

SuDS Drainage Statement

Wandleys Farm, Wandleys Lane, Walberton
West Sussex BN18 0QR

Client

Mr Kevin & Mrs Vyvyan Lillywhite
Wandleys Farm
Wandleys Lane
Walberton
BN18 0QR
Ref: 11117

Consulting Engineers

GTA Civils & Transport Ltd
66a Church Walk
Burgess Hill
West Sussex
RH15 9AS
Tel: 01444 871444

1.0 INTRODUCTION

This statement has been prepared for Mr Kevin & Mrs Vyvyan Lillywhite in relation to a proposed application for Full Planning Permission on land at Wandleys Farm, Wandleys Lane, Walberton, West Sussex BN18 0QR. The proposal is to build 5 new dwelling houses on a vacant site.

This Statement outlines the proposed surface water drainage (SuDS) strategy with the view to satisfy and discharge Appeal Condition #4 as shown on the Decision Notice reference APP/C3810/W/3209249, dated 8 April 2019. This states:

"Development shall not commence until full details of the proposed surface water drainage scheme have been submitted to and approved in writing by the Local Planning Authority. The design should follow the hierarchy of preference for different types of surface water drainage disposal systems as set out in Approved Document H of the Building Regulations, the recommendations of the SuDS Manual produced by CIRIA. Winter groundwater monitoring to establish highest annual groundwater levels and percolation testing to BRE 365, or similar approved, will be required to support the design of any infiltration drainage. The development shall be carried out in accordance with the approved details".

No responsibility is accepted to any third party for all or part of this study in connection with this or any other development.

2.0 EXISTING SITE

This site currently comprises greenfield land - previously used for animal grazing with access in from Wandleys Lane. The site area is approximately 1ha.

A small lake, which appears to have been infilled since 2012, is approximately 100m east of the site, with another pond some 200m southeast of the site. A watercourse, flowing broadly south, passes to the north and, at its closest, approximately 880m to the east of the site. Appendix A shows a location map.

Topography: a topographic survey is shown in Appendix B. There is a north-south fall across the site, from 23.92m AOD to 20.09m AOD, approximately.

Geology: the BGS online geological map shows this area dominated by Lambeth Group (clay, silt and sand). Head (gravel, sand, silt and clay) drift deposits overlie this solid bedrock.

A winter groundwater monitoring exercise was undertaken between 06/07/19 and 14/03/20. The 2 graphs in Appendix E show that the water table level rose to within 0.1m of the ground's surface. Such a high water table level precludes the viability of soakage, irrespective of the soil's infiltration characteristics.

Public Sewers: it is understood from the Applicant, that Southern Water owns a foul sewer that runs along Wandley's Lane but there are no public surface water sewers in this area.

The greenfield runoff rate for the total post-development contributing area has been calculated as 1.0l/s. Refer to the first calculation shown in Appendix D.

3.0 PROPOSED SURFACE WATER DRAINAGE

The SuDS Hierarchy (infiltration, watercourses, public sewers, private sewers) was applied. The high water table level and Clay soil type add up to make infiltration features unfeasible here. The ditch watercourse that runs along the south boundary, is clearly the only viable option for discharging the development's surface water.

The new dwellings' roofs' surface water will be routed to a new outfall headwall. It is understood that, although this ditch is in the neighbour's land, relations between these parties are very good and there will be no problem with setting up a legal easement in due course.

The drainage strategy layout is shown in Appendix D (drawing no. 11117/1101 – P2).

The surface water storage proposals have been sized to hold the volume in the critical '1 in 100 years plus 40% climate change' event using FEH rainfall data. 2 sets of Micro Drainage Source Control calculations are contained within Appendix D.

The strategy layout and calculations show 2 areas of pavings, the first to the NE and the main area to the SW. Flow from the NE will be restricted via a control manhole into the lower part of the network at 1l/s. This will join with the main area. The offsite flow rate will be restricted to the Qbar rate determined (see section 2 above), namely 1.0l/s – in the critical '1 in 100 years plus 40% climate change' storm event.

The new outfall will be subject to an application for Ordinary Watercourse Consent from the LLFA, in due course.

The winter groundwater monitoring exercise, strategy layout and calculations address the items listed in the relevant Appeal Condition. This proposal is 100% sustainable and complies fully with the NPPF.

Preliminary Issue: 02 March 2021

APPENDIX A – AERIAL LOCATION PLAN



APPENDIX B – TOPOGRAPHIC SURVEY



NOTES
SURVEY IS BASED ON OS GRID SYSTEM

Every effort has been made to survey the area as indicated. Where detail is obscured from view or inaccessible it has been deemed unable to survey.

LAYER INFORMATION

0	Empty
1	Downed ban: arrows
2	Bottom of Ban: arrow
3	Building lines
4	Edge of concrete
5	Edge of road surface
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100	Edge of road surface

Line types and Symbols

Building Lines	100.40
Rooflines	100.40
Top of Ban: of Kerb	100.40
Edge of Surface: Footpath	100.40
Edge of Road	100.40
Edge of Concrete	100.40
Top of ban	100.40
Bottom of ban	100.40
Fence / Handrail	100.40
Overhead Cables	100.40

Garden Line

Scrub Line

Gullies / Waste Water

Man holes / Flow

Trees

Spot Levels

Road Markings

Hedge Line

Walls

Steps

Plant

Gates

Control Stations

Point Number	Eastings	Northings	Coordinates in OSGB	Description
100	493075.901	10627.550	23.723	Water Target
101	493075.901	10627.550	23.723	Water Target
102	493075.901	10627.550	23.723	Water Target
103	493075.901	10627.550	23.723	Water Target
104	493075.901	10627.550	23.723	Water Target
105	493075.901	10627.550	23.723	Water Target
106	493075.901	10627.550	23.723	Water Target
107	493075.901	10627.550	23.723	Water Target
108	493075.901	10627.550	23.723	Water Target
109	493075.901	10627.550	23.723	Water Target
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114	493075.901	10627.550	23.723	Water Target
115	493075.901	10627.550	23.723	Water Target
116	493075.901	10627.550	23.723	Water Target
117	493075.901	10627.550	23.723	Water Target
118	493075.901	10627.550	23.723	Water Target
119	493075.901	10627.550	23.723	Water Target
120	493075.901	10627.550	23.723	Water Target

