

Section Profile

Project Name 79 Guildford Street, London WC1N 1DR	Project Number	Project Date 14/05/2018
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Circular, 100 mm, 100 mm

Section	Upstream Node	Downstream Node	Date	Road	Pipe Material	Total Length	Inspected Length
3	GULLY 1	MH03	14/05/2018	79 Guildford Street	Vitrified clay pipe	1.25 m	1.25 m
4	GULLY 2	MH03	14/05/2018	79 Guildford Street	Vitrified clay pipe	0.71 m	0.71 m

Total: 2 Sections x Circular 100 mm, 100 mm = 1.96 m Total Length and 1.96 m Inspected Length

Circular, 150 mm, 150 mm

Section	Upstream Node	Downstream Node	Date	Road	Pipe Material	Total Length	Inspected Length
1	MH01	MH03	14/05/2018	79 Guildford Street	Vitrified clay pipe	13.10 m	13.10 m
2	MH03	SEWER	14/05/2018	79 Guildford Street	Vitrified clay pipe	5.42 m	5.42 m

Total: 2 Sections x Circular 150 mm, 150 mm = 18.52 m Total Length and 18.52 m Inspected Length

Total: 4 Sections = 20.48 m Total Length and 20.48 m Inspected Length

Section 1	Inspection 1	Date 14/05/18	Time 17:03	Client`s Job Ref JSD9098	Weather No Rain Or Snow	Pre Cleaned Yes	PLR MH01X
Operator ADAM SMITH		Vehicle		Camera Push Rod	Preset Length	Criticality Grade	Alternative ID

Scale: 1:114	Position [m]	Code	Observation	Grade
<p>Depth: 1200.00 m</p> <p>MH03</p>				
	0.00	WL	Water level, 0% of the vertical dimension	
	0.00	IC	Start node type, inspection chamber, reference number: MH03	
	2.52	IC	Start node type, inspection chamber, reference number: MH02: MANHOLE SITUATED IN PROPERTY	
	5.66	S01 DEC	Settled deposits, hard or compacted, 5% cross-sectional area loss, start	
	8.71	GP	General photograph taken at this point: PHOTO OF SCALE	
	10.66	F01 DEC	Settled deposits, hard or compacted, 5% cross-sectional area loss, finish	4
	13.10	ICF	Finish node type, inspection chamber, reference number: MH01: BURIED MANHOLE REAR OF PROPERTY BENEATH DECKING	
<p>MH01</p> <p>Depth: m</p>				

Structural Defects					Construction Features				
Service & Operational Observations					Miscellaneous Features				
STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
0	0.0	0.0	0.0	1.0	1	5.0	0.4	5.0	4.0

Section Inspection - 14/05/2018 - MH01X

Section 1	Inspection 1	Date 14/05/18	Time 17:03	Client's Job Ref JSD9098	Weather No Rain Or Snow	Pre Cleaned Yes	PLR MH01X
Operator ADAM SMITH		Vehicle		Camera Push Rod	Preset Length	Criticality Grade	Alternative ID

Section Drawing MH01X



Section Pictures - 14/05/2018 - MH01X

Section	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
1	Upstream	MH01X	JSD9098	JSD9098



MH01X_919b053e-3c15-42d0-ad76-d10e264feae5_20180520_170657_789.jpg, 00:00:00, 0.00 m
Start node type, inspection chamber, reference number: MH03



MH01X_af1f0fd8-07d0-43ad-a8e1-10c938e7c251_20180520_170848_875.jpg, 00:00:34, 2.52 m
Start node type, inspection chamber, reference number: MH02,



MH01X_cf1ed632-094b-4c90-9aed-09c6bcffc7b1_20180520_170938_300.jpg, 00:01:05, 5.66 m
Settled deposits, hard or compacted, 5% cross-sectional area



MH01X_852157e0-1cd5-4193-be50-e3176276f317_20180520_171044_689.jpg, 00:01:44, 8.71 m
General photograph taken at this point, PHOTO OF SCALE



MH01X_of4d0968-b5be-494c-b313-a1e3eadce7a3_20180520_171201_880.jpg, 00:02:29, 13.10 m
Finish node type, inspection chamber, reference number: MH01,

Section Pictures - 14/05/2018 - MH03X

Section	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
2	Downstream	MH03X	JSD9098	JSD9098



MH03X_866941c8-3dbc-41b9-970f-964bc9294d16_20180520_171457_908.jpg, 00:00:00, 0.00 m
Start node type, inspection chamber, reference number: MH03



MH03X_61e378b2-d115-4780-bfc5-56fde129f536_20180520_171601_747.jpg, 00:00:13, 0.94 m
Joint displaced, medium



MH03X_db4c3902-a805-424c-9d19-91b8378396aa_20180520_171714_316.jpg, 00:00:42, 4.65 m
Joint displaced, large



MH03X_c99818b7-19b7-4326-bfa4-27cbf5ff8a6f_20180520_171729_205.jpg, 00:00:47, 5.42 m
Finish node type, major connection without manhole, reference

Section Inspection - 14/05/2018 - GULLY 1X

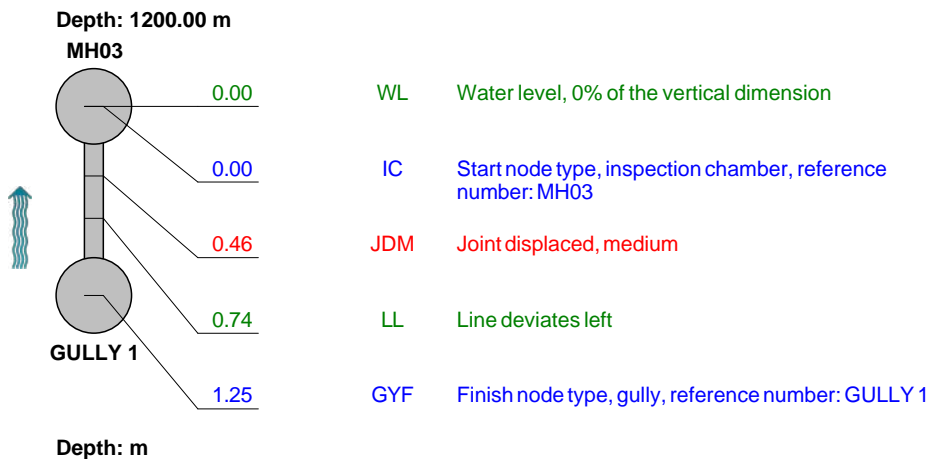
Section 3	Inspection 3	Date 14/05/18	Time 17:17	Client's Job Ref JSD9098	Weather No Rain Or Snow	Pre Cleaned Yes	PLR GULLY 1X
Operator ADAM SMITH		Vehicle		Camera Push Rod	Preset Length	Criticality Grade	Alternative ID

Town or Village:		Inspection Direction: Upstream		Upstream Node: GULLY 1	
Road: 79 Guildford Street		Inspected Length: 1.25 m		Upstream Pipe Depth:	
Location: Gardens (within private property)		Total Length: 1.25 m		Downstream Node: MH03	
Surface Type:		Joint Length: 0.00 m		Downstream Pipe Depth: 1,200.000 m	
Use: Combined		Pipe Shape: Circular			
Type of Pipe: Gravity drain/sewer		Dia/Height: 100 mm		Width: 100 mm	
Year Constructed:		Pipe Material: Vitrified clay pipe			
Flow Control: No flow control		Lining Type: None			
Inspection Purpose:		Lining Material: None			

Comments:

Recommendations:

Scale: 1:50 Position [m] Code Observation Grade



3

Structural Defects					Construction Features				
Service & Operational Observations					Miscellaneous Features				
STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
1	1.0	0.8	1.0	1.0	1	2.0	1.6	2.0	3.0

Section Pictures - 14/05/2018 - GULLY 1X

Section	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
3	Upstream	GULLY 1X	JSD9098	JSD9098



GULLY
1X_7e78fbf1-5979-48e8-971b-25dca53ff650_20180520_17193
3_348.jpg, 00:00:00, 0.00 m



GULLY
1X_b0313d24-22c8-4731-a547-a755dd71f738_20180520_1719
56_500.jpg, 00:00:13, 0.46 m



GULLY
1X_37939400-cdfb-465e-beeb-214ff5a04dfd_20180520_17203
6_352.jpg, 00:00:28, 1.25 m

Section Inspection - 14/05/2018 - GULLY 2X

Section 4	Inspection 4	Date 14/05/18	Time 17:21	Client's Job Ref JSD9098	Weather No Rain Or Snow	Pre Cleaned Yes	PLR GULLY 2X
Operator ADAM SMITH		Vehicle		Camera Push Rod	Preset Length	Criticality Grade	Alternative ID

Town or Village:		Inspection Direction: Upstream		Upstream Node: GULLY 2	
Road:	79 Guildford Street	Inspected Length: 0.71 m		Upstream Pipe Depth:	
Location:	Gardens (within private property)	Total Length: 0.71 m		Downstream Node: MH03	
Surface Type:		Joint Length: 0.00 m		Downstream Pipe Depth: 1,200.000 m	
Use:	Combined			Pipe Shape: Circular	
Type of Pipe:	Gravity drain/sewer			Dia/Height: 100 mm	Width: 100 mm
Year Constructed:				Pipe Material: Vitrified clay pipe	
Flow Control:	No flow control			Lining Type: None	
Inspection Purpose:				Lining Material: None	
Comments:	NO TRAP WITHIN GULLY TO PREVENT SEWER GASES OR RODENTS				
Recommendations:	BY METHOD OF EXCAVATION, INSTALL A 110MM PVC TRAPPED GULLY				

Scale: 1:50	Position [m]	Code	Observation	Grade
	0.00	WL	Water level, 0% of the vertical dimension	
	0.00	IC	Start node type, inspection chamber, reference number: MH03	
	0.71	GYF	Finish node type, gully, reference number: GULLY 2: GULLY WITH NO TRAP TO PREVENT RODENTS OR SEWER GASES FROM RISING	

Structural Defects					Construction Features				
Service & Operational Observations					Miscellaneous Features				
STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
0	0.0	0.0	0.0	1.0	0	0.0	0.0	0.0	1.0

Section Pictures - 14/05/2018 - GULLY 2X

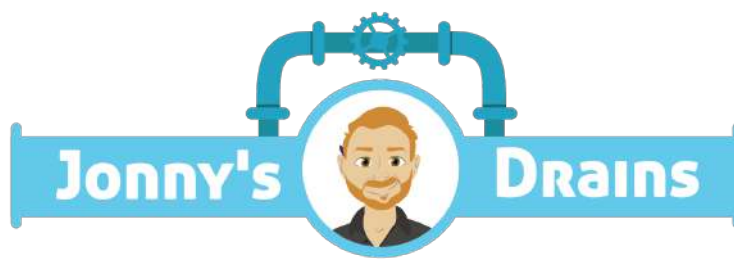
Section	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
4	Upstream	GULLY 2X	JSD9098	JSD9098



GULLY
2X_0b01dde3-d927-4b11-84e6-f6a70ff29d8d_20180520_172237_778.jpg, 00:00:00, 0.00 m



GULLY
2X_2ccb08c8-fe01-4461-af8d-b1e8db087d1c_20180520_172328_578.jpg, 00:00:18, 0.71 m



Site Report

Date :- 05/03/2019

Site Address :- 79 Guildford Street, London, WC1N 1DF

Our Findings:

We attended site and installed a new access point onto the cast iron drop pipe located in the light-well.

A CCTV survey was successfully carried out upstream to find it leads to either a gully or a discharge pipe at 1.9 metres.



