

DO NOT SCALE

Key



Windowless Sampling Borehole



Cable Percussion Borehole

CLIENT:

PROJECT:

Hatfield

TITLE:

Site Investigation Location Plan

DESIGN / DRAWN:

ST

DATE:

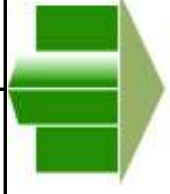
August 2017

PROJECT NO:

170703

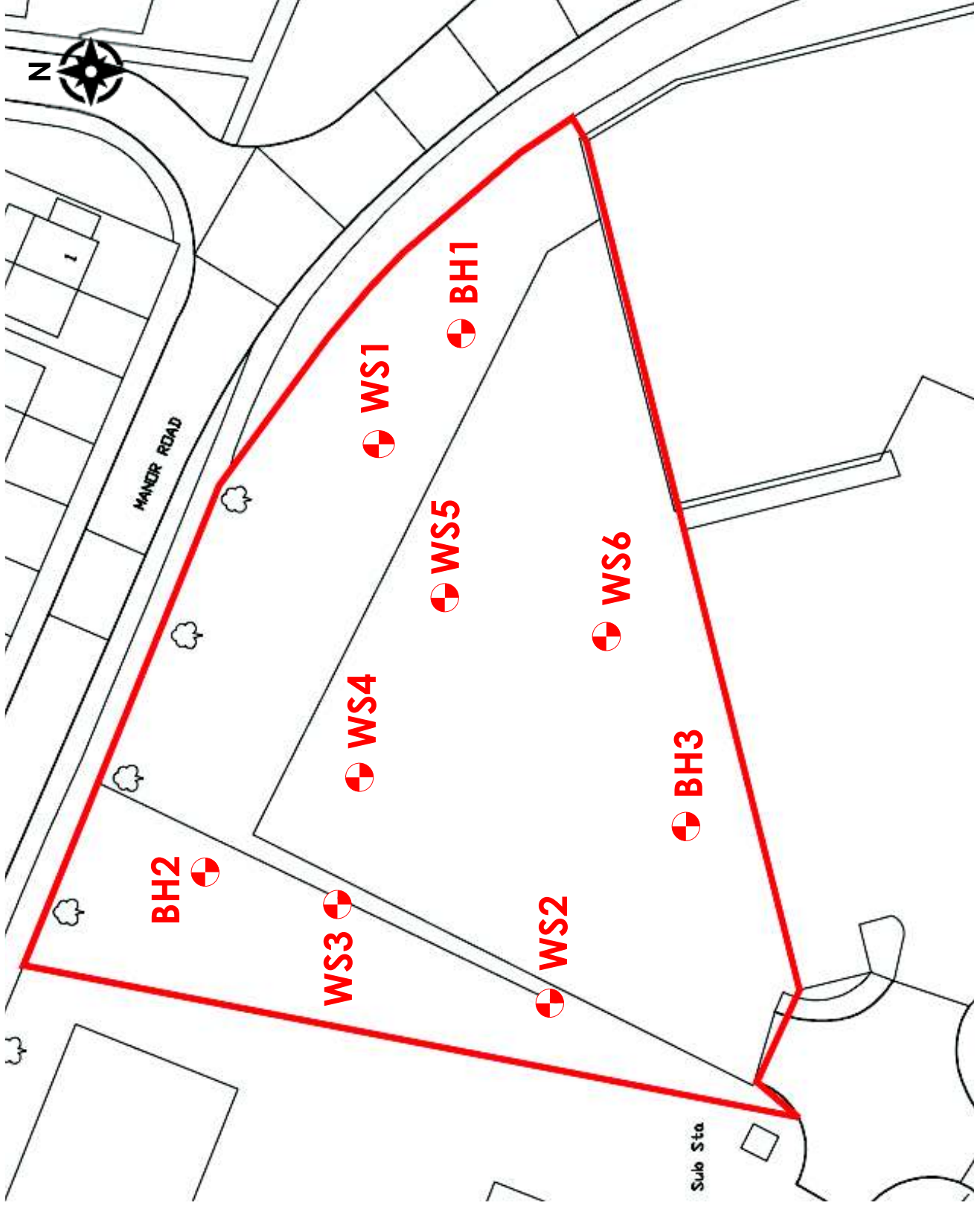
DRAWING NO:

170703.01



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## BOREHOLE LOG

Project <b>Hatfield</b>				<b>BOREHOLE No</b>  <b>BH1</b>	
Job No <b>170703</b>	Date <b>24-07-17</b> <b>26-07-17</b>	Ground Level (m)	Co-Ordinates ( )		
Contractor <b>GWD</b>				Sheet <b>1 of 2</b>	

SAMPLES & TESTS			STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)		
1.00	D					0.10 (0.50) 0.60	Brown gravelly clayey fine sand with rootlets and fragments of brick, flint and rare chalk (MADE GROUND). Brown clay fill (MADE GROUND).	
1.50-1.95 1.50-1.95	B SPT	N=24				(0.40) 1.00	Brown slightly gravelly sandy CLAY. Gravel is of flint and occasional chalk.	
3.00-3.45 3.00-3.45	B SPT	N=10				(6.30)	Orangish brown gravelly SAND of flint and occasional chalk.	
4.50-4.95 4.50-4.95	B SPT	N=11						
6.00-6.45 6.00-6.45	B SPT	N=7						
7.30 7.50-7.95	D SPT	N=12				7.30	Orangish brown GRAVEL of flint and occasional chalk.	

