

DRAINAGE STRATEGY AND FLOOD RISK ASSESSMENT

**CHELMSINE COURT, BURY STREET,
RUISLIP, HA4 7TL**

Prepared By: PEP Civil & Structures Limited

Our Ref: 485720/GCR

Date: 25 February 2020

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Appendix B - **Proposed Site Layout**

Appendix C - **Proposed Drainage Layout**

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1. Objectives

The following report has been prepared to support a planning application for the development in line with the Hillingdon Borough Council Sustainable Drainage Proforma.

This document and its appendices have been produced to demonstrate that a viable surface water drainage solution can be achieved without increasing flood risk.

The report represents the opinions of PEP Civil & Structures Limited, based upon information known to PEP at the time of preparation only.

2. Current Site Details

The overall site measures approximately 530m² in plan area and currently comprises a two storey office and residential building, with significant areas of tarmac and concrete hardstanding. There is some limited soft landscaping to the site frontage, occupying approximately 10m². See existing layout plan in appendix A.

The proportion of impermeable surfacing for the existing site is therefore 98% of the overall site area.

3. Proposed Development

The development proposals comprise the demolition of the existing two storey office and residential building and construction of eight apartments in a new four storey block with associated car parking and soft landscaping. See proposed layout plan in appendix B.

The new apartment building is approximately 192m² in plan area (inclusive of two balconies to the rear of the building). The remainder of the site will comprise 150m² of tanked permeable surfaced car parking, 75m² of traditional flag paved footpaths and 113m² of soft landscaping.

The proportion of impermeable surfacing for the proposed development is therefore 79% of the overall site area.

A comparison of pre- and post-development areas is summarised overleaf.

Pre-Development Areas (m ²)		Post-Development Areas (m ²)	
Buildings	190.0	Buildings	192.0
Hardstanding	330.0	Hardstanding	225.0
Soft Landscaping	10.0	Soft Landscaping	113.0

4. Geology of the Area

A detailed geotechnical and environmental site investigation is currently being commissioned. However reference to publically available drainage strategy documents on the Hillingdon Borough Council Planning Portal for previous planning applications related to the site confirms....

The 1:50,000 British Geological Survey (BGS) maps have been analysed to establish the underlying geology of the area. The site is shown to be underlain by the Lambeth Group – Clay, Silt and Sand sedimentary bedrock.

A site investigation was undertaken in April 2012 by Ashmere Soils Laboratories (available through the planning portal). The investigations described the site condition to be – Surface made ground overlying brown and grey silty clays with variable gravel content. This overlies a brown silty sand with traces of clay that represents the Reading Beds at this site. At depths between 5.9m and 6.8m the Readings Beds were penetrated and a brown claybound gravel marks the base of the formation was encountered. These mixed cohesive and granular soils are only 3.0m to 10.0m in thickness and overlie Upper Chalk.

The site investigations encountered groundwater at depths of approximately 5.9 to 6.9m and described these as fast inflows. Furthermore the smell of petroleum had been noted in the boring operations.

Traditional infiltration methods are deemed to be not applicable to the site noting the ground make up (clay – low infiltration) and presence of potential contaminants. It is noted that the Environment Agency have not been engaged in respects to remediation works for the ground conditions however infiltration will not be proposed due to the potential risk of resuspension of contaminants.

The petroleum smells noted in the earlier investigation presumably emanate from the site immediately to the north of the development area, which was formerly a petrol filling station. This potential contamination issue will be thoroughly investigated as part of the proposed site investigation works, but at this stage it is considered prudent to rule out infiltration techniques as a result.

5. Proposed Surface Water Drainage and Drainage Hierarchy

The drainage proposals for the development are based on an attenuated 2.0l/s discharge to the Thames Water public sewer (see drainage layout plan in appendix C). This has been assessed based on the recognised drainage hierarchy as follows:

a. Store rainwater for later use

Water butts will be provided to assist with maintenance of the soft landscaped area to the rear of the development.

b. Use infiltration techniques, such as porous surfaces in non-clay areas

Infiltration has been ruled out for use on this site due to the anticipated nature of the underling subsoils (which suggest low infiltration rates due to the clay content of the material) but more significantly due to the likelihood of contamination emanating from the former adjacent petrol filling station.

However the drainage proposals include tanked permeable surfacing to the car park as an effective mechanism to direct runoff into the below ground cellular crates and to provide a level of treatment for the surface run-off.

c. Attenuate rainwater in ponds or open water features for gradual release

The site is highly constrained. The only significant area of soft landscaping large enough to incorporate a pond or open water feature is at the rear of the site. Unfortunately ground levels at the rear (46.250m) are much lower than the main road (47.150m) and it would not therefore be possible to achieve a gravity discharge from such a feature to the Thames Water sewer system.

d. Attenuate rainwater by storing in tanks or sealed water features for gradual release

Attenuation is proposed using a combination of tanked permeable surfacing to the car park, and a below ground attenuation crate system beneath. Discharge rates will be limited to 2.0l/s (minimum practicable for a hyrdobrake system, and in line with the Thames Water pre-planning enquiry requirements – see appendix E).

e. Discharge rainwater direct to a watercourse

There are no available watercourses local to the site.

f. Discharge rainwater to a surface water sewer/drain

Discharge to the public sewer is proposed at a maximum rate of 2.0l/s, and this has been the subject of a pre-planning enquiry to Thames Water (see appendix E).

g. Discharge rainwater to the combined sewer

Not applicable to this site as there are separate surface and foul water sewers in Bury Street (see Thames Water sewer asset plan in appendix E).

Drainage System Description

RWPs from the new building will discharge into a traditional below-ground piped drainage network and hence directly into the attenuation crates.

The parking area will comprise tanked permeable surfacing, which will act as a collection mechanism as well as providing a level of treatment to the car park run-off. Water will flow down through the permeable stone and into the attenuation crates beneath. The crates will be terram wrapped to prevent silt entry from above, and will be laid on a heavy gauge polythene membrane to prevent water penetrating the sub-soil formation beneath. The crates will be provided with jetting access channels on the line of the pipe network.

The access chambers within the network will have catchpit sumps to control silt entry.

The attenuation crates will be linked by a traditional below-ground piped network, which will then run to the Thames Water public sewer via a hydrobrake control chamber.

The proposed drainage system has been modelled using Microdrainage software and the output calculations are provided within appendix D. The permeable stone has been ignored for storage purposes, and the crates have been modelled into the network as pn2.002 with the width reduced to allow for the 95% voids ratio. The system proposals have been checked for a 1 in 100 year storm event with 40% allowance for climate change. Checks have been undertaken using FSR data for the 15 and 30 minute storm durations, and FEH data for storms of 60 minute duration and longer. These calculations demonstrate that there will be no surface water flooding resulting from the scheme proposals, with the exception of a small volume at chamber S1 (0.007m³) which will be contained within the area of soft landscaping at the rear of the site.

The discharge outfall arrangement has been the subject of a Pre-Planning Enquiry with Thames Water (see appendix E).

6. Potential for Flood Impact due to Drainage System Failure

Refer to drainage exceedance flow route plan in appendix F. Level are such that any exceedance flows will run to the back of the site down the footways on either side of the building and hence into the soft landscaped area at the rear.

7. General Site Flood Risk Potential

Reference to the Thames Water sewer flooding history information in appendix G and the EA flood zone map in appendix H demonstrates that the proposed development area is located in flood zone 1, and has a low annual probability of flooding.

Introducing a positive drainage system as part of the development proposals (which includes attenuation storage and flow control) will not increase the probability of future flooding.

The significant increase in soft landscaped area between the pre- and post-development layouts will further reduce flood risk.

8. Drainage System Maintenance

The maintenance guidance for the various SUDS features forming the proposed drainage network is based on guidance provided in CIRIA C753. All surface water drainage systems will remain private and be maintained by the developer landlord.

Inlets, Outlets and Hydrobrake

It is suggested that six monthly inspections are carried out to ensure inlets and outlets are fit for purpose and clear of litter, debris and any other obstructions. Over and above the six monthly inspections, it is suggested that additional inspections be carried out after large storm events. These large events have a greater probability of mobilising litter and debris within the network which could negatively affect the performance of the network.

Porous / Permeable Surfaces

TABLE 20.15 Operation and maintenance requirements for pervious pavements

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment
Occasional maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than spraying	As required – once per year or less frequently used pavements
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm 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	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	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 h after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

CIRIA C753: The SuDs manual, 2015. Also refer to manufacturer's specific guidance.

Geocellular / Modular Attenuation Storage Systems

Operation and maintenance requirements for attenuation storage tanks		
Maintenance schedule	Required action	Typical frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from pre-treatment structures and/or internal forebays	Annually, or as required
Remedial actions	Repair/rehabilitate inlets, outlet, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

CIRIA C753: The SuDs manual, 2015. Also refer to manufacturer's specific guidance.