Orientation

North

Rev.	Date	Description
1	07.01.21	AR
2	07.01.21	SE

Client

Philips Surveyors

Drawing Title

Topographical Survey

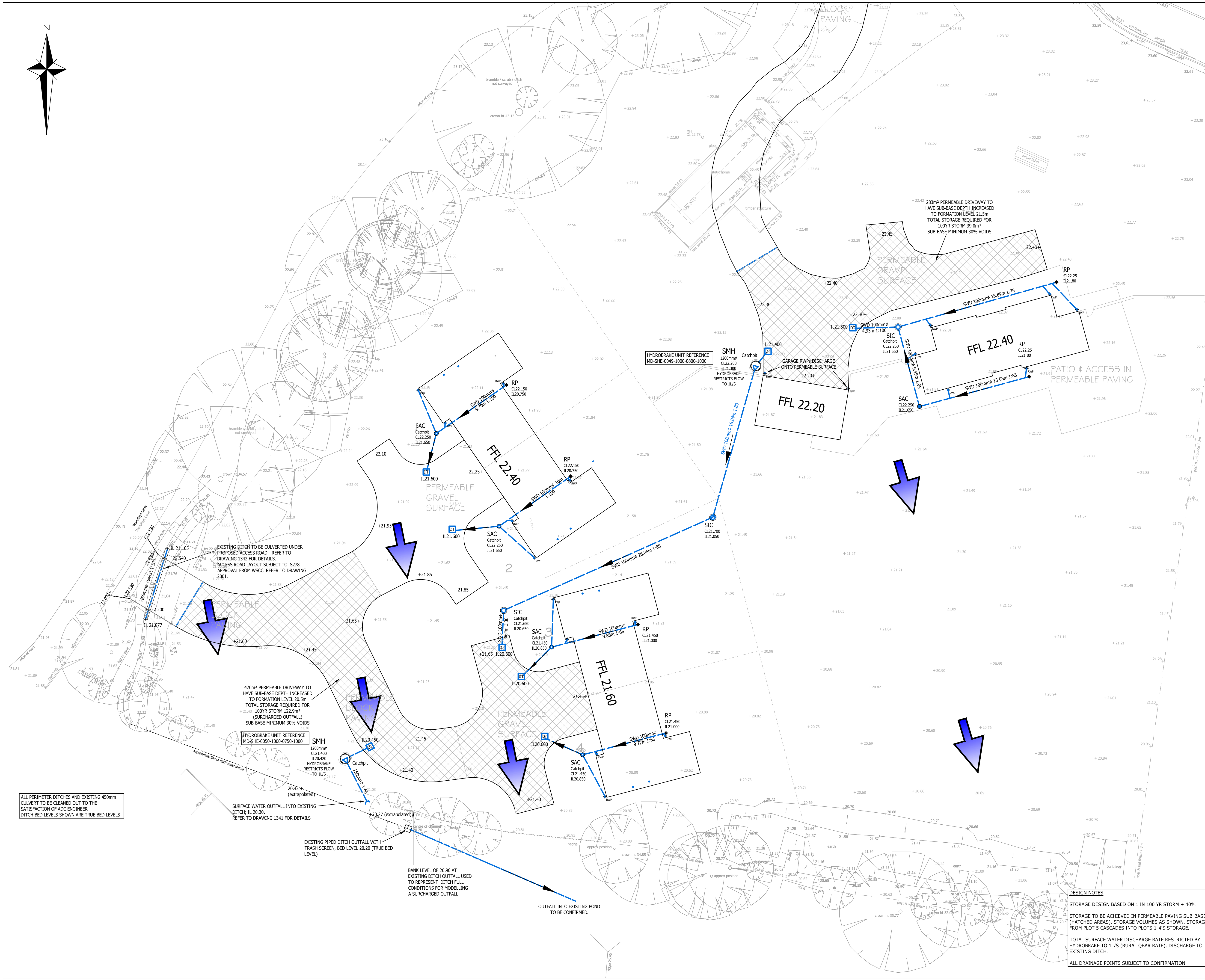
Job Title

Wandleys Farm, Fontwell

Scale	Date	Drawn	Job No.	Drawing No.	Rev.
1:200	07.01.21	AR	002 01 21	001	-
A1	AR	SE			

SeSurveying

APPENDIX C – SuDS DRAINAGE STRATEGY LAYOUT



1. The location, size, depth and identification of existing services that may be shown or referred to on this drawing have been assessed from non-intrusive observations, record drawings or the like. The contractor shall safely carry out intrusive investigations, trial holes or soundings prior to commencing work to satisfy himself that it is safe to proceed and that the assessments are accurate. any discrepancies shall be notified to gta prior to works commencing.
2. Tender or building drawings shall not be used for construction or the ordering of materials.
3. Do not scale. All dimensions and levels to be site confirmed.
4. This drawing shall be read in conjunction with all relevant architects, consultants drawings and specifications, together with H&S plan requirements.
5. Copyright : This drawing must not be copied, amended nor reproduced without the prior written agreement of gta.
6. All drawings specifications and recommendations made by gta are subject to Local Authority and other relevant Statutory Authorities approval. Any works or services made abortive due to the client proceeding prior to these approvals is considered wholly at the Clients risk. gta hold no responsibility for resulting abortive works or costs.

The diagram illustrates the proposed sewerage system layout with the following components and connections:

- Private surface water drain**: Represented by a dashed blue line at the top.
- SIC** (Surface Water Plastic Inspection Chamber - D202): A blue circular manhole symbol.
- SMH** (Surface Water Manhole): A white circular manhole symbol with a blue border.
- Private Surface Water Manhole**: A white circular manhole symbol with a blue border.
- D1** (Distribution Tank): A blue rectangular tank symbol.
- Distribution Tank**: A blue rectangular tank symbol.
- Existing Surface Water Drain**: Represented by a dashed purple line at the bottom.
- Overland Flow Route**: A large blue arrow pointing right, indicating the path for surface water flow.

The layout shows the SIC and SMH connected to the Private Surface Water Manhole, which in turn connects to the Distribution Tank (D1). The Distribution Tank is connected to the Existing Surface Water Drain. The Overland Flow Route is shown as a separate path for surface water.

All drainage shall be constructed and commissioned in accordance with BS EN 295 & BS EN752, Building Regulations Doc. H and any particular requirements of the Building Control Officer.

Drainage pipelines shall be in PVC-u below ground as Marley or similar approved, or vitrified clay.
All sewer pipelines to be VC only.

All chamber covers to be min load class B125 in vehicular areas and A15 in pedestrian areas.

This drawing shall be read in conjunction with all other relevant drainage drawings, architectural drawings and structural drawings.

For manhole details, gully details, bedding etc, refer to gta detail sheets

All foul water drain runs shall have a fall of 1:40 or steeper, unless noted otherwise.

All cement used for concrete drainage installations shall be sulphate resistant to class 3 of BRE Digest 363. (Grade ST5)

The use of short radius or 90° bends for changes in direction is not permitted, only long or medium radius 45° bends shall be used. All junctions shall be 45°.

All drains shall have granular bed and surround as class 'S' bedding, unless noted otherwise.

All drainage works shall commence from the downstream end first unless agreed otherwise. Outfall level to be checked by contractor prior to any works commencing and any discrepancy identified to engineer prior to laying and drainage.

See drawing 11117/1103 for typical drainage details.

