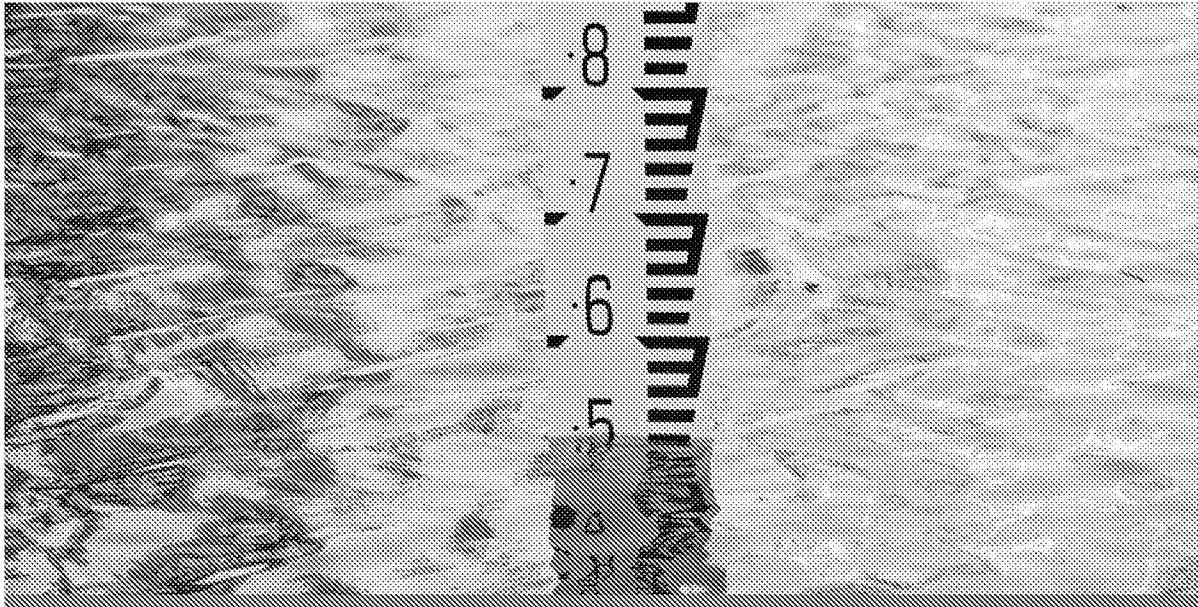




SuDS Drainage Statement

Comfort Inn, Lyminster Road, Littlehampton

Client

Mr Mousavizadeh

Comfort Inn

Arundel Hospitality Ltd

Lyminster Road, Littlehampton

Ref: 7321

Date: December 2018

Consulting Engineers

GTA Civils Ltd

Gloucester House

66a Church Walk

Burgess Hill

West Sussex RH15 9AS

Index

1	Introduction	2
2	Existing Site	3
3	Proposed Site & Drainage Strategy	4

Schedule of Appendices

A	Site Location and Aerial Photo
B	Topographic Survey & Sewer Records
C	Proposed Site Layout & Drainage Strategy/ Details
D	Soakage Test Results & Winter Groundwater Monitoring Charts
E	Drainage Calculation Sheets
F	LLFA Correspondence

Issue	Issue date	Compiled	Checked
Preliminary/First Issue	24 December 2018	JP	MR
Second Issue	12 August 2020	JP	MR
Third Issue	05 March 2021	JP	MR

1 Introduction

- 1.1 This Statement has been prepared for Comfort Inn, Crossbush Service Station, Lyminster. No responsibility is accepted to any third party for all or part of this study in connection with this or any other development.
- 1.2 GTA CIVILS Ltd. was appointed by the client to provide a SuDS Drainage Statement (SDS) and proposed strategy design in order to achieve Planning Approval at said property.
- 1.3 The second version of this statement has been prepared following a Winter Groundwater Monitoring Exercise. The drainage strategy has been amended to reflect this result. Drainage details have been added to Appendix C. Ordinary Watercourse Consent has been applied for – confirmed by Paul Cann, the LLFA engineer. Appendix F shows emails from Mr Cann confirming that this Application has been received and is being processed.
- 1.4 The third version of this statement has been prepared following the proposal being refused planning permission. The LLFA engineer stated the need for the point of (drainage) connection at the SW corner to be made 'fit for purpose'. The drainage strategy layout shows the additional detail. Various paragraphs in Sections 2 and 3 have been amended / updated accordingly.

2 Existing Site

- 2.1 The application site lies within the area administered by Arun District Council (ADC). A site location map and an aerial view are shown in Appendix A.
- 2.2 The developable site area is 4098m² comprising a parking area and made ground/spoil heaps.
- 2.3 The topographic survey in Appendix B shows the site to be relatively flat with localised variations in level at an average of 16.00m AOD.
- 2.4 Geology: the BGS records show this area to be underlain by superficial deposits of sand and gravel which are themselves underlain by London clay. This was borne out by the findings of intrusive investigations (refer to the Site Investigation extracts in Appendix D) which also confirmed the presence of varying depths of made ground.
- 2.5 A Winter Groundwater Monitoring Exercise was undertaken between 04/11/19 and 02/04/20 in 2 boreholes within the site. The resultant charts are shown in Appendix D. These show the water table level rising to 0.2m depth at BH01 and 0.4m below ground level at BH02. The layout showing these 2 borehole locations is shown in Appendix D, too.
- 2.6 Included within the site's extents - at the southern end - is a 150mm diameter SW drain that outfalls into the neighbouring farm's ditch (refer to the drainage strategy layout in Appendix C). This conveys water westwards where it eventually discharges into tributaries of the River Arun.
- 2.7 The local area sewer records (in Appendix B) show that there are existing public rising mains beyond the southern boundary and that the existing hotel has its own pumped rising main which discharges at a point to the east of the site.