Catchpit Chambers

Initially catchpit chamber sump units should be visually inspected after rainfall events and the amount of deposition measured to give the maintenance team an indication of the expected rate of sediment deposition. Following this initial period it is recommended that sump units are inspected every six months to verify the appropriate level of maintenance.

Silt should be removed when 75% of the sump capacity is reached and in most situations this will be required annually.

General Maintenance Considerations

All maintenance works should be undertaken by a competent professional to best practice methods.

Most of the SUDS features are shallow and located at surface. As such, these can be maintained easily from ground level with no specific method statements beyond those required for the use of any of the maintenance equipment.

Works to sub-surface piped drainage networks will often involve confined spaces, which can contain noxious gases. Works should be undertaken from ground level wherever possible, and any works requiring entering a confined space should be undertaken by suitably trained and certified individuals.

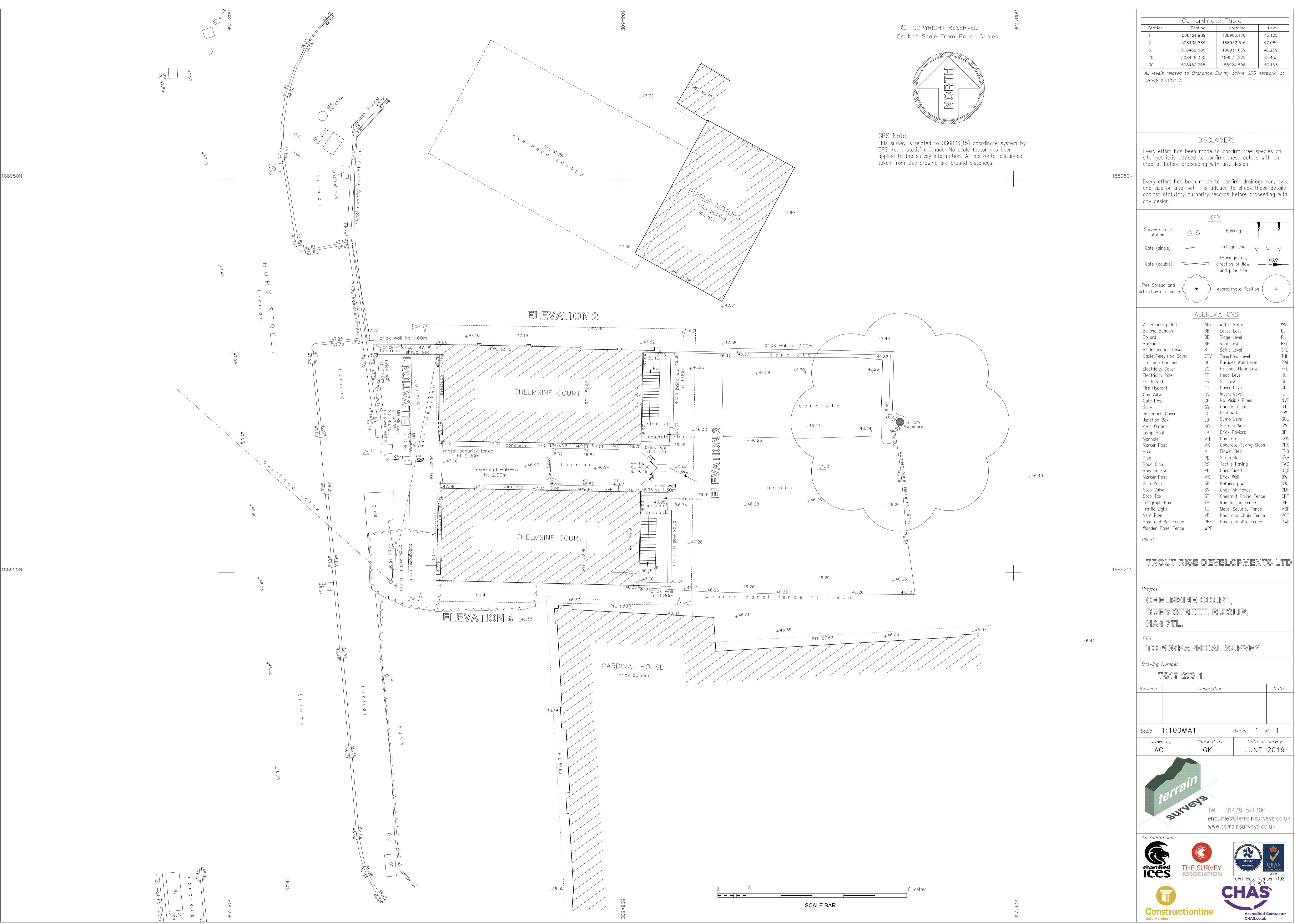
This report has been produced exclusively for the site owner. It may be shown to other professional advisors, but any liability to third parties is expressly excluded.

Report Prepared By

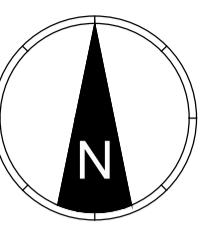


GARY REDMAN
BEng (Hons) CEng MICE FIStructE
For and on behalf of PEP Civil & Structures Ltd

APPENDIX A



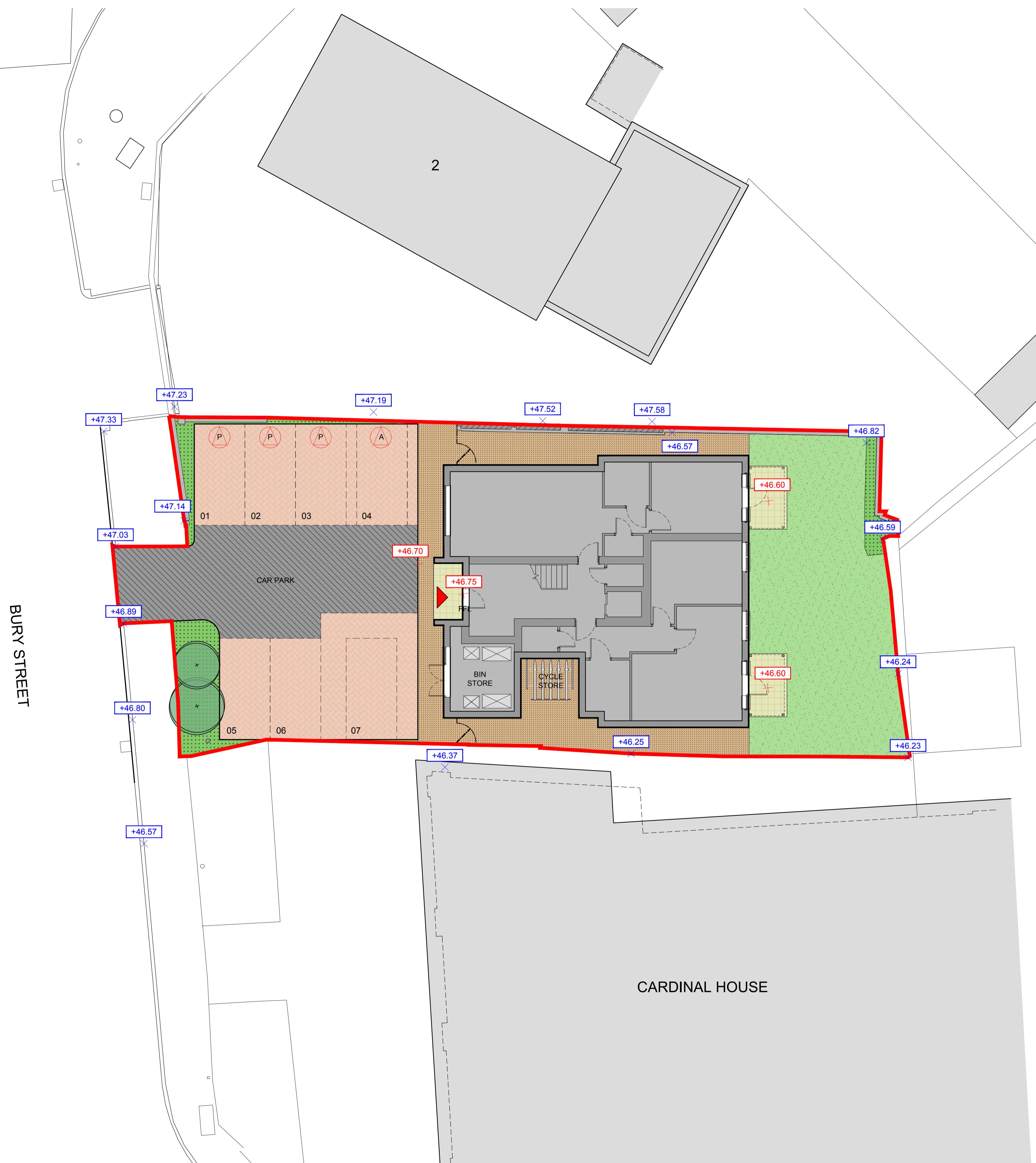
APPENDIX B



1 2 3 4 5M

NOTE:
 1. ORIGINAL SURVEY INFORMATION TAKEN FROM TOPOGRAPHICAL SURVEY DRAWING T819273 PRODUCED BY TERRAIN SURVEYS. REFER TO ORIGINAL SURVEY INFORMATION FOR DETAILED LEVEL INFORMATION. SITE CO-ORDINATES ARE TO OS.