Following this, a dye test was carried out from the SVP located in the rear garden for over 15 minutes and there was no evidence of dye in the interceptor located in the front garden.

I do not believe the SVP to be connected to the foul drainage system of 79 Guildford Street, however; there may be a pump chamber under the decking, deck boards should be removed and area inspected.

Kind regards

John Balzaretto
Jonny's Drains LTD



Project Information

Project Name	Project Number	Project Date
79 Guildford Street, London, WC1N 1DF		06/03/2019

Site

Company: BUF Architecture LTD
Contact: Hyunkyu Kim
Department: 07933557341
Street: 79 Guildford Street
Town or City: London
Post Code: WC1N 1DF
Email: hk@bufarchitecture.com

Contractor

Company: Jonny's Drains LTD
Contact: John Balzaretta
Street: 63 Ash Road
Town or City: Westerham
County: Kent
Post Code: TN16 1EJ
Phone: 01959 928 853



Section Inspection - 05/03/2019 - X

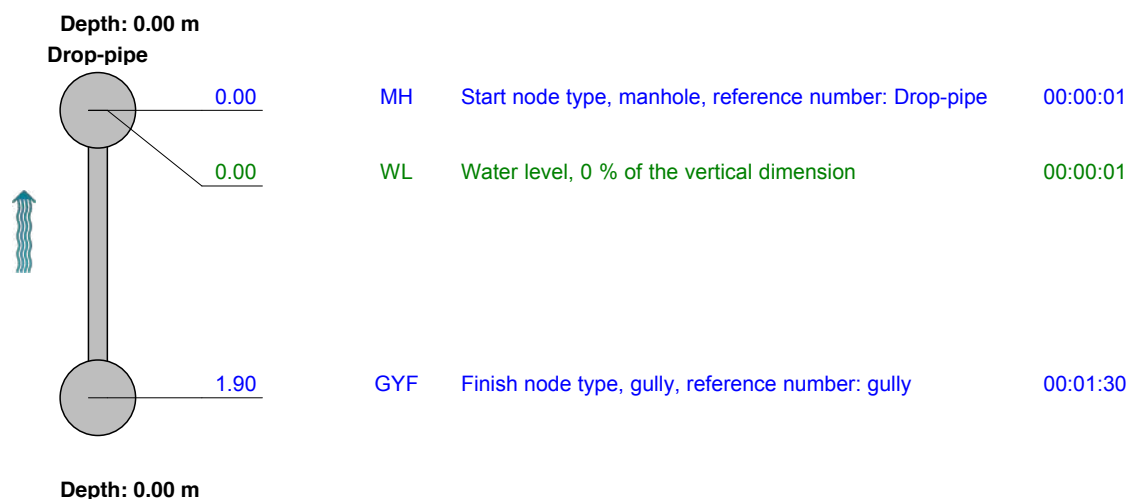
Section 2	Inspection 2	Date 05/03/19	Time 11:57	Client's Job Ref 01	Weather	Pre Cleaned N	PLR X
Operator 7935/B9566/C0831		Vehicle		Camera	Preset Length	Criticality Grade	Alternative ID

Town or Village:		Inspection Direction: Upstream		Upstream Node:	
Road:		Inspected Length: 1.90 m		Upstream Pipe Depth: 0.000 m	
Location: Under a permanent building		Total Length: 1.90 m		Downstream Node: DROP-PIPE	
Surface Type:		Joint Length: 0.00 m		Downstream Pipe Depth: 0.000 m	
Use: Foul		Pipe Shape: Circular			
Type of Pipe: Gravity drain/sewer		Dia/Height: 100 mm			
Year Constructed:		Pipe Material: Cast iron			
Flow Control: No flow control		Lining Type:			
Inspection Purpose: Sample survey to determine asset condition		Lining Material:			

Comments:

Recommendations:

Scale: 1:50 Position [m] Code Observation MPEG Photo Grade



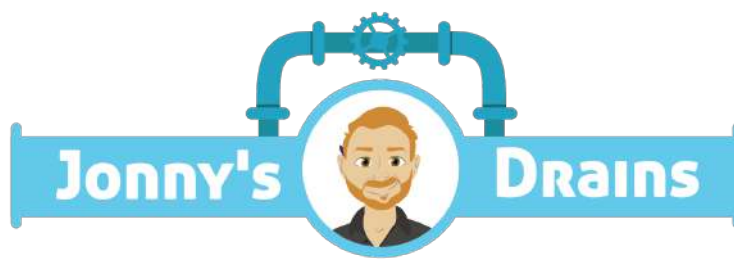
Structural Defects					Construction Features				
Service & Operational Observations					Miscellaneous Features				
STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
0	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0

Section Pictures - 05/03/2019 - X

Section	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
2	Upstream	X	01	



20190305-120013-snap0000.jpg, 00:01:30, 1.90 m
Finish node type, gully, reference number: gully



Site Report

Date :- 20th February 2019

Site Address :- 79 Guildford Street, London, WC1N 1DF

Our Findings:

We attended site to conduct a CCTV survey of an underground foul drain and two rainwater down pipes located in the rear garden.

Rainwater:

A CCTV survey was conducted from the top of the first rain water down pipe, however, our camera was unable to navigate the 68mm knuckle 90 degree bend at the base.

Following this, a dye test was conducted but no dye was seen in the interceptor chamber located in the front garden.

Electrical connections found in the rear garden suggest there may be a pumping chamber, this could explain why no dye had entered the interceptor.

The second rainwater down pipe was found to be discharging to the surface and is not connected to a drainage system.

Foul:

Access was created at the base of an SVP located to the back of the rear garden, however; due to five 90 degree bends within 1 metre, our camera was unable to continue.

An attempt was made to remove the cast iron access located in the rear light well but this was unsuccessful.

Due to other site investigations taking place, I no longer had access to the interceptor located in the front garden.

I therefore recommend the following course of action:

- To install access point on cast iron drop pipe located in rear garden. (<https://www.sle.co.uk/products/consumables-ancillaries/access-point>)
- To conduct CCTV survey upstream and investigate possible connections from SVP and rainwater down pipe.
- If required, conduct a dye test from the SVP to interceptor chamber to confirm a connection.
- If required, to conduct a pressurised smoke test from the interceptor upstream to establish connections to SVP and rainwater system.

Cost of above works: £290.00 + VAT

I await your further instruction.

Kind regards

John Balzaretto
Jonny's Drains LTD

APPENDIX C

EDWARD GARDNER SURVEY DRAWINGS

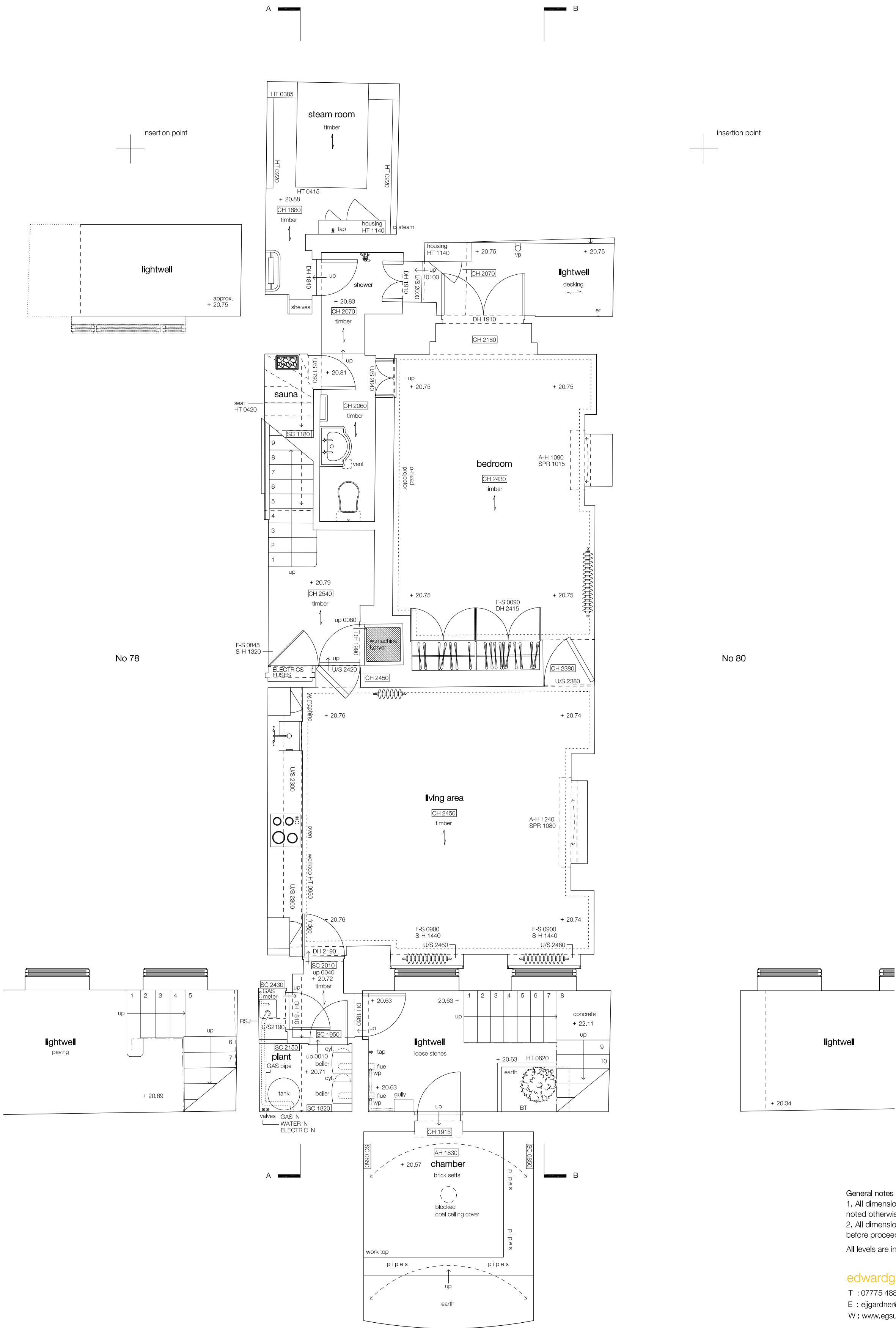






wp	self and vent pipe
wp	rain water pipe
dh	downward direction
DH 1500	door height
DH 2000	beam height
AH 2000	arch height
SPR 1800	spring point
FS 0100	floor to all
SH 1800	shelf to head
US 1800	underside
SC 2430	sliding ceiling
SC 2000	room height
K - - -	overhead slope
← - - -	radiator
A	section marker

TOP	top of fence
TOV	top of wall
K	inspection cover
d	cover level
d	level level
up	upside to all
up	building height
up	stop valve
up	stop
up	telecom
conv	cable television
conv	concrete
clnt	countdown
to	fireplace



General notes -
1. All dimensions are in millimeters unless noted otherwise.
2. All dimensions shall be verified on site before proceeding with the work.
All levels are in meters related to GPS (OSTN15)

edwardgardner surveys
T : 07775 488916
E : ejigardner@icloud.com
W : www.egsurveys.co.uk

client: BÜF Architecture Ltd
project: 79 Guilford St, London WC1N 1DF
title: Existing Lower Ground Floor
date: Mar 2018
scale: 1:50 - Plan size A2
drawing: 18-007-2





General notes -

1. All dimensions are in millimeters unless noted otherwise.
2. All dimensions shall be verified on site before proceeding with the work.

