MICHAEL CHESTER & PARTNERS Consulting Civil and Structural Engineers
8 Hale Lane London NW7 3NX tel 020 8959 9119 fax 020 8959 9662 mail@michaelchester.co.uk

Our Ref: 16038 May 2017

106 HIGHGATE ROAD NW5

RESPONSE TO QUERIES RAISED IN CAMPBELL REITH'S BASEMENT IMPACT ASSESSMENT AUDIT

INTRODUCTION:

Michael Chester & Partners prepared a structural Basement Impact Assessment (BIA) to accompany a planning application for the above site by Drawing and Planning Ltd. The application included the demolition of an existing outbuilding followed by the construction of an extension of the existing original basement out into the rear garden. All neighbouring properties have original basements, the right hand neighbour at No 104 has a small extension of ther basement out into their rear garden.
Campbell Reith act on behalf of London Borough of Camden and they have prepared an Audit Report of the BIA. The following addresses the structural engineering queries raised by Campbell Reith in the Audit Tracker contained within section 1 of their report. The queries are reproduced for ease of reference.

QUERIES RAISED IN AUDIT TRACKER REPORT:

1 Are the BIA Authors qualifications satisfactory

Michael Chester and Partners LLP are a long established firm of Consulting Civil and Structural Engineers with experience of many basement designs in London Clays. We have adequate knowledge of 'ground engineering' for the purposes of this project.

2 Is the data required by Cl.233 of the GSD presented

A utilities companies search is being implemented and results will be forwarded

3 Are suitable plans/maps included

Please see site location plan in Appendix 3

4 Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail

Please see site location plan in Appendix 3

5 Land Stability Screening: Have the appropriate data sources been consulted? Is justification provided for the No answers?

See site investigation trial pit logs and the site location plan. The site is sensibly level.

6 Is a conceptual model presented

The site is sensibly level with topsoil overlying London Clay as illustrated by the trial pit logs.

7 Land stability scoping provided? Is scoping consistent with screening outcome?

Subsoils are London Clays. Foundations are below the zone of tree root influence (see Arboricultural report by Simon Pryce).Foundations are all the same depth as the existing basements. Garden walls beyond the proposed extension are jointed from the new structure.

8 Is the ground information informed by a desk study

See screenshot of BGS Appendix 4

9 Is a geological interpretation provided

Geotechnical parameters are as follows:

Safe ground bearing pressures are taken conservatively as 110KN/M2 for London Clays. The Shear Vane readings from the site investigation are:

Trial Pit Number	Depth Below Garden	Depth Relative to Basement	Vanes	Average	Comment
1		650	100,104	102	
2	1840	-100	110, 112	111	
3	1000	+700	74 , 76	75	Will increase with depth commensurate others
4	1500 2000	+200 -300	114, 114 120, 120	114 120	

Conservatively take Cu as $^2/_3$ of 100 = 66 to allow for sampling error as the test only shears small cones
For footings 1000mm wide at a depth of 2,300 mm D/B =2.3
From Skempton (1951) Nc=7.1
Safe bearing Pressure = Cu.Nc/F.O.S 66x7.1/3=156 kN/M^2

10 Does the geotechnical interpretation include include information on retaining wall design

Retaining wall pressure parameters. LC density 20kN/M^2 Ko=2.0
For retaining wall design see later.

11 Are estimates of ground movement and and structural impact presented

The depth of bulk excavation is to 1.700m below garden level. The effective depth of underpinning to the base of the strip footings is 2.300m.

From CIRIA 580 table 2.4, the movement affecting neighbours' gardens is as follows:
Horizontal 0.15%H = 0.15 x 1.700/100 = 2.6 mm
Vertical 0.1%H at 0.5H 0.1x1700/100= 1.7mm max at 0.5H=850mm from the edge.

These movements are negligible and will in any case only affect gardens.

The adjacent properties have basements at the same level as the proposed extension to 106 and will suffer little or no movement resulting from the excavations.

12 Is the impact assessment appropriate to the matters identified by the screening and scoping

No relevant matters identified from the screening and scoping. Movements will be negligible.

13 Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme

See temporary works sequence and movement/damage assessments

14 Has the need for monitoring during construction been considered

Predicted movements are too small to warrant monitoring

15 Have the residual (after mitigation) impacts been clearly defined

Residual impacts are negligible

16 Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained

See calculations Appendix A and movement prediction calculations

17 Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area

There is no impact on the rear extension of No104. There is negligible impact on garden walls which are jointed beyond the underpinning

18 Does the report state that damage to surrounding buildings will be no worse than Burtland Category 2

There is negligible movement predicted, hence Burtland category Zero

The foregoing also respond to the following sections in Campbell Reith's non technical summary:

1.5, 1.7, 1.9, 1.10, 1.11, 1.13, 1.14, 1.15, 1.16,1.17, 1.18

MICHAEL CHESTER & PARTNERS Consulting Civil and Structural Engineers
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APPENDIX A

106 HIGHGATE ROAD NW5

CALCULATIONS FOR RETAINING WALLS, BASEMRNT SLAB and FOUNDATIONS

MICHAEL CHESTER & PARTNERS
Consulting Civil & Structural Engineers

8 Hale Lane London NW7 3NX tel 020 8959 9119 fax 020 8959 9662

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Project

106 HIGHGATE ROAD
NW5 1PB.

INTRODUCTION.

SUBJECT PROPERTY IS GRADE 2 LISTED, TERRACED ON LG to 2nd FLOORS.

L.G FLOOR IS APPROX 600 BELOW GL AT THE FRONT AND 1200 BELOW GARDEN LEVEL AT THE REAR.

IT IS PROPOSED TO MAKE AN OPENNING IN THE REAR WALL AND TO EXTEND THE LOWER GROUND FLOOR BACK INTO THE REAR GARDEN.

THE OPENING IN THE REAR WALL WILL USE A STEEL BOX FRAME TO KEEP FOUNDATION LOADS AS NEAR AS POSSIBLE TO EXISTING.

THE EXCAVATION IN THE REAR GARDEN WILL BE FORMED WITH AN RC SLAB AND WALLS, BUILT IN SECTIONS TO UNDERPIN EXISTING BOUNDARY WALLS.

STRIP FOOTINGS WILL BE PROVIDED UNDER THE SLAB TO TAKE FOUNDATIONS DOWN TO LEVELS DICTATED BY TREES IN ADJACENT GARDENS.

A "BIA" IS SEPERATELY PROVIDED.

MICHAEL CHESTER & PARTNERS
Consulting Civil & Structural Engineers
8 Hale Lane London NW7 3NX tel 020 8959 9119 fax 020 8959 9662

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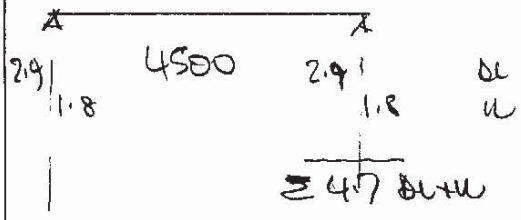
EXTENSION ROOF BEAMS. Take glass roof @ 1.0 kN/m² DL
.75 kN/m² LL

		DL	LL
BEAM A	2100/2 @ 1.0 =	1.05	
	SW	.25	
	2400/2 @ 0.75 =	.8	
		1.3	+ 0.8 = 2.1 kN/m.

1.3 kN/m DL
0.8 kN/m DL



≡ 4.7 DL+LL

M = 5.3 kN.m

18MK ≡ 430

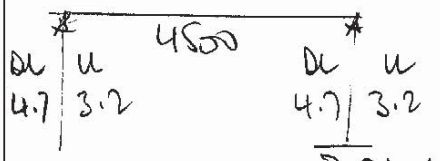
152×89 UB-16 I = 838

$\delta = \frac{4500}{360} + \frac{430}{838} = 6.4$ mm

$\frac{4500 \times 1.2}{21} = 257$ $D/t = 19.8$ $p_{cb} = 68$ $f_{cb} = \frac{5.3 \times 10^3}{110} = 48$ N/mm² ✓

BEAM B. 3600/2 @ 1.0 = 1.8
SW .3
3600/2 @ 0.75 = 1.4
2.1 kN/m DL
1.4 kN/m LL

$\frac{\cdot}{2.1} + \frac{1.4}{1.4} = 3.5$ kN/m.



7.9 kN

M = 8.6 kN.m.

18MK = 718 cm⁴

BY INSPECTION USE 2 - 152×89 UB-16 BOLTED TOGETHER.

PADSTONE TO BEAM A. R = 4.7 kN GIVE BK pad

$\frac{4.7 \times 10^3}{110 \times 220} = 0.19$

NOTE CHECK ARCH BELOW IN GOOD ORDER OR REPLACE WITH 150×100 PC CONCR LINTEL.

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Consulting Civil & Structural Engineers
8 Hale Lane London NW7 3NX tel 020 8959 9119 fax 020 8959 9662

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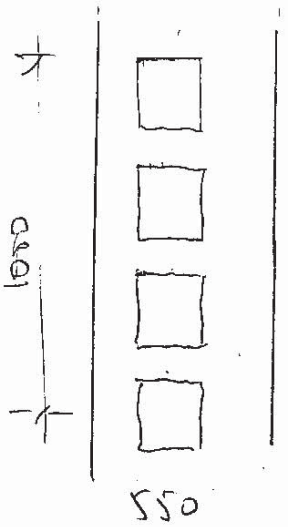


PLAN ON REAR FLUE WALL.

1.000 × .550 = 0.55 m²

.220 × .220 × 3.5 = .17 m² voids

net area = .55 − .17 = .38 m².

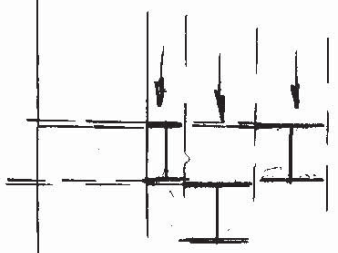
.38 @ 22 = 8.36 kN/M

8.36 × 10.000 kg/k = 83.6 kN/M.

Wall	83.6
Roof Allow 3500/2 @ 2	3.5
2nd 3500/2 @ 2	3.5
1st	3.5
UG	3.5
	97.6 kN/M.

MAIN REAR WALL

mansard 2200 @ 1	2.2
Wall 5750 @ 5 × 60%	17.25
Roof + 2 + 1 + UG Floors	14.0
	33.45 kN/M.



At CB Load to INNER BEAM - take
10,000 @ 2.5 = 25 kN/M.
Roof, 2nd, 1st, UG 14
39 kN/M.

Load to PORTAL BEAM (CENTRE)
10,000 @ say 2.5 = 25 kN/M.

Load to OUTER BEAM.
10,000 @ say 5 = 50 kN/M.

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8 Hale Lane London NW7 3NX tel 020 8959 9119 fax 020 8959 9662

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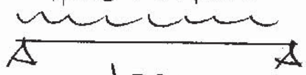
INNER TRIMMER



R = 19.5 kN

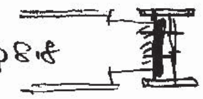
M = 4.9 kNm

18mm ≡ 88 cm⁴.