KEY:	
	SITE BOUNDARY AREA = 0.15 ACRES
	EXISTING BUILDINGS
	PROPOSED TREE CANOPY
	ROAD/HARDSTANDING
	PARKING SPACES
	FOOTPATH
	PATH
	PLANTING
	LAWN
	FENCE
	EXISTING LEVELS
	PROPOSED LEVELS
	PASSIVE VEHICLE CHARGING POINTS
	ACTIVE VEHICLE CHARGING POINTS

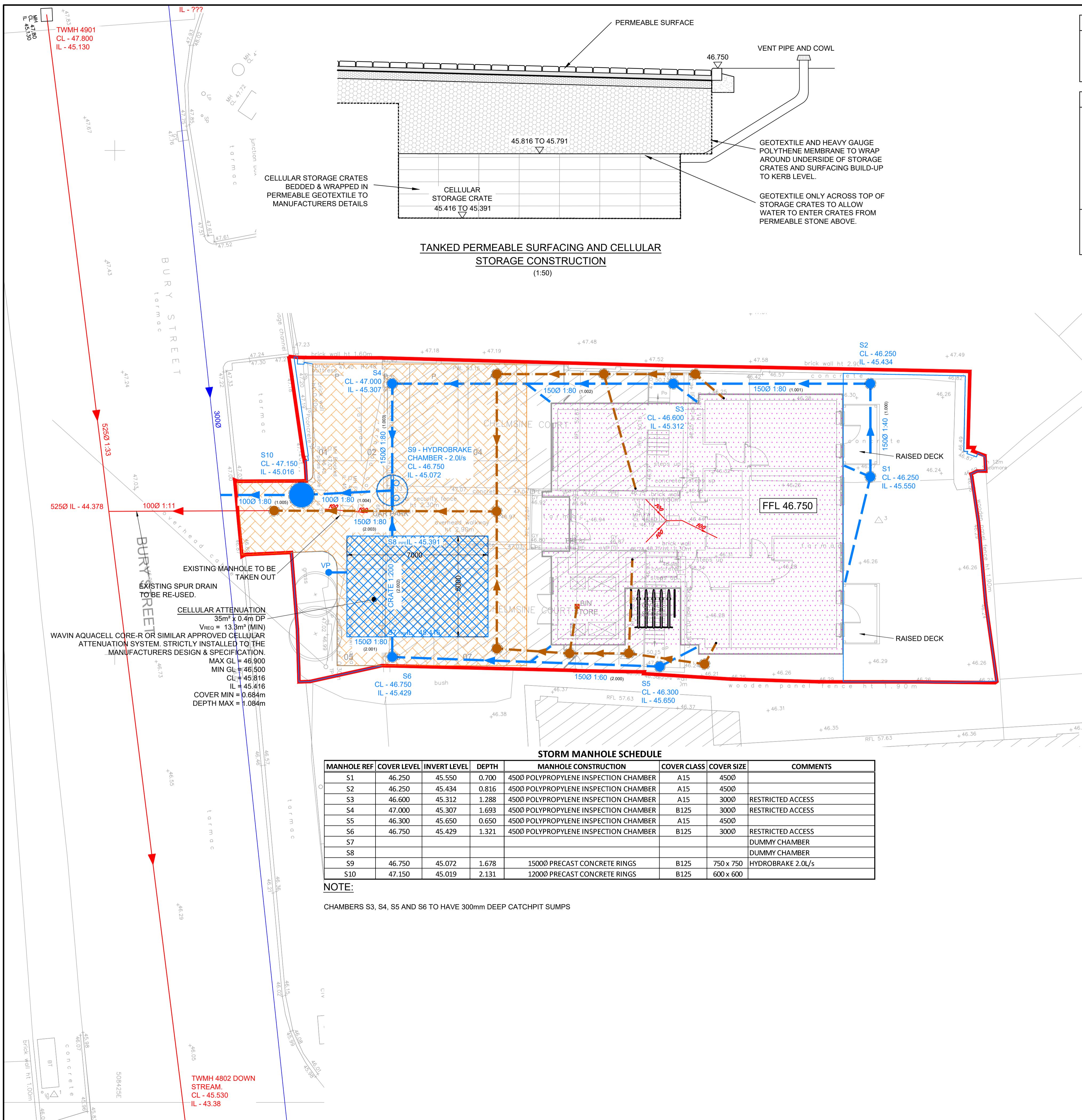


PROPOSED SITE PLAN - COLOURED

PL1	PLANNING ISSUE	GH	21.02.2020
REV DESCRIPTION			
PROJECT WORK STAGE			
PLANNING			
CLIENT			
TROURISE DEVELOPMENTS LTD.			
PROJECT			
CHELMSINE COURT BURY STREET, RUISLIP HA4 7TL			
DRWG TITLE			
PROPOSED SITE PLAN COLOURED			
PROJECT	ORIGINATOR	ZONE	LEVEL
1232PL	RDT	ZZ	XX
DR	A		1100
STATUS	SUITABILITY DESCRIPTION	-	
DRAWN BY	DATE	SCALE	CHECKED BY
DMY	JUNE 19	1:100	CC
RDT PROJECT REF.		PAPER SIZE	REVISION
1232		A1	PL1



APPENDIX C



STORM MANHOLE SCHEDULE							
MANHOLE REF	COVER LEVEL	INVERT LEVEL	DEPTH	MANHOLE CONSTRUCTION	COVER CLASS	COVER SIZE	COMMENTS
S1	46.250	45.550	0.700	450Ø POLYPROPYLENE INSPECTION CHAMBER	A15	450Ø	
S2	46.250	45.434	0.816	450Ø POLYPROPYLENE INSPECTION CHAMBER	A15	450Ø	
S3	46.600	45.312	1.288	450Ø POLYPROPYLENE INSPECTION CHAMBER	A15	300Ø	RESTRICTED ACCESS
S4	47.000	45.307	1.693	450Ø POLYPROPYLENE INSPECTION CHAMBER	B125	300Ø	RESTRICTED ACCESS
S5	46.300	45.650	0.650	450Ø POLYPROPYLENE INSPECTION CHAMBER	A15	450Ø	
S6	46.750	45.429	1.321	450Ø POLYPROPYLENE INSPECTION CHAMBER	B125	300Ø	RESTRICTED ACCESS
S7							DUMMY CHAMBER
S8							DUMMY CHAMBER
S9	46.750	45.072	1.678	1500Ø PRECAST CONCRETE RINGS	B125	750 x 750	HYDROBRAKE 2.0L/s
S10	47.150	45.019	2.131	1200Ø PRECAST CONCRETE RINGS	B125	600 x 600	