3 Proposed Site & Drainage Strategy

- 3.1 The approved layout shows proposals for 3 new accommodation blocks along with an extension to the capacity of the existing building. The proposed layouts, including drainage strategy, are shown in Appendix C.
- 3.2 Proposed surface water drainage: SuDS (Sustainable Urban Drainage Systems) Policy states that surface water runoff for use must be discharged according to the following hierarchy:
- Infiltration to ground;
 - Discharge to a surface water body;
 - Discharge to a surface water sewer, highway drain, or another drainage system;
 - Discharge to a combined sewer where there are absolutely no other options, and only where agreed in advance with the relevant sewerage undertaker.
- 3.3 The SuDS Hierarchy (infiltration, watercourses, public sewers, private sewers) was considered. Given the high water table level (see the SI in Appendix D and section 2.5 above) infiltration features will not be viable here.
- 3.4 The development's surface water will be routed to the 150mm diameter pipe at the southern end of the site via a screened orifice-based control chamber, probably a vortex device such as a hydrobrake. This will restrict flows to a potential maximum of 0.8l/s which is the Qbar (greenfield) runoff rate of the contributing area into the drainage network.
- 3.5 The surface water drainage is to be connected to the existing 150mm Comfort Inn outfall sw drain; an existing rainwater pipe from the hotel shall be diverted into the new storage system. A roofed area of 87m² will be removed to provide capacity of 1.2l/s based on 50mm /hr rainfall intensity to enable the new development to discharge without a net increase in flow rate from both sites.
- 3.6 The backed up volume of water will be stored in a 1.2m diameter storage pipe at the low level - initially. The rainwater will be routed via porous pavings' sub-base in the whole car park area. The drainage strategy layout is shown in Appendix C. Calculation sheets in Appendix E show that the network will store all the water and not flood.
- 3.7 The proposed parking area will be of permeable paving with a porous sub-base of clean, coarse granular fill. This will have a 30% void ratio which will provide capacity for the storage of water while it is discharged to ground and to the water course.

- 3.8 The filtration characteristics of coarse granular fill are excellent. The SuDS Manual published by CIRIA demonstrates that this will provide sufficient treatment for the 3 main pollution parameters, namely total suspended solids, metals and hydrocarbons.
- 3.9 Maintenance of the SuDS system will be the overall responsibility of the Applicant. Regular inspections shall be made of the structure and manholes – in line with industry standards. A formal Maintenance Plan will be prepared during the next stage.
- 3.10 Exceedance flows: In the 1 in 1000 years event, initially the storage pipe will overtop, resulting in a shallow overland flow into the watercourse at the southern boundary. This will act as a drain for excess flows – in the event of the control manhole clogging up, thereby limiting the impact of any exceedance.

- End of Statement -

Appendix A

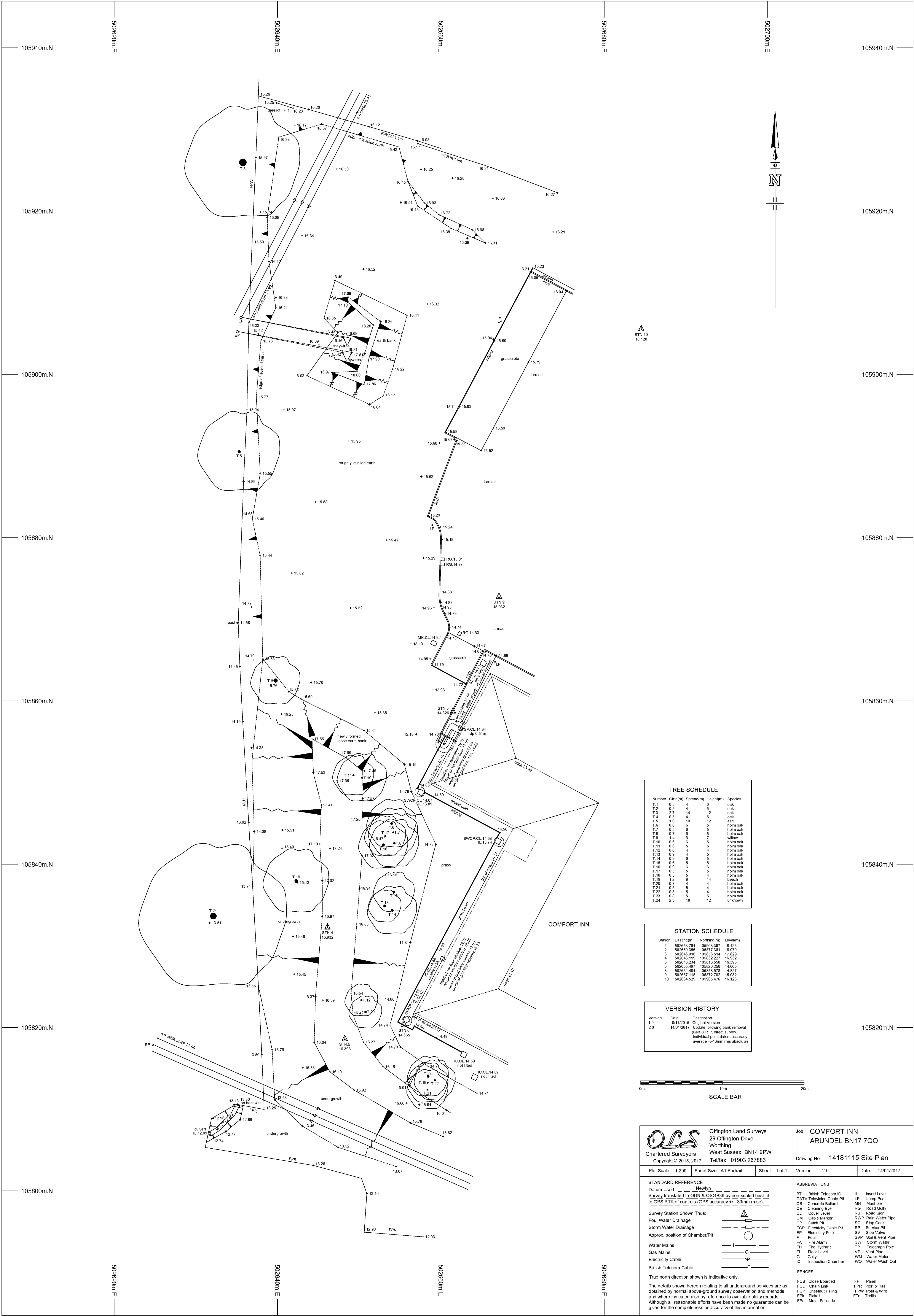
Site Location Map & Aerial Photo





Appendix B

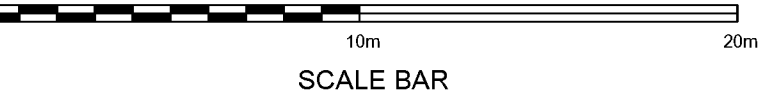
Topographic Survey Layout & Sewer Records