All levels are in meters related to GPS (OSTN15)

edwardgardner surveys
T : 07775 488916
E : ejgardner@icloud.com
W : www.egsurveys.co.uk

client: BÜF Architecture Ltd

project: 79 Guilford St, London WC1N 1DF

title: Existing Roof Plan

date: Mar 2018

scale: 1:50 - Plan size A2

drawing: 18-007-7



EXISTING FRONT ELEVATION (south-east)

Datum 20.00m

No 78

No 79

No 80

General notes -
1. All dimensions are in millimeters unless noted otherwise.
2. All dimensions shall be verified on site before proceeding with the work.
All levels are in meters related to GPS (OSTN15)

edwardgardner surveys

T : 07775 488916
E : ejjgardner@icloud.com
W : www.egsurveys.co.uk

client: BÜF Architecture Ltd
project: 79 Gullford St, London WC1N 1DF
title: Existing Front Elevation
date: Mar 2018
scale: 1:50 - Plan size A2
drawing: 18-007-8



EXISTING REAR ELEVATION (north-west)

Datum 20.00m

No 80

No 79

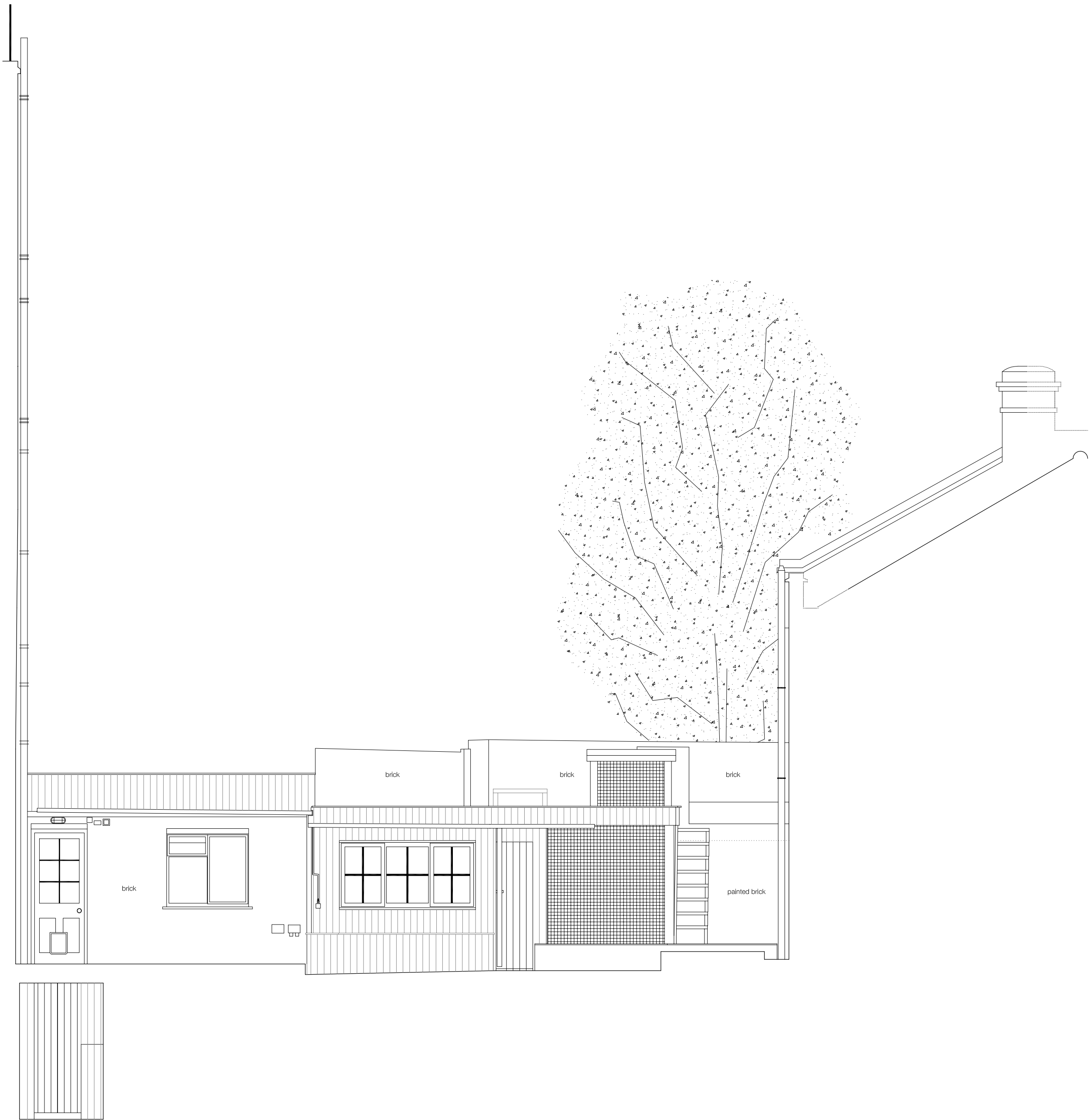
No 78

General notes -
1. All dimensions are in millimeters unless noted otherwise.
2. All dimensions shall be verified on site before proceeding with the work.
All levels are in meters related to GPS (OSTN15)

edwardgardner surveys

T : 07775 488916
E : ejigardner@icloud.com
W : www.egsurveys.co.uk

client: BÜF Architecture Ltd
project: 79 Guilford St, London WC1N 1DF
title: Existing Rear Elevation
date: Mar 2018
scale: 1:50 - Plan size A2
drawing: 18-007-9



EXISTING SIDE ELEVATION (south-west)

Datum 20.00m

General notes -
1. All dimensions are in millimeters unless noted otherwise.
2. All dimensions shall be verified on site before proceeding with the work.
All levels are in meters related to GPS (OSTN15)

edwardgardner surveys
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E : ejlgardner@icloud.com
W : www.egsurveys.co.uk

client: BÜF Architecture Ltd
project: 79 Guilford St, London WC1N 1DF
title: Existing Side Elevation
date: Mar 2018
scale: 1:50 - Plan size A2
drawing: 18-007-10



General notes -
1. All dimensions are in millimeters unless noted otherwise.
2. All dimensions shall be verified on site before proceeding with the work.
All levels are in meters related to GPS (OSTN15)

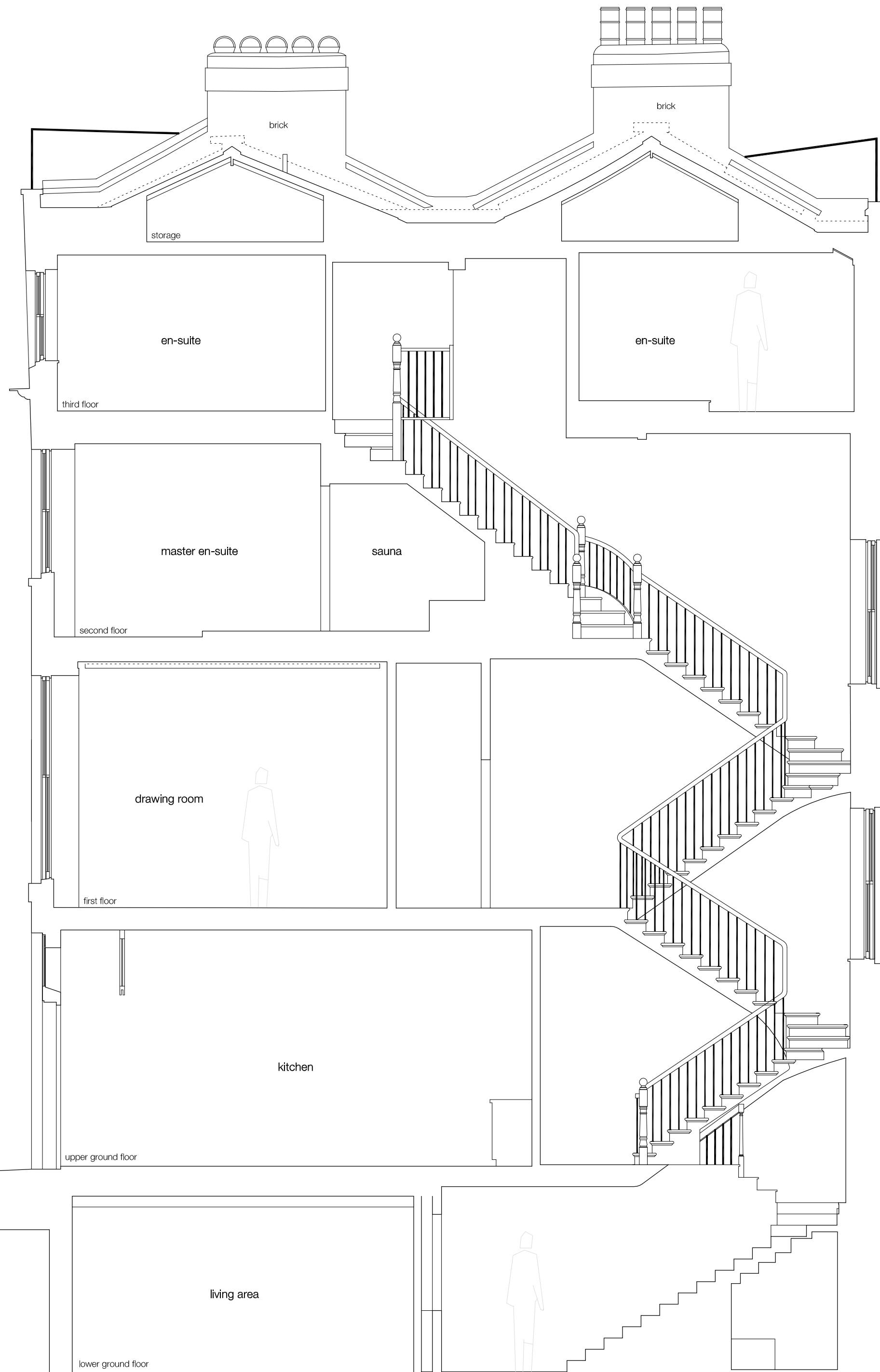
edwardgardner surveys

T : 07775 488916
E : ejjgardner@icloud.com
W : www.egsurveys.co.uk

client: BÜF Architecture Ltd
project: 79 Gullford St, London WC1N 1DF
title: Existing Rear Boundary Wall Elevation
date: Mar 2018
scale: 1:50 - Plan size A3
drawing: 18-007-11

EXISTING REAR BOUNDARY ELEVATION No5 COLONNADE (south-east)

Datum 22.00m



General notes -

1. All dimensions are in millimeters unless noted otherwise.
2. All dimensions shall be verified on site before proceeding with the work.