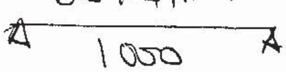
152×89 UB-16
I = 838

$f = \frac{4.9 \times 10^3}{110} = 44$

SAW 4-12ϕ 8.8



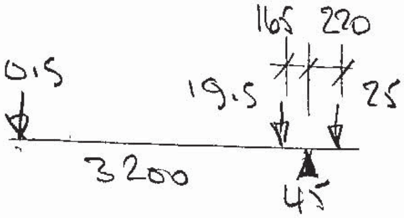
OUTER TRIMMER



R = 25 kN

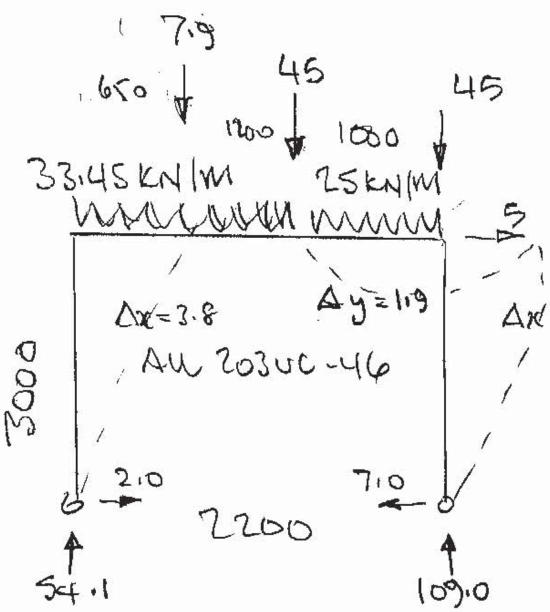
M = 6.3 kN-m.

18mm ≡ 113 cm⁴.



3200 R_1 = (3.035 × 19.5) + (3.420 × 25)
= 59.2 + 85.5

R_1 = 45 kN ∴ R_2 = −0.5 kN.

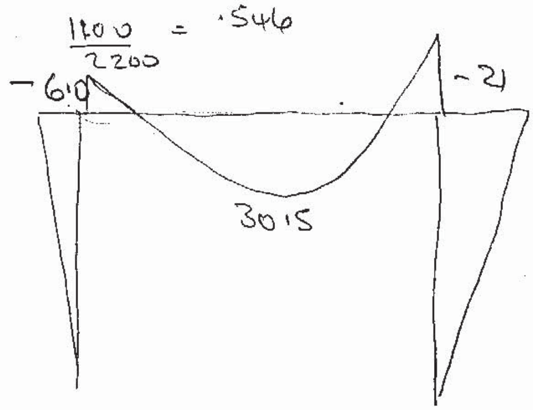


LOADS | REACTIONS | DEFLECTIONS.

650/2200 = .296

1100/2200 = .546

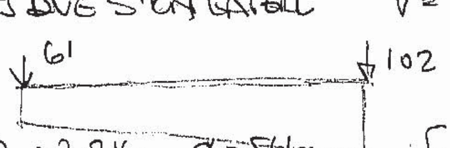
33.45 − 25 = 8.45



220
130
130
480
say 500

550
130
130
810

REACTIONS DUE 5kN LATERAL V = ± 5 × 3/2.200 = 6.8 say 7



$\frac{102 \times 4500}{163} = 2.816$ e = 566

$f = \frac{163}{4.5}\left(1 \pm \frac{6 \times 566}{4500}\right) = \frac{63}{.810}$ or $\frac{9}{.480}$ = 78 or 19 kN/m²

175

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Consulting Civil & Structural Engineers
8 Hale Lane London NW7 3NX tel 020 8959 9119 fax 020 8959 9662

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HEAD BEAM

$l_{ef}/r_y = \frac{2200}{51.1} = 43$ $\quad D/t = 18.5$

$p_{cb} = 180$ $\quad f_{cb} = \frac{30.5 \times 10^3}{449.2} = 68$ ✓

Cols. $\quad M = 21$ kNm
$V = 109$ kN

$\frac{l_{ef}}{r_y} = \frac{3000 \times 15}{51.1} = 88$ $\quad D/t = 18.5$

$p_{cb} = 148$ $\quad p_c = 94$

$f_{cb} = \frac{21 \times 10^3}{449.2} = 47$ $\quad f_c = \frac{109 \times 10}{58.8} = 18.5$

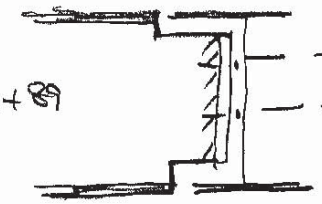
$\frac{47}{148} + \frac{18.5}{94} = .32 + 0.20 = .52 \neq 1$ ✓

CHIMNEY BREAST LINTELS

INNER By inspection 152×89 UB 16

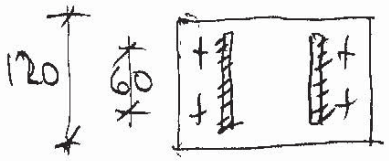
$I = 838 > 88$ $\quad f = \frac{4.9 \times 10^3}{110} = 44$ N/mm²

Connection



10 plate
5 fw all round
4 - 12φ 8.8 Bolts

OUTER By inspection 2 - 152×89 UB 16
V prep BUTT weld to common end plates



220 - 5m fw = 2 . 220×14 = 88 kN
> 25 ✓

4 - 12φ 8.8 in 4.6 Tck
4+15+4.6/5 = 55.2 > 25 ✓

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Consulting Civil & Structural Engineers
8 Hale Lane London NW7 3NX tel 020 8959 9119 fax 020 8959 9662

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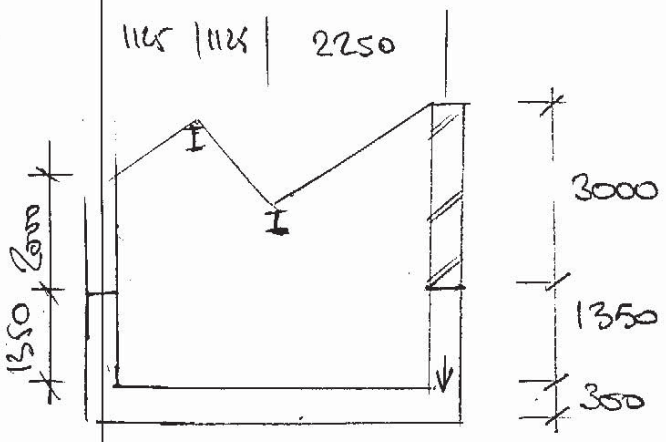
CONSIDER WALL LOADS TO SLAB.



				DL	LL
RHS	BRICK WALL	3000 @ 5	=	15.0	
	CONCR WALL	1.350 @ 1.3424	=	9.4	
	ROOF	2250/2 @ 1	=	1.1	
		2250/2 @ .75	=	0.8	
				25.5 + 0.8	≡ 26.3 kN/M
LHS	WALL	2000 @ 5	=	10.0	
	CONCR WALL	1350 @ 1.3424	=	9.4	
	ROOF	1.125/2 @ 1	=	0.6	
		1.125/2 @ .75	=	0.5	
				20 + 0.5	= 20.5 kN/M

SLAB

.300 @ 24	=	7.2
SCREED - allow		1.8
INSULATION		0.1
		9.1 kN/M² DL
LL		1.5
		10.6 kN/M² DL + LL

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Consulting Civil & Structural Engineers
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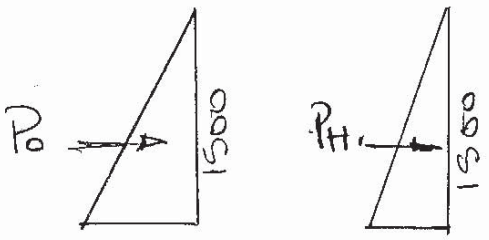
RETAINING LOADS ABOVE SLAB ℄.



At rest - take $k_o = 2$

$P_o = 2.0 \times 20 \times \frac{1.500^2}{2} = 45$ kN/M @ 0.500 ≡ 22.5 kN·M/M.

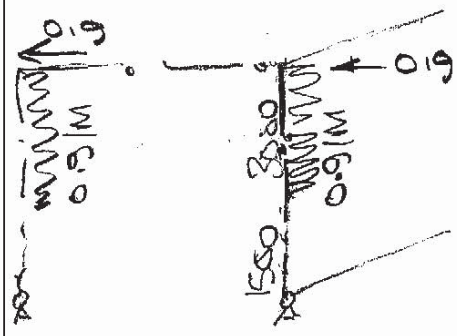
$P_H = 10 \times \frac{1.500^2}{2} = 11.25$ kN/M @ 0.500 = 5.6 kN·M/M.

28.1 kN·M/M.

CONCRETE COL LOADS.

FROM ROOF BEAM - allow 4 kN.

WIND + LATERAL STABILITY.



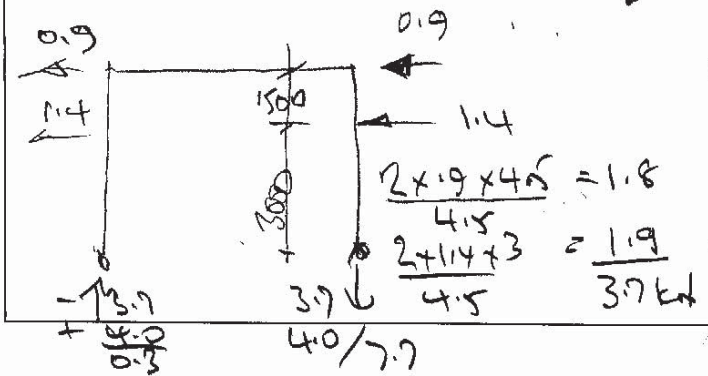
wind to frame take

$\frac{4500}{2}$ @ 0.4 = 0.9 kN/M.

brickwork restraint load

3000 @ 5 × 2½% = 0.4 kN/M

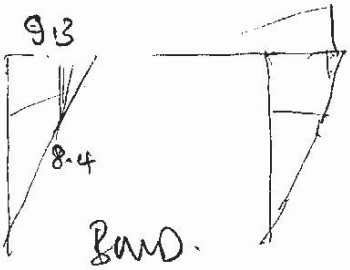
$\frac{4500}{2}$ @ 0.4 = 0.9 kN



$\frac{2 \times 0.9 \times 4.5}{4.5} = 1.8$

$\frac{2 \times 1.4 \times 3}{4.5} = 1.9$

3.7 kN



$0.9 \times 4.500 = 4.1$
$1.4 \times 3.00 = 5.2$
9.3

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Consulting Civil & Structural Engineers
8 Hale Lane London NW7 3NX tel 020 8959 9119 fax 020 8959 9662

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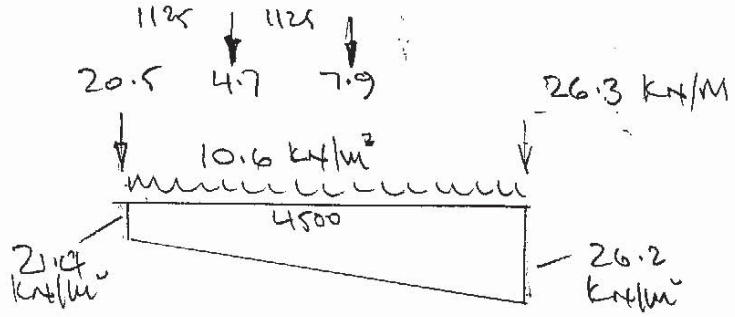
CONSLOOK LOADS TO SLABS (not incl wind)

10.6 × 4500 = 47.7



47.7
20.5
26.3
4.7
7.9
107.1

moments abt LHS.