P6	LLFA COMMENTS INCORPORATED	14/05/21	PW	JP
P5	LLFA COMMENTS INCORPORATED	07/05/21	PH	JP
P4	UPDATED ACCESS ROAD DESIGN	29/03/21	PW	MR
P3	FOR OWC APPLICATION	19/03/21	FV	MB
P2	PRELIMINARY ISSUE	01/03/21	CM	JP
P1	INITIAL ISSUE	23/02/21	CM	JP
Rev	Amendments	Date	Dsn	Cnl

Status	PRELIMINARY
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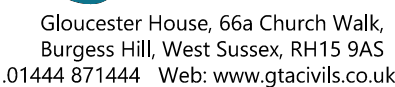
MR & MRS K LILLYWHITE

SLOANE & BROWN

WANDLEYS FARM
WANDLEYS LANE, FONTWELL

DRAINAGE STRATEGY

Date	FEBRUARY 2021	Scale @ A1	1:200
Clients Ref.		Project Ref.	11117



Drawing Number	Rev.
11117/1101	P6

STORAGE DESIGN BASED ON 1 IN 100 YR STORM + 40%
STORAGE TO BE ACHIEVED IN PERMEABLE PAVING SUB-BASE
(HATCHED AREAS), STORAGE VOLUMES AS SHOWN, STORAGE
FROM PLOT 5 CASCADES INTO PLOTS 1-4'S STORAGE.

TOTAL SURFACE WATER DISCHARGE RATE RESTRICTED BY HYDROBRAKE TO 1L/S (RURAL QBAR RATE), DISCHARGE TO EXISTING DITCH.

ALL DRAINAGE POINTS SUBJECT TO CONFIRMATION.

APPENDIX D – MICRO DRAINAGE CALCULATIONS

GTA Civils Ltd		Page 1
66a Church Walk		
Burgess Hill		
West Sussex RH15 9AS		
Date 23/02/2021 23:08	Designed by cmoore	
File	Checked by	
Micro Drainage	Source Control 2020.1	

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.450
Area (ha)	0.187	Urban	0.000
SAAR (mm)	810	Region Number	Region 7

Results 1/s

QBAR Rural	1.0
QBAR Urban	1.0
Q100 years	3.1
Q1 year	0.8
Q30 years	2.2
Q100 years	3.1

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GTA Civils Ltd						Page 1	
66a Church Walk Burgess Hill West Sussex RH15 9AS			WANDLEYS FARM PLOTS 1-4				
Date 24/02/2021 05:39 File 11117 cascade.CASX			Designed by CM Checked by JP				
Micro Drainage			Source Control 2020.1				
<u>Cascade Summary of Results for 11117 PP plots 1-4.SRCX</u>							
Upstream Structures			Outflow To Overflow To				
11117 PP plot 5.SRCX			(None)		(None)		
Half Drain Time : 867 minutes.							
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max E Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	20.699	0.199	0.0	1.0	1.0	27.9	O K
30 min Summer	20.773	0.273	0.0	1.0	1.0	38.3	O K
60 min Summer	20.870	0.370	0.0	1.0	1.0	51.8	O K
120 min Summer	20.924	0.424	0.0	1.0	1.0	59.3	O K
180 min Summer	20.965	0.465	0.0	1.0	1.0	65.2	O K
240 min Summer	20.997	0.497	0.0	1.0	1.0	69.6	O K
360 min Summer	21.038	0.538	0.0	1.0	1.0	75.4	O K
480 min Summer	21.062	0.562	0.0	1.0	1.0	78.7	O K
600 min Summer	21.074	0.574	0.0	1.0	1.0	80.4	O K
720 min Summer	21.080	0.580	0.0	1.0	1.0	81.3	O K
960 min Summer	21.080	0.580	0.0	1.0	1.0	81.3	O K
1440 min Summer	21.088	0.588	0.0	1.0	1.0	82.4	O K
2160 min Summer	21.077	0.577	0.0	1.0	1.0	80.9	O K
2880 min Summer	21.051	0.551	0.0	1.0	1.0	77.2	O K
4320 min Summer	20.984	0.484	0.0	1.0	1.0	67.8	O K
5760 min Summer	20.924	0.424	0.0	1.0	1.0	59.4	O K
7200 min Summer	20.873	0.373	0.0	1.0	1.0	52.2	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)			
15 min Summer	143.146	0.0	46.3	19			
30 min Summer	96.228	0.0	63.5	34			
60 min Summer	62.028	0.0	83.1	648			
120 min Summer	36.334	0.0	97.8	764			
180 min Summer	26.639	0.0	107.8	184			
240 min Summer	21.329	0.0	115.4	244			
360 min Summer	15.469	0.0	125.7	364			
480 min Summer	12.249	0.0	132.9	484			
600 min Summer	10.199	0.0	138.2	604			
720 min Summer	8.773	0.0	142.6	724			
960 min Summer	6.908	0.0	149.7	962			
1440 min Summer	4.937	0.0	149.5	1444			
2160 min Summer	3.547	0.0	171.8	1772			
2880 min Summer	2.822	0.0	181.6	2036			
4320 min Summer	2.072	0.0	198.6	2724			
5760 min Summer	1.684	0.0	213.8	3568			
7200 min Summer	1.448	0.0	228.8	4392			
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GTA Civils Ltd							Page 2	
66a Church Walk Burgess Hill West Sussex RH15 9AS			WANDLEYS FARM PLOTS 1-4					
Date 24/02/2021 05:39 File 11117 cascade.CASX			Designed by CM Checked by JP					
Micro Drainage			Source Control 2020.1					
<u>Cascade Summary of Results for 11117 PP plots 1-4.SRCX</u>								