All levels are in meters related to GPS (OSTN15)

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W : www.egsurveys.co.uk

client: BÜF Architecture Ltd

project: 79 Guilford St, London WC1N 1DF

title: Existing Section A-A

date: Mar 2018

scale: 1:50 - Plan size A2

drawing: 18-007-12

lo 5

EXISTING SECTION A-A

Datum 20.00m

General notes -
1. All dimensions are in millimeters unless noted otherwise.
2. All dimensions shall be verified on site before proceeding with the work.
All levels are in meters related to GPS (OSTN15)

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T : 07775 488916
E : ejjgardner@icloud.com
W : www.egsurveys.co.uk

client: BÜF Architecture Ltd
project: 79 Guilford St, London WC1N 1DF
title: Existing Section B-B
date: Mar 2018
scale: 1:50 - Plan size A2
drawing: 18-007-13



EXISTING SECTION B-B

Datum 20.00m

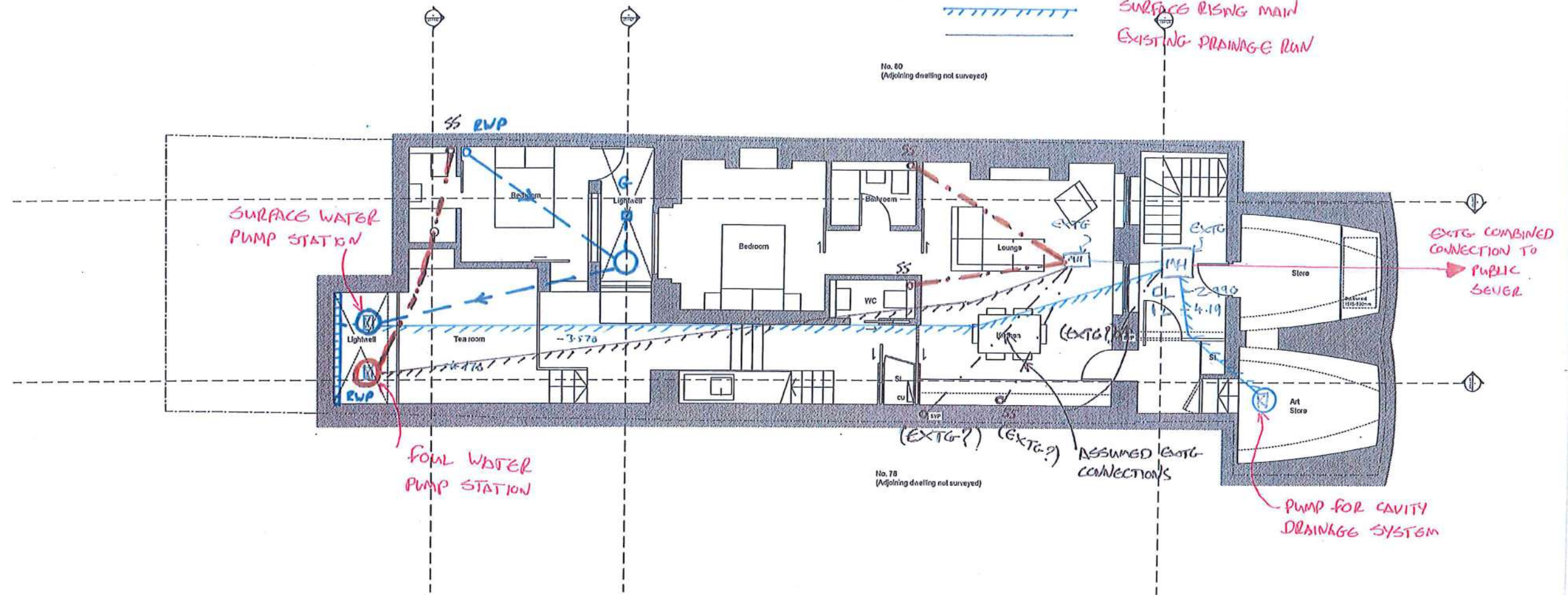
APPENDIX D

GSE PROPOSED DRAINAGE DRAWINGS



KEY:

- SS O STUB STACK
- PROPOSED FOUL SEWER
- PROPOSED SURFACE WATER SEWER
- G [Symbol] YARD GULLY
- SD AGO SLOT DRAIN
- RWP O RAINWATER PIPE
- FOUL RISING MAIN
- SURFACE RISING MAIN
- EXISTING DRAINAGE RUN



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ALL DIMENSIONS IN mm UNLESS OTHERWISE NOTED.
ALL DIMENSIONS AND LEVELS TO BE CONFIRMED BY ARCHITECT.
SETTING OUT TO BE CONFIRMED ON SITE.

J001413

79 GUILFORD STREET

GREEN
STRUCTURAL
ENGINEERING
www.gseld.co.uk

Unit 5 Quayside Lodge,
William Morris Way,
Fulham, SW6 2UZ
020 3405 3120

PROPOSED BASEMENT DRAINAGE

PRELIMINARY

DRAWN
MJE

CHECKED

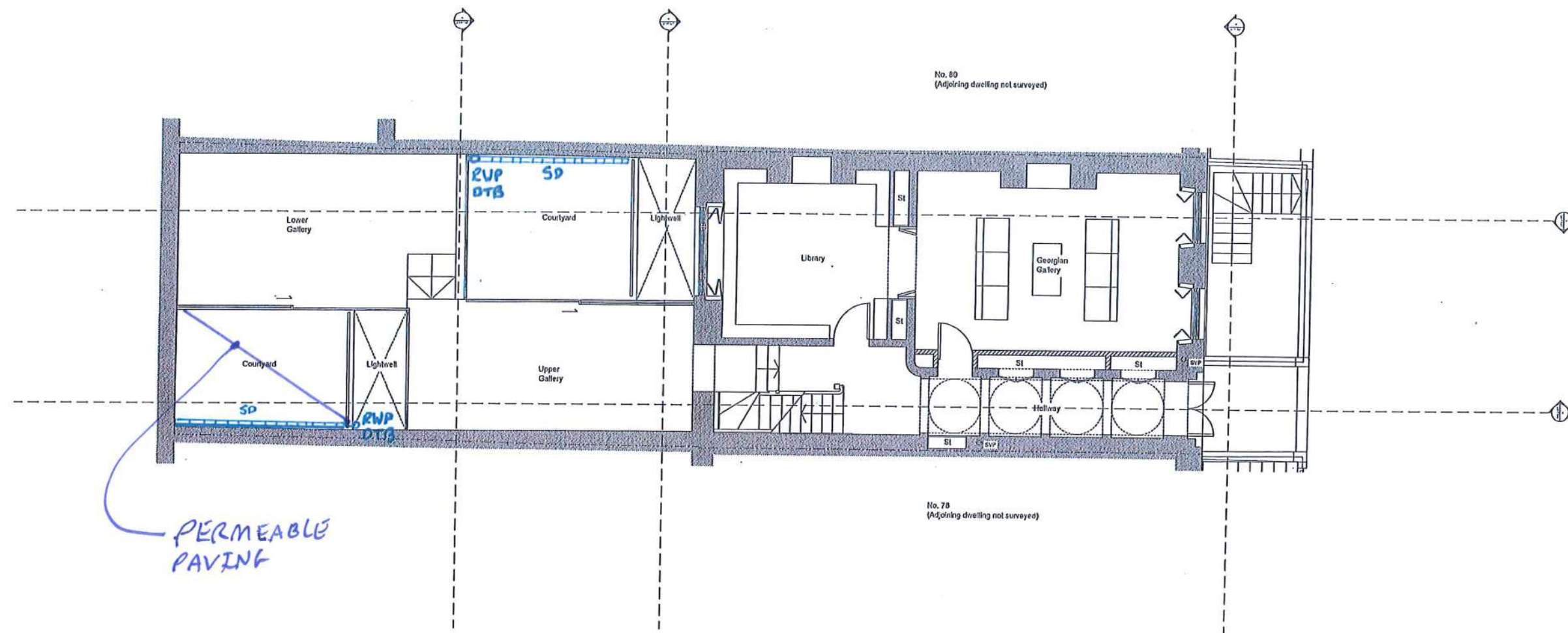
DATE
26/04/2019

PAPER SIZE
A3

SCALE
1:200

DRAWING NO.
SK-P-200

REV.
P1



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ALL DIMENSIONS AND LEVELS TO BE CONFIRMED BY ARCHITECT.
SETTING OUT TO BE CONFIRMED ON SITE.

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Unit 5 Quayside Lodge,
William Morris Way,
Fulham, SW6 2UZ
020 3405 3120

PROPOSED GROUND FLOOR DRAINAGE

PRELIMINARY

DRAWN
MJE

CHECKED

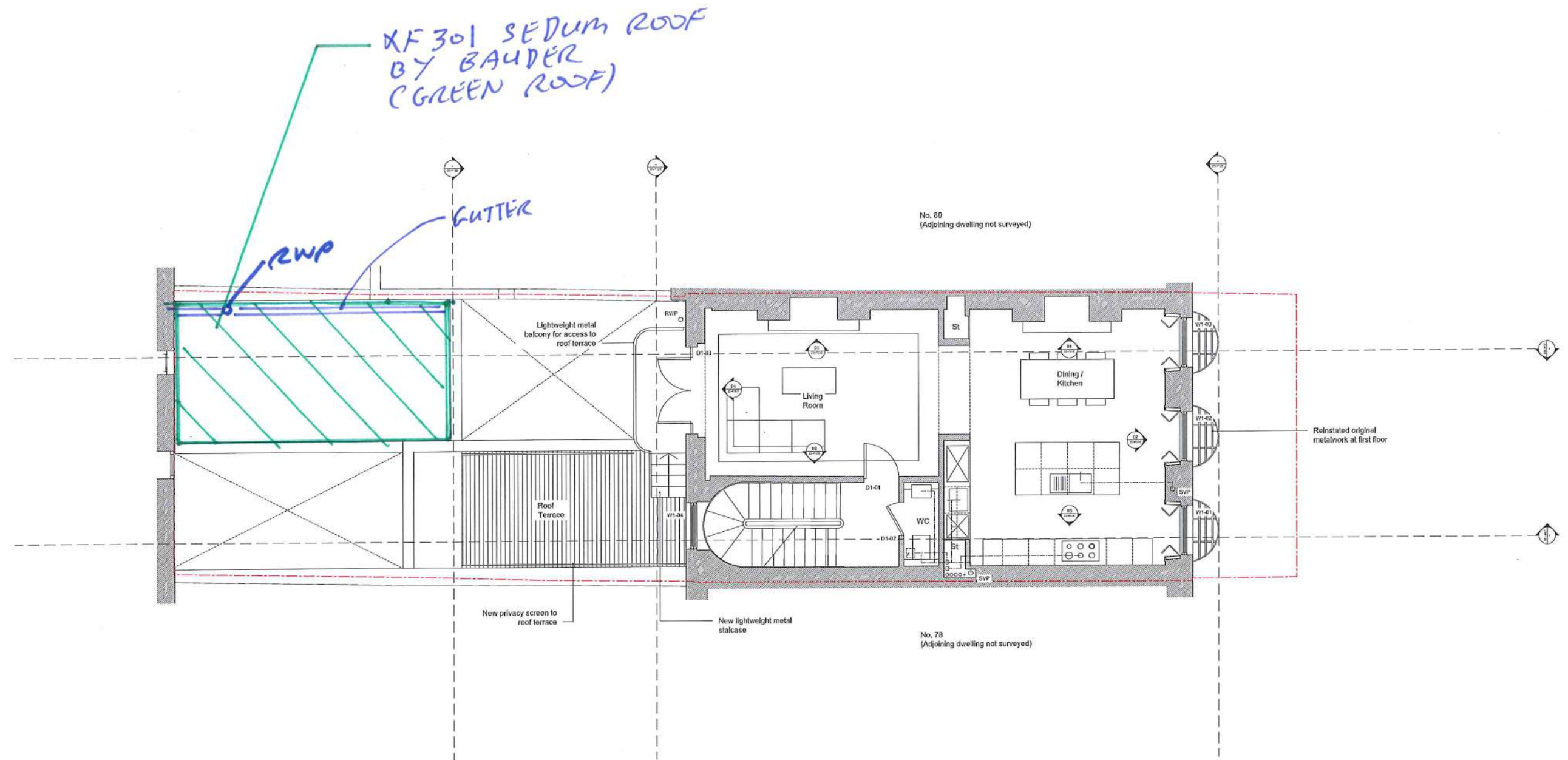
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26/04/2019

PAPER SIZE
A3

SCALE
1:200

DRAWING NO.
SK-P-201

REV.
P1



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ALL DIMENSIONS AND LEVELS TO BE CONFIRMED BY ARCHITECT.
SETTING OUT TO BE CONFIRMED ON SITE.