AGS3 UK BH HATFIELD.GPJ GINT STD AGS 3.1 GDT 9-8-17

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing		Water Dpt	From	To	Hours	From	To	
			Depth	Dia. mm							

All dimensions in metres Scale 1:50		Client	Maxbase Ltd			Method/ Plant Used	Cable Percussive		Logged By GWD	
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3rd Floor, Venlaw Building  
 349 Bath Street  
 Glasgow G2 4AA



Date 28/10/2020 11:41  
 File

Designed by lc  
 Checked by

Causeway Source Control 2020.1

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

Half Drain Time : 3125 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	98.964	0.964	0.0	0.2	0.3	41.2	O K
30 min Summer	99.243	1.243	0.0	0.2	0.3	53.1	O K
60 min Summer	99.520	1.520	0.0	0.3	0.3	65.0	O K
120 min Summer	99.790	1.790	0.0	0.3	0.3	76.5	Flood Risk
180 min Summer	99.938	1.938	0.1	0.3	0.3	82.9	Flood Risk
240 min Summer	100.100	2.100	0.1	0.3	0.3	87.0	FLOOD
360 min Summer	100.105	2.105	0.1	0.3	0.3	92.3	FLOOD
480 min Summer	100.109	2.109	0.1	0.3	0.3	95.9	FLOOD
600 min Summer	100.111	2.111	0.1	0.3	0.3	98.4	FLOOD
720 min Summer	100.113	2.113	0.1	0.3	0.3	100.1	FLOOD
960 min Summer	100.115	2.115	0.1	0.3	0.3	102.3	FLOOD
1440 min Summer	100.117	2.117	0.1	0.3	0.3	103.6	FLOOD
2160 min Summer	100.115	2.115	0.1	0.3	0.3	101.5	FLOOD
2880 min Summer	100.112	2.112	0.1	0.3	0.3	98.5	FLOOD
4320 min Summer	100.106	2.106	0.1	0.3	0.3	92.7	FLOOD
5760 min Summer	100.100	2.100	0.1	0.3	0.3	87.3	FLOOD
7200 min Summer	99.931	1.931	0.1	0.3	0.3	82.6	Flood Risk
8640 min Summer	99.833	1.833	0.0	0.3	0.3	78.4	Flood Risk
10080 min Summer	99.745	1.745	0.0	0.3	0.3	74.6	Flood Risk
15 min Winter	99.081	1.081	0.0	0.2	0.3	46.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	142.829	0.0	19.8	23
30 min Summer	92.260	0.0	21.7	38
60 min Summer	56.713	0.0	43.6	68
120 min Summer	33.709	0.0	47.0	126
180 min Summer	24.562	0.0	48.9	186
240 min Summer	19.521	1.5	50.1	246
360 min Summer	14.048	6.8	51.6	366
480 min Summer	11.131	10.4	52.5	484
600 min Summer	9.286	12.9	53.0	604
720 min Summer	8.005	14.6	53.3	724
960 min Summer	6.329	16.8	53.3	962
1440 min Summer	4.539	18.1	52.3	1442
2160 min Summer	3.251	16.0	99.3	2104
2880 min Summer	2.564	13.0	98.7	2416
4320 min Summer	1.832	7.2	94.8	3116
5760 min Summer	1.442	1.8	161.0	3920
7200 min Summer	1.198	0.0	163.6	4760
8640 min Summer	1.029	0.0	159.5	5616
10080 min Summer	0.904	0.0	153.6	6448
15 min Winter	142.829	0.0	20.6	23