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	
8640 min Summer	20.813	0.313	0.0	1.0	1.0	43.9	O K	
10080 min Summer	20.765	0.265	0.0	1.0	1.0	37.1	O K	
15 min Winter	20.725	0.225	0.0	1.0	1.0	31.5	O K	
30 min Winter	20.808	0.308	0.0	1.0	1.0	43.2	O K	
60 min Winter	20.908	0.408	0.0	1.0	1.0	57.2	O K	
120 min Winter	20.975	0.475	0.0	1.0	1.0	66.5	O K	
180 min Winter	21.023	0.523	0.0	1.0	1.0	73.3	O K	
240 min Winter	21.058	0.558	0.0	1.0	1.0	78.2	O K	
360 min Winter	21.106	0.606	0.0	1.0	1.0	84.9	O K	
480 min Winter	21.137	0.637	0.0	1.0	1.0	89.2	O K	
600 min Winter	21.154	0.654	0.0	1.0	1.0	91.7	O K	
720 min Winter	21.165	0.665	0.0	1.0	1.0	93.2	O K	
960 min Winter	21.173	0.673	0.0	1.0	1.0	94.3	O K	
1440 min Winter	21.171	0.671	0.0	1.0	1.0	94.0	O K	
2160 min Winter	21.177	0.677	0.0	1.0	1.0	94.8	O K	
2880 min Winter	21.133	0.633	0.0	1.0	1.0	88.6	O K	
4320 min Winter	21.020	0.520	0.0	1.0	1.0	72.8	O K	
5760 min Winter	20.923	0.423	0.0	1.0	1.0	59.3	O K	
7200 min Winter	20.819	0.319	0.0	1.0	1.0	44.7	O K	
8640 min Winter	20.728	0.228	0.0	1.0	1.0	32.0	O K	
10080 min Winter	20.663	0.163	0.0	1.0	1.0	22.9	O K	
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)				
8640 min Summer	1.288	0.0	242.9	5104				
10080 min Summer	1.172	0.0	256.7	5848				
15 min Winter	143.146	0.0	52.3	19				
30 min Winter	96.228	0.0	71.6	34				
60 min Winter	62.028	0.0	93.6	728				
120 min Winter	36.334	0.0	110.1	170				
180 min Winter	26.639	0.0	121.4	184				
240 min Winter	21.329	0.0	129.8	244				
360 min Winter	15.469	0.0	141.4	362				
480 min Winter	12.249	0.0	149.2	480				
600 min Winter	10.199	0.0	155.5	598				
720 min Winter	8.773	0.0	157.8	716				
960 min Winter	6.908	0.0	156.8	950				
1440 min Winter	4.937	0.0	153.3	1426				
2160 min Winter	3.547	0.0	193.3	1840				
2880 min Winter	2.822	0.0	204.4	2048				
4320 min Winter	2.072	0.0	223.9	2944				
5760 min Winter	1.684	0.0	241.0	3856				
7200 min Winter	1.448	0.0	258.0	4680				
8640 min Winter	1.288	0.0	274.1	5280				
10080 min Winter	1.172	0.0	289.9	5952				
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66a Church Walk Burgess Hill West Sussex RH15 9AS	WANDLEYS FARM PLOTS 1-4																															
Date 24/02/2021 05:39	Designed by CM																															
File 11117 cascade.CASX	Checked by JP																															
Micro Drainage		Source Control 2020.1																														
<u>Cascade Rainfall Details for 11117 PP plots 1-4.SRCX</u> <table> <tr> <td>Rainfall Model</td> <td>FEH</td> </tr> <tr> <td>Return Period (years)</td> <td>100</td> </tr> <tr> <td>FEH Rainfall Version</td> <td>2013</td> </tr> <tr> <td>Site Location</td> <td>GB 495398 106588 SU 95398 06588</td> </tr> <tr> <td>Data Type</td> <td>Point</td> </tr> <tr> <td>Summer Storms</td> <td>Yes</td> </tr> <tr> <td>Winter Storms</td> <td>Yes</td> </tr> <tr> <td>Cv (Summer)</td> <td>0.750</td> </tr> <tr> <td>Cv (Winter)</td> <td>0.840</td> </tr> <tr> <td>Shortest Storm (mins)</td> <td>15</td> </tr> <tr> <td>Longest Storm (mins)</td> <td>10080</td> </tr> <tr> <td>Climate Change %</td> <td>+40</td> </tr> </table> <u>Time Area Diagram</u> Total Area (ha) 0.113 <table> <tr> <td>Time (mins)</td> <td>Area</td> </tr> <tr> <td>From:</td> <td>To: (ha)</td> </tr> <tr> <td>0</td> <td>4 0.113</td> </tr> </table>			Rainfall Model	FEH	Return Period (years)	100	FEH Rainfall Version	2013	Site Location	GB 495398 106588 SU 95398 06588	Data Type	Point	Summer Storms	Yes	Winter Storms	Yes	Cv (Summer)	0.750	Cv (Winter)	0.840	Shortest Storm (mins)	15	Longest Storm (mins)	10080	Climate Change %	+40	Time (mins)	Area	From:	To: (ha)	0	4 0.113
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66a Church Walk Burgess Hill West Sussex RH15 9AS	WANDLEYS FARM PLOTS 1-4	
Date 24/02/2021 05:39	Designed by CM	
File 11117 cascade.CASX	Checked by JP	
Micro Drainage		Source Control 2020.1