J001413

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William Morris Way,
Fulham, SW6 2UZ
020 3405 3120

PROPOSED REAR ROOF DRAINAGE

PRELIMINARY

DRAWN
MJE

CHECKED

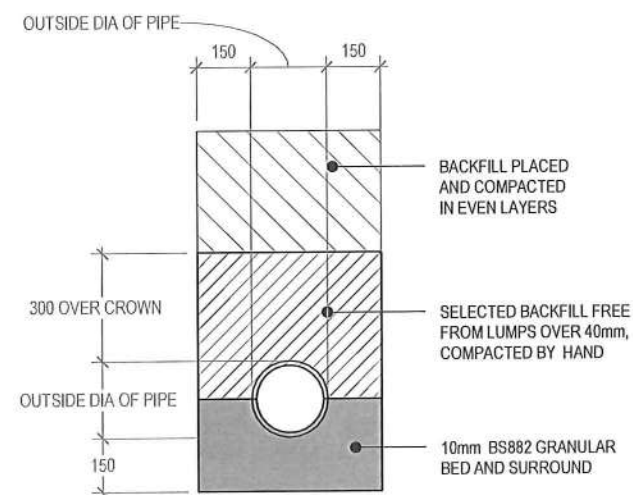
DATE
26/04/2019

PAPER SIZE
A3

SCALE
1:200

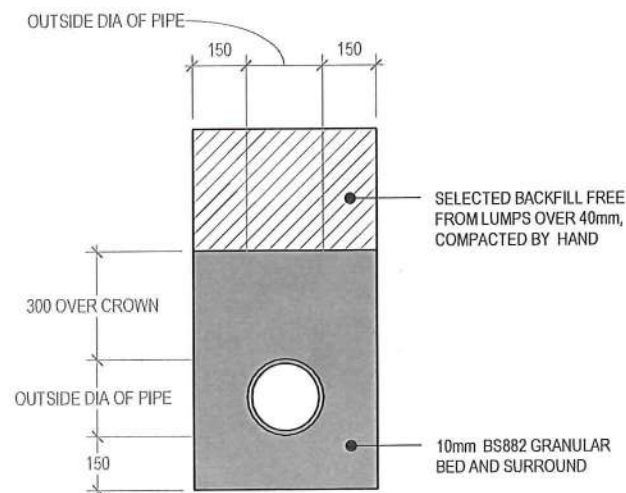
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SK-P-202

REV.
P1



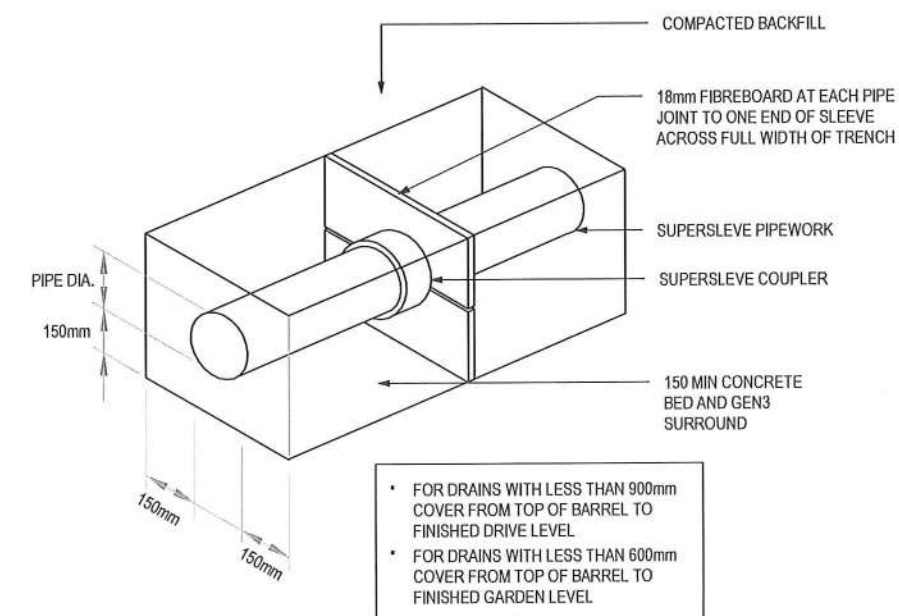
BEDDING CLASS B

1:20



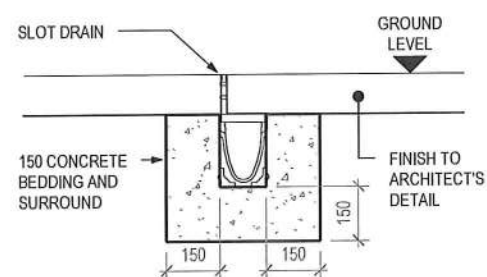
BEDDING CLASS S

1:20



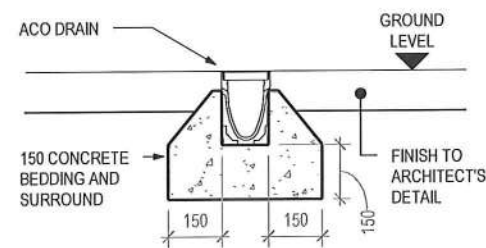
CONCRETE BED AND SURROUND FOR DRAINS

1:20



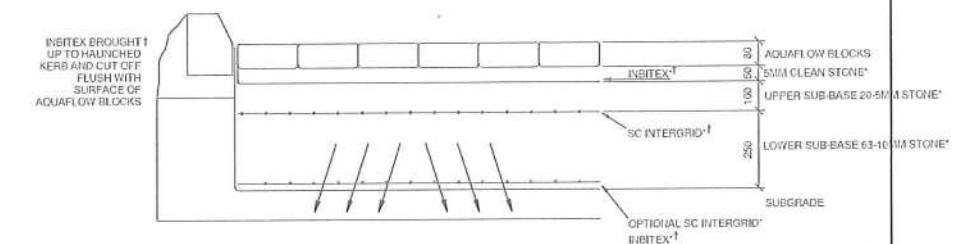
SLOT DRAIN DETAIL

1:20



DRAINAGE CHANNEL DETAIL

1:20

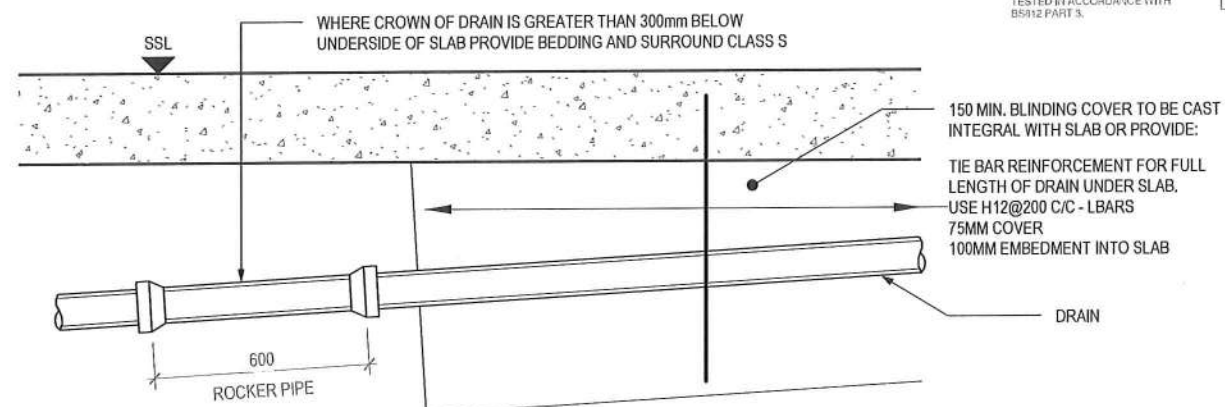
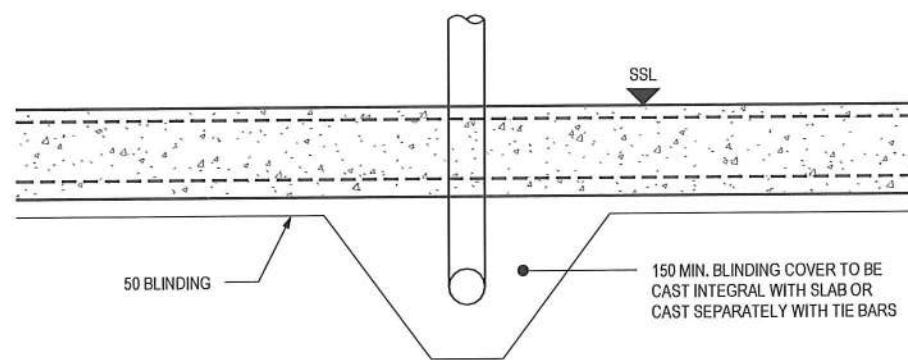


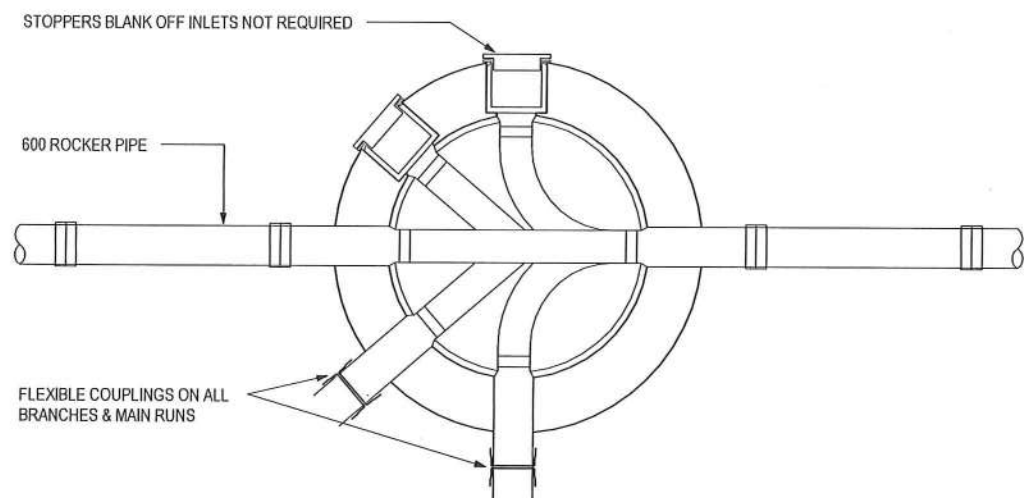
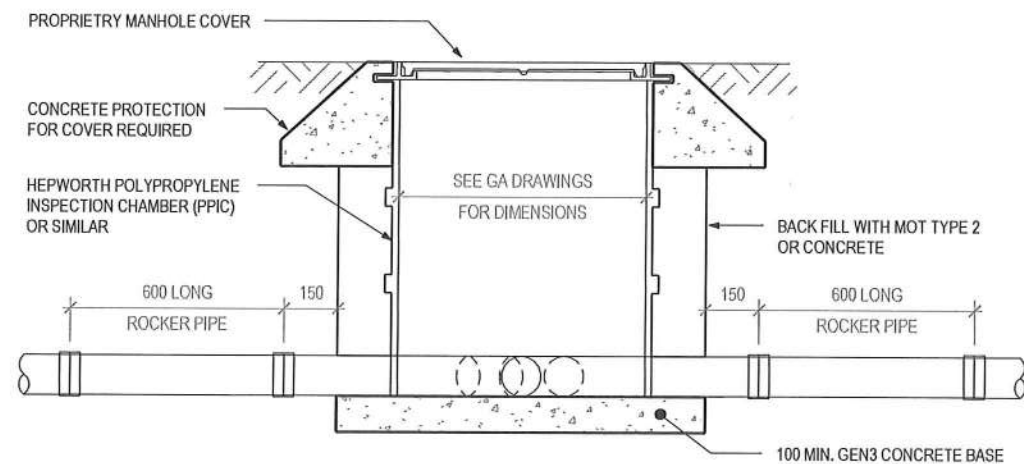
TYPICAL INFILTRATION SYSTEM