NOTE

CHAMBERS S3, S4, S5 AND S6 TO HAVE 300mm DEEP CATCHPIT SUMPS

DESIGN ASSUMPTIONS AND LOADINGS

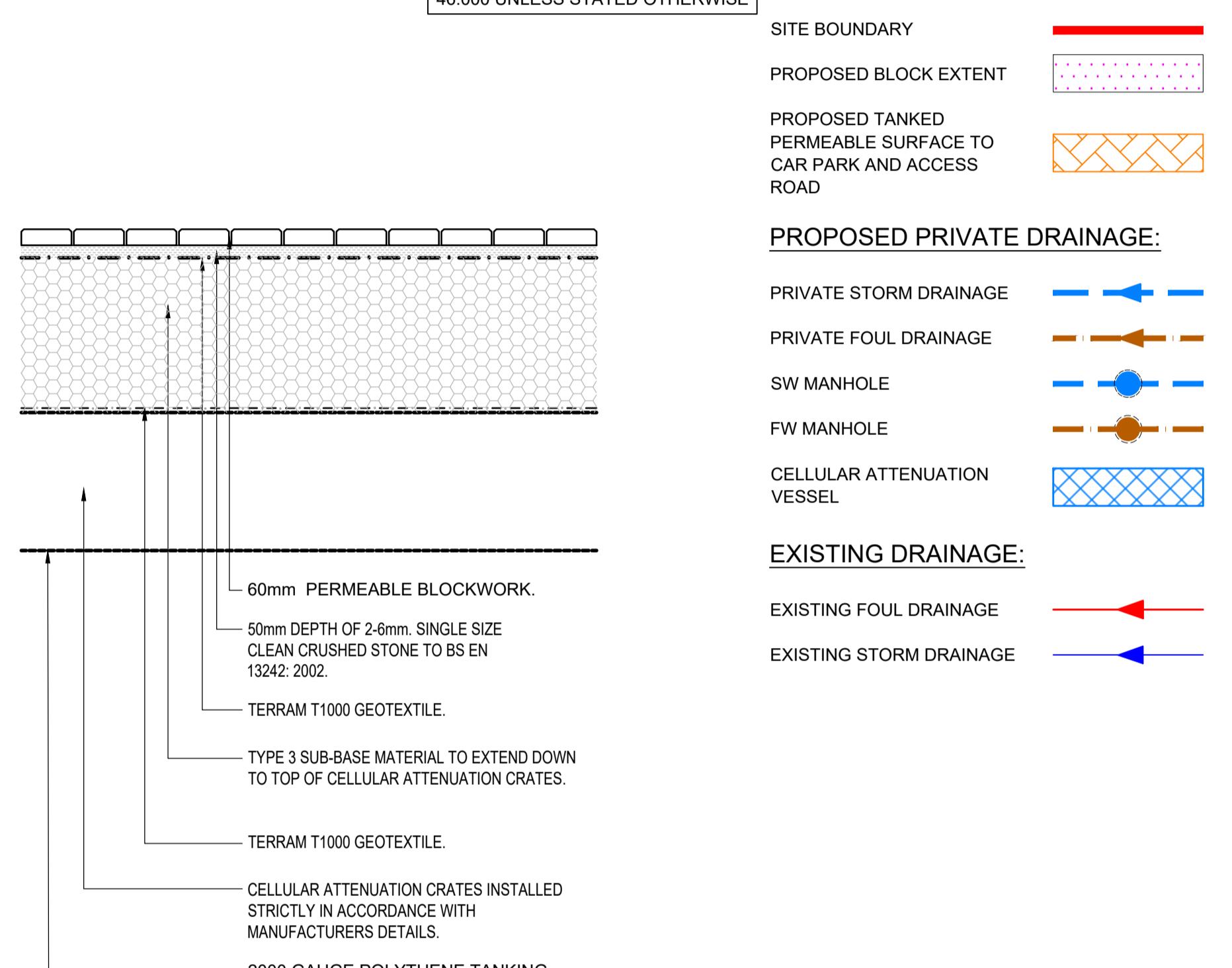
CDM REGULATIONS 2015: DESIGNERS NOTES ON SIGNIFICANT RESIDUAL RISKS

THESE NOTES RELATE SOLELY TO INFORMATION SHOWN ON THIS DRAWING. ONLY SIGNIFICANT RISKS WHICH ARE CONSIDERED TO BE UNUSUAL, OR UNLIKELY TO BE OBVIOUS TO A COMPETENT CONTRACTOR OR OTHER DESIGNER WILL BE HIGHLIGHTED. THIS INFORMATION MAY BE SUBJECT TO REVISION AS THE DESIGN DEVELOPS.

GENERAL NOTES

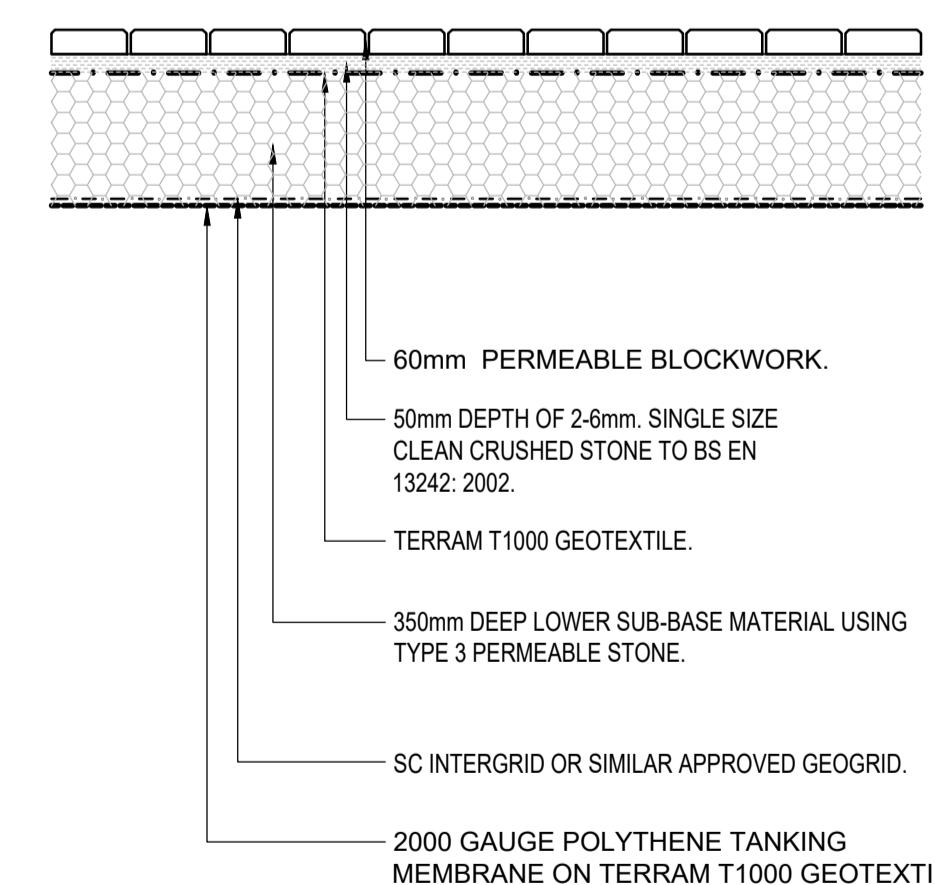
1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT DETAILS, DRAWINGS, SPECIFICATIONS, REPORTS AND OTHER DOCUMENTS ISSUED BY THE ARCHITECT AND OTHER DESIGN TEAM MEMBERS.
2. REPORT ANY DISCREPANCIES IMMEDIATELY AND AWAIT FURTHER INSTRUCTIONS BEFORE PROCEEDING WITH ANY ASSOCIATED CONSTRUCTION WORKS. IF A DETAIL APPEARS UNCLEAR, OR THERE IS ANY DOUBT, THEN CONTACT PEP FOR FURTHER ADVICE.
3. CONTRACTORS ARE NOT TO WORK TO THIS DRAWING UNLESS IT IS AT 'FOR CONSTRUCTION' STATUS, AS THE DESIGN MAY NOT HAVE BEEN FINALISED.
4. ANY DIGITAL SCALING / TAKE OFF FROM THIS DRAWING IS DONE SO AT THE CONTRACTORS RISK, ONLY FIGURED DIMENSIONS SHOULD BE USED.

GENERAL KEY:



PERMEABLE BLOCKWORK CONSTRUCTION OVER CELLULAR CRATES

SCALE 1:20



BY	CHK	AMENDMENTS	DATE														
 <p>PEP House, Stoney Lane, Bourne End, Hemel Hempstead, Herts, HP1 2SB 01442 869400 www.pepgroup.co.uk design@pepgroup.co.uk</p>																	
<h2>TROTRISE DEVELOPMENTS LTD.</h2>																	
<p>JECT HELMSINE COURT URY STREET UISLIP</p>																	
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LE 100	ORIGINAL PAPER SIZE A1	FIRST ISSUE DATE 26.20.2020															
<table border="1"> <tr> <th>PROJECT</th> <th>ORIGINATOR</th> <th>VOLUME</th> <th>LEVEL</th> <th>TYPE</th> <th>ROLE</th> <th>NUMBER</th> </tr> <tr> <td>485720</td> <td>PEP</td> <td>- 00</td> <td>- XX</td> <td>- DR</td> <td>- C</td> <td>- 1200</td> </tr> </table>				PROJECT	ORIGINATOR	VOLUME	LEVEL	TYPE	ROLE	NUMBER	485720	PEP	- 00	- XX	- DR	- C	- 1200
PROJECT	ORIGINATOR	VOLUME	LEVEL	TYPE	ROLE	NUMBER											
485720	PEP	- 00	- XX	- DR	- C	- 1200											
TUS	SUITABILITY DESCRIPTION																
	INITIAL / WORK IN PROGRESS																
ISION 1	REVISION DESCRIPTION PRELIMINARY				PEP PROJECT REF. 485720												