Cascade Model Details for 11117 PP plots 1-4.SRCX

Storage is Online Cover Level (m) 21.350

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	10.0
Membrane Percolation (mm/hr)	1000	Length (m)	46.7
Max Percolation (l/s)	129.7	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	20.500	Membrane Depth (m)	0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0050-1000-0750-1000
Design Head (m)	0.750
Design Flow (l/s)	1.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	50
Invert Level (m)	20.400
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.750	1.0	Kick-Flo®	0.445	0.8
Flush-Flo™	0.222	1.0	Mean Flow over Head Range	-	0.9

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.9	1.200	1.2	3.000	1.9	7.000	2.8
0.200	1.0	1.400	1.3	3.500	2.0	7.500	2.9
0.300	0.9	1.600	1.4	4.000	2.1	8.000	2.9
0.400	0.9	1.800	1.5	4.500	2.3	8.500	3.0
0.500	0.8	2.000	1.6	5.000	2.4	9.000	3.1
0.600	0.9	2.200	1.6	5.500	2.5	9.500	3.2
0.800	1.0	2.400	1.7	6.000	2.6		
1.000	1.1	2.600	1.7	6.500	2.7		

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GTA Civils Ltd		Page 1					
66a Church Walk Burgess Hill West Sussex RH15 9AS	WANDLEYS FARM PLOT 5						
Date 24/02/2021 05:38 File 11117 cascade.CASX	Designed by CM Checked by JP						
Micro Drainage	Source Control 2020.1						
Cascade Summary of Results for 11117 PP plot 5.SRCX							
Upstream Structures	Outflow To	Overflow To					
(None)	11117 PP plots 1-4.SRCX	(None)					
Half Drain Time : 397 minutes.							
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max E Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	21.708	0.208	0.0	0.9	0.9	17.7	O K
30 min Summer	21.781	0.281	0.0	0.9	0.9	23.9	O K
60 min Summer	21.855	0.355	0.0	0.9	0.9	30.1	O K
120 min Summer	21.890	0.390	0.0	0.9	0.9	33.1	O K
180 min Summer	21.902	0.402	0.0	0.9	0.9	34.1	O K
240 min Summer	21.902	0.402	0.0	0.9	0.9	34.1	O K
360 min Summer	21.883	0.383	0.0	0.9	0.9	32.6	O K
480 min Summer	21.864	0.364	0.0	0.9	0.9	30.9	O K
600 min Summer	21.847	0.347	0.0	0.9	0.9	29.5	O K
720 min Summer	21.832	0.332	0.0	0.9	0.9	28.2	O K
960 min Summer	21.803	0.303	0.0	0.9	0.9	25.7	O K
1440 min Summer	21.749	0.249	0.0	0.9	0.9	21.1	O K
2160 min Summer	21.671	0.171	0.0	0.9	0.9	14.5	O K
2880 min Summer	21.612	0.112	0.0	0.9	0.9	9.6	O K
4320 min Summer	21.540	0.040	0.0	0.9	0.9	3.4	O K
5760 min Summer	21.507	0.007	0.0	0.9	0.9	0.6	O K
7200 min Summer	21.500	0.000	0.0	0.9	0.9	0.0	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)			
15 min Summer	143.146	0.0	18.4	19			
30 min Summer	96.228	0.0	25.2	33			
60 min Summer	62.028	0.0	32.9	62			
120 min Summer	36.334	0.0	38.7	122			
180 min Summer	26.639	0.0	42.7	182			
240 min Summer	21.329	0.0	45.7	240			
360 min Summer	15.469	0.0	49.9	328			
480 min Summer	12.249	0.0	52.7	384			
600 min Summer	10.199	0.0	54.7	448			
720 min Summer	8.773	0.0	56.5	514			
960 min Summer	6.908	0.0	59.3	652			
1440 min Summer	4.937	0.0	63.5	924			
2160 min Summer	3.547	0.0	68.1	1300			
2880 min Summer	2.822	0.0	72.1	1648			
4320 min Summer	2.072	0.0	78.8	2332			
5760 min Summer	1.684	0.0	84.8	2952			
7200 min Summer	1.448	0.0	90.8	0			
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GTA Civils Ltd						Page 2		
66a Church Walk Burgess Hill West Sussex RH15 9AS			WANDLEYS FARM PLOT 5					
Date 24/02/2021 05:38 File 11117 cascade.CASX			Designed by CM Checked by JP					
Micro Drainage			Source Control 2020.1					
<u>Cascade Summary of Results for 11117 PP plot 5.SRCX</u>								
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	
8640 min Summer	21.500	0.000	0.0	0.8	0.8	0.0	O K	
10080 min Summer	21.500	0.000	0.0	0.7	0.7	0.0	O K	
15 min Winter	21.737	0.237	0.0	0.9	0.9	20.1	O K	
30 min Winter	21.819	0.319	0.0	0.9	0.9	27.0	O K	
60 min Winter	21.904	0.404	0.0	0.9	0.9	34.3	O K	
120 min Winter	21.947	0.447	0.0	0.9	0.9	37.9	O K	
180 min Winter	21.965	0.465	0.0	0.9	0.9	39.5	O K	
240 min Winter	21.970	0.470	0.0	0.9	0.9	39.9	O K	
360 min Winter	21.958	0.458	0.0	0.9	0.9	38.8	O K	
480 min Winter	21.930	0.430	0.0	0.9	0.9	36.5	O K	
600 min Winter	21.909	0.409	0.0	0.9	0.9	34.7	O K	
720 min Winter	21.889	0.389	0.0	0.9	0.9	33.0	O K	
960 min Winter	21.848	0.348	0.0	0.9	0.9	29.6	O K	
1440 min Winter	21.769	0.269	0.0	0.9	0.9	22.9	O K	
2160 min Winter	21.649	0.149	0.0	0.9	0.9	12.7	O K	
2880 min Winter	21.567	0.067	0.0	0.9	0.9	5.7	O K	
4320 min Winter	21.500	0.000	0.0	0.9	0.9	0.0	O K	
5760 min Winter	21.500	0.000	0.0	0.7	0.7	0.0	O K	
7200 min Winter	21.500	0.000	0.0	0.6	0.6	0.0	O K	
8640 min Winter	21.500	0.000	0.0	0.6	0.6	0.0	O K	
10080 min Winter	21.500	0.000	0.0	0.5	0.5	0.0	O K	
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)				
8640 min Summer	1.288	0.0	96.4	0				
10080 min Summer	1.172	0.0	101.9	0				
15 min Winter	143.146	0.0	20.8	18				
30 min Winter	96.228	0.0	28.4	33				
60 min Winter	62.028	0.0	37.1	62				
120 min Winter	36.334	0.0	43.6	120				
180 min Winter	26.639	0.0	48.1	178				
240 min Winter	21.329	0.0	51.4	234				
360 min Winter	15.469	0.0	56.0	344				
480 min Winter	12.249	0.0	59.1	442				
600 min Winter	10.199	0.0	61.6	474				
720 min Winter	8.773	0.0	63.5	550				
960 min Winter	6.908	0.0	66.6	704				
1440 min Winter	4.937	0.0	71.3	1008				
2160 min Winter	3.547	0.0	76.7	1384				
2880 min Winter	2.822	0.0	81.1	1704				
4320 min Winter	2.072	0.0	88.8	0				
5760 min Winter	1.684	0.0	95.7	0				
7200 min Winter	1.448	0.0	102.4	0				
8640 min Winter	1.288	0.0	108.8	0				
10080 min Winter	1.172	0.0	115.1	0				
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66a Church Walk Burgess Hill West Sussex RH15 9AS	WANDLEYS FARM PLOT 5																																		
Date 24/02/2021 05:38	Designed by CM																																		
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<u>Cascade Rainfall Details for 11117 PP plot 5.SRCX</u> <table> <tr> <td>Rainfall Model</td> <td>FEH</td> </tr> <tr> <td>Return Period (years)</td> <td>100</td> </tr> <tr> <td>FEH Rainfall Version</td> <td>2013</td> </tr> <tr> <td>Site Location</td> <td>GB 495398 106588 SU 95398 06588</td> </tr> <tr> <td>Data Type</td> <td>Point</td> </tr> <tr> <td>Summer Storms</td> <td>Yes</td> </tr> <tr> <td>Winter Storms</td> <td>Yes</td> </tr> <tr> <td>Cv (Summer)</td> <td>0.750</td> </tr> <tr> <td>Cv (Winter)</td> <td>0.840</td> </tr> <tr> <td>Shortest Storm (mins)</td> <td>15</td> </tr> <tr> <td>Longest Storm (mins)</td> <td>10080</td> </tr> <tr> <td>Climate Change %</td> <td>+40</td> </tr> </table> <u>Time Area Diagram</u> Total Area (ha) 0.074 <table> <thead> <tr> <th align="left" colspan="3">Time (mins) Area</th> </tr> <tr> <th align="left">From:</th> <th align="left">To:</th> <th align="left">(ha)</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>4</td> <td>0.074</td> </tr> </tbody> </table>			Rainfall Model	FEH	Return Period (years)	100	FEH Rainfall Version	2013	Site Location	GB 495398 106588 SU 95398 06588	Data Type	Point	Summer Storms	Yes	Winter Storms	Yes	Cv (Summer)	0.750	Cv (Winter)	0.840	Shortest Storm (mins)	15	Longest Storm (mins)	10080	Climate Change %	+40	Time (mins) Area			From:	To:	(ha)	0	4	0.074
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66a Church Walk Burgess Hill West Sussex RH15 9AS	WANDLEYS FARM PLOT 5	
Date 24/02/2021 05:38	Designed by CM	
File 11117 cascade.CASX	Checked by JP	
Micro Drainage		Source Control 2020.1