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

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (1/s)	Max Control (1/s)	Max Σ Outflow (1/s)	Max Volume (m³)	Status
30 min Winter	99.393	1.393	0.0	0.2	0.3	59.6	O K
60 min Winter	99.705	1.705	0.0	0.3	0.3	72.9	Flood Risk
120 min Winter	100.010	2.010	0.1	0.3	0.3	85.9	FLOOD
180 min Winter	100.106	2.106	0.1	0.3	0.3	93.1	FLOOD
240 min Winter	100.111	2.111	0.1	0.3	0.3	97.8	FLOOD
360 min Winter	100.117	2.117	0.1	0.3	0.3	104.0	FLOOD
480 min Winter	100.121	2.121	0.1	0.3	0.3	108.3	FLOOD
600 min Winter	100.124	2.124	0.1	0.3	0.3	111.3	FLOOD
720 min Winter	100.127	2.127	0.1	0.3	0.3	113.5	FLOOD
960 min Winter	100.130	2.130	0.1	0.3	0.3	116.5	FLOOD
1440 min Winter	100.132	2.132	0.1	0.3	0.3	118.8	FLOOD
2160 min Winter	100.131	2.131	0.1	0.3	0.3	118.2	FLOOD
2880 min Winter	100.128	2.128	0.1	0.3	0.3	115.2	FLOOD
4320 min Winter	100.121	2.121	0.1	0.3	0.3	107.9	FLOOD
5760 min Winter	100.114	2.114	0.1	0.3	0.3	101.1	FLOOD
7200 min Winter	100.107	2.107	0.1	0.3	0.3	94.3	FLOOD
8640 min Winter	100.101	2.101	0.1	0.3	0.3	88.1	FLOOD
10080 min Winter	99.934	1.934	0.1	0.3	0.3	82.7	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	92.260	0.0	22.7	37
60 min Winter	56.713	0.0	45.9	66
120 min Winter	33.709	0.4	49.7	126
180 min Winter	24.562	7.6	51.8	184
240 min Winter	19.521	12.3	53.0	242
360 min Winter	14.048	18.5	54.4	360
480 min Winter	11.131	22.8	55.0	478
600 min Winter	9.286	25.8	55.4	596
720 min Winter	8.005	28.0	55.4	714
960 min Winter	6.329	31.0	55.1	946
1440 min Winter	4.539	33.3	53.4	1404
2160 min Winter	3.251	32.7	104.2	2076
2880 min Winter	2.564	29.7	103.1	2712
4320 min Winter	1.832	22.4	98.3	3372
5760 min Winter	1.442	15.6	177.3	4272
7200 min Winter	1.198	8.8	175.7	5184
8640 min Winter	1.029	2.6	171.7	6048
10080 min Winter	0.904	0.0	165.5	6952

Project				Job no.	
Calcs for				Start page no./Revision 1	
Calcs by L	Calcs date 28/10/2020	Checked by	Checked date	Approved by	Approved date

## SOAKAWAY DESIGN

### In accordance with BRE Digest 365 - Soakaway design

Tedds calculation version 2.0.04

#### Design rainfall intensity

Location of catchment area	London
Impermeable area drained to the system	A = <b>1550.0</b> m <sup>2</sup>
Return period	Period = <b>100</b> yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = <b>0.440</b>
5-year return period rainfall of 60 minutes duration	M5_60min = <b>20.0</b> mm
Increase of rainfall intensity due to global warming	p <sub>climate</sub> = <b>40</b> %

#### Soakaway / infiltration trench details

Soakaway type	Rectangular
Minimum depth of pit (below incoming invert)	d = <b>2000</b> mm
Width of pit	w = <b>16000</b> mm
Length of pit	l = <b>16000</b> mm
Percentage free volume	V <sub>free</sub> = <b>33</b> %
Soil infiltration rate	f = <b>1.02*10<sup>-6</sup></b> m/s
Wetted area of pit 50% full	a <sub>s50</sub> = l * d + w * d = <b>64000000</b> mm <sup>2</sup>

#### Table equations

Inflow (cl.3.3.1)	I = M100 * A
Outflow (cl.3.3.2)	O = a <sub>s50</sub> * f * D
Storage (cl.3.3.3)	S = I - O

Duration, D (min)	Growth factor Z1	M5 rainfalls (mm)	Growth factor Z2	100 year rainfall, M100 (mm)	Inflow (m <sup>3</sup> )	Outflow (m <sup>3</sup> )	Storage required (m <sup>3</sup> )
5	0.39;	10.8;	1.92;	20.8;	32.27;	0.02;	32.25
10	0.54;	15.0;	1.99;	29.9;	46.35;	0.04;	46.32
15	0.65;	18.1;	2.01;	36.5;	56.55;	0.06;	56.49
30	0.82;	22.9;	2.02;	46.2;	71.54;	0.12;	71.43
60	1.00;	28.0;	1.99;	55.6;	86.19;	0.24;	85.96
120	1.19;	33.4;	1.94;	64.9;	100.61;	0.47;	100.14
240	1.39;	39.0;	1.90;	74.0;	114.77;	0.94;	113.83
360	1.53;	42.8;	1.87;	80.0;	123.99;	1.41;	122.58
600	1.70;	47.6;	1.83;	87.1;	134.96;	2.35;	132.61
1440	2.07;	58.1;	1.76;	101.9;	157.94;	5.64;	152.30

Required storage volume S<sub>req</sub> = **152.30** m<sup>3</sup>

Soakaway storage volume S<sub>act</sub> = l \* d \* w \* V<sub>free</sub> = **168.96** m<sup>3</sup>

**PASS - Soakaway storage volume**

Time for emptying soakaway to half volume t<sub>s50</sub> = S<sub>req</sub> \* 0.5 / (a<sub>s50</sub> \* f) = 324hr 1min 54s

**FAIL - Soakaway discharge time greater than 24 hours**