APPENDIX D

Pep Civil & Structures Ltd		Page 1
PEP House Stoney Lane Bourne End Hemel Hempstead HP1 2SB	Chelmsine Court Bury Street, Ruislip SW Network 2.0 l/s Outfall FSR	
Date 26/02/2020 14:02 File 485720_ChelmsineCourt -...	Designed by G C Redman Checked by	
Micro Drainage	Network 2018.1	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	1	PIMP (%)	100
M5-60 (mm)	21.000	Add Flow / Climate Change (%)	0
Ratio R	0.431	Minimum Backdrop Height (m)	1.000
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	3.000
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	0.600
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Inverts

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	4.625	0.116	39.9	0.009	5.00	0.0	0.600	o	150	Pipe/Conduit	
S1.001	9.775	0.122	80.1	0.002	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.002	13.950	0.174	80.2	0.007	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.003	5.300	0.066	80.3	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S2.000	13.275	0.221	60.1	0.009	5.00	0.0	0.600	o	150	Pipe/Conduit	
S2.001	1.000	0.013	76.9	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S2.002	5.000	0.025	200.0	0.015	0.00	0.0	0.600	[]	-4	Pipe/Conduit	
S2.003	2.250	0.028	80.4	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.004	4.500	0.056	80.4	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S1.005	8.750	0.109	80.3	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	5.05	45.550	0.009	0.0	0.0	0.0	1.60	28.3	1.2
S1.001	50.00	5.19	45.434	0.011	0.0	0.0	0.0	1.12	19.9	1.5
S1.002	50.00	5.40	45.312	0.018	0.0	0.0	0.0	1.12	19.9	2.4
S1.003	50.00	5.48	45.138	0.018	0.0	0.0	0.0	1.12	19.8	2.4
S2.000	50.00	5.17	45.650	0.009	0.0	0.0	0.0	1.30	23.0	1.2
S2.001	50.00	5.18	45.429	0.009	0.0	0.0	0.0	1.15	20.3	1.2
S2.002	50.00	5.23	45.416	0.024	0.0	0.0	0.0	1.98	5274.2	3.2
S2.003	50.00	5.26	45.391	0.024	0.0	0.0	0.0	1.12	19.8	3.2
S1.004	50.00	5.57	45.072	0.042	0.0	0.0	0.0	0.86	6.7	5.7
S1.005	50.00	5.74	45.016	0.042	0.0	0.0	0.0	0.86	6.8	5.7

Pep Civil & Structures Ltd PEP House Stoney Lane Bourne End Hemel Hempstead HP1 2SB		Chelmsine Court Bury Street, Ruislip SW Network 2.0 l/s Outfall FSR	Page 2
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Micro Drainage Network 2018.1			

Conduit Sections for Storm

NOTE: Diameters less than 66 refer to section numbers of hydraulic conduits. These conduits are marked by the symbols:- [] box culvert, \/ open channel, oo dual pipe, ooo triple pipe, O egg.

Section numbers < 0 are taken from user conduit table

Section Number	Conduit Type	Major Dimn. (mm)	Minor Dimn. (mm)	Side Slope (Deg)	Corner Splay	4*Hyd Radius (mm)	XSect Area (m)	XSect Area (m ²)
-4	[]	6650	400	90.0			0.755	2.660

PEP House
Stoney Lane Bourne End
Hemel Hempstead HP1 2SB

Chelmsine Court
Bury Street, Ruislip
SW Network 2.0 l/s Outfall FSR

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Designed by G C Redman
Checked by



Micro Drainage Network 2018.1

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdr (mm)
S1	46.250	0.700	Open Manhole	450	S1.000	45.550	150				
S2	46.250	0.816	Open Manhole	450	S1.001	45.434	150	S1.000	45.434	150	
S3	46.600	1.288	Open Manhole	450	S1.002	45.312	150	S1.001	45.312	150	
S4	47.000	1.862	Open Manhole	450	S1.003	45.138	150	S1.002	45.138	150	
S5	46.350	0.700	Open Manhole	450	S2.000	45.650	150				
S6	46.750	1.321	Open Manhole	450	S2.001	45.429	150	S2.000	45.429	150	
S7	46.750	1.334	Open Manhole	100	S2.002	45.416	-4	S2.001	45.416	150	
S8	46.750	1.359	Open Manhole	100	S2.003	45.391	150	S2.002	45.391	-4	
S9	46.750	1.678	Open Manhole	1500	S1.004	45.072	100	S1.003	45.072	150	
S10	47.150	2.134	Open Manhole	1200	S1.005	45.016	100	S1.004	45.016	100	
STW Sewer	47.050	2.143	Open Manhole	100		OUTFALL		S1.005	44.907	100	

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PEP House Stoney Lane Bourne End Hemel Hempstead HP1 2SB			Chelmsine Court Bury Street, Ruislip SW Network 2.0 l/s Outfall FSR				
Date 26/02/2020 14:02 File 485720_ChelmsineCourt -...			Designed by G C Redman Checked by				
Micro Drainage				Network 2018.1			



PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., (mm)	L*W
S1.000	o	150	S1	46.250	45.550	0.550	Open Manhole	450	
S1.001	o	150	S2	46.250	45.434	0.666	Open Manhole	450	
S1.002	o	150	S3	46.600	45.312	1.138	Open Manhole	450	
S1.003	o	150	S4	47.000	45.138	1.712	Open Manhole	450	
S2.000	o	150	S5	46.350	45.650	0.550	Open Manhole	450	
S2.001	o	150	S6	46.750	45.429	1.171	Open Manhole	450	
S2.002	[]	-4	S7	46.750	45.416	0.934	Open Manhole	100	
S2.003	o	150	S8	46.750	45.391	1.209	Open Manhole	100	
S1.004	o	100	S9	46.750	45.072	1.578	Open Manhole	1500	
S1.005	o	100	S10	47.150	45.016	2.034	Open Manhole	1200	

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., (mm)	L*W
S1.000	4.625	39.9	S2	46.250	45.434	0.666	Open Manhole	450	
S1.001	9.775	80.1	S3	46.600	45.312	1.138	Open Manhole	450	
S1.002	13.950	80.2	S4	47.000	45.138	1.712	Open Manhole	450	
S1.003	5.300	80.3	S9	46.750	45.072	1.528	Open Manhole	1500	
S2.000	13.275	60.1	S6	46.750	45.429	1.171	Open Manhole	450	
S2.001	1.000	76.9	S7	46.750	45.416	1.184	Open Manhole	100	
S2.002	5.000	200.0	S8	46.750	45.391	0.959	Open Manhole	100	
S2.003	2.250	80.4	S9	46.750	45.363	1.237	Open Manhole	1500	
S1.004	4.500	80.4	S10	47.150	45.016	2.034	Open Manhole	1200	
S1.005	8.750	80.3	STW Sewer	47.050	44.907	2.043	Open Manhole	100	

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D, L (mm)	W (mm)
S1.005	STW Sewer	47.050	44.907	0.000	100	0

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Simulation Criteria for Storm

Volumetric Runoff Coeff 0.750 Additional Flow - % of Total Flow 0.000
 Areal Reduction Factor 1.000 MADD Factor * 10m³/ha Storage 2.000
 Hot Start (mins) 0 Inlet Coeffiecient 0.800
 Hot Start Level (mm) 0 Flow per Person per Day (l/per/day) 0.000
 Manhole Headloss Coeff (Global) 0.500 Run Time (mins) 60
 Foul Sewage per hectare (l/s) 0.000 Output Interval (mins) 1

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

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	1
FEH Rainfall Version	1999
Site Location GB 508500 188850 TQ 08500 88850	
C (1km)	-0.026
D1 (1km)	0.298
D2 (1km)	0.322
D3 (1km)	0.235
E (1km)	0.308
F (1km)	2.531
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

Pep Civil & Structures Ltd PEP House Stoney Lane Bourne End Hemel Hempstead HP1 2SB		Chelmsine Court Bury Street, Ruislip SW Network 2.0 l/s Outfall FSR	Page 6
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Online Controls for Storm

Hydro-Brake® Optimum Manhole: S9, DS/PN: S1.004, Volume (m³): 3.1

Unit Reference	MD-SHE-0065-2000-1150-2000
Design Head (m)	1.150
Design Flow (l/s)	2.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	65
Invert Level (m)	45.072
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.150	2.0
Flush-Flo™	0.284	1.8
Kick-Flo®	0.579	1.5
Mean Flow over Head Range	-	1.7

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

Depth (m)	Flow (l/s)						
0.100	1.5	1.200	2.0	3.000	3.1	7.000	4.6
0.200	1.8	1.400	2.2	3.500	3.3	7.500	4.8
0.300	1.8	1.600	2.3	4.000	3.5	8.000	4.9
0.400	1.8	1.800	2.4	4.500	3.7	8.500	5.0
0.500	1.7	2.000	2.6	5.000	3.9	9.000	5.2
0.600	1.5	2.200	2.7	5.500	4.1	9.500	5.3
0.800	1.7	2.400	2.8	6.000	4.3		
1.000	1.9	2.600	2.9	6.500	4.4		