TREE SCHEDULE				
Number	Girth(m)	Spread(m)	Height(m)	Species
T.1	0.5	4	6	oak
T.2	0.5	4	6	oak
T.3	2.7	14	12	oak
T.4	0.5	4	5	oak
T.5	1.0	10	12	ash
T.6	0.8	6	5	holm oak
T.7	0.5	6	5	holm oak
T.8	0.7	6	5	holm oak
T.9	1.4	6	7	willow
T.10	0.6	6	5	holm oak
T.11	0.6	5	5	holm oak
T.12	0.6	4	4	holm oak
T.13	0.9	4	5	holm oak
T.14	0.8	6	5	holm oak
T.15	0.6	5	5	holm oak
T.16	0.9	6	6	holm oak
T.17	0.5	5	5	holm oak
T.18	0.5	5	4	holm oak
T.19	1.2	8	14	beech
T.20	0.7	4	4	holm oak
T.21	0.5	5	4	holm oak
T.22	0.5	5	4	holm oak
T.23	0.8	5	5	holm oak
T.24	2.3	18	12	unknown

STATION SCHEDULE			
Station	Easting(m)	Northing(m)	Level(m)
1	502653.754	105908.397	18.425
2	502650.356	105877.361	18.070
3	502646.896	105865.514	17.829
4	502646.119	105832.227	16.932
5	502648.234	105818.558	16.395
6	502655.487	105820.256	14.653
8	502651.484	105858.678	14.827
9	502657.118	105872.702	15.032
10	502684.529	105905.476	16.128

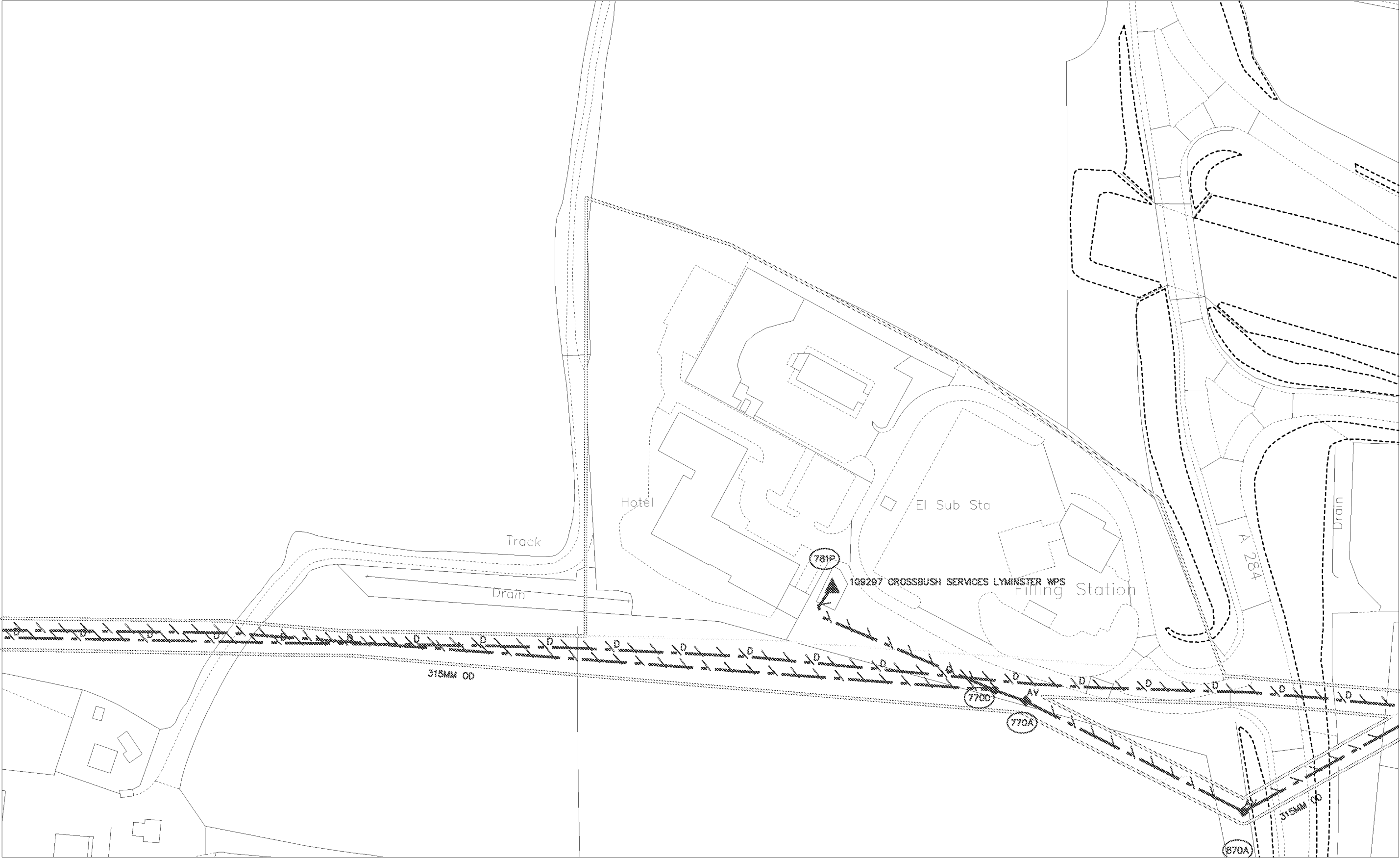
VERSION HISTORY		
Version	Date	Description
1.0	10/11/2015	Original Version
2.0	14/01/2017	Update following bank removal (GNSS RTK direct survey, individual point datum accuracy average ~13mm rms absolute)



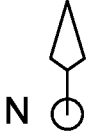
 Offington Land Surveys 29 Offington Drive Worthing West Sussex BN14 9PW Copyright © 2015, 2017 Tel/fax 01903 267883		Job COMFORT INN ARUNDEL BN17 7QQ	
Plot Scale: 1:200 Sheet Size: A1 Portrait Sheet: 1 of 1		Drawing No. 14181115 Site Plan	
Version: 2.0 Date: 14/01/2017			
STANDARD REFERENCE Datum Used Newlyn Survey translated to ODN & OSGB36 by non-scaled best-fit to GPS RTK of controls (GPS accuracy +/- 30mm rms). Survey Station Shown Thus:  Foul Water Drainage  Storm Water Drainage  Approx. position of Chamber/Pit  Water Mains  Gas Mains  Electricity Cable  British Telecom Cable  True north direction shown is indicative only. The details shown hereon relating to all underground services are as obtained by normal above-ground survey observation and methods and where indicated also by reference to available utility records. Although all reasonable efforts have been made no guarantee can be given for the completeness or accuracy of this information.		ABBREVIATIONS BT British Telecom IC Invert Level CATV Television Cable Pit LP Lamp Post CB Concrete Bollard MH Manhole CE Cleaning Eye RG Road Gully CL Cover Level RS Road Sign CM Cable Marker RWP Rain Water Pipe CP Catch Pit SV Stop Valve ECP Electricity Cable Pit SP Service Pit EP Electricity Pole SV Stop Valve F Foul SVP Soil & Vent Pipe FA Fire Alarm SW Storm Water FH Fire Hydrant TP Telegraph Pole FL Floor Level VP Vent Pipe G Gully WM Water Meter IC Inspection Chamber WO Water Wash Out FENCES FCB Close Boarded FP Panel FCL Chain Link FPR Post & Rail FCP Chestnut Paling FFW Post & Wire FPK Picket FTR Trellis FPal Metal Palisade	