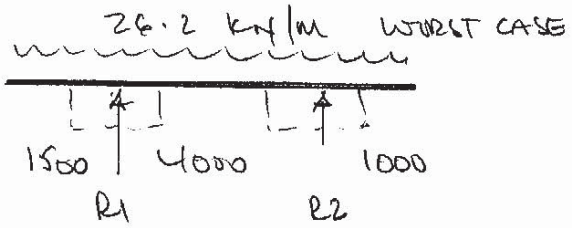
$(10.6 \times \frac{4.500^2}{2}) + (4.7 \times 1.125) + (7.9 \times 2.250) + (26.3 \times 4.500) = 107.1\,x$

$107.3 + 5.3 + 17.8 + 118.4 = 107.1\,x \qquad x = 2.323$

$q = 2250 - 2323 = 73$

$f = \frac{107.1}{4.500}\left(1 \pm \frac{6 \times 73}{4500}\right) = 26.2$ or

CONSLOOK LOAD VIA SLAB TO STRIP FOOTINGS:



moments about R2. ↻ $R1 \times 4 + 26.2 \times \frac{1.000^2}{2} = 4R_1 + 13.1$

↺ $26.2 \times \frac{5.500^2}{2} = 396.3$

⇒ $R_1 = 95.8$ kN/m².

similarly for 21.4 kN/m $R_1' = 78.2$ kN/m²

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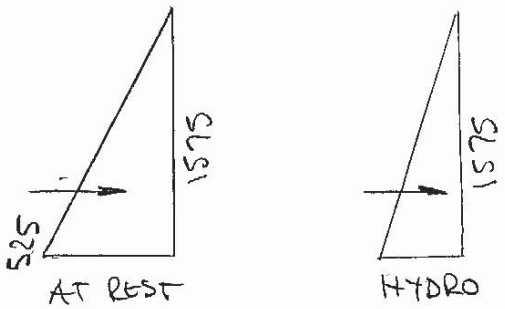
CONSIDER RETAINING LOADS

SURCHARGE $1.5 KN/m^2 \equiv \frac{1.5}{20} = .075$ additional height



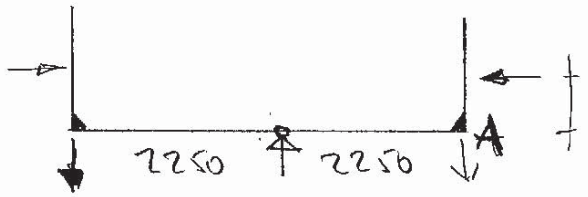
take $k_a = 2$

take density = 20 KN/m³

$P_0 = 2.0 \times 20.0 \times \frac{1.575^2}{2} = 49.6 KN \quad \times \frac{1575}{3} \equiv 26.0 KN.M.$

$P_H = 10 \times \frac{1.575^2}{2} = 12.4 \quad \times \frac{1575}{3} = 6.5 KN.M.$

$32.5 KN.M.$



Moments about ~~A~~

$\frac{32.5 + 0.1525}{2.250} = 7.16$

∴ centre reaction = $2 + 7.16 = 15.2 KN/M.$

add foundation loads from p7

$(78.2 + 95.8)/2 = 87$

$+15.2$

$102 KN/M^2 + 110 + (1.500 \times 20) = 140 KN/m^2$

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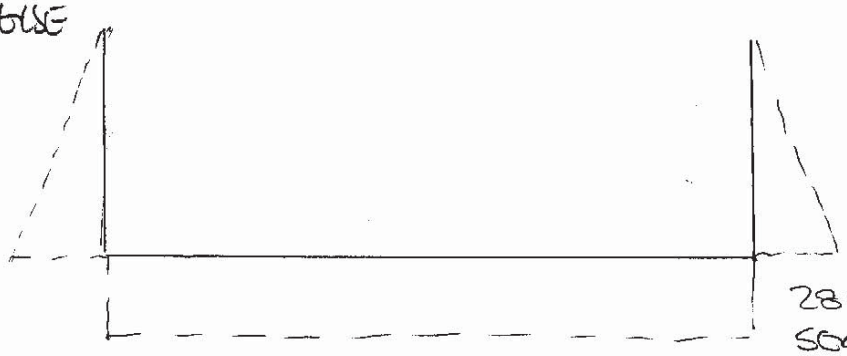
COMPOSITE SLAB MOMENTS

TRANSVERSE

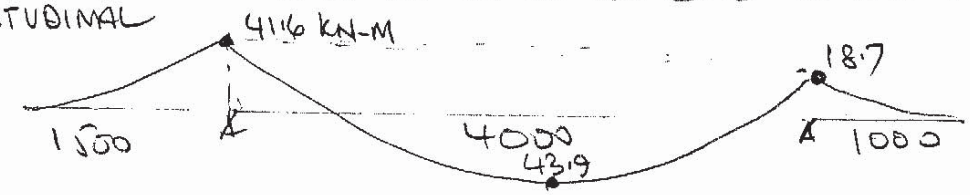


28.1 kN-M/M SERVICE MOMENT. FROM REINFORCED SOILS

28.1 × 1.2 = 33.7 kN-M ULT.

1.5 kN/M LL
24.7 kN/M DL

LONGITUDINAL



$24.7 \times \frac{1.500^2}{2} = 27.8$ $\quad 24.7 \times \frac{4.000^2}{8} = 49.4$ $\quad 24.7 \times \frac{1.000^2}{2} = 12.4$

$1.5 \times \frac{1.500^2}{2} = 1.7$ $\quad 1.5 \times \frac{4.000^2}{8} = 3.0$ $\quad 1.5 \times \frac{1.000^2}{2} = 0.8$

$27.8 \times 1.4 = 38.9$ $\quad 49.4 \times 1.4 = 69.2$ $\quad 12.4 \times 1.4 = 17.4$

$1.7 \times 1.6 = 2.7$ $\quad 3 \times 1.6 = 4.8$ $\quad 0.8 \times 1.6 = 1.3$

41.6 $\quad 74.0$ $\quad 18.7$

$\frac{41.6 + 18.7}{2} = 30.15$ $\quad 74 - 30.15 = 43.9$.

350 slab C35 40 cover - allow for T16 $\Rightarrow d = 350 - 40 - 8 = 252$

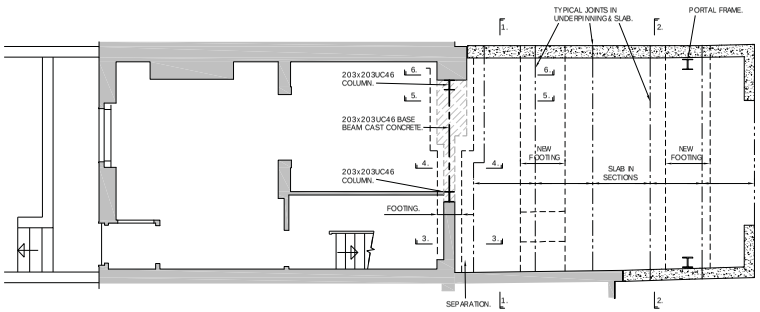
$K = \frac{43.9 \times 10^6}{10^3 \times 252^2 \times 35} = .02$ $\quad a_1 = .94$ $\quad z = .94 \times 252 = 236$

$A_s > \frac{43.9 \times 10^6}{.87 \times 460 \times 236} = 464 \text{ mm}^2/\text{m}$ $\quad$ T12-200 $\equiv$ 565 mm².

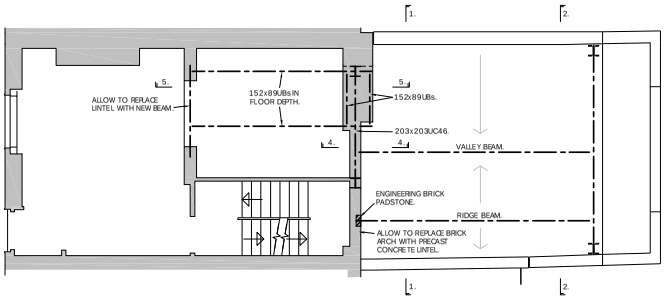
APPENDIX B

106 HIGHGATE ROAD NW5

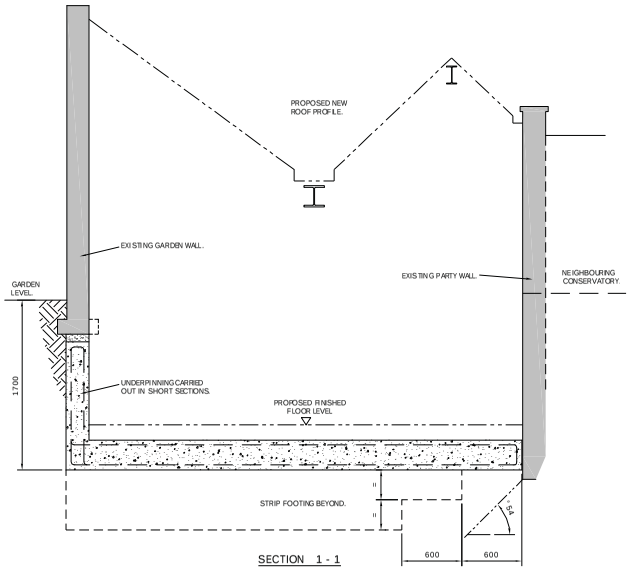
REVISED DRAWING 16038/20 rev A



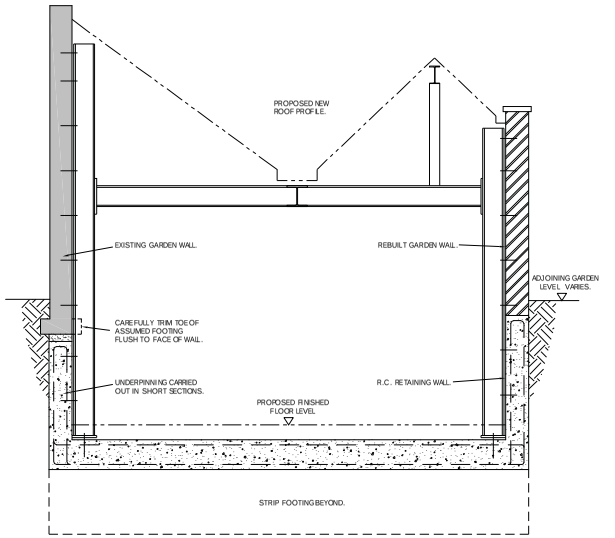
PLAN AT BASEMENT LEVEL



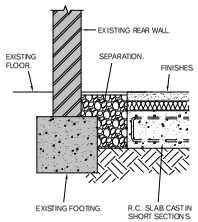
PLAN ON NEW ROOF LEVEL



SECTION 1 - 1
(SCALE 1:25)



SECTION 2 - 2
(SCALE 1:25)



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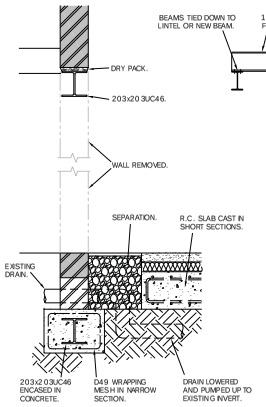

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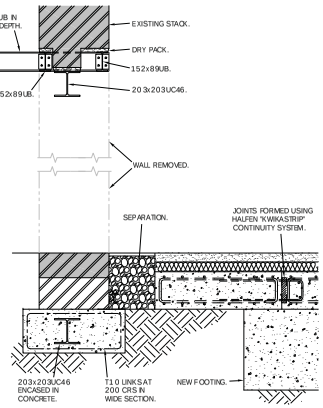

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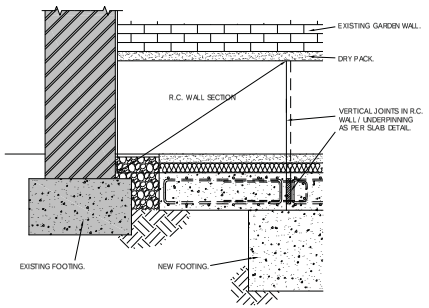
(SCALE 1:20)



SECTION 6 - 6
(SCALE 1:20)

Rev	Date	Alteration
A	MAY 2017	FOOTING STEPPED UP ADJACENT TO No. 104

MICHAEL CHESTER & PARTNERS
Consulting Civil and Structural Engineers
8 Hale Lane London NW7 3NX tel 020 8959 9119 fax 020 8959 9662