Cascade Model Details for 11117 PP plot 5.SRCX

Storage is Online Cover Level (m) 22.200

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	10.0
Membrane Percolation (mm/hr)	1000	Length (m)	28.3
Max Percolation (l/s)	78.6	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	21.500	Membrane Depth (m)	0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0049-1000-0800-1000
Design Head (m)	0.800
Design Flow (l/s)	1.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	49
Invert Level (m)	21.300
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.800	1.0	Kick-Flo®	0.437	0.8
Flush-Flo™	0.215	0.9	Mean Flow over Head Range	-	0.8

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.8	1.200	1.2	3.000	1.8	7.000	2.7
0.200	0.9	1.400	1.3	3.500	1.9	7.500	2.8
0.300	0.9	1.600	1.4	4.000	2.1	8.000	2.9
0.400	0.8	1.800	1.4	4.500	2.2	8.500	2.9
0.500	0.8	2.000	1.5	5.000	2.3	9.000	3.0
0.600	0.9	2.200	1.6	5.500	2.4	9.500	3.1
0.800	1.0	2.400	1.6	6.000	2.5		
1.000	1.1	2.600	1.7	6.500	2.6		

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APPENDIX E – EXCERPT FROM WINTER GROUNDWATER MONITORING EXERCISE

GROUND WATER MONITORING AND SUPPLEMENTARY TESTING
AT
WANDLEYS FARM, WANDLEYS LANE, FONTWELL
FOR
MR & MRS K LILLYWHITE

G6386

30 March 2020



Ground Management Ltd
Civil and Geotechnical Engineering Services

PROJECT: Wandleys Farm, Wandleys Lane, Fontwell

PREPARED: AJHT

SECTION: Preliminary Ground Investigation

CHECKED: AJHT

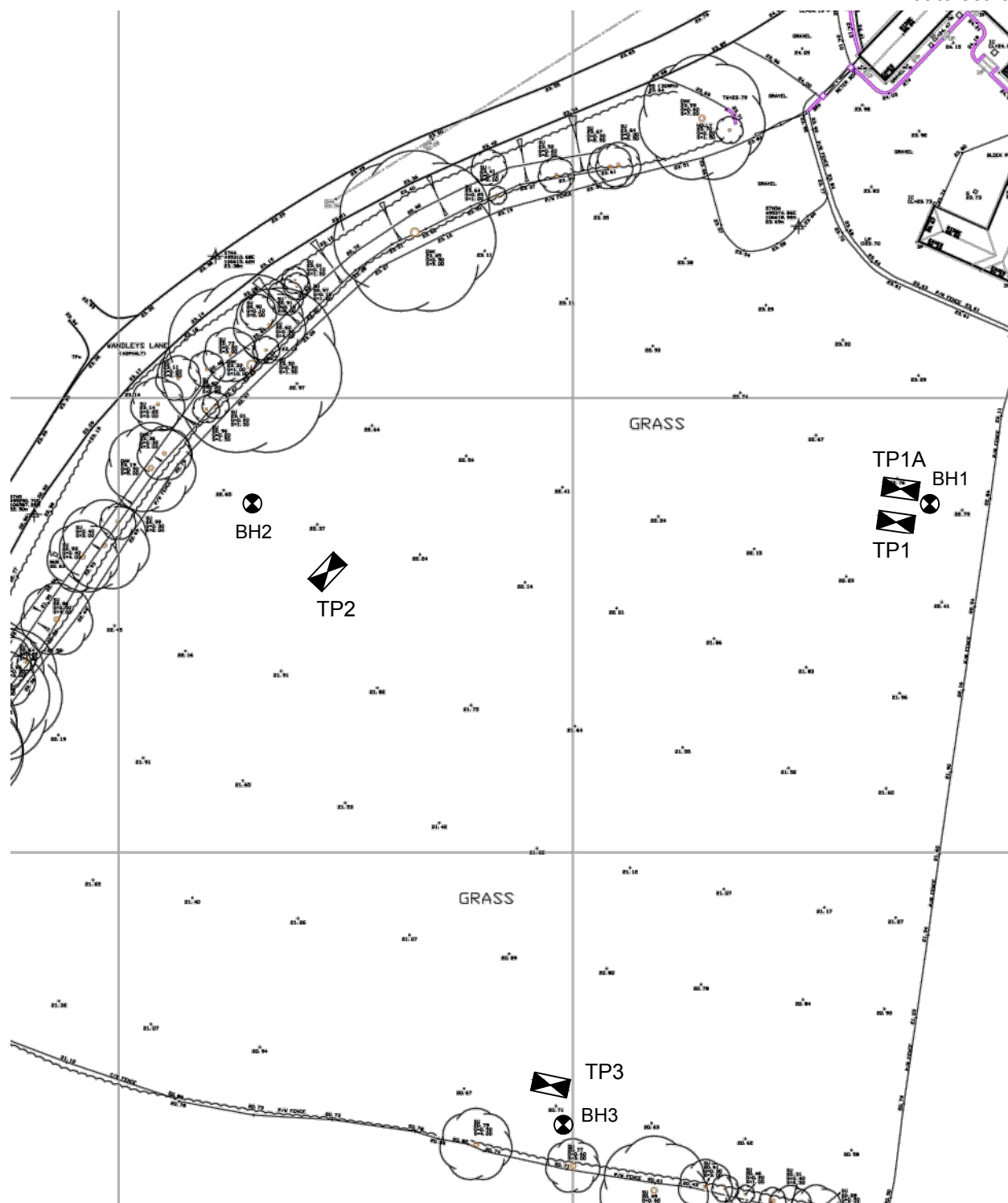
TITLE: Exploratory Hole Location Plan

DATE: Jul 2019

(HOLE LOCATIONS ARE INDICATIVE ONLY UNLESS DIMENSIONED)

North
(Approx)

Not to scale



Ground Management Ltd

Civil and Geotechnical Engineering Services

Robin Hill Farm Clay Lane Fishbourne
CHICHESTER West Sussex PO18 8AB
Phone/Fax: 01243 575073