SEWER RECORDS PAGE 1 OF 2

106001



105713

502437	O.S. REF. TQ0205NE	Drawn by: rohandas	The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site. WARNING: BAC pipes are constructed of Bonded Asbestos Cement WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement Based upon Ordnance Survey Digital Data with the permission of the controller of H.M.S.O. Crown Copyright Reserved Licence No. WU 298530.	 N 
	Title: 302616_Comfort Inn, Lyminster	Scale: 1:1250		
		Date: 26/07/2018		

502910

SEWER RECORDS PAGE 2 OF 2

Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape
770AX	14.453	12.993	UNK	PE	CIRC																		
781PX			100	PVC	CIRC																		
870AX	13.973	12.517	UNK	PE	CIRC																		

LINE STYLES / COLOURS

Brown	-----	Foul
	-----	Foul Syphon Sewer
	-----	Foul Vacuum Main
	-----	Foul Rising Main
Red	-----	Combined
	-----	Combined Syphon Sewer
	-----	Combined Rising Main
	-----	Lateral Drain
Orange	-----	Building Over Agreement Area
Dark Blue	-----	Treated Effluent
Purple	-----	Sludge
	-----	Sewer Catchment
	-----	Section 104 Area
Light Blue	-----	Surface Water
	-----	Surface Water Rising Main
Yellow	-----	Private
Green	-----	Access Shaft
	-----	Decommissioned

MATERIALS

AK	Alkaline
BAC	Bonded Asbestos Cement
BRD	Brick (Common)
BRE	Brick (Engineering)
CC	Concrete Box Culvert
CI	Cast Iron
CO	Concrete (In-Situ)
CP	Concrete (Pre-Cast)
CSB	Concrete Segments (bolted)
CSU	Concrete Segments (unbolted)
DI	Ductile Iron
GRD	Glass Reinforced Concrete
GRP	Glass Reinforced Plastic
MAC	Masonry in regular Courses
MAR	Masonry in random Courses
PE	Polyethylene
PF	Pitch Fibre
PP	Polypropylene
PVC	Polyvinyl Chloride
RPM	Reinforced Plastic Matrix
SI	Spun Iron
ST	Steel
VC	Vertified Clay
XXX	Other
ZZZ	Unknown

Manhole (SW)
Manhole (F&C)
Lamp hole (SW)
Lamp hole (F&C)
Pumping Station (SW)
Pumping Station (F&C)
Side entry manhole (SW)
Side entry manhole (F&C)
Blind shaft (SW)
Blind shaft (F&C)
Ejector station (SW)
Ejector station (F&C)
Watertight door (SW)
Watertight door (F&C)
Flushing ch. Min-e (SW)
Flushing ch. Min-e (F&C)
Flushing ch. No-e (SW)
Flushing ch. No-e (F&C)
Damencation Chamber

LEGEND - SEWERS

Washout (SW)
Washout (F&C)
Rodding Eye (SW)
Rodding Eye (F&C)
Gauging point (SW)
Gauging point (F&C)
Intercept chamber (SW)
Intercept chamber (F&C)
Storm Tank (SW)
Storm Tank (F&C)
Vortex chamber (SW)
Vortex chamber (F&C)
Label ellipse
Dummy/S24 manhole
Outfall
Penstock chamber
Demiboards
Storm Overflow
Backdrop manhole
Other (s)
Other
Change In sewer (s)
Change In sewer
Rafflux valve
Flap valve
Cascade
Anode
Valve
Closed Valve
Air Valve
Hatch box (SW)
Hatch box (F&C)
Direction arrow
Emptying valve
Catchpit
Soakaway
Inlet
Balancing Pond

Wastewater treatment works
Marine treatment works
Outfall headworks
Vent
Vent column
Tidal storage tank
Blank end
Head of Public Sewer
Micro Pumping Station
SHAPES (S)
A Arched
B Barrel
C Circular
E Egg
H Horseshoe
R Rectangular
S Square
T Trapezoidal
U U Shape
X Other
NODE REFERENCING SYSTEM
1st digit: hundred metre easting identifier
2nd digit: hundred metre northing identifier
3rd digit: sewer type identifier
4th digit: next sequential node
0-4 = Foul/Combined
5-9 = Surface Water

Drawn by:	rohandas	
Title:	302616_Comfort Inn, Lyminster	
Date:	26/07/2018	

Appendix C

Proposed Site Layout & Drainage Strategy/ Details

BLOCK C

BLOCK B

BLOCK A

43 PARKING SPACES

SECTION A - A

SECTION B - B

REV.A AUG. 2017 LANDSCAPING AND BOUNDARY DEFINITION

ATELIER CONSULTANTS

OLD RECTORY COTTAGE, 55C KINGSTON LANE BN42 4SP

phone 07977 070 031

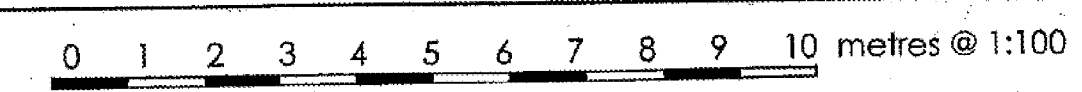
e.mail peter@atelierconsultants.co.uk

PROJECT: ARUNDEL RESIDENCE INN, CROSSBUSH, ARUNDEL

CLIENT:

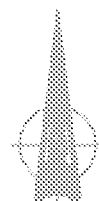
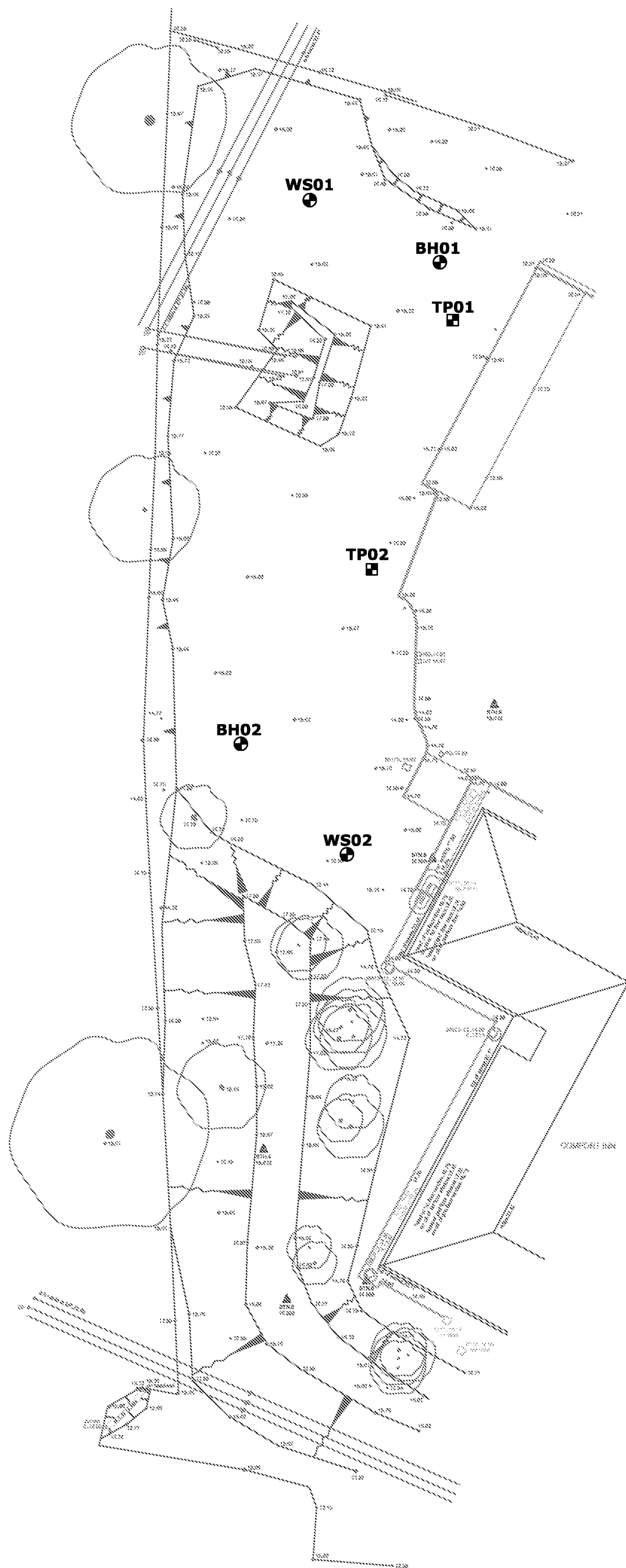
Drawing Title: PROPOSED SITE PLAN

Drawing Number: 095 / P / 10 Rev. **A**



Appendix D

Soakage Test Results & Winter Groundwater Monitoring Charts



ASHDOWN SITE INVESTIGATION

L · I · M · I · T · E · D

Unit 3,
The Old Grain Store,
Ditchling Common Business Park,
Ditchling,
West Sussex
BN6 8SG
Tel: 01273 483119
email: contact@ashdownsi.co.uk

DRAWN BY:	DATE:	SCALE (at A3):
TSH	April 2018	1:400

SITE:
Site Adjacent to Comfort Inn,
Arundel,
West Sussex

REPORT REF.:	FIGURE NO.:
R18-12799	1

DRAWING TITLE:
Site Plan

monitoring period may have been influenced by percolation of surface water into the standpipe installation.

4. STORMWATER INFILTRATION SYSTEMS

In situ infiltration testing¹ was carried out in both trial pits. During each test performed, the water level within the test pit did not fall below 75% to 25% of the initial test depth and calculation of the soil infiltration rate in accordance with the BRE digest was not possible. For each test, the soil infiltration rate has therefore been calculated by dividing the volume of water lost during the test by the product of the average surface area of the trial pit in contact with water during the test period and the test duration in seconds.

In situ infiltration testing² was also undertaken within boreholes WS01 and WS02.

The infiltration rates derived from the tests are summarised in the following table.

Table 1. Calculated Infiltration Rates

Exploratory Hole	Test Response Zone Depth (m)		Stratum	Infiltration Rate (f) (m/sec)
	Top	Bottom		
WS01 Borehole	2.00	3.00	London Clay Formation	Negligible – the water level fell only 10mm during the test period of 185 minutes
WS02 Borehole	1.00	2.60	Raised Beach Deposits	Negligible – the water level fell only 20mm during the test period of 190 minutes
TP01 Trial pit	0.50	0.80	London Clay Formation	1.9×10^{-6}
TP02 Trial pit	0.35	0.65	Raised Beach Deposits	1.0×10^{-6}

The results from the infiltration tests indicate that the underlying natural soils possess poor to negligible infiltration characteristics. The results should be provided to engineers responsible for the design of the drainage system.

Ashdown Site Investigation Ltd.
April 2018

¹ Conducted in general accordance with the requirements of BRE 365, Soakaway Design.

² Conducted in accordance with The Soakaway Design Guide, published by Kent County Council, July 2000.

Site Name: Site Adjacent to Comfort Inn, Arundel, West Sussex

Job Number: R18-12799

Start Date: 06/03/2018

End Date: 06/03/2018

Trial Pit Number: TP01

Sheet 1 of 1

Samples and In-situ Testing					
Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result	Legend	Stratum Description
					0.00 Topsoil.
D	0.20				0.10 MADE GROUND/ Reworked: Light brown mottled light grey and orange brown gravelly silty clay. Gravel is angular to subrounded fine to coarse flint with occasional cobbles.
D	0.40				0.30 Relict topsoil: Dark brown gravelly slightly sandy silty clay.
					0.50 Light brown CLAY with occasional subrounded to rounded fine to coarse gravel of flint. (London Clay Formation)
D	0.80				0.80 End of trial pit at 0.80m

Remarks	
---------	--

Groundwater: Trial pit dry on completion.

Stability: Trial pit stable on completion.