Date JUL 16 | Dwg No 16038/20 | Rev A
Drawn VP
Scale 1:50@A1

Project
106 HIGHGATE ROAD
LONDON NW5

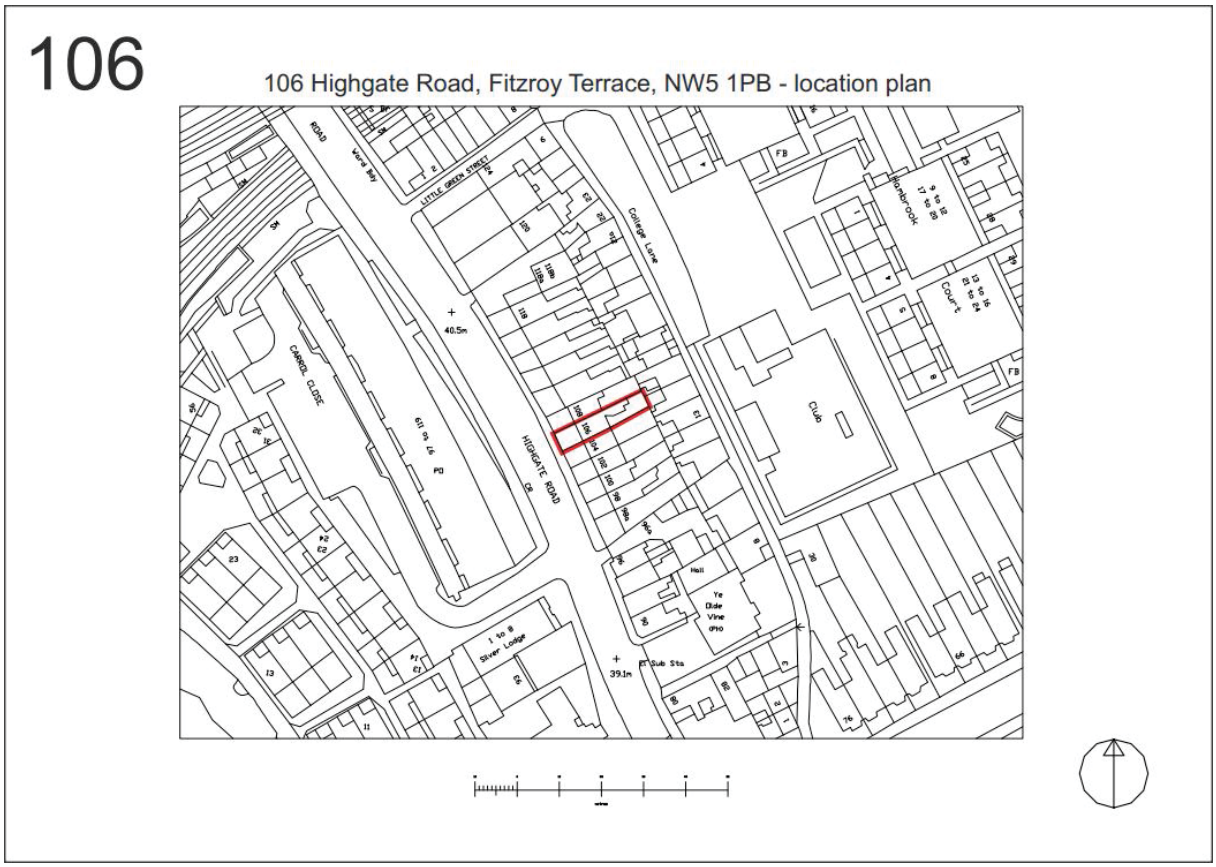
BASEMENT IMPACT ASSESMENT

PRELIMINARY | A1

APPENDIX C

106 HIGHGATE ROAD NW5

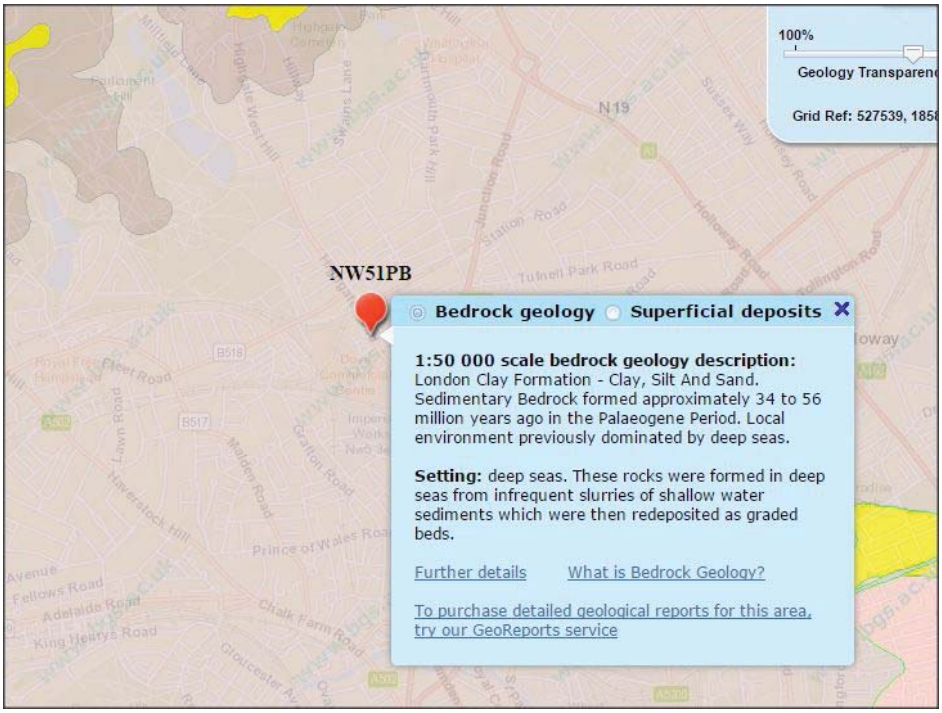
Site Location Plan

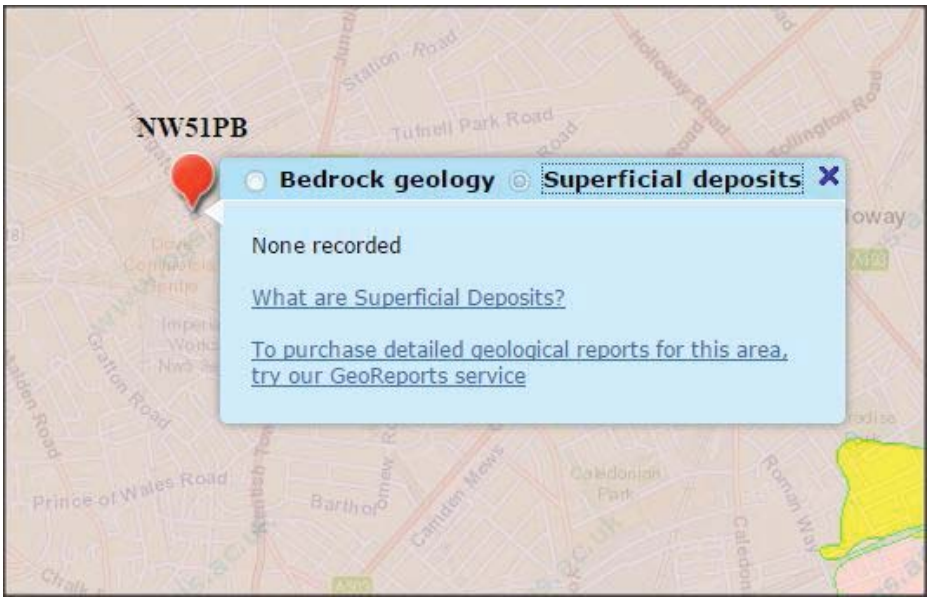


APPENDIX D

106 HIGHGATE ROAD NW5

BGS SCREENSHOT





MICHAEL CHESTER & PARTNERS Consulting Civil and Structural Engineers
8 Hale Lane London NW7 3NX tel 020 8959 9119 fax 020 8959 9662 mail@michaelchester.co.uk

APPENDIX E

106 HIGHGATE ROAD NW5

UTILITIES SEARCH

JOANNA JAMES
Geo Spatial Data

Tuesday, 06 Jun 2017
Underground Utilities Search Report for:
Joanna James Ltd
Site Name : 106 Highgate Road
Ref No 1 : U118/17 Ref No 2 :

Utility / Service	Attached	Comments
Gas	**Yes**	
Water	**Yes**	
Sewers	**Yes**	
BT	**Yes**	
Electricity	**Yes**	
Linesearch	**Yes**	
Vodafone	**Yes**	**Formerly Cable & Wireless & Thus**
Virgin Media	**Yes**	**Formerly ntl & Telewest**
BSkyB	**Yes**	**Formerly Easynet**
Vtesse	**Not Affected**	
Colt	**Yes**	
KPN	**Yes**	
Tata	**Not Affected**	
Sota	**Not Affected**	
CGI Logica	**Not Affected**	
Energetics	**Yes**	
City Fibre	**Yes**	
Telia Sonera	**Yes**	
Instalcom	**Yes**	**Includes Level3, GC (UK) Ltd, GC PEC, Fibrenet UK Ltd and Fibrespan Ltd**
KCom	**Not Affected**	**Formerly Kingston Communications**
Verizon	**Yes**	
Interoute	**Yes**	
Trafficmaster	**Not Affected**	
Independent Utilities	**Yes**	
Other	**Not Requested**	
NB: All responses that do not include plans apply to the **grid references** supplied only unless a plan of the site was provided. All plans / responses are valid for a maximum of three months unless noted otherwise		

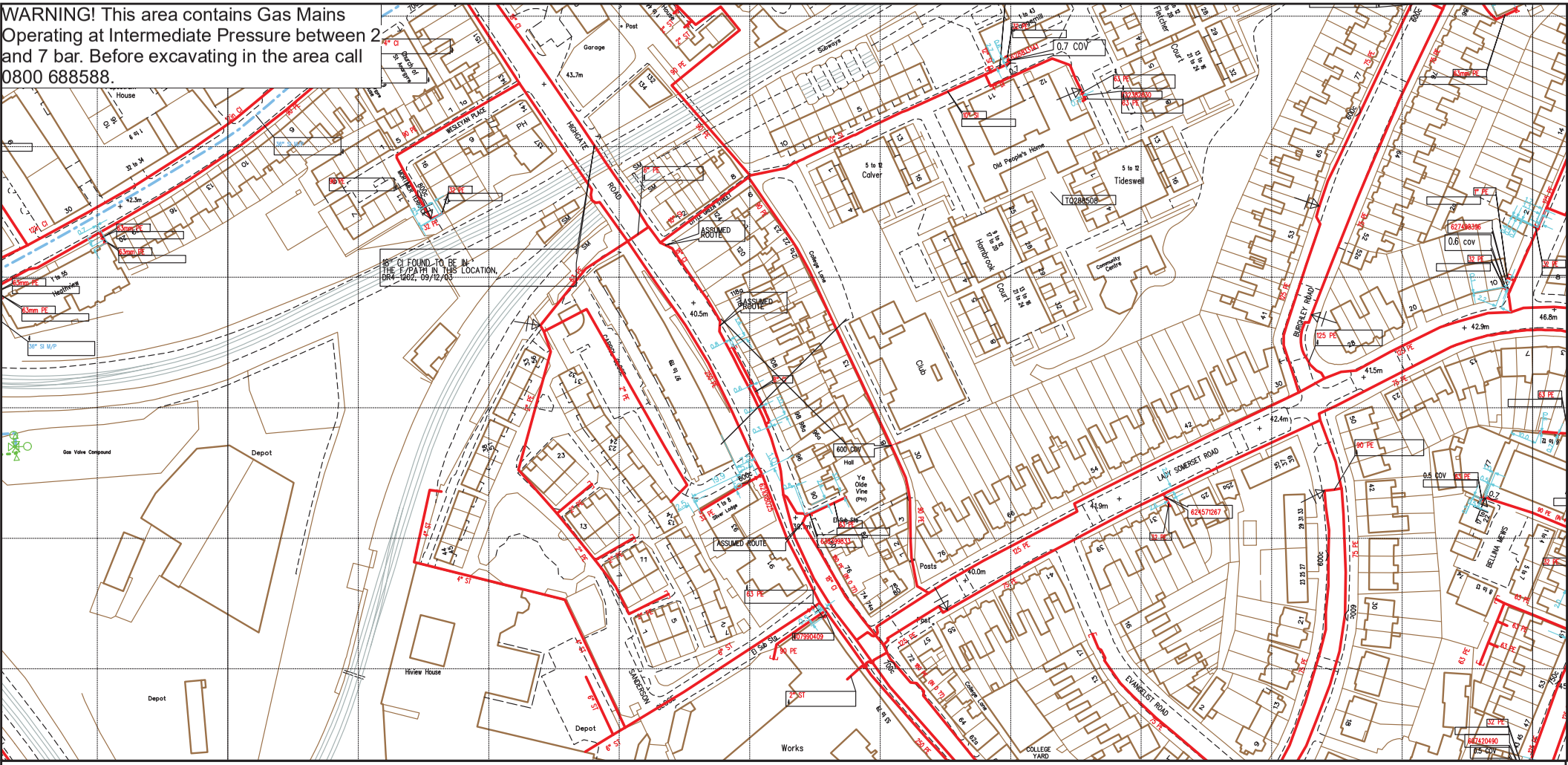
Joanna James Ltd.
Geovation House, 37 Armstrong Road, Cheltenham, GL52 7SB
Tel: +44 (0)1242 681140
Email: info@joanna-james.com

JOANNA JAMES
Geo Spatial Data

GAS

Joanna James Ltd.
Geovation House, 37 Armstrong Road, Cheltenham, GL52 7SB
Tel: +44 (0)1242 681140
Email: info@joanna-james.com

WARNING! This area contains Gas Mains Operating at Intermediate Pressure between 2 and 7 bar. Before excavating in the area call 0800 688588.