AREA SUBJECT TO TRAFFICKING BY HGV'S
SCALE 1:10

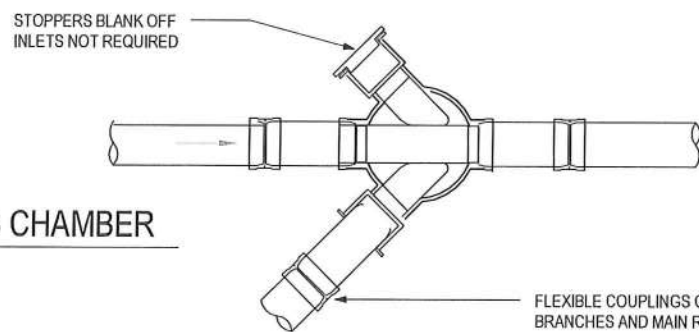
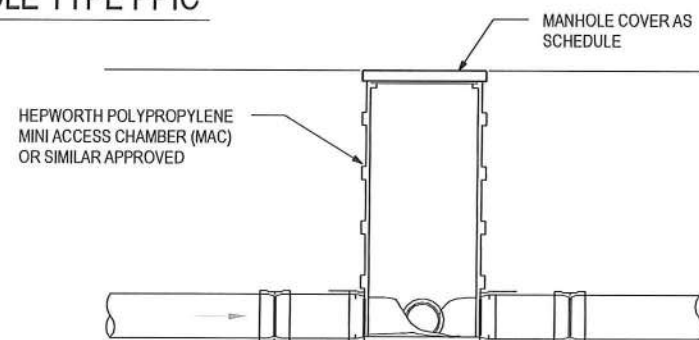
NOTES
1. SUPPLIED BY WTB GEOTEXTILES
* SPECIFICATION FOR SUB-BASE LAYING COURSE AND BUNDLING LAYER: THE CRUSHED STONE MUST POSSESS WELL DEFINED EDGES AND HAVE A MINIMUM 10% FINES VALUE OF 150µm WHEN TESTED IN ACCORDANCE WITH BS912 PART 3.

GRADING OF LOWER SUB-BASE STONE	
SIEVE SIZE	% PASSING
100mm	100
80mm	80-100
60mm	60-80
40mm	30-50
20mm	0-20
10mm	0-5

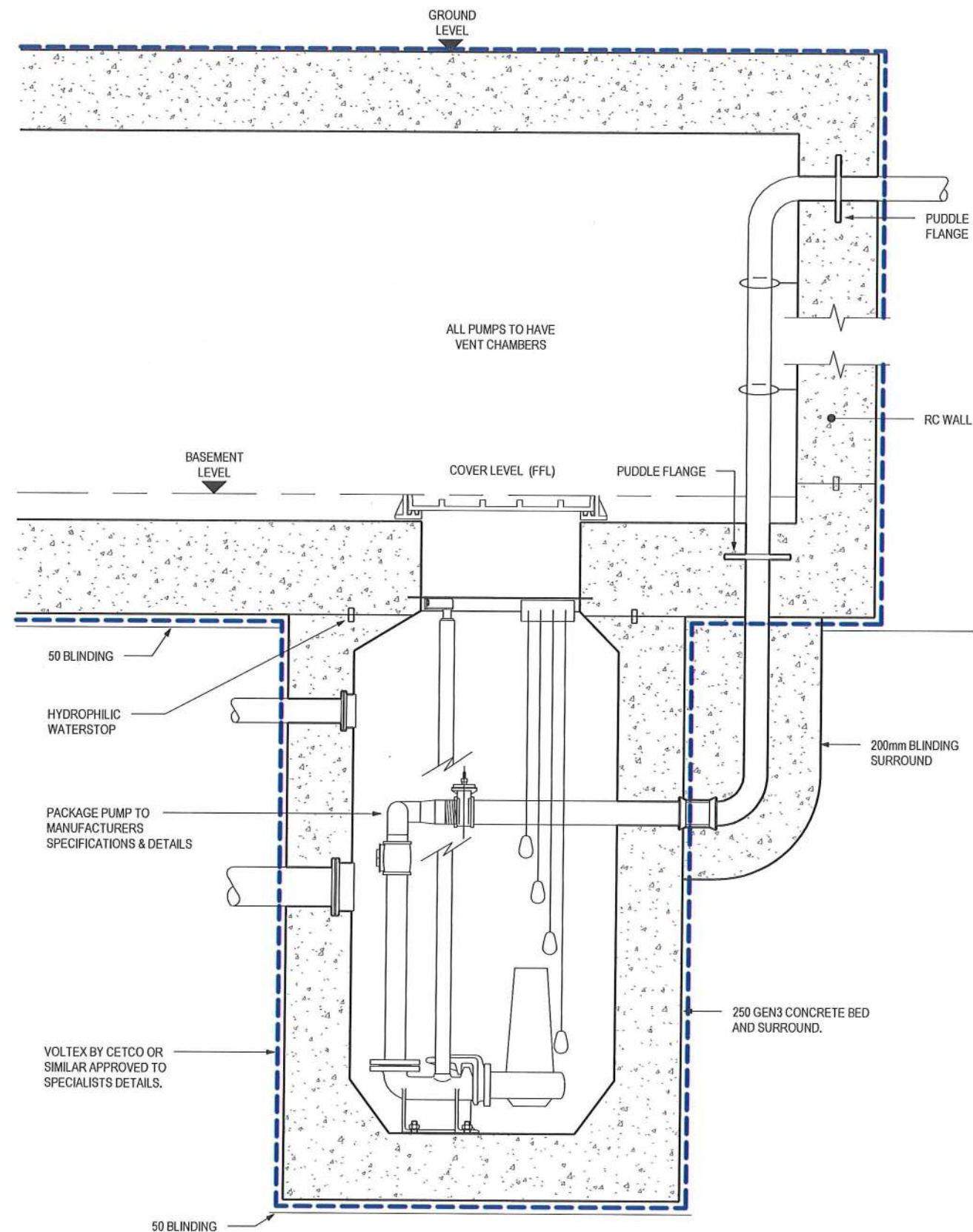




MANHOLE TYPE PPIC
1:20



MINI ACCESS CHAMBER
1:20



TYPICAL PACKAGE PUMP DETAIL
1:20

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THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL SITE DIMENSIONS BEFORE COMMENCING ANY WORK.
ALL DIMENSIONS IN mm UNLESS OTHERWISE NOTED.
ALL DIMENSIONS AND LEVELS TO BE CONFIRMED BY ARCHITECT.
SETTING OUT TO BE CONFIRMED ON SITE.

J001413

79 GUILFORD STREET

GSE GREEN
STRUCTURAL
ENGINEERING
www.gseld.co.uk

Unit 5 Quayside Lodge,
William Morris Way,
Fulham, SW6 2UZ
020 3405 3120

TYPICAL DRAINAGE DETAILS (SHEET 2 OF 2)

DRAWN
MJE

CHECKED

DATE
26/04/2019

PAPER SIZE
A3

SCALE
1:200

PRELIMINARY

DRAWING NO.
SK-P-204

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APPENDIX E

EXTRACT OF SITE INVESTIGATION REPORT



5. HYDROLOGICAL SETTING (SURFACE WATER)

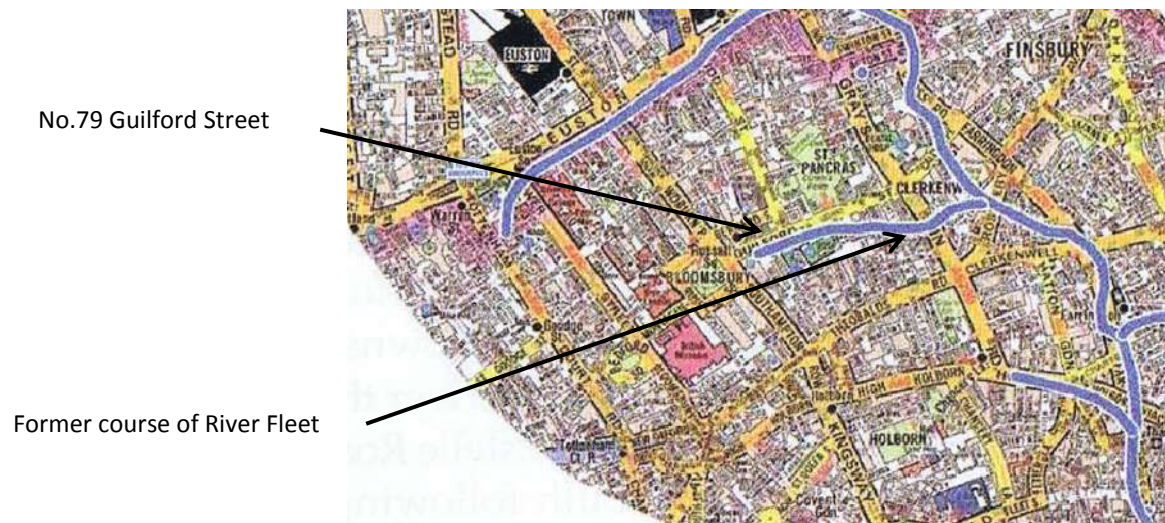


Figure 4: Extract from Map 9 of Barton & Myers' Lost Rivers of London (2016) – 'The course of the Fleet from Hampstead and Highgate to the Thames at Blackfriars'.

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- 5.1 Barton and Myers' map of the 'lost' rivers of London (Figure 4) indicates that a former tributary of the Fleet (which is now carried in dedicated culverts or the sewer system) runs along Guilford Street, from the junction between Guilford Street and Russell Square to the main channel of the Fleet at Clerkenwell. There is some discrepancy between the 2016 edition (presented in Figure 4) and the 1992 edition, which records this tributary forking into three smaller tributaries, with one running north along Guilford Place into Coram Fields, one running west along Great Ormond Street and one running south along Lamb's Conduit Street.
- 5.2 The historic OS maps (presented in Appendix E) do not show any surface water features in the vicinity of No.79. This is compatible with the local tributary (or tributaries) of the River Fleet having been culverted prior to the publication of the earliest map, dated 1871-1875.
- 5.3 To the front of the property, the lightwell is partially protected from surface water run-off from the Guilford Street footway by a low up-stand which forms the base of the metal railings (Photos 1 & 2). This up-stand is not present where the access steps meet the footway. There are two steps up from the footway to the front door of No.79, which is also raised above the level of neighbouring No.78's lightwell (see Photo 2). Although the adjacent level of No.80 is above that of No.79, there is another low up-stand topped with metal railings along the boundary. These upstands reduce the potential for surface water run-off into the lightwell from the adjoining properties.