Notes: n/a

Excavation Method: HDP

Pit Length: 0.30m

Pit Width: 0.28m

Made By: RJ



Site Name: Site Adjacent to Comfort Inn, Arundel, West Sussex

Job Number: R18-12799

Start Date: 06/03/2018

End Date: 06/03/2018

Borehole Number: WS01

Sheet 1 of 1

Samples and In Situ Testing					Legend	Depth	Stratum Description
Standpipe	Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result			
	D	0.30	0.50			0.00	Topsoil.
						0.10	MADE GROUND/ Reworked: Brown very gravelly slightly sandy silty clay. Gravel is angular to subangular fine to coarse flint.
						0.20	
						0.35	
							Relict topsoil.
	D	0.60				0.50	Grey mottled orange brown CLAY with occasional angular to subangular fine to coarse gravel of flint. (London Clay Formation)
	D	1.20					with rare gravel of flint below 1.30m depth.
	D	1.80					with no flint gravel and becoming light grey below 2.00m depth.
	D	2.20					
	D	2.80					
						3.00	End of borehole at 3.00m

Remarks

Groundwater: Borehole dry on completion.

Stability: Borehole stable on completion.

Notes: n/a

Excavation Method: WLS

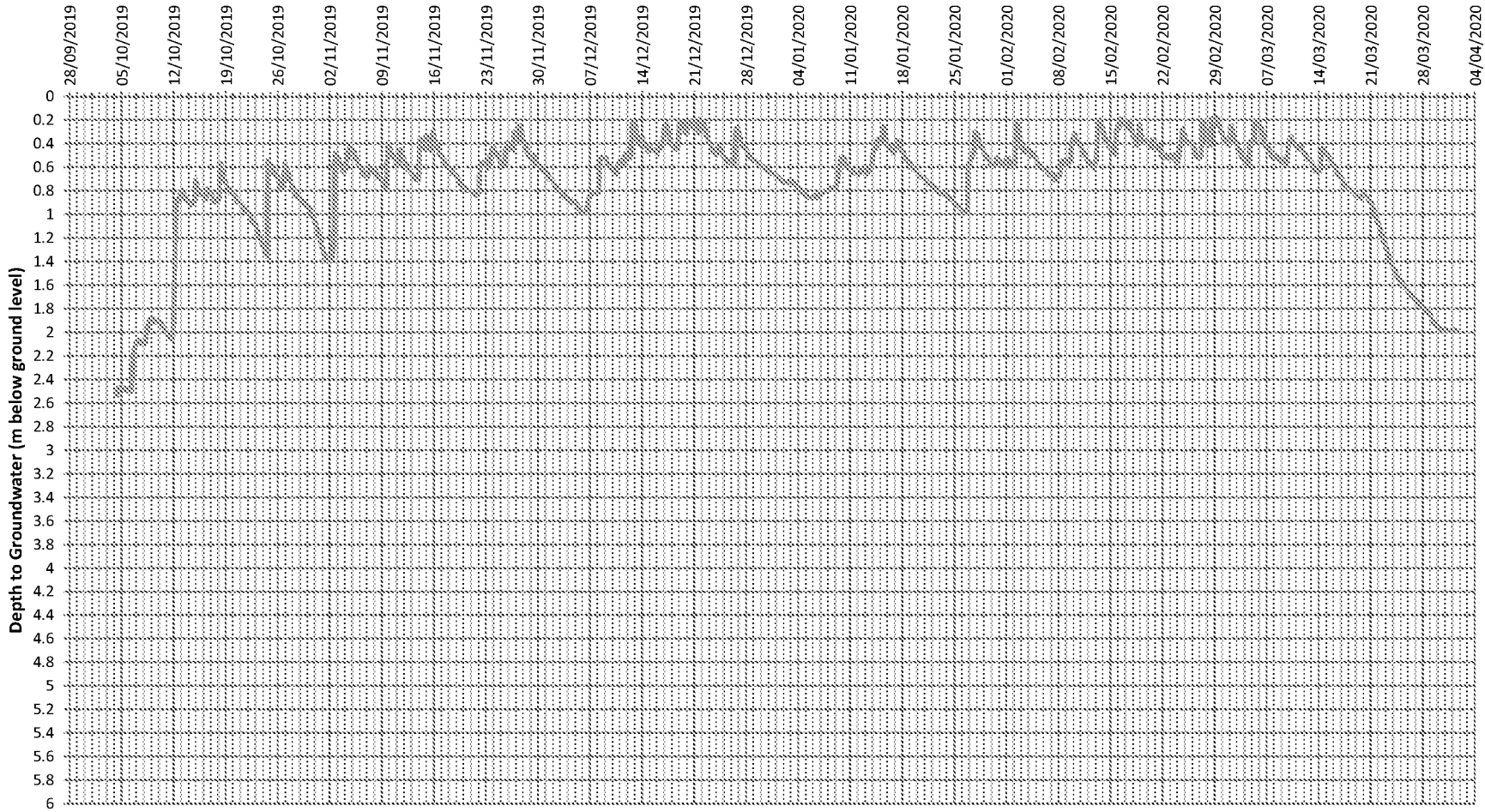
Borehole Diameter: Various

Made By: RJ

Ashdown Site Investigation Limited

Site: Site Adjacent to Comfort Inn, Arundel, West Sussex	Project No. P14169
--	--------------------