SCALE: Not to scale	LP MAINS
USER ID: Chris	MP MAINS
DATE: 23/05/2017	IP MAINS
EXTRACT DATE: 01/03/2017	LHP MAINS
MAP REF: TQ2885	NHP MAINS
CENTRE: 528713, 185660	

Some examples of Plant Items:

Valve | Depth of Cover | Syphon | Diameter Change | Material Change | Out of Standard Service

This plan shows those pipes owned by National Grid Gas plc in their role as a Licensed Gas Transporter (GT). Gas pipes owned by other GTs, or otherwise privately owned, may be present in this area. Information with regard to such pipes should be obtained from the relevant owners. The information shown on this plan is given without warranty, the accuracy thereof cannot be guaranteed. Service pipes, valves, syphons, stub connections, etc. are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by National Grid Gas plc or their agents, servants or contractors for any error or omission. Safe digging practices, in accordance with HS(G)47, must be used to verify and establish the actual position of mains, pipes, services and other apparatus on site before any mechanical plant is used. It is your responsibility to ensure that this information is provided to all persons (either direct labour or contractors) working for you on or near gas apparatus. The information included on this plan should not be referred to beyond a period of 28 days from the date of issue. Further information on all DR4s can be determined by calling the DR4 hotline on 01455 892426 (9am-5pm) A DR4 is where a potential error has been identified within the asset record and a process is currently underway to investigate and resolve the error as appropriate.

MAPS Viewer Version 5.7.0.0

Local Machine

JOANNA JAMES
Geo Spatial Data

WATER AND SEWER

Joanna James Ltd.
Geovation House, 37 Armstrong Road, Cheltenham, GL52 7SB
Tel: +44 (0)1242 681140
Email: info@joanna-james.com

Asset location search

Property Searches

Cornerstone Projects LTD
91Market Street
HOYLAKE
WIRRAL
CH47 5AA

Search address supplied 106 highgate road

Your reference U118/17

Our reference ALS/ALS Standard/2017_3574758

Search date 23 May 2017

Notification of Price Changes...

From **1 September 2016** Thames Water Property Searches will be increasing the prices of its Asset Location Searches. This will be the first price rise in three years and is in line with the RPI at 1.84%. The increase follows significant capital investment in improving our systems and infrastructure.

Enquiries received with a higher payment prior to 1 September 2016 will be non-refundable. For further details on the price increase please visit our website at

www.thameswater-propertysearches.co.uk

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

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

0845 070 9148

searchcode

Asset location search

Search address supplied: 106 highgate road,

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

Waste Water Services

Asset location search

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.

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

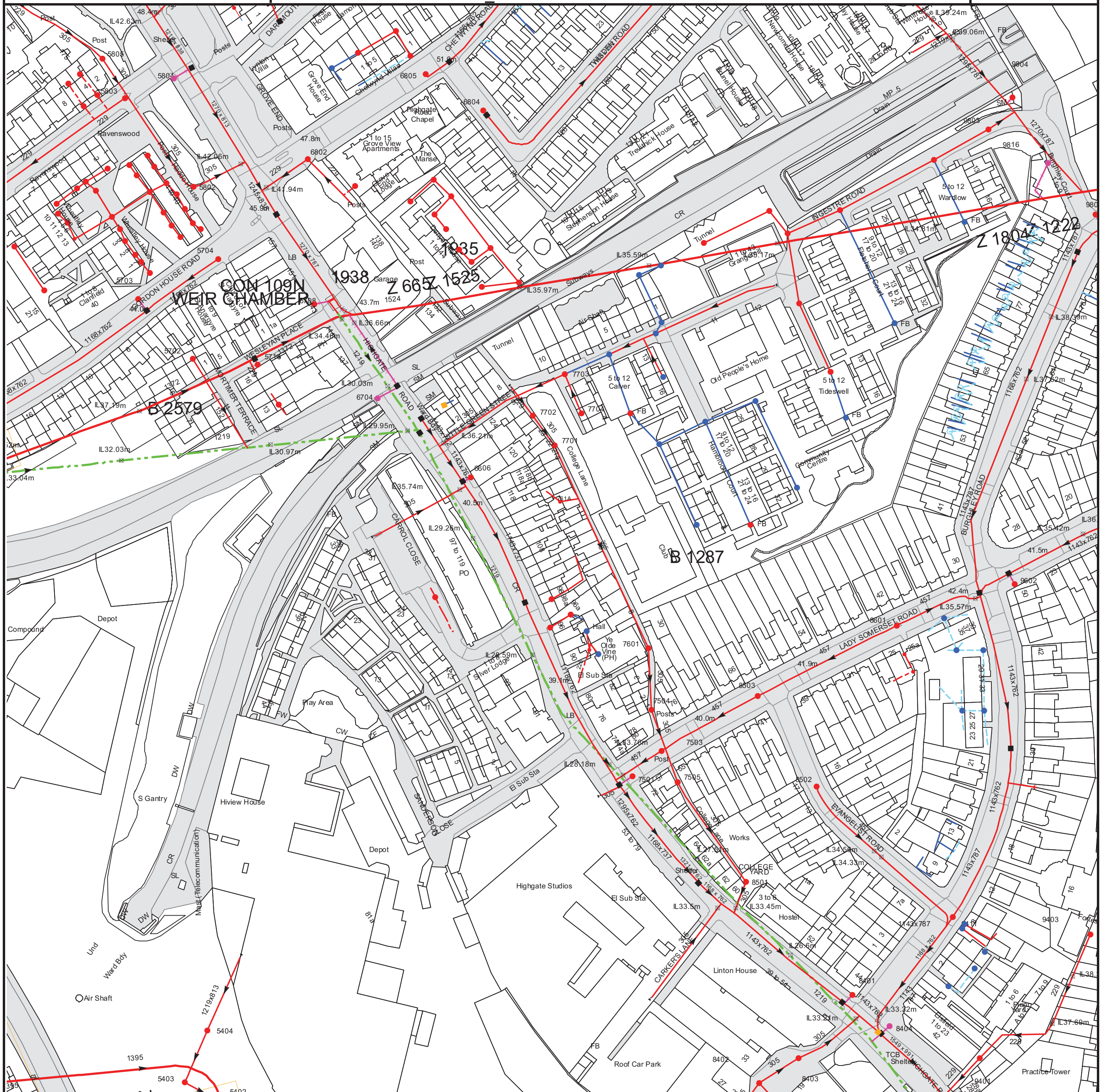
Clean Water queries

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/2017_3574758



The width of the displayed area is 500 m and the centre of the map is located at OS coordinates 528717,185665

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

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

Manhole Reference	Manhole Cover Level	Manhole Invert Level
9403	41.06	38.74
9816	43.32	n/a
9802	n/a	n/a
87AB	n/a	n/a
86AD	n/a	n/a
87AC	n/a	n/a
87AD	n/a	n/a
87AE	n/a	n/a
87AF	n/a	n/a
8601	42.71	n/a
861A	n/a	n/a
861B	n/a	n/a
86AG	n/a	n/a
87AI	n/a	n/a
87BA	n/a	n/a
97BH	n/a	n/a
96AJ	n/a	n/a
97CB	n/a	n/a
97CE	n/a	n/a
97DF	n/a	n/a
97EA	n/a	n/a
96BC	n/a	n/a
97EJ	n/a	n/a
97FD	n/a	n/a
97FI	n/a	n/a
97GC	n/a	n/a
97GH	n/a	n/a
9602	n/a	n/a
97HG	n/a	n/a
98BB	n/a	n/a
8402	36.54	34.17
8403	36.66	33.84
9401	38	34.26
8404	37.24	n/a
8401	n/a	n/a
84BA	n/a	n/a
94AE	n/a	n/a
94BC	n/a	n/a
94BE	n/a	n/a
94BH	n/a	n/a
9411	38.41	33.74
8501	38.84	34.64
951A	n/a	n/a
8502	39.57	37.62
7505	n/a	n/a
7501	n/a	n/a
7503	39.53	35.09
95BH	n/a	n/a
95BG	n/a	n/a
7504	39.7	36.93
8503	40.82	37.09
67CJ	n/a	n/a
67DA	n/a	n/a
68DG	n/a	n/a
77BJ	n/a	n/a
7702	42.33	41.25
76CB	n/a	n/a
76CI	n/a	n/a
7701	41.71	40.61
761A	n/a	n/a
7703	n/a	n/a
76CA	n/a	n/a
7704	n/a	n/a
76BC	n/a	n/a
76BB	n/a	n/a
76BE	n/a	n/a
77AF	n/a	n/a
7706	n/a	n/a
77AH	n/a	n/a
7601	40.25	37.65
77AI	n/a	n/a
77AJ	n/a	n/a
77BB	n/a	n/a
77BA	n/a	n/a
77BC	n/a	n/a
76AC	n/a	n/a
77BD	n/a	n/a
8602	n/a	n/a
68BB	n/a	n/a
69BI	n/a	n/a
68DA	n/a	n/a
68BC	n/a	n/a
6805	51.04	48.58
68DB	n/a	n/a
68DD	n/a	n/a
68DE	n/a	n/a
68DC	n/a	n/a
6804	51.12	48.26
78AB	n/a	n/a
88AB	n/a	n/a
88AC	n/a	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level
8803	n/a	n/a
88AE	n/a	n/a
98AB	n/a	n/a
9803	n/a	n/a
9804	43.41	38.56
98BJ	n/a	n/a
98CC	n/a	n/a
58DF	n/a	n/a
58DC	n/a	n/a
58DE	n/a	n/a
58CG	n/a	n/a
58DB	n/a	n/a
58CF	n/a	n/a
58DD	n/a	n/a
58DA	n/a	n/a
58CE	n/a	n/a
58CD	n/a	n/a
58CJ	n/a	n/a
5802	46.81	42.9
6889	n/a	n/a
58CC	n/a	n/a
58CI	n/a	n/a
58DH	n/a	n/a
58CB	n/a	n/a
58CH	n/a	n/a
6802	47.87	45.47
58CA	n/a	n/a
5803	47.17	n/a
5804	n/a	n/a
68BA	n/a	n/a
5805	47.23	43.58
591A	n/a	n/a
47BH	n/a	n/a
58DG	n/a	n/a
5703	n/a	n/a
57CB	n/a	n/a
57CC	n/a	n/a
5702	42.13	41.08
5704	45.17	40.87
5714	n/a	n/a
57DE	n/a	n/a
6708	n/a	n/a
6704	n/a	n/a
68DF	n/a	n/a
6606	40.56	35.35
48DF	n/a	n/a
48DA	n/a	n/a
48DC	n/a	n/a
48DB	n/a	n/a
48DE	n/a	n/a
58DJ	n/a	n/a
48DD	n/a	n/a
58DI	n/a	n/a
5817	n/a	n/a
5816	n/a	n/a
4803	n/a	n/a
5814	n/a	n/a
5403	n/a	n/a
5404	n/a	n/a
661A	n/a	n/a