PROJECT NO: G6386

FIGURE REF: Figure 5

PROJECT: Wandleys Farm, Wandleys Lane, Fontwell

PREPARED: AJHT

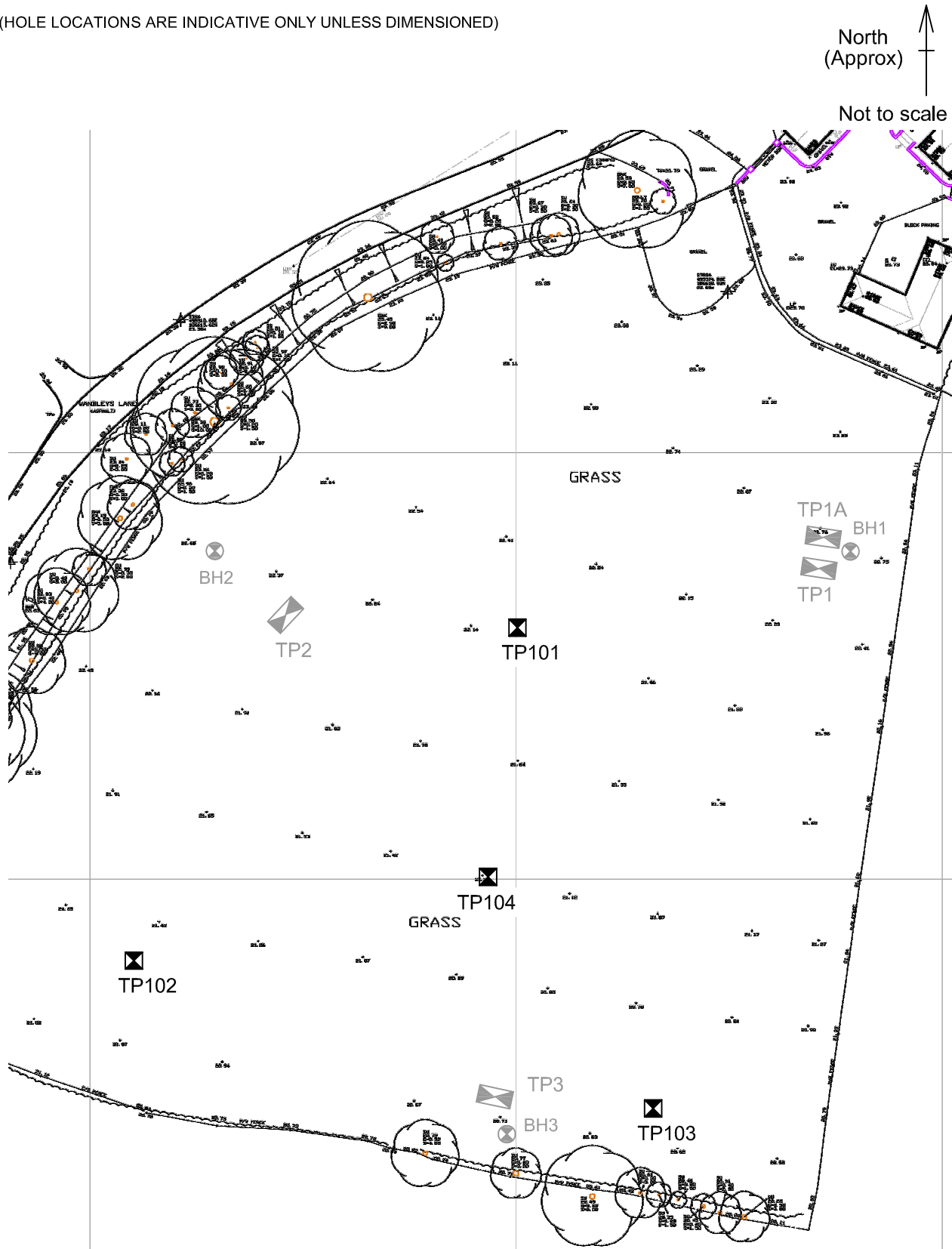
SECTION: Further Ground Investigation

CHECKED: AJHT

TITLE: Exploratory Hole Location Plan

DATE: March 2020

(HOLE LOCATIONS ARE INDICATIVE ONLY UNLESS DIMENSIONED)



Based on topographic survey by Shaw Colegate Oct 2016

G6386 Wandleys Farm, Fontwell
Soakage Testing (Second Round)

TP102 Test 1

Test Start Date: 03-Mar-20

Dimensions (m):

width = 0.30

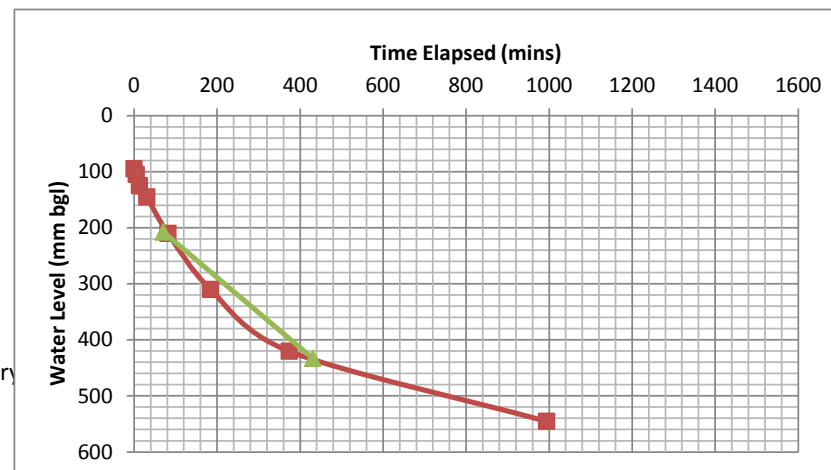
length = 0.30

depth = 0.50

Date	Time	Date and time	Elapsed	Dip
03/03/2020	14:50	03/03/2020 14:50	start	530
03/03/2020	14:56	03/03/2020 14:56	0	95
03/03/2020	15:01	03/03/2020 15:01	5	105
03/03/2020	15:09	03/03/2020 15:09	13	125
03/03/2020	15:27	03/03/2020 15:27	31	145
03/03/2020	16:18	03/03/2020 16:18	82	210
03/03/2020	18:00	03/03/2020 18:00	184	310
03/03/2020	21:10	03/03/2020 21:10	374	420
04/03/2020	07:30	04/03/2020 07:30	994	545
04/03/2020	15:00	04/03/2020 15:00	1444	545