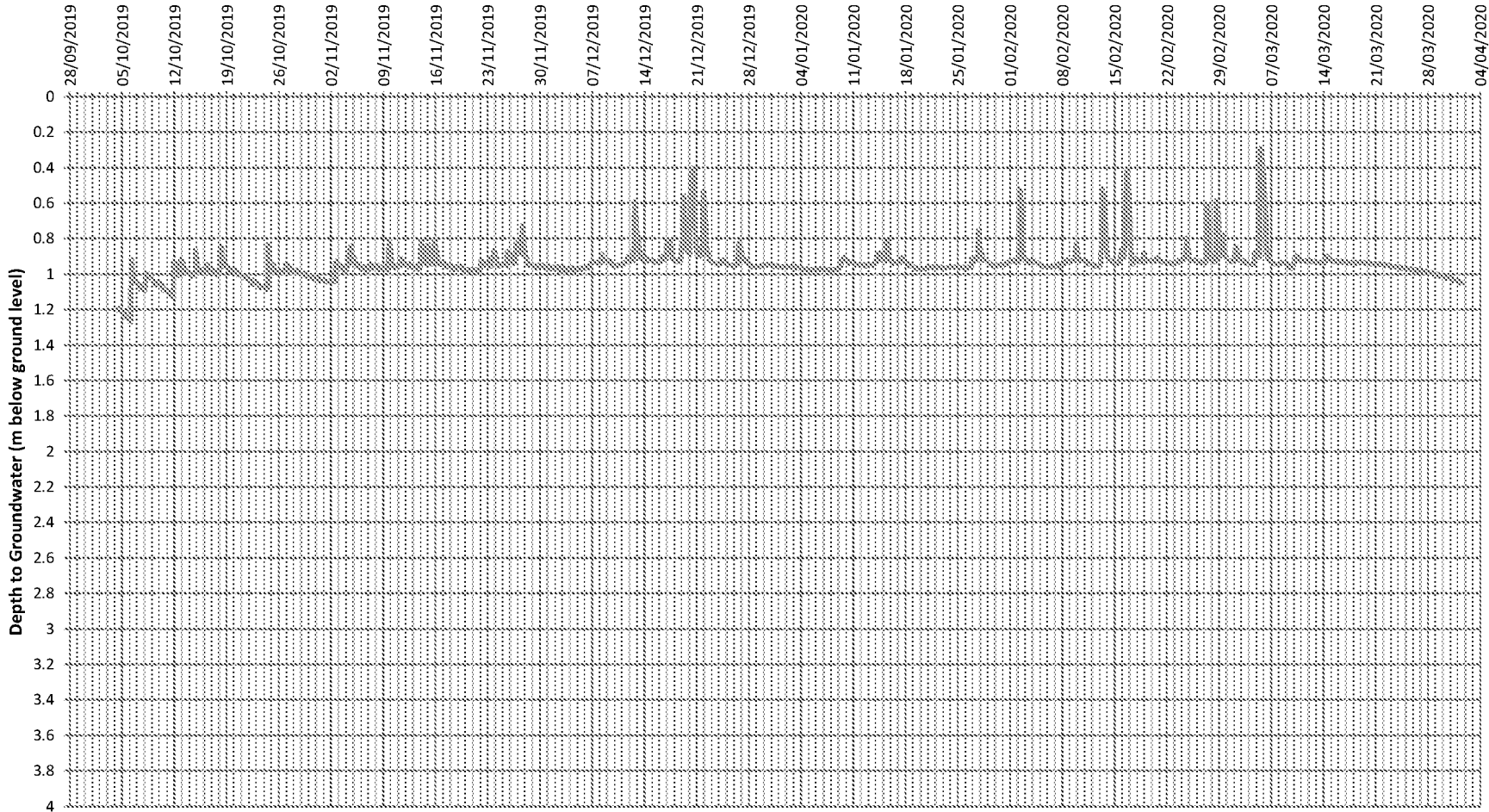
Groundwater Monitoring Results - BH01



Ashdown Site Investigation Limited

Site: Site Adjacent to Comfort Inn, Arundel, West Sussex	Project No. P14169
--	--------------------

Groundwater Monitoring Results - BH02



Appendix E

Drainage Calculation Sheets

GTA Civils Ltd		Page 1
66a Church Walk Burgess Hill West Sussex RH15 9AS	COMFORT INN LYMINSTER ROAD LITTLEHAMPTON	
Date 05/11/2018	Designed by DMS	
File	Checked by	
Micro Drainage		Source Control 2018.1
<u>ICP SUDS Mean Annual Flood</u> Input Return Period (years) 1 Soil 0.300 Area (ha) 0.410 Urban 0.000 SAAR (mm) 775 Region Number Region 7 Results 1/s QBAR Rural 0.8 QBAR Urban 0.8 Q1 year 0.7 Q1 year 0.7 Q30 years 1.9 Q100 years 2.7		
©1982-2018 Innovyze		

GTA Civils Ltd		Page 1
Gloucester House 66a Church Walk Burgess Hill, BN43 6LB	COMFORT INN LYMINSTER ROAD LITTLEHAMPTON	
Date 04/03/2021	Designed by DMS	
File 7321 NETWORK.MDX	Checked by MR	
XP Solutions		Network 2020.1

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales			
Return Period (years)	1	Foul Sewage (l/s/ha)	0.000
M5-60 (mm)	19.500	Volumetric Runoff Coeff.	0.750
Ratio R	0.350	PIMP (%)	100
Maximum Rainfall (mm/hr)	0	Add Flow / Climate Change (%)	0
Maximum Time of Concentration (mins)	30	Minimum Backdrop Height (m)	0.200
		Maximum Backdrop Height (m)	1.500
		Min Design Depth for Optimisation (m)	1.200
		Min Vel for Auto Design only (m/s)	1.00
		Min Slope for Optimisation (1:X)	500

Designed with Level Inverts

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.125	4-8	0.055

Total Area Contributing (ha) = 0.180

Total Pipe Volume (m³) = 56.757

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	20.510	0.257	79.8	0.149	5.00	0.0	0.600	o	100	Pipe/Conduit	
S1.001	32.000	0.080	400.0	0.031	0.00	0.0	0.600	o	1500	Pipe/Conduit	
S1.002	6.040	0.076	79.5	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	0.00	5.40	14.160	0.149	0.0	0.0	0.0	0.86	6.8	0.0
S1.001	0.00	5.65	13.500	0.180	0.0	0.0	0.0	2.14	3779.1	0.0
S1.002	0.00	5.76	13.420	0.180	0.0	0.0	0.0	0.86	6.8	0.0

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
S1	14.980	0.820	Open Manhole	1200	S1.000	14.160	100				
S2	17.300	3.800	Open Manhole	2400	S1.001	13.500	1500	S1.000	13.903	100	
S3	16.100	2.680	Open Manhole	2400	S1.002	13.420	100	S1.001	13.420	1500	
S	13.250	1.906	Open Manhole	500		OUTFALL		S1.002	13.344	100	

No coordinates have been specified, layout information cannot be produced.