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

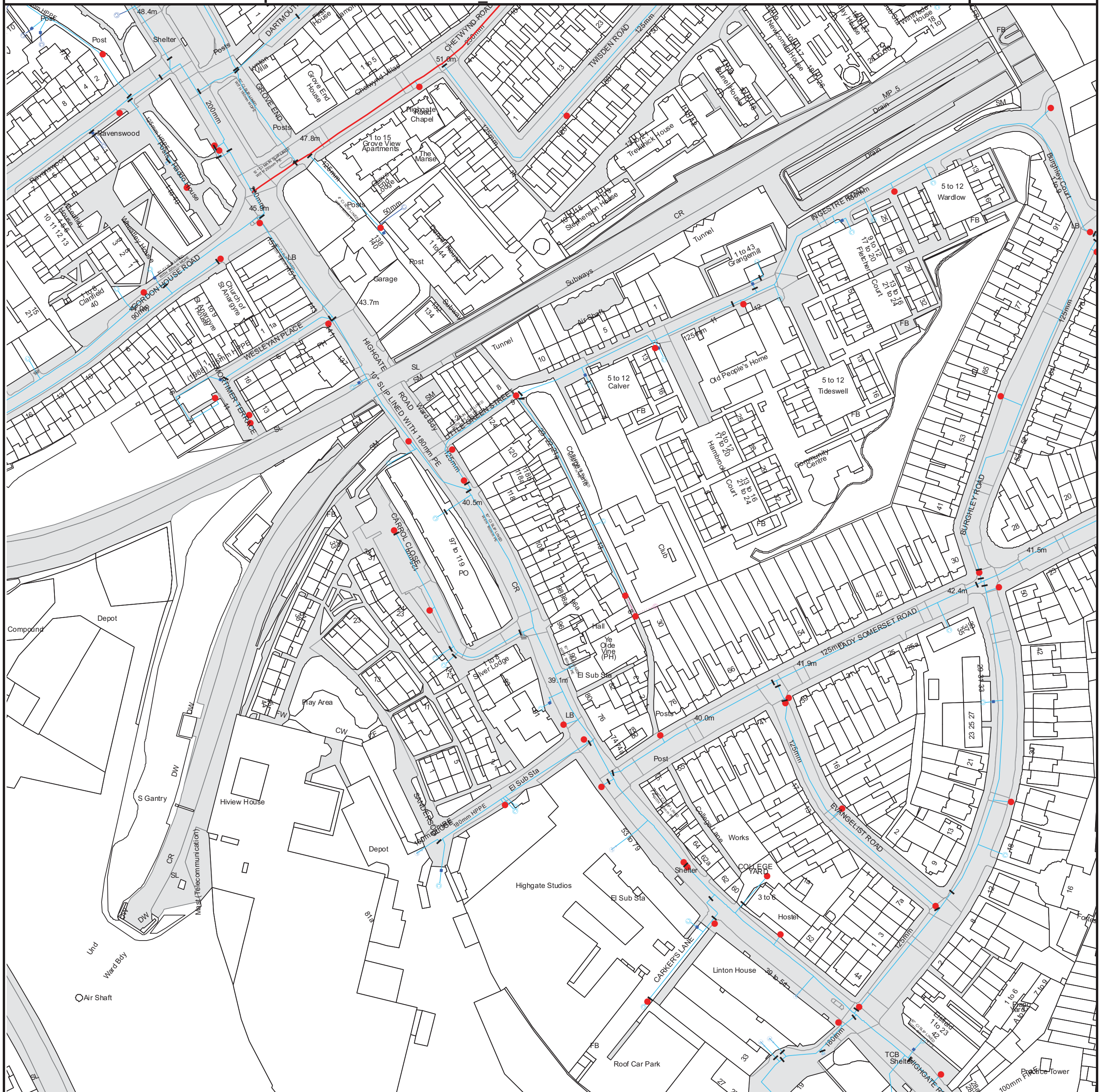
Proposed

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/2017_3574758



The width of the displayed area is 500 m and the centre of the map is located at OS coordinates 528717, 185665.

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.

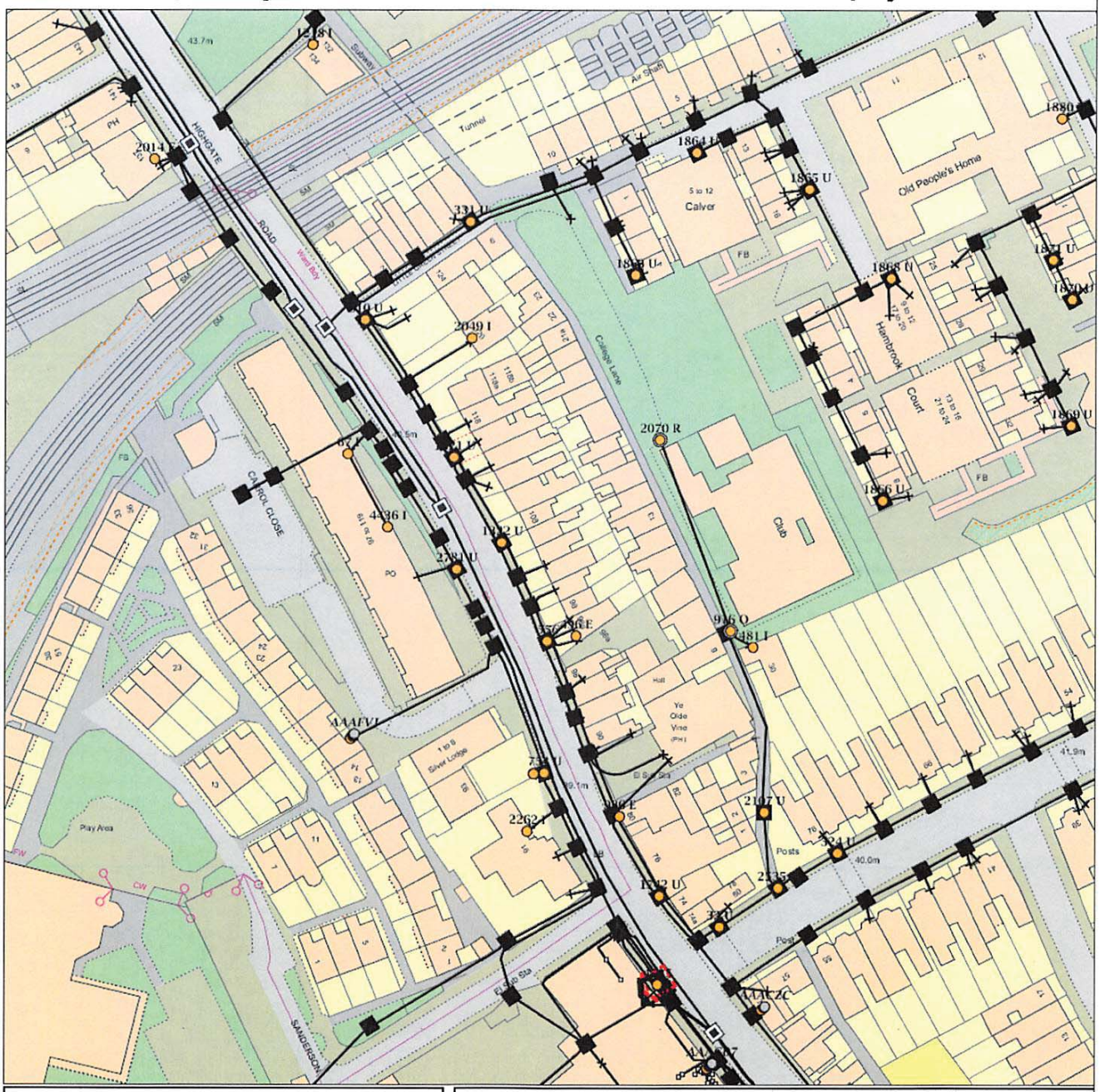
Private Main: Indiates that the water main in question is not owned by Thames Water. These mains normally have text associated with them indicating the diameter and owner of the pipe.

JOANNA JAMES
Geo Spatial Data

BT

Joanna James Ltd.
Geovation House, 37 Armstrong Road, Cheltenham, GL52 7SB
Tel: +44 (0)1242 681140
Email: info@joanna-james.com

Maps by email Plant Information Reply



IMPORTANT WARNING

Information regarding the location of BT apparatus is given for your assistance and is intended for general guidance only. No guarantee is given of its accuracy.
It should not be relied upon in the event of excavations or other works being made near to BT apparatus which may exist at various depths and may deviate from the marked route.

openreach

CLICK BEFORE YOU DIG

FOR PROFESSIONAL FREE ON SITE ASSISTANCE PRIOR TO COMMENCEMENT OF EXCAVATION WORKS INCLUDING LOCATE AND MARKING SERVICE

email cbyd@openreach.co.uk

ADVANCE NOTICE REQUIRED
(Office hours: Monday - Friday 08.00 to 17.00)
www.openreach.co.uk/cbyd

KEY TO BT SYMBOLS

DP	Pole
Planned DP	Planned Pole
PCP	Joint Box
Planned PCP	Change Of State
Built	Split Coupling
Planned	Duct Tee
Inferred	Planned Box
Building	Manhole
Kiosk	Planned Manhole
Hatchings	Cabinet
	Planned Cabinet

Other proposed plant is shown using dashed lines.
BT Symbols not listed above maybe disregarded.
Existing BT Plant may not be recorded.
Information valid at time of preparation

openreach
a BT Group business

BT Ref : TYF08398U
Map Reference : (centre) TQ287138566C
Easting/Northing : (centre) 528713,185€
Issued : 23/05/2017 08:39:55

WARNING: IF PLANNED WORKS FALL INSIDE HATCHED AREA IT IS ESSENTIAL BEFORE PROCEEDING THAT YOU CONTACT THE NATIONAL NOTICE HANDLING CENTRE. PLEASE SEND E-MAIL TO: nnhc@openreach.co.uk

JOANNA JAMES
Geo Spatial Data

ELECTRIC

Joanna James Ltd.
Geovation House, 37 Armstrong Road, Cheltenham, GL52 7SB
Tel: +44 (0)1242 681140
Email: info@joanna-james.com

Mr. Jake Hughes
Cornerstone Projects Ltd
91 Market Street
Hoylake
Wirral
CH47 5AA

Our Ref: 2017/2255595
Your Ref: U118/117
26/05/2017

Dear Sir/Madam

106 HIGHGATE ROAD LONDON

Thank you for your letter of 22/05/2017 in which you asked if there are any electric lines and/or electrical plant belonging to UK Power Networks (LPN) plc ("UK Power Networks") within the land identified by your enquiry.

I enclose a copy of UK Power Networks record of its electric lines and/or electrical plant at the site identified by your enquiry. If the records provided do not relate to the land to which you had intended to refer please resubmit your enquiry.

Should your excavation affect any of our Extra High Voltage equipment (6.6 KV, 22 KV, 33 KV or 132 KV), please contact us to obtain a copy of the primary route drawings and associated cross sections.

This information is made available to you on the terms set out below.

1. **UK Power Networks does not warrant that the information provided to you is correct. You rely upon it at your own risk.**

2. UK Power Networks does not exclude or limit its liability if it causes the death of any person or causes personal injury to a person where such death or personal injury is caused by its negligence.