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

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.431
 Region England and Wales Cv (Summer) 0.750
 M5-60 (mm) 21.000 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
 Analysis Timestep Fine Inertia Status OFF
 DTS Status ON

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 0, 40

US/MH	Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Water Level
PN	Name	Storm	Period	Change	Surcharge	Flood	Overflow Act. (m)
S1.000	S1	30 Winter	100	+40%	100/15	Summer	45.802
S1.001	S2	30 Winter	100	+40%	30/15	Summer	45.801
S1.002	S3	30 Winter	100	+40%	30/15	Summer	45.798
S1.003	S4	30 Winter	100	+40%	1/15	Summer	45.797
S2.000	S5	30 Winter	100	+40%			45.794
S2.001	S6	30 Winter	100	+40%	30/30	Winter	45.792
S2.002	S7	30 Winter	100	+40%			45.792
S2.003	S8	30 Winter	100	+40%	30/15	Summer	45.792
S1.004	S9	30 Winter	100	+40%	1/15	Summer	45.796
S1.005	S10	15 Winter	1	+0%			45.053

US/MH	Surcharged Flooded				Pipe			Level
	Depth	Volume	Flow / Overflow	Cap.	Flow (l/s)	Flow (l/s)	Status	
PN	Name	(m)	(m ³)					
S1.000	S1	0.102	0.000	0.21		4.4	SURCHARGED	
S1.001	S2	0.217	0.000	0.30		5.3	SURCHARGED	
S1.002	S3	0.336	0.000	0.48		8.8	SURCHARGED	
S1.003	S4	0.509	0.000	0.54		8.7	SURCHARGED	
S2.000	S5	-0.006	0.000	0.22		4.7	OK	
S2.001	S6	0.213	0.000	0.37		4.1	SURCHARGED	

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

PN	US/MH Name	Surcharged Flooded			Pipe		Status	Level Exceeded
		Depth (m)	Volume (m ³)	Flow / Overflow Cap. (l/s)	Flow (l/s)			
S2.002	S7	-0.024	0.000	0.01	11.8		OK	
S2.003	S8	0.251	0.000	0.26	2.9	SURCHARGED		
S1.004	S9	0.624	0.000	0.31	1.8	SURCHARGED		
S1.005	S10	-0.063	0.000	0.29	1.8		OK	

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	1
FEH Rainfall Version	1999
Site Location	GB 508500 188850 TQ 08500 88850
C (1km)	-0.026
D1 (1km)	0.298
D2 (1km)	0.322
D3 (1km)	0.235
E (1km)	0.308
F (1km)	2.531
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	1.000
Maximum Backdrop Height (m)	3.000
Min Design Depth for Optimisation (m)	0.600
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Inverts

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	4.625	0.116	39.9	0.009	5.00	0.0	0.600	o	150	Pipe/Conduit	
S1.001	9.775	0.122	80.1	0.002	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.002	13.950	0.174	80.2	0.007	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.003	5.300	0.066	80.3	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S2.000	13.275	0.221	60.1	0.009	5.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul Flow (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	5.05	45.550	0.009	0.0	0.0	0.0	1.60	28.3	1.2
S1.001	50.00	5.19	45.434	0.011	0.0	0.0	0.0	1.12	19.9	1.5
S1.002	50.00	5.40	45.312	0.018	0.0	0.0	0.0	1.12	19.9	2.4
S1.003	50.00	5.48	45.138	0.018	0.0	0.0	0.0	1.12	19.8	2.4
S2.000	50.00	5.17	45.650	0.009	0.0	0.0	0.0	1.30	23.0	1.2

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Network Design Table for Storm

PN	Length (m)	Fall (1:X)	Slope	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S2.001	1.000	0.013	76.9	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S2.002	5.000	0.025	200.0	0.015	0.00	0.0	0.600	[]	-4	Pipe/Conduit	
S2.003	2.250	0.028	80.4	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.004	4.500	0.056	80.4	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S1.005	8.750	0.109	80.3	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul Flow (l/s)	Add (l/s)	Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S2.001	50.00	5.18	45.429	0.009	0.0	0.0	0.0	1.15	20.3	1.2	
S2.002	50.00	5.23	45.416	0.024	0.0	0.0	0.0	1.98	5274.2	3.2	
S2.003	50.00	5.26	45.391	0.024	0.0	0.0	0.0	1.12	19.8	3.2	
S1.004	50.00	5.57	45.072	0.042	0.0	0.0	0.0	0.86	6.7	5.7	
S1.005	50.00	5.74	45.016	0.042	0.0	0.0	0.0	0.86	6.8	5.7	

Conduit Sections for Storm

NOTE: Diameters less than 66 refer to section numbers of hydraulic conduits. These conduits are marked by the symbols:- [] box culvert, \/ open channel, oo dual pipe, ooo triple pipe, O egg.

Section numbers < 0 are taken from user conduit table

Section Number	Conduit Type	Major Dimn.	Minor Dimn.	Side Slope	Corner Splay	4*Hyd Radius	XSect Area (m ²)
-4	[]	6650	400	90.0		0.755	2.660

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdr (mm)
S1	46.250	0.700	Open Manhole	450	S1.000	45.550	150				
S2	46.250	0.816	Open Manhole	450	S1.001	45.434	150	S1.000	45.434	150	
S3	46.600	1.288	Open Manhole	450	S1.002	45.312	150	S1.001	45.312	150	
S4	47.000	1.862	Open Manhole	450	S1.003	45.138	150	S1.002	45.138	150	
S5	46.350	0.700	Open Manhole	450	S2.000	45.650	150				
S6	46.750	1.321	Open Manhole	450	S2.001	45.429	150	S2.000	45.429	150	
S7	46.750	1.334	Open Manhole	100	S2.002	45.416	-4	S2.001	45.416	150	
S8	46.750	1.359	Open Manhole	100	S2.003	45.391	150	S2.002	45.391	-4	
S9	46.750	1.678	Open Manhole	1500	S1.004	45.072	100	S1.003	45.072	150	
S10	47.150	2.134	Open Manhole	1200	S1.005	45.016	100	S1.004	45.016	100	
STW Sewer	47.050	2.143	Open Manhole	100		OUTFALL		S1.005	44.907	100	

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., (mm)	L*W
S1.000	o	150	S1	46.250	45.550	0.550	Open Manhole	450	
S1.001	o	150	S2	46.250	45.434	0.666	Open Manhole	450	
S1.002	o	150	S3	46.600	45.312	1.138	Open Manhole	450	
S1.003	o	150	S4	47.000	45.138	1.712	Open Manhole	450	
S2.000	o	150	S5	46.350	45.650	0.550	Open Manhole	450	
S2.001	o	150	S6	46.750	45.429	1.171	Open Manhole	450	
S2.002	[]	-4	S7	46.750	45.416	0.934	Open Manhole	100	
S2.003	o	150	S8	46.750	45.391	1.209	Open Manhole	100	
S1.004	o	100	S9	46.750	45.072	1.578	Open Manhole	1500	
S1.005	o	100	S10	47.150	45.016	2.034	Open Manhole	1200	

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., (mm)	L*W
S1.000	4.625	39.9	S2	46.250	45.434	0.666	Open Manhole	450	
S1.001	9.775	80.1	S3	46.600	45.312	1.138	Open Manhole	450	
S1.002	13.950	80.2	S4	47.000	45.138	1.712	Open Manhole	450	
S1.003	5.300	80.3	S9	46.750	45.072	1.528	Open Manhole	1500	
S2.000	13.275	60.1	S6	46.750	45.429	1.171	Open Manhole	450	
S2.001	1.000	76.9	S7	46.750	45.416	1.184	Open Manhole	100	
S2.002	5.000	200.0	S8	46.750	45.391	0.959	Open Manhole	100	
S2.003	2.250	80.4	S9	46.750	45.363	1.237	Open Manhole	1500	
S1.004	4.500	80.4	S10	47.150	45.016	2.034	Open Manhole	1200	
S1.005	8.750	80.3	STW Sewer	47.050	44.907	2.043	Open Manhole	100	

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D, L (mm)	W (mm)
S1.005	STW Sewer	47.050	44.907	0.000	100	0

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Simulation Criteria for Storm

Volumetric Runoff Coeff 0.750 Additional Flow - % of Total Flow 0.000
 Areal Reduction Factor 1.000 MADD Factor * 10m³/ha Storage 2.000
 Hot Start (mins) 0 Inlet Coeffiecient 0.800
 Hot Start Level (mm) 0 Flow per Person per Day (l/per/day) 0.000
 Manhole Headloss Coeff (Global) 0.500 Run Time (mins) 60
 Foul Sewage per hectare (l/s) 0.000 Output Interval (mins) 1