GTA Civils Ltd		Page 3
Gloucester House 66a Church Walk Burgess Hill, BN43 6LB	COMFORT INN LYMINSTER ROAD LITTLEHAMPTON	
Date 04/03/2021	Designed by DMS	
File 7321 NETWORK.MDX	Checked by MR	
XP Solutions		Network 2020.1

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.149	0.149	0.149
1.001	-	-	100	0.031	0.031	0.031
1.002	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.180	0.180	0.180

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D, L (mm)	W (mm)
S1.002	S	15.250	13.344	0.000	500	0

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Gloucester House 66a Church Walk Burgess Hill, BN43 6LB	COMFORT INN LYMINSTER ROAD LITTLEHAMPTON	
Date 04/03/2021	Designed by DMS	
File 7321 NETWORK.MDX	Checked by MR	
XP Solutions		Network 2020.1

Online Controls for Storm

Hydro-Brake® Optimum Manhole: S3, DS/PN: S1.002, Volume (m³): 64.4

Unit Reference	MD-SHE-0037-8000-1600-8000	Sump Available	Yes
Design Head (m)	1.600	Diameter (mm)	37
Design Flow (l/s)	0.8	Invert Level (m)	13.420
Flush-Flo™	Calculated	Minimum Outlet Pipe Diameter (mm)	75
Objective	Minimise upstream storage	Suggested Manhole Diameter (mm)	1200
Application	Surface		

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.600	0.8	Kick-Flo®	0.333	0.4
Flush-Flo™	0.164	0.5	Mean Flow over Head Range	-	0.6

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)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.5	0.600	0.5	1.600	0.8	2.600	1.0	5.000	1.3	7.500	1.6
0.200	0.5	0.800	0.6	1.800	0.8	3.000	1.1	5.500	1.4	8.000	1.7
0.300	0.4	1.000	0.6	2.000	0.9	3.500	1.1	6.000	1.5	8.500	1.7
0.400	0.4	1.200	0.7	2.200	0.9	4.000	1.2	6.500	1.5	9.000	1.8
0.500	0.5	1.400	0.8	2.400	1.0	4.500	1.3	7.000	1.6	9.500	1.8

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Gloucester House 66a Church Walk Burgess Hill, BN43 6LB	COMFORT INN LYMINSTER ROAD LITTLEHAMPTON																									
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XP Solutions Network 2020.1																										
<u>Storage Structures for Storm</u> <u>Porous Car Park Manhole: S1, DS/PN: S1.000</u> <table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.00000</td><td>Porosity</td><td>0.30</td><td>Slope (1:X)</td><td>40.0</td></tr><tr><td>Membrane Percolation (mm/hr)</td><td>1000</td><td>Invert Level (m)</td><td>14.180</td><td>Depression Storage (mm)</td><td>0</td></tr><tr><td>Max Percolation (l/s)</td><td>246.9</td><td>Width (m)</td><td>18.1</td><td>Evaporation (mm/day)</td><td>0</td></tr><tr><td>Safety Factor</td><td>2.0</td><td>Length (m)</td><td>49.1</td><td>Membrane Depth (mm)</td><td>0</td></tr></table>			Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.30	Slope (1:X)	40.0	Membrane Percolation (mm/hr)	1000	Invert Level (m)	14.180	Depression Storage (mm)	0	Max Percolation (l/s)	246.9	Width (m)	18.1	Evaporation (mm/day)	0	Safety Factor	2.0	Length (m)	49.1	Membrane Depth (mm)	0
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.30	Slope (1:X)	40.0																					
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Max Percolation (l/s)	246.9	Width (m)	18.1	Evaporation (mm/day)	0																					
Safety Factor	2.0	Length (m)	49.1	Membrane Depth (mm)	0																					
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Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 19.500 Cv (Summer) 0.750
Region England and Wales Ratio R 0.350 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

									Water	Surcharged	Flooded				Half Drain	Pipe
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	
S1.000	S1 960 Winter		100	+40%	1/15 Summer				14.969	0.709	0.000	0.47		1008	3.1	
S1.001	S2 960 Winter		100	+40%					14.961	-0.039	0.000	0.00			3.4	
S1.002	S3 960 Winter		100	+40%	1/15 Summer				14.961	1.441	0.000	0.13			0.8	

US/MH		Level	
PN	Name	Status	Exceeded
S1.000	S1	FLOOD RISK	
S1.001	S2	OK	
S1.002	S3	SURCHARGED	

Appendix F

LLFA Correspondence

From: Paul Cann <Paul.Cann@arun.gov.uk>
Sent: Friday, August 7, 2020 10:12
To: John Pakenham <j[REDACTED]>
Cc: Peter Southgate <p[REDACTED]>
Subject: RE: Comfort Inn, Lyminster Road, Littlehampton BN17 7QQ

Payment confirmed as received

Paul Cann

Principal Drainage Engineer
Engineering Services

T: 01903 737819

E: paul.cann@arun.gov.uk



Arun District Council, Civic Centre, Maltravers Rd, Littlehampton, West Sussex, BN17 5LF
www.arun.gov.uk

From: Paul Cann <Paul.Cann@arun.gov.uk>
Sent: Thursday, August 6, 2020 12:32
To: John Pakenham <j[REDACTED]>
Cc: Peter Southgate <p[REDACTED]>
Subject: OWC Application: Comfort Inn, Lyminster Road, Littlehampton BN17 7QQ

Hi John

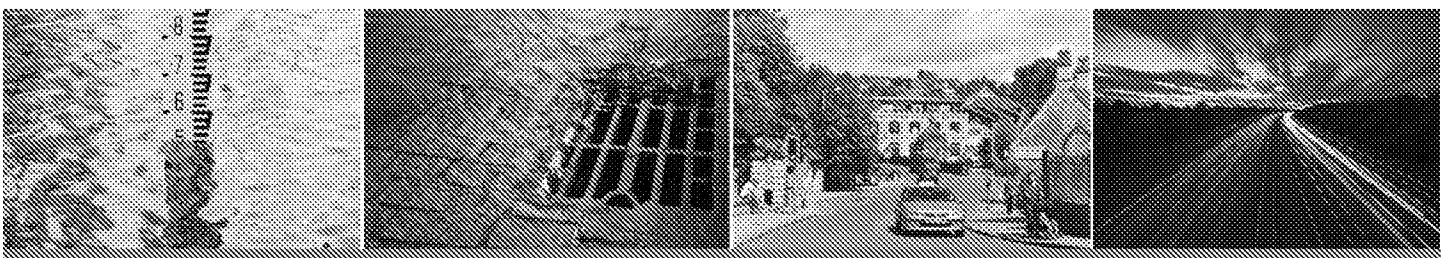
Comments;

1. Provide site location plan (scale 1/2500)
2. The fee (£150) can be paid by BACS or online – see attached text file.
3. The remainder of my comments will be encompassed within my response to planning in respect to the DOC application. I will send you a copy soon.

Regards

Paul Cann

Principal Drainage Engineer
Engineering Services



Civil Engineering - Transport Planning - Flood Risk

GT4 Civils & Transport, Clarendon House, 66a Church Walk, Broom's Barn, West Sussex, BN15 9AF