3. **Subject to paragraph 2 UK Power Networks has no liability to you in contract, in tort (including negligence), for breach of statutory duty or otherwise how for any loss, damage, costs, claims, demands, or expenses that you or any third party may suffer or incur as a result of using the information provided whether for physical damage to property or for any economic loss (including without limitation loss of profit, loss of opportunity, loss of savings, loss of goodwill, loss of business, loss of use) or any special or consequential loss or damage whatsoever.**

4. The information about UK Power Networks electrical plant and/or electric lines provided to you belongs to and remains the property of UK Power Networks. You must not alter it in any respect.

5. **The information provided to you about the electrical plant and/or electric lines depicted on the plans may NOT be a complete record of such apparatus belonging to UK Power Networks. The information provided relates to electric lines and/or electrical plant belonging to UK Power Networks that it believes to be present but the plans are NOT definitive: other electric lines and/or electrical plant may be present and that may or may not belong to UK Power Networks.**

6. **Other apparatus not belonging to UK Power Networks is not shown on the plan. It is your responsibility to make your own enquiries elsewhere to discover whether apparatus belonging to others is present. It would be prudent to assume that other apparatus is present.**

7. You are responsible for ensuring that the information made available to you is passed to those acting on your behalf and that all such persons are made aware of the contents of this letter.

8. Because the information provided to you may **NOT** be accurate, you are recommended to ascertain the presence of UK Power Networks electric lines and/or electrical plant by the digging of trial holes. **Trial holes should be dug by hand only**.

Excavations must be carried out in line with the Health and Safety Executive guidance document HSG 47. We will not undertake this work. A copy of HSG 47 can be obtained from the Health an Safety Executives website.

All electric lines discovered must be considered LIVE and DANGEROUS at all times and must not be cut, resited, suspended, bent or interfered with unless specially authorised by UK Power Networks.

The electric line and electrical plant belonging to UK Power Networks remains so even when made dead and abandoned and any such electric line and/or electrical plant exposed shall be reported to UK Power Networks.

Where your works are likely to affect our electric lines and/or electrical plant an estimate of the price of any protective /diversionary works can be prepared by UK Power Networks Branch at Metropolitan House, Darkes Lane, Potters Bar, Herts. , EN6 1AG, telephone no. 0845 2340040

9 **Any work near to any overhead electric lines must be carried out by you in accordance with the Health and Safety Executive guidance document GS6 and the Electricity at Work Regulations**.

The GS6 Recommendations may be purchased from HSE Books or downloaded from the Energy Networks Association's website.

If given a reasonable period of prior notice UK Power Networks will attend on site without charge to advise how and where "goal posts" should be erected. If you wish to avail yourself of this service, in the first instance please telephone: 0845 6014516 between 08:30 and 17:00 Monday to Friday, Public and bank holidays excepted.

10. You are responsible for the security of the information provided to you. It must not be given, sold or made available upon payment of a fee to a third party.

11. If in carrying out work on land in, on, under or over which is installed an electric line and/or electrical plant that belongs to UK Power Networks you and/or anyone working on your behalf damages (however slightly) that apparatus you must inform immediately UK Power Networks by telephone at the number below providing:

- your name, address and telephone number; and
- the date, time and place at which such damage was caused; and
- a description of the electric line and/or electrical plant to which damage was caused; and
- the name of the person whom it appears to you is responsible for that damage; and
- the nature of the damage

In the East of England or London 0800 780078 (24 Hours).

12. The expression "UK Power Networks" includes UK Power Networks (EPN) plc, UK Power Networks (LPN) plc, UK Power Networks (SEPN) plc, UK Power Networks and any of their successors and predecessors in title.

IF YOU DO **NOT** ACCEPT AND/OR **DO NOT** UNDERSTAND THE TERMS OF USE SET OUT IN PARAGRAPHS 1 TO 12 INCLUSIVE ABOVE YOU MUST NOT USE THE PLANS AND RETURN THEM TO ME.

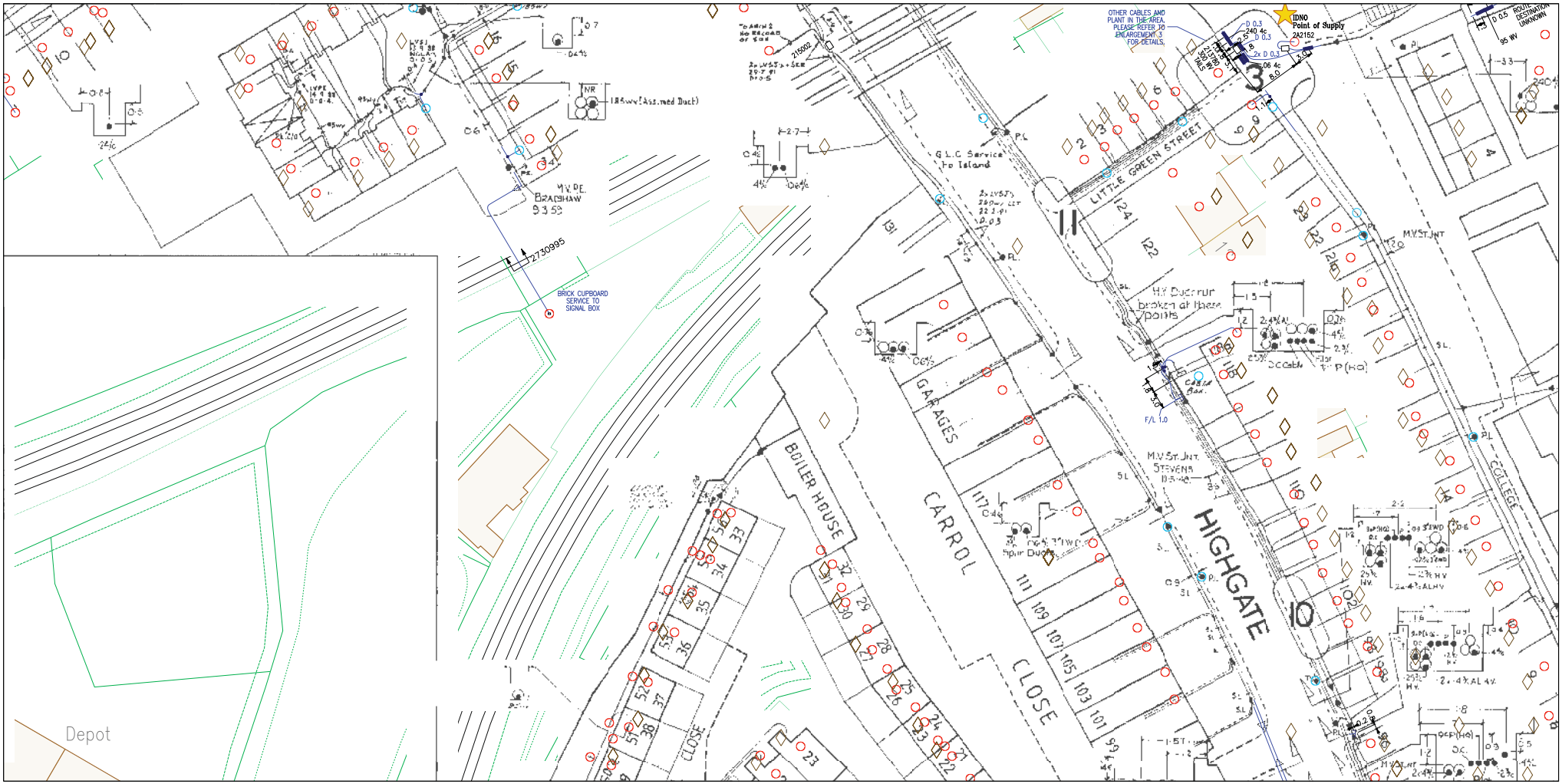
I would remind you that work adjacent to electric lines and/or electrical plant represents a serious risk to health and safety and as such should feature amongst the items you have assessed in your workplace risk assessment and method statement.

I shall be pleased to supply you with further assistance if you require it.

Yours sincerely

L Blizard

Lynda Blizard - Telephone: 0800 0565 866
Plan Provision



Plotted On : 26/05/2017

Plotted By : Lynda Blizard

Plot Description: 106 HIGHGATE ROAD LONDON

2017/2255595/comp

Map Centre : TQ2885NE

UK Power Networks
Plan Provision
Fore Hamlet
IPSWICH
Suffolk
IP3 8AA
Tel 0800 0565 866
Fax 08701 963782

For details of the symbology please refer to http://www.ukpowernetworks.co.uk/safety-emergencies/in-the-workplace/understanding-safety-symbols.shtml

PRIMARY CABLES
EXTRA HIGH VOLTAGE CABLES (EHV) 22,000 TO 132,000 Volts

Depth normally 750mm cover in carriageway & 600mm cover in footway.

Before digging within one metre of these cable routes Telephone 0800 056 5866 in order that the Company's apparatus may be located on site and any necessary protection works agreed.

N.B. THRUST BORERS OR MOLES MUST NOT BE USED WITHIN THE VICINITY OF ANY CABLES BELONGING TO UK POWER NETWORKS WITHOUT FIRST CONTACTING THIS COMPANY.

1. The position of the apparatus shown on this drawing is believed to be correct but the original landmarks may have been altered since the apparatus was installed.
2. The exact position of the apparatus should be verified – use approved cable avoidance tools prior to excavation using suitable hand tools.
3. It is essential that trial holes are carefully made avoiding the use of mechanical tools or picks until the exact location of all cables have been determined.
4. It must be assumed that each property and item of street furniture has an electricity supply. A separate record is kept for each service cable but its route is not necessarily shown on this record.
5. All cables must be treated as being live unless proved otherwise by UK Power Networks.
6. The information provided must be given to all people working near UK Power Networks' plant & equipment. Do not use plans more than 3 months after the issue date for excavation purposes.
7. Please be aware that electric cables/lines belonging to other owners of licensed electricity distribution systems may be present and it is your responsibility to identify their location.

ADVICE TO CONTRACTORS ON AVOIDING DANGER FROM BURIED ELECTRICITY CABLES.

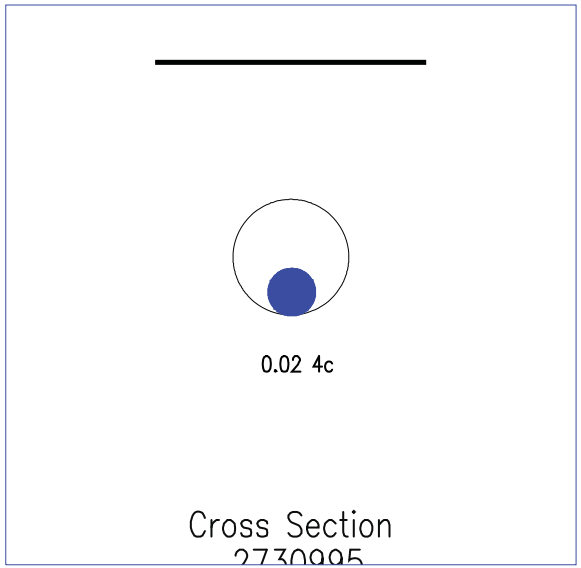
1) Do have cable drawings with you on site and check them before you start the excavation.
2) Do have a cable locator tool on site and use it to help you.
3) Mark out the location of electricity cables.
4) Do not use a mechanical excavator within 0.5m of electricity cables.
5) Use spades and shovels in preference to other tools.
6) Never disturb electricity cables and joints or their protective covers.

IF IN DOUBT – ASK! PHONE 0800 056 5866
EMERGENCY – If you damage a cable or line Phone 0800 780 0780 (24hrs) URGENTLY

These basic safety precautions are explained in detail in the HSE booklet. HS(G)47 – Avoiding Danger from Underground Services, a copy of which may be obtained from your supervisor or HMSO.

Please be aware that electric lines belonging to other owners of licensed electricity distribution systems may be present and it is your responsibility to identify their location.