End Fit

hole dry
rain, hole dry

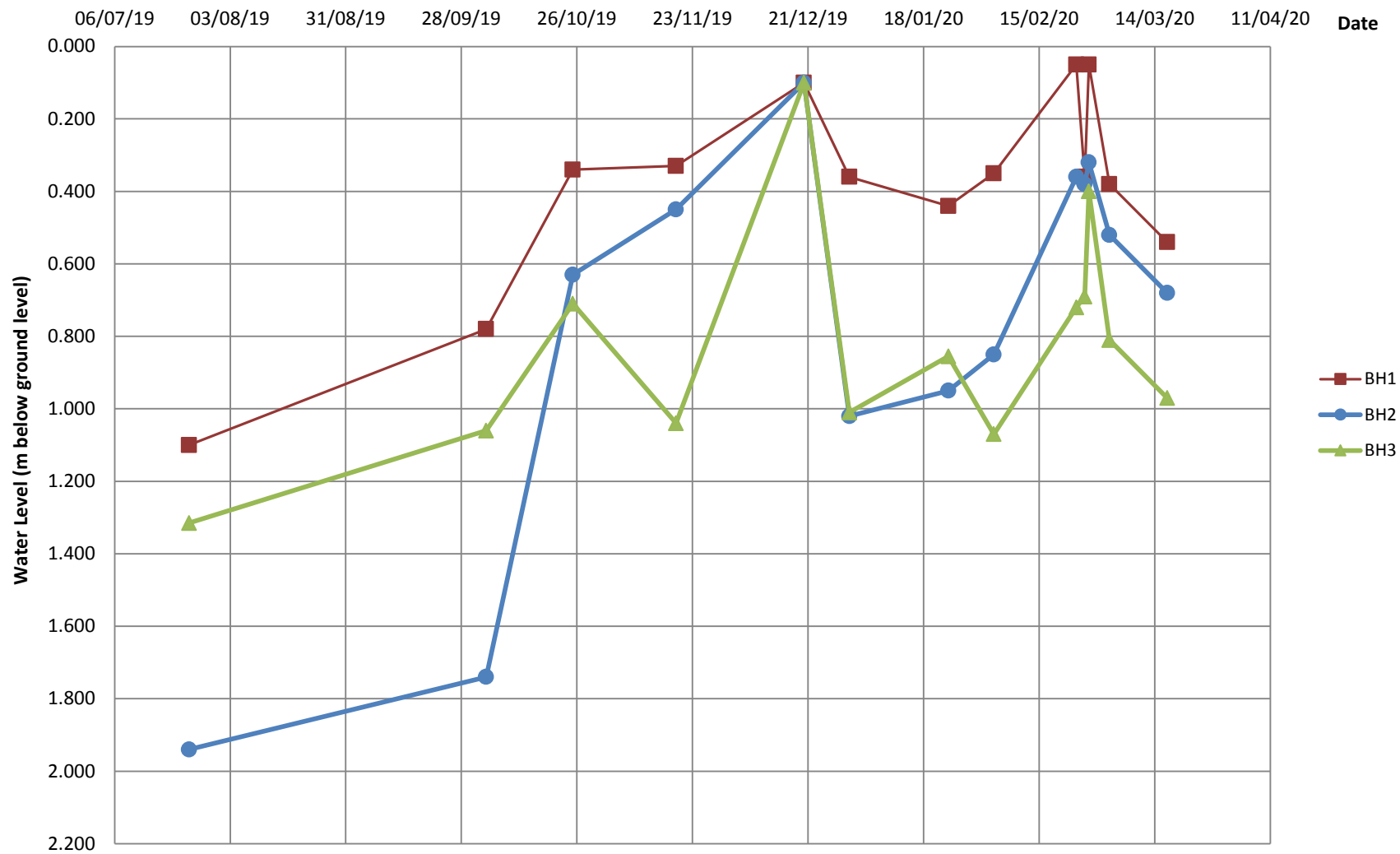


	Time (mins)	
t0	95	
t25	207.5	70
t50	320	
t75	432.5	430
t100	545	
fall		0.45
t25 - t75		0.225
Area t50		0.306

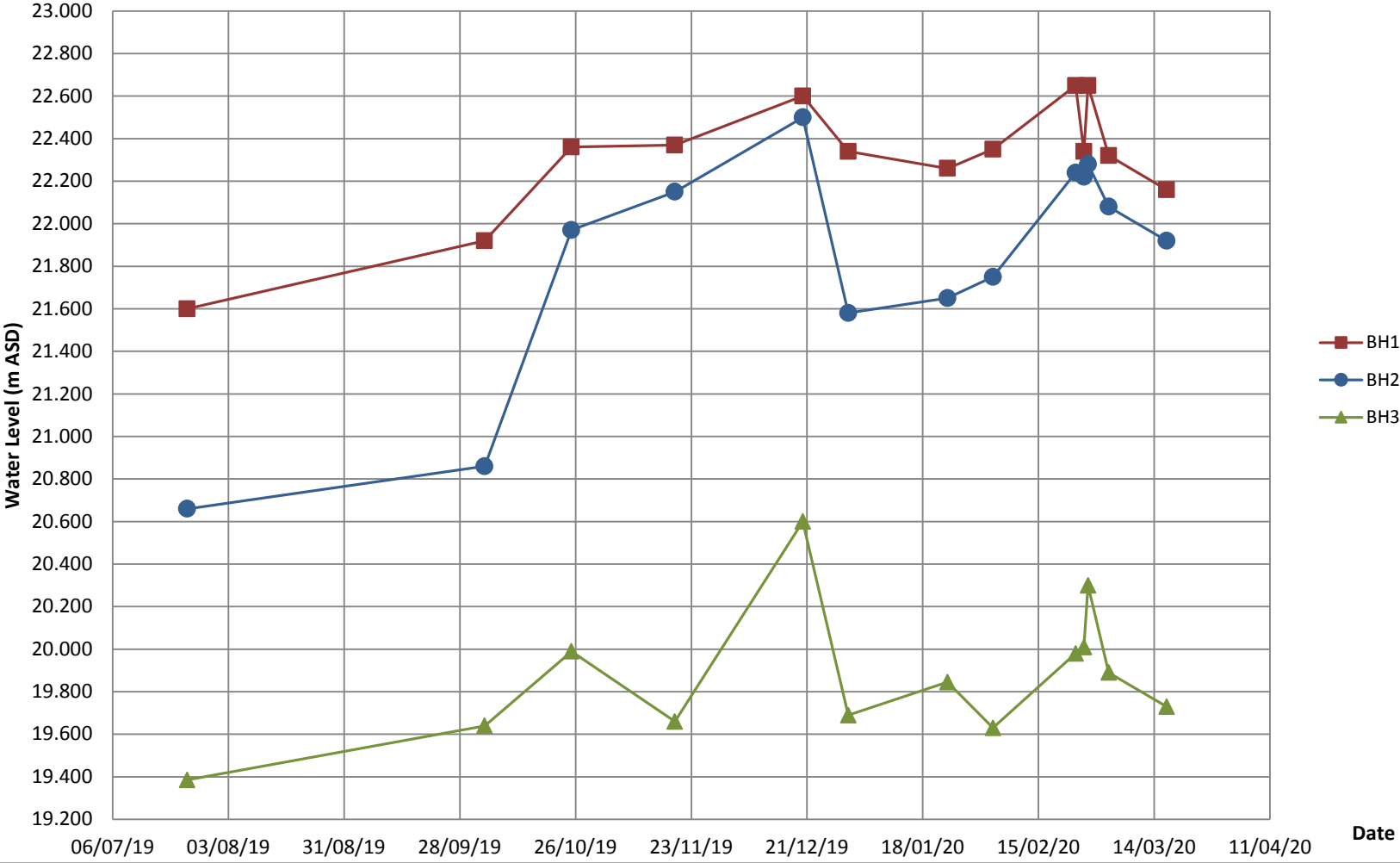
Infiltration Coefficient = 3.06E-06 m/s

Infiltration Coefficient = 3.13E-06 m/s

G6386 Wandleys Farm Fontwell Water Level Monitoring



G6386 Wandleys Farm Fontwell Water Level Monitoring





Civil Engineering - Transport Planning - Flood Risk

GTA Civils & Transport, Gloucester House, 66a Church Walk, Burgess Hill, West Sussex, RH15 9AS
T: 01444 871444 E: enquiries@gtacivils.co.uk www: gtacivils.co.uk

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