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

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	1
FEH Rainfall Version	1999
Site Location GB 508500 188850 TQ 08500 88850	
C (1km)	-0.026
D1 (1km)	0.298
D2 (1km)	0.322
D3 (1km)	0.235
E (1km)	0.308
F (1km)	2.531
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: S9, DS/PN: S1.004, Volume (m³): 3.1

Unit Reference	MD-SHE-0065-2000-1150-2000
Design Head (m)	1.150
Design Flow (l/s)	2.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	65
Invert Level (m)	45.072
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.150	2.0
Flush-Flo™	0.284	1.8
Kick-Flo®	0.579	1.5
Mean Flow over Head Range	-	1.7

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

Depth (m)	Flow (l/s)						
0.100	1.5	1.200	2.0	3.000	3.1	7.000	4.6
0.200	1.8	1.400	2.2	3.500	3.3	7.500	4.8
0.300	1.8	1.600	2.3	4.000	3.5	8.000	4.9
0.400	1.8	1.800	2.4	4.500	3.7	8.500	5.0
0.500	1.7	2.000	2.6	5.000	3.9	9.000	5.2
0.600	1.5	2.200	2.7	5.500	4.1	9.500	5.3
0.800	1.7	2.400	2.8	6.000	4.3		
1.000	1.9	2.600	2.9	6.500	4.4		

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

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	1999
Site Location	GB 508500 188850 TQ 08500 88850
C (1km)	-0.026
D1 (1km)	0.298
D2 (1km)	0.322
D3 (1km)	0.235
E (1km)	0.308
F (1km)	2.531
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
 Analysis Timestep Fine Inertia Status OFF
 DTS Status ON

Profile(s)	Summer and Winter
Duration(s) (mins)	60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

US/MH PN	US/MH Name	Return Storm	Climate Period	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S1	60	Winter	100 +40%	100/60 Summer	100/60	Winter
S1.001	S2	60	Winter	100 +40%	30/60	Summer	
S1.002	S3	60	Winter	100 +40%	30/60	Summer	
S1.003	S4	60	Winter	100 +40%	1/60	Summer	
S2.000	S5	60	Winter	100 +40%	100/60	Summer	
S2.001	S6	60	Winter	100 +40%	30/60	Summer	
S2.002	S7	60	Winter	100 +40%	100/60	Summer	
S2.003	S8	60	Winter	100 +40%	30/60	Summer	
S1.004	S9	60	Winter	100 +40%	1/60	Summer	
S1.005	S10	60	Winter	100 +40%			

Pep Civil & Structures Ltd		Page 8
PEP House Stoney Lane Bourne End Hemel Hempstead HP1 2SB	Chelmsine Court Bury Street, Ruislip SW Network 2.0 l/s Outfall FEH	
Date 26/02/2020 14:03 File 485720_ChelmsineCourt -...	Designed by G C Redman Checked by	
Micro Drainage	Network 2018.1	



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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Pipe			Level Exceeded
					Flow / Overflow Cap.	Flow (l/s)	Status	
S1.000	S1	46.250	0.550	0.007	0.16	3.5	FLOOD	1
S1.001	S2	46.249	0.665	0.000	0.24	4.2	FLOOD RISK	
S1.002	S3	46.267	0.805	0.000	0.38	6.9	SURCHARGED	
S1.003	S4	46.283	0.995	0.000	0.43	6.9	SURCHARGED	
S2.000	S5	46.304	0.504	0.000	0.17	3.7	FLOOD RISK	
S2.001	S6	46.298	0.719	0.000	0.30	3.2	SURCHARGED	
S2.002	S7	46.297	0.481	0.000	0.00	9.4	SURCHARGED	
S2.003	S8	46.297	0.756	0.000	0.32	3.5	SURCHARGED	
S1.004	S9	46.293	1.121	0.000	0.35	2.0	SURCHARGED	
S1.005	S10	45.055	-0.061	0.000	0.33	2.0	OK	

APPENDIX E



Mr Gary Redman
PEP Civil and Structures Limited
PEP House, Stoney Lane
Bourne End
Hemel Hempstead
HP1 2SB

**Wastewater
pre-planning**



Our ref DS6069675

31 January 2020

Pre-planning enquiry: Confirmation of sufficient capacity

Dear Mr Redman,

Thank you for providing information on your development:

Chelmsine Court, Bury Street, Ruislip, HA4 7TL.

Existing: Commercial premises (175m²) and flats (x2).

Proposed: Development of 8 flats. Foul water discharging by gravity to the foul water sewer in Bury Street. Surface water discharging by gravity attenuated to 2l/s to the surface water sewer in Bury Street.

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

Foul Water

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

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

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

Surface Water

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 not be 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 Soakaways; 2nd Watercourses; 3rd Sewers.

Only when it can be proven that soakage into the ground or a connection into an adjacent watercourse is not possible would we consider a restricted discharge into the public surface water sewer network.

If the peak surface water run-off discharge is then restricted to Greenfield run-off rates/a maximum of 2l/s as your drainage strategy indicates, then we would have no objections to the proposals.

Thames Water Planning team would ask to see why it is not practicable on the site to restrict to Greenfield run-off rates if they are consulted as part of any planning application.

In considering your surface water needs, we support the use of sustainable drainage on development sites. You'll need to show the local authority and/or lead local flood authority how you've taken into account the surface water hierarchy that we've included.

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

What happens next?

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

If you've any further questions, please contact me on 0203 577 9811

Yours sincerely

Siva Rajaratnam – Adoptions Engineer

Thames Water

Asset location search



Property Searches

PEP Civil and Structures Limited
PEP House Bourne End, PEP House

HEMEL HEMPSTEAD
HP1 2SB

Search address supplied Chelmsine Court
Bury Street
Ruislip
HA4 7TL

Your reference 485720_ChelmsineCourt

Our reference ALS/ALS Standard/2020_4143321

Search date 27 January 2020

Keeping you up-to-date

Knowledge of features below the surface is essential for every development

The benefits of this knowledge not only include ensuring due diligence and avoiding risk, but also being able to ascertain the feasibility of any development.

Did you know that Thames Water Property Searches can also provide a variety of utility searches including a more comprehensive view of utility providers' assets (across up to 35-45 different providers), as well as more focused searches relating to specific major utility companies such as National Grid (gas and electric).

Contact us to find out more.



Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW
DX 151280 Slough 13



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



0845 070 9148



Asset location search



Property Searches

Search address supplied: Chelmsine Court, Bury Street, Ruislip, HA4 7TL

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 search provides 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



Property Searches

Waste Water Services

Please provide a copy extract from the public sewer map.

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

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

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

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

For your guidance:

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

Clean Water Services

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

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

Affinity Water Ltd
Tamblin Way
Hatfield
AL10 9EZ
Tel: 0345 3572401

Asset location search



Property Searches

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



Property Searches

Further contacts:

Waste Water queries

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

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

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

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

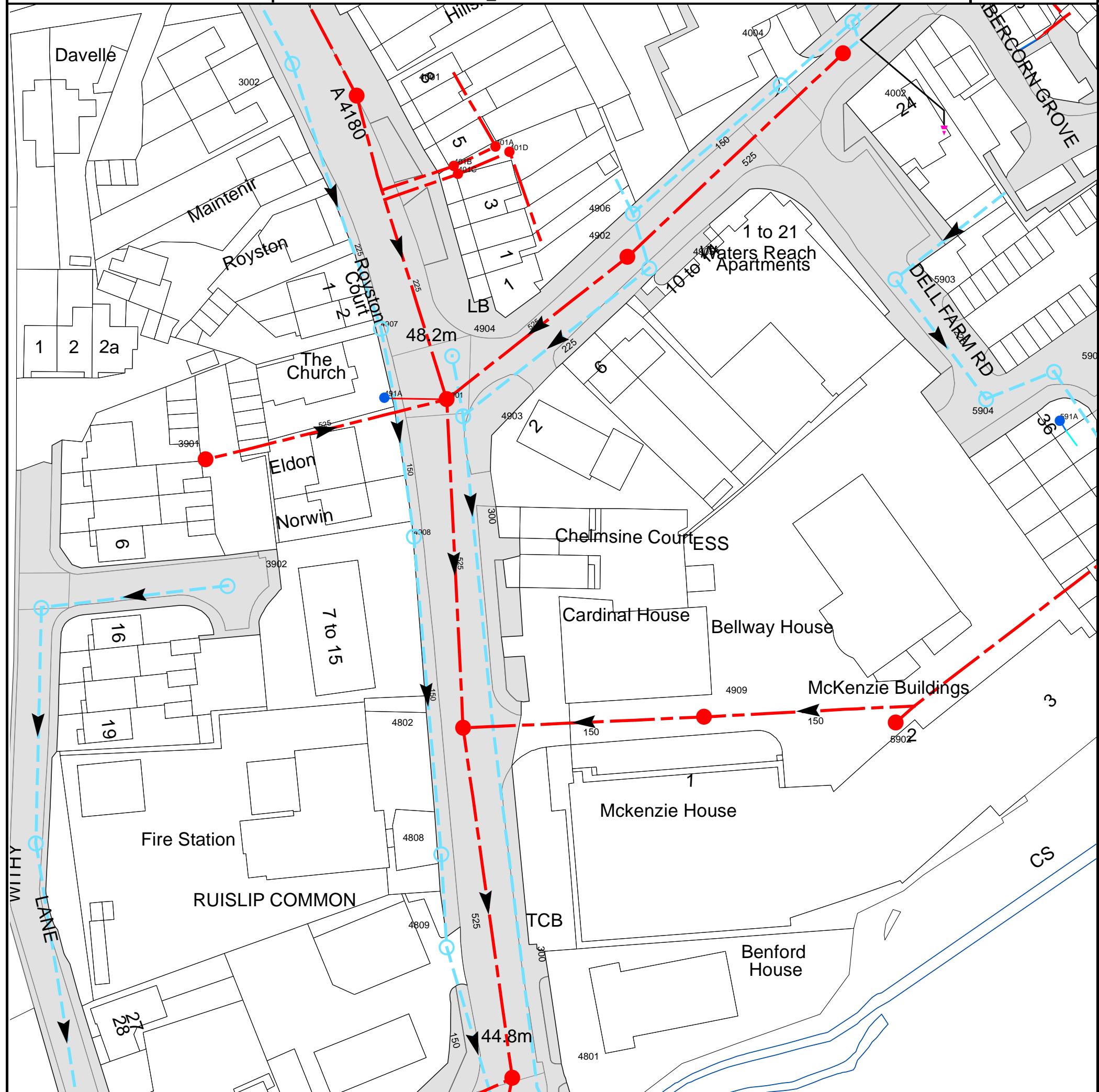
Clean Water queries

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

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

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

Asset Location Search Sewer Map - ALS/ALS Standard/2020_4143321



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
3002	n/a	n/a
4002	n/a	n/a
4003	n/a	n/a
4909	45.93	43.81
3903	n/a	n/a
3902	n/a	n/a
4908	46.82	45.7
3901	n/a	n/a
591A	n/a	n/a
4903	n/a	n/a
4901	47.83	45.13
5904	47.16	46.37
491A	n/a	n/a
5905	47.21	46.3
4904	n/a	n/a
4907	n/a	n/a
5903	48.6	47.22
4905	48.58	47.61
4902	48.55	44.82
4906	48.14	47.21
401C	n/a	n/a
401B	n/a	n/a
401D	n/a	n/a
401A	n/a	n/a
4001	n/a	n/a
4004	n/a	n/a
4801	45.2	42.52
4809	44.97	44.07
4808	45.12	44.34
3803	n/a	n/a
4802	45.53	43.38
5902	n/a	n/a

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



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
	Vacuum

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.

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
	<1 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		Gully
	Culverted Watercourse		Proposed
	Abandoned Sewer		

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 her 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 / OSS	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.

Terms and Conditions

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 the Ombudsman finds that you have suffered actual loss and/or aggravation, distress or inconvenience 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.

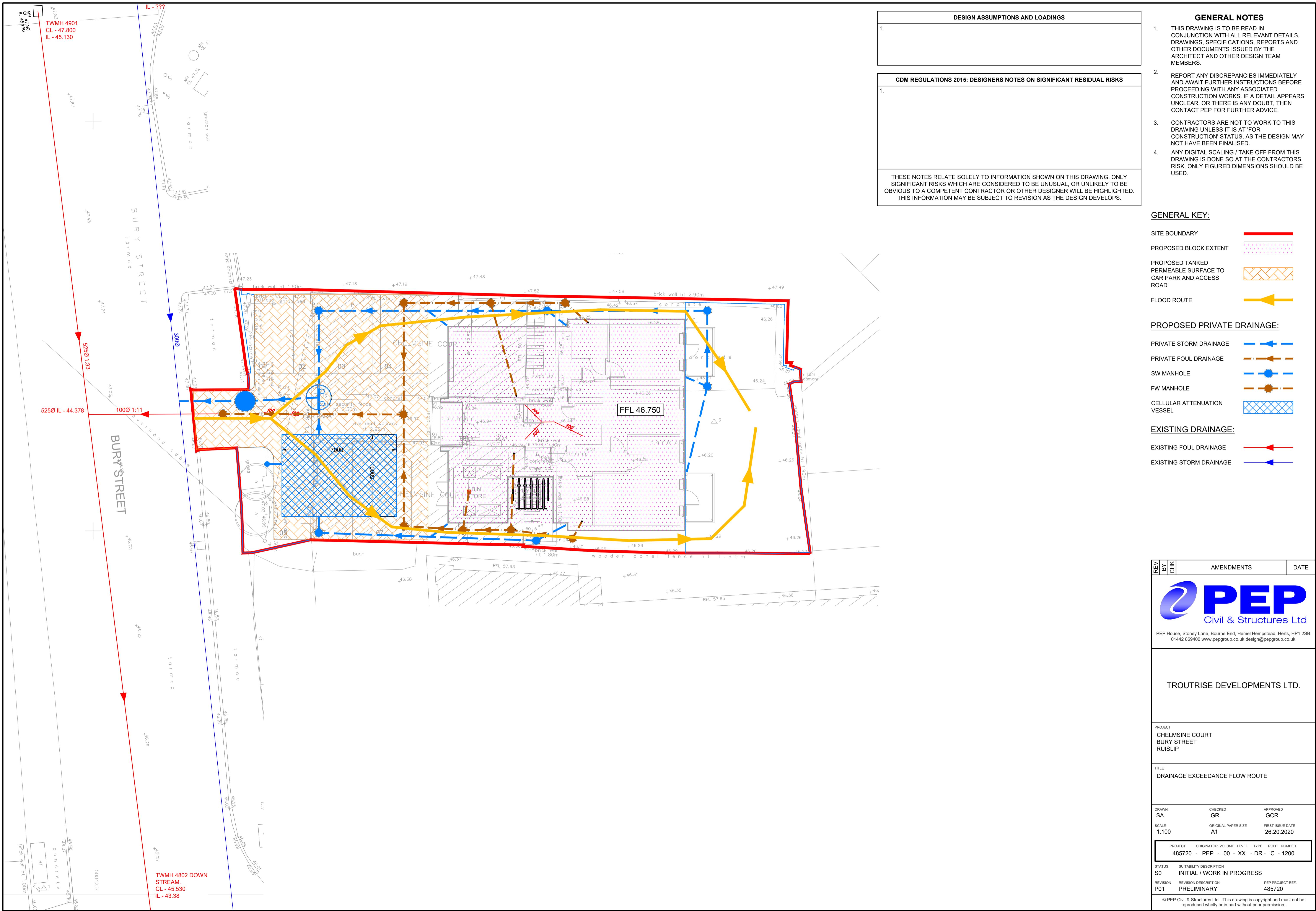
TPOs Contact Details

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

APPENDIX F



APPENDIX G

Sewer Flooding

History Enquiry



Property
Searches

PEP Civil and Structures Limited

Search address supplied

Chelmsine Court
Bury Street
Ruislip
HA4 7TL

Your reference

485720_ChelmsineCourt

Our reference

SFH/SFH Standard/2020_4143322

Received date

27 January 2020

Search date

27 January 2020



Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW
DX 151280 Slough 13



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



0845 070 9148

Sewer Flooding

History Enquiry



Property
Searches

Search address supplied: Chelmsine Court, Bury Street, Ruislip, HA4 7TL

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



Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW
DX 151280 Slough 13



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



0845 070 9148

Sewer Flooding

History Enquiry



Property
Searches

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



Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW
DX 151280 Slough 13



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



0845 070 9148

APPENDIX H

Flood map for planning

Your reference
Chelmsine

Location (easting/northing)
508451/188931

Created
26 Feb 2020 14:27

Your selected location is in flood zone 1, an area with a low probability of flooding.

This means:

- you don't need to do a flood risk assessment if your development is smaller than 1 hectare and not affected by other sources of flooding
- you may need to do a flood risk assessment if your development is larger than 1 hectare or affected by other sources of flooding or in an area with critical drainage problems

Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

The Open Government Licence sets out the terms and conditions for using government data.
<https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>



Environment
Agency

Flood map for planning

Your reference

Chelmsine

Location (easting/northing)

508451/188931

Scale

1:2500

Created

26 Feb 2020 14:27



- Selected point
- Flood zone 3
- Flood zone 3: areas benefitting from flood defences
- Flood zone 2
- Flood zone 1
- Flood defence
- Main river
- Flood storage area



Page 2 of 2