- 5.4 The rear garden is partly surfaced by pea gravel above a plastic membrane, with wooden decking covering the area adjacent to the rear main wall and rear lightwell (Photos 3 & 5). The raised planting beds along sections of the boundary wall and to the rear of the garden (Photo 4) will provide some surface water infiltration and temporary retention.
- 5.5 To the rear of No.79, the garden is bounded on all sides by high brickwork walls (No.80's rear extension, garden boundary walls, party with No's 78 and 80, and the rear wall of No.5), so there is no potential for surface water run-off from the adjoining properties.
- 5.6 The following hydrological data for the site has been obtained from the Groundsure Enviro Insight report (see Appendix D), including:
- The 'Ordnance Survey MasterMap Water Network' does not hold records for any entries of rivers or other water courses within 500m of the site (App.D, Section 6.10).
 - There are no surface water features recorded within 250m of the site (App.D, Section 6.11).
 - There are four surface water abstraction licences within 2000m of the site. Two are active and are along Regent's Canal; at Maiden Lane Bridge, 1378m north of the site and at City Road Basin, 1948m north-east of the site (App.D, Section 6.4).
 - There are no flood defences, no areas benefitting from flood defences and no flood storage areas within 250m of the site (App.D, Sections 7.4, 7.5 & 7.6).
- 5.7 Figure 15 of the Camden Geological, Hydrogeological and Hydrological Study (Arup, 2010) shows that all the flooding in the 1975 and 2002 flooding events occurred to the north and north-west of the borough, so are all over 2km from No.79. The "areas with the potential to be at risk of surface water flooding" are highlighted in the same locations and along the far eastern boundary of the borough, the closest of which is approximately 850m east of No.79.
- 5.8 Maps provided by the Environment Agency on the GOV.UK website show that the site lies within Flood Zone 1, which is defined as areas where flooding from rivers and the sea is very unlikely, with less than a 0.1% (1 in 1000) chance of flooding occurring each year. The EA's website also shows that this area does not fall within an area at risk of flooding from reservoirs.
- 5.9 The Environment Agency (EA) published a new map of 'Flood Risk from Surface Water' in January 2014, and a more detailed version has since become available on the Government's 'Long Term Flood Risk Information' website, an extract of which is presented in Figure 5 below. This map identifies four levels of risk (high, medium, low and very low), and appears to be based primarily on topographic levels, flood depths and flow paths. The EA's definitions of these risk categories are:

- 'Very low' risk: Each year, these areas have a chance of flooding of less than 1 in 1000 (0.1%).
- 'Low' risk: Each year, these areas have a chance of flooding of between 1 in 1000 (0.1%) and 1 in 100 (1%)
- 'Medium' risk: Each year, these areas have a chance of flooding of between 1 in 100 (1%) and 1 in 30 (3.3%).
- 'High' risk: Each year, these areas have a chance of flooding of greater than 1 in 30 (3.3%).

5.10 The EA's modelling shows a 'Very Low' risk of surface water flooding for the entire site of No.79, the adjoining properties and along the Guilford Street carriageway outside the site. A 'Low' risk classification is given to a linear section of the Guilford Street footway outside No's 73 to 68, to the rear garden of No.73 and to various isolated pockets between hospital buildings on the south side of Guilford Street, with a small associated area of 'Medium' risk 35m south-east of No.79. The closest areas at 'High' risk of flooding are along Colonnade carriageway to the rear of the site, approximately 40m north-west of No.79. An extract of the EA's most recent model is presented in Figure 5.

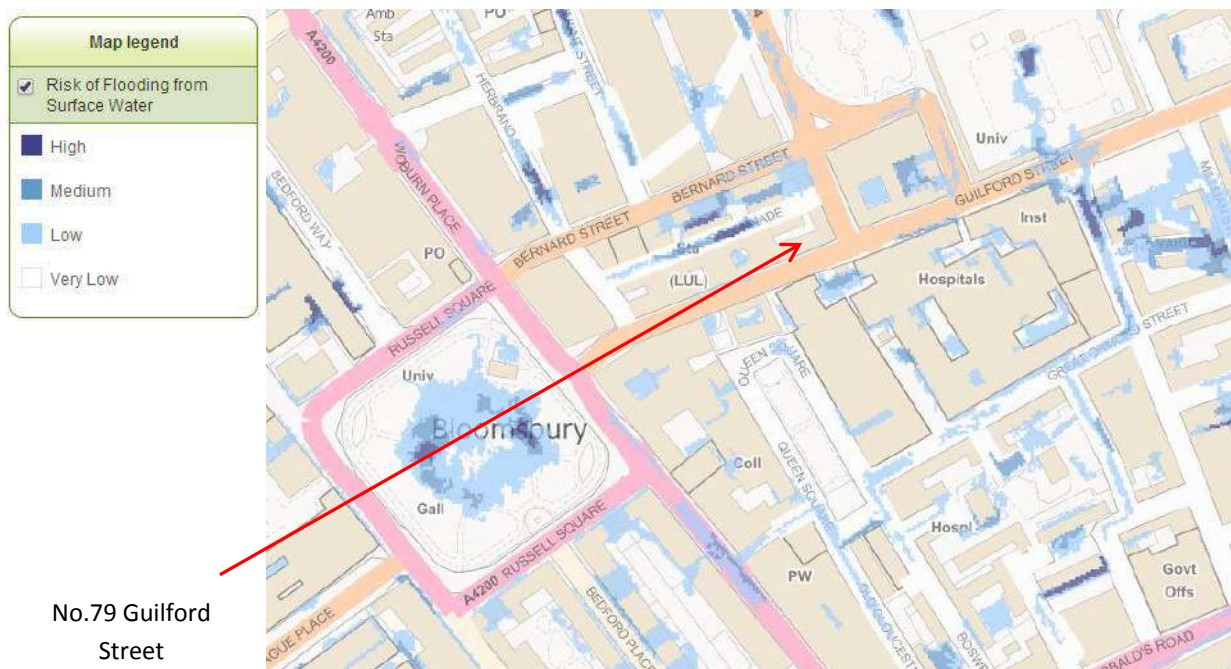


Figure 5: Extract from the Environment Agency's map of 'Flood Risk from Surface Water' map.

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5.11 Surface water modelling has been undertaken by URS as part of a Strategic Flood Risk Assessment for the London Borough of Camden, and was published in July 2014; an extract from their model is presented in Figure 6. As per the Environment Agency modelling, this map identifies the same four levels of risk (high, medium, low and very low), and also shows a 'Very Low' risk of flooding for the site of No.79 and the surrounding area. The areas of 'Low', 'Medium' and 'High' risk are also similar to those identified by the EA, as described in 5.10.

5.12 Figure 6 also shows that Guilford Street falls within Critical Drainage Area Group3_003, but does not fall within a Local Flood Risk Zone (LFRZ).

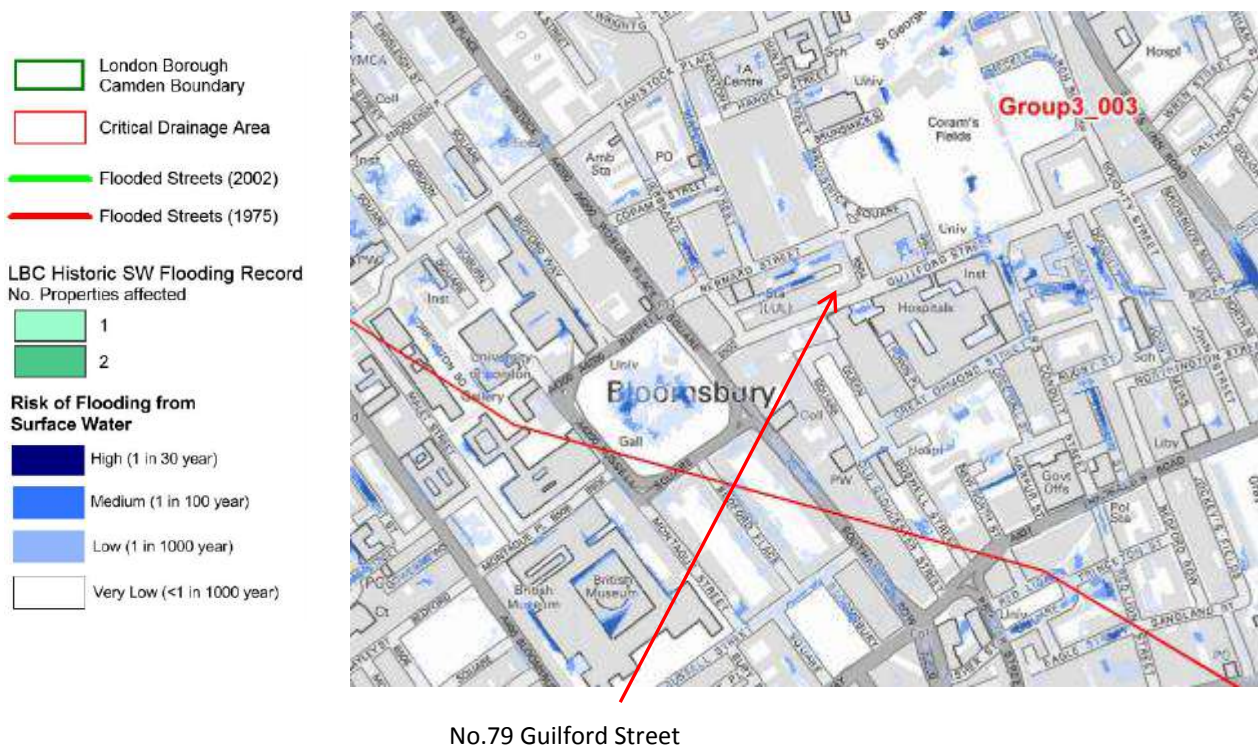


Figure 6: Extract from Figure 3i of the Camden Strategic Flood Risk Assessment (SFRA) (URS, July 2014) showing risk of flooding from surface water.

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5.13 The implications from these flood models are discussed in Section 10.8.

5.14 Figures 5a & 5b of the Camden Strategic Flood Risk Assessment present historic records of internal and external sewer flooding respectively, based on Thames Water's DG5 Flood Register. These figures do not record any properties affected by internal or external sewer flooding within the 'WC1N 1' postcode (as of July 2014, when the SFRA was written), therefore a 'Sewer Flooding History Enquiry' has not been obtained from Thames Water Utilities Ltd (TWU). A report can be obtained on request if required.

6. HYDROGEOLOGICAL SETTING (GROUNDWATER)

- 6.1 The Lynch Hill Gravel Member is classified by the Environment Agency as a Secondary 'A' Aquifer and the underlying London Clay Formation is classified as an 'Unproductive Stratum', as indicated by Figure 7. Under the old groundwater classification scheme, which now applies only to superficial soils, the site is in an area which is classed as 'Minor Aquifer High' groundwater vulnerability.

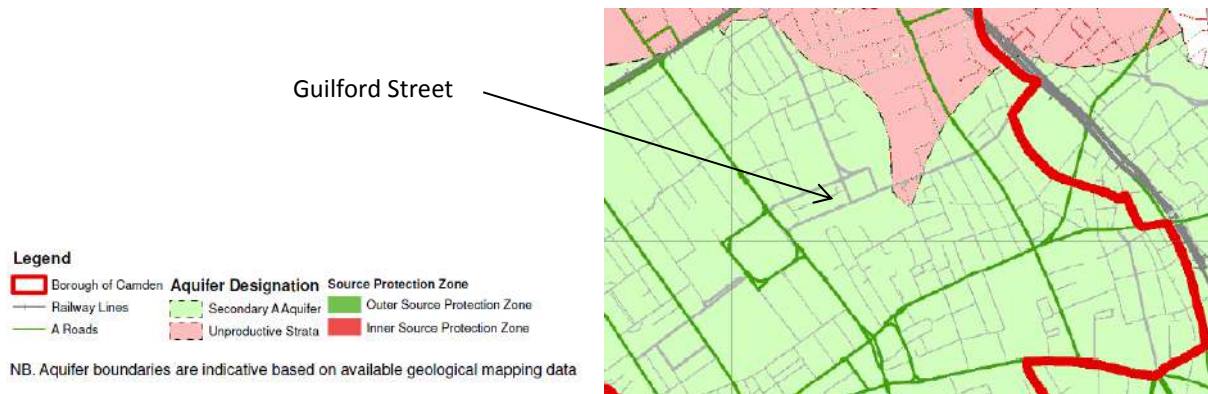


Figure 7: Extract from Figure 8 of the Camden GHHS (Arup, 2010) showing aquifer designations.