Cross Section (2730995)



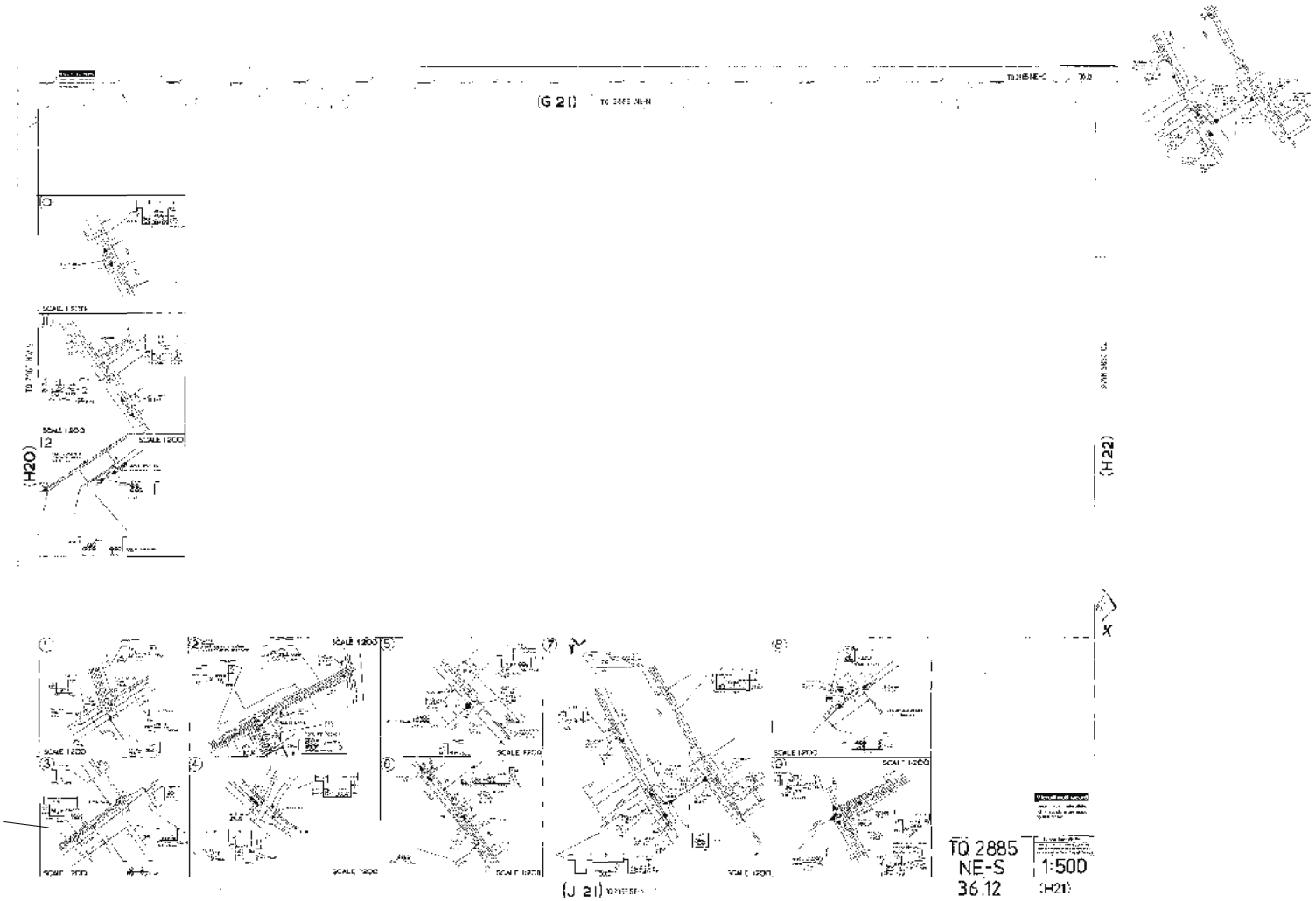
Plotted By: Lynda Blizard

Plotted On 26/05/2017

2017/2255595

TQ2885NEBNW

UK Power Networks



OTHER CABLES AND PLANT IN THE AREA. PLEASE REFER TO MAPBASE FOR DETAILS.

Plotted By: Lynda Blizard

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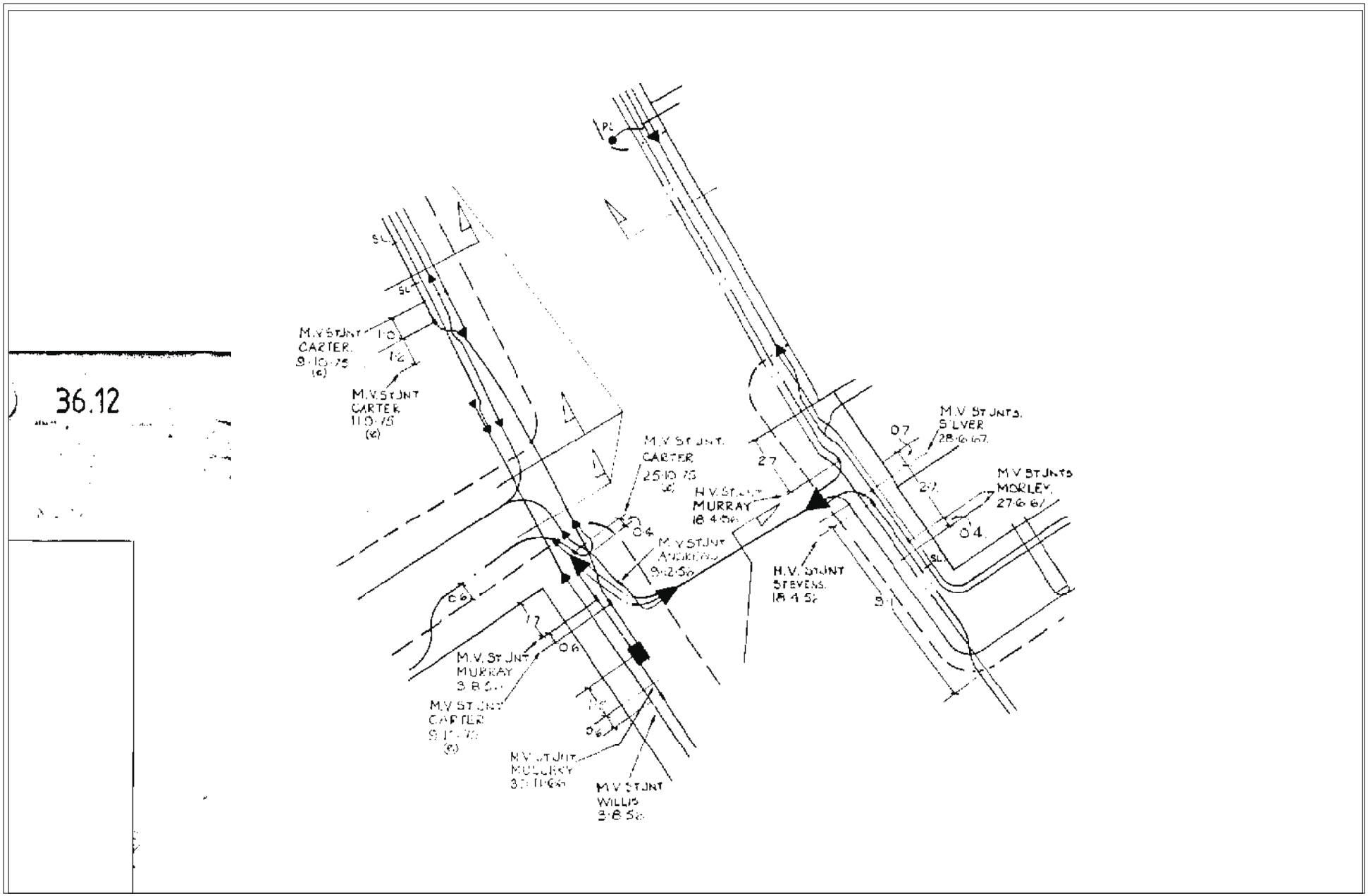
2017/2255595

TQ2885NEBNW

UK Power Networks



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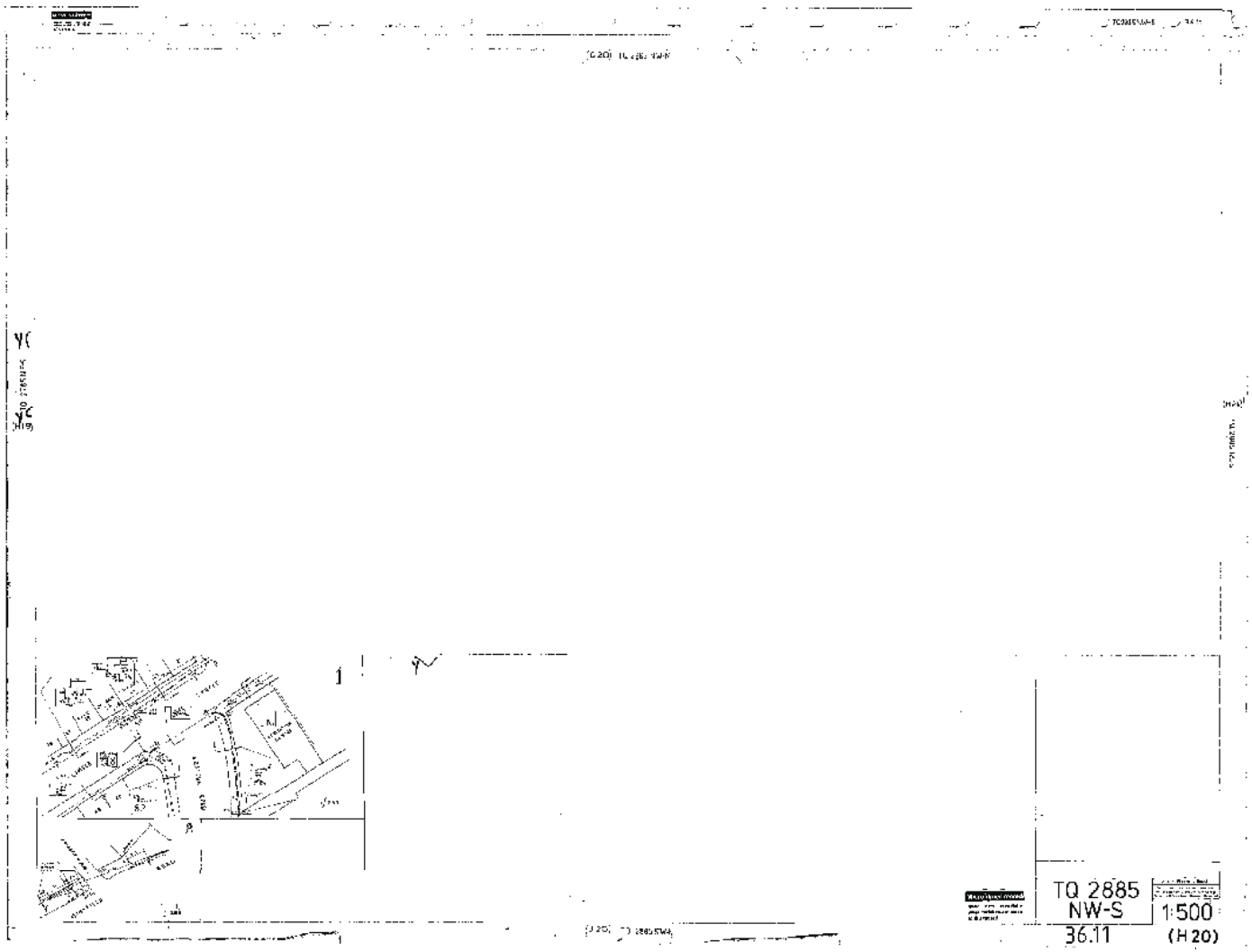
UK Power Networks



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