1800
Greater than 900	Consult undertaker

SFA 7th Edition, Clause B3.2, Table B.1)

Table B

NRSWA Road Category	Description	Minimum frame depth (mm)
I	Trunk roads and dual carriageways	150
II	All other A roads	150
III	Bus sevices	150
IV	All other roads except residential cul-de-sacs	150
	Residential cul-de-sacs	100

(SFA 7th Edition, Clause E2.32, Table E.6)

THIS DRAWING MUST BE READ IN CONJUNCTION WITH THE SPECIFICATION AND ALL OTHER RELEVANT DRAWINGS. DO NOT SCALE FROM THIS DRAWING.

NOTES

1. For proposed drainage layouts refer to drawing nos. C-140674 - X - 00 - DR - 110 to 113.

2. Precast Concrete Manholes *(SFA 7th edition, Clause E2.29)*

2.1. Precast concrete manhole units shall comply with the relevant provisions of BS EN 1917 and BS 5911-3. Units wich bed into bases shall be manufactured so that imposed vertical loads are transmitted directly via the full wall thickness of the unit. The profiles of joints between units and the underside of slabs, shall be capable of withstanding applied loadings from such slabs and spigot-ended sections shall only be used where the soffit of the slab is recessed to receive them.

2.2. Precast concrete chamber sections for valves and meters shall be interlocking and comply with BS EN 1917 and BS 5911-3.

3. Manhole Covers and Frames *(SFA 7th edition, Clause E2.32)*

3.1. Manhole covers and frames shall comply with the relevant provisions of BS EN 124, BS 7903 and Highways Agency Guidance Document HA 104/09. They shall be of non-rocking design which does not rely on the use of cushion inserts.

3.2. Manhole covers on foul only sewers shall be of low leakage types in order to prevent excessive surface water ingress.

3.3. As a minimum, Class D400 covers shall be used in carriageways of roads (including pedestrian streets), hard shoulders and parking areas used by all types of road vehicles.

3.4. Minimum frame depths for NRSWA road categories I t IV shall be as Table B.

3.5. Class B125 shall be used in footways, pedestrian areas and comparable locations.

3.6. In situations where traffic loading is anticipated to be heavier than would occur on a typical residential estate distributor road (i.e., braking or turning near a junction), a higher specification (E600) shall be used.

3.7. All manhole covers shall be the non-ventilating type and shall have closed keyways.

4. Manhole Steps *(SFA 7th edition, Clause E2.33)*

4.1. steps for manholes and other chambers shall be Type D Class 1, complying with the requirements of BS EN 13101.

4.2. Galvanized mild steel and plastic encapsulated steps are preferred.

5. Ladders *(SFA 7th edition, Clause E2.37)*

5.1. Ladders in manholes and similar structures shall comply with the requirements of BS EN 14396, with width of rung 380mm and two stringers, but shall not be made from aluminium.

5.2. Mild steel ladders for vertical fixing shall be fabricated from steel conforming to BS EN 10025-2. After fabrication, low carbon steel ladders shall not be hot dip galvanized in accordance with BS EN ISO 1461.

5.3. Stainless steel ladders for fixing shall be fabricated from Grade X5CrNiMo 17-12-2 steel conforming to BS EN 10088-3.

5.4. GRP ladders shall be manufactured from pultruded sections conforming to BS EN 13706-3. The surface shall be smooth with the fibres embedded and sealed against penetration from dirt and water. The Barcol hardness of the sections shall be at least 35 when tested in accordance with BS 2782-10.

6. Pipes and Joints Adjacent to Structures *(SFA 7th edition, Clause E6.6)*

6.1. Where rigid pipes are used, a flexible joint shall be provided as close as is feasible to the outside face of any structure into which a pipe is built, within 150mm for pipe diameters less than 300m. The design of the joints shall be compatible with any subsequent movement.

6.2. The recommended length of the next pipe (rocker pipe) away from the structure shall be as shown in Table C.

7. Setting manhole covers and frames *(SFA 7th edition, Clause E6.7)*

7.1. Manhole frames shall be set to level, bedded and haunched externally over the base and sides of the frame in mortar, in accordance with the manufacturer's instructions. The frame shall be seated on at least two courses of Class B engineering bricks, on precast concrete masonry units or on a precast concrete cover frame seating rings to regulate the distance between the top of the cover and the top rung to no greater than 675mm. A mortar fillet shall be provided where the corners to an opening in a slab are chamfered and the brickwork is not flush with the edges of the opening.

7.2. Frames for manhole covers shall be bedded in a polyester resin bedding mortar in all situations where covers are sited in NRSWA Road Categories i, ii or iii (i.e., all except residential cul-de-sacs).

Rev	Date	Description	Drawn	Check
T1	10.07.15	TENDER ISSUE	AW	TG

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Drawing Status: TENDER

Project: CAMLEY STREET KINGS CROSS

Title: DRAINAGE DETAILS - SHEET 1

Date: MAY 2014
Scale: AS SHOWN
Drawn: PM
Engineer: AW
Project No: **140674**
Drawing No: **C-1-161**
Revision: **T1**