- 6.2 Perched groundwater would typically be expected in any Made Ground, where underlain by strata of lower permeability such as clays within the River Terrace Deposits (RTDs), in at least the winter and early spring seasons. Variations in groundwater levels and pressures will occur seasonally and with other man-induced influences such as groundwater abstraction from wells or boreholes.
- 6.3 The Secondary Aquifers in the superficial River Terrace Deposits are collectively known as the 'Upper Aquifer'. The Upper Aquifer generally occurs in the lower part of the River Terrace Deposits (in this case the Lynch Hill Gravel Member), and it is possible that multiple areas of perched groundwater may be present above the main groundwater table in the Upper Aquifer.
- 6.4 While the London Clay Formation is classified as an 'Unproductive Stratum' it can still be water-bearing. The water pressures within the clay in the depths of current interest are likely to be hydrostatic, which means they increase linearly with depth, except where they are modified by tree root activity or the influence of man-made changes such as utility trenches (which can act either as land drains or as sources of water and high groundwater pressures). Any silt or sand partings, laminations or thicker beds are likely to contain free groundwater and, where these are laterally continuous, they can give rise to moderate water entries into excavations. In most cases there will be only very limited or no natural flow in these silt/sand horizons.

- 6.5 The Chalk Principal Aquifer, which occurs at depth beneath the London Clay, is not considered relevant to the proposed basement, so is not considered further.
- 6.6 The groundwater catchment areas upslope of No.79 are likely to differ for each of the main stratigraphic units:
- Made Ground: The catchment for any perched groundwater in the Made Ground is probably limited to the immediately adjoining areas of Made Ground, as well as infiltration within No.79's own garden where not hard surfaced or overlain by the plastic sheeting found in the external trial pits, except where the trenches for drains and other services provide conduits for water from a wider area.
 - Lynch Hill Gravel Member: The catchment for the Upper Aquifer within the Lynch Hill Gravel Member will comprise recharge from both the overlying soils in the vicinity of the site and a wider subterranean area due to the expected lateral permeability.
 - London Clay Formation: The catchment for the underlying London Clay will comprise predominantly recharge from the overlying aquifer in the vicinity of the site plus potentially a wider area determined by the lateral extent of any interconnected silt/sand horizons, though the contribution from the surrounding area is likely to be minimal given the general low permeability of the London Clay.
- 6.7 Other hydrogeological data obtained from the Groundsure EnviroInsight report (Appendix D) include:
- There are no Source Protection Zones (SPZ) within 500m of the site (Figure 8 above and App.D, Section 6.6 and 6.7)
 - The nearest groundwater abstraction licence is 556m south-west of the site, this was an active licence for the London School of Hygiene and Tropical Medicine, on Keppel Street (borehole 1). There is another active licence at this site (557m south-west, for borehole 2) and two further historical licences; both the active licences were for heat pumps, so the water would have been circulated back to the aquifer; both expired on 31st March 2019, but should be assumed to have been renewed. There are 67 licences in total within 2000m of the site, 19 of which are still active licences (App.D, Section 6.3). All of these are probably irrelevant to the proposed basement extension.
 - There are 33 abstraction licences for potable water within 2000m of the site, seven of which are active licences. The closest active licence is 1091m north-east of the No.79 (App.D, Section 6.5). These licences are also irrelevant for the proposed basement.
 - The BGS has classified the area within 50m of the site as being susceptible to flooding at surface from superficial deposits. A moderate confidence rating has been provided by the BGS for the accuracy of this classification (App.D, Sections 7.7 & 7.8). The implications of this classification for the proposed basement are discussed in 10.3 below.

- 6.8 Groundwater records from local BGS boreholes are presented in Table 1. Boreholes TQ38SW/531 and ~/1021 both record groundwater strike/seepage within the sands and gravels of the River Terrace Deposits, with groundwater standing levels between 2.4m and 4.5m below ground level (bgl). Borehole TQ38SW/123 records groundwater strike within the London Clay at 13.7m bgl, but with the remark of "seepage from sandy pocket in the grey-blue clay".
- 6.9 Reference to the historic OS maps (presented in Appendix E) record the presence of two pumps at the southern end of Queen Square, roughly 180-190m south of No.79 on 1878 1:2,500 map. The 1896 1:2,500 map records these two and a further pump 200m south-west on Russell Square. These are absent for subsequent maps up to 1987, which records a single pump to the south of Queen Square Gardens. This same pump is recorded up to 1995, the most recent OS map published at this scale. These pumps probably extracted relatively small quantities of groundwater from the Upper Aquifer.
- 6.10 Details of the groundwater regime found by the site-specific ground investigation in February 2019 are presented in Section 9.

10.8 Surface Flow and Flooding

Flooding from Rivers, Sea & Reservoirs:

10.8.1 The evidence presented in Section 5 has shown that:

- the site lies within the Environment Agency's Flood Zone 1 which means that it is considered to be at negligible risk of fluvial flooding (from rivers or sea);
- the area is not at risk of flooding from reservoirs;
- there are no flood defences, no areas benefitting from flood defences and no flood storage areas within 250m of the site.

Surface Water (Pluvial) Flooding:

10.8.2 There are no surface water features within 250m of the site (paragraph 5.6).

10.8.3 The site lies approximately 5 - 10m north-west of one of the former tributaries of the River Fleet, which now runs in either a dedicated culvert or in the sewer system (as described in Section 5.1).

10.8.4 The Camden GHHS (Arup, 2010) records that Guilford Street did not flood in either the 1975 or the 2002 local pluvial flood events. Guilford Street falls within Critical Drainage Area (CDAs) Group3_003 as identified in the Camden Strategic Flood Risk Assessment (the SFRA, by URS, 2014) (see Figure 6) but is not within a Local Flood Risk Zone (LFRZ). CDAs include both source areas and flood-prone areas; the evidence presented above and below indicates that No.79 is **not** in a flood-prone area.

10.8.5 The latest flood models by both the Environment Agency, and by URS for the Camden SFRA, gave a 'Very Low' risk of surface water flooding, the lowest category that represents the national 'background' level of risk, for No.79's site and for the adjacent properties in the vicinity on Guilford Street. Surface water run-off from the neighbouring properties is unlikely due to the upstands at the front of the house and the brickwork boundary walls surrounding the rear garden; thus, no special precautions will be required for the proposed basement in relation to the flood risk models reviewed. Flood mitigation measures to protect the basement extension from local surface water flooding may be restricted to:

- Providing upstands to the retaining walls between the two rear lightwells and their adjoining courtyards in order to prevent surface water draining into the lightwells.
- Provision of a raised threshold at the access doorway to the front vaults, of sufficient height to protect the vaults from the maximum depth of surface water in the front lightwell (predicted by appropriate calculations);
- Installing raised thresholds at the access doorways from front and rear lightwells into the main basement and basement extension.
- Alternatively, or in conjunction with the raised thresholds, inclusion of sufficient surface water storage volume in the lightwells to accommodate direct rainfall from a design storm in accordance with current standards. It is likely

to be beneficial to link this surface water storage volume with temporary interception storage recommended in 10.8.12 below.

Change to Hard Surfacing & Surface Water Run-off:

- 10.8.6 The works to the front vaults will be below the Guilford Street footway and within the existing front lightwell, which is currently surfaced with concrete (covered by loose gravel). Surface water run-off drains to a gully adjacent to the front wall of the lightwell and thence into the mains drainage system. Thus, the proposed works to the front vaults will not increase the area of hard surfacing or the volume of water currently being discharged into the mains drainage.
- 10.8.7 The garden to the rear of No.79 is described in paragraph 2.3, and shown in Photos 3, 4 & 5 in Appendix A. The trial pits found that the area surfaced with gravel was underlain by plastic sheeting which will prevent most infiltration. The extent of the planting areas is shown on BUF's 'As Existing Ground Floor Plan' (Drg No. A010 20-P011) and includes various shrubs and small trees. The proposed works involve the excavation of the rear garden to create the lowered rear ground floor extension including the 'Upper and Lower Galleries' and courtyards. This will result in the replacement of the existing limited areas of soft landscaping with hard surfacing (and the removal of the raised planters). The proposed works could result in an increase in impermeable surfacing of around 8.5m².
- 10.8.8 The potential change in discharge to the mains drainage system that this very small increase in hard surfacing might cause is virtually insignificant, but it could be mitigated by the inclusion of one or more appropriate Sustainable Drainage Systems (SuDS) in the scheme. The options for simple SuDS in this circumstance include:
- Inclusion of permeable paving in the two rear courtyards, adjacent to No.5 Colonnade.
 - Inclusion of a green roof on the single-storey rear extension, which counts as beneficial 'treatment' of the run-off, although these provide limited benefit once they become saturated in storm conditions, or are frozen.
 - Temporary interception storage and/or inclusion of a grey water system.

Sewer Flooding:

- 10.8.9 There are no records of flooding from public sewers in the SFRA for the postcode 'WC1N 1' (see paragraph 5.14). However, no drainage system can be guaranteed to have adequate capacity for all storm eventualities and all drainage systems only work at full capacity when they are properly maintained, including emptying gullies and regular checks of the sewers themselves for condition and blockages. Maintenance of the adopted sewers is primarily the responsibility of Thames Water, so is outside the Applicant's control and largely outside the Council's influence too. Given the lack of any recorded history of sewer flooding affecting the area postcode, the probability of future sewer flooding affecting No.79 is considered very low,

provided that the sewer system is well maintained and appropriate flood resistance measures are implemented, as set out below.

- 10.8.10 Drainage systems are designed to operate under 'surcharge' at times of peak rainfall, which means that the level of effluent in the sewers may rise to ground level. When this happens, the effluent can back-up into un-protected properties with basements and lower ground floors. During major rainfall events, it is possible for some sewers to overflow at ground level, although this is rare.
- 10.8.11 Camden's CPG Basements requires all basements to be "*protected from sewer flooding by the installation of a positive pumped device*" (paragraph 6.16 in CPG, 2018). Non-return valves and pumped loop systems must therefore be fitted on the drains serving the basement and the lightwells, in order to ensure that water from the mains sewer system cannot enter the basement or vaults when the adjacent sewer is operating under surcharge. All drains which discharge via the same outfall as the basement and vaults must be protected, including those carrying foul water, roof water, and surface water from the lightwells and courtyards (as relevant). A battery-powered reserve pump should be fitted to ensure that the system remains functional during power cuts.
- 10.8.12 The pumped loops must rise high enough to create sufficient pressure head to open the non-return valves when the mains sewer flow is surcharged to ground level, otherwise the basement would once again be vulnerable to flooding while the surcharged flow continues. If it is not possible to achieve a sufficient rise of the loop then temporary interception storage would be required, to hold temporarily the predicted maximum volume of water from all relevant sources which discharge via the valve-protected outfalls (including surface water from the various roofs and lightwells, and foul water), for the duration of the predicted surcharged flows in the sewer. If decking is used in the rear lightwells, then the area beneath the decking could be used for interception storage, deepened as necessary to provide adequate capacity, though it must be protected from backup of foul sewage. This temporary interception storage would require formal design to ensure satisfactory performance.